Sun Ray™ Connector for Windows OS, Version 1.0 Installation and Administration Guide

Sun Microsystems, Inc.
www.sun.com

Adobe PostScript

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Preface

This volume provides instructions for installing, using, and administering the Sun Ray™ Connector for Windows OS, a Sun-supported terminal services client based on the Microsoft Remote Desktop Protocol (RDP).

Audience

This manual is intended for system and network administrators who are already familiar with Windows operating systems and the Sun Ray™ computing paradigm. In particular, this document should provide Windows administrators with what they need to install, set up, and administer the Sun Ray Connector. For information on administering Sun Ray servers, please see the *Sun Ray Server Software 3.1 Administrator's Guide*. For information on administering Windows terminal services, see www.microsoft.com.

Scope

This manual is written from the point of view of the Sun Ray Connector software and the Solaris™ and Linux operating systems. Although the Sun Ray Connector is a Windows terminal services client, this manual does not give any instructions for administering Windows Terminal Servers or other Microsoft products.

Before You Read This Book

This guide assumes that you have access to a Sun Ray Desktop Unit (DTU) attached to a Sun Ray Server running version 3.1 of the Sun Ray Server Software and have a network connection to at least one Microsoft Windows Terminal Server.

Using UNIX Commands

This document does not contain information on basic UNIX® commands and procedures, such as shutting down the system, booting the system, or configuring devices. This document does, however, contain information about specific Sun Ray system commands as they pertain to management of the Sun Ray Connector.

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	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this.
	Command-line variable; replace with a real name or value	To delete a file, type `rm` *filename*.

Shell Prompts

Shell	Prompt
C shell	*machine_name*%
C shell superuser	*machine_name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Related Documentation

Application	Title	Part Number
Administration	*Sun Ray Server Software 3.1 Administrator's Guide for the Solaris™ Operating System*	819-2384-10
	Sun Ray Server Software 3.1 Administrator's Guide for the Linux Operating System	819-2389-10
Release Notes	*Sun Ray Server Software 3.1 Release Notes for the Solaris™ Operating System*	819-2386-10
	Sun Ray Server Software 3.1 Release Notes for the Linux Operating System	819-2391-10
	Sun Ray Connector for Windows OS, Version 1.0 Release Notes	819-4667-10

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Sun Ray Connector for Windows OS

Introduction

The Sun Ray™ Connector for Windows OS is a Sun-supported terminal services client, based on the Microsoft Remote Desktop Protocol (RDP), that enables Sun Ray users to access applications running on remote Windows Terminal Servers. It is especially useful to those who are accustomed to Windows-based applications or who wish to access documents in certain formats from a Sun Ray thin client. The Sun Ray Connector for Windows OS is often referred to simply as the Sun Ray Connector.

The Sun Ray Connector gives users access to a Windows desktop, either occupying the entire Sun Ray screen or running in a window in a Solaris™ or Linux environment.

Architectural Overview

From a user point of view, the Sun Ray Connector mediates between the Sun Ray desktop and the Microsoft Windows Terminal Server. Residing on the Sun Ray server, it uses the Remote Desktop Protocol (RDP) to communicate with the Windows Terminal Server and the Appliance Link Protocol™ (ALP) to communicate with the Sun Ray desktop, as suggested in FIGURE 1. Once installed, the Sun Ray Connector requires only that a user type a simple command to connect to a Windows Terminal Server where the usual applications reside. The command can be modified to accommodate a variety of preferences, or options, for instance to specify screen size or a list of available printers.
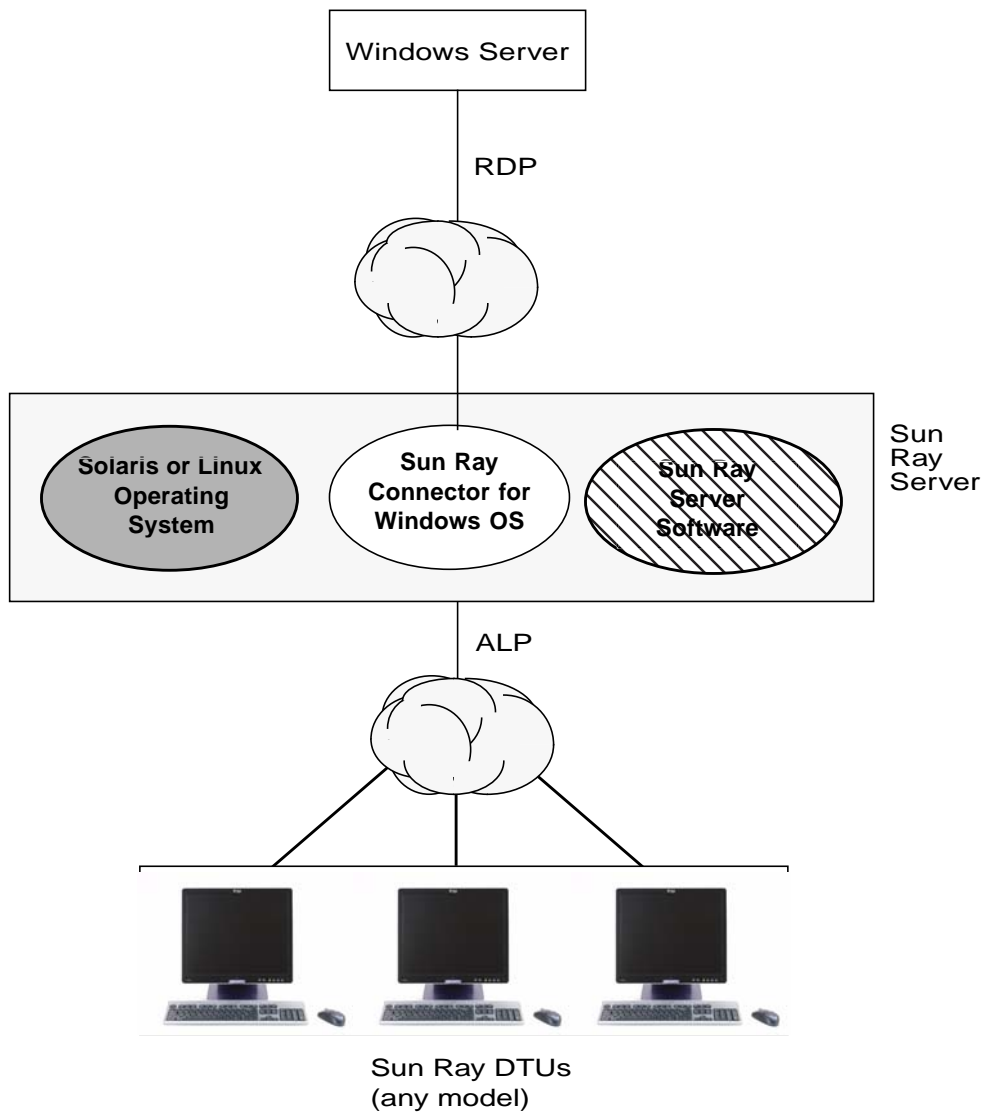
FIGURE 1   Sun Ray-Windows Connectivity via RDP and ALP Protocols

Features

The Sun Ray Connector provides audio support, compression and encryption, device support for smart cards, local drives, and serial devices, and printer redirection as well as text cut-and-paste functionality between Windows applications and the Sun Ray desktop. These features are described in the following sections.

Audio Support

Users can use audio applications located on the Windows Terminal Server to play sound files on their Sun Ray desktops (downstream audio); however, recording from the Sun Ray desktop unit to the Windows Terminal Server (upstream audio) is not supported by the RDP Protocol and is therefore not implemented.

Clipboard

The Sun Ray Connector enables cut-and-paste text functionality between Windows applications and applications running on the Sun Ray desktop, whether Linux or Solaris versions. Copying and pasting is enabled for all supported languages, including double-byte languages, such as Chinese, Japanese, and Korean.

Compression

The Sun Ray Connector uses Microsoft Point-to-Point Compression (MPPC) to compress data between Sun Ray clients and the Windows Terminal Server.

Encryption

The Sun Ray Connector provides encryption of the connection to secure all data being transferred from and to the Windows server. For this purpose, it uses RSA Security's RC4 cipher, which encrypts data of varying size with a 56-bit or a 128-bit key.

Four levels of encryption can be configured at the Terminal Server:

- Low

  All data from client to server is encrypted, based on maximum key strength supported by the client.

- Client-compatible

  All data between client and server in both directions is encrypted based on the maximum key strength supported by the client.

- High

  All data between the client and server in both directions is encrypted based on the server's maximum key strength. Clients that do not support this strength of encryption cannot connect.

- FIPS-Compliant

  FIPS-compliant encryption is not supported.

Note – Data encryption is bidirectional except at the Low setting, which encrypts data only from the client to the server.

Local Drive Mapping

Filesystems from removable media devices, such as flash drives or ZIP drives, connected to Sun Ray USB ports can be mapped to the Windows environment, where they appear as locally mounted drives. In fact, any file can be mounted and mapped from the Sun Ray environment to the Windows environment.

Note – Mapping of mass storage devices is not supported in Linux implementations of the Sun Ray Connector.

Printing

Once a connection is established, the user can print from Windows applications via any of the following:

- a network printer or locally attached printer on the Windows Terminal Server
- a network printer or a local printer on the Sun Ray server
- a local printer attached to the Sun Ray DTU.

Network printing is recommended over locally attached printing.

Serial Port Mapping

Users can access serial devices connected to a Sun Ray DTU from their Windows sessions. Serial devices can be connected either directly to the serial ports on a Sun Ray DTU or via a serial adapter.

Smart Cards

The Sun Ray Connector uses the PC/SC SRCOM bypass, based on the PC/SC framework, to allow applications on the Windows Terminal Server to access smart cards inserted in the Sun Ray DTU. Typically, this feature is used to provide two-factor authentication with digital certificates, or to permit the use of electronic signatures or other information stored on a smart card. See "Smart Cards" on page 19.

Note – Smart Cards and the PC/SC SRCOM bypass are supported on the Solaris Operating System but not on Linux.

Licensing

The Sun Ray Connector supports both per-user and per-device Terminal Server Client Access Licenses (TS-CAL). When per-device licensing is configured for Windows Terminal Server, each Sun Ray DTU is granted a new license from the licensing server. Implications of these licensing modes are discussed under "Hotdesking and Licensing Modes" on page 10.

Licensing information is stored in the Sun Ray data store and can be retrieved and presented each time a Windows connection is made.

For information on administering licenses, see the `utlicenseadm` man page. See also the Note on page 7.

Installation

Installation Requirements

The Sun Ray Connector requires the following:

■ Sun Ray Server Software (SRSS) version 3.1, with appropriate licenses, on any supported operating system.

TABLE 1   Supported Operating System Versions for the Sun Ray Connector

SuSE Linux Enterprise Server (SLES)	Red Hat Enterprise Linux Advanced Server (RHEL AS)	Solaris 8	Solaris 9	Solaris 10	Trusted Solaris (TSOL)
8.0 at the SP3 level or later	3.0	Solaris 8 Update 7 or higher (Solaris 8 2/02)	Solaris 9 Update 7 or higher (Solaris 9 9/04)	SPARC and x86 (Solaris 10 3/05)	Trusted Solaris 8 (7/03 and 2/04)

■ The latest SRSS patches:

  ■ 120879-01 or later for SRSS on Solaris SPARC
  ■ 120880-01 or later for SRSS on Solaris x86
  ■ 120881-01 or later for SRSS on Linux

■ The SMClibgcc package (on Solaris 8 and Solaris 9 systems only)
■ For Trusted Solaris 7/03 or 2/04, the latest libCstd and libCrun patches are:

  ■ 108434-20
  ■ 108435-20

■ OpenSSL

  OpenSSL is installed by default on Solaris 10 as well as on Red Hat and SuSE, but not on earlier version of Solaris, and is sometimes removed from Solaris 10 installations. Please confirm that OpenSSL is installed before proceeding.

■ Windows 2000 Server with Service Pack 4 Rollup 1 or
  Windows 2003 Server with Service Pack 1 or
  Windows XP Professional

■ All necessary Microsoft licenses for accessing Windows Terminal Services

  Please read the Note on page 7.

> **Note –** 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. Currently, information regarding Terminal Services can be found in the following URL:
> `http://www.microsoft.com/windowsserver2003/howtobuy/licensing/ts2003.mspx`

Installation Procedure

If you have already mounted the Sun Ray Connector for Windows OS CD-ROM locally or from a remote server, or if you have extracted the ESD files to an image directory, begin at Step 4.

1. **Open a shell window as superuser on the Sun Ray server.**

   To avoid installation script errors that can occur if user environment settings are carried forward, use one of the following commands for superuser login instead of using the su command without arguments:

   ```
   % su -
   ```

   ```
   % su - root
   ```

2. **Insert the Sun Ray Connector for Windows OS CD-ROM.**

   If a file manager window opens, close it. The file manager CD-ROM window is not necessary for installation.

3. **Change to the image directory, for example:**

   ```
   # cd /cdrom/cdrom0
   ```

4. **Install the Sun Ray Connector for Windows OS software:**

   ```
   # ./installer
   ```

5. Run the automatic configuration script:

```
# /opt/SUNWuttsc/sbin/uttscadm -c
```

The uttscadm script prompts you at this point for a path to the OpenSSL libraries.

6. **Accept the default path or supply a different path, if applicable.**

7. **Restart Sun Ray services if the script asks you to do so.:**

```
# /opt/SUNWut/sbin/utrestart
```

Note – It is not necessary to restart Sun Ray services if the uttscadm script does not ask you to do so.

Uninstallation Procedure

1. **Before uninstalling the Sun Ray Connector for Windows OS, use the following command to unconfigure it:**

```
# /opt/SUNWuttsc/sbin/uttscadm -u
```

2. **To remove the Sun Ray Connector for Windows OS software, type the following command:**

```
# /opt/SUNWuttsc/sbin/uninstaller
```

Using the Sun Ray Connector

Once the Sun Ray Connector software has been installed, type the following command to connect to the desired Windows Terminal Server:

```
% /opt/SUNWuttsc/bin/uttsc <options> <hostname.domain>
```

If the Windows Terminal Server is in the same domain as the Sun Ray desktop, it is not necessary to specify the domain name; however, you may specify the full IP address instead of *hostname.domain* if you prefer.
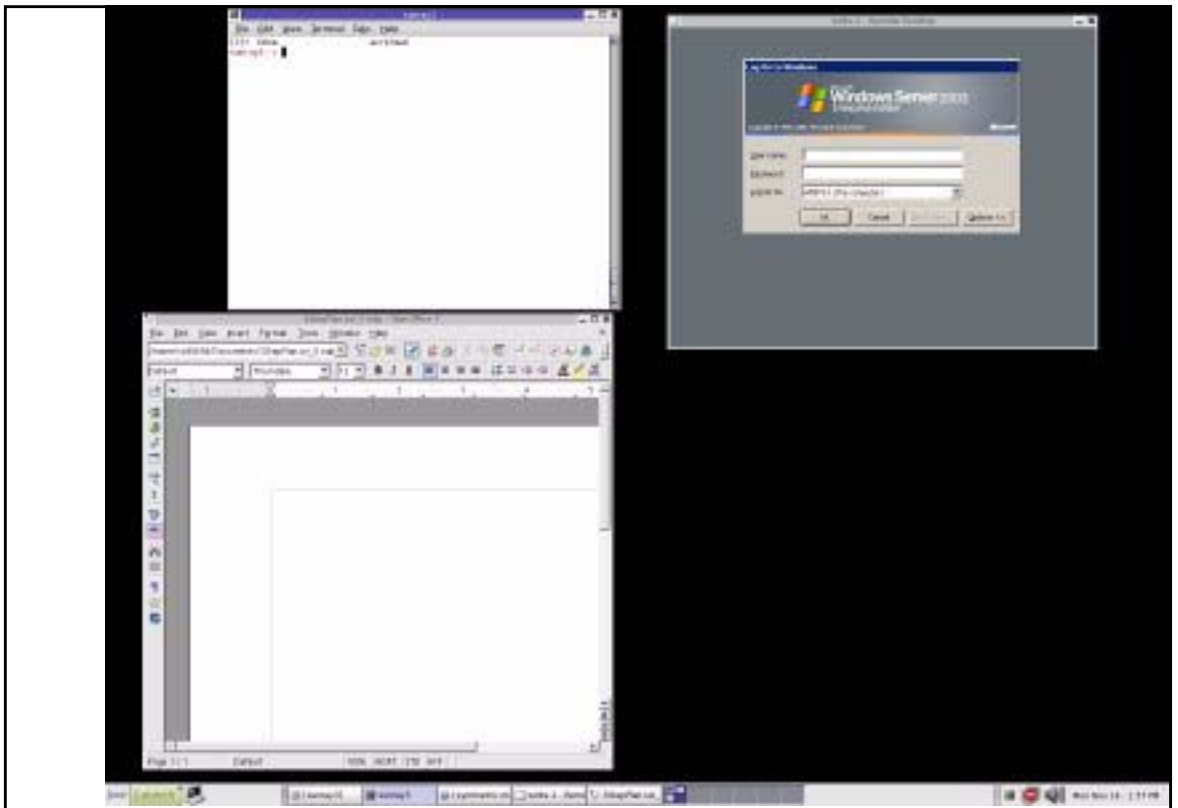
FIGURE 2 A Windows session can occupy the whole screen or run inside a Solaris or Linux window as shown in this figure

Command Line Options

The uttsc command with no options specified other than the name or address of a Windows Terminal Server displays a Windows session on the Sun Ray DTU (See FIGURE 2). The default screen size is 640 x 480 pixels.

To display a session in full screen mode or to modify it in other ways, see the command line options listed in the uttsc man page.

To allow your users to access the man command directly, add the following entry to your users' man path:

```
/opt/SUNWuttsc/man
```

They can then display the man page:

```
% man uttsc
```

Graphical User Interface (GUI)

No graphical user interface is available for the Sun Ray Connector at this time; however, launchers can be set up to provide users with desktop icons or menu items to connect to the Windows session.

For details on how to set up launchers, please consult the desktop documentation for your operating system.

Hotdesking and Licensing Modes

Terminal Server Client Access Licenses can be configured in two modes on the Windows Terminal Server: per-user and per-device. In per-user mode, the user's hotdesking experience is virtually seamless. In per-device mode, the requirement that each DTU use the appropriate license requires an extra login when a user hotdesks to a different DTU.

The differences in the user's hotdesking experience are summarized below.

Note – The Sun Ray administrator may choose to set a policy that requires the user login with username and password to access the Sun Ray session.

Per-user Mode

The user logs into a Sun Ray session with a smart card and opens a connection to a Windows session.

1. The user removes the smart card and reinserts it in the same DTU.

2. The user removes the smart card and inserts it in a different DTU.

In both cases, the user is instantly reconnected to the existing Windows session, and other features and services are unaffected.

Per-device Mode

The user logs into a Sun Ray session with a smart card and opens a connection to a Windows session.

1. The user removes the smart card and reinserts it in the same DTU.

   The user is instantly reconnected to the existing Windows session.

2. The user removes the smart card and inserts it in a different DTU.

   The Windows login screen prompts the user for username and password, after which the user is reconnected to the existing Windows session. Other features and services are similarly affected. For example:

   - Windows Media Player stops playing audio, although the application is still active on the Windows session. The user needs to replay the audio.
   - Any serial port transfer is stopped.
   - All the command line options specified remain valid.

Note – The `uttsc` command provides a CLI option (`-O`) that can be used to prevent the Sun Ray Connector from disconnecting upon detection of hotdesking events. Please see the `uttsc` man page for details.

Trusted Solaris™ Configuration

To launch Windows terminal server session in a Trusted Solaris environment:

1. **Assume the primaryadmin role.**

2. **Create a profile and assign** `file_dac_read`, `file_dac_search`, `file_dac_write`, `file_mac_write`, **and** `net_mac_read` **privileges to the** `/opt/SUNWuttsc/bin/uttsc` **command.**

   After the changes, the profile description database `/etc/security/prof_attr` will have the following entry:

```
Sun Ray Connector:::Sun Ray Connector for Windows Terminal Services:help=RtSunrayConnector.html
```

   The execution attributes database `/etc/security/exec_attr` will have the following entry:

```
Sun Ray Connector:tsol:cmd:::/opt/SUNWuttsc/bin/uttsc:uid=0;privs=4,5,6,12,33
```

3. **Add** `net_mac_read` **and** `net_reply_equal` **privileges to** `utdsd`.

4. **Configure the Windows server to match the same label as the** `uttsc` **by updating trusted network database** `/etc/security/tsol/tnrhdb`.

   For example, if `uttsc` is launched from an unclassified label, then the trusted network database `/etc/security/tsol/tnrhdb` will have the following entry:

```
10.6.132.155:unclassified
```

5. **Assign the profile created in Step 1 to a role/user which launches** `uttsc` **client in a profile shell.**

   For example, if the Sun Ray Connector profile is created and assigned to a demouser, then the extended user attributes database `/etc/user_attr` will have the following entry:

```
demouser:::::lock_after_retries=yes;idletime=30;idlecmd=lock;
profiles=Sun Ray Connector; type=normal;labelview=showsl
```

6. **Launch a terminal server session using the profile shell.**

    For example, open a terminal and type:

```
$ pfcsh
% /opt/SUNWuttsc/bin/uttsc <windows_terminal_server_name>
```

Administration

The Sun Ray Connector requires very little administration; however, administrators should be aware of the following issues, suggestions, and configuration instructions.

Compression and Encryption

The administrator needs decide which of the available levels of encryption to use, after which the Windows Terminal Server can be configured accordingly. (See "Encryption" on page 3.)

Compression is enabled by default. It can be disabled on a per-connection basis with a CLI option. For example, to disable compression:

```
% /opt/SUNWuttsc/bin/uttsc -z <hostname.domain>
```

JDS Integration Package

The Sun Java™ Desktop System (JDS) integration package for the Solaris Operating System delivers a CLI, `uttscwrap`. This CLI improves integration of the Sun Ray Connector with the JDS desktop on Solaris 10. `uttscwrap` is installed in `/opt/SUNWuttscwrap/bin/uttscwrap`.

`uttscwrap` provides a login dialog that allows input of credentials (*username/domain/password*). The credentials can be saved through the dialog for subsequent invocations. At the next launch, the dialog is pre-filled with the credentials.

Credentials are saved separately for each Windows server/application combination. This allows you to save different credentials the following ways:

- For different applications on the same server
- For different applications on different servers
- For different server sessions with no applications launched

Any new credentials saved for a server/application replace previously saved credentials.

Use `uttscwrap` when desktop or menu launchers are defined to launch either Windows Terminal Services sessions or Windows applications on various Windows servers.

To launch the Sun Ray Connector through `uttscwrap`, specify the same parameters on the `uttscwrap` command line as you would use on the `uttsc` command line.

Licensing

Licenses can be administered with a new CLI, `utlicenseadm`. Administrative functions for licenses include listing and deleting. See the `utlicenseadm` man page for details.

Microsoft Terminal Services licensing information is stored in the Sun Ray data store automatically upon startup, based upon the existing LDAP schema. No administrator setup or intervention is required.

Load Balancing

Load balancing is handled transparently by the Windows Terminal Server.

Printing

The Sun Ray Connector supports printing to:

- network printers visible on the Windows server
- local printers attached to the Windows server
- local printers attached to the Sun Ray server
- network printers visible on the Sun Ray server
- local printers attached to the DTU

Note – Network printers are not affected by hotdesking. Printers connected to DTUs are available for printing from any DTU connected to the same Sun Ray server.

Printer Configuration Caching

The Sun Ray server maintains a cache, in the Sun Ray data store, of printer configurations that users set up on the Windows Terminal Server. The Sun Ray server presents the appropriate configuration to the Windows Terminal Server when a user reconnects via the Sun Ray Connector.

A new CLI, `uttscprinteradm`, helps administrators to maintain this information. It can be used to list the available information and to perform cleanup in case of user or printer deletion. See the `uttscprinteradm` man page for further information.

Setting Up Print Queues

Printer setup in Windows environments is beyond the scope of this document; however, printer setup requirements for Solaris and Linux are described below.

The Windows Terminal Server session is aware only of the print queues specified in the command line when the Sun Ray Connector is started. To change print queues, restart the Sun Ray Connector with the relevant print queues specified on the command line.

Note – These instructions pertain to raw print queues.[1] Please consult your operating system documentation for instructions on setting up queues for PostScript drivers. See also the `lp` and `lpadmin` man page.

Solaris Printing

To set up a raw print queue on a Sun Ray server running Solaris:

1. **Specify the printer and printer device node using the** `lpadmin` **command:**

```
# /usr/sbin/lpadmin -p <printer-name> -v \
/tmp/SUNWut/units/IEEE802.<mac-address>/dev/printers/<device node>
```

2. **Enable the print queue.**

```
# /usr/bin/enable <printer-name>
```

3. **Accept the print queue.**

```
# /usr/sbin/accept <printer-name>
```

Linux Printing

To set up a raw print queue on a Sun Ray server running any supported flavor of Linux:

---

1. When a Solaris or Linux print queue is configured with a print driver, the `lp` utility sends print data to the driver for processing before redirecting it to the printer. When a print queue is configured without a driver, lp sends unprocessed, or "raw" data to the printer. A print queue configured without a printer driver is called a raw queue.

1. **Uncomment the following line from the** `/etc/cups/mime.convs` **file:**

```
application/octet-stream         application/vnd.cups-raw         0 -
```

2. **Uncomment the following line from the** `/etc/cups/mime.types` **file:**

```
application/octet-stream
```

3. **Restart the** `cups` **daemon.**

```
# /etc/init.d/cups restart
```

Red Hat Linux

To complete this procedure for Red Hat Linux:

1. **Create a soft link to the Sun Ray printer node in /dev/usb.**

   For example, if the device node is
   `/tmp/SUNWut/units/IEEE802.`*<mac-address>*`/dev/printers/`*<device node>*,
   then use the following command:

```
# ln -s \
/tmp/SUNWut/units/IEEE802.<mac-address>/dev/printers/<device node> \
/dev/usb/sunray-printer
```

2. **Set up a raw print queue:**

```
# /usr/sbin/lpadmin -p <printer-name> -E -v usb:/dev/usb/sunray-printer
```

SuSE Linux

No soft link is required for SuSE Linux. To create the raw printer queue:

● **Specify the printer and printer device node with the** `lpadmin` **command:**

```
# /usr/sbin/lpadmin -p <printer-name> -E -v \
usb:/tmp/SUNWut/units/IEEE802.<mac-address>/dev/printers/<device node>
```

Making Sun Ray Printers Available to Windows

To make Sun Ray-attached printers available to a Windows session, specify the corresponding print queues on the command line. Printer data is created on the Windows server, so the name of the printer's Windows driver should be specified if possible.

- If you specify a Windows driver, use a raw Sun Ray print queue.
- If you do not specify a Windows driver, use a PostScript queue for the Sun Ray printer. The Windows server uses a generic PostScript driver to generate print data.

Tip – To find the printer driver name, check the Windows Registry key *My Computer/HKEY_LOCAL_MACHINE/System/CurrentControlSet/Control/Print/Environments/Windows NT x86/Drivers/Version-3*. All printer drivers installed on the system are in this list.

● **To specify a printer's Windows driver, type:**

```
# uttsc -r printer:<printername>=<driver name> <Windows server>
```

● **To make a printer available without specifying a driver, type:**

```
# uttsc -r printer:<printername> <Windows server>
```

● **To make multiple printers available, type:**

```
# uttsc -r printer:<printer1>=<driver1>,<printer2>=<driver2> <Windows server>
```

Smart Cards

In addition to normal Sun Ray smart card functionality, such as hotdesking, the Sun Ray Connector enables additional smart card functionality, such as:

- strong, two-factor authentication for access control
- PIN-based logins
- digital signing, encrypting, and decrypting of email messages from Windows-based email clients.

For this purpose, it uses the Sun Ray PC/SC SRCOM bypass on the Sun Ray server and smart card middleware on the Windows Terminal Server. Please download the PC/SC SRCOM bypass from the Sun Download Center at:
`http://www.sun.com/download/products.xml?id=42c5d3d9`

Smart card redirection is disabled by default. It can be enabled on a per-connection basis with the following CLI option:

```
% /opt/SUNWuttsc/bin/uttsc -r scard:on <hostname.domain>
```

Setting Up Smart Card Login

To set up Smart Card login for Windows with the Sun Ray Connector:

1. **Set up Active Directory and Certification Authority (CA) on Windows Server**

2. **Install latest PC/SC SRCOM bypass version 1.1 build 04 on Sun Ray server**

3. **Install Smart Card middleware product on Windows Terminal Server.**

Note – If you use ActivClient version 5.4 middleware, set "Disable PIN Obfuscation" to Yes through ActivClient user console on the Windows Server.

---

4. **Enroll necessary Certificate(s) onto the Smart Card using either a Sun Ray Token Reader or an External Smart Card Reader connected to the Windows Server.**

Setting Up a CAM Implementation for the Sun Ray Connector

Sun Ray Controlled Access Mode (CAM) allows the administrator to set up groups of DTUs to access a restricted set of applications, typically in settings where users are expected to use only one application, or where security is an especially important consideration. In CAM, the Sun Ray DTU behaves like a Windows Based Terminal, and users do not interact with the Solaris login.

To configure a CAM implementation for the Sun Ray Connector, follow the instructions in "Controlled Access Mode" on page 177 of the *Sun Ray Server Software 3.1 Administration Guide for Solaris*, specifying the `uttsc` command, Windows server name, and other options in the Add/Edit Apps panel.
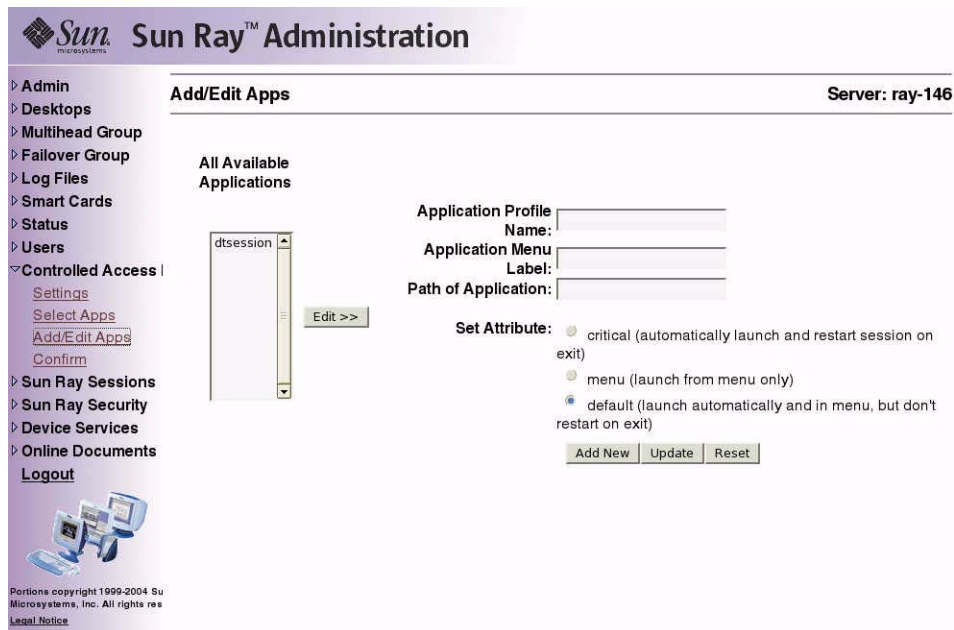

FIGURE 3   Sun Ray Server Software 3.1 Add/Edit Apps Panel

Troubleshooting

Printer Caching

If a user changes the driver for a printer, the settings are not restored.

To restore the settings, use the printer driver that was used when the settings were changed. Using a different driver, even without changing any settings, can invalidate stored settings for that printer with any previous driver.

Printer Not Visible in Windows

If a Sun Ray printer specified on the Solaris or Linux command line is not available on Windows (not visible in the Printers and Faxes View), the user should confirm that the printer driver name is correct and installed on the Windows server. See "Making Sun Ray Printers Available to Windows" on page 18.

Printing via Windows

If a job does not print, the user should contact the Windows system administrator, whether for local or network printing.

Solaris or Linux Printing

If a job fails and cannot be diagnosed and fixed with the ordinary Unix remedies (lpq, lprm, etc.), the user should contact the appropriate system administrator.

Local Printing via Sun Ray DTU

Users can continue to send jobs from Solaris or Linux applications to printers locally attached to their Sun Ray DTU. To enable access to printers attached to the Sun Ray DTU for Windows jobs, the administrator must specify the printer with the uttsc CLI. See "Printing" on page 15 and the uttsc man page.

Glossary

CAM   Sun Ray Server Software controlled access mode, also known as *kiosk mode*.

client   Normally, this term refers both to the physical hardware, such as a Sun Ray thin client desktop unit, and the process that accesses resources such as compute power, memory, and applications from a server. The server may be located remotely or locally. In the present context, the Sun Ray DTU is a client of the Sun Ray server; the Sun Ray Connector software is a Windows Terminal Server client.

client-server   A common way to describe network services and the user processes of those services. Although this term can apply to a wide range of interactions between desktops and larger computing facilities, the thin client model suggests that all, or nearly all, computing be performed on the server.

data store   The Sun Ray data store is a repository for information needed to administer several aspects of the Sun Ray server software, such as failover groups, for example. The Sun Ray Connector utilizes it to store licensing information and printer preferences.

downstream audio   The capability for using applications located on a server to play audio files on a client. For example, `.wmv` files can be played on a remote Windows Terminal Server and heard on a Sun Ray DTU.

hotdesking   The ability for a user to remove a smart card, insert it into any other DTU within a server group, and have the user's session "follow" the user, thus allowing the user to have instantaneous access to the user's windowing environment and current applications from multiple DTUs.

kiosk mode   Old term for CAM.

MPPC   Microsoft Point-to-Point Compression protocol.

PAM   Pluggable Authentication Module. A set of dynamically loadable objects that gives system administrators the flexibility of choosing among available user authentication services.

raw print queue   A print queue enabled without a print driver having been specified. Instead of processing data before sending it to a printer, the `lp` utility sends raw, unprocessed data to the printer.

regional hotdesking   Also known as Automatic Multigroup Hotdesking (AMGH), this SRSS feature allows users to access their sessions across wider domains and greater physical distances than was possible in earlier versions of SRSS. Administrators enable this feature by defining how user sessions are mapped to an expanded list of servers in multiple failover groups.

RDP Microsoft Remote Desktop Protocol.

server Generically defined as a network device that manages resources and supplies services to a client. This manual refers in particular to the Sun Ray server(s), which host Sun Ray sessions and DTUs, and to Windows Terminal Servers, which act as hosts for Windows applications that can be reached by RDP clients, of which the Sun Ray Connector is an example. The Sun Ray DTU is a client of the Sun Ray server; the Sun Ray Connector is a Windows Terminal Server client.

service For the purposes of the Sun Ray Server Software, any application that can directly connect to the Sun Ray DTU. It can include audio, video, X servers, access to other machines, and device control of the DTU.

session A group of services associated with a single user.

session mobility The ability for a session to "follow" a user's login ID or a token embedded on a smart card.

Sun Ray DTU The desktop unit, originally known as the desktop terminal unit, is the physical appliance used to transmit keystrokes and mouse events to and receive display information from the Sun Ray server. The Sun Ray DTU hardware has a built-in smart card reader, and most models also contain a flat-panel display.

Terminal Server client The client software used to access remote sessions hosted on a Windows Terminal Server, in this case, the Sun Ray Connector.

thin client Thin clients remotely access some resources of a computer server, such as compute power and large memory capacity. The Sun Ray DTUs rely on the server for all computing power and storage. Within the client-server computing model, thin clients are distinguished from fat clients by the absence of local operating systems, applications, disc drives, fans, or other devices that fat clients need in order to operate.

upstream audio The capability for recording sound from the client to the server.

Windows terminal Any device used to access Windows applications residing on a Windows Terminal Server.

Windows Terminal Server A server that hosts Microsoft applications for remote terminals or clients.