What's New in the Solaris 9 Operating Environment

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Contents

Preface

What's New in the Solaris 9 Operating Environment describes the new features of the Solaris™ 9 operating environment. Chapters 1 through 4 summarize new features for desktop users, system administrators, and software developers. The "(more)" term that is used in these chapters is an online link to more detailed feature descriptions in "What's New: A Closer Look." The appendixes describe features in the previous Solaris 7 and Solaris 8 software releases.

For further information on the Solaris 9 features summarized in this book, please refer to the following documentation:

Solaris Common Desktop Environment: User's Guide

Solaris 9 Installation Guide

System Administration Guide: Basic Administration

System Administration Guide: IP Services

System Administration Guide: Naming and Directory Services

System Administration Guide: Resource Management and Network Services

System Administration Guide: Security Services

Solaris Volume Manager Administration Guide

System Administration Guide: Advanced Administration

Solaris Tunable Parameters Reference Manual

Solaris WBEM Services Administration Guide

Solaris DHCP Service Developer's Guide

International Language Environments Guide

Solaris WBEM SDK Developer's Guide

Solaris Modular Debugger Guide

Programming Interfaces Guide

Writing Device Drivers

Note – The Solaris operating environment runs on two types of hardware, or platforms - SPARC™ and IA (Intel Architecture). The Solaris operating environment also runs on both 64–bit and 32–bit address spaces. The information in this document pertains to both platforms and address spaces unless called out in a special chapter, section, note, bullet, figure, table, example, or code example.

In this document the term "IA" refers to the Intel 32–bit processor architecture, which includes the Pentium, Pentium Pro, Pentium II, Pentium II Xeon, Celeron, Pentium III, Pentium III Xeon, and Pentium 4 processors and compatible microprocessor chips made by AMD and Cyrix.

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Typographic Conventions

The following table describes the typographic changes used in this book.

TABLE P–1 Typographic Conventions

Typeface or Symbol	Meaning	Example
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `machine_name% you have mail.`
`AaBbCc123`	What you type, contrasted with on-screen computer output	`machine_name%` **`su`** `Password:`
AaBbCc123	Command-line placeholder: replace with a real name or value	To delete a file, type **`rm`** *filename*.
AaBbCc123	Book titles, new words, or terms, or words to be emphasized.	Read Chapter 6 in *User's Guide*. These are called *class* options. You must be *root* to do this.

Shell Prompts in Command Examples

The following table shows the default system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

TABLE P–2 Shell Prompts

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

What's New Highlights

The Solaris operating environment is the foundation for web-based computing. Solaris provides the manageability, scalability, and high performance that compute-intensive tasks require.

Key Features in Solaris 9

The following key features and enhancements are just a few highlights from the Solaris 9 software release. For a complete list of new features, see chapters 2-4.

- **Solaris 9 Resource Manager**

  Solaris 9 Resource Manager provides improved functionality for allocating, monitoring, and controlling system resources.

  Key features include the new fair share scheduler and resource pools for partitioning system resources. These features are shipped with the Solaris 9 operating environment, but they must be purchased and licensed separately.

  See "System Resources Enhancements" on page 14.

- **Linux Compatibility** – Software application developers can now develop and compile their Linux applications more easily in the Solaris operating environment. See "Development Tools" on page 39.

- **iPlanet Directory Server 5.1** – iPlanet™ Directory Server 5.1 is now an integrated part of the Solaris 9 software release. See "Networking" on page 16.

- **Solaris Volume Manager** – Solaris Volume Manager supports the creation of thousands of slices (soft partitions) per disk for greater manageability of data. See "System Administration Tools" on page 21.

- **File System Enhancements** – The Solaris 9 release includes several file system enhancements for system administrators including extended file attributes and

DNLC improvements. See "File System Enhancements" on page 24.

- **Solaris Live Upgrade 2.0** – Solaris Live Upgrade provides a method of upgrading that substantially reduces the usual service outage that is associated with an operating system upgrade. See "Installation" on page 26.

- **Web Start Flash** – You can create a reference installation of the Solaris operating environment and replicate that installation on other machines. See "Installation" on page 26.

- **Minimal Installation** – You can choose to install a minimal set of packages with the Solaris 9 operating environment, then add only the packages you need. See "Installation" on page 26.

- **Multiple Page Size Support** – Multiple Page Size Support (MPSS) allows a program to use any hardware supported page size to access portions of virtual memory. See "System Performance Enhancements" on page 30and "Development Tools" on page 39.

- **Improved Multithreading Library** – In the Solaris 9 software release, there is a new, improved and faster multithreading library. See "System Performance Enhancements" on page 30.

- **Internet Key Exchange** – Internet Key Exchange (IKE) enables administrators to manage larger numbers of secure networks. See "Security Enhancements" on page 32.

- **Solaris Secure Shell** – Secure shell allows a user to securely access a remote host over an unsecured network. See "Security Enhancements" on page 32.

What's New for System Administrators

This chapter highlights new system administration features that have been added to the Solaris 9 operating environment.

Note – For the most current man pages, use the `man` command.

System Resources Enhancements

Description	Release Date
Solaris 9 Resource Manager	Solaris 9

Solaris 9 Resource Manager provides improved management of system resources and enables system administrators to do the following:
- Allocate computing resources on a system.
- Monitor how these resources are being used and adjust allocations as necessary.
- Generate extended accounting information on resource usage. This information can be used for capacity planning and billing.

Resource management features enhance your ability to manage how resources are allocated to applications in a server consolidation environment.

The resource controls framework allows you to set constraints on the system resources consumed by processes and tasks, which are collections of processes that are related to a single activity.

Resource pools provide a way to partition system resources, such as processors, and maintain those partitions across reboots. A new "fair share" scheduler has been added that allows the fine-grained sharing of CPU resources on a system. These features enhance your ability to manage how resources are allocated to applications in a server consolidation environment.

In the Solaris 9 Beta Refresh release, the full functionality is administered through a command-line interface. Performance monitoring and the setting of resource controls can also be done through the Solaris Management Console.

For more information on resource management, see:
- The *System Administration Guide: Resource Management and Network Services*, in the Solaris System Administrator Collection
- Man pages `prctl`(1), `pooladm`(1M), `poolcfg`(1M), `rctladm`(1M), `project`(4), and `FSS`(7)

Description	Release Date
New Fixed-Priority (FX) Scheduling Class	Solaris 9
The FX scheduler provides a scheduling policy for processes that require user or application control of scheduling priorities. The priorities of processes that run under FX are fixed. They are not dynamically adjusted by the system. The FX class has the same priority range as the TS, IA, and FSS classes.	
For more information on the FX scheduler, see the *Programming Interfaces Guide* and the *Multithreaded Programming Guide* in the Solaris 9 Beta Software Developer Collection, and the `priocntl`(1) and `dispadmin`(1M) man pages.	
For restrictions on using the FX and FSS schedulers on the same system, see the "Fair Share Scheduler" in *System Administration Guide: Resource Management and Network Services*, in the Solaris 9 Beta System Administrator Collection.	
New Display Options for the `df` and `du` Commands	Solaris 9
The `df` and `du` commands have two new options, `-h` and `-H`, that display disk space in powers of 1024 and powers of 1000, respectively. These options simplify the interpretation of the output of the `df` and `du` commands by providing disk space in Mbytes and Gbytes, when possible. (more)	
See the `df` and `du` man pages for further information.	
Improved Process Debugging with the `pargs` and `preap` Commands	Solaris 9
Two new commands, `pargs` and `preap`, improve process debugging. You can use the `pargs` command to print the arguments and environment variables associated with a live process or core file. Use the `preap` command to remove zombie processes. (more)	
See the `preap`(1) man page and the `proc`(1) man page for information on the using these commands.	

Networking

Feature Description	Release Date
iPlanet Directory Server (iDS) Integration	Solaris 9

The Solaris 9 release provides an integrated version of the iPlanet LDAP directory with a 200,000 entry full production license for enterprise customers. The iPlanet Directory Server is a powerful, distributed directory server designed to manage an enterprise-wide directory of users and resources. This scalable directory service can be used for intranet applications, extranets with trading partners, and e-commerce applications to reach customers over the Internet.

The Directory Server is managed through the iPlanet Console, the graphical user interface provided with the iPlanet Directory Server. Administrators use the Console to grant access rights, manage databases, configure the directory and replicate the data to multiple directory servers. Users access the data through any LDAP-enabled client application, such as those developed with the iPlanet LDAP SDKs for C and the Java programming language.

Server and client configuration information is available in the *System Administration Guide: Naming and Directory Services (DNS, NIS, and LDAP)*.

For additional reference, follow the links for documentation on the Solaris 9 operating environment Early Access page at:

http://www.sun.com/solaris/programs/solaris9ea

When accessing Solaris 9 documentation during the beta period, you may be asked to accept a restricted usage license.

Feature Description	Release Date
Naming Service Support for Lightweight Directory Access Protocol (LDAP)	Solaris 9

Naming Service support has been enhanced in the Solaris 9 release. Changes include:
- Schema reworking
- Improved password management mechanisms
- Incorporation of new LDAP library `libldap.so.5`

Feature Description	Release Date
NIS+ to LDAP Migration Tools	Solaris 9

A detailed discussion of how to migrate from NIS+ Naming Service to LDAP is included in the *System Administration Guide: Naming and Directory Services (FNS and NIS+)*.

Feature Description	Release Date
Solaris PPP 4.0	Solaris 8 7/01
Solaris PPP 4.0 enables a system in one location to communicate over telephone lines or leased communications media with a system at a remote location. This implementation of Point-to-Point Protocol (PPP) is based on the widely used Australian National University (ANU) PPP, and is entirely new for the Solaris operating environment. PPP 4.0 is easily configured through a set of files. It supports both asynchronous and synchronous communications and offers Password Authentication Protocol (PAP) and Challenge Handshake Authentication Protocol (CHAP) authentication. Because Solaris PPP 4.0 is highly configurable, customers can easily tailor PPP to fit their remote communications needs.	Updated Solaris 9
In the Solaris 9 release, PPP 4.0 includes the PPPoE feature, which enables the use of tunneling with PPP. Also provided is the `asppp2pppd` conversion script for migrating from the earlier Solaris PPP `(asppp)` to Solaris PPP 4.0.	
For further information, see the `pppd`(1M) man page.	
For information on licensing terms, refer to the incorporated material at the following locations:	
`/var/sadm/pkg/SUNWpppd/install/copyright`	
`/var/sadm/pkg/SUNWpppdu/install/copyright`	
`/var/sadm/pkg/SUNWpppg/install/copyright`	
Sun Internet FTP Server	Solaris 9
Sun Internet FTP Server™, hereafter called the FTP Server, is fully compatible with the Solaris 8 FTP software while offering new capability and improved performance for Solaris 9 users.	
The Solaris 9 FTP Server is based on WU-ftpd. Originally developed by Washington University, WU-ftpd is widely used for the distribution of bulk data over the Internet and is the preferred standard for large FTP sites.	
Sun RPC Library Extensions	Solaris 9
The RPC library extensions project extends the Sun ONC+ RPC library with an asynchronous protocol. Programming interfaces have been added to the Transport Independent Remote Procedure Calls to provide one-way asynchronous messaging and non-blocking I/O.	
Sun's Telco Platform users can use the RPC library extensions to help with significant semantic changes to the RPC interface. The extensions are useful to customers who require synchronous and asynchronous protocols that require a single vendor solution. The library extensions provide a range of operations and a level of availability that Sun's network equipment provider customers demand.	
For further information on ONC+ development, see the *ONC+ Developer's Guide*.	

Feature Description	Release Date
Enhancements to `sendmail`	Solaris 9

In the Solaris 9 Beta operating environment, `sendmail` was upgraded to version 8.11 with minor changes from version 8.10, which was available in the Solaris 8 4/01 operating environment. In the Solaris 9 Beta Refresh operating environment, `sendmail` has been upgraded to version 8.12 with major changes from version 8.11. (more)

For further information, see "Mail Services (Tasks)" in the *System Administration Guide: Resource Management and Network Services*.

Feature Description	Release Date
Solaris Network Cache and Accelerator (NCA)	Solaris 8 7/01
	Updated Solaris 9

The Solaris Network Cache and Accelerator (NCA) has been improved with the addition of a sockets interface to NCA through which any web server can communicate with NCA with minimal modifications. Web servers such a as Apache, iPlanet Web Server, and Zeus are able to make use of NCA performance by using standard socket library functions. Also, NCA now supports vectored sendfile, which provides support for AF_NCA. Finally, the `ncab2clf` command has been enhanced by adding new options to support the ability to skip records before a selected date and to process a given number of records when converting log files.

For more information about NCA, see "Managing Web Cache Servers" in the *System Administration Guide: Resource Management and Network Services*.

Feature Description	Release Date
IP Network Multipathing DLPI Link-up and Link-down Notification Support	Solaris 9

Link-down notifications allow the IP multipathing daemon to detect physical link failures faster. When a network interface is started, the IP multipathing daemon attempts to enable link-up and link-down notifications from the network interface driver. If the driver supports this feature, a link-down notification is generated when the interface detects the loss of the physical link to the network. A link-up notification is generated when the physical link is restored. The `RUNNING` flag is unset when a link-down notification is received, and set when a link-up notification is received. The IP multipathing daemon uses the `RUNNING` flag to monitor the physical link state.

For more information, see the IP Network Multipathing chapters in the *System Administration Guide: IP Services*.

Feature Description	Release Date
IP Network Multipathing	Solaris 8 10/00
IP network multipathing provides your system with recovery from single-point failures with network adapters and increased traffic throughput. As of the Solaris 8 10/00 release, if a failure occurs in the network adapter, and if you have an alternate adapter connected to the same IP link, the system switches all the network accesses automatically from the failed adapter to the alternate adapter. This process ensures uninterrupted access to the network. Also, when you have multiple network adapters connected to the same IP link, you achieve increased traffic throughput by spreading the traffic across multiple network adapters.	Updated 4/01 and 7/01
As of the Solaris 8 4/01 release, dynamic reconfiguration (DR) uses IP network multipathing to decommission a specific network device with no impact on existing IP users.	
The Solaris 8 7/01 release introduced the new IPMP Reboot Safe feature. When a failed NIC is removed from the system by using dynamic reconfiguration, and a reboot occurs prior to reinsertion of a functioning NIC, the system attempts, but fails, to plumb an interface for the missing NIC. Rather than losing the IP address, the IPMP Reboot Safe feature transfers the IP address to another NIC in the IPMP interface group.	
For more information, see "IP Network Multipathing Topics" in the *System Administration Guide: IP Services*.	
Mobile IP Agent Advertisements over Dynamic Interfaces	Solaris 9
Dynamically created interfaces are interfaces that are configured after the `mipagent` daemon starts. You can now configure the foreign agent implementation to send advertisements over dynamically created interfaces. You can also enable or disable limited unsolicited advertisements over the advertising interfaces.	
For more information on Mobile Internet Protocol, see "Mobile IP Topics" in the *System Administration Guide: IP Services*.	
Mobile Internet Protocol	Solaris 8 6/00
Mobile Internet Protocol (Mobile IP) enables the transfer of information to and from mobile computers, such as laptop and wireless communications. As of the Solaris 8 6/00 release, the mobile computer can change its location to a foreign network and still access and communicate with and through the mobile computer's home network. The Solaris implementation of Mobile IP supports only IPv4.	Updated 4/01
As of the Solaris 8 4/01 release, Mobile IP enables system administrators to set up reverse tunnels. By setting up a reverse tunnel from the mobile node's care-of address to the home agent, you ensure a topologically correct source address for the IP data packet. By using reverse tunnels, system administrators can also assign private addresses to mobile nodes.	
For more information on Mobile Internet Protocol, see the "Mobile IP Topics" in *System Administration Guide: IP Services*.	

Feature Description	Release Date
Berkeley Internet Name Domain	Solaris 8 4/01
An updated version of Berkeley Internet Name Domain (BIND) has been integrated into the Solaris 9 release. The updated version is BIND version 8.2.4.	Update Solaris 9
BIND functionality includes: ■ In.named configuration options – See conf(4) man page ■ Extensions to the resolver (3RESOLV) interface that are safe to use in multithreaded applications ■ The addition of the ndc(1M) command, which is used to start or stop reconfigure in.named, and the dnskeygen(1M) command, which is used to create TSIG and DNSSEC keys	
For more information, see the *System Administration Guide: Naming and Directory Services*.	
Networking Freeware	Solaris 9
See "Freeware" on page 75 for information about GNU wget 1.6, Ncftp Client 3.0.3 and Samba 2.2.0 in the Solaris 9 release.	

System Administration Tools

Feature Description	Release Date
Solaris Volume Manager	Solaris 9

Solaris Volume Manager (SVM) provides storage management tools that enable you to create and manage `RAID 0`, `RAID 1`, and `RAID 5` volumes, as well as transactional (logging) devices and soft partitions. SVM provides all of the capabilities of Solstice DiskSuite™ and adds the following:

- Soft partitions – Allow numerous partitions on a single drive, thus breaking the 8-slice barrier
- Device id support – Preserves SVM configuration even if disks are moved or rearranged
- Active monitoring of disks – Detects silent failures
- Solaris Management Console based interface – Enables you to manage the enhanced storage devices through the same management interface that is used for other Solaris management tasks
- SVM WBEM application programming interface (API) – Enables standards-based management of SVM from any compliant tool

If you currently use Solstice DiskSuite, note the upgrade support, which enables you to upgrade a running SDS system to SVM without disturbing or changing your configuration. Even an upgrade of the mirrored root is fully and automatically supported.

For more information, see the *Solaris Volume Manager Administration Guide*.

Patch Manager	Solaris 9

Patch Manager manages patches that are created for Solaris 9 operating environment and compatible releases. You can display installed patches and their properties, add patches to one or more systems concurrently, remove patches, analyze a system's patch requirements, and download patches from the SunSolve Online[SM] service.

The new `smpatch(1M)` command installs patches on single or multiple machines, analyzes patch requirements, and downloads required patches.

See the `smpatch`(1M) man page for further information.

Solaris WBEM Services 2.5	Solaris 9

Solaris WBEM Services 2.5 is Sun Microsystem's implementation of Web-Based Enterprise Management (WBEM). WBEM is a set of management and Internet-related technologies intended to unify the management of enterprise computing environments. (more)

Feature Description	Release Date
WBEM CIM Object Manager Now Listens to HTTP Port 5988	Solaris 9

The CIM Object Manager listens for RMI connections on RMI port 5987 and now listens for XML/HTTP connections on HTTP port 5988. In the Solaris 8 release and updates of the Solaris 8 release, the CIM Object Manager listened for XML/HTTP connections on default HTTP port 80.

For further information, see the *Solaris WBEM Services Administration Guide*.

SNMP Adapter for WBEM	Solaris 9

Intended for use by system administrators, the SNMP Adapter for WBEM enables Simple Network Management Protocol (SNMP) management applications to access system management information that is provided by Solaris WBEM Services.

Used with the Solstice Enterprise Agent (SEA) Master Agent, the SNMP Adapter for WBEM maps SNMP requests into equivalent WBEM Common Information Model (CIM) properties or instances.

The SNMP Adapter for WBEM also remaps the response from the CIM Object Manager into an SNMP response, which is returned to the management application.

A mapping file contains the corresponding Object Identifier (OID), class name, property name, and Abstract Syntax Notation One (ASN.1) type for each object.

The *Solaris WBEM Services Administration Guide* contains information about the SNMP Adapter for WBEM.

Feature Description	Release Date
Solaris Management Console	Solaris 8 1/01
Solaris™ Management Console 2.1 software is a GUI-based "umbrella application" that serves as the starting point for a variety of management tools. The console comes complete with a default toolbox that contains the following tools:	Updated Solaris 9

- System Information – Display read-only data about the host, hardware, and software.
- Log Viewer – View application and command-line messages and manage log files.
- Processes – View, suspend, resume, and delete processes.
- Performance – Track the usage and consumption of system resources.
- Users – Set up and maintain user accounts, user templates, groups, mailing lists, administrative roles, and rights. Grant or deny rights to users and to administrative roles to control the specific applications each can work with and which tasks each can perform.
- Projects – Constrain how resources are allocated, by processes and by tasks running in the current project.
- Computers and Networks – View and manage computers, networks, and subnetworks.
- Patches – Manage patches on systems running the Solaris operating environment.
- Scheduled Jobs – Schedule, start, and manage jobs.
- Mounts and Shares – View and manage mounts, shares, and usage information.
- Disks – Create and view disk partitions.
- Enhanced Storage – Create and manage RAID 0 (concatenation and stripe), RAID 1 (mirror), RAID 5, soft partitions, and transactional volumes. Assemble flexible storage configurations that are resistant to data loss or downtime.
- Serial Ports – Configure and manage existing serial ports.

You can add or delete tools from the default toolbox or create a new toolbox to manage a different set of tools by using the console Toolbox Editor.

You can also manage diskless clients, but with commands only, not through the GUI.

For information about the console, see "Solaris Management Console Interface (Overview)" in the *System Administration Guide: Basic Administration*. Also, see the help associated with each tool.

For information about using the command-line interface, see "Availability Solaris Management Commands" in the *System Administration Guide: Basic Administration*.

Solaris Product Registry 3.0	Solaris 8 1/01

This registry includes these new features:
- Ability to uninstall individual system packages.
- All of the Solaris system products that you installed in their localized version appear in the System Software Localizations folder.
- Registry is compatible with more installation wizards.

For further information, see the *System Administration Guide: Basic Administration*.

Feature Description	Release Date
Modify Software Groups in Solaris Web Start Program	Solaris 8 1/01
The Solaris™ Web Start installation method was updated to enable you to modify the selected Solaris Software Group by adding or removing software packages.	
For further information, see the *System Administration Guide: Basic Administration*.	
System Administration Freeware Tools	Solaris 9
See "Freeware" on page 75 for information about `GNU grep 2.4.2` and `GNU tar 1.13` in the Solaris 9 release.	

File System Enhancements

Feature Description	Release Date
Extended File Attributes	Solaris 9
The UFS, NFS, and TMPFS file systems have been enhanced to include extended file attributes, which enable application developers to associate specific attributes to a file. For example, a developer of a file management application for a windowing system might choose to associate a display icon with a file.	
Extended attributes are logically represented as files within a hidden directory associated with the target file.	
You can use the extended file attribute API and a set of shell commands to add and manipulate file system attributes. See the `fsattr(5)`, `openat(2)`, and the `runat(1)` man pages for more information.	
Many Solaris file system commands have been modified to support file system attributes by providing an attribute-aware option that you can use to query, copy, or find file attributes. See the man page for the specific file system command for more information.	
See the *System Administration Guide: Basic Administration* for more information.	

Feature Description	Release Date
DNLC Improvements	Solaris 8 6/00

The directory name look-up cache (DNLC) is enhanced to provide improved performance when you access files in large directories with 1000 or more files.

The DNLC is a general file-system service that caches the most recently referenced directory names and their associated vnodes. UFS directory entries are stored linearly on disk. This means that locating an entry requires searching each entry for the name. Adding a new entry requires searching the entire directory to ensure the name does not exist. To solve this performance problem, entire directories are cached in memory by the DNLC.

Another feature in this release is DNLC caching of file objects that have been looked up, but do not exist. This feature is known as negative caching, and is useful because some applications repeatedly test to check if a file exists.

There are new tunable parameters associated with the DNLC improvements. These parameters are set optimally and should not be changed casually.

See the *Solaris Tunable Parameters Reference Manual* for further information.

Improved UFS Direct I/O Concurrency	Solaris 8 1/01

The performance of direct I/O, which is used by database applications to access unbuffered file-system data, has been improved by allowing concurrent read and write access to regular UFS files. Previously, an operation that updated file data would lock out all other read or write accesses until the update operation was completed.

See the *System Administration Guide: Basic Administration* and the man page, mount_ufs(1M), for more information.

UFS Snapshots (fssnap)	Solaris 8 1/01

You can use the fssnap command to create a snapshot of a file system. A snapshot is a file system's temporary image that is intended for backup operations.

When the fssnap command is run, it creates a virtual device and a backing-store file. You can back up the virtual device, which looks and acts like a real device, with any of the existing Solaris backup commands. The backing-store file is a bitmapped file that contains copies of pre-snapshot data that has been modified since the snapshot was taken.

See the *System Administration Guide: Basic Administration* and the man page, fssnap(1M), for more information.

Updated mkfs **Command**	Solaris 8 1/01

The mkfs command has been updated to improve performance when you create file systems. Improved mkfs performance is often 10 times faster than in previous Solaris releases. Performance improvements are seen on systems when you create both large and small file systems. However, the biggest mkfs performance improvements occur on systems with high-capacity or high-speed disks.

Installation

Feature Description	Release Date
Solaris Live Upgrade	Solaris 8 7/01
Solaris Live Upgrade provides a method of upgrading that substantially reduces the usual service outage that is associated with an operating system upgrade. You can duplicate your current running boot environment, then while the original boot environment continues to run, you can upgrade the duplicate. The duplicate boot environment is then activated to become the active boot environment when the system is rebooted. If a failure occurs, you can quickly fall back to the original boot environment with a simple reboot, thereby eliminating the downtime for the production environment associated with the normal test and evaluation process.	
In addition to upgrading a boot environment, you can install a Web Start Flash archive on an inactive boot environment. When you reboot the system, the configuration that you installed on an inactive boot environment is active.	
For further information, see "Solaris Live Upgrade Topics" in the *Solaris 9 Installation Guide*.	
Web Start Flash Installation Feature	Solaris 8 4/01
The Web Start Flash installation feature enables you to create a single reference installation of the Solaris operating environment on a machine and then replicate that installation on several machines.	
For further information, see "Web Start Flash Installation Feature Topics" in the *Solaris 9 Installation Guide*.	

Feature Description	Release Date
Minimal Installation	Solaris 9

Files that make up several features in the core software group, or metacluster, are now moved into separate, more logically organized packages. You can optionally exclude these packages from the Solaris operating environment when you install the Solaris software. You can also remove these packages by using pkgrm(1M) after installation.

Files that make up the following features are moved into new or existing packages:
- Cache file system
- NFS
- Kerberos security
- Distributed file system
- NIS-related
- Network routing daemons
- Remote network r* commands
- telnet server
- tftp server
- Domain name server
- DARPA name server
- Remote procedure call services
- Boot or install server
- setuid and setgid

Installation from the Solaris DVD	Solaris 8 2/02

You can now install the Solaris operating environment and additional software from the Solaris DVD. The DVD enables you to perform either a Solaris™ Web Start installation or a custom JumpStart™ installation. The Solaris DVD includes the Solaris software, EA software, and the Solaris documentation.

For detailed instructions, see the *Solaris 9 Installation Guide*.

Solaris Web Start Program Uses sysidcfg **File**	Solaris 8 2/02

The Solaris Web Start installation method has been modified to use the sysidcfg file to configure system information during an installation or upgrade. If you create a sysidcfg file with configuration information for your system, the Solaris Web Start program does not prompt you to enter the system information during installation.

For detailed instructions, see the *Solaris 9 Installation Guide*.

Solaris Web Start Program Enhancements	Solaris 8 2/02

The Solaris Web Start installation method was updated to enable you to perform the following functions during the Solaris installation or upgrade:
- Select to automatically reboot the system after installation.
- Select to automatically eject the CD or DVD after installation.
- Select to preserve file systems.
- IA only: Customize fdisk partitions.

For detailed instructions, see the *Solaris 9 Installation Guide*.

Feature Description	Release Date
Increased Time Zone Selections	Solaris 9

The number of time zones available in the Solaris 9 operating environment has dramatically increased. When you install the Solaris operating environment you can select time zones by geographic region. The time zone selections in the lists of continents and countries have been expanded.

For detailed instructions, see the *Solaris 9 Installation Guide*.

Solaris Web Start Wizards SDK 3.0.1.1	Solaris 9

Solaris Web Start Wizards ™ SDK simplifies the installation, setup, and administration of native Solaris, Java™, and non-Java applications. With Solaris Web Start Wizards software, developers can copackage both Solaris and Microsoft Windows versions of their applications. The installation wizard manages the platform specifics.

The Web Start Wizard SDK 3.0.1 is now bundled with the Solaris 9 release and can be installed by using the Solaris Web Start installation program.

IA: PXE Network Boot	Solaris 8 10/01

The Intel Pre-boot eXecution Environment (PXE) enables you to boot a Solaris 9 IA system directly from the network without using the Solaris boot diskette. The IA system must support PXE. On a system that supports PXE, enable the system to use PXE by using the system's BIOS setup tool or the network adapter's configuration setup tool. The Solaris boot diskette is available for the systems that do not support this feature.

For further information, see the *Solaris 9 (Intel Platform Edition) Hardware Compatibility List* and the *Solaris 9 Installation Guide*.

New Boot Options for a Custom JumpStart Installation	Solaris 8 7/01

New options have been added for use with the `boot` command when you perform a custom JumpStart installation.

With the `boot` command, you can specify the location of the configuration files to use to perform the installation. You can specify a path to an HTTP server, an NFS server, or a file that is available on local media. If you do not know the path to the files, you can require that the installation program prompt you for the path after the machine boots and connects to the network.

The `nowin` option enables you to specify that the custom JumpStart program not begin the X program. You do not need to use the X program to perform a custom JumpStart installation, so you can shorten the installation time by using the `nowin` option.

For detailed instructions about how to use these new options, refer to "Custom JumpStart Installation Topics" in the *Solaris 9 Installation Guide*.

Feature Description	Release Date
Upgrading Mirrors with Custom JumpStart	Solaris 9
The Solaris 9 release now supports operating environment upgrades of root mirrors and metadevices that were created by Solaris Volume Manager (formerly Solstice DiskSuite). If you are upgrading a system that has a metadevice that was created by Solaris Volume Manager, you no longer need to edit the systems `vfstab`. As for root mirrors, the mirror is detected and the operating environment on the mirror is upgraded just as would happen in a typical upgrade without metadevices.	
Default Routing with System Identification Utilities	Solaris 8 4/01
The system identification utilities automatically attempt to determine the default router during installation.	
For installation information, see the *Solaris 9 Installation Guide*.	
Configuration with System Identification Utilities	Solaris 8 1/01
During system identification, the system identification utilities can configure systems to be LDAP clients. Prior Solaris releases allowed the configuration of a machine only as an NIS, NIS+, or DNS client.	
For installation information, see the *Solaris 9 Installation Guide*.	
Patch Analyzer	Solaris 8 1/01
The Patch Analyzer is now available when you use the Solaris Web Start program to upgrade to a Solaris Update Release. The Patch Analyzer performs an analysis on your system to determine which (if any) patches will be removed or downgraded by upgrading to a Solaris Update Release. You do not need to use the Patch Analyzer when you upgrade to the Solaris 9 release.	
For further installation information, see the *Solaris 9 Installation Guide*.	

System Performance Enhancements

Feature Description	Release Date
Multiple Page Size Support	Solaris 9
Multiple Page Size Support (MPSS) allows a program to use any hardware supported page sizes to access portions of virtual memory. Previously only 8K pages were available for a program's stack, heap or `mmap()`'d anonymous memory.	
You can use MPSS to run legacy applications with specific memory page size settings where they benefit from this sort of performance tuning. The use of larger page sizes might significantly improve the performance of programs which intensively use large amounts of memory.	
For more information see the man pages for `pagesize`(1) and `ppgsz`(1).	
Improved Multithreading Library	Solaris 9
In the Solaris 9 software release, there is a new, improved and faster multithreading library which was tested as the alternate libthread in previous Solaris software releases.	
For further information, see the *Multithreaded Programming Guide* and the `threads`(3THR) man page.	
Solaris Network Cache and Accelerator (NCA)	Solaris 8 7/01
The Solaris Network Cache and Accelerator (NCA) has been improved with the addition of a sockets interface to NCA through which any web server can communicate with NCA with minimal modifications. See "Networking" on page 16.	
Performance Improvement for Servers	Solaris 8 1/01
Enhancements have been made to the algorithm that controls virtual/physical pages and how they are cached. These enhancements deliver increased system performance of around 10% for general user loads in servers.	
Dynamic Intimate Shared Memory (DISM)	Solaris 8 1/01
Dynamic Intimate Shared Memory (DISM) allows a database to dynamically extend or reduce the size of the shared data segment, eliminating the misconfiguration problem and denial-of-service security vulnerability present with Intimate Shared Memory (ISM).	
The ISM is a shared memory segment consisting of large locked memory pages. The ISM number of locked pages remains constant (can not be changed). Dynamic ISM (DISM) is pageable ISM shared memory where the number of locked pages is variable (can be changed). Therefore, the DISM supports releasing or adding more physical memory to the system during dynamic reconfiguration. The size of the DISM can span available physical memory plus disk swap.	
See the man page `shmop`(2).	

Server and Client Management

Feature Description	Release Date
Dynamic Host Configuration Protocol (DHCP)	Solaris 8 7/01

The Dynamic Host Configuration Protocol (DHCP) service enables host systems to receive IP addresses and network configuration information at boot time from a network server. The Solaris DHCP service has been enhanced in several ways to enable it to support larger numbers of clients:

- The Solaris DHCP server now uses multithreading to serve multiple clients simultaneously.
- A new data store that stores data in binary files can support larger numbers of clients with faster access than with the ASCII files and NIS+ data stores.
- Access to files and NIS+ data stores has been redesigned to support server multithreading.
- Data access architecture has been changed to enable third parties to write code modules to enable the DHCP server to use any data service to store DHCP data.

In addition, the Solaris DHCP server now supports dynamic DNS updates. You can enable the DHCP service to update the DNS service with the host names of DHCP clients that request a specific host name.

The Solaris DHCP client can now be configured to request a specific host name.

For more information, see the *System Administration Guide: IP Services*.

Diskless Client Management	Solaris 8 1/01

Diskless client management is available through the command line. You can manage diskless clients, list OS services for diskless clients, and manage patches on all existing diskless clients.

For information on diskless client management, see "Managing Diskless Client Support (Tasks)" in the *System Administration Guide: Basic Administration*.

Security Enhancements

Feature Description	Release Date
Internet Key Exchange (IKE) Protocol	Solaris 9

Internet Key Exchange (IKE) automates key management for IPsec. IKE replaces manual key assignment and refreshment on an IPv4 network, which enables the administrator to manage larger numbers of secure networks.

System administrators use IPsec to set up secure IPv4 networks. The `in.iked` daemon provides key derivation, authentication, and authentication protection at boot time. The daemon is configurable. The administrator sets up the parameters in a configuration file. After the parameters are set up, no manual key refreshment is required.

See the man pages `in.iked`(1M), `ikeadm`(1M), and `ike.config`(4).

Solaris Secure Shell	Solaris 9

Secure shell allows a user to securely access a remote host over an unsecured network. Data transfers and interactive user network sessions are protected from eavesdropping, session hijacking, and man-in-the-middle attacks. Solaris 9 Secure Shell supports SSH1 and SSH2 protocol versions. Strong authentication is provided using public key cryptography. X-windows and other network services can be tunneled safely over Secure Shell connections for additional protection.

Kerberos KDC and Administration Tools	Solaris 9

System administrators can improve system security by using Kerberos V5 authentication, privacy, and integrity.

The Kerberos V5 Server includes the principal (user) administration system, the Key Distribution Center (KDC), and the principal database replication system. The principal administration system includes a centralized server for local and remote administration of principals and security policies. The system includes both a GUI and a CLI administration tool. The KDC uses the principal database information that was created by the administration server and issues tickets for clients. The replication system is used to duplicate the KDC database to a backup server.

For further information, see "Administering the Kerberos Database" in the *System Administration Guide: Security Services*.

Role-Based Access Control (RBAC) Enhancements	Solaris 8 1/01

The role-based access control (RBAC) databases can be managed through the Solaris Management Console graphical interface. Rights can now be assigned by default in the `policy.conf` file. In addition, rights can now contain other rights. (more)

For further information, see "Role-Based Access Control" in the *System Administration Guide: Security Services*.

Feature Description	Release Date
Generic Security Services Application Programming Interface (GSS-API)	Solaris 8 6/00
The Generic Security Services Application Programming Interface (GSS-API) is a security framework that enables applications to protect the data they transmit. The GSS-API provides authentication, integrity, and confidentiality services to applications. The interface permits those applications to be entirely generic with respect to security. That is, they do not have to check for the underlying platform (such as the Solaris platform) or security mechanism (such as Kerberos) being used. This means that applications that use the GSS-API can be highly portable.	
For more information, see the *GSS-API Programming Guide*.	
Security Freeware	Solaris 9
See "Freeware" on page 75 for information about `Tcp-wrappers 7.6` in the Solaris 9 release.	

XServer Features

Feature Description	Release Date
X11 Support for IPV6 on Solaris	Solaris 9
The Solaris X Window System servers and client libraries now support the Internet Protocol Version 6 (IPv6) in addition to the Internet Protocol Version 4 (IPv4). This extension enables you to use IPv6 addresses and connections when displaying X applications across the network.	
Using Xsun Server as a Display-only Device	Solaris 8 2/02
New options enable the Xsun server to run without a keyboard or a mouse. You can now use the Xsun server in the following ways: ■ As a display-only device ■ As a display with alternative input devices other than a mouse or a keyboard ■ Without a display to drive a frame buffer for hardware-accelerated offscreen rendering	
See the `Xsun` man page for further information.	

Removable Media Management

Feature Description	Release Date
Write CD File Systems with the `cdrw` Command The `cdrw` command enables you to write CD file systems in ISO 9660 format with Rock Ridge or Joliet extensions on CD-R or CD-RW media devices. You can use the `cdrw` command to: ■ Create data CDs ■ Create audio CDs ■ Extract audio data from an audio CD ■ Copy CDs ■ Erase CD-RW media Go to `http://www.sun.com/io_technologies/pci/removable.html` for information on recommended CD-R or CD-RW devices. See the `cdrw`(1) man page for information on using this command.	Solaris 9
Improved Removable Media Management Volume management features have been improved in this release to fully support removable media. This improvement means that DVD-ROMs, Iomega and Universal Serial Bus (USB) Zip drives and Jaz drives, CD-ROMs, and diskettes are mounted and available for reading when they are inserted. With Common Desktop Environment (CDE) and Solaris command-line enhancements, you can: ■ Format, label, and set read or write software protection on removable media with the new `rmformat` command. This command replaces the `fdformat` command for formatting removable media. ■ Create and verify a PCFS file system on removable media with the `mkfs_pcfs` and `fsck_pcfs` commands. ■ Create an `fdisk` partition and a PCFS file system on removable media on a SPARC system to facilitate data transfers to IA systems. See the *System Administration Guide: Basic Administration* for information on managing removable media with the command line interface. See the *Solaris Common Desktop Environment: User's Guide* for information on managing removable media with CDE's File Manager.	Solaris 8 6/00 Updated 10/00

Device Management

Feature Description	Release Date
SPARC: Sun StorEdge Traffic Manager	Solaris 9
The Sun StorEdge™ Traffic Manager Software (STMS) delivers multipath I/O capability into the Solaris 9 release. (more)	
Sun Gigaswift Ethernet Driver	Solaris 8 7/01
As of the Solaris 8 7/01 release, Solaris functionality includes support for the Sun™ Gigaswift 1000Base-T Ethernet driver. This product gives exceptional performance of a 1-Gbyte twisted-pair copper Ethernet link.	
For further information, see the ce(7D) man page.	
USB Devices	Solaris 8 1/01
This release includes support for USB devices such as keyboards, mouse devices, audio devices, and printers on some SPARC systems and IA systems.	
Sun Microsystems™ support for USB devices includes the following: ■ Sun Blade™ 100 and Sun Blade 1000 systems that run the Solaris 8 10/00, Solaris 8 1/01, Solaris 8 4/01, Solaris 8 7/01, and Solaris 9 releases provide USB device support. ■ Sun Ray™ systems also support USB devices. ■ IA systems that run the Solaris 9 *Intel Platform Edition* provide USB support for keyboard and mouse devices, and for certain mass-storage devices, such as Zip drives.	
See the man page, scsa2usb(7D), for further information. See also the *System Administration Guide: Basic Administration* and the *Solaris 9 (Intel Platform Edition) Hardware Compatibility List*.	

Feature Description	Release Date
USB Printer Support	Solaris 8 1/01

You can use Solaris Print Manager to set up a USB printer that is attached to a SPARC system or an IA system with USB ports.

The new logical device names for USB printers are:

`/dev/printers/[0...N]*`

Therefore, when you add a USB printer to a printer server, select one of these devices for a USB printer under Printer Port on the Add New Attached Printer screen.

See the *System Administration Guide: Advanced Administration* for more information on using Solaris Print Manager to set up printers.

Although the new Solaris USB printer driver supports all USB printer-class compliant printers, a list of recommended PostScript™ printers is in the `usbprn`(7D) man page. See also the *Solaris 9 (Intel Platform Edition) Hardware Compatibility List*.

Refer to the Notes and Diagnostics sections of the `usbprn`(7D) man page for information and cautions about hot-plugging USB printers.

Reconfiguration Coordination Manager (RCM)	Solaris 8 1/01 (SPARC) and 4/01 (IA)

Dynamic reconfiguration of system resources enables you to reconfigure system components while the system is still running. This feature has been available with the `cfgadm` command since the Solaris 8 release. The Reconfiguration Coordination Manager is the framework that manages the dynamic removal of system components. By using RCM, you can register and release system resources in an orderly manner.

You can use the new RCM script feature to write your own scripts to shut down your applications, or to cleanly release the devices from your applications during dynamic reconfiguration. The RCM framework launches a script automatically in response to a reconfiguration request, if the request impacts the resources that are registered by the script.

Previously, you had to release resources from applications manually before you could dynamically remove the resource. Or, you could use the `cfgadm` command with the `-f` option to force a reconfiguration operation, but this option might leave your applications in an unknown state. Also, the manual release of resources from applications commonly causes errors.

See the *System Administration Guide: Basic Administration* and the `rcmscript`(4) man page for more information.

Feature Description	Release Date
`mp` **Program Enhancement**	Solaris 8 4/01

In the `mp` program enhancement, the `mp(1)` command is modified to work as an X Print Server client. With a properly configured X Print Server running in the host machine, `mp(1)` can print output in any Print Description Language that the X Print Server supports. The newly introduced options, `-D` and `-P`, can be used for making `mp(1)` work as an X Print Server client.

For more information, see "Print Filter Enhancement mp(1)" in the *International Language Environments Guide*.

New Dynamic Reconfiguration Error Messages	Solaris 8 1/01

The dynamic reconfiguration software has been enhanced to improve troubleshooting dynamic reconfiguration problems.

See the *System Administration Guide: Basic Administration* and the `cfsadmin`(1M) man page for more information.

Language Support

Feature Description	Release Date
Universal Language Coverage	Solaris 9

The Solaris 9 operating environment now includes support for 133 locales, covering 39 languages, on both the Solaris 9 Software CDs and the Solaris 9 Languages CD. See "Language Support" on page 49.

Support for the New Chinese `GB18030-2000` **Character Set**	Solaris 9

Beginning with the Solaris 8 2/02 release, the Solaris platform allows for input, display, and print of the entire `GB18030-2000` character set (including nearly 30,000 characters). Any application that runs on the Solaris platform can thus benefit from a wider set of Chinese characters. (more)

What's New for Software Developers

This chapter highlights new software development features that have been added to the Solaris 9 operating environment.

Note – For the most current man pages, use the `man` command.

Development Tools

Feature Description	Release Date
Compatibility of Solaris and Linux Application Programming Interfaces	Solaris 9
Some of the freeware libraries and supporting utilities that were available on the Solaris 8 Software Companion CD are now integrated in the Solaris 9 operating environment. As a result, software application developers can now develop and compile their freeware applications more easily in the Solaris operating environment. Libraries include `glib`, `GTK+`, `Jpeg`, `libpng`, `Tcl/Tk`, `libtif`, and `libxm12`.	
For further information, see "Freeware" on page 75.	

Feature Description	Release Date
IA 32–bit: `lxrun` **Emulator**	Solaris 9

`lxrun(1)` is an emulator that enables you to run Linux applications unmodified on Solaris 9 *Intel Platform Edition* without having to recompile source code. Most Linux applications that do not rely on specific idiosyncrasies of Linux or interact directly with hardware should work under `lxrun` with little or no loss of performance.

`lxrun` intercepts Linux system calls and maps them to the corresponding system calls in the Solaris environment. `lxrun` itself does not provide the complete runtime environment that Linux applications require. You can install the libraries, configuration files, and commands that the Linux runtime environment requires from a Linux distribution. An extraction script which is designed to extract the files from a Red Hat or SuSE Linux distribution CD is provided.

For further information, see the `lxrun` man page.

Multiple Page Size Support	Solaris 9

Multiple Page Size Support (MPSS) allows a program to use any hardware supported page size to access portions of virtual memory. Previously only 8K pages were available for a program's stack, heap or `mmap()`'d anonymous memory.

You can tune large, memory intensive applications performance to use any of the page sizes supported by hardware for stack, heap, or `/dev/zero` private `mmap()`'d memory. The use of larger page sizes might significantly improve the performance of programs which intensively use large amounts of memory.

For more information see the man pages for `pagesize`(1), `ppgsz`(1), `memcntl`(2), `mmap`(2) and `getpagesizes`(3C).

Improved Multithreading Library	Solaris 9

In the Solaris 9 software release, there is a new, improved and faster multithreading library which was tested as the alternate libthread in previous Solaris software releases.

For further information, see the *Multithreaded Programming Guide* and the `threads`(3THR) man page.

Feature Description	Release Date
The Sysevent Framework	Solaris 9

The sysevent framework enables notification of kernel-level and user-level system events, such as hardware and software state changes, errors and faults, to applications that are interested in being notified of these events.

Components of the sysevent framework include:
- `syseventd(1M)` daemon
- `syseventadm(1M)` command
- Library APIs for event data extraction and sysevent subscription
- A driver-level system event notification interface (`ddi_log_sysevent(9F)`)

The `syseventd` daemon is a user-level daemon that accepts delivery of system event buffers from the kernel. After an event buffer has been delivered to `syseventd`, it, in turn, attempts to propagate the event to all interested end-event subscribers.

The `syseventadm` command can be used to configure event specifications that are subsequently used to invoke commands, applications, or scripts in response to a system event.

See the new 3SYSEVENT man pages for information on the sysevent kernel and library APIs.

See `ddi_log_sysevent`(9F) for information about driver-level event notification logging.

| **Kernel Pseudo Random Number Generator** | Solaris 9 |

The Solaris Pseudo Random Number Generator (PRNG) provides ISVs with a standard interface to access pseudo random numbers for cryptographic operations, scientific applications, and simulation tools. The PRNG operates in the Solaris kernel protecting the contents of the entropy pool. The PRNG gathers entropic data from kernel memory pages and maintains a high level of randomness at all times.

| **SPARC: Application Interface to Remote Shared Memory on Clusters** | Solaris 8 10/01 |

If you develop applications that extend the use of a Sun™ Cluster environment, you can benefit from this interface. Using the new Remote Shared Memory API, you can program your applications to lower the latency for message passing over high-speed cluster interconnects. Such cluster-aware applications can significantly reduce the time that is required to respond to events in a clustered configuration.

You must have Sun Cluster 3.0 installed. Also, you need expertise to modify existing applications to exploit the new interface.

For further information, see the *Programming Interfaces Guide*. Also, the `librsm`(3LIB) man pages and the `section(3RSM)` "Section 3: Extended Library Functions" man pages include references to RSM.

Feature Description	Release Date
GNU-Compatible Version of the `gettext` **API Functions**	Solaris 9

The Solaris 9 release provides a GNU-compatible version of the `gettext` API functions, while maintaining backward compatibility with Solaris `gettext` API functions. Existing `gettext()`, `dgettext()`, `dcgettext()`, `textdomain()`, and `bindtextdomain()` functions in `libc` now can handle both Solaris and GNU-compatible message files. New GNU-compatible `ngettext()`, `dngettext()`, `dcngettext()`, and `bind_textdomain_codeset()` functions in `libc` can handle GNU-compatible message files. Also, the `msgfmt` and the `gettext` utilities now can handle both Solaris and GNU-compatible message files.

For further information, see the `gettext`(3C) man page.

Feature Description	Release Date
Extended File Attributes	Solaris 9

The UFS, NFS, and TMPFS file systems have been enhanced to include extended file attributes, which enable application developers to associate specific attributes to a file. For example, a developer of a file management application for a windowing system might choose to associate a display icon with a file.

For further information see "File System Enhancements" on page 24.

Feature Description	Release Date
New Fixed-Priority (FX) Scheduling Class	Solaris 9

The FX scheduler provides a scheduling policy for processes that require user or application control of scheduling priorities. See "System Resources Enhancements" on page 14.

Feature Description	Release Date
Dynamic Host Configuration Protocol (DHCP)	Solaris 8 7/01

The Dynamic Host Configuration Protocol (DHCP) service enables host systems to receive IP addresses and network configuration information at boot time from a network server. Before the Solaris 8 7/01 release, DHCP configuration data could only be stored in text files or NIS+. Now, data access in the Solaris DHCP service has been redesigned to use a modular framework. Solaris DHCP provides an API that enables you to write shared objects to support any data storage facility for storing DHCP data.

The *Solaris DHCP Service Developer's Guide* provides an overview of the data access framework that is used by Solaris DHCP, general guidelines for developers, and a listing of the API functions you use to write a module to support a new data store.

For further information, see the *Solaris DHCP Service Developer's Guide*.

Feature Description	Release Date
Solaris Web Start Wizards SDK 3.0.1.1	Solaris 9

Solaris Web Start Wizards simplify the installation, setup, and administration of native Solaris, Java, and non-Java applications. With Solaris Web Start Wizards software, developers can copackage both Solaris and Microsoft Windows versions of their applications. The installation wizard manages the platform specifics.

The Web Start Wizard SDK 3.0.1.1 is now bundled with the Solaris 9 release and can be installed by using the Solaris Web Start installation program.

Feature Description	Release Date
Modular Debugger (`mdb`)	Solaris 9

`mdb(1)` is an extensible utility for low-level debugging and editing of the live operating system, operating system crash dumps, user processes, user process core dumps, and object files. In the Solaris 9 release, `mdb` provides new symbolic debugging support for the Solaris kernel, new kernel debugger commands, new features for examination and control of live running user processes, and the ability to examine raw disk files and devices.

The *Solaris Modular Debugger Guide* and `mdb`(1) man page provide more information.

Audio Enhancements	Solaris 9

New audio directories have been added to the Solaris 9 operating environment. `/usr/include/audio` is a new directory for application audio header files. The audio file format has a new header file, `/usr/include/audio/au.h`, and manual page, `au(4)`.

`/usr/share/audio` is a new depository for miscellaneous audio files. The audio files from `/usr/demo/SOUND/sounds` have been moved here. A symbolic link from `/usr/demo/SOUNDS/sounds` to `/usr/share/audio/samples/au` has been created so that current applications and scripts run without failure.

Numerous bug fixes have been made to the audio kernel modules to improve reliability.

For further information, see the *System Administration Guide: Basic Administration*.

A Vectored Sendfile System Call: `sendfilev()`	Solaris 8 7/01

`sendfilev()`, a vectored sendfile system call, enables better performance for sending data from application buffers or files. For example, in web performance, a web server can construct an HTTP response (header, data, and trailer as well as server side includes) in a single system call. This feature provides optimal performance with NCA, because it enables the return of multiple chunks, which might come from various files for the response.

For further information, see the man page `sendfilev(2)`.

Verify File Conformance with the `appcert` **Utility**	Solaris 8 4/01

The `appcert` utility verifies an object file's conformance to the Solaris ABI. Conforming to the Solaris ABI greatly increases an application's probability of being compatible with future releases of Solaris software.

For more information, see "Using appcert" in the *Programming Interfaces Guide*.

Generic Security Services Application Programming Interface (GSS-API)	Solaris 8 6/00

The Generic Security Services Application Programming Interface (GSS-API) is a security framework that enables applications to protect the data they transmit. (more)

Web-Based Enterprise Management Tools

Feature Description	Release Date
Solaris WBEM Services 2.5	Solaris 9

Solaris WBEM Services 2.5

Solaris WBEM Services 2.5 is Sun Microsystem's implementation of Web-Based Enterprise Management (WBEM). WBEM is a set of management and Internet-related technologies intended to unify the management of enterprise computing environments. Developed by the Distributed Management Task Force (DMTF), WBEM enables organizations to deliver an integrated set of standards-based management tools that support and promote World Wide Web technology.

The DMTF has developed a set of standards that make up WBEM. This set of standards includes the following:

- Common Information Model (CIM) – CIM is an object-oriented data model that describes the overall management of information in an enterprise network environment. CIM consists of a CIM specification and a CIM schema.
  CIM Specification consists of the language and methodology that describes management data.
  CIM Schema provides actual model descriptions of systems, applications, large area networks, and devices. The CIM Schema enables applications from different developers on different platforms to describe management data in a standard format. As a result, a variety of management applications can share this information.
- CIM Operations Over HTTP 1.1 – CIM Operations Over HyperText Transport Protocol (HTTP) 1.1 is a transport mechanism that maps CIM operations to HTTP to allow implementations of CIM to interoperate in an open, standardized manner.
- eXtensible Markup Language (XML) – CIM Operations Over HTTP 1.1 uses XML, which is a markup language that represents management information in textual form.
  In addition to the XML representation, CIM information is also represented textually by the managed object format (MOF). These MOF representations are typically stored as text files that developers compile into a CIM Object Manager.

For further developer information about WBEM, see the *Solaris WBEM SDK Developer's Guide*.

Feature Description	Release Date
New WBEM Batching API Added	Solaris 9

The Java Web-Based Enterprise Management (WBEM) client application programming interface (API) now supports the batching of multiple Common Interface Model (CIM) operations by a client into a single request and response. The CIM Object Manager now accepts and services these batched requests as well. This facility is defined in the Distributed Management Task Force (DMTF) Specification for CIM Operations Over HTTP.

The number of remote calls that a client needs to make is consequently reduced.

For further information, see the *Solaris WBEM SDK Developer's Guide*.

WBEM CIM Workshop Enhanced	Solaris 9

CIM WorkShop provides a graphical user interface for the WBEM development tool through which instrumentation, system, and network application developers can view and create WBEM classes and instances.

In CIM WorkShop, you can do following:
- View and select namespaces
- Add and delete namespaces
- View, create, modify, and delete classes
- Add and delete properties, qualifiers, and methods to new classes
- View, create, and delete instances
- View, modify, and delete instance values
- Traverse associations
- Execute methods
- Display contextual help

Enhancements and new features that are available in CIM Workshop include the following:
- Updated and corrected contextual help.
- Ability to traverse associations.
- Ability to subscribe to and display information about events for a selected class, thus enabling you to debug applications that use events more easily. You can use this new feature only when you select the RMI protocol.
- Ability to submit WBEM Query Language (WQL) queries to search for and display WBEM information.

For further information, see the *Solaris WBEM SDK Developer's Guide*.

Feature Description	Release Date
Support for WBEM Process Indication (Extrinsic) Events Added	Solaris 9

Currently, WBEM event services enable client applications to asynchronously receive indications when conditions of interest are met. However, the only supported indications belong to the class life cycle indications, which denote the modification, the creation, and the deletion of an instance.

While this class of indications is very flexible and wide ranging, instrumentation might need to publish indications that do not fall into this category. Given this requirement, the DMTF introduced the process indication hierarchy as an extension to the current indication hierarchy. The process indications for WBEM services now handle this extended hierarchy.

Process indications for WBEM services is Sun Microsystems' implementation of the process indication portion of the event model. The process indication class is the superclass of all indications that are published by instrumentation, which also includes the life cycle indications.

The process of subscribing to process indications is the same as the process of subscribing to life cycle indications.

For further information, see the *Solaris WBEM SDK Developer's Guide*.

WBEM `mofcomp` **Command Enhanced**	Solaris 9

The Managed Object Format (MOF) compiler (`mofcomp`) now allows you to specify a namespace on the command line. If the namespace does not exist, it is created.

In addition, the MOF Compiler now generates Java interface and class source files. This feature enables you to use standard Java interfaces, as opposed to having to learn the CIM constructs and the CIM object model application programming interfaces (APIs).

For each `CIMClass`, an interface and class file is generated. The interface is generated to enable you to create different implementations while maintaining interoperability.

For further information, see the *Solaris WBEM SDK Developer's Guide*.

New Java WBEM SDK Sample Programs Added	Solaris 9

The Java WBEM Software Developer's Kit (SDK) now includes a new sample Java applet and sample programs. The Java applet and sample programs are installed in `/usr/demo/wbem`.

The Java WBEM SDK sample programs show you how to use events, query, and batching. You can use these samples as a basis for developing your own programs.

For further information, see the *Solaris WBEM SDK Developer's Guide*.

Feature Description	Release Date
Sun WBEM Software Developer's Toolkit	Solaris 8 4/01

Web-Based Enterprise Management (WBEM) includes standards for web-based management of systems, networks, and devices on multiple platforms. The Sun WBEM Software Developer's Toolkit (SDK) enables software developers to create standards-based applications that manage resources in the Solaris operating environment. Developers can also use this toolkit to write providers, programs that communicate with managed resources to access data. The Sun WBEM SDK includes Client Application Programming Interfaces (APIs) for describing and managing resources in Common Information Model (CIM), and Provider APIs for getting and setting dynamic data on the managed resource. The Sun WBEM SDK also provides CIM WorkShop, a Java application for creating and viewing the managed resources on a system, and a set of example WBEM client and provider programs.

For more information, see the *Solaris WBEM SDK Developer's Guide*.

New Solaris Providers	Solaris 9

The new Solaris Providers enable developers to create software that gets and sets information about managed devices in a Common Information Model (CIM) environment. A Solaris Provider provides the CIM Object Manager with instances of managed resources in the Solaris operating environment.

Five new Solaris Providers are available in the Solaris 9 software:
- WBEM Solaris Device/System Performance Monitor Provider – Provides a variety of statistical information about a system on which the Solaris operating environment is running.
- WBEM Product Registry Provider – Provides the ability to add, delete, or modify new or existing products that are installed on a system.
- WBEM SNMP Provider – Enables WBEM services to deliver information by means of the Simple Network Management Protocol (SNMP), a protocol of the Internet reference model used for network management.
- WBEM EEprom Provider – Enables the display and modification of configuration information in the EEPROM.
- WBEM System Availability Provider – Provides reboot information about a system so that applications can compute the percentage of time that a system has been up and running. This provider also supplies reasons why a system failed:
  - System panic occurred
  - System halted by a user
  - System shut down by a user

For further information, see the *Solaris WBEM SDK Developer's Guide*.

Writing Device Drivers

Feature Description	Release Date
SPARC: Sun StorEdge Traffic Manager	Solaris 9

The Sun StorEdge Traffic Manager Software (STMS) delivers multipath I/O capability into the Solaris 9 release. This feature introduces the concept of a Virtual Host Controller Interface. This interface implements multipath services for a specific command set or bus architecture such as SCSI-3. The `scsi_vhci` driver delivered with STMS implements this functionality for SCSI-3 Fibre Channel devices. The utilities `luxadm`, `iostat`, and `prtconf` have been enhanced to manage and administer multipath devices.

The following new features are offered by the STMS:
- Single Instance Multipath Device – The device tree is restructured to represent a multipath device (client) as a single device instance, instead of multiple instances, to represent all physical paths to the device.
- Load Balancing – IOs are balanced across all the online paths in a round robin manner.
- Failover – IOs are automatically failed over to the `STANDBY` path(s) when all the `ONLINE` paths have failed.

Following is the list of host platforms, host bus adapters and storage systems that Sun StorEdge Traffic Manager Software supports:
- Host platforms – U60, U80, E250, E450, E220R, E420R, E3x00-E6x00, E10000,F3800, F4800, F4810, F6800
- Storage systems – StorEdge A5x00, StorEdge T3
- Host bus adapters – X6727A, X6799A, X6748A

Sun StorEdge Traffic Management software will provide the following benefits to users:
- Increased availabilty to storage devices
- Increased I/O bandwidth to storage pool
- Better RAS capabilities
- Better support for high availability or cluster environments

Frame Buffer Power Management	Solaris 9

Some devices, such as certain tape drives and frame buffers, should not lose power (even in a power cycle) when their drivers are detached. A new interface, `ddi_removing_power(9F)`, checks if a device will lose power as a result of a suspend operation. A new property, `no-involuntary-power-cycles`, can be specified to ensure that the device is not powered down unintentionally.

For more information, see the `ddi_removing_power`(9F) and `no-involuntary-power-cycles`(9P) man pages.

Feature Description	Release Date
SPARC: Driver Hardening Test Harness	Solaris 8 1/01
The driver hardening test harness is a Solaris device driver development tool. The test harness injects a wide range of simulated hardware faults when the driver under development accesses its hardware. This fault injection test harness tests the resilience of a SPARC based device driver.	
For more information, see "Test Harness Description" in *Writing Device Drivers*. Also, see the man pages th_define(1M) and th_manage(1M).	
Generic LAN Driver	Solaris 8 10/00
Driver developers can use the Generic LAN driver (GLD) to implement much of the STREAMS and Data Link Provider Interface (DLPI) functionality for a Solaris network driver. Until the Solaris 8 10/00 release, the GLD module was available only for Solaris *Intel Platform Edition* network drivers. Now GLD is available for Solaris *SPARC Platform Edition* network drivers as well.	Updated 4/01
For more information, see "Drivers for Network Devices" in *Writing Device Drivers*.	

Language Support

Feature Description	Release Date
Universal Language Coverage	Solaris 9
The Solaris 9 operating environment now includes support for 133 locales, covering 39 languages, on both the Solaris 9 Software CDs and the Solaris 9 Languages CD. (more)	
For information about language support in the Solaris 9 release, see the *International Language Environments Guide*.	
Enhanced Asian Language Support	Solaris 9
The Solaris 9 release offers broader support for the Asian languages with new input methods and collation sequences for Simplified Chinese, Traditional Chinese, Korean and Thai. This release also supports new native locale environments for Hong Kong (zh_HK.BIG5HK) and China (GB18030). (more)	
For further information, see the *International Language Environments Guide*.	
Support for the New Chinese GB18030-2000 **Character Set**	Solaris 9
Beginning with the Solaris 8 2/02 release, the Solaris platform allows for input, display, and print of the entire GB18030-2000 character set (including nearly 30,000 characters). Any application that runs on the Solaris platform can thus benefit from a wider set of Chinese characters. (more)	

Feature Description	Release Date
Improved Data Interoperability	Solaris 9
Data interoperability with non-Solaris environments has been improved in the Solaris 9 release with the addition of new `iconv` utilities for data conversion between UTF-8 and the following native encodings: HKSCS, GB18030, ISO 8859-11, and Hindi. Additionally, Japanese language support has been expanded through `iconv` modules that convert between Solaris Japanese locale codesets and Japanese mainframe codesets from Fujitsu, Hitachi, and NEC. (more)	
For further information, see the *International Language Environments Guide*.	
New European and Middle Eastern Keyboard Support	Solaris 9
The Solaris 9 release has added Sun I/O keyboard support for TurkeyQ, TurkeyF, and Arabic, and support for the Sunray USB keyboard for TurkeyQ, TurkeyF, Belgian, and Arabic.	
For further information, see the *International Language Environments Guide*.	
New TrueType Fonts	Solaris 9
The new TrueType fonts provide a common appearance between the codesets and offer support for the same typefaces across the codesets. The TrueType fonts are common to all European locales. Each Asian locale has its own TrueType fonts file.	
For further information, see the *International Language Environments Guide*.	
Expanded Unicode Support	Solaris 8 10/00
The Solaris 9 release offers broader support for Unicode with the addition of new Unicode (UTF-8) locales for Thailand, India, Hong Kong, Turkey, Egypt, Brazil, Finland, and Belgium-Walloon. (more)	Updated 4/01 and Solaris 9
For further information, see the *International Language Environments Guide*.	
Print Filter Enhancement – the `mp` Program	Solaris 8 4/01
The `mp` program accepts international text files from various Solaris locales and produces output for the specified locale. Because the complex text layout (CTL) is supported in `mp`, the output contains proper text layout, such as bidirectional text rendering and shaping. Depending on the `mp` system font configuration for each locale, the PostScript output file can contain glyph images from Solaris system-resident scalable or bitmap fonts.	
For more information, see "Print Filter Enhancement mp(1)" in the *International Language Environments Guide*.	

Java Releases

Feature Description	Release Date
JavaHelp™ v. 1.1.2	Solaris 9
JavaHelp v. 1.1.2 is a full-featured, platform-independent, extensible help system that enables developers and authors to incorporate online help in applets, components, applications, operating systems, and devices.	
The Solaris JavaHelp packages are as follows: ■ SUNWjhrt – The JavaHelp runtime ■ SUNWjhdev – The JavaHelp developer package ■ SUNWjhdem – The JavaHelp demo package ■ SUNWjhdoc – The JavaHelp documentation package	
For more information on JavaHelp, see the JavaHelp home page at: `http://java.sun.com/products/javahelp`	
Java 2 SDK, Standard Edition v. 1.4.0	Solaris 9
The Java™ 2 SDK Standard Edition v. 1.4.0 is an upgrade release for Java 2 SDK (J2SDK 1.4.0). The upgrade release includes new platform features, and new tools and utilities. (more)	
For full details on these enhancements, see the J2SDK 1.4.0 documentation on the Java Software Web site at: `http://java.sun.com/j2se/1.4/docs/relnotes/features.html`	

Feature Description	Release Date
JSP 1.1 and Java Servlet 2.2 Support in Apache Web Server	Solaris 9

With the addition of Jakarta Tomcat 3.2.1d and the `mod_jserv` module, the Apache web server now supports Java Server Pages™ (JSP Version 1.1) and Java Servlets (Version 2.2).

The following files are stored in `/etc/apache` :
- `tomcat.conf`
- `README.Solaris`
- `zone.properties`
- `jserv.properties`
- `jserv.conf`

The following file is stored in `/etc/apache/tomcat`:
- `server.xml-example`

See the `README.Solaris` file for information on enabling Tomcat support. Also refer to:

`http://jakarta.apache.org/tomcat/index.html`

for configuration information.

Tomcat and the `mod-jserv` module, like the rest of Apache software, is open source code that is maintained by a group external to Sun. This group seeks to maintain compatibility with previous releases.

What's New for Desktop Users

This chapter highlights new desktop features that have been added to the Solaris 9 operating environment.

Note – For the most current man pages, use the `man` command.

Desktop Features

Feature Description	Release Date
Xterm Terminal Emulator Support for Multibyte Character Set	Solaris 9
The Xterm terminal emulator now supports multibyte character sets. This feature enables the use of xterm windows in UTF-8 and other multibyte locales. The Xterm command line and resources incorporate new options to specify X font sets.	
See the `Xterm` man page for further information.	
Graphical Workspace Manager	Solaris 8 6/00
Graphical Workspace Manager provides a graphical representation of all workspaces, the ability to navigate across different workspaces with the press of a button, and the ability to drag and drop applications across different workspaces. You are no longer limited to viewing nine workspaces. Also, the Graphical Workspace Manager Options dialog box has been added to provide a number of additional display options.	Updated 4/01
For more information, see "Graphical Workspace Manager" in the *Solaris Common Desktop Environment: User's Guide*.	

Feature Description	Release Date
Workspace Manager	Solaris 8 4/01
The Workspace Manager provides a graphical user interface (GUI) for controlling behavior and the number of workspaces. You can add and delete workspaces by using a slider. You can also display the Graphical Workspace Manager in the Workspace Switch Area of the Front Panel.	
For more information, see "Workspace Manager" in the *Solaris Common Desktop Environment: User's Guide*.	
Window List	Solaris 8 6/00
Window List provides a list of all currently running applications. The Window List enables you, with the click of a mouse button, to locate any application, even those in workspaces other than the current workspace. The Window List also provides the ability to perform window actions on a selected group of applications. You can choose to display or not display the Workspace column.	Updated 4/01
For more information, see "Window List" in the *Solaris Common Desktop Environment: User's Guide*.	
IA: Three-Button Mouse Emulation Available for a Two-Button Mouse	Solaris 8 4/01
Beginning with the release of Solaris 8 *Intel Platform Edition* 4/01, the kdmconfig(1M) utility configures a two-button mouse as a three-button mouse by default. To emulate the middle button on a two-button mouse, push both buttons simultaneously. To disable emulation, choose a two-button entry without three-button emulation from the list of pointing devices displayed by the kdmconfig utility. Users will notice this change when they are using an application that assumes a three-button mouse. The right button now generates a Button-3 event, when previously it generated a Button-2 event.	
Energy Star Standards	Solaris 8 6/00
X11R6.4 standards have been enhanced with Frame Buffer Power Management (FBPM), an extension to the Display Power Management System (DPMS). This enhancement is added to fulfill the U.S. government's Energy Star program requirements and only works on Energy Star-compliant hardware.	
Adding Multiple Files to Emails	Solaris 8 1/01
This feature enables you to keep the Mailer - Attachment - Add dialog box open in order to add two or more files to an email. The need to select Add Files from the Attachment menu multiple times is eliminated.	
For more information on the Mailer, see "Using Mailer" in the *Solaris Common Desktop Environment: User's Guide*.	
Removable Media Manager	Solaris 8 6/00
Removable Media Manager centralizes access to removable devices in one window. You can format, query properties, view directory structures, and where applicable, protect and slice media. See "Removable Media Management" on page 34.	
See also "Using Removable Media Manager" in the *Solaris Common Desktop Environment: User's Guide*.	

Feature Description	Release Date
Audio Enhancements	Solaris 9

New audio directories have been added to the Solaris 9 operating environment. `/usr/include/audio` is a new directory for application audio header files. The audio file format has a new header file, `/usr/include/audio/au.h`, and manual page, `au(4)`.

`/usr/share/audio` is a new depository for miscellaneous audio files. The audio files from `/usr/demo/SOUND/sounds` have been moved here. A symbolic link from `/usr/demo/SOUNDS/sounds` to `/usr/share/audio/samples/au` has been created so that current applications and scripts run without failure.

Numerous bug fixes have been made to the audio kernel modules to improve reliability.

For further information, see the *System Administration Guide: Basic Administration*.

Universal Language Coverage	Solaris 9

The Solaris 9 operating environment now includes support for 133 locales, covering 39 languages, on both the Solaris 9 Software CDs and the Solaris 9 Languages CD. See "Language Support" on page 49.

Desktop Freeware	Solaris 9

See "Freeware" on page 75 for information about `GNU grep 2.4.2`, `GNU tar 1.13`, `GNU wget 1.6`, and `Ncftp Client 3.0.3` in the Solaris 9 release.

What's New: A Closer Look

The Solaris 9 operating environment provides many new features that improve an already powerful and stable operating environment. This chapter describes some of the new features of the Solaris 9 release in more detail:

- Enhanced language support
- Advanced technologies for centralized network administration
- Enhancements to `sendmail`
- CD writer device management
- Improved system information displays
- Improved audio file formats
- Enhanced Java platforms, tools, and utilities

For a complete list of Solaris 9 features with brief descriptions, see chapters 2-4.

Language Support

The Solaris 9 operating environment now includes support for 133 locales, covering 39 languages, on both the Solaris 9 Software CDs and the Solaris 9 Languages CD. See an overview of the language support features in Chapter 4. The following section is a closer look at some of these features.

New Asian Locale Support

Support for the New Chinese `GB18030-2000` Character Set

Beginning with the Solaris 8 2/02 release, the Solaris platform allows for input, display, and print of the entire `GB18030-2000` character set (including nearly 30,000 characters). Any application that runs on the Solaris platform can thus benefit from a wider set of Chinese characters. These glyphs are primarily Han characters, but the encoding also includes glyphs for minority languages such as Tibetan, Wei, Yi, and Mongolian.

`GB18030-2000` support in the Solaris release also includes backward compatibility to previous Chinese codesets (`GBK` and `GB2312`) as well as conversion to other codesets such as Unicode. Solaris developers do not need to change their procedures to access this new encoding support. Standard toolkits can use the new support.

For Java applications that need `GB18030-2000` support, please review J2SE™ at:

`http://java.sun.com/j2se/1.4`

New Chinese and Korean Collation Locales

Collation locales provide different collation options to users such as stroke count and radical, phonetic, and dictionary options.

Wordbreaker Modules for Thai

The wordbreaker module is used to correctly break the Thai text into proper paragraphs, sentences, and words within Motif.

New Asian UTF-8 (Unicode) Locales

The File System Safe Universal Transformation Format, or UTF-8, is an encoding that is defined by X/Open® as a multibyte representation of Unicode. UTF-8 encompasses almost all of the characters for traditional single-byte and multibyte locales for European and Asian languages for Solaris locales.

- `th_TH.UTF-8` locale is the Unicode locale for Thailand.
- `hi_IN.UTF-8` locale is the Unicode locale for India.
- `zh_HK.UTF-8` locale is the Unicode locale for Hong Kong, China.

New Thai Input Method

The new Thai input method supports the Thai input standard, called the WIT, that is specified by the Thai government. The WIT has 3 levels: level 0, level 1 and level 2.

New Chinese input methods

More popular and powerful input methods in the Traditional Chinese and Simplified Chinese locales have been added for new character sets and new locales:

- New Chuyin IM for Traditional Chinese locales
- Cantonese IM for all Chinese locales
- English-Chinese IM for all Chinese locales

New Auxiliary Window for Chinese Input Methods

The Auxiliary window provides an input method user interface (UI) that is "friendly" and extensible for all Chinese locales. New functions that are supported by the auxiliary window are as follows:

- Input method switching

- Input method properties configuration

- Lookup tables for GB2312, GBK, GB18030, HKSCS, CNS, Big–5 and Unicode character sets

- Code table management tool

- A Visual Keyboard

New `iconv` Modules

`iconv` modules allow conversion between native encoded data and Unicode. The following new `iconv` modules have been added to support new character sets:

- UTF-8 <---> HKSCS
- UTF-8 <---> GB18030
- UTF-8 <---> ISO8859-11
- UTF-8 <---> Hindi

New `zh_CN.GB18030` Locale Enhanced From `zh_CN.GBK`

This new `zh_CN.GB18030` locale is provided to support the new GB18030 standard encoding that is required by a new law that the Chinese Government has enacted.

New `zh_HK.BIG5HK` Locale to Support HKSCS for Hong Kong, China

The new `zh_HK.BIG5HK` locale is provided to support the Hong Kong Supplementary Character Set (HKSCS). The HKSCS, as a supplementary character set of the Big-5 and ISO 10646 coding schemes, contains Chinese characters that are needed in Chinese computing in Hong Kong. However, these characters are not contained in either the Big-5 or ISO 10646 standard character sets.

Japanese Module Support

Additional Japanese `iconv` Modules

Additional Japanese language support includes `iconv` code conversions between Solaris Japanese locale codesets, such as eucJP, PCK and UTF-8, and Japanese mainframe codesets, such as Fujitsu JEF, Hitachi KEIS and NEC JIPS.

New European Locale Support

New Unicode (UTF-8) Locales for Europe and the Middle East

For the Solaris 8 10/00 release, Russian and Polish and two new locales for Catalan were added to the European and Middle Eastern locales. For the Solaris 8 4/01 release, two additional languages, Turkish UTF-8 Codeset and Russian UTF-8 Codeset, were added.

In the Solaris 9 Beta release, European and Middle Eastern language support also includes the addition of UTF-8 locales for Turkey, Egypt, Brazil, Finland, and Belgium-Walloon.

The locale names are as follows:

- `ca_ES.ISO8859-1` locale is a Unicode locale for Spain (Catalan).
- `ca_ES.ISO8859-15` locale is an additional Unicode locale for Spain (Catalan).
- `pl_PL.UTF-8` locale is the Unicode locale for Poland.
- `ru_RU.UTF-8` locale is the Unicode locale for Russia.
- `tr_TR.UTF-8` locale is the Unicode locale for Turkey.

- `ar_EG.UTF-8` locale is the Unicode locale for Egypt.
- `pt_BR.UTF-8` locale is the Unicode locale for Brazil.
- `fi_FI.UTF-8` locale is the Unicode locale for Finland.
- `fr_BE.UTF-8` locale is the Unicode locale for Belgium-Walloon.

Euro Default Currency Support

The following locales have changed from their national currency unit (NCU) to the euro currency glyph:

`ca_ES.ISO8859-15` (Spain)	`de_AT.ISO8859-15` (Austria)
`de_DE.ISO8859-15` (Germany)	`de_DE.UTF-8` (Germany)
`en_IE.ISO8859-15` (Ireland)	`es_ES.ISO8859-15` (Spain)
`es_ES.UTF-8` (Spain)	`fr_BE.ISO8859-15` (Belgium)
`fr_BE.UTF-8` (Belgium)	`fi_FI.ISO8859-15` (Finland)
`fi_FI.UTF-8` (Finland)	`fr_FR.ISO8859-15` (France)
`fr_FR.UTF-8` (France)	`it_IT.ISO8859-15` (Italy)
`it_IT.UTF-8` (Italy)	`nl_BE.ISO8859-15` (Belgium)
`nl_NL.ISO8859-15` (Netherlands)	`pt_PT.ISO8859-15` (Portugal)

Enhanced Dtpad File Open/Save Codeset Conversion

Enhancements include the addition of an "encoding" option to the File Open/Save dialog box that supports file encoding changes with `iconv(3C)`. This option enables users to open or save files in various encodings, such as UTF-8 and UTF-16.

Role-Based Access Control

Role-Based Access Control (RBAC) was updated in the Solaris 8 1/01 software release. RBAC databases can now be managed through the User tool in the Solaris Management Console graphical interface. A terminology change has made the term *execution profiles* obsolete. The term has been replaced with *rights profiles*, also referred to as *rights* (in the graphical interface) and *profiles* (on the command line and in files).

In addition to authorizations and commands with security attributes, a rights profile can now include other rights profiles. If the same command appears in more than one subordinate rights profile, the first occurrence in the file will assumes precedence.

The policy.conf(4) file now recognizes the keyword PROFS_GRANTED, which lets you assign rights profiles by default.

The following figure illustrates how the extended user attributes are supplied to the user.
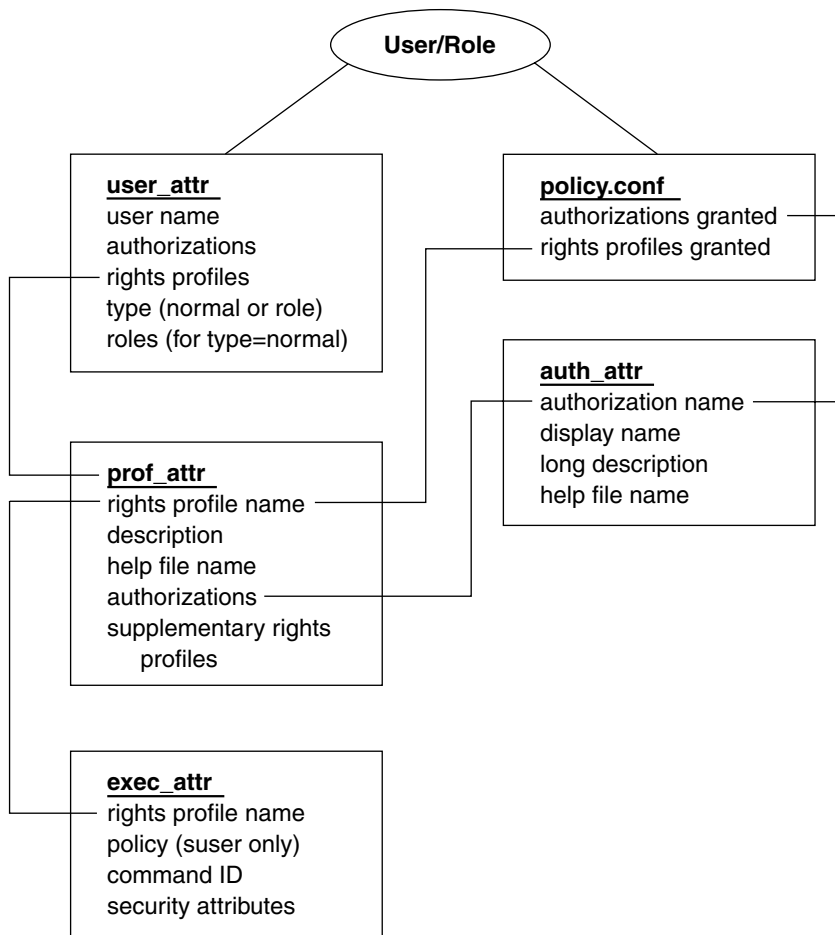
FIGURE 5–1 Extended Attribute Databases

The user_attr database contains the attributes that are shown, including a comma-separated list of profile names. The contents of the profiles are split between the prof_attr file and the exec_attr file. The prof_attr file contains rights

profile identification information, authorizations assigned to the rights profile, and nested rights profiles. The exec_attr file identifies the policy and contains commands with their associated security attributes. The auth_attr file supplies authorization information to the Solaris Management Console tools.

Note – Although you can assign authorizations directly to users through user_attr, this practice is discouraged.

The policy.conf file supplies default attributes to be applied to all users. For example, if the Printer Management rights profile is assigned to a user or role, the user_attr entry for that user or role contains the keyword/value pair: profiles=Printer Management. The prof_attr file defines this profile, which also specifies the help file and authorizations, with the following line:

```
Printer Management:::Manage printers, daemons,
spooling:help=RtPrntAdmin.html;auths=solaris.admin.printer,
/ solaris.admin.printer.modify,solaris.admion.printer.delete
```

In the exec_attr file, the following line assigns an effective user ID = lp to the command /usr/sbin/accept within the Printer Management profile:

```
Printer Management:suser:cmd:::/usr/sbin/accept:euid=lp
```

The following table lists commands that use authorizations.

TABLE 5–1 RBAC Commands

Command	Associated Authorizations
at(1)	solaris.jobs.user
atq(1)	solaris.jobs.admin
crdw(1)	solaris.device.cdrw
crontab(1)	solaris.jobs.user, solaris.jobs.admin
allocate(1M)	solaris.device.allocate, solaris.device.revoke
deallocate(1M)	solaris.device.allocate, solaris.device.revoke
list_devices(1M)	solaris.device.revoke
smcron(1M)	solaris.jobs.admin, solaris.jobs.user
smdiskless	solaris.admin.dcmgr.clients, solaris.admin.dcmgr.read
smexec(1M)	solaris.profmgr.read, solaris.profmgr.write
smgroup(1M)	solaris.admin.usermgr.read, solaris.admin.usermgr.write

TABLE 5–1 RBAC Commands *(Continued)*

Command	Associated Authorizations
smmultiuser(1M), smuser(1M)	solaris.admin.usermgr.pswd, solaris.admin.usermgr.read, solaris.admin.usermgr.write, solaris.profmgr.assign, solaris.profmgr.delegate, solaris.role.assign, solaris.role.delegate
smmaillist(1M)	solaris.admin.usermgr.read, solaris.admin.usermgr.write
smosservice	solaris.admin.dcmgr.admin, solaris.admin.dcmgr.read
smprofile(1M)	solaris.profmgr.read, solaris.profmgr.write
smrole(1M)	solaris.admin.usermgr.pswd, solaris.admin.usermgr.read, solaris.admin.usermgr.write, solaris.profmgr.assign, solaris.profmgr.delegate, solaris.role.assign, solaris.role.delegate

For more information on the Solaris Management Console, see "System Administration Tools" on page 21.

Enhancements to `sendmail`

In the Solaris 9 Beta Refresh operating environment, `sendmail` has been upgraded to version 8.12 with major changes from version 8.11. The new features in `sendmail` version 8.12 include the following:

- A new configuration file, `submit.cf`
- New command-line options
- New and revised configuration file options
- New defined macros
- New macros that are used to build the configuration file
- New and revised `m4` configuration macros
- New compile flags
- New delivery agent flags
- New queue features
- New uses for LDAP
- A method for identifying IPv6 addresses in configuration
- Changes to `mail.local`
- Changes to `mailstats`
- Changes to `makemap`
- A new maintenance utility, `editmap`(1M)

The following details might be of particular interest:

- Per RFC 2476, `sendmail` now listens for submissions on port 587, a feature that was added to but not mentioned in version 8.10.

- Because the `AutoRebuildAliases` option is no longer available, `newaliases` must be run manually now in order for changes to `/etc/mail/aliases` to become effective. Also, because `sendmail` is no longer `setuid root`, only `root` can run `newaliases`.

For further information, see the Mail Services Topics in the *System Administration Guide: Resource Management and Network Services*. The series of chapters on mail services provides overview information, some procedures for setting up and modifying your mail service and for troubleshooting, some background information, and details about all of the new features.

`pargs` and `preap` Commands

The `pargs` command enables you to display all the arguments that are passed to a process. Use the `pargs` command in combination with the `pgrep` command to display the arguments that are passed to a process, as follows:

```
# pargs `pgrep ttymon`
579:    /usr/lib/saf/ttymon -g -h -p system-name console login:
-T sun -d /dev/console -l
argv[0]: /usr/lib/saf/ttymon
argv[1]: -g
argv[2]: -h
argv[3]: -p
argv[4]: system-name console login:
argv[5]: -T
argv[6]: sun
argv[7]: -d
argv[8]: /dev/console
argv[9]: -l
argv[10]: console
argv[11]: -m
argv[12]: ldterm,ttcompat
548:    /usr/lib/saf/ttymon
argv[0]: /usr/lib/saf/ttymon
```

Use `pargs -e` to display the environment variables that are associated with a process, as in the following example:

```
$ pargs -e 6763
6763: tcsh
envp[0]: DISPLAY=:0.0
```

You can use the `pargs` and `preap` commands to examine any process you have privileges to look at. As superuser, you can examine any process.

You can use the `preap` command to clean up a defunct (also called a *zombie*) process. A zombie process is one that has not yet had its exit status reaped (or claimed) by its parent. These processes are generally harmless, but they can consume system resources if they are numerous.

New `df` and `du` Options

The `df` and `du` commands provide two new options for displaying disk space in sizes that are easy to understand.

The default form of `df` displays disk space in blocks (512 bytes). `df` output, in kilobytes, is:

```
$ df -k / /usr
Filesystem          kbytes    used    avail capacity  Mounted on
/dev/dsk/c0t0d0s0    192056   94788    78063   55%    /
/dev/dsk/c0t0d0s6   1982988  829966 1093533   44%    /usr
```

The same disk space displayed in powers of 1024 is:

```
$ df -h / /usr
Filesystem          size    used  avail capacity  Mounted on
/dev/dsk/c0t0d0s0   188M    93M    76M    55%    /
/dev/dsk/c0t0d0s6   1.9G   811M   1.0G    44%    /usr
```

Additionally, the same disk space displayed in powers of 1000 is:

```
$ df -H / /usr
Filesystem          size    used  avail capacity  Mounted on
/dev/dsk/c0t0d0s0   192M    95M    78M    55%    /
/dev/dsk/c0t0d0s6   2.0G   830M   1.1G    44%    /usr
```

The default form of `du` displays disk space in blocks (512 bytes). `du` output is:

```
% du -s k*
100     kadmin
98      kadmin.local
98      kdb5_util
90      keyserv
10      killall
```

The same disk space displayed in powers of 1024 is:

```
% du -h k*
  50K   kadmin
```

```
  49K   kadmin.local
  49K   kdb5_util
  45K   keyserv
   5K   killall
```

Additionally, the same disk space displayed in powers of 1000 is:

```
% du -H k*  51K   kadmin
  50K   kadmin.local
  50K   kdb5_util
  46K   keyserv
   5K   killall
```

Java 2 SDK, Standard Edition v. 1.4.0

The following features have been added to the Java 2 SDK, Standard Edition, in version 1.4.0 (J2SDK 1.4.0). For full details on these platform enhancements, see the J2SDK 1.4.0 documentation on the Java Software Web site at `http://java.sun.com/j2se/1.4/docs/relnotes/features.html`.

XML Processing

API XML processing has been added to the Java 2 Platform. J2SDK 1.4.0 provides basic support for processing XML documents through a standardized set of APIs.

New I/O APIs

The new I/O (NIO) API provides new features and improved performance in the areas of buffer management, character-set support, regular-expression matching, file I/O, and scalable network I/O.

Security

J2SDK 1.4.0 includes the following changes to security:

■ The Java Cryptography Extension (JCE), Java Secure Socket Extension (JSSE), and Java Authentication and Authorization Service (JAAS) security features have now been integrated into J2SDK 1.4.0 rather than being optional packages.

■ Two new security features are:

- The Java GSS-API can be used for securely exchanging messages between communicating applications that use the Kerberos V5 mechanism.

- The Java Certification Path API includes new classes and methods in the `java.security.cert` package that enable you to build and validate certification paths (also known as "certificate chains.")

- With the integration of JAAS into the J2SDK, the `java.security.Policy` API handles Principal-based queries, and the default policy implementation supports Principal-based grant entries. Thus, access control can now be based not just on what code is running, but also on who is running it.

- Support for dynamic policies has been added. In J2SDK releases prior to version 1.4.0, classes were statically bound with permissions by querying security policy during class loading. The lifetime of this binding was scoped by the lifetime of the class loader. In version 1.4.0, this binding is now deferred until a security check needs it. The lifetime of the binding is now scoped by the lifetime of the security policy.

Image I/O Framework

The Java Image I/O Framework provides a pluggable architecture for working with images that are stored in files and accessed across the network. This framework offers substantially more flexibility and power than the current APIs for loading and saving images.

AWT

Changes to the Abstract Window Toolkit (AWT) package center on improving the robustness, behavior, and performance of programs that present a graphical user interface. Improvements include the following:

- A new focus architecture replaces the previous implementation and addresses many focus-related bugs that were caused by platform inconsistencies, and incompatibilities between AWT and Swing components.

- The new full-screen exclusive mode API supports high-performance graphics by suspending the windowing system so that drawing can be rendered directly to the screen. This capacity benefits applications such as games, or other rendering-intensive applications.

- Headless support is now enabled by new graphics environment methods that indicate whether a display, keyboard, and mouse can be supported in a graphics environment.

- The ability to disable native frame decorations is now available for applications that need complete control of the specification of a frame's appearance. When this ability is enabled, it prevents the rendering of a native title bar, system menu,

border, or other native screen components that depend on the operating system.

- The frequently requested mouse wheel, with a scroll wheel in place of the middle mouse button, is enabled with new built-in Java support for scrolling with the mouse wheel. Also, a new mouse wheel listener class allows customization of mouse wheel behavior.

- The AWT package has been modified to be fully 64-bit compliant and now runs on Solaris machines with 64-bit and 32-bit addresses.

Swing

Many new features have been added to Swing:

- The spinner component is a single line input field that enables the user to select a number or a value by cycling through a sequence of values with a tiny pair of up/down arrow buttons.

- The formatted text field component allows formatting of dates, numbers, and strings, such as a text field that accepts only decimal currency values.

- A drag-and-drop architecture provides seamless drag-and-drop support between components as well as an easy way to implement drag-and-drop in your customized Swing components. You need only to write a couple of methods that describe the particulars of your data model.

Several features have been enhanced in Swing:

- The progress bar component has been enhanced to support an indeterminate state. Rather than showing the degree of completeness, the indeterminate progress bar uses constant animation to show that a time-consuming operation is occurring.

- The tabbed pane component has been enhanced to support scrollable tabs. With this feature enabled, if all the tabs cannot fit within a single tab run, the tabbed pane component displays a single, scrollable run of tabs instead of wrapping the tabs onto multiple runs.

- The popup and popup factory classes, which were previously package private, have been exposed and made public so that developers can customize or create their own popups.

- The new focus architecture is fully integrated into Swing.

Logging API

The Java Logging APIs facilitate software servicing and maintenance at customer sites by producing log reports suitable for analysis by end users, system administrators, field service engineers, and software development teams. The Logging APIs capture

information such as security failures, configuration errors, performance problems, and bugs in the application or platform.

Long-term Persistence of JavaBeans Components

The new persistence model is designed to handle the process of converting a graph of beans to and from a persistent form. The new API is suitable for creating archives of graphs of JavaBeans™ components as textual representations of their properties.

JDBC 3.0 API

The JDBC™ 3.0 API, which is composed of packages `java.sql` and `javax.sql`, provides universal data access from the Java programming language. By using the JDBC 3.0 API, you can access virtually any data source, from relational databases to spreadsheets and flat files. JDBC technology also provides a common base on which tools and alternative interfaces can be built.

This API enables you to do the following:

- Set savepoints in a transaction
- Keep result sets open after a transaction is committed
- Reuse prepared statements
- Get metadata about the parameters to a prepared statement
- Retrieve keys that are automatically generated
- Have multiple result sets open at one time

Two new JDBC data types are , `BOOLEAN` and `DATALINK`. The `DATALINK` type enables management of data outside of a data source. This release also establishes the relationship between the JDBC Service Provider Interface and the Connector architecture.

Assertion Facility

An assertion facility has been added to the Java 2 Platform. Assertions are Boolean expressions that the developer believes to be true about the state of a computer program. For example, after sorting a list, the developer might assert that the list is in ascending order. Evaluating assertions at runtime to confirm their validity is one of the most powerful tools for improving code quality, as it quickly uncovers the developer's misconceptions about a program's behavior.

Preferences API

This new feature is a simple API for managing user preference and configuration data. Applications require preference and configuration data to adapt to different users, environments, and needs. Applications need a way to store, retrieve, and modify this data. This need is met by the Preferences API. The Preferences API is intended to replace the most common uses of the class, `java.util.Properties`, and to rectify many of its deficiencies while retaining its light weight.

Monitoring Facility

The monitoring facility is implemented by the class, `java.lang.SystemStatistics`, and allows applications access to the underlying system information about processor and memory utilization, either of the entire OS or of a specific process.

64–bit Support

J2SDK 1.4.0 for Solaris *(SPARC Platform Edition)* supports 64-bit operation on 64-bit Sparc-v9 platforms when you use the Java HotSpot™ Server VM. With a 64-bit address space, more than 4 Gbytes of heap memory is available. The Java HotSpot Server VM includes support for both 32-bit and 64-bit operations. Users can select either a 32-bit or 64-bit operation by using command-line flags.

IPv6 Support

The Java 2 Platform now supports Internet Protocol version 6 (IPv6), the next-generation protocol that is designed to replace the current protocol, IPv4. IPv6 is superior to IPv4 because of the higher number of IP addresses available and improvements to routing and network autoconfiguration.

Networking

J2SDK 1.4.0 supports more flexible and robust functionality in socket creation and manipulation, connected datagram sockets, and query of network interface information. J2SDK 1.4.0 contains a new class that represents Uniform Resource Identifiers (URI) for URI parsing and manipulation. This SDK provides a reference implementation of Java DNS name service provider. J2SDK 1.4.0 also includes

improvements in the URLConnection API, HTTP protocol support, FTP handling, URL encoding/decoding, and SOCKS support.

RMI

In J2SDK 1.4.0, certain static methods of `java.rmi.server.RMIClassLoader` delegate their behavior to an instance of a new service provider interface, `java.rmi.server.RMIClassLoaderSpi`. This service provider object can be configured to augment RMI's dynamic class-loading behavior for a particular application. By default, the service provider implements the standard behavior of all of the static methods in `RMIClassLoader`.

Java Naming and Directory Interface (JNDI)

Java Naming and Directory Interface™ (JNDI) has the following enhancements in J2SDK 1.4.0:

- An Internet Domain Naming System (DNS) service provider is part of J2SDK 1.4.0. This component enables applications to read data that is stored in the DNS.
- The JNDI Lightweight Directory Access Protocol (LDAP) service provider has security enhancements that enable applications to establish secure sessions over existing LDAP connections and to use different authentication protocols.
- The JNDI CORBA Object Services (COS) naming service provider supports the Interoperable Naming Service (INS) specification (99-12-03).

CORBA, Java IDL, and RMI-IIOP

J2SDK 1.4.0 includes a Portable Object Adapter (POA) Object Request Broker (ORB). An ORB enables CORBA objects to communicate with each other by connecting objects that make requests (clients) with objects servicing requests (servers). A POA ORB enables developers to construct object implementations that are portable between different ORB products, to provide support for objects with persistent identities, and to complete numerous other tasks.

Java Platform Debugger Architecture Product

A feature has been added that encapsulates the ability to substitute modified code in a running application through the debugger APIs. For example, you can recompile a single class and replace the old instance with the new instance. This combination

minimizes time the developer takes to make small, incremental changes to an application. This feature is required by some tools vendors before they move to JPDA. These vendors have created hooks in their specialized VM and specialized debugger interfaces for this functionality.

Internationalization

Character handling in J2SDK 1.4.0 is based on version 3.0 of the Unicode standard. This character handling affects the Character and String classes in the `java.lang` package as well as the collation and bidirectional text analysis functionality in the `java.text` package.

J2SDK 1.4.0 supports Thai and Hindi in all areas of functionality. See the Supported Locales document on the Java Software Web site for complete information on supported locales and writing systems.

Java Plug-in Product

Java Plug-in 1.4 offers the following new features:

- Multi-version support so that multiple versions of the JRE can be deployed in the same environment and Java Plug-in can select the correct version
- Support of HTTPS through Java Secure Socket Extension (JSSE) rather than the browser
- Enhanced applet caching so that other files, such as GIF, JPEG, and XML, can be cached in addition to JAR and class files
- Applet persistence across browser sessions

Version 1.4 also provides the following:

- Access to the DOM through standard, w3c-defined interfaces
- Assertion and logging support
- Applet usability enhancements that include a progress bar for applet loading
- Improved JAR compression for faster downloads

Accessibility

J2SDK 1.4.0 offers new support for accessibility in the following areas:

- Mnemonic tab navigation on a JTabbedPane
- Text editing by assistive technologies

- Accessibility of HTML components
- Accessibility of Swing Actions
- List navigation by using the first letter of list items

Regular Expressions

The new package, `java.util.regex`, contains classes for matching character sequences against patterns that are specified by regular expressions.

Java Tools and Utilities Enhancements

The following changes have been made to the tools and utilities in J2SDK 1.4.0:

- The java application launcher supports command-line options for support of the new Assertions Facility. A new option, `-Xconcgc`, is available for invoking concurrent garbage collection on multiprocessor platforms to reduce garbage-collections pauses on large heaps. In the Solaris operating environment *(SPARC Platform Edition)*, new command-line options are available for specifying 64-bit or 32-bit operation.

- The `javac` byte-code compiler has a new `-source` option that enables support for compiling source code that contain assertions.

- The `javadoc` tool now includes values of static fields in the generated documentation.

- The `native2ascii` tool in J2SDK 1.4.0 contains bug fixes to correctly process source files that are encoded with Unicode.

- The `idlj` tool now generates server-side bindings that follow the Portable Servant Inheritance Model. This change involves new default behavior and new command-line options that enable you to continue to generate backward-compatible server-side bindings.

- The `orbd` tool, or Object Request Broker Daemon, replaces the Transient Naming Service, `tnameserv`. ORBD includes both a Transient Naming Service and a Persistent Naming Service. The `orbd` tool is used to enable clients to transparently locate and invoke persistent objects on servers in the CORBA environment. The `orbd` tool incorporates the functionality of a Server Manager, an Interoperable Naming Service, and a Bootstrap Name Server. When you use this tool in conjunction with the `servertool`, the Server Manager locates, registers, and activates a server when a client wants to access the server.

- The `servertool` is new in J2SDK 1.4.0. The `servertool` provides an ease-of-use interface for application developers to register, unregister, start up, and shut down a server.

- The `rmic` compiler has a new option to enable Portable Object Adapter, or POA, support for Remote Method Invocation. The POA enables, for example, portability among vendor ORBs.

- The graphical `Policy Tool` utility has been enhanced to enable the specification of a Principal field that indicates what user is to be granted specified access control permissions.

Other Software

Early Access software

The Solaris 9 software release includes Early Access (EA) directories with EA software. EA products are located on both the Solaris Software CD 2 of 2 and the Solaris DVD.

Located in the `../EA/products` directory are sub-directories that contain each EA product. Each product sub-directory includes a `README` with further information about that particular EA product.

Freeware

Several freeware tools and libraries are included in the Solaris 9 release. The following freeware packages have been updated for the Solaris 9 Beta release:

- Apache 1.3.20 - UNIX based HTTP server
- `bash` 2.05 - `Sh`-compatible command language interpreter
- `bzip2` 1.0.1 - Block-sorting file compressor
- `gzip` 1.3 - GNU zip compression utility
- `less` 358 - A pager, similar to the `more` command
- `mkisofs` 1.13 - Builds a CD image using a iso9660 file system
- `tcsh` 6.0.10 - C shell with file name completion and command line editing
- `zip` 2.3 - Compression and file packaging utility
- `zsh` 3.0.8 - Command interpreter (shell) usable as an interactive login shell and as a shell script command processor

The following libraries have also been included in the Solaris 9 Beta Refresh release:

- `Glib 1.2.10` – A library of useful data types, macros, type conversions, string utilities, and a lexical scanner.
- `GTK+ 1.2.10` – The GIMP toolkit. A set of libraries that can be used to create graphical user interfaces.
- `Jpeg 6b` – Standardized compression software for full color and gray scale images.
- `Libpng 1.0.10` – PNG reference library. PNG is a format for storing images designed to be the successor to the GIF format and, to some extent, the more complex TIFF format.
- `Tcl/tk 8.33` – TCL-TK GUI Toolkit is an Xqq toolkit implemented with the Tcl scripting language.
- `Libtif f3.55` – Provides support for reading and writing TIFF and a small collection of tools for doing simple manipulations of TIFF images.
- `Libxml2 2.3.6` – A C library providing XML, Extensible Markup Language, support. XML is the universal format for structured documents and data on the web.

The following commands and utilities have also been included in the Solaris 9 Beta Refresh release:

- `Gnu Grep 2.4.2` – A pattern matcher which is twice as fast as the stock Unix `egrep` utility.
- `Gnu Tar 1.13` – An archiver that includes multivolume support, the ability to archive sparce files, automatic archive compression and decompression, remote archives and other special features.
- `Ncftp Client 3.0.3` – A free set of programs that use the File Transfer Protocol. It is intended to replace the stock `ftp` program that comes with Unix systems.
- `Samba 2.2.0` – The free SMB and CIFS client and server for Unix and other operating systems. SMB and CIFS are protocols by which many PC-related machines share files, printers, and other information.
- `Tcp-wrappers 7.6` – Small daemon programs that monitor and filter incoming requests for network services. These programs log the client host name of incoming requests and thus enhance network security.
- `Gnu Wget 1.6` – A free network utility to retrieve files from the Web using HTTP and FTP, the two most widely used internet protocols.

Features in the Solaris 8 Software Release

Appendix A summarizes features in the Solaris 8 operating environment.

Note – This appendix includes only features that were in the initial Solaris 8 release.

Features that were added in the Solaris 8 update releases are documented in the Solaris 9 chapters.

Next Generation Internet Protocol

Feature Description

IPv6

IPv6 adds increased address space and improves Internet functionality by using a simplified header format, support for authentication and privacy, and autoconfiguration of address assignments. IPv6 also enables new quality-of-service capabilities.

Directory Services and Naming Enhancements

Feature Description

Native Lightweight Directory Access Protocol (LDAP)

Native LDAP provides the Naming Service switch back-end support for LDAP-based directory service.

Java Enhancements

Feature Description

Java 2 Software Development Kit (SDK) for Solaris

The Java 2 SDK, Standard Edition version 1.2.1_04 is the latest release of the Java 2 platform for the Solaris operating environment. The SDK includes these enhancements:
- Improved scalability
- Improved class libraries, including the new Java 2 APIs
- Enhanced memory management system
- High-performance, scalable Java Virtual Machine (JVM)
- Just-in-time (JIT) compiler optimizations
- Faster Java thread synchronization

Installation and Management

Feature	Description

Solaris Web Start Enhanced Installation CD

Solaris Web Start, a graphical, wizard-based, Java-powered software application that installs the Solaris operating environment and other software, is now distributed on a separate installation CD.

Dynamic Host Configuration Protocol (DHCP) Network Booting

Network installations can now use DHCP to acquire boot parameters and network configuration information necessary for booting a client over the network. DHCP booting is supported on certain SPARC and IA based systems.

IA: Boot Partition in Solaris 8

Users who are running Solaris *Intel Platform Edition* can now designate a separate IA boot partition.

IA: CD-ROM Boot

This new feature enables the user to boot a system from an installation CDthat uses the "El Torito" standard (rather than from the Device Configuration Assistant diskette, as in previous releases.)

DHCP Manager

DHCP Manager provides a Java based graphical interface for configuring and managing the Solaris DHCP server and DHCP databases. The DHCP Manager enables the system administrator to use a single tool to perform all DHCP management duties: set up and manage DHCP servers, manage client configuration options and macros, and manage networks and IP addresses that are under DHCP management.

IA: Large Disk Support

By using improved BIOS interfaces to access the disk, Solaris 8 *Intel Platform Edition* now fully uses disks larger than 8 Gbytes.

Solaris Web-Based Enterprise Management (WBEM) Services

Solaris WBEM Services software is an implementation of Web-Based Enterprise Management (WBEM) standards and technologies in the Solaris operating environment. Intended for developers and administrators of WBEM-enabled environments, Solaris WBEM Services provides the Solaris Schema; extensions of the CIM Schema classes; and management, security, and logging services.

Support for Domain Name System (DNS) in System Identification Utilities

DNS has been added to the list of name services that can be configured through the system identification utilities.

Support for IPv6 in System Identification Utilities

Systems can now be configured at installation to use IPv6 in addition to IPv4.

Unlimited Number of Pseudo-Terminals Available

Solaris 8 software enables the opening on any number of pseudo-terminals (used by programs like `rlogin` and `telnet`).

Reading Documentation from the Solaris 8 Documentation CD

The `ab2cd` script enables all users to read AnswerBook2™ documentation directly from the Solaris 8 Documentation CD. The script has been enhanced to provide better user feedback, to enable users to set the port number on which `ab2cd` runs, and to read documentation already installed on the user's system.

Product Registry

The Solaris Product Registry is a tool to manage software that was installed by using Solaris Web Start 3.0 or the Solaris package management commands (`pkgadd`, for example.) This tool enables you to do the following:
- View a list of installed and registered software and some software attributes
- Install additional software products
- Uninstall software
- Browse for and launch an installer

Networking

SPARC: InterDomain Networks (IDNs)

IDNs enable the user to set up high-speed network connections between dynamic system domains without the need for special hardware.

IP Security Architecture (IPsec) for IPv4

IPsec provides protection for IP datagrams. The protection can include confidentiality, strong integrity of the data, partial sequence integrity (replay protection), and data authentication.

IPv6 NFS/RPC Compliant

This feature adds IPv6 support to NFS and RPC in a seamless manner. No changes are made to existing commands that are related to NFS. Most RPC applications can also run over IPv6 without any change. Some advanced RPC applications with transport knowledge might require updates.

Logical Link Controller 2 (LLC2)

The Class II logical link control driver (LLC2) acts as an interface between network software (NetBIOS, SNA, OSI) that runs under the Solaris operating environment and a physical LAN network that is controlled by one of the supported communications adapters. This version of the LLC2 driver includes support for both connectionless and connection-oriented LLC2 operations for Ethernet, Token Ring, and FDDI adapters when the support is accessed through the appropriate Solaris MAC layer driver.

NIS/NIS+ over IPv6 Transports

This feature enables users to perform NIS and NIS+ operations over IPv6 RPC transports, and to store IPv6 addresses in the NIS, NIS+, and DNS naming services.

Enhancements to `sendmail` 8.9.3

New options and utilities improve the storage and security functionality of `sendmail`.

Service Location Protocol (SLP)

SLP is an Internet Engineering Task Force (IETF) protocol for discovering shared resources (such as printers, file servers, netcams, and so on) in an enterprise network. The Solaris 8 operating environment contains a full implementation of SLP that includes APIs that enable developers to write SLP-enabled applications, and provides system administrators a framework for ease of network extensibility.

Solaris STREAMS Framework Enhancements

The STREAMS framework enhancements in the Solaris 8 operating environment provide more deterministic response times for real-time processes by ensuring that STREAMS processing uses a priority that does not conflict with the user process priority.

Network Time Protocol

NTP provides precise time and network clock synchronization for use in distributed computing environments. The Solaris 8 release has been upgraded to include the 3-5.93e version.

File System Enhancements

Feature	Description

Universal Disk Format (UDF) File System

The UDF file system, the industry-standard format for storing information on optical media technology, is supported in this Solaris release. You can use the UDF file system to exchange data on the following components when they contain a UDF file system:

- CD-ROMs
- Disks and diskettes
- Digital versatile disc or digital video disc (DVD) – DVD-ROM on supported platforms

NFS Server Logging

NFS server logging enables an NFS server to provide a record of file operations that are performed on its file systems. This feature is particularly useful for sites that make anonymous FTP archives available to NFS and WebNFS™ clients.

IA: Extended Memory (XMEM) Support

XMEM support provides a mechanism that enables a single 32-bit process to efficiently allocate and manage more than 4 Gbytes of physical memory. The XMEM feature is implemented as a file system (`xmemfs`) that system administrators can mount and use to reserve memory for applications.

WebNFS JavaBeans Component

The WebNFS JavaBeans component contains an XFileChooser class that extends the JFileChooser graphical component of the Java 2 API. This bean can be used by any Java 2 application that needs to display a file chooser to enable users to select a file for input (open) or output (save). By using XFileChooser, an application can access a file on a local disk or on an NFS server through the use of NFS URL naming.

Deferred Access Time Updates on UFS File Systems

Two new mount options, `dfratime` and `nodfratime`, enable and disable deferred access time updates on UFS file systems. When writing access time updates for the file system are enabled, they can be deferred until the disk is accessed for tasks other than updating access times.

Diagnostic and Availability Enhancements

Feature	Description
coreadm Command	
The coreadm command provides flexible core file-naming conventions and better core file retention.	
Examining Core Files with proc Tools	
The proc tools are utilities that can manipulate features of the /proc file system. Some of the proc tools have been enhanced to examine process core files as well as live processes.	
Improved Device Configuration (devfsadm)	
The devfsadm command provides an improved mechanism for managing the special device files in the /dev and /devices directories, including support for dynamic reconfiguration events.	
Improved System Error Messages	
The system boot and error message format now provides a numeric identifier, module name, and timestamp to messages that are generated by the syslog(1M) logging facility. In addition, messages that were previously lost after a system panic and reboot are now saved.	
Modular Debugger (mdb)	
mdb is a new extensible utility for low-level debugging and editing of the live operating system, operating system crash dumps, user processes, user process core dumps, and object files.	
Remote Console Messaging	
This release includes the consadm command, which enables you to select a serial device as an *auxiliary* (or remote) console for troubleshooting remote system problems.	
TCP/IP Internal Trace Support	
TCP/IP now provides internal trace support by logging TCP communications when a connection is terminated by a reset (RST) packet.	

Performance and Scalability Enhancements

Feature Description

IA: Added Support for Physical Address Extension (PAE) Mode

With the release of Pentium Pro, Intel introduced a mode called PAE on its advanced processors. By using PAE, Solaris *Intel Platform Edition* can address up to 32 Gbytes of physical memory.

New Application Debugging Tool: `apptrace`

A new application debugging tool, `apptrace`, enables application developers and system support personnel to debug application or system problems by providing call traces to Solaris shared libraries, which might show the series of events leading up to a point of failure.

SPARC: New System Monitoring Tool: `busstat`

A new system monitoring tool, `busstat` provides access to bus-related performance counters on supported SPARC platforms. Viewing these performance counters with `busstat` enables you to measure hardware clock cycles and bus statistics including DMA and cache coherency transactions on a multiprocessor system.

Faster Boot for Servers

Large servers now require significantly less time to boot.

New Alternative to `poll()` **Interface**

`/dev/poll` is a second form of polling for the completion of I/O events that provides much higher performance when a very large number of events must be polled for on file descriptors that remain open for a long time. This feature supplements but does not replace `poll(2)`.

New Utility: `prstat`

The `prstat` utility iteratively examines all active processes on the system and reports various statistics, based on the selected output mode and sort order.

IA: Xeon Enhancements

To maximize performance, Solaris 8 *Intel Platform Edition* now supports the Page Attribute Table (PAT) feature of IA32–bit processors (Pentium II and Pentium III).

Security Enhancements

Feature Description

Solaris Smart Cards

The Solaris Smart Card feature implements the Open Card Framework (OCF) 1.1 standard. Security administrators can use this technology to protect a computer desktop or individual application by requiring users to authenticate themselves by means of a smart card.

Default File System and Directory Permissions

Many system files and directories in the Solaris 8 release have different default ownership and stricter permissions than in previous releases.

Role-Based Access Control (RBAC)

Traditional superuser-based systems grant full superuser powers to anyone who can become superuser. With RBAC, administrators can assign limited administrative capabilities to normal users.

Centralized Administration of User Audit Events

The file, `/etc/security/audit_user`, which stores audit preselection classes for users and roles, is now supported in the name switch. You no longer need to set up the audit events for a user on each system to which the user has access.

Real-time Systems Enhancements

Feature Description

High-Resolution Timers

The high resolution timers (HRTs) bypass the traditional 10ms clock interface to expose the granularity of the physical clock interrupt from the hardware. Thus the HRT interface allows a real-time process to take control of one processor (of a multiprocessor system) and operate to any required degree of precision in timing events.

User-Level Priority Inheritance

The real-time threads feature implements the POSIX interfaces (previously only dummied in) that let the high-priority thread "lend" its priority to the low-priority thread until it releases the lock.

Common Desktop Environment (CDE) Enhancements

Feature Description

Personal Digital Assistant (PDA) Support

The PDA Synchronization (PDASync) is a Java based application that enables users to easily synchronize their desktop calendar, mail, address book, and memos with their PDA.

Hot Key Editor

The Hot Key Editor enables users to predefine a series of commands to a particular function key, resulting in increased productivity and efficiency.

Java Media Framework (JMF)

The JMF, a Java based application, provides smooth streaming-video file-format support for MPEG1, MPEG2, Quicktime, and AVI, as well as audio support for MIDI. This feature maximizes real-time video creation and broadcast functionality.

SPARC: PC Launcher 1.0

PC launcher 1.0 for SunPCi enables users to obtain seamless access and power to view, edit, and print many popular types of PC files or attachments instantly, by automatically launching the associated Windows application and file.

Netscape Application Launcher

The Netscape™ Application Launcher enables users to easily access and automatically launch Netscape files and associated Netscape applications such as Composer. This feature eliminates the need to run the entire Netscape environment, simplifying access to Netscape applications.

Print Client Enhancements

Print Client now enables users to easily configure their own set of printers and default printer without any intervention from an administrator.

SDTImage Enhancements

The SDTImage screen snapshot feature now enables users to easily and quickly capture a screenshot image from the command line.

Smart Card Support

CDE now supports authentication security technology for smart cards. Users can now use smart cards to authenticate their identity when they are logging in to CDE on a protected system, relogging in after a screen lock, or reauthenticating after the smart card is removed. CDE supports both external and internal smart card devices.

ToolTips

ToolTips provides users with Balloon Help, a simple and short description of an icon function.

Feature Description

X11R6.4 Support

The X Server is upgraded to the X11R6.4 industry standard, which includes key features that increase user productivity and mobility. These features are remote execution of X applications through web browser on any web-based desktop, Xinerama, Color Utilization Policy, EnergyStar support, and new APIs and documentation for the developer toolkits.

Extended Control Panel

This feature provides a unified, consistent, and extensible launchpad for desktop customization, such as desktop controls for color, font, backdrop, and Application Manager.

Web Services

Feature Description

Java Plug-In

Java Plug-in for the Solaris operating environment is an add-on product for Netscape Navigator™ that enables Java applets and JavaBeans components to run on Web pages by using Java Runtime Environment (JRE) 1.2 instead of the default Java Virtual Machine (JVM) .

Netscape Communicator 4.7

Solaris 8 includes Netscape Communicator 4.7 and now installs it by default on your system.

Solaris Network Cache and Accelerator (NCA)

The Solaris NCA increases web server performance by maintaining an in-kernel cache of web pages that are accessed during HTTP requests.

Apache Web Server

The open source Apache web server is now released with Solaris. This server includes all the standard Apache modules, including proxy server support as well as the `mod_perl` module.

Printing

Feature Description

Print Naming Enhancement

This Solaris release supports the `printers` database in `/etc/nsswitch.conf`, the name service switch file. The `printers` database provides centralized printer configuration information to print clients on the network.

Solaris Print Manager

Solaris Print Manager is a Java based graphical user interface that enables you to manage local and remote printer access. You can use this tool in the following name service environments: NIS, NIS+, and NIS+ with Federated Naming Service (FNS) files.

Language Support

Feature Description

Universal Language Coverage

The Solaris 8 operating environment now includes support for more than 90 locales, covering 37 languages, on both the Solaris 8 Software CDs and the Solaris 8 Languages CD.

Improved Language Installation and Setup

Changes to packaging on the language CD have reduced the storage requirements for a mixed language installation. A redesign of the install interface makes language selection and grouping extremely intuitive.

Expanded Unicode Support

Solaris 8 continues to broaden support for Unicode with the addition of new Unicode (UTF-8) locales for Simplified Chinese and Traditional Chinese.

Customer-Extensible Codeset Conversion (`geniconvtbl`)

With the Solaris 8 operating environment, developers can easily create and add to the Solaris system their own user-defined codeset conversions by using the `geniconvtbl` utility. Modification to existing Solaris codeset conversions is also supported.

Improved Data Interoperability

Data interoperability with non-Solaris environments has been improved in Solaris 8 with the addition of the following new `iconv` data conversion utilities:

- `iconv` for Japanese mainframe data types
- `iconv` for Microsoft data encodings (including user-defined characters)
- `iconv` for UTF-8 interoperability in People's Republic of China and Korea
- `iconv` for various Unicode encoding formats and international and de facto industry standard codesets

New Locales Added

Two new locales have been added to Solaris 8 for Iceland (ISO8859-15) and Russia (ANSI1251). The new Russian locale is in addition to the existing Russian (8859-5) locale and provides native Microsoft data-encoding support.

Documentation

Feature Description

AnswerBook2 Documentation Server Updates

The AnswerBook2 Documentation Server has been updated for this release. Major changes since the Solaris 7 release include replacing the AnswerBook2 navigation icons with text, support improvements for non-English locales, and minor changes to improve overall performance and stability.

Reference Manual Reorganization

The section of the *SunOS Reference Manual* that describes the C library functions (but does not include the system calls) now contains six books instead of one. These books are:

- Library Interfaces and Headers
- Basic Library Functions
- Networking Library Functions
- Threads and Real-time Library Functions
- Extended Library Functions
- Curses Library Functions

In addition, many of the man page suffixes have been changed to reflect the library that contains the function.

Audio Mixer

Feature Description

SPARC: Audio Mixer

The audio mixer driver now enables multiple applications to simultaneously play and record audio. This new enhancement supersedes the previous capability, which only supported a single play application and a single record application. In addition, CDE 1.4 now includes a new GUI tool, `sdtaudiocontrol`, that supersedes `audiocontrol`. `sdtaudiocontrol` uses the features of the audio mixer, and provides more features.

Software Developer Environment

Feature Description

SPARC: 64–bit Kodak Color Management System (KCMS) libraries

Kodak Color Management System™ (KCMS™) is now providing a 64–bit version of the libraries. Applications that currently use KCMS and are converted to the 64–bit operating environment can now retain color management.

Always Ready Power Management

With the Solaris 8 operating environment, a device driver that uses the new device Power Management™ interfaces will be power-managed automatically.

New `cpustat` and `cputrack` Commands

The new `cpustat` and `cputrack` commands capture system-wide and per-process CPU statistics respectively, to monitor the performance of a system or a process.

Extensions to Runtime Link Auditing

Additional means of invoking runtime link-auditing libraries is provided by the link editor options `-p` and `-P`. Additional runtime link-auditing interfaces `la_activity()` and `la_objsearch()` have been added.

Practical Extraction and Report Language (Perl) 5

The popular programming language, Perl 5.005_03, is included in the Solaris 8 release. Perl is commonly used for CGI scripting as well as for automating complex system administration tasks.

Role-Based Access Control (RBAC) for Developers

The addition of RBAC to the Solaris operating environment gives developers the opportunity to deliver fine-grained security in new and modified applications. Developers can now create privileged functions that check for authorizations instead of checking for specific IDs such as superuser.

Secure Path Name Change from `/usr/lib` **to** `/usr/lib/secure`

The secure directory from which files can be preloaded is now `/usr/lib/secure` for 32–bit objects and `/usr/lib/secure/sparcv9` for 64–bit SPARCV9 objects.

Dynamic String Token Support

Greater flexibility in establishing instruction set-specific, and system-specific dependencies is provided with the new `$ISALIST`, `$OSNAME`, and `$OSREL` dynamic string tokens.

Function Update: `strftime()`

The `%u` conversion specification for the `strftime()` function has been changed.

Alternate Libthread

An alternate threads implementation provides a model in which user-level threads are associated one-to-one with lightweight processes (LWPs). This implementation is simpler than the standard implementation and might be beneficial to some multithreaded applications.

SPARC: Audio Mixer Driver

The audio mixer driver now allows multiple applications to play and record audio simultaneously.

Updated DDI Interfaces for Cluster-Aware Device Drivers

A documentation overview introduces the concept of device classes and the necessary interface modifications and additions for device driver writers.

8–bit Visual Support

The 8-bit visual shared library enables device drivers with only 24-bit hardware to display 8-bit visual applications.

Hardware Enhancements

Feature Description

Advanced Configuration and Power Interface (ACPI)

ACPI is a new, more flexible way to configure and control IA hardware. ACPI obsoletes Plug and Play BIOS and the Intel Multi-Processor Specification (MPSPEC). If ACPI is available on your IA based system, Solaris 8 automatically uses it to configure the hardware.

PCI Hot-Plug Support

This feature enables standard PCI adapters to be hot-plugged into a machine with the hot-plug capability that is running Solaris *Intel Platform Edition*. You can now add (hot-add) or remove (hot-remove) adapters from a system while the system is still running.

Universal Serial Bus (USB) Support for Keyboards and Mouse Devices

Solaris *Intel Platform Edition* now provides USB support for keyboards and mouse devices.

X Server Video Driver Enhancement

Solaris *Intel Platform Edition* now provides support for more video devices.

SCSI Drivers

Feature Description

IA: Device Driver Enhancement: `cadp`

The Solaris `cadp` driver now supports Adaptec Ultra2 adapters.

IA: Device Driver Enhancement: `ncrs`

The Solaris `ncrs` device driver now supports the SCSI hot-plugging functionality and Ultra2 devices, in addition to general functionality and performance improvements.

IA: Device Driver Enhancement: `symhisl`

The `symhisl` device driver, which supports the adapters SYM22910 and SYM21002, is now included in Solaris *Intel Platform Edition*.

Features in the Solaris 7 Software Release

Appendix B summarizes features in the Solaris 7 operating environment.

Solaris 64–bit Operating Environment

Feature Description

SPARC: 64-bit Operating Environment

The 64-bit Solaris operating environment is a complete 32-bit and 64-bit application and development environment that is supported by a 64-bit operating system. This environment permits maximum compatibility and interoperability for existing applications, both source and binary. At the same time, the 64-bit Solaris operating environment overcomes many of the limitations of the 32-bit system. Most notably, this environment supports a 64-bit virtual address space and removes other existing 32-bit system limitations. (This feature is for *SPARC Platform Edition* only.)

Web Browser

Feature Description

Netscape™ Communicator

Solaris 7 software now ships with Netscape Communicator.

Network Management and System Administration

UFS Logging

UFS logging is the process of storing transactions (changes that make up a complete UFS operation) in a log before the transactions are applied to the UFS file system. After a transaction is stored, the transaction can be applied to the file system later.

UFS logging provides two advantages. It prevents file systems from becoming inconsistent, therefore eliminating the need to run `fsck(1M)`. And, because `fsck` can be bypassed, UFS logging reduces the time that is required to reboot a system if it crashes, or after an unclean halt.

UFS Mount Option: `-o noatime`

To ignore access time updates on files, you can specify the `-o noatime` option when you mount a UFS file system. This option reduces disk activity on file systems where access times are unimportant (for example, a Usenet news spool).

Lightweight Directory Access Protocol (LDAP)

The Lightweight Directory Access Protocol (LDAP) is an open-standard, platform-independent, access protocol based on the X.500 informational model. LDAP is designed to run over TCP/IP and uses simple string encodings. LDAP applications are client-server applications. The client library that is included in this release enables developers to write LDAP applications and enables users to run LDAP-enabled applications.

SPARC: Dynamic Reconfiguration

Dynamic reconfiguration enables the service provider to add, or remove and replace, hot-pluggable system boards in a running system, eliminating the time lost in rebooting. (This feature is provided for certain SPARC systems only.)

New Commands: `pgrep` and `pkill`

The `pgrep` command checks the active processes on the system and displays the process IDs of the processes with attributes that match the specified criteria on the command line. The `pkill` command works the same way as the `pgrep` command except that each matching process ID is signaled by `kill(2)` instead of having the process ID displayed.

Updated Version: `sendmail` 8.9

This version includes hooks that enable restriction of spam (unsolicited, bulk email); virtual hosting that allows email to be received using different domain names; and an improved configuration hierarchy that makes building your own `sendmail` configuration file much easier.

New Utility: `traceroute`

Solaris 7 software includes the popular `traceroute` utility. The `traceroute` utility is used to trace the route an IP packet follows to an Internet host. This utility is especially useful for determining routing misconfiguration and routing path failures.

System Crash Dump Utility

The system crash dump features include the following:
- The `dumpadm` command enables system administrators to configure crash dumps of the operating system.
- Dump data is now stored in compressed format on the dump device.
- Saving core files is run in the background when a dedicated dump device—not the primary swap area—is part of the dump configuration.

Network Performance

Feature Description

TCP with SACK

TCP selective acknowledgment (TCP SACK) provides the support that is described in RFC 2018 to solve problems that are related to congestion and multiple packet drops. In particular, TCP with SACK addresses problems in applications that use TCP large windows (RFC 1323) over satellite links or transcontinental links.

Network Security

Feature Description

RPC Modification: `RPCSEC_GSS` **Command**

RPC has been modified, based on the GSS-API. This modification increases security integrity and confidentiality, and NFS services are no longer restricted to a specific or a single security mechanism.

NIS+ Extended Diffie-Hellman

Network Information Service+ enhances NIS+ security by increasing the authentication key length from 192 bits to 640 bits.

Feature Description

BIND 8.1.2

Berkeley Internet Name Daemon (BIND), the most popular DNS implementation, has been upgraded to 8.1.2. This upgrade provides a new configuration file that enhances network security through the use of access control lists (ACLs).

Installation

Feature Description

SPARC: Installing a 64-bit Operating Environment

The Solaris 7 installation programs have a new check box for selection of 64-bit support. This feature is selected by default when you install on UltraSPARC™ platforms.

Installing AnswerBooks with Solaris Web Start

The Solaris Web Start product (on the Documentation CD) provides a point-and-click interface with selections for installing the AnswerBook2 server, all document collections on this CD, or selected document collections.

More Locale Selections

In the Solaris 7 release, the English and European localized versions of Solaris software have been combined on a single CD. As a result, more locale selections are available during installation of this combined CD than were seen for Solaris 2.6 software.

Documentation

Feature Description

Man Pages in AnswerBook2 Format

Man pages are available in AnswerBook2 (SGML), rather than AnswerBook format. This feature provides improvements in navigation and links to man pages directly from other AnswerBook2 documents.

Run AnswerBook2 from Documentation CD

With a Documentation CD and root access to the system on which the CD is connected, the AnswerBook2 server can run directly from the CD by using the `ab2cd` script. You can then view the documentation from the CD.

Use CGI-Based Web Servers

The AnswerBook2 server can run on top of an existing web server, such as Sun WebServer™, rather than requiring that an additional web server run on the system solely for AnswerBook2 support.

Control Display of Style Sheet Errors

An environment variable, *AB2_DEBUG*, can be set on the AnswerBook2 server. This variable controls whether style sheet errors are displayed to the user with a red "BUG."

Language Support

Feature Description

Enhanced Language Framework
- Solaris software has expanded its Unicode support with the addition of six new UTF-8 locales: French, German, Italian, Spanish, Swedish, and Europe. Also, enhanced Unicode locale with multiscript capability is included. Users can type and display text from different writing scripts such as Japanese, Thai, and Russian. Users can also easily switch between the scripts without having to change to or install a new locale.
- Complex text support has been integrated for complex text layout languages such as Arabic, Hebrew, and Thai, which require special text preprocessing to handle bidirectional, composite, and context-sensitive text.
- Solaris 7 software implements the Internet Intranet Input Method Protocol (IIIMP) to enable seamless interoperability between the input methods provided in Solaris, Java, and non-X Windows applications.
- The Desktop Font Downloader enables users to download, remove, re-encode and convert fonts; check status; and perform other administrative tasks on a PostScript printer.

Expanded Locale Support
- The European Community (EC) has agreed to standardize on a single currency – the "Euro" currency. Beginning January 1999, all foreign exchange, banking, and finance industries in the EC will convert from using their local currencies to using the Euro. In anticipation of this change, Solaris 7 software has added support for the Euro currency with six new user locales.
- Solaris software has added support for the Eastern European, Thai, and Middle Eastern regions.

Standards

Feature	Description
UNIX 98 Branding
Solaris 7 software is branded UNIX® 98.

Software Developer Environment

Feature	Description
SPARC: 64-bit Developer Environment
The Solaris 7 operating environment provides developers with complete 32-bit and 64-bit development environments.
Runtime Linker
The runtime linker permits programs to find shared libraries without having to set `LD_LIBRARY_PATH` and makes the loading of shared libraries even more efficient.
Display Enhancements to the `man` Utility
The `man` utility is now able to display man pages that are coded with SGML, as well as the traditional `nroff`.
Solaris 64-bit X Window Libraries
All of the core X11 shared libraries (`.so`) and all lint libraries (`.ln`) that were provided for developers in 32-bit versions are available in 64-bit versions for 64-bit Solaris software.
Java Development Kit for Solaris Performance Improvements
The Java Development Kit 1.1.5 for Solaris has been specially tuned and tested. As a result, it offers significantly improved scalability and performance for Java applications that are developed for, and deployed in, the enterprise and across the network.
WebNFS Software Development Kit Included
The WebNFS Software Development Kit (SDK) provides remote file access for Java applications that use WebNFS. Because it implements the NFS protocol directly, the SDK requires no NFS support on the host system.

Feature Description

Function-Call Tracing: `truss` Utility

The `truss` utility traces the system calls, signals, and machine faults of a process. This utility has been enhanced with a new option to enable entry and exit tracing of user-level function calls that are executed by the traced process.

Improved Device Configuration Library

The `libdevinfo` library, which is used to obtain device configuration information, has been made more robust and comprehensive in Solaris 7 software. For more information, see the man page `libdevinfo`(3).

Graphics and Imaging

Feature Description

XIL Foundation Imaging Library

The XIL™ foundation imaging library is suitable for libraries or applications that require imaging or digital video, such as document imaging, color prepress, or digital video generation and playback.

New support for stereoscopic image display enables the presentation of image pairs that represent a left-eye/right-eye view. This support provides an image display with depth perception.

The XIL Developer's Kit is now separate from Solaris and is available free of charge.

Desktop

Feature Description

Common Desktop Environment, (CDE)

CDE contains new tools to make it easy to find, manipulate, and manage address cards, applications, email addresses, files, folders, hosts, processes, and web addresses.

Included in CDE is support for Motif 2.1, which includes five new Motif widgets and is MT safe. Motif 2.1 supports ISO standard Complex Text Language locales in which a single binary that was developed on the Solaris 7 operating environment provides advanced and standard support for Hebrew, Arabic, and Thai customers.

Printing

Enhanced Font Management

The Desktop Font Downloader enables users to download, remove, re-encode and convert fonts, check status, and perform other administrative tasks on a PostScript printer.

Intel Platform Edition Hardware Support

Feature Description

SCSI Disk Driver `sd` Command

The `sd` SCSI disk target driver, that was formerly supplied only on Solaris (*SPARC Platform Edition*) systems, is now used for SCSI disk support and ATAPI CD-ROM support in place of `cmdk`. The `cmdk` driver is still available to support non-SCSI hard disks.

Intelligent I/O Rramework Support

Intelligent I/O (I2O) is an emerging standard for modular, high-performance I/O subsystems. This feature, which is dependent on I2O-capable hardware, is only available for Solaris (*Intel Platform Edition*).