Sun Secure Global Desktop 4.41 Administration Guide

Sun Microsystems, Inc.
www.sun.com

Part No. 820-4907-10
July 2008, Revision 01

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Contents

Preface

The *Sun Secure Global Desktop 4.41 Administration Guide* is a comprehensive guide to how to configure, administer, and troubleshoot problems with Sun Secure Global Desktop Software (SGD). This document is written for SGD Administrators.

How This Book Is Organized

Chapter 1 describes how to integrate SGD into your network infrastructure and secure the network connections used by SGD.

Chapter 2 describes how users authenticate to an SGD server to log in to SGD. This chapter also covers how users authenticate to an application server to run an application.

Chapter 3 describes how you use organizational hierarchies to manage SGD users and give them access to applications.

Chapter 4 contains advice on configuring applications that users can run through SGD, and how to diagnose and fix problems with applications.

Chapter 5 describes how to enable support for peripherals and other client device features from applications displayed in SGD.

Chapter 6 describes how to install, configure, and run the SGD Client. Webtop configuration is also covered.

Chapter 7 describes how to configure, license, and monitor SGD servers and arrays. Some system administration features of SGD, such as the Administration Console, log filters, and installation backups are also covered.

Appendix A describes global settings which apply to all SGD servers in the array, including the password cache and token cache.

Appendix B describes server settings which apply to the specified SGD server in the array.

Appendix C describes the supported object types in SGD and their attributes. Usage details for setting attributes using the Administration Console are included, along with the equivalent SGD command line.

Appendix D describes the available SGD commands. Examples are included for each command.

Appendix E contains reference information about the SGD login scripts. You can use this information to customize the standard SGD login scripts, or to develop your own login scripts.

Using UNIX Commands

This document might not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to your system documentation for this information. This document does, however, contain information about specific SGD commands.

Shell Prompts

Shell	Prompt
C shell	*machine-name*%
C shell superuser	*machine-name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Typographic Conventions

Typeface	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your .login file. Use ls -a to list all files. % You have mail.
AaBbCc123	What you type, when contrasted with on-screen computer output	% **su** Password:
AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. To delete a file, type **rm** *filename*.

Note – Characters display differently depending on browser settings. If characters do not display correctly, change the character encoding in your browser to Unicode UTF-8.

Related Documentation

The following table lists the documentation for this product. The online documentation is available at:

`http://docs.sun.com/app/docs/coll/1706.3`

Application	Title	Part Number	Format	Location
Release Notes	*Sun Secure Global Desktop 4.41 Release Notes*	820-4905-10	HTML PDF	Online Software CD and online
Installation	*Sun Secure Global Desktop 4.41 Installation Guide*	820-4906-10	HTML PDF	Online Software CD and online
Administration	*Sun Secure Global Desktop 4.41 Administration Guide*	820-4907-10	HTML PDF	Online
User	*Sun Secure Global Desktop 4.41 User Guide*	820-4908-10	HTML PDF	Online

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Sun Secure Global Desktop 4.41 Administration Guide, part number 820-4907-10.

CHAPTER 1

Networking and Security

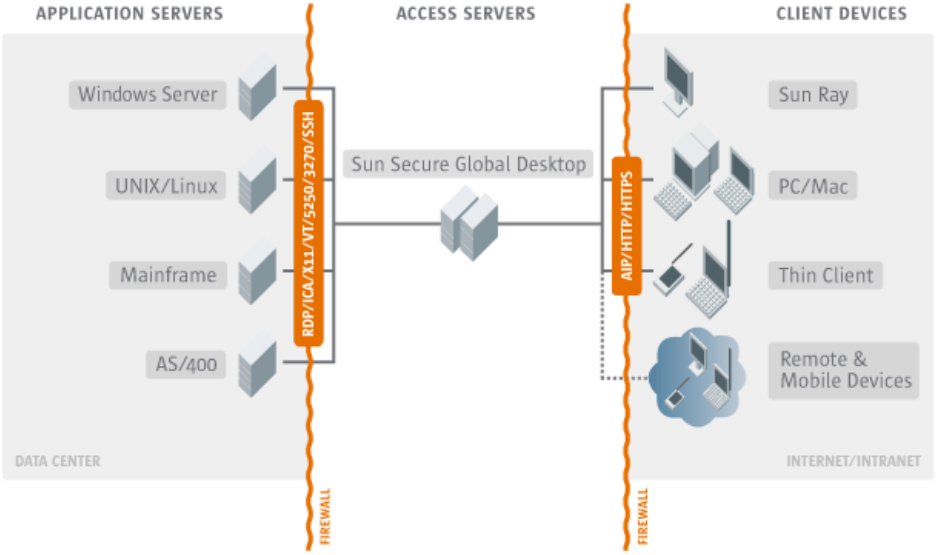
This chapter describes how to integrate SGD into your network infrastructure and secure the network connections used by SGD.

This chapter includes the following topics:

Overview of Networks and Security

When using SGD, client devices never connect directly to application servers. Instead they connect to SGD using Hypertext Transfer Protocol (HTTP) or HTTP over Secure Sockets Layer (HTTPS) and the SGD Adaptive Internet Protocol (AIP). SGD then connects to the application servers on the user's behalf. The network connections required are shown in FIGURE 1-1.

FIGURE 1-1 Diagram Showing the Network Connections Required by SGD



SGD servers can also join together as an array.

The following are the main network connections involved when using SGD:

- Connections between client devices and SGD servers
- Connections between SGD servers and application servers
- Connections between SGD servers

In a default SGD installation, most network connections are not secure. The following sections describe how you can secure these network connections.

Connections Between Client Devices and SGD Servers

To secure connections between client devices and SGD servers, configure the SGD Web Server to be a secure (HTTPS) web server, and enable SGD security services. See "Securing Connections Between Client Devices and SGD Servers" on page 20 for details.

SGD security services enables SGD to use Transport Layer Security (TLS) or Secure Sockets Layer (SSL) to provide secure connections between an SGD Client and an SGD server. SGD supports TLS version 1.0 and SSL version 3.0.

Secure connections have the following benefits:

- **Assured identity** – A server must prove its identity before communication can take place
- **Private connections** – All data is encrypted before transmission
- **Reliable messages** – Messages are checked to ensure they have not changed during transmission

Internet transactions are open to many forms of attack, for example packet-sniffing, Domain Name System (DNS) spoofing, replay attacks, and man-in-the-middle attacks. It is critical to recognize that even when SGD security is used, a connection is only secure if security is configured correctly.

Connections Between SGD Servers and Application Servers

The connections between SGD servers and application servers are used to start applications on the application server, and to send and receive data from the application, such as key presses and display updates.

The level of security between SGD and your application servers depends on the types of application server and the protocols they use.

UNIX or Linux System Application Servers

When connecting using the Telnet protocol or the `rexec` command, all communication and passwords are transmitted unencrypted.

For secure connections to UNIX or Linux system application servers, use Secure Shell (SSH). SSH encrypts all communications between SGD hosts and encrypts passwords before they are transmitted. See "Securing Connections to Application Servers with SSH" on page 57.

By default, SGD secures X displays using X authorization. This prevents users from accessing X displays they are not authorized to access.

Microsoft Windows Application Servers

The level of security depends on the protocol configured for the Windows application, as follows:

- **Microsoft Remote Desktop (RDP) protocol** – All communication is encrypted
- **Citrix Independent Computing Architecture (ICA) protocol** – All communication uses the Telnet protocol and is unencrypted

For secure connections to Microsoft Windows application servers, use the Microsoft RDP protocol.

Web Application Servers

The level of security depends on the type of web server used to host the web application, as follows:

- **HTTP web servers** – All communication is unencrypted
- **HTTPS web server** – All communication is encrypted

For secure connections to web application servers, use HTTPS web servers.

Connections Between SGD servers in an Array

Connections between SGD servers are used to share static and dynamic data across the array. This includes the following:

- The configuration of objects in the organizational hierarchy
- User and application session information
- Configuration information, including array membership information
- The application server password cache
- The token cache, used for automatic logins when the SGD Client is operating in Integrated mode
- Resource files, such as application server login scripts

See "Securing Connections Between SGD Servers" on page 52 for details on how to secure these connections.

DNS Names

The following are the main DNS requirements for SGD:

- Hosts must have DNS entries that can be resolved by all clients.
- DNS lookups and reverse lookups for a host must always succeed.
- All client devices must use DNS.

SGD servers can have multiple DNS names. Each SGD server has one peer DNS name, and one or more external DNS names.

A *peer DNS name* is the DNS name that the SGD servers in the array use to identify themselves to each other. For example, `boston.indigo-insurance.com`.

An *external DNS name* is the DNS name that the SGD Client uses to connect to an SGD server. For example, `www.indigo-insurance.com`.

These two types of DNS names might be associated with the same network interface on the SGD host, or they might each use a different network interface. These DNS names must be fully-qualified DNS names.

When you install SGD you are prompted for a DNS name for the SGD server. This must be the peer DNS name that is used inside the firewall. This is the DNS name that the SGD Web Server binds to.

After installation, you can configure each SGD server with one or more external DNS names. The external DNS name is used by the SGD Client when it connects to an SGD server. By default, the peer DNS name is also used as an external DNS name.

In a network containing a firewall, you might need to make some names usable outside the firewall, for example across the Internet, and others usable inside the firewall. For example, users outside the firewall might be able to use `www.indigo-insurance.com`, but not `boston.indigo-insurance.com`. Users inside the firewall might be able to use either name.

Caution – You do not have to make all your SGD servers available outside the firewall. However, if users log in to an SGD server from both inside and outside the firewall, they might not be able to resume some applications when logging in from outside the firewall.

If you are using mechanisms such as an external hardware load balancer or round-robin DNS to control the SGD server that a user connects to, you must configure SGD to work with these mechanisms, see "User Session Load Balancing" on page 335.

This section includes the following topics:

Configuring External DNS Names

When an SGD Client connects to an SGD server, it connects using the DNS name provided by the SGD server. The actual DNS name used is determined using the Internet Protocol (IP) address of the client.

You configure external DNS names by setting one or more filters that match client IP addresses to DNS names. Each filter has the format *Client-IP-Pattern*:*DNS-Name*

The *Client-IP-Pattern* can be either of the following:

- A regular expression matching one or more client device IP addresses, for example `192.168.10.*`
- A subnet mask expressed in the number of bits to match one or more client device IP addresses, for example `192.168.10.0/22`

SGD servers can be configured with several filters. The order of the filters is important because SGD uses the first matching *Client-IP-Pattern*.

Caution – If SGD is configured for firewall traversal, you cannot use multiple external DNS names because SGD cannot determine the IP address of the client device. You can configure a single external DNS name, for example `*:www.indigo-insurance.com`. See "Using Firewall Traversal" on page 35.

The following is an example of external DNS names configuration:

```
"192.168.10.*:boston.indigo-insurance.com,*:www.indigo-insurance.com"
```

With this configuration, the following applies:

- Clients with IP addresses beginning `192.168.10` connect to `boston.indigo-insurance.com`.
- All other clients connect to `www.indigo-insurance.com`.

If the order of the filters is reversed, all clients connect to `www.indigo-insurance.com`.

▼ How to Configure the External DNS Names of an SGD Server

Ensure that no users are logged in to the SGD server and that there are no running application sessions, including suspended application sessions.

1. **In the Administration Console, go to the SGD Servers tab and select an SGD server.**

   The General tab displays.

2. **In the External DNS Names field, type one or more filters for the external DNS names.**

   Each filter matches client IP addresses to DNS names.

   Press the Return key after each filter.

   The format of each filter is described in "Configuring External DNS Names" on page 5.

   The order of the filters is important. The first match is used.

3. **Click Save.**

4. **Restart the SGD server.**

   You must restart the SGD server for the external DNS names to take effect.

Changing the Peer DNS Name of an SGD Server

You can change the peer DNS name of an SGD server without having to reinstall the software, see "How to Change the Peer DNS Name of an SGD Server" on page 7.

You must detach an SGD server from an array and stop SGD before changing its peer DNS name.

After changing the DNS name, the `/opt/tarantella/var/log/SERVER_RENAME.log` file contains the details of the changes that were made. Your existing server security certificates are backed up in the `/opt/tarantella/var/tsp.OLD.`*number* directory.

Changing a peer DNS name of an SGD server might also affect your application servers, see "Configuring Application Servers after Changing a Peer DNS Name" on page 9.

▼ How to Change the Peer DNS Name of an SGD Server

Ensure that no users are logged in to the SGD server and that there are no running application sessions, including suspended application sessions.

You can only change the peer DNS name from the command line.

1. **Log in as superuser (root) on the SGD host.**

2. **Detach the SGD server from the array.**

   If you are changing the peer DNS name of the primary SGD server, first make another server the primary server and then detach the server.

```
# tarantella array detach --secondary serv
```

   Run the `tarantella status` command on the detached server to check that is detached from the array.

3. **Stop the SGD server.**

4. **Ensure that the DNS name change for the SGD host has taken effect.**

   Check your DNS configuration and ensure that the other SGD servers can resolve the new DNS name. You might also have to edit the `/etc/hosts` and the `/etc/resolve.cnf` files on the SGD host.

5. **Change the DNS name of the SGD server.**

   Use the following command:

```
# tarantella serverrename --peerdns newname [ --extdns newname ]
```

   Use the `--extdns` option to change the external DNS name of the server. This option only works if the SGD server has a single external DNS name. If the server has more than one external DNS name, you must manually update the external DNS names. See "Configuring External DNS Names" on page 5.

   When prompted, type Y to proceed with the name change.

6. **Regenerate the server peer certificates used for secure intra-array communication.**

```
# tarantella security keystoregen
```

   For details about secure intra-array communication, see "Securing Connections Between SGD Servers" on page 52.

7. **(Optional) Create and install new server certificates.**

   For details about server certificates, see "Securing Connections Between Client Devices and SGD Servers" on page 20.

8. **Restart the SGD Web Server and SGD server.**

9. **Join the SGD server to the array.**

```
# tarantella array join --primary p-serv --secondary s-serv
```

Configuring Application Servers after Changing a Peer DNS Name

If you have installed SGD printer queues on UNIX or Linux platform application servers, you might have to remove the printer queue that uses the old DNS name of the SGD server, and configure a new printer queue that uses the new DNS name of the SGD server. See "Configuring UNIX and Linux Platform Application Servers for Printing" on page 224.

If you use an SGD server as an application server, you must manually reconfigure the application server object by changing the DNS name for the application server and, optionally, renaming the object.

Proxy Servers

To be able to connect to SGD through a proxy server, client devices might need to be configured with the address and port number of the proxy servers. You might also need to configure SGD to give clients information about server-side proxy servers.

This section includes the following topics:

Supported Proxy Servers

To use SGD with a proxy server, the proxy server must support tunneling. You can use HTTP, Secure (SSL) or SOCKS version 5 proxy servers.

For SOCKS version 5 proxy servers, SGD supports the Basic and No Authentication Required authentication methods. No server-side configuration is required.

Configuring Client Proxy Settings

To configure client proxy settings, you must configure proxy settings for both the HTTP connections and the AIP connections. How you do this is described in the following sections.

HTTP Connections

HTTP connections are the connections between the user's browser and the SGD Web Server, for example to display a webtop. These connections always use the proxy settings configured for the browser.

AIP Connections

AIP connections are the connections between the SGD Client and the SGD server used to display applications. For these connections, the settings in the client profile control whether the SGD Client determines the proxy settings from a browser or from the client profile itself.

The SGD Client always stores the last proxy settings it used in the client profile cache. See "About the Profile Cache" on page 312 for details.

Note – You can only configure a SOCKS proxy for the AIP connection by specifying an array route, see "Configuring Server-Side Proxy Servers" on page 12 for details.

Determining Proxy Settings From a Browser

If the Use Default Web Browser Settings check box is selected in the client profile, the proxy server settings are determined from the user's default browser. The SGD Client stores the proxy settings in the profile cache on the client device and uses these settings when it next starts.

If Establish Proxy Settings on Session Start is selected in the client profile, the SGD Client obtains the proxy settings from the browser every time it starts. The stored proxy settings are not used. If Automatic Client Login is selected in the client profile, the Establish Proxy Settings on Session Start setting is disabled.

If the SGD Client is Integrated mode, and there are no proxy settings in the profile cache, the SGD Client attempts to make a direct connection.

To be able to determine the proxy settings from a browser, the browser must have Java technology enabled. If Java technology is not available, or it is disabled in the browser, the proxy settings must be manually specified in the client profile.

Note – If proxy server settings are defined in the Java Control Panel for the Sun Java Plug-in tool, these settings are used instead of the browser settings.

Specifying Proxy Settings in the Client Profile

If the Manual Proxy Settings check box is selected in the client profile, you can specify either an HTTP or an SSL proxy server in the client profile itself.

Using Proxy Server Automatic Configuration Scripts

Whenever client proxy server configuration is determined from a browser, you can use an automatic configuration script to automatically configure the proxy settings.

You specify the Uniform Resource Locator (URL) of the configuration script in the connection settings for the browser. The automatic configuration script must be written in JavaScript and have either a `.pac` file extension or *no file extension*. See Netscape Proxy Auto-Config File Format for details.

Note – Use this format for all browsers supported by SGD.

Known Issue With Automatic Configuration Scripts

Proxy server automatic configuration scripts can specify a list of proxy servers to try. If the first proxy server in the list is unavailable, the browser tries the other proxy servers in turn until it finds one that is available.

If you are using Microsoft Internet Explorer with Sun Java Plug-in tool version 1.5.0, only the first proxy server in the list is used. If that proxy server is not available, the connection fails. The solution is to use Sun Java Plug-in tool version 1.6.0.

Proxy Server Exception Lists

You can use proxy server exception lists to control the connections that are not proxied. Proxy exception lists can only be used if the proxy settings are determined from a browser. You cannot configure exception lists in the client profile. The exception list can be configured in the browser or Sun Java Plug-in tool.

An exception list is a list of DNS host names. For Internet Explorer, the list is a semicolon-separated list. For Mozilla-based browsers, the list is a comma-separated list. Exception lists can include the * wildcard.

There is no translation between DNS host names and IP addresses in exception lists. For example, with an exception list of `*.example.com`, connections to `chicago.example.com` and `detroit.example.com` do not use a proxy server, but connections that use the IP addresses for these hosts do use a proxy server.

Exception lists must always include the following entries:

```
localhost; 127.0.0.1
```

Proxy Server Timeouts

Proxy servers can drop a connection after a short period of time if there is no activity on the connection. By default, SGD sends AIP keepalive packets every 100 seconds to keep the connection open.

If you find that applications disappear after a short while, you might have to increase the frequency at which AIP keepalive packets are sent.

In the Administration Console, go to the Global Settings → Communication tab and decrease the AIP Keepalive Frequency. Alternatively, use the following command:

```
$ tarantella config edit --sessions-aipkeepalive secs
```

Configuring Server-Side Proxy Servers

SGD can be configured to "instruct" the SGD Client to connect through a server-side SOCKS version 5 proxy server. The actual proxy server used is determined using the IP address of the client. This known as an *array route*.

You configure array routes by setting one or more filters that match client IP addresses to server-side proxy servers. Each filter has the format *Client-IP-Pattern*:*type*:*host*:*port*.

The *Client-IP-Pattern* can be either of the following:

- A regular expression matching one or more client IP addresses, for example `192.168.10.*`
- A subnet mask expressed in the number of bits to match one or more client IP addresses, for example `192.168.10.0/22`

The *type* is a connection type. Use `CTSOCKS` for a SOCKS version 5 connection. Use `CTDIRECT` to connect directly without using a proxy server.

The *host* and *port* are the DNS name, or IP address, and port of the proxy server to use for the connection.

SGD can be configured with several filters. The order of the filters is important because SGD uses the first matching *Client-IP-Pattern*.

If you use an external SSL accelerator instead of SGD to handle SSL processing, append the array route with `:ssl`, see the following example. This instructs the SGD Client to use SSL on that connection before continuing with the SOCKS connection. See "Using External SSL Accelerators" on page 51 for details.

Caution – If SGD is configured for firewall traversal, you cannot use multiple array routes because SGD cannot determine the IP address of the client device. You can configure a single array route, for example `*:CTSOCKS:taurus.indigo-insurance.com:8080`. See "Using Firewall Traversal" on page 35.

The following is an example of array routes configuration:

```
"192.168.5.*:CTDIRECT:, \
192.168.10.*.*:CTSOCKS:taurus.indigo-insurance.com:8080, \
*:CTSOCKS:draco.indigo-insurance.com:8080:ssl"
```

With this configuration, the following applies:

- Clients with IP addresses beginning `192.168.5` have a direct connection.
- Clients with IP addresses beginning `192.168.10` connect using the SOCKS proxy server `taurus.indigo-insurance.com` on port 8080.
- All other clients connect using the SOCKS proxy server `draco.indigo-insurance.com` on port 8080. These clients also connect using SSL before continuing with the SOCKS connection.

▼ How to Configure Array Routes

You can only configure array routes from the command line.

Ensure that no users are logged in to the SGD servers in the array and that there are no running application sessions, including suspended application sessions.

1. **Configure the filters for array routes.**

   Use the following command:

```
$ tarantella config edit \
--tarantella-config-array-netservice-proxy-routes routes
```

   Enclose *routes* in quotes, and separate each filter with a comma, for example:

   `"filter1,filter2,filter3"`

   The format of each filter is described in "Configuring Server-Side Proxy Servers" on page 12.

   The order of the filters is important. The first match is used.

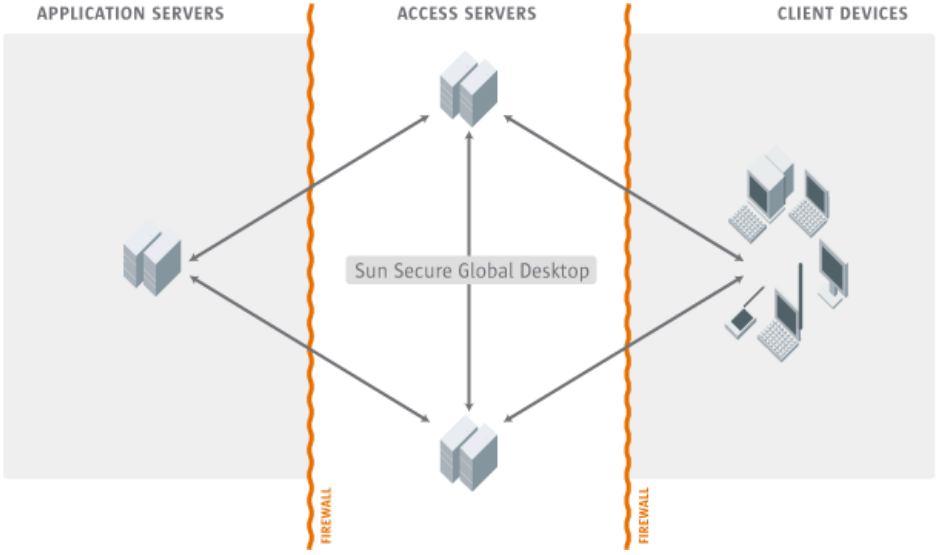
2. **Restart every SGD server in the array.**

   You must restart every server in the array for array routes to take effect.

Firewalls

Firewalls can be used to protect various parts of a network. To use SGD you must configure your firewalls to allow packets to be sent between client devices and SGD servers, and between SGD servers and application servers, as shown in FIGURE 1-2.

FIGURE 1-2 Diagram Showing SGD Connections and Firewalls



This section includes the following topics:

Firewalls Between Client Devices and SGD Servers

Client devices must be able to make HTTP and AIP connections to any SGD server in the array. This is because a user's SGD session and a user's application sessions can be hosted on different SGD servers.

The following table lists the ports you might need to open to allow connections between client devices and SGD servers.

Source	Destination	Port	Protocol	Purpose
Client	SGD Web Server	80	TCP	Standard, unencrypted HTTP requests and responses. Used to display webtops and for web services.
Client	SGD Web Server	443	TCP	Secure, encrypted HTTPS requests and responses. Used to display webtops and for web services.
Client	SGD server	3144	TCP	Standard, unencrypted AIP connections. Used for control and application display updates.
Client	SGD server	5307	TCP	SSL-based secure, encrypted AIP connections. Used for control and application display updates.

Transmission Control Ports (TCP) 80 and 443 are the Internet-standard ports for HTTP and HTTPS. Port 443 is only used if HTTPS is enabled on the SGD Web Server. You can configure the SGD Web Server to use any port. If you use your own web server with SGD, you must still open the ports used by the SGD Web Server because this web server provides the web services needed to access SGD.

In a default installation, ports 3144 and 5307 must both be open in the firewall. The SGD Client initially makes a secure connection on port 5307, but once the user has authenticated, the connection is downgraded to a standard connection on port 3144.

If you enable SGD security services and use only HTTPS, only ports 443 and 5307 must be open in the firewall.

If it is not possible to open the required ports, you can use firewall traversal to direct all SGD traffic through a single port, usually port 443. See "Using Firewall Traversal" on page 35 for details.

Ports 3144 and 5307 are registered with the Internet Assigned Numbers Authority (IANA) and are reserved for use only by SGD.

Firewalls Between SGD Servers

A network might contain firewalls between the SGD servers in an array, for example if you have multiple offices each containing an SGD server. The SGD servers in an array must be able to connect to any other member of the array.

The following table lists the ports you might need to open to allow connections between SGD Servers.

Source	Destination	Port	Protocol	Purpose
SGD server	Another SGD server	515	TCP	Used when moving print jobs from one SGD server to another using the `tarantella print move` command.
SGD server	Another SGD server	5427	TCP	Used for connections between SGD servers to allow array replication, and sharing of both static and dynamic data across the array.

Port 5427 is registered with IANA and is reserved for use only by SGD.

If you enable support for audio, smart cards, or serial ports for Windows applications that use the Microsoft RDP protocol, your firewall must allow connections between SGD servers on TCP port 1024 and above. If you do not use these features, it is best to disable support for them in SGD. See the following for more information:

- "How to Enable the SGD Windows Audio Service" on page 274
- "How to Enable Smart Cards in SGD" on page 288
- "How to Enable Access to Serial Ports" on page 293

Firewalls Between SGD Servers and Application Servers

An SGD server must be able to connect to an application server in order to run applications.

The ports used for connections between SGD servers and application servers depends on the application type and the connection method used to log in to the application server. Other ports are needed to provide support while using applications.

The following table lists the ports you might need to open to allow connections between SGD Servers and application servers.

Source	Destination	Port	Protocol	Purpose
SGD server	Application server	22	TCP	Used to connect to X and character applications using SSH.
SGD server	Application server	23	TCP	Used to connect to Windows, X, and character applications using Telnet.
Application server	SGD server	137	UDP	Used for Windows Internet Name Service (WINS) services with client drive mapping. The server binds to this port at start-up only if WINS services are enabled.
Application server	SGD server	139	TCP	Used for client drive mapping services. The server binds to this port at start-up, whether or not client drive mapping services are enabled.
SGD server	Application server	512	TCP	Used to connect to X applications using `rexec`.
Application server	SGD server	515	TCP	Used to send print jobs from the application server to an SGD server.
SGD server	Application server	3389	TCP	Used to connect to Windows applications configured to use the Microsoft RDP protocol.
SGD server	Application server	3579	TCP	Used for connections between the primary SGD server and the SGD load balancing service on an application server.

Source	Destination	Port	Protocol	Purpose
Application server	SGD server	3579	UDP	Used for connections between the SGD load balancing service on an application server and the primary SGD server.
SGD server	Application server	5999	TCP	Used to connect to Windows applications, if the application is configured to use the Wincenter protocol *and* the connection method is Telnet. The Wincenter protocol is no longer supported but might be used by legacy Windows application objects.
Application server	SGD server	6010 and above	TCP	Used to connect X applications to the protocol engines on the SGD server.

User Datagram Protocol (UDP) port 137 and TCP port 139 might be used by products providing Windows file and print services, such as Samba. You only need to open these ports if you are using client drive mapping on Microsoft Windows application servers. See "Client Drive Mapping" on page 254 for details.

For X applications, ports 6010 and above are only used if the connection method for X applications is Telnet or `rexec`. If the connection method is SSH, the connections use port 22. If you enable audio for X applications, all ports must be open between the application server and SGD. This is because the SGD audio daemon connects to the SGD server on random ports. This applies even if the connection method is SSH. See "Audio" on page 270 for details.

Port 3579 is registered with IANA and is reserved for use only by SGD. You only need to open these ports if you are using SGD Advanced Load Management. See "Application Load Balancing" on page 343 for details.

Other Firewalls

SGD needs to make connections to any authentication services and directory services you might be using.

The following table lists the ports you might need to open to allow connections between SGD Servers and other services.

Source	Destination	Port	Protocol	Purpose
SGD server	Windows server	88	TCP or UDP	Used to authenticate users from a Microsoft Windows domain.
SGD server	Windows server	137	UDP	Used to authenticate users from a Microsoft Windows domain.
SGD server	Windows server	139	TCP	Used to authenticate users from a Microsoft Windows domain.
SGD server	LDAP directory server	389	TCP	Used to authenticate users, or to assign applications to users, using a Lightweight Directory Access Protocol (LDAP) directory.
SGD server	Windows server	464	TCP or UDP	Used to enable users to change their password if it has expired.
SGD server	LDAP directory server	636	TCP	Used to authenticate users, or to assign applications to users, using a secure connection (LDAPS) to an LDAP directory.
SecurID Authentication Manager	SGD server	1024 to 65535	UDP	Used to authenticate users using SecurID.
SGD server	Windows server	3268	TCP	Used to authenticate users from a Microsoft Windows domain.
SGD server	Windows server	3269	TCP	Used to authenticate users from a Microsoft Windows domain.
SGD server	SecurID Authentication Manager	5500	UDP	Used to authenticate users using SecurID.

Ports 88, 464, 3268, 3269 are only required if you are using Active Directory authentication. Ports 88 and 464 can use either the TCP or UDP protocol depending on the packet size and your Kerberos configuration. See "Configuring SGD for Kerberos Authentication" on page 76 for details.

Ports 137 and 139 are only required if you are using a domain controller for authentication. See "Windows Domain Authentication" on page 110 for details.

Ports 389 and 636 are only required if you are using an LDAP directory to establish a user's identity or to assign applications to users. This applies to the following authentication mechanisms:

- Active Directory authentication, see "Active Directory Authentication" on page 74
- LDAP authentication, see "LDAP Authentication" on page 85

- Third-party or web server authentication using the LDAP repository search, see "Third-Party and Web Server Authentication" on page 93

Ports 1024 to 65535 are only required if you are using SecurID Authentication. For the RSA SecurID Authentication Manager to communicate with an SGD server acting as an Agent Host, all ports from 1024 to 65535 must be open from the IP addresses of the Master and Slave Authentication Managers to the IP addresses of all Agent Hosts. See "SecurID Authentication" on page 90 for details.

Port 5500 is only required if you are using SecurID authentication. For the RSA SecurID Authentication Manager to communicate with an SGD server acting as an Agent Host, port 5500 must be open from the IP addresses of the Host Agents to the IP addresses of the Master and Slave Authentication Managers.

Securing Connections Between Client Devices and SGD Servers

When securing connections between client devices and SGD servers, the following connections must be considered:

- **HTTP connections.** These are the connections between a browser and the SGD Web Server, used for authentication to SGD, and to display the webtop.
- **AIP connections.** These are the connections between an SGD Client and an SGD server, used for displaying applications.

When SGD is first installed, connections to the SGD Web Server are not secure. The initial connection between an SGD Client and an SGD server is secure, but after the user is logged in, the connection is downgraded to a standard connection. This section describes how to secure the connections between client devices and SGD servers.

This section includes the following topics:

- "Selecting a Cipher Suite for Secure Client Connections" on page 49
- "Using External SSL Accelerators" on page 51

Setting up Secure Client Connections

You can set up secure client connections using automatic configuration or manual configuration.

Automatic configuration uses the `tarantella security enable` command to configure secure connections to an SGD server. However, automatic configuration can be used only on a fresh installation of SGD when the server is not part of an array.

Setting up Secure Client Connections (Automatic Configuration)

Setting up secure client connections with automatic configuration involves the following steps:

1. (Optional) Generate a Certificate Signing Request (CSR) and send it to a Certificate Authority (CA).

   See "How to Generate a Certificate Signing Request" on page 25.

   This step is optional if you obtain a server certificate *without* using the `tarantella security certrequest` command to generate a CSR, or if you want to enable security using a self-signed certificate.

2. Install a server certificate and enable security.

   See "Enabling SGD Security Services With Automatic Configuration" on page 32.

3. (Optional) Configure connection definition processing.

   Connection definitions enable you to determine which users receive secure connections.

   See "Using Connection Definitions" on page 40.

Setting up Secure Client Connections (Manual Configuration)

Setting up secure client connections with manual configuration involves the following steps:

1. Obtain and install a certificate for each SGD server in the array.

   To use secure connections, an SGD server must present a certificate to identify itself to an SGD Client.

   See "Obtaining and Installing a Server Certificate" on page 24.

2. Configure each SGD Web Server in the array to use HTTPS.

   To secure the connections between a browser and an SGD Web Server, HTTPS connections must be enabled.

   See "Using HTTPS Connections to the SGD Web Server" on page 34.

3. (Optional) Configure SGD for firewall traversal.

   If it is not possible to open TCP port 5307 between client devices and SGD servers, use firewall traversal to give users access to SGD using a single port, usually port 443.

   See "Using Firewall Traversal" on page 35.

4. Configure the SOAP connections to use HTTPS.

   Client applications, such as the SGD webtop, use the Simple Object Access Protocol (SOAP) protocol and HTTP to access the web services provided by an SGD server.

   See "Securing SOAP Connections to an SGD Server" on page 36.

5. Enable SGD security services and restart SGD.

   To enable secure connections, you must enable SGD security services and restart SGD.

   See "Enabling SGD Security Services" on page 39.

6. (Optional) Configure connection definition processing.

   Connection definitions enable you to determine which users receive secure connections.

   See "Using Connection Definitions" on page 40.

Using Server Certificates

A certificate is an encoded file that a secure service, such as a web server, uses to identify itself to a client. When security is enabled, an SGD server requires a certificate.

SGD supports Privacy Enhanced Mail (PEM) Base 64-encoded X.509 certificates. These certificates have the following structure:

```
-----BEGIN CERTIFICATE-----
```

. . .certificate. . .
-----END CERTIFICATE-----

SGD supports the Subject Alternative Name (`subjectAltName`) extension for server certificates. This enables you to associate more than one DNS name with a certificate. If the `subjectAltName` field is present in a certificate, the `subject` field is ignored and only the `subjectAltName` is used. The certificate is accepted by the SGD Client if any of the Subject Alternative Names match the name of the SGD server you are connecting to.

Supported Certificate Authorities

A server certificate is issued by a CA. A CA is a trusted third party that digitally signs a server certificate using a CA, or root, certificate.

SGD includes support for a number of CA certificates by default. The `/opt/tarantella/etc/data/cacerts.txt` file contains the X.500 Distinguished Names (DNs) and MD5 signatures of all the CA certificates that SGD supports.

You can use a server certificate that is signed by an unsupported CA. However, by default, all users are prompted to accept or decline these certificates because they cannot be validated by SGD. This is a potential security risk.

SGD supports the use of certificate chains. With certificate chains, an Intermediate CA signs an certificate with a CA certificate that is issued by another CA.

If your server certificate is signed by an unsupported CA, or an Intermediate CA, you must install the CA certificate or certificate chain.

Using a Certificate Obtained for Another Product

You can use a certificate that was originally obtained for another product, such as a web server. To do this, you must have access to the private key for that certificate. If the private key is encrypted by a product that uses the SSLeay or OpenSSL certificate libraries, you can obtain the private key by decrypting it. See "How to Install a Certificate Obtained for Another Product" on page 29 for details.

If you do not have access to the private key, or the key is not encrypted by a product that uses SSLeay or OpenSSL certificate libraries, you must obtain and install a new server certificate. See "Obtaining and Installing a Server Certificate" on page 24.

Self-Signed Certificates

SGD enables you to create self-signed server certificates for test purposes, for example, while you are waiting to complete the registration requirements before the certificate can be generated.

Only use self-signed server certificates in a test environment because self-signed certificates are not truly secure. While a self-signed server certificate can be used to give users secure connections, users have no guarantee that the server they are connecting to is genuine.

You can create self-signed certificates with the following commands:

- `tarantella security selfsign` – enables you to self-sign a CSR generated with the `tarantella security certrequest` command
- `tarantella security enable` – enables you to configure a secure SGD server automatically and install a server certificate

Obtaining and Installing a Server Certificate

Obtaining and installing a certificate for an SGD server involves the following configuration steps:

1. (Optional) Generate a Certificate Signing Request (CSR) and send it to a CA.

   See "How to Generate a Certificate Signing Request" on page 25.

   If you already have a certificate for another product, such as a web server, you might be able to use that certificate. See "Using a Certificate Obtained for Another Product" on page 24.

2. Install the server certificate.

   When a CA receives a CSR, they check the validity of the request, and return a signed certificate. You then install the certificate on the SGD server, see "How to Install a Server Certificate" on page 28.

   To install a certificate obtained for another product, see "How to Install a Certificate Obtained for Another Product" on page 29.

3. (Optional) Install the CA certificate.

   Perform this step only if the server certificate is signed by an unsupported CA, or an Intermediate CA, see "Supported Certificate Authorities" on page 23.

   The certificates that must be installed are as follows:

   - **Unsupported CA.** Import the CA or root certificate, see "How to Install the CA Certificate for an Unsupported CA" on page 30.
   - **Intermediate CA.** Import the CA certificate chain, see "How to Install a CA Certificate Chain" on page 30.

▼ How to Generate a Certificate Signing Request

1. **Log in as superuser (root) on the SGD host.**

2. **Generate a CSR.**

   Use the `tarantella security certrequest` command to generate the CSR.

   SGD supports the Subject Alternative Name (`subjectAltName`) extension for server certificates. This enables you to associate more than one DNS name with a certificate. See "DNS Names" on page 4 for details.

   SGD supports the use of the `*` wildcard for the first part of the domain name, for example `*.indigo-insurance.com`.

   Generating the CSR also creates the public and private key pair.

   On the SGD server, the CSR is stored in the `/opt/tarantella/var/tsp/csr.pem` file, and the private key is stored in the `/opt/tarantella/var/tsp/key.pending.pem` file.

   If you are replacing a server certificate, for example because it is about to expire, you can generate a CSR without affecting your current certificate.

   In the following example, a CSR is generated for the SGD server `boston.indigo-insurance.com`. This server also has an external DNS name of `www.indigo-insurance.com` and so this name is added as a Subject Alternative Name.

```
# tarantella security certrequest \
--country US --state Massachusetts --orgname "Indigo Insurance"

The certificate's common name (CN) will be:  boston.indigo-insurance.com

This hostname is included in the Certificate Signing Request (CSR) and
corresponds to the name of the server that users will connect to.

 - If DNS names are used to connect to the server, the hostname above
   MUST be a fully qualified DNS name.

 - If clients are required to connect to the server using an IP address,
   the hostname above should be the IP address. A DNS record for this
   IP address SHOULD NOT exist.

For clients to accept the certificate once it's installed, a DNS
lookup of the hostname followed by a reverse lookup of the result must
return the original hostname.

The hostname to be used in the certificate request is
boston.indigo-insurance.com.
```

```
Do you want to use this hostname? [yes] y


Do you want to add any additional hostnames? [no] y

Type in the subject alternative names for the certificate, one per line. Enter a
blank line to finish.

subjectAltName: www.indigo-insurance.com
subjectAltName:
2048 semi-random bytes loaded
Generating RSA private key, 1024 bit long modulus
..++++++
.....................................................++++++
e is 65537 (0x10001)

-----------------------------------------------------------------------------
Certificate Signing Request (CSR): Summary
-----------------------------------------------------------------------------

Subject:
 C=US
 ST=Massachusetts
 O=Indigo Insurance
 CN=boston.indigo-insurance.com


Subject Alternative Names:
 DNS:boston.indigo-insurance.com, DNS:www.indigo-insurance.com

The information above will be contained in the CSR.

Create CSR now? [yes] y

Send the following Certificate Signing Request (CSR) to a Certificate
Authority, such as VeriSign (www.verisign.com). Check with your CA
that you're providing all the information they need.

------CUT HERE------
-----BEGIN CERTIFICATE REQUEST-----
NhY2h1c2V0MIIB5TCCAU4CAQAwXDELMAkGA1UEBhMCVVMxFjAUBgNVBAgTDU1hc3
dpZS5VdHMxGTAXBgNVBAoTEEluZGlnbyBJbnN1cmFuY2UxGjAYBgNVBAMTEXJhZG
sd+SmX7zz6Sy5TdW4uQ09NMIGfMA0GCSqGSIb3DQEBAQUAA4GNADCBiQKBgQDbWM
sMqBs7gQw8Q1Gk3NAypySP6aRiEItLrfSlZ8XgKXmjmlLtb03V9JonjLfhH3fBzk
gnOG6EpTmJM4y3OOpEXZZ2yhtWgsQsXyLWbfTLWZPfHLPI5ztEEJ7Z0G6dpeG0xg
wODA2ApAp6sIrmBqbZG2Aaf5poB+FQ4lsmQIDAQABoEkwRwYJKoZIhvcNAQkOMTo
N1cmFuBgNVHREELzAtghFyYWRnaWUuVUsuU3VuLkNPTYIYd3d3LmluZGlnby1pbn
V617E7oFKY2UuY29tMA0GCSqGSIb3DQEBBQUAA4GBAMsOieZzrGHN7fkW6LmYNHW
sW1tmHeFjekpiUiTLYE+KUZXKKCH9f1eo+nfwFdi9VOomIdga4uehl+4acqqiGEe
```

```
W4iIb9BC9b/V1pA/lGJwWN0aDDB3/d47UGAlli+spW37chg53Fp7eP2xIYWfJR6O
35eSPZm42dyp
-----END CERTIFICATE REQUEST-----
------CUT HERE------

When you receive your certificate, use 'tarantella security certuse'
to install it.
```

3. **Send the CSR to a CA.**

   See "Supported Certificate Authorities" on page 23 for details of the CAs that SGD supports by default.

   Either copy the CSR as output from the command line, or use the copy of the CSR that is stored in the `/opt/tarantella/var/tsp/csr.pem` file on the SGD server.

   While you are waiting for the CA to return the server certificate, you can use the `tarantella security selfsign` command to create and install a self-signed certificate for test purposes. See "Self-Signed Certificates" on page 24 for more details.

▼ How to Install a Server Certificate

Use the following procedure to install a server certificate that was obtained by using the `tarantella security certrequest` command to generate a CSR.

Before you begin, ensure you have access to the server certificate. The certificate must be in PEM format.

1. **Log in as superuser (root) on the SGD host.**

2. **Install the server certificate.**

   Use the `tarantella security certuse` command to install the certificate.

   If you are replacing a server certificate, for example because the original certificate is about to expire, the `tarantella security certuse` command prompts you for confirmation before overwriting the certificate and private key.

   When you install the server certificate, the private key stored in the `/opt/tarantella/var/tsp/key.pending.pem` file is moved to the `/opt/tarantella/var/tsp/key.pem` file.

   If you specify the path to a file, you must specify the *full path* to the file.

   The CSR, the certificate, and the private key are stored in the `/opt/tarantella/var/tsp` directory on the SGD server.

   - To install the certificate from standard input, use the following command:

```
# tarantella security certuse
```

Paste the server certificate in to standard input and press Control+D.

- To install the certificate from a temporary file, use the following command:

```
# tarantella security certuse < /tmp/cert
```

- To install the certificate from a permanent file, use the following command:

```
# tarantella security certuse --certfile /opt/certs/cert.pem
```

Caution – This command creates a *symbolic link* to the certificate file in the `/opt/tarantella/var/tsp` directory on the SGD server. Do not delete or move the certificate file after running this command.

▼ How to Install a Certificate Obtained for Another Product

Use the following procedure to install a certificate obtained *without* using the `tarantella security certrequest` command to generate a CSR.

To install a certificate obtained for another product, you must have the private key for that certificate. If the private key is encrypted by a product that uses the SSLeay or OpenSSL certificate libraries, you can obtain the private key by decrypting it.

1. **Log in as superuser (root) on the SGD host.**
2. **Copy the certificate and key file to a safe location on the SGD host that can only be accessed by superuser (root).**

   For example:

```
# cp /etc/httpd/certs/boston-indigo-insurance.com.pem \
/opt/tarantella/var/tsp
# cp /etc/httpd/certs/boston-indigo-insurance.com.key.pem \
/opt/tarantella/var/tsp
```

3. **(Optional) Decrypt the certificate's private key.**

   Use the `tarantella security decryptkey` command.

   For example:

```
# tarantella security decryptkey \
--enckey /opt/tarantella/var/tsp/boston.indigo-insurance.com.key.pem \
--deckey /opt/tarantella/var/tsp/boston.indigo-insurance.com.key.out \
--format PEM
```

4. **Install the certificate.**

   Use the `tarantella security certuse` command to install the certificate.

   When you specify the path to the certificate file and the key file, you must specify the *full path*.

   For example:

```
# tarantella security certuse \
--certfile /opt/tarantella/var/tsp/boston.indigo-insurance.com.pem \
--keyfile /opt/tarantella/var/tsp/boston.indigo-insurance.com.key.out
```

Caution – This command creates *symbolic links* to the certificate file and the key file in the `/opt/tarantella/var/tsp` directory on the SGD server. Do not delete or move the certificate file or key file after running this command.

▼ How to Install the CA Certificate for an Unsupported CA

Before you begin, ensure you have access to the CA certificate. The CA certificate must be in PEM format.

1. **Log in as superuser (root) on the SGD host.**
2. **Install the CA certificate.**

   Use the `tarantella security customca` command.

   - To install the CA certificate from standard input, use the following command:

```
# tarantella security customca
```

     Paste the CA certificate in to standard input and press Control+D.

   - To install the CA certificate from a file, use the following command:

```
# tarantella security customca --rootfile /tmp/cert
```

▼ How to Install a CA Certificate Chain

Before you begin, ensure that you have all the certificates in the CA certificate chain. The certificates must be in PEM format.

1. **Log in as superuser (root) on the SGD host.**

2. **Combine all the certificates in the chain into a file.**

   For example, create a file called `chainedcerts.pem`.

   The CA certificate used to sign the server certificate *must appear first*, for example:

```
-----BEGIN CERTIFICATE-----
...Intermediate CA's certificate...
-----END CERTIFICATE-----
-----BEGIN CERTIFICATE-----
...CA root certificate...
-----END CERTIFICATE-----
```

3. **Install the CA certificate chain.**

   Use the `tarantella security customca` command.

   - To install the CA certificate from standard input, use the following command:

```
# tarantella security customca
```

     Paste the CA certificate chain in to standard input and press Control+D.

   - To install the CA certificate from a file, use the following command:

```
# tarantella security certuse --rootfile /tmp/chainedcerts.pem
```

▼ How to Replace a Server Certificate

Use the following procedure to replace the server certificate for an SGD server, for example because the original certificate is about to expire.

1. **Obtain and install a new server certificate.**

   See "Obtaining and Installing a Server Certificate" on page 24 for details.

2. **Restart the SGD server and SGD Web Server.**

   You must restart the SGD server to ensure that the new server certificate is used for secure connections.

   Ensure that no users are logged in to the SGD server and that there are no running application sessions, including suspended application sessions.

   Use the following command:

```
# tarantella restart
```

Enabling SGD Security Services With Automatic Configuration

The `tarantella security enable` command enables you to quickly configure and start SGD security services. You can only use this command if both of the following are true:

- The SGD installation is a fresh installation and no attempt has been made to configure SGD security services.
- The SGD server is not joined with other SGD servers in an array.

If these conditions are not met, the `tarantella security enable` command fails and you must enable security by configuring it manually. See "Setting up Secure Client Connections (Manual Configuration)" on page 22.

The `tarantella security enable` command performs the following configuration:

- Installs a server certificate.
- Enables HTTPS connections to the SGD Web Server.

  See "Using HTTPS Connections to the SGD Web Server" on page 34 for details.
- Configures the SGD server for firewall traversal.

  See "Using Firewall Traversal" on page 35 for details.
- Secures the SOAP connections to the SGD server.

  See "Securing SOAP Connections to an SGD Server" on page 36 for details.
- Enables SGD security services.
- Restarts the SGD server and SGD Web Server.

If you do not specify a server certificate to install, the `tarantella security enable` command creates and installs a self-signed certificate. If you want to install a server certificate later, use the `tarantella security disable` command to restore the security settings to their previous state. You can then run the `tarantella security enable` command again and specify a server certificate.

▼ How to Enable SGD Security Services With Automatic Configuration

Before you begin, ensure you have access to the server certificate, and the private key and CA certificate, if needed. The certificates must be in PEM format.

Ensure that no users are logged in to the SGD server and that there are no running application sessions, including suspended application sessions.

1. **Log in as superuser (root) on the SGD host.**

2. **Install a server certificate and enable SGD security services.**

   Use the `tarantella security enable` command to install a server certificate and enable SGD security services.

   If you used the `tarantella security certrequest` command to generate a CSR, you can omit the `--keyfile` option. The key stored in the `/opt/tarantella/var/tsp/key.pending.pem` file is used. When you install the server certificate, the private key is moved to the `/opt/tarantella/var/tsp/key.pem` file.

Caution – If you use the `--certfile` option and the `--keyfile` option together, SGD creates *symbolic links* to the certificate file and the key file in the `/opt/tarantella/var/tsp` directory on the SGD server. Do not delete or move the certificate file or key file after running this command.

   If you do not specify a server certificate to install, the `tarantella security enable` command generates a CSR, and then creates and installs a self-signed certificate. Only use a self-signed certificate for test purposes.

   SGD supports a number of CAs by default. Only use the `--rootfile` option if the server certificate is signed by an unsupported CA, or by an Intermediate CA. See "Supported Certificate Authorities" on page 23 for details.

   If the server certificate is signed by an Intermediate CA, combine all the certificates in the CA certificate chain into a file. The certificates must be in PEM format. The CA certificate used to sign the server certificate *must appear first*, for example:

```
-----BEGIN CERTIFICATE-----
...Intermediate CA's certificate...
-----END CERTIFICATE-----
-----BEGIN CERTIFICATE-----
...CA root certificate...
-----END CERTIFICATE-----
```

   If you specify the path to a certificate or key file, you must specify the *full path* to the file.

   The CSR, the certificate, the private key, and the CA certificate are stored in the `/opt/tarantella/var/tsp` directory on the SGD server.

   - If the server certificate is signed by a supported CA, and the `tarantella security certrequest` command was used to generate a CSR, use the following command:

```
# tarantella security enable \
--certfile certificate-path
```

- If the server certificate is signed by a supported CA, and the `tarantella security certrequest` command was *not* used to generate a CSR, use the following command:

```
# tarantella security enable \
--certfile certificate-path --keyfile key-path
```

- If the server certificate is signed by an unsupported CA, or an Intermediate CA, use the following command:

```
# tarantella security enable \
--certfile certificate-path [--keyfile key-path] \
--rootfile CA-certificate-path
```

- To enable SGD security services with a self-signed certificate, use the following command:

```
# tarantella security enable
```

Using HTTPS Connections to the SGD Web Server

SGD security services only secure the connections between an SGD Client and an SGD server. To secure the connections between a browser and an SGD Web Server on the SGD host, HTTPS connections must be enabled on the web server.

The SGD Web Server is preconfigured to be a HTTPS web server and use the same certificate as the SGD server. This is configured in the Apache configuration file, `/opt/tarantella/webserver/apache/2.2.8_openssl-0.9.8g_jk1.2.25/conf/httpd.conf`.

Note – You can use a separate certificate for the SGD Web Server if you prefer.

Once a server certificate is installed, you enable HTTPS connections by using the `--https` argument when you start the SGD server or the SGD Web Server. See "Enabling SGD Security Services" on page 39.

If you enable HTTPS connections, you must enable HTTPS connections for every SGD Web Server in the array. Every SGD Web Server in the array must use the same HTTPS port.

Once you enable secure connections to a web server, ensure that users have an HTTPS URL for the Login URL in their client profile. See "Client Profiles" on page 306.

Using Firewall Traversal

When SGD security services are enabled, the SGD Client connects to an SGD server on TCP port 5307. If it is not possible to open this port between client devices and SGD servers, you can use *firewall traversal* to give users access to SGD using a single port, usually port 443. With firewall traversal, you configure the SGD server to listen on port 443. The SGD server then forwards all traffic that is not AIP traffic to the SGD Web Server. For this reason, firewall traversal is sometimes called *firewall forwarding*.

If SGD is configured for firewall traversal, you cannot use any SGD features that depend on filtering the IP address of the client device. This means you cannot use the following features:

- **Multiple external DNS names** – See "Configuring External DNS Names" on page 5
- **Multiple array routes** – See "Configuring Server-Side Proxy Servers" on page 12
- **Connection definitions** – See "Using Connection Definitions" on page 40

▼ How to Configure Firewall Traversal

1. **Configure each SGD Web Server in the array to bind to localhost and TCP port 443.**

   a. **Log in as superuser (root) on the SGD host.**

   b. **Edit the Apache configuration file.**

      The configuration file is `/opt/tarantella/webserver/apache/2.2.8_openssl-0.9.8g_jk1.2.25/conf/httpd.conf`.

   c. **Change the `<IfDefine SSL>` directive in the SSL Support section.**

      Change the directive to the following:

      ```
      <IfDefine SSL>
      Listen 127.0.0.1:443
      </IfDefine>
      ```

   d. **Save the changes.**

2. **Log in as superuser (root) on the primary SGD server in the array.**

3. **Configure each SGD server in the array to use TCP port 443 for encrypted connections.**

   Use the following command:

```
# tarantella config edit --array-port-encrypted 443
```

Tip – You can also configure the port in the Administration Console. Go to the Global Settings → Communication tab. Type 443 in the Encrypted Connections Port field.

---

4. **Configure each SGD server in the array to forward HTTP traffic to the SGD Web Server.**

   Use the following command:

```
# tarantella config edit --array \
--security-firewallurl https://127.0.0.1:443
```

Tip – You can also configure the port in the Administration Console. Select an SGD server and go to the Security tab. Type https://127.0.0.1:443 in the Firewall Forwarding URL field.

---

5. **Check that the firewall forwarding URL has taken effect for each SGD server in the array.**

   Use the following command to check each server:

```
# tarantella config list --server serv --security-firewallurl
```

Securing SOAP Connections to an SGD Server

Client applications, such as the SGD webtop, use the SOAP protocol and HTTP to access the web services provided by an SGD server. You can use HTTPS to secure these connections.

To secure the SOAP connections, a client application, such as the SGD webtop, must be configured to use HTTPS. The client application must also be able to validate the server certificate for any SGD server in the array. To do this, the client application's truststore must contain the CA certificate, or the certificate chain, used to sign the server certificate.

You *must* secure the SOAP connections to SGD in the following circumstances:

- The client application is hosted on an SGD server that is configured for firewall traversal.

  See "How to Secure the SOAP Connections to an SGD Server" on page 37.
- The client application is hosted on a *different host* to the SGD server.

  See "Securing the SOAP Connections From Remote Hosts" on page 37.

▼ How to Secure the SOAP Connections to an SGD Server

1. **Log in as superuser (root) on the SGD host.**
2. **(Optional) Import CA certificates or certificate chains into the CA certificate truststore.**

   SGD supports a number of CAs by default. You only need to import CA certificates if the certificate for *any SGD server in the array* is signed by an unsupported CA, or by an Intermediate CA.

   See "The CA Certificate Truststore" on page 383 for details of how to check for supported CAs and how to import CA certificates.
3. **Configure the web services resources file for the client application.**

   a. **Change to the shared resources directory.**

```
# cd /opt/tarantella/webserver/tomcat/5.0.28_axis1.2
# cd shared/classes/com/tarantella/tta/webservices/client/apis
```

   b. **Edit the** `Resources.properties` **file.**

      For *each* of the web services listed in the properties file, change the URL to an HTTPS URL and change the port number to port 443, for example, `https://`*server.example.com*`:443/axis/services/document/print`, where *server.example.com* is the name of the SGD server.

   c. **Save the changes.**

Securing the SOAP Connections From Remote Hosts

This section contains information about securing SOAP connections to SGD from a client application that is hosted remotely. Typically this occurs in the following circumstances:

- You relocate the SGD webtop to another JavaServer Pages (JSP) container
- You develop your own client applications, using a relocated SGD `com.tarantella.tta.webservices.client.views` package

If you develop your own client applications without using the SGD `com.tarantella.tta.webservices.client.views` package, the information in this section contains the principles you need to follow to secure the SOAP connections to an SGD server.

To secure the SOAP connections from remote hosts, you configure the following:

- The CA certificates truststore on the remote host
- The web services resources file on the remote host
- The CA certificates truststore on the SGD server

Configuring the CA Certificates Truststore on the Remote Host

On the remote host, you might have to import CA certificates into the Java Runtime Environment (JRE) truststore for your JSP container. This truststore used for the HTTPS connections from the client application to the SGD server, and enables the client application to validate the certificate presented by an SGD server.

You must ensure that the JRE truststore contains the CA certificate used to sign the certificate for *any SGD server in the array*. If a server certificate was signed by an Intermediate CA, ensure that the truststore contains every certificate in the CA certificate chain.

If the `tarantella security customca` command is used to install a CA certificate or certificate chain on an SGD server, the `/opt/tarantella/var/tsp/ca.pem` file contains the CA certificate or certificate chain.

How you import certificates, and the truststore used, depends on the JSP container.

Configuring the Web Services Resources File on the Remote Host

On the remote host, you must configure the client application to use HTTPS URLs to access SGD web services. The client application must also be configured to use the JRE truststore for your JSP container.

For client applications that use the SGD package, the web services URLs are configured in the `Resources.properties` file in the shared library directory on the JSP container on the remote host. See "Relocating the Webtop" on page 326 for details. For *each* of the web services listed, change the URL to an HTTPS URL, for example, `https://server.example.com:443/axis/services/document/print`.

Once you have added the certificates, add the details of the JRE truststore on the remote host to the `Resources.properties` file, by adding the following lines:

`keystore=`*`keystore-path`*

`keystorepass=`*password*

After changing the `Resources.properties` file, you must restart your JSP container. You must also make sure the web server is configured to accept HTTPS connections and restart it.

Configuring the CA Certificates Truststore on the SGD Server

On the SGD server, you might have to import CA certificates into the CA certificates truststore for the SGD server. This truststore is used for the HTTPS connections from the SGD server to the remote host. This connection is used to send events from the SGD server.

SGD supports a number of CAs by default. You only need to import CA certificates if the certificate for *the remote host* is signed by an unsupported CA, or by an Intermediate CA. See "The CA Certificate Truststore" on page 383 for details of how to check for supported CAs and how to import CA certificates.

Enabling SGD Security Services

You enable SGD security services from the command line.

When you first enable security services, you must restart all the SGD servers and the SGD web servers in the array. Once security is enabled, security services are available whenever SGD restarts.

If you change your SGD configuration, for example by enabling firewall traversal or by installing a new server certificate, you must restart the SGD server and the SGD Web Server.

If firewall traversal is enabled, you must start the SGD server before starting the SGD Web Server. If firewall traversal is not enabled, start the SGD Web Server before starting the SGD Server. If you use the `tarantella start` or `tarantella restart` commands without any command options, the SGD server and SGD Web Server are always started in the correct order depending on your firewall traversal configuration.

▼ How to Enable SGD Security Services for an SGD Server

Ensure that no users are logged in to the SGD server and that there are no running application sessions, including suspended application sessions.

1. Log in as superuser (root) on the SGD host.

2. **Enable SGD security services.**

   Use the following command:

```
# tarantella security start
```

3. **Restart the SGD server and SGD Web Server.**

   Use the following command:

```
# tarantella restart --https
```

Using Connection Definitions

Connection definitions can be used to control whether a secure connection or a standard connection is used between an SGD Client and an SGD server. The connection type can depend on the following factors:

- The DNS name or IP address of the user's client device
- The SGD server the user logs in to

If SGD security services are not enabled on an SGD server, secure connections to that server are not available regardless of the user's connection definitions.

Caution – If SGD is configured for firewall traversal, do not use connection definitions. You always use secure connections with firewall traversal. See "Using Firewall Traversal" on page 35.

To use connection definitions, you must do the following:

- Enable connection definition processing
- Configure connection definitions

When connection definition processing is enabled, you configure the connection definitions to determine which users receive standard or secure connections. You configure connection definitions at an organization level, which you can override at an organizational unit level or user profile level. By default, all users can receive secure connections if SGD security services are enabled.

Connection definitions use the IP address or DNS name of the client device and the SGD server to determine whether standard or secure connections are used. The order of the connection definitions is important as the first match is used. Connection definitions can include the `*` or `?` wildcards to match more than one DNS name or IP address.

For example, the user profile object for Elizabeth Blue has the following connection definitions:

Client Device Address	SGD Server Address	Connection Type
`*.example.com`	*	Standard
*	*	Secure

If Elizabeth logs in to SGD from her usual client device, `sales1.example.com`, the first connection definition in the list matches and Elizabeth receives a standard connection.

If Elizabeth logs in to SGD from a client device that is not part of `example.com`, the second connection definition in the list matches and Elizabeth receives a secure connection.

If Elizabeth had no connection definitions, the connection type is determined by the connection definitions of a parent object in the organizational hierarchy.

▼ How to Enable Connection Definition Processing

1. **In the Administration Console, go to the Global Settings → Security tab.**
2. **Select the Connection Definitions check box.**
3. **Click Save.**

▼ How to Configure Connection Definitions

1. **In the Administration Console, go to the User Profiles tab and select the object you want to configure.**

   It is best to configure connection definitions for organization and organizational unit objects as this configures connections definitions for many users at once and makes administration easier.

2. **Go to the Security tab.**
3. **Add a connection definition.**

   DNS names or IP addresses in a connection definition can include the `*` or `?` wildcards.

   a. **In the Connection Definitions table, click the Add button.**

      The Add New Connection Definition window is displayed.

b. **In the Client Device Address field, type an IP address or DNS name.**

c. **In the Secure Global Desktop Server Address, type an IP address or DNS name.**

d. **Select a Connection Type from the list.**

e. **Click Add.**

The Add New Connection Definition window closes and the connection definition is added to the Connection Definitions table.

4. **Add further connection definitions as needed.**

The Connection Definitions table also shows the definitions that are inherited from parent objects in the organizational hierarchy.

5. **Use the Move Up and Move Down buttons to change the order of the connection definitions.**

The order of the connection definitions is important. The first matching entry is used. Make sure the most specific definitions appear before more general ones.

Client Connections and Security Warnings

When using secure connections between client devices and SGD, users see some or all of the following security warnings:

- Browser and Java Plug-in tool security warnings
- SGD server certificate security warnings
- Untrusted initial connection warnings

Note – Users might see these warnings *even if* SGD security services are not enabled. This is because the initial connection between an SGD Client and an SGD server is always secure.

This section describes why these warnings occur and what you can do about them.

Browser and Java Plug-in Tool Security Warnings

If you have enabled secure connections (HTTPS) to the SGD Web Server, users see a warning if the CA or root certificate used to sign the web server certificate is not available in the browser's certificate store. To enable the web server certificate to be validated without displaying a security warning, import the CA or root certificate into the user's browser certificate store. Use the browser's tools to do this.

If Java technology is enabled in the browser, the Java Plug-in tool might also warn users about the web server's certificate. This depends on the configuration in the Java Control Panel. By default, the Java Plug-in tool is configured to use the certificates in the browser certificate store. If the Plug-in tool is not configured to do this, you might have to import the CA or root certificate using the Java Control Panel.

SGD Server Certificate Security Warnings

When a user logs in to an SGD server that has a server certificate, the SGD Client validates the certificate before proceeding.

If there is a problem with a server certificate, users see a security warning message. The security warning message enables users to view the certificate details before deciding to accept the certificate permanently or temporarily, or to reject the certificate. FIGURE 1-3 shows an example security warning message.

FIGURE 1-3 Example SGD Server Certificate Security Warning Message

If users reject the certificate, the connection to SGD is terminated.

If users accept the certificate temporarily, and they agree to the initial connection, the certificate details are cached for the lifetime of the user session. When users next log in, they are prompted about the certificate again. If users accept the certificate permanently, and they agree to the initial connection, they are not prompted about the certificate again. For details about agreeing to the initial connection, see "Untrusted Initial Connection Warnings" on page 44.

Users see security warnings about certificates in the following circumstances:

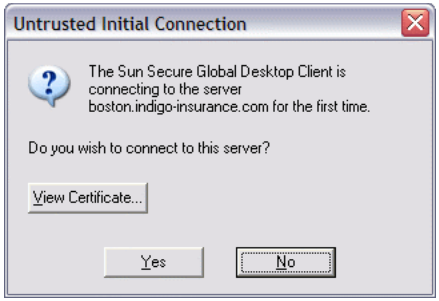
- **Invalid dates** – The current date is earlier than the Not Before date in the certificate, or the current date is later than the Not After date in the certificate
- **Incorrect host name** – The name of the host the SGD Client is connecting to does not match the Subject or Subject Alt Name in the certificate
- **Issuer unknown** – The certificate is signed by an unsupported CA

For details about how to avoid issuer unknown security warnings, see "Avoiding Issuer Unknown Security Warnings" on page 46.

Untrusted Initial Connection Warnings

SGD requires users to authorize their connections to SGD so that they only connect to servers they trust. The first time a user connects to an SGD server, they see an Untrusted Initial Connection message advising that they are connecting to a server for the first time, as shown in FIGURE 1-4.

FIGURE 1-4 Untrusted Initial Connection Warning



Users can check the certificate details by clicking the View Certificate button and checking that the Validity and Subject details are correct. Users must do this *before* clicking Yes to agree to the connection. When a user agrees to a connection, the following files are updated on the client device:

- `hostsvisited`
- `certstore.pem`

The `hostsvisited` and `certstore.pem` files are stored in the same location as the user's client profile cache. See "About the Profile Cache" on page 312 for details.

When a user agrees to a connection to an SGD server, the `hostsvisited` file on the client device is updated with the name of the SGD server. If the server certificate is signed by an unsupported CA, the fingerprint of the CA certificate is also added. The user is not prompted about the connection again, unless there is a problem.

When a user agrees to a connection to an SGD server, and the server certificate is valid, the server certificate is added to the `certstore.pem` file on the client device.

If there is a problem with the server certificate, for example because it is signed by an unsupported CA, users see a certificate security warning, as described in "SGD Server Certificate Security Warnings" on page 43. If a user permanently accepts the certificate, or the certificate and its CA chain, and agrees to the connection to an SGD server, the certificate is added to the `certstore.pem` file on the client device. When the user next logs in, they *are not prompted* about the certificate. If a user accepts the certificate temporarily, and they agree to the connection to an SGD server, the certificate is not added to the `certstore.pem` file on the client device. When the user next logs in, they *are prompted* about the certificate.

If there is a problem with the connection, for example because the server certificate has changed, a Potentially Unsafe Connection message displays, as shown in FIGURE 1-5.

FIGURE 1-5 Potentially Unsafe Connection Message

To ensure that users only connect to SGD servers that are trusted, SGD Administrators can do the following:

- Explain to users the security implications of agreeing to a connection to an SGD server.
- Provide users with a preconfigured `hostsvisited` file. See "Using a Preconfigured `hostsvisited` File" on page 46.

See also "Avoiding Issuer Unknown Security Warnings" on page 46 for details of how to prevent users from seeing issuer known security warnings.

Using a Preconfigured `hostsvisited` *File*

A preconfigured `hostsvisited` file can be used to prevent users from seeing a warning when the SGD Client first connects to an SGD server. You can also use it to restrict the SGD servers to which the SGD Client can connect.

To use a preconfigured `hostsvisited` file, first create a file containing the host names of all the SGD servers. If the server certificate for an SGD server is signed by an unsupported CA, you must also add the fingerprint of the CA certificate. The easiest way to do this is to copy and edit an existing `hostsvisited` file, and then install it on client devices. You can also obtain the CA certificate fingerprint using the `tarantella security fingerprint` command.

You can manually add an `<allowhostoverride>` line to the `hostsvisited` file. If the value of `<allowhostoverride>` line is `0`, the SGD Client can only connect to SGD servers that have entries in the `hostsvisited` file. If the value of `<allowhostoverride>` line is `1`, or if the `<allowhostoverride>` line is missing, the SGD Client can connect to any SGD server. Users only see a warning when the SGD Client connects to an SGD server that is not listed in the `hostsvisited` file.

The following is an example `hostsvisited` file.

```
<?xml version="1.0" encoding="UTF-8" ?>
<array>
 <allowhostoverride>0</allowhostoverride>
 <server peername="boston.indigo-insurance.com">
  <certfingerprint>51:B7:6D:FA:6E:3B:BE:ED:37:73:D4:9D:5B:C5:71:F6
  </certfingerprint>
 </server>
</array>
```

Avoiding Issuer Unknown Security Warnings

Issuer unknown security warnings occur when the server certificate for an SGD server is issued by an unsupported CA. The warning displays because the issuer of certificate cannot be validated.

The easiest way to avoid issuer unknown security warnings is to ensure that a server certificate is signed by a supported CA. See "Supported Certificate Authorities" on page 23 for details.

To enable the certificate to be validated, you must install the CA certificate or certificate chain. However, even if you install the CA certificate, users see a security warning about the certificate the first time they connect to the SGD server. The only way to prevent users from being warned about the certificate is add the server certificate to the `certstore.pem` file on the client device. The server certificate is stored in the `/opt/tarantella/var/tsp/cert.pem` file on each SGD server.

The SSL Daemon

The SSL Daemon is the SGD component that handles secure connections between SGD Clients and SGD servers. On the SGD host, the SSL Daemon is listed as one or more `ttassl` processes.

By default, the SSL Daemon listens on TCP port 5307 for AIP traffic that has been encrypted with SSL. However, if you are using firewall traversal, the SSL Daemon listens on port 443, and accepts AIP and HTTPS traffic. In this situation, the Daemon handles the AIP traffic but forwards the HTTPS traffic on to the SGD Web Server.

Sometimes the load on the SSL Daemon can affect performance. You can tune the SSL Daemon so that it starts new processes as the load increases. If you have a multi-processor server, tuning the number of SSL Daemon processes to the number of processors can also improve performance.

SSL Daemon tuning is specific to each SGD server. You have to tune each server individually.

By default, one SSL Daemon process starts when SGD security services are started and, as the number of connections increases, no further processes are started. You can increase the maximum number of SSL Daemon processes. This enables the SSL Daemon to start new processes as the number of connections increases, up to the maximum number of processes. If you find you regularly need multiple SSL Daemon processes, you can increase the minimum number of SSL Daemon processes. This controls the minimum number of SSL Daemon processes that are started automatically when SGD security services are started. See "How to Tune SSL Daemon Processes" on page 48 for detail of how to change the maximum and minimum number of SSL Daemon processes.

Caution – Once an SSL Daemon process is started, it continues to run *even if* the load reduces.

You can use log filters to monitor SSL Daemon processes. By default, all errors are logged. You can increase the amount of log output to assist with tuning or for troubleshooting, see "How to Change SSL Daemon Log Filters" on page 48. The log filters you use have the same format as the log filters used for the SGD server. See "Using Log Filters to Troubleshoot Problems With an SGD Server" on page 369. The same severity and destination file options can be used. By default, all errors are logged to the `/opt/tarantella/var/log` directory.

If the SSL Daemon exits unexpectedly, it makes 10 attempts to restart before failing completely. You can change the maximum number of restart attempts, see "How to Change SSL Daemon Maximum Restart Attempts" on page 49.

▼ How to Tune SSL Daemon Processes

Ensure that no users are logged in to the SGD server and that there are no running application sessions, including suspended application sessions.

1. **Log in to the SGD host as superuser (root).**
2. **(Optional) Change the minimum number of SSL Daemon processes.**

   Use the following command:

```
# tarantella config edit \
--tarantella-config-ssldaemon-minprocesses num
```

   The default minimum is 1.

3. **(Optional) Change the maximum number of SSL Daemon processes.**

   Use the following command:

```
# tarantella config edit \
--tarantella-config-ssldaemon-maxprocesses num
```

   The default maximum is 1.

4. **Restart the SGD server.**

   You must restart the SGD server for the change to take effect.

▼ How to Change SSL Daemon Log Filters

Ensure that no users are logged in to the SGD server and that there are no running application sessions, including suspended application sessions.

1. **Log in to the SGD host as superuser (root).**
2. **Change the SSL Daemon log filters.**

   Use the following command:

```
# tarantella config edit \
--tarantella-config-ssldaemon-logfilter filter ...
```

   Use a comma-separated list of filters.

   The default filters are:

   `ssldaemon/*/*error,multi/daemon/*error:sslmulti%%PID%%.log`

3. **Restart the SGD server.**

   You must restart the SGD server for the change to take effect.

▼ How to Change SSL Daemon Maximum Restart Attempts

Ensure that no users are logged in to the SGD server and that there are no running application sessions, including suspended application sessions.

1. **Log in to the SGD host as superuser (root).**
2. **Change the maximum number of SSL Daemon restart attempts.**

   Use the following command:

```
# tarantella config edit \
--tarantella-config-ssldaemon-maxrestarts num
```

   The default maximum number is 10. Setting the number of restart attempts to `-1` means there is no limit on the number of restart attempts.

3. **Restart the SGD server.**

   You must restart the SGD server for the change to take effect.

Selecting a Cipher Suite for Secure Client Connections

You can select the cipher suite that is used for secure connections between SGD Clients and SGD servers, see "How to Change the Cipher Suite for Secure Client Connections" on page 50 for details.

A cipher suite is a set of cryptographic algorithms used for the following:

- **Key exchange** – Protects the information required to create shared keys
- **Bulk encryption** – Encrypts messages exchanged between clients and servers
- **Message authentication** – Generates message hashes and signatures to ensure the integrity of a message

A cipher suite specifies one algorithm for each of these tasks. For example, the RSA_WITH_RC4_128_MD5 cipher suite uses RSA for key exchange, RC4 with a 128-bit key for bulk encryption, and MD5 for message authentication.

TABLE 1-1 lists the supported cipher suites.

TABLE 1-1 Supported Cipher Suites for Secure Client Connections

Supported Cipher Suite	Client Preference	OpenSSL Name
RSA_WITH_AES_256_CBC_SHA	1	AES256-SHA
RSA_WITH_AES_128_CBC_SHA	2	AES128-SHA
RSA_WITH_3DES_EDE_CBC_SHA	3	DES-CBC3-SHA
RSA_WITH_RC4_128_SHA	4	RC4-SHA
RSA_WITH_RC4_128_MD5	5	RC4-MD5
RSA_WITH_DES_CBC_SHA	6	DES-CBC-SHA

When selecting a cipher suite, you use the OpenSSL Name of the cipher suite, as shown in TABLE 1-1. If you select more than one cipher suite, the SGD Client determines which suite is used, based on the client preference order shown in the table above.

By default, the SGD Client uses the RSA_WITH_AES_256_CBC_SHAcipher suite.

▼ How to Change the Cipher Suite for Secure Client Connections

Ensure that no users are logged in to the SGD servers in the array and that there are no running application sessions, including suspended application sessions.

1. **Log in as superuser (root) on the primary SGD server in the array.**
2. **Stop all the SGD servers in the array.**
3. **Specify the cipher suite.**

   Use the following command:

```
# tarantella config edit \
--tarantella-config-security-ciphers cipher-suite ...
```

   where *cipher-suite* is the OpenSSL Name of a cipher suite.

   If you specify more than one *cipher-suite*, use a colon-separated list.

   The default setting is `AES256-SHA:RC4-MD5`

4. **Restart all the SGD servers in the array.**

   You must restart the SGD servers for the change to take effect.

Using External SSL Accelerators

SGD supports the use of external SSL accelerators. Performance can be improved by off-loading the processor-intensive transactions required for SSL connections to an external SSL accelerator. External SSL accelerators can also be used to centralize server certificates.

To use an external SSL accelerator with SGD, do the following:

- Install the security certificate for each SGD server in the array on the external SSL accelerator
- Configure the external SSL accelerator to decrypt SSL connections and forward them as unencrypted connections to SGD
- Enable external SSL accelerator support in SGD

When you enable external SSL accelerator support, the SGD SSL Daemon can accept plain text traffic on the port configured for secure connections, and forward it to SGD as SSL traffic it had decrypted itself.

If you are using server-side proxy servers, you might have to configure your array routes for external SSL accelerators. See "Configuring Server-Side Proxy Servers" on page 12.

▼ How to Enable External SSL Accelerator Support

Ensure that no users are logged in to the SGD server and that there are no running application sessions, including suspended application sessions.

1. **In the Administration Console, go the Secure Global Desktop Servers tab and select an SGD server.**
2. **Go to the Security tab.**
3. **Select the SSL Accelerator Support check box.**
4. **Click Save.**
5. **Restart the SGD server.**

   You must restart the SGD server for the change to take effect.

Securing Connections Between SGD Servers

In a standard installation, the data transmitted between the SGD servers in an array is not encrypted. SGD Administrators can secure the connections between array members using SSL. Using SSL for these connections ensures the integrity of the data as follows:

- Communication only takes place between SGD servers that have authenticated to each other
- Data is encrypted before transmission
- Data can be checked to ensure that it has not changed during transmission

Using SSL in this way is known as *secure intra-array communication*.

Using Secure Intra-Array Communication

Using secure intra-array communication means that each SGD server in the array has to have a valid server certificate that has been signed by a trusted certificate authority (CA).

As the certificates used for secure intra-array communication are used only internally by SGD, the primary SGD server in the array acts as the CA. The primary SGD server has a self-signed CA certificate and a private key. All secondary SGD servers in the array have a copy of the primary SGD server's CA certificate in a trusted certificate store, the truststore.

All SGD servers in the array, including the primary, have a server certificate and a private key. The server certificate is signed with the primary SGD server's CA certificate and contains a common name (CN) which is the peer DNS name of the SGD server. As these certificates are created using a self-signed CA certificate, they cannot be used to secure any other SGD-related connection. These certificates are referred to as *server peer certificates* to distinguish them from other types of server certificates.

When one SGD server in the array connects to another, including when using an administration tool, the SGD server being connected to presents its server peer certificate as part of the SSL negotiation. The connecting server evaluates the certificate and checks the following:

- The CN of the certificate matches the peer DNS name of the connecting server
- The expiry date of the certificate

- The issuer of the certificate, which must be the CA certificate of the primary

If the certificate is valid, a secure connection is established.

Secure intra-array communication can only be enabled on an SGD server that is not joined with other SGD servers in an array. When secure intra-array communication is enabled for an array, an SGD server can only join the array if it also has secure intra-array communication enabled.

Managing CA and Server Peer Certificates

When you enable secure intra-array communication, SGD automatically generates and distributes the CA and server peer certificates to the members of the array. Whenever there is a change in the array structure, SGD automatically updates the CA and server peer certificates. The following table summarizes what happens.

Array Change	Action
Server joins the array	1. The primary SGD server CA certificate is installed on the new secondary server. 2. The new secondary SGD server obtains a new server peer certificate signed with the primary SGD server CA certificate.
Server leaves the array	1. The detached SGD server becomes the primary SGD server in an array containing one server. 2. The detached SGD server creates a new CA certificate for itself. 3. The detached SGD server creates a new server peer certificate for itself.
New primary server appointed	1. The new primary SGD server generates a new CA certificate. 2. The new primary CA certificate is installed on all secondary SGD servers. 3. All SGD servers obtain a new server peer certificate signed with the new primary SGD server CA certificate.

SGD Administrators can use the `tarantella security peerca --show` command to view certificates in the truststore. The truststore contains the primary SGD server's CA certificate.

▼ How to Enable Secure Intra-Array Communication

Ensure that no users are logged in to the SGD servers in the array and that there are no running application sessions, including suspended application sessions.

You can only enable secure intra-array communication from the command line.

1. **Dismantle the array.**

   If secure intra-array communication is not enabled for an array, you must dismantle the array, enable secure intra-array communication on each SGD server, and then rebuild the array.

   a. **Log in as an SGD Administrator on the *primary* SGD server.**

   b. **Dismantle the array by detaching all the secondary servers.**

      Use the following command:

```
$ tarantella array detach --secondary server
```

   c. **Check the status of each SGD server.**

      Run the `tarantella status` command on *each array member* to check that the array is completely dismantled.

2. **Enable secure intra-array communication.**

   Secure intra-array communication can only be enabled on an SGD server that is not joined with other SGD servers in an array.

   You enable secure intra-array communication for an SGD server as follows.

   a. **Log in as superuser (root) on the SGD server.**

   b. **Stop the SGD server.**

   c. **Enable secure intra-array communication.**

      Use the following command:

```
# tarantella config edit \
--tarantella-config-security-peerssl-enabled 1
```

   d. **Start the SGD server.**

3. **Rebuild the array.**

   When secure intra-array communication is enabled for an array, an SGD server can only join the array if it also has secure intra-array communication enabled.

   Only add one server to an array at a time.

   When secure intra-array communication is enabled, you add an SGD server to an array as follows.

   a. **Log in as superuser (root) on the SGD server that you want to add to the array.**

   b. **Display the fingerprint of the SGD server's CA certificate.**

      Use the following command:

```
# tarantella security peerca --show
```

   c. **Make a note of the fingerprint of the SGD server's CA certificate.**

   d. **Log in as superuser (root) on the primary SGD server in the array.**

   e. **Join the SGD server to the array as a secondary server.**

      Use the following command to add the SGD server.

```
# tarantella array join --secondary serv
```

      You are prompted to trust the secondary SGD server's CA certificate, and the fingerprint of the certificate is displayed.

   f. **Check that the fingerprint is correct and complete the array join.**

      Check that the certificate fingerprint matches the fingerprint displayed in Step b. This is important as it verifies that the primary SGD server is communicating with the genuine secondary SGD server.

      If the fingerprints match, complete the array join by accepting the secondary SGD server's CA certificate.

   g. **Check the status of the array.**

      Use the `tarantella status` command to check the status of the array.

Selecting a Cipher Suite for Secure Intra-Array Communication

You can select the cipher suite that is used for secure connections between the SGD servers in the array, see "How to Change the Cipher Suite for Secure Intra-Array Communication" on page 56 for details.

A cipher suite is a set of cryptographic algorithms used for the following:

- **Key exchange** – Protects the information required to create shared keys
- **Bulk encryption** – Encrypts messages exchanged between clients and servers
- **Message authentication** – Generates message hashes and signatures to ensure the integrity of a message

A cipher suite specifies one algorithm for each of these tasks. For example, the RSA_WITH_RC4_128_MD5 cipher suite uses RSA for key exchange, RC4 with a 128-bit key for bulk encryption, and MD5 for message authentication.

TABLE 1-2 lists the supported cipher suites.

TABLE 1-2 Supported Cipher Suites for Secure Intra-Array Communication

Supported Cipher Suite	JSSE Name
RSA_WITH_AES_256_CBC_SHA	TLS_RSA_WITH_AES_256_CBC_SHA
RSA_WITH_AES_128_CBC_SHA	TLS_RSA_WITH_AES_128_CBC_SHA
RSA_WITH_3DES_EDE_CBC_SHA	SSL_RSA_WITH_3DES_EDE_CBC_SHA
RSA_WITH_RC4_128_SHA	SSL_RSA_WITH_RC4_128_SHA
RSA_WITH_RC4_128_MD5	SSL_RSA_WITH_RC4_128_MD5
RSA_WITH_DES_CBC_SHA	SSL_RSA_WITH_DES_CBC_SHA

When selecting a cipher suite, you use the Java Secure Socket Extension (JSSE) Name of the cipher suite, as shown in TABLE 1-2. If you select more than one cipher suite, the first cipher suite listed is used.

By default, the SGD uses the RSA_WITH_AES_256_CBC_SHA cipher suite.

▼ How to Change the Cipher Suite for Secure Intra-Array Communication

Ensure that no users are logged in to the SGD servers in the array and that there are no running application sessions, including suspended application sessions.

1. **Log in as superuser (root) on the primary SGD server in the array.**
2. **Stop all the SGD servers in the array.**

3. **Specify the cipher suite.**

   Use the following command:

```
# tarantella config edit \
--tarantella-config-security-peerssl-ciphers cipher-suite ...
```

   where *cipher-suite* is the JSSE Name of a cipher suite.

   If you specify more than one *cipher-suite*, use a colon-separated list.

   The default setting is `TLS_RSA_WITH_AES_128_CBC_SHA`.

4. **Start all the SGD servers in the array.**

Securing Connections to Application Servers with SSH

SGD can use SSH to provide secure connections between SGD servers and application servers. SSH provides the following benefits:

- All communication between application servers and SGD servers using SSH is encrypted, including the X protocol if you are running X applications
- User names and passwords are always encrypted before being transmitted over the network

This section includes the following topics:

SSH Support

SGD works with SSH version 2.x or later. Because of SSH version compatibility problems, use the same major version of SSH, either version 2 or version 3, on all SGD hosts and application servers.

SGD can automatically detect that SSH is installed on the SGD host if SSH is installed in one of the following directories:

- `/usr/local/bin`
- `/usr/bin`
- `/usr/sbin`
- `/usr/lbin`
- `/bin`
- `/sbin`

If you want to run the SSH client from a different location, or you want to specify particular command-line arguments for the client, see "Configuring the SSH Client" on page 58 for details.

To connect to an application server using SSH, the following must be true:

- SSH must be installed on the SGD host and on the application server
- The application object's Connection Method attribute must be ssh

To connect to an X application using SSH, you must enable X11 forwarding. See "Enabling X11 Forwarding" on page 60 for details.

Configuring the SSH Client

When using SSH with SGD, you can configure the command-line arguments used by the SSH client. The arguments can be configured globally, for individual applications, or a combination of both.

You configure the *global options* for the SSH client by setting the `TTASSHCLIENT` environment variable, see "How to Set Global SSH Client Options" on page 59 for details. Use the global SSH client configuration in the following situations:

- SSH is not installed in one of the default locations
- To use the same SSH client command-line arguments for all applications

You configure the *application options* for the SSH client by configuring the SSH Arguments attribute for the application object, see "How to Set Application SSH Client Options" on page 59 for details.

You can combine the global and application SSH client configuration to set the path to the SSH client and set the command-line arguments.

Note – If you do this, any global command-line arguments are ignored.

The following table shows the effect of global and application configuration on the `ssh` command used.

Global Configuration	Application Configuration	SSH Command Used
[none]	[none]	`ssh -l` *user@host*
[none]	`-X`	`ssh -X -l` *user@host*
`/usr/ssh -X`	[none]	`/usr/ssh -X -l` *user@host*
`/usr/ssh -X`	`-p` *port*	`/usr/ssh -p` *port* `-l` *user@host*

▼ How to Set Global SSH Client Options

Ensure that no users are logged in to the SGD server and that there are no running application sessions, including suspended application sessions.

1. **Log on as superuser (root) on the SGD host.**
2. **Stop the SGD server.**
3. **Set the `TTASSHCLIENT` environment variable.**

   Include the full path to the SSH client program and any required command-line arguments. For example:

```
# TTASSHCLIENT="/usr/local/bin/ssh -q -X"; export TTASSHCLIENT
```

Note – If you only want to set command-line arguments for the SSH client, you have to include the full path to the SSH client program, *even if* the SSH program is in a location where SGD can detect it.

4. **Restart the SGD server.**

▼ How to Set Application SSH Client Options

1. **In the Administration Console, go the Applications tab and select the application.**
2. **Go to the Launch tab.**
3. **Ensure that the ssh option is selected for the Connection Method.**
4. **In the SSH Arguments field, type the SSH arguments you want to use for the application.**

5. **Click Save.**

Enabling X11 Forwarding

To display X applications using SGD using an SSH connection, you must enable X11 forwarding.

▼ How to Enable X11 Forwarding

1. **Log in as superuser (root) on the SGD host.**
2. **Configure the SSH daemon.**

   Edit the `sshd_config` file and add the following line:

   ```
   X11Forwarding yes
   ```

3. **Configure the SSH client.**

   Do either of the following:

   - Edit the `ssh_config` file and include the following lines:

     ```
     ForwardAgent yes
     ForwardX11 yes
     ```

   - Configure the SSH client to use the `-X` command-line argument.

     See "Configuring the SSH Client" on page 58 for details.

4. **Restart the SSH daemon.**

Using SSH and the X Security Extension

SGD supports the X Security extension. The X Security extension only works with versions of SSH that support the `-Y` option. For OpenSSH, this is version 3.8 or later. You enable the X security extension by configuring the application objects individual applications as follows:

▼ How to Enable the X Security Extension

1. **In the Administration Console, go to the Applications tab and select the application.**
2. **Go to the Launch tab.**

3. **Ensure that the ssh option is selected for the Connection Method.**
4. **Select the X Security Extension check box.**
5. **Click Save.**

Using SSH and X Authorization

If SSH connections fail when X authorization is enabled, you might have to run the SSH daemon in IPv4-only mode because SGD might not support the xsecurity extension used on your server. You enable IP version 4 mode by editing your system SSH configuration file. For example:

- On SUSE Linux, edit the `/etc/sysconfig/ssh` file and add the following line:

  ```
  SSHD_OPTS="-4"
  ```

- On Red Hat Enterprise Linux, edit the `/etc/sysconfig/sshd` file and add the following line:

  ```
  OPTIONS="-4"
  ```

Note – If the SSH configuration file does not exist on your system, you can create it.

You must restart the SSH daemon after making this change.

Using Advanced SSH Functions

Certain SSH functionality, such as client keys, requires that the SSH client process runs as a privileged user. However, for security reasons, the SGD server processes and the SSH client process run as a non-privileged user.

To use advanced SSH functions, you must make the SGD `ttasshhelper` application a setuid root process. You do this by running the following commands as superuser (root) on each SGD server in the array:

```
# chown root /opt/tarantella/bin/bin/ttasshhelper
# chmod 4510 /opt/tarantella/bin/bin/ttasshhelper
```

Caution – If you make these changes, you must protect your SGD servers from unauthorized access.

Known Limitation With Client Keys

If you are using the SSH client keys functionality, users might be prompted for a user name and password when they start an application. Users are prompted because SGD needs to know the user name to use for the SSH connection. Although users are also prompted for a password, the password is not actually used. Users are only prompted for a user name and password if they do not have an entry in the password cache for the application server, or if the password cache is disabled. If users are prompted, they only need to provide a user name. The password field can be left blank.

CHAPTER 2

User Authentication

SGD has two stages to user authentication. First, users authenticate to an SGD server to log in to SGD. This is known as *Secure Global Desktop authentication*. Second, users authenticate to an application server to run an application. This is known as *application authentication*. User authentication is described in the following topics:

The following topics describe the Secure Global Desktop authentication mechanisms and how they are configured:

The following troubleshooting topics are also included:

Secure Global Desktop Authentication

SGD is designed to integrate with your existing authentication infrastructure and supports the following two mechanisms for authenticating users:

- **System authentication.** SGD tries to authenticate the user's credentials against one or more external authentication services, for example an LDAP directory. See "System Authentication Mechanisms" on page 65 for details of the available system authentication mechanisms.
- **Third-party authentication.** An external mechanism authenticates the user and SGD trusts that the authentication is correct. The most common use of third-party authentication is web server authentication. See "Third-Party and Web Server Authentication" on page 93 for more details.

The following are main results of a successful authentication:

- **A user identity.** The SGD idea of who a user is. See "User Identity" on page 64 for more details.
- **A user profile.** The user's SGD-related settings. See "User Profile" on page 65 for more details.

Sometimes the user identity and the user profile are the same.

In the SGD Administration Console, you can monitor user sessions and application sessions using either the user identity or the user profile.

Depending on how users are authenticated, SGD can prompt users to change their password when they try to log in with an expired password. See "Password Expiry" on page 67 for details.

SGD authentication is global. A user can log in to each SGD server in the array with the same user name and password.

SGD Administrators can enable and disable each authentication mechanism independently, as follows:

- In the Administration Console, use the Global Settings → Secure Global Desktop Authentication tab.
- On the command line, use the `tarantella config` command.

User Identity

A user identity is the SGD idea of who a user is. Each authentication mechanism has its own set of rules for determining the user identity.

A user identity is a name assigned by SGD and is sometimes referred to as the *fully qualified name*. The user identity is not necessarily the name of a user profile in the local repository. For example, for Lightweight Directory Access Protocol (LDAP) authentication the identity is the distinguished name (DN) of the user in the LDAP directory.

The user identity is associated with the user's SGD session, their application sessions, and their entries in the application server password cache.

User Profile

A user profile controls a user's SGD-specific settings. Depending on whether or not you use an LDAP directory to assign applications to users, a user profile can also control the applications a user can access through SGD, sometimes called *webtop content*. Each authentication mechanism has its own set of rules for determining the user profile.

A user profile is always an object in the local repository and is sometimes referred to as an *equivalent name*. A user profile can be a special object called a profile object stored in the System Objects organization. For example, for LDAP authentication the default user profile is `System Objects/LDAP Profile`.

System Authentication Mechanisms

The following table lists the available system authentication mechanisms and describes the basis for authentication.

TABLE 2-1 System Authentication Mechanisms

Mechanism	Description
Anonymous user	Enables users to log in to SGD without using a user name and password. All anonymous users have the same webtop content. See "Anonymous User Authentication" on page 83.
Authentication token	Enables users to log in to SGD if the SGD Client supplies a valid authentication token. Users might have their own webtop content, depending on configuration. Used when the SGD Client operates in Integrated mode, see "Integrated Mode" on page 315.
UNIX system – Search Unix User ID in Local Repository	Enables users to log in to SGD if they have user profiles in the local repository and UNIX or Linux system accounts on the SGD host. Users might have their own webtop content, depending on configuration. See "UNIX System Authentication" on page 107.

TABLE 2-1 System Authentication Mechanisms

Mechanism	Description
Windows Domain	Enables users to log in to SGD if they belong to a specified Windows domain. Users might have their own webtop content, depending on configuration. See "Windows Domain Authentication" on page 110
LDAP	Enables users to log in to SGD if they have an entry in an LDAP directory. Users might have their own webtop content, depending on configuration. See "LDAP Authentication" on page 85
Active Directory	Enables users to log in to SGD if they have an account in an Active Directory domain. Users might have their own webtop content, depending on configuration. See "Active Directory Authentication" on page 74.
UNIX system – Search Unix Group ID in Local Repository	Enables users to log in to SGD if they have UNIX or Linux system accounts on the SGD host. All users in the same UNIX group have the same webtop content. See "UNIX System Authentication" on page 107.
UNIX system – Use Default User Profile	Enables users to log in to SGD if they have UNIX or Linux system accounts on the SGD host. All UNIX users have the same webtop content. See "UNIX System Authentication" on page 107.
SecurID	Enables users with RSA SecurID tokens to log in to SGD. Users might have their own webtop content, depending on configuration. See "SecurID Authentication" on page 90

When a user logs in, the enabled authentication mechanisms are tried in the order they are listed in TABLE 2-1. When you configure SGD authentication, the Administration Console shows the order in which the mechanisms are tried. The first authentication mechanism that authenticates a user "wins" and no further authentication mechanisms are tried.

Password Expiry

In most circumstances, SGD can handle the expiry of the user's password if configured to do so. When a user attempts to log in to SGD with an expired password, the Aged Password dialog displays. This dialog does the following:

- Confirms that the password has expired
- Enables the user to enter and confirm a new password

If the new password is accepted, the user is logged in to SGD.

The following table shows which authentication mechanisms support aged passwords.

Authentication Mechanism	Aged Password Support
Active Directory	Yes. See "Kerberos Configuration File" on page 77 for details.
Anonymous user	Not applicable. User logs in without a user name or password.
Authentication token	Not applicable. User logs in without a user name or password.
LDAP	Yes. See "LDAP Authentication and Password Expiry" on page 88 for details.
SecurID	Yes. If the user's PIN has expired, a new PIN dialog is displayed instead of the Aged Password dialog.
Third-party (including web server authentication)	No. The expiry of the user's password is handled by the third-party authentication mechanism and is nothing to do with SGD.
UNIX system	Yes. See "UNIX System Authentication and PAM" on page 109 for details.
Windows domain	No.

Security and Passwords

When logging in to SGD, passwords and authentication tokens are only encrypted if there is an Hypertext Transfer Protocol over Secure Socket Layer (HTTPS) connection.

SGD uses external mechanisms for authenticating users. The security of passwords when authenticating users is as follows:

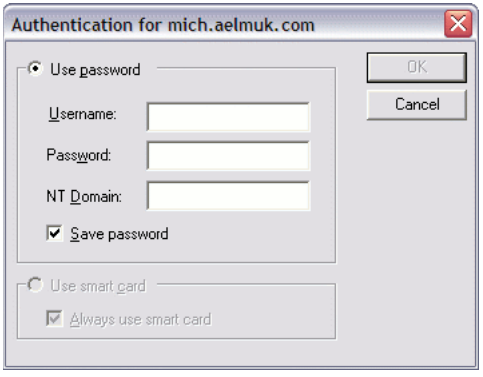
- Active Directory authentication uses the Kerberos protocol for authentication, which is secure
- LDAP authentication can be configured to use a secure connection
- Web server authentication is only secure if the user has an HTTPS connection
- All other authentication mechanisms use the native protocols for authenticating users

Application Authentication

When a user clicks a link to start an application, the login script configured for the application connects to the application server, handles the authentication process, and starts the application.

The Execution Protocol Engine is the SGD component that runs the login script. The login script authenticates the user to the application server by submitting a user name and password stored in the SGD application server password cache. If there is a problem with the user's credentials, SGD displays an Application Authentication dialog as follows:

FIGURE 2-1 Screen Capture of the SGD Application Authentication Dialog



The Application Authentication dialog enables users to enter their credentials and store them in the application server password cache so that they are not prompted when they next run an application on that application server.

Users can also force SGD to display the Application Authentication dialog by holding down the Shift key when they click an application's link on the webtop.

Note – You cannot use the Shift key in this way when the SGD Client is in Integrated mode.

This section includes the following topics:

Login Scripts

SGD uses login scripts to handle the connection to the application server, to run the application, and to perform additional tasks.

Typically a login script performs the following tasks:

- Logs in to the application server, prompting the user for a password if necessary.
- Sets environment variables. These are the variables specified by the Environment Variables attribute on the Launch tab for the application object.
- Starts any window manager programs. These are the programs specified by the Window Manager attribute on the Presentation tab for the application object.
- Starts an input method or input method editor if one is required.
- Runs the command to start the application.

The login script takes into account the differences between application servers, and checks for any errors that might occur during the login process. If an error is encountered that cannot be handled, control is passed back to the user.

The SGD login scripts are designed to be as universal and robust as possible. However, you might need to cope with an unusual scenario. For example, if you have a system prompt that is not catered for, you can add it to the list of prompts recognized by the script.

The login scripts supplied with SGD also contain commands and procedures that you can use to customize the display of the Application Authentication dialog, for example by adding your own labels for the Username and Password fields.

If you need to customize a login script, make a copy of an SGD login script and work on the copy. Do not modify the standard SGD login scripts. Appendix E contains detailed reference information about SGD login scripts.

Configuring Application Authentication

In the Administration Console, the attributes on the Global Settings → Application Authentication tab control application authentication. These attributes allow you to configure the following:

- Whether to automatically try the user's SGD user name and password when logging in to an application server if these details have been cached
- What action to take if the user's application server password has expired
- Whether to log in to a Microsoft Windows application server using a smart card
- When to display the Application Authentication dialog, what the default settings are on the dialog, and whether users can change them

Using RSA SecurID for Application Authentication

SGD supports RSA SecurID authentication for X and character applications.

To use SecurID authentication, ensure that users can log in to the application server using SecurID before introducing SGD. When you are ready to use SecurID authentication, configure the application object to use the `securid.exp` login script.

When logging in to an application server that uses SecurID authentication, users enter a user name and password. When they click OK, they are prompted for a passcode.

In the Administration Console, go to the Global Settings → Application Authentication tab and deselect the Password Cache Usage check box. This prevents SGD from using SGD login details when logging in to the application server.

The Application Server Password Cache

By default, SGD stores the user names and passwords used to run applications in its application server password cache. SGD also stores the user names and passwords used to log in to SGD.

Managing the Application Server Password Cache

In the Administration Console, you can manage the application server password cache as follows:

- **The Caches → Passwords tab** – This tab enables you to manage any entry in the password cache
- **The Passwords tab for user profile objects** – This tab enables you to manage password cache entries for the selected user profile
- **The Passwords tab for application server objects** – This tab enables you to manage password cache entries for the selected application server

On the command line, you manage the application server password cache with the `tarantella passcache` family of commands.

You can use the Administration Console and the command line to list and delete entries in the password cache. You can also create entries in the password cache. With the `tarantella passcache` command, you can populate the password cache with a batch script.

Each entry in the password cache involves the following elements:

- **A user name** – The user name for the application server
- **A password** – The password for the application server
- **A resource** – The application server or domain name for which the password is cached
- **A user identity** –The identity of the user that "owns" the entry in the password cache

---

Note – The user's SGD password can also be stored in the password cache.

Security and the Password Cache

Entries in the application server password cache are encrypted with an encryption key. When starting applications, the passwords are decrypted as they are needed.

By default, the encryption key used for the password cache never changes. You can configure SGD to generate a new encryption key for the password cache whenever an SGD server restarts. In the Administration Console, go to the Global Settings → Security tab and select the New Password Encryption Key check box. Alternatively, use the following command:

```
$ tarantella config edit --security-newkeyonrestart 1
```

Existing entries in the password cache are re-encrypted with the new key.

Windows Domains and the Password Cache

When SGD caches a user's password for a Microsoft Windows application server, the password cache entry is created using the Windows domain name.

The domain name can be specified using the Domain Name attribute on application server objects, Windows application objects, or user profile objects. Users can also specify a domain name on the Application Authentication dialog.

When a user starts an application, SGD goes through the following process to establish the domain name and password cache entry to use:

1. Check if a domain name is set on the application server object.

   If a domain name is set, SGD searches the password cache for an entry for the user identity.

   If there is no domain name, or there is no entry in the password cache, move to step 2.

2. Check if a domain name is set on the application object.

   If a domain name is set, SGD searches the password cache for an entry for the user identity.

   If there is no domain name, or there is no entry in the password cache, move to step 3.

3. Check if the user typed a domain name type when they logged in to SGD.

   If you are using Windows Domain authentication, users can specify a domain name when they log in to SGD. They do this by typing a user name in the format `domain\name`, for example `indigo\rusty`.

   If a domain name is set, SGD searches the password cache for an entry for the user identity.

   If there is no domain name, or there is no entry in the password cache, SGD displays the Application Authentication dialog.

The Application Authentication dialog has an NT Domain field that enables users to set the domain name. This field is automatically completed if the Domain Name attribute is set for the application server or application object, or if the domain is cached in the password cache. If the Domain Name attribute is set only on the user profile object, the NT Domain field is not completed.

To force users to specify a domain when they start a Windows application for the first time, you must ensure that the Domain Name attribute is blank for the user profile object, the application server object, and the application object.

If a user's SGD password is also their Windows domain password, the domain name and password can be cached if the following are true:

- SGD must be configured to save the user's SGD user name and password in the password cache. SGD does this by default.
- The Domain Name must be set on the user profile object.

Note – If the user is authenticated using a Microsoft Active Directory server, you do not need to set the Domain Name attribute on the user profile object as the domain name can be inferred.

Supporting Users in Different Locales

To support users in different locales when starting applications, you might have to do the following:

- Add support for system prompts in different languages
- Enable an input method

The following sections describe how you do this.

Adding Support for System Prompts in Different Languages

By default, the login scripts supplied with SGD support English system prompts on application servers. SGD Administrators can add support for system prompts in other languages.

To do this, you edit the `vars.exp` login script and add a translation for each of the English prompts defined. The `vars.exp` login script is located in the `/opt/tarantella/var/serverresources/expect` directory on the SGD server. You do not need to translate every prompt, only the prompts that are different to the English ones. The file contains examples to help you get started. You can also provide translations for the variables, strings, and error message section to match the client or user locale.

In the Administration Console, configure the General tab → Prompt Locale attribute for your application server objects, to match a locale defined in `vars.exp`.

Enabling an Input Method

An input method is a program or operating system component that allows users to enter characters and symbols not found on their keyboard. On Microsoft Windows Platforms, an input method is called an input method editor (IME).

When running applications, SGD enables an IM if either the `TTA_PreferredLocale`, `TTA_HostLocale`, or the `LANG` (from the application environment overrides) environment variables are set to a locale that requires an IM. The locales that require an IM are controlled by the `IM_localeList` variable, defined in the `vars.exp` login script.

By default, an IM is enabled for all Japanese, Korean, and Chinese locales.

To enable an IM in other locales, you must edit `vars.exp` and add the locale to the `IM_localeList` variable.

Active Directory Authentication

Active Directory authentication enables users to log in to SGD if they have an account in an Active Directory domain. Active Directory authentication offers users a faster, more secure, and more scalable authentication mechanism than LDAP authentication. By using the Kerberos authentication protocol, SGD can securely authenticate any user against any domain in a forest.

Active Directory authentication is disabled by default.

This section includes the following topics:

How Active Directory Authentication Works

At the SGD login screen, the user types a user principal name and password. A user principal name is a user name and a domain name joined by the "@" sign, for example `indigo@indigo-insurance.com`.

SGD uses the Kerberos protocol to check the user principal name and password against a Key Distribution Center (KDC) for a domain.

If the authentication fails, the next authentication mechanism is tried.

If the Kerberos authentication succeeds, SGD establishes the user's identity by performing an LDAP search of Active Directory. Next, SGD searches for the user profile. See "User Identity and User Profile" on page 75 for details. If the Login

attribute of the user profile is not enabled, the user cannot log in and no further authentication mechanisms are tried. If the Login attribute of the user profile is enabled, the user is logged in.

User Identity and User Profile

The user identity is the LDAP identity. In the Administration Console, the user identity is displayed as *LDAP-ID* `(LDAP)`. On the command line, the user identity is displayed as `.../_service/sco/tta/ldapcache/`*LDAP-ID*.

SGD establishes the user profile by searching the local repository, allowing for differences between the LDAP and SGD naming systems. SGD searches for the following until a match is found:

- A user profile with the same name as the LDAP person object.

  For example, if the LDAP person object is `cn=Emma Rald,cn=Sales,dc=Indigo Insurance,dc=com`, SGD searches the local repository for `dc=com/dc=Indigo Insurance/cn=Sales/cn=Emma Rald`.

- A user profile in the same organizational unit as the LDAP person object but with the name `cn=LDAP Profile`.

  For example, `dc=com/dc=Indigo Insurance/cn=Sales/cn=LDAP Profile`.

- A user profile in any parent organizational unit with the name `cn=LDAP Profile`.

  For example, `dc=com/dc=Indigo Insurance/cn=LDAP Profile`.

If there is no match, the profile object `System Objects/LDAP Profile` is used for the user profile.

You can use Active Directory authentication with Directory Services Integration. The applications assigned to Active Directory users come from a combination of the user profile and from LDAP searches. See Chapter for details of how applications are assigned to users.

Setting Up Active Directory Authentication

Setting up Active Directory authentication involves the following configuration steps:

1. Ensure Active Directory is configured correctly.

   Kerberos authentication must be enabled in Active Directory. It is by default.

   Ensure each Active Directory domain has a global catalog server.

Consult your system documentation for details of Kerberos authentication and global catalog servers.

2. Configure SGD for Kerberos authentication.

   Configure SGD with the details of the KDCs to use for Kerberos authentication.

   See "Configuring SGD for Kerberos Authentication" on page 76.

3. Enable Active Directory authentication.

   Configure SGD to use Active Directory authentication and specify the Active Directory domain details.

   See "How to Enable Active Directory Authentication" on page 80.

   Connections to Active Directory are always secure. To use SSL for secure connections, additional configuration is required. See "How to Configure SSL Connections to Active Directory" on page 81.

Configuring SGD for Kerberos Authentication

To use Active Directory authentication, *every SGD server* in the array must be configured for Kerberos authentication.

Whenever you make changes to your Kerberos configuration, SGD does not detect the changes until you restart the SGD server. Alternatively, you can use the following command to refresh the Kerberos configuration without restarting the SGD server:

```
$ tarantella cache --flush krbconfig
```

For the Administration Console to detect changes to your Kerberos configuration, you must restart the SGD Web Server.

You configure SGD for Kerberos authentication by synchronizing system clocks and adding entries to a Kerberos configuration file, as described in the following sections.

Synchronizing System Clocks

To use Kerberos authentication, the clocks on the KDCs and the SGD servers in the array must be synchronized so that the time is within the maximum tolerance for computer clock synchronization defined for the Kerberos security policy and the Default domain security policy on the Microsoft Windows server. This is called *clock skew*. If the clock skew is exceeded, the Kerberos authentication fails.

Because time synchronization is important, use Network Time Protocol (NTP) software to synchronize clocks. Alternatively, use the `rdate` command.

Kerberos Configuration File

A Kerberos configuration file must be present on each SGD server in the array. The Kerberos configuration file used by an SGD server is either of the following:

- **The system default Kerberos configuration file.**

  This is usually one the following files:

  - `/etc/krb5/krb5.conf` on Solaris OS platforms.
  - `/etc/krb5.conf` on Linux platforms.

- **The SGD Kerberos configuration file.**

  This is the `/opt/tarantella/bin/jre/lib/security/krb5.conf` file.

  You must manually create this file or copy an existing configuration file. If this configuration file exists, it is used *instead of* the system default configuration file.

A Kerberos configuration file contains many options for controlling Kerberos authentication. Consult your system documentation for more details. The following configuration options are the minimum requirements for SGD:

- **Kerberos realms and KDCs.** The KDCs SGD uses to authenticate users.
- **Password expiry.** Whether or not SGD prompts a user for a new password if their password has expired.
- **Network protocol.** Whether SGD uses the User Datagram Protocol (UDP) or Transmission Control Protocol (TCP) for Kerberos authentication.
- **KDC timeout.** What happens if there is a failure in the authentication process.

These configuration options are described in the following sections.

Kerberos Realms and KDCs

As a minimum, the Kerberos configuration file must contain the following sections:

- `[libdefaults]`. This sets defaults for Kerberos authentication. You must set the `default_realm` and `default_checksum`.
- `[realms]`. This sets the KDCs for each Kerberos realm. A realm can have more than one KDC. The entry for each KDC has the form *host*:*port*. The *port* can omitted if the default port 88 is used.
- `[domain_realm]`. This maps Active Directory domains to Kerberos realms.

The following is an example Kerberos configuration file:

```
[libdefaults]
default_realm = INDIGO-INSURANCE.COM
default_checksum = rsa-md5

[realms]
INDIGO-INSURANCE.COM = {
  kdc = melbourne.indigo-insurance.com
}
EAST.INDIGO-INSURANCE.COM = {
  kdc = ad01.east.indigo-insurance.com
  kdc = ad02.east.indigo-insurance.com
}
WEST.INDIGO-INSURANCE.COM = {
  kdc = ad01.west.indigo-insurance.com
  kdc = ad02.west.indigo-insurance.com
}

[domain_realm]
indigo-insurance.com = INDIGO-INSURANCE.COM
.east.indigo-insurance.com = EAST.INDIGO-INSURANCE.COM
east.indigo-insurance.com = EAST.INDIGO-INSURANCE.COM
.west.indigo-insurance.com = WEST.INDIGO-INSURANCE.COM
 west.indigo-insurance.com = WEST.INDIGO-INSURANCE.COM
```

Password Expiry

SGD can be configured to prompt a user for a new password if their Active Directory password has expired. To do this, the details of the server that handles the password change *for each Kerberos realm* must be added to the Kerberos configuration file, as follows:

`kpasswd_server =` *host:port*
`admin_server =` *host:port*
`kpasswd_protocol = SET_CHANGE`

The `kpasswd_server` and `admin_server` lines identify the Kerberos administration server that handles the password change. If `kpasswd_server` is omitted, the `admin_server` is used instead. The *port* can omitted if the default port 464 is used.

The following is an example of password expiry configuration for a realm:

```
EAST.INDIGO-INSURANCE.COM = {
 kdc = ad01.east.indigo-insurance.com
 kdc = ad02.east.indigo-insurance.com
 admin_server = ad01.east.indigo-insurance.com
```

```
kpasswd_protocol = SET_CHANGE
}
```

Network Protocols

When sending messages to the KDC or the Kerberos administration server, SGD uses either the UDP or TCP protocols. The protocol used is determined by the following line in the `[libdefaults]` section of the Kerberos configuration file:

`udp_preference_limit =` *bytes*

This line sets the maximum size in bytes for packets that can be sent using UDP. If the message is larger than this size, TCP is used. If the KDC or administration server indicates that the package is too big, TCP is used instead. To always use TCP, set the `udp_preference_limit` as follows:

```
udp_preference_limit = 1
```

KDC Timeout

If the Kerberos authentication process fails, you can configure a KDC timeout that controls how long SGD waits for a reply from a KDC, and how many times it tries to contact each KDC.

To set the KDC timeout, add the following lines to the `[libdefaults]` section of the Kerberos configuration file:

`kdc_timeout =` *time*
`max_retries =` *number*

The `kdc_timeout` sets the maximum number of milliseconds to wait for a reply from a KDC. The `max_retries` is the maximum number of times each KDC is tried. The KDCs for each realm are tried in the order they are listed in the `[realms]` section of the Kerberos configuration file.

It is best to keep the KDC timeout and the LDAP discovery timeout in step. If you increase the KDC timeout, increase the LDAP discovery timeout. See "LDAP Discovery Timeout" on page 116.

If SGD cannot contact any KDCs for the user's realm, the authentication phase fails.

▼ How to Enable Active Directory Authentication

1. **In the Administration Console, display the Secure Global Desktop Authentication Configuration Wizard.**

   Go to the Global Settings → Secure Global Desktop Authentication tab and click the Change Secure Global Desktop Authentication button.

2. **On the Third-Party/System Authentication step, ensure the System Authentication check box is selected.**

3. **On the System Authentication - Repositories step, select the LDAP/Active Directory check box.**

4. **On the LDAP Repository Details step, configure the Active Directory domain details.**

   a. **For Repository Type, select the Active Directory option.**

   b. **In the URLs field, type the URL of an Active Directory domain.**

      For example, `ad://east.indigo-insurance.com`.

      The URL must start with `ad://`. Only type one URL.

      SGD uses the domain name to perform a Domain Name System (DNS) lookup to obtain a list of global catalog servers. The global catalog is used to determine which Active Directory servers SGD can search to determine the user identity and user profile.

   c. **Configure secure connections to Active Directory.**

      - To use only the Kerberos protocol for secure connections, select the Kerberos option for Connection Security, and type the user name and password of a user that has privileges to search Active Directory in the User Name and Password fields.

Note – The Kerberos option is selected by default.

      - To use Kerberos and SSL for secure connections, select the SSL option for Connection Security, and type the user name and password of a user that has privileges to search Active Directory in the User Name and Password fields.

- To use Kerberos, SSL, and client certificates for secure connections, select the SSL option for Connection Security, and select the Use Certificates check box.

See "How to Configure SSL Connections to Active Directory" on page 81 for details of the additional configuration required to use SSL connections.

If you type a user name and password, the user name must be the user principal name, for example `sgd-ldap@indigo-insurance.com`. You might want to create a special user reserved for Active Directory authentication.

d. In the Base Domain field, type a partial domain name.

The base domain is used when users only supply a partial domain when they log in. For example, if the base domain is set to `indigo-insurance.com` and a user logs in with the user name `rouge@west`, SGD tries to authenticate the user as `rouge@west.indigo-insurance.com`.

e. In the default Domain field, type a domain name to use as a default.

The default domain is used when users do not supply a domain when they log in. For example, if the default domain is set to `east.indigo-insurance.com` and a user logs in with the user name `rouge`, the SGD tries to authenticate the user as `rouge@east.indigo-insurance.com`.

5. On the Review Selections step, check the authentication configuration and click Finish.

▼ How to Configure SSL Connections to Active Directory

1. Enable LDAP signing requirements for the domain.

You must enable LDAP signing on your domain controllers so that they accept SSL connections.

Consult you system documentation for details of how to enable LDAP signing.

The following is an example of how to enable LDAP signing.

a. In Group Policy Object Editor, select Domain Security Policy → Local Policies → Security options.

b. Edit the Domain controller: LDAP server signing requirements policy, select Require signing.

c. Edit the Network security: LDAP client signing requirements policy, select Require signing.

2. **Import the Certificate Authority (CA) or root certificate for your Active Directory servers into the CA certificates truststore.**

   To be able to use SSL for secure connections, SGD must be able to validate the certificate presented by an Active Directory server.

   You might have to import the CA certificates for the Active Directory servers you are using with SGD into the CA certificate truststore. See "The CA Certificate Truststore" on page 383 for details of how to check for supported CAs and how to import CA certificates.

3. **(Optional) Create and install client certificates for each SGD server in the array.**

   If you are using client certificates for SSL connections to Active Directory, *each SGD server in the array* must have a valid client certificate that has been signed using the Certificate Services on a Microsoft Windows server.

   You create and install a client certificate as follows:

   a. **Create a certificate signing request (CSR) for the client certificate for an SGD server.**

      See "How to Create a Client Certificate CSR for an SGD server" on page 385.

   b. **Create the client certificate for an SGD server using Microsoft Certificate Services.**

      Consult your system documentation for details of how to create a client certificate using Microsoft Certificate Services.

      The following is an example of how to create a client certificate.

      i. **Using Microsoft Internet Explorer, go to** `http://`*WindowsServer*`/certsrv` **and log in.**

      ii. **On the Microsoft Certificate Services page, click Request a certificate.**

      iii. **On the Request a Certificate page, click advanced certificate request.**

      iv. **On the Advanced Certificate Request page, click Submit a certificate request by using a base-64-encoded CMC or PKCS #10 file, or submit a renewal request by using a base-64-encoded PKCS #7 file.**

      v. **On the Submit a Certificate Request or Renewal Request page, paste the contents of the CSR into the Saved Request text box or browse to the CSR file.**

      vi. **Select an appropriate template from the Certificate Templates list.**

      vii. **Click Submit.**

      viii. **On the Certificate Issued page, ensure Base 64 encoded is selected and click Download certificate.**

      ix. **Save the certificate file.**

x. **Copy the certificate file to the SGD host.**

c. **Install the client certificate for an SGD server.**

4. **Ensure the correct firewall ports are open.**

   Each SGD server in the array must be able to make secure connections to Active Directory.

   The ports required depends on the SSL configuration used for Active Directory authentication, as follows:

   - **SSL connections without client certificates** – TCP port 636 for the secure LDAP connection to an Active Directory server, and TCP port 3289 for the secure connection to the global catalog server
   - **SSL connections with client certificates** – TCP port 389 for the secure LDAP connection to an Active Directory server, and TCP port 3288 for the secure connection to the global catalog server

5. **Restart each SGD server in the array.**

Anonymous User Authentication

Anonymous user authentication enables users to log in to SGD without using a user name and password.

As users are anonymous, SGD assigns each anonymous user a temporary user identity. The user identity is only effective while the user is logged in.

Anonymous user authentication is disabled by default.

This section includes the following topics:

How Anonymous User Authentication Works

At the SGD login screen, the user clicks the Log In button, leaving the user name and password blank.

If the user types a user name or a password, the authentication fails and the next authentication mechanism is tried.

If both the user name and the password are blank, the user is authenticated and is logged in.

User Identity and User Profile

As the user does not supply a user name or password when they log in, SGD assigns a temporary user identity. In the Administration Console, the user identity is displayed as *server*:*number* `(anon)`. On the command line, the user identity is displayed as `.../_dns/`*server*`/_anon/`*number*.

The profile object `System Objects/Anonymous Profile` is always used for the user profile. All anonymous users receive the same webtop content.

Application Sessions and Password Cache Entries

Each user logged in anonymously has independent application sessions. The application sessions end automatically when the user logs out *even if* the application is configured to be always resumable.

All password cache entries belong to the `System Objects/Anonymous User Profile` object. All anonymous users share the same application server passwords. Anonymous users are not allowed to add or change entries in the password cache. This means that, unless an SGD Administrator has cached application server passwords for the `System Objects/Anonymous User Profile` object using the `tarantella passcache` command, anonymous users are prompted for a password *every time* they start an application.

▼ How to Enable Anonymous User Authentication

1. **In the Administration Console, display the Secure Global Desktop Authentication Configuration Wizard.**

   Go to the Global Settings → Secure Global Desktop Authentication tab and click the Change Secure Global Desktop Authentication button.

2. **On the Third-Party/System Authentication step, ensure the System Authentication check box is selected.**

3. **On the System Authentication - Repositories step, select the Anonymous check box.**

4. **On the Review Selections step, check the authentication configuration and click Finish.**

LDAP Authentication

LDAP authentication enables users to log in to SGD if they have an entry in an LDAP directory.

This authentication mechanism is disabled by default.

This section includes the following topics:

How LDAP Authentication Works

At the SGD login screen, the user types a user name and password. The user name can be any of the following:

- A common name, for example `Indigo Jones`
- A user name, for example `indigo`
- An email address, for example `indigo@indigo-insurance.com`

SGD searches the LDAP directory for a person object with an attribute that matches the user name typed by the user. By default, SGD searches the following attributes:

- `cn`
- `uid`
- `mail`
- `userPrincipalName`
- `sAMAccountName`

If a person object is not found, the next authentication mechanism is tried.

If a person object is found, the password typed by the user is checked against the LDAP person object. If the authentication fails, the next authentication mechanism is tried.

If the authentication succeeds, SGD searches the local repository for the user profile, see "User Identity and User Profile" on page 86 for details. If the Login attribute of the user profile is not enabled, the user cannot log in and no further authentication mechanisms are tried. If the Login attribute of the user profile is enabled, the user is logged in.

User Identity and User Profile

The user identity is the LDAP identity. In the Administration Console, the user identity is displayed as *LDAP-ID* `(LDAP)`. On the command line, the user identity is displayed as `.../_service/sco/tta/ldapcache/`*LDAP-ID*.

SGD establishes the user profile by searching the local repository, allowing for differences between the LDAP and SGD naming systems. SGD searches for the following until a match is found:

- A user profile with the same name as the LDAP person object.

  For example, if the LDAP person object is `cn=Emma Rald,cn=Sales,dc=Indigo Insurance,dc=com`, SGD searches the local repository for `dc=com/dc=Indigo Insurance/cn=Sales/cn=Emma Rald`.

- A user profile in the same organizational unit as the LDAP person object but with the name `cn=LDAP Profile`.

  For example, `dc=com/dc=Indigo Insurance/cn=Sales/cn=LDAP Profile`.

- A user profile in any parent organizational unit with the name `cn=LDAP Profile`.

  For example, `dc=com/dc=Indigo Insurance/cn=LDAP Profile`.

If there is no match, the profile object `System Objects/LDAP Profile` is used for the user profile.

You can use LDAP authentication with Directory Services Integration. The applications assigned to LDAP users come from a combination of the user profile and from LDAP searches. See Chapter for details of how applications are assigned to users.

Supported LDAP Directory Servers

SGD supports version 3 of the standard LDAP protocol. You can use LDAP authentication with any LDAP version 3-compliant directory server. SGD supports this functionality on the following directory servers:

- Sun Java System Directory Server version 4.1+ (formerly known as Sun ONE, Netscape™ software, or iPlanet Directory Server)

- Microsoft Active Directory

Other directory servers might work, but are not supported.

▼ How to Enable LDAP Authentication

Before you enable LDAP authentication, make sure *all* the SGD servers in the array can contact each LDAP directory server used for authentication.

1. **In the SGD Administration Console, display the Secure Global Desktop Authentication Configuration Wizard.**

   Go to the Global Settings → Secure Global Desktop Authentication tab and click the Change Secure Global Desktop Authentication button.

2. **On the Third-Party/System Authentication step, ensure the System Authentication check box is selected.**

3. **On the System Authentication - Repositories step, select the LDAP/Active Directory check box.**

4. **On the LDAP Repository Details step, configure the LDAP directory details.**

   a. **For Repository Type, select the LDAP option.**

      Select this option even if you are using a Microsoft Active Directory server.

   b. **In the URLs field, type the URL of one or more LDAP directory servers.**

      For example, `ldap://melbourne.indigo-insurance.com`.

      After typing each URL, press the Return key.

      If there is than one URL, SGD uses the URLs in the order they are listed. If the first LDAP directory server in the list is unavailable, the next one is tried.

      To use secure connections to LDAP directory servers, use an `ldaps://` URL.

      To be able to use secure connections, SGD must be able to validate the certificate presented by an LDAP directory server. You might have to import the CA certificates for the LDAP directory servers you are using with SGD into

the CA certificate truststore. See "The CA Certificate Truststore" on page 383 for details of how to check for supported CAs and how to import CA certificates.

The standard port used for connections to LDAP directory servers is port 389. If the LDAP directory server uses a different port, specify the port number as part of the URL, for example `ldap://melbourne.indigo-insurance.com:5678`.

Adding a search root to the end of the URL, for example `ldap://melbourne.indigo-insurance.com/dc=indigo-insurance,dc=com` restricts the part of the LDAP directory used to search for the user identity.

c. **Type the details of an LDAP user in the User Name and Password fields.**

The user name must be the distinguished name of the user, for example `cn=sgd-user,cn=Users,dc=indigo-insurance,dc=com`.

Some LDAP directory servers support anonymous logins, so you do not need to supply a user name or password. Others, including Microsoft Active Directory, require the user name and password of a user that has sufficient privileges to search the LDAP directory.

As you can only enter one user name and password, this user must be able to search all LDAP directory servers listed in the URL field.

You might want to create a special LDAP user reserved for the SGD LDAP authentication.

5. **On the Review Selections step, check the authentication configuration and click Finish.**

LDAP Authentication and Password Expiry

SGD can prompt a user for a new password if their password has expired on the LDAP directory server. Additional configuration might be needed, as follows.

For *Sun Java System Directory Servers* (formerly known as Sun ONE, Netscape software, or iPlanet Directory Server) Sun One Directory Servers, note the following:

- Do not use the "User must change password after reset" option either in the global password policy or for an individual password policy. This causes the password change to fail.
- The LDAP user entered in the User Name and Password fields for LDAP authentication must have administrative privileges.

For *Microsoft Active Directory*, password expiry, including forcing the user to change their password at next logon, can only be handled if there is a secure connection between the SGD server and the Active Directory server.

Restricting the LDAP Users That Can Log In to SGD

Once LDAP authentication is enabled, any user with an entry in the LDAP directory can log in to SGD. However, you might not want all LDAP users to have access to SGD.

To restrict the LDAP users that can log in to SGD, you can configure an LDAP login filter so that only the users that have a required attribute value on their LDAP person object can log in to SGD. This requires extra configuration in the LDAP directory and in SGD.

To be able to apply a filter, SGD must be able to test for an attribute value on the person object in the LDAP directory. You can use an attribute that already exists in your LDAP directory or create a new attribute, for example an attribute called `allowsgdlogin`. This attribute must be set for *all users* in the LDAP directory.

Once you have configured the LDAP user object attribute, you configure the login filter to test for the LDAP attribute and allow users to log in if they meet the condition. See "How to Configure an LDAP Login Filter" on page 89.

▼ How to Configure an LDAP Login Filter

Repeat this procedure on each SGD server in the array.

Ensure that no users are logged in to the SGD server and that there are no running application sessions, including suspended application sessions.

1. **Log in as superuser (root) on the host.**
2. **Stop the SGD server.**
3. **Configure the LDAP login filter.**

   Use the following command:

```
# tarantella config edit \
--searchldapla.properties-searchFilter (&({0}={1})(attribute_test))
```

   For example:

```
# tarantella config edit \
--searchldapla.properties-searchFilter (&({0}={1})(allowsgdlogin=true))
```

4. **Start the SGD server.**

SecurID Authentication

SecurID authentication enables users with RSA SecurID tokens to log in to SGD. SGD authenticates users against an RSA Authentication Manager, formerly known as ACE/Server.

RSA SecurID is a product from RSA Security, Inc., that uses two-factor authentication based on something you *know*, a PIN, and something you *have*, a tokencode supplied by a separate token such as a PIN pad, standard card, or software token. The PIN and tokencode are combined to form a passcode which is used as the password when you log in to SGD.

This authentication mechanism is disabled by default.

This section includes the following topics:

Supported Versions of SecurID

SGD works with versions 4, 5, and 6 of the RSA Authentication Manager.

SGD supports system-generated PINs and user-created PINs.

How SecurID Authentication Works

At the SGD login screen, the user types their SecurID user name, for example `indigo`, and their passcode.

This authentication mechanism searches the local repository for a user profile with a Name attribute that matches the user name typed by the user. If there is no match, the search is repeated on the Login Name attribute, and finally on the Email Address attribute.

If a user profile is found, the Login Name attribute of that object is used as the SecurID user name. If no user profile is found, the name the user typed is used as the SecurID user name.

Next, SGD checks the SecurID user name, and the passcode typed by the user, against the RSA Authentication Manager. If the authentication fails, the user cannot log in because there are no further authentication mechanisms to try.

If the authentication succeeds and the Login attribute for the user profile is not enabled, the user is not logged in. If the authentication succeeds and the Login attribute for the user profile is enabled, the user is logged in.

User Identity and User Profile

If a user profile was found in the local repository, this is used for the user identity and user profile. In the Administration Console, the user identity is displayed as *user-profile* `(Local)`. On the command line, the user identity is displayed as `.../_ens/`*user-profile*.

If no user profile was found in the local repository, the user identity is the SecurID user name. In the Administration Console, the user identity is displayed a *SecurID-username* `(SecurID)`. On the command line, the identity is displayed as `.../_service/sco/tta/securid/`*SecurID-username*. The profile object `System Objects/SecurID User Profile` is used for the user profile.

Setting Up SecurID Authentication

Setting up SecurID authentication involves the following configuration steps:

1. Install and configure RSA SecurID.

   Ensure you are using a supported version of RSA SecurID, see "Supported Versions of SecurID" on page 90

   Ensure the RSA Authentication Manager is up to date with the latest patches released by RSA.

2. Configure each SGD server in the array as an Agent Host.

   Each SGD server in the array acts an Agent Host so that it can authenticate users against the RSA Authentication Manager.

   See "Configuring SGD servers as Agent Hosts" on page 92.

3. Enable SecurID authentication in SGD.

   Configure SecurID authentication so that SecurID users can log in to SGD.

   See "How to Enable SecurID Authentication" on page 93.

Configuring SGD servers as Agent Hosts

To use SecurID authentication, *each SGD server* in the array must be configured as an Agent Host. As SecurID implementations can vary, the following procedure is an example only. Consult your SecurID documentation for details of how to configure an Agent Host.

▼ How to Configure an SGD Server as an Agent Host

Before you begin, ensure you have access to the RSA Authentication Manager configuration file, `sdconf.rec`.

1. **Log in as superuser (root) on the SGD host.**
2. **Ensure the SGD server can contact the RSA Authentication Manager on the network.**

   You might have to open ports in your firewalls to allow an SGD server to contact the RSA Authentication Manager.

   The default ports that must be open are the following:

   - UDP port 5500 from the SGD server to the Authentication Manager.
   - UDP ports 1024 to 65535 from the Authentication Manager to the SGD server.
3. **Specify the location of the RSA Authentication Manager configuration file.**

   a. **Create the `/etc/sdace.txt` file with the following content:**

   ```
   VAR_ACE=/opt/ace/data
   ```

   b. **Save the file.**
4. **Copy the RSA Authentication Manager configuration file to the SGD server.**

   a. **Create an `/opt/ace/data` directory.**

   b. **Copy the `sdconf.rec` file to the `/opt/ace/data` directory.**
5. **Set the file permissions so that SGD can read and write the configuration files.**

```
# chmod 444 /etc/sdace.txt
# chown -R ttasys:ttaserv /opt/ace
# chmod -R 775 /opt/ace
```

6. **Register the SGD servers as Agent Hosts in the RSA Authentication Manager database.**

   Use either the RSA Authentication Manager Database Administration application or `sdadmin` application.

   Add the SGD server as a UNIX Agent Host in the database, using the fully qualified name, `server.domain.com`.

   For each Agent Host, Configure Group or User Activation. Alternatively, set the Open to All Locally Known Users option.

▼ How to Enable SecurID Authentication

1. **In the SGD Administration Console, display the Secure Global Desktop Authentication Configuration Wizard.**

   Go to the Global Settings → Secure Global Desktop Authentication tab and click the Change Secure Global Desktop Authentication button.

2. **On the Third-Party/System Authentication step, ensure the System Authentication check box is selected.**

3. **On the System Authentication - Repositories step, select the SecurID check box.**

4. **On the Review Selections step, check your authentication configuration and click Finish.**

Third-Party and Web Server Authentication

Third-party authentication enables users to log in to SGD if they have been authenticated by an external mechanism.

If you are using the SGD webtop, the only form of third-party authentication you can use is web server authentication. If you develop your own webtop applications using SGD web services, you can use any third-party authentication mechanism.

Third-party authentication is disabled by default.

This section includes the following topics:

How Third-Party Authentication Works

The user types in a user name and password directly to the external mechanism, typically using a web browser's authentication dialog.

Third-party authentication is based on trust. SGD trusts that the third-party mechanism has authenticated the user correctly and so they are authenticated to SGD.

Next SGD performs a search to establish the user identity and user profile. SGD supports the following search methods for establishing the user identity and user profile:

- Search Local Repository
- Search LDAP Repository
- Use Default Third-Party Identity

If more than one search method is enabled, the methods are tried in the order they are listed above. The first matching user identity found is used. The search methods are described in the following sections.

If the searches do not produce a match, SGD cannot establish an identity for the user and the user cannot log in. If you are using the SGD webtop, the standard login page displays so that the user can log in using system authentication.

Search Local Repository

The Search Local Repository method searches the local repository for a user profile with a Name attribute that matches the user's third-party user name. If there is no match, the search is repeated on the Login Name attribute, and finally on the Email Address attribute. If no user profile is found, the next search method is tried.

User Identity and User Profile

If a user profile is found, that object is used for the user identity and user profile. In the Administration Console, the user identity is displayed as *user-profile* `(Local)`. On the command line, the user identity is displayed as `.../_ens/`*user-profile*

Search LDAP Repository

The Search LDAP Repository method searches an LDAP directory for a person object with a `cn` (common name) attribute that matches the user name typed by the user. If there is no match, the search is repeated on the `uid` (username) attribute, and finally on the `mail` (email address) attribute. If a person object is not found, the next search method is tried.

User Identity and User Profile

If a person object is found, that object is used for the user identity. In the Administration Console, the user identity is displayed as *LDAP-ID* `(LDAP)`. On the command line, the user identity is displayed as `.../_service/sco/tta/ldapcache/`*LDAP-ID*.

Next SGD searches for the user profile. When searching for the user profile, you can specify Use Default LDAP Profile or Use Closest Matching LDAP Profile. Use Default LDAP Profile is the default.

If Use Default LDAP Profile is selected, the profile object `System Objects/LDAP Profile` is used for the user profile.

If Use Closest Matching LDAP Profile is selected, SGD establishes the user profile by searching the local repository, allowing for differences between the LDAP and SGD naming systems. SGD searches for the following until a match is found:

- A user profile with the same name as the LDAP person object.

  For example, if the LDAP person object is `cn=Emma Rald,cn=Sales,dc=Indigo Insurance,dc=com`, SGD searches the local repository for `dc=com/dc=Indigo Insurance/cn=Sales/cn=Emma Rald`.

- A user profile in the same organizational unit as the LDAP person object but with the name `cn=LDAP Profile`.

  For example, `dc=com/dc=Indigo Insurance/cn=Sales/cn=LDAP Profile`.

- A user profile in any parent organizational unit with the name `cn=LDAP Profile`.

  For example, `dc=com/dc=Indigo Insurance/cn=LDAP Profile`.

If there is no match, the profile object `System Objects/LDAP Profile` is used for the user profile.

Use Default Third-Party Identity

The Use Default Third-Party Identity method does not perform a search.

User Identity and User Profile

The user identity is always the third-party user name. In the Administration Console, the user identity is displayed as *third-party-username* `(3rd party)`. On the command line, the user identity is displayed as `.../_service/sco/tta/thirdparty/`*third-party-username*.

The profile object `System Objects/Third Party Profile` is always used for the user profile.

▼ How to Enable Third-Party Authentication

1. **In the SGD Administration Console, display the Secure Global Desktop Authentication Configuration Wizard.**

   Go to the Global Settings → Secure Global Desktop Authentication tab and click the Change Secure Global Desktop Authentication button.

2. **On the Third-Party/System Authentication step, select the Third-Party Authentication check box.**

3. **On the Third-Party Authentication - User Identity and Profile step, select the check box for one or more search methods for finding the user identity.**

   For details on how the search methods work, see "How Third-Party Authentication Works" on page 94.

   If the Search LDAP Repository check box is selected, select an option for finding the LDAP user profile.

4. **(Optional) On the LDAP Repository Details step, configure the LDAP directory details.**

   The LDAP Repository Details step only displays if an LDAP search method is selected in Step 3.

   a. **For Repository Type, select the LDAP option.**

      Select this option even if you are using a Microsoft Active Directory server.

b. In the URLs field, type the URL of one or more LDAP directory servers.

For example, `ldap://melbourne.indigo-insurance.com`.

After typing each URL, press the Return key.

If there is than one URL, SGD uses the URLs in the order they are listed. If the first LDAP directory server in the list is unavailable, the next one is tried.

To use secure connections to LDAP directory servers, use an `ldaps://` URL.

To be able to use secure connections, SGD must be able to validate the certificate presented by an LDAP directory server. You might have to import the CA certificates for the LDAP directory servers you are using with SGD into the CA certificate truststore. See "The CA Certificate Truststore" on page 383 for details of how to check for supported CAs and how to import CA certificates.

The standard port used for connections to LDAP directory servers is port 389. If the LDAP directory server uses a different port, specify the port number as part of the URL, for example `ldap://melbourne.indigo-insurance.com:5678`.

Adding a search root to the end of the URL, for example `ldap://melbourne.indigo-insurance.com/dc=indigo-insurance,dc=com` restricts the part of the LDAP directory used to search for the user identity.

c. Type the details of an LDAP user in the User Name and Password fields.

The user name must be the distinguished name of the user, for example `cn=sgd-user,cn=Users,dc=indigo-insurance,dc=com`.

Some LDAP directory servers support anonymous logins, so you do not need to supply a user name or password. Others, including Microsoft Active Directory, require the user name and password of a user that has sufficient privileges to search the LDAP directory.

As you can only enter one user name and password, this user must be able to search all LDAP directory servers listed in the URL field.

You might want to create a special LDAP user reserved for the SGD LDAP authentication.

5. On the Review Selections step, check the authentication configuration and click Finish.

Web Server Authentication

Web server authentication, or Hypertext Transfer Protocol (HTTP) authentication, is the most common use of third-party authentication. With web server authentication, the web server performs the authentication, and SGD determines the user identity and user profile.

The advantage of web server authentication is that you can use any web server authentication plug-in as long as it sets the `REMOTE_USER` environment variable. If the authentication plug-in you use sets a different variable, you can configure SGD to support it, see "Using Authentication Plug-ins With Web Server Authentication" on page 101.

You can use web server authentication and system authentication together. It is best to enable at least one system authentication mechanism as a fallback. If SGD cannot find a user profile for a user, the standard SGD login page displays so that the user can authenticate using a system authentication mechanism.

How Web Server Authentication Works

Web server authentication works as follows:

- A web server administrator protects a section of a web site. For SGD, this is usually the `http://`*server.example.com*`/sgd` URL, where *server.example.com* is the name of an SGD server.
- When a web browser first tries to access a URL within the protected section, the web server responds by requesting authentication.
- The web browser displays an authentication dialog to the user. SGD users do not see the SGD login screen.
- The user types a user name and password, which the browser sends to the web server.
- The web server authenticates the user's credentials and grants access to the requested URL. SGD users go directly to their webtop.

The web browser caches the user's credentials because the credentials must be sent with every request to the protected URL. The browser sends the credentials automatically. The credentials are cached as follows:

- **Temporarily.** The credentials are cached until the user closes the browser.
- **Permanently.** The user selects the check box on the browser's authentication dialog.

Once the web server has authenticated the user, its sets the `REMOTE_USER` environment variable. This variable contains the user name of the authenticated user. SGD takes the value of the `REMOTE_USER` variable and uses it to search for the user identity and user profile. SGD supports four search methods for establishing the user identity and user profile, see "How Third-Party Authentication Works" on page 94.

Security Considerations of Using Web Server Authentication

The following are the main security considerations of using web server authentication with SGD:

- **Web browser cache.** With web server authentication, the web browser caches the user's credentials and, in effect, their authentication to SGD. To minimize the risk of cached credentials being used by someone else, ensure that users do the following:
  - Deselect the save password check box in the web browser authentication dialog. This ensures that user credentials are not saved permanently by the web browser.
  - Close the web browser after logging out. This clears the user's credentials from the temporary cache. Logging out of SGD does not clear the credentials.
- **Secure web server.** Use a secure (HTTPS) web server to prevent user credentials from being sent in plain text.
- **Trusted user.** SGD is able to trust the web server's authentication because the SGD webtop and the SGD server have a shared secret which is the user name and password of a trusted user. The credentials of this trusted user are created by default when you install SGD. You might want to change these credentials, see "Trusted Users and Third-Party Authentication" on page 104 for details of how to do this.

Enabling Web Server Authentication

To enable web server authentication, you must configure both the web server and SGD.

You configure the web server for web server authentication by protecting the `/sgd` URL on each SGD host. How you protect the `/sgd` URL depends on your web server, see your web server documentation for details. For the SGD Web Server, you can protect the `/sgd` URL in either the Apache or the Tomcat components. See "How to Enable Web Server Authentication for the SGD Web Server" on page 100 for an example of how to do this.

To configure SGD to support web server authentication, you must enable third-party authentication, see "How to Enable Third-Party Authentication" on page 96.

▼ How to Enable Web Server Authentication for the SGD Web Server

For the SGD Web Server, you can protect the `/sgd` URL in either the Apache or the Tomcat components. This procedure protects the URL in Apache.

Repeat the following procedure on each SGD server in the array.

1. **Log in as superuser (root) on the SGD host.**

2. **Create a web server password file.**

   Use the `/opt/tarantella/webserver/apache/2.2.8_openssl-0.9.8g_jk1.2.25/bin/htpasswd` program to create a web server password file and add entries.

   The password file must accessible by the `ttaserv` user.

3. **Edit the Apache configuration file and protect the `/sgd` URL.**

   The Apache configuration file is `/opt/tarantella/webserver/apache/2.2.8_openssl-0.9.8g_jk1.2.25/conf/httpd.conf`.

   a. **Insert the following directives at about line 358:**

```
SetEnvIf Request_URI "\.(class|cab|jar|gif|der)$" sgd_noauth_ok
<LocationMatch /sgd>
 Order Allow,Deny
 Allow from env=sgd_noauth_ok
 AuthUserFile file-path
 AuthName auth-domain
 Authtype Basic
 Require valid-user
 Satisfy any
</LocationMatch>
```

   where *file-path* is the full path to the web server password file and *auth-domain* is the name of authorization realm that appears in the web browser's authentication dialog.

   The `SetEnvIf` directive protects the `/sgd` URL without affecting the operation of the Welcome Page of the SGD Web Server.

Note – You must use a `LocationMatch` directive rather than a `Directory` directive because the SGD Web Server delegates the management of the `/sgd` URL to Tomcat. This is configured in the Apache configuration file and means you cannot use an `.htaccess` file to protect the `/sgd` URL.

---

   b. **Save the changes.**

4. **Edit the Tomcat configuration file.**

   The Tomcat component of the SGD Web Server must be configured to trust the web server's authentication.

   The Tomcat configuration file is `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/conf/server.xml`.

   a. **Amend the configuration of the Coyote/JK2 AJP 1.3 Connector.**

      Add a `tomcatAuthentication="false"` attribute to the `<Connector>` element as follows:

```
<!-- Define a Coyote/JK2 AJP 1.3 Connector on port 8009 -->
<Connector port="8009" minProcessors="5" maxProcessors="75"
 enableLookups="true" redirectPort="8443"
 acceptCount="10" debug="0" connectionTimeout="0"
 useURIValidationHack="false" tomcatAuthentication="false"
 protocolHandlerClassName="org.apache.jk.server.JkCoyoteHandler"/>
```

   b. **Save the changes.**

5. **Restart the SGD Web Server.**

   You must restart the SGD Web Server for the configuration changes to take effect.

Using Authentication Plug-ins With Web Server Authentication

SGD web server authentication relies on the web server setting the `REMOTE_USER` environment variable to identify the user. If you use an authentication plug-in for web server authentication, it is likely that the plug-in uses a different environment variable to identify the user.

Tip – It is best to install to your authentication plug-in and verify that it is working, before configuring SGD.

In addition to the `REMOTE_USER` environment variable, SGD includes support for the `SSL_CLIENT_S_DN_CN` variable. This environment variable is set when using client certificates with web server authentication. See "Using Client Certificates With Web Server Authentication" on page 103 for details of how to enable support for this variable.

If your plug-in uses a different environment variable, you must configure the webtop web application to support your environment variable. See "How to Enable Support for Other Environment Variables for Web Server Authentication" on page 102.

▼ How to Enable Support for Other Environment Variables for Web Server Authentication

Before you begin, consult the documentation for the web server authentication plug-in and make a note of the environment variable it sets to identify users.

Repeat the following procedure on each SGD server in the array.

1. **Log in as superuser (root) on the SGD host.**
2. **Configure the Apache component of the SGD Web Server to forward your variable to the Tomcat component.**
   a. **Edit the Apache configuration file.**

      The file is `/opt/tarantella/webserver/apache/2.2.8_openssl-0.9.8g_jk1.2.25/conf/httpd.conf`.

   b. **Add a `JkEnvVar` directive to forward your environment variable.**

      Search for the existing `JKEnvVar` directives and add a directive for your own variable, as follows:

      ```
      #JkEnvVar SSL_CLIENT_S_DN_CN " "
      #JkEnvVar HTTP_SAFEWORD_USER " "
      JKEnvVar Your-Variable " "
      ```

   c. **Make the variable available in the `/SGD` location.**

      Remove the comment marks (#) from the `Location` directive as follows:

      ```
      <Location "/sgd">
       SSLOptions +StdEnvVars +ExportCertData
      </Location>
      ```

   d. **Save the changes.**
3. **Configure the webtop web application to use your environment variable.**
   a. **Change to the SGD web application resources directory.**

```
# cd /opt/tarantella/webserver/tomcat/5.0.28_axis1.2
# cd webapps/sgd/resources/jsp
```

b. Edit the `webtopsession.jsp` file and add support for your variable.

Search for either the `HTTP_SAFEWORD_USER` or the `SSL_CLIENT_S_DN_CN` variable and use the code for these variables as examples of how to implement your own variable.

c. Save the changes.

4. Restart the SGD Web Server.

Using Client Certificates With Web Server Authentication

You can strengthen the security of web server authentication by authenticating users if they have valid Public Key Infrastructure (PKI) certificate installed on the client device.

To use PKI certificates, you must configure the web server so that to access the `/sgd` URL you need a client certificate. The SGD Web Server includes the Apache mod_ssl (http://www.modssl.org) module which you can use to set up PKI client certificates.

SGD web server authentication relies on the web server setting the `REMOTE_USER` variable to identify the user. However, when users are authenticated using client certificates generally another environment variable is used to identify the user. For Apache web servers, including the SGD Web Server, the `SSL_CLIENT_S_DN_CN` variable is used. See "How to Enable Support for the `SSL_CLIENT_S_DN_CN` Variable" on page 103 for details of how to add support for this variable. If your web server sets a different variable, see "How to Enable Support for Other Environment Variables for Web Server Authentication" on page 102.

▼ How to Enable Support for the `SSL_CLIENT_S_DN_CN` Variable

Repeat the following procedure on each SGD server in the array.

1. Log in as superuser (root) on the SGD host.

2. Configure the Apache component of the SGD Web Server to forward the `SSL_CLIENT_S_DN_CN` variable to the Tomcat component.

a. Edit the Apache configuration file.

The file is `/opt/tarantella/webserver/apache/2.2.8_openssl-0.9.8g_jk1.2.25/conf/httpd.conf`.

b. Enable the `JkEnvVar` directive to forward `SSL_CLIENT_S_DN_CN` variable.

Search for the existing `JKEnvVar` directives and remove the comment mark (#) for the `SSL_CLIENT_S_DN_CN` variable as follows:

```
JkEnvVar SSL_CLIENT_S_DN_CN " "
#JkEnvVar HTTP_SAFEWORD_USER " "
```

c. Make the `SSL_CLIENT_S_DN_CN` variable available in the `/SGD` location.

Remove the comment marks (#) from the `Location` directive as follows:

```
<Location "/sgd">
 SSLOptions +StdEnvVars +ExportCertData
</Location>
```

d. Save the changes.

3. **Restart the SGD Web Server.**

SGD Administrators and Third-Party Authentication

By default, third-party authentication does not allow SGD Administrators to log in to SGD. This is a security measure. To change this behavior, use the following command:

```
$ tarantella config edit \
--tarantella-config-login-thirdparty-allowadmins 1
```

Trusted Users and Third-Party Authentication

Third-party authentication gives users access to SGD *without* having to authenticate to an SGD server. SGD is able to trust the third-party authentication mechanism because client applications, such as the webtop, and the SGD server have a shared secret which is the user name and password of a trusted user.

In a standard installation, there is just one trusted user. However, you might want to create additional trusted users in the following circumstances:

- You relocate the webtop to a different JavaServer Pages (JSP) container on a different host. See "Relocating the Webtop" on page 326 for details.
- You develop your own client applications, using the SGD `com.tarantella.tta.webservices.client.views` package, either on the same host as SGD or on a different host.

- You have concerns about the security of the default trusted user.

You create and maintain the "database" of trusted users on each SGD server in the array. The database is not shared between SGD servers. See "How to Create a New Trusted User" on page 106 for details of how to add a trusted user. Note the following:

- The `tarantella webserver add_trusted_user` command is the only supported way to store trusted users on the SGD server.
- To change the password of an existing trusted user, you must first delete the user with the `tarantella webserver delete_trusted_user` command and then create the user again.
- Every time you make a change to a trusted user, you must restart the SGD Web Server.
- Usually client applications only use the credentials of a single trusted user to access SGD services.

Information for Application Developers

If you are using SGD web services to develop your own applications, the `ITarantellaExternalAuth` web service is used for third-party authentication. This web service is protected with Basic web server authentication so that you can only access it using the credentials of a trusted user. This is configured as follows:

- The `http://`*SGD-server*`/axis/services/document/externalauth` URL is protected in the configuration file for the Axis web application `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/webapps/axis/WEB-INF/web.xml`
- The Tomcat component of the SGD Web Server is configured to support Basic web server authentication using Tomcat's MemoryRealm and Secure Hash Algorithm (SHA) digested passwords. This is in the Tomcat configuration file `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/conf/server.xml`.
- The list of trusted users is stored in the Tomcat users configuration file `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/conf/tomcat-users.xml`

If you have developed your own client applications using the `com.tarantella.tta.webservices.client.views` package, you can store the trusted user credentials for the application in the same way as the webtop, see "How to Create a New Trusted User" on page 106. Otherwise, you need to develop your own methods for storing the credentials.

▼ How to Create a New Trusted User

Repeat the following procedure on each SGD server in the array.

1. **Log in as superuser (root) on the SGD host.**
2. **Stop the SGD Web Server.**
3. **Add the new trusted user to the database of trusted users on the SGD server.**
   a. **Think of a user name and password for the trusted user.**
   b. **Create the trusted user.**
      Use the following command:

```
# tarantella webserver add_trusted_user username
```

      When prompted, type the password.

   c. **Check the user is created.**
      Use the following command:

```
# tarantella webserver list_trusted_users
```

   d. **Check that the trusted user works.**
      Go to the `http://`*SGD-server*`/axis/services/document/externalauth` URL. When prompted, log in as the trusted user.
4. **Add the new trusted user to the web services resources file for the webtop application.**
   If you have relocated the webtop to a different host, perform this step on the remote host.
   a. **Encode the user name and password of the trusted user.**
      Use the following command:

```
# /opt/tarantella/bin/jre/bin/java -classpath \
/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/shared/lib/sgd-webservices.jar
\
com.tarantella.tta.webservices.client.views.SgdPasswd \
--encode username:password
```

   b. **Copy the encoded user name and password from the output.**

c. **Change to the shared resources directory.**

```
# cd /opt/tarantella/webserver/tomcat/5.0.28_axis1.2
# cd shared/classes/com/tarantella/tta/webservices/client/views
```

d. **Edit the** `Resources.properties` **file.**

e. **Replace the text after** `sgdaccess=` **with the encoded user name and password.**

f. **Save the changes.**

5. **Start the SGD Web Server.**

UNIX System Authentication

UNIX system authentication enables users to log in to SGD if they have UNIX or Linux system accounts on the SGD host.

UNIX system authentication is enabled by default.

This section includes the following topics:

How UNIX System Authentication Works

UNIX system authentication supports the following search methods for authenticating users against a UNIX or Linux system user database and determining the user identity and profile:

- Search Unix User ID in Local Repository
- Search Unix Group ID in Local Repository
- Use Default User Profile

These search methods are described in the following sections.

Search Unix User ID in Local Repository

At the SGD login screen, the user types a user name and password. The user name can be any of the following:

- A common name, for example `Indigo Jones`
- A user name, for example `indigo`
- An email address, for example `indigo@indigo-insurance.com`

SGD searches the local repository for a user profile with a Name attribute that matches what the user typed. If there is no match, the search is repeated on the Login Name attribute, and finally on the Email Address attribute. If no user profile is found, the next authentication mechanism is tried.

If a user profile is found, the Login Name attribute of that object is treated as a UNIX or Linux system user name. This user name, and the password typed by the user, are checked against the UNIX or Linux system user database. If the authentication fails, the next authentication mechanism is tried.

If the authentication succeeds and the Login attribute for the user profile is not enabled, the user is not logged in and no further authentication mechanisms are tried. If the authentication succeeds and the Login attribute for the user profile is enabled, the user is logged in.

This search method is enabled by default.

User Identity and User Profile

The matching user profile in the local repository is used for the user identity and user profile. In the Administration Console, the user identity is displayed as *user-profile* `(Local)`. On the command line, the user identity is displayed as `.../_ens/`*user-profile*.

Search Unix Group ID in Local Repository

SGD checks the user name and password typed by the user at the login screen against the UNIX or Linux system user database.

If the authentication fails, the next authentication mechanism is tried.

If the authentication succeeds, SGD searches for the user profile. See "User Identity and User Profile" on page 109 for details. If the Login attribute of the user profile object is not enabled, the user cannot log in and no further authentication mechanisms are tried. If the Login attribute of the user profile is enabled, the user is logged in.

This search method is enabled by default.

User Identity and User Profile

The user identity is the UNIX or Linux system user name. In the Administration Console, the user identity is displayed as *UNIX-username* `(UNIX)`. On the command line, the user identity is displayed as `.../_user/`*UNIX-username*.

SGD searches the local repository for a user profile `cn=`*gid*, where *gid* is the UNIX group ID of the authenticated user. If found, this is used as the user profile. If the user belongs to more than one group, the user's primary or effective group is used. If no user profile is found in the local repository, the profile object `System Objects/UNIX User Profile` is used for the user profile.

Use Default User Profile

SGD checks the user name and password typed by the user at the login screen against the UNIX or Linux system user database.

If the authentication fails, the next authentication mechanism is tried.

If the authentication succeeds, the user is logged in.

This search method is disabled by default.

User Identity and User Profile

The user identity is the UNIX or Linux system user name. In the SGD Administration Console, the user identity is displayed as *UNIX-username* `(UNIX)`. On the command line, the user identity is displayed as `.../_user/`*UNIX-username*.

The profile object `System Objects/UNIX User Profile` is used for the user profile. All UNIX users receive the same webtop content.

UNIX System Authentication and PAM

SGD supports Pluggable Authentication Modules (PAM). UNIX system authentication uses PAM for user authentication, account operations, and password operations.

If you want SGD to prompt UNIX users for a new password when they log in with an expired password, the PAM interface must be installed on your SGD servers. If the PAM interface is not installed, SGD cannot support aged passwords. An error message is logged in `/opt/tarantella/var/log/pemanager`*pid*`_error.log` on server startup if this is the case.

When you install SGD on Linux platforms, the SGD Setup program automatically creates PAM configuration entries for SGD by copying the current configuration for the `passwd` program and creating the `/etc/pam.d/tarantella` file. On Solaris OS platforms, you must add a new entry for `tarantella` in the `/etc/pam.conf` file.

▼ How to Enable UNIX System Authentication

1. **In the SGD Administration Console, display the Secure Global Desktop Authentication Configuration Wizard.**

   Go to the Global Settings → Secure Global Desktop Authentication tab and click the Change Secure Global Desktop Authentication button.

2. **On the Third-Party/System Authentication step, ensure the System Authentication check box is selected.**

3. **On the System Authentication - Repositories step, select the Unix check box.**

4. **On the Unix Authentication - User Profile step, select the check box for one or more search methods for finding the user profile.**

   See "How UNIX System Authentication Works" on page 107 for details on the search methods.

5. **On the Review Selections step, check the authentication configuration and click Finish.**

Windows Domain Authentication

Windows domain authentication enables users to log in to SGD if they belong to a specified Windows 2000 or Windows 2003 Server domain.

Windows domain authentication is disabled by default.

This section includes the following topics:

How Windows Domain Authentication Works

At the SGD login screen, the user types a user name and password. The user name can be any of the following:

- A common name, for example `Indigo Jones`
- A user name, for example `indigo`
- An email address, for example `indigo@indigo-insurance.com`

SGD searches the local repository for a user profile with a Name attribute that matches the user name typed by the user. If there is no match, the search is repeated on the Login Name attribute, and finally on the Email Address attribute.

If a user profile is found, the Login Name attribute of the user profile is treated as the Windows domain user name. If no user profile is found, the name the user typed is used as the Windows domain user name. SGD then checks the Windows domain user name and the password typed by the user against the domain controller.

If the authentication fails, the next authentication mechanism is tried.

If the authentication succeeds and the Login attribute for the user profile is not enabled, the user is not logged in and no further authentication mechanisms are tried.

If the authentication succeeds and either the Login attribute for the user profile is enabled or no matching user profile is found, the user is logged in.

User Identity and User Profile

If a user profile was found in the local repository, that object is used for the user identity and user profile. In the Administration Console, the user identity is displayed as *user-profile* `(Local)`. On the command line, the user identity is displayed as `.../_ens/`*user-profile*.

If no user profile was found in the local repository, the user identity is the Windows domain user name. The profile object `System Objects/NT User Profile` is used for the user profile. In the Administration Console, the user identity is displayed as *NT-username* `(NT)`. On the command line, the user identity is displayed as `.../_service/sco/tta/ntauth/`*NT-username*.

▼ How to Enable Windows Domain Authentication

1. **In the SGD Administration Console, display the Secure Global Desktop Authentication Configuration Wizard.**

   Go to the Global Settings → Secure Global Desktop Authentication tab and click the Change Secure Global Desktop Authentication button.

2. **On the Third-Party/System Authentication step, ensure the System Authentication check box is selected.**

3. **On the System Authentication - Repositories step, select the Windows Domain Controller check box.**

4. **On the Windows Domain Authentication - Domain Controller step, type the name of a domain controller in the Windows Domain field.**

5. **On the Review Selections step, check the authentication configuration and click Finish.**

Passwords, Domains, and Domain Controllers

Windows domain authentication supports 8-bit case-sensitive passwords. The user name can contain any characters.

If you need to authenticate users from more than one domain, you must have one domain that is trusted by all the other domains. You must use the trusted domain as the Windows domain controller when you configure Windows domain authentication.

When a user from another domain logs in to SGD, they must use the format `domain\username` for their user name. If they do not use this format, SGD tries to authenticate the user using the authentication domain and fails.

Note – The Windows NT domain (`--ntdomain`) attribute for user profiles plays no part in the SGD login.

If an SGD server is on a different subnet to the domain controller, you must hard code the domain controller information, see "How to Specify a Domain Controller on a Different Subnet" on page 113.

▼ How to Specify a Domain Controller on a Different Subnet

Ensure that no users are logged in to the SGD server and that there are no running application sessions, including suspended application sessions.

1. **Log in a superuser (root) on the SGD host.**
2. **Stop the SGD server.**
3. **Configure the domain controller**

   Use the following commands:

```
# tarantella config edit \
--com.sco.tta.server.login.ntauth.NTAuthService.properties-authConfig \
authnbt=NTNAME
# tarantella config edit \
--com.sco.tta.server.login.ntauth.NTAuthService.properties-authConfig-append \
authserver=my.domain.name
```

   where *NTNAME* is the NetBIOS name of the domain controller and *my.domain.name* is the DNS name or Internet Protocol (IP) address of the domain controller.

4. **Start the SGD server.**

Troubleshooting Secure Global Desktop Authentication

Use the information in this section to troubleshoot problems when users log in to SGD. This section includes the following topics:

- "An Ambiguous User Name Dialog Is Displayed When a User Tries to Log in" on page 123

Setting Log Filters for Authentication Problems

To help diagnose problems with Secure Global Desktop authentication, use one or more of the log filters shown in the following table to obtain more information.

Log Filter	Purpose
`server/ad/*`	Information about Active Directory authentication. Applies to Active Directory authentication.
`server/login/*`	Information about what happens when users attempt to log in. Applies to all authentication mechanisms.
`server/ldap/*`	Information about connections to an LDAP directory. Applies to Active Directory, LDAP, and third-party authentication.
`server/kerberos/*`	Information about Kerberos authentication. Applies to Active Directory authentication.
`server/securid/*`	Information about connections to RSA Authentication Manager. Applies to SecurID authentication.

For information about setting log filters, see "Using Log Filters to Troubleshoot Problems With an SGD Server" on page 369.

Tuning LDAP Performance for Authentication

This section describes how to tune LDAP performance for the following SGD authentication mechanisms:

- Active Directory authentication
- LDAP authentication
- Third-party or web server authentication, if the LDAP search method is used

This section includes the following topics:

- "LDAP User Name Search Attributes" on page 115
- "LDAP Timeout" on page 116
- "LDAP Discovery Timeout" on page 116
- "LDAP Cache" on page 117

LDAP User Name Search Attributes

Whenever SGD searches an LDAP directory to establish a user's identity, it checks the following attributes on the LDAP person object:

- `cn`
- `uid`
- `mail`
- `userPrincipalName`
- `sAMAccountName`

As SGD checks all of these attributes, this can lead to slow login times if you have a large directory. You can improve login times by reducing the number of search attributes, for example to just `cn` and `mail`.

If your LDAP directory uses other attributes for identifying users, users might not be able to log in to SGD. The solution is to configure SGD to search for additional attributes.

See "How to Configure LDAP User Name Search Attributes" on page 115 for details of how to change the search attributes.

▼ How to Configure LDAP User Name Search Attributes

Repeat the following procedure on each SGD server in the array.

Ensure that no users are logged in to the SGD server and that there are no running application sessions, including suspended application sessions.

1. **Log in as superuser (root) on the SGD host.**
2. **Stop the SGD server.**
3. **Configure the LDAP user name search attributes.**

Caution – Any mistakes in this step can result in all users being unable to log in.

Use a comma-separated list of attributes. The default list is:

```
cn, uid, mail, userPrincipalName, sAMAccountName
```

- For Active Directory and LDAP authentication, use the following command:

```
# tarantella config edit \
--searchldapla.properties-searchAttributes attr ...
```

- For third-party and web server authentication, use the following command:

```
# tarantella config edit \
--thirdpartyldaploginauthority.properties-searchAttributes attr ...
```

4. Start the SGD server.

LDAP Timeout

You can configure an LDAP timeout in the event that the LDAP searches of an LDAP directory or Active Directory server fail. The LDAP timeout controls how long SGD waits for the directory server to respond to LDAP operations, such as requests for data. The default is 20 seconds.

SGD makes two attempts to contact the LDAP directory server. If there is no response, SGD tries another LDAP directory server in the list. For *Active Directory authentication*, the list of Active Directory servers for a domain is obtained from the global catalog. For *LDAP and third-party authentication*, the list of LDAP directory servers comes from the URLs configured for the authentication mechanism.

If all LDAP directory servers time out, SGD might not be able to authenticate users or use directory services integration.

To change this timeout, use the following command:

```
$ tarantella config edit --tarantella-config-ldap-timeout secs
```

LDAP Discovery Timeout

The LDAP discovery timeout is only used with Active Directory authentication.

The LDAP discovery timeout controls how long SGD waits for an Active Directory server to respond to the initial contact request. The default is 20 seconds.

SGD makes two attempts to contact the Active Directory server. If there is no response, SGD tries another Active Directory server. The list of Active Directory servers for a domain is obtained from the global catalog. If all Active Directory servers time out, SGD might not be able to use directory services integration.

To change this timeout, use the following command:

```
$ tarantella config edit \
--tarantella-config-ldap-discovery-timeout secs
```

The LDAP discovery timeout must be longer than the KDC timeout. See "KDC Timeout" on page 79. For example, if the KDC timeout is 10 seconds and the KDC retries is 3, make the LDAP discovery timeout 35 seconds (3 x 10 seconds + extra 5 seconds). Keep the KDC timeout and the LDAP discovery timeout in step. If you increase the KDC timeout, increase the LDAP discovery timeout.

LDAP Cache

SGD caches the data it collects from an LDAP directory. If you find that SGD is not detecting changes, you can flush the cached data manually with the following command:

```
$ tarantella cache \
--flush ldapgroups | ldapconn | ldapconn-lookups | all
```

Option	Description
`ldapgroups`	Flushes the cache of all LDAP group data. Used for Directory Services Integration.
`ldapconn`	Flushes the cache of all the IP address, domain, and attribute data.
`ldapconn-lookups`	Flushes the cache of all LDAP search data. Used for Directory Services Integration.
`all`	Flushes all LDAP data.

Note – This command only flushes the cache on the SGD server on which the command is run. It has no effect on the Administration Console.

Troubleshooting LDAP Authentication

If LDAP users find they cannot log into SGD, use the following checklist to resolve the problem.

Is LDAP authentication enabled?

You cannot use an LDAP directory server with SGD unless the LDAP authentication is enabled.

Are the URLs of the LDAP directory servers correct?

To be able to use LDAP authentication, each SGD server must be able to contact the LDAP directory servers at the specified URLs.

Check the URLs, as follows:

- Does each URL refer to a valid LDAP directory server?
- Does the URL use the fully qualified name of the LDAP directory server?
- If the LDAP directory server listens on a non-standard port, is the port number the LDAP directory server listens on included in the URL?
- Can *all* SGD servers in the array contact the LDAP directory server at this URL. For example, can you connect from the SGD server to the LDAP directory server using the `telnet` program?
- If you have used a search root to restrict the start point of the search of the LDAP directory, check that the search root is correct.

If the log files indicate that the connection to the LDAP directory server is timing out, try increasing the LDAP timeout, see "LDAP Timeout" on page 116.

Is the LDAP directory server user name and password correct?

Some LDAP directory servers support anonymous logins, so you do not need to supply a user name or password. Others, including Microsoft Active Directory, require the user name and password of a user that has sufficient privileges to search the LDAP directory.

If you are you using secure connections to the LDAP directory server, has this been configured correctly?

Check the following:

- Does the URL of the LDAP directory server begin `ldaps://`?
- Does the CA certificate truststore on each SGD server contain the CA certificate, or certificate chain, used to sign the certificate for each LDAP directory server?

  See "The CA Certificate Truststore" on page 383 for details of how to check for supported CAs and how to import CA certificates.

Have recent LDAP configuration changes taken effect?

After making changes to your LDAP database, it is advisable to wait for a period of time for the changes to take effect.

SGD caches the data it collects from an LDAP directory. If you find that SGD is not detecting changes, you can manually flush the cached data with the `tarantella cache` command, see "LDAP Cache" on page 117.

Is SGD providing the right information for locating the user?

When SGD searches an LDAP directory for a user it uses the following attributes:

- `cn`
- `uid`
- `mail`
- `userPrincipalName`
- `sAMAccountName`

If these attributes are not sufficient for identifying users, you can add extra attributes, see "LDAP User Name Search Attributes" on page 115.

Troubleshooting Web Server Authentication

Common problems that users experience when they log in to SGD using web server authentication include the following:

Web Server Authentication Fails

If a user fails to authenticate to the web server, they might see a message such as "401 Authorization Required". This indicates that either there is a problem with the user name and password, or there is a problem with the web server configuration.

Check the following:

- Does the user have an entry in the web server password file?
- Is the web server configured to use the correct password file?
- If you are using the SGD Web Server, is the password file accessible by the `ttaserv` user? If this user cannot read the password file, web server authentication fails.

Users See the Standard SGD Login Page

If web server authentication is not set up correctly or it fails for any reason, SGD displays the standard login page. Use the following checklist to resolve the problem.

Is the right SGD URL protected?

For the webtop, you must set up your web server to protect the `/sgd` URL.

Is Tomcat configured to trust the web server authentication?

The Tomcat component of the SGD Web Server has to be configured to trust the Apache web server authentication.

On each array member, edit the `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/conf/server.xml` file. Add the `tomcatAuthentication="false"` attribute to the `<Connector>` element for the Coyote/JK2 AJP 1.3 Connector.

Does the user have a user profile in the local repository?

If your configuration of SGD relies on users having user profile objects in the local repository and you have not enabled one of the fallback profile objects, users might not be able to log in. If this happens and you have enabled logging, search the log file for messages that indicate that SGD could not find a match for the authenticated user.

Either create a user profile for the user or enable one of the fallback profile objects. See "How Third-Party Authentication Works" on page 94 for more details.

Is the user an SGD Administrator?

By default, SGD Administrators cannot access SGD if they have been authenticated by a web server. To change this behavior, see "SGD Administrators and Third-Party Authentication" on page 104 for details.

Have you changed the trusted user?

If you have changed the user name and password of the trusted user, have you verified that the new user works? See "Trusted Users and Third-Party Authentication" on page 104 for details.

Users Get the Wrong Webtop

With web server authentication, SGD performs a search to establish the user identity and login profile. The first matching user profile found is used.

Search the SGD log files for messages that indicate an ambiguous user. This indicates that more than one user identity matched the user.

To resolve the situation, you can either of the following:

- Accept the first match
- Attempt to manually resolve the ambiguity, for example by creating or amending user profiles

Denying Users Access to SGD After Failed Login Attempts

SGD Administrators can enable a login failure handler so that users are denied access to SGD after three failed login attempts. See "How to Enable the Login Failure Handler" on page 121. This additional security measure only works if users have their own user profile objects in the local repository. It does not work for the default profile objects in the System Objects organization. See for details

The number of login attempts is configurable, see "How to Change the Number of Login Attempts" on page 121. By default users get three attempts. The number of login attempts is local to each SGD server and is not copied across the array. Only when the login limit is reached on a server, is the user denied access across the array. For example, a user could try to log in on each SGD server two times, but only when they fail for the third time on a server are they denied access to the other members of the array.

If a user is denied access, they are only denied access to SGD. They are not denied access to the host on which SGD is installed

When a user is denied access, SGD deselects the Login check box on the General tab (`--enabled false`) for the user profile object in the Administration Console. To give a user access again, you must select the check box (`--enabled true`).

For security reasons, users are not given any indication that their account is disabled. They see the same message as if they had typed an incorrect password.

▼ How to Enable the Login Failure Handler

You can only enable the login failure handler from the command line.

- **Use the following command:**

```
$ tarantella config edit \
--tarantella-config-components-loginfailurehandler 1 \
--tarantella-config-components-loginfailurefilter 1
```

▼ How to Change the Number of Login Attempts

Ensure that no users are logged in to the SGD servers in the array and that there are no running application sessions, including suspended application sessions.

1. **Log in to the primary SGD server as superuser (root).**
2. **Stop the primary SGD server.**

3. **Set the number of login attempts.**

   Use the following command:

```
# tarantella config edit \
--com.sco.tta.server.login.LoginFailureHandler.properties-attemptsallowed num
```

4. **Start the primary SGD server.**

5. **Do a warm restart of all secondary SGD servers.**

   Use the following command:

```
# tarantella restart --warm
```

Users Cannot Log In to Any SGD Server

If all users, including the UNIX system root user, cannot log in to any SGD server, this might be caused by either of the following:

- All authentication mechanisms are disabled
- User logins to all SGD servers are disabled

To check whether all authentication mechanisms are disabled, use the following command:

```
$ tarantella config list | grep login
```

If all authentication mechanisms are disabled, enable the UNIX system authentication mechanism from the command line, as follows:

```
$ tarantella config edit --login-ens 1
```

Once the UNIX system authentication mechanism is enabled, you can log in to the Administration Console with the user name "Administrator" and the UNIX system root user's password. You can then reconfigure authentication.

To check whether user logins are disabled for an SGD server, use the following command:

```
$ tarantella config list --server serv... --server-login
```

If user logins to all SGD servers are disabled, use the following command to enable user logins:

```
$ tarantella config edit --array --server-login 1
```

Using Shared Accounts for Guest Users

SGD enables more than one user to log in using the same user name and password, for example to share an account for guest users.

Note – Anonymous users are always treated as using a shared account, see "Anonymous User Authentication" on page 83.

Guest users are never prompted for application server passwords. This means guest users cannot add or change password cache entries. Use the `tarantella passcache` command to manage application server passwords for guest users.

▼ How to Share a User Profile Between Users

1. **In the Administration Console, go to the User Profiles tab.**
2. **Select the user profile that is to be shared.**
   The General tab is displayed.
3. **For Login, select the Multiple check box.**
4. **Click Save.**

Solaris OS Users Cannot Log in When Security is Enabled

If users with Solaris OS client devices find that they cannot log in to an SGD server when SGD security services are enabled, check that the `/dev/random` device is present on the client device.

SGD security services require the `/dev/random` device. If it is missing, install the Solaris OS patch that contains this device.

An Ambiguous User Name Dialog Is Displayed When a User Tries to Log in

The Ambiguous User Name dialog is displayed only for users who share person object attributes and also have the same password.

For example, there are two users with the name John Smith (cn=John Smith) and they have chosen the same password. Their email addresses and user names are different. If they log in with the name John Smith, SGD displays the Ambiguous User Name dialog which asks them to provide either an email address or a user name. The dialog displays because the credentials they supply match more than one user. If they log in using an email address or a user name, they are logged in.

The Ambiguous User Name dialog is displayed only if you are using LDAP authentication or UNIX system authentication that searches for the user ID in the local repository.

The solution is to ensure that users have unique passwords. Alternatively, configure the user profiles to have unique attributes. SGD uses the Name (`--name`), Login Name (`--user`) and Email Address (`--email`) to identify and disambiguate users.

Troubleshooting Application Authentication

Use the information in this section to troubleshoot problems when users log in to start an application. This section includes the following topics:

Users Can Start Applications With Different User Names and Passwords

By default, users can force SGD to display the Application Authentication dialog by holding down the Shift key when they click an application's link on the webtop. This enables users to start applications with different username and passwords.

Note – You cannot use Shift-click with the SGD Client when it is in Integrated mode.

You can disable the Shift-click behavior. In the Administration Console, go to the Global Settings → Application Authentication tab and deselect the On Shift-Click check box. Alternatively, use the following command:

```
$ tarantella config edit --launch-showauthdialog system
```

Disabling the Shift-click behavior means that the Application Authentication dialog only displays when there is a problem with the password or there is no password.

Using Windows Terminal Services, Users Are Prompted for User Names and Passwords Too Often

If you are using Windows Terminal Services, users might be prompted for a user name and password by SGD or by the Terminal Server.

SGD Prompts the User

If SGD always prompts the user for a user name and password, the problem is usually caused by a missing domain name. If the user has no entries in the password cache that have a domain name, the Application Authentication dialog is displayed.

To fix this problem, the domain name must be provided when saving details in the password cache. You must do this even if the application server is not part of a domain.

The easiest way to configure the domain name is with the Domain Name attribute on the application server object or the application object. Users can also provide their own domain names in the Application Authentication dialog. See "Windows Domains and the Password Cache" on page 72.

Terminal Server Prompts the User

SGD sends user name and password information to Windows Terminal Services to authenticate the user. If the authentication fails, Windows prompts the user again. No information is returned to SGD indicating whether authentication succeeds or fails, and the details remain in the SGD password cache whether correct or incorrect.

The user might have saved the wrong user name, password or domain name in the password cache.

To fix, the user must press Shift when clicking the link to start, the application. This displays the Application Authentication dialog, and the user can correct their user name, password, and domain name. Alternatively, delete the user's entry in the password cache so that SGD prompts the user the next time they start the application.

The Terminal Server might also be configured to always prompt for a password when a user logs in. Microsoft Windows 2000 Server does this by default, but Microsoft Windows Server 2003 does not. See "Authentication Settings" on page 163 for details on how to change this behavior.

CHAPTER

Publishing Applications to Users

This chapter describes how you use organizational hierarchies to manage SGD users and give them access to applications.

This chapter includes the following topics:

Organizations and Objects

SGD is built on the principles of directory services. Users, applications, and application servers are represented by *objects* in a directory. The objects are arranged into an *organizational hierarchy* representing your organization.

An organizational hierarchy starts with a top-level directory object, usually an organization object. Other directory objects, such as an organizational unit (OU), are containers that can be used to divide the organizational hierarchy. You can create group objects. Group objects are not containers. Groups have members that are objects located in other parts of the organizational hierarchy.

SGD also includes a number of different object types for representing users, applications, and application servers.

Each object has a number of configuration settings, known as *attributes*. For example, an application object has an Icon attribute that is the name of an icon to display to users.

SGD objects, and the attributes used for each object, are based on the commonly-used LDAP version 3 schema. These objects have been extended, using the standard method of doing so, to support SGD functionality. For more information on the LDAP schema, see RFC 2256 `(http://www.faqs.org/rfcs/rfc2256.html)`.

SGD uses a *local repository* to store all the objects in your organizational hierarchy. Each object is distinguished from other objects in the same container by using an attribute name as a prefix, for example `ou=Sales`. This attribute is known as the *naming attribute* or the *relative distinguished name* (RDN). Two objects in the same container cannot have the same RDN. The complete name of the object that includes all the RDNs from the top of the hierarchy is the *distinguished name* (DN), for example `o=Indigo Insurance/ou=Sales`. The DN is the name that uniquely identifies an object. The following table shows some example objects, their RDN, and their DN.

Object Type	Relative Distinguished Name	Distinguished Name
Organization	`o=Indigo Insurance`	`o=Indigo Insurance`
OU	`ou=Sales`	`o=Indigo Insurance/ou=Sales`
User profile	`cn=Violet Carson`	`o=Indigo Insurance/ou=Sales/cn=Violet Carson`
User profile	`cn=Elizabeth Blue`	`o=Indigo Insurance/ou=Sales/cn=Elizabeth Blue`

The relationships between objects are significant. For example, to deploy an application to users, you associate user profile objects with an application object. SGD calls these relationships *assignments*. Assignments are described in more detail in "Publishing Applications" on page 144.

For more information about hierarchies and objects, see the following sections:

- "Organizational Hierarchies" on page 128
- "SGD Object Types" on page 130
- "Designing the Organizational Hierarchy" on page 135
- "Naming Objects in the Organizational Hierarchy" on page 135
- "Populating the SGD Organizational Hierarchy Using a Batch Script" on page 136
- "LDAP Mirroring" on page 138
- "SGD Administrators" on page 142

Organizational Hierarchies

SGD uses four organizational hierarchies: one each for users, applications, and application servers, and a System Objects hierarchy that contains objects for use by SGD. In the Administration Console, you use the following tabs to manage these organizational hierarchies:

- User Profiles tab
- Applications tab
- Application Servers tab

The following sections describe these tabs, the objects that they can contain, and how they are used. The System Objects organization is also described.

On the command line, you manage your organizational hierarchies with the `tarantella object` command. You can also use this command to populate an organizational hierarchy using a batch script. See "Populating the SGD Organizational Hierarchy Using a Batch Script" on page 136.

The User Profiles Tab

In the Administration Console, the User Profiles tab is where you create and configure objects for managing SGD users. You use the objects on this tab to control users' SGD-related settings, and the applications that they can access through SGD.

By default, this tab contains two objects, an organization object called `o=organization` and a domain component object called `dc=com`. These are the top-level objects in the organizational hierarchy. You can rename or delete these objects, or create new top-level objects. You create all the objects you need for managing users within these top-level objects.

The following are the SGD object types that are available on the User Profiles tab:

- Directory Object: Organization
- Directory (Light) Object: Domain Component
- Directory Object: Organizational Unit
- Directory (Light) Object: Active Directory Container
- User Profile Object

The Applications Tab

In the Administration Console, the Applications tab is where you create and configure objects that represent the applications and documents that users can access through SGD. These objects are always created within the applications organization. On the command line, this organization is called `o=applications`.

The following are the SGD object types that are available on the Applications tab:

- Directory Object: Organizational Unit
- Group Object
- X Application Object
- Windows Application Object
- Character Application Object
- Document Object

- 3270 Application Object
- 5250 Application Object

The Application Servers Tab

In the Administration Console, the Application Servers tab is where you create and configure objects for managing the application servers that run the applications displayed through SGD. These objects are always created in the application servers organization. On the command line, this organization is called `o=appservers`.

The following are the SGD object types that are available on the Application Servers tab:

- Directory Object: Organizational Unit
- Group Object
- Application Server Object

The System Objects Organization

The System Objects organization contains objects that are essential for the running and maintenance of SGD. On the command line, the System Objects organization is displayed as `o=Tarantella System Objects`.

The System Objects organization contains the Global Administrators role object. This object determines who is an SGD Administrator, and who can use the SGD graphical administration tools. See "SGD Administrators" on page 142.

The System Objects organization also contains profile objects. These are default user profile objects for use with the various authentication mechanisms supported by SGD. For example, the profile object `System Objects/LDAP Profile` is the default user profile if you are using LDAP or Active Directory authentication.

You can edit objects in the System Objects organization, but you cannot create, move, rename, or delete objects.

SGD Object Types

This section describes the available SGD object types and how they are used.

The following are the object types that are used to organize users, applications, and application servers:

- "Directory Object: Organization" on page 131
- "Directory (Light) Object: Domain Component" on page 131

The following are the object types used to represent users, applications, and application servers.

Directory Object: Organization

Directory objects that are organization objects are used for the things that apply to your organization as a whole. Organization objects are always at the top of the organizational hierarchy and can contain OU, Active Directory container, or user profile objects.

On the command line, you create an organization object with the `tarantella object new_org` command.

Organization objects have an `o=` naming attribute.

Directory (Light) Object: Domain Component

Directory (light) objects that are domain component objects are used to replicate a directory structure, usually a Microsoft Active Directory structure, within the SGD organizational hierarchy. Domain component objects are similar to organization objects, but do not include additional SGD-specific attributes or allow you to assign applications. This is why they are called directory (light) objects.

Domain component objects can only appear at the top of the organizational hierarchy, or within another domain component object. Domain component objects can contain OU, domain component, Active Directory container, or user profile objects.

On the command line, you create a domain component object with the `tarantella object new_dc` command.

Domain component objects have a `dc=` naming attribute.

Directory Object: Organizational Unit

Directory objects that are OU objects are used to divide your users, applications, and application servers into different departments, sites, or teams.

An OU can be contained in an organization or a domain component object.

On the command line, you create a directory object with the `tarantella object new_orgunit` command.

Directory objects have an `ou=` naming attribute.

Directory (Light) Object: Active Directory Container

Active Directory container objects are used to replicate your Microsoft Active Directory structure within the SGD organizational hierarchy.

Active Directory container objects are similar to OUs, but do not include additional SGD-specific attributes or allow you to assign applications. This is why they are called directory (light) objects.

An Active Directory container object can be contained in an organization, an OU, or a domain component object.

On the command line, you create an Active Directory container object with the `tarantella object new_container` command.

Active Directory container objects have a `cn=` naming attribute.

User Profile Object

User profile objects are used to represent a user in your organization, and give that user access to applications. They also define the SGD settings associated with a user.

How SGD associates a user profile object with a user depends on the authentication mechanisms in use. For some authentication mechanisms, you might not have to create user profile objects at all. See "Secure Global Desktop Authentication" on page 63 for details.

On the command line, you create a user profile object with the `tarantella object new_person` command.

User profile objects can have a `cn=` (common name), a `uid=` (user identification), or a `mail=` (mail address) naming attribute.

Group Object

Group objects are used to associate groups of applications with an object on the User Profiles tab or groups of application servers with an object on the Applications tab.

Group objects are not the same as directory objects. Applications or application servers can only belong to one directory, but can be a member of many different groups.

Members of a group can be applications, application servers, or other groups. Groups can moved or renamed without affecting group membership.

Groups of application server objects can be used to associate similar application servers for load balancing. See "Load Balancing" on page 334 for details.

On the command line, you create a group object with the `tarantella object new_group` command.

Group objects have a `cn=` naming attribute.

Windows Application Object

Windows application objects are used to give Microsoft Windows graphical applications to users. See "Windows Applications" on page 159 for more details.

On the command line, you create a Windows application object with the `tarantella object new_windowsapp` command.

Windows application objects have a `cn=` naming attribute.

X Application Object

X application objects are used to give X11 graphical applications to users. See "X Applications" on page 172 for more details.

On the command line, you create an X application object with the `tarantella object new_xapp` command.

X application objects have a `cn=` naming attribute.

Character Application Object

Character application objects are used to give VT420, Wyse 60, or SCO Console character applications to users. See "Character Applications" on page 179 for more details.

On the command line, you create a character application object with the `tarantella object new_charapp` command.

Character application objects have a `cn=` naming attribute.

Document Object

Document objects are used to give documents to users. A document object can refer to any Uniform Resource Locator (URL).

On the command line, you create a document object with the `tarantella object new_doc` command.

Document objects have a `cn=` naming attribute.

3270 Application Object

3270 application objects are used to give 3270 (mainframe) applications to users.

On the command line, you create a 3270 application object with the `tarantella object new_3270app` command.

3270 application objects have a `cn=` naming attribute.

5250 Application Object

5250 application objects are used to give 5250 (AS/400) applications to users.

On the command line, you create a 5250 application object with the `tarantella object new_5250app` command.

5250 Application objects have a `cn=` naming attribute.

Application Server Object

Application server objects are used to represent an application server that is used to run applications through SGD.

Application servers are used with load balancing. If you assign two or more application server objects to an application object, SGD chooses which application server to use, based on the load across the application servers. See "Load Balancing" on page 334 for details.

On the command line, you create an application server object with the `tarantella object new_host` command. Application server objects have a `cn=` naming attribute.

Designing the Organizational Hierarchy

You have complete control over the objects that you create to model your organizational hierarchy. However it is important to design and test your organizational hierarchy before implementing it. The following factors affect your design:

- **Authentication mechanism.** The most important influence on the design of organizational hierarchy is the Secure Global Desktop authentication mechanisms you use. For example, if you use UNIX system authentication, you can structure the hierarchy however you like. However, with LDAP authentication, you might need to mirror part of your LDAP directory structure. See "Secure Global Desktop Authentication" on page 63 for details.
- **Organization chart.** Sometimes it is a good approach to use OUs to represent the departments or offices in your organization. However, if your organization is restructured, you might have to reorganize your hierarchy.
- **Inheritance.** The settings for user profile objects and OU objects can be inherited from the object's parent in the organizational hierarchy. For example if everyone in a department needs an application, assign the application to the OU that represents the department. Every user belonging to that OU gets the applications assigned to the OU. Inheritance works best if you are *not* using LDAP assignments.
- **User profile objects.** User profile objects can be configured to give users access to particular applications and customized settings. Depending on the authentication mechanisms you enable, a default user profile is often used and this might be sufficient for your needs. This is particularly true if you use LDAP assignments to assign applications to users.
- **Naming convention.** Use a naming convention for each application or document object type. The name of the application or document object is displayed to users. For user profile objects, it is best to use the person's full name, for example "Indigo Jones".

Naming Objects in the Organizational Hierarchy

When you create an object in the Administration Console, you can use any characters you want for the name of the object, apart from backslash (\) or plus (+).

On the command line, if you use a forward slash in an object name, you must backslash protect, or escape, it. This is because SGD interprets the forward slash as a part of the organizational hierarchy. For example, if you try to create an object with the relative name `cn=a/b` beneath `o=organization`, SGD tries to create an object called `b` within `o=organization/cn=a`. This fails because `o=organization/cn=a` does not exist. To create an object with this name, type `cn=a\/b`.

On the command line, if the name of an object includes spaces, make sure you enclose the name in quotes, for example `"../_ens/o=Indigo Insurance"`.

How you name an object on the command line varies, depending on which part of the SGD datastore the object is from.

For example, an object in the local repository might have this name:

```
.../_ens/o=Indigo Insurance/ou=Marketing/cn=Cust-o-Dat
```

For objects in the local repository, the `.../_ens` part of the name is optional. You can also type the following:

```
o=Indigo Insurance/ou=Marketing/cn=Cust-o-Dat
```

An object stored on an LDAP directory server might have this name:

```
.../_service/sco/tta/ldapcache/cn=Cust-o-Dat,ou=Marketing,o=
Indigo Insurance
```

A server on the network might have this name:

```
.../_dns/verona.indigo-insurance.com
```

With the `tarantella object` command, any name in the local repository is treated as case insensitive. When you create or rename an object, the case used is preserved. However, other commands, such as the `tarantella webtopsession` and `tarantella emulatorsession` commands, *are* case sensitive.

Populating the SGD Organizational Hierarchy Using a Batch Script

If you want to populate your organizational hierarchy with a large number of objects, using the Administration Console to do this is not very efficient. The solution is to use the batch scripting functionality of the `tarantella object` command.

Once you have designed the structure of your SGD organizational hierarchy, you create a file for each type of object you want. Each file contains one line per object, with the correct syntax for creating the object from the appropriate `tarantella object` command. For example, to create five OUs you might have a file called `orgunits.txt` containing the following:

```
--name "o=Indigo Insurance/ou=IT" \
--name "o=Indigo Insurance/ou=Sales" \
--name "o=Indigo Insurance/ou=Marketing" \
--name "o=Indigo Insurance/ou=Finance" \
--name "o=Indigo Insurance/ou=Finance/ou=Administration"
```

Do not include the actual `tarantella object` command name, for example `object new_orgunit`, as part of each line.

Remember the following:

- Application objects, including their groups and OUs, must be created in the `o=applications` organization.
- Application server objects, including their groups and OUs, must be created in the `o=appservers` organization.
- Every application must have an application object.
- Every application server must have an application server object.

Once all your files are complete, use the `tarantella object script` command to process them all at once, for example:

```
#!/bin/sh
tarantella object script << EOF
new_orgunit --file orgunits.txt
new_group --file groups.txt
new_host --file hosts.txt
new_person --file people.txt
new_xapp --file xapps.txt
new_windowsapp --file windowsapps.txt
new_charapp --file charapps.txt
EOF
```

The `tarantella object script` command runs each command in order. Each command reads and processes the specified file.

You can use any `tarantella object` subcommand with the `tarantella object script` command. You do not have to read in object details from other files.

Many other commands, for example the `tarantella passcache` command, accept `--file` arguments so you can perform multiple related actions at once.

LDAP Mirroring

When a user is authenticated with either LDAP authentication, Active Directory authentication, or third-party authentication using the LDAP search, SGD establishes the user profile for a user by searching the local repository, allowing for differences between the LDAP and SGD naming systems. SGD searches for the following until a match is found:

- A user profile with the same name as the LDAP person object.

  For example, if the LDAP person object is `cn=Emma Rald,cn=Sales,dc=Indigo Insurance,dc=com`, SGD searches the local repository for `dc=com/dc=Indigo Insurance/cn=Sales/cn=Emma Rald`.

- A user profile in the same organizational unit as the LDAP person object but with the name `cn=LDAP Profile`.

  For example, `dc=com/dc=Indigo Insurance/cn=Sales/cn=LDAP Profile`.

- A user profile in any parent organizational unit with the name `cn=LDAP Profile`.

  For example, `dc=com/dc=Indigo Insurance/cn=LDAP Profile`.

If there is no match, the profile object `System Objects/LDAP Profile` is used for the user profile.

Typically LDAP and Active Directory users use the default LDAP profile, and applications and documents are assigned to them using LDAP assignments. See "LDAP Assignments" on page 147. However, user profile objects can also be used to control a user's SGD-specific settings, such as the ability to use copy and paste or to edit client profiles. If you want to customize an LDAP or Active Directory user's SGD settings, you might have to mirror some of your LDAP organization in the local repository.

When you mirror your LDAP organization, remember the following:

- Do not mirror your entire LDAP organization in the local repository. Only create as much of the structure as you need.
- Inherit as much as possible from other objects in the organizational hierarchy.
- Do not create user profile objects for all users. Only create user profile objects for users that must have individual settings. Creating `cn=LDAP Profile` objects is sufficient in most cases.

When you configure LDAP authentication, or third-party authentication using the LDAP search, you specify one or more LDAP URLs. LDAP URLs can contain a search root. If you specify a search root on your LDAP URLs, that search root is used as the starting point for the objects you need to mirror in the local repository.

When working with LDAP mirroring in the Administration Console, it is useful to display the naming attribute for the objects you work with. By default the Administration Console does not display naming attributes. You enable the display of naming attributes in the Preferences for the Administration Console.

When working with user profiles in the Administration Console, select Local + LDAP from the Repository list on the User Profiles tab. LDAP objects that are mirrored in the local repository are indicated by the following icon:

The following is an example of how to mirror your LDAP organization to give users different SGD settings.

An Example of LDAP Mirroring

Indigo Insurance has five departments: IT, Sales, Marketing, Finance, and Administration. The Finance and Marketing departments need different SGD settings to the other departments. Sid Cerise in the Finance department needs different SGD settings to the other users in the Finance department.

The objects you create depend on the type of LDAP directory server used, as described in the following sections.

Sun Java System Directory Server

For Sun Java System Directory Server, the following are the LDAP names of the objects you need to mirror in the local repository and the object types use:

- `o=indigo-insurance.com`

  Use an organization object.

- `ou=Finance,o=indigo-insurance.com`

  Use an OU object.

- `ou=Marketing,o=indigo-insurance.com`

  Use an OU object.

Note – In the Administration Console, create Directory objects. The naming attribute is set automatically.

FIGURE 2-2 shows the mirrored objects in the Administration Console.

FIGURE 2-2 Example Mirrored LDAP Objects for Sun Java System Directory Server

With this structure in place, create the following user profile objects in the local repository:

- `o=indigo-insurance.com/ou=Finance/cn=LDAP Profile`
- `o=indigo-insurance.com/ou=Marketing/cn=LDAP Profile`
- `o=indigo-insurance.com/ou=Finance/uid=Sid Cerise`

Note – In the Administration Console, remember to select uid as the naming attribute for the user profile object `o=indigo-insurance.com/ou=Finance/uid=Sid Cerise`.

With this organizational hierarchy, users receive settings as follows:

- Sid Cerise receives the settings defined for the following user profile object, including any settings inherited from parent objects in the organizational hierarchy:

  `o=indigo-insurance.com/ou=Finance/uid=Sid Cerise`

- Users in the Finance department receive the settings defined for the following user profile object, including any settings inherited from parent objects in the organizational hierarchy:

  `o=indigo-insurance.com/ou=Finance/cn=LDAP Profile`

- Users in the Marketing department receive the settings defined for the following user profile object, including any settings inherited from parent objects in the organizational hierarchy:

  `o=indigo-insurance.com/ou=Marketing/cn=LDAP Profile`

- All other users receive the settings defined for the default LDAP user profile, `System Objects/cn=LDAP Profile`

Microsoft Active Directory

For Microsoft Active Directory, the following are the LDAP names of the objects you need to mirror in the local repository and the object types to use:

- `dc=indigo-insurance,dc=com`

Use a domain component object.

- `cn=Finance,dc=indigo-insurance,dc=com`

  Use an Active Directory container object.

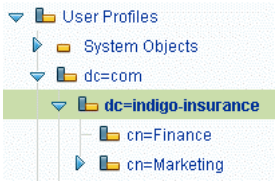
- `cn=Marketing,dc=indigo-insurance,dc=com`

  Use an Active Directory container object.

Note – In the Administration Console, you create domain components and Active Directory containers by creating Directory (Light) objects, and then selecting the correct naming attribute.

FIGURE 2-3 shows the mirrored objects in the Administration Console.

FIGURE 2-3 Example Mirrored LDAP Objects for Microsoft Active Directory



With this structure in place, create the following user profile objects in the local repository:

- `dc=com/dc=indigo-insurance/cn=Finance/cn=LDAP Profile`
- `dc=com/dc=indigo-insurance/cn=Marketing/cn=LDAP Profile`
- `dc=com/dc=indigo-insurance/cn=Finance/cn=Sid Cerise`

With this organizational hierarchy, users receive settings as follows:

- Sid Cerise receives the settings defined for the following user profile object:

  `o=indigo-insurance.com/cn=Finance/cn=Sid Cerise`

- Users in the Finance department receive the settings defined for the following user profile object:

  `o=indigo-insurance.com/ou=Finance/cn=LDAP Profile`.

- Users in the Marketing department receive the settings defined for the following user profile object:

  `o=indigo-insurance.com/ou=Marketing/cn=LDAP Profile`.

- All other users receive the settings defined for the default LDAP user profile, `System Objects/cn=LDAP Profile`

Note – It is not possible to inherit SGD settings from domain component and Active Directory container objects.

SGD Administrators

In SGD, administration privileges are managed using the Global Administrators role object in the System Objects organization.

The Global Administrators role object has a list of members, and a list of assigned applications. All SGD Administrators are defined as members of the Global Administrators role object. The list of assigned applications is used to assign administration tools to SGD Administrators. SGD Administrators are assigned these applications *in addition to* any other applications assigned to them.

Only SGD Administrators can configure SGD using the SGD graphical administration tools, Administration Console and Profile Editor. To use the SGD command-line tools, the following conditions apply:

- Commands that control the SGD server and SGD Web Server can be run only by superuser (root).
- Commands for creating and managing arrays of SGD servers can only be run by SGD Administrators.
- All other commands can be run by any user in the `ttaserv` group.

Use the `usermod -G` command to make a user a member of the `ttaserv` group. The `ttaserv` group does not have to be the users primary or effective group.

You can use the SGD Administration Console or the `tarantella role` command to add or remove SGD Administrators.

If no user profile objects are defined as members of the Global Administrators role object, the UNIX or Linux system root user has administration privileges.

Note – If you want SGD Administrators to authenticate using an LDAP directory or Active Directory authentication, you must create user profiles for them. See "LDAP Mirroring" on page 138 for details.

▼ How To Add an SGD Administrator

1. **In the Administration Console, go to the User Profiles tab.**
2. **Select the Global Administrators role object.**

a. In the navigation tree, click System Objects.

The System Objects table is displayed.

b. In the System Objects table, click the Global Administrators role object.

The Members tab is displayed.

3. Add a user profile object to the Members tab.

a. In the Editable Members table, click Add.

The Add User Assignment window is displayed.

b. Locate the user profile object.

Use the Search field or the navigation tree to find the object you want.

c. Select the check box next to a user profile object.

To add several SGD Administrators, select more than one user profile object.

d. Click Add Assignment.

The Members tab is displayed, showing the selected user profile object.

Tip – You can also use the `tarantella role add_member --role global --member` *pobj* command.

▼ How To Remove an SGD Administrator

1. In the Administration Console, go to the User Profiles tab.

2. Select the Global Administrators role object.

a. In the navigation tree, click System Objects.

The System Objects table is displayed.

b. In the System Objects table, click the Global Administrators role object.

The Members tab is displayed.

3. Remove a user profile object from the Members tab.

a. In the Editable Members table, select the check box next to a user profile object.

To remove several SGD Administrators, select more than one user profile object.

b. Click Delete.

A warning message is displayed.

c. **Click OK.**

The Members tab is displayed.

Tip – You can also use the `tarantella role remove_member --role global --member` *pobj* command.

Publishing Applications

Creating objects to represent the applications, application servers, and users in your organization does not, by itself, give users to access applications through SGD. Applications must be published. You publish applications by creating relationships between the objects in the organizational hierarchy. SGD calls these relationships *assignments*. You publish applications as follows:

- **Assign applications to application servers.** This configures the application servers that can run the application.
- **Assign applications to users.** This configures the users that see the application on their webtop.

Assignments can be either of the following types:

- **Local assignments.** These are relationships between objects that are in the SGD repository. See "Local Assignments" on page 145.
- **LDAP assignments.** These are relationships between objects in the SGD repository and objects in an LDAP directory. See "LDAP Assignments" on page 147.

Assigning applications to application servers is done by using local assignments.

Assigning applications to users is done by using local assignments, LDAP assignments, or a combination of both.

The Administration Console provides several ways for reviewing assignments, see "Reviewing Assignments" on page 151.

Local Assignments

Local assignments are relationships between objects in the local repository.

In the Administration Console, you assign applications on the Applications tab as follows:

- Use the Hosting Application Servers tab to assign applications, or groups of applications, to application servers.

  See "How to Assign Application Servers to Applications" on page 145.

Tip – You can also assign applications from the Hosted Applications tab for group and application server objects.

- Use the Assigned User Profiles tab to assign applications to users.

  See "How to Assign Applications to Users" on page 146.

Tip – You can also assign applications from the Assigned Applications tab for directory and user profile objects.

SGD uses inheritance to make local assignments easier to manage and more efficient. OU and user profile objects can inherit the assignments and settings of their parent objects in the organizational hierarchy. Inheritance is enabled by default. To use inheritance, create user profile objects within OU objects, and then assign applications to the OUs.

The Administration Console provides several ways for reviewing assignments, see "Reviewing Assignments" on page 151.

▼ How to Assign Application Servers to Applications

1. **In the Administration Console, go to the Applications tab and select an application object or a group object.**

   If you select a group of applications, you can assign application servers to all the applications in the group.

   The General tab is displayed.

2. **Go to the Hosting Application Servers tab.**

3. **In the Editable Assignments table, click Add.**

   The Add Application Server Assignment window displays.

4. **Locate application server or group objects.**

   Use the Search field or the navigation tree to find the objects you want.

5. **Select the check box next to the application server or group objects and click Add**

   If you select more than one application server, or a group of application servers, SGD load balances between application servers. See "Load Balancing" on page 334.

   If you select a group of application servers, you select all the application servers in the group.

   The Effective Application Servers table is updated with the selected application servers.

▼ How to Assign Applications to Users

1. **In the Administration Console, go to the Applications tab and select an application object or a group object.**

   If you select a group of applications, you can assign all the applications in the group to users.

   The General tab is displayed.

2. **Click the Assigned User Profiles Tab.**

3. **In the Editable Assignments table, click Add.**

   The Add User Assignment window displays.

4. **Locate user profile or directory objects.**

   Use the Search field or the navigation tree to find the objects you want.

   You can assign an application to user profile or directory objects.

   If you assign an application to a directory object, all the user profiles contained in that directory object automatically receive the application. This is called *inheritance*. Assigning an application to directory objects is more efficient.

5. **Select the check box next to the user profile or directory objects and click Add.**

   The Effective User Profiles table is updated with the selected users.

LDAP Assignments

LDAP assignments make use of SGD's Directory Services Integration feature. With Directory Services Integration, you use an LDAP directory instead of the local repository for holding user information. This means you do not need to create any user profile objects in the local repository.

You can only use Directory Services Integration for users who have their user identity established by searching an LDAP directory. This means users must be authenticated by one of the following authentication mechanisms:

- Active Directory authentication, see "Active Directory Authentication" on page 74
- LDAP authentication, see "LDAP Authentication" on page 85
- Third-party or web server authentication using the LDAP repository search, see "Third-Party and Web Server Authentication" on page 93

LDAP assignments are relationships between objects in the SGD repository and objects in an LDAP directory. With LDAP assignments, instead of assigning applications to users, you assign users to applications. In the Administration Console, you do this on the Assigned User Profiles tab for application, document, and group objects. You can assign users as follows:

- **LDAP users.** You select individual users in an LDAP directory.

  See "How to Assign Applications to LDAP Users" on page 148 for details.

- **LDAP groups.** You select groups in an LDAP directory and SGD assigns the users in the group to the application.

  See "How to Assign Applications to Members of LDAP Groups" on page 148 for details.

  You might have to perform additional configuration to use LDAP group searches successfully. See "Tuning LDAP Group Searches" on page 152 for details.

- **LDAP searches.** You configure an LDAP search filter or URL and SGD assigns the matching users to the application.

  See "How to Assign Applications Using LDAP Searches" on page 149 for details.

Caution – Using LDAP assignments requires many round-trips to an LDAP directory server. This can generate a lot of network traffic and degrade performance. Using LDAP searches is more efficient and flexible than using LDAP users and groups. Use LDAP users and groups sparingly.

When working with LDAP assignments in the Administration Console, it is useful to display the naming attribute for the objects you work with. By default the Administration Console does not display naming attributes. You enable the display of naming attributes in the Preferences for the Administration Console.

If you want more control over the SGD-specific settings for LDAP users, such as the ability to use copy and paste, or to edit client profiles, see "LDAP Mirroring" on page 138.

The Administration Console shows you which users are configured to receive an application using LDAP assignments, see "Reviewing Assignments" on page 151.

See "Troubleshooting LDAP Assignments" on page 155 for tips on working with LDAP assignments.

▼ How to Assign Applications to LDAP Users

1. **In the SGD Administration Console, go to the Applications tab.**
2. **Select an application or group object and go the Assigned User Profiles tab.**

   Use the Search field or the navigation tree to find the object you want.

   If you select a group object, LDAP users receive all the applications in the group.
3. **In the Editable Assignments table, click the Add button.**

   The Add User Assignment window is displayed.
4. **From the Repository list, select Local + LDAP.**
5. **Locate the LDAP users you want to assign to the object.**

   Use the Search field or the navigation tree to find users in the LDAP directory.
6. **Select the check box next to the LDAP users and click the Add button.**

   If you assign several LDAP users to an object, it is more efficient to use an LDAP search.

Tip – On the command line, you can use the `--ldapusers` option to assign LDAP users.

The Add User Assignment window closes and the Editable Assignments table is updated with the LDAP users.

▼ How to Assign Applications to Members of LDAP Groups

1. **In the Administration Console, go to the Applications tab.**
2. **Select an application, document, or group object and go to the Assigned User Profiles tab.**

   Use the Search field or the navigation tree to find the object you want.

   If you select a group object, all members of the LDAP group receive all the applications in the group.
3. **In the Editable Assignments table, click the Add button.**

   The Add User Assignment window is displayed.

4. **From the Repository list, select Local + LDAP.**

5. **Locate the LDAP groups you want to assign to the object.**

   Use the Search field or the navigation tree to find groups in the LDAP directory.

6. **Select the check box next to the LDAP groups and click the Add button.**

   If you assign several groups to an object, it is more efficient to use LDAP searches instead.

Tip – On the command line, you can use the `--ldapgroups` option to assign the members of LDAP groups.

The Add User Assignment window closes and the Editable Assignments table is updated with the LDAP groups.

▼ How to Assign Applications Using LDAP Searches

1. **In the Administration Console, go to the Applications tab.**

2. **Select an application, document, or group object and go to the Assigned User Profiles tab.**

3. **In the LDAP Searches section configure the LDAP search.**

   Do either of the following:

   - Select the Simple Search option and use the LDAP query builder to construct the LDAP search.
   - Select the Advanced Search option and enter the LDAP search string in the LDAP URL or Filter field.

   See "Using LDAP Searches" on page 150 for details.

   Click the Preview button to check whether the configured search returns the expected results.

Tip – On the command line, you can use the `--ldapsearch` option to configure LDAP searches.

---

4. **Click Save.**

Using LDAP Searches

LDAP searches can be either of the following:

- An RFC 2254 search filter, see `http://www.faqs.org/rfcs/rfc2254.html`
- An RFC 1959 LDAP URL, see `http://www.faqs.org/rfcs/rfc1959.html`

The Administration Console provides a Simple Search and an Advanced Search for configuring LDAP searches.

As you configure LDAP searches, use the Preview button to check that the search returns the expected results.

Using the Simple Search

The Simple Search enables you to construct an LDAP search using the following commonly-used LDAP and Active Directory attribute.

Attribute Name	Description
`c`	The countryName attribute containing a two-letter ISO 3166 country code.
`cn`	The commonName attribute containing the name of the object. For person objects, this is usually the person's full name.
`departmentNumber`	The attribute containing the code for a department. The code can be numeric or alphanumeric.
`l`	The localityName attribute containing the name of a locality such as a city or country.
`memberOf`	The commonly-used attribute for managing users in Active Directory. Contains a list of groups to which the user belongs.
`ou`	The organizationalUnitName attribute containing the name of an Organizational Unit.
`sn`	The surname attribute containing the family name of a person.

You can also select a search root. The search root you specify is used instead of the search root configured for the SGD authentication mechanism. If you specify a search root, the search is formatted as an LDAP URL. If you do not specify a search root, the search is formatted as an LDAP filter.

When you save a Simple Search, the search string is displayed in the Advanced Search field.

Using the Advanced Search

The Advanced Search field enables you to enter your own LDAP search filter or URL, or to paste in a search from another tool.

If you enter an LDAP URL, use the format `ldap:///`*search*. If you include the host, port, and return attribute specification in the URL they are ignored.

You can use the Simple Search to construct a basic search and save it. This loads the simple search into the Advanced Search field. Then select the Advanced Search option to fine tune the search.

Note – If you fine tune a Simple Search in the Advanced Search field and edit it in a way that is not compatible with a Simple Search, you might not be able to edit the search again as a Simple Search. If this happens, you must clear the Advanced Search field and save the change. Then rebuild the Simple Search.

Reviewing Assignments

The Administration Console enables you to review assignments as follows:

- Assigned User Profiles tab for application, document, group, and OU objects – The Effective User Profiles table shows you the users that are assigned the application
- Assigned Applications tab for user profile, OU, and organization objects – The Effective Applications table shows you the users that are assigned the application
- Hosting Application Servers tab on application and group objects – The Effective Application Servers table shows you the application servers that can run an application
- The Hosted Applications tab on application server and group objects – The Effective Applications table shows you the applications that can run on the application servers
- The Members tab on group objects – The Effective Members table shows you the members of the group

By default, LDAP assignments are not displayed. To display LDAP assignments, click the Load LDAP link in the effective assignment tables.

The effective assignment tables enable you to trace the origin of assignments, where the assignment is the result of inheritance, group membership, or an LDAP search.

Tuning LDAP Group Searches

You can tune the LDAP group searches to return the users you require for LDAP assignments by configuring how SGD identifies the users in a group and whether SGD can search nested groups or sub-groups.

By default, the LDAP group search searches a single depth of LDAP groups. If your organization uses nested groups or sub-groups, you can increase the depth of the search. Increasing the depth might have a negative effect on performance. See "How to Increase the LDAP Group Search Depth" on page 152.

SGD checks the reverse attributes on the LDAP user object for group membership *before* searching for users on group objects. Reverse attributes are attributes that list the groups to which the user belongs. By default, SGD searches for groups in the `isMemberOf`, `nsroledn`, `memberOf` attributes on user objects. If your LDAP directory uses other reverse attributes to list group membership, you can configure SGD to use those attributes. See "How to Configure LDAP Group Reverse Attributes" on page 153.

When SGD searches for members of LDAP groups, it searches for users in the `uniquemember`, `member`, and `uniqueMember` attributes on group objects. If your LDAP directory uses other attributes to specify group membership, you can configure SGD to use those attributes. See "How to Configure LDAP Group Membership Attributes" on page 154.

If the group membership attributes do not provide enough information to allow SGD to uniquely identify users, for example because the attributes contain only the user's relative distinguished name, then the group search fails. SGD enables you to specify one or more short name attributes that can be used to identify users. SGD considers a user to be a member of a group if the value of their short name attribute also appears in one of the group membership attributes for the group. For short name attributes to work, they must contain unique values. See "How to Configure LDAP Group Short Name Attributes" on page 154.

▼ How to Increase the LDAP Group Search Depth

Repeat the following procedure on each SGD server in the array.

Ensure that no users are logged in to the SGD server, and that there are no application sessions, including suspended application sessions, running on the SGD server.

1. **Log in as superuser (root) on the SGD host.**
2. **Stop the SGD server.**

3. **Increase the depth of group searches.**

   Use the following command:

```
# tarantella config edit \
--com.sco.jndi.toolkit.utils.LDAPUserCollection.properties-maximumGroupDepth \
depth
```

   The default *depth* is 0. Increase the value of *depth* to match the depth of the nested groups.

4. **Start the SGD server.**

▼ How to Configure LDAP Group Reverse Attributes

Repeat the following procedure on each SGD server in the array.

Ensure that no users are logged in to the SGD server, and that there are no application sessions, including suspended application sessions, running on the SGD server.

1. **Log in as superuser (root) on the SGD host.**
2. **Stop the SGD server.**
3. **Specify additional attributes as reverse attributes**

   Use the following command:

```
# tarantella config edit \
--com.sco.jndi.toolkit.utils.LDAPUserCollection.properties-reverseAttributes-a
ppend \
attribute ...
```

   You can list more than one *attribute*. Each *attribute* must be separated by a space.

4. **Start the SGD server.**

▼ How to Configure LDAP Group Membership Attributes

Repeat the following procedure on each SGD server in the array.

Ensure that no users are logged in to the SGD server, and that there are no application sessions, including suspended application sessions, running on the SGD server.

1. **Log in as superuser (root) on the SGD host.**

2. **Stop the SGD server.**

3. **Specify additional attributes as group membership attributes**

   Use the following command:

```
# tarantella config edit \
--com.sco.jndi.toolkit.utils.LDAPUserCollection.properties-directAttributes-ap
pend \
attribute ...
```

   You can list more than one *attribute*. Each *attribute* must be separated by a space.

4. **Start the SGD server.**

▼ How to Configure LDAP Group Short Name Attributes

Repeat the following procedure on each SGD server in the array.

Ensure that no users are logged in to the SGD server, and that there are no application sessions, including suspended application sessions, running on the SGD server.

1. **Log in as superuser (root) on the SGD host.**

2. **Stop the SGD server.**

3. **Specify the short name attributes.**

   Use the following command:

```
# tarantella config edit \
--com.sco.jndi.toolkit.utils.LDAPUserCollection.properties-userShortAttributes
-append \
attribute ...
```

   You can list more than one *attribute*. Each *attribute* must be separated by a space.

4. **Start the SGD server.**

Troubleshooting LDAP Assignments

The Administration Console has some configuration settings that affect the display of LDAP data, for example the attributes that are used to identify users. If you find that LDAP operations in the Administration Console do not work as you expect, you might have to adjust the settings. See "Administration Console Configuration Settings" on page 363 for details.

To help diagnose problems with LDAP assignments, set a `server/webtop` log filter to obtain more information. For information about setting log filters, see "Using Log Filters to Troubleshoot Problems With an SGD Server" on page 369.

You can configure an LDAP timeout in the event that the LDAP searches of an LDAP directory fail. See "LDAP Timeout" on page 116.

SGD caches the data it collects from an LDAP directory. If you find that SGD is not detecting changes, you can flush the cached data manually. See "LDAP Cache" on page 117.

If LDAP group searches are not returning the expected results, see "Tuning LDAP Group Searches" on page 152.

CHAPTER 3

Configuring Applications

This chapter contains advice on configuring applications that users can run through Sun Secure Global Desktop (SGD), and how to diagnose and fix problems with applications.

This chapter includes the following topics:

Supported Applications

You can use SGD to access the following types of applications:

- Microsoft Windows
- X applications running on Solaris OS, Linux, HP-UX, and AIX application servers
- Character applications running on Solaris OS, Linux, HP-UX, and AIX application servers
- Applications running on IBM mainframe and AS/400 systems
- Web applications, using Hypertext Markup Language (HTML) and Java technology

SGD supports the following protocols:

- Microsoft Remote Desktop Protocol (RDP) version 5.2
- X11

- Hypertext Transfer Protocol (HTTP)
- Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS)
- Citrix Independent Computing Architecture (ICA)
- SSH version 2 or later
- Telnet VT, American National Standards Institute (ANSI)
- TN3270E
- TN5250

Supported Installation Platforms for the SGD Enhancement Module

The SGD Enhancement Module is a software component that can be installed on an application server to provide the following additional functionality when using applications displayed through SGD:

- Advanced load balancing
- Client drive mapping (CDM)
- Seamless windows (Microsoft Windows platforms only)
- Audio (UNIX or Linux platforms only)

The following are the supported installation platforms for the SGD Enhancement Module:

Operating System	Supported Versions
Microsoft Windows	Windows Server 2008 Windows Server 2003 Windows 2000 Server Microsoft Windows XP Professional Microsoft Windows Vista Ultimate Microsoft Windows Vista Business
Solaris OS on SPARC platforms	8, 9, 10, 10 Trusted Extensions
Solaris OS on x86 platforms	10, 10 Trusted Extensions
Red Hat Enterprise Linux (Intel x86 32-bit)	4, 5
Fedora Linux (Intel x86 32-bit)	8
SUSE Linux Enterprise Server (Intel x86 32-bit)	9, 10

Note the following limitations:

- On Microsoft Windows XP Professional and Microsoft Windows Vista platforms, only CDM is supported. Seamless windows and advanced load balancing are not supported. Only full Windows desktop sessions are supported, not applications.
- On Solaris 10 OS Trusted Extensions platforms, audio and CDM are not supported.

Application servers that are not supported platforms for the SGD Enhancement Module can be used with SGD to access a supported application type using any of the supported protocols.

Windows Applications

This section describes how to configure Windows application objects.

This section includes the following topics:

Configuring Windows Application Objects

You use a Windows application object if you want to give a Microsoft Windows graphical application to users.

In the Administration Console, the configuration settings for Windows application objects are divided into the following tabs:

- **General tab –** These settings control the name and the icon used when creating links for users
- **Launch tab –** These settings control how the application is started and whether application sessions can be suspended and resumed
- **Presentation tab –** These settings control how the application is displayed to users
- **Performance tab –** These settings are used to optimize the performance of the application
- **Client Device tab –** These settings control how the user's client device interacts with the application

The following table lists the most commonly used settings for configuring Windows application objects, and how to use them.

Attribute	Description
Name	The name that users see.
Icon	The icon that users see.
Application Command	The full path to the application that runs when users click the link. The application must be installed in the same location on all application servers. Leave this field blank if you want to run a Windows desktop session.
Arguments for Command	Any command-line arguments to use when starting the application.
Windows Protocol	The mechanism SGD uses to connect to the application. Select the Try Running from Client First check box to run the application on the user's client device. See "Running Windows Applications on Client Devices" on page 172. Select the Microsoft RDP Protocol option to run an application using Microsoft Terminal Services. This option gives users the best experience when using Windows applications displayed through SGD. A wider range of features, such as client drive mapping, audio, and smart cards, are supported. See "Using Microsoft RDP" on page 162. Select the Citrix ICA Protocol to run an application using the Citrix ICA protocol.
Domain Name	The Windows domain to use for the application server authentication process. This can be left blank. The domain can also be configured on either the application server or the user profile. See also "Windows Domains and the Password Cache" on page 72.
Number of Sessions	The number of instances of an application a user can run. The default is three.
Application Resumability	For how long the application is resumable. The following options are available: • Never – The application can never be resumed • During the User Session – The application keeps running and is resumable until the user logs out of SGD • General – The application keeps running for a time, controlled by the Timeout setting, after the user logs out of SGD, and can be resumed when the user next logs in
Window Type	How the application is displayed to the user. Use Kiosk for full-screen desktop sessions. Selecting the Scale to Fit Window check box for the Window Size enables SGD to scale the application window to fit the client device display. For Independent Window, you must specify a Height and Width for the Window Size or select the Client's Maximum Size check box. Use Seamless Window mode to the application in the same way it displays on the Windows application server, regardless of the user's desktop environment. See "Seamless Windows" on page 166.

Attribute	Description
Color Depth	The application's color depth. If the protocol is Microsoft RDP, only applications running on a Microsoft Windows 2003 Server or later can be displayed using 16-bit or 24-bit color. By default, a Windows 2003 Server displays applications using 16-bit color. If the color depth setting of a Windows application object is different from that of the application server, SGD automatically adjusts the color depth to match the server setting.
Application Load Balancing	How SGD chooses the best application server to run the application. See "Application Load Balancing" on page 343 for more details.
Hosting Application Servers tab	Use the Editable Assignments table to select the application servers, or group of application servers, that can run the application. The application must be installed in the same location on all application servers
Assigned User Profiles tab	Use the Editable Assignments table to select the users that can see the application. Selecting Directory or Directory (light) objects enables you to give the application to many users at once. You can also use a Lightweight Directory Access Protocol (LDAP) directory to assign applications. See "LDAP Assignments" on page 147.

In addition to this configuration, you can also configure the following:

- Printing – See "Printing" on page 219.
- Client drives – See "Client Drive Mapping" on page 254.
- Audio – See "Audio" on page 270.
- Smart cards – See "Smart Cards" on page 285.
- Copy and paste – See "Copy and Paste" on page 280.
- Serial ports – See "Serial Ports" on page 291.

Creating Windows Application Objects on the Command Line

On the command line, you create an Windows application object with the `tarantella object new_windowsapp` command. You can also create multiple Windows application objects at the same time with the `tarantella object script` command. See "Populating the SGD Organizational Hierarchy Using a Batch Script" on page 136.

Windows application objects can only be created in the `o=applications` organizational hierarchy.

Using Microsoft RDP

This section covers advanced configuration for Windows application objects that use Microsoft RDP as the Windows protocol.

This section includes the following topics:

Configuring Microsoft Windows Terminal Services for Use With SGD

Selecting Microsoft RDP Protocol as the Windows Protocol for a Windows application object enables you to use Microsoft Windows Terminal Services.

The following table shows the Terminal Services features supported by SGD and the application server platforms on which they are supported.

Terminal Services Feature	Windows 2000 Server	Windows Server 2003	Windows Server 2008	Windows XP Professional	Windows Vista Ultimate	Windows Vista Business
Audio redirection		✓	✓	✓	✓	✓
Clipboard redirection	✓	✓	✓	✓	✓	✓
COM port mapping		✓	✓	✓	✓	✓
Encryption level	✓	✓	✓	✓	✓	✓
Session directory		✓	✓	✓	✓	✓
Smart card device redirection		✓	✓	✓	✓	✓
Time zone redirection	✓	✓	✓	✓	✓	✓
Windows printer mapping	✓	✓	✓	✓	✓	✓

There are many possible configuration settings for Microsoft Windows Terminal Services. For detailed information on configuring Terminal Services, see your system documentation. To use Terminal Services with SGD, the settings you might have to configure include the following:

Note – Changes to your Terminal Services configuration only take effect for new Windows Terminal Server sessions.

Authentication Settings

You must configure Windows Terminal Services so that it does not prompt for a password when a user logs in.

By default, Windows 2000 Server always prompts for a password when users log in, whether or not SGD supplies the password for the application server from its password cache. By default, Windows Server 2003 or later, does not prompt for passwords.

Session Resumability and Session Directory

Windows Terminal Services allow users' sessions to continue running following a connection loss.

If you are not using Session Directory, it is best to disable this feature on the Windows Terminal Server, and let SGD handle session resumability. This prevents unnecessary use of resources on the application server, and ensures that if users share accounts on the application server, they do not resume each other's Windows sessions. To disable this feature, you must select End Session for the When Session Limit Is Reached Or Connection Is Broken option in Terminal Services Configuration.

If you are using Session Directory to handle session resumability, you must select Suspend Session for the When Session Limit Is Reached Or Connection Is Broken option in Terminal Services Configuration. To use Session Directory, you must also configure the Window Close Action attribute for Windows application objects to End Application Session.

Windows Printer Mapping

To support printing to client printers from a Windows Terminal Server session, Windows printer mapping must be enabled. Windows printer mapping is enabled by default.

Encryption Level

You can only use the Low, Client-compatible, or High encryption levels with SGD. SGD does not support the Federal Information Processing Standards (FIPS) encryption level.

Multiple Terminal Services Sessions

By default, a Microsoft Windows Server only allows users to start one Terminal Services session. If a user starts another desktop session, or another instance of an application with the same arguments, the second Terminal Services session *grabs* the first session and disconnects it. This means that it is not possible to start two desktop sessions, or two instances of the same application, on the same Windows Server.

On Microsoft Windows Server 2003 or later application servers, you can enable support for multiple Terminal Services sessions.

Remote Desktop Users

For Microsoft Windows Server 2003 or later application servers, users can only use Terminal Services if they are members of the Remote Desktop Users group.

Time Zone Redirection

Client computers can redirect their time zone settings to the Terminal Server, so that users see the correct time for their time zone in their desktop or application sessions. Terminal Services uses the server base time on the Terminal Server and the client time zone information to calculate the time in the session. This feature is useful if you have clients devices in different time zones. By default, this feature is disabled.

In the Administration Console, the Time Zone Map File attribute on the Global Settings → Client Device tab specifies a file that contains mappings between UNIX client device and Windows application server time zone names.

Audio Redirection

To play audio from a Windows Terminal Server session, audio redirection must be enabled on the application server. By default, audio redirection is disabled.

Smart Card Device Redirection

To use a smart card reader from a Windows Terminal Server session, smart card device redirection must be enabled on the application server. By default, smart card device redirection is enabled.

COM Port Mapping

To access the serial ports on the client device from a Windows Terminal Server session, COM port mapping must be enabled on the application server. By default, COM port mapping is disabled.

Terminal Services Group Policies

For Windows Server 2003 and later, Terminal Services settings can be configured using Group Policy, as follows:

- Individual Windows Terminal Servers can be configured using a Local Group Policy Object (LGPO). In the Group Policy Object Editor, the Terminal Services settings are at: `Local Computer Policy\Computer Configuration\Administrative Templates\Windows Components\Terminal Services`
- Multiple Windows Terminal Servers can be configured using a Group Policy Object (GPO), linked to a domain or organizational unit (OU).

To improve performance, you might want to configure some or all of the following policies:

- **Keep-Alive Connections.** This policy specifies a keep alive time interval for the Terminal Services session. See also "Keep Alive Configuration for Windows Terminal Servers" on page 166.
- **Limit Maximum Color Depth.** This policy controls the display color depth on client devices. See `http://support.microsoft.com/?kbid=278502` for details of how to set this policy.

Keep Alive Configuration for Windows Terminal Servers

If you find that the connection between the SGD server and the Windows Terminal Server is being dropped unexpectedly, you might need to configure the keep alive mechanism for the Windows Terminal Server.

How to do this is described at:
`http://support.microsoft.com/default.aspx?scid=kb;en-us;216783.`

Microsoft Windows Remote Desktop

Some editions of Microsoft Windows include a Remote Desktop feature that enables you to access a computer using Microsoft RDP. You can use SGD and Remote Desktop, for example, to give users access to their office PC when they are out of the office.

Remote Desktop is supported on the following platforms:

- Microsoft Windows XP Professional
- Microsoft Windows Vista Ultimate
- Microsoft Windows Vista Business

Before introducing SGD, ensure that the Remote Desktop connection to the Microsoft Windows computer is working.

You configure SGD for use with Remote Desktop as follows:

- Create an application server object for each Microsoft Windows computer.
- Create Windows application objects.

  Only full Windows desktop sessions are supported. You cannot run a specific application on the Windows computer. Seamless windows are not supported. To ensure users access their own computer, you have to create separate Windows desktop application objects for each Microsoft Windows computer.
- To use client drive mapping, install the SGD Enhancement Module for Windows on the Microsoft Windows computer.

See "Using My Desktop" on page 190 for details of how to run a full-screen desktop session, without displaying the SGD webtop.

Seamless Windows

With seamless windows, the Microsoft Windows application server manages the display of the application. This means an application's windows behave in the same way as an application displayed on the application server, regardless of the user's

desktop environment. The window can be resized, stacked, maximized, and minimized. The Windows Start Menu and Taskbar are not displayed when using seamless windows.

Seamless windows are not suitable for displaying Windows desktop sessions. Use a kiosk or independent window instead.

The following are the conditions for using seamless windows:

- The application server must be a Windows 2000 Server or later.
- The SGD Enhancement Module for Windows must be installed on the application server.
- The Windows application object must be configured to use Microsoft RDP as the Windows Protocol, and the Window Type must be seamless window.

If any of the above conditions are not met, SGD displays the Windows application in an independent window instead.

Notes and Tips on Using Seamless Windows

The following are some notes and tips on displaying applications in seamless windows:

- If an application is displayed in a seamless window, you can toggle between a seamless window and an independent window by pressing the Scroll Lock key.
- Applications that have non-rectangular windows, for example, a media player with a customized skin, display in a rectangular window.
- On Windows client devices, seamless windows are not affected by the Cascade, Tile Windows Horizontally, or Tile Windows Vertically window commands.
- If a screen saver or the Windows Security dialog displays, the window automatically switches to an independent window. Unlocking the application automatically restores the window to a seamless window.
- If a seamless window application is resumed on a display that is larger or smaller in size than the original session, the application is displayed in an independent window.
- Each application displaying in a seamless window has its own RDP connection.
- Applications configured to display in seamless windows might not display correctly when accessed from a Gnome 2.0.0 Desktop. This is caused by an unpatched version of the Metacity Window Manager. The solution is to install the Gnome 2.0.0 Window Manager patch. Patch ID: 115780, available from the SunSolve web site at `http://sunsolve.sun.com`.

Key Handling for Windows Terminal Services

You can configure how SGD handles keyboard presses on the client device in a Windows Terminal Services session, as follows:

Enabling Window Management Keys

For Windows application objects, the Window Management Keys (`--remotewindowkeys`) attribute configures keyboard shortcut behavior.

Using this attribute, keyboard shortcuts that deal with window management can either be sent to the remote session or acted on locally. This setting is only effective for applications having a Window Type setting of Kiosk.

To exit Kiosk mode if this attribute is enabled, use the key sequence Alt-Ctrl-Shift-Space. This minimizes the kiosk session on the local desktop.

Alternatively, to exit Kiosk mode you can use the `--allowkioskescape` attribute to enable a pull-down header for the application window. The pull-down header includes icons for minimizing and closing the kiosk session. See "Window Type: Pull-Down Header" on page 624 for more details about this attribute.

The Window Management Keys attribute is disabled by default. To turn on this attribute, do either of the following:

- In the Administration Console, go to the Client Device tab for the Windows application object and select the Window Management Keys check box.
- Use the following command:

```
$ tarantella object edit --name obj --remotewindowkeys 1
```

Configuring the Windows Key Behavior

By default, the Windows key is enabled in SGD Windows Terminal Services sessions. This means that the Windows key is used for the remote session and not on the local client device.

The default setting for the SGD Terminal Services Client (`ttatsc`) `-windowskey` option is `on`. You can change this option using the Arguments for Protocol (`--protoargs`) attribute on the Windows application object.

In the Administration Console, go to the Launch tab for the Windows application object and type `-windowskey off` in the Arguments for Protocol field.

Supported Keyboard Shortcuts for Windows Terminal Services

SGD supports the following keyboard shortcuts for Windows Terminal Services sessions.

Keyboard Shortcut	Description
Ctrl-Alt-End	Displays the Windows Security dialog.
Alt-Page Up	Switches between windows, from left to right.
Alt-Page Down	Switches between windows, from right to left.
Alt-Insert	Cycles through windows, in the order they were opened.
Alt-End	Displays the Windows Start menu.
Alt-Delete	Displays the pop-up menu for the current window.
Ctrl-Alt-Minus	Use the Minus (-) key on the numeric keypad. Places a snapshot of the active client window on the Windows Terminal server clipboard. Provides the same functionality as pressing Alt-PrintScrn on a local computer.
Ctrl-Alt-Plus	Use the Plus (+) key on the numeric keypad. Places a snapshot of the entire client window area on the Windows Terminal server clipboard. Provides the same functionality as pressing PrintScrn on a local computer.
Alt-Ctrl-Shift-Space	Minimizes the active window. Only applies for kiosk mode.

Configuring Windows Keyboard Maps

The process of configuring Windows keyboard maps in SGD is the same as that used for configuring keyboard maps for X applications. See also "Keyboard Maps" on page 178.

Note – For Windows applications, the keyboard layout must be the same on the client device and the application server.

The SGD Terminal Services Client

The SGD Terminal Services Client, also known as `ttatsc`, is a client program that handles the connection between the SGD server and the Windows Terminal Server.

The syntax for running `ttatsc` from the command line is:

`ttatsc [-options..]` *server.example.com*

where *server.example.com* is the name of a Windows Terminal Server.

You can use the `ttatsc` to configure Windows Terminal Services sessions in the following ways:

- Configure the Arguments for Protocol (`--protoargs`) attribute of the Windows application object. Using this attribute, you can specify `ttatsc` command options used for a Windows application object.
- Edit the `wcpwts.exp` login script, and specify `ttatsc` command options. Any changes you make to this file are used for all Windows applications that connect using the Microsoft RDP protocol.

The following options are supported for the `ttatsc` command.

Option	Description
`-application`	The application to run in the Terminal Services session.
`-audioquality`	Sets the quality of the audio redirection. Available settings are: • `low` • `medium` • `high`
`-bulkcompression`	Enable or disable data compression for the connection.
`-console`	Instead of starting a normal RDP session, connect to the console session.
`-crypt`	Configures encryption for the connection. The default setting, `on`, gives the best user experience.
`-defaultdepth`	Whether to allow the Terminal Server to set the default color depth of the X session.
`-desktop`	Whether to display a full screen desktop session.
`-dir`	Working directory for the Terminal Services session. This can be overridden by the application.
`-display`	The X display to connect to.
`-domain`	Domain on the Terminal Server to authenticate against.
`-keyboard`	Input locale. Specify an RFC1766 language tag.

Option	Description
`-name`	Name of the client device.
`-netbiosname`	NetBIOS name for the client device. This is used for the redirected printer names on the Terminal Server.
`-noaudio`	Disables audio redirection.
`-nofork`	Do not run `ttatsc` as a background process.
`-opts`	Read command options from a file.
`-password`	Password for the Terminal Services user.
`-perf disable`	Disable display options, to improve performance. Available settings are: • `wallpaper` – Disable the desktop wallpaper • `fullwindowdrag` – Disable the option to show window contents when moving a window • `menuanimations` – Disable transition effects for menus and tooltips • `theming` – Disable desktop themes • `cursorshadow` – Disable the mouse pointer shadow • `cursorsettings` – Disable mouse pointer schemes and customization
`-port`	RDP port to connect to on the Terminal Server. The default setting is 3389.
`-printcommand`	*This option is deprecated.*
`-sharedcolor`	Do not use a private color map.
`-size`	Display width and display height for the Terminal Services session, in pixels.
`-spoil`	*This option is deprecated.*
`-stdin`	Read command options from standard input. Used by the login scripts to pass command options to `ttatsc`.
`-storage`	*This option is deprecated.*
`-timeout connect`	Timeout for connecting to the Terminal Server, in seconds.
`-timeout establish`	Timeout for establishing an RDP connection, in seconds.
`-uncompressed`	*This option is deprecated.*
`-user`	User name for the Terminal Services user.
`-windowskey`	Whether to enable or disable Windows key for the Terminal Services session. The default setting is `on`.

Running Windows Applications on Client Devices

You can run a Windows application on a client device, instead of displaying it through SGD. If the application is not available on the client device, and the Try Running from Application Server check box is selected, SGD tries to run it on the application server using the configured Windows Protocol.

Applications that run on client devices are not resumable, *even if* the Application Resumability and Windows Protocol attributes are configured.

The application must be installed in the same location on all client devices.

X Applications

This section describes how to configure X application objects.

This section includes the following topics:

Configuring X Application Objects

In the Administration Console, the configuration settings for X application objects are divided into the following tabs:

- **General tab –** These settings control the name and the icon used when creating links for users
- **Launch tab –** These settings control how the application is started and whether application sessions can be suspended and resumed
- **Presentation tab –** These settings control how the application is displayed to users
- **Performance tab –** These settings are used to optimize the performance of the application
- **Client Device tab –** These settings control how the user's client device interacts with the application

The following table lists the most commonly used settings for configuring X application objects and how to use them.

Attribute	Description
Name	The name that users see.
Icon	The icon that users see.
Application Command	The full path to the application that runs when users click the link. The application must be installed in the same location on all application servers. The following are commonly used commands for desktop sessions: • `/usr/dt/config/Xsession.jds` – For a Sun Java Desktop System desktop • `/usr/bin/gnome-session` – For a Gnome desktop • `/usr/bin/startkde` – For a K Desktop Environment (KDE) desktop See also "Configuring Common Desktop Environment Applications" on page 198, and "Configuring VMS Applications" on page 201.
Arguments for Command	Any command-line arguments to use when starting the application. **Note -** Never specify a `-display` argument. This is set by SGD.
Connection Method	The mechanism SGD uses to connect to the application server, for example telnet or ssh.
Number of Sessions	The number of instances of an application a user can run. The default is three.
Application Resumability	For how long the application is resumable. The following options are available: • Never – The application can never be resumed • During the User Session – The application keeps running and is resumable until the user logs out of SGD • General – The application keeps running for a time, controlled by the Timeout setting, after the user logs out of SGD, and can be resumed when the user next logs in
Session Termination	The circumstances when the SGD server ends the application session.
Window Type	How the application is displayed to the user. Use Kiosk for full-screen desktop sessions. Selecting the Scale to Fit Window check box for the Window Size enables SGD to scale the application window to fit the client device display. Use Client Window Management to display the application as though it is running on the client device. For other window types, you must specify a Height and Width for the Window Size or select the Client's Maximum Size check box.
Color Depth	The application's color depth. SGD supports X applications with multiple color depths. So you can run an 8-bit application within a 24-bit desktop session by selecting 24/8-bit, for example

Attribute	Description
Application Load Balancing	How SGD chooses the best application server to run the application. See "Application Load Balancing" on page 343 for more details.
Hosting Application Servers tab	Use the Editable Assignments table to select the application servers, or group of application servers, that can run the application. The application must be installed in the same location on all application servers.
Assigned User Profiles tab	Use the Editable Assignments table to select the users that can see the application. Selecting Directory or Directory (light) objects enables you to give the application to many users at once. You can also use an LDAP directory to assign applications. See "LDAP Assignments" on page 147.

In addition to this configuration, you can also configure the following:

- Printing – See "Printing" on page 219.
- Client drives – See "Client Drive Mapping" on page 254.
- Audio – See "Audio" on page 270.
- Copy and paste – See "Copy and Paste" on page 280.

Creating X Application Objects on the Command Line

On the command line, you create an X application object with the `tarantella object new_xapp` command. You can also create multiple X application objects at the same time with the `tarantella object script` command. See "Populating the SGD Organizational Hierarchy Using a Batch Script" on page 136.

X application objects can only be created in the `o=applications` organizational hierarchy.

Supported X Extensions

SGD supports the following X extensions for X applications:

- BIG-REQUESTS
- BLINK
- DAMAGE
- DEC-XTRAP
- DOUBLE-BUFFER
- Extended-Visual-Information
- GLX
- MIT-SCREEN-SAVER

- MIT-SHM
- MIT-SUNDRY-NONSTANDARD
- NATIVE-WND
- RDP
- RECORD
- RENDER
- SCO-MISC
- SECURITY
- SGI-GLX
- SHAPE
- SYNC
- TOG-CUP
- X-Resource
- XC-APPGROUP
- XC-MISC
- XFIXES
- XFree86-Bigfont
- XTEST
- XTTDEV

The following X extensions are *not* supported:

- KEYBOARD
- RANDR
- XINERAMA
- XVIDEO

X Authorization

By default, SGD secures X displays using X authorization. This prevents users from accessing X displays that they are not authorized to access.

For information about troubleshooting X authorization for X applications, see "Applications Fail To Start When X Authorization Is Enabled" on page 210.

X Fonts

SGD includes the standard X Window System fonts in compiled (`.pcf`) and compressed form, together with some additional fonts required by different UNIX systems. See Fonts in X11R6.8.2 for details. The fonts are installed in the `/opt/tarantella/etc/fonts` directory.

The following X fonts and font directories are available with SGD.

Directory	Description
75dpi	Variable-pitch 75 dpi fonts.
100dpi	Variable-pitch 100 dpi fonts.
andrew	Fonts from the Andrew toolkit, required by some IBM applications.
CID	A placeholder for CID-keyed fonts. If you want to add your own CID fonts for use with SGD, install them in this directory.
cyrillic	Cyrillic fonts.
encodings	A set of encoding files used by the Type1 and TrueType font handlers
hangul	Korean fonts.
hp	Fonts required by some Hewlett-Packard applications.
icl	Fonts required by some ICL applications.
misc	Fixed-pitch fonts, cursor fonts, and fonts for compatibility with older versions of X.
oriental	Kanji and other oriental fonts.
scoterm	Cursor fonts.
TTF	True Type fonts.
Type1	PostScript Type 1 fonts.

Using Your Own X Fonts

You can make your own X fonts available through SGD in the following ways:

- Use a font directory, see "Using a Font Directory" on page 177
- Use a font server, see "Using a Font Server" on page 177

After making the X fonts available, you must configure each SGD server in the array to use the fonts, see "How to Configure SGD to Use Your Own X Fonts" on page 177.

Using a Font Directory

To use a font directory, copy your fonts in `.pcf` format to a directory on each SGD server in the array and include a `fonts.dir` file that maps filenames to X logical font descriptions. The fonts can be compressed or gzipped.

The following is an example line from a `fonts.dir` file:

```
COURBO10.pcf  -Adobe-Courier-Bold-0-Normal-10-100-75-75-M-60-ISO8859-1
```

If your font directory does not include a `fonts.dir` file, you can use a program such as `mkfontdir`, which is available for most UNIX systems, to create one.

You can also include a `fonts.alias` file, that specifies aliases for the fonts in the directory. This file maps aliases to X logical font descriptions. For example:

```
variable  *-helvetica-bold-r-normal-*-*-140-*
```

Using a Font Server

A font server is a program that makes fonts on a host available on the network. Font servers make font administration easier by centralizing fonts, reducing duplication.

To name a font server in a font path, you need to know the name of the font server and the port on which fonts are being served. For example, if the font server boston uses Transmission Control Protocol (TCP) port 7100, add the font path entry `tcp/boston:7100`.

▼ How to Configure SGD to Use Your Own X Fonts

Ensure that no users are logged in to the SGD server, and that there are no application sessions, including suspended application sessions, running on the SGD server.

1. **In the Administration Console, go to the Secure Global Desktop Servers tab and select an SGD server.**
2. **Go to the Protocol Engines → X tab.**
3. **In the Font Path field, type the path to the directory containing your X fonts, or the location of the font server.**

   Each SGD server in the array can use a different font path. However, to avoid inconsistent display of applications, ensure that the same fonts, in the same order, are available to all SGD servers.
4. **Click Save.**

5. **Restart the SGD server.**

6. **Check the validity of the font path.**

   Use the `xset` command to see if the font path is set.

```
$ xset q
```

Keyboard Maps

SGD uses a keyboard map, or *keymap*, file to process keyboard input for X applications. A keymap file contains a list of keys for the keyboard and the corresponding characters produced when you press the keys.

By default, an SGD server uses the keymap file corresponding to the locale specified by the Keyboard Map attribute on the Protocol Engines → X tab for the SGD server in the Administration Console.

The available locale settings are:

- **LANG Variable –** Use the locale of the SGD server. This is the value of the LANG environment variable on the SGD server.
- **Client's Input Locale –** Use the locale of the client device.
- **Select Custom Keyboard Map –** Specify your own keyboard map.

You can override the locale for a particular user, by setting the Keyboard Map (`--keymap`) attribute for the user profile object

To prevent an application from changing the default keyboard mappings, set the Keyboard Map: Locked (`--lockkeymap`) attribute for the application object.

Keymap files are located in the `/opt/tarantella/etc/data/keymaps` directory on the SGD server. This directory contains keymap files for the most common keyboard layouts. The keymap files in this directory have a file name beginning with *x*. For example, `xuniversal.txt` keymap file is used to map the keys of a Universal (English US) keyboard.

SGD uses the `/opt/tarantella/etc/data/keymaps/xlocales.txt` file to find the keymap file for the specified locale. This file maps locales to keymap files. For example, the `xlocales.txt` specifies the `xuniversal.txt` keymap file for a locale setting of `en_US`.

Character Applications

This section describes how to configure character application objects. Terminal emulator mappings are also discussed.

This section includes the following topics:

Configuring Character Application Objects

You use a character application object if you want to give a VT420, Wyse 60, or SCO Console character application to users.

In the Administration Console, the configuration settings for character application objects are divided into the following tabs:

- **General tab –** These settings control the name and the icon used when creating links for users
- **Launch tab –** These settings control how the application is started and whether application sessions can be suspended and resumed
- **Presentation tab –** These settings control how the application is displayed to users
- **Performance tab –** These settings are used to optimize the performance of the application
- **Client Device tab –** These settings control how the user's client device interacts with the application

The following table lists the most commonly used settings for configuring character application objects and how to use them.

Attribute	Description
Name	The name that users see.
Icon	The icon that users see.
Application Command	The full path to the application that runs when users click the link. The application must be installed in the same location on all application servers. See also "Configuring VMS Applications" on page 201 for details of how to configure Virtual Memory System (VMS) character applications.
Arguments for Command	Any command-line arguments to use when starting the application.
Connection Method	The mechanism SGD uses to connect to the application server, for example telnet or ssh.
Number of Sessions	The number of instances of an application a user can run. The default is three.
Application Resumability	For how long the application is resumable. The following options are available: • Never – The application can never be resumed • During the User Session – The application keeps running and is resumable until the user logs out of SGD • General – The application keeps running for a time, controlled by a timeout value, after the user logs out of SGD, and can be resumed when the user next logs in
Window Close Action	What happens if the user closes the main application window using the Window Manager decoration. This attribute only applies for applications that use an Independent Window.
Window Type	How the application is displayed to the user. If Independent Window is selected, you must specify a Height and Width for the Window Size or select the Client's Maximum Size check box. Specify the number of Columns and Lines to display in the terminal window.
Emulation Type	The type of character application to emulate. SGD supports VT420, Wyse 60, or SCO Console character applications.
Terminal Type	The application's terminal type. Accept the default terminal type, or type you own type in the Custom field.

Attribute	Description
Application Load Balancing	How SGD chooses the best application server to run the application. See "Application Load Balancing" on page 343 for more details.
Hosting Application Servers tab	Use the Editable Assignments table to select the application servers, or group of application servers, that can run the application. The application must be installed in the same location on all application servers.
Assigned User Profiles tab	Use the Editable Assignments table to select the users that can see the application. Selecting Directory or Directory (light) objects enables you to give the application to many users at once. You can also use an LDAP directory to assign applications. See "LDAP Assignments" on page 147.

To use and display the euro character, the terminal session must be capable of displaying 8-bit characters. To ensure this, enter the command `stty -istrip`. Also, the client device must be capable of entering the euro character.

Creating Character Application Objects on the Command Line

On the command line, you create a character application object with the `tarantella object new_charapp` command. You can also create multiple character application objects at the same time with the `tarantella object script` command. See "Populating the SGD Organizational Hierarchy Using a Batch Script" on page 136.

Character application objects can only be created in the `o=applications` organizational hierarchy.

Terminal Emulator Keyboard Maps

The SGD terminal emulators associate keys on the user's client keyboard with keys found on a real terminal. For each type of terminal emulator: SCO Console, Wyse 60, and VT420, there is a default keyboard mapping.

To change the default mappings or define additional mappings for a particular application, you can specify your own keyboard map file using an object's Keyboard Map attribute.

Default Mappings

The emulators have built-in keyboard maps, which are equivalent to the following sample keymap files in the `/opt/tarantella/etc/data/keymaps` directory:

- `ansikey.txt` – For the SCO Console emulator
- `vt420key.txt` – For the VT420 emulator
- `w60key.txt` – For the Wyse 60 emulator

Note – Modifying these keyboard maps does not alter the default mappings used by SGD. The only way to do this is to specify a keyboard map in an application object's Keyboard Map attribute.

Creating a Keyboard Map

To create your own keyboard map, make a copy of one of the sample keyboard map files, and modify it to suit your application. You can modify a keyboard map in any text editor.

The format of a mapping is:

ClientKeys=Translation

Where *ClientKeys* is the key, or keys, that the user presses on the client device, and *Translation* is the keystroke, or keystrokes, sent to the application on the application server. For example:

```
PageDown=Next
```

With this mapping, when the user presses the Page Down key the emulator sends the keystroke Next to the application server.

If a particular key has a user-defined mapping, the default settings are overridden. If no user-defined mapping is present, the default mapping is sent to the application server.

You can send complete strings on a single key press, by surrounding the string in straight quotation marks. For example:

```
F1="hello world"
```

To enter non-printable characters when mapping strings, use the code shown in the table below:

Code	Meaning
\r	Carriage return
\n	Line feed
\"	Straight quotation marks
\e	Escape

Code	Meaning
\t	Tab
nnn	The character with octal value *nnn*
\x*HH*	The character with hex value *HH*

To specify modifier keys, such as Shift, Control, and Alt, in a mapping, separate the keys with the plus sign, +. For example:

```
Shift+NUMLOCK=INSLINE
Shift+F1="\0330a"
Alt+Shift+Control+DELETE="\003[33~"
```

Key Names

The following are lists of key names that are valid in SGD keyboard maps. The Client Device Keys list shows the key names that represent keys on the user's client device. These are the keys that can be mapped to the emulator key names given in Application Server Keystrokes, which are the keystrokes ultimately sent to the application on the application server.

Note – The default mappings between these key names are as found in the keyboard maps supplied with SGD. If a key is not in a keyboard map, then it is not mapped.

Client Device Keys

SGD supports the following keys on the user's client device:

- CURSOR_DOWN
- CURSOR_LEFT
- CURSOR_RIGHT
- CURSOR_UP
- DELETE
- END
- F1 to F12
- HOME
- INSERT
- KP0 to KP9

- KPADD
- KPDELETE
- KPDIVIDE
- KPENTER
- KPMULTIPLY
- KPSUBSTRACT
- NUMLOCK
- PAGEDOWN
- PAGEUP

Application Server Keystrokes

The following application server keystrokes are supported for *SCO Console* applications:

- CURSOR_DOWN
- CURSOR_LEFT
- CURSOR_RIGHT
- CURSOR_UP
- DELETE
- END
- F1 to F12
- HOME
- INSERT
- KP0 to KP9
- KPADD
- KPDIVIDE
- KPDOT
- KPMULTIPLY
- KPSUBSTRACT
- NUMLOCK
- PAGEDOWN
- PAGEUP

The following application server keystrokes are supported for *VT420* applications:

- CURSOR_DOWN
- CURSOR_LEFT

- CURSOR_RIGHT
- CURSOR_UP
- F1 to F20
- FIND
- INSERT
- KP0 to KP9
- KPCOMMA
- KPDOT
- KPENTER
- KPMINUS
- NEXT
- PF1 to PF4
- PREV
- REMOVE
- SELECT

The following application server keystrokes are supported for *Wyse 60* applications:

- CLRLINE
- CLRSCR
- CURSOR_DOWN
- CURSOR_LEFT
- CURSOR_RIGHT
- CURSOR_UP
- DELCHAR
- DELETE
- DELLINE
- F1 to F16
- HOME
- INSCHAR
- INSERT
- INSLINE
- KP0 to KP9
- KPCOMMA
- KPDELETE
- KPENTER

- KPMINUS
- NEXT
- PREV
- PRINT
- REPLACE
- SEND
- SHIFTHOME

Terminal Emulator Attribute Maps

Terminal emulator attribute maps enable you to change how character attributes such as bold or underline are displayed in the SGD terminal emulators. For example, you can specify that text that normally appears bold and underlined appears red in the SGD terminal emulators, but not red *and* bold and underlined.

SGD provides a default attribute map `/opt/tarantella/etc/data/attrmap.txt`. This maps character attributes to the logical color `Color_15` (white). You can also create your own attribute map.

▼ How to Create Your Own Attribute Map

1. **As superuser (root), create a copy of `/opt/tarantella/etc/data/attrmap.txt` to work on.**
2. **Edit the new file, so that character attributes map to your chosen colors.**
3. **Use the name of the file for the application object's Attribute Map attribute.**

Editing Character Attributes

The SGD attribute maps enable you to map the following attributes:

- Normal
- Bold
- Dim
- Blinking
- Underline
- Inverse

To map combinations of attributes, separate the attributes with the plus sign +, for example, `Bold+Underline`.

To display colors in the terminal emulators, SGD maps logical colors to RGB values. For example, the logical color `Color_9` maps to the RGB value `128 0 0` (red).

When mapping attributes to colors in your attribute map, specify the logical color name. For example:

- To change bold underlined text to red text:

  ```
  Bold+Underline=Color_9
  ```

- To change inverse blinking text to light red text:

  ```
  Inverse+Blinking=Color_1
  ```

For a complete list of logical color to RGB value mappings, refer to the comments in `attrmap.txt`.

You can change the default color mappings by editing the color map used by the terminal emulators. See "Terminal Emulator Color Maps" on page 187.

Note – Wyse 60 terminals display only black and white colors. However, you can use the SGD Wyse 60 terminal emulator to display colors in your Wyse 60 applications. You can do this by using the attribute map to map character attributes in the Wyse 60 application to colors.

Terminal Emulator Color Maps

SCO Console (ANSI) and VT420 terminals support 16 colors. The SGD terminal emulator uses a color map to determine how these colors are presented in an application session.

Note – Wyse 60 terminals are monochrome. You can only switch the background and foreground colors, black and white, using the color map. However, you can map character attributes such as bold or underline to any of the 16 logical colors supported by the terminal emulator. See "Terminal Emulator Attribute Maps" on page 186.

The color map maps the logical colors `Color_0` through to `Color_15`, inclusive, to colors and the RGB values that SGD uses to represent those colors. The default mappings are as follows:

Logical Color	Terminal Color	RGB Value Used by SGD
`Color_0`	Black	0 0 0
`Color_1`	Light red	255 0 0
`Color_2`	Light green	0 255 0
`Color_3`	Yellow	255 255 0
`Color_4`	Light blue	0 0 255
`Color_5`	Light magenta	255 0 255
`Color_6`	Light cyan	0 255 255
`Color_7`	High white	255 255 255
`Color_8`	Gray	128 128 128
`Color_9`	Red	128 0 0
`Color_10`	Green	0 128 0
`Color_11`	Brown	128 128 0
`Color_12`	Blue	0 0 128
`Color_13`	Magenta	128 0 128
`Color_14`	Cyan	0 128 128
`Color_15`	White	192 192 192

To alter the defaults for a particular application, create your own color map, and specify it in the application object's Color Map attribute.

A default text-format color map `/opt/tarantella/etc/data/colormap.txt` is provided.

Examples of Using Color Maps

- To make the color red brighter, change the RGB setting of `Color_9` to `192 0 0`.
- To change items that appear in light green to appear yellow, change the RGB setting of `Color_2` to `255 255 0`, the RGB value of yellow.
- One common color change is to switch the foreground and background colors between black and white. When you do this, you are not changing the foreground or background color as such, you are changing the way black (`Color_0`) and

white (`Color_15`) are displayed. Therefore, if your application has a white background and you want to change it to a black background, change the value of `Color_15` to `0 0 0`, the RGB value of black.

Tips on Configuring Applications

This section contains tips on configuring applications and documents for use with SGD includes the following topics:

Starting an Application or Desktop Session Without Displaying a Webtop

With SGD, you can start a single application or a full-screen desktop session without displaying the webtop. You can do this in any of the following ways:

- Using My Desktop
- Using the SGD Client in Integrated mode
- Using SGD web services

Note – If an application is not assigned to a user they cannot start the application. This applies whether the application is assigned directly to the user, or indirectly, for example, by inheritance.

Using My Desktop

My Desktop enables users to log in and display a full-screen desktop without displaying a webtop.

To be able to use My Desktop, the user must be assigned an application object called My Desktop (`cn=My Desktop`). This object is created automatically when SGD is installed. By default, the object is configured to run the default desktop application available on the SGD server, for example, the Sun Java Desktop System. You can reconfigure this object to run any application you want, but it works best with full-screen desktop applications. If users require different desktop applications, you can create additional My Desktop objects as required. However, users must be assigned only one My Desktop application.

Users access My Desktop at `http://`*`server.example.com`*`/sgd/mydesktop`, where *server.example.com* is the name of an SGD server. This Uniform Resource Locator (URL) displays the SGD Login page. Once the user has logged in, the desktop session is displayed. The browser window can be closed.

Alternatively, users can click the My Desktop link on the SGD Web Server Welcome page, at `http://`*`server.example.com`*.

Note – Users can be assigned any number of applications, but the My Desktop URL only gives users access to the My Desktop application.

Users cannot suspend or resume the My Desktop application. They must log out of the desktop application as normal.

Using the SGD Client in Integrated Mode

You can use the SGD Client in Integrated mode to run applications or a full-screen desktop without displaying a webtop. Once a user has performed an initial log in, displayed a webtop, and configured Integrated mode, the applications they can run display in the desktop Start or Launch menu. The user then does not have to display a webtop when starting applications or full-screen desktop sessions. See "Integrated Mode" on page 315 for more details.

Using SGD Web Services

You can use SGD web services to develop your own *application launcher*, to start a single application from a URL. You can use this method to start an application from a bookmark or a favorite. SGD provides an example application that shows what is possible using SGD web services.

The URL for using the SGD example application is:

`http://`*server.example.com*`/sgd/launcher.jsp?o=`*application*`&u=`*username*`&p=`*password*`&e=true|false`

where *server.example.com* is the name of an SGD server.

The URL has the following parameters:

Parameter	Description
`o=`*application*	The name of the application object. This does not have to be a fully-qualified name.
`u=`*username*	The user name to use to log in to SGD.
`p=`*password*	The password to use to log in to SGD.
`e=true|false`	`true` means display an edit page where users can override some of the application attributes. `false` means do not display edit page.

Note – All of the parameters are optional.

For example, the following URL starts the Write-o-Win application using the configuration for the application object defined in the Administration Console.

`http://`*server.example.com*`/sgd/launcher.jsp?o=Write-o-Win&u=indigo&p=purple&e=false`

Using Multihead Or Dual Head Monitors

You can use multihead or dual head monitors with SGD. However, if any of your applications are configured with a Window Type (`--displayusing`) setting of Client Window Management, you might have to change the application and monitor configuration to be able to use multiple monitors.

See also "Configuring X Application Objects" on page 172.

To configure multiple monitors to work with applications that have a Window Type setting of Client Window Management, perform the following configuration steps:

1. Disable shared resources.
   - See "Disabling Shared Resources" on page 192.
2. Configure the correct desktop size.
   - See "Configuring the Correct Desktop Size" on page 192.

3. Set up the monitors.
   - See "Setting Up the Monitors" on page 193.

Disabling Shared Resources

SGD enables similar applications to share resources, to reduce memory overhead. This feature must be disabled for any applications that you want to display using multiple monitors.

In the Administration Console, go to the Performance tab for the application that is displayed on multiple monitors and deselect the Share Resources Between Similar Sessions check box.

Alternatively, use the following command:

```
$ tarantella object edit --name obj --share false
```

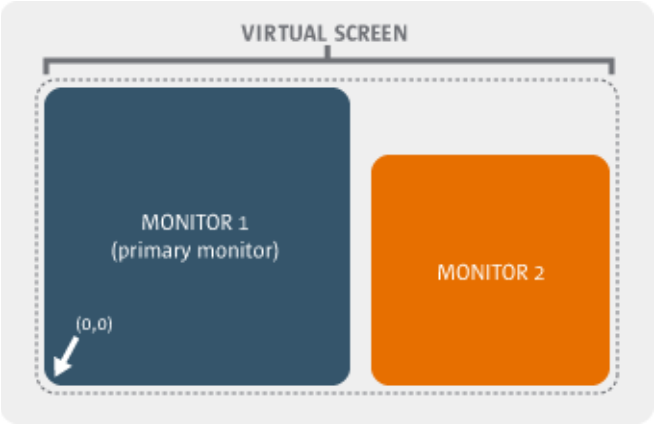
Repeat the configuration for each application that is displayed on multiple monitors.

Configuring the Correct Desktop Size

You must ensure that the SGD server sends the client enough space to display all the monitors on the desktop.

Note – This increases the amount of memory used on the client device and on the SGD server.

You must configure your SGD servers so that they send the size of the entire desktop area to the client device, and not just the size of the primary monitor. The size of the entire desktop area is shown by the "virtual screen" in the following diagram.



For example, if the dimensions of Monitor 1 in the diagram are 1200 x 768 and the dimension of Monitor 2 are 800 x 600, then the desktop size that needs to be configured is 2000 x 768.

In the Administration Console, go to the Protocol Engines → X tab for the SGD server. For Client Window Size, type the dimensions in pixels of the virtual screen in the Maximum Height and Maximum Width fields.

Alternatively, use the following command:

```
$ tarantella config edit --array \
--xpe-cwm-maxwidth pixels --xpe-cwm-maxheight pixels
```

Repeat this configuration for each SGD server in the array.

Setting Up the Monitors

Set up the monitors so that all the secondary monitors are to the right of the primary monitor, as shown in the previous diagram.

You have to do this because the X server cannot handle negative screen coordinates.

Improving the Performance of Windows Desktop Sessions

When using Windows Terminal Services, the performance of Windows desktop sessions might be poor. This is caused by using animation effects and other desktop settings in the Windows session. Performance is affected because these features require more screen updates and can greatly increase the bandwidth used. The problem is more severe on slower connections.

The causes of these problems can include the following:

- Animated mouse cursors
- Mouse cursor shadows
- Screensavers
- Animated icons in the notification area
- Animated images in programs
- Animated wallpaper
- Images used as wallpaper

By default, the SGD Terminal Services Client, `ttatsc`, enables these features.

You can turn off these features by configuring one or more `-perf disable` *option* command arguments in the Arguments for Protocol attribute (`--protoargs`) for the Windows application object. The *option* can be one of the following.

Option	Description
`wallpaper`	Disables the desktop wallpaper. Disabling the wallpaper can reduce the amount of data that is updated when users move items around the desktop.
`fullwindowdrag`	Disables the option to show the contents of a window while it is moved.
`menuanimations`	Disables transition effects for menus and tooltips.
`theming`	Disables desktop themes.
`cursorshadow`	Disables the shadow on the mouse pointer.
`cursorsettings`	Disables mouse pointer schemes and customizations.

See also "The SGD Terminal Services Client" on page 170.

Improving the Performance of JDS Desktop Sessions or Applications

This section includes some tips on how to get the best user experience when using SGD with Sun Java™ Desktop System (JDS).

You can improve performance of JDS desktop sessions and applications in the following ways:

- Configure the X application object for JDS
- Disable some default JDS desktop settings

Configuring the X Application Object for JDS

For a JDS desktop session or application, ensure that you specify the correct command path for the X application object. Set the Application Command (`--app`) attribute to `/usr/dt/config/Xsession.jds`. Using a path of `/usr/bin/gnome-session` results in some JDS configuration parameters being lost and gives a poorer user experience.

To improve the display of animated effects, you can configure performance settings for the X application object. See "An Application's Animation Appears 'Jumpy'" on page 212.

Disabling Default JDS Settings

The performance of JDS desktop sessions and applications can be affected by animation effects and other default desktop settings. Performance is affected because these features require more screen updates and can greatly increase the bandwidth used. The problem is more severe on slower connections.

Performance can often be improved by turning off, or modifying, some of the following JDS desktop features:

- Anti-aliased fonts
- Large fonts
- Login screen, splash screen, About screen, and Logout screen
- Animations
- Desktop applets
- Showing window contents when dragging
- Desktop wallpaper
- Themes

Documents and Web Applications

A document object can refer to any URL. This can be any document on the web, including StarOffice™ documents, or Adobe Acrobat files. A document can also refer to a web application.

As it is the user's *client device* that actually fetches the URL, firewalls, or other security measures can prevent a user from accessing a document.

You can use SGD to access web applications. A web application is simply a web page, or any URL, that requires the user to supply a user name and password for access. To give users access to a web application, you create a document object that links to the URL of the web application.

Unlike passwords for application servers, SGD cannot cache the user names and passwords for accessing web applications. However, you can configure web server authentication, so that users can access SGD from a web application without having to log in again. See "Web Server Authentication" on page 97 for details. Alternatively, you can authenticate SGD users to the web application.

When accessing web applications, use a secure (HTTPS) web server, so that all communication is encrypted using SSL before transmission.

Creating a Virtual Classroom

This section describes how to configure application objects for use in a *virtual classroom*.

You can use SGD shadowing to create a virtual classroom, where the *pupils* in the classroom shadow an application being demonstrated by a *teacher.*

To be able to do this, you have to create a teacher's application object and a classroom application object.

The teacher must start their application first, then the pupils start their classroom application to shadow the teacher. The classroom can only shadow Windows applications or X applications.

Only one person can use the teacher's application at any one time. If more than one person starts the teacher's application, the classroom shadows the application that was started last. For this reason, only give the teacher's application to one user. If you have several teachers, create separate application objects for each of them.

The classroom application must have a color depth of at least 16-bit. The display size of the classroom application must be at least the size of the teacher's application. For the best results, use an independent window for the classroom.

When the teacher starts their application, information is stored on the SGD server about which application can be shadowed by the classroom. This information is *not* copied to the other members of the array. This means that if the classroom application is started on a different SGD server to the teacher's application, the classroom application fails because the information about which application can be shadowed is not available. You can use load balancing groups to guarantee that the teacher and classroom applications are started on the same SGD server. You must set the load balancing group for the application server *and* the SGD server. Otherwise, only use classroom shadowing in an SGD array containing a single SGD server.

See also "Using Shadowing to Troubleshoot a User's Problem" on page 203.

▼ How to Create the Teacher's Application Object

1. **In the Administration Console, create a new Windows application object or X application object.**
2. **Go to the Launch tab and type one of the following in the Login Script field:**
   - `unixclass.exp` – If the application is an X application
   - `winclass.exp` – If the application is a Windows application
3. **Click Save.**
4. **Configure any other settings you want for the teacher's application.**
5. **Click the Hosting Application Servers tab and select the application servers that can run the application.**
6. **On the Assigned User Profiles tab, assign the teacher's user profile to the application.**

▼ How to Create the Classroom Application

1. **In the Administration Console, create a new X application object.**

Note – The classroom application is an X application, even if the teacher's application is a Windows application.

The General tab is displayed.

2. **Go to the Launch tab and configure the application as follows:**

   a. **In the Application Command field, type** `/opt/tarantella/bin/bin/ttashadow`**.**

b. **In the Arguments For Command field, type** `-readonly -silent -pointer $SHADOWDISPLAY`.

c. **In the Login Script field, type** `pupil.exp`.

d. **In the Environment Variables field, type** `MYCLASS="`*name_of_teacher's_application*`"`**, for example,** `MYCLASS=".../_ens/o=applications/ou=Finance/cn=XClaim"`

3. **Click Save.**
4. **Go to the Presentation tab.**
5. **For Color Depth, select 16-bit - thousands of colors and click Save.**
6. **Configure any other settings you want for the classroom application.**
7. **Go to the Hosting Application Servers tab and select the application servers that can run the application.**

   The `ttashadow` application is only available on servers where SGD is installed.
8. **Go to the Assigned User Profiles tab, assign the user profiles of all users in the class to the classroom application.**

Configuring Common Desktop Environment Applications

The configuration required for Common Desktop Environment (CDE) applications depends on whether you want to run a desktop session or an individual application.

For CDE desktop sessions configured with a Connection Method of `ssh`, problems can occur when a user tries to exit from the CDE session. The CDE session might hang, making it impossible to log out normally from the system. See "Using CDE and SSH" on page 200.

Configuring a CDE Desktop Session

To run a CDE desktop session through SGD, create an X application object with the settings shown in the following table.

Attribute	Setting
Application Command	The full path to the `Xsession` application, for example, `/usr/dt/bin/Xsession`. On the command line, use `--app` *pathname*.
Keep Launch Connection Open	Select the Enabled check box. On the command line, use `--keepopen true`.
Session Termination	Select Login Script Exit from the list. On the command line, use `--endswhen loginscript`.
Window Type	Select Kiosk from the list. On the command line, use `--displayusing kiosk`
Window Size	Select the Scale to Fit Window check box. Use this setting only if users suspend and resume the application on displays of different sizes. On the command line, use `--scalable true`

Configuring a CDE Application

To run a CDE application directly, rather than from the CDE Front Panel, create an X application object with the settings shown in the following table.

Attribute	Setting
Application Command	The full path to the application you want to run. On the command line, use `--app` *pathname*.
Keep Launch Connection Open	Deselect the Enabled check box. On the command line, use `--keepopen false`. **Note -** This is the default value for this attribute.

Attribute	Setting
Session Termination	Select No Visible Windows from the list. On the command line, use `--endswhen nowindows`. **Note -** This is the default value for this attribute.
Window Type	Select Client Window Management from the list. On the command line, use `--displayusing clientwm`
Window Manager	Type the following in the field: `/usr/dt/bin/dtwm -xrm "Dtwm*useFrontPanel: false" -xrm "Dtwm*ws0*backdrop*image: none"` On the command line, use `--winmgr '/usr/dt/bin/dtwm -xrm "Dtwm*useFrontPanel: false" -xrm "Dtwm*ws0*backdrop*image: none"'`

Using CDE and SSH

For CDE desktop sessions configured with a Connection Method of ssh, problems can occur when a CDE desktop user tries to exit from the CDE session. The CDE session might hang, making a proper logout from the system impossible.

The CDE session displays a `TT_ERR_NO_MATCH` error message.

The workaround for this issue is as follows:

- Log in to the CDE host as superuser (root) and type the following commands:

```
# mkdir /etc/dt
# mkdir /etc/dt/config
# cp /usr/dt/config/sessionetc /etc/dt/config
# cp /usr/dt/config/sessionexit /etc/dt/config
# cp /usr/dt/config/sys.dtprofile /etc/dt/config
# chgrp bin /etc/dt/config
# chmod 555 /etc/dt/config/*
# chown bin:bin /etc/dt/config/*
```

- Add the following lines to the `/etc/dt/config/sessionetc` file:

```
if [ "$SSH_TTY" != "" ]
then
SSHPTTY=‘echo $SSH_TTY | cut -c6-15‘
ps -ef | grep -v grep | grep $SSHPTTY | grep Xsession | awk ’{print $3}’ >
/var/dt/tmp/$DTUSERSESSION/sshd_pid
fi
```

- Add the following lines to the `/etc/dt/config/sessionexit` file:

```
if [ -f /var/dt/tmp/$DTUSERSESSION/sshd_pid ]
then
/bin/kill -HUP `/bin/cat /var/dt/tmp/$DTUSERSESSION/sshd_pid`
/bin/rm /var/dt/tmp/$DTUSERSESSION/sshd_pid
fi
```

- Add the following line to the `/etc/dt/config/sys.dtprofile` file:

```
dtstart_session[0]="/usr/local/bin/ssh-agent /usr/dt/bin/dtsession"
```

See `http://sunsolve.sun.com/search/document.do?assetkey=1-26-25361-1` for more information about this issue.

Configuring VMS Applications

You can use SGD to access X applications and character applications on a VMS application server.

To configure SGD to access applications on a VMS server, you have to perform the following configuration steps:

1. Configure the login script used for the application.
   - See "Configuring the Login Script Used for the Application" on page 201.
2. Configure the transport variable in the login script.
   - See "Configuring the Transport Variable in the Login Script" on page 202.
3. Disable X security.
   - See "Disabling X Security" on page 202.

Configuring the Login Script Used for the Application

The login script used for the X application or character application must be configured.

In the Administration Console, go to the Applications → Launch tab for the application object you want to configure.

In the Login Script box, type one of the following:

- `vms.exp` – If `telnet` or `ssh` is selected as the Connection Method
- `vmsrexec.exp` – If `rexec` is selected as the Connection Method

Alternatively, use the following command:

```
$ tarantella object edit --name obj --login vms.exp | vmsrexec.exp
```

Configuring the Transport Variable in the Login Script

By default, the `vms.exp` or `vmsrexec.exp` login scripts set the transport variable to `TCPIP`. This setting is correct for Digital Transmission Control Protocol/Internet Protocol (TCP/IP) stacks, including Ultrix Communications Extensions (UCX).

If you need to change this variable, edit the transport variable setting in the login script. The transport variable is set by the following entry in the login script:

```
set transport "TCPIP"
```

The login scripts are located in the `/opt/tarantella/var/serverresources/expect` directory.

Disabling X Security

To use VMS X applications, you must disable X security in SGD. This is because VMS does not support X authorization.

In the Administration Console, go to the Global Settings → Security tab and deselect the X Authorization for X Display check box.

Alternatively, use the following command:

```
$ tarantella config edit --security-xsecurity 0
```

3270 and 5250 Applications

SGD uses the third-party emulator application, TeemTalk for Unix, for 3270 and 5250 applications. See the TeemTalk for Unix User's Guides supplied with SGD for details.

The first time a user runs the 3270 or 5250 emulator, the `tta3270.nv` configuration file is created in the user's home directory on the SGD server.

Troubleshooting Applications

This section describes some typical problems that users might have with their applications, and how to fix them.

"Using Shadowing to Troubleshoot a User's Problem" on page 203 describes how an SGD Administrator and a user can see and use an application simultaneously.

The following troubleshooting topics are covered:

To troubleshoot problems with authentication when starting an application, see "Troubleshooting Application Authentication" on page 124.

Using Shadowing to Troubleshoot a User's Problem

If a user is having difficulty with an application, you can use the Administration Console to find the user's application session and then *shadow* it. Shadowing enables the user and an SGD Administrator to see and use the application simultaneously.

To find a user's application session, go to the Application Sessions tab for their user profile object. Alternatively, go to the Application Sessions tab for the application object. This lists the users who are currently running the application.

Select the application session in the Application Sessions List table. Click the Shadow button to commence shadowing.

The user sees a dialog box, asking whether to allow you to shadow the session. If the user agrees, a new window appears on your screen, showing the running application. Both you and the user can control the mouse pointer and use the application.

When you have fixed the user's problem, close the shadowing window, but do not close the application. The user sees a dialog box, saying that nobody is currently shadowing the session.

The Application Sessions tab shows other application session information, such as the date and time the session started, and whether the session is suspended or currently active.

You can only shadow Windows applications and X applications. The application must not be suspended.

If the user has application sessions for two or more applications that are using shared resources, all applications that are sharing resources are displayed when you shadow the session. The button bar on the shadowing window enables you to toggle between the applications.

You can also shadow a user's session from the command line, using the `tarantella emulatorsession shadow` command.

An Application Does Not Start

If an application does not start when a user clicks a link, first check the configuration of the application object, see "Checking the Configuration of the Application Object" on page 204.

If this does not resolve the problem, check the launch details or the log files for a launch error message, see "Checking the Launch Details and Error Logs" on page 205.

If users cannot log in to SGD or start applications, do a warm restart of the SGD servers by running the following command:

```
# tarantella restart --warm
```

Checking the Configuration of the Application Object

Check the configuration of the application object in the Administration Console.

First, check the Hosting Application Servers tab for the application object. You must specify at least one application server to run the application. Check that the listed application servers are available.

Next, check the Launch tab for the application object. Check the attributes shown in the following table.

Attribute	What to Check
Application Command	Does the command contain the full path name of the application's executable? For Windows application objects, does the command also include the correct filename extension? Does the path name point to a Windows shortcut? If so, change it to the full path name of the application itself. Is the application installed in the same location on every application server listed in the Hosting Application Servers tab?
Arguments for Command	Are the command arguments correct?
Connection Method	For X and Character application objects, is the selected Connection Method appropriate for the type of application server?
Windows Protocol	For Windows application objects, is the correct Windows Protocol used for the type of application server?
Login Script	Is a login script set? Is the login script appropriate for the application type?
Environment Variables	Are all the environment variables required for the application set correctly?

If the application object is configured correctly, check that the application itself actually runs on all the application servers.

Checking the Launch Details and Error Logs

When an application fails to start, SGD displays an error message in the details area of the Connection Progress dialog. The error message is output to the SGD Client log file (`tcc.txt`) in the user's home directory.

The error messages are also output to the following log files:

- `/opt/tarantella/var/log/execpe`*PID*`_error.log`

  This file contains log output from the Execution Protocol Engine process.

- `/opt/tarantella/var/log/launchhelper`*PID*`_error.log`

  This file contains additional log output if the connection method for the application object is SSH.

The error messages have the following form:

ErrorMessage
`Script` *process-id* `exited with code` *error-code* `and signal` *signal*

The *ErrorMessage* and *error-code* can be used to troubleshoot problems. The following are the most common error messages:

- `ErrApplicationServerTimeout`

  See "Troubleshooting `ErrApplicationServerTimeout` Errors" on page 207

- `ErrApplicationServerLoginFailed`

  See "Troubleshooting `ErrApplicationServerLoginFailed` Errors" on page 207.

For a complete list of error messages and codes and troubleshooting information, see "Login Script Error Messages" on page 807.

If the launch details or log files show error messages such as "`Failed to find xauth`" or "`Attempt to run xauth failed`", see "Applications Fail To Start When X Authorization Is Enabled" on page 210.

Increasing the Log Output

If you are still unable to resolve the problem, you can increase the amount of information that is output to the log files. To do this, you amend the log filters for the Execution Protocol Engine, and, *for X and character applications only*, enable debugging in the login script.

To amend the log filter for the Execution Protocol Engine, use the following command:

```
$ tarantella config edit \
  --tarantella-config-execpeconfig-logfilter \
  execpe/*/*,pem/*/*,launchhelper/*/*
```

To enable debugging in the login scripts, edit the following files:

- The login script configured for the application object.

  Remove the comment mark (`#`) from the start of the `startdebug` line

  The login script is usually either `unix.exp`, `securid.exp`, `vms.exp`, `unixclass.exp`, or `pupil.exp`

- `procs.exp`

  Insert a comment mark (`#`) at the start of the `stopdebug` line.

When you have resolved the problem, remember to reset the log filter for the Execution Protocol Engine back to the default, and disable logging in the login scripts. Use the following command to reset the log filter:

```
$ tarantella config edit \
  --tarantella-config-execpeconfig-logfilter \
  execpe/*/*error,pem/*/*error,launchhelper/*/*error
```

Troubleshooting `ErrApplicationServerTimeout` Errors

If starting an application results in an `ErrApplicationServerTimeout` error, this usually means a login script has timed out before it can log the user in.

You can fix this by increasing the login script timeouts. See "Login Script Timeouts" on page 803 for details of the available timeouts.

When changing the timeouts, increase the Expect timeouts first. If the application still fails to start, one of the client timers might be too short. If the application is particularly slow to start, increase all the client timers.

Increasing the login script timeouts slows down application start times. Only change the timeouts if you are experiencing problems, and tune the timeouts to the capabilities of the application server.

Note – None of the timeouts, apart from the Execution Protocol Engine timeout, apply when running a Microsoft Windows application that is configured to use the Microsoft RDP protocol.

Troubleshooting `ErrApplicationServerLoginFailed` Errors

If starting an application results in an `ErrApplicationServerLoginFailed` error, the login script failed to log into the application server.

Check that you can log into the application server manually.

If you can log in, check that the application server's system prompt is recognized by the login script. Unusual system prompts are a common reason for this failure, and can be caused by the following:

- System prompts in a language other than English
- Message-of-the-day (`/etc/motd`) or issue messages (`/etc/issue`)

- The user's login profile is configured to run a menu

By default, SGD supports English system prompts on application servers. Administrators can add support for system prompts in other languages. See "Supporting Users in Different Locales" on page 73 for details.

If you are using the standard SGD login scripts, check the system prompts defined in the `vars.exp` login script.

If a message-of-the-day or a menu causes a login script to fail, you must configure the login script to handle this situation. Alternatively, contact Technical Support for help.

The login script might also be timing out. If you see "`echo SYNC`" in the launch details or log files, and the system prompt ends in the normal way with `$`, `%`, `#`, or `>`, try increasing the `timeouts(prelogin)` value in the `vars.exp` login script. See "Expect Timeouts" on page 804 for details.

An Application Exits Immediately After Starting

Users might see this problem with Windows applications or X applications. The solution is to keep open the network connection used to start the application.

In the Administration Console, select the Keep Launch Connection Open check box on the Launch tab for the application object.

Alternatively, use the following command:

```
$ tarantella object edit --name obj --keepopen true
```

Applications Disappear After About Two Minutes

If users find that their applications disappear unexpectedly after about two minutes, a proxy server might be timing out the connections. Proxy servers drop a connection after a short period of time if there is no activity on the connection.

SGD sends keepalive packets to keep the connection open and by default this is every 100 seconds. If applications are disappearing, you can increase the frequency at which keepalive packets are sent to keep the connection open.

In Administration Console, go to the Global Settings → Communication tab for the application object and set the AIP Keepalive Frequency to a smaller value than the default, for example, 60.

Alternatively, use the following command:

```
$ tarantella config edit --sessions-aipkeepalive secs
```

An Application Session Does Not End When the User Exits an Application

In the Administration Console, go to the Launch tab for the application object and check the value of the Session Termination attribute. If No Visible Windows is selected, the application session ends when there are no visible windows.

When running an application on a Microsoft Windows Terminal Server, closing the application does not always result in the session closing. This is because the SGD Enhancement Module for Windows is still running. The solution is to configure the SGD Enhancement Module to ignore certain system processes so that it closes. To do this, edit the `System processes` value for the `HKEY_LOCAL_MACHINE\Software\Tarantella\Enhancement Module for Windows` key in the registry on the application server. This value is a string that contains a comma-separated list of `.exe` binaries that the SGD Enhancement Module can ignore. You must amend this value by listing the processes that were running when the session failed to close. To do this, open Task Manager, while you have a session that has failed to close, and go to the Processes tab. Make a list of all the `.exe` processes that are running. Do not include the following processes:

- `clipsrv.exe`
- `conime.exe`
- `csrss.exe`
- `EventLog.exe`
- `lmsvcs.exe`
- `lsass.exe`
- `MsgSvc.exe`
- `nddeagnt.exe`
- `netdde.exe`
- `NETSTRS.EXE`
- `os2srv.exe`
- `proquota.exe`
- `rdpclip.exe`
- `screg.exe`
- `smss.exe`
- `spoolss.exe`

- ttaswm.exe
- ttatdm.exe
- wfshell.exe
- win.com
- winlogon.exe

If you are running a single application session, you might find that the session still does not exit, even after editing the System processes registry setting. To force the session to exit, amend the Logoff application sessions setting for the HKEY_LOCAL_MACHINE\Software\Tarantella\Enhancement Module for Windows key and change the DWORD value to 1.

Applications Fail To Start When X Authorization Is Enabled

In a default SGD installation, X authorization is enabled. If there are any problems with X authorization, users cannot start applications. If applications fail to start because of X authorization, the message "Failed to find xauth" or "Attempt to run xauth failed" displays in the application launch details and in the log files.

Use the following checklist to establish why X authorization causes application to fail to start. If this does not resolve the issue, check the log files as described in "Checking the Launch Details and Error Logs" on page 205.

Is X authorization installed on the application server?

For SGD to be able to use X authorization, xauth must be installed on every application server.

If xauth is not installed, you must either install it or disable the use of X authorization for every application. To disable X authorization, deselect the X Authorization for X Display check box on the Global Settings → Security tab in the Administration Console.

Can SGD find the xauth binary?

If the message "Failed to find xauth" displays in the application launch dialog or log files, SGD cannot find the xauth binary. By default, SGD searches the following locations for the xauth binary:

- /usr/bin/X11/xauth
- /usr/X/bin/xauth

- /usr/X11R6/bin/xauth
- /usr/bin/X/xauth
- /usr/openwin/bin/xauth
- /usr/bin/xauth

If the xauth binary is in a different location, you must add its location to the /opt/tarantella/var/serverresources/expect/vars.exp login script. Look for the line beginning "set xauthcmds".

Note – If the xauth binary is only in one location, you can speed up application launches by removing the other locations from the vars.exp login script.

Does the user have a UNIX account on the application server?

When the user starts an application, the X Protocol Engine process generates a cookie and stores it in the .Xauthority file in the user's home directory on the application server. The cookie is used to validate whether or not the user has permission to connect to the X display.

If the user does not have a home directory, the cookie cannot be stored in the user's .Xauthority file and so the user cannot be validated.

You can do any of the following:

- Create a home directory for the user on the application server
- Disable X authorization

  Deselect the X Authorization for X Display check box on the Global Settings → Security tab in the Administration Console. Alternatively, use the following command:

```
$ tarantella config edit --security-xsecurity 0
```

- Edit configuration files on the application server, so that the cookie is stored in a temporary directory.

  Add the following lines to the /etc/profile file on the application server:

```
XAUTHORITY=/tmp/.Xauthority.$LOGNAME
export XAUTHORITY
```

Create the following SSH daemon configuration file, `/etc/ssh/sshrc`, on the application server:

```
HOME=/tmp
XAUTHORITY=$HOME/.Xauthority.$USER
export XAUTHORITY

if read proto cookie && [ -n "$DISPLAY" ]
then
       if [ `echo $DISPLAY | cut -c1-10` = 'localhost:' ]
       then
               # X11UseLocalhost=yes
               echo add unix:`echo $DISPLAY |
               cut -c11-` $proto $cookie
       else
               # X11UseLocalhost=no
               echo add $DISPLAY $proto $cookie
       fi | /usr/openwin/bin/xauth -q -
 fi
```

A Kiosk Application Is Not Appearing Full-Screen

If an application that is configured to display in a kiosk window is resumed on a display that is larger or smaller than the original display, the application no longer fits the screen exactly.

The solution is to ensure that SGD scales the kiosk window to fit the screen.

In the Administration Console, go to the Presentation tab for the application object and set the Window Size to Scale to Fit Window.

Alternatively, use the following command:

```
$ tarantella object edit --name obj --scalable true
```

An Application's Animation Appears 'Jumpy'

Changing an application object's performance settings can improve the display of animation effects in the application session.

In the Administration Console, go to the Performance tab for the application object and set the Command Execution attribute to In Order. Deselect the Delayed Updates check box.

Alternatively, use the following command:

```
  $ tarantella object edit --name obj \
--execution inorder --delayed false
```

Font Problems with X Applications

If users see font problems with X applications, check the following:

Is the font size wrong?

In the Administration Console, go to the Client Device tab for the X application object and check the value of the Monitor Resolution attribute. Display the Protocol Engines → X tab for each SGD server in the array and check the value of the Monitor Resolution attribute.

The Monitor Resolution attributes are used to specify the monitor resolution, in dots per inch, that SGD reports to X applications that ask for this information. Some X applications need this value to determine what font size to use.

The default resolution can cause the X application to choose a font size larger than it normally chooses. If this happens, try reducing the resolution by specifying a smaller value, for example, 75.

Are the wrong fonts displayed?

In the Administration Console, go to the Protocol Engines → X tab for each SGD server in the array and check that the Font Path attribute is correct.

Some X Fonts are supplied with SGD. You can also configure your own X fonts. See "How to Configure SGD to Use Your Own X Fonts" on page 177.

Display Problems With High Color X Applications

Several problems can occur when displaying high color X applications:

- The X Application Fails With a Color Planes Error
- The Colors Appear Strange
- The X Application Uses Too Much Bandwidth
- 8-bit Applications Exit With a PseudoColor Visual Error

The X Application Fails With a Color Planes Error

If an X application fails to run and exits with errors such as “Cannot Allocate Enough Color Planes”, the application probably only displays 8-bit color. Check the display specification of the application and adjust the color depth of the application object.

In the Administration Console, go to the Presentation tab for the application object and set the Color Depth to 8-bit - 256 colors.

Alternatively, use the following command:

```
$ tarantella object edit --name obj --depth 8
```

The Colors Appear Strange

If there are any problems with appearance in 16-bit or 24-bit color applications, change the color quality of the application object.

In the Administration Console, go to the Performance tab for the application object and set the Color Quality to 16-bit, for 16-bit applications, or 24-bit, for 24-bit applications.

Alternatively, use the following command:

```
$ tarantella object edit --name obj --quality 16 | 24
```

The X Application Uses Too Much Bandwidth

If bandwidth is critical, try reducing the color quality of the application object.

In the Administration Console, go to the Performance tab for the X application object and set the Color Quality to 9-bit, or 6-bit.

Alternatively, use the following command:

```
$ tarantella object edit --name obj --quality 9 | 6
```

Note – There is no absolute guarantee of a bandwidth saving when you make this configuration change. Also, the appearance of the application might be affected adversely.

8-bit Applications Exit With a PseudoColor Visual Error

If you run an 8-bit application within a 16-bit or 24-bit high color X application session, for example from a CDE desktop, you might find the application exits with an error such as `"Cannot find a matching 8-bit PseudoColor visual"`.

To fix this, change the color depth of the X application so that it supports multiple color depths.

In the Administration Console, go to the Presentation tab for the X application object and set the Color Depth to 16/8-bit - Thousands of Colors, or 24/8-bit - Millions of Colors.

If the 8-bit application requires the primary color depth to be 8-bit, set the Color Depth to 8/16-bit - Thousands of Colors, or 8/24-bit - Millions of Colors.

Alternatively, use the following command:

```
$ tarantella object edit --name obj --depth 16/8 | 24/8
```

Note – There are memory and performance effects of using these settings.

If the application still exits after changing the color depth, a workaround is to create a separate X application object for the application and set the color depth to 8-bit.

Clipped Windows With Client Window Management Applications

If users see clipped windows when using X applications that are configured to use Client Window Management, this means that users have displays with a greater resolution than expected.

The solution is to increase display resolution for the X Protocol Engine.

In the Administration Console, go to the Protocol Engines → X tab for each SGD server in the array and change the Client Window Size settings. In the Maximum Height and Maximum Width fields, type the highest display resolution you expect to support.

Note – Increasing the Maximum Width and Maximum Height attributes increases the memory requirements for Client Window Management applications on both client devices and SGD servers.

Alternatively, use the following command:

```
$ tarantella config edit --array \
--xpe-cwm-maxwidth pixels \
--xpe-cwm-maxwidth pixels
```

Emulating a Sun Keyboard

Some applications accept input from the left-hand keypad on a Sun workstation. To emulate these keys using Shift-Function key strokes on the client device, you must use a custom keymap file.

Log in to SGD as root (superuser) and make a copy of the `xuniversal.txt` keymap file. This file is located in the `/opt/tarantella/etc/data/keymaps` directory on the SGD server. Rename the file to `xsunkey.txt`.

Edit the Function key definitions in the `xsunkey.txt` file, as follows:

```
112  F1 Cancel NoSymbol NoSymbol 0x3b
113  F2 Redo NoSymbol NoSymbol 0x3c
114  F3 0x1005ff70 NoSymbol NoSymbol 0x3d
115  F4 Undo NoSymbol NoSymbol 0x3e
116  F5 0x1005ff71 NoSymbol NoSymbol 0x3f
117  F6 0x1005ff72 NoSymbol NoSymbol 0x40
118  F7 0x1005ff73 NoSymbol NoSymbol 0x41
119  F8 0x1005ff74 NoSymbol NoSymbol 0x42
120  F9 Find NoSymbol NoSymbol 0x43
121  F10 0x1005ff75 NoSymbol NoSymbol 0x44
122  F11 Help NoSymbol NoSymbol 0x57
```

This maps the client device Function keys to Sun workstation keys, as shown in the following table.

Function Key	Sun Workstation Key
Shift-F1	Stop
Shift-F2	Again
Shift-F3	Props
Shift-F4	Undo
Shift-F5	Front
Shift-F6	Copy
Shift-F7	Open

Function Key	Sun Workstation Key
Shift-F8	Paste
Shift-F9	Find
Shift-F10	Cut
Shift-F11	Help

On the application server that runs the application, add the following line to the `/usr/dt/lib/bindings/xmbind.alias` file:

```
 "Sun Microsystems, Inc."           sun
```

In the Administration Console, go to the Client Device tab for the user profile object. Select the Custom Value option for the Keyboard Map attribute and type `xsunkey.txt` in the field.

Alternatively, use the following command:

```
$ tarantella object edit --name obj --keymap xsunkey.txt
```

Note – The new keyboard map is used for all graphical applications for the specified user.

In Some X Applications, the Alt and AltGraph Keys Do Not Work

The X keyboard maps used by SGD include support for the Meta key on a Sun keyboard, as follows:

```
199  Meta_L NoSymbol NoSymbol NoSymbol
200  Meta_R NoSymbol NoSymbol NoSymbol
```

Some X applications choose to use the Meta key in preference to the Alt or AltGraph keys when both keys are made available in the X keyboard map.

Edit the keyboard map file used with the application. Replace the Meta key definitions, as follows:

```
199  NoSymbol NoSymbol NoSymbol NoSymbol
200  NoSymbol NoSymbol NoSymbol NoSymbol
```

CHAPTER 4

Client Device Support

This chapter describes how to enable support for peripherals and other client device features from applications displayed in Sun Secure Global Desktop (SGD).

This chapter includes the following topics:

Printing

This section describes how to configure printing services in SGD and includes the following topics:

- "Users Cannot Print From Applications Displayed Through SGD" on page 242
- "Troubleshooting Other Printing Problems" on page 250

Overview of SGD Printing

SGD supports two types of printing: PDF printing and Printer-Direct printing.

With *PDF printing*, users print from an application using an SGD PDF printer. The print job must be in PostScript format. The PostScript print job is sent from the application server to an SGD server, where it is converted into a Portable Document Format (PDF) file. The SGD server then sends the PDF file to a PDF viewer on the user's client device, where the file can be viewed, saved, and printed.

With *Printer-Direct printing*, users print from an application to a printer attached to their client device. SGD does this by cooperating with the `lp` or `lpr` printing system on the SGD host and the native printing system on the application server. The print job is sent from the application server to an SGD server. The SGD server then sends the print job to the SGD Client, which sends it to the user's client printer. If the format of the print job used by the application server is different to the format needed by the client printer, SGD converts the print job before sending it to the SGD Client.

PDF printing is usually more reliable and produces better results than Printer-Direct printing.

SGD has two PDF printers: *Universal PDF Printer* and *Universal PDF Viewer*.

On Microsoft Windows client devices, the Universal PDF Printer displays the print job as a PDF file in the Adobe Reader, which then prints the PDF file to the user's default printer. The Universal PDF Viewer displays the print job as a PDF file in the Adobe Reader, which the user can then decide whether to print or save.

On UNIX, Linux, and Mac OS X platform client devices, there is no difference between the Universal PDF Printer and Universal PDF Viewer, as the print job is always displayed as a PDF file in a PDF viewer. The user can then decide whether to print or save the PDF file.

SGD uses *distributed printing*. Print jobs are sent to the SGD server hosting the user's application session. This means that a user's print jobs are distributed across the array, and there are no bottlenecks or single points of failure.

SGD supports printer-direct printing to PostScript, Printer Command Language (PCL), and text-only printers attached to the user's client device. The SGD `tta_print_converter` script performs any conversion needed to format print jobs correctly for the client printer. To convert from Postscript to PCL, Ghostscript must be installed on the SGD server.

Setting Up Printing

Setting up printing involves the following configuration steps:

1. Configure application server for printing.

   The required configuration for the application server depends on the application server platform.

   See "Configuring Microsoft Windows Application Servers for Printing" on page 221.

   See "Configuring UNIX and Linux Platform Application Servers for Printing" on page 224.

2. Configure the SGD servers for printing.

   See "Configuring an SGD Server for Printing" on page 229.

3. Configure printing to client devices.

   The required configuration depends on the client device platform.

   See "Configuring Printing to Microsoft Windows Client Devices" on page 233.

   See "Configuring Printing to UNIX, Linux, and Mac OS X Platform Client Devices" on page 237.

Configuring Microsoft Windows Application Servers for Printing

The configuration required to print from applications running on a Microsoft Windows application server depends on whether or not the Microsoft Remote Desktop Protocol (RDP) protocol is used to connect to the application server. See the following:

- "Configuring Printing for Microsoft RDP" on page 221
- "Configuring Other Microsoft Windows Application Servers for Printing" on page 224

Configuring Printing for Microsoft RDP

If the connection method used for the Windows application is Microsoft RDP, SGD automatically creates printer queues in the Windows application session if the application server supports Microsoft RDP version 5.0 or later. This applies to Microsoft Windows 2000 Server and later application servers.

Note – The version of Microsoft RDP supported by Windows NT 4 is not version 5.0 or later. To configure printing from NT 4, see "Configuring Other Microsoft Windows Application Servers for Printing" on page 224.

When a user starts or resumes a Windows application that uses the Microsoft RDP Windows Protocol, the SGD Client sends information about the client's printers to SGD. SGD supplies this information to the application server and the application server then creates, or *maps*, the printers in the Windows Terminal Services session. The user sees the printers that are attached to the client device and also the printers that are attached directly to the application server.

To be able to create a client printer in the Microsoft Windows application session, the following must be true:

- Printer mapping must be enabled on the application server, see "Configuring Microsoft Windows Terminal Services for Use With SGD" on page 162 for details.
- The SGD Client must determine the name of the printer driver for the client printer and send it to application server.
- The printer driver for the client printer must be installed on the application server.

The printer drivers that must be installed on the application server are as follows:

- **PDF printing** – The printer drivers selected for use with PDF printing.

  See "Configuring the Printers Available in Windows Terminal Services Sessions" on page 223 for information on selecting printer drivers.

- **Printer-Direct printing** – The printer driver for every client printer.

  For Microsoft Windows client devices, you can use printer driver mapping to map one printer driver name to another. See "Printer Driver Mapping" on page 234.

  For UNIX, Linux, and Mac OS X client devices, the printer configuration files specify the printer driver that is used. See "Configuring Printing to UNIX, Linux, and Mac OS X Platform Client Devices" on page 237.

When running a Windows application session, the names of the client printers are displayed in the application server's Printers folder, as follows:

- Windows 2000 application session – *printer-name*/Sun SGD/Session *number*. For example, `HP LaserJet 8000 Series PS/Sun SGD/Session 1`.
- Windows 2003 application session – *printer-name* (from Sun SGD) in session *number*. For example, `HP LaserJet 8000 Series PS (from Sun SGD) in session 1`.

SGD Administrators can control the SGD printers that are available in Windows Terminal Services sessions. See "Configuring the Printers Available in Windows Terminal Services Sessions" on page 223.

Configuring the Printers Available in Windows Terminal Services Sessions

SGD enables Administrators to control the printers that are available in Windows Terminal Services sessions. You can configure the printers, as follows:

- **Globally.** In the Administration Console, go to the Global Settings → Printing tab.
- **Individually.** In the Administration Console, go to the Printing tab for an organization, an organizational unit, or a user profile object.

  If you configure an organization or organizational unit object, this affects all the users in that organization or organizational unit.

You can set the following attributes on the Printing tab.

TABLE 4-1 Attributes Used to Configure RDP Printing

Attribute	Description
Client Printing	Controls the client printers users can print to, either all client printers, the default client printer, or no client printers. By default, users can print to all their client printers.
Universal PDF Printer	Enables the Universal PDF Printer printer.
Make Universal PDF Printer the Default	Sets the Universal PDF Printer printer as the client device's default printer for Windows applications.
Universal PDF Viewer	Enables the Universal PDF Viewer printer.
Make Universal PDF Viewer the Default	Sets the Universal PDF Viewer printer as the client device's default printer for Windows applications.
Postscript Printer Driver	The name of the PostScript printer driver to use for PDF printing.

Note – Any configuration changes you make on the Printing tab only take effect for new user sessions.

If you make a PDF printer the default printer for Windows applications and SGD is configured to only allow users to print to their default printer, users see two printers in their Windows application session. The user's default client printer and the PDF printer are shown.

To use PDF printing, you must install the PostScript printer drivers you want to use for PDF printing on the application server. Make sure the printer drivers have sufficient features for your users. By default, SGD is configured to use the `HP Color LaserJet 8500 PS` printer driver. The printer driver name entered in the Postscript Printer Driver field on the Printing tab must match the name of the printer driver installed on the application server *exactly*. Pay particular attention to the use of capitals and spaces. The

`/opt/tarantella/etc/data/default.printerinfo.txt` file contains all the common printer driver names, ordered by manufacturer. To avoid errors, copy and paste the driver name from this file.

Note – If a PDF viewer is not configured on the client device, the PDF printers are not available in the Windows application session, even if a PDF printer is enabled.

Configuring Other Microsoft Windows Application Servers for Printing

To print from an Microsoft Windows application that is configured to use either the Citrix Independent Computing Architecture (ICA) protocol, or an earlier version of the Microsoft RDP protocol, you must configure a Line Printer Remote (LPR)-compatible Transmission Control Protocol/Internet Protocol (TCP/IP) printer on the application server. Configure the printer to send print jobs to the primary SGD server in the array. Consult your system documentation for details of how to configure printers.

Note the following limitations:

- **PDF printing is not supported.**
- **No multiple printer support.** You can only print to the client device's default printer. It is not possible for users to select a printer. If a user needs to print to a different printer, they have to log out of SGD, change their default printer, and then log in again.
- **Print jobs might be deleted.** When a print job is transferred from the application server to an SGD server, the user's SGD name is needed to identify which client device to send the print job to. With some versions of Microsoft Windows, there is no direct way to associate print jobs with SGD users. If SGD cannot identify which user has printed a particular job, the print job is deleted. This might happen, for example, if two users log in to the application server with the same name.
- **Distributed printing is not available.** All print jobs are directed through the primary server in an SGD array.

Configuring UNIX and Linux Platform Application Servers for Printing

To use PDF printing from a UNIX or Linux platform application server, you must install at least one SGD printer queue on the application server. You do not have to install printer queues for the Universal PDF Printer and Universal PDF Viewer.

However, if a UNIX or Linux application you are using does not allow you to configure printer arguments, or does not allow you to specify the Universal PDF Printer and Universal PDF Viewer because their names contain spaces, you must install an additional printer queue called `tta_pdfprinter` and print to that queue.

To use Printer-Direct printing from a UNIX or Linux platform application server, you must install SGD printer queues as follows:

- **Single printer queue.** Install an SGD printer queue for the primary SGD server in the array. All print jobs are directed to the primary SGD server, and the primary server sends the print jobs to the client device.
- **Multiple printer queues.** Install an SGD printer queue for each SGD server in the array. Each printer queue redirects print jobs to an SGD server, and the SGD server sends the print jobs to the client device.

Note – It is best to use multiple printer queues so that print jobs are distributed across the array, and there are no bottlenecks or single points of failure

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You configure printer queues with the SGD printer queue installation script. See "How to Install an SGD Printer Queue on a UNIX or Linux Platform Application Server" on page 225.

The SGD printer queue installation scripts installs replacement `lp` or `lpr` scripts. These are used instead of the standard scripts, to ensure that print jobs contain enough information for SGD to be able to identify the user that printed them. See "Printing With the SGD `lp` and `lpr` Scripts" on page 228 for details.

▼ How to Install an SGD Printer Queue on a UNIX or Linux Platform Application Server

If the application server is also an SGD server, a printer queue is installed automatically when you install SGD.

1. **Copy the `/opt/tarantella/bin/scripts/prtinstall.en.sh` script from an SGD server to a temporary directory on the application server.**
2. **Log in to the application server as superuser (root).**
3. **Change to the temporary directory.**
4. **Run the script to install the printer queue.**

   See "The SGD Printer Queue Installation Script" on page 226 for details of all the command options for the SGD printer queue installation script.

- If the array consists of a single SGD server, use the following command:

```
# sh prtinstall.en.sh
```

  When prompted, type the full Domain Name System (DNS) name of the SGD server.

- If the array contains more than one SGD server, create a printer queue for each SGD server in the array. Use the following command:

```
# sh prtinstall.en.sh --ttahost DNS-name --appprinter name
```

  The *DNS-name* is the full DNS name of an SGD server. The name of each printer queue, as specified by the `--appprinter` argument, can be anything you like but it must be unique.

If you use the Common UNIX Printing System (CUPS), you might have to use the `--cups` option with `prtinstall.en.sh`, to indicate that you are using CUPS. You might also have to reconfigure CUPS. See "Configuring Printing for CUPS" on page 228.

The SGD Printer Queue Installation Script

The SGD printer queue installation script, `prtinstall.en.sh`, installs an SGD printer queue on a UNIX or Linux application server. It also installs the SGD replacement `lp` or `lpr` scripts.

The `prtinstall.en.sh` script is located in the `/opt/tarantella/bin/scripts` directory on the SGD server.

You must be superuser (root) to run this script.

The syntax for the script is as follows:

```
sh prtinstall.en.sh [--ttahost SGD_hostname]
                    [--ttaprinter printer_name]
                    [--appprinter printer_name]
                    [--uninstall [printer_name]]
                    [--cups y | n | auto]
                    [--cupsconf filename]
                    [--cupscontrol filename]
                    [--gsbindir gs_bin_dir]
                    [--append]
                    [--help]
```

The following table describes the available options for the script.

Option	Description
`--ttahost` *SGD_hostname*	Fully qualified DNS name of an SGD server
`--ttaprinter` *printer_name*	Use this option to specify a name for the printer queue. Use this if the SGD server is also used as an application server. If you do not use this option, the printer is created with the default name of `tta_printer`.
`--appprinter` *printer_name*	Use this option to specify a name for the printer queue on a UNIX or Linux application server. If you do not use this option, the printer queue is created with the default name of `tta_printer`.
`--uninstall` [*printer_name*]	Uninstalls an SGD printer queue. If you do not specify a printer queue, you are prompted for one.
`--cups y | n | auto`	Indicates that you are using CUPS. If you do not use this option, a default of `auto` is assumed and this means SGD tries to detect whether CUPS is being used. If CUPS is incorrectly detected, use this option to tell SGD whether CUPS is being used (`y`) or not (`n`).
`--cupsconf` *filename*	Specifies the path to the CUPS configuration file. If you do not use this option, the CUPS configuration file is assumed to be `/etc/cups/cupsd.conf`.
`--cupscontrol` *filename*	Specifies the path to the CUPS startup script. If you do not use this option, the CUPS startup script is assumed to be `/etc/init.d/cups`.
`--gsbindir` *gs_bin_dir*	Use this option to specify the directory where Ghostscript is installed. Use this option if Ghostscript is not installed in one of the default locations, or to specify the version of Ghostscript to use, if more than one version is installed. Only use this option if you are running the printer queue installation script on the SGD host. See "Checking the Ghostscript Installation on the SGD Host" on page 229 for details.
`--append`	Installs an additional printer queue rather than replacing the existing printer queue(s).
`--help`	Shows the list of `prtinstall.en.sh` script options.

The following example installs an SGD printer called tta_london on an application server.

```
# sh prtinstall.en.sh --appprinter tta_london
```

Configuring Printing for CUPS

SGD printing only works with CUPS version 1.1.19 or later. The following configuration changes might be needed to enable printing with CUPS:

- **CUPS LPD compatibility mode must be enabled for any LPD clients.**

  If you have any Line Printer Daemon (LPD) clients on your application server, you must enable the CUPS LPD compatibility mode so that CUPS can accept remote print jobs from LPD clients. The CUPS Software Administrators Manual explains how you enable LPD compatibility mode.

- **CUPS raw printing must be enabled.**

  On the host where SGD is installed, enable raw printing in CUPS, by editing the `/etc/cups/mime.convs` and `/etc/cups/mime.types` files. These files contain comments explaining how to do this. Search for comments containing the word "raw".

Note – After making changes to your CUPS configuration, you might have to restart the CUPS daemon.

To use CUPS for printing, you must use the `/opt/tarantella/bin/lp` script.

Printing With the SGD `lp` and `lpr` Scripts

The SGD printer queue installation script, `prtinstall.en.sh`, installs the SGD `lp` or `lpr` replacement scripts. Users must use these replacement scripts when they print from a UNIX or Linux platform application server. The replacement scripts ensure that print jobs contain enough information for SGD to be able to identify the user that printed them.

The SGD login scripts set the user's `PATH` to ensure that the replacement scripts take precedence over the system scripts. However, if the application uses a full path name, for example `/usr/bin/lp`, or modifies `PATH` itself, you must reconfigure the application to use `/opt/tarantella/bin/lp` or `/opt/tarantella/bin/lpr`.

Users print with the replacement scripts as follows:

```
$ lp -d printer file
```

```
$ lpr -P printer file
```

If the `-d` or `-P` argument is omitted, the output goes to the client's default printer. How you specify the *printer* depends on the client device. See "Configuring Printing to Microsoft Windows Client Devices" on page 233 and "Configuring Printing to UNIX, Linux, and Mac OS X Platform Client Devices" on page 237 for details.

Configuring an SGD Server for Printing

Configuring an SGD server for printing involves the following configuration steps:

- Ghostscript might need to be installed on the SGD host. SGD might need to be configured to find the Ghostscript installation.

  See "Checking the Ghostscript Installation on the SGD Host" on page 229.

- The SGD host might need to be configured to accept remote print requests.

  See "Configuring the SGD Host to Accept Remote Print Requests" on page 230.

- SGD might need to be configured to convert print jobs between different formats.

  See "Configuring SGD Print Job Conversion" on page 231.

Checking the Ghostscript Installation on the SGD Host

SGD uses Ghostscript to convert print jobs into PDF files. To use PDF printing, Ghostscript version 6.52 or later must be installed on the SGD host. Your Ghostscript distribution must include the `ps2pdf` program.

With Printer-Direct printing, the `tta_print_converter` script uses Ghostscript to convert print jobs from PostScript to PCL format. For best results, download and install the additional fonts.

Ghostscript is not included with the SGD software.

When you install SGD, it automatically detects Ghostscript if it is installed in one of the following locations:

- `/usr/local/bin`
- `/usr/bin`
- `/usr/sfw/bin`
- `/opt/sfw/bin`
- `/bin`
- `/usr/sbin`
- `/sbin`
- `/usr/lbin`

If Ghostscript is installed in a different location, run the SGD printer queue installation script on the SGD host. Use the `--gsbindir` option of the script to configure the location of Ghostscript. See "The SGD Printer Queue Installation Script" on page 226 for more details.

If more than one version of Ghostscript is installed, run the SGD printer queue installation script with the `--gsbindir` option, to tell SGD which version to use.

If Ghostscript is not installed on the SGD host, or your Ghostscript distribution does not include the `ps2pdf` program, install Ghostscript and then run the SGD printer queue installation script.

Using the `gstest` *Script to Test a Ghostscript Installation*

You can use the `gstest` script to test the Ghostscript installation on an SGD host. This script is run by default when you install SGD.

The `gstest` script checks for errors in the Ghostscript installation and uses `ps2pdf` to generate a test PDF file. Script output is reported on-screen, and is also written to the `/opt/tarantella/var/log/print.log` file.

You run `gstest` as follows:

```
# /opt/tarantella/bin/scripts/gstest
```

Using `gstest` in this way performs a basic test of the font installation on the SGD host and generates a fonts test file, `/opt/tarantella/var/log/sample.pdf`. If Ghostscript fonts are installed correctly, the `sample.pdf` file contains three lines, each rendered in a different font. The fonts used are listed in the `/opt/tarantella/var/log/print.log` file.

Alternatively, you can specify an input file and output file to use with `gstest`. For example:

```
# cd /opt/tarantella/bin/scripts
# gstest /tmp/myPostScriptFile.ps /home/indigojones/myPDFFile.pdf
```

If you do not specify an output file, `gstest` creates an output PDF file at `/tmp/sgd_sample.pdf`.

Note – If you specify your own input file, `gstest` does not generate the fonts test PDF file, `/opt/tarantella/var/log/sample.pdf`.

Configuring the SGD Host to Accept Remote Print Requests

Print jobs are sent from the application server to an SGD server, and then from the SGD server to the client device. To be able to direct print jobs from an application server to a client device, the SGD host must be configured to accept remote print requests. How you do this varies for each platform. Check your System Administration documentation for information about this.

For example, if you are using `lpd` on Linux systems, you must add an entry in the `/etc/hosts.equiv` or `/etc/hosts.lpd` file, if available, for each application server that might send a print request. After making these changes, remember to restart the `lpd` daemon.

Note – For Windows applications that use the Citrix ICA Windows protocol, the entry in `/etc/hosts.equiv` is for the UNIX server running the ICA client.

Configuring SGD Print Job Conversion

With Printer-Direct printing, print jobs are sent from an application server to an SGD server. The SGD server then sends the print job to the client device, which sends it to the user's printer. When print jobs arrive at the SGD server, they might need to be converted to a format suitable for the client printer.

Note – Print jobs from Windows application sessions that use the Microsoft RDP protocol are never converted, because they are assumed to be in the correct format.

To decide whether a print job needs to be converted, the SGD server checks a printer type configuration file to see whether the format used by the client printer matches the format used by the application server. If the format matches, the print job is forwarded to the client device printer without any conversion. If the formats do not match, the SGD server converts the print job to the right format using the `tta_print_converter` script.

To ensure that print jobs are formatted correctly, you might have to edit a printer type configuration file and the `tta_print_converter` script. This is described in the following sections.

Caution – Only edit these files if you have to use Printer-Direct printing and need to resolve issues with print job formats. In most cases, PDF printing provides a better solution for issues with print job formats.

Printer Type Configuration Files

SGD uses the following configuration files to determine the printer type:

- **Microsoft Windows client devices.** The `/opt/tarantella/etc/data/printertypes.txt` file is used.

  See "Configuring Printing to Microsoft Windows Client Devices" on page 233.

- **UNIX, Linux, and Mac OS X platform client devices.** One of the following files is used:
  - `/opt/tarantella/etc/data/default.printerinfo.txt` – This is the global configuration file.
  - `$HOME/.tarantella/printerinfo.txt` – This is a user-specific configuration file.

  See "Configuring Printing to UNIX, Linux, and Mac OS X Platform Client Devices" on page 237.

You can edit these files if you want to support particular printers, or to add new types of printer.

Note – If you add a new printer type, you might also have to edit the `tta_print_converter` script.

If there is insufficient detail or inaccurate mappings in these files, SGD might convert print jobs unnecessarily, or not at all.

The `tta_print_converter` *Script*

The `tta_print_converter` script converts print jobs from the format used by the application server to the format required by the client device, as determined by the printer type. By default, the script recognizes PostScript and non-PostScript formats. To convert print jobs from PostScript to PCL, Ghostscript must be installed on the SGD host. See "Checking the Ghostscript Installation on the SGD Host" on page 229 for more information about installing and configuring Ghostscript for SGD printing.

You can edit the `tta_print_converter` script to recognize and convert between different print job formats, or to add support for a new printer type.

Note – You must log on as superuser (root) to edit the script.

The `tta_print_converter` script is in the `/opt/tarantella/bin/scripts` directory. The script includes comments, to help you to customize it.

The shell function `GetDataType` determines the print job format from the first 128 bytes of the print job. The data is URL-encoded, for example, the % character is encoded as `%25`.

The client printer type is passed to this script in upper case, for example, `POSTSCRIPT` or `MYNEWTYPE`.

If you experience problems printing to a PCL printer, the `tta_print_converter` script contains some code which has been commented out. You can use this code to see if this solves the problem.

Configuring Printing to Microsoft Windows Client Devices

The configuration required for printing to Microsoft Windows client devices depends on whether you are using PDF printing or Printer-Direct printing, as described in the following sections.

PDF Printing

To be able to use PDF printing, the Adobe Reader version 4.0 or later must be installed on the client device.

From a Microsoft Windows application, you print in the normal way, and select either the Universal PDF Printer or the Universal PDF Viewer in the application's Print dialog.

From an application running on a UNIX or Linux system application server, you print in the normal way, using the SGD replacement `lp` or `lpr` scripts. You select a PDF printer as part of the print command, for example:

```
$ /opt/tarantella/bin/lp -d "Universal PDF Printer" filename
```

```
$ /opt/tarantella/bin/lpr -P "Universal PDF Viewer" filename
```

Note – The *filename* must be a PostScript file, so the application must be able to output PostScript.

When users print, the PDF file is displayed in the Adobe Reader. If the Universal PDF Printer is selected, the PDF file is printed automatically to the user's default printer. The Adobe Reader runs minimized and does not exit when the print job has finished. If the Universal PDF Viewer is selected, the PDF file is displayed in the Adobe Reader window. The user can then decide whether to print or save the file.

On UNIX, Linux, and Mac OS X system client devices, the PDF file is displayed either in the default PDF viewer or in the PDF viewer configured in the client profile. The user can then decide whether to print or save the PDF file. There is no difference between the Universal PDF Printer and the Universal PDF Viewer, as the print job is always displayed in a PDF viewer.

Printer-Direct Printing

This section describe the configuration that might be needed when using Printer-Direct printing to print to Microsoft Windows client devices and includes the following topics:

Printer Driver Mapping

When printing from a Microsoft Windows application, the large number and variety of client printers available can cause problems. The majority of the problems are caused by not having the correct printer drivers installed on the application server. One solution is to use PDF printing. Another solution, for Windows client devices only, is to use printer driver mapping.

Printer driver mapping enables you to map one printer driver name to another. You do this by editing the `[Previous Names]` section of the `/opt/tarantella/etc/data/default.printerinfo.txt` file.

The following is an example of an entry in a `default.printerinfo.txt` file:

```
[Previous Names]
"HP LaserJet 5" = "my HP driver", "my other HP driver"
```

This means that if users have client printers that use either the "my HP driver" or "my other HP driver" printer driver, SGD uses the "HP LaserJet 5" printer driver when creating the printer.

You can also use wild-card characters, such as * and ?, on the right hand side of the = sign. Use * to mean any string of characters, including an empty string and ? to mean any single character. This is useful, for example, to create generic printer mappings where you have a wide variety of client devices.

For example, if the file contains the following entry:

```
[Previous Names]
"HP LaserJet 5" = "hp*laserjet 5*"
```

All printer driver names like "HP LaserJet 5", "HP LaserJet 5M", and "HP Color LaserJet 5" are mapped to the printer driver "HP LaserJet 5".

The `default.printerinfo.txt` file contains more detailed instructions on how to create the mappings.

The Printer Types Configuration File

For Microsoft Windows client devices, SGD uses the `/opt/tarantella/etc/data/printertypes.txt` file to determine whether to convert a print job from one format to another before sending it to the client device. The `printertypes.txt` file maps printer drivers, for example, `pscript.dll`, to printer types, for example PostScript.

Note – Print jobs from Windows application sessions that use the Microsoft RDP protocol are never converted, because they are assumed to be in the correct format.

The `printertypes.txt` file includes comments to help you to customize it. By default, the file includes mappings for PostScript, PCL, and text-only printers. You must log on as superuser (root) to edit this file.

Note – The `printertypes.txt` file used for Windows clients also contains entries for UNIX and Apple Macintosh. This is used only as a fallback. For UNIX or Linux platforms, it maps UNIX types to printer types. For Apple Macintosh, it maps printer names to printer types.

To find out the name of the printer driver used by a client device, print a test page and check the Driver Name field.

To add support for a new printer type, add lines following the same pattern. For example:

```
MyNewType=mydriver.drv
```

For example, a client device, cairo, runs Windows 2000 and its default printer is PCL. The printer driver used is `unidrv.dll`. The `[Windows*]` section in `printertypes.txt` has the following format:

```
[Windows*]
PostScript=pscript5.dll;pscript.dll
PCL=rasdd.dll
PostScript=*
```

As there is no specific match for `unidrv.dll`, the final entry applies: PostScript. This means that when the user prints, print jobs are incorrectly converted to PostScript before being sent to cairo.

To fix this, edit `printertypes.txt` as root and add a specific match for `unidrv.dll` as follows:

```
PCL=rasdd.dll;unidrv.dll
```

Following this change, SGD correctly identifies the printer configured on cairo, and print jobs are converted to PCL for that client device.

Printing From a UNIX or Linux Platform Application Server

When printing from a UNIX or Linux platform application server to a Microsoft Windows client device, users can specify the printer they print to by using any of the following:

- The Universal Naming Convention (UNC) name of a network printer accessible to the client, for example:

```
$ lp -d '\\\\PRTSERVER\\HPLJ5' filename
```

- A "friendly" name, for example:

```
$ lpr -P label-printer filename
```

- A port on the client, for example:

```
$ lpr -P LPT1: filename
```

To use a UNC name, you must enclose the printer name in quotes and escape every backslash with an extra backslash, as shown in the previous example. As different shells process backslashes differently, you might need to experiment with the number of backslashes. You can also use underscores instead of backslashes, for example:

```
$ lp -d __PRTSERVER_HPLJ5 filename
```

Note – Using underscores only works if the first two characters of the printer name are underscores.

You can avoid problems with UNC names by using a "friendly" name. You configure "friendly" names in the `/opt/tarantella/etc/data/printernamemap.txt` file. The entries in this file map "friendly" names to UNC names, for example:

```
"label-printer"="\\PRTSERVER\HPLJ5"
```

Note – You do not have to escape any backslashes.

Configuring Printing to UNIX, Linux, and Mac OS X Platform Client Devices

The configuration required for printing to UNIX, Linux, and Mac OS X platform client devices depends on whether you are using PDF printing or Printer-Direct printing, as described in the following sections.

PDF Printing

To be able to use PDF printing, a PDF viewer must be installed on the client device. SGD supports the following PDF viewers by default.

Client Platform	Default PDF Viewer
Solaris OS on SPARC platforms	Adobe Reader (`acroread`) GNOME PDF Viewer (`gpdf`)
Solaris OS on x86 platforms	GNOME PDF Viewer (`gpdf`)
Linux	GNOME PDF Viewer (`gpdf`) X PDF Reader (`xpdf`)
Mac OS X	Preview App (`/Applications/Preview.app`)

Note – The Adobe Reader PDF viewer must support the `-openInNewWindow` command option. The Preview App PDF viewer must support the `open -a` command option.

To be able to use a default PDF viewer, the application must be on the user's `PATH`.

If an alternative PDF viewer is preferred, the command for the alternative viewer application can be configured in the user's client profile. In the profile you enter either the command or the *full path* to the command, depending on whether the application is on the user's `PATH`. See "Client Profile Settings" on page 310 for details.

From a Microsoft Windows application, you print in the normal way, and select either the Universal PDF Printer or the Universal PDF Viewer in the application's Print dialog.

From an application running on a UNIX or Linux system application server, you print in the normal way, using the SGD replacement `lp` or `lpr` scripts. You select a PDF printer as part of the print command, for example:

```
$ /opt/tarantella/bin/lp -d "Universal PDF Printer" filename
```

```
$ /opt/tarantella/bin/lpr -P "Universal PDF Viewer" filename
```

Note – The *filename* must be a PostScript file, so the application must be able to output PostScript.

The PDF file is displayed either in the default PDF viewer or in the PDF viewer configured in the client profile. The user can then decide whether to print or save the PDF file. There is no difference between the Universal PDF Printer and the Universal PDF Viewer, as the print job is always displayed in a PDF viewer.

Printer-Direct Printing

To use Printer-Direct printing to print to printers attached to UNIX, Linux, or Mac OS X platform client devices, the client printers must be defined in one of the following printer configuration files:

- **Global printer configuration file** – `/opt/tarantella/etc/data/default.printerinfo.txt`.

  This file set the defaults for *all* users printing through that SGD server. As this file is not replicated across the array, you have to manually copy it to the other SGD servers.

- **User-specific printer configuration file** – `$HOME/.tarantella/printerinfo.txt`.

  The user-specific printer configuration file is optional and has to be manually created on client devices. Users can create their own file or you can use the global configuration file as a template and distribute it to users. This file contains the settings for an individual user regardless of the SGD server they print through. The settings in this file take precedence over the settings in the global configuration file.

The format of the global and user-specific printer configuration file is the same:

```
[UNIX]
"printer-name" = "windows-driver" printer-type
"printer-name" = "windows-driver" printer-type
...
```

printer-name is the name of the printer as it is known to the `lp` or `lpr` system on the client. The printer name must be enclosed in straight quotation marks (") and be followed by an Equal (=) sign. This is the name that users can specify when printing from a UNIX or Linux platform application server. It is also the name that displays in the Print dialog when users print from a Microsoft Windows application server.

windows-driver is the name of the printer driver to use when printing from a Microsoft Windows application server. The printer driver name must be enclosed in double quotes. The name of the printer driver must match the name of the printer driver installed on the Windows application server *exactly*. Pay particular attention to the use of capitals and spaces. The `default.printerinfo.txt` file contains all the common printer driver names ordered by manufacturer. To avoid errors, copy and paste the driver name from this file.

printer-type is the format to be used for the print job. The values can be `PostScript`, `PCL` or `Text`. This information is optional, but if it is missing, `PostScript` is used by default. This information is used to determine whether SGD needs to convert the print job from the format used by the application server to the format needed by the client printer. See also "Configuring SGD Print Job Conversion" on page 231.

The first printer listed in the `[UNIX]` section is the client's default printer.

When SGD is first installed, the `default.printerinfo.txt` file contains the following entry:

```
[UNIX]
"_Default" = "QMS 1060 Print System" PostScript
```

With this configuration, when users print from a Windows application server, they see a printer called `_Default (from Sun SGD) Session` *number*. This printer prints to the default printer on the client using a basic PostScript printer driver, "QMS 1060 Print System".

Note – This means that a printer is available in the Windows application, even if there is no printer connected to the client device.

For example, if an SGD user's `$HOME/.tarantella/printerinfo.txt` file contains the following entries:

```
[UNIX]
"drafts" = "HP DeskJet 970Cxi" PCL
"salesprinter" = "HP LaserJet 5/5M" PostScript
```

When the user prints from a Microsoft Windows application server to a UNIX client device, the following printers are available:

- `drafts/Sun SGD/Session` *number*
- `salesprinter/Sun SGD/Session` *number*

The user's default printer is `drafts/Sun SGD/Session` *number*, which in this example has been defined as a PCL printer.

Managing Printing

This section describes the print job management features of SGD and includes the following topics:

The `tarantella print` Command

SGD Administrators control printing services with the `tarantella print` command. This command enables you to do the following:

- List spooled print jobs and identify the SGD users they belong to. You can use this to check that print jobs from the application server printing system have reached the SGD print queue.
- Remove print jobs from the SGD print queue.
- Pause and restart SGD printing services.
- Move print jobs from one SGD server to another.

The syntax for the `tarantella print` command is as follows:

```
tarantella print start | stop | status | pause | resume | list
| cancel | move
```

The following table shows the available subcommands for `tarantella print`.

Subcommand	Description
`cancel`	Cancels print jobs
`list`	Lists print jobs
`move`	Moves queued print jobs from one SGD server to another
`pause`	Pauses printing temporarily
`resume`	Resumes printing
`start`	Starts printing services for the array
`status`	Displays information about printing services
`stop`	Stops printing services

Setting a Time Limit for Print Jobs

SGD Administrators can set a time limit on how long a print job can remain on an SGD server before it is deleted. This is useful if you have to manage a high volume of printing.

To specify the number of hours that print jobs remain on the server, use the following command:

```
$ tarantella config edit \
--tarantella-config-array-printjoblifetime hours
```

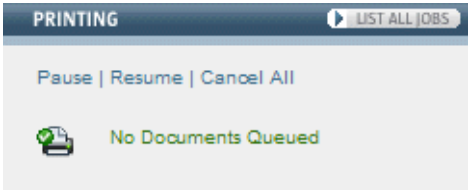
To return SGD to its default behavior, so that print jobs remain on the server indefinitely, use the following command:

```
$ tarantella config edit \
--tarantella-config-array-printjoblifetime 0
```

User Management of Print Jobs

Users can manage their own print jobs from the Printing area on the webtop, as shown in FIGURE 4-1.

FIGURE 4-1 Printing Area on the SGD Webtop



The Printing area shows the number of jobs currently in the print queue and the controls for managing print jobs.

When documents are printing, the webtop tells a user how many print jobs they have in the queue. Users can click Cancel All to delete all pending print jobs.

Users can also click Pause to temporarily stop printing. When printing is paused, any print jobs that are pending are held in a queue until the user either cancels them or resumes printing. Click Resume to start printing again. The printer icon changes to show you when printing is paused.

To manage print jobs individually, click List all jobs. The webtop displays a list of all the print jobs the user has in the queue, along with information about the job, for example the number of copies and the selected printer.

If you pause printing, click the Resume button to print just that one print job.

To cancel a print job, click the Cancel button.

When printing from a Microsoft Windows 2000 or Microsoft Windows 2003 application server, or a UNIX or Linux system application server, users can choose which printer they print to. If the user does not select a printer, the output goes to their default printer. For all other application servers, the output always goes to the client device's default printer.

Users can see which printer is their default printer by pointing with the mouse at the printer icon on their webtop. A popup displays the name of the default printer.

If a user wants to change their default printer, they must log out of SGD, change the default printer and then log in to again.

Users Cannot Print From Applications Displayed Through SGD

Use the following checklists to diagnose and fix the problem:

- "Client Devices Checklist" on page 242
- "Application Server Checklist" on page 244
- "SGD Server Checklist" on page 246

If this does not resolve the problem, follow the steps in "Tracing a Print Job" on page 247.

Client Devices Checklist

Use the following client device troubleshooting steps to diagnose printing problems in SGD.

Does SGD Support Printing for the Client Device or Printer Type?

Check the Printing Area on the webtop. Does the printer icon contain a red cross and is the message "No Client Printer Available" displayed? If so, this means that SGD does not support printing for this client device or printer type, or that there was an error creating client printers.

Is Printing Paused on the Client Device?

Make sure that the user has not paused printing. Check the Printer Paused icon is not displayed.

Use the `tarantella webtopsession list` command to see whether the user has paused printing.

Is the Printer Configured Correctly?

Make sure that the printer is correctly configured, for example by printing a web page to the printer from a web browser on the client device. Depending on the application server, some print jobs can only go to the client device's default printer.

If printing to a UNIX, Linux, or Mac OS X system client device, check that you have configured printing for these client types. See "Configuring Printing to UNIX, Linux, and Mac OS X Platform Client Devices" on page 237.

For PDF Printing, is the PDF Viewer Installed on the Client?

To be able to use PDF printing in SGD, a PDF viewer must be installed on the client device.

Check that the supported viewer, or the user's preferred viewer, is installed on the client and that the application is executable.

On UNIX, Linux, or Mac OS X system client devices, check that the user has read and write access to the `/tmp` directory.

If the PDF viewer is Adobe Reader (`acroread`), check that the viewer supports the `-openInNewWindow` command option. If the PDF viewer is Preview app (`/Applications/preview.app`), check that the viewer supports the `open -a` command option.

If a PDF viewer is not installed or accessible, the SGD PDF printers are available to the user.

For PDF Printing From a UNIX or Linux System Application Server, is the Print Job in the Right Format?

If the user's PDF viewer starts, but they receive a file format error, check that the format of the file being printed on a UNIX or Linux application server is PostScript.

Does the User Have the Necessary Registry Permissions?

On Microsoft Windows client devices, users must have write access to the `HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Cryptography\RNG\Seed` registry key and read access to the rest of the registry.

This access is required by several of the Windows application programming interfaces (APIs) for printing.

Application Server Checklist

Use the following application server troubleshooting steps to diagnose printing problems in SGD.

Is a Printer Configured on the Application Server?

Before users can print, you might need to configure a SGD printer on your application server. See the following:

- "Configuring Microsoft Windows Application Servers for Printing" on page 221.
- "Configuring UNIX and Linux Platform Application Servers for Printing" on page 224.

Is the Printer Created in the Windows Application Session?

If the user is trying to print from a Microsoft Windows application server, accessed using Windows Terminal Services, then the user's printers are configured automatically. See "Configuring Printing for Microsoft RDP" on page 221. If not, check the System event log on the application server for the following errors:

- `Event ID: 1111 Description: Driver` *`drivername`* `required for printer` *`printertype`* `is unknown. Contact the administrator to install the driver before you log in again.`
- `Event ID: 1105 Description: Printer security information for the` *`printername`* `/` *`clientcomputername`* `/Session` *`number`* `could not be set`
- `Event ID: 1106 Description: The printer could not be installed.`

These errors indicate that the printer driver for the client printer might not be supported by the application server. Either install the printer driver on the application server, or see "Printer Driver Mapping" on page 234 for details of how to support other printer drivers, including using wildcards to support a wide range of printer driver names.

It is also worth checking that the name of the printer driver in `/opt/tarantella/etc/data/default.printerinfo.txt`, or the user's `$HOME/.tarantella/printerinfo.txt`, matches the name of the driver on the application server.

If this does not resolve the problem, see the Microsoft Knowledge Base article Q239088 for more details.

Is the Application Printing to the Correct Printer?

The application must print to the printer queue you have configured. On UNIX or Linux application servers, the `prtinstall.en.sh` script creates a printer queue named `tta_printer` by default.

On UNIX or Linux system application servers, the application must print using the replacement `lp` or `lpr` scripts installed by `prtinstall.en.sh`. The SGD login scripts set `PATH` to ensure that the replacement scripts take precedence over the system scripts. If the application uses a full path name, for example `/usr/bin/lp`, or modifies `PATH` itself, reconfigure the application to use `/opt/tarantella/bin/lp` or `/opt/tarantella/bin/lpr`.

Are Accounts Shared on the Application Server?

If more than one user is simultaneously logged in to the same application server with the same user name, SGD might be unable to distinguish which user owns the print jobs. SGD discards the print jobs, logging that it has done so. This occurs with UNIX or Linux system application servers that do not have an SGD printer queue.

To fix this problem, run the `prtinstall.en.sh` script to configure a printer. See "The SGD Printer Queue Installation Script" on page 226.

Use the `tarantella print` command to check that print jobs from the application server printing system are reaching the SGD print queue.

Is the Windows Name of the Server the Same as the DNS Name?

If you have a Microsoft Windows NT server with a DNS name of `naples.indigo-insurance.com` and a NetBIOS name of VESUVIUS, print jobs from this server fail, because they contain the host identifier VESUVIUS instead of naples.

You can avoid this problem by editing the file `hostnamemap.txt` in the `/opt/tarantella/etc/data` directory. This file enables you to map host names to DNS names. The file contains instructions on how to create the mappings.

If You Are Using PDF Printing, is the Same PostScript Printer Driver Installed on Every Microsoft Windows Application Server?

To be able to use PDF printing, you must install the same PostScript printer driver on every Microsoft Windows application server.

In the Administration Console, check that the name of the driver matches the name configured in the Postscript Printer Driver field on the Global Settings → Printing tab, or the Printing tab for the user profile or parent object. The System event log on the application server shows an error if the names do not match.

SGD Server Checklist

Use the following SGD server troubleshooting steps to diagnose printing problems in SGD.

Is Printing Paused or Disabled Across the Array?

Use the `tarantella print status` command to check whether printing is paused or disabled for the array.

If necessary, enable printing, using `tarantella print start` or `tarantella print resume`.

For Printing on Microsoft Windows Client Devices, Are Client Printers Disabled?

In the Administration Console, check the Global Settings → Printing tab, or the Printing tab for the user profile or parent object. See whether users can access all their client printers, just their default client printer, or no client printers.

For PDF printing, check whether the SGD PDF printers are enabled.

Has the Array Configuration Changed?

Printing is not reconfigured if you do any of the following:

- Create an array
- Add a new secondary server to the array
- Change the primary server in the array

If the array has changed you might have to reconfigure printing, so that print jobs are sent to the correct printer.

For PDF Printing, is Ghostscript Available on the SGD Host?

PDF printing in SGD uses Ghostscript to convert print jobs into PDF files. SGD also uses Ghostscript to convert print jobs from PostScript to PCL.

If the `/opt/tarantella/var/log/print.log` file contains a message such as `"Can't find ps2pdf"` or `"Consider obtaining Ghostscript from http://www.ghostscript.com"`, then either Ghostscript is not installed or it is installed in a non-standard location.

See "Checking the Ghostscript Installation on the SGD Host" on page 229 for details of how fix Ghostscript installation problems.

Tracing a Print Job

If the checklists above do not solve your SGD printing problem, try the following troubleshooting steps. These steps enable you to track the progress of a print job from the application server to the SGD server to the client device.

Step 1: Can You Print From the SGD Server?

Configure an X or character application to run on the SGD server. Display a terminal window, for example `xterm`, and start the application from your SGD webtop.

Try printing a test page, by running the `/opt/tarantella/bin/scripts/printtestpage.en.sh` script.

If the page does not print, run `/opt/tarantella/bin/scripts/printtestpage.en.sh --direct`. This bypasses the UNIX or Linux system spooler.

Check the following:

- **Did the first test page print?**

  The problem is related to the movement of print jobs from the application server to the SGD server.

  - For UNIX or Linux system application servers, go to "Step 3: Is the Print Job Leaving the UNIX or Linux System Application Server?" on page 248.
  - For Windows Terminal Services, go to "Step 5: Is the Print Job Leaving the Windows Terminal Services Application Server?" on page 249.

- **Did the second test page print?**

  The problem is related to the UNIX or Linux system printing system on the SGD host.

  Investigate and fix any problems, using your UNIX or Linux system documentation for help. Then try printing again.

- **Did neither of the test pages print?**

  The problem is related to the SGD server.

  Go to "Step 2: Is the SGD Printer Queue Installed on the SGD Server?" on page 247.

Step 2: Is the SGD Printer Queue Installed on the SGD Server?

In the list of printers on the SGD host, check for an entry for `tta_printer`.

Consult your UNIX or Linux system documentation to find out how to display the list of printers. On some systems, you can use `lpstat -t`. If your system has a file `/etc/printcap`, this contains a list of printers in plain text format.

Check the following:

- **Is the tta_printer printer present on the SGD host?**

  The problem is related to the movement of print jobs from the SGD server to the client device. Go to "Step 7: Have You Examined the Print Log Files?" on page 250.

- **Is the tta_printer printer missing from the SGD host?**

  Run the `prtinstall.en.sh` script on the SGD server. Then try printing again.

  See also "The SGD Printer Queue Installation Script" on page 226.

Step 3: Is the Print Job Leaving the UNIX or Linux System Application Server?

Using an application object configured to display a terminal window on the UNIX or Linux system application server, try printing a small text file to the SGD printer. For example, type the command: `lp -d tta_printer /etc/hosts`.

Check the following:

- **Does the command return an error message?**

  Check that the UNIX or Linux platform application server is configured to print through SGD. You might need to run the `prtinstall.en.sh` script. See "The SGD Printer Queue Installation Script" on page 226 for more details.

- **Does the command return a print job ID?**

  This suggests that SGD printing is correctly configured, but the problem might lie in the UNIX or Linux print system. Go to "Step 4: Is the Print Job Present in the UNIX or Linux System Spool Directory?" on page 248.

Step 4: Is the Print Job Present in the UNIX or Linux System Spool Directory?

The print spool directory varies between different UNIX or Linux systems. Consult your UNIX or Linux system documentation for assistance.

Check the following:

- **Is the print job present in the spool directory?**

  There might be a network problem between the application server and SGD server. Go to "Step 6: Is the Print Job Reaching the SGD Server?" on page 249.

- **Is the print job missing from the spool directory?**

  Check your UNIX or Linux system LPD printing configuration. For example, ensure that there are suitable entries in `/etc/hosts.equiv` or `/etc/hosts.lpd`, and that there are no `.deny` files, such as `/etc/hosts.equiv.deny`.

Check that the `lpd` daemon is running and listening. For example, use the following commands:

```
# ps -ef | grep lpd
# netstat -a | grep printer
```

Try printing again.

Step 5: Is the Print Job Leaving the Windows Terminal Services Application Server?

Check the print queue on the application server. Consult your system documentation if you need help on how to do this.

Check the following:

- **Is the print job leaving the application server?**

  There might be a network problem between the application server and SGD server. Go to "Step 6: Is the Print Job Reaching the SGD Server?" on page 249.

- **Is the print job leaving the application server?**

  Check the configuration of the SGD printer, as follows:

  - Check that you can `ping` and `telnet` to the SGD server from the application server.
  - Look for errors in the Event Log.
  - From a command prompt, use the `lpr -s` *server* `-p tta_printer` *filename* command to print. If this works, the printer driver on the application server might not be installed or configured correctly.

Step 6: Is the Print Job Reaching the SGD Server?

Check the SGD print spool directories on the SGD server: `/opt/tarantella/var/spool` and `/opt/tarantella/var/print/queue`.

Check the following:

- **Is the print job present on the SGD server?**

  Check that you are using fully qualified DNS names in the application object, and that name resolution is working correctly.

  Examine the printing log files for more information. Go to "Step 7: Have You Examined the Print Log Files?" on page 250.

- **Is the print job missing from the SGD server?**

  Check the configuration of the SGD server, as follows:

  - Check your UNIX or Linux system LPD printing configuration.

For example, ensure that there are suitable entries in `/etc/hosts.equiv` or `/etc/hosts.lpd`, and that there are no `.deny` files, such as `/etc/hosts.equiv.deny`.

Check that the `lpd` daemon is running and listening. For example, use the following commands:

```
# ps -ef | grep lpd
# netstat -a | grep printer
```

- Check that you can `ping` and `telnet` to the SGD server from the application server.
- If you are using Windows Terminal Services, display a command prompt and use the `lpr -s` *server* `-p tta_printer` *filename* command to print. If this works, this suggests the printer driver on the application server is not installed or configured correctly.

Step 7: Have You Examined the Print Log Files?

You can use the `tarantella query` command to examine the logs across the array. Log files are stored in `/opt/tarantella/var/log` on each SGD server in the array.

If the print log files are empty, edit the Log Filter, to log printing messages. In the Administration Console, go to the Global Settings → Monitoring tab, and add the following log filters:

```
server/printing/*:print%%PID%%.log
server/printing/*:print%%PID%%.jsl
```

If the log contains messages indicating problems with user name mappings, this suggests you are using shared accounts on the application server. See "Are Accounts Shared on the Application Server?" on page 245.

Troubleshooting Other Printing Problems

This section describes some typical problems when printing through SGD and includes the following topics.

Troubleshooting Printer Preferences and Settings

When printing from a Windows application that uses the Microsoft RDP Windows Protocol, users can set preferences for the printers they use. The following are common problems with printer preferences.

Current Client Printer Preferences Ignored

The first time a client printer is defined for a user, the printer preferences, such as the paper size and orientation, are the application server's defaults for the printer driver and not the client printer's current preferences.

Users can change the printer preferences on the application server, and these modified preferences are used when they next connect using a client device with the same printer.

Changes to Printer Preferences Are Not Remembered

When a user changes their printer preferences, for example by changing the default paper size, sometimes the change is not remembered when they next run a Windows application.

There is a delay between changing the preferences and the new preferences being sent to the client. When changing printer preferences, it is advisable to wait a few minutes before logging out of the Windows application.

Printer Preferences Are Lost When a User Changes Printers

Printer preferences are linked directly to the driver name. So, if a user changes the printer they use and the new printer uses a different driver name, they have to set the printer preferences again.

Local Printer Settings Are Not Set in the Remote Windows Application Session

The printer settings of a local printer are not set on the printer in the remote Windows application session when you use SGD. However, they are set when you use the Microsoft Terminal Services Client.

SGD does not support this capability.

Printer Settings Are Ignored When Using PDF Printing

If you are using PDF printing on a Microsoft Windows client device, some printer settings might be ignored by the Adobe Reader.

This might be because the printer driver used for PDF printing has settings that are not available on the client printer.

Some settings, such as page orientation, have to be set in the Adobe Reader print dialog, as well as on the printer in the Windows application session. Once you have set up the Reader, the settings are remembered.

Print Jobs Can Be Queued When SGD Printing is Disabled

After disabling the SGD print system, by running `tarantella print stop`, it is still possible to spool print jobs on application servers. These jobs remained queued until SGD printing is restarted.

To prevent print jobs from being submitted, disable the SGD print queue manually on the application servers.

Fonts Do Not Print Correctly With PDF Printing

When using PDF printing, users might find that the fonts on the printed output are not what they expected.

As PDF printing relies on a combination of Windows printer drivers, when printing from Windows applications, Ghostscript and a PDF viewer to deliver its output, you might have to experiment with the font settings for each of these components to see if this produces a better result.

TrueType Fonts and Windows Applications

When printing from a Windows application and the document contains TrueType fonts, users might find that the printer is using its own fonts, called *device fonts*, instead of the TrueType fonts. This can result in some characters being printed as "empty boxes" ([]).

The solution to this problem is to force the printer to download the TrueType fonts for printing.

Display the Print dialog in the Windows application and select Properties → Advanced. In the Graphic section, change the TrueType Font option to Download as Softfont.

Changing Printer Names in Windows Application Sessions

Printers created in a Microsoft Windows 2000 application session have the format "*printer-name*/Sun SGD/Session *number*". For example, `HP LaserJet 8000 Series PS/Sun SGD/Session 1`.

Printers created in a Windows 2003 application session have the format "*printer-name* (from Sun SGD) in session *number*". For example, `HP LaserJet 8000 Series PS (from Sun SGD) in session 1`.

For Unix, Linux, and Mac OS X platform client devices, the *printer-name* comes from the printer configuration file used for the client device. See "Configuring Printing to UNIX, Linux, and Mac OS X Platform Client Devices" on page 237 for more details. For Windows client devices, the *printer-name* comes from the printer driver.

You can change the `Sun SGD` part of the printer name by editing the `/opt/tarantella/var/serverresources/expect/wcpwts.exp` login script. By adding a `-netbiosname "`*name*`"` argument for the `ttatsc` command, for example `-netbiosname "IndigoInsurance"`, you can change the printer name in the previous example to the following:
`HP LaserJet 8000 Series PS/IndigoInsurance/Session 1`.

Note – The name can only be 15 characters long. If you use more than 15 characters, the name is truncated.

If you are using PDF printing, you can amend the names of the PDF printers. See "Changing the Names of the PDF Printers" on page 254.

Changing the Names of the PDF Printers

The names of SGD PDF printers are configurable. You can amend these names as follows.

To change the PDF printer names for all users, use the following command:

```
$ tarantella config edit \
--printing-pdfprinter name --printing-pdfviewer name
```

To change the PDF printer names for an organization, organizational unit, or user profile object, the object must also be configured to override the parent object's printing settings. Use the following command:

```
$ tarantella object edit --name object \
--userprintingconfig true --pdfprinter name --pdfviewer name
```

Users See a Printer Called '_Default' in a Windows Application Session?

Users who access Windows applications from UNIX, Linux, or Mac OS X platform client devices, might see a printer called '_Default' in their Windows application session. This can be confusing to users if their client printer has a different name or they have no client printer.

This is caused by the default setting in the `printerinfo.txt` file, which is used to associate the printer driver name with a print job when printing from a Windows application.

To correct the printer name, edit the `printerinfo.txt` file.

To remove the '_Default' printer name, delete the `'_Default'` entry from the `printerinfo.txt` file.

See "Configuring Printing to UNIX, Linux, and Mac OS X Platform Client Devices" on page 237, for more details about the `printerinfo.txt` file.

Client Drive Mapping

Client drive mapping (CDM) enables SGD users to access the drives on their client device from applications running on UNIX, Linux, or Microsoft Windows platform application servers.

This section describes how to configure CDM for SGD users. Common problems when using CDM in SGD are also covered, along with tips on how to fix them.

This section includes the following topics:

Setting Up Client Drive Mapping

Setting up CDM involves the following configuration steps:

1. Configure the application servers for CDM.

   The SGD Enhancement Module must be installed on the application server.

   - See "Configuring UNIX and Linux Platform Application Servers for CDM" on page 256.
   - See "Configuring Microsoft Windows Application Servers for CDM" on page 258.

2. Enable CDM services in SGD.
   - See "Enabling CDM Services in SGD" on page 259.

3. Configure the drives you want users to access from SGD.
   - See "Configuring the Drives Available to UNIX, Linux, and Mac OS X Platform Client Devices" on page 261.
   - See "Configuring the Drives Available to Microsoft Windows Client Devices" on page 261.

Configuring UNIX and Linux Platform Application Servers for CDM

Configuring UNIX and Linux platform application servers for CDM involves the following steps:

1. Install the SGD Enhancement Module for UNIX and Linux Platforms.

   The *Sun Secure Global Desktop 4.41 Installation Guide* has details of how to install the Enhancement Module.

   See "Supported Installation Platforms for the SGD Enhancement Module" on page 158 for information on the supported platforms for the SGD Enhancement Module.

2. Configure the Network File System (NFS) share to be used for CDM.

   See "Configuring an NFS Share for CDM" on page 256.

3. Start the CDM processes on the application server.

   See "Starting CDM Processes on the Application Server" on page 258.

Configuring an NFS Share for CDM

Configuring an NFS share for CDM involves the following:

- Configuring a shared directory on the application server
- Configuring how client drives are displayed on UNIX platforms

Configuring a Shared Directory on the Application Server

You must have an NFS server installed and running on the application server. The NFS server must share, or export, a directory to be used for CDM. By default, the directory is `/smb`. You have to manually create and export this directory.

You can specify an alternative NFS share in the CDM configuration file, `/opt/tta_tem/etc/client.prf`. Edit the `[nfsserver/mount/mountpoint={(/smb)}]` setting to reflect the name of the share.

The NFS share must be accessible to localhost, and users must have read and write access to it. Consult your system documentation for details of how to configure an NFS server and export a directory.

Configuring How Client Drives Are Displayed on UNIX Platforms

When CDM is enabled, the user's client drives or file systems are available by default in the `My SGD Drives` directory in the user's home directory. The `My SGD Drives` directory is a symbolic link to the NFS share that is used for CDM.

You can configure the name and location of the symbolic link by *adding* settings to the CDM configuration file, `/opt/tta_tem/etc/client.prf`, as follows:

- **The name of the symbolic link.** This is configured with the following setting:

  `[nfsserver/user/symlinkname={(`*symlink*`)}]`

  The default setting is: `My SGD Drives`

  For example, to change the name of the symbolic link to `Client Shares`, add the following line to the configuration file:

  `[nfsserver/user/symlinkname={(Client Shares)}]`

- **The directory where the symbolic link is created.** This is configured with the following setting:

  `[nfsserver/user/symlinkdir={(`*dir*`)}]`

  The default setting is: `$HOME`

  For example, to create the symbolic link in the `/tmp` directory, add the following line to the configuration file:

  `[nfsserver/user/symlinkdir={(/tmp)}]`

  The directory can also be specified using environment variables. The variables you can use are controlled by the `nfsserver/user/envvars` setting.

  For example, to create the symbolic link in the `/tmp/`*username* directory, add the following line to the configuration file:

  `[nfsserver/user/symlinkdir={(/tmp/$USER)}]`

- **Environment variables for specifying the directory where the symbolic link is created**. These are configured with the following setting:

  `[nfsserver/user/envvars={(`*var*`)...}]`

  The default setting is: `(USER)(HOME)(LOGNAME)`

  Enclose each variable in parentheses. Do not include the dollar sign ($) before the variable name.

  The variables in the list *replace* the default variables.

  For example, to be able to use the `HOME`, `USER`, `DISPLAY` and `TMPDIR` variables, add the following line to the configuration file:

  `[nfsserver/user/envvars={(HOME)(USER)(DISPLAY)(TMPDIR)}]`

After making any changes to the CDM configuration file, you must restart the CDM processes on the application server. See "Starting CDM Processes on the Application Server" on page 258 for details of how to do this.

Starting CDM Processes on the Application Server

To start the CDM processes on the application server, log in as superuser (root) and use the following commands:

```
# /opt/tta_tem/bin/tem stopcdm
# /opt/tta_tem/bin/tem startcdm
```

Configuring Microsoft Windows Application Servers for CDM

Configuring Microsoft Windows application servers for CDM involves the following steps:

1. Install the SGD Enhancement Module for Windows.

   The *Sun Secure Global Desktop 4.41 Installation Guide* has details of how to install the Enhancement Module.

   See "Supported Installation Platforms for the SGD Enhancement Module" on page 158 for information on the supported platforms for the SGD Enhancement Module.

2. (Optional) Reconfigure the application server's drives.

   See "Remapping or Hiding Microsoft Windows Application Server Drives" on page 258.

CDM is only available for Windows applications that are configured to use the Microsoft RDP Windows Protocol.

Remapping or Hiding Microsoft Windows Application Server Drives

By default, a Microsoft Windows application server's drives are also listed when users access their client drives from a Windows application. If you want users to see familiar drive letters, such as drive A for their client's floppy drive, you can configure the application server to remap its drive letters or hide its drives.

On a Microsoft Windows application server, you can use the Computer Management tools to do the following:

- Disable drives A and B
- Disable or remap any CD or DVD drives
- Remap hard drives

To ensure consistency for users, remap or disable drives in the same way on all Microsoft Windows application servers used for CDM. See your system documentation for more information about remapping and disabling drives.

For information on hiding drives, so that users can only access a limited set of drives, see the Microsoft article: Using Group Policy Objects to Hide Specified Drives in My Computer for Windows 2000 (Q231289).

Enabling CDM Services in SGD

This section describes how to enable CDM services for an array of SGD servers.

In a default installation, you cannot use CDM and run another Server Message Block (SMB) service, such as Samba, on the SGD host. This is because they both use Transmission Control Protocol (TCP) port 139. To use CDM, you must either disable the other SMB server or configure the host to enable more than one service to use TCP port 139.

To enable more than one service to use TCP port 139, you have to configure the SGD host to have more than one Internet Protocol (IP) address. To do this, either install another network interface card (NIC), or use IP aliasing to assign multiple IP addresses to a single NIC. This is described in "How to Run CDM and Another SMB Service on the Same Host" on page 260.

▼ How to Enable SGD Client Drive Mapping Services

1. **In the Administration Console, display the Global Settings → Client Device tab.**
2. **Configure the following attributes.**
   - **Client Drive Mapping.** Select the Enabled check box.
   - **Fallback Drive Search.** Choose a drive letter to Start at and a Direction.

     These settings are used for Microsoft Windows client devices only.

     If the desired drive letter is already allocated on a Microsoft Windows application server, the first available fallback drive letter is allocated instead. By default, this is drive V, then drive U, then drive T, and so on.

- **Windows Internet Naming Service (WINS).** This setting is optional.

  Enabling WINS can improve CDM performance. Only enable WINS if either of the following is true:

  - Your Microsoft Windows application servers are on the same subnet as an SGD server.
  - Your Microsoft Windows application servers list an SGD server as a WINS server.

3. **Either restart all the SGD servers in the array, or use the** `tarantella start cdm` **command on each SGD server in the array.**

   If you restart the SGD servers, ensure that no users are logged in to the SGD server, and that there are no application sessions, including suspended application sessions, running on the SGD server.

Note – Changes made only take effect for new user sessions.

▼ How to Run CDM and Another SMB Service on the Same Host

Repeat this procedure for each SGD server that also has an SMB service enabled.

Ensure that no users are logged in to the SGD server, and that there are no application sessions, including suspended application sessions, running on the SGD server.

1. **Stop the SGD server and configure the IP addresses you want it to bind to for CDM.**

   Use the following command:

```
# tarantella config edit \
--tarantella-config-cdm-externalnbtaddress ip-address ...
```

   The default setting for *ip-address* is `*`, which means bind to all interfaces. Separate each IP address with a space.

2. **When you have configured the IP addresses, start the SGD server.**

3. **Configure the other SMB service, or services, to bind to a different IP address.**

Configuring the Drives Available to UNIX, Linux, and Mac OS X Platform Client Devices

By default, users with UNIX, Linux, and Mac OS X platform client devices have access to their home directory and this is mapped to a drive called *My Home*.

Users can configure which part of their client file system they can access from applications by editing the `$HOME/.tarantella/native-cdm-config` configuration file. This file is automatically created when the SGD Client is installed. The file contains detailed instructions for users on how to create mapped drives.

The configuration file contains entries of the form `<path> <type> <label>` where:

- `<path>` is the absolute path name of the client file system.
- `<type>` is either `unknown`, `fixed`, `floppy`, `cdrom`, or `remote`.
- `<label>` is the name that is used in the application session.

Use a separate line for each drive and separate each of the fields with a space or a tab. If either the `<path>` or the `<label>` fields contains spaces or tabs, enclose the field in quotes.

You can use environment variables in the `<path>` or `<label>` fields. You delimit these with a dollar sign ($). To use a literal $, escape it with another $.

The following is an example configuration file:

```
[CDM]
$HOME$ fixed "My Home"
/tmp/$USER$ fixed Temp
"/mnt/win/My Documents" fixed "My Local Documents"
[/CDM]
```

Note – Changes to the configuration file only take effect for new user sessions.

Configuring the Drives Available to Microsoft Windows Client Devices

For Microsoft Windows client devices, you configure the drives you want users to access with the Client Drive Mapping attribute on the Client Device tab for user profiles, organizational unit, and organization objects. CDM uses inheritance. You

define access to client drives at an organization level, which you can override at an organizational unit level or user profile level. By default, users have read and write access to all drives.

When a user logs in to an SGD server, information is gathered about the drives on the client device. For each available drive, the Client Drive Mapping attribute on the user profile is checked. If there is no matching client drive configured, the parent organizational unit's Client Drive Mapping attribute is checked, and so on up the organizational hierarchy to the organization object.

If a match is found, then the associated access rights are granted for that drive, using the configured drive letter. If that drive letter is already in use on the application server, the Fallback Drive Search attribute on the Global Settings → Client Device tab in the Administration Console is used to determine the drive letter to use.

At each level in the organizational level, you configure a number of drive mapping specifications. Each of these states a client drive letter, the access rights to that drive, and the application server drive letter to allocate. For example, you might specify that a user has read-write access to client drive A using application server drive Z. The first matching entry in the list is used. Make sure the most specific settings, for example, A or B, appear before more general settings, for example, All Drives.

Note – Changes to client drive specifications only take effect for new user sessions.

An Example of Configuring Drive Availability for Users

The following example shows how to disable access to all client drives for all users in the Indigo Insurance organization. Only a single user in the organization, Ruby Port, is allowed to access her PC's floppy drive.

In the Administration Console, go to the Client Device tab and display the Client Drive Mapping table for the `o=Indigo Insurance` organization object. In the Client Drive Mapping table, select the check box next to All Drives. Click the Edit button and set the Access Rights to None. This disables access to all client drives.

In the Administration Console, go to the Client Device tab and display the Client Drive Mapping table for the `Ruby Port` user profile object. In the Client Drive Mapping table, click the New button and configure the following settings:

- **Client Device Drive**. Select A:, the drive letter of Ruby's floppy drive, or R/W Removable. R/W Removable matches all read-write removable drives, such as floppy drives.
- **Access Rights.** Select Read/Write. This gives Ruby full access to the drive, as long as the floppy disk is not write-protected.

- **Application Server Drive Letter.** Select Same as Client. With this setting, SGD attempts to use the same drive letters on the application server as are used on the client device.

This gives Ruby Port full access to her PC's floppy drive on drive A:.

Troubleshooting Client Drive Mapping

The following are common problems when using CDM in SGD:

No Client Drives Are Mapped Within the User's Session or There Are Fewer Drives Than Expected

Use the following checklist to resolve this problem.

Is the SGD Enhancement Module installed on the application server?

To access client drives from applications displayed through SGD, the SGD Enhancement Module must be installed on the application server.

See "Supported Installation Platforms for the SGD Enhancement Module" on page 158 for information on the supported platforms for the SGD Enhancement Module.

Is CDM enabled?

In the Administration Console, go to the Global Settings → Client Device tab and ensure that the Client Drive Mapping check box is selected.

Remember, CDM services only become available when you restart all SGD servers in the array. To manually start CDM services without restarting the array, run the `tarantella start cdm` command on all members of the array.

Have the user's client drives been configured correctly?

For users with *Microsoft Windows* client devices, the Client Drive Mapping attribute on the Client Device tab for organization, organizational unit, and user profile objects determines which client drives each user can access. The user might be configured to have no access to any client drives. Remember to check the ancestor OUs in the organizational hierarchy. CDM settings are inherited, so you can give access to many users with one configuration change.

For users with *UNIX, Linux, or Mac OS X* platform client devices, check that the user's `$HOME/.tarantella/native-cdm-config` file is present and has valid entries.

Are CDM processes running?

On the host where SGD is installed, use the following command:

```
# ps -ef | grep ttacdmd
```

If CDM processes are running, there are at least two processes with the name `ttacdmd`.

If there are no any drive mapping processes, use the following command:

```
# grep cdm /opt/tarantella/var/log/*
```

Check the output for any messages.

On *UNIX and Linux platform application servers*, use the following command to check that CDM processes are running:

```
# /opt/tta_tem/bin/tem status
```

If CDM processes are not running, use the following command:

```
# /opt/tta_tem/bin/tem startcdm
```

If starting CDM processes produces errors such as `"Failed to mount /smb"`, check that the NFS server is running and that the directory being used for CDM is exported correctly.

Check whether another service is using port 4242. If so, edit the `/opt/tta_tem/etc/client.prf` file and change the port number in the line `[nfsserver/mount/port={(4242)}]` and restart the CDM processes.

On *Microsoft Windows application servers*, use Task Manager to check that there is a `ttatdm.exe` process for the user.

Are you using a proxy server?

Proxy servers drop a connection after a short period of time if there is no activity on the connection.

SGD sends keepalive packets to keep the connection open between the client device and the SGD server and by default this is every 100 seconds. This connection is used for CDM. Try increasing the frequency of the keepalive packets.

See also "Proxy Server Timeouts" on page 12.

Do the version numbers for the SGD Enhancement Module and the SGD server match?

Run the following command on the host where SGD is installed:

```
$ tarantella version
```

Make a note of the version number.

On Microsoft Windows application servers, browse to the `C:\Program Files\Tarantella\Enhancement Module` directory. Click the right mouse button on the `ttatdm.exe` file and select Properties. On the Version tab, click File Version.

On UNIX or Linux platform application servers, run the following command:

```
$ /opt/tta_tem/bin/tem version
```

Are other services using TCP ports 139 and 137?

SGD CDM services must bind to TCP port 139, which is used for SMB services. This port might already be in use, for example by a product such as Samba. User Datagram Protocol (UDP) port 137 is also used if the Windows Internet Naming Service (WINS) check box is selected on the Global Settings → Client Device tab in the Administration Console.

To find out whether any other process is using ports 139 and 137, stop the SGD server and then run the following commands on the host where SGD is installed:

```
$ netstat -an | grep 139
$ grep 139 /etc/xinetd.conf
```

To ensure that CDM services are available, stop any other products that bind to TCP port 139 and TCP port 137, if required, and restart the SGD server.

Follow the instructions in "How to Run CDM and Another SMB Service on the Same Host" on page 260.

Have all the client drives been found?

For Windows client devices, the SGD Client displays information about the drives it has found. Click the right mouse button on the System Tray icon and select Connection Info.

For UNIX and Linux platform client devices, this information is written to the SGD Client log file.

Does logging reveal any errors?

Check the CDM log files for any errors, as follows:

- **Microsoft Windows application servers.** Check the Windows Event Viewer for any drive mapping errors.
- **UNIX or Linux platform application servers.** Check for any drive mapping errors in the `clerr.log` and the `cl`*PID*`.log` files in the `/opt/tta_tem/var/log` directory.

See also "Logging for CDM" on page 269.

Is the drive mapping connection between the application server and the SGD server working?

Use the diagnostics feature of the application server, as follows:

- **Microsoft Windows application servers.** To check whether the drive mapping connection between the application server and the SGD server is working, enable drive mapping in *diagnostic mode* on the application server. See "CDM Diagnostics for Microsoft Windows Application Servers" on page 269 for details. When the drive mapping window displays, select Information from the Debug menu. Check the output for information on why the drive connections are failing.

  Common reasons why drive connections fail for Microsoft Windows application servers include the following:

  - The application server cannot resolve the netBIOS name of the SGD server. The solution is to configure a WINS server on the application server that points to a WINS server that can resolve the netBIOS name of the SGD server. Alternatively, edit the `lmhosts` file to include the netBIOS name and the IP address of the SGD server.
  - The `ttacdmd` program is not running, because another SMB server is running.

- **UNIX or Linux platform application servers.** Drive mapping errors are reported to the `clerr.log` and the `cl`*PID*`.log` files in the `/opt/tta_tem/var/log` directory. See also "CDM Diagnostics for Unix or Linux Platform Application Servers" on page 270.

Invalid Password Errors on Microsoft Windows Application Servers

If no client drives are mapped in the Microsoft Windows application session and you see errors such as `Add device failed with ERROR_INVALID_PASSWORD` in the CDM log output, this can be caused by either of the following:

- **SMB packet signing.** Microsoft Windows application servers can be configured so that the SMB communications between a client and Microsoft Windows server are digitally signed for security.

  SGD does not support SMB packet signing. The solution is to disable SMB packet signing.

  See this Microsoft TechNet article for information on disabling SMB packet signing.

- **LAN Manager authentication level.** The LAN Manager authentication level controls the authentication protocols used for communications between a client and Microsoft Windows server. If the authentication level is set too high, CDM fails.

  The solution is to edit the `Security options\Network security\LAN Manager authentication level` policy and select Send LM & NTLM - Use NTLMv2 session security if negotiated.

  See Microsoft KB article 823659 for more details.

These solutions apply to Microsoft Windows 2000 Server application servers, and to Microsoft Windows Server 2003 and later application servers.

See also "Logging for CDM" on page 269.

Windows Client Drives Are Mapped Using Unexpected Drive Letters

If a drive letter is already in use on the Microsoft Windows application server, the drive cannot be remapped automatically. For example, drive A might be reserved for the application server's floppy drive. The CDM service uses a Fallback Drive to ensure the client drive can be accessed using a different drive letter.

To help ensure that the configured drive letter is available, it is best to hide or remap application server drives to use different drive letters. See "Remapping or Hiding Microsoft Windows Application Server Drives" on page 258.

More Client Drives Are Mapped Than Expected

For users with *Microsoft Windows* client devices, client drives are inherited within the organizational hierarchy, so you can give access to many users with one configuration change. Check the Client Drive Mapping attribute on the organizational unit object that the user profile object belongs to. If necessary, check all ancestors of the user profile, including the top-level organization object. You can override a setting that is specified in a parent OU or organization object, by configuring the user profile's Client Drive Mapping attribute. The first matching drive specification is used.

For users with *UNIX, Linux, or Mac OS X* platform client devices, check that the user's `$HOME/.tarantella/native-cdm-config` file is present and has valid entries.

The Recycle Bin Does Not Work As Expected

On Microsoft Windows client devices, client drives accessed through SGD are treated by the application server as network drives. This means that Recycle Bin features are not available for client drives.

Deleting a file does not send the file to the Recycle Bin. The `Recycled` directory, if present, is not shown as the Recycle Bin, and its contents are not displayed.

Mapped Drives Have Unusual Names

On Microsoft Windows client devices, sometimes drives appear with unusual names. This is caused by the drive mapping application timing out.

The solution is to increase the default timeout values in the Microsoft Windows registry for the CDM application, `ttatdm.exe`, on the Microsoft Windows application server. Edit the following settings for the `HKEY_LOCAL_MACHINE\Software\Tarantella, Inc.\Enhancement Module for Windows` key in the Windows registry:

- **Initial Timeout.** The default value is 10000 milliseconds. Increase this value.
- **Subsequent Timeout.** The default value is 1000 milliseconds. Increase this value, for example, to 8000 milliseconds.

Note – Changes made only take effect for new user sessions.

On UNIX, Linux, and Mac OS X platform client devices, the names of mapped drives are configured in the user's `$HOME/.tarantella/native-cdm-config` file. Check that this file has valid entries.

CDM Limitations for Shared Users

On Unix or Linux platform application servers, access to client file systems is given to users based on their UNIX user ID and standard NFS file system privileges. If a shared account is used to access applications, CDM is not available. This is because SGD has no way to distinguish between these users, as they all have the same user ID.

Logging for CDM

Logging can be used to diagnose problems with CDM. You configure and use logging for the SGD array and for application servers, as follows:

- Enable CDM logging for the SGD array
- Use CDM diagnostics for Microsoft Windows application servers
- Use CDM diagnostics for UNIX or Linux application servers

Enabling CDM Logging for the SGD Array

Add the following filters in the Log Filters field on the Monitoring tab of the Administration Console.

```
cdm/*/*:cdm%%PID%%.jsl
cdm/*/*:cdm%%PID%%.log
server/deviceservice/*:cdm%%PID%%.log
server/deviceservice/*:cdm%%PID%%.jsl
```

CDM Diagnostics for Microsoft Windows Application Servers

On Microsoft Windows application servers, you can run CDM in diagnostic mode, to obtain information for troubleshooting drive mapping problems.

To enable diagnostic mode, log on to the application server as an Administrator and double-click the drive mapping program file, `C:\Program Files\Tarantella\Enhancement Module\ttatdm.exe`.

When the drive mapping window displays, select the level of information you want, by choosing an option from the Debug menu.

The Debug menu has the following options:

- **Errors.** Select this option to see any errors that have occurred. This also causes errors to be reported to the Windows Event Viewer. This option is selected by default.
- **Warnings.** Select this option to see any errors and warnings that have occurred. This also causes errors and warnings to be reported to the Windows Event Viewer.
- **Information.** Select this option to display all drive mapping information.
- **Log to file.** Select this option to save the output to a log file in the user's temp directory. The drive mapping window shows you the name and location of the log file it has written.
- **Start visible.** Select this option to have the drive mapping window display every time the drive mapping services are started.

The drive mapping window only shows drive mapping information from when the window is displayed. It does not show historical information. If you change the level of information displayed in the drive mapping window, the user needs to log out of Windows and log in again to generate the new information.

The Edit menu enables you to select, copy, and clear information from the drive mapping window.

CDM Diagnostics for Unix or Linux Platform Application Servers

On UNIX or Linux platform application servers, drive mapping errors are reported to the `clerr.log` and the `cl`*PID*`.log` files in the `/opt/tta_tem/var/log` directory.

Audio

This section describes how to configure SGD audio services for Windows applications and X applications. Troubleshooting information for SGD audio is also included.

The following topics are covered:

Setting Up Audio

Setting up audio involves the following configuration steps:

1. Configure the application servers for audio.
   - Configure Microsoft Windows application servers.

     Audio redirection must be configured on the Microsoft Windows application server.

     See "Configuring Microsoft Windows Application Servers for Audio" on page 272.
   - Configure UNIX and Linux platform application servers.

     Configure the audio module of the SGD Enhancement Module on the UNIX or Linux platform application server.

     See "Configuring UNIX and Linux Platform Application Servers for Audio" on page 272
2. Configure X application objects to use the correct audio device and audio format.

   See "Configuring X Applications for Audio" on page 273.
3. Enable the SGD audio services.

   See "Enabling SGD Audio Services" on page 274.
4. Configure the client device to play audio.

   See "Configuring Client Devices for Audio" on page 275.

Configuring Microsoft Windows Application Servers for Audio

You can only play audio in Microsoft Windows Server 2003 or later Terminal Services sessions. See "Audio Redirection" on page 165.

To use audio, Windows application objects must be configured to use the Microsoft RDP protocol.

Configuring UNIX and Linux Platform Application Servers for Audio

To be able to hear audio in an X application, you must install and run the audio module of the SGD Enhancement Module on the UNIX or Linux platform application server.

Installing the Audio Module

See the *Sun Secure Global Desktop 4.41 Installation Guide* for instructions on installing the audio module. If you did not install the audio module when you installed the SGD Enhancement Module, you must uninstall the SGD Enhancement Module and install it again.

Note – If you are using zones on Solaris OS platforms, the audio module must be installed in the global zone.

The audio module installs the SGD audio daemon and audio driver emulator. On Linux platforms, the audio driver emulator requires the `soundcore` module in the kernel. The audio driver emulator is an Open Sound System (OSS) emulator.

Note – As the audio module includes an audio driver emulator, the application server itself does not actually need to have a sound card.

Starting the Audio Module

If the audio module is installed, you start the audio service with the `/opt/tta_tem/bin/tem startaudio` command. You must be superuser (root) to use this command.

About the SGD Audio Daemon

When audio is enabled and the user starts an X application, the SGD login script starts the SGD audio daemon, `sgdaudio`, on the application server.

The audio daemon connects to an SGD audio driver emulator, `sgdadem`, and starts an audio device node in the `/tmp/SGD/dev/sgdaudio` directory. The audio daemon sets the `SGDAUDIODEV`, `AUDIODEV`, and `AUDIO` environment variables to the location of the audio device node. The audio device node is then used to play audio during the application session.

The audio daemon transfers the audio data to the SGD server, which then sends the data to the client.

The audio daemon supports the following audio data formats:

- u-law and A-law with 8-bit precision
- 16-bit linear Pulse-code modulation (PCM)

To play audio, the client device must also support these formats.

The audio daemon supports any sample rate from 8000 Hz to 48 kHz for one or two channels. The audio daemon uses the sample rate specified by the UNIX Audio Sound Quality attribute on the Global Settings → Client Device tab in the Administration Console. By default, the sample rate is 22.05kHz.

The SGD audio daemon connects to the SGD server on random ports. If there is a firewall between the application server and the SGD server, the firewall must allow connections on all ports from the application server to the SGD server.

Configuring X Applications for Audio

To be able to hear audio in an X application, the X application might have to be configured to output audio using the right audio device and audio format.

Some X applications are hard-coded to use the `/dev/audio` or `/dev/dsp` devices for audio output. You can enable an SGD audio redirection library, to force the X application to use the device specified by the `SGDAUDIODEV` environment variable.

In the Administration Console, go to the Client Device tab for the X application and select the Audio Redirection Library check box.

Alternatively, use the following command:

```
$ tarantella object edit --name obj --unixaudiopreload true
```

As the SGD audio driver emulator is an OSS driver, the X application might have to be configured to use OSS. If your system uses the Advanced Linux Sound Architecture (ALSA), you might have to enable the ALSA OSS emulation modules in the kernel.

If the Connection Method (`--method`) used for the X application is SSH and the application's Window Type (`--displayusing`) is Kiosk, the Session Termination (`--endswhen`) attribute must be set to Login Script Exit or No Visible Windows (`--loginscriptnowindows`).

Enabling SGD Audio Services

To be able to hear audio in Windows applications and X applications, audio services must be enabled for the SGD array.

▼ How to Enable the SGD Windows Audio Service

To be able to hear audio in a Windows application, the SGD Windows audio service must be enabled in the array. The Windows audio service is disabled by default.

1. **In the Administration Console, go to the Global Settings → Client Device tab and select the Windows Audio check box.**

Tip – You can also use the `tarantella config edit --array-audio` command to enable the SGD Windows audio service.

Note – The audio service only takes effect for new user sessions. Users must log out of SGD and log back in again to enable audio in their current Windows Terminal Server sessions.

---

2. **(Optional) Set the audio quality.**

   Select an option for Windows Audio Sound Quality.

   The default is Medium Quality Audio, using a sample rate of 22.05kHz. Only change this setting if you experience problems with audio quality.

▼ How to Enable the SGD UNIX Audio Service

To be able to hear audio in an X application, the SGD UNIX audio service must be enabled in the array. The UNIX audio service is disabled by default.

1. **In the Administration Console, go to the Global Settings → Client Device tab and select the Unix Audio check box.**

Tip – You can also use the `tarantella config edit --array-unixaudio` command to enable the SGD UNIX audio service.

Note – The audio service only takes effect for new user sessions. Users must log out of SGD and log back in again to enable audio in their X application sessions.

---

2. **(Optional) Set the audio quality.**

   Select an option for Unix Audio Sound Quality.

   The default is Medium Quality Audio, using a sample rate of 22.05kHz. Only change this setting if you experience problems with audio quality.

Configuring Client Devices for Audio

To be able to hear audio in an Windows application or X application, the client device must be capable of playing audio.

Users with Solaris OS or Linux platform client devices must also have read and write access to the following audio devices:

- The `/dev/audio` device on Solaris OS platforms
- The `/dev/dsp` device on Linux platforms

Audio mixing on the client device is supported. On Solaris OS workstations, Microsoft Windows, and Mac OS X client devices, the client hardware performs the mixing. On Linux and SunRay client devices, the Enlightened Sound Daemon, also known as ESD or EsounD, is required to perform mixing.

Troubleshooting Audio in Applications

The following are common problems when using audio in Windows applications and X applications:

- "No Audio Plays At All" on page 276
- "Audio Is Muffled or Distorted" on page 279
- "Not All Users Require Audio" on page 280
- "Enabling UNIX Audio Debug Logging" on page 280

No Audio Plays At All

If no audio is playing at all in the application session, use the following checklists to resolve the problem.

For *Windows applications and X applications*, you can use the following checklist.

Does the client device have an audio device?

To be able to play audio, the client device must have an audio device. If there is an audio device, check that it works.

Users with Solaris OS or Linux platform client devices must also have read and write access to the following audio devices:

- The `/dev/audio` device on Solaris OS platforms
- The `/dev/dsp` device on Linux platforms

Note – On Solaris OS platforms, if the `AUDIODEV` environment variable has been set to a different device, the SGD Client tries to use this device before trying the `/dev/audio` device.

Is the volume muted on the client device?

Check the volume control on the client device, to see whether the user has muted the volume or set the volume level too low to hear.

Is the volume muted on the application server?

Check the volume control on the application server, or in the application, to see whether the user has muted the volume or set the volume level too low to hear.

Has the audio service been enabled on the SGD server?

By default, SGD audio services are disabled for an SGD array.

See "How to Enable the SGD Windows Audio Service" on page 274 for details of how to enable the SGD Windows audio service.

See "How to Enable the SGD UNIX Audio Service" on page 274 for details of how to enable the SGD UNIX audio service.

Has the audio quality been changed?

By default, the SGD audio service uses Medium Quality Audio. Changing the audio quality to Low Quality Audio or High Quality Audio limits the audio formats used in the application session and might mean that the client device cannot play audio.

Reset the audio quality to Medium Quality Audio on the Global Settings → Client Device tab in the Administration Console.

For *Windows applications*, you can use the following checklist.

Is the Windows application running on a Windows 2003 or later application server?

You can only play audio in Windows 2003 or later Terminal Services sessions.

For Windows applications, has audio been enabled on the Windows 2003 or later application server?

By default, audio is disabled for Windows Terminal Services sessions.

For *X applications*, you can use the following checklist.

Is there a firewall between the application server and the SGD server?

For X applications, the SGD audio daemon connects to the SGD server on random ports. If there is a firewall between the application server and the SGD server, the firewall must allow connections on all ports from the application server to the SGD server.

Have you installed the audio module of the SGD Enhancement Module?

To be able to play sound in X applications, you must install and run the audio module of the SGD Enhancement Module on the application server.

See the *Sun Secure Global Desktop 4.41 Installation Guide* for details of how to install the SGD Enhancement Module.

Note – If you are using zones on Solaris OS platforms, the audio module only works if it is installed in the global zone.

Use the following command to check that UNIX audio processes are running:

```
$ /opt/tta_tem/bin/tem status
```

You start the UNIX audio module with the following command:

```
# /opt/tta_tem/bin/tem startaudio
```

You must be superuser (root) to use this command.

Is the X application hard-coded to use either the `/dev/audio` or the `/dev/dsp` device?

If an application is hard-coded to use either the `/dev/audio` or the `/dev/dsp` device, you might have to enable the SGD audio redirection library to ensure that the SGD audio driver emulator is used by the application. See "Configuring X Applications for Audio" on page 273.

Is the X application outputting sound in the right format?

The SGD audio driver emulator is an OSS driver. The X application might have to be configured to use OSS. If your system uses ALSA, you might have to enable the ALSA OSS emulation modules in the kernel.

For UNIX or Linux platform application servers, is the SGD audio driver loaded in the kernel?

When you install the SGD Enhancement Module on the application server, you install the SGD audio driver, `sgdadem`. Check that the audio driver is loaded in the kernel.

- On Solaris OS platforms, use the `modinfo -c` command to check whether the `sgdadem` module is loaded.
- On Linux platforms, use the `lsmod` command to check whether the `sgdadem` and `soundcore` modules are loaded.

If the audio driver is installed but not loaded, you can try to load the module manually, as follows:

- On Solaris OS platforms, use the `modload -i` *moduleID* command. Use the `modinfo -c` command to find the *moduleID*.
- On Linux platforms, use the `modprobe sgdadem` command.

If loading the audio driver manually produces any errors, try to correct those errors and load the driver again.

If the SGD audio driver is not listed, check the audio module installation log for any errors. The installation log is `/opt/tta_tem/var/log/tem_unixaudio_inst.log`. If the log reports any errors, try to correct those errors and load the driver again.

If the audio driver does not load into the kernel, contact Sun Support.

Is the SGD audio daemon running?

There is an SGD audio daemon, called `sgdaudio`, running for each X application accessed through SGD. Use the following command to see the instances of the audio daemon:

```
$ ps -ef | grep -i sgdaudio
```

If the user does not have an audio daemon, check the audio daemon log files for any errors. The SGD audio daemon logs all fatal errors to the `/opt/tta_tem/var/log/sgdaudio`*PID*`.log` file.

Is there an SGD audio device node?

If the SGD audio daemon is running, it starts an audio device node in the `/tmp/SGD/dev/sgdaudio` directory.

In the X application session, check the value of the user's `SGDAUDIODEV`, `AUDIODEV` and `AUDIO` environment variables. These must be set to the location of the SGD audio device node.

If the environment variables are set correctly, check that the device file is present in the `/tmp/SGD/dev/sgdaudio` directory.

Does audio debug logging show any errors with the X application?

Enable UNIX audio debug logging on the application server and check the log files for errors.

See "Enabling UNIX Audio Debug Logging" on page 280 for more details.

Audio Is Muffled or Distorted

If audio is muffled or distorted, adjust the audio quality and audio compression settings to see if this improves the audio. You can adjust the following:

- The Sound Quality attribute on the Global Settings → Client Device tab in the Administration Console
- The Packet Compression attribute on the Protocol Engines → Audio tab for an SGD server in the Administration Console

---

Note – The net gain of compressing audio data, which is precompressed, is limited.

Not All Users Require Audio

If you enable audio on the Windows application server and enable the SGD audio service, all users can play audio in their Windows Terminal Services session. However, playing audio increases the amount of network bandwidth used and so you might want to restrict its use. Currently, the only way to do this is to disable audio for groups of users on the Windows application server. To do this you have to disable the Allow audio redirection setting for the group policy object, at `Computer Configuration\Administrative Templates\Windows Components\Terminal Services\Client Server Redirection`.

Changes to this setting only apply to new Windows Terminal Server sessions.

Enabling UNIX Audio Debug Logging

To enable UNIX audio debug logging, log in as superuser (root) on the application server and edit the `/etc/sgdtem.conf` file. Change the value of the `SGDUNIXAUDIODEBUG` environment variable in this file, as follows:

```
SGDUNIXAUDIODEBUG=1; export SGDUNIXAUDIODEBUG
```

To obtain debug logging output, the user must start a new instance of the application. Suspending and resuming the application does not generate any output, as this does not start a new instance of the SGD audio daemon.

The debug logging output goes to the `/opt/tta_tem/var/log/sgdaudio`*PID*`.log` file.

Copy and Paste

This section describes how to configure and control access to copy and paste for applications displayed through SGD. Common problems with copy and paste are also described.

This section includes the following topics:

Using Copy and Paste

Users can copy and paste *text* between applications displayed through SGD. Users can also copy and paste text between applications running on a client device and applications displayed through SGD. SGD supports the copy and paste of Unicode characters.

Users can only copy and paste *graphics* to or from Microsoft Windows 2000 or later applications.

For *Windows applications* and *X applications*, you copy and paste by using the normal method for the application you are copying from, and then the normal method for the application you are pasting to.

For *character applications*, click with the right mouse button, and then choose Copy or Paste as appropriate. To select a column of text in a character application, hold down the Shift key while selecting the text.

If a user attempts a copy and paste operation that is not permitted, for example because of differing security levels, they paste the following message instead of the copied data: `Sun Secure Global Desktop Software: Copied data not available to this application`

SGD Administrators have full control over copy and paste operations in Windows applications and X applications. See "Controlling Copy and Paste in Applications" on page 281.

Controlling Copy and Paste in Applications

In the Administration Console, you can control copy and paste operations for Windows applications and X applications displayed through SGD by doing the following:

- Configuring global copy and paste settings for the SGD array
- Configuring copy and paste for specific users
- Configuring copy and paste for specific applications

Configuring Global Copy and Paste Settings for the SGD Array

On the Global Settings → Client Device tab, copy and paste for SGD as a whole can be enabled or disabled. By default, copy and paste is enabled.

The Client's Clipboard Security Level attribute can be used to assign a security level to the SGD Client. Data can only be copied from SGD to applications running on the client device if the SGD Client has the same security level or higher as the source application. This enables SGD Administrators to secure the flow of data outside of SGD. The default Client's Clipboard Security Level is 3.

Configuring Copy and Paste for Specific Users

On the Client Device tab for organization, organizational unit, or user profile objects, the Copy and Paste attribute can be used to control which users in the organization are allowed to use copy and paste.

The setting for this attribute can be inherited from a parent object in the organizational hierarchy, so that SGD Administrators can enable or disable copy and paste for many users without having to edit each user profile object. By default, copy and paste is enabled.

Configuring Copy and Paste for Specific Applications

On the Client Device tab for Windows application and X application objects, the Copy and Paste attribute can be used to enable or disable copy and paste operations to or from the application.

The application can also be assigned a Clipboard Security Level. Users can only copy and paste data to an application displayed through SGD if it has the same security level or higher as the source application. The source application is the application that the data was copied from. This enables SGD Administrators to secure the data available through particular applications. The default security level is 3.

When configuring security levels, the higher the number, the higher the security level.

Note – Character applications displayed through SGD are treated the same as applications running on the client. This is because character applications use the local client clipboard for copy and paste operations.

An Example of Using Clipboard Security Levels

In this example, copy and paste has been enabled for all users in an organization. The Client's Clipboard Security Level attribute is set to 3, the default setting. The following table shows the security levels for applications displayed through SGD.

Application	Application's Clipboard Security Level
XFinance	3
XClaim	4
Write-o-Win	4
Slide-o-Win	2

When an SGD user runs these applications, the following copy and paste operations are allowed.

In This Application	An SGD User Can Paste Data From These Applications
XFinance	• Slide-o-Win. It has a lower security level. • Applications running on the client device. The client device has equal security level.
XClaim	• XFinance and Slide-o-Win. They have a lower security level. • Applications running on the client device. The client device has a lower security level. • Write-o-Win. It has an equal security level.
Write-o-Win	• XFinance and Slide-o-Win. They have a lower security level. • Applications running on the client device. The client device has a lower security level. • XClaim. It has an equal security level.
Slide-o-Win	• Copy and paste is not allowed. All applications and the client device have a higher security level.

Tips on Configuring Copy and Paste

The following are some tips for SGD Administrators who need to configure copy and paste settings for SGD objects.

- To disable copy and paste from applications running on the client device to all applications displayed through SGD, the value of the Client's Clipboard Security Level attribute must be *higher than* the highest value of the Application's Clipboard Security Level attribute of any application in the organizational hierarchy.

- To disable copy and paste from all applications displayed through SGD to applications running on the client device, the value of the Client's Clipboard Security Level attribute must be *lower than* the lowest value of the Application's Clipboard Security Level attribute of any application in the organizational hierarchy.
- To disable all copy and paste operations to or from the client device, deselect the Copy and Paste check box on the Global Settings → Client Device tab in the Administration Console.
- To disable all copy and paste operations for an individual Windows application or X application accessed through SGD, deselect the Copy and Paste check box on the Client Device tab for the application in the Administration Console.
- Inherit the copy and paste settings from other objects in the organizational hierarchy as much as possible. Only enable or disable copy and paste for individual users if you really have to. This simplifies the administration of copy and paste settings.
- For best results when copying and pasting non-ASCII text, run SGD in a UTF-8 locale. If it is not possible to do this and UTF-8 locales are installed on the SGD host, you can specify a UTF-8 locale by setting the `TTA_TEXTCONV_LANG` environment variable. For example:

  ```
  TTA_TEXTCONVLANG=en_US.UTF8; export TTA_TEXTCONVLANG
  ```

  You must restart SGD for this environment variable to take effect.

Copy and Paste Troubleshooting

For Windows applications and X applications, users can only copy and paste *text* under the following conditions:

- In the Administration Console, go to the Global Settings → Client Device tab, copy and paste for SGD as a whole must be enabled. Copy and paste is enabled by default.
- The user must be allowed to copy and paste. If the Copy and Paste attribute on the Client Device tab for the user profile is selected, then the user can copy and paste. This attribute might be configured to use the setting of any parent organizational unit or organization object. Copy and paste is enabled by default.
- To be able to paste data to another Windows application or X application displayed through SGD, the *source application* must have an Application's Clipboard Security Level that is lower than, or equal to, the *target application*. The source application is the application the data is copied from. The target application is the application the data is pasted to. The default security level is 3.

- To be able to paste data to an application running on the client device, the source application must have an Application's Clipboard Security Level that is lower than, or equal to, the Client's Clipboard Security Level. The Client's Clipboard Security Level is shown on the Global Settings → Client Device tab of the Administration Console. The default Client's Clipboard Security Level is 3.

If these conditions are not met, users paste the following message, instead of the copied data: `Sun Secure Global Desktop Software: Copied data not available to this application`

For Windows applications, users you can only copy *graphics* from, or paste graphics to, Microsoft Windows 2000 or later applications.

To copy and paste Unicode text in X applications, the X application must support Unicode. CDE and Motif applications, for example, do not support Unicode.

Smart Cards

This section describes how to configure smart cards for Windows applications displayed through SGD.

This section includes the following topics:

Using Smart Cards With Windows Applications

SGD enables users to access a smart card reader attached to their client device from applications running on a Windows Server 2003 or later application server. Users can do the following:

- Use a smart card to log in to a Windows Server 2003 or later application server.

- Access the data on a smart card while using an application running on a Windows 2003 Server or later application server. For example, to use a certificate for signing or encrypting an email.

Note – Windows 2000 Server application servers do not support smart card device redirection.

See "Smart Cards Supported by SGD" on page 286 for details of the smart cards that have been tested successfully with SGD.

Smart Cards Supported by SGD

SGD works with any Personal Computer/Smart Card (PC/SC)-compliant smart card and reader.

Logging in to a Windows Server 2003 application server using a smart card has been tested successfully with the smart cards listed in the following table.

Client Operating System and Libraries	Smart Card
Microsoft Windows XP Vista	ActivCard 64K CryptoFlex 32K GemPlus GPK16000
Microsoft Windows XP Professional	ActivCard 64K CryptoFlex 32K GemPlus GPK16000
Microsoft Windows 2000 Professional	ActivCard 64K CryptoFlex 32K GemPlus GPK16000
Solaris OS with Sun Ray™ thin client PC/SC Bypass package (`SUNWsrcbp`)	ActivCard 64K CryptoFlex 32K
Fedora Linux with `pcsc-lite 1.2.0`	ActivCard 64K CryptoFlex 32K GemPlus GPK16000

Setting Up Access to Smart Cards

SGD Administrators can give users access to smart card readers from Windows applications displayed through SGD. Setting up access to smart cards involves the following configuration steps:

1. Enable smart card services on the application server.

   See "Configuring the Microsoft Windows Application Server for Smart Cards" on page 287.

2. Enable access to smart cards for SGD users.

   See "Enabling Smart Cards in SGD" on page 288.

3. Configure a smart card reader on the client device.

   See "Configuring Smart Card Readers on Client Devices" on page 288.

4. Log in to the application server using the smart card.

   See "How to Log In to a Microsoft Windows Application Server With a Smart Card" on page 290.

Configuring the Microsoft Windows Application Server for Smart Cards

To configure the Microsoft Windows application server for smart cards, do the following:

- Deploy smart cards on the Microsoft Windows Server domain.

  See Planning a Smart Card Deployment for the main configuration steps involved when deploying smart cards.

- Check that smart card device redirection is enabled for Terminal Services on the Microsoft Windows Server 2003 or later application server. See "Smart Card Device Redirection" on page 165.
- Ensure that smart cards are working before introducing SGD.

See also "Using Smart Cards With Windows Applications" on page 285.

Application Server Authentication Dialog Settings

In the Administration Console, the Global Settings → Application Authentication tab has several attributes that control the behavior of the Application Server Authentication dialog when using the SGD smart card service.

The Smart Card Authentication check box controls whether users get the choice of logging in with a smart card or only with a user name and password.

The "Always Use Smart Card" Box attributes enable you to control whether a user's decision to log in with a smart card is remembered, or *cached*, for the next time they log in to that application server, and whether they can change this setting.

Note – Users can only choose an authentication method, or to cache the smart card decision, if they have access to the Application Server Authentication dialog. If you disable the ability to use Shift-click, this restricts user access to the Application Server Authentication dialog. See "Users Can Start Applications With Different User Names and Passwords" on page 124.

Enabling Smart Cards in SGD

SGD must be configured in order to support user access to smart cards.

▼ How to Enable Smart Cards in SGD

1. **Check that the SGD smart card service is enabled.**

   In the Administration Console, go to the Global Settings → Client Device tab, ensure the Smart Card check box is selected.

   The smart card service is enabled by default.

2. **Ensure that Windows applications that require smart cards are configured to use Microsoft RDP Protocol as the Windows Protocol (`--winproto`).**

3. **Ensure that smart card authentication is enabled.**

   Smart card authentication is enabled by default.

   In the Administration Console, go to the Global Settings → Application Authentication tab, ensure the Smart Card Authentication check box is selected.

   The Global Settings → Application Authentication tab has other settings that affect the behavior of the Always Use Smart Card check box on the Application Server Authentication dialog. See "Application Server Authentication Dialog Settings" on page 287.

Configuring Smart Card Readers on Client Devices

SGD works with PC/SC-compliant cards and readers. See the PC/SC Workgroup web site for more information.

The smart cards supported by SGD are listed in "Smart Cards Supported by SGD" on page 286.

Microsoft Windows Client Devices

On Microsoft Windows client devices, you must install the smart card reader and any required drivers on the client device to make the smart card available to Terminal Services sessions running through SGD.

Linux Platform and Solaris OS Client Devices

On Linux platform and Solaris OS client devices, a PCSC-Lite library must be installed for SGD to communicate with smart card readers. PCSC-Lite provides an interface to the PC/SC framework on UNIX and Linux platforms.

For Linux platform client devices, PCSC-Lite is available from the following locations:

- Your Linux platform vendor. For example, for Fedora you can download the package from the Fedora web site.
- The MUSCLE project.

PCSC-Lite version 1.2.0 or later is required.

For Solaris OS client devices, PCSC-Lite compatible libraries are available in the following packages:

- The PC/SC Shim for SCF package (`PCSCshim`)
- The Sun Ray PC/SC Bypass package (`SUNWsrcbp`)

The PC/SC Shim for SCF package enables you to use a PC/SC application with the Solaris Card Framework (SCF) and work with Sun internal readers and Sun Ray readers. Version 1.1.1 or later is required. PC/SC Shim is included with Solaris 10. For other Solaris versions, PC/SC Shim is available from the MUSCLE project.

The Sun Ray PC/SC Bypass package provides a PCSC-Lite interface for the Sun Ray reader. Make sure you have the latest patches for Sun Ray Server Software and the latest `SUNWsrcbp` package.

SGD clients require the PCSC-Lite `libpcsclite.so` library file. This is normally installed in `/usr/lib`, but the location depends on your dynamic linker path. If this file is installed outside of the dynamic linker path, or you want to use a different library file, use the `TTA_LIB_PCSCLITE` environment variable to specify the location. This can be set either in the user's environment or in the login script.

▼ How to Log In to a Microsoft Windows Application Server With a Smart Card

1. **Log in to SGD.**
2. **On the webtop, click the link to start the Windows application.**
3. **When the Application Server Authentication dialog displays, click Use smart card.**
4. **To always use a smart card to log in, click the Always use smart card box.**
5. **When the Windows security dialog displays, insert your smart card.**
6. **When prompted, enter your PIN.**

Troubleshooting Smart Cards

For information about configuring SGD to use smart cards with Windows applications see "Using Smart Cards With Windows Applications" on page 285.

If users find they are unable to use their smart cards with Windows applications, use the following checklist to resolve the problem.

Is the application running on a Microsoft Windows Server 2003 or later application server?

Only Microsoft Windows Server 2003 or later application servers support smart card device redirection.

Check that smart card device redirection been enabled for Terminal Services on the Microsoft Server.

Does the Windows application use Microsoft RDP as the Windows Protocol?

In the Administration Console, go to the Launch tab for the Windows application object and check that the Windows Protocol attribute is set to Microsoft RDP Protocol.

Are smart card services enabled for all SGD servers in the array?

In the Administration Console, go to the Global Settings → Client Device tab, ensure the Smart Card check box is selected.

In the Administration Console, go to the Global Settings → Application Authentication tab, ensure the Smart Card Authentication check box is selected.

Is the client device configured correctly?

On *Microsoft Windows* client platforms, do the following:

- Check that the smart card reader is listed in the Windows Device Manager.
- Check that the smart card service is running on the client. Click Start Menu → Programs → Administrative Tools → Services.
- Check that the SGD Client has detected the smart card reader and card. Click the right mouse button on the SGD icon in the Windows system tray and select Connection info. The Smart card reader property lists the details in the format *reader*:*ATR_string* where *reader* is the manufacturer and model of the smart card reader and *ATR_string* is the Automatic Terminal Recognition (ATR) string, a sequence of hexadecimal numbers used to identify the card to the system.

On *Linux* platforms, do the following:

- Check that the PCSC daemon, `pcscd`, is running. For example, you can use the following command:

```
# /sbin/service pcscd status
```

- Try restarting the PCSC daemon with a `--debug stdout` option. Insert the smart card in the reader and see if the reader and card are detected.

On *Solaris OS* platforms, do the following:

- If you are using the PC/SC Shim for SCF package, check that the OCF server, `ocfserv`, is running. If it is not running, use the following command to enable the OCF server:

```
# svcadm enable svc:/network/rpc/ocfserv
```

- If you are using the Sun Ray PC/SC Bypass package, check the Sun Ray Server Software configuration.

Are there any error messages listed in the log file?

Smart card device access data and error messages are stored in the SGD Client log file. This data is displayed in the Detailed Diagnostics page of the SGD webtop.

Serial Ports

This section describes how to set up access to serial ports for Windows applications displayed through SGD.

This section includes the following topics:

Setting Up Access to Serial Ports

Setting up access to serial ports involves the following configuration steps:

1. Enable COM port mapping on the application server.

   See "Configuring the Microsoft Windows Application Server" on page 292.

2. Enable access to serial ports for SGD users.

   See "Enabling Serial Port Access in SGD" on page 292.

3. Configure the client device for serial port access.

   See "Configuring the Client Device" on page 293.

Configuring the Microsoft Windows Application Server

You can only access serial ports in Microsoft Windows Server 2003 or later Terminal Services sessions. See "COM Port Mapping" on page 165.

To access serial ports, Windows application objects must be configured to use the Microsoft RDP protocol.

Enabling Serial Port Access in SGD

Access to serial ports is enabled for all users by default. If it is disabled, you can enable access to serial ports for all users, or for specific users.

When a user starts a Windows application, SGD checks the user profile for the user and then any parent object further up the organizational hierarchy to see whether access to serial ports is enabled or disabled. If all the objects checked are configured to use the parent's setting, then the global setting is used.

▼ How to Enable Access to Serial Ports

1. **In the Administration Console, go to the Global Settings → Client Device tab and select the Serial Port Mapping check box.**

   The Serial Port mapping check box is enabled by default.

2. **(Optional) In the Administration Console, go to the Client Device tab for an organization, an organizational unit, or a user profile object.**

   a. **Select the Override Parent's Settings or Override Global Settings check box.**

   b. **Set the Serial Port Mapping attribute.**

      To enable access to serial ports, select the Enabled check box. To disable access to serial ports, deselect the Enabled check box.

   If you configure an organization or organizational unit object, this affects all the users in that organization or organizational unit.

Note – The changes made only take effect for new user sessions.

Configuring the Client Device

To determine the serial ports that are mapped in the Windows Terminal Services session, you might have to configure the client device.

On *UNIX* and *Linux* client platforms, users must have read and write access to any serial device that is mapped. SGD uses the *first match* of the following:

1. The serial ports listed in the `SUN_MAP_SERIALPORTS` environment variable.

   Each serial port in the list is separated with a semi-colon and has the format `serial device=`*com-port-name*. For example:

   ```
   /dev/ttyS0=COM1;/dev/ttyS4=COM8
   ```

   The *=com-port-name* part is optional, but if it is omitted the serial port is mapped to COM*x* in the Windows application session, where *x* is the position of the serial port in the list.

2. The serial ports listed in the user's client profile.

   The `<serialports>` entry in the `<localsettings>` section of the user's client profile lists the serial ports to be mapped. See "Client Profile Settings" on page 310.

   The `<serialports>` entry has to be added manually.

   The serial ports are listed in the same format as above.

Caution – If a user has not edited their client profile, any manual changes made to the `profile.xml` file are lost when the user next logs in.

3. The serial port listed in the `SUN_DEV_SERIAL` environment variable.

   This is a single serial device, for example `/dev/ttyS2`. This is always mapped to COM1 in the Windows application session.

On *Microsoft Windows* client platforms, SGD uses the *first match* of the following:

1. The serial ports listed in the user's client profile.

   The `<serialports>` entry in the `<localsettings>` section of the user's client profile lists the serial ports to be mapped. See "Client Profile Settings" on page 310.

   The `<serialports>` entry has to be added manually.

   Each serial port in the list is separated with a semi-colon and has the format `serial device=`*com-port-name*.

   ```
   COM1=COM5;COM2=COM8
   ```

   The *=com-port-name* part is optional, but if it is omitted the serial port is mapped to COM*x* in the Windows application session where *x* is the position of the serial port in the list.

Caution – If a user has not edited their client profile, any manual changes made to the `profile.xml` file are lost when the user next logs in.

2. Any available COM1 to COM9 ports.

   The SGD Client attempts to open ports COM1 to COM9. If a COM port is found, it is mapped to the same COM port number in the Windows application session.

CHAPTER 5

SGD Client and Webtop

This chapter describes how to install, configure, and run the Sun Secure Global Desktop (SGD) Client. Webtop configuration is also covered.

This chapter includes the following topics:

Supported Client Platforms

The following table lists the supported client platforms for the SGD Client. Also included are the supported browsers, and the supported desktop menu systems when the SGD Client is operating in Integrated mode.

Supported Client Platform	Supported Browsers	Integrated Mode Support
Microsoft Windows Vista	Internet Explorer 7.0+ Mozilla Firefox 2.0+	Microsoft Windows Start Menu
Microsoft Windows XP Professional	Internet Explorer 6.0+, 7.0+ Mozilla Firefox 2.0+	Microsoft Windows Start Menu
Microsoft Windows 2000 Professional	Internet Explorer 6.0+ Mozilla Firefox 2.0+	Microsoft Windows Start Menu
Solaris 8+ OS on SPARC platforms	Mozilla Firefox 2.0+	Sun Java Desktop System Launch Menu

Supported Client Platform	Supported Browsers	Integrated Mode Support
Solaris 10 OS Trusted Extensions on SPARC platforms	Mozilla Firefox 2.0+	Not supported
Solaris 10 OS on x86 platforms	Mozilla Firefox 2.0+	Sun Java Desktop System Launch Menu
Mac OS X 10.4+	Safari 2.0+ Mozilla Firefox 2.0+	Not supported
Fedora Linux 8 (Intel x86 32-bit)	Mozilla Firefox 2.0+	Gnome or KDE Start Menu
Red Hat Desktop version 5	Mozilla Firefox 2.0+	Gnome or KDE Start Menu
SUSE Linux Enterprise Desktop 10	Mozilla Firefox 2.0+	Gnome or KDE Start Menu
Ubuntu 7.04	Mozilla Firefox 2.0+	Gnome Start Menu

Beta versions or preview releases of browsers are not supported.

Browsers must have the JavaScript™ programming language enabled.

To support the following functionality, browsers must have Java technology enabled:

- Downloading and installing the SGD Client automatically
- Determining proxy server settings from the user's default browser

If Java technology is not available, the SGD Client can be downloaded and installed manually.

The following are the supported plug-ins for Java technology:

- Sun Java Plug-in tool version 1.6.0
- Sun Java Plug-in tool version 1.5.0

Note – Sun Java Plug-in tool version 1.6.0 is the *only* supported plug-in for Microsoft Windows Vista platforms.

When users start more than one user session using the same client device and browser, the user sessions join rather than the new session ending the existing session. For user sessions to join in this way, the browser must be configured to allow permanent cookies. If permanent cookies are not allowed, user sessions always end and this might cause application windows to disappear.

For best results, client devices must be configured for at least 256 colors.

The SGD Client

The SGD Client is the part of SGD that is installed on client devices. The SGD Client is required to run applications.

This section includes details of how you can install and run the SGD Client.

This section includes the following topics:

Overview of the SGD Client

The SGD Client can operate in either of the following ways:

- **Using a browser.** You can use a browser to display a special web page, called a *webtop*. The webtop lists the applications a user can run through SGD and provides controls for managing application sessions and printing. This is the default way of using SGD.

  See the *Sun Secure Global Desktop 4.41 User Guide* for more details about the webtop.

- **Integrated mode.** The list of applications that a user can run through SGD is shown in the desktop Start or Launch Menu on the client device. Using Integrated mode enables users to run remote applications in the same way as local applications. Depending on other configuration factors, users might not need to use a browser.

  See "Integrated Mode" on page 315 for more details.

Depending on the client platform, users see an icon in the System tray or Workspace switcher when the SGD Client is running.

The SGD Client performs the following functions:

- Gets information about the client device, such as the operating system, local printers, and client drives.
- Manages the display of applications.
- Maintains a communication connection with the SGD server, using the Adaptive Internet Protocol (AIP) protocol.

- Receives and acts on events from the SGD server. For example, the arrival of a print job.

Configuring the SGD Client

The SGD Client needs to be configured so that it can connect to an SGD server. The connection settings for the SGD Client are defined in a *client profile*. The client profile is stored on the client device.

The client profile controls things such as the Uniform Resource Locator (URL) that the SGD Client connects to when it starts, and the operating mode of the SGD Client.

See "Client Profiles" on page 306 for more information about how SGD uses client profiles and the settings you can configure for a client profile.

The SGD Client Helper

When using a browser with Java technology enabled, the SGD Client is supported by the *SGD Client Helper*.

The SGD Client Helper is a Java applet that performs the following functions:

- Downloads and installs the SGD Client. This only applies if automatic installation is used. See also "Automatic Installation of the SGD Client" on page 299.
- Obtains proxy server settings from the browser and sends them to the SGD Client. This depends on the settings in the user's client profile.
- Starts the SGD Client. This only happens when a user starts a browser and goes to the login URL.
- Responds to instructions received from the SGD Client. For example, prompting the browser to redraw the screen.

Use of the SGD Client Helper is optional. See "How to Access SGD Without Using Java Technology" on page 305.

Installing the SGD Client

The SGD Client can be installed in the following ways:

- **Automatic installation.** Download and installation of the SGD Client can be handled automatically, using a browser with Java technology enabled. See "Automatic Installation of the SGD Client" on page 299.
- **Manual installation.** The SGD Client can be downloaded to the client device and installed manually. See "Manual Installation of the SGD Client" on page 300.

Automatic Installation of the SGD Client

If you are using a browser with Java technology enabled, the SGD Client is installed automatically when you visit the `http://`*server.example.com*`/sgd` URL, where *server.example.com* is the name of an SGD server.

Note – If you use Internet Explorer on Microsoft Windows Vista platforms, you must add the SGD server to the list of Trusted Sites in Internet Explorer's Security Settings before the SGD Client can be automatically downloaded and installed.

With automatic installation of the SGD Client, different versions of the SGD Client are installed in separate directories. This means the following:

- Users only have to log in to an upgraded SGD server in order to upgrade the SGD Client
- Users who log in to different SGD servers always run the correct SGD Client for the version of SGD

The SGD Client is installed in the following directories:

- **Microsoft Windows client devices.** A user-specific writeable directory. For example:

  `C:\Documents and Settings\`*username*`\Local Settings\Temp\tcc\`*version*

  The actual location depends on the user's privileges, the operating system, and the version of the Java Plug-in tool being used.

  Users with Microsoft Windows client devices can have *roaming user profiles*. Roaming user profiles provide the user with the same working environment, no matter which Microsoft Windows computer they use.

  If Microsoft Windows users have roaming user profiles, the SGD Client is installed in the following directory:

  `C:\Documents and Settings\`*username*`\Application Data\Temp\tcc\`*version*

  For details of how to configure SGD to work with roaming user profiles, see "How to Enable Automatic Installation for Roaming User Profiles" on page 300.

- **UNIX, Linux, or Mac OS X client devices.** The user's home directory:

  `$HOME/.tarantella/tcc/`*version*

If you want to use automatic installation and have more control over where the SGD Client is installed, you can develop your own web application for installing the SGD Client and use SGD web services to specify the installation location.

See the *Sun Secure Global Desktop 4.41 Installation Guide* for more details about automatic installation of the SGD Client.

▼ How to Enable Automatic Installation for Roaming User Profiles

To enable the SGD Client to be installed automatically in a directory that is roamed, perform the following procedure on each SGD server in the array.

Ensure that no users are logged in to the SGD server, and that there are no application sessions, including suspended application sessions, running on the SGD server.

1. **Log in as superuser (root) on the SGD host.**
2. **Edit the** `webtopsession.jsp` **file.**

   The file is located on the SGD host at:

   ```
   /opt/tarantella/webserver/tomcat/5.0.28_axis1.2/webapps/sgd/resou
   rces/jsp/webtopsession.jsp
   ```

   Change the `tccRoaming` line in `webtopsession.jsp`, as follows:

   ```
   String tccRoaming = "true";
   ```

3. **Restart the SGD Web Server.**

   Use the following command:

```
# tarantella restart webserver
```

Manual Installation of the SGD Client

With manual installation, you have full control over where the SGD Client is installed.

You download and install the SGD Client from the SGD Web Server Welcome page. The SGD Web Server Welcome page is at `http://`*server.example.com*, where *server.example.com* is the name of an SGD server.

Click the Install the Sun Secure Global Desktop Client link on the Welcome page. The Sun Secure Global Desktop Client download page has instructions for downloading and installing the SGD Client.

On Microsoft Windows client devices, the default installation directory is: `C:\Program Files\Sun\Secure Global Desktop Client`. A shortcut for the SGD Client is also added to the Windows Start Menu.

Note – Manual installation is not available for all supported client platforms.

See the *Sun Secure Global Desktop 4.41 Installation Guide* for more details about manual installation of the SGD Client.

Running the SGD Client From the Command Line

Typically, users log in to SGD by starting a browser and visiting the `http://`*`server.example.com`*`/sgd` URL, where *server.example.com* is the name of an SGD server.

Connecting to SGD in this way, automatically downloads and starts the SGD Client. However, you can also start the SGD Client from the command line and connect to an SGD server. From the command line, you can run the SGD Client either using a browser or in Integrated mode.

You start the SGD Client with the `tcc` command on Microsoft Windows client platforms, or the `ttatcc` command on UNIX, Linux, or Mac OS X client platforms, as follows:

```
tcc
  [ -profile name ]
  [ -loginurl url ]
  [ -preferredlanguage lang ]
  [ -logdir file ]
  [ -use-java ]
  [ -version ]
```

The following table lists the supported arguments for the `tcc` and `ttatcc` commands.

Argument	Description
`-profile` *name*	The name of the profile to use when starting the SGD Client. Currently there is only one profile for each SGD server, called Default. To specify the profile for a particular server, use `-profile server.example.com::Default` where `server.example.com` is the name of an SGD server. **Note -** Profile names are case sensitive.
`-loginurl` *URL*	The login URL. This overrides the URL defined in the profile.
`-preferredlanguage` *lang*	The language to use in any dialogs and messages displayed by the SGD Client. This overrides the language defined in the profile. The following are the supported languages: • `en` for English • `fr` for French • `ja` for Japanese • `ko` for Korean • `zh_CN` for Simplified Chinese • `zh_TW` for Traditional Chinese
`-logdir` *file*	The directory where the SGD Client log file is created.
`-use-java`	Enable the detection of Java technology in the SGD Client.
`-version`	Displays the version number of the SGD Client.
`-help`	Displays help information. This option is only available on UNIX, Linux, or Mac OS X client platforms.

Note – The arguments are case-sensitive.

The command line does not allow you to supply a user name and password. However, the SGD Client can be configured to log a user in automatically. This is called *Integrated mode*. See "Setting Up the SGD Client for Integrated Mode" on page 317 for more details.

Command-Line Examples

The command line for the SGD Client can be used to create your own shortcuts and shell scripts.

Note – If either the Connect on System Login or the Add Applications to Start Menu options are enabled in a user's profile, the SGD Client automatically adds shortcuts for itself in the user's desktop Start Menu. "Supported Client Platforms" on page 295 has details of which desktop systems are supported.

The following are some examples of running the SGD Client from the command line.

Starting the SGD Client Without Any Arguments

The following example starts the SGD Client and uses the settings defined in the Default profile, available from the user's profile cache.

```
$ ttatcc
```

If there is no profile, or the profile does not contain a login URL, the SGD Client starts but it cannot connect to an SGD server.

If the user has previously connected to more than one SGD server, the SGD Client connects to the last SGD server the user connected to, using the profile for that server.

Use this command to start the SGD Client if the user always connects to the same SGD server.

Connecting to a Particular SGD Server

The following example starts the SGD Client and uses the settings defined in the profile for *server.example.com*, available from the user's profile cache.

```
$ ttatcc -profile server.example.com::Default
```

If there is no profile available in the cache for *server.example.com*, the SGD Client prompts for connection settings.

Use this command to start the SGD Client if the user might connect to different SGD servers.

Overriding the Login URL

The following example starts the SGD Client and uses the settings defined in the Default profile, available from the user's profile cache, but connects to the specified URL.

```
$ tcc -loginurl url
```

Depending on the URL, this can be used to start an application.

Use this command to start the SGD Client and connect to a single SGD server, but connect to different web applications on that server.

Web Services Developer Options

The SGD Client also supports the following command-line arguments. These arguments are useful only when developing applications with SGD web services.

Argument	Description
`-port` *tcp*	The port on which the SGD Client connects to the SGD server. Usually, this is Transmission Control Protocol (TCP) port 5307 when the user has a secure connection to SGD.
`-baseroute`	The base network route the SGD Client uses to traverse a SOCKS proxy server.
`-firewalltraversal`	Indicates that the SGD server is using firewall traversal. Connections to the SGD server and the webtop both use the same port, usually TCP port 443.
`-connectioncookie` *cookie*	Supplies the cookie used by the SGD server to identify the user session which the SGD Client is being used for.
`-portfile` *file*	The name of a file where the SGD Client writes its listening port number.
`-psn`	For use with Mac OS X client devices only. Ensures an X server is running.
`-server` *server*	The fully-qualified Domain Name System (DNS) name of the SGD server.
`-no-browser`	Do not start a browser when starting the SGD Client.

Note – The arguments are case-sensitive.

Accessing SGD Without Using Java Technology

By default, SGD uses the SGD Client Helper, a Java™ applet, to perform the following functions:

- Download, install, and start the SGD Client
- Obtain proxy server settings from the user's browser

If your organization prefers not to use Java technology, additional configuration is required. You must download the SGD Client manually, install it, and then configure the SGD Client to connect to an SGD server. This is described in the following procedure.

▼ How to Access SGD Without Using Java Technology

1. **Manually download and install the SGD Client.**

   You download the SGD Client from the SGD Web Server Welcome page, for example at `http://`*server.example.com*, where *server.example.com* is the name of an SGD server.

   Click the link to Install the Sun Secure Global Desktop Client.

   The download page and the *Sun Secure Global Desktop 4.41 Installation Guide* have details of how to install the SGD Client.

2. **Start the SGD Client and connect to SGD.**

   a. **Start the SGD Client from the shortcut in the desktop Start menu.**

      The first time you start the SGD Client, it prompts you for the URL to connect to. This is normally `http://`*server.example.com*`/sgd`, where *server.example.com* is the name of an SGD server. The SGD Client also prompts you for the proxy server settings to use.

      When the SGD Client connects, it starts your default browser and displays the SGD login page.

      Alternatively, you can start the SGD Client from the command line. See "Running the SGD Client From the Command Line" on page 301 for more details.

   b. **Log in to SGD.**

      The SGD webtop is displayed.

3. **Edit the profile for your client device.**

   On the webtop, click the Edit button in the Applications area of the webtop. Go to the Client Settings tab and edit the client profile.

   See also "Client Profile Settings" on page 310.

a. **Configure the operating mode of the SGD Client.**

   You can access SGD either by using a browser or by using Integrated mode.

   Integrated mode gives users the best user experience when Java technology is unavailable. Select the Add Applications to Start Menu check box. See also "Integrated Mode" on page 315.

   To use automatic logins to minimize the use of a browser, select the Automatic Client Login check box. See "Authentication Token Authentication" on page 318.

   Whenever the SGD Client needs to display a page in a browser, for example to display a webtop or a login page, it always starts the *default* browser.

   To update the webtop display, users might have to manually reload the page. Alternatively, change the login URL to use the "thin" style webtop, `http://`*server.example.com*`/sgd/thin.jsp`, where *server.example.com* is the name of an SGD server.

b. **Configure the proxy server settings.**

   You must specify the proxy server settings in the profile, because these settings cannot be obtained from the browser. See "Configuring Client Proxy Settings" on page 9.

c. **Click Save.**

Note – SGD Administrators can preconfigure many of these settings for users, by editing the profile for an organization or organizational unit.

---

4. **Log out of SGD.**

Client Profiles

This section includes details on how to manage and configure client profiles for the SGD Client.

This section includes the following topics:

Client Profiles and the SGD Client

A *client profile* is a group of configuration settings that control the SGD Client. The settings in a client profile include the following:

- The URL the SGD Client connects to when it starts. Usually, this is the URL used to log in to SGD.
- The operating mode of the SGD Client. Whether the applications a user can run are displayed on a webtop or in the user's desktop Start or Launch Menu.
- Whether or not the user is logged in automatically to SGD when the SGD Client starts.
- Whether or not the SGD Client starts automatically when the user logs in to their desktop system.
- Proxy server configuration. Whether the proxy settings are manually configured in the profile or determined from the browser.

Note – The SGD Client can only connect to an SGD server if they both have the same major and patch version number. For example, version *4.40.917*.

There is one client profile, a single group of settings, for each SGD server that the user connects to. The profile is downloaded when the user connects to an SGD server. If the SGD Client has been installed manually, the user is prompted for initial connection information the first time the SGD Client is started.

Note – Client profiles are not the same as user profiles. User profiles control webtop content and other SGD-specific settings, such as printing.

This section includes the following topics:

Managing Client Profiles

SGD Administrators manage client profiles with the SGD administration tool, Profile Editor. The Profile Editor tool is only available to SGD Administrators.

SGD Administrators can create, edit, and delete client profiles for the following objects:

- Organization objects
- Organizational unit (OU) objects
- Profile objects in the `System Objects` organization. For example, `System Objects/LDAP Profile`

Each of these objects can only have one client profile. The client profile is stored on the SGD server.

The default system client profile is the profile for the `System Objects` organization. This client profile can be edited, but it cannot be deleted.

Users can edit their own client profiles from the webtop. Click the Edit button in the Applications area of the webtop and then go to the Client Settings tab.

Users can only edit the client profile for the SGD server they are currently connected to. The client profile for a user is stored on the client device, not the SGD server.

Note – Anonymous users cannot edit client profiles. This is because these users are temporary. See "Anonymous User Authentication" on page 83 for more details.

▼ How to Configure Client Profile Editing for Users

1. **Enable profile editing for SGD.**

   Profile editing for SGD is enabled by default.

   a. **In the Administration Console, go to the Global Settings → Client Device tab.**

   b. **In the Profile Editing section, ensure the Editing check box is selected.**

      The check box is selected by default.

Note – If profile editing is disabled, it is disabled for *all* users, including SGD Administrators. However, SGD Administrators can still create and edit client profiles using the Profile Editor application.

---

2. **Configure profile editing in the organizational hierarchy.**

   Profile editing can be configured for organizations, organizational units, or user profiles.

   Profile editing can be inherited from a parent object in the organizational hierarchy, so that SGD Administrators can enable or disable profile editing for many users without having to edit each user profile. By default, profile editing is enabled for all users.

   a. **In the Administration Console, go to the User Profiles tab and select an object in the organizational hierarchy.**

   b. **Go to the Client Device tab.**

   c. **Enable Client Profile Editing as follows:**

      - Select the Override Parent's Setting, or the Override Global Setting check box.

        Selecting this check box allows you to override the profile editing setting from any parent object. For example, profile editing can be disabled for an OU, but enabled for a user profile in that OU.

      - Select the Enabled check box.

        Selecting the check box enables profile editing for the user profile, or for all users in the organization unit or organization.

        The initial state of this check box is the setting of the parent object.

   d. **Click Save.**

Client Profile Settings

The following table lists the settings available in a client profile, with a description of what the setting does.

Setting	Description
Login URL	The SGD URL to use for the profile. This is usually `http://`*server.example.com*`/sgd`, where *server.example.com* is the name of an SGD server. If the user runs SGD by displaying the webtop in a browser, the URL is loaded automatically in the user's default browser, so that they can log in and access their webtop. In Integrated mode, the URL is only loaded in the user's default browser if the user needs to log in to SGD. The URL in a client profile can be overridden by a command-line argument. See "Running the SGD Client From the Command Line" on page 301. The default Login URL is `http://`*server.example.com*`:80/sgd/index.jsp`.
Connect on System Login	If enabled, the SGD Client is started automatically with this client profile whenever the user logs in to their client device. If enabled, the SGD Client creates an application shortcut or symbolic link for itself in the startup folder of the desktop system. The links are created in the following locations: • **Microsoft Windows.** The Windows startup folder for the current user. This is usually *C:*`\Documents and Settings\`*username*`\Start Menu\Programs\Startup` • **KDE.** `$HOME/.kde/autostart` • **Gnome.** `$HOME/.config/autostart` • **Sun Java Desktop System**. `$HOME/.config/autostart` This setting is disabled by default.
Add Applications to Start Menu	Controls how users interact with SGD. If enabled, the applications a user can run are displayed in the desktop Start or Launch Menu on the client device. This is called Integrated mode. Users do not have any of the controls that are available on a webtop, for example controls for suspending and resuming applications. If disabled, the applications a user can run are displayed on a webtop in a browser. This setting is disabled by default.
Automatic Client Login	If enabled, the SGD Client tries to log the user in using an authentication token as soon as it starts. You can only enable this option if the Add Applications to Start Menu setting is enabled. This setting is disabled by default. See "Integrated Mode" on page 315 for more details.

Setting	Description
Alternative PDF Viewer	The application command for an alternative Portable Document Format (PDF) viewer to use with PDF printing. If the application is not on the user's `PATH`, type the full path to the application. This setting only applies to UNIX, Linux, and Mac OS X platform client devices.
Logging	Controls the amount of information that is output to the SGD Client log file. The output is logged to a text file in the same directory as the SGD Client. The default is Errors only.
Preferred Language	The default language to use when the SGD Client is started from the command line. For example, when the SGD Client is in Integrated mode. The language selected is used for messages displayed by the SGD Client, the login dialog, and the webtop. See "Setting the Language for the Webtop" on page 324 for details. The default is en.

Setting	Description
Check for Local X Server	If enabled, the SGD Client checks whether there is an X server running on the client device. Enabling this option can improve performance when starting X applications that are configured to display using an X server on the client device. If a local X server is not available, an independent window is used instead. This setting only applies to Windows client devices. This setting is disabled by default.
Proxy Settings	Settings that control how the SGD Client determines what proxy servers to use. Use Default Web Browser Settings means use the proxy server settings configured in the user's default browser. Manual Proxy Settings enable you to define the proxy server settings in the profile. You can specify an Hypertext Transfer Protocol (HTTP) proxy server. If the proxy settings are determined from a browser, the settings are stored and used the next time the SGD Client starts. If Establish Proxy Settings on Session Start is enabled, the SGD Client obtains the proxy settings from the browser every time it starts. The stored proxy settings are not used. If Automatic Client Login is selected, the Establish Proxy Settings on Session Start setting is disabled. By default, the Use Default Web Browser Settings check box is selected and the Establish Proxy Settings on Session Start check box is not selected.
Connection Failure	Settings that control what the SGD Client does if the connection to an SGD server is lost, whether to always reconnect, to never reconnect, or to ask the user. If the SGD Client reconnects, these settings control how many attempts are made to reconnect and the time in seconds between each attempt. If the SGD Client is unable to reconnect, the user session ends and any running applications are ended or suspended, depending on the resumability setting of the application. The default settings are to Always Attempt to Reconnect, and make 6 attempts at 10 second intervals.

About the Profile Cache

Client profiles created by SGD Administrators are stored on the SGD server where they are created. The profiles are then copied to all the SGD servers in the array, so that they are available for editing on any SGD server.

When a user first logs in to SGD, the SGD Client downloads the client profile to a profile cache on the client device. The client profile that is downloaded is the first match of the following:

- The client profile defined for a user profile object in the System Objects organization that is assigned to the user. For example, if the user is authenticated using LDAP authentication and a client profile exists for the `System Objects/LDAP Profile` object, this is the profile that is downloaded.
- The client profile defined by an SGD Administrator for the organizational unit or organization to which the user belongs. If there is no client profile for the user's organizational unit, SGD checks any parent object further up the organizational hierarchy to see whether they have a client profile.
- The system default client profile defined for the `System Objects` object.

When a user edits and saves a client profile, they override the client profile defined by an SGD Administrator, or the system default client profile, and create a user-specific client profile that is only saved in the profile cache on the client device.

Note – Users must log out of SGD and log in again for changes to their client profile to take effect.

The profile cache is specific to each user who logs in to SGD from the client device and is stored in the following locations:

- **UNIX, Linux, and Mac OS X platform client devices –** `$HOME/.tarantella/tcc/profile.xml`
- **Microsoft Windows client devices –** *C:*`\Documents and Settings\`*username*`\Local Settings\Application Data\Sun\SSGD\profile.xml`

Note – If the user has a roaming user profile, see "How to Enable Automatic Installation for Roaming User Profiles" on page 300.

The same profile cache is used by the SGD Client, whether it has been installed manually or automatically.

The profile cache is updated each time the user edits a client profile, or each time the user logs in, if they are using the client profile defined by an Administrator.

Caution – If a user has not edited their client profile, any manual changes made to the `profile.xml` file are lost when the user next logs in.

The profile cache contains one client profile for each SGD server the user connects to.

Users can restore a client profile to the default settings by editing the client profile and clicking the Reset button. This resets the client profile to the settings defined for the system default client profile on the `System Objects` object.

Microsoft Windows Users With Roaming User Profiles

Users with Microsoft Windows client devices can have *roaming user profiles*. Roaming user profiles provide the user with the same working environment, no matter which Microsoft Windows computer they use. If Microsoft Windows users have roaming user profiles, the SGD client profile is automatically adjusted to allow for this, as follows:

- Settings specific to the user's client device, for example the proxy server configuration, are stored on the client device.

  By default, this is *C:*`\Documents and Settings\`*username*`\Local Settings\Application Data\Sun\SSGD\profile.xml`

- Settings specific to the user, for example the preferred language, are stored in the location of the roaming user profile.

  Usually, this is *C:*`\Documents and Settings\`*username*`\Application Data\Sun\SSGD\profile.xml`

Note – This location also contains the user's `hostsvisited` and `certstore.pem` files.

The following settings from the SGD client profile are stored in the location of the user's roaming profile:

Setting	Profile Entry
Login URL	`<url>`
Add Applications to Start Menu	`<mode>`
Automatic Client Login	`<autologin><AT>`
Connect on System Login	`<autostart>`

Connection Failure	`<reconnect_mode>`
	`<reconnect_attempts>`
	`<reconnect_interval>`

The settings that are stored with the user's roaming profile are controlled by the `/opt/tarantella/var/serverconfig/local/roamingattributes.properties` file.

Roaming user profiles are not enabled by default. See "How to Enable Automatic Installation for Roaming User Profiles" on page 300 for details of how to configure SGD to use roaming profiles.

Integrated Mode

This section describes how you can access SGD from the desktop Start or Launch Menu on the client device. Operating SGD in this way is called *Integrated mode*.

When users first connect to an SGD server, they usually start a browser and go to the `http://`*server.example.com*`/sgd` URL, where *server.example.com* is the name of an SGD server. They can then log in to SGD and display a webtop. However, once users have logged in, the SGD Client can be configured to use Integrated mode.

When the SGD Client operates in Integrated mode, the links for starting applications are displayed in the desktop Start or Launch Menu, instead of on the webtop. This means that users can run remote applications in the same way as local applications. Depending on how you configure Start Menu integration, there might be no need to use a browser.

Use Integrated mode if your organization prefers not to use Java™ technology on the client device. See also "Accessing SGD Without Using Java Technology" on page 305.

Note – See "Supported Client Platforms" on page 295 for details of the desktop systems that are supported for Integrated mode.

This section includes the following topics:

Working in Integrated Mode

When the SGD Client is in Integrated mode, the user logs in to SGD by clicking the Login link on their desktop Start or Launch Menu.

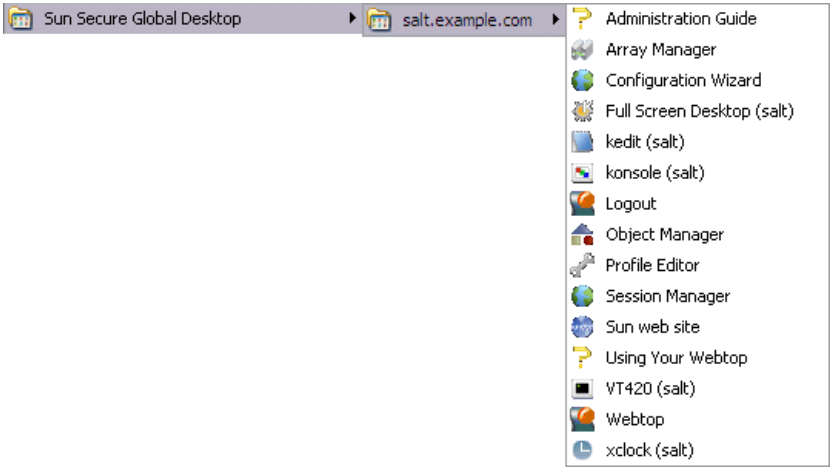
FIGURE 5-1 Logging In From the Desktop Start Menu

If the user has logged in to more than one SGD server, there is a Login link for each server in the Start or Launch Menu.

Note – To use Integrated mode, you must log in using the Start or Launch Menu. Integrated mode is not available if you start a browser and log in.

Once the user has logged in to SGD, the Start or Launch Menu is updated with the links for the applications they can run through SGD.

FIGURE 5-2 Application Links in the Desktop Start Menu



To start an application, the user clicks the application's link on the Start or Launch Menu. To start another instance of the application, the user clicks the link again.

Working in Integrated mode simplifies session management. Unlike the webtop, there are no controls for suspending and resuming applications. Instead, when the user logs out, the SGD Client automatically suspends or ends all running application sessions. When the user logs in again, the SGD Client automatically resumes all suspended sessions.

In Integrated mode, users *cannot* start applications with a different user name and password, by pressing and holding down the Shift key when clicking the application's link. See "Users Can Start Applications With Different User Names and Passwords" on page 124.

Printing is simplified too. Printing is always "on" and print jobs go straight to the printer the user has selected. Unlike the webtop, print jobs cannot be managed individually.

If the user needs to display a webtop, for example to be able to edit their profile, resume a suspended application, or manage printing, they can click the Webtop link on the Start Menu. The user is not prompted to log in, as they already have a user session. The webtop is displayed in their default browser.

If the user has arranged any of their webtop content to display in groups, those groups are also used in the Start or Launch Menu. If the group is configured to hide webtop content, the content does not display in the Start or Launch Menu.

To log out of SGD, the user clicks the Logout link on the Start or Launch Menu.

Setting Up the SGD Client for Integrated Mode

Setting up Integrated mode for the SGD Client involves the following configuration steps:

1. Enable at least one other authentication mechanism.

   The user must log in and be authenticated by another authentication mechanism so that SGD can store a user identity and user profile when the user generates an authentication token.

   You can use third-party authentication, or any of the other system authentication mechanisms, apart from anonymous user authentication.

   See "Secure Global Desktop Authentication" on page 63.

2. Configure SGD for authentication token authentication.

   In Integrated mode, if you configure the SGD Client to log in users in automatically to SGD, an authentication token is used to authenticate the user.

   See "Authentication Token Authentication" on page 318.

3. Enable client profile editing.

   Client profile editing must be enabled, to allow users to generate authentication tokens. You can enable profile editing for all users, or just for users that require authentication tokens.

   See "How to Configure Client Profile Editing for Users" on page 308.

4. Configure the client profile for Integrated mode.

   Integrated mode must be enabled in the client profile. Other settings in the client profile also affect how Integrated mode works.

   See "Configuring the Client Profile for Integrated Mode" on page 322.

5. Applications might have to be configured to give users the best experience.

   See "Configuring Applications for Integrated Mode" on page 323.

Authentication Token Authentication

Authentication token authentication enables users to log in to SGD if the SGD Client submits a valid authentication token.

Authentication token authentication can only be used when the SGD Client is operating in Integrated mode and a user has an authentication token.

Authentication token authentication is disabled by default.

This section includes the following topics:

How Authentication Token Authentication Works

When the SGD Client starts, it submits an authentication token to SGD. The user does not enter a user name or password.

If the authentication token is invalid or the SGD Client does not submit a token, the user is not logged in. The SGD login screen is displayed in a browser, so that the user can log in using another system authentication mechanism.

If the SGD Client submits a valid authentication token, the user is logged in.

User Identity and User Profile

The SGD server stores the authentication token against the identity of the user when they generated their authentication token. This means the user identity and user profile used are those of the authentication mechanism that originally authenticated the user. See Chapter 2 for details of the SGD authentication mechanisms.

Authentication Tokens and Security

When a user generates an authentication token and saves their client profile, the SGD server sends the authentication token to the SGD Client. The SGD Client stores the token in the profile cache on the client device. See "About the Profile Cache" on page 312.

To ensure an authentication token cannot be intercepted and used by a third party, use secure HTTPS web servers and enable SGD security services.

When a user generates an authentication token, SGD maintains a record of the tokens issued in a *token cache*. SGD stores the authentication token using the current identity of the user when the token was generated.

When a user logs in with an authentication token, the authentication token enables SGD to "remember" the user's original identity and user profile. All user sessions and application sessions are managed using the original user identity and user profile.

If the original login becomes invalid, for example because the UNIX system account is disabled or the password has expired, the user can still log in automatically if they have a valid token. However, they cannot run any applications using the invalid credentials.

▼ How to Enable Authentication Token Authentication

1. **In the Administration Console, display the Secure Global Desktop Authentication Configuration Wizard.**

   On the Global Settings → Secure Global Desktop Authentication tab, click the Change Secure Global Desktop Authentication button.

2. **On the Third-Party/System Authentication step, ensure the System Authentication check box is selected.**

3. **On the System Authentication - Repositories step, select the Authentication Token check box.**

4. **On the Review Selections step, check your authentication configuration and click Finish.**

   The Secure Global Desktop Authentication Configuration Wizard closes.

5. **On the Secure Global Desktop Authentication tab, select the Token Generation check box.**

6. **Click Save.**

Administering Authentication Tokens

SGD Administrators can use the Administration Console or the `tarantella tokencache` command to administer authentication tokens. The following administration tasks can be done:

- Viewing the tokens in the token cache

- Deleting tokens from the token cache
- Preventing users from generating new tokens

If token generation is enabled, users can generate a new authentication token from the webtop.

▼ How to View Authentication Tokens

You can view the entries in the token cache that belong to a particular user identity or user profile.

- **Use the Administration Console to view the authentication tokens for a user.**
  - On the Caches → Tokens tab, use the search to find a user identity if needed.
  - On the Sessions tab, click a user identity and then click the Token tab.
  - On the User Profiles tab, select a user profile and then click the Tokens tab.

Tip – On the command line, you can use the `tarantella tokencache list` command to show all entries in the token cache.

▼ How to Delete Authentication Tokens

Deleting a token from the token cache makes the token stored on a client device invalid. If the SGD Client presents an invalid token, the user is prompted to log in with a user name and password. The user must then generate another authentication token if they want to log in automatically.

- **Use the Administration Console to delete authentication tokens.**
  - On the Caches → Tokens tab, use the search feature to find a user identity, if needed.

    Select the check box next to a token and click Delete.
  - On the User Sessions tab, click a user identity and then go to the Token tab.

    Click Delete.
  - On the User Profiles tab, click a user profile and then go to the Tokens tab.

    Select the check box next to a token and click Delete.

Tip – On the command line, you can use the `tarantella tokencache delete` command to delete token cache entries.

Tip – You can run the `tarantella tokencache delete` command on any SGD server in the array. The change is replicated to the other servers in the array.

▼ How to Disable Token Generation

Use this procedure to prevent SGD from issuing new authentication tokens. If authentication token authentication is still enabled, users with existing authentication tokens can still log in to SGD.

1. **In the Administration Console, go to the Global Settings → Secure Global Desktop Authentication tab.**

   Deselect the Token Generation check box and click Save.

2. **(Optional) On the command line, use the following command:**

```
$ tarantella config edit --login-autotoken 0
```

▼ How to Generate a New Authentication Token

If a user needs to generate a new authentication token, they must edit their client profile.

1. **Click the Edit button in the Applications area of the webtop and then go to the Client Settings tab.**
2. **Clear the Automatic Client Login box.**
3. **Click Save.**
4. **Check the Automatic Client Login box.**
5. **Click Save.**

   See "Setting Up the SGD Client for Integrated Mode" on page 317 for more details about using an authentication token to log in to SGD.

Troubleshooting Automatic Logins

To troubleshoot problems with automatic logins, use the following log filters:

`server/login/*:`*destination*
`server/tokencache/*:`*destination*

where *destination* is a log file or log handler.

The `server/login/*` filter enables you to see when authentication tokens are used for authentication and when they fail.

The `server/tokencache/*` filter enables you to see errors with operations on the token cache. For example, to see why a token is not added to the token cache.

See "Using Log Filters to Troubleshoot Problems With an SGD Server" on page 369 for more information on configuring and using SGD log filters.

Configuring the Client Profile for Integrated Mode

The following settings in a client profile are applicable when using Integrated mode.

Setting	Description
Add Applications to Start Menu	Enables Integrated mode. Causes the SGD Client to add icons to the user's desktop Start or Launch Menu.
Automatic Client Login	Enables automatic logins to SGD. If this is disabled, users must log in with a browser. This means they see a webtop *and* have applications in their desktop Start or Launch Menu. If this is enabled, an authentication token is generated when the client profile is saved. Only users can select this check box.
Connect on System Login	If enabled, the SGD Client connects each time the user logs into the desktop system. If Automatic Client Login is also enabled, this gives users a single sign-on experience.
Proxy Settings	Proxy server settings can be configured in the client profile itself or obtained from the user's browser. Configuring the settings in the client profile itself reduces the need for a browser. See "Configuring Client Proxy Settings" on page 9 for more details.

SGD Administrators can configure all these settings apart from the Automatic Client Login.

All of the available client profile settings for Integrated mode can be configured by both SGD Administrators and users, except for the Automatic Client Login setting.

The Automatic Client Login setting enables automatic logins to SGD, and can only be configured by individual users. This is because when Automatic Client Login is first enabled, SGD generates a unique authentication token for the user when the client profile is saved. The authentication token is stored in the profile cache on the user's client device. This means that users must be able to edit their client profiles, in order to generate an authentication token.

If a user logs in to different SGD servers, they must log in to each SGD server and edit their client profile.

If a user edits their client profile, they must log out of SGD and log in again for the changes to take effect.

To use automatic logins, users click the SGD Login link in their desktop Start menu. If the Connect on System Login check box in the client profile is selected, the SGD Client logs in automatically when a user logs in to their desktop.

Configuring Applications for Integrated Mode

For applications that are configured with a Window Type of Independent Window, closing the window might end or suspend the application session, depending on the setting of the application's Window Close Action attribute.

In Integrated mode, there are no controls for suspending and resuming individual application instances. Applications that are configured to be always resumable are automatically suspended when you log out and resumed when you log in. In the Administration Console, application objects that are always resumable have an Application Resumability setting of General in the Launch tab.

While in Integrated mode, you can only resume a suspended session by displaying a webtop and using the session controls for the application.

You might also want to configure the Number of Instances attribute, to limit the number of instances of applications that users can run.

Webtops

This section includes topics that describe how you can make changes to the default SGD webtop.

This section includes the following topics:

■ "Relocating the Webtop" on page 326

Setting the Language for the Webtop

By default, the SGD Web Server Welcome page at `http://`*server.example.com*, where *server.example.com* is the name of an SGD server, is displayed in English.

To change the default language of the Welcome page, amend the symbolic link `/opt/tarantella/webserver/apache/2.2.8_openssl-0.9.8g_jk1.2.25/htdocs/index.html`, so that it links to another index page in this directory. For example, to make the default Welcome page display in Japanese, link to the `index_ja.html` page.

When users log in using a browser at the `http://`*server.example.com*`/sgd` URL, where *server.example.com* is the name of an SGD server, the default language used for messages displayed by the login dialog and the webtop is controlled by the `defaultlanguage` parameter setting in the following file: `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/webapps/sgd/WEB-INF/web.xml`

To change the default language, edit this file and replace the parameter value `en` with the language identifier for one of the following supported languages:

Language	Identifier
English	`en`
French	`fr`
Japanese	`ja`
Korean	`ko`
Simplified Chinese	`zh_CN`
Traditional Chinese	`zh_TW`

Save changes to the `web.xml` file and restart the SGD Web Server.

The default language is also controlled by the Preferred Language in the user's client profile. Whenever the SGD Client is started from the command line, for example when the SGD Client is in Integrated mode, the language specified in the profile is used for messages displayed by the SGD Client, the login dialog, and the webtop. SGD Administrators can set the default language by editing the profiles in their organizational hierarchy. See also "Client Profile Settings" on page 310.

Note – To be able to display text for a locale, users must also have appropriate fonts installed on their client device.

Overriding the Default Language for the Webtop

Individual users can override the default language for the webtop in the following ways:

- On the SGD Web Server Welcome page, click one of the flags at the top of the page, to select a preferred language. Then click Log in to access a webtop in that language.

  The SGD Web Server Welcome page is at `http://`*server.example.com*, where *server.example.com* is the name of an SGD server.
- Specify a different preferred language in the client profile.
- Log in to SGD using a URL that specifies the preferred language. The URL is `http://`*server.example.com*`/sgd/index.jsp?langSelected=`*lang*, where *lang* is a supported language identifier for SGD and *server.example.com* is the name of an SGD server. Users can manually type this URL in their browser.
- Run the SGD Client from the command line and use the `-preferredlanguage` *lang* command line argument to set the language, where *lang* is a supported language identifier for SGD. This argument can used in shortcuts and shell scripts.

Note – When you override the default language, the login URL specified in the user's client profile does not need to be changed. This is usually `http://`*server.example.com*`/sgd`, where *server.example.com* is the name of an SGD server.

Using Different Styles of Webtop

Different styles of webtop are available at different URLs, as shown in the following table. Here, *server.example.com* is the name of an SGD server.

URL	Style	Description
`http://`*server.example.com*`/sgd`	Standard	The default webtop.
`http://`*server.example.com*`/sgd/hierarchy.jsp`	Hierarchical	A webtop that lists webtop content according to the groups the applications and documents belong to.
`http://`*server.example.com*`/sgd/thin.jsp`	Thin	A webtop that does not use Java™ technology to start the SGD Client.

You can also use the SGD web services to develop your own styles of webtop.

Relocating the Webtop

The webtop is a JavaServer Pages (JSP) application that you can relocate to your own JSP container. The JSP container can be on the same host as an SGD server or on a different host.

To use your own JSP container, the container must support the following:

- Version 2.2 of the Java Servlet specification
- Version 1.2 of the JavaServer Pages specification

Note – Once you relocate the webtop to your JSP container, you have to manually upgrade the webtop as shown in this procedure for each new release of SGD.

If you use third-party authentication, you might want to configure a new trusted user for the relocated webtop. See "Trusted Users and Third-Party Authentication" on page 104.

▼ How to Relocate the Webtop to Your Own JSP Container

1. **(Optional) Reconfigure the ports used by the SGD Web Server.**

   If your JSP container is on the *same host* as an SGD server, you might have to reconfigure the ports used by the SGD Web Server.

a. Change the ports that the SGD Web Server listens on.

The SGD Web Server might be listening on the standard HTTP or HTTPS ports, TCP ports 80 or 443, depending on the ports selected for the SGD installation.

Configure your web server to listen on TCP ports 80 or 443 and configure the SGD Web Server to use different ports, by editing the `/opt/tarantella/webserver/apache/2.2.8_openssl-0.9.8g_jk1.2.25/conf/httpd.conf` file.

b. Change the ports used by the Tomcat component of the SGD Web Server.

The Tomcat component of the SGD Web Server uses port TCP ports 8005 and 8009. If these ports are used elsewhere, for example by your JSP container, you must change the Tomcat configuration.

Edit the `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/conf/server.xml` file and change the server shutdown port on TCP port 8005 and the Coyote/JK2 AJP 1.3 Connector port on TCP port 8009.

2. Copy the webtop web application to your JSP container.

Copy all the files in the following directories into the web applications directory on the new host:

- `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/webapps/sgd`
- `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/webapps/axis`

Note – These directories contain symbolic links. Make sure you preserve the links when you copy the directories.

Copy all the files in the `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/shared/lib` directory to the shared library directory on the new container.

Copy all the files in the `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/shared/classes` directory to the shared classes directory on the new container.

3. Copy the required library and class files.

The webtop requires some additional library and class files, which must be copied to your container.

Copy the following Java™ Archive (JAR) files from the `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/common/lib` directory to the global library directory on your container:

- `axis.jar`
- `commons-discovery-0.2.jar`
- `commons-logging-1.0.4.jar`

- `jaxrpc.jar`
- `saaj.jar`
- `xerces.jar`

4. **Configure the web services endpoints.**

   The webtop uses the Simple Object Access Protocol (SOAP) protocol, over HTTP, to access the services provided by an SGD server. The webtop uses a `Resources.properties` file to determine the server and port to send the web services requests to. This is currently set to `http://localhost`.

   a. **Edit the `Resources.properties` file.**

      On the new host, edit the `Resources.properties` file in the shared classes directory. For example, for a Tomcat JSP container, this file is located in `shared/classes/com/tarantella/tta/webservices/client/apis` directory. Replace `http://localhost:`*port* with `http://`*server.example.com*`:`*port*, where *server.example.com* is the DNS name of an SGD server and *port* is the port that the SGD Web Server listens on. Do this for each of the web services listed in the properties file.

   b. **Secure the SOAP connections.**

      If the webtop is relocated to a different host or you are using SGD security services, secure the SOAP connections to an SGD server. See "Securing SOAP Connections to an SGD Server" on page 36.

5. **Restart your JSP container.**

   You must restart your JSP container, to apply the global library and class file changes.

6. **(Optional) Restart the SGD Web Server.**

   If you made any configuration changes to the SGD Web Server, you must restart it to apply the changes.

7. **Log in to the relocated webtop.**

CHAPTER 6

SGD Servers, Arrays, and Load Balancing

This chapter describes how to configure, license, and monitor SGD servers and arrays. Some system administration features of SGD, such as the Administration Console, log filters, and installation backups are also covered.

This chapter includes the following topics:

Arrays

In SGD, an *array* is a collection of SGD servers that share configuration information.

Arrays have the following benefits:

- Users and application sessions are *load-balanced* across the array. To scale to more users, simply add more SGD servers to the array. See "Load Balancing" on page 334 for more details.

- With more than one server, there is no single point of failure. You can decommission a server temporarily with the minimum of disruption to your users.
- Configuration information, including all the objects in your organizational hierarchy, is replicated to all array members. All array members have access to all information.

Users see the same webtop and can resume applications, no matter which SGD server they log in to.

This section includes the following topics:

The Structure of an Array

An array contains the following:

- **One primary server.** This server is the authoritative source for global SGD information, and maintains the definitive copy of the organizational hierarchy, called the local repository.
- **One or more secondary servers.** The primary server replicates information to these servers.

A single, *standalone* server is considered to be the primary server in an array with no secondary servers.

SGD servers in an array might run different operating systems. However, all the array members must run the same version of SGD.

While you are evaluating SGD you are limited to an array with two members. Once you install a license key, this restriction is removed.

As the SGD servers in an array share information about user sessions and application sessions, it is important to synchronize the clocks on the SGD hosts. Use Network Time Protocol (NTP) software, or the `rdate` command, to ensure the clocks on all SGD hosts are synchronized.

Replicating Data Across the Array

When the primary server replicates data to the secondary servers, it replicates the following data:

- The local repository
- Session information
- Configuration information, including global configuration
- Client profiles created by SGD Administrators
- User preferences created by SGD users from the webtop
- The application server password cache
- The token cache
- Resource files, such as application server login scripts

Apart from the resource files, any changes to the above data are replicated immediately. The synchronization of resource files occurs once daily, and only while the servers are running. The resource files that are synchronized are the files in the following directories:

- `/opt/tarantella/var/serverresources`
- `/opt/tarantella/var/docroot/resources`

Only add, modify, or delete the files in these directories on the primary server.

The time and effort that it takes to synchronize an array is directly proportional to the size of the array. Resource synchronization can be scheduled to take place at a time of your choice. In the Administration Console, this is configured with the Daily Resource Synchronization Time attribute on the Performance tab for each SGD server.

Array Communication

In the array, each SGD server has a peer domain name system (DNS) name and one or more external DNS names. SGD servers always use peer DNS names to communicate with each other. You also use peer DNS names when specifying array members in the SGD configuration tools. External DNS names are only used by SGD Clients when connecting to SGD servers. See "DNS Names" on page 4 more details.

Connections between the SGD servers in an array are made on Transmission Control Protocol (TCP) port 5427. Unless explicitly enabled, this connection is not encrypted. The connection between SGD servers in an array can be encrypted by using secure intra-array communication. See "Securing Connections Between SGD Servers" on page 52.

Each server in the array has a record of the peer DNS names of all the SGD servers in an array. A server only accepts connections on TCP port 5427 if the following occurs:

- The connection is from an array member, according to its own records.
- A shared secret, known only to array members, is used to authenticate connections between array members. Secret Key Identification (SKID) authentication is used. SKID authentication does not encrypt the data.

Most connections are made from the primary server to a secondary server. These connections replicate data to keep the array synchronized. However, array members must be able to communicate directly with other array members.

Adding and Removing SGD Servers From An Array

You add and remove SGD servers from an array by using the Administration Console or by using the `tarantella array` command.

It is best to perform all array operations on the primary SGD server in the array.

▼ How to Add a Server to an Array

The server joining the array must be a standalone server. In other words, the server must be in an array on its own.

1. **Log in to the Administration Console on the primary SGD server.**
2. **Go to the Secure Global Desktop Servers tab.**
3. **In the Secure Global Desktop Server List, click the Add button.**

   The Add a Secure Global Desktop Server screen is displayed.

Tip – You can also use the `tarantella array join` command to add an SGD server to an array.

---

4. **Enter the peer DNS name of an SGD server in the DNS Name field.**
5. **Enter the user name and password of an SGD Administrator in the User Name and Password fields.**

6. **Click Add.**

   The Secure Global Desktop Servers tab is displayed.

   The Secure Global Desktop Servers tab shows messages advising you to wait for the server change and synchronization processes to complete.

Note – After making a change to the structure of an array, wait until SGD has copied the changes to all the SGD servers in the array before making any further changes. Run the `tarantella status` command on the primary SGD server to check the status of the array.

If the server you add has been load balancing application servers using Advanced Load Management, you must do a warm restart, `tarantella restart --warm`, of the new server after it has joined the array. See also "How Advanced Load Management Works" on page 350.

▼ How to Remove a Server From an Array

To remove the primary server from an array, you must first make another server the primary server and then remove the old primary server.

When you remove a server from an array, it loses its license keys.

1. **Log in to the Administration Console on the primary SGD server.**
2. **Go to the Secure Global Desktop Servers tab.**
3. **In the Secure Global Desktop Server List, click the Remove button.**

Tip – You can also use the `tarantella array detach` command to remove an SGD server from an array.

---

4. **When prompted, click OK.**

   The Secure Global Desktop Servers tab shows messages advising you wait for the server change and synchronization processes to complete.

Note – After making a change to the structure of an array, wait until SGD has copied the changes to all the SGD servers in the array before making any further changes. Run the `tarantella status` command on the primary SGD server to check the status of the array.

▼ How to Change the Primary Server in an Array

1. **Log in to the Administration Console on the primary SGD server.**
2. **Go to the Secure Global Desktop Servers tab.**
3. **In the Secure Global Desktop Server List, click the Make Primary button.**

Tip – You can also use the `tarantella array make_primary` command to change the primary server in an array.

---

4. **When prompted, click OK.**

   The Secure Global Desktop Servers tab shows messages advising you wait for the server change and synchronization processes to complete.

   The previous primary server becomes a secondary server.

Note – After making a change to the structure of an array, wait until SGD has copied the changes to all the SGD servers in the array before making any further changes. Run the `tarantella status` command on the primary SGD server to check the status of the array.

Configuring Arrays and Servers

The Administration Console enables you to configure arrays and SGD servers. The attributes on the Global Settings tabs are the settings that apply to the array as a whole, for example how users authenticate to SGD. Appendix A has details of all the global settings. If you click the name of an SGD server on the Secure Global Desktop Servers tab, you display the attributes that apply only to that server, for example the server's external DNS names. Appendix B has details of all the server-specific settings.

You can also list and edit global settings or server-specific settings from the command line, using the `tarantella config` command.

Load Balancing

Load balancing helps you scale up to support more users so that they receive a reliable and high-performance service without any single point of failure.

SGD supports the following load balancing mechanisms:

- **User session load balancing** – Determines which SGD server in the array a user logs in to

  See "User Session Load Balancing" on page 335 for details.

- **Application session load balancing** – Determines which SGD server in the array manages an application session for a user

  See "Application Session Load Balancing" on page 342 for details.

- **Application load balancing** – Determines which application server runs an application for a user

  See "Application Load Balancing" on page 343 for details.

- **Load balancing groups** – Tries to deliver the best possible user experience by choosing SGD servers and application servers linked by a fast network

  See "Load Balancing Groups" on page 344 for details.

User Session Load Balancing

User session load balancing is concerned with choosing a SGD server to log in to. Users can log in to any SGD server in an array and access the same applications.

User session load balancing happens before the first connection is made to SGD. You can use a number of mechanisms to choose an appropriate SGD server, for example:

- Round-robin or Dynamic DNS
- An external hardware load balancer
- The SGD load-balancing JavaServer page (JSP)
- Allocate different SGD servers to different departments and give one URL to each department

When load balancing user sessions, the most important factor is *session persistence*. A user session begins when a user logs in to an SGD server and the session is owned by that server. As the user interacts with SGD, further requests are sent over the Hypertext Transfer Protocol (HTTP) connection to the SGD server. If network connections are load-balanced, HTTP requests might be directed to any SGD server in the array. If an HTTP request goes to an SGD server that does not own the user session, the following can occur:

- The user session is transferred to that SGD server and the windows of any running applications might disappear. This is sometimes called *session grabbing*.
- The visible state of the user's session is displayed incorrectly.

To load balance user sessions successfully, HTTP requests must *persist* so that they always go to the correct SGD server.

In a default SGD installation, additional configuration using a load-balancing JSP is required to make HTTP connections persistent. The JSP contains a JavaScript script that sets a cookie, and that cookie is used to redirect HTTP requests to the correct server.

The load-balancing JSP can only be used if the following conditions are met:

- Browsers must have cookies enabled and JavaScript enabled
- The SGD Client must not be in Integrated mode

The load-balancing JSP can be used in the following ways:

- The JSP selects an SGD server from a list using a round-robin mechanism. See "Using The Load-Balancing JSP to Distribute User Sessions" on page 336.
- The JSP supports an external mechanism for selecting an SGD server. See "Using an External Mechanism to Distribute User Sessions" on page 337.

Using The Load-Balancing JSP to Distribute User Sessions

To use the load-balancing JSP to distribute user sessions, one member of the array acts as the load distribution server. Typically this is the primary SGD server in the array. On the load distribution server, you configure the load-balancing JSP with a list of SGD servers that can host user sessions. Users connect to the load distribution server and the load-balancing JSP redirects them to an SGD server in the list using a round-robin mechanism.

Users must connect to the load distribution server using a URL that connects to the load-balancing JSP, usually this is `http://`*`server.example.com`*`/sgd`, where *server.example.com* is the name of an SGD server.

To use Hypertext Transfer Protocol over Secure Socket Layer (HTTPS) connections, you configure SGD as follows:

- Use an HTTP connection to the load distribution server.
- Configure HTTPS Uniform Resource Locators (URLs) for the SGD servers in the load-balancing JSP.

▼ How to Configure the Load-Balancing JSP to Distribute User Sessions

Select one member of the array to act as the load distribution server. The following procedure uses the primary SGD server in the array.

1. **Log in as superuser (root) on the *primary* SGD server in the array.**

2. **Copy the load-balancing JSP files to the `/sgd` web application directory.**

   For example:

```
# cd /opt/tarantella/webserver/tomcat/5.0.28_axis1.2/webapps/sgd/
# cp -rp admin/loaddist/ swcd/
```

Note – When you copy the files, use the `-p` option to preserve the file permissions.

3. **Edit the load-balancing JSP.**

   The load-balancing JSP is `swcd.jsp`.

   a. **Add the external DNS names of the SGD servers to be load balanced.**

      See "Configuring External DNS Names" on page 5 for details.

      Amend the `hosts = new Array` section, for example:

```
hosts[0] = "http://www1.example.com"
hosts[1] = "http://www2.example.com"
...
hosts[4] = "http://www5.example.com"
```

      If you are using secure connections, ensure the URLs begin with `https://`.

      Only include the primary SGD server in the list if you want the primary server to host user sessions.

   b. **Set the `LBHOST` variable.**

      Remove the first comment marks (`//`) as follows:

```
var LBHOST = null // Not in Load Balancer/Round Robin DNS mode
```

   c. **Save the changes.**

4. **Configure the SGD entry point JSP to use the load-balancing JSP.**

   The entry point JSP is `index.jsp`.

   a. **Change the first line to the following:**

```
<%@ include file="swcd/swcd.jsp" %>
```

   b. **Save the change.**

Using an External Mechanism to Distribute User Sessions

When using an external mechanism, such as a hardware load balancer or round-robin DNS, for load balancing user sessions, the following factors are important:

- **External DNS names.** The SGD servers in the array must be directly accessible using their external DNS names. If an external load balancer is acting as a firewall, a switch, or a router, it must be configured to allow access using the external DNS names. See "Configuring External DNS Names" on page 5.
- **Adaptive Internet Protocol (AIP) connections.** AIP connections must go to the SGD server that is hosting the application session. An external load balancer must not distribute the connections to different SGD servers in the array.
- **AIP is not HTTP.** If you enable SGD security services, AIP connections are encrypted using Secure Sockets Layer (SSL). If an external load balancer decrypts the SSL for an AIP request, it cannot handle the remaining contents.
- **URL rewriting.** An external load balancer can be configured to rewrite URLs. The impact of a connection to SGD using a URL containing a host name that does not match the external DNS name of the SGD server is undefined.
- **Virtual hosting multiple HTTPS connections.** To use HTTPS connections to an external load balancer and the SGD Web Server requires two certificates: one for the load balancer DNS name and one for the external DNS name of the SGD server. You can only do this by using virtual hosting to create two web servers on the same host, each with a different DNS name. However, the web servers must use either different TCP ports or different Internet Protocol (IP) addresses.

To use an external mechanism to distribute user sessions, you configure the load-balancing JSP on *every* SGD server in the array.

If you are using a hardware load balancer, the load balancer must be configured to allow access to the SGD servers using their external DNS names. Typically the load balancer is also an SSL accelerator. With this configuration, the connection to SGD is processed as follows:

1. Users make HTTPS connections to the load balancer DNS name.
2. The load balancer decrypts the SSL request and forwards it as an HTTP request to the external DNS name of the selected SGD server.
3. The load-balancing JSP on the SGD server checks for the load-balancing cookie and redirects the HTTP request to the correct SGD server as needed.

Users must connect to SGD using a URL that contains the DNS name of the load balancer, for example `https://`*`loadbalancer`*`.indigo-insurance.com/sgd`.

If SGD security services are enabled, and the external load balancer is configured to decrypt SSL connections and forward them as unencrypted connections, you must configure each SGD server in the array to accept plain text connections on the secure port. See "Using External SSL Accelerators" on page 51 for details.

To use HTTPS connections between the load balancer and the SGD servers, ensure that the URLs in the load-balancing JSP begin with `https://`. Then perform *either* of the following configurations:

- Configure the external load balancer to terminate the load-balanced HTTPS connection and then regenerate the connection as an HTTPS connection to the external DNS name of the SGD server.
- Assign an additional IP address to the SGD host and configure the host to use this address. Configure the SGD Web Server to listen on the additional IP address and associate the certificate for the load balancer with this address. Configure the SGD Web Server to associate the external DNS name of the SGD server with the original IP address of the server. Configure the load balancer to use the additional IP addresses.

Using SGD in firewall traversal mode can also help to simplify the configuration needed when using an external load balancer. With firewall traversal, the HTTP and AIP connections to SGD are made over a single port, usually TCP port 443. See "Using Firewall Traversal" on page 35.

▼ How to Configure the Load-Balancing JSP for an External Load Balancing Mechanism

The following procedure is an example of how to configure the load-balancing JSP on an SGD server when using an external load balancing mechanism.

All the SGD servers in the array must be configured in the same way.

1. **Log in as superuser (root) on the SGD host.**
2. **Copy the load-balancing JSP files to the `/sgd` web application directory.**

   For example:

```
# cd /opt/tarantella/webserver/tomcat/5.0.28_axis1.2/webapps/sgd/
# cp -rp admin/loaddist/ swcd/
```

Note – When you copy the files, use the `-p` option to preserve the file permissions.

3. **Edit the load-balancing JSP.**

   The load-balancing JSP is `swcd.jsp`.

   a. **Add the external DNS names of the SGD servers to be load balanced.**

      See "Configuring External DNS Names" on page 5 for details.

      Amend the `hosts = new Array` section, for example:

```
hosts[0] = "http://www1.example.com"
hosts[1] = "http://www2.example.com"
...
```

```
hosts[4] = "http://www5.example.com"
```

b. Set the `LBHOST` variable.

Remove the first comment marks (`//`) and enter the external DNS name of the SGD server, for example:

```
var LBHOST = "http://www1.example.com" // LB mode
```

c. Save the changes.

4. Configure the SGD entry point JSP to use the load-balancing JSP.

The entry point JSP is `index.jsp`.

a. Change the first line to the following:

```
<%@ include file="swcd/swcd.jsp" %>
```

b. Save the change

▼ How to Configure the Load-Balancing JSP for Use With My Desktop

See "Using My Desktop" on page 190 for details of the My Desktop features.

All the SGD servers in the array must be configured in the same way.

1. Log in as superuser (root) on the SGD host.

2. Copy the load-balancing JSP files to the `/sgd/mydesktop` web application directory.

For example:

```
# cd /opt/tarantella/webserver/tomcat/5.0.28_axis1.2/webapps/sgd/
# cp -rp admin/loaddist/ mydesktop/swcd/
```

Note – When you copy the files, use the `-p` option to preserve the file permissions.

3. Configure My Desktop to use the load-balancing JSP.

a. Rename the My Desktop entry point JSP.

The entry point JSP is `mydesktop/index.jsp`.

For example:

```
# mv mydesktop/index.jsp mydesktop/mydesktop.jsp
```

b. Create a new entry point JSP for My Desktop.

Create a new JSP file, `mydesktop/index.jsp`, with the following content:

```
<%@ include file="/mydesktop/swcd/swcd.jsp" %>
```

c. Check the file permissions for the My Desktop JSP files.

```
# chmod root:ttaserv mydesktop/index.jsp mydesktop/mydesktop.jsp
```

4. Edit the load-balancing JSP.

The load-balancing JSP is `mydesktop/swcd/swcd.jsp`.

a. Add the external DNS names of the SGD servers to be load balanced and set the `LBHOST` variable.

- To use the loadbalancing JSP to distribute user sessions, follow the instructions in Step 3 of "How to Configure the Load-Balancing JSP to Distribute User Sessions" on page 336.
- To use an external mechanism to distribute user sessions, follow the instructions in Step 3 of "How to Configure the Load-Balancing JSP for an External Load Balancing Mechanism" on page 339.

b. Set the `TARGET` variable.

You must change the `TARGET` variable so that it directs users to My Desktop instead of the webtop.

```
var TARGET="/sgd/mydesktop/mydesktop.jsp"
```

c. Save the changes.

Additional Load-Balancing JSP Configuration

This section describes the additional configuration that is available for the load-balancing JSP.

Using Another Webtop

The load-balancing JSP connects users to the standard webtop. To use another webtop, for example a customized webtop, amend the following line:

```
var TARGET="/sgd/standard.jsp"
```

Localized Splash Screen

The load-balancing JSP displays a splash screen in English using the images in the `/sgd/swcd/` directory. To display a localized splash screen, change the default location of the splash screen images in the following lines:

```
// ** Location of gif files
<%
// If the gifs are located in the locale dependent resource use the Path below
String path = getContextPath(request) + "/resources/images/splash/locale=" +
getBestSupportedLocale(request) + "/";
// Default location
//String path = "swcd/";
%>
```

Other Variables

The following are the other variables used by the load-balancing JSP:

- `SGDLDCOOKIE`

  The name of the cookie used for load balancing purposes.

  The default is `SGD_SWCDCOOKIE`.

- `TIMEOUT`

  The time in milliseconds the load-balancing JSP waits for a response from the SGD Web Server on the selected host. If the timeout period elapses, the next host in the list is tried.

  The default is 10000 milliseconds.

- `TESTGIF`

  The file the load-balancing JSP attempts to get from the SGD Web Server on the selected host. This is used to check whether the host is available.

  The default is `/sgd/resources/images/webtop/secure.gif`.

Application Session Load Balancing

Application session load balancing is concerned with choosing an SGD server to manage an application session.

An application session consists of a set of data about the session, for example the user identity of the user that started the session, and a Protocol Engine process. The Protocol Engine process runs on an SGD server and performs the following tasks:

- Maintains the connection to the application on the application server

- Stores the display data for the application
- Sends and receives data over the AIP connection to the client device

A Protocol Engine process can run on any SGD server in the array. This is not necessarily the same server that hosts the user session, which is the SGD server the user logged in to.

SGD can load balance application sessions across all the SGD servers in the array. The more servers you have, the less the load on each. In the Administration Console, you configure application session load balancing on the Global Settings → Performance tab. You can configure SGD to use one of the following methods for selecting the SGD server to host the application session:

- **Server Hosting the User Session** – The SGD server that is hosting the user session
- **Least Central Processing Unit (CPU) Load** – The SGD server that has the least CPU load
- **Fewest Application Sessions** – The SGD server that is hosting the fewest application sessions

By default, SGD load balances application sessions using the server that hosts the user session.

Application Load Balancing

Application load balancing is concerned with the following:

- Choosing an application server to run an application so that users get the best performance
- Distributing application starts so that the application servers achieve a similar relative workload

SGD Administrators manage application load balancing by defining the application servers that can run an application and by selecting the load balancing method to use.

Defining the Application Servers to Run the Application

You define the application servers that can run an application by assigning application server objects to the application object.

In the Administration Console, you do this on the Hosting Application Servers tab for the application. Alternatively, you can assign an application to an application server. You do this on the Hosted Applications tab for the application server object.

You can also assign groups of applications to an application server, or groups of application servers to an application. Groups are useful for creating pools of application servers, sometimes called application server farms, or applications.

In the Administration Console, you can also select and deselect the Application Start check box on the General tab for an application server object. This marks an application server as available or unavailable to run applications. This is useful, for example, to make a server temporarily unavailable during maintenance work.

Selecting the Load Balancing Method

You can select the load balancing method that SGD uses to determine the most suitable application server for the user.

In the Administration Console, you configure a default load balancing method on the Global Settings → Performance tab. You can override the global load balancing method for an individual application by selecting a different method on the Performance tab for the application object.

By default, SGD uses a method that load balances applications by counting the number of application sessions each server is hosting through SGD and then selecting the server with the fewest sessions. SGD also provides methods for load balancing applications based on the *true load of the application server* when a user starts an application. This is called Advanced Load Management. To use Advanced Load Management, you must install the SGD Enhancement Module on every application server.

See "How Application Load Balancing Works" on page 345 for details on how the load balancing method and other factors affect load balancing.

Load Balancing Groups

SGD uses load balancing groups to ensure that connections between SGD servers and application servers take place over high-speed links.

SGD's Protocol Engines convert the native protocol, such as X11, which is used between the application server and the SGD server, into AIP, which is used between the SGD server and the client device. AIP is optimized for lower bandwidths, but native protocols are not.

If your network includes slow links, you can improve the performance of applications by using load balancing groups. You use load balancing groups to group SGD servers and application servers together. When a user runs an

application, SGD tries to ensure that the Protocol Engine process runs on an SGD server in the same group as the application server. This works best when all the application servers and SGD servers in a group are connected by high-speed links.

In the Administration Console, you define the load balancing groups on the Performance tab for an SGD server or an application server. The load balancing group name is simply a string or a comma-separated list of strings. The name can be anything, for example the location in the world or a building code.

How Application Load Balancing Works

The purpose of application load balancing is to select the application server that gives the user the best performance for a particular application. When starting an application, SGD builds a list of candidate application servers using the application servers listed on the Hosting Application Servers tab for the application object. SGD then has to determine which of the candidates is the best one for the user. The decision takes into account the following factors:

- Application server availability
- Load balancing groups
- Server affinity
- The relative power of the application servers
- The application server with the least load

The following sections describe how these factors, and your SGD configuration, affect the choice of application server.

Application Server Availability

When starting an application, SGD checks its list of candidate application servers to see if any of them are currently unavailable. If an application server is unavailable, it is removed from the list.

SGD Administrators can mark an application server as being unavailable by deselecting the Application Start check box on the General tab for the application server object in the Administration Console. You can do this, for example, to make an application server unavailable during maintenance work.

If you are using SGD Advanced Load Management, the load balancing service sends regular keep alive packets to SGD. If these packets stop, SGD considers the application server to be “out of contact” and treats the server as unavailable until the load balancing service makes contact again.

Load Balancing Groups

Load balancing groups are used to group SGD servers and application servers together. When a user runs an application, SGD tries to ensure that the Protocol Engine process runs on an SGD server in the same load balancing group as the application server. This works best when all the application servers and SGD servers in a group are connected by high-speed links.

See "Load Balancing Groups" on page 344 for more detail.

Server Affinity

When starting an application, SGD takes into account whether the user is already running any applications on an application server. This is known as *server affinity*. Server affinity means that, if possible, SGD runs an application on the same application server as the last application started by the user.

Note – For server affinity to work efficiently, the applications must be associated with the same set of application servers.

Server affinity is expressed as a percentage. Currently only the following two values are allowed:

- `0` – Any running applications do not affect the choice of application server.
- `100` – Any existing application servers must be reused if they can run the selected application. This is the default value.

You change the server affinity value by running the following command:

```
$ tarantella config edit \
--tarantella-config-applaunch-appserveraffinity 0|100
```

Caution – If you are using Windows applications, it is best not to change this value, as using multiple application servers causes problems, especially with roaming profiles. There might also be licensing implications for running different applications in a suite of applications on different servers.

The Relative Power of the Application Servers

SGD allows you to factor in the relative power of the application servers to the decision as to where to start an application.

The relative power is expressed as a percentage and by default all servers have a value of 100. By editing the `weighting` load balancing property for your servers, you can increase or decrease these weightings to increase or decrease the likelihood of SGD choosing an application server. For more details about weightings, see "Tuning Application Load Balancing" on page 351.

You can use the relative power of application servers to do the following:

- Reduce the number of application sessions that are started on a particular server, for example, because it is used for other processes outside of SGD
- Increase the number of application sessions that are started on a particular server, for example, because, although it has less CPU capacity, it has better Input/Output (I/O) capabilities

For more details on how the weighting is used, see the load calculations in "The Application Server With the Least Load" on page 347.

Example Relative Power Calculation 1

You have two application servers, london and paris. Paris has a weighting of 50 and london has a weighting of 100. If all the other conditions for starting applications are met and the servers currently have the same load, london is more likely to be chosen to run the application.

Example Relative Power Calculation 2

You have 100 application servers and you want to make just one of them "more powerful" than the others. Increase the weighting of that server to 200.

The Application Server With the Least Load

SGD supports several methods for selecting the application server with the least load.

You set a default method on the Global Settings → Performance tab in the Administration Console. You can override the default by specifying a different method on the Performance tab for the application object. This allows you to load balance applications in different ways.

The following are the supported application load balancing methods:

- Fewest Application Sessions
- Least CPU Usage
- Most Free Memory

The Least CPU Usage and Most Free Memory methods calculate the *true load of the application server* when a user starts an application. This is called Advanced Load Management. See "How Advanced Load Management Works" on page 350 for more details.

Fewest Application Sessions

The Fewest Application Sessions method allows SGD to choose the application server which is currently running the fewest number of application sessions. It is based on a simple count of the number of application sessions hosted through SGD.

This method is the default.

If you use Advanced Load Management, the Fewest Application Sessions method is used as a fallback whenever there is a problem, for example if the application server load information is not available to the array when the application is started. This might happen, for example, if the primary SGD server is being restarted.

The application server load is calculated using the following formula:

```
number of application sessions x 100 /server weighting
```

Example Load Calculation Using Fewest Application Sessions

The following is an example of how SGD calculates the load using the Fewest Application Sessions method of application load balancing.

The application server london is currently hosting 10 application sessions and has a server weighting value of 100.

The application server paris is currently hosting 12 application sessions, and has a server weighting value of 100.

The load value for london is:

```
10 x 100/100 = 10
```

The load value for paris is:

```
12 x 100/100 = 12
```

Assuming the other conditions for starting an application are met, SGD chooses london to run the next two application sessions. If the server weighting value for london was decreased to 50, SGD chooses paris to run the next 8 application sessions, because london's load is now 20 (10 x 100/50).

Least CPU Usage

The Least CPU Usage method allows SGD to choose the application server with the most CPU idle and is suitable for applications that require many processor cycles.

The method measures the application server's load in terms of its CPU capabilities, measured in BogoMips, and by how much of its CPU is being used. These measurements are taken by the load balancing service.

The spare capacity is calculated using the following formula:

```
(BogoMips x CPU idle %) x weighting /100
```

Example Load Calculation Using Least CPU Usage

The following is an example of how SGD calculates the load using the Least CPU Usage method of application load balancing.

The application server london has a BogoMips measurement of 500, a server weighting value of 75 and has 25% CPU idle.

The application server paris has a BogoMips measurement of 100, a server weighting value of 100 and has 50% CPU idle.

The spare capacity for london is:

```
(500 x 25) x 75/100 = 9375
```

The spare capacity for paris is:

```
(100 x 50) x 100/100 = 5000
```

Assuming the other conditions for starting an application are met, london is chosen as the application server, even though paris is using less of its CPU and has a higher server weighting value.

Most Free Memory

The Most Free Memory method allows SGD to choose the application server with most free virtual memory and is suitable for applications that require a lot of memory.

The method measures the application server's load by comparing the application server's actual virtual memory with the amount of memory that is currently being used. These measurements are taken by the load balancing service.

The spare capacity is calculated using the following formula:

```
virtual memory free x weighting /100
```

Example Load Calculation Using Most Free Memory

The following is an example of how SGD calculates the load using the Most Free Memory method of application load balancing.

The application server london has a server weighting value of 100 and has 250 megabytes virtual memory free.

The application server paris has a server weighting value of 75 and has 500 megabytes virtual memory free.

The spare capacity value for london is:

```
250 x 100/100 = 250
```

The spare capacity value for paris is:

```
500 x 75/100 = 375
```

Assuming the other conditions for starting an application are met, paris is the chosen application server.

How Advanced Load Management Works

Advanced Load Management enables you to load balance applications based on either the amount of free memory, or the amount of free CPU, the application server has when the application is started. You can only load balance X applications, Windows applications, and character applications using these methods.

To use Advanced Load Management, you must install the SGD Enhancement Module on every application server. This installs a load balancing service which provides SGD with real-time information about the application server's CPU and memory load. It also helps SGD to detect if an application server is unavailable, for example because it is being rebooted.

The following is an overview of how the load balancing service works:

1. Whenever the primary SGD server is started, it builds a list of application servers that need to be considered for load balancing. The list is updated whenever a host is assigned to, or removed from, an application.

2. The primary SGD server contacts each of the load-balanced application servers and requests initial load information. It does this by contacting the load balancing service on TCP port 3579 on each application server. Establishing contact also confirms that the application server is available to run applications.

3. The primary SGD server sends an update to the secondary servers in the array. The update contains capacity values for each of the methods and information about the application servers that are not available.

4. The load balancing service sends regular updates to the primary SGD server on UDP port 3579. The updates take place even if the load does not change. The absence of a regular update helps SGD to detect whether an application server is available to run applications.

5. The primary SGD server sends regular updates to the secondary servers in the array. The update contains capacity values for each of the methods and information about the application servers that are not available. The updates take place even if the load does not change.

Note – The load balancing service always sends application server load data to the primary SGD server. If the primary server is not available, Advanced Load Management is not available and the secondary servers revert to the default session-based load balancing instead.

---

6. The primary or secondary SGD servers starts applications on the basis of the load information they receive in the updates.

Tuning Application Load Balancing

SGD Administrators can tune application load balancing by editing application load balancing properties. These properties affect how the load balancing service used for Advanced Load Management operates, and how SGD calculates the application server load. You can tune application load balancing globally and for individual application servers. See "Editing Application Load Balancing Properties" on page 354 for details on how to edit the load balancing properties.

Before you tune application load balancing, make sure you have read and understood the following:

- "How Application Load Balancing Works" on page 345
- "How Advanced Load Management Works" on page 350

You can tune the following aspects of how application load balancing works:

- Application server's relative power
- Load balancing listening ports
- SGD server requests updates from an application server
- Frequency of the load calculation
- Frequency of updates to the primary SGD server
- Reliability of CPU and memory data
- Frequency of updates to array members

This tuning is described in the following sections.

Caution – With the exception of tuning an application server's relative power, this tuning only applies if you are using Advanced Load Management.

Application Server's Relative Power

The `weighting` property allows you to factor in the relative power of the application servers to the decision SGD takes as to where to run an application. This is discussed in "The Relative Power of the Application Servers" on page 346.

Load Balancing Listening Ports

The primary SGD server in the array contacts the SGD load balancing service on an application server on TCP port 3579. This is controlled by the `listeningport` property.

The load balancing service sends updates to the primary SGD server on User Datagram Protocol (UDP) port 3579. This is controlled by the `probe.listeningport` property.

These ports are registered with the Internet Assigned Numbers Authority (IANA) and are reserved for use only by SGD. Only change these properties if Sun Support asks you to. You must open these ports if you have a firewall between the primary SGD server and the application servers.

SGD Requests Updates From an Application Server

The `connectretries` property is the number of times the primary SGD server tries to connect to an application server to request load updates. The interval between each attempt is controlled by the `shorttimeout` property. If the attempts to connect fail, the SGD server waits for the period of time controlled by the `longtimeout` property before trying again.

For example, using the defaults for these properties, the primary SGD server makes 5 attempts (`connectretries`) to contact the application server at 20 second intervals (`shorttimeout`). If all 5 attempts fail, SGD waits 600 seconds (`longtimeout`) before making 5 more attempts at 20 second intervals.

You might want to change the timeout properties, for example, if an application server takes a long time to reboot.

The `scaninterval` property controls the period of time between scans of the SGD server's list of load-balanced application servers. The scan checks for the application servers that need to be contacted to request a load update (`connectretries`).

The `sockettimeout` property controls how long it is before an SGD server gets an error by trying to contact the load balancing service when there is no data available.

Frequency of the Load Calculation

The `probe.samplerate` and `probe.windowsize` properties control how often the load balancing service measures the application server's average load.

For example, the `probe.samplerate` is 10 seconds and the `probe.windowsize` is 5. After 50 seconds (5 x 10), the 5 measurements needed to calculate the average have been taken. After a further 10 seconds, the load balancing service takes a new measurement, discards the oldest measurement and then calculates a new average load.

You can increase and decrease the frequency of the calculation depending on how often you expect the application server load to change. For example, if users start applications at the start of the day and then close them at the end of the day, you might want to decrease the frequency of the load calculation. However, if users repeatedly start and stop applications, you might want to increase the frequency of the load calculation.

Frequency of Updates to the Primary SGD Server

The `replyfrequency` property controls the interval at which the load balancing service send updates to the primary SGD server.

The `percentagechange` property controls the minimum percentage change in CPU or memory use that must be reported to the primary SGD server. The load balancing service sends these updates as soon as the percentage change occurs. For example if an application server is running at 30% CPU load and the `percentchange` value is 10, an update occurs when the load is either 20% or 40%. The load balancing service takes into account sudden "spikes" of activity and also makes adjustments when, for example a server reaches 81% CPU load and the `percentagechange` value is 20%.

The `replyfrequency` updates are sent even if the load does not change and even if there has been a `percentagechange` update. The basis for the `percentage change` calculation is reset every time there is a `replyfrequency` update.

If there is no update from an application server for `updatelimit` x `replyfrequency` seconds, SGD considers the application server to be "out of contact". This means the application server is marked as unavailable to run applications until the SGD server can re-establish contact with it.

Reliability of CPU and Memory Data

SGD considers the CPU and memory data it receives to be too unreliable if there has been no update from the application server for `updatelimit` x `replyfrequency` seconds.

Note – The load balancing service sends updates even if the load does not change.

If the data is unreliable, the data is ignored when making the decision on where to run an application. The net effect of this is to make the application server the last in the queue so that it can only be used to run applications if no other server is available or suitable.

Frequency of Updates to Array Members

The primary SGD server sends CPU and memory load updates to the other members of the array every `maxmissedsamples` x `replyfrequency`/2 seconds. This update takes place even if the load does not change.

If a secondary SGD server misses an update, it considers the load data it has to be unreliable and reverts to the Fewest Application Sessions method of load balancing. It uses this method until it receives a new update.

Editing Application Load Balancing Properties

You tune SGD application load balancing by editing application server load balancing properties. The properties are stored in a properties file, which you can edit with a text editor. There are three properties files, as follows:

- **Global properties file** – This file contains the default settings for all the SGD servers in an array
- **Application server properties file** – This file allows you to override some of the default settings in the global properties file for a particular application server
- **Load balancing service properties file** – This file contains the settings the load balancing service uses when it is first started or restarted on a UNIX or Linux platform application server

This section describes how you edit the properties files and what properties are available. For detailed information on how to use the properties, see "Tuning Application Load Balancing" on page 351.

Caution – Edit these properties with care as it can cause applications to fail to start.

The Global Load Balancing Properties File

The global load balancing properties file contains the default load balancing properties for all the SGD servers in an array.

The file is `/opt/tarantella/var/serverconfig/global/tier3lb.properties`.

Caution – Only edit these properties on the primary SGD server in the array. The primary copies the amended properties file to the secondary servers.

In the `tier3lb.properties` properties file, the properties are prefixed with `tarantella.config.tier3lb`, for example `tarantella.config.tier3lb.weighting`.

The following table lists the properties you can change, and gives the default value of the property when SGD is first installed. The table also explains what each property is used for.

Property	Default Value	Purpose
`connectretries`	`3`	The number of times the SGD server tries to connect to the application server to request CPU and memory usage updates.
`listeningport`	`3579`	The UDP port the SGD server uses to listen for data sent by the load balancing service.
`longtimeout`	`900`	The pause in seconds between groups of attempts by the SGD server to connect to the application server.
`maxmissedsamples`	`20`	The number of missed samples used to calculate whether the CPU and memory data for the application server is too unreliable to be used.
`probe.listeningport`	`3579`	The TCP port the load balancing service uses to listen for requests from SGD servers, for example, when to start sending updates.
`probe.percentchange`	`10`	The minimum percentage increase or decrease in CPU and memory use that must be reported to the SGD server.
`probe.replyfrequency`	`30`	The interval in seconds at which the load balancing service sends CPU and memory measurements to the SGD server. The minimum value for this property is 2.
`probe.samplerate`	`15`	The interval in seconds between CPU and memory measurements. The minimum value for this property is 1.

Property	Default Value	Purpose
probe.windowsize	3	The number of CPU and memory measurements used to calculate the CPU and memory average. The minimum value for this property is 1.
scaninterval	60	The interval in seconds between scans of the SGD server's list of load-balanced application servers.
shorttimeout	60	The interval in seconds between attempts by the SGD server to connect to the application server.
sockettimeout	5	The socket timeout in seconds.
updatelimit	5	The limit used to calculate when the load balancing service has stopped sending updates.
weighting	100	The weighting of load measurements relative to the other application servers.

The following properties also appear in the `tier3lb.properties` properties file, but they must not be changed:

```
tarantella.config.name=tier3lb
tarantella.config.type=server
```

The Application Server Load Balancing Properties File

You can override some of the global load balancing properties by creating a load balancing properties file for a particular application server. You have to *manually* create this file as described in "How to Create an Application Server Load Balancing Properties File" on page 357.

The global properties you can override are the following:

- `probe.listeningport`
- `probe.percentchange`
- `probe.replyfrequency`
- `probe.samplerate`
- `probe.windowsize`
- `weighting`

In the server-specific properties file, the properties are prefixed with `tarantella.config.tier3hostdata`, for example `tarantella.config.tier3hostdata.weighting`.

▼ How to Create an Application Server Load Balancing Properties File

Ensure that no users are logged in to the SGD server, and that there are no application sessions, including suspended application sessions, running on the SGD server.

1. **Log in as superuser (root) on the primary SGD server.**

Caution – Only create the load balancing properties file on the primary SGD server in the array. The primary copies the file to the secondary servers.

2. **Change to the** `/opt/tarantella/var/serverconfig/global/t3hostdata` **directory.**
3. **Create the load balancing properties file.**

   Copy the `template.properties` file to a file called *hostname*`.properties` in the same directory, where *hostname* is the name of the application server, for example, `paris.indigo-insurance.com.properties`.

4. **Edit the load balancing properties file.**

   a. **Open the properties file in a text editor.**

   b. **Add the fully qualified name of the application server.**

      Find the line containing the `tarantella.config.tier3hostdata.name` property.

      After the "`=`", type the fully qualified name of the application server.

      Enclose the name in quotes and escape each part of the host name with a backslash. For example:

      ```
      ".../_ens/o\=Indigo Insurance/cn\=paris"
      ```

   c. **Configure the server-specific properties.**

      Uncomment the lines, by deleting the "`#`", that contain the properties you want to be override.

      Only uncomment the properties that you want to be different from the global defaults.

      Change the values of the properties you want to override.

Tip – The `template.properties` file contains comments to help you create a server-specific file.

   d. **Save the changes and close the file.**

5. **Do a warm restart of the primary SGD server.**

```
# tarantella restart --warm
```

The Load Balancing Service Properties File

The load balancing service properties file contains the settings that are used when the load balancing service is first started, or whenever the service is restarted, on a UNIX or Linux platform application server.

Caution – Only make changes to these properties if you have been asked to by Sun Support, or if you change the physical or virtual memory of the application server and you have not reinstalled the SGD Enhancement Module.

The load balancing services properties file is: `/opt/tta_tem/var/serverconfig/local/tier3loadbalancing.properties`.

If you change these properties, you must manually stop and restart the load balancing service.

The properties you can override are the following:

- `probe.listeningport`
- `probe.percentchange`
- `probe.replyfrequency`
- `probe.samplerate`
- `probe.windowsize`
- `weighting`

In the load balancing service properties file, the properties are prefixed with `tarantella.config.tier3loadbalancing`, for example `tarantella.config.tier3loadbalancing.weighting`.

SGD Web Server

This section describes how to configure the web server that is included with SGD. This web server is called the *SGD Web Server*.

This section includes the following topics:

Introducing the SGD Web Server

You must have a web server running on each host on which SGD is installed. When you install SGD, the SGD Web Server is also installed.

The SGD Web Server is a web server that has been preconfigured for use with SGD. The SGD Web Server consists of the following components.

Component	Version
`Apache HTTP Server`	2.2.8
`OpenSSL`	0.9.8g
`mod_jk`	1.2.25
`Apache Jakarta Tomcat`	5.0.28
`Apache Axis`	1.2

Note – The Apache web server includes all the standard Apache modules as shared objects.

If you have an existing web server on the SGD host, this is not affected by the SGD Web Server, as the SGD Web Server listens on a different port.

You can configure the SGD Web Server using standard Apache directives. See the Apache documentation for details.

You control the SGD Web Server independently of the SGD server, using the `tarantella webserver` command.

Using Another Web Server With SGD

When you install SGD, you install the SGD Web Server. This web server is preconfigured for use with SGD and it is best to use it.

If you want to use your own web server with SGD, you can do so. However, as client applications such as the SGD webtop use the Simple Object Access Protocol (SOAP) protocol over HTTP to access the services provided by an SGD server, you *must* continue to run the SGD Web Server, even if you use your own web server.

To use your own web server for the webtop, you need a web server and a JSP container. This is because the webtop is a JSP application.

Once you have a working web server and JSP container, follow the instructions for relocating the webtop in "Relocating the Webtop" on page 326.

Securing the SGD Web Server

By default, the SGD Web Server is configured to be a secure HTTPS web server and to share the server certificate used for SGD security services. See "Using HTTPS Connections to the SGD Web Server" on page 34.

Every web server in an array of SGD servers must use the same HTTP or HTTPS port. You must not mix HTTP and HTTPS web servers in the same SGD array.

Once you enable secure connections to a web server, the URL in the client profile must be reconfigured to an HTTPS URL. See "Client Profile Settings" on page 310.

Administration Console

This section describes how SGD Administrators can run and configure the Administration Console.

This section includes the following topics:

Running the Administration Console

This section describes how to run the Administration Console. It also includes details of how to avoid some common problems when using the Administration Console.

Supported Browsers for the Administration Console

To display the Administration Console, you can use any browser that is supported by SGD, apart from Safari. See "Supported Client Platforms" on page 295 for details of the supported browsers for SGD. The browser must have the JavaScript programming language enabled.

Caution – When using the Administration Console, do not use the browser's Back button. Instead, use the Jump to Object View and Jump to Navigation View links, or the Object History list, to navigate through the Administration Console pages.

Starting the Administration Console

The Administration Console works best when you run it on the primary SGD server in the array.

You can start the Administration Console in the following ways:

- Click the Administration Console link on the webtop of an SGD Administrator.
- Click the Launch the Sun Secure Global Desktop Administration Console link on the SGD Web Server Welcome Page at `http://`*server.example.com*, where *server.example.com* is the name of an SGD server.
- Go to the `http://`*server.example.com*`/sgdadmin` URL.

Note – The Administration Console is for SGD Administrators only. To use the Administration Console you must log in as, or be logged in as, an SGD Administrator.

Deploying the Administration Console on Other Web Application Containers

The Administration Console is only supported when used with the SGD Web Server.

The Administration Console ships with a web application archive (WAR) file, `sgdadmin.war`. Using this file to redeploy the Administration Console on another web application server is not supported.

Avoiding SGD Datastore Update Problems

You can perform operations on the SGD datastore, such as creating new objects and editing object attributes, using the Administration Console from any SGD server in the array.

When you edit the SGD datastore, the changes you make are sent to the primary SGD server. The primary SGD server then replicates these changes to all secondary servers in the array.

By running the Administration Console from the primary SGD server, you can avoid problems due to the following:

- **Slow network.** If the network is slow, "Object not found" or "Object not created" errors can be returned. Also, problems with stale data can occur, where configuration changes are not shown correctly.
- **Primary down.** If the primary server is down, or unavailable, SGD datastore changes are not applied.

Performing Array Operations Using the Administration Console

The following limitations apply when using the Administration Console to perform array operations, such as array joining or array detaching:

- **Use the primary SGD server.** Running the Administration Console on the primary server avoids data replication problems. See also "Avoiding SGD Datastore Update Problems" on page 362.
- **All servers involved in an array operation must be up.** For example, you cannot use the Administration Console to detach a secondary server that is down. Instead, use the `tarantella array detach` command.

Displaying Online Help Over HTTPS Connections

The Administration Console uses the JavaHelp™ software to display online help. However, the online help is disabled when HTTPS connections to the SGD Web Server are enabled.

To run JavaHelp over an HTTPS connection, the Certificate Authority (CA) certificate truststore must contain the CA certificate, or the CA certificate chain, used to sign the SGD Web Server certificate. By default, the SGD Web Server uses the same certificate as the SGD server. See "The CA Certificate Truststore" on page 383 for details.

Administration Console Configuration Settings

The deployment descriptor for the Administration Console web application contains settings that control the operation of the Administration Console. The deployment descriptor is the following file:

```
/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/sgdadmin/WEB-INF/web.xml
```

This section describes the settings in the deployment descriptor that you might want to configure. Most of the settings are context parameters, contained in `<context-param>` elements. You must not change any other settings in the `web.xml` file.

When working with deployment descriptor settings, note the following:

- Only change `web.xml` if you understand what you are doing.
- Always create and keep a backup of the original `web.xml`, in case you need to revert to a previous version. See "Backing Up and Restoring an SGD Installation" on page 389 for advice on how to do this.
- After changing `web.xml`, you must always restart the SGD Web Server for the changes to take effect.
- Changes to `web.xml` only apply for the server that is hosting the Administration Console.
- You must not change the order of the XML elements contained in `web.xml`.

Number of Search Results

The `com.sun.tta.confmgr.DisplayLimit` context parameter enables you to configure the maximum number of search results you can display in the Administration Console. The default is `150`. If there are more results than the display limit, the Administration Console displays a message. Increasing the display limit can have an effect on performance. Set the display limit to `0` to see unlimited search results.

Synchronization Wait Period

The `com.sun.tta.confmgr.ArraySyncPeriod` context parameter is only used if you are running the Administration Console from a secondary server, and you create or edit objects in the SGD datastore. This parameter enables you to configure the period of time, in milliseconds, that the Administration Console waits for changes to be copied across the array before proceeding. The default value is 250. The Administration Console waits for twice this setting, a default of 0.5 seconds, before proceeding.

Searching and Displaying LDAP Data

The `com.sun.tta.confmgr.LdapSearchTimeLimit` context parameter enables you to configure the maximum time, in milliseconds, to allow for a search of an LDAP directory. The default is `0`, which means the search time is unlimited. Only change this context parameter if you have particularly slow LDAP directory servers.

The following context parameters are used to filter the display of LDAP data, when you select Local + LDAP in the Repository list in the Administration Console:

- Filters used by the navigation tree. These are the following context parameters:
  - `com.sun.tta.confmgr.LdapContainerFilter`
  - `com.sun.tta.confmgr.LdapUserFilter`
  - `com.sun.tta.confmgr.LdapGroupFilter`
- Filters used when you search an LDAP directory. These are the following context parameters:
  - `com.sun.tta.confmgr.LdapContainerSearchFilter`
  - `com.sun.tta.confmgr.LdapUserSearchFilter`
  - `com.sun.tta.confmgr.LdapGroupSearchFilter`
- Filters used when you load the LDAP assignments on the Assigned Applications tab for a user profile. This is the `com.sun.tta.confmgr.LdapMemberFilter` context parameter.

These context parameters contain the definitions of what the Administration Console considers as LDAP containers, users, and groups. You might want to change these filters to improve performance, or to change the definition of these LDAP object types to match those used in your LDAP directory. To avoid inconsistencies, if you change a filter for the navigation tree, you must also change the filter used for the LDAP search.

Session Timeout

The `session-timeout` setting defines the period of time after which the user is logged out if there is no activity, meaning no HTTP requests, in the Administration Console. The default setting is 30 minutes, to ensure unattended Administration Console sessions are not left open indefinitely.

Note – The `session-timeout` setting is independent of the timeout attribute for inactive user sessions, `tarantella-config-array-webtopsessionidletimeout`.

Securing Access to the Administration Console

Because the Administration Console is a web application, you can control which client devices are allowed to access it.

For example, you can do this by configuring the SGD Web Server to use the Apache `<Location>` directive, as in the following example:

```
<Location /sgdadmin>
   Order Deny,Allow
   Deny from all
   Allow from 129.156.4.240
</Location>
```

In this example, only client devices with an IP address of `129.156.4.240` are allowed to access the `/sgdadmin` directory on the SGD Web Server. The `/sgdadmin` directory contains the home page of the Administration Console.

For more information on how to configure the `<Location>` directive, check the Apache documentation.

Monitoring

This section describes how to configure SGD logging to help you to diagnose and fix problems with the SGD server. Using the Administration Console to monitor and control user sessions and application sessions is also covered.

This section includes the following topics:

Sessions

This section describes the differences between user sessions and application sessions in SGD. Using the Administration Console to monitor and control user sessions and application sessions is also covered.

This section includes the following topics:

■ "Anonymous Users and Shared Users" on page 368

User Sessions

A user session begins when a user logs in to SGD and ends when a user logs out of SGD. User sessions are hosted by the SGD server the user logs in to. The user name and password they type determine the type of user they are. See Chapter 2 for more details about user authentication.

If a user logs in and they already have a user session, the user session is transferred to the new SGD server and the old session ends. This is sometimes called *session moving*, or *session grabbing*.

User sessions can be *standard* sessions or *secure* sessions. Secure sessions are only available when SGD security services are enabled. See "Securing Connections Between Client Devices and SGD Servers" on page 20 for more details.

In the Administration Console, you can list user sessions as follows:

- The Sessions tab, in Navigation View, shows all the user sessions that are running on all SGD servers in the array
- The User Sessions tab for an SGD server shows all the user sessions that are hosted by that SGD server
- The User Sessions tab for a user profile shows all the user sessions associated with the user profile

The Sessions tab and User Sessions tab enable you to select and end user sessions. The User Sessions tab enables you to view further details about the user session. For example, the information that the SGD Client detects about the client device.

On the command line, you use the `tarantella webtopsession` command to list and end user sessions.

Idle User Session Timeout

You can configure an idle timeout period for inactive user sessions. User sessions are suspended if there has been no activity on the AIP connection between the SGD Client and the SGD server for the specified period.

Activity on the following devices has no effect on the idle timeout period:

- Serial ports
- Smart cards
- Client drives
- Printing

- Audio

You specify the idle timeout attribute using the following command:

```
$ tarantella config edit \
--tarantella-config-array-webtopsessionidletimeout secs
```

Replace *secs* with the timeout value, measured in seconds. A setting of 0 turns off the user session idle timeout feature. This is the default setting.

Application Sessions

An application session begins when a user starts an application and ends when the application exits. Each application session corresponds to an application currently running through SGD.

An application session can be hosted by any SGD server in the array. This might not be the same SGD server that the user logged in to, see "Arrays" on page 329.

Each application session has a corresponding Protocol Engine process. The Protocol Engine handles the communication between the client device and the application server. The Protocol Engine also converts the display protocol used by the application to the AIP, which is understood by the SGD Client running on the client device.

You can use application session load balancing to spread the load of the Protocol Engines among the SGD servers in the array. See "Application Session Load Balancing" on page 342 for more details.

Some applications can be configured to keep running, even when they are not displayed. These are called *resumable* applications.

Each application object has an Application Resumability attribute that determines the application's resumability behavior. Applications can have one of the following Application Resumability settings.

Setting	Description
Never	The application exits when the user logs out of SGD. You cannot suspend or resume applications that are non-resumable.
During the User Session	The application continues to run until the user logs out of SGD. While they are logged in, the user can suspend and resume these applications.
General	The application continues to run even after the user has logged out of SGD. When the user logs in again, they can click the Resume button to display the running application again.

If an application is resumable, it is resumable for a period of time, specified by a timeout. If the SGD Client exits unexpectedly, the timeout period is the configured timeout plus 20 minutes.

Resumable applications are useful for the following reasons:

- Applications that take a long time to start can be left running, even after users have logged out of SGD
- Mobile users can leave applications running while they travel
- Users can easily recover from browser or other crashes

In the Administration Console you can list application sessions as follows:

- The Application Sessions tab for an SGD server shows all the application sessions that are hosted by that server
- The Application Sessions tab for a user profile shows all the application sessions associated with the user profile
- The Application Sessions tab for an application server shows all the applications that are running on that application server

The Applications Sessions tab enables you to view details about each application session. You can also end and shadow application sessions. Shadowing a session enables you and the user see and interact with the application at the same time.

See "Using Shadowing to Troubleshoot a User's Problem" on page 203 for more details about shadowing application sessions.

Note – You can only shadow Windows applications and X applications. The application sessions must not be suspended.

On the command line, you use the `tarantella emulatorsession` command to list and end user sessions.

Anonymous Users and Shared Users

There are two special cases, as follows:

- **Anonymous users.** These are users that log in without typing a user name and password. See "Anonymous User Authentication" on page 83.
- **Shared users.** Also called *guest users*. These are users that log in with the same user name and password. See "Using Shared Accounts for Guest Users" on page 123.

To be able to distinguish between these users, SGD assigns shared users and anonymous users a temporary user identity when they log in. This has the following effects:

- User sessions do not transfer if the user logs in to SGD more than once
- Application sessions end as soon as the user session ends, regardless of the application's Application Resumability setting
- If the user does not log out, server resources are consumed

Using Log Filters to Troubleshoot Problems With an SGD Server

When you first install SGD, the default log filters log all errors on the SGD server. If you want to obtain more detailed information, for example to troubleshoot a problem, you can set additional log filters.

You can set additional log filters in the following ways:

- Type the filter in the Log Filter field on the Global Settings → Monitoring tab in the Administration Console. Each filter must be separated by a Return key press.
- Use the following command:

```
$ tarantella config edit --array-logfilter filter...
```

  Each *filter* must be separated by a space.

Each log filter has the form:

```
component/subcomponent/severity:destination
```

The options for each part of the filter, and how you view the log output, are described in the following sections.

Note – Log filters can create large amounts of data. It is good practice to set as specific a filter as possible and then remove the filter when you have finished with it.

Selecting a Component and Subcomponent

Selecting a component and subcomponent enables you to choose the area of information you want to log from the SGD server.

The table below shows the available component/subcomponent combinations and an explanation of the kind of information produced.

Component and Subcomponent	Information Provided
`audit/glue`	Audit of changes made to the SGD server configuration, or to your local repository configuration, and who made the changes. For example, you can use this to find out who made changes to a user profile object.
`audit/license`	License use across an array of SGD servers. For example, you can use this to find out why the use of licenses is not being recorded.
`audit/session`	Starting and stopping user sessions and application sessions. For example, you can use this to find out how long a user had a running application session.
`cdm/audit`	Authorization of SGD user for client drive mapping (CDM) purposes. For example, you can use this to find out whether a user's credentials are causing CDM to fail.
`cdm/server`	Information about CDM services. For example, you can use this to find out whether a client connection error is causing CDM to fail.
`common/config`	How SGD server configuration is stored and copied across the array. For example, you can use this to find out why a global setting configuration change is not being applied to an SGD server.
`metrics/glue`	Memory and timings. For example, you can use this to find out how long it took to run an SGD command.
`metrics/soap`	The SOAP component of Tomcat's SOAP proxy. For example, you can use this to trace how long it took a SOAP request to finish.
`server/ad`	Active Directory authentication. For example, you can use this to find out why an Active Directory user cannot log in.
`server/billing`	SGD billing services. For example, you can use this to find out why billing data is being lost.

Component and Subcomponent	Information Provided
`server/common`	General SGD information. For example, you can use this to troubleshoot DNS errors.
`server/config`	Changes to SGD server configuration. For example, you can use this to log changes to SGD server configuration or to find out if the configuration has become corrupt.
`server/csh`	The SGD client session handler. For example, you can use this to find out why a user can not restart an application session.
`server/deviceservice`	Mapping of users to accessible device data. For example, you can use this to find out why a user can not access client drives.
`server/diskds`	Information about the local repository. For example, you can use this to get information about corrupt objects or inconsistencies in the local repository.
`server/glue`	The protocol used for communication between SGD servers. For example, you can use this to find out why SGD servers cannot communicate.
`server/install`	Installation and upgrades. For example, you can use this to investigate problems with an installation.
`server/kerberos`	Windows Kerberos authentication. For example, you can use this to find out why an Active Directory user cannot log in.
`server/launch`	Starting or resuming applications. For example, you can use this to find out why a user cannot start an application.
`server/ldap`	Connections to an LDAP server. For example, you can use this to find out why an LDAP user cannot log in.
`server/loadbalancing`	User session and application load balancing. For example, you can use this to find out why an SGD server is not selected to host application sessions.
`server/logging`	Logging. For example, you can use this to find out why log messages are not being written to a file.

Component and Subcomponent	Information Provided
`server/login`	Log in to SGD. For example, you can use this to find out which authentication mechanism authenticated a user and the user profile used.
`server/mupp`	The SGD MUltiplePlexing Protocol (MUPP) protocol. Only use this filter if Support ask you to.
`server/printing`	SGD printing services. For example, you can use this to find out why print jobs are failing.
`server/replication`	Copying data between SGD servers in an array. For example, you can use this to find out why data has not been copied between array members.
`server/securid`	Connections to SecurID RSA Authentication Manager. For example, you can use this to find out why SecurID authentication is not working.
`server/security`	Secure SSL-based connections. For example, you can use this to find out why the SSL Daemon is not running.
`server/server`	The SGD server component. For example, you can use this to troubleshoot SGD server failures, such as Java™ runtime exceptions which are not logged elsewhere.
`server/services`	Internal SGD server services. For example, you can use this to find out why a service is failing.
`server/session`	User sessions. For example, you can use this to find out why a session failed to suspend.
`server/soap`	SOAP bean interface. For example, you can use this to diagnose problems with the SOAP beans.
`server/soapcommands`	SOAP requests. For example, you can use this to log the SOAP requests received.
`server/tier3loadbalancing`	Application server load balancing. For example, you can use this to find out why an application server is not being selected to run an application.

Component and Subcomponent	Information Provided
server/tokencache	Authentication token cache. For example, you can use this to find out why an authentication token is not being created for a user.
server/tscal	Windows Terminal Services Client Access Licenses (CALs) for non-Windows clients. For example, you can use this to find out why a non-Windows client does not have a CAL.
server/webtop	Webtop content, if you are using Directory Services Integration. For example, you can use this to find out why an application is not appearing on a user's webtop.

Selecting the Severity

You can select one of the following levels of severity for each log filter.

Severity	Description
fatalerror	Logs information on fatal errors. Fatal errors stop the SGD server from running. When you first install SGD, all fatal errors are logged by default.
error	Log information on any errors that occur. When you first install SGD, all errors are logged by default.
warningerror	Log information on any warnings that occur, for example if system resources are running low. When you first install SGD, all warnings are logged by default.
info	Informational logging. Useful for problem solving and identifying bugs.
moreinfo	Verbose informational logging.
auditinfo	Logs selected events for auditing purposes, for example changes to SGD server configuration. For details see, "Using Log Filters for Auditing" on page 376.

The fatalerror severity level produces the least amount of information. The moreinfo severity level produces the most information.

Selecting a severity level is not cumulative. For example, selecting info does not mean you also see warningerror or fatalerror log messages.

To log more than one level of severity, use a wild card.

Using Wildcards

You can use a wildcard (*) to match multiple components, subcomponents, and severities.

For example, to log all warning, error, and fatal error messages for printing, you can use a `server/printing/*error` log filter.

Note – If you use a wildcard on the command line, you must enclose the filter in straight quotation marks, to stop your shell from expanding them.

Selecting a Destination

When selecting a destination for the logs, you can specify that the output goes to one of the following destinations:

- A log file
- A log handler

These destinations are described in the following sections.

Using Log Files

If you direct the output to a log file, you can output to the following types of file:

- *filename*`.log`

  SGD formats this log output so that it is easy to read.

  This format is required by the `tarantella query errlog` command. This command only searches log files that have names that end `error.log`.

- *filename*`.jsl`

  SGD formats this log output for automated parsing and searching.

  This format is required by the `tarantella query audit` command.

The file extension of the destination file controls the format of the file.

You can also create a separate log file for each process ID, by including the `%%PID%%` placeholder in the file name.

The log files are output in the `/opt/tarantella/var/log` directory. You cannot change the location of the log files, but you can use a symbolic link to redirect the logs to a different location. Alternatively, you can use the `syslog` log handler described in "Using Log Handlers" on page 375.

Using Log Handlers

A log handler is a JavaBeans™ component used as the destination for the log messages. When specifying a log handler, you must use its full name. SGD provides the following log handlers:

- **ConsoleSink.** The ConsoleSink log handler writes log messages in a easy-to-read format to standard error. This log handler is enabled by default and logs all errors.

  The full name of this log handler is:

  ```
  .../_beans/com.sco.tta.server.log.ConsoleSink
  ```

- **SyslogSink.** The SyslogSink log handler writes log messages to the UNIX or Linux platform `syslog` facility.

  The full name of this log handler is:

  ```
  .../_beans/com.sco.tta.server.log.SyslogSink
  ```

Examples of Using Log Filters

The following are some examples of commonly used log filters:

- To debug user logins:

  ```
  server/login/*:login%%PID%%.log
  server/login/*:login%%PID%%.jsl
  ```

- To troubleshoot CDM:

  ```
  cdm/*/*:cdm%%PID%%.log
  cdm/*/*:cdm%%PID%%.jsl
  server/deviceservice/*:cdm%%PID%%.log
  server/deviceservice/*:cdm%%PID%%.jsl
  ```

- To troubleshoot printing problems:

  ```
  server/printing/*:print%%PID%%.log
  server/printing/*:print%%PID%%.jsl
  ```

- To get timing measurements for server performance:

  ```
  metrics/*/*info:metrics.log
  metrics/*/*info:metrics.jsl
  ```

- To send all warnings, errors, and fatal errors to syslog:

  ```
  */*/*error:.../_beans/com.sco.tta.server.log.SyslogSink
  ```

Viewing Log Output

To view the log output, you can do either of the following:

- Open the `.log` files in a viewer or text editor
- Use the `tarantella query` command

If you use the `tarantella query` command, use the following command options:

- `tarantella query errlog` – To see only the errors and fatal errors for specific SGD server components
- `tarantella query audit` – Searches the logs for any messages relating to a person, an application, or an application server

---

Note – You can only use these commands to view the log output until the logs are archived. You configure archiving when you install SGD, but you can change the settings at any time by running the `tarantella setup` command.

Using Log Filters for Auditing

SGD enables you to set log filters to provide an audit of the following system events:

- Starting and stopping an SGD server
- Starting and stopping SGD security services
- Changes to object configuration in the local repository
- Changes to global and SGD server configuration
- Unsuccessful attempts to log in to an SGD server
- Logging in and out of SGD
- Starting and stopping an application session

To audit these events, you must set a `*/*/*auditinfo` log filter.

You can use any of the standard destinations as a destination for the output, but you must direct the output to a `.jsl` file if you want to view the audit information from the command line.

See "Using Log Filters to Troubleshoot Problems With an SGD Server" on page 369 for more information about setting log filters.

Note – Log output is only created while an SGD server is actually running. If an SGD server is stopped, only the UNIX system root user can perform any of the auditable events.

For each of the events, the log filter records following:

- The date and time of the event
- The type of event
- The result of the event, whether it was successful or it failed
- The identity of the user responsible for the event
- Any other relevant information about the event, for example what was changed and to what value

Viewing Audit Log Information

You can use any of the standard methods for viewing the log output. However, the following command is the most useful:

```
# tarantella query audit --format text|csv|xml --filter "filter"
```

If you select the `text` format, SGD formats the log output so that it is easy to read on screen, but it does not show every detail logged. Using the `csv` format shows every detail logged, but it is only suitable for outputting to a file.

The "*filter*" is an RFC2254-compliant LDAP search filter. The command searches the log fields in the log files for matching entries to display. For auditing purposes, the most useful log fields are shown in the following table.

Log Field	Description
`log-category`	For auditing purposes, the log-category is always `*auditinfo`, but this can be any of the standard log filter component/subcomponent/severity settings.
`log-date`	The system date and time when the event took place. The format is `yyyy/MM/dd HH:mm:ss.SSS`.
`log-event`	The name of the event.
`log-ip-address`	The IP address of a client or server associated with an event.
`log-keyword`	The keyword identifier for the auditable event.
`log-localhost`	The peer DNS name of the SGD server where the event took place.
`log-pid`	The process ID of the event.

Log Field	Description
log-security-type	The type of security used on a connection, std or ssl.
log-systime	The system Cordinated Universal Time (UTC) time, in milliseconds, when the event took place.
log-tfn-name	The full name of an object associated with an event. For example, starting an application session might record the name of the user, the application, and the application server.

Note – A complete list of all the log fields is available in the /opt/tarantella/var/serverresources/schema/log.at.conf schema file.

The following table below shows all the log-keywords, and their corresponding log-events, together with a description of the event.

Log-Keyword	Log-Event	Description
createFailure	createFailure	A user tried to create an object in the local repository but failed.
createSuccess	createSuccess	A user created an object in the local repository.
deleteFailure	deleteFailure	A user tried to delete an object in the local repository but failed.
deleteSuccess	deleteSuccess	A user deleted an object in the local repository.
loginFailure	loginResultReconnect	The SGD server requested the client to reconnect on a different port.
loginFailure	loginResultFailed	None of the enabled authentication mechanisms authenticated the user.
loginFailure	loginResultRejected	User was denied a login by a login filter. For example, this might be because logins are currently not enabled for that particular server, or because the user is currently not allowed to log in.
loginFailure	loginResultDisabled	The SGD server is not currently accepting connections.
loginFailure	loginResultNoAmbig	An ambiguous login failed because the SGD server does not support ambiguous logins.
loginFailure	loginResultAmbiguous	An ambiguous login failed because the user did give enough disambiguation information.
loginFailure	loginResultAnonymous	An anonymous login failed because the SGD server does not support anonymous logins.

Log-Keyword	Log-Event	Description
loginFailure	loginResultNoSecurity	Login failed because the user requires a secure connection, but the connection was made to the standard port.
loginFailure	loginResultUnresolveable	Login failed because the SGD server was unable to resolve which user had logged in.
loginFailure	loginResultUnknown	Login failed because the SGD server was unable to process an unexpected login result.
loginSuccess	webtopSessionStartedDetails	Started a user session for a user.
logout	webtopSessionEndedDetails	Stopped a user session for a user.
modifyFailure	modifyFailure	A user tried to change an object in the local repository, to change global settings, or to change the configuration of an SGD server but failed.
modifySuccess	modifySuccess	A user changed an object in the local repository, changed global settings, or changed the configuration of an SGD server.
renameFailure	renameFailure	A user tried to rename an object in the local repository but failed.
renameSuccess	renameSuccess	A user renamed an object in the local repository.
serverStart	serverStart	The SGD server was started.
serverStop	serverStop	The SGD server was stopped.
sessionEnded	sessionEndedDetails	Stopped an application session for a user.
sessionStarted	sessionStartedDetails	Started application session for a user.
sslStart	securitySSLStart	Started SGD security (SSL) services.
sslStop	securitySSLStop	Stopped SGD security (SSL) services.

Examples of Using Log Filters for Auditing

To search for failed log in attempts, use the following filter:

```
--filter "(&(log-category=*auditinfo)(log-keyword=loginFailure))"
```

To search for changes to made to the SGD server configuration by the Administrator Bill Orange, use the following filter:

```
--filter "(&(log-category=*auditinfo)(log-keyword=
modifySuccess)(log-tfn-name=.../ens/o=Indigo Insurance/ou=IT/cn=Bill
Orange))"
```

Licensing and SGD

SGD has two licensing modes: *Evaluation mode* and *Fully Licensed mode*.

License mode	Description
Evaluation mode	• Applies when no license keys have been installed. • Allows you to evaluate SGD for 30 days. • The size of an array is limited to two SGD servers. • The number of users that can log in or have running applications is limited to five.
Fully Licensed mode	• Applies when any license keys have been installed. • The size of an array is not limited. • The number of users that can log in or have running applications is limited by the installed license keys.

While you are evaluating SGD, the number of days remaining in the evaluation period is shown whenever a user logs in to SGD using a browser.

After the 30-day evaluation period, users are unable to log in to their webtop, or to start or resume applications. To continue using SGD you must obtain and install a license key.

You add license keys in the Administration Console on the Global Settings → Licenses tab. Alternatively, you can use the `tarantella license add` command.

This section includes the following topics:

License Keys and Licenses

When you install a license key, it installs the licenses that unlock the software features. Licenses are one of the following types:

- **Array-based –** They make functionality available to the SGD servers in an array
- **User-based –** They make functionality available to users

The following table lists the types of license available, their basis, and what they license.

License Type	Basis	Software Features
Base Component	User	Core functionality, such as the following: • The ability to log in. • The ability to authenticate users against an LDAP directory server. • Support for SOCKS v5 proxy servers. • Support for HTTP and Secure SSL proxy servers. • The ability to traverse firewalls. • The ability to use secure connections. • Webtops, starting applications, and managing sessions. • Support for arrays.
Windows Connectivity	User	The ability to run Windows applications.
UNIX Connectivity	User	The ability to run UNIX and Linux applications.
AS/400 Connectivity	User	The ability to run 5250 applications.
Mainframe Connectivity	User	The ability to run 3270 applications.
Advanced Load Management	Array	The ability to load balance application servers based on their true CPU or memory load.

User-Based Licenses

User-based licenses are enforced by the software on a concurrent user basis. A user is allocated a license as soon as they use a software component.

For example, when a user logs in to SGD, they are allocated a Base Component license. If they then run a Windows application, they are allocated a Windows Connectivity license. The license is released when they stop using the component.

A single user is never counted as using more than one of each type of license. For example, if user is logged in and is running four UNIX applications, the user is counted as using one Base Component license and one UNIX Connectivity license.

Note the following about user-based licenses:

- Each guest user and anonymous user is counted as a separate user. See "Using Shared Accounts for Guest Users" on page 123 and "Anonymous User Authentication" on page 83.
- When all the Base Component licenses are allocated, additional users cannot log in to SGD.
- If a user suspends an application, they are counted as still using a connectivity component and keep their license, even if they are not logged in to SGD.

- If a user logs out of SGD without closing applications that are configured to be always resumable, the applications continue run, and use a connectivity component, until they time out. The default timeout period is eight days.
- It is possible for a user to log in to SGD but not be able to run any applications. This is because there are Base Component licenses available but all the connectivity licenses are taken by users who are not logged in but have suspended application sessions.

License Administration

SGD automatically allocates and releases licenses to users as they use software components. SGD Administrators cannot manually allocate and release licenses, although they can end a user's SGD session and their application sessions.

The SGD log files record all license usage over time. Administrators can use the `tarantella license query` command to display information on both current and past license usage.

Licensing Microsoft Windows Terminal Services

SGD does not include licenses for Microsoft Windows Terminal Services. If you access terminal server functionality provided by Microsoft operating system products, you need to purchase additional licenses to use such products. Consult the license agreements for the Microsoft operating system products you are using to determine which licenses you must acquire.

Terminal Services licensing is done using a Client Access License (CAL). A CAL is a license that allows a client to access the Windows Terminal Server. Depending on the licensing mode, a client can be either a *user*, or a *device*, or a combination of both.

Client license management for Microsoft Windows Terminal Services varies according to the client platform, as follows:

- **Windows platforms.** CALs for client devices that connect to the Terminal Server are allocated in accordance with Microsoft policy. CALs are stored in the Windows registry on the client device.
- **UNIX, Linux, or Mac OS X platforms.** CALs for client devices that connect to the Terminal Server are stored in a license pool in the datastore on the SGD server. Management of this license pool is done by the SGD Administrator, using the `tscal` command. See "Managing CALs From the Command-Line" on page 383.

Managing CALs From the Command-Line

You can use the `tarantella tscal` command to manage Microsoft Windows Terminal Services CALs for *non-Windows* client devices, as follows:

- To list the Terminal Services CALs currently reserved for non-Windows client devices, type the following:

```
$ tarantella tscal list
```

- To free a Terminal Services CAL for use by another non-Windows client devices, type the following:

```
$ tarantella tscal free
```

- To return all free Terminal Services CALs to the Windows License Server, type the following:

```
$ tarantella tscal return --free
```

SGD Server Certificate Stores

Each SGD server has two certificate stores, a CA certificate truststore and a client certificate store.

The CA Certificate Truststore

Each SGD server has its own CA certificate truststore. This is the `/opt/tarantella/bin/jre/lib/security/cacerts` file.

The CA certificate truststore contains the CA certificates that the SGD server trusts.

The `/opt/tarantella/etc/data/cacerts.txt` file contains the X.500 Distinguished Names (DNs) and MD5 signatures of all the CA certificates that are in the CA certificates truststore when SGD is first installed. These are the CAs that SGD supports by default. To add support for additional CAs, you can import CA certificates to the truststore.

You might need to import CA certificates in the following circumstances:

- **SOAP connections** – If HTTPS is used for SOAP connections, and the certificate for *any SGD server in the array* is signed by an unsupported CA, or by an Intermediate CA

See "Securing SOAP Connections to an SGD Server" on page 36.

- **Active Directory authentication** – If SSL connections to Active Directory are used, and the certificate for an Active Directory server is signed by an unsupported CA, or by an Intermediate CA

  See "How to Configure SSL Connections to Active Directory" on page 81.

- **LDAP authentication** – If SSL connections to LDAP directories are used, and the certificate for an LDAP directory server is signed by an unsupported CA, or by an Intermediate CA
- See "How to Enable LDAP Authentication" on page 87.

The certificates that must be imported are as follows:

- **Unsupported CA** – Import the CA or root certificate
- **Intermediate CA** – Import the CA certificate chain

If the `tarantella security customca` command is used to install a CA certificate, or CA certificate chain, this command also imports the CA certificates into the CA certificate truststore. It only does this on the SGD server on which the command is run.

To manually import CA certificates, use the `keytool` application. See the JDK Tools and Utilities documentation for details on how to use the `keytool` application. The `/opt/tarantella/var/tsp/ca.pem` file on the SGD host contains the CA certificate or certificate chain.

If you need to import a CA certificate chain, import each certificate in the chain separately.

The password for the CA certificate truststore is `changeit`.

▼ How to Import CA Certificates or Certificate Chains into the CA Certificate Truststore

1. **Log in as superuser (root) on the SGD host.**

2. **Import the CA certificate.**

   To import a CA certificate chain, you must import each certificate in the chain separately.

   Use the following command:

```
# /opt/tarantella/bin/jre/bin/keytool -importcert \
-keystore /opt/tarantella/bin/jre/lib/security/cacerts \
-storepass changeit -file CA-certificate-path \
-alias alias
```

   Use the `-alias` option to uniquely identify the certificate.

The Client Certificate Store

Each SGD server has its own client certificate store. This is the `/opt/tarantella/var/info/certs/sslkeystore` file.

The client certificate store contains the client certificates that an SGD server uses to identify itself when connecting to another server.

You create and install server client certificates with the `keytool` application. See the JDK Tools and Utilities documentation for details on how to use the `keytool` application.

You must provide a password when adding or removing certificates from the client certificate store. The password for the client certificate store is unique to each SGD server and can be found in the `/opt/tarantella/var/info/key` file. Use this password for both the `-storepass` and `-keypass` options.

▼ How to Create a Client Certificate CSR for an SGD server

1. **Log in as superuser (root) on the SGD host.**

2. **Generate the key pair for the client certificate.**

```
# /opt/tarantella/bin/jre/bin/keytool -genkeypair \
-keyalg rsa \
-keystore /opt/tarantella/var/info/certs/sslkeystore \
-storepass "$(cat /opt/tarantella/var/info/key)" \
-alias alias \
-keypass "$(cat /opt/tarantella/var/info/key)"
```

Use the `-alias` option to uniquely identify the key pair.

3. **Generate a CSR for the client certificate.**

```
# /opt/tarantella/bin/jre/bin/keytool -certreq \
-keystore /opt/tarantella/var/info/certs/sslkeystore \
-storepass "$(cat /opt/tarantella/var/info/key)" \
-alias alias \
-keypass "$(cat /opt/tarantella/var/info/key)" \
-file CSR-path
```

The *alias* must be the same as the alias used when generating the key pair. Aliases are case-insensitive.

▼ How to Install a Client Certificate for an SGD Server

1. **Log in as superuser (root) on the SGD host.**
2. **Install the client certificate.**

```
# /opt/tarantella/bin/jre/bin/keytool -importcert \
-file certificate-path
-keystore /opt/tarantella/var/info/certs/sslkeystore \
-storepass "$(cat /opt/tarantella/var/info/key)" \
-alias alias \
-keypass "$(cat /opt/tarantella/var/info/key)"
```

The *alias* must be the same as the alias used when generating the CSR for the client certificate. Aliases are case-insensitive.

SGD Installations

This section describes the files that are included in an SGD installation. Information on backing up and restoring your SGD installation is also included.

This section includes the following topics:

About Your SGD Installation

The standard installation directory for SGD is `/opt/tarantella`.

During SGD installation, you have the option of specifying a different installation directory.

You can find out your installation directory from the command line, as follows:

- **Solaris OS platforms.** Use the command:

```
$ pkgparam `pkginfo 'tta.*' | cut -d' ' -f2` INSTDIR
```

- **Linux system platforms.** Use the command:

```
$ rpm -qi tta | grep Relocations
```

The SGD installation directory contains the following subdirectories:

- `bin`
- `etc`
- `var`
- `webserver`

The following sections describe the contents of each of these subdirectories, and what each subdirectory is used for.

See also "Backing Up and Restoring an SGD Installation" on page 389.

bin Directory

The bin directory contains the scripts, binaries, and server-side Java™ technology needed to run SGD.

etc Directory

The etc directory contains configuration files that control the behavior of SGD and applications displayed through SGD. It contains the subdirectories listed in the following table.

Subdirectory	Contents
etc/data	The following configuration files: • Character application object configuration files: – Attribute maps (attrmap.txt) – Color maps (colormap.txt) • Printing configuration files: – Host name maps (hostnamemap.txt) – Printer driver maps (default.printerinfo.txt) – Printer driver to printer type mappings (printertypes.txt) – Printer to user-friendly name mappings (printernamemap.txt) • RGB color names (rgb.txt) • Timezone configuration files • Supported CA certificates (cacerts.txt)
etc/data/keymaps	Keyboard map files.
etc/fonts	X Window System fonts and additional fonts installed with SGD.
etc/pkg	Information about installed SGD packages, for example version compatibility and dependencies.
etc/templates	A complete copy of the standard files that are installed in the etc/data directory and the var/serverresources directory.

var Directory

The var directory contains the files that are used by the web server and the files that the SGD server copies to other members of the array. The var directory contains many subdirectories, and the important ones are listed in the following table.

Subdirectory	Contents
var/docroot	The HTML pages used by the SGD Web Server.
var/tsp	Server security certificates, keys, and CA certificates.
var/ens	The local repository, containing the objects in the organizational hierarchy.
var/log	SGD server log files.
var/print	The print queue and First In First Out (FIFO).
var/serverresources/expect	SGD login scripts.
var/spool	Files on their way to the print queue.

webserver Directory

The webserver directory contains the scripts, binaries, and server-side Java technology needed to run the SGD Web Server, web services, and the webtop. The important subdirectories are listed in the following table.

Subdirectory	Contents
apache	All the files needed to configure and run the SGD Web Server.
tomcat	All the files needed to configure and run the Tomcat JSP and servlet container.
tomcat/5.0.28_axis1.2/webapps/axis	Files needed to run SGD web services. The webtop uses web services.
tomcat/5.0.28_axis1.2/webapps/sgd	Files needed to run the webtop, including the SGD Client.
tomcat/5.0.28_axis1.2/shared/lib	
tomcat/5.0.28_axis1.2/shared/classes	

Backing Up and Restoring an SGD Installation

This section describes how to back up an SGD installation, so that you can repair SGD in the event that a component or an entire installation becomes damaged.

Before using the procedures on this page, it is helpful if you are familiar with the layout of the SGD installation. See "About Your SGD Installation" on page 387.

This section includes the following topics:

▼ How to Make a Full Backup of an SGD Installation

To be able to restore an SGD installation or to be able to repair some individual SGD components, you need a full backup.

While making the backup, *do not* run any command-line tools or use the Administration Console. It is also best if you shut down the SGD server while making the backup. However, if this is not possible, do it when the server is least loaded.

1. **Log on as superuser (root) on the SGD host.**
2. **Back up the SGD log files.**

```
# tarantella archive
```

3. **Back up the entire SGD installation directory on each SGD server in the array.**

   See "About Your SGD Installation" on page 387 for details of the SGD installation directory.

   SGD also uses the following configuration files, which only need to be backed up if you are using them and you have modified them:

   - The `/etc/ttaprinter.conf` file – This file contains the `lpr` defaults
   - The `/etc/sdace.txt` and `/var/ace/data` files – These files contain RSA SecurID settings
   - **Web server password files –** If you have created these files for use with the SGD Web Server, and they are stored outside the SGD installation directory

Restoring a Damaged SGD Component

For the purposes of restoring a damaged installation, SGD can be divided up into the following components:

- Binaries, scripts, and template files
- Login scripts

- Server configuration
- Global configuration
- The local repository
- Automatic log archives
- SGD printing
- The SGD Web Server, web services, and the webtop

The following sections describe how to back up each of these components.

Binaries, Scripts, and Template Files

The binaries, scripts, and template files are only modified as part of an installation, patch, or custom engineering work. These files do not change very often.

You can restore these files from a backup or another installation, as follows:

- The binaries are in the `/opt/tarantella/bin/bin` directory
- The scripts are in the `/opt/tarantella/bin/scripts` directory
- The template files are in the `/opt/tarantella/etc/templates` directory

Login Scripts

The Login Scripts control the interaction between SGD and the application servers, for example, by logging a user in. See "Login Scripts" on page 69.

How you recover login scripts depends on whether or not you are using customized login scripts.

If you are not using customized login scripts, you can restore these files from another installation, a backup, or from the `/opt/tarantella/etc/templates` directory.

If you are using customized login scripts, you must only restore these files from a backup.

The login scripts are in the `/opt/tarantella/var/serverresources/expect` directory.

Server Configuration

Server configuration covers all the properties for an SGD server that are not shared with the other SGD servers in the array, such as the server DNS name and server tuning.

As this configuration is unique to a particular SGD host, it must only be restored from a backup taken from that host.

The server-specific configuration is in the `/opt/tarantella/var/serverconfig/local` directory.

If you are using SGD security services, you must also restore the following:

- `/opt/tarantella/var/tsp`
- `/opt/tarantella/var/info/certs`
- `/opt/tarantella/var/info/key`

Global Configuration

Global configuration covers all the properties that are the same for all the SGD servers in the array, for example the names of the other array members.

To restore the global configuration for an SGD server, you must only restore from a backup of the primary SGD server.

The global configuration is in the `/opt/tarantella/var/serverconfig/global` directory.

The Local Repository

The local repository, formerly called the Enterprise Naming Scheme (ENS) datastore, is shared across all SGD servers in the array. This is the organizational hierarchy that contains all the information about users, applications, and application servers. This information changes very often.

Restore the local repository from the backup of the primary SGD server.

The local repository is in the `/opt/tarantella/var/ens` directory.

Automatic Log Archives

By default, SGD archives its log files each week at 4 a.m. on Sunday, using a `cron` job.

If the root user's `crontab` becomes corrupt, or the archiving does not take place, use the `tarantella setup` command to restore the default setting, or to change the time and day that the archiving takes place.

The log files are archived under the `/opt/tarantella/var/log` directory.

SGD Printing

When you install SGD, it configures an SGD printer queue.

If the printer queue is not present, you can restore it using either of the following methods:

- Use the SGD printer queue installation script, `prtinstall.en.sh`. See "The SGD Printer Queue Installation Script" on page 226.
- Use the `tarantella setup` command.

The printer queue is in the `/opt/tarantella/var/print` directory.

SGD Web Server, Web Services, and the Webtop

The configuration of the SGD Web Server, SGD web services, and the webtop is unique to a particular SGD host and must only be restored from a backup taken from that host.

The configuration for the SGD Web Server is in the `/opt/tarantella/webserver/apache/2.2.8_openssl-0.9.8g_jk1.2.25` directory. You might also have web server password files, which can be stored in other locations.

The configuration for SGD web services is in the `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2` directory.

The files used for the webtop are in the `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/webapps/sgd` directory.

▼ How to Do a Full Restore of an SGD Installation

If you are unable to restore a damaged SGD component or you are unsure about the extent of the damage to your system, you must do a full restore of your SGD installation.

To do a full restore, you must have a full backup. See "How to Make a Full Backup of an SGD Installation" on page 390 for details of how to back up an SGD installation.

Ensure that no users are logged in to the SGD server, and that there are no application sessions, including suspended application sessions, running on the SGD server.

1. Log on as superuser (root) on the SGD host.

2. **Stop the SGD server.**

3. **Uninstall SGD.**

```
# tarantella uninstall --purge
```

Note – If this fails, you might have to manually remove the SGD package. Use the `rpm -e tta` command on Linux platforms, and the `pkgrm tta` command on Solaris OS platforms.

4. **Delete the SGD installation directory.**

```
# rm -rf /opt/tarantella
```

5. **Reinstall SGD and any patches, if applicable.**

   This installs the printer queue, rc scripts and package database.

6. **Stop the SGD server.**

7. **Delete the SGD installation directory.**

```
# rm -rf /opt/tarantella
```

8. **Reinstate the SGD installation from the backup.**

Note – Make sure you restore from the server's backup. Also, check that the DNS name of the host has not changed.

9. **Restart the SGD server.**

Troubleshooting Arrays and Load Balancing

This section describes some typical problems when using SGD servers, and how to fix them.

The following troubleshooting topics are covered:

- "Users Cannot Connect to an SGD Server When It Is In Firewall Traversal Mode" on page 400
- "Users Cannot Relocate Their Sessions" on page 400

Troubleshooting Advanced Load Management

If you experience problems with the Least CPU Usage and Most Free Memory methods of application load balancing, you can get information from the following places to help you understand what is happening:

- SGD server log files

  Add the following filters to the Log Filters field on the Global Settings → Monitoring tab in the Administration Console:

  ```
  server/tier3loadbalancing/*:t3loadbal%%PID%%.log
  server/tier3loadbalancing/*:t3loadbal%%PID%%.jsl
  ```

  This provides detailed information about the decision to run an application and the data being sent by the application server.

- SGD Enhancement Module logs

  For UNIX or Linux platform application servers, these are in the /opt/tta_tem`/var/log/tier3loadprobe`*PID*`_error.log` file.

  For Windows application servers, this information is displayed in the Event Viewer.

- Load balancing service connection Common Gateway Interface (CGI) program

  Go to the `http://`*applicationserver*`:3579?get&ttalbinfo` URL.

You can use this information to troubleshoot the following common problems:

- "The Load Balancing Service Is Not Working" on page 395
- "SGD Ignores an Application Server Load Balancing Properties File" on page 396
- "One of the Application Servers Is Never Picked" on page 397
- "One of the Application Servers Is Always Picked" on page 397
- "Two Identical Application Servers, But One Runs More Applications Than the Other" on page 398
- "The SGD Server Log File Shows an Update Received for an Unknown ID" on page 398

The Load Balancing Service Is Not Working

If you think the load balancing service is not working, check the following.

Is the SGD Enhancement Module installed and running?

On Microsoft Windows applications servers, use Control Panel → Administrative Tools → Services to check whether the Tarantella Load Balancing Service is listed and is started.

On UNIX and Linux platform application servers, run the following command as superuser (root) to check that load balancing processes are running:

```
# /opt/tta_tem/bin/tem status
```

Is the primary SGD server running?

The load balancing service on the application server sends load information to the primary SGD server. If the primary is not available, SGD uses Fewest application sessions as the method for load balancing application servers.

Is your firewall blocking the load balancing service?

For the load balancing service to work, the firewall must allow the following connections:

- A TCP connection on port 3579 between the SGD server and the application server.
- A UDP connection on port 3579 between the application server and the SGD server.

Note – These connections do not need to be authenticated.

What do the log files show?

Check the log files for further information, see "Troubleshooting Advanced Load Management" on page 395 for details.

SGD Ignores an Application Server Load Balancing Properties File

After creating a load balancing properties file for an application server, you must do a warm restart of the primary SGD server. Run the following command as superuser (root):

```
# tarantella restart --warm
```

Ensure that no users are logged in to the SGD server, and that there are no application sessions, including suspended application sessions, running on the SGD server.

One of the Application Servers Is Never Picked

If one of the application servers is never picked to run applications, check the following.

Is the load balancing service running on the application server?

See "The Load Balancing Service Is Not Working" on page 395.

Is the application server available to run applications?

Check the application server object in the Administration Console. Ensure the Application Start check box is selected on the General tab for the application server object.

Check that the application server is up.

What do the log files show?

Check the log files for further information, see "Troubleshooting Advanced Load Management" on page 395 for details.

One of the Application Servers Is Always Picked

If one application server is always picked to run applications regardless of its load, check the following.

Is more than one application server configured to run the application?

Check the Hosting Application Servers tab for the application object.

Are the other application servers available to run applications?

Check the application server objects in the Administration Console. Ensure the Application Start check box is selected on the General tab

Check that all the application servers are up.

Is the correct load balancing method selected?

In the Administration Console, check that either Most Free Memory or Least CPU Usage is selected as the load balancing method on the Performance tab for the application object, or on the Global Settings → Performance tab.

Are you using server affinity?

Server affinity means that, if possible, SGD starts an application on the same application server as the last application started by the user. Server affinity is on by default, see "Server Affinity" on page 346.

Is the load balancing service running on the application server?

See "The Load Balancing Service Is Not Working" on page 395.

What do the log files show?

Check the log files for further information, see "Troubleshooting Advanced Load Management" on page 395 for details.

Two Identical Application Servers, But One Runs More Applications Than the Other

Check that the server weighting value for the servers are the same. See "Application Server's Relative Power" on page 352.

The SGD Server Log File Shows an Update Received for an Unknown ID

The SGD server log file might show an information message containing the following text:

`Got an update for unknown` *id* `from machine` *applicationserver*

This message can be ignored. It occurs only when the primary SGD server is restarted.

SGD Uses Too Much Network Bandwidth

If SGD is using a lot of network bandwidth, set the Bandwidth Limit attribute for a user profile to reduce the maximum allowable bandwidth the user can use.

Note – Reducing the available bandwidth might have implications for application usability.

In the Administration Console, go to the User Profiles tab and select the user profile object you want to configure. Go to the Performance tab and select a value from the Bandwidth Limit list.

Alternatively, use the following command:

```
$ tarantella object edit --name obj --bandwidth bandwidth
```

The following are the available bandwidths:

Administration Console	Command Line
2400 bps	2400
4800 bps	4800
9600 bps	9600
14.4 Kbps	14400
19.2 Kbps	19200
28.8 Kbps	28800
33.6 Kbps	33600
38.8 Kbps	38800
57.6 Kbps	57600
64 Kbps	64000
128 Kbps	128000
256 Kbps	256000
512 Kbps	512000
768 Kbps	768000
1 Mbps	1000000
1.5 Mbps	1500000
10 Mbps	10000000
None	0

Note – None is the default. This means there is no limit on bandwidth usage.

Users Cannot Connect to an SGD Server When It Is In Firewall Traversal Mode

If users cannot connect to an SGD server when it is in firewall traversal mode, this is usually caused by starting the SGD server *before* the SGD Web Server.

In firewall traversal mode, an SGD server listens on port 443 and forwards any web connections to the SGD Web Server, which is configured to listen on `localhost` port 443 (`127.0.0.1:443`).

If an SGD server is started before the SGD Web Server, the SGD server binds to all the available interfaces and this means that the SGD server forwards any web connections to itself in an infinite loop.

One solution is to always start the SGD Web Server before the SGD server.

Another solution is to configure SGD so that it never binds to the `localhost` interface. To do this, use the following command:

```
 $ tarantella config edit \
--tarantella-config-server-bindaddresses-external "!127.0.0.1"
```

Note – On some shells you cannot use straight quotation marks, `"!127.0.0.1"`, as the `!127` might be substituted. Use single straight quotation marks instead, `'!127.0.0.1'`.

You can also use this command to specify exactly which interfaces you do want SGD to bind to. You do this by typing a comma-separated list of DNS names or IP addresses.

See "Using Firewall Traversal" on page 35 for more details about running SGD in firewall traversal mode.

Users Cannot Relocate Their Sessions

When a user logs in to an SGD server without logging out of another, normally the user's session is relocated to the new server. This is sometimes called session moving, or session grabbing.

If the clocks on all SGD servers in the array are not synchronized, user sessions might not relocate successfully.

SGD uses the time stamps on user sessions to determine which is newer. The newer user session is considered to be current. If clocks are not synchronized, the time stamps might give misleading information.

Because time synchronization is important, use NTP software to synchronize clocks. Alternatively, use the `rdate` command.

See also "Sessions" on page 365 for more information about user sessions in SGD.

APPENDIX **A**

Global Settings and Caches

Use the Global Settings tabs to configure settings that apply to Sun Secure Global Desktop (SGD) as a whole. Changes made in the Global Settings tabs affect all SGD servers in the array.

Use the Caches tab to view and manage entries in the password cache and the token cache.

This chapter includes the following topics:

Secure Global Desktop Authentication Tab

Use the settings on the Secure Global Desktop Authentication tab to control how users log in to SGD. The settings apply to all SGD servers in the array. Changes to the settings take effect immediately.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

User authentication can be performed by an external authentication mechanism (*third-party authentication*), or SGD can perform the authentication using a specified repository (*system authentication*).

The Secure Global Desktop Authentication tab contains the following sections:

- **Tokens and Cache.** This section contains the following attributes:
  - Token Generation
  - Password Cache
- **Secure Global Desktop Effective Sequence.** This section displays a summary of the current SGD authentication settings. If you click the Change User Authentication button, the Authentication Wizard starts. The Wizard enables you to configure SGD authentication. See The Authentication Wizard.
- **LDAP Repository Details.** If you are using lightweight directory access protocol (LDAP) authentication, this section displays a summary of your LDAP directory server settings.

The Authentication Wizard

The Authentication Wizard guides you through the process of setting up authentication for SGD users. The number of steps shown in the Authentication Wizard depend on the choices you make as you work though the Wizard.

The available steps in the Authentication Wizard are as follows:

- **Overview.** Includes background information about how users authenticate to SGD.
- **Third-Party/System Authentication.** Select whether you want to use third-party authentication, system authentication or both.

  This step contains the following attributes:
  - Third-Party Authentication

- System Authentication

- **Third-Party Authentication – User Identity and Profile.** For third-party authentication only. Choose search methods to use for finding the user identity and user profile of the authenticated user.

  This step contains the following attributes:

  - Search Local Repository
  - Search LDAP Repository
  - Use Default Third-Party Identity
  - Use Default LDAP Profile
  - Use Closest Matching LDAP Profile

- **System Authentication – Repositories.** For system authentication only. Select one or more check boxes to enable repositories that SGD uses for locating user information. The repositories are listed in the order in which they are tried. If one repository authenticates the user, no more repositories are tried.

  This step contains the following attributes:

  - LDAP/Active Directory
  - Unix
  - Authentication Token
  - Windows Domain Controller
  - SecurID
  - Anonymous

- **Unix Authentication – User Profile.** For system authentication only. This screen is shown if UNIX authentication is selected. Select one or more check boxes to specify how to find the user profile for the authenticated UNIX user. The authentication methods are listed in the order in which they are tried. If one method finds a matching user profile, no more search methods are tried.

  This step contains the following attributes:

  - Search Unix User ID in Local Repository
  - Search Unix Group ID in Local Repository
  - Use Default User Profile

- **Windows Domain Authentication – Domain Controller.** For system authentication only. This screen is shown if the Windows Domain Controller system authentication repository is selected. Here, you specify the name of the domain controller.

  This step contains the Windows Domain attribute.

- **LDAP Repository Details.** For third-party or system authentication. This screen is shown if an LDAP or Active Directory system authentication repository is selected, or if the Search LDAP Repository option is selected for third-party authentication. Here, you specify details of the LDAP repository to use.

  This step contains the following attributes:

  - Active Directory
  - LDAP
  - URLs
  - User Name and Password
  - Connection Security
  - Active Directory Base Domain
  - Active Directory Default Domain
- **Review Selections.** Shows a summary of the choices you have made using the Wizard. You can review your authentication settings before confirming the changes.

Token Generation

Usage: Select or deselect the check box.

Description

Whether to create authentication tokens for users so they can log in automatically to SGD.

To ensure that an authentication token cannot be intercepted and used by a third party, use secure Hypertext Transfer Protocol over Secure Socket Layer (HTTPS) web servers and enable SGD security services.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → Generate Authentication Tokens

Command Line

Command option: `--login-autotoken  1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example enables generation of authentication tokens for users.

```
--login-autotoken 0
```

Password Cache

Usage: Select or deselect the check box.

Description

Whether to save the user name and password that the user types to log in to SGD in the password cache.

If you are using SecurID authentication, do not save the user name and password, as SecurID passwords cannot be reused.

Array Manager: Application Launch Properties (Array-Wide) → Authentication → Save SGD Login Details in Cache

Command Line

Command option: `--launch-savettapassword 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example saves user log in details in the password cache.

```
--launch-savettapassword 1
```

Third-Party Authentication

Usage: Select or deselect the check box.

Description

Select the check box to enable third-party authentication.

This attribute enables you to give access to SGD to users who have been authenticated by a third-party mechanism, such as web server authentication.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → External Authentication → Use Third Party Authentication

Command Line

Command option: `--login-thirdparty 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example disables third-party authentication.

```
--login-thirdparty 0
```

System Authentication

Usage: Select or deselect the check box.

Description

Specifies that user authentication is done by the SGD server. Selecting this option enables the Wizard screens for system authentication settings.

Command Line

There is no command line equivalent for this attribute.

Search Local Repository

Usage: Select or deselect the check box.

Description

This attribute specifies a search method used by SGD to determine the identity and user profile of a user who has been authenticated by a third-party authentication mechanism.

This search method searches for the user identity in the local repository and then uses the matching user profile.

If additional search methods are selected, the search methods are used in the order shown. However, third-party authentication does not support ambiguous users and so the first match found is used.

If the searches do not produce a match, the standard login page is displayed and the user must log in to SGD in the normal way.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → User Identity Mapping → Search ENS for Matching Person

Command Line

Command option: `--login-thirdparty-ens 1 | 0`

Usage: Specify `1` (true) or `0` (false).

In the following example, searching the local repository for a matching user profile is disabled.

```
--login-thirdparty-ens 0
```

Search LDAP Repository

Usage: Select or deselect the check box.

Description

Specifies that the LDAP repository is searched to find the user identity for a user who has been authenticated by a third-party authentication mechanism.

The search method used is defined by the Use Default LDAP Profile or Use Closest Matching LDAP Profile attribute.

Command Line

There is no command line equivalent for this attribute.

Use Default Third-Party Identity

Usage: Select or deselect the check box.

Description

This attribute specifies a search method used by SGD to determine the identity and user profile of a user who has been authenticated by a third-party authentication mechanism.

This search method does not perform a search. The user identity is the third-party user name. The third-party user profile, `System Objects/Third Party Profile`, is used.

If additional search methods are selected, the search methods are used in the order shown. However, third-party authentication does not support ambiguous users and so the first match found is used.

If the searches do not produce a match, the standard login page is displayed and the user must log in to SGD in the normal way.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → User Identity Mapping → Use Default Profile

Command Line

Command option: `--login-thirdparty-noens 1 | 0`

Usage: Specify `1` (true) or `0` (false).

In the following example, using the default user profile is disabled.

```
--login-thirdparty-noens 0
```

Use Default LDAP Profile

Usage: Select the option.

Description

This attribute specifies a search method used by SGD to determine the identity and user profile of a user who has been authenticated by a third-party authentication mechanism.

This search method searches for the user identity in an LDAP repository and then uses the default LDAP user profile, `System Objects/LDAP Profile`.

If additional search methods are selected, the search methods are used in the order shown. However, third-party authentication does not support ambiguous users and so the first match found is used.

If the searches do not produce a match, the standard login page is displayed and the user must log in to SGD in the normal way.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → User Identity Mapping → Search LDAP and Use LDAP Profile

Command Line

Command option: `--login-ldap-thirdparty-profile 1 | 0`

Usage: Specify `1` (true) or `0` (false).

In the following example, searching LDAP and using the default LDAP profile is disabled.

```
--login-ldap-thirdparty-profile 0
```

Use Closest Matching LDAP Profile

Usage: Select the option.

Description

This attribute specifies a search method used by SGD to determine the identity and user profile of a user who has been authenticated by a third-party authentication mechanism.

This search method searches for the user identity in an LDAP repository and then uses the closest matching user profile in the local repository, allowing for differences between the LDAP and SGD naming systems.

SGD searches for the following until a match is found:

- A user profile with the same name as the LDAP person object.

  For example, if the LDAP person object is `cn=Emma Rald,cn=Sales,dc=Indigo Insurance,dc=com`, SGD searches the local repository for `dc=com/dc=Indigo Insurance/cn=Sales/cn=Emma Rald`.

- A user profile in the same organizational unit as the LDAP person object but with the name `cn=LDAP Profile`.

  For example, `dc=com/dc=Indigo Insurance/cn=Sales/cn=LDAP Profile`.

- A user profile in any parent organizational unit with the name `cn=LDAP Profile`.

  For example, `dc=com/dc=Indigo Insurance/cn=LDAP Profile`.

- If there is no match, the profile object `System Objects/LDAP Profile` is used for the user profile.

If additional search methods are selected, the search methods are used in the order shown. However, third-party authentication does not support ambiguous users and so the first match found is used.

If the searches do not produce a match, the standard login page is displayed and the user must log in to SGD in the normal way.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → User Identity Mapping → Search LDAP and Use Closest ENS Match

Command Line

Command option: `--login-ldap-thirdparty-ens 1 | 0`

Usage: Specify `1` (true) or `0` (false).

In the following example, searching LDAP and using the closest matching LDAP profile is disabled.

```
--login-ldap-thirdparty-ens 0
```

LDAP/Active Directory

Usage: Select or deselect the check box.

Description

Specifies that an LDAP directory server or Active Directory server is used for authentication.

Selecting this option enables the Wizard screen where you can type in LDAP directory server or Active Directory server details.

Command Line

There is no command line equivalent for this attribute.

Unix

Usage: Select or deselect the check box.

Description

Enables UNIX authentication.

Selecting this option enables the Wizard screen where you can configure UNIX authentication settings.

Command Line

There is no command line equivalent for this attribute.

Authentication Token

Usage: Select or deselect the check box.

Description

Enables authentication using an authentication token.

Authentication using an authentication token can only be used when the SGD Client is operating in Integrated mode.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → Authentication Token Login Authority

Command Line

Command option: `--login-atla 1 | 0`

Usage: Specify `1` (true) or `0` (false).

In the following example, authentication using an authentication token is disabled.

```
--login-atla 0
```

Windows Domain Controller

Usage: Select or deselect the check box.

Description

Enables authentication against a Windows domain controller.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → NT Login Authority

Command Line

Command option: `--login-nt 1 | 0`

Usage: Specify `1` (true) or `0` (false).

In the following example, Windows Domain Controller authentication is disabled.

```
--login-nt 0
```

SecurID

Usage: Select or deselect the check box.

Description

Enables users with RSA SecurID tokens to log in to SGD.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → SecurID Login Authority

Command Line

Command option: `--login-securid 1 | 0`

Usage: Specify `1` (true) or `0` (false).

In the following example, SecurID authentication is disabled.

```
--login-securid 0
```

Anonymous

Usage: Select or deselect the check box.

Description

Enables users to log in to SGD without supplying a user name and password.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → Anonymous User Login Authority

Command Line

Command option: `--login-anon 1 | 0`

Usage: Specify `1` (true) or `0` (false).

In the following example, anonymous user authentication is disabled.

```
--login-anon 0
```

Search Unix User ID in Local Repository

Usage: Select or deselect the check box.

Description

Specifies a search method used to find the user profile for an authenticated UNIX user. Select this attribute to search for the user identity in the local repository and use the matching user profile.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → ENS Login Authority

Command Line

Command option: `--login-ens 1 | 0`

Usage: Specify `1` (true) or `0` (false).

In the following example, searching for the UNIX User ID in the local repository is enabled.

```
--login-ens 1
```

Search Unix Group ID in Local Repository

Usage: Select or deselect the check box.

Description

Specifies a search method used to find the user profile for an authenticated UNIX user. Select this attribute to use the UNIX user identity and search for a user profile in the local repository that matches the user's UNIX Group ID.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → UNIX Group Login Authority

Command Line

Command option: `--login-unix-group 1 | 0`

Usage: Specify `1` (true) or `0` (false).

In the following example, searching for the UNIX Group ID in the local repository is enabled.

```
--login-unix-group 1
```

Use Default User Profile

Usage: Select or deselect the check box.

Description

Specifies a search method used to find the user profile for an authenticated UNIX user. Select this attribute to use the default UNIX user profile, `System Objects/UNIX User Profile`, for the authenticated user.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → UNIX User Login Authority

Command Line

Command option: `--login-unix-user 1 | 0`

Usage: Specify `1` (true) or `0` (false).

In the following example, using the default UNIX user profile `(System Objects/UNIX User Profile)` is enabled.

```
--login-unix-user 1
```

Windows Domain

Usage: Type the Windows domain name in the field.

Description

The name of the domain controller used for Windows domain authentication.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → Windows NT Domain

Command Line

Command option: `--login-nt-domain` *dom*

Usage: Replace *dom* with the name of the Windows domain controller used to authenticate users.

In the following example, users are authenticated with the Windows domain controller `sales.indigo-insurance.com`.

```
--login-nt-domain sales.indigo-insurance.com
```

Active Directory

Usage: Select the option.

Description

Enables Active Directory authentication.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → Active Directory Login Authority

Command Line

Command option: `--login-ad 1 | 0`

Usage: Specify `1` (true) or `0` (false).

In the following example, Active Directory authentication is enabled.

```
--login-ad 1
```

LDAP

Usage: Select the LDAP option.

Description

Enables LDAP authentication.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → LDAP Login Authority

Command Line

Command option: `--login-ldap 1 | 0`

Usage: Specify `1` (true) or `0` (false).

In the following example, LDAP authentication is enabled.

```
--login-ldap 1
```

URLs

Usage: Type the uniform resource locators (URLs) in the field. Type each separate URL on a line and press the Return key.

Description

The locations of the LDAP directory servers or Active Directory servers used for the following authentication mechanisms.

- LDAP authentication
- Third-party authentication (Search LDAP Repository options)
- Active Directory authentication

If you use an LDAP directory for authentication, you can use SGD Directory Services Integration (DSI). DSI enables you to use an LDAP version 3 directory instead of the local repository for holding user information. Using DSI means you do not need to mirror your LDAP organization in the local repository.

See the "LDAP Assignments" on page 147 for more information about using DSI.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → LDAP Server → URL

LDAP Authentication

For *LDAP authentication* or *third-party authentication*, type in a list of URLs.

The URLs are used in the order they are listed. If the first LDAP directory server listed is unavailable, SGD tries the next one in the list.

Each URL has the form `ldap://`*server*`:`*port*`/`*searchroot*. Each of these options is defined as follows:

- **Server.** The Domain Name System (DNS) name of the LDAP directory server.
- **Port.** The Transmission Control Protocol (TCP) port that the LDAP directory server listens on for connections. You can omit this, and the preceding ":", to use the default port.
- **Searchroot.** The position in the LDAP directory structure from where the LDAP repository starts searching for matching users.
  For example, `dc=indigo-insurance,dc=com`.

Use an `ldaps://` URL if your LDAP directory server uses Secure Sockets Layer (SSL) connections. Extra configuration is required for SSL connections. See "How to Enable LDAP Authentication" on page 87 for more information about securing connections to LDAP directory servers.

Active Directory Authentication

For an *Active Directory repository*, type in the URL of an Active Directory domain in the form `ad://`*domain*. For example, `ad://east.indigo-insurance.com`.

The URL *must* start `ad://`. Only type *one* domain.

Command Line

Command option: `--login-ldap-url` *url*

Usage: Replace *url* with the URLs of one or more LDAP directory servers.

In the following example, the URL of an LDAP directory server is specified.

```
--login-ldap-url "ldap://melbourne.indigo-insurance.com/dc=
indigo-insurance,dc=com"
```

User Name and Password

Usage: Type the user name and password in the fields.

Description

The user name and password of a user that has privileges to search an LDAP directory server or Active Directory server. This is not required for some LDAP directory servers.

For *LDAP authentication* or *third-party authentication*, type the distinguished name of a user, such as `cn=Bill Orange,cn=Users,dc=indigo-insurance,dc=com`.

For *Active Directory authentication*, type a user principal name such as `orange@indigo-insurance.com`.

Note – For security reasons, the password is not displayed, even if it has been previously set.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → LDAP Server → Username

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → LDAP Server → Password

Command Line

From the command line, use the `tarantella passcache new --ldap` command.

Command option: `tarantella passcache new --ldap --resuser` *resuser* `--respass` *respassr*

Usage: Replace *resuser* and *respass* with the user name and password.

The following example specifies a user name (`test1`) and password (`test2`) for searching an LDAP directory server.

```
tarantella passcache new --ldap --resuser test1 --respass test2
```

Connection Security

Usage: Select the required option. If the SSL option is selected, an option for using client certificates is enabled.

Description

The mechanism used to secure the connection to an Active Directory server.

The supported mechanisms are Kerberos and SSL. If SSL is selected, client certificates can also be used for extra security.

The Kerberos option is selected by default.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → Active Directory → Use Certificates

Command Line

Command option: `--tarantella-config-ad-usessl 1 | 0`

Usage: Specify `1` to use SSL, or `0` to use Kerberos. The default setting is `0`.

In the following example, the Kerberos protocol is used to authenticate the connection to an Active Directory server.

```
--tarantella-config-ad-usessl 0
```

Command option: `--login-ldap-pki-enabled 1 | 0`

Usage: Specify `1` (true) or `0` (false). This attribute is only used if SSL connections are enabled.

In the following example, client certificates are used to authenticate the SSL connection to an Active Directory server.

```
--tarantella-config-ad-usessl 1
--login-ldap-pki-enabled 1
```

Active Directory Base Domain

Usage: Type a domain name in the field.

Description

The domain that SGD uses for Active Directory authentication if users only supply a partial domain when they log in.

For example, if the base domain is set to `indigo-insurance.com` and a user logs in with the user name `rouge@west`, SGD tries to authenticate `rouge@west.indigo-insurance.com`.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → Active Directory → Base Domain

Command Line

Command option: `--login-ad-base-domain` *dom*

Usage: Replace *dom* with the base domain name to use for Active Directory authentication.

In the following example, a base domain of indigo-insurance.com is specified.

```
--login-ad-base-domain indigo-insurance.com
```

Active Directory Default Domain

Usage: Type a domain name in the field.

Description

The domain that SGD uses for Active Directory authentication if users do not supply a domain when they log in.

For example, if the default domain is set to `east.indigo-insurance.com` and a user logs in with the user name `rouge`, SGD tries to authenticate `rouge@east.indigo-insurance.com`.

Array Manager: Secure Global Desktop Login Properties (Array-Wide) → Active Directory → Default Domain

Command Line

Command option: `--login-ad-default-domain` *dom*

Usage: Replace *dom* with the default domain name to use for Active Directory authentication.

In the following example, a base domain of west.indigo-insurance.com is specified.

```
--login-ad-default-domain west.indigo-insurance.com
```

Application Authentication Tab

Settings on the Application Authentication tab control the user experience when starting applications.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

Changes to these attributes take effect immediately.

This tab contains the following sections:

- Authentication

  This section contains the following attributes:

  - Password Cache Usage
  - Action When Password Expired
  - Smart Card Authentication
- Authentication Dialog

  This section contains the following attributes:

  - Dialog Display
  - "Save Password" Box
  - "Always Use Smart Card" Box
- Launch Dialog

This section contains the following attributes:

- Display Delay
- "Launch Details" Pane

Password Cache Usage

Usage: Select or deselect the check box.

Description

Whether to try the password the user typed for the SGD server, if it is stored in the password cache, as the password for the application server.

SGD server passwords might be stored in the cache if some applications are configured to run on the SGD host, or if Password Cache is selected.

This attribute can be overridden by a application server object's Password Cache Usage attribute.

Array Manager: Application Launch Properties (Array-Wide) → Authentication → Try Secure Global Desktop Password if Cached

Command Line

Command option: `--launch-trycachedpassword 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example uses the SGD password stored in the password cache when authenticating to an application server.

```
--launch-trycachedpassword 1
```

Action When Password Expired

Usage: Select an option.

Description

The action to take if the user's password has expired on the application server.

The command line options and their Administration Console equivalents are shown in the following table.

Administration Console	Command Line	Description
Authentication Dialog	`dialog`	Show an SGD authentication dialog.
Aged Password Handler	`manual`	Show a terminal window, where the user can change their password.
Launch Failure	`none`	Take no further action. Treat as a startup failure.

Array Manager: Application Launch Properties (Array-Wide) → If Password Has Expired

Command Line

Command option: `--launch-expiredpassword manual | dialog | none`

Usage: Specify an option.

In the following example, the user can change their password using a terminal window.

```
--launch-expiredpassword manual
```

Smart Card Authentication

Usage: Select or deselect the check box.

Description

Enable users to log in with a smart card. Smart card authentication is only supported for applications running on a Microsoft Windows Server 2003 application server.

Array Manager: Application Launch Properties (Array-Wide) → Authentication → Allow Smart Card Authentication

Command Line

Command option: `--launch-allowsmartcard 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example enables users to log in using a smart card.

```
--launch-allowsmartcard 1
```

Dialog Display

Usage: Select or deselect the check boxes.

Description

Controls when the application server's authentication dialog is displayed. The check boxes are inter-related, enabling you to select from three possible options.

The command line options and their Administration Console equivalents are shown in the following table.

Administration Console	Command Line	Description
On Shift-Click (selected) On Password Problem (selected)	`user`	Show the authentication dialog if the user holds down the Shift key when they click an application's link, or if there is a password problem.
On Shift-Click (deselected) On Password Problem (selected)	`system`	Only show the authentication dialog when there is a password problem.
On Shift-Click (deselected) On Password Problem (deselected)	`none`	Never show the authentication dialog.

Array Manager: Application Launch Properties (Array-Wide) → Authentication Dialog

Command Line

Command option: `--launch-showauthdialog user | system | none`

Usage: Specify an option.

In the following example, the application server's authentication dialog is shown if you hold down the Shift key and click a link to start an application, or if there is a problem with the password.

```
--launch-showauthdialog user
```

“Save Password” Box

Usage: Select or deselect the check boxes.

Description

Two attributes that control the initial state of the Save Password check box in the application server authentication dialog and whether users can change it.

If users cannot change the setting, the Initially Checked attribute determines whether users can save passwords in the application server password cache.

Array Manager: Application Launch Properties (Array-Wide) → Save Password

Command Line

Command option: `--launch-savepassword-initial  checked | cleared`

Command option: `--launch-savepassword-state  enabled | disabled`

Usage: Specify a valid option.

In the following example, the initial state of the Save Password check box is *selected*. Users can change this setting.

```
--launch-savepassword-initial checked
--launch-savepassword-state enabled
```

“Always Use Smart Card” Box

Usage: Select or deselect the check boxes.

Description

Two attributes that control the initial state of the Always Use Smart Card check box in the application server authentication dialog box and whether users can change it.

If users cannot change the setting, the Initially Checked attribute determines whether the user’s decision to always use smart card authentication is cached.

Array Manager: Application Launch Properties (Array-Wide) → Always Use Smart Card

Command Line

Command option: `--launch-alwayssmartcard-initial checked|cleared`

Command option: `--launch-alwayssmartcard-state enabled|disabled`

Usage: Specify a valid option.

In the following example, the initial state of the Always Use Smart Card check box is *selected*. Users can change to this setting.

```
--launch-alwayssmartcard-initial checked
--launch-alwayssmartcard-state enabled
```

Display Delay

Usage: Enter a time period, measured in seconds, in the field.

Description

The delay in seconds before showing the Application Launch dialog to users.

Array Manager: Application Launch Properties (Array-Wide) → Launch Dialog

Command Line

Command option: `--launch-showdialogafter` *secs*

Usage: Replace *secs* with the delay, measured in seconds.

In the following example, the Application Launch dialog is displayed after two seconds.

```
--launch-showdialogafter 2
```

“Launch Details” Pane

Usage: Select or deselect the check boxes.

Description

Attributes that control the initial display state of the Launch Details area of the Application Launch dialog, whether users can change it and whether to show the Launch Details area if an application startup fails.

If users cannot change the setting, the Showed by Default attribute determines whether the users see the application launch details.

Array Manager: Application Launch Properties (Array-Wide) → Launch Details

Array Manager: Application Launch Properties (Array-Wide) → If Launch Fails

Command Line

Command option:

Command option: `--launch-details-state  enabled | disabled`

Command option: `--launch-details-showonerror 1 | 0`

Usage: Specify a valid option.

In the following example, the initial state of the Launch Details area is *hidden*. Users can change this setting. The Launch Details area is shown if the application fails to start.

```
--launch-details-initial hidden
--launch-details-state enabled
--launch-details-showonerror 1
```

Communication Tab

Settings on the Communication tab control connections between the client device, the SGD server, and application servers. They also control the resumability behavior for application sessions.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

This tab contains the following sections:

- Ports

  This section contains the following attributes:

- Unencrypted Connections Port
- Encrypted Connections Port

- Application Sessions

  This section contains the following attributes:

  - AIP Keepalive Frequency
  - Timeout for User Session Resumability
  - Timeout for General Resumability

- Synchronization

  This section contains the Resource Synchronization Service attribute.

Unencrypted Connections Port

Usage: Type a port number in the field.

Description

The TCP port number used for *unencrypted* connections between client devices and SGD servers.

Open this port in your firewall to enable connections from users who have standard connections. Standard connections are connections that do not use SSL.

You must restart every SGD server in the array for changes to this attribute to take effect.

The default is TCP port 3144.

Array Manager: Array Properties (Array-Wide) → Port Numbers (Unencrypted Connections)

Command Line

Command option: `--array-port-unencrypted` *tcp-port*

Usage: Replace *tcp-port* with the port number to use for unencrypted connections.

In the following example, TCP port 3144 is used for unencrypted connections.

```
--array-port-unencrypted 3144
```

Encrypted Connections Port

Usage: Type a port number in the field.

Description

The TCP port number used for *encrypted* connections between client devices and SGD servers.

Open this port in your firewall to enable connections from users who have secure (SSL-based) connections to SGD.

You must restart every SGD server in the array for changes to this attribute to take effect.

The default is TCP port 5307.

Array Manager: Array Properties (Array-Wide) → Port Numbers (Encrypted Connections)

Command Line

Command option: `--array-port-encrypted` *tcp-port*

Usage: Replace *tcp-port* with the port number to use for encrypted connections.

In the following example, TCP port 5307 is used for encrypted connections.

```
--array-port-encrypted 5307
```

AIP Keepalive Frequency

Usage: Type a time period, measured in seconds, in the field.

Description

Determines how often a keepalive message is sent to client devices during application sessions. The default value is 100 seconds.

Some Hypertext Transfer Protocol (HTTP) proxy servers close a connection if there is no activity on it. Using a keepalive ensures that a connection stays open.

Set this to `0` to disable keepalive messages.

This attribute is also used keep open connections between the SGD Client and the SGD server for client drive mapping.

Changes to this attribute take effect immediately.

Array Manager: Emulator Session Properties (Array-Wide) → AIP Keepalive

Command Line

Command option: `--sessions-aipkeepalive` *secs*

Usage: Replace *secs* with the keepalive time period, measured in seconds.

In the following example, a keepalive message is sent to the client device every 100 seconds.

```
--sessions-aipkeepalive 100
```

Timeout for User Session Resumability

Usage: Type a timeout value, measured in minutes, in the field.

Description

For applications configured to be resumable during the user session, the length of time in minutes that a suspended application session is guaranteed to be resumable for if the connection to SGD is lost. Note that if the user logs out, the application sessions end. See the Application Resumability attribute.

After this period, the SGD server ends the session.

You can override this setting using the Application Resumability: Timeout attribute of an application.

Note – If an application is terminated because the SGD Client exits unexpectedly, the timeout is the timeout plus 20 minutes.

Changes to this attribute take effect immediately.

Array Manager: Emulator Session Properties (Array-Wide) → Resumability Timeout → Webtop Session

Command Line

Command option: `--sessions-timeout-session` *mins*

Usage: Replace *mins* with the timeout value, measured in minutes.

In the following example, the application session is resumable for 1440 minutes (24 hours).

```
--sessions-timeout-session 1440
```

Timeout for General Resumability

Usage: Type a timeout value, measured in minutes, in the field.

Description

For applications configured to be generally resumable, the length of time in minutes that a suspended application session is guaranteed to be resumable for after the user logs out or the connection to SGD is lost. See the Application Resumability attribute.

After this period the SGD server ends the session.

You can override this setting using the Application Resumability: Timeout attribute of an application.

Note – If an application is terminated because the SGD Client exits unexpectedly, the timeout is the timeout plus 20 minutes.

Changes to this attribute take effect immediately.

Array Manager: Emulator Session Properties (Array-Wide) → Resumability Timeout → Always

Command Line

Command option: `--sessions-timeout-always` *mins*

Usage: Replace *mins* with the timeout value, measured in minutes.

In the following example, the application session is resumable for 11500 minutes.

```
--sessions-timeout-always 11500
```

Resource Synchronization Service

Usage: Select or deselect the check box.

Description

Whether to enable replication of resources for the array.

If enabled, synchronization starts at a time determined by the Daily Resource Synchronization Time for each SGD server in the array.

Resource synchronization is enabled by default.

Changes to this attribute take effect immediately.

Array Manager: Array Properties (Array-Wide) → Enable Resource Synchronization

Command Line

Command option: `--array-resourcesync 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example disables resource synchronization for the array.

```
--array-resourcesync 0
```

Client Device Tab

Attributes on the Client Device tab are settings for the user's client device. This tab controls the use of client device features for applications displayed through SGD.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

This tab contains the following sections:

- Client Drive Mapping

  This section contains the following attributes:

  - Client Drive Mapping
  - Windows Internet Naming Service (WINS)
  - Fallback Drive Search

- Audio

  This section contains the following attributes:

  - Windows Audio
  - Unix Audio
- Other Features

  This section contains the following attributes:

  - Smart Card
  - Serial Port Mapping
  - Copy and Paste
  - Client's Clipboard Security Level
  - Time Zone Map File
- Profile Editing

  This section contains the Editing attribute.

Client Drive Mapping

Usage: Select or deselect the check box.

Description

Whether to enable client drive mapping (CDM) for the array.

To use client drive mapping, the Sun Secure Global Desktop Enhancement Module (SGD Enhancement Module) must be installed and running on the application server.

If you enable drive mapping, CDM services only become available when you restart all SGD servers in the array. To manually start CDM services without restarting the array, run the `tarantella start cdm` command on all SGD servers in the array.

If you disable drive mapping, the CDM processes only stop when you restart all SGD servers in the array. To manually stop CDM services without restarting the array, run the `tarantella stop cdm` command on all SGD servers in the array.

Changes to this attribute only take effect for new user sessions.

Array Manager: Array Properties (Array-Wide) → Client Drive Mapping → Let Users Access Client Drives

Command Line

Command option: `--array-cdm 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example enables CDM for the array.

```
--array-cdm 1
```

Windows Internet Naming Service (WINS)

Usage: Select or deselect the check box.

Description

Whether to enable the Windows Internet Naming Service (WINS) to improve client drive access performance. Without WINS, performance can be limited by known problems with Microsoft Windows networking.

WINS services use User Datagram Protocol (UDP) port 137 on the SGD server.

Only enable WINS if either of the following is true:

- Your Microsoft Windows application servers are on the same subnet as an SGD server in the array
- Your Microsoft Windows application servers list an SGD server in the array as a WINS server

Changes to this attribute take effect on an SGD server the next time the server starts.

Array Manager: Array Properties (Array-Wide) → Client Drive Mapping → Use WINS for Better Performance

Command Line

Command option: `--array-cdm-wins 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example disables WINS services for the array.

```
--array-cdm-wins 0
```

Fallback Drive Search

Usage: Select a drive letter from the Start At list and select a Direction option.

Description

Used for client drives that cannot be mapped using the configured drive letter, because that drive letter is already in use. This attribute specifies the drive letter to start searching from and the direction to search. The first unused drive letter is used to map the client drive.

The Start At list is used to specify the drive letter to start searching from. The Direction option specifies whether the alphabetic search is done backwards or forwards.

Changes to this attribute take effect for new user sessions.

Array Manager: Array Properties (Array-Wide) → Client Drive Mapping → Fallback Drive

Command Line

Command option: `--array-cdm-fallbackdrive` *letter-direction*

Usage: Replace *letter-direction* with a drive letter to start from and a search direction.

Allowed values are of the form `[a-zA-Z][+-]`. For example, `V-` to start at drive V and search alphabetically backwards, or `f+` to search forwards from drive F. Drive letters are case-insensitive.

The default setting when CDM is enabled is to start at drive V and search backwards.

The following example starts at drive T and searches backwards.

```
--array-cdm-fallbackdrive t-
```

Windows Audio

Usage: Select or deselect the check box.

Description

Whether to enable Windows audio services for the array.

Audio is only available for applications running on a Microsoft Windows 2003 application server. Audio redirection must also be enabled on the application server.

Changes to this attribute only take effect for new user sessions.

Array Manager: Array Properties (Array-Wide) → Audio → Enable Windows Audio Service

Command Line

Command option: `--array-audio 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example disables Windows audio services for the array.

```
--array-audio 0
```

Windows Audio Sound Quality

Array Manager: Array Properties (Array-Wide) → Audio → Windows Audio Sound Quality

Usage: Select an option.

Description

The sample rate of the audio data.

Adjusting the audio quality increases or decreases the amount of audio data sent.

By default, SGD uses Medium Quality Audio.

The sample rates are as follows:

- **Low Quality Audio –** 8 kHz.
- **Medium Quality Audio –** 22.05 kHz.
- **High Quality Audio –** Same as Medium Quality Audio. This is a Terminal Services restriction.

Command Line

Command option: `--array-audio-quality  low | medium | high`

Usage: Specify an audio quality setting.

The following example specifies medium quality audio for Windows audio services.

```
--array-audio-quality medium
```

Unix Audio

Usage: Select or deselect the check box.

Description

Whether to enable UNIX audio services for the array.

UNIX audio is only available for X applications. The audio module of the SGD Enhancement Module must be installed and running on the application server.

Changes to this attribute only take effect for new user sessions.

Array Manager: Array Properties (Array-Wide) → Audio → Enable UNIX Audio Service

Command Line

Command option: `--array-unixaudio 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example disables UNIX audio services for the array.

```
--array-unixaudio 0
```

Unix Audio Sound Quality

Usage: Select an option.

Description

The sample rate of the audio data.

Adjusting the audio quality increases or decreases the amount of audio data sent.

By default, SGD uses Medium Quality Audio.

The sample rates are as follows:

- **Low Quality Audio –** 8 kHz
- **Medium Quality Audio –** 22.05 kHz
- **High Quality Audio –** 44.1 kHz

Array Manager: Array Properties (Array-Wide) → Audio → UNIX Audio Sound Quality

Command Line

Command option: `--array-unixaudio-quality  low | medium | high`

Usage: Specify an audio quality setting.

The following example specifies medium quality audio for UNIX audio services.

```
--array-unixaudio-quality medium
```

Smart Card

Usage: Select or deselect the check box.

Description

Whether to enable smart card services for the array.

Support for smart cards is only available for applications running on a Microsoft Windows Server 2003 application server.

Changes to this attribute only take effect for new user sessions.

Array Manager: Array Properties (Array-Wide) → Smart Card → Enable Smart Card Services

Command Line

Command option: `--array-scard 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example enables smart card services for the array.

```
--array-scard 1
```

Serial Port Mapping

Usage: Select or deselect the check box.

Description

Whether to enable access to serial ports for the array.

By default, access to serial ports is enabled.

Access to serial ports for individual users can be enabled and disabled using the Serial Port Mapping attribute for organization, organizational unit or user profile objects.

Changes to this attribute only take effect for new user sessions.

Array Manager: Array Properties (Array-Wide) → Serial Port → Enable Serial Port Mapping

Command Line

Command option: `--array-serialport 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example enables access to serial ports for the array.

```
--array-serialport 1
```

Copy and Paste

Usage: Select or deselect the check box.

Description

Whether to allow copy and paste operations for Windows and X application sessions for the array.

By default, copy and paste is allowed.

Copy and paste operations for individual users can be enabled and disabled using the Copy and Paste attribute for organization, organizational unit or user profile objects.

Changes to this attribute only take effect for new application sessions.

Array Manager: Array Properties (Array-Wide) → Clipboard → Enable Copy and Paste

Command Line

Command option: `--array-clipboard-enabled 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example enables copy and paste for Windows and X application sessions.

```
--array-clipboard-enabled 1
```

Client's Clipboard Security Level

Usage: Type a number in the field.

Description

The security level for the SGD Client.

Used to control copy and paste operations between Windows or X application sessions and applications running on the client device.

The security level can be any positive integer. The higher the number, the higher the security level. The default security level is 3.

Changes to this attribute only take effect for new application sessions.

Array Manager: Array Properties (Array-Wide) → Clipboard → Client Security Level

Command Line

Command option: `--array-clipboard-clientlevel` *num*

Usage: Replace *num* with a positive integer that specifies the security level.

The following example specifies a client clipboard security level of 3.

```
--array-clipboard-clientlevel 3
```

Time Zone Map File

Usage: Type the file name in the field.

Description

A file that contains mappings between UNIX client device and Windows application server time zone names.

Command Line

Command option: `--xpe-tzmapfile` *filename*

Usage: Replace *filename* with the path to the time zone map file.

In the following example, a time zone map file is specified.

```
--xpe-tzmapfile "%%INSTALLDIR%%/etc/data/timezonemap.txt"
```

Editing

Usage: Select or deselect the check box.

Description

Whether to allow users to edit their own profiles for use with the SGD Client.

By default, profile editing is enabled.

If profile editing is disabled, it is disabled for *all* users, including SGD Administrators. However, SGD Administrators can still create and edit profiles using the Profile Editor application.

Profile editing for individual users can be enabled and disabled using the Client Profile Editing attribute for organization, organizational unit, or user profile objects.

Changes to this attribute only take effect for new user sessions.

Array Manager: Array Properties (Array-Wide) → Profile Editing → Enable User Profile Editing

Command Line

Command option: `--array-editprofile 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example enables user profile editing for the array.

```
--array-editprofile 1
```

Printing Tab

Attributes on the Printing tab control printing from Windows applications that use the Microsoft Remote Desktop Protocol (RDP). The settings on this tab are default settings which can be overridden by the Client Printing: Override (`--userprintingconfig`) attribute for an organization, organizational unit, or user profile object.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

Client Printing

Usage: Select an option.

Description

Controls the client printers users can print to from Windows application.

By default, users can print to all their client printers.

If you select the No Printer option, you can still use an SGD Portable Document Format (PDF) printer.

Changes to this attribute take effect for new user sessions.

If SGD is configured so you can only print to the client's default printer and you want to print to a different printer, log out of SGD. Then change the default printer and log in to SGD again.

Array Manager: Printing Properties (Array-Wide) → Printing

Command Line

Command option: `--printing-mapprinters  2 | 1 | 0`

Usage: Specify one of the following options:

- **2 –** Allow users to print to all client printers
- **1 –** Allow users to print to the client's default printer
- **0 –** No client printers available

The following example enables the user to print to all client printers from a Windows application.

```
--printing-mapprinters 2
```

Universal PDF Printer

Usage: Select or deselect the check box.

Description

Enables users to print from a Windows application using the SGD Universal PDF printer.

When a user prints to the Universal PDF printer, the print job is converted into a PDF file and is printed on the user's client device.

This is enabled by default.

Changes to this attribute take effect for new user sessions.

Array Manager: Printing Properties (Array-Wide) → PDF Printing → Let Users Print to a PDF Printer

Command Line

Command option: `--printing-pdfenabled 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example enables printing from Windows applications to the SGD Universal PDF printer.

```
--printing-pdfenabled 1
```

Make Universal PDF Printer the Default

Usage: Select or deselect the check box.

Description

Sets the SGD Universal PDF printer as the client's default printer when printing from a Windows application.

When a user prints to the Universal PDF printer, the print job is converted into a PDF file and is printed on the user's client device.

This attribute is only available if the Universal PDF printer is enabled.

By default, the Universal PDF printer is not the default printer.

Changes to this attribute take effect for new user sessions.

Array Manager: Printing Properties (Array-Wide) → PDF Printing → Make PDF Printer the Default for Windows 2000/3

Command Line

Command option: `--printing-pdfisdefault 1 | 0`

Usage: Specify `1` (true) or `0` (false).

In the following example, the SGD Universal PDF printer is set to be the client's default printer.

```
--printing-pdfisdefault 1
```

Universal PDF Viewer

Usage: Select or deselect the check box.

Description

Enables users to print from a Windows application using the SGD Universal PDF Viewer printer.

When a user prints to the Universal PDF Viewer printer, the print job is converted into a PDF file and can be viewed, saved, or printed on the user's client device.

This attribute is enabled by default.

Changes to this attribute take effect for new user sessions.

Array Manager: Printing Properties (Array-Wide) → PDF Printing → Let Users Print to a PDF Local File

Command Line

Command option: `--printing-pdfviewerenabled 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example enables printing from Windows applications to the SGD Universal PDF Viewer printer.

```
--printing-pdfviewerenabled 1
```

Make Universal PDF Viewer the Default

Usage: Select or deselect the check box.

Description

Sets the SGD Universal PDF Viewer printer as the client's default printer when printing from a Windows application.

When a user prints to the Universal PDF Viewer printer, the print job is converted into a PDF file and can be viewed, saved or printed on the user's client device.

This attribute is only available if Universal PDF Viewer is enabled.

By default, the Universal PDF Viewer printer is not the default printer.

Changes to this attribute take effect for new user sessions.

Array Manager: Printing Properties (Array-Wide) → PDF Printing → Make PDF File Printer the Default for Windows 2000/3

Command Line

Command option: `--printing-pdfviewerisdefault 1 | 0`

Usage: Specify `1` (true) or `0` (false).

In the following example, the SGD Universal PDF Viewer printer is set to be the client's default printer.

```
--printing-pdfviewerisdefault 0
```

Postscript Printer Driver

Usage: Type the printer driver name in the field.

Description

The name of the printer driver to use for SGD PDF printing. This printer driver must be installed on every Windows application server used with SGD.

The printer driver must be a PostScript printer driver.

The default is `HP Color LaserJet 8500 PS`.

The name of the printer driver must match the name of the printer driver installed on the Windows application server exactly. Pay particular attention to the use of capitals and spaces. The `/opt/tarantella/etc/data/default.printerinfo.txt` file contains all the common printer driver names, ordered by manufacturer. To avoid errors, copy and paste the driver name from this file.

Changes to this attribute take effect for new user sessions.

Array Manager: Printing Properties (Array-Wide) → PDF Printing → Driver Name

Command Line

Command option: `--printing-pdfdriver` *driver_name*

Usage: Replace *driver_name* with the PDF printer driver name.

In the following example, an HP Laserjet 4000 driver is used for PDF printing.

```
--printing-pdfdriver "HP Laserjet 4000 Series PS"
```

Performance Tab

Attributes on the Performance tab are used to specify the following load balancing settings:

- The method for selecting the SGD server used to host the application session
- The method for selecting the application server used to host the application

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

Changes to these attributes take effect immediately.

Application Session Load Balancing

Usage: Choose an option.

Description

The algorithm used at application start time to choose the SGD server in the array that hosts the application session. In other words, the method used to choose where to run the Protocol Engine when a user starts an application.

Select the Server Hosting the User Session option to choose the SGD server in the array that is hosting the user session.

Array Manager: Load Balancing Properties (Array-Wide) → Emulator Sessions → Use Array Member With

Command Line

Command option: `--sessions-loadbalancing-algorithm` *algorithm*

Usage: Replace *algorithm* with the load balancing algorithm to use for application sessions.

The following algorithms are available:

- **Server Hosting the User Session –** `.../_beans/com.sco.tta.server.loadbalancing.tier2.LocalLoadBalancingPolicy`
- **Least CPU Load –** `.../_beans/com.sco.tta.server.loadbalancing.tier2.CpuLoadBalancingPolicy`
- **Fewest Application Sessions –** `.../_beans/com.sco.tta.server.loadbalancing.tier2.SessionLoadBalancingPolicy`

The following example specifies that the SGD server hosting the user session is used to host the application session.

```
--sessions-loadbalancing-algorithm \
.../_beans/com.sco.tta.server.loadbalancing.tier2.LocalLoadBalancingPolicy
```

Application Load Balancing

Usage: Select an option.

Description

The default algorithm SGD uses to choose the best application server to run the application. The server is selected from those defined on the application object's Hosting Application Servers tab.

This attribute is only used if the value of the application object's Application Load Balancing attribute is not set to Override Global Setting.

Select one of the following settings:

- **Most Free Memory.** Choose the application server with the most free memory.
- **Least CPU Load.** Choose the application server with the most central processing unit (CPU) idle time.

- **Fewest Applications.** Choose the application server that is running the fewest application sessions through SGD. This is the default setting.

Note – To use the Most Free Memory and Least CPU Load algorithms, you must install the SGD Enhancement Module on the application server.

Array Manager: Load Balancing Properties (Array-Wide) → Applications → Use Application Server With

Command Line

Command option: `--launch-loadbalancing-algorithm cpu | memory | sessions`

Usage: Specify a valid option.

In the following example, the application server with the fewest application sessions is used to run the application.

```
--launch-loadbalancing-algorithm sessions
```

Security Tab

Attributes on the Security tab are global security attributes which apply to all SGD servers in the array.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

New Password Encryption Key

Usage: Select or deselect the check box.

Description

Whether to generate a new encryption key for the password cache when an SGD server is restarted.

If a new encryption key is generated, the existing password cache is preserved and encrypted with the new key.

Array Manager: Security Properties (Array-Wide) → Password Cache → Generate New Encryption Key on Restart

Command Line

Command option: `--security-newkeyonrestart 1 | 0`

Usage: Specify `1` (true) or `0` (false).

In the following example, a new encryption key for the password cache is not generated when an SGD server is restarted.

```
--security-newkeyonrestart 0
```

Timeout for Print Name Mapping

Usage: Type a timeout value, measured in seconds, in the field.

Description

The period of time an entry in the print name mapping table is retained. This table is used to ensure that users can print from an application and then exit the application, without losing the print job.

The timer starts counting when the user closes the last application on the application server.

Set the timeout value to be greater than the maximum delay between choosing to print from an application and the printer responding.

If you change this value, all existing expiry timeouts are reset. Changes take effect immediately.

To flush the table, type in 0 and click Apply. You can then set the timeout to the required value.

To display the table, use the `tarantella print status --namemapping` command.

Array Manager: Security Properties (Array-Wide) → Print Name Mapping → Expire After

Command Line

Command option: `--security-printmappings-timeout` *seconds*

Usage: Replace *seconds* with the timeout value, measured in seconds.

In the following example, the print name mapping table is retained for 1800 seconds (30 minutes).

```
--security-printmappings-timeout 1800
```

Connection Definitions

Usage: Select or deselect the check box.

Description

Whether to take note of the Connections attribute when a user logs in to SGD.

Select the check box, or set the command line option to 1, if you are using the Connections attribute for user profile, organizational unit, or organization objects.

Deselect the check box if SGD security services are not enabled.

If SGD security services are enabled, connections are secure unless the check box is selected *and* some connections are defined otherwise.

Deselecting the check box enables users to log in more quickly.

Changes to this attribute take effect immediately.

Array Manager: Security Properties (Array-Wide) → Connection Types → Apply When Users Log In

Command Line

Command option: `--security-applyconnections 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example disables checking of connections for SGD log ins.

```
--security-applyconnections 0
```

X Authorization for X Display

Usage: Select or deselect the check box.

Description

Whether to secure all SGD X displays using X authorization. This prevents users from accessing X displays they are not authorized to access.

X authorization is enabled by default.

To use X authorization, `xauth` must be installed on the application server.

If X authorization is enabled, SGD checks the standard locations for the `xauth` binary. Extra configuration might be needed if the binary is in a nonstandard location.

Changes to this attribute take effect immediately.

Note – This attribute only secures the X display between the SGD server and the application server.

Array Manager: Security Properties (Array-Wide) → X Displays → Use X Authorization (xauth)

Command Line

Command option: `--security-xsecurity 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example enables X authorization.

```
--security-xsecurity 1
```

Monitoring Tab

Settings on the Monitoring tab are used to configure system message log filters and enable billing services.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

Log Filter

Usage: Type log filter definitions in the field. Press the Return key to add new entries.

Description

This attribute specifies which diagnostic messages are logged and a destination file or handler for log messages.

The attribute contains multiple values, each of the form:

component/*subcomponent*/*severity*:*destination*

Use the wildcard (`*`) to match multiple components, subcomponents and severities.

Valid destinations are a file name or the name of a plug-in log handler.

File names can include the placeholder `%%PID%%`, which is substituted with a process ID.

Changes to this attribute take effect immediately.

Array Manager: Array Properties (Array-Wide) → Log Filter

Command Line

Command option: `--array-logfilter` *filter...*

Usage: Replace *filter...* with a list of log filter definitions. Separate each *filter* definition with a space. Quote any filters that contain wildcards (`*`), to stop your shell from expanding them.

The following example specifies a log filter that stores all warnings and error messages for the SGD server to a `.log` file.

```
--array-logfilter */*/*error:jserver%%PID%%_error.log
```

Billing Service

Usage: Select or deselect the check box.

Description

Whether to enable billing services for the array.

This might use significant additional disk space on SGD servers in the array.

If enabled, you can use `tarantella query billing` to analyze the billing logs.

You must restart an SGD server for billing services to start.

Array Manager: Array Properties (Array-Wide) → Enable Billing Services

Command Line

Command option: `--array-billingservices 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example disables billing services for the array.

```
--array-billingservices 0
```

Licenses Tab

The Licenses tab consists of two sections as follows:

- The New License Key field enables you to add new SGD license keys
- The Licenses table shows a summary of license status for the array

New License Key

Usage: Type a license key in the field.

Description

To add a license key, type or paste the key into the empty field. Click the Add button to validate and activate the key.

As you add license keys, SGD updates the information in the Licenses table.

If an invalid license key is entered, a validation error message is displayed.

Array Manager: Licenses Properties (Array-Wide) → License Keys

Licenses Table

The Licenses table shows the number of user licenses and application licenses for the SGD array. The current usage of licenses is also shown.

The number of license keys is indicated in brackets at the top of the table.

Array Manager: Licenses Properties (Array-Wide) → License Summary

The Licenses table includes the following columns:

- Key
- User
- Application
- Load Management

Key

Lists the installed license keys for the SGD array.

To remove a license key, click the Delete link in the Licenses table.

As you remove license keys, SGD updates the information in the Licenses table.

If you remove all the license keys, SGD reverts to evaluation mode or expired evaluation mode, depending on how recently you installed the software.

You cannot log in to an SGD server when it is in expired evaluation mode.

To license a server when it is in expired evaluation mode, you must either add a valid license key, using `tarantella license add`, or join the server to an array that is already fully licensed.

User

Shows the number of user licenses for each license key.

Subcolumns in the User column indicate the number of standard and secure user licenses.

The current number of user licenses being used is shown in the Current Use row of the table.

A user license is used when a user logs in and freed when the user logs out.

Application

Shows the number of application licenses for each license key.

Subcolumns in the Application column indicate the number of licenses for each application type: Windows, UNIX, AS/400, and Mainframe.

The current number of application licenses being used is shown in the Current Use row of the table.

An application license is used when a user starts the first application of one of the application types. The application license is freed when the last application of the same type terminates. A second application of the same type started by the same user does not use an additional license. Suspended applications use licenses.

Load Management

Indicates whether load management is active for each license key.

Command Line

From the command line, use the `tarantella license` commands to add and remove license keys and to show license status and license usage information. See "The `tarantella license` Command" on page 651.

Caches Tab

The Caches tab is where you can view, edit, and manage the caches used by SGD for authentication.

The Caches tab includes the following tabs:

Passwords Tab

Usage: Use the Password Cache table to manage entries in the password cache.

Description

The Passwords tab lists *all* password cache entries for the SGD array.

Use the New button to add a password cache entry, using the Create New Password Cache Entry page.

Use the Edit button to edit an entry in the password cache, or the Delete button to remove an entry from the password cache.

Use the Reload button to refresh the Password Cache table.

Use the Search field to search for entries in the Password Cache table. You can use the "*" wildcard in your search string. Typing a search string of *name* is equivalent to searching for "**name***" and returns any match of the search string. The number of results returned by a search is limited to 150, by default.

Adding Entries to the Password Cache

When you create a new password cache entry, it is important that you enter a valid name in the User Identity or Server fields on the Create New Password Cache Entry page. The Administration Console supports several ways that you can enter a name in the User Identity or Server field, as follows:

- **Browse button.** If the selected User Identity Type option is Local or LDAP/Active Directory, you can use the Browse button next to the User Identity or Server field to browse for object names. Using the Browse button in this way avoids errors when typing in object names.
- **Full Name.** Type the *full name* into the field. For example, you can type in the fully qualified name for an application server from the local repository as follows:

```
.../_ens/o=appservers/cn=boston
```

- **Partial Name.** Type a *partial name*, without the namespace prefix, in the field. Depending on the selected User Identity Type option, the Administration Console adds the relevant namespace prefix when the password cache entry is saved.

  For example, if you select UNIX (User/Groups) as the User Identity Type and type `o=organization/cn=Indigo Jones` in the field, the Administration Console creates the password cache entry using the name `.../_user/o=organization/cn=Indigo Jones`.

  The Administration Console adds the `.../_user` namespace prefix when the password cache entry is saved.

  The following table shows the namespace prefixes that the Administration Console adds for the selected User Identity Type option.

User Identity Type	Namespace Prefix
Local	`.../_ens`
UNIX (User/Groups)	`.../_user`
Windows Domain Controller	`.../_wns`
LDAP/Active Directory	`.../service/sco/tta/ldapcache`
SecurID	`.../service/sco/tta/securid`
Anonymous	None
Third Party	`.../service/sco/tta/thirdparty`

  If you specify a partial name in the Server field, the Administration Console adds the `.../_ens/o=appservers` namespace prefix when the password cache entry is saved.

LDAP names must be typed in using the SGD naming format. The following example shows a partial name for a user identity from an LDAP repository:

```
dc=com/dc=example/cn=indigo-jones
```

This name is converted to the correct LDAP format when the password cache entry is saved, as follows:

```
.../_service/sco/tta/ldapcache/cn=indigo-jones,dc=example,dc=com
```

Command Line

On the command line, use the `tarantella passcache` commands to list, add, and delete password cache entries. See "The `tarantella passcache` Command" on page 710.

Tokens Tab

Usage: Use the Token Cache table to manage entries in the token cache.

Description

The Tokens tab is used to manage tokens used for the authentication token authentication mechanism. This authentication mechanism is used when the SGD Client is in Integrated mode.

The Tokens tab lists *all* token cache entries for the SGD array.

Use the Delete button to delete a token from the token cache.

Use the Reload button to refresh the Token Cache table.

Use the Search field to search for entries in the Token Cache table. You can use the "*" wildcard in your search string. Typing a search string of *name* is equivalent to searching for "**name***" and returns any match of the search string. The number of results returned by a search is limited to 150, by default.

Command Line

On the command line, use the `tarantella tokencache` commands to list and delete token cache entries. See "The `tarantella tokencache` Command" on page 770.

APPENDIX **B**

Secure Global Desktop Server Settings

Secure Global Desktop servers are machines running Sun Secure Global Desktop (SGD) software. By adding at least one other server you create an array. An array can distribute load between its servers and therefore increase reliability. One server in the array is the *primary server*, which is responsible for replicating configuration data. Other servers in the array are called *secondary servers*.

Use the Secure Global Desktop Server Settings tab to set up an SGD server array, or to configure settings for a particular SGD server.

This chapter includes the following topics:

Secure Global Desktop Servers Tab

The Secure Global Desktop Servers tab gives you an overview of the current status of each SGD server in the array, including how many user and application sessions each server is hosting.

SGD server information is shown in the Secure Global Desktop Server List table.

If you click the name of a server in the Secure Global Desktop Server List table a series of tabs are displayed. The tabs are used to view and change the configuration for the server.

The following tabs are shown:

- General Tab
- Security Tab
- Performance Tab
- Protocol Engines Tab
- User Sessions Tab
- Application Sessions Tab

The Secure Global Desktop Server List Table

The number of SGD servers in the array is indicated in brackets at the top of the table.

The Add Server button adds an SGD server to the array. The SGD server is added as a secondary server.

If you select a secondary server in the table, the Make Primary button makes the selected server the primary server in the SGD array.

The Remove Server button removes the selected SGD server from the array. The selected SGD server must be a secondary server.

You update the Secure Global Desktop Server List table by clicking the Reload button.

The Secure Global Desktop Server List table includes the following information for each SGD server in the array:

- **Server**. Domain Name System (DNS) name of the SGD server.
- **Type.** Whether the server is a primary or secondary server.

- **Status.** Server status, for example, whether the server is running.
- **Start Time.** When the server was last started.
- **Accepting Connections**. Whether the server is accepting standard connections, secure connections or both types of connection. Secure connections use the Secure Sockets Layer (SSL) to encrypt data. Standard connections do not encrypt data.
- **User Sessions.** The current number of user sessions on this server. The numbers of user sessions using standard and secure connections are shown.
- **Application Sessions.** The current number of application sessions on this server, including those that are currently suspended. The numbers of graphical application sessions and terminal-based application sessions are shown.

Command Line

From the command line, use the `tarantella array` commands to add servers to the SGD array, remove servers from the SGD array, make a secondary server the primary server, or view information about the SGD array. See "The `tarantella array` Command" on page 633.

General Tab

Attributes on the General tab are general attributes for a particular SGD server.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

Changes to these attributes take effect immediately.

External DNS Names

Usage: Type the external DNS names of this server in the field. Press the Return key after each name definition.

Description

The external DNS names of this server.

This attribute enables you to use different names, depending on the Internet Protocol (IP) address of the client.

Only change this setting if this server is known by different names on the network, for example, inside and outside a firewall.

Each name has the following format:

IP-pattern:*DNS name*

IP-pattern is a regular expression, or a subnet mask, matching a client IP address. For example, `192.168.10.*`, or `192.168.10.0/24`.

If this server only has one name, use one line matching all clients. For example, `*:www.indigo-insurance.com`.

The order of the names is important. The DNS name for the *first* matching IP pattern is used.

Note – You must restart the SGD server for a change to this setting to take effect.

Array Manager: General Properties (Server-Specific) → DNS Name

Command Line

Command option: `--server-dns-external` *IP-pattern:dns-name*

Usage: Replace *IP-pattern* with a regular expression for the client IP addresses. Replace *dns-name* with the external DNS name of the server. Use a comma to separate multiple DNS names.

In the following example, a DNS name of boston.indigo-insurance.com is used for clients with an IP address in the 192.168.10.* range. All other clients use a DNS name of www.indigo-insurance.com.

```
--server-dns-external "192.168.10.*:boston.indigo-insurance.com, \
*:www.indigo-insurance.com"
```

User Login

Usage: Select or deselect the check box.

Description

Whether to allow users to log in to this SGD server.

To “decommission” an SGD server, deselect the check box. No users can log in and no new application sessions can start. Users currently logged in to this server, or with application sessions hosted on this server, are not affected. Users can log in to another SGD server in the array and resume application sessions hosted on this server.

Users are redirected to the web page defined by the Redirection URL attribute. Typically, you set this to another SGD server in the array.

Array Manager: General Properties (Server-Specific) → Secure Global Desktop Login

Command Line

Command option: `--server-login enabled | disabled`

Usage: Specify `enabled` or `disabled`.

In the following example, user logins are disabled for the SGD host.

```
--server-login disabled
```

Redirection URL

Usage: Type a redirection Uniform Resource Locator (URL) in the field.

Description

If the SGD server does not allow users to log in, client devices are redirected to this URL.

If the attribute is not set, client devices are redirected to a page telling users that they cannot log in.

Array Manager: General Properties (Server-Specific) → Redirection URL

Command Line

Command option: `--server-redirectionurl` *url*

Usage: Replace *url* with the address of a web page to redirect to.

The following example specifies a redirection URL of `www.indigo-insurance.com`.

```
--server-redirectionurl "www.indigo-insurance.com"
```

Security Tab

Attributes on the Security tab are security attributes for a particular SGD server in the array.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

Changes to these settings take effect immediately.

Connection Types

Usage: Select the check box for each connection type you want to make available to users.

Description

The possible connection types available to users.

Secure connections use SSL to encrypt transmissions.

For standard connections, transmissions are not encrypted.

Array Manager: Security Properties (Server-Specific) → Connection Types

Command Line

Command option: `--security-connectiontypes` *types*

Usage: Specify the connection types to use.

Valid settings are `std` (standard connections only), `ssl` (secure connections only), or `std,ssl` (both standard and secure connections).

The following example specifies standard connections only.

```
--security-connectiontypes std
```

SSL Accelerator Support

Usage: Select or deselect the check box.

Description

Select the check box to enable support for an external SSL accelerator.

Selecting this check box enables the SGD SSL daemon to accept plain text traffic and pass it on to the SGD server as if it was SSL traffic it had decoded.

Array Manager: Security Properties (Server-Specific) → SSL Accelerator Support

Command Line

Command option: `--security-acceptplaintext 1 | 0`

Usage: Specify `1` (true) or `0` (false).

The following example enables SSL accelerator support.

```
--security-acceptplaintext 1
```

Firewall Forwarding URL

Usage: Type a URL in the field.

Description

The absolute URL to forward all web server traffic not related to SGD.

Use this feature if you plan to run SGD on the same port as your web server, so that you do not have to open any additional ports in your firewall.

Array Manager: Security Properties (Server-Specific) → Firewall Forwarding URL

Command Line

Command option: `--security-firewallurl` *server-url*

Usage: Replace *server-url* with a firewall forwarding URL.

The following example specifies a URL to forward all non-SGD web traffic to.

```
--security-firewallurl https://127.0.0.1:443
```

Performance Tab

Use attributes on the Performance tab to tune the SGD server.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

Maximum Simultaneous Requests

Usage: Type a number in the field.

Description

The maximum number of requests the server processes simultaneously.

As a rough guide, set this to the number of central processing units (CPUs) multiplied by 4.

Too high a setting might degrade performance.

Changes to this attribute take effect immediately.

Array Manager: Tuning Properties (Server-Specific) → Processing Limits → Maximum Simultaneous Requests

Command Line

Command option: `--tuning-maxrequests` *num*

Usage: Replace *num* with the maximum number of simultaneous requests.

The following example sets the maximum number of simultaneous requests to 7.

```
--tuning-maxrequests 7
```

Maximum Simultaneous User Sessions

Usage: Type a number in the field.

Description

The maximum number of simultaneous user sessions. A user session is defined as a connection between an SGD Client and the SGD server.

Once the limit is reached, connections are refused.

Too high a setting might degrade performance.

Changes to this attribute take effect immediately.

Array Manager: Tuning Properties (Server-Specific) → Processing Limits → Maximum Simultaneous Webtop Connections

Command Line

Command option: `--tuning-maxconnections` *num*

Usage: Replace *num* with the maximum number of simultaneous user sessions.

The following example sets the maximum number of simultaneous user sessions to 1000.

```
--tuning-maxconnections 1000
```

Maximum File Descriptors

Usage: Type a number in the field.

Description

The maximum number of open file descriptors allowed.

Increasing this value increases the number of simultaneous connections that can be handled.

This value affects all SGD server components.

Too high a setting might degrade performance.

Changes to this attribute take effect when the server restarts.

Array Manager: Tuning Properties (Server-Specific) → File Descriptors

Command Line

Command option: `--tuning-maxfiledescriptors` *num*

Usage: Replace *num* with the maximum number of open file descriptors.

The following example sets the maximum number of open file descriptors to 4096.

```
--tuning-maxfiledescriptors 4096
```

JVM Size

Usage: Type numbers in the fields.

Description

These attributes control the size and expansion rate of the memory allocated to the SGD server's Java™ Platform, Standard Edition Runtime Environment (JRE™). The following attributes are available:

- The amount of memory, in megabytes, to allocate initially for the SGD server's Java Virtual Machine (JVM™). Set this to no greater than the amount of random access memory (RAM) on the host.
- A scaling factor, expressed as a percentage, used to increase the amount of JVM software memory dynamically when needed.
- An absolute maximum size in megabytes, that is never exceeded.

Too high a setting might degrade performance.

Changes to this attribute take effect when the server or JVM software restarts.

Array Manager: Tuning Properties (Server-Specific) → Server JVM Size

Command Line

Command option: `--tuning-jvm-initial` *MB*

Usage: Replace *MB* with the initial memory allocation for the JVM software, in megabytes.

Command option: `--tuning-jvm-scale` *percent*

Usage: Replace *percentage* with a dynamic scaling factor, expressed as a percentage.

Command option: `--tuning-jvm-max` *MB*

Usage: Replace *MB* with the maximum memory allocation for the JVM software, in megabytes.

The following examples set the initial JVM software size to 58 megabytes. The amount of JVM software memory can be scaled up to 150% when needed. The maximum JVM software size is set to 512 megabytes.

```
--tuning-jvm-initial 58
--tuning-jvm-scale 150
--tuning-jvm-max 512
```

Daily Resource Synchronization Time

Usage: Type a number in the field.

Description

When to start resource synchronization each day, if enabled for the array.

Use the server's local time zone.

Express the time in 24-hour clock format. For example, use 16:00 for 4 p.m.

Changes to this attribute take effect immediately.

Array Manager: Tuning Properties (Server-Specific) → Resource Synchronization

Command Line

Command option: `--tuning-resourcesync-time` *hh:mm*

Usage: Replace *hh:mm* with the time, in 24-hour clock format.

The following example sets the resource synchronization time to 4:00 (4 a.m.)

```
--tuning-resourcesync-time 4:00
```

Load Balancing Groups

Usage: Type the load balancing groups for this SGD server in the field.

Description

This attribute is a string identifying the load balancing group for an SGD server in an array. This information can be used for application load balancing.

This attribute is used to enable optimal bandwidth usage. SGD servers are chosen from the same load balancing groups as application servers, where possible.

Leave this attribute blank unless your array spans a wide area network (WAN), or includes slow links, and you are using load balancing.

More than one string is allowed, but this slows application launch.

If used, set this attribute on all SGD servers in the array, and all application server objects in the organizational hierarchy.

Array Manager: General Properties (Server-Specific) → Location

Command Line

Command option: `--server-location` *location*

Usage: Replace *location* with a string identifying the load balancing group for the SGD server in the array.

The following example specifies a location of boston.

```
--server-location boston
```

Protocol Engines Tab

The Protocol Engines tab contains several tabs where you can change settings for the Protocol Engines running on the SGD server.

A Protocol Engine is an SGD software component that runs on an SGD server. Protocol Engines emulate native protocols, such as X11 and Microsoft Remote Desktop Protocol (RDP), and communicate with application servers. Protocol Engines also send display data to the client device using Adaptive Internet Protocol (AIP).

You can change settings for the following Protocol Engines:

- Character
- X
- Execution
- Channel
- Print
- Audio
- Smart Card

Character Protocol Engine Tab

Use the attributes on the Character Protocol Engine tab to tune terminal emulator processes.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

Changes to these attributes take effect for new Protocol Engines only. Existing Protocol Engines are not affected.

Maximum Sessions

Usage: Type a number in the field.

Description

The maximum number of application sessions each Character Protocol Engine handles.

More Character Protocol Engines are started to meet demand.

Array Manager: Character Protocol Engine Properties (Server-Specific) → Process Tuning → Maximum Sessions per Engine

Command Line

Command option: `--cpe-maxsessions` *num*

Usage: Replace *num* with the maximum number of application sessions.

The following example specifies a maximum application sessions setting of 20 for each Character Protocol Engine.

```
--cpe-maxsessions 20
```

Exit Timeout

Usage: Type a number in the field.

Description

The length of time, in seconds, a Character Protocol Engine process continues to run without any active connections.

Array Manager: Character Protocol Engine Properties (Server-Specific) → Process Tuning → Exit After

Command Line

Command option: `--cpe-exitafter` *secs*

Usage: Replace *num* with the time period, measured in seconds.

In the following example, the Protocol Engine exits after 60 seconds if there are no active connections.

```
--cpe-exitafter 60
```

Command-Line Arguments

Usage: Type command-line arguments in the field.

Description

Any arguments to the Protocol Engine. For example, the name of a log file.

Only change this setting if Technical Support ask you to.

Array Manager: Character Protocol Engine Properties (Server-Specific) → Command-Line Arguments

Command Line

Command option: `--cpe-args` *args*

Usage: Replace *args* with the arguments to pass to the Protocol Engine.

The following example specifies an error log file for the Protocol Engine.

```
--cpe-args cpeerror.log
```

X Protocol Engine Tab

Use attributes on the X Protocol Engine tab to tune graphical emulator processes.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

Changes to these attributes take effect for new Protocol Engines only. Existing Protocol Engines are not affected.

Monitor Resolution

Usage: Type a number in the field.

Description

The default monitor resolution, in dots per inch, to assume.

You can override this value using an application's Monitor Resolution attribute.

Array Manager: X Protocol Engine Properties (Server-Specific) → Monitor Resolution

Command Line

Command option: `--xpe-monitorresolution` *dpi*

Usage: Replace *dpi* with the monitor resolution, in dots per inch.

The following example specifies a monitor resolution of 96 dots per inch.

```
--xpe-monitorresolution 96
```

Font Path

Usage: Type path names for the fonts directories in the field.

Description

Directories on the SGD host containing the fonts used by the X Protocol Engine.

Font paths are listed in search order.

Use `%%INSTALLDIR%%` to represent the SGD installation directory.

You can include font servers, for example, `tcp/boston:7000`.

Array Manager: X Protocol Engine Properties (Server-Specific) → Font Path

Command Line

Command option: `--xpe-fontpath` *fontpath*

Usage: Replace *fontpath* with a list of font directories. Separate each directory in the font path with a comma ",".

The following example specifies a list of font directories used by the X Protocol Engine.

```
--xpe-fontpath %%INSTALLDIR%%/etc/fonts/misc,\
%%INSTALLDIR%%/etc/fonts/TTF,%%INSTALLDIR%%/etc/fonts/Type1
```

RGB Database

Usage: Type the path name of the RGB database file in the field.

Description

Full path name on the SGD host of the RGB database used by the X Protocol Engine to resolve color names to RGB values.

Use `%%INSTALLDIR%%` to represent the SGD installation directory.

Array Manager: X Protocol Engine Properties (Server-Specific) → RGB Database

Command Line

Command option: `--xpe-rgbdatabase` *file*

Usage: Replace *file* with the full path name of the RGB database file.

The following example specifies the RGB database used by the X Protocol Engine.

```
--xpe-rgbdatabase %%INSTALLDIR%%/etc/data/rgb.txt
```

Keyboard Map

Usage: Select the required keyboard map option. For custom keyboard maps, type a file name in the field.

Description

The default keyboard map to use for graphical applications.

To specify a keyboard map based on a locale, do one of the following:

- Select LANG Variable to use the locale of the SGD server
- Select Client's Input Locale to use the locale of the client device

The actual keyboard map used is determined using the `/opt/tarantella/etc/data/keymaps/xlocales.txt` file.

Note – You can use the * and ? wildcards in the `xlocales.txt` file to support a wide range of input locales. See the `xlocales.txt` file for details.

Alternatively, you can type a filename to always use a particular keyboard map.

You can override this for each user with the user profile object's Keyboard Map attribute.

Array Manager: X Protocol Engine Properties (Server-Specific) → Keyboard Map

Command Line

Command option: `--xpe-keymap lang | client-locale | file`

Usage: Specify a valid setting. For custom keyboard maps, replace *file* with the full path name of the keyboard map file.

In the following example, a keyboard map based on the locale of the client device is used.

```
--xpe-keymap client-locale
```

Client Window Size

Usage: Type numbers for horizontal and vertical display sizes, in pixels, in the fields.

Description

The maximum expected horizontal and vertical display resolution for client devices connecting to this server.

Use these attributes to tune the Client Window Management value of the Window Type attribute.

These attributes only apply for applications with Window Type set to Client Window Management. Use them to avoid clipping problems.

Array Manager: X Protocol Engine Properties (Server-Specific) → Client Window Management

Command Line

Command option: `--xpe-cwm-maxwidth` *pixels*

Command option: `--xpe-cwm-maxheight` *pixels*

Usage: Replace *pixels* with a value for maximum display width or maximum display height.

The following example specifies a maximum display size of 1280 x 960 pixels.

```
--xpe-cwm-maxwidth 1280
```

```
--xpe-cwm-maxheight 960
```

Session Start Timeout

Usage: Type a number in the field.

Description

How long the X Protocol Engine waits for X applications to connect, in seconds.

Array Manager: X Protocol Engine Properties (Server-Specific) → Session Start Timeout

Command Line

Command option: `--xpe-sessionstarttimeout` *seconds*

Usage: Replace *seconds* with a timeout value, in seconds.

The following example specifies a timeout value of 60 seconds when starting an X session.

```
--xpe-sessionstarttimeout 60
```

Maximum Sessions

Usage: Type a number in the field.

Description

The maximum number of application sessions each X Protocol Engine handles.

More X Protocol Engines are started to meet demand.

Array Manager: X Protocol Engine Properties (Server-Specific) → Process Tuning → Maximum Sessions per Engine

Command Line

Command option: `--xpe-maxsessions` *num*

Usage: Replace *num* with the maximum number of application sessions.

The following example specifies a maximum sessions setting of 20 for each X Protocol Engine.

```
--xpe-maxsessions 20
```

Exit Timeout

Usage: Type a number in the field.

Description

The length of time, in seconds, an X Protocol Engine process continues to run without any active connections.

Array Manager: X Protocol Engine Properties (Server-Specific) → Process Tuning → Exit After

Command Line

Command option: `--xpe-exitafter` *secs*

Usage: Replace *num* with the time period, measured in seconds.

In the following example, the Protocol Engine exits after 60 seconds if there are no active connections.

```
--xpe-exitafter 60
```

Command-Line Arguments

Usage: Type command-line arguments in the field.

Description

Any arguments to the Protocol Engine. For example, the name of a log file.

Only change this setting if Technical Support ask you to.

Array Manager: X Protocol Engine Properties (Server-Specific) → Command-Line Arguments

Command Line

Command option: `--xpe-args` *args*

Usage: Replace *args* with the arguments to pass to the Protocol Engine.

The following example specifies an error log file for the Protocol Engine.

```
--xpe-args xpeerror.log
```

Execution Protocol Engine Tab

Use the attributes on the Execution Protocol Engine tab to tune application startup processes.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

Changes to these attributes take effect for new Protocol Engines only. Existing Protocol Engines are not affected.

Maximum Sessions

Usage: Type a number in the field.

Description

The maximum number of application sessions each Execution Protocol Engine handles.

More Execution Protocol Engines are started to meet demand.

Array Manager: Execution Protocol Engine Properties (Server-Specific) → Process Tuning → Maximum Sessions per Engine

Command Line

Command option: `--execpe-maxsessions` *num*

Usage: Replace *num* with the maximum number of application sessions.

The following example specifies a maximum sessions setting of 10 for each Execution Protocol Engine.

```
--execpe-maxsessions 10
```

Exit Timeout

Usage: Type a number in the field.

Description

The length of time, in seconds, an Execution Protocol Engine process continues to run without any active connections.

Array Manager: Execution Protocol Engine Properties (Server-Specific) → Process Tuning → Exit After

Command Line

Command option: `--execpe-exitafter` *secs*

Usage: Replace *secs* with the time period, measured in seconds.

In the following example, the Protocol Engine exits after 60 seconds if there are no active connections.

```
--execpe-exitafter 60
```

Login Script Directory

Usage: Type a directory path name in the field.

Description

The directory on the SGD host where login scripts are stored.

Use `%%INSTALLDIR%%` to represent the SGD installation directory.

If an application object's Login Script attribute uses a relative path name, for example `unix.exp`, this directory is assumed.

Only change this setting if Technical Support ask you to.

Array Manager: Execution Protocol Engine Properties (Server-Specific) → Login Script Directory

Command Line

Command option: `--execpe-scriptdir` *dir*

Usage: Replace *dir* with the path name for the login script directory.

In the following example, the login script directory for a default SGD installation is `/opt/tarantella/var/serverresources/expect`.

```
--execpe-scriptdir %%INSTALLDIR%%/var/serverresources/expect
```

Command-Line Arguments

Usage: Type command-line arguments in the field.

Description

Any arguments to the Protocol Engine. For example, the name of a log file.

Only change this setting if Technical Support ask you to.

Array Manager: Execution Protocol Engine Properties (Server-Specific) → Command-Line Arguments

Command Line

Command option: `--execpe-args` *args*

Usage: Replace *args* with the arguments to pass to the Protocol Engine.

The following example specifies an error log file for the Protocol Engine.

```
--execpe-args execpeerror.log
```

Channel Protocol Engine Tab

Use the attributes on the Channel Protocol Engine tab to tune SGD channel processes. The SGD channel is used to detect information about the client. For example, to detect client drives or audio devices.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

Changes to these attributes take effect for new Protocol Engines only. Existing Protocol Engines are not affected.

Packet Compression

Usage: Choose a compression setting option.

Description

Whether a Channel Protocol Engine uses data compression on a client connection.

Select On Slow Connection to enable the Channel Protocol Engine to compress data if the connection is slow.

Array Manager: Channel Protocol Engine Properties (Server-Specific) → Compression

Command Line

Command option: `--chpe-compression auto | always | never`

Usage: Specify a valid compression setting.

The following example enables data compression for slow client connections only.

```
--chpe-compression auto
```

Packet Compression Threshold

Usage: Type a compression threshold value, measured in bytes, in the field.

Description

The smallest size of network packet that a Channel Protocol Engine can compress.

Array Manager: Channel Protocol Engine Properties (Server-Specific) → Threshold

Command Line

Command option: `--chpe-compressionthreshold` *bytes*

Usage: Replace *bytes* with a compression threshold setting, in bytes.

In the following example, a minimum packet size of 256 bytes is specified. Network packets smaller than this value are not compressed.

```
--chpe-compressionthreshold 256
```

Exit Timeout

Usage: Type a number in the field.

Description

The length of time, in seconds, a Channel Protocol Engine process continues to run without any active connections.

Array Manager: Channel Protocol Engine Properties (Server-Specific) → Process Tuning → Exit After

Command Line

Command option: `--chpe-exitafter` *secs*

Usage: Replace *secs* with the time period, measured in seconds.

In the following example, the Protocol Engine exits after 60 seconds if there are no active connections.

```
--chpe-exitafter 60
```

Print Protocol Engine Tab

Use the attributes on the Print Protocol Engine tab to tune SGD printing processes.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

Changes to these attributes take effect for new Protocol Engines only. Existing Protocol Engines are not affected.

Packet Compression

Usage: Choose a compression setting option.

Description

Whether a Print Protocol Engine uses data compression on a client connection.

Select On Slow Connection to enable the Print Protocol Engine to compress data if the connection is slow.

Array Manager: Print Protocol Engine Properties (Server-Specific) → Compression

Command Line

Command option: `--ppe-compression auto | always | never`

Usage: Specify a valid compression setting.

The following example enables data compression for slow client connections.

```
--ppe-compression auto
```

Packet Compression Threshold

Usage: Type a compression threshold value, measured in bytes, in the field.

Description

The smallest size of file that a Print Protocol Engine can compress.

Array Manager: Print Protocol Engine Properties (Server-Specific) → Threshold

Command Line

Command option: `--ppe-compressionthreshold` *bytes*

Usage: Replace *bytes* with a compression threshold setting, in bytes.

In the following example, a minimum file size of 4096 bytes is specified. Print files smaller than this value are not compressed.

```
--ppe-compression 4096
```

Exit Timeout

Usage: Type a number in the field.

Description

The length of time, in seconds, a Print Protocol Engine process continues to run without any active connections.

Array Manager: Print Protocol Engine Properties (Server-Specific) → Process Tuning → Exit After

Command Line

Command option: `--ppe-exitafter` *secs*

Usage: Replace *secs* with the time period, measured in seconds.

In the following example, the Protocol Engine exits after 240 seconds if there are no active connections.

```
--ppe-exitafter 240
```

Audio Protocol Engine Tab

Use the attributes on the Audio Protocol Engine tab to tune SGD audio processes.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

Changes to these attributes take effect for new Protocol Engines only. Existing Protocol Engines are not affected.

Packet Compression

Usage: Choose a compression setting option.

Description

Whether an Audio Protocol Engine uses data compression on a client connection.

By default, compression is off. This is to avoid unnecessarily compressing audio data that might already be compressed.

Select On Slow Connection to enable the Audio Protocol Engine to compress data if the connection is slow.

Array Manager: Audio Protocol Engine Properties (Server-Specific) → Compression

Command Line

Command option: `--audiope-compression auto | always | never`

Usage: Specify a valid compression setting.

The following example enables data compression for slow client connections only.

```
--audiope-compression auto
```

Smart Card Protocol Engine Tab

Use the attributes on the Smart Card Protocol Engine tab to tune SGD smart card processes.

From the command line, use the `tarantella config list` command to list these settings, and the `tarantella config edit` command to edit these settings.

Changes to these attributes take effect for new Protocol Engines only. Existing Protocol Engines are not affected.

Packet Compression

Usage: Choose a compression setting option.

Description

Whether a Smart Card Protocol Engine uses data compression on a client connection.

Select On Slow Connection to enable the Smart Card Protocol Engine to compress data if the connection is slow.

Array Manager: Smart Card Protocol Engine Properties (Server-Specific) → Compression

Command Line

Command option: `--scardpe-compression auto | always | never`

Usage: Specify a valid compression setting.

The following example enables data compression for slow client connections.

```
--scardpe-compression auto
```

User Sessions Tab

The User Sessions tab enables you to view and manage user sessions for the SGD server. A user session represents a user that is connected to an SGD server.

User session information is shown in the User Session List table.

The User Session List Table

The User Session List table shows details of user sessions for the SGD server.

The number of user sessions is indicated in brackets at the top of the table.

The User Session List table includes the following information for each user session:

- **User Identity.** A unique identifier for the user.
- **User Profile.** A profile that defines configuration settings and the applications available to the user.
- **Secure Global Desktop Server.** The name of the SGD server hosting the user session.
- **Login Time.** When the user logged in to the SGD server.

Use the Search options to search the User Session List table. When searching for a User Identity or User Profile, you can use the "*" wildcard in your search string. Typing a search string of *name* is equivalent to searching for "**name***" and returns any match of the search string.

To search for a Login Time, use a search string format of `yyyy/mm/dd hh:mm:ss`.

The number of results returned by a search is limited to 150, by default.

To show more details about a user session, select the check box for the user session in the User Session List table and click the View Details button.

To end a user session, select the check box for the user session in the User Session List table and click the End button.

To end all user sessions, click the Select Items Currently Displayed icon to select all user sessions and click the End button.

You can update the User Session List table by clicking the Reload button.

Command Line

From the command line, use the `tarantella webtopsession` command to list user session details, and end user sessions. See "The `tarantella webtopsession` Command" on page 782.

Application Sessions Tab

The Application Sessions tab enables you to view and manage application sessions for the SGD server.

Application session information is shown in the Application Session List table.

The Application Session List Table

The Application Session List table shows details of application sessions for the SGD server.

The number of application sessions is indicated in brackets at the top of the table.

The Application Session List table includes the following information for each application session:

- **User Identity.** A unique identifier for the user.
- **User Profile.** A profile that defines configuration settings and the applications available to the user.
- **Secure Global Desktop Server.** The name of the SGD server hosting the application session.
- **Application Server.** The name of the application server hosting the application.
- **Application.** The name of the application.
- **Start Time.** When the application was started.
- **Status.** Current state of the application, for example, whether the application is running or suspended.

You can use the Search options to search the Application Session List table. When searching for a User Identity, User Profile, Application Server, or Application, you can use the "*" wildcard in your search string. Typing a search string of *name* is equivalent to searching for "**name***" and returns any match of the search string.

To search for a Start Time, use a search string format of `yyyy/mm/dd hh:mm:ss`.

The number of results returned by a search is limited to 150, by default.

To show more details about an application session, select the check box for the application session in the Application Session List table and click the View Details button.

To end an application session, select the check box for the application session in the Application Session List table and click the End button.

To end all application sessions, click the Select Items Currently Displayed icon to select all application sessions and click the End button.

You can update the Application Session List table by clicking the Reload button.

Shadowing an application session enables you and the user to interact with the application simultaneously. To shadow an application session, select the check box for the application session in the Application Session List table and click the Shadow button.

Note – In some countries, it is illegal to shadow a user without their knowledge. It is your responsibility to comply with the law.

Shadowing is not supported for character applications or suspended applications. A warning message is shown if you attempt to shadow either of these applications.

Command Line

From the command line, use the `tarantella emulatorsession` command to list application session details, shadow application sessions, and end application sessions. See "The `tarantella emulatorsession` Command" on page 643.

APPENDIX C

User Profiles, Applications, and Application Servers

Sun Secure Global Desktop (SGD) represents users, resources, and the structure of your organization as *objects* in a directory. Different types of object have different configuration settings, known as *attributes*.

The object types used by SGD and their attributes are described in this chapter. This chapter includes the following topics:

SGD Objects

The supported object types in SGD are as follows:

- Windows Application Object
- X Application Object

3270 Application Object

Use a 3270 application object to give a 3270 application to users.

SGD uses the third-party TeemTalk for Unix emulator for 3270 applications. See the TeemTalk for Unix User's Guide supplied with SGD for details.

To create a 3270 application object, use the Administration Console or the `tarantella object new_3270app` command.

In the Administration Console, the configuration settings for 3270 application objects are divided into a series of tabs.

The *General tab* contains the attributes that control the name and the icon used when creating links for users. The attributes on the General tab are as follows:

- Name
- Comment
- Icon

The *Launch tab* contains the attributes that control how the application is started and whether application sessions can be suspended and resumed. The attributes on the Launch tab are as follows:

- Arguments for Command
- Connection Method
- Connection Method: ssh Arguments
- Login Script
- Environment Variables
- Number of Sessions
- Application Resumability
- Application Resumability: Timeout
- Keep Launch Connection Open
- Session Termination
- Window Close Action

The *Presentation tab* contains the attributes that control how the application displays to users. The attributes on the Presentation tab are as follows:

- Window Type
- Window Manager

- Window Size: Client's Maximum Size
- Window Size: Scale to Fit Window
- Window Size: Width
- Window Size: Height
- Window Color
- Window Color: Custom Color
- Hints

The *Performance tab* contains the attributes for optimizing the performance of the application. The attributes on the Performance tab are as follows:

- Command Compression
- Command Execution
- Delayed Updates
- Graphics Acceleration
- Interlaced Images
- Share Resources Between Similar Sessions

The *Client Device tab* contains the attributes that control how the user's client device interacts with the application. The attributes on the Client Device tab are as follows:

- Keyboard Map: Locked
- Euro Character
- Copy and Paste
- Copy and Paste: Application's Clipboard Security Level
- Middle Mouse Timeout
- Monitor Resolution

The *Third-Party Emulator tab* contains the attributes for the third-party TeemTalk for Unix emulator. The attributes on the Third-Party Emulator tab are as follows:

- Server Address
- Server Port
- Connection Closed Action
- Window Size: Maximized
- Menu Bar
- 'File' and 'Settings' Menus
- Displayed Soft Buttons
- Foreground Color
- Background Color
- Keyboard Type

The *Assigned User Profiles tab* lists the user profile objects that can run the application. See Assigned User Profiles Tab.

The *Application Sessions tab* lists the running and suspended application sessions for the application. See Application Sessions Tab.

5250 Application Object

Use a 5250 application object to give a 5250 application to users.

SGD uses the third-party TeemTalk for Unix emulator for 5250 applications. See the TeemTalk for Unix User's Guide supplied with SGD for details.

To create a 5250 application object use the Administration Console or the `tarantella object new_5250app` command.

In the Administration Console, the configuration settings for 5250 application objects are divided into a series of tabs.

The *General tab* contains the attributes that control the name and the icon used when creating links for users. The attributes on the General tab are as follows:

- Name
- Comment
- Icon

The *Launch tab* contains the attributes that control how the application is started and whether application sessions can be suspended and resumed. The attributes on the Launch tab are as follows:

- Arguments for Command
- Connection Method
- Connection Method: ssh Arguments
- Login Script
- Environment Variables
- Number of Sessions
- Application Resumability
- Application Resumability: Timeout
- Keep Launch Connection Open
- Session Termination
- Window Close Action

The *Presentation tab* contains the attributes that control how the application displays to users. The attributes on the Presentation tab are as follows:

- Window Type
- Window Manager
- Window Size: Client's Maximum Size
- Window Size: Scale to Fit Window
- Window Size: Width
- Window Size: Height
- Window Color
- Window Color: Custom Color
- Hints

The *Performance tab* contains the attributes for optimizing the performance of the application. The attributes on the Performance tab are as follows:

- Command Compression
- Command Execution
- Delayed Updates
- Graphics Acceleration
- Interlaced Images
- Share Resources Between Similar Sessions

The *Client Device tab* contains the attributes that control how the user's client device interacts with the application. The attributes on the Client Device tab are as follows:

- Keyboard Map: Locked
- Euro Character
- Copy and Paste
- Copy and Paste: Application's Clipboard Security Level
- Middle Mouse Timeout
- Monitor Resolution

The *Third-Party Emulator tab* contains the attributes for the third-party TeemTalk for Unix emulator. The attributes on the Third-Party Emulator tab are as follows:

- Server Address
- Server Port
- Connection Closed Action
- Window Size: Maximized
- Menu Bar
- 'File' and 'Settings' Menus
- Displayed Soft Buttons
- Foreground Color

- Background Color
- Keyboard Type

The *Assigned User Profiles tab* lists the user profile objects that can run the application. See Assigned User Profiles Tab.

The *Application Sessions tab* lists the running and suspended application sessions for the application. See Application Sessions Tab.

Application Server Object

Use an application server object to represent an application server that is used to run applications through SGD.

Application server objects are used with application load balancing. If you assign two or more application server objects to an application object, SGD chooses the application server to use, based on the load across the application servers.

To create an application server object use the Administration Console or the `tarantella object new_host` command.

In the Administration Console, the configuration settings for application server objects are divided into a series of tabs.

The *General tab* contains the attributes that control the designation and application authentication for the application server. The attributes on the General tab are as follows:

- Name
- Comment
- Address
- Application Start
- Domain Name
- Password Cache Usage
- Prompt Locale

The *Performance tab* contains the attributes for optimizing the performance of applications. See Load Balancing Groups.

The *Hosted Applications tab* lists the applications hosted on the application server. See Hosted Applications Tab.

The *Application Sessions tab* lists the running and suspended application sessions for the application server. See Application Sessions Tab.

The *Passwords tab* lists the entries of the password cache for the application server. See Passwords Tab.

Character Application Object

Use a character application object to give a VT420, Wyse 60, or SCO Console character application to users.

Character application objects support VT420, Wyse 60, or SCO Console character applications. The Emulation Type attribute determines the type of application.

To create a character application object use the Administration Console or the `tarantella object new_charapp` command.

In the Administration Console, the configuration settings for character application objects are divided into a series of tabs.

The *General tab* contains the attributes that control the name and the icon used when creating links for users. The attributes on the General tab are as follows:

- Name
- Comment
- Icon

The *Launch tab* contains the attributes that control how the application is started and whether application sessions can be suspended and resumed. The attributes on the Launch tab are as follows:

- Application Command
- Arguments for Command
- Connection Method
- Connection Method: ssh Arguments
- Login Script
- Environment Variables
- Answerback Message
- Number of Sessions
- Application Resumability
- Application Resumability: Timeout
- Window Close Action

The *Presentation tab* contains the attributes that control how the application displays to users. The attributes on the Presentation tab are as follows:

- Window Type

- Emulation Type
- Terminal Type
- Window Size: Client's Maximum Size
- Window Size: Width
- Window Size: Height
- Window Size: Columns
- Window Size: Lines
- Font Family
- Font Size: Fixed Font Size
- Font Size
- Border Style
- Cursor
- Attribute Map
- Color Map
- Scroll Style
- Status Line
- Line Wrapping
- Hints

The *Performance tab* contains the attributes for optimizing the performance of the application. The attributes on the Performance tab are as follows:

- Application Load Balancing
- Command Compression

The *Client Device tab* contains the attributes that control how the user's client device interacts with the application. The attributes on the Client Device tab are as follows:

- Keyboard Map
- Keyboard Codes Modification
- Numpad Codes Modification
- Cursor Key Codes Modification
- Escape Sequences
- Code Page

The *Hosting Application Servers tab* lists the application servers that are configured to host the application. See Hosting Application Servers Tab.

The *Assigned User Profiles tab* lists the user profile objects that can run the application. See Assigned User Profiles Tab.

The *Application Sessions tab* lists the running or suspended application sessions for the application. See Application Sessions Tab.

Directory: Organization Object

Use an organization object for things that apply to your organization as a whole.

Organization objects are always at the top of the organizational hierarchy.

Organization objects can contain organizational unit (OU) or user profile objects.

To create an organization object use the Administration Console or the `tarantella object new_org` command.

In the Administration Console, the configuration settings for organization objects are divided into a series of tabs.

The *General tab* contains the attributes that control the name of the organization. The attributes on the General tab are as follows:

- Name
- Comment

The *Printing tab* contains the attributes for users printing from Windows applications that use the Microsoft Remote Desktop Protocol (RDP). The attributes on the Printing tab are as follows:

- Client Printing: Override
- Client Printing
- Universal PDF Printer
- Make Universal PDF Printer the Default
- Universal PDF Viewer
- Make Universal PDF Viewer the Default
- Postscript Printer Driver

The *Client Device tab* contains the attributes that control how the user's client device interacts with the application. The attributes on the Client Device tab are as follows:

- Client Profile Editing
- Copy and Paste
- Serial Port Mapping
- Client Drive Mapping

The *Security tab* contains attributes that define the connections that are allowed between the client device and the SGD server. See Connections.

The *Assigned Applications tab* lists the applications that are available to users in the organization. See Assigned Applications Tab.

Directory: Organizational Unit Object

Use an organizational unit (OU) object to distinguish different departments, sites, or teams in your organization.

An OU can be contained in an organization or a domain component object.

To create an OU object use the Administration Console or the `tarantella object new_orgunit` command.

In the Administration Console, the configuration settings for OU objects are divided into a series of tabs.

The *General tab* contains the attributes that control the name of the OU. The attributes on the General tab are as follows:

- Name
- Comment

The *Printing tab* contains the attributes for users printing from Windows applications. The attributes on the Printing tab are as follows:

- Client Printing: Override
- Client Printing
- Universal PDF Printer
- Make Universal PDF Printer the Default
- Universal PDF Viewer
- Make Universal PDF Viewer the Default
- Postscript Printer Driver

The *Client Device tab* contains the attributes that control how the user's client device interacts with the application. The attributes on the Client Device tab are as follows:

- Client Profile Editing
- Copy and Paste
- Serial Port Mapping
- Client Drive Mapping

The *Security tab* contains attributes that define the connections that are allowed between the client device and the SGD server. See Connections.

The *Assigned Applications tab* lists the applications that are available to users in the organizational unit. See Assigned Applications Tab.

Directory (Light): Active Directory Container Object

Use an Active Directory container object to replicate your Microsoft Active Directory structure within the SGD organizational hierarchy.

Active Directory container objects are similar to OU objects, but do not include additional SGD-specific attributes or allow you to assign applications. This is why they are called Directory (light) objects.

An Active Directory container object can be contained in an Organization, an OU, or a Domain Component object.

To create an Active Directory container object use the Administration Console or the `tarantella object new_container` command.

In the Administration Console, the configuration settings for an Active Directory container object are divided into a series of tabs.

The General tab contains the attributes that control the name of the Active Directory container. See Name.

Directory (Light): Domain Component Object

Use a domain component object to replicate a directory structure, usually a Microsoft Active Directory structure, within the SGD organizational hierarchy.

Domain component objects are similar to organization objects, but do not include additional SGD-specific attributes or allow you to assign applications. That is why they are called Directory (light) objects.

Domain component objects can only appear at the top of the organizational hierarchy, or within another domain component object.

Domain component objects can contain OU, domain component, Active Directory container, or user profile objects

To create a domain component object use the Administration Console or the `tarantella object new_dc` command.

In the Administration Console, the configuration settings for domain component objects are divided into a series of tabs.

The *General tab* contains the attributes that control the name of the domain component. See Name.

Document Object

Use a document object to give a document to users.

A document object can refer to any Uniform Resource Locator (URL). This can be any document on the web, including Sun StarOffice documents, or Adobe Acrobat files. A document can also refer to a web application.

It is the user's *client device* that actually fetches the URL and so firewall or other security measures might prevent a user from accessing a URL.

To create a document object use the Administration Console or the `tarantella object new_doc` command.

In the Administration Console, the configuration settings for document objects are divided into a series of tabs.

The *General tab* contains the attributes that control the name and the icon used when creating links for users. The attributes on the General tab are as follows:

- Name
- Comment
- Icon

The *Launch tab* contains the the URL that is displayed when users click the link for the document. See URL.

The *Presentation tab* contains the attributes that control how the document displays to users. The attributes on the Presentation tab are as follows:

- Window Type: New Browser Window
- Hints

The *Assigned User Profiles tab* lists the user objects that can access the document. See Assigned User Profiles Tab.

Group Object

Use a group object to associate groups of applications with a user profile, OU, or organization, or to associate similar application servers for application load balancing.

Group objects are not the same as OUs. Applications and application servers can only belong to one OU, but can be a member of many different groups.

Members of a group can be moved or renamed without affecting group membership.

Group objects can be added to the following tabs for an object.

- **Assigned Applications tab.** Use this tab to assign a group of applications to a user profile, OU or organization object. The group members are shown recursively, but not the group itself. See Assigned Applications Tab.
- **Hosting Application Servers tab.** Use this tab to assign a group of application servers to an application object. The group members are used recursively for application server load balancing. See Hosting Application Servers Tab.

To create a group object use the Administration Console or the `tarantella object new_group` command.

In the Administration Console, the configuration settings for group objects are divided into a series of tabs.

The *General tab* contains the attributes that control the name of the group. The attributes on the General tab are as follows:

- Name
- Comment

The *Members tab* is used to display and edit the members of the group object. See Members Tab.

The *Assigned User Profiles tab* lists the user profile objects that can run the applications in the group. See Assigned User Profiles Tab.

The *Hosted Applications tab* lists the applications hosted on the application servers in the group. See Hosted Applications Tab.

User Profile Object

Use a user profile object to represent a user in your organization, and give that user access to applications.

Depending on the authentication mechanisms used, users might be able to log in to SGD even if they do not have a user profile object.

To use inheritance, create user profile objects within OUs. This makes administration easier and more efficient, see Inherit Assigned Applications from Parent.

To create a user profile object use the Administration Console or the `tarantella object new_person` command.

In the Administration Console, the configuration settings for user profile objects are divided into a series of tabs.

The *General tab* contains user naming attributes for user designation and authentication. The attributes on the General tab are as follows:

- Name

- Comment
- Surname
- Login
- Login: Multiple
- Login Name
- Email Address
- Domain Name

The *Printing tab* contains the attributes for users printing from Windows applications. The attributes on the Printing tab are as follows:

- Client Printing: Override
- Client Printing
- Universal PDF Printer
- Make Universal PDF Printer the Default
- Universal PDF Viewer
- Make Universal PDF Viewer the Default
- Postscript Printer Driver

The *Performance tab* contains the attributes that control the user's bandwidth limit. See Bandwidth Limit.

The *Client Device tab* contains the attributes that control how the user's client device interacts with the application. The attributes on the Client Device tab are as follows:

- Client Profile Editing
- Copy and Paste
- Keyboard Map
- Serial Port Mapping
- Client Drive Mapping

The *Security tab* contains attributes that define the connections that are allowed between the client device and the SGD server. See Connections.

The *Assigned Applications tab* lists the applications that are available to the user. See Assigned Applications Tab.

The *Passwords tab* lists the entries in the password cache for the user. See Passwords Tab.

The *Tokens tab* lists the authentication tokens for the user. See Tokens Tab.

The *User Sessions tab* lists the active user sessions for the user. See User Sessions Tab.

The *Application Sessions tab* lists the running and suspended application sessions for the user. See Application Sessions Tab.

Windows Application Object

Use a Windows application object to give a Microsoft Windows graphical application to users.

To create a Windows application object use the Administration Console or the `tarantella object new_windowsapp` command.

In the Administration Console, the configuration settings for Windows application objects are divided into a series of tabs.

The *General tab* contains the attributes that control the name and the icon used when creating links for users. The attributes on the General tab are as follows:

- Name
- Comment
- Icon

The *Launch tab* contains the attributes that control how the application is started and whether application sessions can be suspended and resumed. The attributes on the Launch tab are as follows:

- Application Command
- Arguments for Command
- Windows Protocol
- Windows Protocol: Try Running From Client First
- Arguments for Protocol
- Domain Name
- Login Script
- Environment Variables
- Number of Sessions
- Application Resumability
- Application Resumability: Timeout
- Keep Launch Connection Open
- Session Termination
- Window Close Action

The *Presentation tab* contains the attributes that control how the application displays to users. The attributes on the Presentation tab are as follows:

- Window Type
- Window Manager
- Window Size: Client's Maximum Size
- Window Size: Scale to Fit Window
- Window Size: Width
- Window Size: Height
- Color Depth
- Hints

The *Performance tab* contains the attributes for optimizing the performance of the application. The attributes on the Performance tab are as follows:

- Application Load Balancing
- Command Compression
- Command Execution
- Delayed Updates
- Graphics Acceleration
- Interlaced Images

The *Client Device tab* contains the attributes that control how the user's client device interacts with the application. The attributes on the Client Device tab are as follows:

- Keyboard Map: Locked
- Window Management Keys
- Euro Character
- Copy and Paste: Application's Clipboard Security Level
- Middle Mouse Timeout
- Monitor Resolution

The *Hosting Application Servers tab* lists the application servers hosting the application. See Hosting Application Servers Tab.

The *Assigned User Profiles tab* lists the user profile objects that can run the application. See Assigned User Profiles Tab.

The *Application Sessions tab* lists the running and suspended application sessions for the application. See Application Sessions Tab.

X Application Object

Use an X application object to give an X11 graphical application to users.

To create an X application object use the Administration Console or the `tarantella object new_xapp` command.

In the Administration Console, the configuration settings for X application objects are divided into a series of tabs.

The *General tab* contains the attributes that control the name and the icon used when creating links for users. The attributes on the General tab are as follows:

- Name
- Comment
- Icon

The *Launch tab* contains the attributes that control how the application is started and whether application sessions can be suspended and resumed. The attributes on the Launch tab are as follows:

- Application Command
- Arguments for Command
- Connection Method
- Connection Method: ssh Arguments
- X Security Extension
- Login Script
- Environment Variables
- Number of Sessions
- Application Resumability
- Application Resumability: Timeout
- Keep Launch Connection Open
- Session Termination
- Window Close Action

The *Presentation tab* contains the attributes that control how the application displays to users. The attributes on the Presentation tab are as follows:

- Window Type
- Window Manager
- Window Size: Client's Maximum Size
- Window Size: Scale to Fit Window
- Window Size: Width
- Window Size: Height
- Window Color
- Window Color: Custom Color

- Color Depth
- Hints

The *Performance tab* contains the attributes for optimizing the performance of the application. The attributes on the Performance tab are as follows:

- Application Load Balancing
- Command Compression
- Command Execution
- Delayed Updates
- Graphics Acceleration
- Interlaced Images
- Color Quality
- Share Resources Between Similar Sessions

The *Client Device tab* contains the attributes that control how the user's client device interacts with the application. The attributes on the Client Device tab are as follows:

- Keyboard Map: Locked
- Window Management Keys
- Euro Character
- Copy and Paste: Application's Clipboard Security Level
- Audio Redirection Library
- Mouse
- Middle Mouse Timeout
- Monitor Resolution

The *Hosting Application Servers tab* lists the application servers hosting the application. See Hosting Application Servers Tab.

The *Assigned User Profiles tab* lists the user profile objects that can run the application. See Assigned User Profiles Tab.

The *Application Sessions tab* lists the running and suspended application sessions for the application. See Application Sessions Tab.

Attributes Reference

This section describes the available attributes for the SGD objects.

For each attribute, usage information is given for the Administration Console. The corresponding command line is also described, where applicable.

Address

Usage: Type a Domain Name System (DNS) name, or Internet Protocol (IP) address, in the field.

Application server objects have this attribute.

Description

This attribute specifies the network address of the application server.

It is best to use the DNS name.

When you create a new application server object, the Name setting is automatically entered in the Address field.

You can use the Test button to validate that the DNS name or IP address is a valid network address. To enable the Test button, you must first save any changes you make to the General tab.

Object Manager: Address

Command Line

Command option: `--address` *address*

Usage: Replace *address* with a DNS name, preferably, or an IP address.

The following example specifies the address of the application server as `naples.indigo-insurance.com`.

```
--address naples.indigo-insurance.com
```

Answerback Message

Usage: Type a text string in the field.

Character application objects have this attribute.

Description

Defines the message to return when an inquiry is sent from the application server to the emulator.

This attribute applies to VT420 and Wyse 60 character applications only.

Object Manager: Behavior → Answerback Message

Command Line

Command option: `--answermsg` *message*

Usage: Replace *message* with the text string to use.

The following example returns the text "My message" in response to an inquiry from the application server.

```
--answermsg "My message"
```

Application Command

Usage: Type the full path name of the application in the field.

The following objects have this attribute:

- Character application
- Windows application
- X application

Description

This attribute specifies the application that runs when users click the link for the application on the webtop or in the desktop Start or Launch menu.

The path name must be the same on all application servers that might run the application.

For any command-line arguments, use the Arguments for Command attribute.

With X applications, use the Window Manager attribute to start a window manager for the application.

With Windows applications, you can use a backslash (\) or a forward slash (/) between subdirectories. On the command line you might need to escape backslashes, for example, \\.

With Windows applications, leave the field blank to start a full Microsoft Windows session rather than a particular application.

Object Manager: General → Application Command

Command Line

Command option: `--app` *pathname*

Usage: Replace *pathname* with the full path name of the application. Make sure that you quote any path names containing spaces

The following example specifies a UNIX X application.

```
--app /usr/local/bin/xfinance
```

The following example specifies a Windows application.

```
--app "c:/Program Files/Indigo Insurance/cash.exe"
```

Application Load Balancing

Usage: Select the Override Global Setting check box, and then select an option. To use the global setting defined in the Global Settings tab, deselect the Override Global Setting box.

The following objects have this attribute:

- Character application
- Windows application
- X application

Description

When the application is started, this setting determines the algorithm SGD uses to choose the application server to run the application. The server is selected from those defined on the application object's Hosting Application Servers Tab.

The default setting for this attribute is to use the setting defined on the Global Settings → Performance tab. You can override this by selecting the Override Global Setting check box and selecting an option.

The Administration Console options and their command line equivalents are shown in the following table.

Administration Console	Command Line	Description
Override Global Setting (deselected)	`default`	Use the default algorithm defined on the Global Settings → Performance tab.
Most Free Memory	`memory`	Choose the application server with the most free memory.
Least CPU Usage	`cpu`	Choose the application server with the most central processing unit (CPU) idle time.
Fewest Applications	`sessions`	Choose the application server that is running the fewest application sessions through SGD.

Note – To use the Least CPU Usage and Most Free Memory algorithms, you must install the SGD Enhancement Module on the application server.

Object Manager: General → Load Balancing Algorithm

Command Line

Command option: `--loadbal default | cpu | memory | sessions`

Usage: Specify a setting.

The following example uses the application server with the most free memory to run the application.

```
--loadbal memory
```

Application Resumability

Usage: Select an option.

The following objects have this attribute:

- Character application
- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute determines for how long a user is able to resume an application.

Administration Console	Command Line	Description
Never	`never`	The application can never be resumed. Use for applications that do not provide a mechanism for the user to exit. For example, a clock application.
During the User Session	`session`	The application keeps running and is resumable until the user logs out of SGD. If a user does not log out of SGD cleanly, for example, if they close their web browser or terminate the SGD Client without logging out, then applications that are user session resumable keep running for a time. See Application Resumability: Timeout. This is the default setting.
General	`always`	The application keeps running for a time, see Application Resumability: Timeout, after the user logs out of SGD, and can be resumed when they next log in. Use for applications that need to exit in a controlled way. For example, an email application that might need to remove lock files before it exits.

An *X application* configured with a Window Type setting of Local X Server is not resumable, whatever the value of the Application Resumability attribute.

A *Windows application* configured to run on the client device, see Windows Protocol: Try Running From Client First, is not resumable, whatever the value of the Application Resumability attribute.

Users can see if an application is resumable or not by pointing to its link on the webtop and looking at the popup window that is displayed.

The webtop has controls for suspending and resuming individual application sessions. If you are using the SGD Client in Integrated mode, applications that have a General resumability setting are automatically suspended when you log out. When you log in again, they are automatically resumed.

Object Manager: General → Resumable

Command Line

Command option: `--resumable never | session | always`

Usage: Specify one of the valid resumability settings.

In the following example, the application is never resumable.

```
--resumable never
```

In the following example, the application is resumable until the user logs out of SGD.

```
--resumable session
```

Application Resumability: Timeout

Usage: Type the number of minutes you want the application to be resumable for in the field.

The following objects have this attribute:

- Character application
- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute ensures that resources on the SGD server are used as efficiently as possible. It is used with the Application Resumability attribute to define when the SGD server ends a suspended application session.

Application Resumability Setting	Resumability Behavior
Never	Ignored.
During the User Session	If the SGD Client connection is lost, a timer starts. Once the timer reaches the value of this timeout, the SGD server ends the application session. If the user logs out of SGD, the application session ends. If an application is terminated because the SGD Client exits unexpectedly, the timeout is the timeout plus 20 minutes.
General	If the user disconnects from the SGD server in any way, including by logging out, or if the SGD Client connection is lost, a timer starts. Once the timer reaches the value of this timeout, the SGD server ends the application session. If an application is terminated because the SGD Client exits unexpectedly, the timeout is the timeout plus 20 minutes.

If you leave this setting blank, the default timeout for the Application Resumability attribute is used. You can configure the default timeouts on the Global Settings → Communication tab of the Administration Console.

Object Manager: Advanced → Resumable For

Command Line

Command option: `--resumetimeout` *mins*

Usage: Replace *mins* with the number of minutes you want the application to be resumable for.

The following example configures the application to be resumable for at least 30 minutes. This timeout is appropriate for an application configured to be resumable During the User Session.

```
--resumetimeout 30
```

Application Sessions Tab

Usage: Use the buttons in the Application Sessions tab to view and manage application sessions.

The following objects have this attribute:

- Character application
- Windows application
- X application
- 3270 application
- 5250 application
- User profile
- Application server

Description

This tab lists the running and suspended application sessions for the selected object. An application session represents an application running on an application server on behalf of a user.

To show more details about an application session, select the check box for the application session in the Application Session List table and click the View Details button.

To end an application session, select the check box for the application session in the Application Session List table and click the End button.

To shadow an application session, select the check box for the application session in the Application Session List table and click the Shadow button. Suspended applications or character applications cannot be shadowed.

Note – In some countries, it is illegal to shadow a user without their knowledge. It is your responsibility to comply with the law.

The Reload button refreshes the Application Session List table.

You can use the Search options to search the Application Session List table. When searching for a User Identity, User Profile, Secure Global Desktop Server, or Application Server, you can use the "*" wildcard in your search string. Typing a search string of *name* is equivalent to searching for "**name***" and returns any match of the search string.

To search for a Start Time, use a search string format of `yyyy/mm/dd hh:mm:ss`.

The number of results returned by a search is limited to 150, by default.

Object Manager: Sessions tab

Command Line

On the command line, use the `tarantella emulatorsession` commands to list, end, or shadow application sessions. See "The `tarantella emulatorsession` Command" on page 643.

Command option: `tarantella emulatorsession list --person` *pobj*

Usage: Replace *pobj* with the full name of the user profile object.

The following example lists application sessions for the `Indigo Jones` user profile object.

```
tarantella emulatorsession list --person \
"o=Indigo Insurance/ou=IT/cn=Indigo Jones"
```

Application Start

Usage: Select or deselect the check box.

Application server objects have this attribute.

Description

This attribute specifies whether applications can run on this application server.

Selecting the check box allows applications to run. The check box is selected by default. An application is started on the application server only if both of the following are true:

- The application server object appears on the application object's Hosting Application Servers Tab.
- The application's load balancing algorithm chooses this application server.

Deselecting the check box means that no new applications can be started on the application server. Making an application server unavailable does not affect applications that are already running. If a user has a suspended application session on the application server and the application is set up to be always resumable, the user can resume their session.

You can use this attribute, for example, to make an application server temporarily unavailable while you carry out maintenance work. If the application server is the only server configured to run a particular application, then the application is not available to users.

Object Manager: Available to Run Applications

Command Line

Command option: `--available true | false`

Usage: Specify `true` or `false`.

The following example enables the application server object to run applications.

```
--available true
```

Arguments for Command

Usage: Type the command-line arguments for the application in the field.

The following objects have this attribute:

- Character application
- Windows application
- X application
- 3270 application

- 5250 application

Description

This attribute specifies the command-line arguments to use when starting the application. The Application Command attribute specifies the application that runs, without arguments.

For X applications, *do not* include the `-display` argument. The display is set automatically for each user.

Object Manager: General → Arguments for Command

Command Line

Command option: `--args` *args*

Usage: Replace *args* with the command-line arguments for the application. Make sure you quote the arguments.

The following example runs the application with command-line arguments to set the background color to "plum4".

```
--args "-bg plum4"
```

Arguments for Protocol

Usage: Type command-line arguments for the Windows Protocol in the field.

Windows application objects have this attribute.

Description

This attribute specifies the command-line arguments to use with the Windows Protocol.

The valid settings depend on the Windows Protocol.

Object Manager: Advanced → Protocol Arguments

Command Line

Command option: `--protoargs` *args*

Usage: Replace *args* with the command-line arguments for the Windows Protocol.

The following example sets the application's working directory to `c:\mydir`. This example applies to the Microsoft RDP protocol.

```
--protoargs "-dir c:\\mydir"
```

Assigned Applications Tab

Usage: To assign applications to a user profile, organization, or OU object, click the Add button in the Editable Assignments table.

To delete applications for a user profile, organization, or OU object, use the Delete button in the Editable Assignments table.

The following objects have this attribute:

- Organization
- Organizational Unit
- User profile

Description

The Assigned Applications tab lists the applications that are assigned to the selected user profile, organizational unit or organization.

This attribute defines a series of application links available to the user. Each link is stored as *a reference to the application object*, so the same application object can be assigned to many users. If an object is moved or renamed later, all references to it are automatically updated.

If a group of applications is added to an Assigned Applications tab, the group's members and not the group are assigned.

User profile objects and organizational unit objects can inherit applications from their parent in the organizational hierarchy. See Inherit Assigned Applications from Parent. To inherit applications assigned to the parent object, select the Inherit Assigned Applications from Parent check box in the Editable Assignments area.

Object Manager: Links tab

The following sections of the Assigned Applications tab are used to display, select, and assign applications:

- Effective Applications table
- Editable Assignments table

Effective Applications Table

The Effective Applications table shows all the application objects that are assigned to the selected object. The Local Assignments section of the table lists applications that are selected from the local repository.

The Assignment Type column shows one of the following:

- **Direct.** The assignment was made using the Editable Assignments table.
- **Indirect.** The assignment is the result of another relationship, such as membership of a group, or inheritance from another object.
- **Multiple.** The assignment has multiple sources, both Direct and Indirect.

If an assignment type is Indirect or Multiple, clicking the See Details link displays information that enables you to trace the origin of the link.

Editable Assignments Table

You can use the Editable Assignments table to select applications from the local repository.

Click the Add button in the Editable Assignments table. The Add Application Assignment window is shown.

To select applications in the Add Application Assignment window, do either of the following:

- **Browse the Navigation Tree.** As you browse the tree, the Content Area is updated with applications.
- **Use the Search Applications field.** Use this field to search for applications. Type in the names of applications in the field. Note that you can use the "*" wildcard in your search string. Typing a search string of *name* is equivalent to searching for "**name***" and returns any match of the search string. Results of the search are displayed in the Search Results table in the Content Area. The number of results returned by a search is limited to 150, by default.

Select the required applications from those listed in the Content Area. When you have finished selecting applications click the Add button.

The selected applications are displayed in the Effective Applications table of the Assigned Applications tab.

To delete applications from the Assigned Applications tab, use the Delete button in the Editable Assignments table.

Command Line

Command option: `--links` *object*

Usage: Replace *object* with the full name of the object. For example, `"o=applications/ou=Finance/cn=XClaim"`. Make sure that you quote any object names containing spaces.

The following example adds `Pers-o-dat` and `Slide-o-win` as links on a webtop.

```
--links "o=applications/cn=Pers-o-dat" \
        "o=applications/cn=Slide-o-win"
```

Assigned User Profiles Tab

Usage: To assign user profiles to an application, click the Add button in the Editable Assignments table. If you are using SGD with a Lightweight Directory Access Protocol (LDAP) directory, you can also use the LDAP Searches area of the Assigned User Profiles tab to search for users in your LDAP directory server.

The following objects have this attribute:

- Character application
- Document
- Group
- Windows application
- X application
- 3270 application
- 5250 application

Description

Use this tab to define the user profile objects that can run an application, or group of applications. The application, or group of applications, is *in addition* to any applications already defined for the user profile in its Assigned Applications tab.

User profile objects can be selected from the local repository. If you are using an LDAP directory, you can also select the following:

- Users in the LDAP directory

- Groups of users in the LDAP directory
- Users in the LDAP directory that match an LDAP search criteria

The following sections of the Assigned User Profiles tab are used to display, select and assign user profile objects:

- Effective User Profiles table
- Editable Assignments table
- LDAP Searches section

Object Manager: Seen By tab

Object Manager: Directory Services Integration → LDAP Groups

Object Manager: Directory Services Integration → LDAP Search

Object Manager: Directory Services Integration → LDAP Users

Effective User Profiles Table

The Effective User Profiles table shows all the user profile objects that are assigned to the application.

The Local Assignments section of the table lists user profiles that are selected from the local repository.

The LDAP Assignments section of the table lists users and groups that are selected from an LDAP directory. This section is only shown if the Local + LDAP setting is selected for the Repository field in the User Profiles tab. You can click the Load LDAP Assignments link to refresh this area of the table.

The Assignment Type column shows one of the following:

- **Direct.** The assignment was made using the Editable Assignments table.
- **Indirect.** The assignment is the result of another relationship, such as an LDAP search, membership of a group, or inheritance from another object.
- **Multiple.** The assignment has multiple sources, both Direct and Indirect.

If an assignment type is Indirect or Multiple, clicking the See Details link displays information that enables you to trace the origin of the link.

Editable Assignments Table

You can use the Editable Assignments table to select user profile objects from the local repository, and, if you are using LDAP authentication, users, or groups in an LDAP directory.

Click the Add button in the Editable Assignments table. The Add User Assignment window is shown.

The Add User Assignment window can be used to select the following:

- User profiles from the local repository
- Users in an LDAP directory
- Groups in an LDAP directory

To use the local repository, select the Local option in the Repository list.

To use the local repository *and* your LDAP directory server, select the Local + LDAP option in the Repository list.

To select user profiles in the Add User Assignment window, do either of the following:

- **Browse the Navigation Tree.** As you browse the tree, the Content Area is updated with user profiles.
- **Use the Search User Profiles field.** Use this field to search the user profiles within the selected repositories. You can type in names of users and groups in your LDAP directory. Note that you can use the "*" wildcard in your search string. Typing a search string of *name* is equivalent to searching for "**name**" and returns any match of the search string. Results of the search are displayed in the Search Results table in the Content Area. The number of results returned by a search is limited to 150, by default. The Matched Attribute field of the Search Results table indicates the LDAP attribute that the search matched on.

Select the required user profiles from those listed in the Content Area. When you have finished selecting user profiles, click the Add button.

The selected user profiles are displayed in the Effective User Profiles table of the Assigned User Profiles tab.

To delete applications you have added to the Assigned User Profiles tab, use the Delete button in the Editable Assignments table.

LDAP Searches Section

The LDAP Searches section is used to define search criteria for locating users in an LDAP directory. You can use this feature to assign an application or group of applications to all users in an LDAP directory that match the search criteria.

The search criteria can be either of the following:

- An RFC2254-compliant LDAP search filter
- An RFC1959-compliant LDAP URL

For an RFC2254 search filter, enclose each search criteria in double quotes and brackets.

For an LDAP URL, use the format `ldap:///`*search-criteria*. If you include the host, port and return attribute specification in the URL they are ignored. This is because the LDAP directory server configured as part of SGD authentication is used.

The LDAP Search area includes two options:

- **Simple Search.** This option enables an area where you can "build" a simple LDAP search filter using the window controls. In the Filter Components table, select the attributes you want to match and define search criteria for them.
- **Advanced Search.** This option displays a field where you can type in an LDAP URL or search filter.

The Simple Search option is designed for creating LDAP search filters that are based on attributes such as `cn` and `uid`. The Advanced Search option enables you to create more complex LDAP search filters.

As you build a simple search, the LDAP filter string is shown in gray text in the Advanced Search area. If you then select the Advanced Search option, the LDAP filter string can be edited. This enables you to start with a simple search and then edit the search string manually to specify an advanced search.

You cannot revert to a simple search after specifying an advanced search that is incompatible with the capabilities of the simple search. You must delete the advanced search and re-enter the simple search.

To specify where in the LDAP directory to start searching from, click the Browse button next to the Search Root field. You can then use the Select Root for LDAP Search window to browse or search for a location in the LDAP directory. Selecting a new Search Root loads a new LDAP URL. The new URL is indicated next to the Browse button and in the Advanced Search box.

Select the Search Filter options to specify the attributes you want to match in your search. You can choose to match all of the attributes (Match All), any of the attributes (Match Any), or none of the attributes (Match None).

Click the Preview button to show the list of user profiles returned by the LDAP search.

To save the LDAP search definition, click the Save button.

Click the Load LDAP Assignments link in the Effective User Profiles tab. The user profiles from the LDAP search are displayed in the LDAP Assignments section of the Effective User Profiles table.

Command Line

On the command line, make sure that you quote any object names containing spaces.

LDAP Users

Command option: `--ldapusers` *user_dn*

Usage: Enter one or more distinguished names (DNs) of users in an LDAP directory.

The following example assigns the application or groups of applications to users with the UID "violet" in the Sales department and the UID "emmarald" in the Marketing department.

```
--ldapusers uid=violet,ou=Sales,dc=indigo-insurance,dc=com uid=
emmarald,ou=Marketing,dc=indigo-insurance,dc=com
```

LDAP Groups

Command option: `--ldapgroups` *group_dn*

Usage: Enter one or more DNs of groups in an LDAP directory.

If your organization uses nested groups (sub-groups), you might need to change the depth of the group search.

The following example assigns the application or groups of applications to users in the `managers` group in the Sales and Marketing departments.

```
--ldapgroups cn=managers,ou=Sales,dc=indigo-insurance,dc=com cn=
managers,ou=Marketing,dc=indigo-insurance,dc=com
```

LDAP Search

Command option: `--ldapsearch` *search_string*

Usage: Enter one or more LDAP search strings.

The following example assigns the application or groups of applications to any manager in the Sales department *and* anyone who has Violet Carson as their manager.

```
--ldapsearch "(&(job=manager)(dept=Sales))" \
"(manager=Violet Carson)"
```

The following example assigns the application or groups of applications to any manager in the Sales department of indigo-insurance.com.

```
--ldapsearch "ldap:///ou=Sales,dc=indigo-insurance,dc=com??sub?job=
manager"
```

Attribute Map

Usage: Type the full path name of the attribute map in the field.

Character application objects have this attribute.

Description

This attribute specifies the attribute map to use for the application. This maps attributes such as bold and underline to colors.

To use the default attribute map, leave the setting blank.

An example attribute map is installed in `/opt/tarantella/etc/data/attrmap.txt`.

Object Manager: Advanced → Attribute Map

Command Line

Command option: `--attributemap` *attrmap*

Usage: Replace *attrmap* with the full path name of the attribute map to use.

The following example uses the named attribute map.

```
--attributemap /opt/tarantella/etc/data/myattrmap.txt
```

Audio Redirection Library

Usage: Select or deselect the check box.

X application objects have this attribute.

Description

This attribute specifies whether the application enables the SGD audio redirection library.

Some X applications are hard-coded to use the `/dev/audio` or `/dev/dsp` devices for audio output. Enabling the audio redirection library causes the application to use the device specified by the `SGDAUDIODEV` environment variable instead.

Object Manager: Advanced → UNIX Audio – Enable LD_PRELOAD

Command Line

Command option: `--unixaudiopreload true | false`

Usage: Specify `true` or `false`.

The following example enables the audio redirection library for the application.

```
--unixaudiopreload true
```

Background Color

Usage: Type a valid color resource, such as `yellow`, in the field.

The following objects have this attribute:

- 3270 application
- 5250 application

Description

Specifies the background color of the application's text window.

Color names are resolved to RGB values using the file named in the X Protocol Engine's RGB Database attribute.

Object Manager: 3270 → Background Color

Object Manager: 5250 → Background Color

Command Line

Command option: `--3270bg` *color*

Command option: `--bg` *color*

Usage: Replace *color* with a valid color resource, such as `yellow`.

In the following example, the background color of the 3270 application text window is set to the color plum4.

```
--3270bg plum4
```

In the following example, the background color of the 5250 application text window is set to the color plum4.

```
--bg plum4
```

Bandwidth Limit

Usage: Select the maximum bandwidth from the list.

User profile objects have this attribute.

Description

This attribute specifies the maximum bandwidth a user can use between the client device and the SGD server for X and Windows applications.

Select None to specify no limit. The user can then use as much of the available bandwidth as possible. This gives the best application usability for the speed of the network connection.

You do not need to change this unless you have particular bandwidth restrictions. For normal use, use None.

The table below shows the bandwidth settings in the Administration Console and the equivalent values to use on the command line:

Administration Console	Command Line
2400 bps	2400
4800 bps	4800
9600 bps	9600
14.4 Kbps	14400
19.2 Kbps	19200
28.8 Kbps	28800
33.6 Kbps	33600
38.8 Kbps	38800
57.6 Kbps	57600

Administration Console	Command Line
64 Kbps	64000
128 Kbps	128000
256 Kbps	256000
512 Kbps	512000
768 Kbps	768000
1 Mbps	1000000
1.5 Mbps	1500000
10 Mbps	10000000
None	0

Object Manager: General → Bandwidth Limit

Command Line

Command option: `--bandwidth` *bandwidth*

Usage: Replace *bandwidth* with the maximum bandwidth, in bits per second.

The following example limits the user to a maximum bandwidth of 512 kilobits per second.

```
--bandwidth 512000
```

The following example enables the user to use as much of the available bandwidth as possible.

```
--bandwidth 0
```

Border Style

Usage: Select an option.

Character application objects have this attribute.

Description

This attribute determines whether the terminal window has a raised, indented, or "flat" (normal) appearance.

Object Manager: Appearance → Border Style

Command Line

Command option: `--border normal | indented | raised`

Usage: Specify the border style you want.

In the following example, the terminal window has a raised appearance.

```
--border raised
```

Client Drive Mapping

Usage: Use the Client Drive Mapping table to create client drive mapping (CDM) specifications. Use the Add, Edit and Delete buttons to create, edit and remove CDM specifications. Order the specifications using the Move Up and Move Down buttons. Any CDM specifications you create are listed in the Mappings Defined Directly section of the Client Drive Mapping table.

The following objects have this attribute:

- Organization
- Organizational Unit
- User profile

Description

This attribute defines the drives on their Microsoft Windows client device that a user can access from applications running on Microsoft Windows, UNIX, and Linux application servers, and the drive letters to use on the application server for those drives.

The Client Drive Mapping attribute is an *ordered list* of drive mapping specifications. Each specification includes the following:

- The client drive letter or type
- The access rights to grant to the client drive
- The drive letter to use on the application server to map to the client drive

Note – The first matching entry in the list is used, so make sure that the most specific settings, for example A or B, appear before more general settings, for example All Drives.

The following tables show the available options for each part of a drive mapping specification, and the corresponding value to use on the command line.

The following Client Drive options are available.

Administration Console	Command Line
All Drives	`alldrives`
Fixed Drives	`fixeddrives`
R/W Removable	`rw`
R/O Removable	`ro`
Network Drives	`networkdrives`
A:, B: ... Z:	`a, b ... z`

The following Access Rights options are available.

Administration Console	Command Line
Read Only	`ro`
Read/Write	`rw`
None	`none`

The following Drive Letter options are available.

Administration Console	Command Line
Same as Client	`same`
A:, B: ... Z:	`a, b ... z`

Object Manager: Client Drive Mapping

Command Line

Command option: `--cdm` *drive_spec*

Usage: Replace *drive_spec* with a drive mapping specification of the form *clientdrive*:*access*:*driveletter*. For example, `a:rw:z`. Separate each *drive_spec* with the pipe character, (`|`).

For a user profile object, the following example means the user is given read-write access to drive A on their client device using drive Z on the application server, and also has read-write access to all network drives defined on their client device using the same drive letter used on the client.

```
--cdm 'a:rw:z|networkdrives:rw:same'
```

The user might have access to other drives, for example a fixed drive C, depending on the Client Drive Mapping attributes for the user profile object's ancestors in the organizational hierarchy.

Client Printing

Usage: Select an option.

The following objects have this attribute:

- Organization
- Organizational Unit
- User profile

Description

Controls the client printers that users can print to when printing from Windows applications that use the Microsoft RDP Windows Protocol.

This attribute can only be edited using the Administration Console if Client Printing: Override is enabled for the object.

The setting for this attribute overrides either of the following:

- The setting for a parent object in the organizational hierarchy
- The default setting configured on the Global Settings → Printing tab of the Administration Console, if no parent object configuration exists

Changes to this attribute only take effect for new user sessions.

If you select No Printer, you can still use an SGD Portable Document Format (PDF) printer.

The Administration Console options and their command line equivalents are shown in the following table.

Administration Console	Command Line	Description
All Printers	2	Let users print to all client printers
Default Printer	1	Let users print to client's default printer
No Printer	0	No client printers are available

If users can only print to their default printer and they want to print to a different printer, they have to log out of SGD, change the default printer and then log in again.

Object Manager: Printing → Client Printers

Command Line

Command option: `--mapprinters 2|1|0`

Usage: Specify 2|1|0.

The following example enables users to print only to their default client printer.

```
--mapprinters 1
```

Client Printing: Override

Usage: For *user profile* objects or *organizational unit* objects, select the Override Parent's Settings check box. To use the setting defined for the parent object, deselect the Override Parent's Settings check box.

For *organization* objects, select the Override Global Settings check box. To use the default setting defined in the Global Settings → Client Device tab, deselect the Override Global Settings check box.

The following objects have this attribute:

- Organization
- Organizational Unit
- User profile

Description

Enables user-specific printing configuration. This configuration is used when printing from Windows applications that use the Microsoft RDP Windows Protocol.

If user-specific printing is enabled, the printing settings for this object override the following:

- The printing settings for a parent object in the organizational hierarchy.
- The default printing settings configured on the Global Settings → Printing tab of the Administration Console, if no parent object printing configuration exists.

Changes to this attribute only take effect for new user sessions.

Object Manager: Printing → User-Specific Printing Configuration

Command Line

Command option: `--userprintingconfig 1|0`

Usage: Specify `1` (true) or `0` (false).

The following example enables user-specific printing configuration.

```
--userprintingconfig true
```

Client Profile Editing

Usage: For *user profile* objects or *organizational unit* objects, select the Override Parent's Setting check box and then select or deselect the Enabled option. To use the setting defined for the parent object, deselect the Override Parent's Setting check box.

For *organization* objects, select the Override Global Setting check box and then select or deselect the Enabled option. To use the default setting defined in the Global Settings tab, deselect the Override Global Setting check box.

The following objects have this attribute:

- Organization
- Organizational Unit
- User profile

Description

This attribute controls whether or not users can create and edit profiles for use with the SGD Client.

Note – Profile editing must also be enabled on the Global Settings → Client Device tab of the Administration Console.

The Administration Console options and their command line equivalents are shown in the following table.

Administration Console	Command Line	Description
Override Parent's Setting (deselected)	`2`	**User profile objects or organizational unit objects**. Use the setting inherited from the parent object. This is the default setting.
Override Global Setting (deselected)	`2`	**Organization objects.** Use the global setting. This is the default setting.
Enabled (selected)	`1`	Enable client profile editing.
Enabled (deselected)	`0`	Disable client profile editing.

For user profile objects or organizational unit objects, deselect the Override Parent's Setting check box to inherit the setting of a parent object in the organizational hierarchy. This is used to enable or disable profile editing for many users without having to edit each user profile object.

For organization objects, deselect the Overrride Global Setting check box to use the default setting configured on the Global Settings → Client Device tab of the Administration Console.

SGD checks the user profile object for the user and then any parent object further up the organizational hierarchy to see whether profile editing is enabled or disabled. If all the objects selected are configured to use the parent's setting, then the default setting is used.

If profile editing is disabled for a user profile object in the System Objects organization, for example `o=Tarantella System Objects/cn=UNIX User Profile`, this affects *all* users who are assigned that profile.

By default, profile editing is enabled.

Object Manager: General → Profile Editing

Command Line

Command option: `--editprofile 2|1|0`

Usage: Specify 2|1|0.

The following example disables profile editing.

```
--editprofile 0
```

Code Page

Usage: Select an option.

Character application objects have this attribute.

Description

This attribute specifies the code page you want to use for the emulator. Different code pages are available for different types of character application.

Application Type	Code Pages Available
SCO Console	• 437 - International • 850 - Multilingual • 852 - Central Europe • 860 - Portuguese • 863 - Canadian-French • 865 - Danish-Norwegian
VT420	• 8859-1 - ISO Latin 1 • 8859-2 - ISO Latin 2
Wyse 60	• Multinational • Mazovia • CP852

Object Manager: Behavior → Code Page

Command Line

Command option: `--codepage 437 | 850 | 852 | 860 | 863 | 865 | 8859-1 | 8859-2 | Multinational | Mazovia | CP852`

Usage: Specify a valid setting for the type of character application.

The following example uses the ISO 8859-1 code page, appropriate for a VT420 application.

```
--codepage 8859-1
```

Color Depth

Usage: Select a setting from the list.

The following objects have this attribute:

- X application
- Windows application

Description

The color depth for the application. As the number of colors increases, more memory is required on the SGD server and on the client device, and more network bandwidth is used between them.

Object Manager: General → Color Depth

X Applications

The 16/8-bit, 24/8-bit, 8/16-bit, and 8/24-bit settings are only available to X applications.

The 16/8-bit, 24/8-bit, 8/16-bit, and 8/24-bit settings enable you to support X applications with multiple color depths. For example, if you need to run an 8-bit application in a 16-bit or 24-bit high color X application session, such as a Common Desktop Environment (CDE) desktop, use either the 16/8-bit or the 24/8-bit setting.

Changing these settings can affect system performance as follows:

- Increases the amount of memory used on the SGD server compared to an application using a single color depth.

  The amount of extra memory used for each setting is as follows:

  - The 8/16 setting uses 200% more memory
  - The 8/24 setting uses 400% more memory
  - The 16/8 setting uses 50% more memory
  - The 24/8 setting uses 25% more memory

- Increases the amount of bandwidth used.
- Degrades performance over low bandwidth connections.

To reduce network bandwidth at greater color depths for X applications, change the Color Quality setting.

Windows Applications

For Windows applications, only applications running on a Microsoft Windows 2003 Server can be displayed using 16-bit or 24-bit color. By default, a Microsoft Windows 2003 Server displays applications using 16-bit color. If the color depth setting of a Windows application object is different from that of the application server, SGD automatically adjusts the color depth to match the server setting.

Command Line

Command option: `--depth 8 | 16 | 24 | 16/8 | 24/8 | 8/16 | 8/24`

Usage: Specify a valid setting.

The following example sets the color depth for the application to 16-bit color (thousands of colors).

```
--depth 16
```

Color Map

Usage: Type the full path name of the color map in the field.

Character application objects have this attribute.

Description

This attribute specifies the color map to use for the application. A color map maps logical colors such as Color_1, Color_2 and so on, to displayed colors.

To use the default color map, `/opt/tarantella/etc/data/colormap.txt`, leave the setting blank.

Object Manager: Advanced → Color Map

Command Line

Command option: `--colormap` *colormap*

Usage: Replace *colormap* with the full path name of the color map to use.

The following example uses the named color map.

```
--colormap /usr/local/maps/mycolormap.txt
```

Color Quality

Usage: Select a setting from the list.

X application objects have this attribute.

Description

The effective color depth displayed on client devices. Reducing color quality reduces bandwidth usage, but also reduces the number of colors that can be displayed.

Note – If the Color Depth is set to 8-bit, this attribute is not available. If the Color Depth is set to 16-bit, only the 16-bit, 15-bit, 12-bit, 9-bit, and 6-bit settings are available.

The default setting Best at Applications Start fixes the color depth at the most appropriate setting according to network conditions at the time the user starts the application. The color depth does not change while the session is running.

Specify Adjust Dynamically to enable the quality level to change at any time during the session, depending on network conditions. This setting works within the following ranges:

- **24 bit images –** 12 to 24-bit color
- **16 bit images –** 12 to 16-bit color

The following table shows the effect on color quality of using a numeric quality setting.

Color Quality Setting	Approximate Color Quality for 16-bit Applications	Approximate Color Quality for 24-bit Applications
24	-	100%
21	-	88%
18	-	75%
16	100%	67%
15	94%	63%
12	75%	50%
9	56%	38%
6	38%	25%

The physical color quality of the client device is not forced to match that of the X session. If a 24-bit color session is being displayed on an 8-bit client device, the client dithers the image locally so that the session can be displayed reasonably.

Object Manager: Adaptive Internet Protocol → Color Quality

Command Line

Command option: `--quality automatic|best|24|21|18|16|15|12|9|6`

Usage: Specify a valid setting.

The following example sets the color quality to 12-bit color. If the Color Depth is set to 24-bit, this reduces color quality to approximately 50% on client devices.

```
--quality 12
```

Command Compression

Usage: Select an option.

The following objects have this attribute:

- Windows application
- X application
- 3270 application

- 5250 application
- Character application

Description

This attribute determines whether the Adaptive Internet Protocol (AIP) compresses commands for transmission.

Select Adjust Dynamically to allow compression to be turned on or off at any stage, according to the network conditions.

With some applications, compression incurs a greater overhead than transmitting commands uncompressed. Turn off compression for these applications.

Object Manager: Adaptive Internet Protocol → Command Compression

Command Line

Command option: `--compression automatic|on|off`

Usage: Specify a valid option.

The following example disables AIP command compression.

```
--compression off
```

Command Execution

Usage: Select an option.

The following objects have this attribute:

- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute determines whether the AIP protocol always executes commands in order, or optimizes commands for performance reasons.

Select Adjust Dynamically to allow the network conditions to determine the setting.

For some applications, for example those that use animation, the order that commands are executed is critical.

Object Manager: Adaptive Internet Protocol → Command Execution

Command Line

Command option: `--execution automatic|inorder|optimized`

Usage: Specify a valid option. When listing object attributes on the command line, the following applies:

- The `inorder` attribute value is displayed as `on`
- The `optimized` attribute value is displayed as `off`

The following example executes commands in the order they occur.

```
--execution inorder
```

Comment

Usage: Type a description of the object in the field.

The following objects have this attribute:

- Character application
- Document
- Group
- Application server
- Organization
- Organizational Unit
- User profile
- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute describes the object. Use this as an optional comment field for administrator notes

Descriptions can include any characters you want.

Object Manager: General → Description

Command Line

Command option: `--description` *text*

Usage: Replace *text* with a description of the object. Ensure that you quote any descriptions containing spaces.

The following example describes the object. You might use this description with a document object, for example.

```
--description "The intranet for Indigo Insurance"
```

Connection Closed Action

Usage: Select a telnet close option.

The following objects have this attribute:

- 3270 application
- 5250 application

Description

Specifies the course of action to be taken by the TeemTalk for Unix emulator when the telnet connection to the application server is closed.

The Administration Console options and their command line equivalents are shown in the following table.

Administration Console	Command Line	Description
Prompt User for Action	`0`	Prompt the user to choose to either reconnect, close the connection or exit the emulator.
Reconnect	`2`	Attempt to reconnect to the 3270 application server.
Close Connection	`3`	Close the connection.
Exit Emulator	`1`	Exit the TeemTalk for Unix emulator. The SGD application session is terminated.

Object Manager: 3270 → Close Telnet Action

Object Manager: 5250 → Close Telnet Action

Command Line

Command option: `--3270tn 0|1|2|3`

Command option: `--tn 0|1|2|3`

Usage: Specify one of the valid telnet close options.

The following example exits the emulator when the telnet connection to the 3270 application server is closed.

```
--3270tn 1
```

The following example exits the emulator when the telnet connection to the 5250 application server is closed.

```
--tn 1
```

Connection Method

Usage: Select a connection method option.

The following objects have this attribute:

- Character application
- Windows application
- X application

- 3270 application
- 5250 application

Description

This attribute specifies the mechanism used by the SGD server to access the application server and start the application.

The default connection method is `telnet`.

For character applications, only the connection methods `telnet` and `ssh` are allowed.

Object Manager: General → Connection Method

Command Line

Command option: `--method rexec | telnet | ssh`

Usage: Specify one of the valid connection methods. Not all methods are available for all types of application.

The following example uses the `telnet` connection method to log in to an application server.

```
--method telnet
```

Connections

Usage: Create as many connection type specifications as you need, using the Connection Definitions table. Use the Add, Edit, and Delete buttons to create, modify, and delete connections. Order the connections using the Move Up and Move Down buttons.

The following objects have this attribute:

- Organization
- Organizational Unit
- User profile

Description

This attribute defines, for ranges of DNS names or IP addresses, the connections that are allowed between the client device and the SGD server.

Once a user is logged in to an SGD server, the DNS names and IP addresses of the client device and the SGD server are used to determine the type of connection. First, the Connections attribute for the user profile object is selected. If no matching entry exists, the parent organizational unit's Connections attribute is selected, and so on up the organizational hierarchy to the organization object.

If no matching entry for the organization object is found, the user is given the best available connection.

Processing of connection types is turned off by default, enabling users to log in more quickly. You can turn on processing of connection types on the Security tab in the Global Settings → Security tab of the Administration Console.

The Connections attribute is an *ordered list* of connection type specifications. Each specification names the following:

- The DNS name or IP address of a client device. Use the wildcards `?` and `*` to match more than one client device.
- The DNS name or IP address of an SGD server. Use the wildcards `?` and `*` to match more than one SGD server.
- The connection type.

In all cases, DNS names or IP addresses are considered *from the perspective of the SGD server*. They are peer DNS names and IP addresses. If your network is configured to use different names on each side of a firewall, you must use the names on the side of the SGD servers for this attribute.

The following connection types are available.

Administration Console	Command Line	Notes
Standard	`STD`	Always available.
Secure	`SSL`	Gives users a secure connection between their client device and the SGD server. The connection uses Secure Sockets Layer (SSL). Only available if SGD security services are enabled. If not, users configured to receive secure connections are given standard connections instead.

Note – If security services have been enabled on the SGD server, all connections are secure until the user logs in. Once the user is known, the connection can be downgraded.

Object Manager: Connections tab

Command Line

Command option: `--conntype` *type_spec*

Usage: Replace *type_spec* with a connection type specification of the form: *client*:*server*:*type*. For example, `192.168.5.*:*:STD`.

Separate each *type_spec* with the "pipe" character, "`|`".

The following example, for a user profile object, means the user is given a secure connection to all SGD servers if the client device has an IP address that starts 192.168.5, and a standard connection for all other client devices.

```
--conntype '192.168.5.*:*:SSL|*:*:STD'
```

For an organizational unit or an organization object, these connection type specifications are used only if no match is found for the client device and SGD server in the user profile object's Connections attribute.

Connection Method: ssh Arguments

Usage: Select the ssh Connection Method option and type the `ssh` command-line arguments in the field.

The following objects have this attribute:

- Character application
- X application
- 3270 application
- 5250 application

Description

The attribute enables you to specify the command-line arguments for the `ssh` client when the Connection Method for an application is `ssh`.

See "Securing Connections to Application Servers with SSH" on page 57 for information on installing and using ssh with SGD.

Object Manager: Advanced → SSH Arguments

Command Line

Command option: `--ssharguments` *args*

Usage: Replace *args* with the `ssh` command-line arguments.

The following example configures the `ssh` client to use the `-X` command-line option when using the application. This enables X11 forwarding.

```
--ssharguments "-X"
```

Copy and Paste

Usage: For *user profile* objects or *organizational unit* objects, select the Override Parent's Setting check box and then select or deselect the Enabled option. To use the setting defined for the parent object, deselect the Override Parent's Setting check box.

For *organization* objects, select the Override Global Setting check box and then select or deselect the Enabled option. To use the default setting defined in the Global Settings → Client Device tab, deselect the Override Global Setting check box.

The following objects have this attribute:

- Organization
- Organizational Unit
- User profile

Description

This attribute controls whether users can use copy and paste in Windows or X application sessions.

For user profile objects or organizational unit objects, deselect the Override Parent's Setting check box to inherit the setting of a parent object in the organizational hierarchy. This is used to enable or disable copy and paste for many users without having to edit each user profile object.

For organization objects, deselect the Overrride Global Setting check box to use the default setting configured on the Global Settings → Client Device tab of the Administration Console.

When a user starts an application, SGD checks the user profile object for the user and then any parent object further up the organizational hierarchy to see whether copy and paste is enabled or disabled. If all the objects selected are configured to use the parent's setting, then the default setting is used.

By default, copy and paste is enabled.

The Administration Console options and their command line equivalents are shown in the following table.

Administration Console	Command Line	Description
Override Parent's Setting (deselected)	`2`	**User profile objects or organizational unit objects**. Use the setting inherited from the parent object. This is the default setting.
Override Global Setting (deselected)	`2`	**Organization objects.** Use the global setting. This is the default setting.
Enabled (selected)	`1`	Enable copy and paste.
Enabled (deselected)	`0`	Disable copy and paste.

Changes to this attribute only take effect for new application sessions.

Object Manager: General → Clipboard Access

Command Line

Command option: `--clipboard 2|1|0`

Usage: Specify 2|1|0.

The following example disables copy and paste for a user's Windows or X application sessions.

```
--clipboard 0
```

Copy and Paste: Application's Clipboard Security Level

Usage: Select the Enabled check box and type a number in the field.

The following objects have this attribute:

- Windows application
- X application

Description

This attribute is used to control user copy and paste operations in Windows or X application sessions.

Use this attribute to specify a security level. The security level can be any positive integer. The higher the number, the higher the security level.

You can only copy and paste data to an application if it has the same security level or higher as the source application. The source application is the application the data was copied from.

SGD Clients also have a security level. You can only copy and paste data to applications running on the client device if the client has the same security level or higher as the source application. See "Client's Clipboard Security Level" on page 442.

The default security level is 3.

Changes to this attribute only take effect for new application sessions.

Object Manager: General → Clipboard Security Level

Command Line

Command option: `--clipboardlevel` *level*

Usage: Replace *level* with the security level. Specify `-1` to disable copy and paste operations for the application object.

The following example sets the security level for an application to 5. You can only copy and paste data to this application if the source application or SGD Client has a security level of 5 or less.

```
--clipboardlevel 5
```

Cursor

Usage: Select a cursor style option.

Character application objects have this attribute.

Description

This attribute specifies how you want the cursor to appear within the application.

Object Manager: Appearance → Cursor

Command Line

Command option: `--cursor off | block | underline`

Usage: Specify the cursor style you want.

The following example uses an underline for the cursor.

```
--cursor underline
```

Cursor Key Codes Modification

Usage: Select or deselect the check box.

Character application objects have this attribute.

Description

This attribute specifies the behavior of the cursor keys. It determines whether they always generate cursor movement codes, or whether the application changes the codes generated by the cursor keys.

This attribute applies to VT420 character applications only.

Object Manager: Behavior → Cursor Keys

Command Line

Command option: `--cursorkeys application | cursor`

Usage: Specify the cursor key behavior you want.

In the following example, the cursor keys always generate cursor movement codes.

```
--cursorkeys cursor
```

Delayed Updates

Usage: Select or deselect the check box.

The following objects have this attribute:

- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute specifies whether delayed updates of the display are enabled. This accumulates changes and can improve performance.

If your application's display must always be exact, deselect the check box. To improve performance, turn off delayed updates for animation.

Object Manager: Adaptive Internet Protocol → Allow Delayed Updates

Command Line

Command option: `--delayed true|false`

Usage: Specify `true` or `false`.

The following example enables delayed updates of the application's display.

```
--delayed true
```

Displayed Soft Buttons

Usage: Select an option.

The following objects have this attribute:

- 3270 application
- 5250 application

Description

Specifies how many levels of “soft buttons” are displayed.

Object Manager: 3270 → Soft Button Levels

Object Manager: 5250 → Soft Button Levels

Command Line

Command option: `--3270bl 0|1|2|3|4`

Command option: `--bl 0|1|2|3|4`

Usage: Specify a level between 0 and 4.

The following example sets the number of levels of “soft buttons” for a 3270 application to 2.

```
--3270bl 2
```

The following example sets the number of levels of “soft buttons” for a 5250 application to 2.

```
--bl 2
```

Domain Name

Usage: Type the domain to use for application server authentication in the field.

The following objects have this attribute:

- Application server
- Windows application
- User profile

Description

This attribute specifies the domain to use for the application server authentication process.

Note – This attribute plays no part in the SGD login.

Object Manager: General → Windows NT Domain

Command Line

Command option: `--ntdomain` *dom*

Usage: Replace *dom* with the domain to use for application server authentication.

The following example authenticates using the domain indigo.

```
--ntdomain indigo
```

Email Address

Usage: Type the user's email address in the field.

User profile objects have this attribute.

Description

This attribute specifies a user's email address, in the form: *name@domain*

When authenticating users, SGD might use this attribute for identifying the user.

Object Manager: General → Email Address

Command Line

Command option: `--email` *email*

Usage: Replace *email* with the user's email address.

The following example defines the email address of the user as `indigo@indigo-insurance.com`.

```
--email indigo@indigo-insurance.com
```

Emulation Type

Usage: Select an emulation type option.

Character application objects have this attribute.

Description

This attribute identifies the type of emulation required for the application: SCO Console, VT420, or Wyse 60. Set the correct Terminal Type for the selected Emulation Type.

Not all character application attributes apply to all emulation types. In the Administration Console, selecting an emulation type option enables and disables other attributes for the object.

Object Manager: General → Emulation Type

Command Line

Command option: `--emulator scoconsole | vt420 | wyse60`

Usage: Specify the correct emulation type.

The following example uses Wyse 60 terminal emulation for the application.

```
--emulator wyse60
```

Environment Variables

Usage: Type the environment variables in the field, one on each line. Press Return to add new entries.

The following objects have this attribute:

- Character application
- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute specifies any environment variable settings needed to run the application. For example, you might need to set `LD_LIBRARY_PATH` to access shared libraries.

Quote any environment variable setting with a value containing spaces.

Do not set the `DISPLAY` variable. SGD sets the display automatically for each user.

Object Manager: Advanced → Environment Variables

Command Line

Command option: `--env` *setting*

Usage: Replace *setting* with an environment variable setting, of the form *VARIABLE=value*. To set more than one variable, use multiple `--env` arguments.

The following example runs the application with two environment variables set.

```
--env LD_LIBRARY_PATH=/usr/lib "MY_VARIABLE=603 1769"
```

Escape Sequences

Usage: Select an option.

Character application objects have this attribute.

Description

This attribute specifies how escape sequences are sent from the emulator to the application server. Escape sequences can be sent as 7-bit or 8-bit control codes.

This attribute applies to VT420 character applications only.

Object Manager: Behavior → Escape Sequences

Command Line

Command option: `--escape 7-bit | 8-bit`

Usage: Specify a valid setting.

The following example sends escape sequences using 8-bit control codes.

```
--escape 8-bit
```

Euro Character

Usage: Select a setting from the list.

The following objects have this attribute:

- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute specifies the keycode mapping required by the application to support the euro character. Most euro-compliant applications currently use iso8859-15. If in doubt, check your X application's documentation to see which method to use.

To use the euro character with SGD, the client device must be capable of entering the character.

To display the euro character, you must configure your application to use an iso8859-15 font. Add one of the following to the Arguments for Command attribute:

```
-fn 5x7euro
-fn 6x10euro
-fn 6x13euro
-fn 6x13boldeuro
-fn 7x13euro
-fn 7x13boldeuro
-fn 7x14euro
-fn 7x14boldeuro
-fn 8x13euro
-fn 8x13boldeuro
-fn 8x16euro
-fn 9x15euro
-fn 9x15boldeuro
-fn 10x20euro
-fn 12x24euro
```

This ensures that the application uses the iso8859-15 fonts supplied with SGD. You can use your own fonts if you wish. However, to display the euro character they must be iso8859-15 compliant.

The application server must also support the euro character.

Object Manager: Advanced → Euro Character

Command Line

Command option: `--euro unicode|iso8859-15`

Usage: Specify a valid option.

The following example enables iso8859-15 keycode mapping.

```
--euro iso8859-15
```

'File' and 'Settings' Menus

Usage: Select or deselect the check box.

The following objects have this attribute:

- 3270 application
- 5250 application

Description

Specifies whether or not the File and Settings menu items are enabled. When disabled, only the window resize buttons are displayed in the menu bar.

Object Manager: 3270 → Enable File and Settings Menus

Object Manager: 5250 → Enable File and Settings Menus

Command Line

Command option: `--3270si true|false`

Command option: `--si true|false`

Usage: Specify `true` or `false`.

The following example enables the File and Settings menu items for a 3270 application.

```
--3270si true
```

The following example enables the File and Settings menu items for a 5250 application.

```
--si true
```

Font Family

Usage: Select a font family from the list.

Character application objects have this attribute.

Description

This attribute determines the font family used within the terminal window for the application.

Only Courier, Helvetica, or Times Roman can be used. It is not possible to use any other font family.

Object Manager: Appearance → Font Family

Command Line

Command option: `--font courier | helvetica | timesroman`

Usage: Specify a valid font family.

The following example uses the Times Roman font in the application's terminal window.

```
--font timesroman
```

Font Size

Usage: Type a font size, in points, in the field.

Character application objects have this attribute.

Description

This attribute defines the font size in the terminal window, in the range 2-20 points.

Object Manager: Appearance → Font Size

Command Line

Command option: `--fontsize` *points*

Usage: Replace *points* with the font size in points.

The following example uses a 16-point font in the terminal window.

```
--fontsize 16
```

Font Size: Fixed Font Size

Usage: Select or deselect the Fixed Font Size check box.

Character application objects have this attribute.

Description

If this attribute is not selected, the emulator chooses a font size that fits the defined number of Window Size: Columns and Window Size: Lines into the Window Size: Width and Window Size: Height defined for the application. The application's Font Size setting is used as a minimum value.

If this attribute is selected, the Font Size defined is used, and scroll bars appear if necessary.

Note – If this attribute is selected, the Window Size: Client's Maximum Size attribute is ignored.

Object Manager: Appearance → Fixed Font Size

Command Line

Command option: `--fixedfont true|false`

Usage: Specify `true` or `false`.

The following example uses the font size specified by Font Size for the terminal window.

```
--fixedfont true
```

Foreground Color

Usage: Type a valid color resource, such as `yellow`, in the field.

The following objects have this attribute:

- 3270 application
- 5250 application

Description

Specifies the color of the text in the application's text window.

Color names are resolved to RGB values using the file named in the X Protocol Engine's RGB Database attribute.

Object Manager: 3270 → Foreground Color

Object Manager: 5250 → Foreground Color

Command Line

Command option: `--3270fg` *color*

Command option: `--fg` *color*

Usage: Replace *color* with a valid color resource, such as `yellow`.

In the following example, the text in the 3270 application's text window is set to the color plum4.

```
--3270fg plum4
```

In the following example, the text in the 5250 application's text window is set to the color plum4.

```
--fg plum4
```

Graphics Acceleration

Usage: Select or deselect the check box.

The following objects have this attribute:

- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute specifies whether acceleration is enabled. Acceleration optimizes how graphics are rendered and improves performance at the expense of smoothness and exactness. For example, colors might not always be exact.

If your application's display must always be exact, deselect the check box.

Object Manager: Adaptive Internet Protocol → Use Graphics Acceleration

Command Line

Command option: `--accel true | false`

Usage: Specify `true` or `false`.

The following example enables graphics acceleration for the application's display.

```
--accel true
```

Hints

Usage: Type the hints in the field. Separate each hint with a semi-colon.

The following objects have this attribute:

- Character application
- Document
- Windows application
- X application
- 3270 application

- 5250 application

Description

This attribute enables you to define one or more strings that can be used to control the publishing and display of objects on the webtop.

You can use any number of strings and the strings can be anything. Separate each hint with a semi-colon. Use a name=value naming convention for webtop hints.

This attribute is blank by default.

This attribute is for developers who are using the SGD web services to develop custom webtops.

Object Manager: General → Webtop Hints

Command Line

Command option: `--hints` *hint*`...`

Usage: Replace *hint* with the webtop hint. Separate each hint with a semi-colon.

The following example sets a hint that might be used to specify the size of the webtop icon for the application.

```
--hints "preferredsize=16;"
```

Hosted Applications Tab

Usage: To assign applications to an application server object, click the Add button in the Editable Assignments table.

To delete applications for an application server object, use the Delete button in the Editable Assignments table.

Application server objects have this attribute.

Description

The Hosted Applications tab lists the applications that are hosted by the application server.

Object Manager: Seen By tab

The following sections of the Hosted Applications tab are used to display, select and assign applications:

- Effective Applications table
- Editable Assignments table

Effective Applications Table

The Effective Applications table shows all the application objects that are assigned to the selected object. The Local Assignments section of the table lists applications that are selected from the local repository.

The Assignment Type column shows one of the following:

- **Direct.** The assignment was made using the Editable Assignments table.
- **Indirect.** The assignment is the result of another relationship, such as membership of a group, or inheritance from another object.
- **Multiple.** The assignment has multiple sources, both Direct and Indirect.

If an assignment type is Indirect or Multiple, clicking the See Details link displays information that enables you to trace the origin of the link.

Editable Assignments Table

You can use the Editable Assignments table to select applications from the local repository.

Click the Add button in the Editable Assignments table. The Add Application Assignment window is shown.

To select applications in the Add Application Assignment window, do either of the following:

- **Browse the Navigation Tree.** As you browse the tree, the Content Area is updated with applications.
- **Use the Search Applications field.** Use this field to search for applications. Type in the names of applications in the field. Note that you can use the "*" wildcard in your search string. Typing a search string of *name* is equivalent to searching for "**name***" and returns any match of the search string. Results of the search are displayed in the Search Results table in the Content Area. The number of results returned by a search is limited to 150, by default.

Select the required applications from those listed in the Content Area. When you have finished selecting applications click the Add button.

The selected applications are displayed in the Effective Applications table of the Hosted Applications tab.

To delete applications from the Hosted Applications tab, use the Delete button in the Editable Assignments table.

Command Line

There is no command-line equivalent for this attribute.

Hosting Application Servers Tab

Usage: To assign application servers to a character, Windows, or X application object, click the Add button in the Editable Assignments table.
To delete application servers for a character, Windows, or X application object, use the Delete button in the Editable Assignments table.

The following objects have this attribute:

- Character application
- Windows application
- X application

Description

This attribute defines the application servers that can run the application. The SGD server uses application server load balancing to determine the application server to use. Each application server is stored as *a reference to the object*, so a particular object can appear on many Hosting Application Server tabs. If an object is moved or renamed later, all references to it are automatically updated.

If a group is added to a Hosting Application Servers tab, the group's members and not the group are used for application server load balancing.

If you do not specify any application servers to run the application, the application can run on any SGD server in the array that supports that type of application.

Object Manager: Hosts tab

The following sections of the Hosting Application Servers tab are used to display, select and assign applications:

- Effective Application Servers table
- Editable Assignments table

Effective Application Servers Table

The Effective Application Servers table shows all the application server objects that are assigned to the selected object. The Local Assignments section of the table lists applications that are selected from the local repository.

The Assignment Type column shows one of the following:

- **Direct.** The assignment was made using the Editable Assignments table.
- **Indirect.** The assignment is the result of another relationship, such as membership of a group, or inheritance from another object.
- **Multiple.** The assignment has multiple sources, both Direct and Indirect.

If an assignment type is Indirect or Multiple, clicking the See Details link displays information that enables you to trace the origin of the link.

Editable Assignments Table

You can use the Editable Assignments table to select application servers from the local repository.

Click the Add button in the Editable Assignments table. The Add Application Server Assignment window is shown.

To select application servers in the Add Application Server Assignment window, do either of the following:

- **Browse the Navigation Tree.** As you browse the tree, the Content Area is updated with application servers.
- **Use the Search Application Servers field.** Use this field to search for application servers. Type in the names of application servers in the field. Note that you can use the "*" wildcard in your search string. Typing a search string of *name* is equivalent to searching for "**name***" and returns any match of the search string. Results of the search are displayed in the Search Results table in the Content Area. The number of results returned by a search is limited to 150, by default.

Select the required application servers from those listed in the Content Area. When you have finished selecting application servers click the Add button.

The selected application servers are displayed in the Effective Application Servers table of the Hosting Application Servers tab.

To delete application servers from the Hosting Application Servers tab, use the Delete button in the Editable Assignments table.

Command Line

Command option: `--appserv` *object*

Usage: Replace *object* with the full name of an object, for example, `"o=appservers/ou=IT/cn=london"`. Make sure that you quote any object names containing spaces.

The following example adds `geneva` and `prague` as application servers for an application.

```
--appserv "o=appservers/ou=IT/cn=geneva" \
        "o=appservers/cn=prague"
```

Icon

Usage: Click the Edit button and select an icon option from the Select Application Icon list. Click OK to save the setting.

The following objects have this attribute:

- Character application
- Windows application
- X application
- Document
- 3270 application
- 5250 application

Description

This attribute specifies the icon that users see on their webtop, or their desktop Start menu or Launch menu.

Object Manager: General → Webtop Icon

Command Line

Command option: `--icon` *icon_name*

Usage: Replace *icon_name* with a file name, including the extension. For example, `spreadsheet.gif`.

The following example uses the `clock.gif` icon.

```
--icon clock.gif
```

Inherit Assigned Applications from Parent

Usage: Select or deselect the check box and click the Save button.

The following objects have this attribute:

- Organizational Unit
- User profile

Description

This attribute determines whether the assigned applications for the object also includes the assigned applications for the object's parent in the organizational hierarchy.

Depending on this attribute's setting in the parent object, the aggregation of assigned applications can continue up the hierarchy to the organization object.

Object Manager: General → Inherit Parent's Webtop Content

Command Line

Command option: `--inherit true | false`

Usage: Specify `true` or `false`.

In the following example, the object inherits assigned applications from the parent object.

```
--inherit true
```

Interlaced Images

Usage: Select an option.

The following objects have this attribute:

- Windows application
- X application
- 3270 application

- 5250 application

Description

This attribute determines whether images are transmitted and displayed in a series of interlaced passes or in one pass from top to bottom.

Select Adjust Dynamically to allow interlacing to be turned on or off at any stage, according to the network conditions.

Use interlacing for graphics-intensive applications, particularly over low-bandwidth connections.

Object Manager: Adaptive Internet Protocol → Interlaced Images

Command Line

Command option: `--interlaced automatic|on|off`

Usage: Specify a valid setting.

The following example enables interlaced image transmission.

```
--interlaced on
```

Keep Launch Connection Open

Usage: Select or deselect the check box.

The following objects have this attribute:

- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute specifies whether to keep open the connection used to start the application, or to close the connection.

Usually, you deselect the check box.

Select the check box if users experience either of these symptoms:

- The application appears to start and then immediately exits
- The application has problems shutting down. In this case, also set the Session Termination attribute to Login Script Exit

Object Manager: Advanced → Keep Launch Connection Open

Command Line

Command option: `--keepopen true | false`

Usage: Specify `true` or `false`.

The following example closes the connection used to start the application.

```
--keepopen false
```

Keyboard Codes Modification

Usage: Select or deselect the check box.

Character application objects have this attribute.

Description

This attribute determines whether the application can change the codes generated by keys on the keyboard.

This attribute applies to Wyse 60 character applications only.

Object Manager: Behavior → Application Key Mode

Command Line

Command option: `--appkeymode true|false`

Usage: Specify `true` or `false`.

The following example disables key code changes for the application.

```
--appkeymode false
```

Keyboard Map

Usage: For *user profile* objects, select an option. For the Custom Value option, type the path name of a keyboard map file in the field. For *character applications*, type the path name of a keyboard map file in the field.

The following objects have this attribute:

- User profile
- Character application

Description

This attribute specifies the path name of a keyboard map file. You can use a full path name or a relative path name. Relative path names are relative to the `/opt/tarantella/etc/data/keymaps` directory.

Object Manager: General → Keyboard Map

User Profile Objects

The keyboard map file specified is used for all graphical applications started by this user.

To use a keyboard map based on the locale of the client device, select Client's Input Locale. The actual keymap used is determined using the `/opt/tarantella/etc/data/keymaps/xlocales.txt` file.

Note – You can use the * or ? wildcards in the `xlocales.txt` file to support a range of input locales. See the `xlocales.txt` file for details.

To use the X Protocol Engine settings defined for an SGD server to determine the keyboard map, select the X Protocol Engine Value option.

Alternatively, to always use a particular keyboard map for this user, type a file name.

Character Application Objects

The specified keyboard map file is used for this application.

Leave blank to use the default keyboard map for the application type. These are built-in to the emulators, but are equivalent to the keyboard maps in the files `ansikey.txt`, `vt420key.txt` and `w60key.txt`. These files are in the `/opt/tarantella/etc/data/keymaps` directory.

Command Line

Command option: `--keymap` *keymap*

Usage: For *user profile* objects, use either `default` or `client-locale` or replace *keymap* with the path name of a keyboard map file. For *character applications*, replace *keymap* with the path name of a keyboard map file.

The following example uses the named keymap, which is stored in `/opt/tarantella/etc/data/keymaps`.

```
--keymap mykeymap.txt
```

Keyboard Map: Locked

Usage: Select or deselect the check box.

The following objects have this attribute:

- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute specifies whether an application is prevented from changing the default keyboard mappings. Select the check box to ensure that the keyboard mappings cannot be changed.

Object Manager: Advanced → Lock Keymap

Command Line

Command option: `--lockkeymap true | false`

Usage: Specify `true` or `false`.

The following example prevents an application from changing keyboard mappings.

```
--lockkeymap true
```

Keyboard Type

Usage: Select a keyboard type option.

The following objects have this attribute:

- 3270 application
- 5250 application

Description

Specifies the layout to use for mapping the keyboard to the terminal being emulated.

Object Manager: 3270 → Keyboard Type

Object Manager: 5250 → Keyboard Type

Command Line

Command option: `--3270kt pc|sun4|sun5|hp`

Command option: `--kt pc|sun4|sun5|hp`

Usage: Specify one of the valid keyboard types.

In the following example, the keyboard type for a 3270 application is set to pc.

```
--3270kt pc
```

In the following example, the keyboard type for a 5250 application is set to pc.

```
--kt pc
```

Line Wrapping

Usage: Select or deselect the check box.

Character application objects have this attribute.

Description

This attribute determines the behavior when a user types characters extending beyond the right edge of the terminal window.

Select the check box to wrap the characters onto the next line.

Deselect the check box to not display the characters. The characters are placed in the keyboard buffer.

Object Manager: Appearance → Wrap Long Lines

Command Line

Command option: `--autowrap true|false`

Usage: Specify `true` or `false`.

The following example wraps characters onto the next line in the terminal window.

```
--autowrap true
```

Load Balancing Groups

Usage: Type one or more load balancing groups for the application server in the field. Press the Return key after each load balancing group.

Application server objects have this attribute.

Description

This attribute specifies the load balancing group used for application load balancing.

You can use any string, for example “Scandinavia” or “US-East”. Application load balancing tries to choose an application server and SGD server with the same location, to minimize the “network distance” between them and maximize performance. The connection between the user’s client device and the SGD server uses the AIP protocol, which adapts to the network conditions.

Leave this attribute blank unless you use an array spanning a wide area network (WAN), or one that includes slow links, and you use the intelligent array routing load balancing groups feature. More than one string is allowed, but this slows application startup.

If used, set this attribute on all appropriate application server objects, and for all SGD servers in the array. Use the Server Settings → General tab of the Administration Console.

Object Manager: Location

Command Line

Command option: `--location` *location*

Usage: Replace *location* with the location of the application server.

The following example locates the application server in Paris.

```
--location Paris
```

Login

Usage: Select or deselect the check box.

User profile objects have this attribute.

Description

This attribute specifies whether someone can log in using this user profile object.

Deselect the check box to deny a user access to SGD.

This attribute is always selected for profile objects in the System Objects organization. Users can always log in using the profile object, as long as the appropriate authentication mechanism is available. The authentication mechanism is configured on the Global Settings → Secure Global Desktop Authentication tab of the Administration Console.

To deny access to all users who use a particular authentication mechanism, deselect the appropriate authentication repository using the Authentication Wizard on the Global Settings → Secure Global Desktop Authentication tab of the Administration Console.

To stop all users from logging in to a particular SGD server, deselect User Login for the server on the Server Settings → General tab of the Administration Console.

Object Manager: General → May Log In to Secure Global Desktop

Command Line

Command option: `--enabled true|false`

Usage: Specify `true` or `false`.

The following example enables the user profile object to log in to SGD.

```
--enabled true
```

Login: Multiple

Usage: Select or deselect the check box.

User profile objects have this attribute.

Description

This attribute specifies whether the user profile is used by a single user, or can be shared by multiple users in the form of a "guest" account.

The following table shows the similarities and differences between user profile objects with the attribute deselected and with the attribute selected.

Account is Not Shared	Account is Shared
Must be used by one user.	Can be used by more than one user.
Each user has their own application sessions.	Each user has their own application sessions.
Application sessions can continue between user sessions.	Application sessions end when a user logs out.
One set of password cache entries.	One set of password cache entries, which is shared between all users.
The user can save entries in the password cache.	Users cannot save entries in the password cache.
If the user is already logged in, logging in again from a different client device relocates the user session. The old user session ends.	Logging in again creates a new user session. No existing user sessions are affected.

Object Manager: General → Shared Between Users (Guest)

Command Line

Command option: `--shared true | false`

Usage: Specify `true` or `false`.

The following example enables the user profile object to be shared by multiple users in the form of a "guest" account.

```
--shared true
```

Login Name

Usage: Type the user's login name in the field.

User profile objects have this attribute.

Description

This attribute specifies the login name of a user. This is typically their UNIX user name.

An authentication repository might use this attribute for identifying and authenticating users.

Object Manager: General → Username

Command Line

Command option: `--user` *username*

Usage: Replace *username* with the user's login name.

The following example defines the login name as `indigo`.

```
--user indigo
```

Login Script

Usage: Type the login script file name in the field.

The following objects have this attribute:

- Character application

- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute specifies the login script that runs to start this application. Only change this attribute if you are having problems starting an application.

To configure SGD to choose a login script automatically, leave the setting blank.

You can use a full path name or a relative path name. Relative path names are considered relative to the value of the Execution Protocol Engine's Login Script Directory attribute.

The current working directory of the login script is the directory containing the script. If the script sources another script using a relative path name, it is considered relative to this directory.

Object Manager: Advanced → Login Script

Command Line

Command option: `--login` *script*

Usage: Replace *script* with the file name of the login script to use.

The following example uses the custom login script `my_login.exp` to start the application.

```
--login my_login.exp
```

Make Universal PDF Printer the Default

Usage: Select or deselect the check box.

The following objects have this attribute:

- Organization
- Organizational Unit
- User profile

Description

Sets the SGD Universal PDF printer as the client's default printer when printing from Windows applications that use the Microsoft RDP Windows Protocol.

This attribute is only available if the Universal PDF Printer is enabled.

This attribute can only be edited using the Administration Console if Client Printing: Override is enabled for the object.

By default, the Universal PDF printer is not the default printer. The setting is `false` on the command line.

The setting for this attribute overrides either of the following:

- The setting for a parent object in the organizational hierarchy
- The default setting configured on Global Settings → Printing tab of the Administration Console, if no parent object configuration exists

Changes to this attribute only take effect for new user sessions.

Object Manager: Printing → Make PDF Printer the Default for Windows 2000/3

Command Line

Command option: `--pdfisdefault 1|0`

Usage: Specify `1` (true) or `0` (false).

The following example makes the Universal PDF printer the default printer when printing from a Windows application using RDP.

```
--pdfisdefault true
```

Make Universal PDF Viewer the Default

Usage: Select or deselect the check box.

The following objects have this attribute:

- Organization
- Organizational Unit
- User profile

Description

Sets the SGD Universal PDF Viewer printer as the client's default printer when printing from Windows applications that use the Microsoft RDP Windows Protocol.

By default, the Universal PDF Viewer printer is not the default printer. The setting is `false` on the command line.

This attribute is only available if the Universal PDF Viewer is enabled.

This attribute can only be edited using the Administration Console if Client Printing: Override is enabled for the object.

The setting for this attribute overrides either of the following:

- The setting for a parent object in the organizational hierarchy
- The default setting configured on the Global Settings → Printing tab of the Administration Console, if no parent object configuration exists

Changes to this attribute only take effect for new user sessions.

Object Manager: Printing → Make PDF File Printer the Default for Windows 2000/3

Command Line

Command option: `--pdfviewerisdefault 1|0`

Usage: Specify `1` (true) or `0` (false).

The following example makes the Universal PDF Viewer printer the default printer when printing from Windows applications using RDP.

```
--pdfviewerisdefault true
```

Members Tab

Usage: To add group members to a group object, click the Add button in the Editable Assignments table.

To delete group members from a group object, use the Delete button in the Editable Assignments table.

Group objects have this attribute:

Description

The Members tab shows the members of the selected group object. You can only create groups of applications or groups of application servers.

A group can have many members, including other groups. Each member is stored as *a reference to the object*, so a particular object can be a member of many groups. If an object is moved or renamed later, all references to it are automatically updated.

Object Manager: Members tab

The following sections of the Members tab are used to display, select, and assign group members:

- Effective Members table
- Editable Members table

Effective Members Table

The Effective Members table shows all the objects that are assigned to the selected group object.

The Assignment Type column shows one of the following:

- **Direct.** The assignment was made using the Editable Assignments table.
- **Indirect.** The assignment is the result of another relationship, such as membership of a group, or inheritance from another object.
- **Multiple.** The assignment has multiple sources, both Direct and Indirect.

If an assignment type is Indirect or Multiple, clicking the See Details link displays information that enables you to trace the origin of the link.

Editable Members Table

You can use the Editable Members table to select group members from the local repository.

Click the Add button in the Editable Assignments table. The Add Application Member window, or Add Application Server Member window, is shown, depending on the whether you are editing a group of applications or a group of application servers.

To select group members in the Add Application Assignment or Add Application Server Member window, do either of the following:

- **Browse the Navigation Tree.** As you browse the tree, the Content Area is updated with applications.

- **Use the Search Applications or Search Application Servers field.** The name of this field varies, depending on whether you are editing a group of applications or a group of application servers. Use this field to search for group members. Type in the names of applications or application servers in the field. Note that you can use the "*" wildcard in your search string. Typing a search string of *name* is equivalent to searching for "**name**" and returns any match of the search string. Results of the search are displayed in the Search Results table in the Content Area. The number of results returned by a search is limited to 150, by default.

Select the required group members from those listed in the Content Area. When you have finished selecting members click the Add button.

The selected group members are displayed in the Effective Members table of the Members tab.

To delete members from the Members tab, use the Delete button in the Editable Members table.

Command Line

Command option: `--member` *object*

Usage: Replace *object* with the full name of the object. For example,`"o=Indigo Insurance/ou=Finance/cn=XClaim"`. Make sure that you quote any object names containing spaces.

The following example names `Indigo Jones` and `Emma Rald` as members.

```
--member "o=Indigo Insurance/cn=Indigo Jones" \
         "o=Indigo Insurance/ou=Marketing/cn=Emma Rald"
```

Menu Bar

Usage: Select or deselect the check box.

The following objects have this attribute:

- 3270 application
- 5250 application

Description

Specifies whether the application's menu bar is displayed or not.

Object Manager: 3270 → Enable Menu Bar

Object Manager: 5250 → Enable Menu Bar

Command Line

Command option: `--3270mb true|false`

Command option: `--mb true|false`

Usage: Specify `true` or `false`.

In the following example, the 3270 application's menu bar is enabled.

```
--3270mb true
```

In the following example, the 5250 application's menu bar is enabled.

```
--mb true
```

Middle Mouse Timeout

Usage: Type a timeout, in milliseconds, in the field.

The following objects have this attribute:

- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute enables you to emulate the middle mouse button on a two-button mouse by clicking the left and right mouse buttons at the same time.

This attribute is the maximum time that can elapse between pressing the left and the right mouse buttons for the action to be treated as a middle mouse button operation.

Object Manager: Advanced → Middle Mouse Timeout

Command Line

Command option: `--middlemouse` *ms*

Usage: Replace *ms* with a timeout in milliseconds.

In the following example, the left and right buttons must be pressed within 0.3 seconds for the operation to be considered as a middle mouse button operation.

```
--middlemouse 300
```

Monitor Resolution

Usage: Type a resolution, in dots per inch, in the field.

The following objects have this attribute:

- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute specifies the monitor resolution, in dots per inch, that SGD reports to X applications asking for this information. Some X applications need this value to determine what font size to use.

If you leave this attribute blank, the value specified in the X Protocol Engine's Monitor Resolution attribute is reported.

The default resolution might cause the X application to choose a font size larger than it normally uses. This can cause clipping problems, as the X application needs more screen space. If this happens, try reducing the resolution by typing a smaller value, for example, 75.

The X application might also use too large a font if the X Protocol Engine's Font Path attribute uses a different order than the console or X terminal.

Object Manager: Advanced → Monitor Resolution

Command Line

Command option: `--dpi` *dpi*

Usage: Replace *dpi* with a resolution in dots per inch.

The following example reports a resolution of 75 dpi to X applications that need this information.

```
--dpi 75
```

Mouse

Usage: Select or deselect the Only 3-Button Mouse Supported check box.

X application objects have this attribute.

Description

This attribute enables you to specify whether the X application only supports a 3-button mouse.

Select the check box if the application only supports a 3-button mouse. The check box is cleared by default.

Object Manager: Advanced → Application Supports 3-Button Mouse Only

Command Line

Command option: `--force3button true|false`

Usage: Specify `true` or `false`.

In the following example, the application only supports a 3-button mouse.

```
--force3button true
```

Name

Usage: Type the name used for the object, for example, Indigo Jones.

The following objects have this attribute:

- Active Directory container
- Character application
- Document
- Domain component
- Group

- Application server
- User profile
- Windows application
- X application
- 3270 application
- 5250 application
- Organization
- Organizational Unit

Description

This attribute specifies the name of the object in the local repository.

The following naming conventions are used for SGD objects.

- 3270 application objects have a `cn=` naming attribute.
- 5250 application objects have a `cn=` naming attribute.
- Active Directory container objects have a `cn=` naming attribute.
- Application server objects have a `cn=` naming attribute.
- Character application objects have a `cn=` naming attribute.
- Document objects have a `cn=` naming attribute.
- Domain Component objects have a `dc=` naming attribute.
- Group objects have a `cn=` naming attribute.
- Organization objects have an `o=` naming attribute.
- OU objects have an `ou=` naming attribute.
- User profile objects can have a `cn=` (common name), a `uid=` (user identification), or a `mail=` (mail address) naming attribute.
- Windows application objects have a `cn=` naming attribute.
- X application objects have an `cn=` naming attribute.

In the Administration Console, names can include any characters, except the backslash (\) or plus (+) characters.

When you create a new application server object, the Name setting is automatically entered in the Address field.

Object Manager: General → Name

Object Manager: Name tab

Command Line

Command option: `--name` *name*

Usage: Replace *name* with the full name of the object, for example, `"o=applications/ou=Finance/cn=XClaim"`.

Make sure that you quote any names containing spaces.

If you use a forward slash (/) in an object name, you must backslash protect (escape) it. For example, to create an object with the relative name `cn=a/b` beneath `o=organisation`, type `cn=a\/b`.

This creates an object `o=organisation/"cn=a/b"`.

The following example defines the name of the organization object as `Indigo Insurance`.

```
--name "o=Indigo Insurance"
```

The following example defines the name of the organizational unit object as `Finance`. The object belongs to the directory object, `Indigo Insurance`, which must already exist.

```
--name "o=Indigo Insurance/ou=Finance"
```

The following example defines the common name of a user profile object as `Indigo Jones`. The object belongs to the organization object, `Indigo Insurance`.

```
--name "o=Indigo Insurance/cn=Indigo Jones"
```

The following example defines the names of a domain component object as `indigo-insurance`.

```
--name "dc=com/dc=indigo-insurance"
```

Number of Sessions

Usage: Select or deselect the Limited check box. If the Limited check box is selected, type a number in the Max per User field.

The following objects have this attribute:

- Character application
- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute enables you to set the maximum number of instances of an application a user can run simultaneously. The default is 3.

The application's link on the webtop indicates how many instances of the application the user can run. The webtop also provides tools for suspending, resuming or ending each application instance.

Object Manager: General → Max Instances

Command Line

Command option: `--maxinstances 0| instances`

Usage: Specify 0 or replace *instances* with the number of instances.

The following example sets the maximum number of instances of the application to unlimited.

```
--maxinstances 0
```

Numpad Codes Modification

Usage: Select a keypad behavior option from the list.

Character application objects have this attribute.

Description

This attribute specifies the behavior of the numeric keypad, whether it always generates numbers or whether you want the application to change the codes generated by the keypad.

This attribute applies to VT420 character applications only.

Object Manager: Behavior → Keypad

Command Line

Command option: `--keypad numeric | application`

Usage: Specify the keypad behavior you want.

In the following example, the keypad always generates numbers.

```
--keypad numeric
```

Passwords Tab

Usage: Use the Password Cache table to manage entries in the password cache.

The following objects have this attribute:

- Application server
- User profile

Description

The Passwords tab lists the password cache entries for the selected user profile or application server object.

Use the New button to add a password cache entry, using the Create New Password Cache Entry page.

Use the Edit button to edit an entry in the password cache, or the Delete buton to remove an entry from the password cache.

Use the Reload button to refresh the Password Cache table.

Use the Search field to search for entries in the Password Cache table. You can use the "*" wildcard in your search string. Typing a search string of *name* is equivalent to searching for "**name***" and returns any match of the search string. The number of results returned by a search is limited to 150, by default.

Object Manager: Passwords tab

Command Line

On the command line, use the `tarantella passcache` commands to delete and examine entries in the password cache. See "The `tarantella passcache` Command" on page 710.

Password Cache Usage

Usage: Select the Override Global Setting check box and then select or deselect the Secure Global Desktop Password Tried option. To use the default setting defined in the Global Settings → Application Authentication tab, deselect the Override Global Setting check box.

Application server objects have this attribute.

Description

This attribute specifies the policy for authenticating users on the application server, *if no password is already cached* for that server.

The Administration Console options and their command line equivalents are shown in the following table.

Administration Console	Command Line	Description
Secure Global Desktop Password Tried (selected)	`--auth trytta`	If the user's password for logging in to SGD is cached, the same password is used to try to log in to the application server. If the attempt fails, the user is prompted for a password. When listing object attributes on the command line, this attribute value is displayed as `true`.
Secure Global Desktop Password Tried (deselected)	`--auth nevertrytta`	The user's password for logging in to SGD is not used. The user is prompted to enter a user name and password for the application server. When listing object attributes on the command line, this attribute value is displayed as `false`.
Override Global Setting (deselected)	`--auth default`	The Password Cache Usage attribute determines whether to try the user's password or not. When listing object attributes on the command line, this attribute value is displayed by `default`.

A user's password for logging in to SGD can be stored in the password cache if an SGD server is also used as an application server, or if Password Cache is selected in the Secure Global Desktop Authentication Tab.

Object Manager: Authentication

Command Line

Command option: `--auth trytta|nevertrytta|default`

Usage: Specify one of the valid settings.

The following example tries the password the user typed to log in to SGD, if it is cached.

```
--auth trytta
```

Postscript Printer Driver

Usage: Type the name of the printer driver to use for PDF printing in the field.

The following objects have this attribute:

- Organization
- Organizational Unit
- User profile

Description

The name of the printer driver to use for PDF printing when printing from Windows applications that use the Microsoft RDP Windows Protocol.

This printer driver must be installed on every Windows application server used with SGD.

The printer driver must be a PostScript printer driver. The default is HP Color LaserJet 8500 PS.

The name you type must match the name of the printer driver installed on your Windows application servers *exactly*. Pay particular attention to the use of capitals and spaces. The `/opt/tarantella/etc/data/default.printerinfo.txt` file contains all the common printer driver names ordered by manufacturer. To avoid errors, copy and paste the driver name from this file.

This attribute is only available if Universal PDF Printer is enabled.

This attribute can only be edited using the Administration Console if Client Printing: Override is enabled for the object.

The setting for this attribute overrides either of the following:

- The setting for a parent object in the organizational hierarchy
- The default setting configured on the Global Settings → Printing tab of the Administration Console, if no parent object configuration exists

Changes to this attribute only take effect for new user sessions.

Object Manager: Printing → Driver Name

Command Line

Command option: `--pdfdriver` *driver_name*

Usage: Replace `driver_name` with the name of the printer driver to use for PDF printing. Use quotes on the command line if the name includes spaces.

The following example configures the HP LaserJet 8000 Series PS printer driver as the driver to use for PDF printing.

```
--pdfdriver "HP LaserJet 8000 Series PS"
```

Prompt Locale

Usage: Type a locale in the field.

Application server objects have this attribute.

Description

This attribute controls the language used in the login scripts when pattern matching the login data from an application server.

When using the login scripts supplied with SGD, the `vars.exp` script defines variables for matching system prompts. By default, English system prompts are supported. This script can be customized to support users in other locales.

A locale has two parts, a *language* and an optional *territory*, separated by an underscore.

The language part of a locale is specified using ISO 639 language codes, for example `en` for English or `ja` for Japanese.

The territory part of a locale is specified using ISO 3166 territory codes, for example `us` for the United States or `jp` for Japan.

By default, the locale is en_us.

Object Manager: Host Locale

Command Line

Command option: `--hostlocale` *ll_tt*

Usage: Replace *ll_tt* with a locale.

The following example sets the default language of the application server object to French. French prompts must be configured in the login scripts used with this application server.

```
--locale fr
```

Scroll Style

Usage: Select a scroll style option.

Character application objects have this attribute.

Description

This attribute specifies how the terminal window scrolls. The available options are line-by-line, several lines at once, or smoothly.

When listing object attributes on the command line, the following applies:

- The `line` attribute value is displayed as `normal`
- The `multiple` attribute value is displayed as `jump`

Object Manager: Appearance → Scroll Style

Command Line

Command option: `--scrollstyle line | multiple | smooth`

Usage: Specify the scroll style you want.

The following example scrolls the terminal window smoothly.

```
--scrollstyle smooth
```

Serial Port Mapping

Usage: For *user profile* objects or *organizational unit* objects, select the Override Parent's Setting check box and then select or deselect the Enabled option. To use the setting defined for the parent object, deselect the Override Parent's Setting check box.

For *organization* objects, select the Override Global Setting check box and then select or deselect the Enabled option. To use the setting defined in the Global Settings tab, deselect the Override Global Setting check box.

The following objects have this attribute:

- Organization
- Organizational Unit
- User profile

Description

This attribute controls whether users can access the serial ports on a client device from a Windows application running on a Microsoft Windows Server 2003 application server.

By default, a user profile object or organizational unit object inherits the setting of its parent object in the organizational hierarchy. This is used to enable or disable access to serial ports for many users without having to edit each user profile object. To override this, select the Override Parent's Setting check box and change the setting.

By default, organization objects use the global setting configured on the Global Settings → Client Device tab of the Administration Console. To override this, select the Override Global Setting check box and change the setting.

The Administration Console options and their command line equivalents are shown in the following table.

Administration Console	Command Line	Description
Override Parent's Setting (deselected)	2	**User profile objects or organizational unit objects**. Use the setting inherited from the parent object. This is the default setting.

Administration Console	Command Line	Description
Override Global Setting (deselected)	2	**Organization objects.** Use the global setting. This is the default setting.
Enabled (selected)	1	Enable access to serial ports.
Enabled (deselected)	0	Disable access to serial ports.

When a user starts a Windows application, SGD checks the user profile object for the user and then any parent object further up the organizational hierarchy to see whether access to serial ports is enabled or disabled. If all the objects selected are configured to use the parent's setting, then the default setting is used.

By default, access to serial ports is enabled.

Object Manager: General → Serial Port Mapping

Command Line

Command option: `--serialport 2|1|0`

Usage: Specify 2|1|0.

The following example disables access to serial ports.

```
--serialport 0
```

Server Address

Usage: Type DNS name or IP address of the application server in the field.

The following objects have this attribute:

- 3270 application
- 5250 application

Description

This attribute names the 3270 (mainframe) or AS/400 application server that runs the application.

Use a DNS name rather than an IP address, if it is known.

Object Manager: 3270 → 3270 Host

Object Manager: 5250 → AS/400 Host

Command Line

Command option: `--hostname` *host*

Usage: Replace *host* with the DNS name or IP address of the 3270 (mainframe) or AS/400 application server.

The following example runs the application on the application server warsaw.indigo-insurance.com.

```
--hostname warsaw.indigo-insurance.com
```

Server Port

Usage: Type the Transmission Control Protocol (TCP) port number used to connect to the application server in the field.

The following objects have this attribute:

- 3270 application
- 5250 application

Description

This attribute specifies the TCP port used by the emulator to exchange data with the 3270 (mainframe) application server or AS/400 application server.

By default, TCP port 23 is used.

Object Manager: 3270 → Port Number

Object Manager: 5250 → Port Number

Command Line

Command option: `--portnumber` *tcp*

Usage: Replace *tcp* with the TCP port number used to connect to the application server.

The following example connects on TCP port 4567 to the application server.

```
--portnumber 4567
```

Session Termination

Usage: Select a setting from the list.

The following objects have this attribute:

- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute determines when an application session ends.

The Administration Console options and their command line equivalents are shown in the following table.

Administration Console	Command Line	Description
Last Client Exit	`lastclient`	The SGD server keeps track of the number of X clients running within the session, and ends the session when this reaches zero.
Window Manager Exit	`windowmanager`	The SGD server ends the session when the Window Manager exits, no matter how many X clients are running.
Only Window Manager Remaining	`windowmanageralone`	The SGD server ends the session when the only remaining X client is the Window Manager. Some Window Managers, such as OpenLook, run X clients in the background, which means that this condition is never met. If you encounter this problem, use the No Visible Windows setting.

Administration Console	Command Line	Description
Login Script Exit	`loginscript`	The SGD server ends the session when the login script completes. Use this setting with Keep Launch Connection Open if an application has problems shutting down.
No Visible Windows	`nowindows`	The SGD server ends the session when no windows are visible. This is useful for window managers, such as OpenLook, that run X clients in the background.
Login Script Exit or No Visible Windows	`loginscriptnowindows`	The SGD server ends the session when either the login script completes or no windows are visible. Use this setting for applications that have a General Application Resumability setting and that use X clients, as this forces a session to close if an application server is rebooted or disconnected from the network. Use this setting with Keep Launch Connection Open if an application has problems shutting down.

Object Manager: General → Session Ends When

Command Line

Command option: `--endswhen lastclient | windowmanager | windowmanageralone | loginscript | nowindows | loginscriptnowindows`

Usage: Specify a valid setting.

The following example ends the application session when no windows are visible.

```
--endswhen nowindows
```

Share Resources Between Similar Sessions

Usage: Select or deselect the check box.

The following objects have this attribute:

- X application
- 3270 application
- 5250 application

Description

This attribute specifies whether application sessions for applications configured with a Window Type setting of Client Window Management try to share resources. Sharing sessions reduces the memory overhead on both the SGD server and the client device.

Resources are shared between applications with the same settings for the following attributes:

- Window Color: Custom Color
- Window Color
- Interlaced Images
- Graphics Acceleration
- Delayed Updates
- Middle Mouse Timeout
- Monitor Resolution

Object Manager: Advanced → Share Resources Between Similar Sessions

Command Line

Command option: `--share true | false`

Usage: Specify `true` or `false`.

The following example enables resource sharing for similar sessions.

```
--share true
```

Status Line

Usage: Select a type of status line from the list.

Character application objects have this attribute.

Description

This attribute specifies the type of status line to show for the application.

Application Type	Types of Status Line Available
VT420	• None • Cursor Position and Print Mode • Messages from the Host
Wyse 60	• None • Standard • Extended
SCO Console	• *Not Applicable*

When listing object attributes on the command line, the attribute value `hostmessages` is displayed as `host writable`.

Object Manager: Appearance → Status Line

Command Line

Command option: `--statusline none | indicator | hostmessages | standard | extended`

Usage: Specify the type of status line you want. Not all settings are valid for all types of character application.

The following example does not display a status line.

```
--statusline none
```

Surname

Usage: Type the user's surname in the field.

User profile objects have this attribute.

Description

This attribute specifies the surname, or family name, of the user.

Names can include any characters you want.

Object Manager: General → Surname

Command Line

Command option: `--surname` *name*

Usage: Replace *name* with the surname of the user. Make sure that you quote any names containing spaces.

The following example defines the surname of the user as `Jones`.

```
--surname Jones
```

Terminal Type

Usage: Select a terminal type option, or select the Custom option and type in the field.

Character application objects have this attribute.

Description

This attribute specifies the terminal type required for the application. You must set this appropriately for the Emulation Type.

Object Manager: General → Terminal Type

Command Line

Command option: `--termtype` *type*

Usage: Replace *type* with a terminal type, for example, `ansi`.

The following example uses the `ansi` terminal type.

```
--termtype ansi
```

The following example uses the `wyse60` terminal type.

```
--termtype wyse60
```

Tokens Tab

Usage: Use the Token Cache table to manage entries in the token cache.

User profile objects have this attribute.

Description

The Tokens tab is used to manage tokens used for the authentication token authentication mechanism. This authentication mechanism is used when the SGD Client is in Integrated mode.

The Tokens tab shows the token cache entries for the selected user profile object.

Use the Delete button to delete a token from the token cache.

Use the Reload button to refresh the Token Cache table.

Use the Search field to search for entries in the Token Cache table. You can use the "*" wildcard in your search string. Typing a search string of *name* is equivalent to searching for "**name***" and returns any match of the search string. The number of results returned by a search is limited to 150, by default.

Object Manager: Tokens tab

Command Line

On the command line, use the `tarantella tokencache` commands to delete and examine entries in the token cache. See "The `tarantella tokencache` Command" on page 770.

Use the `tarantella tokencache list` command to display entries in the token cache.

Command option: `tarantella tokencache list`

The following example lists all entries in the token cache.

```
tarantella tokencache list
```

Universal PDF Printer

Usage: Select or deselect the check box.

The following objects have this attribute:

- Organization
- Organizational Unit
- User profile

Description

This attribute enables users to print using the SGD Universal PDF printer when printing from Windows applications that use the Microsoft RDP Windows Protocol.

This attribute can only be edited using the Administration Console if Client Printing: Override is enabled for the object.

The setting for this attribute overrides either of the following:

- The setting for a parent object in the organizational hierarchy
- The default setting configured on the Global Settings → Printing tab of the Administration Console, if no parent object configuration exists

Changes to this attribute only take effect for new user sessions.

Object Manager: Printing → Let Users Print to a PDF Printer

Command Line

Command option: `--pdfenabled 1|0`

Usage: Specify `1` (true) or `0` (false).

The following example enables users to print using the Universal PDF printer.

```
--pdfenabled 1
```

Universal PDF Viewer

Usage: Select or deselect the check box.

The following objects have this attribute:

- Organization
- Organizational Unit
- User profile

Description

This attribute enables users to print using the SGD Universal PDF Viewer printer when printing from Windows applications that use the Microsoft RDP Windows Protocol.

This attribute can only be edited using the Administration Console if Client Printing: Override is enabled for the object.

The setting for this attribute overrides either of the following:

- The setting for a parent object in the organizational hierarchy
- The default setting configured on the Global Settings → Printing tab of the Administration Console, if no parent object configuration exists

Changes to this attribute only take effect for new user sessions.

Object Manager: Printing → Let Users Print to a PDF Local File

Command Line

Command option: `--pdfviewerenabled 1|0`

Usage: Specify `1` (true) or `0` (false).

The following example enables users to print using the Universal PDF Viewer printer.

```
--pdfviewerenabled true
```

URL

Usage: Type a URL in the field.

Document objects have this attribute.

Description

The URL associated with the object. This is displayed when users click the link on their webtop or in their desktop Start or Launch menu

You can use absolute or relative URLs. Relative URLs are considered relative to the SGD document root. This is usually `/opt/tarantella/var/docroot`.

Object Manager: General → URL

Command Line

Command option: `--url` *url*

Usage: Replace *url* with a URL. Make sure that you quote any values containing spaces or other characters that might be interpreted by your shell.

The following example makes the object display the Indigo Insurance home page when clicked.

```
--url http://www.indigo-insurance.com
```

The following example displays the specified URL, considered relative to the SGD document root.

```
--url ../my_docs/index.html
```

User Sessions Tab

Usage: Use the buttons in the User Sessions tab to view and manage user sessions.

User profile objects have this attribute.

Description

This tab lists the active user sessions for the selected user profile object. A user session represents a user who is connected to an SGD server.

Use the View Details button in the User Session List table to show more details for the selected user session. Use the End button to end the selected user session. The Reload button refreshes the User Session List table.

Use the Search options to search the User Session List table. When searching for a User Identity or Secure Global Desktop Server, you can use the "*" wildcard in your search string. Typing a search string of *name* is equivalent to searching for "**name**" and returns any match of the search string.

To search for a Login Time, use a search string format of `yyyy/mm/dd hh:mm:ss`.

The number of results returned by a search is limited to 150, by default.

Object Manager: Sessions tab

Command Line

On the command line, use the `tarantella webtopsession` commands to list and end user sessions. See "The `tarantella webtopsession` Command" on page 782.

Use the `tarantella webtopsession list` command to show user session details for a specified user profile object.

Command option: `tarantella webtopsession list --person` *pobj*

Usage: Replace *pobj* with the full name of the user profile object.

The following example lists user sessions for the `Indigo Jones` user profile object.

```
tarantella webtopsession list \
"o=Indigo Insurance/ou=IT/cn=Indigo Jones".
```

Window Close Action

Usage: Select a setting from the list.

The following objects have this attribute:

- Character application
- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute determines what happens if the user closes the main application window using the Window Manager decoration. This attribute only applies for applications that are configured with a Window Type setting of Client Window Management or Independent Window.

The Administration Console options and their command line equivalents are shown in the following table.

Administration Console	Command Line	Description
Notify Application	`notifyapp`	The application is notified of a close action in the normal way. If the application ignores the request, SGD kills it. When listing object attributes on the command line, this attribute value is displayed as `notifyclient`. This setting only applies to X applications that are configured with a Window Type setting of Client Window Management.
Kill Application	`killapp`	SGD kills the application. This is similar to using the program `xkill` to exit the application. Use this setting only if your users are having difficulty closing an application. When listing object attributes on the command line, this attribute value is displayed as `killclient`. This setting only applies to X applications that are configured with a Window Type setting of Client Window Management.
Suspend Application Session	`suspendsession`	If the application object is resumable, the application's application session is suspended. If the application object is not resumable, the application session ends. Use this setting only if the application provides its own mechanism for the user to exit. See also Application Resumability. If you are using the SGD Client in Integrated mode, there are no controls for resuming a suspended application. Users have to log out and log in again to resume their applications, or display a webtop.
End Application Session	`endsession`	SGD ends the application session. This is the default setting for Windows and character applications configured with a Window Type setting of Independent Window.

Note – An application session can contain several main application windows, for example, a CDE session with several applications running. If this attribute is set to either Suspend Application Session or End Application Session, then closing any of the applications results in the entire session being suspended or ended.

Object Manager: Advanced → Window Close Action

Command Line

Command option: `--windowclose notifyapp | killapp | suspendsession | endsession`

Usage: Specify a valid setting.

In the following example, closing the application's main window suspends the application session, as long as the application object is resumable.

```
--windowclose suspendsession
```

Window Color

Usage: Select an option. For the Custom Color option, type a color in the field.

The following objects have this attribute:

- X application
- 3270 application
- 5250 application

Description

This attribute determines the appearance of the root window.

Select Default Colors to show the standard X "root weave" pattern. To use your own color, select Custom Color and specify a Window Color: Custom Color attribute.

When listing object attributes on the command line, the `custom` attribute value is displayed as `color`.

Object Manager: Appearance → Root Window

Command Line

Command option: `--roottype default|custom`

Usage: Specify a valid setting.

The following example uses a custom color, which is specified using `--rootcolor`, for the root window.

```
--roottype custom
```

Window Color: Custom Color

Usage: Used when the Custom Color option is selected for the Window Color attribute. Type a valid color resource, such as `yellow`, in the field.

The following objects have this attribute:

- X application
- 3270 application
- 5250 application

Description

This attribute determines the color of the root window.

Color names are resolved to RGB values using the file named in the X Protocol Engine's RGB Database attribute.

Object Manager: Appearance → Color

Command Line

Command option: `--rootcolor` *color*

Usage: Replace *color* with a valid color resource, such as `yellow`.

In the following example, the root window uses the color plum4.

```
--rootcolor plum4
```

Window Management Keys

Usage: Select or deselect the check box.

The following objects have this attribute:

- Windows application
- X application

Description

Keyboard shortcuts that deal with window management can either be sent to the remote session or acted on locally. This attribute is only effective for applications having a Window Type setting of Kiosk mode.

To exit kiosk mode when this attribute is enabled, use the key sequence Alt-Ctrl-Shift-Space. This minimizes the kiosk session on the local desktop.

Object Manager: No equivalent

Command Line

Command option: `--remotewindowkeys 1 | 0`

Usage: Specify `1` (true) or `0` (false). The default setting is `0`.

The following example sends window management keys to the remote session.

```
--remotewindowkeys 1
```

Window Manager

Usage: Type the full path name of the Window Manager in the field. Press Return to add new entries.

The following objects have this attribute:

- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute specifies the Window Manager to use for the application. You can also use this to name any other applications to run alongside the main application.

You can name as many Window Manager applications as you want.

A Window Manager is not needed for X applications configured with a Window Type setting of Client Window Management, or for Windows applications that use the Microsoft RDP Windows Protocol.

Object Manager: Advanced → Window Manager

Command Line

Command option: `--winmgr` *command*

Usage: Replace *command* with a full path name. Separate each path name with a space.

The following example runs the application using the twm Window Manager.

```
--winmgr /usr/local/bin/twm
```

Window Size: Client's Maximum Size

Usage: Select or deselect the check box.

The following objects have this attribute:

- Character application
- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute affects the initial size of the application.

Select the check box to ensure that the application fills the user's screen when it starts.

The application appears with window decoration. To cause an application to fill the screen completely, without window decoration, set the application object's Window Type attribute to Kiosk.

Deselect the check box to size the application according to the object's Window Size: Width and Window Size: Height attributes.

Unless Window Size: Scale to Fit Window is selected, the application size does not change during the lifetime of the application session. If the user starts an application on one client device, then resumes the same application on a client device with a different screen resolution, the application does not resize to fit the screen.

Note – If this attribute is selected and the application is a character application, the Font Size: Fixed Font Size attribute *must* be deselected.

Object Manager: General → Client's Maximum Size

Command Line

Command option: `--maximize true | false`

Usage: Specify `true` or `false`.

The following example displays the application at maximum size on the client device.

```
--maximize true
```

Window Size: Columns

Usage: Type the number of columns for the application's terminal window in the field.

Character application objects have this attribute:

Description

This attribute defines the number of columns in the terminal window, in the range 5–132.

Object Manager: General → Columns

Command Line

Command option: `--cols` *cols*

Usage: Replace *cols* with the number of columns in the terminal window.

The following example uses an 80-column window for the application.

```
--cols 80
```

Window Size: Height

Usage: Type the height of the application, in pixels, in the field.

The following objects have this attribute:

- Character application
- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute defines the height of the application, in pixels. The minimum height is 10 pixels, the maximum 65535 pixels.

Object Manager: General → Height

Command Line

Command option: `--height` *pixels*

Usage: Replace *pixels* with the height of the application, in pixels. You must specify the height, even if this attribute is not required, for example because the application is configured with a Window Type setting of Client Window Management, or to display at the Window Size: Client's Maximum Size.

The following example uses a 600-pixel high window to display the application.

```
--height 600
```

Window Size: Lines

Usage: Type the number of lines for the application's terminal window in the field.

Character application objects have this attribute:

Description

This attribute defines the number of lines in the terminal window, in the range 5-100.

Object Manager: General → Lines

Command Line

Command option: `-lines` *lines*

Usage: Replace *lines* with the number of lines in the terminal window.

The following example uses a 25-line window for the application.

```
--lines 25
```

Window Size: Maximized

Usage: Select or deselect the Maximized check box.

The following objects have this attribute:

- 3270 application
- 5250 application

Description

Specifies whether the emulator window is maximized.

These commands cause the window to be displayed at the maximum size possible when the TeemTalk for Unix emulator is loaded. The window retains the default number of lines and columns and includes all window elements, such as the title bar and soft buttons, if enabled.

Object Manager: 3270 → Maximize the Emulator Window

Object Manager: 5250 → Maximize the Emulator Window

Command Line

Command option: `--3270ma true|false`

Command option: `--ma true|false`

Usage: Specify `true` or `false`.

In the following example, the emulator window for a 3270 application is maximized.

```
--3270ma true
```

In the following example, the emulator window for a 5250 application is maximized.

```
--ma true
```

Window Size: Scale to Fit Window

Usage: Select or deselect the Scale to Fit Window check box.

The following objects have this attribute:

- 3270 application
- 5250 application
- Windows application
- X application

Description

This attribute specifies that the application is scaled to fit the window in which it is displayed.

This attribute is only available if the application has a Window Type setting of Independent Window or Kiosk.

If this attribute is selected, the application is always scaled to fit the window in which it is displayed. If you resize the window, SGD rescales the application to fit the new window size and scroll bars never display.

You can toggle between a scaled and an unscaled application by pressing the Scroll Lock key.

Object Manager: General → Scale to Fit Window

Command Line

Command option: `--scalable true | false`

Usage: Specify `true` or `false`.

The following example scales the application to fit the window.

```
--scalable true
```

Window Size: Width

Usage: Type the width of the application, in pixels, in the field.

The following objects have this attribute:

- Character application
- Windows application
- X application
- 3270 application
- 5250 application

Description

This attribute defines the width of the application, in pixels. The minimum width is 10 pixels, the maximum 65535 pixels.

Object Manager: General → Width

Command Line

Command option: `--width` *pixels*

Usage: Replace *pixels* with the width of the application, in pixels. You must specify the width, even if this attribute is not required, for example because the application is configured with a Window Type setting of Client Window Management or to display at the Window Size: Client's Maximum Size.

The following example uses a 300-pixel wide window to display the application.

```
--width 300
```

Window Type

Usage: Select a setting from the list.

The following objects have this attribute:

- Character application
- Windows application
- X application
- 3270 application

- 5250 application

Description

This attribute determines how the application is displayed to the user.

Some settings affect other attributes. For example, in the Administration Console, choosing Client Window Management disables the attributes for configuring the application's size. You can specify these attributes on the command line, but they have no effect.

The Administration Console options and their command line equivalents are shown in the following table.

Administration Console	Command Line	Applies To	Description
Client Window Management	`clientwm`	X applications	The application's windows behave in the same way as those of applications running on the client device. For example, the windows can be resized, moved, minimized and maximized using the client's normal window management controls. The object's Window Close Action attribute determines what happens when the user closes the application's last or main window. When listing object attributes on the command line, this attribute value is displayed as `multiplewindows`. Use for applications with many top-level resizable windows.
Independent Window	`independent`	All application types	The application appears in a new window, without any web browser toolbars or menus. This window can be resized, but this does not resize the application: the window includes scrollbars. The object's Window Size: Width and Window Size: Height attributes determine the size of the application. Closing the window ends or suspends the application session, depending on the object's Window Close Action attribute. A dialog is shown when the window is closed, asking you to confirm closure of the application. When listing object attributes on the command line, this attribute value is displayed as `awtwindow`.

Administration Console	Command Line	Applies To	Description
Kiosk	`kiosk`	Character, X, and Windows applications	The application appears full-screen, with no window decoration. Users cannot resize or move the window. Use for full-screen desktop sessions.
Local X Server	`localx`	X and Windows applications	The application is displayed using an X server installed on the client device, if one is available. Otherwise, an independent window is used. Applications configured with this setting are *not resumable*, even if an independent window is used. The client device X server's host access control must grant access to the application server. See your X server's documentation for information about host access control.
Seamless Window	`seamless`	Windows applications	The application's windows behave like an application running on a Windows application server. If an application is started in a seamless window, you can toggle between a seamless and independent window by pressing the Scroll Lock key. When listing object attributes on the command line, this attribute value is displayed as `seamlesswindows`. Do not use for full-screen desktop sessions. Use a kiosk or independent window instead.

Object Manager: General → Display Using

Command Line

Command option: `--displayusing clientwm | independent | kiosk | localx | seamless`

Usage: Specify one of the valid settings. Not all settings are available for all types of application.

The following example displays the application as a full-screen desktop session.

```
--displayusing kiosk
```

The following example displays the application in an independent window.

```
--displayusing independent
```

Window Type: New Browser Window

Usage: Select or deselect the check box.

Document objects have this attribute.

Description

For users logged in to SGD using a web browser, if this attribute is selected the URL specified for the object is displayed in a new browser window. If this attribute is not selected, the URL is displayed on the webtop.

Object Manager: General → Open in New Browser Window

Command Line

Command option: `--newbrowser true | false`

Usage: Specify `true` or `false`.

The following example displays the document in a new browser window.

```
--newbrowser true
```

Window Type: Pull-Down Header

Usage: Select or deselect the check box.

The following objects have this attribute:

- Windows application
- X application

Description

Enables a pull-down header for the application. The header includes icons for minimizing and closing the application window. This attribute is only effective for applications having a Window Type setting of Kiosk mode.

To display the pull-down header when this attribute is enabled, move the mouse to the top of the application window.

Object Manager: No equivalent

Command Line

Command option: `--allowkioskescape true | false`

Usage: Specify `true` or `false`. The default setting is `true`.

The following example enables the pull-down header.

```
--allowkioskescape true
```

Windows Protocol

Usage: Select the Try Running from Application Server check box and then select a protocol option.

Windows application objects have this attribute.

Description

This attribute identifies the protocol used to connect to the server hosting the Windows application.

Administration Console	Command Line
Microsoft RDP	`wts`
Citrix ICA	`winframe`

Use Microsoft RDP to run an application using Microsoft Terminal Services.

Deselect the Try Running from Application Server check box, which selects the Windows Protocol: Try Running From Client First check box, if you only want to run a Windows application installed on the client device.

Use the Arguments for Protocol attribute for any command-line options that apply to the defined Windows Protocol.

Object Manager: General → Windows Protocol

Command Line

Command option: `--winproto wts | winframe | none`

Usage: Specify a valid setting.

The following example connects to a Microsoft Windows server using the Microsoft RDP protocol.

```
--winproto wts
```

Windows Protocol: Try Running From Client First

Usage: Select or deselect the Try Running from Client First check box.

Windows application objects have this attribute.

Description

This attribute specifies whether to try starting the application from the user's client device.

If this attribute is selected and the application is not installed on the client device, the Windows Protocol attribute is used. If this attribute is selected the application is not resumable, even if the Windows Protocol is used.

Object Manager: General → Try Running From Client First

Command Line

Command option: `--trylocal true | false`

Usage: Specify `true` or `false`.

The following example tries to start the application locally.

```
--trylocal true
```

X Security Extension

Usage: Select or deselect the check box.

X application objects have this attribute.

Description

Whether to enable the X Security Extension for the application.

The X Security Extension divides X clients, also known as hosts, into trusted and untrusted clients. Untrusted clients cannot interact with windows and resources owned by trusted clients.

If you need to run an X application from an application server that might not be secure, enable the X Security Extension and run the application in untrusted mode. This restricts the operations that the X application can perform in the X server and protects the display.

To run an application in untrusted mode, do the following:

1. Configure the X application to use ssh as the Connection Method.
2. Configure `ssh` to allow X11 forwarding.

The X Security Extension only works with versions of `ssh` that support the `-Y` option.

Object Manager: Advanced → Enable X Security Extension

Command Line

Command option: `--securityextension true | false`

Usage: Specify `true` or `false`.

The following example enables the X Security Extension for the application.

```
--securityextension true
```

APPENDIX **D**

Commands

SGD includes a built-in command set for controlling and configuring SGD. This chapter describes the available SGD commands and includes usage examples for each of the commands.

This chapter includes the following topics:

The `tarantella` Command

You can control SGD from the command line using the `/opt/tarantella/bin/tarantella` command.

Syntax

`tarantella` *option* `[` *option-specific-arguments* `]`

Description

Do not try to control the SGD server by running binaries directly, or by using `kill`. Using the `tarantella` command is the only supported way of controlling the SGD server.

The options for this command enable you to control the SGD server in different ways, or produce information about the SGD server. The `tarantella` command can be used in your own shell scripts to help automate your administration of SGD.

If the SGD server is running, most `tarantella` options can be run by root or *any user* in the `ttaserv` group. The `ttaserv` group does not have to be the user's primary or effective group. See the table below for details of which users can use the command options.

If the SGD server is stopped, only root can use the `tarantella` command.

The following table shows the available options for this command.

Option	Description	Can Be Run By	More Information
`archive`	Archives the SGD server's log files.	root	"The `tarantella archive` Command" on page 633
`array`	Creates and manages arrays of SGD servers.	SGD Administrators	"The `tarantella array` Command" on page 633
`cache`	Manages the cache of LDAP data.	SGD Administrators	"The `tarantella cache` Command" on page 638
`config`	Edits global and server-specific configuration.	root or ttaserv group	"The `tarantella config` Command" on page 639
`emulatorsession`	Lists and controls application sessions.	root or ttaserv group	"The `tarantella emulatorsession` Command" on page 643
`help`	Shows a list of SGD commands.	root or ttaserv group	"The `tarantella help` Command" on page 650
`license`	Adds, lists, and removes SGD license keys.	root or ttaserv group	"The `tarantella license` Command" on page 651
`object`	Manipulates objects in the organizational hierarchy.	root or ttaserv group	"The `tarantella object` Command" on page 658
`passcache`	Manipulates the password cache.	root or ttaserv group	"The `tarantella passcache` Command" on page 710
`print`	Controls SGD printing services.	root or ttaserv group	"The `tarantella print` Command" on page 717
`query`	Examines the SGD server's log files.	root	"The `tarantella query` Command" on page 727
`restart`	Restarts SGD services.	root	"The `tarantella restart` Command" on page 734
`role`	Gives users specific roles, and assigns applications specific to that role.	root or ttaserv group	"The `tarantella role` Command" on page 737
`security`	Controls security services, manages certificates.	root	"The `tarantella security` Command" on page 745
`setup`	Changes Setup options, restores original objects.	root	"The `tarantella setup` Command" on page 761
`start`	Starts SGD services.	root	"The `tarantella start` Command" on page 762
`status`	Shows the current status of SGD servers in the array.	root or ttaserv group	"The `tarantella status` Command" on page 765

Option	Description	Can Be Run By	More Information
`stop`	Stops SGD services.	root	"The `tarantella stop` Command" on page 766
`tokencache`	Manipulates the token cache.	root or ttaserv group	"The `tarantella tokencache` Command" on page 770
`tscal`	Manages Microsoft Windows Terminal Services Client Access Licenses (CALs) for non-Windows clients.	root or ttaserv group	"The `tarantella tscal` Command" on page 772
`uninstall`	Uninstalls SGD.	root	"The `tarantella uninstall` Command" on page 777
`version`	Displays versions of installed SGD packages.	root or ttaserv group	"The `tarantella version` Command" on page 778
`webserver`	Configures trusted users for the third-party authentication mechanism.	root	"The `tarantella webserver` Command" on page 778
`webtopsession`	Lists and controls user sessions.	root or ttaserv group	"The `tarantella webtopsession` Command" on page 782

Note – All commands include a `--help` option. You can use `tarantella` *command* `--help` to get help on a specific command.

Examples

The following example stops and then restarts the SGD server, without displaying any messages.

```
# tarantella restart sgd --quiet
```

The following example adds a link for the Write-o-Win application to the assigned applications for members of the Global Administrators role.

```
$ tarantella role add_link --role global \
--link "o=applications/cn=Write-o-Win"
```

The `tarantella archive` Command

Archives the SGD server's log files.

Syntax

```
tarantella archive
```

Description

Archiving the logs compresses the files and moves them to a numbered subdirectory of the `/opt/tarantella/log` directory. A file `summary.txt` in this directory contains the results of performing the `tarantella query` command at the time of the archive.

Examples

The following example archives the SGD server's log files.

```
# tarantella archive
```

The `tarantella array` Command

This command enables SGD Administrators to set up and dismantle arrays of SGD servers.

The command can be run on any SGD server in the array.

Syntax

```
tarantella array join | detach | make_primary | list
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`join`	Adds a server to an array.	"`tarantella array join`" on page 635
`detach`	Removes secondary servers from an array.	"`tarantella array detach`" on page 634
`make_primary`	Makes a secondary server the primary server for the array that it is currently a member of.	"`tarantella array make_primary`" on page 637
`list`	Lists the members of the array, identifying the primary server.	"`tarantella array list`" on page 637

Note – All commands include a `--help` option. You can use `tarantella array` *command* `--help` to get help on a specific command.

Examples

The following example adds the server boston to the array with primary server newyork.

```
$ tarantella array join --primary newyork.indigo-insurance.com \
--secondary boston.indigo-insurance.com
```

The following example makes the secondary server boston the primary server in the array. The previous primary server becomes a secondary server.

```
$ tarantella array make_primary \
--secondary boston.indigo-insurance.com
```

`tarantella array detach`

Removes a secondary server from the array of SGD servers it belongs to.

Syntax

`tarantella array detach --secondary` *serv*

Description

The following table shows the available options for this command.

Option	Description
`--secondary`	Specifies the peer Domain Name System (DNS) name of a secondary server to remove. The server name must be the name of a secondary server in the same array. You can only remove one server at a time.

To remove the primary server from an array, first use `tarantella array make_primary` to make another server the primary server and then detach the old primary server.

When you remove a server from an array, it loses its license keys.

Note – After running this command, it is advisable to wait until SGD has copied the changes to all SGD servers in the array before running any further `tarantella array` commands. Run the `tarantella status` command on the primary SGD server to check the status of the array.

If you are using secure intra-array communication, the secondary server generates its own Certificate Authority (CA) certificate and its own server peer certificate when it is detached.

Examples

The following example removes the secondary server boston from the array.

```
$ tarantella array detach --secondary boston.indigo-insurance.com
```

tarantella array join

Adds a server to an array of SGD servers, either as a primary or a secondary server.

Syntax

```
tarantella array join [ --primary pserv ]
                      [ --secondary sserv ]
```

Description

The following table shows the available options for this command.

Option	Description
`--primary`	Specifies the peer DNS name of the primary server in the array. Defaults to the server where the command is run.
`--secondary`	Specifies the peer DNS name of the server to add. The secondary server must be the only member of an array. Defaults to the server where the command is run. You can only add one secondary server at a time.

Note – After running this command, it is advisable to wait until SGD has copied the changes to all SGD servers in the array before running any further `tarantella array` commands. Run the `tarantella status` command on the primary SGD server to check the status of the array.

If the server you add has been load balancing application servers using Advanced Load Management, use the `tarantella restart` sgd `--warm` command to do a warm restart of the new server after it has joined the array. If the array to which the new server is joined is using Advanced Load Management, do a warm restart of the whole array after the new server has joined.

If you are using secure intra-array communication, you are prompted to accept the CA certificate of either the primary server or the secondary server, depending on where you ran the command.

Examples

The following example adds the server boston to the array with newyork as its primary server.

```
$ tarantella array join \
--primary newyork.indigo-insurance.com \
--secondary boston.indigo-insurance.com
```

The following example adds the server where the command is run to the array with newyork as its primary server.

```
$ tarantella array join \
--primary newyork.indigo-insurance.com
```

tarantella array list

Lists each member of the array of SGD servers, identifying the primary server.

Note – You must be root to run this command.

Syntax

```
tarantella array list
```

Examples

The following example lists all SGD servers in the array.

```
$ tarantella array list
```

tarantella array make_primary

Makes a secondary server the primary server for the array that it is currently a member of. The previous primary server becomes a secondary server.

Syntax

```
tarantella array make_primary --secondary serv
```

Description

The following table shows the available options for this command.

Subcommand	Description
`--secondary`	Specifies the peer DNS name of the secondary server to be made the primary server.

Note – After running this command, it is advisable to wait until SGD has copied the changes to all SGD servers in the array before running any further `tarantella array` commands. Run the `tarantella status` command on the primary SGD server to check the status of the array.

If you are using secure intra-array communication, the new primary becomes the certificate authority for the array and issues new server peer certificates to all SGD servers in the array.

Examples

The following example makes the secondary server boston the primary server in the array.

```
$ tarantella array make_primary \
--secondary boston.indigo-insurance.com
```

The `tarantella cache` Command

Flushes the cache of data obtained from an Lightweight Directory Access Protocol (LDAP) directory server.

Syntax

```
tarantella cache --flush
ldapgroups|ldapconn|ldapconn-lookups|krb5config|all
```

Description

This command flushes the cache of data obtained from an LDAP directory server. This data is only obtained if you are using the following:

- LDAP authentication
- Active Directory authentication
- Directory Services Integration

The following table shows the values you can use with the `--flush` option.

Value	Description
`ldapgroups`	Flushes the cache of all LDAP group data. Used for Directory Services Integration.
`ldapconn`	Flushes the cache of all the Internet Protocol (IP) address, domain, and attribute data.
`ldapconn-lookups`	Flushes the cache of all LDAP search data. Used for Directory Services Integration.
`krb5config`	Refreshes the current Kerberos configuration settings with the original Kerberos configuration of the SGD server. Can be used to reconfigure Kerberos settings without restarting the SGD server. Used for Active Directory authentication only.
`all`	Flushes all LDAP data.

Note – This command only flushes the cache on the SGD server where the command is run. It has no effect on the Administration Console.

Examples

The following example flushes the cache of all LDAP data.

```
$ tarantella cache --flush all
```

The `tarantella config` Command

The `tarantella config` command lists and configures global settings, and also server-specific settings for any SGD server in the array.

Syntax

```
tarantella config list | edit
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`list`	Lists global and server-specific attributes and their current values.	"tarantella config list" on page 641
`edit`	Edits global and server-specific attributes.	"tarantella config edit" on page 640

Note – All commands include a `--help` option. You can use `tarantella config` *subcommand* `--help` to get help on a specific command.

Examples

The following example lists server-specific attributes from the server newyork.indigo-insurance.com.

```
$ tarantella config list --server newyork.indigo-insurance.com
```

The following example sets the `cpe-maxsessions` attribute to 10 for the server where the command is run.

```
$ tarantella config edit --cpe-maxsessions 10
```

tarantella config edit

Edits global and server-specific attributes.

Syntax

```
tarantella config edit { { --setting value... }...
                         [ --array | --server serv... ]
                       } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
--setting value...	Names an attribute you want to edit, and its new value or values.
`--array`	When configuring a server-specific attribute, applies the change to all SGD servers in the array.
`--server`	When configuring a server-specific attribute, applies the change to each named *serv* in the array. Use a peer DNS name or IP address for each server.
`--file`	Specifies a file containing a batch of commands to edit attributes.

If neither `--array` nor `--server` is specified, the command sets server-specific attributes for the SGD server where the command is run.

Use `tarantella config list` to see a list of *setting*s you can change.

For detailed information on *global* attributes, see Appendix A.

For detailed information on *server-specific* attributes, see Appendix B.

Examples

The following example sets the `cpe-exitafter` attribute to 50 on SGD servers newyork.indigo-insurance.com and boston.indigo-insurance.com.

```
$ tarantella config edit --cpe-exitafter 50 \
--server newyork.indigo-insurance.com boston.indigo-insurance.com
```

The following example sets the `cpe-maxsessions` attribute to 10 for the server where the command is run.

```
$ tarantella config edit --cpe-maxsessions 10
```

tarantella config list

Lists global and server-specific attributes and their current values.

Syntax

```
tarantella config list { [ --setting... ]
                         [ --server serv ]
                       } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
--setting	Names an attribute you want to list the value of. If no *--setting* is specified, all global and server-specific attributes are listed.
`--server`	Lists server-specific attributes for the specified SGD server in the array. Use a peer DNS name or IP address. If omitted, lists server-specific attributes for the SGD server where the command is run.
`--file`	Specifies a file containing a batch of commands to list attributes.

For detailed information on *global* attributes, see Appendix A.

For detailed information on *server-specific* attributes, see Appendix B.

Examples

The following example lists global attributes, and server-specific attributes for the server newyork.indigo-insurance.com.

```
$ tarantella config list --server newyork.indigo-insurance.com
```

The following example lists the value of the `array-port-unencrypted` attribute.

```
$ tarantella config list --array-port-unencrypted
```

The `tarantella emulatorsession` Command

This command enables SGD Administrators to list and manipulate application sessions.

Syntax

```
tarantella emulatorsession list | info | shadow | suspend | end
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`list`	Lists application sessions.	"`tarantella emulatorsession list`" on page 644
`info`	Displays detailed information about application sessions.	"`tarantella emulatorsession info`" on page 645
`shadow`	Shadows an application session.	"`tarantella emulatorsession shadow`" on page 647
`suspend`	Suspends application sessions.	"`tarantella emulatorsession suspend`" on page 648
`end`	Ends application sessions.	"`tarantella emulatorsession end`" on page 649

Note – All commands include a `--help` option. You can use `tarantella emulatorsession` *subcommand* `--help` to get help on a specific command.

Examples

The following example lists Emma Rald's application sessions.

```
$ tarantella emulatorsession list \
--person "o=Indigo Insurance/cn=Emma Rald"
```

The following example shadows the application session with the specified session ID.

```
$ tarantella emulatorsession shadow \
"paris.indigo-insurance.com:965127448604:...%2f_ens%2fo=Indigo
Insurance%2fcn=Emma Rald"
```

tarantella emulatorsession list

Lists application sessions matching the criteria specified. Information shown includes session IDs, which are used with other `tarantella emulatorsession` commands.

An example session ID is `paris.indigo-insurance.com:965127448604:...%2f_ens%2fo=Indigo Insurance%2fcn=Emma Rald`.

Session IDs can contain spaces, so make sure you quote them.

Syntax

```
tarantella emulatorsession list
             [--person pobj]
             [--application appobj]
             [--appserver hobj]
             [--server serv]
             [--format text|count|xml]
```

Description

The following table shows the available options for this command.

Option	Description
`--person`	Lists application sessions matching the person specified. Use the name for the user profile.
`--application`	Lists application sessions matching the application specified. Use the name for the application.
`--appserver`	Lists application sessions matching the application server specified. Use the name for the application server.
`--server`	Lists application sessions hosted by the SGD server specified. Use the name or a peer DNS name for the server.
`--full`	Includes the current IP address of the client and the status of the application session in the output. It takes longer to display this information.
`--format`	Specifies the output format. The default setting is `text`. Use `count` to display only the number of matching sessions.

If `--person`, `--application`, `--appserver`, and `--server` are all omitted, all application sessions are listed.

Examples

The following example lists Emma Rald's application sessions.

```
$ tarantella emulatorsession list \
--person "o=Indigo Insurance/cn=Emma Rald"
```

The following example lists all application sessions hosted by the SGD server boston.indigo-insurance.com. This is the server on which the Protocol Engines run.

```
$ tarantella emulatorsession list \
--server boston.indigo-insurance.com
```

tarantella emulatorsession info

Displays detailed information about application sessions.

Syntax

```
tarantella emulatorsession info [ --sessid sessid... ]
                                [ --peid peid... ]
                                [ --format text|xml|quiet ]
```

Description

The following table shows the available options for this command.

Option	Description
`--sessid`	Displays detailed information on application sessions matching the session IDs listed. Use `tarantella emulatorsession list` to find out session IDs.
`--peid`	Displays detailed information on application sessions matching the Protocol Engine process IDs listed. Valid process IDs are as follows: • A number, such as `3456`, representing the process ID on the application server where the command is run • A combination of peer DNS name and process ID, for example `boston.indigo-insurance.com:3456`, representing the process ID on the SGD server named.
`--format`	Specifies the output format. The default setting is `text`. With `--format quiet`, no messages are displayed.

The exit code indicates the number of session IDs and process IDs named that do not exist.

Examples

The following example displays detailed information on application sessions matching the Protocol Engine process IDs “3456” and “4567” on the application server where the command is run.

```
$ tarantella emulatorsession info --peid 3456 4567
```

tarantella emulatorsession shadow

Shadows an application session, enabling you and the user to interact with the application simultaneously. Only SGD Administrators can shadow application sessions. You can only shadow Windows and X applications. Suspended applications cannot be shadowed.

Syntax

```
tarantella emulatorsession shadow sessid
                         [--read-only]
                         [--silent]
                         [--format text|quiet]
```

Description

The following table shows the available options for this command.

Option	Description
sessid	Shadows the application session with the specified session ID. Use `tarantella emulatorsession list` to find out session IDs.
`--read-only`	Enables an Administrator to shadow a session without being able to interact with the application.
`--silent`	Enables an Administrator to shadow a session and interact with the application. The user is *not notified* that an Administrator wants to shadow their session and they cannot refuse permission. If this is used with `--read-only`, the user does not know they are being shadowed and the Administrator cannot interact with the application. **Note -** In some countries, it is illegal to shadow a user without their knowledge. It is your responsibility to comply with the law.
`--format`	Specifies the output format. The default setting is `text`. With `--format quiet`, no messages are displayed.

Note – You can also shadow a session from the Global Settings → Application Sessions tab of the Administration Console. You select the session from either the user profile object or the application object. However, using the Administration Console does not enable you to shadow a session in read-only mode or silent mode.

If `--silent` is not used, the user is notified that an Administrator wants to shadow their session and they can refuse permission. The user is also notified when shadowing ends.

The exit code is 0 for success, 1 if the session does not exist, 2 if the session is not shadowable, or 3 if the session is suspended.

Examples

The following example shadows the application session with the specified session ID.

```
$ tarantella emulatorsession shadow \
"paris.indigo-insurance.com:965127448604:...%2f_ens%2fo=Indigo
Insurance%2fcn=Emma Rald"
```

The following example shadows the application session with the specified session ID without the user knowing that they are being shadowed. The Administrator is unable to interact with the application.

```
$ tarantella emulatorsession shadow \
"paris.indigo-insurance.com:965127448604:...%2f_ens%2fo=Indigo
Insurance%2fcn=Emma Rald" \
--read-only --silent
```

tarantella emulatorsession suspend

Suspends application sessions.

Syntax

```
tarantella emulatorsession suspend sessid...
                        [--format text|quiet]
```

Description

The following table shows available options for this command.

Option	Description
sessid...	Suspends the application sessions with the specified session IDs. Use `tarantella emulatorsession list` to find out session IDs.
`--format`	Specifies the output format. The default setting is `text`. With `--format quiet`, no messages are displayed.

The exit code is 0 for success, 1 if some sessions do not exist, 2 if some sessions are already suspended, or 3 if there is a mixture of nonexistent and suspended sessions.

Examples

The following example suspends the application session with the specified session ID.

```
$ tarantella emulatorsession suspend \
"paris.indigo-insurance.com:965127448604:...%2f_ens%2fo=Indigo
Insurance%2fcn=Emma Rald"
```

tarantella emulatorsession end

Ends application sessions. The applications exit immediately, which might result in loss of data for users.

Syntax

```
tarantella emulatorsession end sessid...
                               [--format text|quiet]
```

Description

The following table shows the available options for this command.

Option	Description
sessid...	Specifies the session IDs of the application sessions to end. Use `tarantella emulatorsession list` to find out session IDs.
`--format`	Specifies the output format. The default setting is `text`. With `--format quiet`, no messages are displayed.

The exit code of the command is 0 if all sessions were successfully ended, or 1 if some session IDs did not exist.

Examples

The following example ends the specified application session.

```
$ tarantella emulatorsession end \
"paris.indigo-insurance.com:965127448604:...%2f_ens%2fo=Indigo
Insurance%2fcn=Emma Rald"
```

The `tarantella help` Command

Shows a list of the SGD commands.

Syntax

```
tarantella help
```

Description

Shows the list of SGD commands.

To get help on a particular command, use `tarantella` *command* `--help`.

Examples

The following example shows the list of SGD commands.

```
$ tarantella help
```

The `tarantella license` Command

This command adds and removes SGD license keys, and displays license information.

Syntax

```
tarantella license add | remove | list | status | query | info
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`add`	Adds license keys for the array.	"`tarantella license add`" on page 652
`remove`	Removes license keys from the array.	"`tarantella license remove`" on page 656
`list`	Lists license keys currently installed.	"`tarantella license list`" on page 653
`status`	Displays current licensing status.	"`tarantella license status`" on page 657
`query`	Displays information on license usage across the array, including infringements.	"`tarantella license query`" on page 654
`info`	Generates signed license key information.	"`tarantella license info`" on page 653

Note – All commands include a `--help` option. You can use `tarantella license` *command* `--help` to get help on a specific command.

Examples

The following example displays currently installed license keys for the array.

```
$ tarantella license list
```

The following example adds the license key XXXXX-XXXXX-XXXXX-XXXXX-XXXXX. This is not a valid SGD license key.

```
$ tarantella license add XXXXX-XXXXX-XXXXX-XXXXX-XXXXX
```

tarantella license add

Adds license keys to the SGD array.

Syntax

tarantella license add *key*...

Description

The following table shows the available options for this command.

Option	Description
key...	Valid SGD license keys.These are of the form AAAAA-AAAAA-AAAAA-AAAAA-AAAAA (five blocks of five case-insensitive characters in the range A-Z, with blocks separated by hyphens).

Examples

The following example adds the license key XXXXX-XXXXX-XXXXX-XXXXX-XXXXX. This is not a valid SGD license key.

```
$ tarantella license add XXXXX-XXXXX-XXXXX-XXXXX-XXXXX
```

tarantella license info

Generates signed license key information.

Syntax

```
tarantella license info
```

Description

The output from this command contains the following:

- A list of your license keys
- Information about your array
- The date and time
- The version of SGD
- A digital signature

Note – If you copy the output, make sure you include the BEGIN and END lines.

You must run this command on the primary SGD server.

Examples

The following example generates signed license key information.

```
$ tarantella license info
```

tarantella license list

Lists the license keys currently installed for the array

Syntax

```
tarantella license list
```

Description

For details about license keys and licenses, see "Licensing and SGD" on page 380.

For summary information, use `tarantella license status`.

Examples

The following example displays currently installed license keys for the array.

```
$ tarantella license list
```

tarantella license query

Displays information on license usage across the array, including license infringements.

Syntax

```
tarantella license query [ --now
                | --history [--format text|csv|xml]
                | --maxusers [--format text|xml] ]
```

Description

To avoid inconsistencies arising from the replication of data across the array, you must run this command on the primary server in the array.

Note – This command only shows the license usage for the software components that are licensed on a per-user basis.

SGD maintains a history of license usage for 30 samples. A sample is created every day, whenever the server is restarted, warm or cold, and whenever licenses are added or removed.

The following table shows the available options for this command.

Option	Description
`--now`	Displays information on the current license usage across the array. This is the default if no arguments are specified.
`--history`	Displays recent historical information on license usage across the array. The license usage information is broken down by sample and software component. For each component, the command displays the following: • The number of licenses used. • The number of licenses available. • The maximum number of users using a component during the sample period, known as the peak. Use `--format` to specify the output format. By default, this is text.
`--maxusers`	Use this option to display the number and the names of users who were consuming a license when license usage peaked in the 30 samples history kept by SGD. A user consumes licenses if one of the following applies: • They are logged in to SGD. • They have a suspended application session. • They are within the lease period for a named-user license. **Note -** Anonymous or guest users are only listed once. The output distinguishes between standard and secure connections. Use `--format` to specify the output format. By default, this is text.

Information on recent license infringements is also shown whenever an SGD Administrator logs in to SGD.

Examples

The following example displays information on the current license usage across the array.

```
$ tarantella license query -now
License usage at: Tue Feb 20 12:42:21 GMT 2007
 Type          In use / Total
 Base          9      / 100
 UNIX          9      / 100
 Mainframe     0      / 100
 Windows       5      / 100
 AS/400        0      / 100
```

The following example displays recent historical information on license usage across the array.

```
$ tarantella license query --history
2007/02/14 15:45:07:
 - Base      in use:     5 / 100         peak: 1
 - UNIX      in use:     5 / 100         peak: 15
 - Mainframe in use:     0 / 100         peak: 0
 - Windows   in use:     3 / 100         peak: 12
 - AS/400    in use:     0 / 100         peak: 0
2007/02/15 13:25:53:
 - Base      in use:     9 / 100         peak: 16
 - UNIX      in use:     9 / 100         peak: 16
 - Mainframe in use:     0 / 100         peak: 0
 - Windows   in use:     5 / 100         peak: 13
 - AS/400    in use:     0 / 100         peak: 0
```

The following example displays the numbers and names of users who were logged in when license usage last peaked.

```
$ tarantella license query --maxusers
Maximum number of users logged in: 3
o=Indigo Insurance/ou=IT/cn=Bill Orange
o=Indigo Insurance/ou=IT/cn=Ginger Butcher
o=Indigo Insurance/ou=IT/cn=Rusty Spanner
```

tarantella license remove

Removes license keys from the SGD array.

Syntax

`tarantella license remove` *key*`...`

Description

If you remove all the license keys, SGD reverts to evaluation mode or expired evaluation mode, depending on how recently you installed SGD. You cannot log in to an SGD server when it is in expired evaluation mode. To license a server when it is in expired evaluation mode, you must either add a valid license key, using `tarantella license add`, or join the server to an array that is already fully licensed.

The following table shows the available options for this command.

Option	Description
key...	The license keys to remove.

Examples

The following example removes the license key `XXXXX-XXXXX-XXXXX-XXXXX-XXXXX`. This is not a valid SGD license key.

```
$ tarantella license remove XXXXX-XXXXX-XXXXX-XXXXX-XXXXX
```

tarantella license status

Displays a summary of the current licensing status for the array.

Syntax

```
tarantella license status
```

Description

This command shows the following information.

- The SGD product you are licensed to use.
- The current license mode of the array. This is either of the following:
  - **Evaluation mode**. The end date of the evaluation period is displayed in brackets.
  - **Fully licensed.**
- A breakdown by license type of what is licensed. For details about license types, see "Licensing and SGD" on page 380.

Examples

The following example displays a summary of the current licensing status for the array.

```
$ tarantella license status
```

The `tarantella object` Command

The `tarantella object` command enables you to create, list, edit, and delete objects in the organizational hierarchy. You can also add and remove assigned applications links, configure application server load balancing for each application, and add and remove group members.

Syntax

```
tarantella object add_host | add_link | add_member | delete | edit |
list_attributes | list_contents | new_3270app | new_5250app |
new_charapp | new_container | new_dc | new_doc | new_group |
new_host | new_org | new_orgunit | new_person | new_windowsapp |
new_xapp | remove_host | remove_link | remove_member | rename | script
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`add_host`	Adds application servers to the list of those that can run an application.	"`tarantella object add_host`" on page 660
`add_link`	Adds assigned applications links.	"`tarantella object add_link`" on page 661
`add_member`	Adds members to a group.	"`tarantella object add_member`" on page 663
`delete`	Permanently deletes objects from the organizational hierarchy.	"`tarantella object delete`" on page 664
`edit`	Edits attributes for an object.	"`tarantella object edit`" on page 665

Subcommand	Description	More Information
list_attributes	Lists attributes of an object.	"tarantella object list_attributes" on page 666
list_contents	Lists the contents of an OU or an organization.	"tarantella object list_contents" on page 667
new_3270app	Creates 3270 application objects.	"tarantella object new_3270app" on page 668
new_5250app	Creates 5250 application objects.	"tarantella object new_5250app" on page 672
new_charapp	Creates character application objects.	"tarantella object new_charapp" on page 676
new_container	Creates Active Directory container objects.	"tarantella object new_container" on page 680
new_dc	Creates domain component objects.	"tarantella object new_dc" on page 681
new_doc	Creates document objects.	"tarantella object new_doc" on page 682
new_group	Creates group objects.	"tarantella object new_group" on page 684
new_host	Creates application server objects.	"tarantella object new_host" on page 685
new_org	Creates organization objects.	"tarantella object new_org" on page 687
new_orgunit	Creates organizational unit objects.	"tarantella object new_orgunit" on page 690
new_person	Creates user profile objects.	"tarantella object new_person" on page 692
new_windowsapp	Creates Windows application objects.	"tarantella object new_windowsapp" on page 695
new_xapp	Creates X application objects.	"tarantella object new_xapp" on page 699
remove_host	Removes application servers from those that can run an application.	"tarantella object remove_host" on page 704
remove_link	Removes assigned applications links.	"tarantella object remove_link" on page 705

Subcommand	Description	More Information
remove_member	Removes members from groups.	"tarantella object remove_member" on page 706
rename	Renames or moves an object.	"tarantella object rename" on page 707
script	Runs a batch script of object commands.	"tarantella object script" on page 708

Note – All commands include a `--help` option. You can use `tarantella object` *subcommand* `--help` to get help on a specific command.

Examples

The following example lists the objects that belong to the organizational unit Sales.

```
$ tarantella object list_contents \
--name "o=Indigo Insurance/ou=Sales"
```

tarantella object add_host

Adds application servers to the list of those that can run an application, for application server load balancing.

Syntax

```
tarantella object add_host { --name obj...
    --host hobj...
} | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--name`	The names of application objects you want to configure load balancing for.
`--host`	The names of application server objects you want to add to the load balancing pool.
`--file`	A file containing a batch of commands to configure application server load balancing.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example adds the application server rome to the load balancing pool for the application Slide-o-Win.

```
$ tarantella object add_host \
--name "o=applications/cn=Slide-o-Win" \
--host "o=appservers/ou=Sales/cn=rome"
```

The following example adds the group WinHosts to the load balancing pool for the applications Write-o-Win and Slide-o-Win. Load balancing is performed across all the application servers in WinHosts.

```
$ tarantella object add_host \
--name "o=applications/cn=Write-o-Win" \
"o=applications/cn=Slide-o-Win" \
--host "o=appservers/cn=WinHosts"
```

tarantella object add_link

Adds assigned applications links for an object.

Syntax

```
tarantella object add_link { --name obj...
                             --link lobj...
                           } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--name`	The names of objects you want to add assigned applications links for.
`--link`	The names of assigned applications links you want to add.
`--file`	A file containing a batch of commands to add assigned applications links.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example adds the Write-o-Win application to Violet Carson's assigned applications.

```
$ tarantella object add_link \
--name "o=Indigo Insurance/ou=Sales/cn=Violet Carson" \
--link "o=applications/cn=Write-o-Win"
```

The following example adds the group Applications to the assigned applications of the organizational units Sales and Marketing. Everyone who inherits assigned applications from one of these OUs, for example, they belong to that OU and Inherit Assigned Applications from Parent is selected for their user profile object, sees all the applications in the group in their assigned applications.

```
$ tarantella object add_link \
--name "o=Indigo Insurance/ou=Sales" \
--name "o=Indigo Insurance/ou=Marketing" \
--link "o=applications/cn=Applications"
```

tarantella object add_member

Adds objects to groups.

Syntax

```
tarantella object add_member { --name obj...
                               --member mobj...
                             } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--name`	Specifies the names of group objects you want to add members for.
`--member`	Specifies the names of objects you want to add to the groups.
`--file`	Specifies a file containing a batch of commands to add group members.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example adds the Write-o-Win application to the group Applications.

```
$ tarantella object add_member \
--name "o=applications/cn=Applications" \
--member "o=applications/cn=Write-o-Win"
```

The following example adds the three application server objects rome, brussels, and berlin to the group WinHosts. This group can be added to an application's Hosting Application Servers Tab to perform load balancing between the application servers. From the command line, use `tarantella object add_host`.

```
$ tarantella object add_member \
--name "o=appservers/cn=WinHosts" \
```

```
--member "o=appservers/ou=Sales/cn=rome" \
--member "o=appservers/cn=brussels" \
--member "o=appservers/ou=Marketing/cn=berlin"
```

tarantella object delete

Permanently deletes objects from the organizational hierarchy.

Syntax

```
tarantella object delete { --name obj [--children] } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--name`	Specifies the name of the object you want to delete.
`--children`	When deleting organizational units, Active Directory containers or domain components, confirms that you want to delete the object and all objects that belong to it, recursively. As a safeguard, it is impossible to delete an organizational unit, Active Directory container or domain component without specifying `--children`.
`--file`	Specifies a file containing a batch of commands to delete objects.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example removes the user profile object for Violet Carson.

```
$ tarantella object delete \
--name "o=Indigo Insurance/ou=Sales/cn=Violet Carson" \
```

The following example deletes the organizational unit Sales.

```
$ tarantella object delete \
--name "o=Indigo Insurance/ou=Sales" \
--children
```

tarantella object edit

Edits the attributes of an object in the organizational hierarchy.

Syntax

```
tarantella object edit {
  --name obj
 {--attribute [value]}...
} | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--name`	Specifies the name of the object you want to edit the attributes of.
`{--`*attribute* `[`*value*`]}...`	Specifies the attribute names you want to edit, and their new values. The valid *attribute*s depend on the type of object. See the `tarantella object new_`*object_type* documentation for the appropriate list. For example, when editing attributes for an application object you can specify `--displayusing` to edit the Window Type attribute. If you omit *value* for an attribute, it is deleted from the object.
`--file`	Specifies a file containing a batch of commands to edit attributes.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example changes the Inherit Assigned Applications from Parent attribute for the organizational unit Sales.

```
$ tarantella object edit \
--name "o=Indigo Insurance/ou=Sales" \
--inherit false
```

tarantella object list_attributes

Lists the attributes of an object in the organizational hierarchy.

Syntax

```
tarantella object list_attributes {
 --name obj
[--attribute...]
} | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--name`	Specifies the name of the object you want to list the attributes of.
`{--attribute [value]}...`	Specifies the attribute names you want to list. The valid *attribute*s depend on the type of object. See the `tarantella object new_object_type` documentation for the appropriate list. For example, when listing attributes for an application object you can specify `--displayusing` to edit the Window Type attribute.
`--file`	Specifies a file containing a batch of commands to list attributes.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example lists all attributes for the Sales organizational unit.

```
$ tarantella object list_attributes \
--name "o=Indigo Insurance/ou=Sales"
```

The following example lists the Email Address and Login attributes for the user profile object for Rusty Spanner.

```
$ tarantella object list_attributes \
--name "o=Indigo Insurance/ou=IT/cn=Rusty Spanner" \
--email --enabled
```

tarantella object list_contents

Lists the objects that belong to a particular object in the organizational hierarchy.

Syntax

`tarantella object list_contents { --name` *obj* `}| --file` *file*

Description

The following table shows the available options for this command.

Option	Description
`--name`	Specifies the name of the object you want to list the contents of.
`--file`	Specifies a file containing a batch of commands to list object contents.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example lists all the objects within the organizational unit Sales.

```
$ tarantella object list_contents \
--name "o=Indigo Insurance/ou=Sales"
```

tarantella object new_3270app

Creates one or more 3270 application objects. See "3270 Application Object" on page 496.

Syntax

```
tarantella object new_3270app {
  --name obj
  --width pixels
 --height pixels
[ --description text ]
[ --args args ]
[ --method rexec|telnet|ssh ]
[ --resumable never|session|always ]
[ --endswhen lastclient|windowmanager|windowmanageralone|nowindows|
loginscript|loginscriptnowindows ]
[ --maxinstances 0|instances ]
[ --displayusing clientwm|independent|kiosk|localx ]
[ --maximize true|false ]
[ --scalable true|false ]
[ --icon icon_name ]
[ --hints hint...]
[ --hostname host ]
[ --portnumber tcp ]
[ --3270tnclose 0|1|2|3 ]
[ --3270kt pc|sun4|sun5|hp ]
[ --3270bl 0|1|2|3|4 ]
[ --3270ma true|false ]
[ --3270mb true|false ]
[ --3270si true|false ]
[ --3270fg color ]
[ --3270bg color ]
[ --roottype default|custom ]
[ --rootcolor color ]
```

```
[ --compression automatic|on|off ]
[ --execution automatic|inorder|optimized ]
[ --interlaced automatic|on|off ]
[ --accel true|false ]
[ --delayed true|false ]
[ --ldapusers user_dn... ]
[ --ldapgroups group_dn... ]
[ --ldapsearch search_string... ]
[ --env setting... ]
[ --login script ]
[ --winmgr command... ]
[ --resumetimeout mins ]
[ --middlemouse ms ]
[ --windowclose notifyapp|killapp|suspendsession|endsession ]
[ --euro unicode|iso8859-15 ]
[ --dpi monitordpi ]
[ --keepopen true|false ]
[ --lockkeymap true|false ]
[ --share true|false ]
[ --ssharguments args ]
 } | --file file
```

Description

SGD uses the third-party TeemTalk for Unix emulator for 3270 applications. See the TeemTalk for Unix User's Guide supplied with SGD for details.

The following table shows the available options for this command.

Option	Description	More Information
`--name`	The common name of the object in the SGD datastore.	"Name" on page 589
`--width`	The width of the application, in pixels.	"Window Size: Width" on page 620
`--height`	The height of the application, in pixels.	"Window Size: Height" on page 617
`--description`	A text description of the object.	"Comment" on page 546
`--args`	The command-line arguments to use when starting the application.	"Arguments for Command" on page 521
`--method`	The mechanism used by the SGD server to access the application server and start the application.	"Connection Method" on page 548
`--resumable`	Resumability behavior for the application.	"Application Resumability" on page 516

Option	Description	More Information
`--endswhen`	When the application session ends.	"Session Termination" on page 601
`--maxinstances`	The maximum number of instances of the application a user can run simultaneously.	"Number of Sessions" on page 591
`--displayusing`	How the application is displayed to the user.	"Window Type" on page 620
`--maximize`	The initial size of the application.	"Window Size: Client's Maximum Size" on page 615
`--scalable`	Scale the application to fit the window in which it is displayed.	"Window Size: Scale to Fit Window" on page 619
`--icon`	Webtop icon for the application.	"Icon" on page 571
`--hints`	String containing additional name-value data for the application.	"Hints" on page 566
`--hostname`	The 3270 host that runs the application.	"Server Address" on page 599
`--portnumber`	The TCP port number used to connect to the 3270 host.	"Server Port" on page 600
`--3270tnclose`	Behavior when telnet connection to the 3270 host is closed.	"Connection Closed Action" on page 547
`--3270kt`	Layout to use for mapping the keyboard to the terminal being emulated.	"Keyboard Type" on page 577
`--3270bl`	Number of "soft button" levels to display.	"Displayed Soft Buttons" on page 556
`--3270ma`	Maximizes the emulator window.	"Window Size: Maximized" on page 618
`--3270mb`	Enables the application's menu bar.	"Menu Bar" on page 586
`--3270si`	Enables the File and Settings menu items.	"'File' and 'Settings' Menus" on page 562
`--3270fg`	Text color in the application's text window.	"Foreground Color" on page 565
`--3270bg`	Background color of the application's text window.	"Background Color" on page 531
`--roottype`	Appearance of the root window.	"Window Color" on page 612
`--rootcolor`	Color of the root window.	"Window Color: Custom Color" on page 613
`--compression`	Whether the Adaptive Internet Protocol (AIP) protocol compresses commands for transmission.	"Command Compression" on page 544
`--execution`	Whether the AIP protocol always executes commands in order, or optimizes commands for performance reasons.	"Command Execution" on page 545
`--interlaced`	Enables interlaced image transmission.	"Interlaced Images" on page 572

Option	Description	More Information
`--accel`	Enables graphics acceleration for the application's display.	"Graphics Acceleration" on page 566
`--delayed`	Enables delayed updates of the application's display.	"Delayed Updates" on page 556
`--ldapusers`	Assigns the application to the specified LDAP users.	"Assigned User Profiles Tab" on page 525
`--ldapgroups`	Assigns the application to the specified LDAP groups.	"Assigned User Profiles Tab" on page 525
`--ldapsearch`	Assigns the application to the users that match the LDAP search criteria.	"Assigned User Profiles Tab" on page 525
`--env`	Environment variable settings needed to run the application.	"Environment Variables" on page 559
`--login`	The login script used to start the application.	"Login Script" on page 581
`--winmgr`	The Window Manager to use for the application.	"Window Manager" on page 614
`--resumetimeout`	Number of minutes the application is resumable for.	"Application Resumability: Timeout" on page 518
`--middlemouse`	Timeout for emulating a middle mouse button click using a two-button mouse.	"Middle Mouse Timeout" on page 587
`--windowclose`	Effect on application session of closing the main application window.	"Window Close Action" on page 610
`--euro`	Keycode mapping required by the application to support the euro character.	"Euro Character" on page 561
`--dpi`	Monitor resolution that SGD reports to X applications.	"Monitor Resolution" on page 588
`--keepopen`	Keep open the connection used to start the application.	"Keep Launch Connection Open" on page 573
`--lockkeymap`	Prevents applications from changing keyboard mappings.	"Keyboard Map: Locked" on page 576
`--share`	Enables resource sharing for similar application sessions.	"Share Resources Between Similar Sessions" on page 602
`--ssharguments`	Command-line arguments for the `ssh` client.	"Connection Method: ssh Arguments" on page 551
`--file`	Batch file used to create multiple objects within the organizational hierarchy.	

To batch-create multiple objects, use the `--file` option. Use the other options to create a single object.

Examples

The following example creates a new 3270 application object for the application 3270cat. The emulator connects to the 3270 host warsaw.indigo-insurance.com.

```
$ tarantella object new_3270app \
--name "o=applications/ou=Finance/cn=3270cat" \
--width 1000 --height 800 \
--app /3270cat \
--hostname warsaw.indigo-insurance.com
```

tarantella object new_5250app

Creates one or more 5250 application objects. See "5250 Application Object" on page 498.

Syntax

```
tarantella object new_5250app {
  --name obj
  --width pixels
  --height pixels
[ --description text ]
[ --args args ]
[ --method telnet|ssh ]
[ --resumable never|session|always ]
[ --endswhen lastclient|windowmanager|windowmanageralone|nowindows|
loginscript|loginscriptnowindows ]
[ --maxinstances 0|instances ]
[ --displayusing clientwm|independent|kiosk|localx ]
[ --maximize true|false ]
[ --scalable true|false ]
[ --icon icon_name ]
[ --hints hint...]
[ --hostname host ]
[ --portnumber tcp ]
[ --tnclose 0|1|2|3 ]
[ --kt pc|sun4|sun5|hp ]
[ --bl 0|1|2|3|4 ]
[ --ma true|false ]
[ --mb true|false ]
[ --si true|false ]
[ --fg color ]
```

```
[ --bg color ]
[ --roottype default|custom ]
[ --rootcolor color ]
[ --compression automatic|on|off ]
[ --execution automatic|inorder|optimized ]
[ --interlaced automatic|on|off ]
[ --accel true|false ]
[ --delayed true|false ]
[ --ldapusers user_dn... ]
[ --ldapgroups group_dn... ]
[ --ldapsearch search_string... ]
[ --env setting... ]
[ --login script ]
[ --winmgr command... ]
[ --resumetimeout mins ]
[ --middlemouse ms ]
[ --windowclose notifyapp|killapp|suspendsession|endsession ]
[ --euro unicode|iso8859-15 ]
[ --dpi monitordpi ]
[ --keepopen true|false ]
[ --lockkeymap true|false ]
[ --share true|false ]
[ --ssharguments args ]
 } | --file file
```

Description

SGD uses the third-party TeemTalk for Unix emulator for 5250 applications. See the TeemTalk for Unix User's Guide supplied with SGD for details.

The following table shows the available options for this command.

Option	Description	More Information
`--name`	The common name of the object in the SGD datastore.	"Name" on page 589
`--width`	The width of the application, in pixels.	"Window Size: Width" on page 620
`--height`	The height of the application, in pixels.	"Window Size: Height" on page 617
`--description`	A text description of the object.	"Comment" on page 546
`--args`	The command-line arguments to use when starting the application.	"Arguments for Command" on page 521

Option	Description	More Information
`--method`	The mechanism used by the SGD server to access the application server and start the application.	"Connection Method" on page 548
`--resumable`	Resumability behavior for the application.	"Application Resumability" on page 516
`--endswhen`	When the application session ends.	"Session Termination" on page 601
`--maxinstances`	The maximum number of instances of the application a user can run simultaneously.	"Number of Sessions" on page 591
`--displayusing`	How the application is displayed to the user.	"Window Type" on page 620
`--maximize`	The initial size of the application.	"Window Size: Client's Maximum Size" on page 615
`--scalable`	Scale the application to fit the window in which it is displayed.	"Window Size: Scale to Fit Window" on page 619
`--icon`	Webtop icon for the application.	"Icon" on page 571
`--hints`	String containing additional name-value data for the application.	"Hints" on page 566
`--hostname`	The AS/400 host that runs the application.	"Server Address" on page 599
`--portnumber`	The Transmission Control Protocol (TCP) port number used to connect to the AS/400 host.	"Server Port" on page 600
`--tnclose`	Behavior when telnet connection to the AS/400 host is closed.	"Connection Closed Action" on page 547
`--kt`	Layout to use for mapping the keyboard to the terminal being emulated.	"Keyboard Type" on page 577
`--bl`	Number of "soft button" levels to display.	"Displayed Soft Buttons" on page 556
`--ma`	Maximizes the emulator window.	"Window Size: Maximized" on page 618
`--mb`	Enables the application's menu bar.	"Menu Bar" on page 586
`--si`	Enables the File and Settings menu items.	"'File' and 'Settings' Menus" on page 562
`--fg`	Text color in the application's text window.	"Foreground Color" on page 565
`--bg`	Background color of the application's text window.	"Background Color" on page 531
`--roottype`	Appearance of the root window.	"Window Color" on page 612
`--rootcolor`	Color of the root window.	"Window Color: Custom Color" on page 613
`--compression`	Whether the AIP protocol compresses commands for transmission.	"Command Compression" on page 544

Option	Description	More Information
`--execution`	Whether the AIP always executes commands in order, or optimizes commands for performance reasons.	"Command Execution" on page 545
`--interlaced`	Enables interlaced image transmission.	"Interlaced Images" on page 572
`--accel`	Enables graphics acceleration for the application's display.	"Graphics Acceleration" on page 566
`--delayed`	Enables delayed updates of the application's display.	"Delayed Updates" on page 556
`--ldapusers`	Assigns the application to the specified LDAP users.	"Assigned User Profiles Tab" on page 525
`--ldapgroups`	Assigns the application to the specified LDAP groups.	"Assigned User Profiles Tab" on page 525
`--ldapsearch`	Assigns the application to the users that match the LDAP search criteria.	"Assigned User Profiles Tab" on page 525
`--env`	Environment variable settings needed to run the application.	"Environment Variables" on page 559
`--login`	The login script used to start the application.	"Login Script" on page 581
`--winmgr`	The Window Manager to use for the application.	"Window Manager" on page 614
`--resumetimeout`	Number of minutes the application is resumable for.	"Application Resumability: Timeout" on page 518
`--middlemouse`	Timeout for emulating a middle mouse button click using a two-button mouse.	"Middle Mouse Timeout" on page 587
`--windowclose`	Effect on application session of closing the main application window.	"Window Close Action" on page 610
`--euro`	Keycode mapping required by the application to support the euro character.	"Euro Character" on page 561
`--dpi`	Monitor resolution that SGD reports to X applications.	"Monitor Resolution" on page 588
`--keepopen`	Keep open the connection used to start the application.	"Keep Launch Connection Open" on page 573
`--lockkeymap`	Prevents applications from changing keyboard mappings.	"Keyboard Map: Locked" on page 576

Option	Description	More Information
`--share`	Enables resource sharing for similar application sessions.	"Share Resources Between Similar Sessions" on page 602
`--ssharguments`	Command-line arguments for the `ssh` client.	"Connection Method: ssh Arguments" on page 551
`--file`	Batch file used to create multiple objects within the organizational hierarchy.	

To batch-create multiple objects, use the `--file` option. Use the other options to create a single object.

Examples

The following example creates a new 5250 application object for the application 5250cat. The emulator runs on the application server prague, and connects to the AS/400 host warsaw.indigo-insurance.com.

```
$ tarantella object new_5250app \
--name "o=applications/ou=Finance/cn=5250cat" \
--width 400 --height 300 \
--app /5250cat \
--appserv "o=appservers/cn=prague" \
--hostname warsaw.indigo-insurance.com
```

tarantella object new_charapp

Creates one or more character application objects. See "Character Application Object" on page 501.

Syntax

```
tarantella object new_charapp {
  --name obj
  --emulator scocon|vt420|wyse60
  --termtype type
  --width pixels
  --height pixels
[ --description text ]
[ --app pathname ]
[ --args args ]
```

```
[ --appserv obj... ]
[ --method telnet|ssh ]
[ --resumable never|session|always ]
[ --maxinstances 0|instances ]
[ --displayusing independent|kiosk ]
[ --maximize true|false ]
[ --cols cols ]
[ --lines lines ]
[ --icon icon_name ]
[ --hints hint...]
[ --font courier|helvetica|timesroman ]
[ --fontsize points ]
[ --fixedfont true|false ]
[ --autowrap true|false ]
[ --cursor off|block|underline ]
[ --statusline none|indicator|hostmessages|standard|extended ]
[ --scrollstyle line|multiple|smooth ]
[ --border normal|indented|raised ]
[ --answermsg message ]
[ --appkeymode true|false ]
[ --keypad numeric|application ]
[ --cursorkeys application|cursor ]
[ --escape 7-bit|8-bit ]
[ --codepage 437|850|852|860|863|865|8859-1|8859-2|Multinational|
Mazovia|CP852 ]
[ --ldapusers user_dn... ]
[ --ldapgroups group_dn... ]
[ --ldapsearch search_string... ]
[ --loadbal default|cpu|memory|sessions ]
[ --compression automatic|on|off ]
[ --env setting... ]
[ --login script ]
[ --keymap keymap ]
[ --attributemap attrmap ]
[ --colormap colormap ]
[ --resumetimeout mins ]
[ --windowclose suspendsession|endsession ]
[ --ssharguments args ]
} | --file file
```

Description

The following table shows the available options for this command.

Option	Description	More Information
`--name`	The common name of the object in the SGD datastore.	"Name" on page 589
`--emulator`	The type of emulation required for the application.	"Emulation Type" on page 559
`--termtype`	The terminal type required for the application.	"Terminal Type" on page 605
`--width`	The width of the application, in pixels.	"Window Size: Width" on page 620
`--height`	The height of the application, in pixels.	"Window Size: Height" on page 617
`--description`	A text description of the object.	"Comment" on page 546
`--app`	Full path name of the application.	"Application Command" on page 514
`--args`	The command-line arguments to use when starting the application.	"Arguments for Command" on page 521
`--appserv`	The application servers that can run the application.	"Hosting Application Servers Tab" on page 569
`--method`	The mechanism used by the SGD server to access the application server and start the application.	"Connection Method" on page 548
`--resumable`	Resumability behavior for the application.	"Application Resumability" on page 516
`--maxinstances`	The maximum number of instances of the application a user can run simultaneously.	"Number of Sessions" on page 591
`--displayusing`	How the application is displayed to the user.	"Window Type" on page 620
`--maximize`	The initial size of the application.	"Window Size: Client's Maximum Size" on page 615
`--cols`	The number of columns in the terminal window.	"Window Size: Columns" on page 616
`--lines`	The number of lines in the terminal window.	"Window Size: Lines" on page 617
`--icon`	Webtop icon for the application.	"Icon" on page 571
`--hints`	String containing additional name-value data for the application.	"Hints" on page 566
`--font`	Determines the font family used within the terminal window for the application	"Font Family" on page 563
`--fontsize`	Defines the font size in the terminal window.	"Font Size" on page 563
`--fixedfont`	Uses the font size specified by `--fontsize` for the terminal window.	"Font Size: Fixed Font Size" on page 564

Option	Description	More Information
`--autowrap`	Determines the behavior when a user types characters extending beyond the right edge of the terminal window.	"Line Wrapping" on page 577
`--cursor`	Cursor style used for the application.	"Cursor" on page 555
`--statusline`	Specifies the type of status line.	"Status Line" on page 603
`--scrollstyle`	The scroll behavior of the terminal window.	"Scroll Style" on page 597
`--border`	The border style for the terminal window.	"Border Style" on page 533
`--answermsg`	Defines the message to return when an inquiry is sent from the application server to the emulator.	"Answerback Message" on page 513
`--appkeymode`	Determines whether the application can change the codes generated by keys on the keyboard.	"Keyboard Codes Modification" on page 574
`--keypad`	Specifies the behavior of the cursor keys.	"Numpad Codes Modification" on page 592
`--cursorkeys`	Specifies the behavior of the cursor keys.	"Cursor Key Codes Modification" on page 555
`--escape`	Specifies how escape sequences are sent from the emulator to the application server.	"Escape Sequences" on page 560
`--codepage`	The code page to use for the emulator.	"Code Page" on page 540
`--ldapusers`	Assigns the application to the specified LDAP users.	"Assigned User Profiles Tab" on page 525
`--ldapgroups`	Assigns the application to the specified LDAP groups.	"Assigned User Profiles Tab" on page 525
`--ldapsearch`	Assigns the application to the users that match the LDAP search criteria.	"Assigned User Profiles Tab" on page 525
`--loadbal`	Load balancing algorithm to use.	"Application Load Balancing" on page 515
`--compression`	Whether the AIP protocol compresses commands for transmission.	"Command Compression" on page 544
`--env`	Environment variable settings needed to run the application.	"Environment Variables" on page 559
`--login`	The login script used to start the application.	"Login Script" on page 581
`--keymap`	Path name of a keyboard map file.	"Keyboard Map" on page 575
`--attributemap`	The attribute map to use for the application.	"Attribute Map" on page 530
`--colormap`	The color map to use for the application.	"Color Map" on page 542

Option	Description	More Information
`--resumetimeout`	Number of minutes the application is resumable for.	"Application Resumability: Timeout" on page 518
`--windowclose`	Effect on application session of closing the main application window.	"Window Close Action" on page 610
`--ssharguments`	Command-line arguments for the `ssh` client.	"Connection Method: ssh Arguments" on page 551
`--file`	Batch file used to create multiple objects within the organizational hierarchy.	

To batch-create multiple objects, use the `--file` option. Use the other options to create a single object.

Examples

The following example creates a character application object for the application Pers-o-dat. The application can be run on the application servers prague and london. Application server load balancing decides which application server to use.

```
$ tarantella object new_charapp \
--name "o=applications/cn=Pers-o-dat" \
--emulator vt420 --termtype vt220 \
--width 400 --height 300 \
--app /bin/persodat \
--appserv "o=appservers/cn=prague" \
"o=appservers/ou=IT/cn=london"
```

tarantella object new_container

Creates one or more Active Directory container objects. See "Directory (Light): Active Directory Container Object" on page 505.

Syntax

`tarantella object new_container { --name` *obj* `} | --file` *file*

Description

To batch-create multiple objects, use the `--file` option. Use the other options to create a single object.

Examples

The following example creates a new Active Directory container object with name `Users`, within the indigo-insurance.com domain components.

```
$ tarantella object new_container \
--name "dc=com/dc=indigo-insurance/cn=Users"
```

The following example creates two Active Directory container objects using a batch script defined as a "here-document". You can alternatively store the batch script in a file, and reference it using `--file` *filename*.

```
$ tarantella object new_container --file - <<EOF
--name "dc=com/dc=indigo-insurance/cn=Users"
--name "dc=com/dc=indigo-insurance/cn=Applications"
EOF
```

tarantella object new_dc

Creates one or more domain component objects. See "Directory (Light): Domain Component Object" on page 505.

Syntax

`tarantella object new_dc { --name` *obj* `} | --file` *file*

Description

To batch-create multiple objects, use the `--file` option. Use the other options to create a single object.

Examples

The following example creates a new domain component object with name `com`, at the top level of the organizational hierarchy.

```
$ tarantella object new_dc --name "dc=com"
```

The following example creates two domain component objects using a batch script defined as a "here-document". You can alternatively store the batch script in a file, and reference it using `--file` *filename*.

```
$ tarantella object new_dc --file - <<EOF
--name "dc=com"
--name "dc=com/dc=indigo-insurance"
EOF
```

tarantella object new_doc

Creates one or more document objects. See "Document Object" on page 506.

Syntax

```
tarantella object new_doc {
  --name obj
  --url url
[ --description text ]
[ --newbrowser true|false ]
[ --icon icon_name ]
[ --hints hint...]
[ --ldapusers user_dn... ]
[ --ldapgroups group_dn... ]
[ --ldapsearch search_string... ]
} | --file file
```

Description

The following table shows the available options for this command.

Option	Description	More Information
`--name`	The name of the document object.	"Name" on page 589
`--url`	Uniform Resource Locator (URL) displayed when document object link is clicked.	"URL" on page 608
`--description`	A text description of the object.	"Comment" on page 546
`--newbrowser`	Displays the document in a new browser window.	"Window Type: New Browser Window" on page 624
`--icon`	Webtop icon for the application.	"Icon" on page 571
`--hints`	String containing additional name-value data for the application.	"Hints" on page 566
`--ldapusers`	Assigns the application to the specified LDAP users.	"Assigned User Profiles Tab" on page 525
`--ldapgroups`	Assigns the application to the specified LDAP groups.	"Assigned User Profiles Tab" on page 525
`--ldapsearch`	Assigns the application to the users that match the LDAP search criteria.	"Assigned User Profiles Tab" on page 525
`--file`	A file containing a batch of commands to configure application server load balancing.	

To batch-create multiple objects, use the `--file` option. Use the other options to create a single object.

Examples

The following example creates a new document object with common name `PhoneList`, belonging to the organizational unit `applications`.

```
$ tarantella object new_doc \
--name "o=applications/ou=Finance/ou=Administration/cn=Phone List" \
--url http://newyork.indigo-insurance.com \
--newbrowser false
```

The following example creates two document objects using a batch script defined as a "here-document". You can alternatively store the batch script in a file, and reference it using `--file` *filename*.

```
$ tarantella object new_doc --file - <<EOF
--name "o=applications/ou=Finance/ou=Administration/cn=Phone List" \
--url http://newyork.indigo-insurance.com \
--newbrowser false
--name "o=applications/cn=Indigo Insurance web site" \
--url http://www.indigo-insurance.com \
--newbrowser true
```

tarantella object new_group

Creates one or more group objects. See "Group Object" on page 506.

Syntax

```
tarantella object new_group {
  --name obj
[ --description text ]
[ --member obj... ]
[ --ldapusers user_dn... ]
[ --ldapgroups group_dn... ]
[ --ldapsearch search_string... ]
 } | --file file
```

Description

The following table shows the available options for this command.

Option	Description	More Information
`--name`	The name of the group object.	"Name" on page 589
`--description`	A text description of the object.	"Comment" on page 546
`--member`	Member of the group object.	"Members Tab" on page 584
`--ldapusers`	Assigns the application to the specified LDAP users.	"Assigned User Profiles Tab" on page 525

Option	Description	More Information
`--ldapgroups`	Assigns the application to the specified LDAP groups.	"Assigned User Profiles Tab" on page 525
`--ldapsearch`	Assigns the application to the users that match the LDAP search criteria.	"Assigned User Profiles Tab" on page 525
`--file`	A file containing a batch of commands to configure application server load balancing.	

To batch-create multiple objects, use the `--file` option. Use the other options to create a single object.

Examples

The following example creates a new group object with common name `WinHosts`, belonging to the organization object `appservers`. The group's members are the application server objects for the application servers rome, brussels, and berlin.

```
$ tarantella object new_group \
--name "o=appservers/cn=WinHosts" \
--member "o=appservers/ou=Sales/cn=rome" \
--member "o=appservers/cn=brussels" \
--member "o=appservers/ou=Marketing/cn=berlin"
```

The following example creates three group objects using a batch script defined as a "here-document". The groups have no members. You can use `tarantella object add_member` to add members later from the command line. You can alternatively store the batch script in a file, and reference it using `--file` *filename*.

```
$ tarantella object new_group --file - <<EOF
--name "o=appservers/cn=WinHosts"
--name "o=appservers/cn=UNIXHosts"
--name "o=applications/cn=Applications"
EOF
```

tarantella object new_host

Creates one or more application server objects. See "Application Server Object" on page 500.

Syntax

```
tarantella object new_host {
  --name obj
  --address address
[ --description text ]
[ --ntdomain dom ]
[ --available true|false ]
[ --auth trytta|nevertrytta|default ]
[ --location location ]
[ --hostlocale ll_tt ]
} | --file file
```

Description

The following table shows the available options for this command.

Option	Description	More Information
`--name`	The names of objects you want to add assigned applications links for.	"Name" on page 589
`--address`	Network address of the application server.	"Address" on page 513
`--description`	A text description of the object.	"Comment" on page 546
`--ntdomain`	The Windows domain used for application server authentication.	"Domain Name" on page 557
`--available`	Specifies whether applications can run on this application server.	"Application Start" on page 520
`--auth`	Specifies the policy for authenticating users on the application server, *if no password is already cached* for that server.	"Password Cache Usage" on page 594
`--location`	String describing the location of the application server. Used for load balancing.	"Load Balancing Groups" on page 578
`--hostlocale`	Default language setting for the application server.	"Prompt Locale" on page 596
`--file`	A file containing a batch of commands to add assigned applications links.	

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example creates a new application server object with common name `paris`, belonging to the organizational unit object `Finance`, which must already exist.

```
$ tarantella object new_host \
--name "o=appservers/ou=Finance/cn=paris" \
--address paris.indigo-insurance.com \
--auth default \
--location Europe-north
```

The following example creates three application server objects using a batch script defined as a "here-document". Alternatively, you can store the batch script in a file, and reference it using `--file` *filename*.

```
$ tarantella object new_host --file - <<EOF
--name "o=appservers/ou=Finance/cn=paris" \
--address paris.indigo-insurance.com
--name "o=appservers/cn=brussels" \
--address brussels.indigo-insurance.com
--name "o=appservers/ou=IT/cn=london" \
--address london.indigo-insurance.com
EOF
```

tarantella object new_org

Syntax

Creates one or more organization objects. See "Directory: Organization Object" on page 503.

```
tarantella object new_org {
   --name obj
 [ --description text ]
 [ --conntype type_spec... ]
 [ --cdm drive_spec... ]
 [ --userprintingconfig true|false ]
 [ --mapprinters 2|1|0 ]
 [ --pdfenabled 1|0 ]
 [ --pdfviewerenabled 1|0 ]
 [ --pdfdriver driver_name ]
 [ --pdfisdefault 1|0 ]
```

```
  [ --pdfviewerisdefault 1|0 ]
  [ --links obj... ]
  [ --editprofile 2|1|0 ]
  [ --clipboard 2|1|0 ]
  [ --serialport 2|1|0 ]
} | --file file
```

Description

The following table shows the available options for this command.

Option	Description	More Information
`--name`	The name of the organization object in the SGD datastore.	"Name" on page 589
`--description`	A text description of the object.	"Comment" on page 546
`--conntype`	The connections that are allowed between the client device and the SGD server.	"Connections" on page 549
`--cdm`	The drives on a Microsoft Windows client device that can be accessed from applications running on application servers.	"Client Drive Mapping" on page 534
`--userprintingconfig`	Enables user-specific printing configuration.	"Client Printing: Override" on page 537
`--mapprinters`	The client printers users can print to when printing from Windows applications.	"Client Printing" on page 536
`--pdfenabled`	Enables users to print using the SGD "Universal PDF Printer" printer when printing from Windows applications.	"Universal PDF Printer" on page 606
`--pdfviewerenabled`	Enables users to print using the SGD "Universal PDF Viewer" printer when printing from Windows applications.	"Universal PDF Viewer" on page 607
`--pdfdriver`	The printer driver to use for SGD Portable Document Format (PDF) printing when printing from Windows applications.	"Postscript Printer Driver" on page 595
`--pdfisdefault`	Sets the SGD "Universal PDF Printer" printer as the client's default printer when printing from Windows applications.	"Make Universal PDF Printer the Default" on page 582

Option	Description	More Information
`--pdfviewerisdefault`	Sets the SGD "Universal PDF Viewer" printer as the client's default printer when printing from Windows applications.	"Make Universal PDF Viewer the Default" on page 583
`--links`	Defines assigned applications links.	"Assigned Applications Tab" on page 523
`--editprofile`	Whether users can create and edit profiles for use with the SGD Client.	"Client Profile Editing" on page 538
`--clipboard`	Whether users can use copy and paste in Windows or X application sessions.	"Copy and Paste" on page 552
`--serialport`	Whether users can access the serial ports on a client device from a Windows application running on a Microsoft Windows Server 2003 application server.	"Serial Port Mapping" on page 598
`--file`	Batch file used to create multiple objects within the organizational hierarchy.	

To batch-create multiple objects, use the `--file` option. Use the other options to create a single object.

Examples

The following example creates a new organization object with name `Indigo Insurance`. Connections for all users in the organization are secure (SSL-based) unless the OU or user profile objects are configured to give a different type of connection.

```
$ tarantella object new_org \
--name "o=Indigo Insurance" \
--conntype '*:*:SSL'
```

The following example creates two organization objects using a batch script defined as a "here-document". You can alternatively store the batch script in a file, and reference it using `--file` *filename*.

```
$ tarantella object new_org --file - <<EOF
--name "o=Indigo Insurance"
--name "o=Indigo Insurance Services"
EOF
```

tarantella object new_orgunit

Creates one or more organizational unit (OU) objects. See "Directory: Organizational Unit Object" on page 504.

Syntax

```
tarantella object new_orgunit {
   --name obj
 [ --description text ]
 [ --inherit true|false ]
 [ --conntype type_spec... ]
 [ --cdm drive_spec... ]
 [ --userprintingconfig 1|0 ]
 [ --mapprinters 2|1|0 ]
 [ --pdfenabled 1|0 ]
 [ --pdfviewerenabled 1|0 ]
 [ --pdfdriver driver_name ]
 [ --pdfisdefault 1|0 ]
 [ --pdfviewerisdefault 1|0 ]
 [ --links obj... ]
 [ --editprofile 2|1|0 ]
 [ --clipboard 2|1|0 ]
 [ --serialport 2|1|0 ]
 } | --file file
```

Description

The following table shows the available options for this command.

Option	Description	More Information
`--name`	The name of the organizational unit object in the SGD datastore.	"Name" on page 589
`--description`	A text description of the object.	"Comment" on page 546
`--inherit`	Whether the assigned applications for the object also includes the assigned applications for the object's parent.	"Inherit Assigned Applications from Parent" on page 572
`--conntype`	The connections that are allowed between the client device and the SGD server.	"Connections" on page 549

Option	Description	More Information
`--cdm`	The drives on a Microsoft Windows client device that can be accessed from applications running on application servers.	"Client Drive Mapping" on page 534
`--userprintingconfig`	Enables user-specific printing configuration.	"Client Printing: Override" on page 537
`--mapprinters`	The client printers users can print to when printing from Windows applications.	"Client Printing" on page 536
`--pdfenabled`	Enables users to print using the SGD "Universal PDF Printer" printer when printing from Windows applications.	"Universal PDF Printer" on page 606
`--pdfviewerenabled`	Enables users to print using the SGD "Universal PDF Viewer" printer when printing from Windows applications.	"Universal PDF Viewer" on page 607
`--pdfdriver`	The printer driver to use for SGD PDF printing when printing from Windows applications.	"Postscript Printer Driver" on page 595
`--pdfisdefault`	Sets the SGD "Universal PDF Printer" printer as the client's default printer when printing from Windows applications.	"Make Universal PDF Printer the Default" on page 582
`--pdfviewerisdefault`	Sets the SGD "Universal PDF Viewer" printer as the client's default printer when printing from Windows applications.	"Make Universal PDF Viewer the Default" on page 583
`--links`	Defines the assigned applications for an object.	"Assigned Applications Tab" on page 523
`--editprofile`	Whether users can create and edit profiles for use with the SGD Client.	"Client Profile Editing" on page 538
`--clipboard`	Whether users can use copy and paste in Windows or X application sessions.	"Copy and Paste" on page 552
`--serialport`	Whether users can access the serial ports on a client device from a Windows application running on a Microsoft Windows Server 2003 application server.	"Serial Port Mapping" on page 598
`--file`	Batch file used to create multiple objects within the organizational hierarchy.	

To batch-create multiple objects, use the `--file` option. Use the other options to create a single object.

Examples

The following example creates a new OU object with the name `IT`, belonging to the organization object `Indigo Insurance`, which must already exist. This OU inherits assigned applications from its parent, the organization object. Connections for all users in the OU are secure (SSL-based) unless their user profile objects are configured to give a different type of connection.

```
$ tarantella object new_orgunit \
--name "o=Indigo Insurance/ou=IT" \
--inherit true --conntype '*:*:SSL'
```

The following example creates three OU objects using a batch script defined as a "here-document". The OU `Administration` belongs to the OU `Finance`, just created. You can alternatively store the batch script in a file, and reference it using `--file` *filename*.

```
$ tarantella object new_orgunit --file - <<EOF
--name "o=Indigo Insurance/ou=IT"
--name "o=Indigo Insurance/ou=Finance"
--name "o=Indigo Insurance/ou=Finance/ou=Administration"
EOF
```

tarantella object new_person

Creates one or more user profile objects. See "User Profile Object" on page 507.

Syntax

```
tarantella object new_person {
   --name obj
   --surname surname
 [ --description text ]
 [ --user user ]
 [ --email name@domain ]
 [ --ntdomain dom ]
 [ --inherit true|false ]
 [ --shared true|false ]
 [ --enabled true|false ]
 [ --conntype type_spec... ]
 [ --cdm drive_spec... ]
 [ --keymap keymap ]
 [ --bandwidth limit ]
```

```
[ --links obj... ]
[ --userprintingconfig 1|0 ]
[ --mapprinters 2|1|0 ]
[ --pdfenabled 1|0 ]
[ --pdfviewerenabled 1|0 ]
[ --pdfdriver driver_name ]
[ --pdfisdefault 1|0 ]
[ --pdfviewerisdefault 1|0 ]
[ --editprofile 2|1|0 ]
[ --clipboard 2|1|0 ]
[ --serialport 2|1|0 ]
} | --file file
```

Description

The following table shows the available options for this command.

Option	Description	More Information
`--name`	The common name of the object in the SGD datastore.	"Name" on page 589
`--surname`	The surname, or family name, for the user profile.	"Surname" on page 604
`--description`	A text description of the object.	"Comment" on page 546
`--user`	The user name for the user profile. This is typically their UNIX user name.	"Login Name" on page 581
`--email`	The email address for the user profile.	"Email Address" on page 558
`--ntdomain`	The Windows domain used for application server authentication.	"Domain Name" on page 557
`--inherit`	Whether the assigned applications for the object also includes the assigned applications for the object's parent.	"Inherit Assigned Applications from Parent" on page 572
`--shared`	Whether the user profile object is used by a single user, or can be shared by multiple users in the form of a "guest" account.	"Login: Multiple" on page 580
`--enabled`	Whether someone can log in using this user profile object.	"Login" on page 579
`--conntype`	Defines the connections that are allowed between the client device and the SGD server.	"Connections" on page 549
`--cdm`	The drives on a Microsoft Windows client device that users can access from applications.	"Client Drive Mapping" on page 534

Option	Description	More Information
`--keymap`	The path name of a keyboard map file.	"Keyboard Map" on page 575
`--bandwidth`	The maximum bandwidth this person can use for applications.	"Bandwidth Limit" on page 532
`--links`	Defines the assigned applications for an object.	"Assigned Applications Tab" on page 523
`--userprintingconfig`	Enables user-specific printing configuration.	"Client Printing: Override" on page 537
`--mapprinters`	The client printers users can print to when printing from Windows applications.	"Client Printing" on page 536
`--pdfenabled`	Enables users to print using the SGD "Universal PDF Printer" printer when printing from Windows applications.	"Universal PDF Printer" on page 606
`--pdfviewerenabled`	Enables users to print using the SGD "Universal PDF Viewer" printer when printing from Windows applications.	"Universal PDF Viewer" on page 607
`--pdfdriver`	The printer driver to use for SGD PDF printing when printing from Windows applications.	"Postscript Printer Driver" on page 595
`--pdfisdefault`	Sets the SGD "Universal PDF Printer" printer as the client's default printer when printing from Windows applications.	"Make Universal PDF Printer the Default" on page 582
`--pdfviewerisdefault`	Sets the SGD "Universal PDF Viewer" printer as the client's default printer when printing from Windows applications.	"Make Universal PDF Viewer the Default" on page 583
`--editprofile`	Whether users can create and edit profiles for use with the SGD Client.	"Client Profile Editing" on page 538
`--clipboard`	Whether users can use copy and paste in X or Windows application sessions.	"Copy and Paste" on page 552
`--serialport`	Whether users can access the serial ports on a client device from a Windows application running on a Microsoft Windows Server 2003 application server.	"Serial Port Mapping" on page 598
`--file`	Batch file used to create multiple objects within the organizational hierarchy.	

To batch-create multiple objects, use the `--file` option. Use the other options to create a single object.

Examples

The following example creates a new user profile object for Indigo Jones. Indigo inherits assigned applications from the organization object, and is given a secure (SSL-based) connection.

```
$ tarantella object new_person \
--name "o=Indigo Insurance/cn=Indigo Jones" \
--surname Jones --user indigo \
--email indigo@indigo-insurance.com --inherit true \
--conntype '*:*:SSL'
```

The following example creates three user profile objects using a batch script defined as a "here-document". You can alternatively store the batch script in a file, and reference it using `--file` *filename*.

```
$ tarantella object new_person --file - <<EOF
--name "o=Indigo Insurance/cn=Indigo Jones" --surname Jones
--name "o=Indigo Insurance/ou=IT/cn=Bill Orange" --surname Orange
--name "o=Indigo Insurance/ou=Finance/cn=Mulan Rouge" --surname Rouge
EOF
```

tarantella object new_windowsapp

Creates one or more Windows application objects. See "Windows Application Object" on page 509.

Syntax

```
tarantella object new_windowsapp {
   --name obj
   --width pixels
   --height pixels
 [ --description text ]
 [ --winproto wts|winframe|none ]
 [ --trylocal true|false ]
 [ --ntdomain dom ]
 [ --app pathname ]
 [ --args args ]
 [ --appserv obj... ]
 [ --method rexec|telnet|ssh ]
 [ --resumable never|session|always ]
```

```
[ --endswhen lastclient|windowmanager|windowmanageralone|nowindows|
loginscript|loginscriptnowindows ]
[ --maxinstances 0|instances ]
[ --displayusing independent|kiosk|seamless ]
[ --maximize true|false ]
[ --scalable true|false ]
[ --depth 8|16|24 ]
[ --icon icon_name ]
[ --hints hint...]
[ --clipboardlevel level ]
[ --roottype default|custom ]
[ --rootcolor color ]
[ --compression automatic|on|off ]
[ --execution automatic|inorder|optimized ]
[ --interlaced automatic|on|off ]
[ --accel true|false ]
[ --delayed true|false ]
[ --ldapusers user_dn... ]
[ --ldapgroups group_dn... ]
[ --ldapsearch search_string... ]
[ --loadbal default|cpu|memory|sessions ]
[ --env setting... ]
[ --login script ]
[ --winmgr command... ]
[ --protoargs args ]
[ --resumetimeout mins ]
[ --middlemouse ms ]
[ --windowclose suspendsession|endsession ]
[ --euro unicode|iso8859-15 ]
[ --dpi monitordpi ]
[ --keepopen true|false ]
[ --lockkeymap true|false ]
[ --remotewindowkeys true|false ]
[ --allowkioskescape true|false ]
} | --file file
```

Description

The following table shows the available options for this command.

Option	Description	More Information
`--name`	The common name of the object in the SGD datastore.	"Name" on page 589
`--width`	The width of the application, in pixels.	"Window Size: Width" on page 620
`--height`	The height of the application, in pixels.	"Window Size: Height" on page 617
`--description`	A text description of the object.	"Comment" on page 546
`--winproto`	The protocol used to connect to the server hosting the application.	"Windows Protocol" on page 625
`--trylocal`	Try starting the application from the user's client device.	"Windows Protocol: Try Running From Client First" on page 626
`--ntdomain`	The Windows NT domain to use for the application server authentication process.	"Domain Name" on page 557
`--app`	Full path name of the application.	"Application Command" on page 514
`--args`	The command-line arguments to use when starting the application.	"Arguments for Command" on page 521
`--appserv`	The application servers that can run the application.	"Hosting Application Servers Tab" on page 569
`--method`	The mechanism used by the SGD server to access the application server and start the application.	"Connection Method" on page 548
`--resumable`	Resumability behavior for the application.	"Application Resumability" on page 516
`--endswhen`	When the application session ends.	"Session Termination" on page 601
`--maxinstances`	The maximum number of instances of the application a user can run simultaneously.	"Number of Sessions" on page 591
`--displayusing`	How the application is displayed to the user.	"Window Type" on page 620
`--maximize`	The initial size of the application.	"Window Size: Client's Maximum Size" on page 615
`--scalable`	Scale the application to fit the window in which it is displayed.	"Window Size: Scale to Fit Window" on page 619
`--depth`	Color depth for the application.	"Color Depth" on page 541
`--icon`	Webtop icon for the application.	"Icon" on page 571

Option	Description	More Information
`--hints`	String containing additional name-value data for the application.	"Hints" on page 566
`--clipboardlevel`	Clipboard security level for the application.	"Copy and Paste: Application's Clipboard Security Level" on page 554
`--roottype`	Appearance of the root window.	"Window Color" on page 612
`--rootcolor`	Color of the root window.	"Window Color: Custom Color" on page 613
`--compression`	Whether the AIP protocol compresses commands for transmission.	"Command Compression" on page 544
`--execution`	Whether the AIP protocol always executes commands in order, or optimizes commands for performance reasons.	"Command Execution" on page 545
`--interlaced`	Enables interlaced image transmission.	"Interlaced Images" on page 572
`--accel`	Enables graphics acceleration for the application's display.	"Graphics Acceleration" on page 566
`--delayed`	Enables delayed updates of the application's display.	"Delayed Updates" on page 556
`--ldapusers`	Assigns the application to the specified LDAP users.	"Assigned User Profiles Tab" on page 525
`--ldapgroups`	Assigns the application to the specified LDAP groups.	"Assigned User Profiles Tab" on page 525
`--ldapsearch`	Assigns the application to the users that match the LDAP search criteria.	"Assigned User Profiles Tab" on page 525
`--loadbal`	Load balancing algorithm to use.	"Application Load Balancing" on page 515
`--env`	Environment variable settings needed to run the application.	"Environment Variables" on page 559
`-login`	The login script used to start the application.	"Login Script" on page 581
`--winmgr`	The Window Manager to use for the application.	"Window Manager" on page 614
`--protoargs`	Command-line arguments used for the Windows Protocol (`--winproto`).	"Arguments for Protocol" on page 522
`--resumetimeout`	Number of minutes the application is resumable for.	"Application Resumability: Timeout" on page 518
`--middlemouse`	Timeout for emulating a middle mouse button click using a two-button mouse.	"Middle Mouse Timeout" on page 587

Option	Description	More Information
`--windowclose`	Effect on application session of closing the main application window.	"Window Close Action" on page 610
`--euro`	Keycode mapping required by the application to support the euro character.	"Euro Character" on page 561
`--dpi`	Monitor resolution that SGD reports to X applications.	"Monitor Resolution" on page 588
`--keepopen`	Keep open the connection used to start the application.	"Keep Launch Connection Open" on page 573
`--lockkeymap`	Prevents applications from changing keyboard mappings.	"Keyboard Map: Locked" on page 576
`--remotewindowkeys`	Sends window management key strokes to the remote session.	"Window Management Keys" on page 613
`--allowkioskescape`	Enables a pull-down header for kiosk mode applications.	"Window Type: Pull-Down Header" on page 624
`--file`	Batch file used to create multiple objects within the organizational hierarchy.	

To batch-create multiple objects, use the `--file` option. Use the other options to create a single object.

Examples

The following example creates a new Windows application object for the application Write-o-Win. The application runs on the application server rome.

```
$ tarantella object new_windowsapp \
--name "o=applications/cn=Write-o-Win" \
--width 1000  --height 800 \
--app c:\\programs\\apps\\write.exe \
--appserv "o=appservers/ou=Sales/cn=rome" \
```

tarantella object new_xapp

Creates one or more X application objects. See "X Application Object" on page 510.

Syntax

```
tarantella object new_xapp {
```

```
    --name obj
    --width pixels
    --height pixels
  [ --description text ]
  [ --app pathname ]
  [ --args args ]
  [ --appserv obj... ]
  [ --method rexec|telnet|ssh ]
  [ --resumable never|session|always ]
  [ --endswhen lastclient|windowmanager|windowmanageralone|nowindows|
loginscript|loginscriptnowindows ]
  [ --maxinstances 0|instances ]
  [ --displayusing clientwm|independent|kiosk|localx ]
  [ --maximize true|false ]
  [ --scalable true|false ]
  [ --depth 8|16|24|16/8|24/8|8/16|8/24 ]
  [ --icon icon_name ]
  [ --hints hint...]
  [ --clipboardlevel level ]
  [ --roottype default|custom ]
  [ --rootcolor color ]
  [ --compression automatic|on|off ]
  [ --execution automatic|inorder|optimized ]
  [ --quality automatic|best|24|21|18|16|15|12|9|6 ]
  [ --interlaced automatic|on|off ]
  [ --accel true|false ]
  [ --delayed true|false ]
  [ --ldapusers user_dn... ]
  [ --ldapgroups group_dn... ]
  [ --ldapsearch search_string... ]
  [ --loadbal default|cpu|memory|sessions ]
  [ --env setting... ]
  [ --login script ]
  [ --winmgr command... ]
  [ --resumetimeout mins ]
  [ --middlemouse ms ]
  [ --force3button true|false ]
  [ --windowclose notifyapp|killapp|suspendsession|endsession ]
  [ --euro unicode|iso8859-15 ]
  [ --dpi monitordpi ]
  [ --keepopen true|false ]
  [ --lockkeymap true|false ]
  [ --share true|false ]
  [ --securityextension true|false ]
  [ --ssharguments args ]
```

```
[ --unixaudiopreload true|false ]
[ --remotewindowkeys true|false ]
[ --allowkioskescape true|false ]
} | --file file
```

Description

The following table shows the available options for this command.

Option	Description	More Information
`--name`	The common name of the object in the SGD datastore.	"Name" on page 589
`--width`	The width of the application, in pixels.	"Window Size: Width" on page 620
`--height`	The height of the application, in pixels.	"Window Size: Height" on page 617
`--description`	A text description of the object.	"Comment" on page 546
`--app`	Full path name of the application.	"Application Command" on page 514
`--args`	The command-line arguments to use when starting the application.	"Arguments for Command" on page 521
`--appserv`	The application servers that can run the application.	"Hosting Application Servers Tab" on page 569
`--method`	The mechanism used by the SGD server to access the application server and start the application.	"Connection Method" on page 548
`--resumable`	Resumability behavior for the application.	"Application Resumability" on page 516
`--endswhen`	When the application session ends.	"Session Termination" on page 601
`--maxinstances`	The maximum number of instances of the application a user can run simultaneously.	"Number of Sessions" on page 591
`--displayusing`	How the application is displayed to the user.	"Window Type" on page 620
`--maximize`	The initial size of the application.	"Window Size: Client's Maximum Size" on page 615
`--scalable`	Scale the application to fit the window in which it is displayed.	"Window Size: Scale to Fit Window" on page 619
`--depth`	Color depth for the application.	"Color Depth" on page 541
`--icon`	Webtop icon for the application.	"Icon" on page 571
`--hints`	String containing additional name-value data for the application.	"Hints" on page 566

Option	Description	More Information
`--clipboardlevel`	Clipboard security level for the application.	"Copy and Paste: Application's Clipboard Security Level" on page 554
`--roottype`	Appearance of the root window.	"Window Color" on page 612
`--rootcolor`	Color of the root window.	"Window Color: Custom Color" on page 613
`--compression`	Whether the AIP protocol compresses commands for transmission.	"Command Compression" on page 544
`--execution`	Whether the AIP protocol always executes commands in order, or optimizes commands for performance reasons.	"Command Execution" on page 545
`--quality`	The effective color depth displayed on client devices.	"Color Quality" on page 543
`--interlaced`	Enables interlaced image transmission.	"Interlaced Images" on page 572
`--accel`	Enables graphics acceleration for the application's display.	"Graphics Acceleration" on page 566
`--delayed`	Enables delayed updates of the application's display.	"Delayed Updates" on page 556
`--ldapusers`	Assigns the application to the specified LDAP users.	"Assigned User Profiles Tab" on page 525
`--ldapgroups`	Assigns the application to the specified LDAP groups.	"Assigned User Profiles Tab" on page 525
`--ldapsearch`	Assigns the application to the users that match the LDAP search criteria.	"Assigned User Profiles Tab" on page 525
`--loadbal`	Load balancing algorithm to use.	"Application Load Balancing" on page 515
`--env`	Environment variable settings needed to run the application.	"Environment Variables" on page 559
`--login`	The login script used to start the application.	"Login Script" on page 581
`--winmgr`	The Window Manager to use for the application.	"Window Manager" on page 614
`--resumetimeout`	Number of minutes the application is resumable for.	"Application Resumability: Timeout" on page 518
`--middlemouse`	Timeout for emulating a middle mouse button click using a two-button mouse.	"Middle Mouse Timeout" on page 587
`--force3button`	Specifies that the application only supports a 3-button mouse.	"Mouse" on page 589
`--windowclose`	Effect on application session of closing the main application window.	"Window Close Action" on page 610

Option	Description	More Information
`--euro`	Keycode mapping required by the application to support the euro character.	"Euro Character" on page 561
`--dpi`	Monitor resolution that SGD reports to X applications.	"Monitor Resolution" on page 588
`--keepopen`	Keep open the connection used to start the application.	"Keep Launch Connection Open" on page 573
`--lockkeymap`	Prevents applications from changing keyboard mappings.	"Keyboard Map: Locked" on page 576
`--share`	Enables resource sharing for similar application sessions.	"Share Resources Between Similar Sessions" on page 602
`--securityextension`	Enables the X Security Extension for the application.	"X Security Extension" on page 626
`--ssharguments`	Command-line arguments for the `ssh` client.	"Connection Method: ssh Arguments" on page 551
`--unixaudiopreload`	Enables the SGD audio redirection library.	"Audio Redirection Library" on page 530
`--remotewindowkeys`	Sends window management key strokes to the remote session.	"Window Management Keys" on page 613
`--allowkioskescape`	Enables a pull-down header for kiosk mode applications.	"Window Type: Pull-Down Header" on page 624
`--file`	Batch file used to create multiple objects within the organizational hierarchy.	

To batch-create multiple objects, use the `--file` option. Use the other options to create a single object.

Examples

The following example creates a new X application object for the application XFinance. The application can be run on the application servers paris, bonn, or lisbon. Application server load balancing decides which one to use.

```
$ tarantella object new_xapp \
--name "o=applications/ou=Finance/cn=XFinance" \
--width 1000  --height 800 \
--app /usr/local/bin/xfinance \
--appserv "o=appservers/ou=Finance/cn=paris" \
"o=appservers/ou=Finance/cn=bonn" "o=appservers/cn=lisbon"
```

tarantella object remove_host

Removes application servers from the list of those that can run an application, for application server load balancing.

Syntax

```
tarantella object remove_host { --name obj...
                                --host hobj...
                              } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--name`	Specifies the names of application objects you want to configure load balancing for.
`--host`	Specifies the names of application server objects you want to remove from the load balancing pool.
`--file`	Specifies a file containing a batch of commands to configure application server load balancing.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example removes the application server rome from the load balancing pool for the application Slide-o-Win.

```
$ tarantella object remove_host \
--name "o=applications/cn=Slide-o-Win" \
--host "o=appservers/ou=Sales/cn=rome"
```

The following example removes the group WinHosts from the load balancing pool for the applications Write-o-Win and Slide-o-Win. Load balancing is no longer performed across all the application servers in WinHosts.

```
$ tarantella object remove_host \
--name "o=applications/cn=Write-o-Win" \
"o=applications/cn=Slide-o-Win" \
--host "o=appservers/cn=WinHosts"
```

tarantella object remove_link

Removes assigned applications links for an object.

Syntax

```
tarantella object remove_link { --name obj...
                                --link lobj...
                              } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--name`	Specifies the names of objects you want to remove links for.
`--link`	Specifies the names of objects you want to remove links for.
`--file`	Specifies a file containing a batch of commands to remove links for.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example removes the Write-o-Win application from the assigned applications for Violet Carson.

```
$ tarantella object remove_link \
--name "o=Indigo Insurance/ou=Sales/cn=Violet Carson" \
--link "o=applications/cn=Write-o-Win"
```

The following example removes the group Applications from the assigned applications of the organizational units Sales and Marketing. Everyone who inherits assigned applications from one of these OUs no longer sees all the applications in their assigned applications. For example, if they belong to that OU and Inherit Assigned Applications from Parent is selected for their user profile object. However, they might still see an application if it is inherited from elsewhere.

```
$ tarantella object remove_link \
--name "o=Indigo Insurance/ou=Sales" \
"o=Indigo Insurance/ou=Marketing" \
--link "o=applications/cn=Applications"
```

tarantella object remove_member

Removes objects from groups.

Syntax

```
tarantella object remove_member { --name obj...
                                  --member mobj...
                                } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--name`	Specifies the names of group objects you want to remove members from.
`--member`	Specifies the names of objects you want to remove from the groups.
`--file`	Specifies a file containing a batch of commands to remove group members.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example removes the Write-o-Win application from the group Applications.

```
$ tarantella object remove_member \
--name "o=applications/cn=Applications" \
--member "o=applications/cn=Write-o-Win"
```

The following example removes the three application server objects rome, brussels, and berlin from the group WinHosts.

```
$ tarantella object remove_member \
--name "o=appservers/cn=WinHosts" \
--member "o=appservers/ou=Sales/cn=rome" \
"o=appservers/cn=brussels" \
"o=appservers/ou=Marketing/cn=berlin"
```

tarantella object rename

Renames or moves an object in the organizational hierarchy.

Syntax

```
tarantella object rename {   --name obj...
                             --newname newobj...
                           } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--name`	Specifies the name of the object you want to rename or move.
`--newname`	Specifies the new name of the object.
`--file`	Specifies a file containing a batch of commands to rename or move objects.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example renames the user profile object for Elizabeth Blue to Liz Blue.

```
$ tarantella object rename \
--name "o=Indigo Insurance/ou=Sales/cn=Elizabeth Blue" \
--newname "o=Indigo Insurance/ou=Sales/cn=Liz Blue"
```

The following example moves Ginger Butcher between the organizational units IT and Sales.

```
$ tarantella object rename \
--name "o=Indigo Insurance/ou=IT/cn=Ginger Butcher" \
--newname "o=Indigo Insurance/ou=Sales/cn=Ginger Butcher"
```

tarantella object script

Runs a batch script of `tarantella object` commands, or enables commands to be run interactively.

Syntax

```
tarantella object script
```

Description

The batch script consists of standard `tarantella object` commands, one per line, *without* the `tarantella object` prefix. For example, use `edit` rather than `tarantella object edit`.

The batch script can use a back slash (\) to break commands across multiple lines. Lines beginning with a hash (#) are treated as comments and ignored.

If you need to include quotes (") or a backslash (\) character in any of the values for the commands, you must backslash protect them. For example, to use "c:\ Program Files" as a value for the `--args` option, type the following:
`--args "\"c:\\Program Files\""`

The command reads from standard input. For example, you can use a "here-document" to run a batch script:

```
$ tarantella object script <<EOF
commands
EOF
```

If standard input is empty, you can run `tarantella object` commands interactively.

Examples

The following example adds the group Applications to the organizational units Sales and Marketing, and sets the Sales OU's Inherit Assigned Applications from Parent attribute to false.

```
$ tarantella object script <<EOF
add_link \
--name "o=Indigo Insurance/ou=Sales" \
"o=Indigo Insurance/ou=Marketing" \
--link "o=Indigo Insurance/cn=Applications"
edit \
--name "o=Indigo Insurance/ou=Sales" --inherit false
EOF
```

The `tarantella passcache` Command

This command manipulates the application server password cache. SGD Administrators can create, modify, delete, and examine entries.

Syntax

```
tarantella passcache new | edit | list | delete
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`new`	Creates entries in the password cache.	"`tarantella passcache new`" on page 716
`edit`	Modifies existing entries in the password cache.	"`tarantella passcache edit`" on page 713
`list`	Lists the contents of the password cache.	"`tarantella passcache list`" on page 714
`delete`	Deletes entries from the password cache.	"`tarantella passcache delete`" on page 711

Note – All commands include a `--help` option. You can use `tarantella passcache` *command* `--help` to get help on a specific command.

Examples

The following example creates a password cache entry for the SGD user Indigo Jones, on the application server represented by the application server object prague.

```
$ tarantella passcache new \
```

```
--person "o=Indigo Insurance/cn=Indigo Jones" \
--resource "o=appservers/cn=prague" \
--resuser indigo --respass rainbow
```

The following example lists entries in the password cache for the SGD user Indigo Jones.

```
$ tarantella passcache list\
--person "o=Indigo Insurance/cn=Indigo Jones"
```

tarantella passcache delete

Deletes entries in the application server password cache.

Note – You can also use this command to delete the decision to always use a smart card to authenticate to an application server.

Syntax

```
tarantella passcache delete { [ --person pobj | --anon | --ldap ]
                              [ --resource resource ]
                            } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--person`	Specifies the name of the user profile object to delete the password cache entry for.
`--anon`	Removes the password cache entry for all anonymous users.

Option	Description
`--ldap`	Deletes the password cache entry for LDAP integration. This special entry is only used with LDAP authentication. This is the user name and password for the LDAP directory server that you enter on the Global Settings → SGD Authentication tab of the Administration Console. Use a full user name such as `cn=Bill Orange,cn=Users,dc=indigo-insurance,dc=com`. If you specify `--ldap`, the `--resource` option is ignored.
`--resource`	Specifies the application server or Microsoft Windows domain the password cache entry applies to. For the resource, use the name. This can be one of the following: • An application server object, for example "o=appservers/cn=paris". • A DNS name, for example ".../_dns/paris.indigo-insurance.com". • A Windows domain, for example ".../_wns/indigo.dom". • ".../_array" to mean the array. This is used when caching the password used to log in to SGD. See Password Cache Usage.
`--file`	Specifies a file containing password cache entries to delete.

If neither `--person`, `--anon`, nor `--ldap` is specified, all password cache entries for the specified resource are deleted.

If `--resource` is not specified, all the password cache entries for the person, or anonymous user, are deleted.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example deletes all password cache entries for the user Indigo Jones.

```
$ tarantella passcache delete \
--person "o=Indigo Insurance/cn=Indigo Jones"
```

The following example deletes all password cache entries for anonymous users on the application server prague.indigo-insurance.com.

```
$ tarantella passcache delete \
--anon --resource .../_dns/prague.indigo-insurance.com
```

tarantella passcache edit

Edits entries in the application server password cache.

Syntax

```
tarantella passcache edit {
{ --person pobj | --anon | --ldap }
  --resource resource
  --resuser resuser
[ --respass respass ]
} | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--person`	Specifies the name of the user profile object to edit the password cache entry for.
`--anon`	Edits a password cache entry for anonymous users.
`--ldap`	Edits the password cache entry for LDAP integration. This special entry is only used with LDAP authentication. This is the user name and password for the LDAP directory server that you enter on the Global Settings → SGD Authentication tab of the Administration Console. Use a full user name such as `cn=Bill Orange,cn=Users,dc=indigo-insurance,dc=com`. If you specify `--ldap`, the `--resource` option is ignored.
`--resource`	Specifies the application server or Microsoft Windows domain the password cache entry applies to. For the resource, use the name. This can be one of the following: • A application server object, for example "o=appservers/cn=paris". • A DNS name, for example ".../_dns/paris.indigo-insurance.com". • A Windows domain, for example ".../_wns/indigo.dom". • ".../_array" to mean the array. This is used when caching the password used to log in to SGD. See Password Cache Usage.

Option	Description
`--resuser`	Identifies the user name appropriate to the resource. Set this to the text the user types in the authentication box for this resource.
`--respass`	Specifies the password associated with `--resuser`. If you omit this option, you are prompted for the password.
`--file`	Specifies a file containing password cache entries to edit.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example edits the password cache entry for the SGD user Indigo Jones, on the application server represented by the application server object prague.

```
$ tarantella passcache edit\
--person "o=Indigo Insurance/cn=Indigo Jones" \
--resource "o=appservers/cn=prague" \
--resuser indigo --respass rainbow
```

The following example edits the password cache entry for anonymous users on the application server paris.indigo-insurance.com.

```
$ tarantella passcache edit \
--anon --resource .../_dns/paris.indigo-insurance.com
```

tarantella passcache list

Lists entries in the application server password cache.

Syntax

```
tarantella passcache list { [ --person pobj | --anon | --ldap ]
                            [ --resource resource ]
                            [ --resuser resuser ]
                            [ --format text | xml ]
                          } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--person`	Specifies the name of the user profile object to list the password cache entry for.
`--anon`	Lists password cache entries for anonymous users.
`--ldap`	Lists the password cache entry for LDAP integration. This special entry is only used with LDAP authentication. This is the user name and password for the LDAP directory server that you enter on the Global Settings → SGD Authentication tab of the Administration Console. Use a full user name such as `cn=Bill Orange,cn=Users,dc=indigo-insurance,dc=com`. If you specify `--ldap`, the `--resource` option is ignored.
`--resource`	Lists password cache entries for an application server or Microsoft Windows domain. For the resource, use the name. This can be one of the following: • A application server object, for example "o=appservers/cn=paris". • A DNS name, for example ".../_dns/paris.indigo-insurance.com". • A Windows domain, for example ".../_wns/indigo.dom". • ".../_array" to mean the array. This is used when caching the password used to log in to SGD. See Password Cache Usage.
`--resuser`	Lists password cache entries for a particular application server user name.
`--format`	Specifies the output format. The default setting is `text`.
`--file`	Specifies a file containing password cache entries to list.

If you omit all arguments, or just specify `--format`, all entries in the password cache are displayed.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example lists entries in the password cache for the SGD user Indigo Jones.

```
$ tarantella passcache list \
--person "o=Indigo Insurance/cn=Indigo Jones"
```

The following example lists all entries in the password cache.

```
$ tarantella passcache list
```

tarantella passcache new

Syntax

```
tarantella passcache new {
{ --person pobj | --anon | --ldap }
  --resource resource
  --resuser resuser
[ --respass respass ]
} | --file file
```

Description

Adds entries to the application server password cache.

The following table shows available options for this command.

Option	Description
`--person`	Specifies the name of the user profile object to create a password cache entry for.
`--anon`	Creates a password cache entry for anonymous users.
`--ldap`	Creates a password cache entry for LDAP integration. This special entry is only used with the LDAP authorisation. This is the user name and password for the LDAP directory server that you enter on the Global Settings → SGD Authentication tab of the Administration Console. Use a full user name such as `cn=Bill Orange,cn=Users,dc=indigo-insurance,dc=com`. If you specify `--ldap`, the `--resource` option is ignored.
`--resource`	Specifies the application server or Microsoft Windows domain the password cache entry applies to. For the resource, use the name. This can be one of the following: • A application server object, for example "o=appservers/cn=paris". • A DNS name, for example ".../_dns/paris.indigo-insurance.com". • A Windows domain, for example ".../_wns/indigo.dom". • ".../_array" to mean the array. This is used when caching the password used to log in to SGD. See Password Cache Usage.

Option	Description
`--resuser`	Identifies the user name appropriate to the resource. Set this to the text the user types in the authentication box for this resource.
`--respass`	Specifies the password associated with `--resuser`. If you omit this option, you are prompted for the password.
`--file`	Specifies a file containing entries to add to the password cache.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example creates a password cache entry for the SGD user Indigo Jones, on the application server represented by the application server object prague.

```
$ tarantella passcache new \
--person "o=Indigo Insurance/cn=Indigo Jones" \
--resource "o=appservers/cn=prague" \
--resuser indigo --respass rainbow
```

The following example creates a password cache entry for anonymous users on the application server paris.indigo-insurance.com, prompting for the password.

```
$ tarantella passcache new --anon --resuser \
--resource .../_dns/paris.indigo-insurance.com
```

The `tarantella print` Command

This command enables you to administer SGD printing services across the array.

Syntax

```
tarantella print start | stop | status | pause | resume | list | cancel
| move
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`cancel`	Cancels print jobs.	"tarantella print cancel" on page 718
`list`	Lists print jobs.	"tarantella print list" on page 719
`move`	Moves queued print jobs from one SGD server to another.	"tarantella print move" on page 721
`pause`	Pauses printing temporarily.	"tarantella print pause" on page 722
`resume`	Resumes printing.	"tarantella print resume" on page 723
`start`	Starts printing services for the array.	"tarantella print start" on page 724
`status`	Displays information about printing services.	"tarantella print status" on page 725
`stop`	Stops printing services for the array.	"tarantella print stop" on page 726

Note – All commands include a `--help` option. You can use `tarantella print` *command* `--help` to get help on a specific command.

Examples

The following example starts SGD printing services for the array.

```
$ tarantella print start
```

The following example lists all print jobs for Bill Orange.

```
$ tarantella print list \
--person "o=Indigo Insurance/ou=IT/cn=Bill Orange"
```

tarantella print cancel

Cancels SGD print jobs that are currently spooled.

You can run this command on any SGD server in the array.

Syntax

```
tarantella print cancel { --all
                        | --jobid id...
                        | --person pobj... [--server serv]
                        | --server serv }
```

Description

The following table shows the available options for this command.

Option	Description
`--all`	Cancels all print jobs spooled across the array.
`--jobid`	Cancels jobs with the specified job IDs.
`--person`	Cancels jobs belonging to each specified user profile, which must be the name. If this is used without `--server`, SGD cancels all print jobs for each specified user profile.
`--server`	Cancels jobs on each SGD server listed. Use the peer DNS name for each server. If this is used with `--person`, SGD only cancels the print jobs for each specified user profile on each specified server.

Examples

The following example cancels print jobs for Bill Orange.

```
$ tarantella print cancel \
--person "o=Indigo Insurance/ou=IT/cn=Bill Orange"
```

The following example cancels all print jobs on the SGD server detroit.

```
$ tarantella print cancel --server "detroit.indigo-insurance.com"
```

tarantella print list

Lists print jobs currently spooled.

You can run this command on any SGD server in the array.

Syntax

```
tarantella print list { --jobid id... | [ --person pobj... ]
                      [ --server serv... ]
                       }
                      [ --format text|brief ]
```

Description

The following table shows the available options for this command.

Option	Description
`--jobid`	Lists jobs with the specified job IDs.
`--person`	Lists jobs belonging to each specified person, which must be the name.
`--server`	Lists jobs for each specified SGD server. Use the peer DNS name for each server. If this is used with the `--person` option, SGD only lists the spooled print jobs for the specified user profile on that server.
`--format`	Specifies the output format. The "text" format displays a block of text for each print job, showing each print job attribute, for example the job ID and job owner, on a new line. A blank line separates each job. This is the default. The "brief" format shows print job attributes on one line.

If you omit `--jobid`, and `--person` or `--server` are used, all print jobs across the array are listed.

Examples

The following example lists print jobs for Bill Orange, in "text" format.

```
$ tarantella print list \
--person "o=Indigo Insurance/ou=IT/cn=Bill Orange"
```

The following example lists print jobs in "text" format for Bill Orange and Rusty Spanner on the SGD servers detroit and chicago.

```
$ tarantella print list \
--person "o=Indigo Insurance/ou=IT/cn=Bill Orange" \
```

```
"o=Indigo Insurance/ou=IT/cn=Rusty Spanner" \
--server "detroit.indigo-insurance.com" \
"chicago.indigo-insurance.com"
```

tarantella print move

Moves queued print jobs from one SGD server to another.

If an SGD server is temporarily unavailable, you can use this command to move the print jobs that are "stranded" on that server.

Note – This command only moves the print jobs that are currently in the SGD print queue. The SGD print queue is located at `/opt/tarantella/var/print/queue`.

Syntax

```
tarantella print move --server serv
                     [ --printer printer_name ]
                     [ --cups {y | n |auto} ]
                     [ --preserve ]
```

Description

The following table shows the available options for this command.

Option	Description
`--cups`	Indicates that the SGD server you are moving print jobs from uses the Common UNIX Printing System (CUPS). If you do not use this option, a default of `auto` is assumed and this means SGD tries to detect whether CUPS is being used. If CUPS is incorrectly detected, use this option to tell SGD whether CUPS is being used (`y`) or not (`n`).

Option	Description
`--preserve`	Forces SGD to copy rather than move the print jobs to the target SGD server. The original print jobs are kept in the SGD print queue. **Note -** If SGD printing services are restarted on the original SGD server and the print jobs have not been deleted, they are printed.
`--printer`	The name of the printer on the SGD server where you are moving the print jobs. If you leave out this argument, a default of `tta_printer` is used.
`--server`	The fully qualified peer DNS name of the SGD server where you are moving the print jobs.

Examples

The following example moves print jobs from the SGD server where the command is run to the printer called tta_boston on the SGD server boston.indigo-insurance.com.

```
$ tarantella print move \
--server boston.indigo-insurance.com --printer tta_boston
```

tarantella print pause

You can run this command on any SGD server in the array.

Pauses SGD printing services. New print jobs continue to spool, but do not print until printing is resumed using `tarantella print resume`.

If `--server` is not used, this command pauses printing services across the array.

Note – Pausing printing services on individual SGD servers in the array can cause problems for users. Whenever you pause printing services, do so for the whole array.

Syntax

```
tarantella print pause [ --server serv... ]
```

Description

The following table shows the available options for this command.

Option	Description
`--server`	Pauses printing services on each SGD server listed. Use the peer DNS name for each server.

Examples

The following example pauses printing services across the array.

```
$ tarantella print pause
```

The following example pauses printing services on the SGD servers detroit and chicago.

```
$ tarantella print pause \
--server "detroit.indigo-insurance.com" \
"chicago.indigo-insurance.com"
```

tarantella print resume

Resumes SGD printing services, previously suspended with `tarantella print pause`. Any spooled jobs begin to print.

If `--server` is not used, this command resumes printing services across the array.

You can run this command on any SGD server in the array.

Note – Resuming printing services on individual SGD servers in the array can cause problems for users. Whenever you resume printing services, do so for the whole array.

Syntax

`tarantella print resume [ --server` *`serv`*`... ]`

Description

The following table shows the available options for this command.

Option	Description
`--server`	Resumes printing services on each SGD server listed. Use the peer DNS name for each server.

Examples

The following example resumes printing services across the array.

```
tarantella print resume
```

```
$ tarantella print resume
```

The following example resumes printing services on the SGD servers detroit and chicago.

```
$ tarantella print resume \
--server "detroit.indigo-insurance.com" \
"chicago.indigo-insurance.com"
```

tarantella print start

Starts SGD printing services. If `--server` is not used, this command starts printing services across the array.

You can run this command on any SGD server in the array.

Note – Starting printing services on individual SGD servers in the array can cause problems for users. Whenever you start printing services, do so for the whole array.

Syntax

```
tarantella print start [ --server serv... ]
```

Description

The following table shows the available options for this command.

Option	Description
`--server`	Starts printing services on each SGD server listed. Use the peer DNS name for each server.

Examples

The following example starts printing services across the array.

```
$ tarantella print start
```

The following example starts printing services on the SGD server detroit.

```
$ tarantella print start --server "detroit.indigo-insurance.com"
```

tarantella print status

Displays information about SGD printing services, including the following:

- Whether printing services are available, not available, or paused.
- The number of print jobs spooled.

You can run this command on any SGD server in the array.

Syntax

```
tarantella print status [ --summary | --server serv | --namemapping ]
```

Description

The following table shows the available options for this command.

Option	Description
`--summary`	Shows information for the array.
`--server`	Shows information for the SGD server listed. Use the peer DNS name for the server.
`--namemapping`	Lists all the current name mappings used for printing. The print name mapping table ensures that users can print from an application and then exit the application, without losing the print job. These name mappings expire in time. You can set the expiry timeout on the Global Settings → Security tab in the Administration Console.

Examples

The following example displays information about SGD printing services for the array.

```
$ tarantella print status --summary
```

tarantella print stop

Stops SGD printing services. Print jobs are not accepted and do not spool.

If `--server` is not used, this command stops printing services across the array.

You can run this command on any SGD server in the array.

Note – Stopping printing services on individual SGD servers in the array can cause problems for users. Whenever you stop printing services, do so for the whole array.

Syntax

```
tarantella print stop  [ --server serv... ][ --purge ]
```

Description

The following table shows the available options for this command.

Option	Description
`--purge`	Removes all pending print jobs. If you omit this, print jobs that are currently spooled are printed.
`--server`	Stops printing services on each SGD server listed. Use the peer DNS name for each server

Examples

The following example stops printing services across the array, removing all pending print jobs.

```
$ tarantella print stop --purge
```

The following example stops printing services on the SGD server detroit.

```
$ tarantella print stop --server "detroit.indigo-insurance.com"
```

The `tarantella query` Command

Examines the SGD server's log files.

Syntax

```
tarantella query audit | billing | errlog | uptime
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`audit`	Displays log entries matching some criteria.	"`tarantella query audit`" on page 728
`billing`	Queries billing log files.	"`tarantella query billing`" on page 730
`errlog`	Displays the error log of SGD components.	"`tarantella query errlog`" on page 732
`uptime`	Displays how long an SGD server has been available for.	"`tarantella query uptime`" on page 733

Note – All commands include a `--help` option. You can use `tarantella query` *command* `--help` to get help on a specific command.

Examples

The following example displays all error logs.

```
# tarantella query errlog
```

The following example displays how long the SGD server newyork.indigo-insurance.com has been available.

```
# tarantella query uptime --server newyork.indigo-insurance.com
```

`tarantella query audit`

Displays all log entries matching some criteria.

Syntax

```
tarantella query audit {
  --app app | --person person | --host host |  --filter filter }
[ --server arrayhost ]
[ --format text|csv|xml ]
```

Description

The following table shows the available options for this command.

Option	Description
`--app`	Displays log entries referring to a specific application. Use the object name for the application.
`--person`	Displays log entries referring to a specific person. Use the object name for the person.
`--host`	Displays log entries referring to a specific SGD server. Use the object name or a peer DNS name for the server.
`--filter`	An RFC2254-compliant LDAP search filter to find matching entries to display. Enclose the filter in quotes. You can use the "=", "~=", "<=" and ">=" matching rules in the filter.
`--server`	Only show log entries from the specified SGD server. Use a peer DNS name. If you omit this option, log entries across the entire array are displayed.
`--format`	Specifies the output format. The default setting is `text`. If you select the text format, SGD formats the log output so that it is easy to read on scree, but it does not show every detail logged. Using the csv format shows every detail logged but it is only suitable for outputting to a file.

Note – The output that you see depends on the Log Filter settings for the array. To produce log entries for processing by this command, make sure the Log Filter attribute on the Global Settings → Monitoring tab in the Administration Console includes at least one filter that outputs to a `.jsl` file.

Using a Filter

The attributes you use in the filter are the log fields used in the `.jsl` log files. The following table lists the commonly used attributes.

Field Name	Description
`log-category`	The logging component/sub-component/severity setting used in the log filters. For example, to find entries for a server/printing/* log filter, you can use a "(log-category=*printing*)" filter
`log-date`	The system date and time when the event took place. The format is `yyyy/MM/dd HH:mm:ss.SSS`.
`log-ip-address`	The IP address of a client or server associated with an event.
`log-keyword`	The keyword for auditable events.

Field Name	Description
log-localhost	The peer DNS name of the SGD server where the event took place.
log-pid	The process ID of the event.
log-security-type	The type of security used on a connection, std or ssl.
log-systime	The system Coordinated Universal Time (UTC) time, in milliseconds, when the event took place.
log-tfn-name	The name of an object associated with an event. For example, starting an application session can record the name of the user, the application and the SGD server.

Note – A complete list of all the log fields is available in the */install-dir*/var/serverresources/schema/log.at.conf schema file.

Examples

The following example displays all log entries for the UNIX user indigo that were logged on the SGD server boston.indigo-insurance.com.

```
# tarantella query audit \
--person .../_user/indigo --server boston.indigo-insurance.com
```

The following example outputs all log entries that refer to the Write-o-Win application, in comma-separated values (CSV) format.

```
# tarantella query audit \
--app "o=applications/cn=Write-o-win" --format csv
```

The following example outputs all log errors that occurred on or after 23 October 2003 for the Write-o-Win application, in human-readable text format.

```
# tarantella query audit \
--filter "(&(log-category=*error*)(log-tfn-name=o=
applications/cn=Write-o-win) (log-date>=2003/10/23 00:00:00.0))"\
--format text
```

tarantella query billing

Outputs billing information for the array, or for a subset of the array, over a time period. Information is displayed on screen in CSV format.

Syntax

```
tarantella query billing
          { --full | --sessions | --summary }
            --start date
            --days days
            --end date
          [ --servers arrayhost... ]
```

Description

The following table shows the available options for this command.

Option	Description
`--full`	Displays detailed information for all user sessions and application sessions.
`--sessions`	Displays information for all application sessions.
`--summary`	Displays a short summary of billing information and an application session summary.
`--start`	Specifies the start of the billing period. The format is `YYYY/MM/DD`, for example, "2000/05/01".
`--days`	Specifies the number of days from the date specified by `--start` to display billing information.
`--end`	Specifies the end of the billing period. The format is `YYYY/MM/DD`, for example, “2000/05/02”. The end date is *exclusive*. This means, for example, that `--start 2001/01/19 --end 2001/01/23` is the same as `--start 2001/01/19 --days 4`. Both examples query data covering the 19th, 20th, 21st and 22nd.
`--servers`	Only reports billing information from the named SGD servers. Use peer DNS names. If you omit `--servers`, billing information across the array is reported.

The billing files are written at midnight *local time* each day.

You must run this command on the primary server in the array.

Note – You must enable billing services, see Billing Service, and restart all SGD servers in the array before any data is logged.

Examples

The following example displays billing information for the entire array, for the 30 days from May 1, 2000.

```
# tarantella query billing --full\
 --start "2000/05/01" --days 30
```

The following example displays a short summary of billing information for the servers prague and paris, for the 30 days from January 1 2000.

```
# tarantella query billing --summary \
 --start "2000/01/01" --days 30 \
-- servers prague.indigo-insurance.com paris.indigo-insurance.com
```

The following example displays billing information for all application sessions for the entire array for the period January 19 2001 to January 22 2001 and outputs the results to a file called `Sessions.csv`.

```
# tarantella query billing --sessions \
 --start "2000/01/19" --end "2000/01/23" > sessions.csv
```

tarantella query errlog

Displays the error logs of SGD components.

Syntax

```
tarantella query errlog
          [ all|xpe|tpe|print|jserver|pemanager|proxy|wm ]
          [ --server arrayhost ]
```

Description

The following table shows the available options for this command.

Option	Description
`all | xpe | tpe | print | jserver | pemanager | proxy | wm`	Specifies the component error log to display. Use all, the default, to display all error logs.
`--server`	Displays error logs from the named SGD server. Use a peer DNS name. If you omit this option, error logs from all SGD servers in the array are displayed.

Note – To display error log information from the JServer component, make sure the Log Filter attribute on the Global Settings → Monitoring tab of the Administration Console includes at least one filter that outputs to an `error.log` file. The attribute does include this, by default.

Examples

The following example displays all error logs.

```
$ tarantella query errlog
```

The following example displays the X Protocol Engine error log on the SGD server newyork.indigo-insurance.com.

```
$ tarantella query errlog xpe \
--server newyork.indigo-insurance.com
```

tarantella query uptime

Displays how long SGD servers have been available for.

Syntax

`tarantella query uptime [ --server` *arrayhost* `]`

Description

The following table shows the available options for this command.

Option	Description
`--server`	Display information for the specified SGD server. Use a peer DNS name. If you omit this option, information for all SGD servers in the array is displayed.

Examples

The following example displays how long all SGD servers in the array have been available for.

```
$ tarantella query uptime
```

The `tarantella restart` Command

Stops and then restarts services on the SGD server, prompting if users are currently connected.

Syntax

```
tarantella restart [ --warm | --force | --kill ] [ --quiet ]
                   [ --http | --https ] [ --servlet ]
tarantella restart sgd [ --warm | --force | --kill ] [ --quiet ]
tarantella restart webserver [ --http | --https ] [ --servlet ]
```

Description

If no subcommands are specified, this command restarts both the SGD server and the SGD Web Server.

Caution – Never use the UNIX kill command to stop SGD services.

The following table shows the available options for this command.

Option	Description
`--force`	Tries harder to stop SGD services.
`--kill`	Kills the process IDs used by SGD services. Only use this option if you are having difficulty stopping the SGD server by other means.
`--quiet`	Does not prompt. Stops SGD services even if users are connected.
`--warm`	Tries a "warm restart" of the SGD server. This restarts the JServer component, without affecting other components. This has no effect on user sessions or application sessions. Only use this option if no users can log in to SGD or launch applications and no specific reason is found.
`--http`	Restarts HTTP services (Apache).
`--https`	Restarts HTTPS services (Apache). Requires a valid X.509 certificate for the SGD Web Server.
`--servlet`	Restarts Java Servlet/JavaServer Pages services (Tomcat).

Stopping an SGD server causes all user sessions and application sessions, including suspended application sessions, to be terminated.

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`sgd`	Restarts *only* the SGD server.	"`tarantella restart sgd`" on page 736
`webserver`	Restarts *only* the SGD Web Server.	"`tarantella restart webserver`" on page 736

Note – All commands include a `--help` option. You can use `tarantella restart` *subcommand* `--help` to get help on a specific command.

Examples

The following example restarts the SGD server *and* the SGD Web Server in HTTP mode. SGD does not display a confirmation message if users are currently connected.

```
# tarantella restart --quiet --http
```

tarantella restart sgd

Stops and restarts only the SGD server.

Syntax

```
tarantella restart sgd [ --warm | --force | --kill ] [ --quiet ]
```

Description

Stops and restarts the SGD server.

The following table shows the available options for this command.

Option	Description
`--force`	Tries harder to stop SGD services.
`--kill`	Kills the process IDs used by SGD services. Only use this option if you are having difficulty stopping the SGD server by other means.
`--quiet`	Does not prompt. Stops SGD services even if users are connected.
`--warm`	Tries a "warm restart" of the SGD server. This restarts the JServer component, without affecting other components. This has no effect on user sessions or application sessions. Only use this option if no users can log in to SGD or launch applications and no specific reason is found.

Examples

The following example restarts the SGD server, without displaying a confirmation message if users are currently connected.

```
# tarantella restart sgd --quiet
```

tarantella restart webserver

Stops and restarts only the SGD Web Server.

Syntax

```
tarantella restart webserver [ --http | --https ] [ --servlet ]
```

Description

If you do not use any command options, the command restarts both the SGD Web Server (Apache) and Java Servlet/JavaServer Pages services (Tomcat).

The following table shows the available options for this command.

Option	Description
`--http`	Restarts HTTP services (Apache).
`--https`	Restarts HTTPS services (Apache). Requires a valid X.509 certificate for the SGD Web Server.
`--servlet`	Restarts Java Servlet/JavaServer Pages services (Tomcat).

Note – If you restart both the SGD Web Server (Apache) and Java Servlet/JavaServer Pages services (Tomcat) using separate subsequent commands, you must restart the Java Servlet/JavaServer Pages services first.

Examples

The following example restarts the SGD Web Server and the Java Servlet/JavaServer Pages services.

```
# tarantella restart webserver
```

The `tarantella role` Command

You use this command to give users specific roles, and to give them assigned applications that apply to that role.

Syntax

```
tarantella role add_link | add_member | list | list_links |
list_members | remove_link | remove_member
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`add_link`	Adds assigned applications links for occupants of particular roles.	"`tarantella role add_link`" on page 739
`add_member`	Adds occupants to particular roles.	"`tarantella role add_member`" on page 740
`list`	Lists and describes all available roles.	"`tarantella role list`" on page 741
`list_links`	Lists the assigned applications links for occupants of particular roles.	"`tarantella role list_links`" on page 741
`list_members`	Lists the occupants of particular roles.	"`tarantella role list_members`" on page 742
`remove_link`	Removes assigned applications links for users occupying particular roles.	"`tarantella role remove_link`" on page 743
`remove_member`	Removes occupants from particular roles.	"`tarantella role remove_member`" on page 744

Note – All commands include a `--help` option. You can use `tarantella role` *subcommand* `--help` to get help on a specific command.

Examples

The following example lists all available roles.

```
$ tarantella role list
```

The following example adds a link for the application Indigo Time to the assigned applications of users occupying the Global Administrators role.

```
$ tarantella role add_link \
--role global \
--link "o=applications/cn=Indigo Time"
```

tarantella role add_link

Adds assigned applications links for users occupying particular roles.

Syntax

```
tarantella role add_link {
                --role rolename
                --link lobj...
                        } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--role`	Specifies the name of a role, for example `global`. Use `tarantella role list` to find out the available roles.
`--link`	Specifies the names of objects to add to the assigned applications of users occupying the role, for example, `o=applications/cn=Indigo Time`.
`--file`	Specifies a file containing a batch of commands to add assigned applications links for users with a particular role.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example adds a link for the application Indigo Time to the assigned applications of users occupying the Global Administrators role.

```
$ tarantella role add_link \
--role global \
--link "o=applications/cn=Indigo Time"
```

tarantella role add_member

Adds occupants to particular roles.

Syntax

```
tarantella role add_member {
              --role rolename
              --member mobj...
          } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--role`	Specifies the name of a role, for example `global`. Use `tarantella role list` to find out the available roles.
`--member`	Specifies the names of user profile objects or profile objects for the users you want to occupy the role.
`--file`	Specifies a file containing a batch of commands to add occupants to particular roles.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example adds Sid Cerise to the Global Administrators role.

```
$ tarantella role add_member \
--role global \
--member "o=Indigo Insurance/ou=Finance/cn=Sid Cerise"
```

tarantella role list

Lists and describes all available roles, including the name of the role object applicable to each role.

Syntax

```
tarantella role list
```

Description

Use the short name, for example “global”, with other `tarantella role` commands.

Examples

The following example lists all available roles.

```
$ tarantella role list
```

tarantella role list_links

Lists the assigned applications links for occupants of particular roles. The name for each link is shown.

Syntax

`tarantella role list_links --role` *rolename* | `--file` *file*

Description

The following table shows the available options for this command.

Option	Description
`--role`	Specifies the name of a role, for example `global`. Use `tarantella role list` to find out the available roles.
`--file`	Specifies a file containing a batch of commands to list the assigned applications for role occupants.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example lists the assigned applications for occupants of the Global Administrators role.

```
$ tarantella role list_links --role global
```

tarantella role list_members

Lists the occupants of particular roles. The name for each member is shown.

Syntax

`tarantella role list_members --role` *rolename* | `--file` *file*

Description

The following table shows the available options for this command.

Option	Description
`--role`	Specifies the name of a role, for example `global`. Use `tarantella role list` to find out the available roles.
`--file`	Specifies a file containing a batch of commands to list the occupants of a particular role.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example lists the names of all occupants of the Global Administrators role.

```
$ tarantella role list_members --role global
```

tarantella role remove_link

Removes assigned applications links for users occupying particular roles.

Syntax

```
tarantella role remove_link {
              --role rolename
              --link lobj...
          } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--role`	Specifies the name of a role, for example `global`. Use `tarantella role list` to find out the available roles.
`--link`	Specifies the names of assigned applications links to remove for users occupying the role. For example, `o=applications/cn=Indigo Time`.
`--file`	Specifies a file containing a batch of commands to remove assigned applications links of users with a particular role.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example removes the Write-o-Win application from the assigned applications of members of the Global Administrators role.

```
$ tarantella role remove_link \
--role global \
--link "o=applications/cn=Write-o-Win"
```

tarantella role remove_member

Removes occupants from particular roles.

Syntax

```
tarantella role remove_member {
              --role rolename
              --member mobj...
          } | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--role`	Specifies the name of a role, for example `global`. Use `tarantella role list` to find out the available roles.
`--member`	Specifies the names of objects for the users you do not want to occupy the role.
`--file`	Specifies a file containing a batch of commands to remove occupants from a particular role.

Note – Make sure you quote any object names containing spaces, for example "o= Indigo Insurance".

Examples

The following example removes Sid Cerise from the Global Administrators role.

```
$ tarantella role remove_member \
--role global \
--member "o=Indigo Insurance/ou=Finance/cn=Sid Cerise"
```

The `tarantella security` Command

Controls SGD security services and manages X.509 certificates.

Syntax

```
tarantella security certinfo | certrequest | certuse | customca |
decryptkey | disable | enable | fingerprint | peerca | selfsign |
start | stop
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`certinfo`	Displays information about an X.509 certificate or Certificate Signing Request (CSR), and optionally checks whether a specified private key matches the public key contained in a particular certificate.	"`tarantella security certinfo`" on page 747
`certrequest`	Creates a CSR and a corresponding key pair, which you use to obtain an X.509 certificate for use with SGD security services.	"`tarantella security certrequest`" on page 749
`certuse`	Installs an X.509 certificate, or specifies the location of an installed certificate, for use with SGD security services.	"`tarantella security certuse`" on page 751
`customca`	Installs a root certificate for a custom CA for use with SGD security services.	"`tarantella security customca`" on page 752
`decryptkey`	Decrypts an encrypted private key so that you can use it with SGD.	"`tarantella security decryptkey`" on page 753
`disable`	If an SGD server has been secured using the `tarantella security enable` command, restores the security settings to their previous state.	"`tarantella security disable`" on page 754
`enable`	Makes an SGD server secure.	"`tarantella security enable`" on page 755
`fingerprint`	Displays the fingerprint of the CA certificate installed on the SGD server.	"`tarantella security fingerprint`" on page 758
`peerca`	Shows, imports, or exports the primary server's CA certificate used for secure intra-array communication.	"`tarantella security peerca`" on page 758
`selfsign`	Generates and installs a self-signed X.509 server certificate.	"`tarantella security selfsign`" on page 759
`start`	Enables secure (SSL) connections. Users who require secure connections are given them.	"`tarantella security start`" on page 760
`stop`	Disables secure (SSL) connections. Users configured for secure connections are given standard connections instead.	"`tarantella security stop`" on page 760

Note – All commands include a `--help` option. You can use `tarantella security` *subcommand* `--help` to get help on a specific command.

Examples

The following example displays information about a CSR in `/tmp/boston.csr`.

```
tarantella security certinfo --csrfile /tmp/boston.csr
```

The following example decrypts the key `/opt/keys/key1`, which is stored in Definite Encoding Rules (DER) format, placing the decrypted key in `/opt/keys/key2`.

```
tarantella security decryptkey \
  --enckey /opt/keys/key1 \
  --deckey /opt/keys/key2 \
  --format DER
```

tarantella security certinfo

Displays information about an installed X.509 certificate (`--certfile`) or a Certificate Signing Request (`--csrfile`).

Syntax

```
tarantella security certinfo  [ --certfile certfile [ --keyfile keyfile ] ]
                              [ --full ]
tarantella security certinfo --csrfile csrfile [ --full ]
```

Description

This command can also check whether a specified private key matches the public key in a particular certificate. In other words, the public key can decrypt text encrypted with the private key.

Use the first form of this command without specifying a *certfile* and *keyfile* to check keys and certificates you have already installed using the `tarantella security certuse` command.

The following table shows the available options for this command.

Option	Description
`--certfile`	Specifies the location of a file containing an X.509 certificate. The command displays information about this certificate, including the following: • Information about the server and your organization. • Alternative DNS names for the server. • Credentials of the CA that validated the certificate. • Dates for which the certificate is valid. If you omit `--certfile`, the command displays information about the certificate and key installed in the `/opt/tarantella/var/tsp` directory. You must specify the full path to the certificate file.
`--keyfile`	Specifies the location of a private key. The command checks whether a private key matches the public key contained in the X.509 certificate file. You must specify the full path to the key file.
`--csrfile`	Specifies the location of a file containing a CSR. The command displays information about this CSR, including the following: • The DNS name, or chosen common name, of the server the CSR is for. • Alternative DNS names for the server. • Your organization's name and location. You must specify the full path to the CSR file.
`--full`	Displays more detailed information about the specified certificate or CSR, for example, the contents of the public keys they contain.

Examples

The following example displays detailed information about the certificate in `/opt/certs/newyork.cert`.

```
# tarantella security certinfo \
--certfile /opt/certs/newyork.cert \
--full
```

The following example displays information about the certificate in `/opt/certs/boston.cert`, and checks that the private key `/opt/keys/boston.key` matches the public key contained in that certificate.

```
# tarantella security certinfo \
--certfile /opt/certs/boston.cert \
--keyfile /opt/keys/boston.key
```

The following example displays information about the CSR in `/tmp/boston.csr`.

```
# tarantella security certinfo \
--csrfile /tmp/boston.csr
```

tarantella security certrequest

Generates a CSR, and a public and private key pair.

Syntax

```
tarantella security certrequest --country country
                        --state state
                        --orgname org
                      [ --ouname ou ]
                      [ --email email ]
                      [ --locality locality ]
                      [ --keylength length ]
```

Description

You send the generated CSR to a supported CA to obtain a certificate for use with SGD security services.

Note the following:

- If your CA lets you change the host name stored in the certificate, make sure the certificate contains a fully qualified DNS name. For example, boston.indigo-insurance.com, not boston.
- If the SGD server has multiple DNS names, for example, it is known by different names inside and outside a firewall, you can specify the additional DNS names as *subject alternative names* for the certificate. This enables you to associate more than one DNS name with the certificate.
- Make a copy of the private key and CSR generated by this command and keep them in a safe, secure location. Key information is stored in the `/opt/tarantella/var/tsp` directory. *If your private key is lost or damaged, you will be unable to use any certificate you obtain using the CSR.*
- This command generates a new CSR and key pair each time you run it. If you generate a new CSR with this command, the previous CSR is overwritten and the new private key is stored in the file `/opt/tarantella/var/tsp/key.pending.pem`.

You can use the `tarantella security certinfo` command to display information about certificates and CSRs.

If you do not specify `--ouname`, `--email` or `--locality` SGD omits that information from the CSR. There are no default values.

The options that can be used for this command are as follows.

Option	Description
`--country`	Specifies the country where your organization is located. Use ISO 3166 country codes. For example, use US for the United States or DE for Germany.
`--state`	Specifies the state or province where your organization is located. Do not use abbreviations here. For example, use Massachusetts rather than Mass. or MA.
`--orgname`	Specifies the official, legal name of your organization.
`--ouname`	Specifies the name of a organizational unit (OU) within your organization, if required. If you do not need to specify an OU, you can use this setting to specify a less formal organization name.
`--email`	Specifies your business email address. This address is used for correspondence between you and the CA you send the CSR to.
`--locality`	Specifies the city or principality where your organization is located, if needed.
`--keylength`	Specifies the length of the key pair. The default is 1024.

Note – Make sure you quote any value containing spaces, for example,`"Indigo Insurance"`.

Examples

The following example generates a CSR for Indigo Insurance, located in Massachusetts, with contact Bill Orange.

```
# tarantella security certrequest \
--country US \
--state MA \
--orgname "Indigo Insurance" \
--email "orange@indigo-insurance.com"
```

tarantella security certuse

Installs an X.509 certificate, or specifies the location of a previously installed certificate, to be used by SGD security services.

Syntax

```
tarantella security certuse
tarantella security certuse --certfile cfile [ --keyfile kfile ]
```

Description

Certificates must be Base 64-encoded PEM-format, with a header line including "BEGIN CERTIFICATE", as used by OpenSSL.

If no arguments are specified, this command reads the certificate from standard input and installs it in `/opt/tarantella/var/tsp`.

After installing an X.509 certificate, you must restart SGD using the `tarantella restart` command.

The following table shows the available options for this command.

Option	Description
`--certfile`	Specifies the location of a file containing the certificate. If no `--keyfile` argument is specified, SGD assumes that the the `tarantella security certrequest` command was used to generate the private key. You can use this option as follows: • To tell SGD about a certificate you have already installed for use with another product, such as a web server. In this case, SGD *makes symbolic links to, not copies of,* the certificate file and key file, if specified. • To install a certificate received from a CA after generating a CSR using `tarantella security certrequest`. In this case, SGD installs the certificate in `/opt/tarantella/var/tsp` for use with SGD security services. You must specify the full path to the certificate file.
`--keyfile`	Specifies the location of a file containing the private key for the certificate specified by `--certfile`. Use this option to tell SGD about a private key you have already. If you used the `tarantella security certrequest` command to generate a CSR and obtain a certificate, you do not need to use this option. You must specify the full path to the key file.

Examples

The following command installs a certificate, which is saved in a temporary file `/tmp/cert`, and uses the private key generated when the `tarantella security certrequest` command was used to generate the CSR:

```
# tarantella security certuse < /tmp/cert
```

The following command installs a certificate, which is stored in `/opt/certs/cert`, and a private key, which is stored in `/opt/keys/key`. The `tarantella security certrequest` command was *not* used to generate the CSR.

```
# tarantella security certuse \
--certfile /opt/certs/cert \
--keyfile /opt/keys/key
```

tarantella security customca

Installs or removes a root certificate for a custom CA for use with SGD security services.

Syntax

```
tarantella security customca
tarantella security customca --rootfile carootfile | --remove
```

Description

Certificates must be Base 64-encoded PEM-format, with a header line including "BEGIN CERTIFICATE", as used by OpenSSL.

If no arguments are specified, this command reads the root certificate from standard input.

The following table shows the available options for this command.

Option	Description
`--rootfile`	Specifies the location of a file containing the CA's root certificate. Details are copied to `/opt/tarantella/var/tsp` for use by SGD security services. You must specify the full path to the root certificate file.
`--remove`	Removes any custom CA's root certificate currently installed for use with SGD security services.

This command also imports the CA certificate into the CA certificate truststore for the SGD server. This is the `/opt/tarantella/bin/jre/lib/security/cacerts` file.

Examples

The following example installs a CA's root certificate from the file`/tmp/rootcert`, which you can then delete.

```
# tarantella security customca --rootfile /tmp/rootcert
```

tarantella security decryptkey

Decrypts an encrypted private key so that you can use it with SGD. This enables you to use an X.509 certificate that you are already using with another product such as a web server, rather than obtaining a separate certificate for use exclusively with SGD.

Syntax

```
tarantella security decryptkey --enckey enckeyfile
                        --deckey deckeyfile
                      [ --format PEM|DER ]
```

Description

The following table shows the available options for this command.

Option	Description
`--enckey`	Specifies the location of the encrypted private key that you want to decrypt. Only keys encrypted by a product that uses SSLeay or OpenSSL certificate libraries can be decrypted. You must specify the full path to the encrypted private key file.
`--deckey`	Specifies a file where the decrypted key is stored. **Note -** For security reasons, it is very important to restrict access to private keys, especially when stored in an unencrypted form. Access to private keys by unauthorized users can result in a serious security breach. Store private keys accordingly. You must specify the full path to the decrypted key file.
`--format`	Specifies the format the encrypted key is stored in. Defaults to PEM.

Note – You can only decrypt private keys that were originally encrypted by a product that uses SSLeay or OpenSSL certificate libraries.

See the `tarantella security certuse` command for information about how to share certificates in this way.

Examples

The following example decrypts the key `/opt/keys/key1`, which is stored in DER format, placing the decrypted key in `/opt/keys/key2`.

```
# tarantella security decryptkey \
--enckey /opt/keys/key1 \
--deckey /opt/keys/key2 \
--format DER
```

tarantella security disable

If an SGD server has been secured using the `tarantella security enable` command, this command restores the security settings to their previous state.

Syntax

```
tarantella security disable
```

Description

Use this command to disable security services for an SGD server.

The following limitations apply for this command:

- **Automatic security configurations only.** Only use this command if you used the `tarantella security enable` command to enable security automatically on the SGD host. See "`tarantella security enable`" on page 755 for more details.
- **Standalone servers only.** The SGD server must not be joined with other SGD servers in an array. If the SGD server is a member of an array, detach the SGD server from the array before using this command.

The command restores the security settings of an SGD server to their previous non-secure state. Any X.509 server certificates or CA certificates are not removed.

Examples

The following example disables security services for an SGD server.

```
# tarantella security disable
```

tarantella security enable

Makes an SGD server secure.

Syntax

```
tarantella security enable
tarantella security enable --certfile cfile
                           [ --keyfile kfile ]
                           [ --rootfile carootfile ]
```

Description

Use this command to secure an SGD server.

The following limitations apply for this command:

- **New installations only.** The SGD installation must be a fresh installation and there has been no attempt to configure SGD security services.
- **Standalone servers only.** The SGD server must not be joined with other SGD servers in an array. If the SGD server is a member of an array, detach the SGD server from the array before using this command.

Use the `--certfile` option to specify an X.509 server certificate to install. Certificates must be Base 64-encoded PEM-format, with a header line including "BEGIN CERTIFICATE", as used by OpenSSL.

If you omit the `--certfile` option, this command generates and installs a self-signed X.509 server certificate. Only use self-signed server certificates for test purposes.

If you use the `--certfile` option and the `--keyfile` option together, SGD creates *symbolic links* to the specified certificate and key files.

Use the `--rootfile` option to install the CA certificate if the X.509 certificate is signed by an unsupported CA. This option also imports the CA certificate into the CA certificate truststore for the SGD server. This is the `/opt/tarantella/bin/jre/lib/security/cacerts` file.

Note – If you have attempted to configure security previously, the `tarantella security enable` command has no effect. The command exits with an error message, indicating that security settings have been modified previously.

The following table shows the available options for this command.

Option	Description
`--certfile`	Specifies the location of a file containing the certificate. You can use this option as follows: You must specify the full path to the certificate file.
`--keyfile`	Specifies the location of a file containing the private key for the certificate specified by `--certfile`. Use this option to tell SGD about a private key you have already. If you used the `tarantella security certrequest` command to generate a CSR and obtain a certificate, you do not need to use this option. You must specify the full path to the key file.
`--rootfile`	Specifies the location of a file containing the CA's root certificate. Details are copied to `/opt/tarantella/var/tsp` for use by SGD security services. You must specify the full path to the root certificate file.

If you use this command to secure an SGD server, the `tarantella security disable` command can be used to restore the security settings to their previous state.

Examples

The following example secures the SGD server, installs the specified certificate, and uses the private key generated when the `tarantella security certrequest` command was used to generate a CSR:

```
# tarantella security enable \
--certfile /opt/certs/cert
```

The following example secures the SGD server, and installs the specified certificate and private key. A CA root certificate is also installed. The `tarantella security certrequest` command was *not* used to generate a CSR.

```
# tarantella security enable \
--certfile /opt/certs/cert \
--keyfile /opt/keys/key \
--rootfile /tmp/rootcert
```

tarantella security fingerprint

Displays the fingerprint of the CA certificate installed on the SGD server.

Syntax

```
tarantella security fingerprint
```

Description

This command displays the fingerprint of the CA certificate installed using the `tarantella security customca` command.

If the X.509 server certificate for an SGD server is signed by a supported CA, you do not need to install a CA certificate.

If an X.509 server certificate is not installed on the SGD server, this command shows the fingerprint of the built-in SGD CA certificate

Examples

The following example displays the fingerprint of the CA certificate installed on the SGD server.

```
# tarantella security fingerprint
```

tarantella security peerca

Shows, imports or exports the primary server's CA certificate used for secure intra-array communication.

Syntax

```
tarantella security peerca [ --show | --import hostname | --export ]
```

Description

The following table shows the available options for this command.

Option	Description
`--show`	Displays the primary server's CA certificate for the array.
`--import`	Import the CA certificate from the specified server.
`--export`	Export the CA certificate from this server.

Examples

The following example shows the primary server's CA certificate for the array.

```
# tarantella security peerca --show
```

tarantella security selfsign

Generates and installs a self-signed X.509 server certificate.

Syntax

```
tarantella security selfsign
```

Description

Generates and installs a self-signed X.509 server certificate. You must run the `tarantella security certrequest` command before using this command.

Only use self-signed X.509 server certificates in a test environment because self-signed certificates are not truly secure. While a self-signed X.509 server certificate can be used to give users secure connections, users have no guarantee that the server they are connecting to is genuine.

Examples

The following example generates and installs a self-signed X.509 server certificate.

```
# tarantella security selfsign
```

tarantella security start

Starts security services on the SGD server where the command is run. Secure (SSL-based) connections are given to those users configured to require them.

Syntax

```
tarantella security start
```

Description

To enable secure connections to a particular SGD server you must already have installed an X.509 certificate for that server.

Secure connections are enabled for the SGD server where the command is run.

Examples

The following example enables secure connections for the SGD server where the command is run.

```
# tarantella security start
```

tarantella security stop

Disables security services on the SGD server where the command is run. Users configured to require secure (SSL-based) connections are given standard connections instead, if available.

Syntax

```
tarantella security stop [ --keep ]
```

Description

The following table shows the available options for this command.

Option	Description
`--keep`	Specifies that any existing secure connections are preserved. If omitted, all secure connections are closed.

If you run the command without any options, secure connections are disabled for the SGD server where the command is run.

Examples

The following example disables security services for the SGD server where the command is run, but preserves any existing secure connections.

```
# tarantella security stop --keep
```

The `tarantella setup` Command

Enables you to change Setup options. Follow the instructions on your screen.

Syntax

```
tarantella setup
```

Description

You can turn weekly archiving on or off. If archiving is on, you can schedule the time when the log is created.

You can also choose to recreate the default objects and assigned applications links originally created at installation time. This does not remove any objects you have created, but it does replace any objects with the same names as the originals.

Examples

The following example enables you to change Setup options.

```
# tarantella setup
```

The `tarantella start` Command

Starts SGD services on the host.

Syntax

```
tarantella start [ --http | --https ] [ --servlet]
tarantella start cdm | sgd | webserver [--http | --https] [--servlet]
```

Description

If no subcommands are specified, this command starts both the SGD server and the SGD Web Server.

The following table shows the available options for this command.

Option	Description
`--http`	Starts HTTP services (Apache).
`--https`	Starts HTTPS services (Apache). Requires a valid X.509 certificate for the SGD Web Server.
`--servlet`	Starts Java Servlet/JavaServer Pages services (Tomcat).

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`cdm`	Starts *only* the client drive mapping services on the SGD server.	"`tarantella start cdm`" on page 763
`sgd`	Starts *only* the SGD server.	"`tarantella start sgd`" on page 763
`webserver`	Starts *only* the SGD Web Server.	"`tarantella start webserver`" on page 764

Note – All commands include a `--help` option. You can use `tarantella start` *subcommand* `--help` to get help on a specific command.

Examples

The following example starts the SGD server *and* HTTPS services on the SGD Web Server.

```
# tarantella start --https
```

tarantella start cdm

Starts only client drive mapping (CDM) services on the SGD server.

Syntax

```
tarantella start cdm
```

Description

Starts CDM services on the SGD server where the command is run.

Examples

The following example starts CDM services on the SGD server.

```
# tarantella start cdm
```

tarantella start sgd

Starts only the SGD server.

Syntax

```
tarantella start sgd
```

Description

Starts the SGD server.

Examples

The following example starts the SGD server.

```
# tarantella start sgd
```

tarantella start webserver

Starts only the SGD Web Server.

Syntax

```
tarantella start webserver [ --http | --https ] [ --servlet ]
```

Description

If you do not use any command options, the command starts the SGD Web Server in both HTTP and HTTPS mode, providing valid SSL certificates are present on the host. If valid SSL certificates are not present, the command starts the SGD Web Server in HTTP mode only.

The following table shows the available options for this command.

Option	Description
`--http`	Starts HTTP services (Apache).
`--https`	Starts HTTPS services (Apache). Requires a valid X.509 certificate for the SGD Web Server.
`--servlet`	Starts Java Servlet/JavaServer Pages services (Tomcat).

Note – If you restart both the SGD Web Server (Apache) and Java Servlet/JavaServer Pages services (Tomcat) using separate subsequent commands, you must restart the Java Servlet/JavaServer Pages services first.

Examples

The following example starts the SGD Web Server and the Java Servlet/JavaServer Pages services.

```
# tarantella start webserver
```

The `tarantella status` Command

Reports SGD server information.

Syntax

```
tarantella status
    [ --summary | --byserver | --server serv | --ping [serv] ]
    [ --format text|xml ]
    [ --verbose ]
```

Description

Reports SGD server information, including array details, the number of user sessions and application sessions running or suspended across the array, and how those sessions are distributed.

If there are problems with the array, the command shows the following information:

- If the servers do not agree on the array membership, the output shows the array configuration as seen by every SGD server in the array.
- If there are any other errors, for example a SKID error, the command reports the error it received from the problem server.

The following table shows the available options for this command.

Option	Description
`--summary`	Summarizes the global information for the array. This is the default setting.
`--byserver`	Displays detailed information for each server in the array.
`--server`	Displays detailed information for the specified server. Type in a peer DNS name.
`--format`	Specifies the output format. The default setting is `text`.
`--ping`	Performs a quick health check of all SGD servers in the array or a single specified SGD server.
`--verbose`	Displays the server health check and lists servers being contacted, before generating the command output.

Examples

The following example summarizes information about sessions across the array.

```
$ tarantella status
```

The following example reports detailed status information for the SGD server boston.indigo-insurance.com.

```
$ tarantella status --server boston.indigo-insurance.com
```

The `tarantella stop` Command

Stops SGD services on the SGD host, prompting if users are currently connected.

Syntax

```
tarantella stop [ --force | --kill ] [ --quiet ]
                [ --http | --https ] [ --servlet ]
tarantella stop cdm
tarantella stop sgd [ --force | --kill ] [ --quiet ]
tarantella stop webserver [ --http | --https ] [ --servlet ]
```

Description

If no subcommands are specified, this command stops both the SGD server and the SGD Web Server.

Caution – Never use the UNIX kill command to stop SGD services.

The following table shows the available options for this command.

Option	Description
`--force`	Tries harder to stop SGD services.
`--kill`	Kills the process IDs used by SGD services. Only use this option if you are having difficulty stopping the SGD server by other means.
`--quiet`	Does not prompt. Stops SGD services even if users are connected.
`--http`	Stops HTTP services (Apache).
`--https`	Stops HTTPS services (Apache). Requires a valid X.509 certificate for the SGD Web Server.
`--servlet`	Stops Java Servlet/JavaServer Pages services (Tomcat).

Stopping an SGD server causes all user sessions and application sessions, including suspended application sessions, to be terminated.

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`cdm`	Stops *only* the client drive mapping services on the SGD server	"`tarantella stop cdm`" on page 768
`sgd`	Stops *only* the SGD server.	"`tarantella stop sgd`" on page 768
`webserver`	Stops *only* the SGD Web Server.	"`tarantella stop webserver`" on page 769

Note – All commands include a `--help` option. You can use `tarantella stop` *subcommand* `--help` to get help on a specific command.

Examples

The following example stops the SGD server *and* the SGD Web Server, without displaying a confirmation message if users are currently connected.

```
# tarantella stop --quiet
```

tarantella stop cdm

Stops only client drive mapping (CDM) services on the SGD server.

Syntax

```
tarantella stop cdm
```

Description

Stops CDM services on the SGD server where the command is run.

Examples

The following example stops CDM services on the SGD server.

```
# tarantella stop cdm
```

tarantella stop sgd

Stops SGD services on the SGD server.

Syntax

```
tarantella stop sgd [ --force | --kill ] [ --quiet ]
```

Description

Stops only the SGD server.

The following table shows the available options for this command.

Option	Description
`--force`	Tries harder to stop SGD services.
`--kill`	Kills the process IDs used by SGD services. Only use this option if you are having difficulty stopping the SGD server by other means.
`--quiet`	Does not prompt. Stops SGD services even if users are connected.

Examples

The following example stops the SGD server.

```
# tarantella stop sgd
```

tarantella stop webserver

Stops only the SGD Web Server.

Syntax

```
tarantella stop webserver [ --http | --https ] [ --servlet ]
```

Description

If you do not use any command options, the command stops both the SGD Web Server and Tomcat services on the SGD host.

The following table shows the available options for this command.

Option	Description
`--http`	Stops HTTP services (Apache).
`--https`	Stops HTTPS services (Apache). Requires a valid X.509 certificate for the SGD Web Server.
`--servlet`	Stops Java Servlet/JavaServer Pages services (Tomcat).

Note – If you start both the SGD Web Server and Tomcat services using separate subsequent commands, you must start the Tomcat services first.

Examples

The following example stops the SGD Web Server and the Java Servlet/JavaServer Pages services.

```
# tarantella stop webserver
```

The `tarantella tokencache` Command

This command manipulates the token cache used for logging in with an authentication token. SGD Administrators can list and delete entries in the token cache.

Syntax

```
tarantella tokencache delete | list
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`delete`	Deletes entries from the token cache.	"`tarantella tokencache delete`" on page 771
`list`	Lists the contents of the token cache.	"`tarantella tokencache list`" on page 772

Note – All commands include a `--help` option. You can use `tarantella tokencache` *command* `--help` to get help on a specific command.

Examples

The following example deletes all entries in the token cache.

```
$ tarantella tokencache delete --all
```

The following example lists all entries in the token cache and the time the tokens were created.

```
$ tarantella tokencache list --creationtime
```

tarantella tokencache delete

Deletes entries in the token cache. The token cache is used for logging in with an authentication token.

Syntax

```
tarantella tokencache delete {
                  [ --username username | --all ]
                  [ --format text | xml ] }
                  | --file file
```

Description

The following table shows the available options for this command.

Option	Description
`--username`	Specifies the name of the entry to be deleted.
`--all`	Deletes all entries in the cache.
`--format`	Output format. The default setting is `text`.
`--file`	Specifies a batch file to process. The file contains one line per set of settings, each line using the above options. Use `--file -` to read from `stdin`.

Examples

The following example deletes all entries in the token cache.

```
$ tarantella tokencache delete --all
```

tarantella tokencache list

Lists the contents of the token cache. The token cache is used for logging in with an authentication token.

Syntax

```
tarantella tokencache list [ --creationtime ] [ --format text | xml ]
```

Description

The following table shows the available options for this command.

Option	Description
`--creationtime`	Lists the time each token in the cache was created.
`--format`	Specifies the output format. The default setting is `text`.

Examples

The following example lists all entries in the token cache and the time the tokens were created.

```
$ tarantella tokencache list --creationtime
```

The tarantella tscal Command

Use the `tarantella tscal` command to manage Microsoft Windows Terminal Services Client Access Licenses (CALs) for non-Windows clients.

Syntax

```
tarantella tscal free | list | return
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`free`	Frees a Terminal Services CAL for use by another non-Windows client.	"`tarantella tscal free`" on page 773
`list`	Lists the Terminal Services CALs currently reserved for non-Windows clients.	"`tarantella tscal list`" on page 775
`return`	Returns Terminal Services CALs to the Windows license server.	"`tarantella tscal return`" on page 776

Note – All commands include the `--help` option. You can use `tarantella tscal` *subcommand* `--help` to get help on a specific command.

Examples

The following example lists the Terminal Services CALs currently reserved for non-Windows clients.

```
$ tarantella tscal list
```

tarantella tscal free

Use the `tarantella tscal free` command to free a Microsoft Windows Terminal Services CAL so that it can be used by another non-Windows client.

Syntax

```
tarantella tscal free [ --inuseby user | --calid id ]
```

Description

You can only free a CAL if the user has no application sessions that use Windows Terminal Services.

Note – Freed CALs are not returned to the Windows license server.

Normally, you do not need to run this command, as SGD automatically frees a CAL as soon as a user exits their last Windows application. However, if an SGD server is removed from an array or it loses contact with the array, it might still be listed as using CALs. In this situation, you can run this command to free a CAL.

If you do not use any arguments, the command frees all CALs that have no application sessions that use Windows Terminal Services.

If you run this command on a secondary server in a SGD array and the primary server is unavailable, the CAL information might not be completely accurate. This is because the primary server is responsible for updating all SGD servers in the array with changes to CAL information. The command warns you if the primary is unavailable.

The following table shows the available options for this command.

Option	Description
`--inuseby`	Free only the CALs for a particular user where the user is either of the following: • The name of a user. • A wild card filter. The * character is the only character you can use in a wild card filter. It represents a string of any length containing any characters. So, an `--inuseby "*green*"` argument frees only the unused CALs for users whose name contains the string “green”.
`--calid`	The ID of the CAL you want to free. Use the `tarantella tscal list` command to obtain the ID of the CAL you wish to free.

Examples

The following example frees the CALs for Elizabeth Blue.

```
$ tarantella tscal free \
--inuseby "o=Indigo Insurance/ou=Sales/cn=Elizabeth Blue"
```

tarantella tscal list

Use the `tarantella tscal list` command to list the Microsoft Windows Terminal Services CALs currently reserved for use by non-Windows clients.

Syntax

```
tarantella tscal list [ --inuseby user | --inuse | --free ]
                      [ --type name ]
                      [ --format text|xml ]
```

Description

If you do not use any arguments, the command lists all CALs and shows whether or not they are in use.

If you run this command on a secondary server in an SGD array and the primary server is unavailable, the list might not be completely accurate. This is because the primary server is responsible for updating all SGD servers in the array with changes to CAL information. The command warns you if the primary is unavailable.

The following table shows the available options for this command.

Option	Description
`--inuseby`	List only the CALs being used by a particular user where the user is either of the following: • The name of a user. • A wild card filter. You can use the `tarantella emulatorsession list` command to determine the name of a user. The * character is the only character you can use in a wild card filter. It represents a string of any length containing any characters. So, an `--inuseby "*green*"` argument lists only the CALs for users whose name contains the string “green”.
`--inuse`	List only the CALs that are currently in use.
`--free`	List only the CALs that are currently not in use.
`--type`	List only the CALs that can connect to a particular type of Terminal Services server. This is either `WinNT4-TS-CAL` or `Win200x-TS-CAL`. **Note -** The name is not case sensitive.
`--format`	Specifies the output format. The default setting is `text`.

Examples

The following example lists the CALs for non-Windows clients that are currently not in use.

```
$ tarantella tscal list --free
```

tarantella tscal return

Use the `tarantella tscal return` command to return all free Microsoft Windows Terminal Services CALs to the Windows license server.

Syntax

```
tarantella tscal return --free
```

Description

Note – The Windows license server might not reissue the returned CALs until approximately 90 days have elapsed since they were last in use.

Use the `tarantella tscal free` command to free a CAL so that it can be returned.

Normally, you do not need to run this command, as SGD automatically returns a CAL if it has not been used for 90 days. However, if an SGD server is removed from an array, you can use this command to manually return the CALs.

The following table shows the available options for this command.

Option	Description
`--free`	Returns all free CALs to the Windows license server.

Examples

The following example returns all free CALs to the Windows license server.

```
$ tarantella tscal return --free
```

The `tarantella uninstall` Command

Uninstalls SGD or the specified SGD packages.

Syntax

```
tarantella uninstall { [ package... ] [ --purge ] | --list  }
```

Description

Removes SGD or parts of it from your system, or lists the installed SGD packages.

The following table shows the available options for this command.

Option	Description
package...	Specifies individual packages to uninstall. If no packages are specified, the command uninstalls all SGD packages. SGD currently installs as a single package.
`--purge`	If all SGD packages are removed, this option also removes all configuration information related to your organization. If `--purge` is omitted, configuration information is left intact.
`--list`	Lists all SGD packages currently installed.

Examples

The following example completely uninstalls SGD, removing all configuration information.

```
# tarantella uninstall --purge
```

The `tarantella version` Command

Reports the version numbers of installed SGD components.

Syntax

```
tarantella version
```

Description

Displays the version numbers of SGD components installed on the SGD server, together with information about the SGD server.

Information about installed SGD components is also available on the webtop. Click the ? button, in the lower-left corner of the webtop.

Examples

The following example displays the version numbers of installed SGD components.

```
$ tarantella version
```

The `tarantella webserver` Command

Use the `tarantella webserver` command to configure trusted users for the third-party authentication mechanism.

Syntax

```
tarantella webserver add_trusted_user | delete_trusted_user |
list_trusted_users
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`add_trusted_user`	Adds the user name and password of a user that is to be trusted by the third-party authentication mechanism.	"`tarantella webserver add_trusted_user`" on page 779
`delete_trusted_user`	Deletes the user name and password of a user that is to be trusted by the third-party authentication mechanism.	"`tarantella webserver delete_trusted_user`" on page 780
`list_trusted_users`	Lists the user names of the users that are to be trusted by the third-party authentication mechanism.	"`tarantella webserver list_trusted_users`" on page 781

Note – All commands include the `--help` option. You can use `tarantella webserver` *subcommand* `--help` to get help on a specific command.

Examples

The following example lists trusted users.

```
# tarantella webserver list_trusted_users
```

`tarantella webserver add_trusted_user`

Adds the user name and password of a user that is to be trusted for third-party authentication.

Syntax

`tarantella webserver add_trusted_user` *username*

Description

After you enter the *username*, SGD prompts you to enter the password. The password must be at least six characters long.

You must restart the SGD Web Server, using `tarantella restart webserver`, to activate the new user.

You cannot use this command to change the password of a trusted user. You must delete the trusted user first, using `tarantella webserver delete_trusted_user`.

This command adds the user name to the "database" of Tomcat users in `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/conf/tomcat-users.xml` and creates an SHA digest of the password. The user is also assigned the "SGDExternalAuth" role. This role is required to access the SGD external authentication web service.

Examples

The following example adds L3nNy_G0db3r as a trusted user.

```
# tarantella webserver add_trusted_user L3nNy_G0db3r
```

tarantella webserver delete_trusted_user

Deletes the user name and password of a user that is to be trusted for third-party authentication.

Syntax

`tarantella webserver delete_trusted_user` *username*

Description

You must restart the SGD Web Server, using `tarantella restart webserver`, to deactivate the user.

This command removes the user name from the “database” of Tomcat users in `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/conf/tomcat-users.xml`.

Examples

The following example deletes L3nNy_G0db3r as a trusted user.

```
# tarantella webserver delete_trusted_user L3nNy_G0db3r
```

tarantella webserver list_trusted_users

Lists the user names of the users that are to be trusted for third-party authentication.

Syntax

```
tarantella webserver list_trusted_users
```

Description

Each user name is separated by a comma. The command also shows whether or not the third-party authentication is currently enabled.

This command lists the user names in the “database” of Tomcat users in `/opt/tarantella/webserver/tomcat/5.0.28_axis1.2/conf/tomcat-users.xml`.

Examples

The following example lists trusted users.

```
# tarantella webserver list_trusted_users
```

The `tarantella webtopsession` Command

This command enables SGD Administrators to list and end user sessions.

Syntax

```
tarantella webtopsession list | logout
```

Description

The following table shows the available subcommands for this command.

Subcommand	Description	More Information
`list`	Lists user sessions matching the person or server specified.	"`tarantella webtopsession list`" on page 783
`logout`	Logs users out of SGD.	"`tarantella webtopsession logout`" on page 784

Note – All commands include a `--help` option. You can use `tarantella webtopsession` *subcommand* `--help` to get help on a specific command.

Examples

The following example displays details of all user sessions maintained by the SGD server detroit.

```
$ tarantella webtopsession list \
--server "o=Indigo Insurance/cn=detroit"
```

The following example logs out Emma Rald from SGD.

```
$ tarantella webtopsession logout \
--person "o=Indigo Insurance/ou=Marketing/cn=Emma Rald"
```

tarantella webtopsession list

Lists user sessions matching the person or server specified.

Syntax

```
tarantella webtopsession list
    [ --person pobj | --server serv ]
    [ --format text|count|xml ]
```

Description

For each session, the following details are displayed:

- **Print state.** Shows whether the user has paused printing or not.
- **Client.** The IP address of the client.
- **Logged in at.** The timestamp when the user logged in.
- **User.** The name of the user.
- **Logged in to.** The SGD server hosting the user session.
- **Connection type.** Whether the connection is a standard or a secure connection.

You can list user session details using the following Administration Console tabs:

- Sessions tab
- Secure Global Desktop Servers → User Sessions tab
- User Sessions tab for a user profile object

The following table shows the available options for this command.

Option	Description
`--person`	Displays details of user sessions matching the person specified. Use the name of the user profile object.
`--server`	Displays details of user sessions matching the SGD server specified. Use the name or a peer DNS name of the SGD server object.
`--format`	Specifies the output format. The default setting is `text`. Use `count` to display only the number of matching sessions.

If neither a person nor server is specified, the command lists all user sessions across the array.

Guest users and anonymous users have unique names, even though they can share the same profile in the System Objects organization. To name a guest or anonymous user, use the unique name and not the name of the profile object. For example, `.../_dns/newyork.indigo-insurance.com/_anon/1`.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example displays details of all user sessions maintained by the SGD server detroit.

```
$ tarantella webtopsession list \
--server "o=Indigo Insurance/cn=detroit"
```

The following example displays all user sessions across the array.

```
$ tarantella webtopsession list
```

tarantella webtopsession logout

Ends the user session for each person specified. This has the effect of logging them out of SGD.

Syntax

```
tarantella webtopsession logout --person pobj...
                                [--format text|quiet]
```

Description

The following table shows the available options for this command.

Option	Description
`--person`	Ends the user session of the specified person. Use the name of the user profile object.
`--format`	Specifies the output format. The default setting is `text`. With `--format quiet`, no messages are displayed and the exit code indicates the number of sessions logged out.

You can end user sessions using the following Administration Console tabs:

- Sessions tab
- Secure Global Desktop Servers → User Sessions tab
- User Sessions tab for a user profile object

Guest users and anonymous users have unique names, even though they can share the same profile in the System Objects organization. To name a guest or anonymous user, use the unique name and not the name of the profile object. For example, `.../_dns/newyork.indigo-insurance.com/_anon/1`.

Note – Make sure you quote any object names containing spaces, for example, "o= Indigo Insurance".

Examples

The following example logs out Emma Rald from SGD.

```
$ tarantella webtopsession logout \
--person "o=Indigo Insurance/ou=Marketing/cn=Emma Rald"
```

The following example ends an anonymous user's user session.

```
$ tarantella webtopsession logout \
--person .../_dns/newyork.indigo-insurance.com/_anon/1
```

APPENDIX E

Login Scripts

This appendix contains reference information about the Sun Secure Global Desktop (SGD) login scripts. You can use this information to customize the standard SGD login scripts, or to develop your own login scripts.

This appendix includes the following topics:

Login Scripts Supplied With SGD

All login scripts supplied with SGD are stored in the `/opt/tarantella/var/serverresources/expect` directory.

SGD login scripts are written in Tcl (version 8.4) and Expect (version 5.43). Expect extends Tcl and provides additional commands for interacting with programs.

For more information about Tcl, see the Tcl Developer Exchange `(http://www.tcl.tk)`.

For more information about Expect, see The Expect Home Page `(http://expect.nist.gov/)`.

The login scripts can be divided into the scripts that can be used when configuring applications and the scripts that contain common code. The available scripts are described in the following sections.

Login Scripts Used When Configuring Applications

You configure the login script that is used for an application as follows:

- In the Administration Console, use the Login Script script attribute on the Launch tab for the application object.
- On the command line, use the `--login` *script* command option with the `tarantella object` commands.

The following table lists the login scripts supplied with SGD that you can set as the Login Script attribute for an application object, and a description of what they are used for.

Script Name	Description
`unix.exp`	The standard login script for character and X applications. If the Login Script attribute is blank, this script is used by default. Can be used with all application Connection Methods.
`securid.exp`	Replacement for `unix.exp` if you are using SecurID for application server authentication. See "Using RSA SecurID for Application Authentication" on page 70.
`windows.exp`	The standard login script for Windows applications If the Login Script attribute is blank, this script is used by default. Calls other login scripts depending on the Windows Protocol attribute.
`3270.exp`	The standard login script for 3270 applications. If the Login Script attribute is blank, this script is used by default. Can be used with all application Connection Methods. The script builds a command to run the TeemTalk for UNIX terminal emulation software.
`5250.exp`	The standard login script for 5250 applications. If the Login Script attribute is blank, this script is used by default. Can be used with all application Connection Methods. The script builds a command to run the TeemTalk for UNIX terminal emulation software.
`vms.exp`	Used for X or character applications running on Virtual Memory System (VMS) application servers. Can be used for all application Connection Methods except `rexec`. See "Configuring VMS Applications" on page 201.
`vmsrexec.exp`	Used for X or character applications running on VMS application servers. Can only be used if the application Connection Method is `rexec`. See "Configuring VMS Applications" on page 201.

Script Name	Description
`unixclass.exp`	Script used to create a shadowable UNIX session, for use in a virtual classroom situation. See "Creating a Virtual Classroom" on page 196.
`winclass.exp`	Script used to create a shadowable Windows session, for use in a virtual classroom situation. See "Creating a Virtual Classroom" on page 196.
`pupil.exp`	Script used by the pupils when shadowing a teacher in a virtual classroom situation. See "Creating a Virtual Classroom" on page 196.

Login Scripts Containing Common Code

The following table lists the login scripts supplied with SGD that contain common code and a description of what they are used for. These scripts must not be set as the Login Script attribute for an application object.

Script Name	Description
`runsubscript.exp`	The standard wrapper login script used to call all the other SGD login scripts. Sets the environment variables the login scripts are allowed to use.
`procs.exp`	Called by other scripts. Defines common Tcl procedures.
`vars.exp`	Called by other scripts. Defines the variables, messages, and timeouts used by the other login scripts.
`securid-vars.exp`	Called by `securid.exp`. Defines additional variables and messages needed for SecurID authentication.
`xauth.exp`	Called by `procs.exp` and `classroom.exp`. Used to handle the X authorization process, including the X authorization permissions for shadowing.
`classroom.exp`	Called by `unixclass.exp`, `winclass.exp`, and `pupil.exp`. Defines common procedures for retrieving the X display to shadow.

Script Name	Description
`unixwin.exp`	Called by `windows.exp` for Windows applications configured to use the Citrix Independent Computing Architecture (ICA) Windows Protocol. This script assumes that the user's `PATH` includes the directory where the Merge or ICA UNIX client software is installed. Although SGD no longer supports the SCO Merge protocol, legacy windows application objects can continue to use it.
`wcpwts.exp`	Called by `windows.exp` for Windows applications configured to use the Microsoft Remote Desktop Protocol (RDP) Windows protocol.
`wincenter.exp`	Called by `windows.exp` for Windows applications configured to use the WinCenter or Citrix UNIX Integration Services Windows Protocol. Although SGD no longer supports the WinCenter and Citrix UNIX Integration Services protocols, legacy Windows application objects can continue to use them.

Login Script Tcl Commands and Procedures

The login scripts supplied with SGD use several Tcl commands and procedures for communication with the application server.

The *Tcl commands* are commands that are defined in the Execution Protocol Engine component of SGD. The commands can be used in your own login scripts to provide control over the connection to the application server, and the display of the SGD Application Authentication and Progress dialogs.

The *Tcl procedures* are defined in the login scripts only. The procedures can be used to provide more control over the SGD Application Authentication dialog.

Controlling the SGD Application Authentication Dialog

The following Tcl commands and procedures are used to control the display of the SGD Application Authentication dialog when starting applications:

■ "`authrequest`" on page 789

authrequest

```
authrequest
 [ -normal | -changed ]
   -showuser 0|1
   -title title
   -message message
   -customuserlabel 0|1
   -userlabel label
   -custompasswdlabel 0|1
   -passwdlabel label
   -showpasscache 0|1
   -showsmartcard 0|1
   -isuserdialog 0|1|2
```

This Tcl command displays a dialog box that indicates a problem with the user name or password.

Typically you do not call the `authrequest` command directly in your login scripts. Instead, you use the defined Tcl procedures to call this command with the required arguments.

This command has the following arguments.

Argument	Description
`-normal`	Specifies that the password is incorrect.
`-changed`	Specifies that the password has expired.
`-showuser`	Specifies that the user name field is displayed.
`-showpasswd`	Specifies that the password field is displayed.
`-title`	Specifies the title used for the authentication dialog.
`-message`	Specifies the message that is displayed in the authentication dialog.
`-customuserlabel`	Specifies whether to use a customized label for the user name field.
`-userlabel`	Specifies the customized label to use for the user name field.

Argument	Description
`-custompasswdlabel`	Specifies whether to use a customized label for the password field.
`-passwdlabel`	Specifies the customized label to use for the password field.
`-showpasscache`	Specifies whether the Save This Password check box is displayed.
`-showsmartcard`	Specifies whether the smart card option is displayed.
`-isuserdialog 0|1|2`	Specifies whether a customized authentication dialog is used. Specify one of the following: • `0` - Do not check whether the user name has changed • `1` - Check whether the user name has changed and reconnect to the application server if necessary • `2` - Use the default SGD behavior if the user name has changed

The following example displays a dialog box that says the password is incorrect.

```
authrequest -normal
```

authenticate

Displays a dialog box that indicates a problem with the user name or password.

This Tcl procedure calls the `authrequest` command with the following options.

```
authenticate [ -normal | -changed ]
```

authenticate2

Displays a dialog box that indicates a problem with the user name or password. You can use your own title for the dialog and display your own message. You can also control whether the user name and password fields display.

This Tcl procedure calls the `authrequest` command with the following arguments.

```
authenticate2
 [ -normal | -changed ]
   -showuser 0|1
   -showpasswd 0|
   -title title
   -message message
```

customauthenticate

Displays a dialog box that indicates a problem with the user name or password. You can fully customize the authentication dialog.

With this procedure, the Execution Protocol Engine does not check the text the user types in the user name field. If Secure Shell (SSH) is used as the connection method for the application and the user changes the user name, the Execution Protocol Engine does not break the connection and reconnect as the new user name. This can cause applications to fail to start. If you are using SSH and allow the user to change the user name, use the `userauthenticate` procedure instead.

This Tcl procedure calls the `authrequest` command with the following arguments.

```
customauthenticate
 [ -normal | -changed ]
   -showuser 0|1
   -title title
   -message message
   -customuserlabel 0|1
   -userlabel label
   -custompasswdlabel 0|1
   -passwdlabel label
   -showpasscache 0|1
   -showsmartcard 0|1
```

userauthenticate

Displays a dialog box that indicates a problem with the user name or password. You can fully customize the authentication dialog.

This procedure is the same as `customauthenticate` except that it does check whether the user has changed the user name. If the user name is changed, the Execution Protocol Engine breaks the connection to the application server and reconnects as the changed user.

This Tcl procedure calls the `authrequest` command with the following arguments:

```
userauthenticate
 [ -normal | -changed ]
   -showuser 0|1
   -showpasswd 0|1
   -title title
   -message message
   -customuserlabel 0|1
   -userlabel label
   -custompasswdlabel 0|1
```

```
    -passwdlabel label
    -showpasscache 0|1
    -showsmartcard 0|1
```

Controlling the SGD Progress Dialog

The following Tcl commands are used to control the display of the SGD progress dialog when starting applications:

loaderror

```
loaderror error
```

You can use this Tcl command to override the error message returned by the login script. You can use this function, for example, to replace the standard login script error messages with your own message. If the application fails to start, the error is displayed in the progress dialog and in the log files. See "Login Script Error Messages" on page 807.

clienttimer

```
clienttimer [ time ] [ message ] [ timers ]
```

This Tcl command displays *message* in the progress dialog box for the specified *time*. The progress bar has *timers* sections in total. The following is an example.

```
clienttimer 10 "Launching the application" 4
```

canceltimer

```
canceltimer
```

This Tcl command cancels the `clienttimer` command. This command has no arguments.

progress

```
progress [ message ]
```

This Tcl command displays *message* in the progress dialog box. The following is an example.

```
progress "Initializing..."
```

Controlling the Connection to the Application Server

The following Tcl commands are used to control the connection to the application server:

- "setbuffer" on page 793
- "locallaunch" on page 794
- "tarantella" on page 795
- "sgdconnect" on page 795

setbuffer

```
setbuffer [ -buffer num ] [ -output 0|1 ]
```

This Tcl command defines the number of bytes to read from the application server.

Argument	Description
`-buffer` *num*	Specifies the number of bytes. Default is 1.
`-output 0|1`	Turns output on (1) or off (0). Default is 1.

The following is an example.

```
setbuffer -buffer 1000
```

locallaunch

```
locallaunch [ -start ] [ -abort ] [ -user launchspec -root launchspec ]
```

This Tcl command starts an application when the application server is also the SGD server. This is known as an *optimized launch*.

Argument	Description
`-start`	Starts an optimized launch.
`-abort`	Stops the optimized launch and reverts to the standard connection method.
`-user` *launchspec*	Defines the connection methods to use for starting applications on the SGD server when the user is not the UNIX or Linux root user. You can specify different behavior for applications that are detached on launch, background applications, and those that are not, foreground applications. The *launchspec* can be one of the following: • `0` - Starts all applications using the Connection Method defined for the application object • `1` - Background applications use `/bin/su`. Foreground applications use the application object's Connection Method • `2` - Background applications use the application object's Connection Method. Foreground applications use `/bin/su` • `3` - Starts all applications using `/bin/su` The default is `1`.
`-root` *launchspec*	Defines the connection methods to use for starting applications on the SGD server when the user is the UNIX or Linux root user. You can specify different behavior for applications that are detached on launch, background applications, and those that are not, foreground applications. The *launchspec* can be one of the following: • `0` - Starts all applications using the Connection Method defined for the application object • `1` - Background applications use `/bin/su`. Foreground applications use the application object's Connection Method • `2` - Background applications use the application object's Connection Method. Foreground applications use `/bin/su` • `3` - Starts all applications using `/bin/su` • `4` - Starts all applications using the Connection Method defined for the application object The default is `3`.

The following is an example.

```
locallaunch -abort
```

tarantella

```
tarantella -nosocket -portnumber num -thirdtiershell shell
```

This Tcl command is used to configure the connection to the application server. You must configure the connection before you use the `sgdconnect` command.

Argument	Description
`-nosocket`	Specifies that the application is to be started by some other means and must be implemented by whoever is creating the script, for example by using Expect's `spawn` command. This can only be done with applications that do not require a permanent connection, such as X applications. This command is useful if you have an unusual application server, or if you need to integrate with an existing application start mechanism.
`-portnumber` *num*	Overrides the port used to make the connection to the application server. If you use this option, you must execute the `tarantella` command before the `sgdconnect` command, otherwise the port number is ignored.
`-thirdtiershell` *shell*	Specifies the shell to use on the application server, for example `/bin/sh`.

The following example connects to the application server on TCP port 5999.

```
tarantella -portnumber 5999
```

sgdconnect

```
sgdconnect
```

Instructs the Execution Protocol Engine to connect to the application server. This command has no arguments.

Most of the SGD login scripts use `sgdconnect` to make the connection. If you want to handle the connection to the application server yourself, you must ensure that your script does not use this command.

The wcpwts.exp standard login script is an example of a login script that does not use this command to connect to an application server.

Login Script Variables

SGD login scripts use and support a number of variables. The variables can be divided into guaranteed variables, that are always available, and optional variables, that are only available if they have a value.

To be able to use a variable in a login script, it must be defined in the runsubscript.exp login script.

The following sections list the guaranteed and optional variables, and a description of their purpose.

Guaranteed Login Script Variables

Guaranteed variables store the names of commands to run, the application server to log in to, and the connection method to use.

All login scripts use at least some of the guaranteed variables.

Guaranteed variables always exist, though they might have a null value.

Variable	Description
ALTDISPLAY	The fully qualified Domain Name System (DNS) name of the user's client device and the display number being used.
DISPLAY	The Internet Protocol (IP) address of the user's client device and the display number being used.
TTA_AGEDPASSWORD	Whether to use the manual or dialog method of dealing with aged passwords.
TTA_ALLOWTHIRDTIERDIALOG	Whether to show a dialog box on the application server if the user's password is aged, missing or incorrect. This variable can have the following values: • user - If the user holds down the Shift key when they click an application's link or if there is a password problem • system - Only when there is a password problem • none - Never show a dialog box
TTA_AUXCOMMANDS	Any auxiliary commands to run on the application server. This corresponds to the application object's Window Manager attribute.

Variable	Description
TTA_CLIENT_IPADDR	The IP address of the user's client device. This is the IP address obtained by the SGD Client.
TTA_COMMAND	The command to run on the application server. This corresponds to the application object's Application Command attribute.
TTA_CONNECTIONSERVICE	The transport used to connect to the application server. This corresponds to the application object's Connection Method attribute.
TTA_ENVIRONMENT	Any environment variable settings required on the application server. This corresponds to the application object's Environment Variables attribute.
TTA_HOSTNAME	The application server that the login script connects to. This is chosen by application load balancing, from those listed on the Hosting Application Servers tab for the application object.
TTA_HOSTPROBE	The path to the `ttahostprobe` binary. Used to check whether an application server is available.
TTA_IPADDRESS	The application server's IP address.
TTA_LOGFILE	The name of a file where error and diagnostic messages are logged. By default, this has the form *scriptID*`.log`, where *script* is the name of the login script and *ID* is its process ID on the SGD server. If set to null, messages are not stored. To log messages in this file, include the following code in your login script: `log_file $env(TTA_LOGFILE)`
TTA_PORT	The port used to connect to the application server for the Connection Method configured for the application object.
TTA_PRIMARY_DNSNAME	The primary SGD server's fully qualified DNS name. This lets the login script choose the correct SGD printer when setting the default printer value. It is used to differentiate between multiple entries in the `/etc/ttaprinter.conf` file.
TTA_SCRIPT	The Expect script that runs after `runsubscript.exp`, for example `unix.exp`.
TTA_SECOND_TIER_DNSNAME	The fully qualified DNS name of the SGD server hosting the application session. Used with `TTA_THIRD_TIER_DNSNAME` to determine whether the application server and the SGD server are the same, and use an optimized launch process if they are.
TTA_THIRD_TIER_DNSNAME	The fully qualified DNS name of the application server hosting the application. Used with `TTA_SECOND_TIER_DNSNAME` to determine whether the application server and the SGD server are the same, and use an optimized launch process if it they are.
TTA_THIRD_TIER_VARS	The list of variables to export to the environment on the application server.

Variable	Description
TTA_STDERR	A temporary error file.
TTA_WILLDISCONNECT	Whether the connection is broken once the command is executed.
TTA_XLAUNCH	Whether the application is an X application. The value of this variable is 0 or 1.

The following guaranteed variables are also defined in `runsubscript.exp`. These are variables used by the SGD server when starting applications:

- LANG
- LANGUAGE
- LC_ALL
- LC_CTYPE
- LC_NUMERIC
- LC_TIME
- LC_COLLATE
- LC_MONETARY
- LC_MESSAGES
- LC_PAPER
- LC_NAME
- LC_ADDRESS
- LC_TELEPHONE
- LC_MEASUREMENT
- LC_IDENTIFICATION
- PATH
- TTA_PreferredLocale
- TTABASEDATADIR
- TTADATADIR
- TTADIR

Optional Login Script Variables

Optional variables store additional information about the application, the user, and their session.

Optional variables are often used to test conditions and modify the login script's behavior accordingly. Optional variables only exist if they have a value. For example, the TTA_ResumeTimeOut variable only exists if the application object's Application Resumability attribute has a value.

Most optional variables contain the values of object attributes. The application being started has its application object's attributes made available as optional variables. Similarly, the attributes of the user profile are also made available in the same way. Other optional variables contain additional information about the user's session.

Variable	Description
TTA_Appearance	Corresponds to a character application object's Border Style attribute.
TTA_AppletHeight	Corresponds to the application object's Window Size: Height attribute.
TTA_AppletWidth	Corresponds to the application object's Window Size: Width attribute.
TTA_ApplicationName	The application object's fully qualified name.
TTA_ApplicationPlacement	Corresponds to the application object's Window Type attribute. This variable can have the value multiplewindows - client window management, awtwindow - independent window, kiosk - kiosk, localx - local X server, and seamlesswindows - seamless window.
TTA_Arguments	Corresponds to the application object's Arguments For Command attribute.
TTA_AudioQuality	Corresponds to the Windows Audio Quality attribute on the Global Settings → Client Device tab in the Administration Console. This variable can have the value low, medium, and high.
TTA_Autowrap	Corresponds to the character application object's Line Wrapping attribute.
TTA_BackgroundColor	Corresponds to the Background Color attribute for a 3270 or 5250 application object.
TTA_ButtonLevels	Corresponds to the 3270 or 5250 application object's Displayed Soft Buttons attribute. This variable can have the value 0 - No Buttons), 1 - 2 Rows, 2 - 4 Rows, 3 - 6 Rows, and 4 - 8 Rows.
TTA_CachePassword	Whether the user selected the Save This Password? box when they supplied a user name and password for the application server.
TTA_CodePage	Corresponds to the character application object's Code Page attribute. This variable can have the value 437, 850, 852, 860, 863, 865, 8859-1, 8859-2, Multinational, Mazovia, or CP852.
TTA_ColorMap	Corresponds to the character application object's Color Map attribute.
TTA_Columns	Corresponds to the character application object's Window Size: Columns attribute.

Variable	Description
TTA_Compression	Corresponds to the application object's Command Compression attribute. This variable can have the value automatic, on, or off.
TTA_ContinuousMode	Corresponds to the application object's Command Execution attribute. This variable can have the value automatic, on, or off.
TTA_ControlCode	Corresponds to the character application object's Escape Sequences attribute. This variable can have the value 7-bit, or 8-bit.
TTA_Cursor	Corresponds to the character application object's Cursor attribute. This variable can have the value off, block, or underline.
TTA_CursorKeyMode	Corresponds to the character application object's Cursor Key Codes Modification attribute. This variable can have the value application, or cursor.
TTA_DelayedUpdate	Corresponds to the application object's Delayed Updates attribute.
TTA_DisplayEnginePage	Corresponds to the application object's Emulator Applet Page attribute. **Note -** This attribute is no longer used.
TTA_DisplayName	Corresponds to the user profile's Name attribute.
TTA_Domain	Corresponds to the application object's Domain Name attribute.
TTA_EuroMapping	Corresponds to the application object's Euro Character attribute. This variable can have the value iso8859-15, or unicode.
TTA_FilePath	Corresponds to the application object's Application Command attribute.
TTA_FixedFontSize	Corresponds to the character application object's Font Size: Fixed attribute.
TTA_FontFamily	Corresponds to the character application object's Font Family attribute. This variable can have the value courier, helvetica, or timesroman.
TTA_FontSize	Corresponds to the character application object's Font Size attribute.
TTA_ForegroundColor	Corresponds to the 3270 or 5250 application object's Foreground Color attribute.
TTA_GraphicsAcceleration	Corresponds to the application object's Graphics Acceleration attribute.
TTA_Height	Corresponds to the application object's Window Size: Height attribute. This variable provides the same information as TTA_AppletHeight.
TTA_HostLocale	Corresponds to the application server object's Prompt Locale attribute.
TTA_HostName	The application server that the login script connects to. This is chosen by application server load balancing, from those listed on the Hosting Application Servers tab for the application object.

Variable	Description
TTA_IBMHostName	Corresponds to the 3270 or 5250 application object's Server Address attribute.
TTA_Icon	Corresponds to the application object's Icon attribute.
TTA_InstanceName	The application session ID.
TTA_InterlacedImages	Corresponds to the application object's Interlaced Images attribute. This variable can have the value automatic, on, or off.
TTA_KeyboardType	Corresponds to the 3270 or 5250 application object's Keyboard Type attribute. This variable can have the value pc, sun4, sun5, and hp.
TTA_KeymapLock	Corresponds to the application object's Keyboard Map attribute.
TTA_KeypadMode	Corresponds to the character application object's Numpad Codes Modification attribute. This variable can have the value application, or numeric.
TTA_Lines	Corresponds to the character application object's Window Size: Lines attribute.
TTA_LocalAddr	The IP address of the SGD host.
TTA_LoginScript	Corresponds to the application object's Login Script attribute.
TTA_Maximise	Corresponds to the 3270 or 5250 application object's Window Size attribute.
TTA_MiddleMouseTimeout	Corresponds to the application object's Middle Mouse Timeout attribute.
TTA_ParentName	The application object's fully qualified name. This variable provides the same information as TTA_ApplicationName.
TTA_PortNumber	Corresponds to the 3270 or 5250 application object's Server Port attribute.
TTA_ProtocolArguments	Corresponds to the Windows application object's Arguments for Protocol attribute.
TTA_RemoteAddr	The IP address of the application server used to run the application.
TTA_RequiresDisplayEngine	Whether or not the application requires a display engine.
TTA_ResumeTimeOut	Corresponds to the application object's Application Resumability: Timeout attribute.
TTA_RootColor	Corresponds to the application object's Window Color: Custom Color attribute.
TTA_RootType	Corresponds to the application object's Window Color attribute. This variable can have the value default, or color.

Variable	Description
TTA_ScrollStyle	Corresponds to the character application object's Scroll Style attribute. This variable can have the value normal, jump, or smooth.
TTA_SecureConnection	Corresponds to the user profile's Security tab.
TTA_SessionExit	Corresponds to the application object's Session Termination attribute. This variable can have the value lastclient - Last Client Exit, windowmanager - Window Manager Exit, windowmanageralone - Only Window Manager Remaining), loginscript - Login Script Exit), loginscript - Login Script Exit), nowindows - No Visible Windows, and loginscriptnowindows - Login Script exit or No Visible Windows.
TTA_SettingsItem	Corresponds to the 3270 or 5250 application object's 'File' and 'Settings' Menus attribute.
TTA_StatusLine	Corresponds to the character application object's Status Line attribute. This variable can have the value none, indicator, and host writable, standard, or extended.
TTA_Suspend	Corresponds to the application object's Application Resumability attribute. This variable can have the value never, session (means User Session), and forever (means Always).
TTA_TerminalClass	Corresponds to the character application object's Emulation Type attribute. This variable can have the value scoconsole, vt420, or wyse60.
TTA_TerminalType	Corresponds to the character application object's Terminal Type attribute.
TTA_TNClose	Corresponds to the 3270 or 5250 application object's Connection Closed Action attribute. This variable can have the value 0 - Prompt User for Action, 1 - Exit Emulator, 2 - Reconnect, and 3 - Close Connection.
TTA_TopMenuBar	Corresponds to the 3270 or 5250 application object's Menu Bar attribute.
TTA_Transport	Corresponds to the application object's Connection Method attribute. This variable can have the value rexec, telnet, or ssh. The guaranteed variable TTA_CONNECTIONSERVICE also provides this information.
TTA_UserName	The fully qualified name of the user this application session is for.
TTA_UserSecurityEquivalent	Corresponds to the user profile's User Name attribute.
TTA_UNIXAUDIO_QUALITY	Corresponds to the UNIX Audio Quality attribute on the Global Settings → Client Device tab in the Administration Console. This variable can have the value low, medium, and high.

Variable	Description
TTA_UNIXAUDIOPRELOAD	Corresponds to the X application objects Audio Redirection Library attribute.
TTA_ViewHostReply	Corresponds to the application object's Keep Launch Connection Open attribute.
TTA_WebTop	Corresponds to the Webtop Theme attribute. **Note -** This attribute is no longer used.
TTA_Width	Corresponds to the application object's Window Size: Width attribute. This variable provides the same information as TTA_AppletWidth.
TTA_WinCursor	Corresponds to the application object's Use Windows Cursor attribute. **Note -** This attribute is no longer used.
TTA_WindowsApplicationServer	Corresponds to the Windows application object's Windows Protocol attribute. This variable can have the value wincenter, wincentermf - Citrix UNIX Integration Services, merge - SCO Merge, winframe - Citrix ICA), wcpwts - Microsoft RDP, or none. Only Citrix ICA and Microsoft RDP are supported. The other protocols can only be used with legacy SGD Windows application objects.
TTA_WindowsApplicationSupport	Corresponds to the Windows application object's Windows Protocol: Try Running From Client First attribute.

Login Script Timeouts

SGD uses several timeouts when starting applications. The following timeouts are available:

- "Expect Timeouts" on page 804
- "Client Timers" on page 805
- "Other Timeouts" on page 806

Note – None of the timeouts, apart from the Execution Protocol Engine timeout, apply when starting a Microsoft Windows application that is configured to use the Microsoft RDP protocol.

Expect Timeouts

The Expect timeouts are defined in the `vars.exp` login script. The following table lists the available Expect timeouts and their default values.

Timeout	Default Value
`timeouts(hostprobe)`	30 seconds
`timeouts(prelogin)`	40 seconds
`timeouts(loggedin)`	20 seconds

If an Expect timeout expires, the script attempts to guess the prompt, and then continues to start the application.

`timeouts(hostprobe)`

The `timeouts(hostprobe)` timeout is called by the `unix.exp` login script. This is the time to wait for a response from the `ttahostprobe` binary. The `ttahostprobe` binary is used to check whether an application server is available.

The `ttahostprobe` binary outputs its response to standard output (`stdout`), and returns `y` for success or `n` for failure.

`timeouts(prelogin)`

The time allowed for each Expect command to match a required string during the login phase.

For example, after the connection is made to the application server, the script has 40 seconds by default to match the login prompt before it times out. Every successful match resets the timer. During a login, the timeout is usually reset for the login prompt, the password prompt, and the shell prompt.

Increasing this timeout increases the time allowed for each phase of the login. This timeout must be large enough to allow for the longest phase of the login to be completed.

If the timeout expires, the script assumes that it is logged in and has failed to match the shell prompt and sends "`echo SYNC`" to the application server to guess the prompt string. If the user is not logged in when the timer fires, the application fails to start. Otherwise, the shell prompt is set to whatever the application server sent immediately after the "`echo SYNC`" and the application startup continues.

Note – If you see "`echo SYNC`" and the shell prompt ends in the normal way with `$`, `%`, `#`, or `>`, the `timeouts(prelogin)` value is too short.

`timeouts(loggedin)`

The time allowed for each Expect command to match a required string once the user is logged in.

If the timeout expires, the script moves on to the next command. This can cause commands to be sent before the prompt has returned.

The most common occurrence of this timeout is if the script incorrectly sets the shell prompt. By default, this causes each command to wait 20 seconds before moving to the next command and can trigger one of the client timers.

Client Timers

Client timers are set using the `clienttimer` Tcl command (see "`clienttimer`" on page 792). If a client timer expires, the application start is canceled with a fatal `ErrApplicationServerTimeout` error.

The client timers are defined in the `vars.exp` login script.

The following table lists the available client timers and their default values.

Timer	Default Value
`timers(login)`	`timeouts(prelogin)` + 10 seconds
`timers(env)`	40 seconds
`timers(runmain)`	40 seconds
`timers(build)`	25 seconds
`timers(total)`	5 seconds

`timers(login)`

The total time for the complete login phase, from making the connection to receiving the first shell prompt.

The `timers(login)` timer must be large enough to cover all of the login phases. Each individual phase of the login (login prompt, password prompt, shell prompt) might last up to the number of seconds defined for the `timeouts(prelogin)` timeout. The value of this timer must always be greater than `timeouts(prelogin)` Expect timeout.

If you increase the `timeouts(prelogin)` Expect timeout, increase the `timers(login)` timer as well so that the difference between them is never less than 10.

`timers(env)`

The total time from receiving the first shell prompt until all of the application server environment variables have been exported.

`timers(runmain)`

The total time from setting the last environment variable to starting the main application.

`timers(build)`

The total time taken to build the command line to be executed. This timer is only used when starting Windows applications that use the SCO Merge protocol.

Note – The SCO Merge protocol is no longer supported and can only be used by legacy SGD Windows application objects.

`timers(total)`

The total number of client timers. Only change this setting if you add or remove a client timer.

Other Timeouts

The `procs.exp` login script includes a 3-second timeout when issuing commands. This is defined in the `proc wait_for_prompt` procedure.

The Execution Protocol Engine has a default timeout of 180 seconds (3 minutes). This timeout starts when the request to start an application is received and removed when the application startup has completed successfully. If it expires, the application startup is canceled. This timeout is specific to each SGD server.

Use the following command to change this timeout:

```
$ tarantella config edit \
  --tarantella-config-execpeconfig-maxlaunchtime secs
```

Note – Use the `--array` option with this command to change this timeout for all the SGD servers in the array.

Login Script Error Messages

The following table lists the error codes and messages that can occur with login scripts, and a description of what to do about them. Use this information to diagnose why a login script is failing.

Code	Error Message and Description
0	`ErrOK` The login script successfully connected to the application server and started the application.
1	`ErrApplicationServerResourceFailure` The login script failed due to a lack of system resources on the application server. Ensure that the application server is capable of running the application.
2	`ErrApplicationServerNoLicenseAvailable` No licenses were available on the application server. Ensure that the application server has sufficient licenses for the number of connections you expect to make.
3	`ErrFaultInExecutionScript` The login script contains a syntax error. Review the login script.
4	`ErrApplicationServerLoginFailed` The login script failed to log into the application server. See see "Troubleshooting `ErrApplicationServerLoginFailed` Errors" on page 207.

Code	Error Message and Description
5	`ErrApplicationServerLoginIncorrect` The user name and password supplied to the application server were not accepted. Check that the user name and password are valid on that application server.
6	`ErrApplicationServerPasswordAged` The user's password on the application server has expired. Ensure that the user has a valid password on the application server. To avoid seeing this error, configure SGD to handle aged passwords. You configure this on the Global Settings → Application Authentication tab in the Administration Console.
7	`ErrCommandExecutionFailed` The login script successfully logged in to the application server but could not run the application. Ensure that the application object's Application Command attribute contains a valid command. Ensure that the user has write permissions for the `/tmp` directory on the application server.
8	`ErrApplicationServerConnectionFailed` The login script failed to log in to the application server. Check that you can log into the application server manually.
9	`ErrApplicationServerEndOfFileOnConnection` The login script encountered an End of File error (EOF) on connection to the application server. Investigate why an EOF error is returned.
10	`ErrApplicationServerTimeout` The login script timed out when trying to connect to the application server. See "Troubleshooting `ErrApplicationServerTimeout` Errors" on page 207.
12	`ErrInvalidDesktopSize` The width and height defined for a Windows application is not valid. Check the application object's Window Size: Width and Window Size: Height attributes.
14	`ErrCouldNotPipe` The login script was unable to create a pipe between the parent and child processes in the Execution Protocol Engine. This error might indicate that there is not enough memory on the application server. Check the number of other applications running on the server and increase size of memory if necessary.
15	`ErrCouldNotFork` The login script was unable to fork a child process in the Execution Protocol Engine. This error might indicate that there is not enough memory on the application server. Check the number of other applications running on the server and increase the amount of memory if necessary.
16	`ErrScriptRead` The login script produced an error when trying to read from the script process in the Execution Protocol Engine. Try to run the application again. If the error persists, contact Sun Support.

Code	Error Message and Description
17	`ErrScriptWrite` The login script produced an error when trying to write to the script process in the Execution Protocol Engine. Try to run the application again. If the error persists, contact Sun Support.
18	`ErrThirdTierWrite` The login script produced an error when trying to write to the application server in the Execution Protocol Engine. This error usually means the connection to the application server was lost. Check the application server is available and try to run the application again.
19	`ErrThirdTierRead` The login script produced an error when trying to read from the application server in the Execution Protocol Engine. This error usually means the connection to the application server was lost. Check the application server is available and try to run the application again.
21	`ErrTransportNotAvailable` The login script was unable to connect to the application server using the requested connection method method. Check that the application server supports the connection method. Check that the application server is available.
22	`ErrLogFileError` This is not an application startup error. SGD was unable to create a log file for the Protocol Engine Manager. If the error persists, contact Sun Support.
27	`ErrThirdTierFailure` Something has gone wrong on the application server. Check that the server is available and that you can run the application manually.
30	ErrLoginPasswordNotAvailable The login script was unable to supply the application server with a password. This error usually means the Execution Protocol Engine timeout has been triggered. See "Other Timeouts" on page 806 for details of how to increase the Execution Protocol Engine timeout.
31	`ErrRequestNotSupported` The login script cannot execute the requested auxiliary commands. Check that the Arguments for Command attribute for the application object is configured correctly and that the additional commands work on the application server.
32	`ErrRequestNotImplemented` The login script cannot execute the requested operation because it has not been implemented. If the error persists, contact Sun Support.
33	`ErrUnknown` An error occurred in the Execution Protocol Engine. Check the log file and try to run the application again.

Code	Error Message and Description
34	`ErrInternalError` An error in the Protocol Engine Manager. Check the log file and try to run the application again.
37	`ErrProtocolEngineDied` The Protocol Engine process failed. Check the log file for the process ID of the protocol engine and try running the application again. If the problem persists, contact Sun Support.
43	`ErrExpectInitialisationFailed` SGD was unable to initialize the Expect interpreter and so the script was not run. Try to run the application again. If the problem persists, contact Sun Support.
44	`ErrEvalFileFailed` The login script file does not exist or contains a syntax error that is causing the Expect interpreter to fail. Check that the login script is in the specified directory. All login scripts supplied by SGD are stored in the `/opt/tarantella/var/serverresources/expect` directory. Check the Execution Protocol Engine error log file for details of any errors with the script.
45	`ErrCreateInterpreterFailed` SGD was unable to initialize the Tcl interpreter and so the script was not run. Try to run the application again. If the error persists, contact Sun Support.
46	`ErrChdirFailed` The login script failed to change to the directory containing the script. Check the path to the script.
47	`ErrReadError` The login script produced an error when trying reading from the protocol connection between the parent and child processes in the Execution Protocol Engine. Try to run the application again. If the error persists, contact Sun Support.
49	`ErrEndOfFile` The login script read an unexpected end of file on a connection. Try to run the application again. If the error persists, contact Sun Support.
51	`ErrBadMessage` The login script received an invalid message, probably due to a corruption of the data packet. Try to run the application again. If the error persists, contact Sun Support.
52	`ErrStaleCookie` The client connected to the application but the cookie needed for the application startup has expired. Try to run the application again. If this fails, increase the lifetime of the cookie. You do this with the following command: `$ tarantella config edit --tarantella-config-applaunch-reconnecttimeout` *seconds* The default value is `60` (60 seconds). If the error persists, contact Sun Support.

Code	Error Message and Description
53	`ErrEatenCookie` The client connected to the application but the cookie needed for the application startup has already been used, probably by the user running multiple sessions. Try to run the application again. If the error persists, contact Sun Support.
54	`ErrDifferentCookie` The client connected to the application but the cookie supplied does not match the one required for the application startup. Try to run the application again. If the error persists, contact Sun Support.
55	`ErrLaunchPolicyNotFound` SGD was unable to find the details needed to run the application. This error might never occur. Try to run the application again. If this fails, stop the SGD server, start it again, and then run the application again. If the error persists, contact Sun Support.
56	`ErrBadLength` The login script received a message that was not the correct length, probably due to a corruption of the data packet. Try to run the application again. If the error persists, contact Sun Support.
57	`ErrInvalidConfigObject` The configuration data provided by SGD did not contain all the required information. This error might never occur. Try to run the application again. If this fails, stop the SGD server, start it again and then run the application. If the error persists, contact Sun Support.
58	`ErrSessionCircuitNotFound` The connection between the protocol engine and the Protocol Engine Manager was lost. Try to run the application again. If this fails, stop the SGD server, start it again and then run the application. If the error persists, contact Sun Support.
59	`ErrExecutionCircuitNotFound` The connection between the Protocol Engine Manager and the Execution Protocol Engine was lost. Try to run the application again. If this fails, stop the SGD server, start it again, and then run the application. If the error persists, contact Sun Support.
61	`ErrCircuitNotFound` The Protocol Engine Manager cannot find a circuit (connection). Try to run the application again. If this fails, stop the SGD server, start it again and then run the application. If the error persists, contact Sun Support.
62	`ErrCreateFailed` The create request to the protocol engine failed and SGD was unable to run the application. The definition of the application is missing some attributes. Check the log file for details of the missing attributes and correct these errors before trying to run the application again
63	`ErrComplete` This is not an error. It is a message from Execution Protocol Engine to the Protocol Engine Manager to indicate the launch process was completed.

Code	Error Message and Description
65	`ErrNonZeroConnectresult` When the SGD Client connected to the protocol engine, an error occurred. If possible, log out. Otherwise, close the web browser and end the SGD Client processes on the client device. Try to run the application again.
66	`ErrUserAbort` This is not an error. The user canceled the application launch.
67	`ErrClientEndOfFileOnConnection` The connection to the SGD Client was lost. If possible, log out. Otherwise, close the web browser and end the SGD Client processes on the client device. Try to run the application again.
68	`ErrNothingToDo` This is not an error. This message indicates that the launch request sent to the Protocol Engine Manager does not require any protocol engines.
71	`ErrIoError` The login script was unable to write to `stderr`. Try to run the application again. If the error persists, contact Sun Support.
73	`ErrTscLicenseError` There are not enough Windows Terminal Services licenses available to be able to run the application. Increase the number of Windows Terminal Services licenses.

Glossary

This chapter includes a glossary of terms that are used in Sun Secure Global Desktop (SGD).

Numeric

3270 Application object An SGD object that represents a 3270 protocol application running on a mainframe host. 3270 Application objects have a `cn=` naming attribute.

5250 Application object An SGD object that represents a 5250 protocol application running on an AS/400 host. 5250 Application objects have a `cn=` naming attribute.

A

Active Directory Microsoft's implementation of LDAP directory services. Used to store information about the resources, services, and users across a Windows domain.

Active Directory Container object An SGD object used to represent an Active Directory structure within the SGD organizational hierarchy. Active Directory Container objects have a `cn=` naming attribute.

advanced load balancing Load balancing algorithms that measure the true load on application servers, using information provided by the SGD Enhancement Module.

AIP Adaptive Internet Protocol. A proprietary protocol used by SGD software components. AIP optimizes the user experience by choosing the most efficient ways to transfer application display data and user input between client devices and SGD servers.

ALSA Advanced Linux Sound Architecture.

ambiguous login The situation where an authentication mechanism has found more than one match for a user and cannot distinguish between them without further information from the user.

anonymous user authentication An authentication mechanism where users can log in to SGD without supplying a user name or password. Anoymous user authentication is disabled by default.

ANSI American National Standards Institute.

API Application programming interface.

applet A software program running in a web browser.

application launch dialog Dialog shown when a user clicks a webtop link to start an application.

application load balancing The mechanism that determines which application server runs a user's application.

application server A networked device, such as a Windows 2000 server or Linux server, configured to run applications. Application servers are represented in the SGD datastore by an Application Server object.

Application Server object An SGD object that represents an application server used to run applications through SGD. Application Server objects have a `cn=` naming attribute.

application server password cache A secure store of application server user names and passwords associated with user identities. Maintained so that application server authentication can proceed without prompting the user. Also called the password cache.

application session An application session begins when a user starts an application, and ends when the application exits. Information about an application session is stored in memory by the SGD server. Each application session is associated with a Protocol Engine.

application session load balancing The mechanism that determines which SGD server in the array manages the application session, and runs the Protocol Engine for a user's application.

array A collection of SGD servers that share configuration information. The SGD servers in an array act together to enable users to see the same webtop, and resume their applications, whatever SGD server they log in to. Arrays of SGD servers provide scalability and redundancy.

array route Configures SOCKS proxy server usage, depending on the IP address of the client device.

Assignment Type A field in the Administration Console that indicates the origin of an object link. Assignment Types can be Direct, Indirect, or Multiple. See also direct assignment, indirect assignment, multiple assignment.

ATR string Automatic Terminal Recognition string. A sequence of bytes used to identify a smart card.

attribute A named property of an object. Attributes may have zero or more values, as defined by the schema.

attribute map A file that defines how character attributes, such as bold and underline, are displayed in the SGD terminal emulators.

authentication token In Integrated mode operation, identification data submitted from the SGD Client to the SGD server. Used by the authentication token authentication mechanism.

B

batch scripting The ability to perform more than one SGD related task with a single instance of a `tarantella` command.

billing service An SGD service that logs user session and application session information for an SGD server or an array of SGD servers.

C

CA See Certificate Authority.

CA certificate See root certificate.

CAL Client Access License. Used by Microsoft Windows Terminal Services.

CDE Common Desktop Environment. A graphical user interface for UNIX desktops.

CDM See client drive mapping.

Certificate Authority A trusted issuer of X.509 certificates.

Certificate Signing Request Information supplied to a Certificate Authority, that is used to verify identity and generate an X.509 certificate.

CGI Common Gateway Interface. A specification for interfacing external applications with a web server.

Character Application object An SGD object that represents a VT420, Wyse 60, or SCO Console application. Character Application objects have a `cn=` naming attribute.

cipher In cryptography, an algorithm for performing encryption and decryption.

client device A networked device, such as a Windows PC or Linux workstation, used to access an SGD server.

client drive mapping Enables users to access some or all of their client's drives, from an application running on an application server.

client profile Settings for the SGD Client, including server URL, proxy settings, and mode of operation. The client profile is downloaded to the client device when a user connects to an SGD server.

CN See common name.

color map SGD terminal emulators support a palette of 16 colors. The color map is a file that defines the RGB values of these colors.

common name A name used to identify an entry in an LDAP directory. For example, the name of a person.

COM port A serial port, in a Microsoft Windows environment.

Configuration Wizard A tool for SGD Administrators, useful for quickly adding new objects to an existing hierarchy, rather than creating a new hierarchy.

concurrent-user licensing The SGD licensing model where a license is allocated when a user starts to use the licensed functionality, and is released as soon as a user stops using the licensed functionality.

cookie A short packet of data, used as an identification token. Some cookies are encrypted, to prevent forgery.

CPU Central processing unit.

CSR See Certificate Signing Request.

CUPS Common UNIX Printing System.

D

daemon A service process on UNIX platform operating systems that runs in the background, rather than under the direct control of a user.

data replication The process where SGD system data is copied from the primary server in an SGD array to the secondary servers in the SGD array.

datastore The sum of all the information used by the various components of SGD, including information about application servers and users on the network, user session and application session information, and organizational information. Organized into namespaces, such as `_ens`, `_dns` etc.

DER Definite Encoding Rules. A cryptographic format used for storing X.509 certificate keys.

DES Data Encryption Standard. A cryptographic cipher.

digital signature Information encrypted with a user's private key and appended to a message to ensure the authenticity of the message. The digital signature can be verified using the user's public key. See also public key cryptography.

direct assignment In the Administration Console, a one-to-one object link created using the Editable Assignments table. See also editable assignment.

Directory (light) object A container object in SGD, similar to an Organization object, but does not include SGD-specific attributes or allow you to assign applications. Examples include a Domain Component object and an Active Directory Container object.

directory services Services that store and manage the resources and users on a network. SGD uses the principles of directory services for object storage and management.

Directory Services Integration The ability to define webtops for users without requiring User Profile objects for those users in the SGD datastore. Instead, user information is kept in an external LDAP directory. Application objects in the SGD datastore define which LDAP users can see them on their webtop.

disambiguate The process of resolving an ambiguous login.

Display Engine An SGD software component that runs on a client device. Display Engines display applications to users and accept user input. They use AIP to communicate with Protocol Engines on SGD servers.

distinguished name The name that uniquely identifies an entry in an LDAP directory.

distributed printing Where print jobs are distributed across the array, avoiding bottlenecks and single points of failure. A user's print jobs are processed on the SGD server hosting the application session for the application you want to print from.

DN See distinguished name.

DNS Domain Name System.

DNS name A unique name for a computer on a network, for example, `server.example.com`.

Document object An SGD object that represents a document on the web. Documents can be any URL, including Sun StarOffice documents, or Adobe Acrobat files. A Document object can also refer to a web application. Document objects have a `cn=` naming attribute.

Domain Component object An SGD object used to replicate a directory structure, usually a Microsoft Active Directory structure, within the SGD organizational hierarchy. Domain Component objects have a `dc=` naming attribute.

domain controller See Windows domain controller.

DSI See Directory Services Integration.

E

editable assignment In the Administration Console, a one-to-one object link that can be edited by an SGD Administrator. See also direct assignment.

effective assignments In the Administration Console, a summary of the object links for the current object. Effective assignments can include both direct assignments and indirect assignments.

Enhancement Module An optional SGD software component installed on an application server to provide additional SGD functionality, such as client drive mapping, audio, and advanced load balancing.

environment variables A set of system configuration values that can be accessed by a running program.

ESD Enlightened Sound Daemon. A sound server for UNIX and Linux platforms that enables mixing of several digitized audio streams for playback by a single device.

EsounD See ESD.

Evaluation mode Using SGD when no license keys have been installed. In Evaluation mode, a limited-functionality version of SGD may be used for a 30-day period. See also Fully Licensed mode.

ExecPE Execution Protocol Engine.

Expect An extension to the Tcl scripting language, typically used for interactive applications. The SGD login scripts are written in the Expect language.

external DNS name The name by which an SGD server is known to a client device. An SGD server can have multiple external DNS names.

F

fingerprint A short sequence of bytes used to authenticate or look up a public key.

FIPS Federal Information Processing Standards. Standards developed by the United States Federal government for use by non-military government agencies and government contractors.

firewall traversal Running SGD through a single open firewall port between client devices and SGD servers. Also known as firewall forwarding.

font server A program that makes fonts on a host available on a network.

fully qualified name An unambiguous name used to specify an SGD object. For example, `.../_ens/o=organization/ou=marketing/cn=Indigo Jones`, specifies a User Profile object in SGD.

Fully Licensed mode Using SGD when license keys have been installed. The number of users that can log in or have running applications is limited by the installed license keys.

G

Global Administrators A role object in the `Tarantella System Objects` organization, used to assign administrative privileges to users.

global catalog A domain controller that contains attributes for every object in the Active Directory.

Group object An SGD object that represents a collection of applications or application servers. Each application or application server in the group is called a member. Group objects have a `cn=` naming attribute.

H

HTML Hypertext Markup Language. A document format used for web pages.

HTTP Hypertext Transfer Protocol.

HTTPS Hypertext Transfer Protocol over Secure Sockets Layer.

I

IANA Internet Assigned Numbers Authority. Organization that allocates and manages IP addresses, domain names, and port numbers used by the Internet.

ICA Independent Computing Architecture. A protocol used by Citrix Presentation Server to communicate with client devices.

IM See input method.

IME Input method editor. See input method.

indirect assignment In the Administration Console, an object link created by an LDAP search or by inheritance from another object.

inheritance The ability to define webtop content implicitly. Content is usually inherited from the parent object, but other objects can also be used.

input method A program that enable users to type in characters or symbols not found on their keyboard. On Microsoft Windows platforms, an IM is called an input method editor (IME).

Integrated mode The mode of operation of SGD where your applications are displayed in the desktop Start or Launch menu.

I/O Input/Output.

IP address Internet Protocol address. A unique 32-bit numeric identifier for a computer on a network.

J

JAR Java Archive.

JDK Java Development Kit.

JDS Java Desktop System.

JRE Java Runtime Environment.

JSP JavaServer Page.

JSP container A web server component that handles requests for JSP pages. SGD uses the Tomcat JSP container.

JSSE Java Secure Socket Extension. An implementation of SSL using Java technology.

JVM Java Virtual Machine.

K

KDC Key Distribution Center. Used by Kerberos authentication as part of the Active Directory authentication mechanism.

KDE K Desktop Environment. An open source graphical user interface for UNIX and Linux platforms.

Kerberos An authentication system used for Active Directory authentication.

keyboard map A file that contains mapping information between keys on the user's client keyboard and keys on a terminal. Used with SGD terminal emulators.

keystore A database of cryptographic keys. A keystore can contain both public keys and private keys.

kiosk mode SGD display mode where an application is displayed full-screen.

L

LDAP Lightweight Directory Access Protocol.

LDAP directory A set of LDAP objects organized in a logical and hierarchical manner.

LDAP search filter An RFC2254-compliant search filter, used to select objects in an LDAP directory.

LDAP URL An RFC1959-compliant URL, used to select objects in an LDAP directory.

LDAPS Lightweight Directory Access Protocol over SSL. Used for secure connections to an LDAP directory.

license key A string, of the form AAAAA-AAAAA-AAAAA-AAAAA-AAAAA. Installing the license key in an SGD array enables you to use certain features of the SGD software. See also Fully Licensed mode.

license pool The collection of Microsoft Windows Terminal Services CALs allocated to non-Windows client devices. Manipulated using the `tarantella tscal` command.

load balancing groups The mechanism that delivers the best possible user experience by choosing SGD servers and application servers linked by a fast network where possible.

locale A set of parameters that defines the user's language, country, and other location-specific preferences.

local repository A store containing information about users, applications, webtops, and application servers. Stored on the primary SGD server and replicated to other SGD servers in the array. Corresponds to the `_ens` namespace in the SGD datastore. Can be managed using the Administration Console or the `tarantella` commands.

log filter A string used to configure error reporting to the SGD log files.

login script A script that runs on the SGD server when a user starts an application. Connects to the application server, supplies authentication credentials for that server, and starts the application.

LPD Line Printer Daemon. A printing protocol used to provide print server functions to a UNIX or Linux platform system. Also known as LPR.

LPR Line Printer Remote. See also LPD.

M

member A constituent of a group or a role. In SGD, Group objects and Role objects contain one or more member objects. These are usually Application objects, User Profile objects, or Application Server objects.

multiple assignment In the Administration Console, an object link that has both direct assignment and indirect assignment sources. See also Assignment Type.

MUPP MultiplePlexing Protocol.

My Desktop A feature of SGD that enables users to log in and display a full-screen desktop, without displaying an SGD webtop.

N

NetBIOS name An identifier for a computer running Microsoft Windows. The NetBIOS name can be specified when Windows networking is installed or configured on the computer.

NFS Network File System.

NIC Network Interface Card.

NTP Network Time Protocol.

O

object A self-contained entity, defined by a number of attributes and values. SGD objects have different types, such as X Application or Character Application. The available attributes for each type are defined by a schema.

Organization object An SGD object used to represent the top level of an organizational hierarchy. Organization objects can contain OU or User Profile objects. Organization objects have an `o=` naming attribute.

organizational hierarchy The collection of objects in the SGD datastore, descending from one or more Organization or Domain Component objects. Represents the collection of people, application servers, and applications within an organization.

Organizational Unit object An SGD object used to distinguish different departments, sites, or teams in an organizational hierarchy. Organizational Unit (OU) objects can be contained in an Organization or Domain Component object. Organizational Unit objects have an `ou=` naming attribute.

OSS Open Sound System. A standard interface for audio recording and reproduction in UNIX platform operating systems

OU See Organizational Unit object.

P

PAM Pluggable Authentication Modules.

passcode In SecurID authentication, the combination of the PIN and the tokencode.

password cache Short form of application server password cache.

PCL Printer Command Language.

PCM Pulse Code Modulation.

PC/SC Personal Computer/Smart Card. A standard for interoperability of PCs, smart card readers, and smart cards.

PDF Portable Document Format.

PDF printing An SGD feature available for client devices with Adobe Reader software installed. Enables users to print to a PDF printer from their application, which either displays the file or prints using the Adobe Reader program on their client device.

peer DNS name The name by which an SGD server is known to other SGD servers in the same array.

PEM Privacy-Enhanced Mail. Protocol based on public key cryptography.

PIN Code supplied to a SecurID device using a key pad. Combined with a tokencode to form a passcode.

PKCS Public Key Cryptography Standards. Specifications produced by RSA Laboratories for public key cryptography.

PKI Public Key Infrastructure. A security infrastructure based on public key cryptography.

primary server The SGD server that acts as the authoritative source for global information, and maintains the definitive copy of the SGD datastore.

print queue A number of print jobs placed in a storage area on disk.

private key In public key cryptography, a key that is only know by the recipient of a message. The private key can be used to decrypt messages and to create digital signatures.

proxy server A server that acts as an intermediary between a client device and the Internet. The proxy server can provide access control and web request caching services.

public key In public key cryptography, a key that can be distributed to anyone. The public key can be used to encrypt messages and to verify digital signatures.

public key cryptography A cryptographic system using a pair of keys, a public key and a private key. The public key is used to encrypt messages and the private key is used to decrypt messages.

Protocol Engine An SGD software component that runs on an SGD server. Protocol Engines emulate native protocols such as X11 and RDP and communicate with application servers, sending display data using AIP to Display Engines on client devices. See also application session.

R

RAM Random access memory.

RDN See relative distinguished name.

RDP Remote Desktop Protocol. Protocol that allows a user to connect to a computer running Windows Terminal Services.

RDP printing Another name for SGD printing from application servers using Windows Terminal Services.

relative distinguished name In an LDAP directory, the part of a distinguished name that uniquely identifies a child entry for a common parent entry.

repository A store containing user information.

registry Microsoft Windows registry. On Windows client devices, a database of settings for the operating system.

resumability The attribute of an application session that controls its lifetime. Defined on a per-application basis by an SGD Administrator, as either never resumable, resumable during the user session, or always resumable. See also resume and suspend.

resume To redisplay an application session that has been suspended. See also suspend.

RGB value Defines a color in the RGB color model. The amount of red, green, and blue in the color are indicated by a value from 0 to 255.

roaming profiles A feature of SGD that provides Microsoft Windows users with the same working environment, no matter which Microsoft Windows computer they use.

Role object An object that defines the members and applications associated with a particular role in SGD. Currently, only one role is available, *Global Administrators*. This role defines the SGD Administrators.

root certificate A self-signed certificate issued by a root level Certificate Authority.

S

Samba Software that enables a UNIX or Linux platform server to act as a file server for Windows client devices. Uses a variant of the SMB file sharing protocol.

SCF Solaris Card Framework.

seamless windows An SGD window display mode used for Windows applications. Causes an application's windows to behave in the same way as an application running on a Microsoft Windows application server, regardless of the user's desktop environment. Requires the SGD Enhancement Module.

secondary server An array member that is not the primary server. The primary server replicates information to secondary servers.

secure connection A connection between client device and SGD server that uses SSL to protect AIP traffic from eavesdropping, tampering, and forgery. Not related to HTTPS traffic.

secure intra-array communication Secure, encrypted, communication between SGD array members. Uses SSL.

SecurID An authentication mechanism developed by RSA Security to authenticate a user to a network resource.

self-signed certificate An X.509 certificate signed by the person who created it.

serial port A physical interface on a computer through which information is transferred one bit at a time.

server affinity Where possible, SGD runs an application on the same application server as the one used to run the previous application for the user. See also application load balancing.

session grabbing The situation where a user logs in to an SGD server, but they already have a user session on another SGD server. The user session is transferred to the new SGD server and the old session ends.

SGD Sun Secure Global Desktop software.

SGD Administrator An SGD user with permission to configure SGD settings and create and edit SGD objects, either using the Administration Console or the `tarantella` commands.

SGD Client An SGD component that can be installed on client devices. The SGD Client maintains communication with the SGD server and is required to run applications.

SGD Client Helper A Java applet that downloads the SGD Client.

SGD server A collection of SGD software components that together provide SGD functionality.

SGD Web Server A pre-built web server installed and configured along with the SGD server Contains Apache, `mod_ssl` for HTTPS support, and Tomcat for Java Servlet and JSP support.

SGD web services A collection of APIs that allow developers to build their own applications to work with SGD. The APIs can be used to authenticate users, launch applications, and interact with the SGD datastore.

SHA Secure Hash Algorithm. In cryptography, an algorithm that computes a fixed-length representation of a message, called a message digest.

shadowing When an SGD Administrator displays and interacts with a user's application at the same time as the user.

SKID Secret Key Identification. An authentication protocol where a shared secret is used to authenticate a connection.

smart card A plastic card, about the size of a credit card, with an embedded microchip that can be loaded with data.

smart card authentication Authentication to a Windows Server 2003 application server by means of user data contained on a smart card.

SMB Server Message Block.

SOAP Simple Object Access Protocol. A protocol for sending XML messages over computer networks using HTTP.

SOCKS A protocol used by proxy servers to handle TCP connection requests from client devices inside a firewall.

SSH Secure Shell. A secure network protocol for data exchange between two computers.

SSL Secure Sockets Layer. A cryptographic protocol designed for secure Internet communications.

standard connection A connection between a client device and an SGD server that is not secured. This is the default connection mode when using SGD.

subject alternative names Alternative DNS name, other than the hostname, specified for an SGD server on an X.509 certificate.

suspend To pause an application session. A suspended application is not closed down, it can be resumed. See also resume.

system authentication A component of the SGD server that authenticates users against an external authentication service, such as a Windows domain or an LDAP directory, and determines a user's SGD user identity and user profile.

T

`tarantella` command An SGD administration tool available from the command line. Used to control the SGD server and make configuration changes.

Tarantella System Objects The Organization object in the SGD datastore that contains objects essential for smooth running and maintenance of SGD.

Tcl Tool Command Language. A scripting language developed by John Ousterhout. The SGD login scripts include some Tcl functions.

TCP Transmission Control Protocol.

TCP/IP Transmission Control Protocol/Internet Protocol.

terminal emulator A program that runs on a graphical user interface and emulates a "dumb" video terminal. SGD includes terminal emulators for SCO Console, Wyse 60, and VT420 terminals.

Terminal Services Microsoft Windows software that enables client devices to run applications and access data on a networked Windows server.

third-party authentication A component of the SGD server that trusts authentication information supplied by a third party and uses that information to automatically authenticate the user as an SGD user, allocating a user identity and a user profile.

token cache A store for tokens used by the authentication token authentication mechanism.

tokencode A random number generated by a SecurID device. Combined with a PIN to form a passcode.

ttaserv, ttasys Users and a group (*ttaserv*) that must be set up on a system before SGD can be installed. These users and group own some SGD files and processes after installation.

U

UCX Ultrix Communications Extensions.

UDP User Datagram Protocol.

UNC Universal Naming Convention.

Unicode A standard for universal character encoding. Provides the basis for processing, storage, and interchange of text data in any language.

URL Uniform Resource Locator.

user identity The SGD concept of who a user is. A user identity can belong to one of a number of different namespaces. User identities are allocated by authentication mechanisms. The user identity can be the same as the user profile in some cases.

user principal name In Active Directory, the required format for user names. The user principal name is in email address format, for example, `indigojones@indigo.insurance.com`.

User Profile object An SGD object that represents a user in an organization. Can be used to give a user access to applications. User Profile objects can have a `cn=` (common name), a `uid=` (user identification), or a `mail=` (mail address) naming attribute.

user session Begins when a user logs in to SGD, and ends when the user logs out. Information about a user session is stored in memory by the SGD server.

user session load balancing The mechanism that determines which SGD server in the array a user logs in to to display their webtop.

UTC Coordinated Universal Time.

V

virtual hosting Hosting of multiple web servers on the same computer. Each web server has a different DNS name.

VMS Virtual Memory System. Operating system originally developed for use on the VAX and Alpha family of computers from DEC.

W

WAN Wide Area Network.

WAR Web Application Archive.

webtop A web page where users can run applications using SGD, view documents, and manage print jobs. Can be accessed using a web browser or the SGD Client.

webtop content The collection of applications and documents that appear on a user's webtop.

webtop inheritance The ability to define webtop content implicitly. Content is usually inherited from the parent object, but other objects can also be used.

webtop link A hyperlink on an SGD webtop that the user clicks to starts an application.

Webtop mode The mode of operation of SGD where you use a browser to display the SGD webtop.

Windows Application object An SGD object that represents a Microsoft Windows graphical application. Windows Application objects have a `cn=` naming attribute.

Windows domain A logical group of computers running the Windows operating system.

Windows domain controller A server in a Windows domain that hosts the Active Directory. The domain controller handles authentication of users and administration tasks.

Windows protocol In SGD, the protocol used to connect to an application server hosting a Microsoft Windows application.

WINS Windows Internet Naming Service.

X

X.509 certificate A digital passport that establishes credentials on the web. In SGD, allows client devices to trust the identity of an SGD server.

X11 forwarding The process of forwarding, or tunneling, the windows of a remotely started X application to a client desktop.

X11 protocol Display protocol used for the X Window System.

X Application object An SGD object that represents an X11 graphical application. X Application objects have a `cn=` naming attribute. See also X11 protocol.

X authorization Access control mechanisms that control whether a client application can connect to an X server.

X Window System A distributed window system for UNIX platform operating systems, based on the X11 protocol. Also called X11, or X Windows.

Z

zones A feature of Solaris 10 OS that enables multiple virtual operating systems to be deployed on a single Solaris OS server.