Sun microsystems

Solaris 8 2/04 What's New Supplement

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Contents

Preface

The *Solaris 8 2/04 What's New Supplement* describes new features in Solaris™ Update releases.

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.

Accessing Sun Documentation Online

The docs.sun.com^{SM} Web site enables you to access Sun technical documentation online. You can browse the docs.sun.com archive or search for a specific book title or subject. The URL is `http://docs.sun.com`.

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.

What's New at a Glance

The *Solaris 8 2/04 What's New Supplement* highlights new features that have been added to the Solaris 8 operating environment for the Update releases.

The *Solaris 8 2/04 What's New Supplement* covers the following topics:

- What's New for Installation
- What's New for System Administrators
- What's New for Developers
- What's New for Desktop Users

New Features in the Solaris 8 2/04 Release

To read about features that have been added since the Solaris 8 2/02 release, refer to the *Solaris 8 2/04 Sun Hardware Platform Guide*. See, also, "USB Dual Framework" in "Device Management" on page 20.

Early Access

Solaris 9 Documentation

Some features in this Update release may not have documentation other than man pages. For additional reference, refer to the Solaris 9 operating environment documentation on `http://docs.sun.com`.

Prior to the release of the Solaris 9 operating environment, follow the links for documentation on the Solaris 9 operating environment Early Access Web site at `http://www.sun.com/solaris/programs/solaris9ea`.

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

Solaris 8 Early Access Directories

The Solaris 8 2/02 release includes Early Access (EA) directories with EA software. EA products are located on both the Solaris Software CD 2of2 and the Solaris DVD at the location:

`../Solaris_8/EA/products`

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

What's New for Installation

This chapter highlights new installation features in the Solaris 8 Update releases.

Note – For the most current man pages, use the `man` command. The Solaris 8 Update release man pages include new feature information not found in the *Solaris 8 Reference Manual Collection*.

Installing

Feature Description	Release Date
Installation from the Solaris 8 DVD	2/02
You can now install the Solaris operating environment and additional software from the Solaris 8 DVD. The DVD enables you to perform either a Solaris™ Web Start installation or a custom JumpStart™ installation. The Solaris 8 DVD includes the Solaris software, EA software, and the Solaris documentation.	
For detailed instructions, see the *Solaris 8 Advanced Installation Guide*.	
Solaris Web Start Program Uses `sysidcfg` **File**	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 8 Advanced Installation Guide*.	

Feature Description	Release Date
Solaris Web Start Program Enhancements	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 8 Advanced Installation Guide*.

Solaris Live Upgrade	10/01

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 service outages that are 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 the *Solaris Live Upgrade 2.0 Guide*.

IA: PXE Network Boot	10/01

The Intel Pre-boot eXecution Environment (PXE) enables you to boot a Solaris 8 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 8 Advanced Installation Guide*.

New Boot Options for a Custom JumpStart Installation	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 "Performing a Custom JumpStart Installation" in the *Solaris 8 Advanced Installation Guide*.

Feature Description	Release Date
Revisions to the *Solaris 8 Advanced Installation Guide*	7/01

The *Solaris 8 Advanced Installation Guide* has been revised. The revised version combines all of the previous Solaris 8 installation guides:
- *Solaris 8 (SPARC Platform Edition) Installation Guide*
- *Solaris 8 (Intel Platform Edition) Installation Guide*
- *Solaris 8 Advanced Installation Guide*
- *Solaris 8 Installation Supplement*

The revision also includes the addition of information about new and enhanced Solaris installation technologies. The focus is on task-based procedures, with reference material covered separately in the guide.

For further information, see the *Solaris 8 Advanced Installation Guide*.

| **Web Start Flash Installation Feature** | 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 the *Solaris 8 Advanced Installation Guide*.

| **Default Routing With System Identification Utilities** | 4/01 |

The system identification utilities automatically attempt to determine the default router during installation.

For further information, see the *Solaris 8 Advanced Installation Guide*.

| **Configuration With System Identification Utilities** | 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 a NIS, NIS+, or DNS client.

For further information, see the *Solaris 8 Advanced Installation Guide*.

Upgrading

Feature Description	Release Date
Patch Analyzer	6/00

The Patch Analyzer is now available when you upgrade with the Solaris Web Start 3.0 installation method on the Solaris 8 Installation CD. The Patch Analyzer performs an analysis on your system to determine which (if any) patches will be removed or downgraded by upgrading from the Solaris 8 release to a Solaris 8 Update release.

For further information, see the *Solaris 8 Advanced Installation Guide*.

Administering and Uninstalling Software

Feature Description	Release Date
Solaris Product Registry 3.0	1/01

A new version of the Solaris Product Registry tool has been released. The Solaris Product Registry 3.0 includes these new features:
- You can 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 *Solaris 8 Advanced Installation Guide*.

Modify Software Groups in Solaris Web Start Program	1/01

The Solaris Web Start 3.0 installation method was updated to allow you to modify the selected Solaris Software Group by adding or removing software packages.

For further information, see the *Solaris 8 Advanced Installation Guide*.

What's New for System Administrators

This chapter highlights new system administration features that have been added to the Solaris 8 Update releases.

Note – For the most current man pages, use the `man` command. The Solaris 8 Update release man pages include new feature information not found in the *Solaris 8 Reference Manual Collection*.

Networking

Feature Description	Release Date
Sun RPC Library Extensions	2/02

Sun RPC Library Extensions

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 both synchronous and asynchronous protocols that require a single vendor solution. The library extensions provide a level of functionality and availability that Sun's Network Equipment Provider customers demand.

Further information is provided in the *ONC+ Developer's Guide* in the Solaris 9 Software Developer Collection. For instructions on how to access Solaris 9 documentation, see "Early Access" on page 8 in this document.

Feature Description	Release Date
Solaris PPP 4.0	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 10/01

The Solaris 8 10/01 release includes the PPP over Ethernet (PPPoE) addition to Solaris PPP 4.0. PPPoE enables the user to "tunnel" a PPP session over an Ethernet, thus providing a virtual private network. Networks with PPPoE in place can support multiple users who are connecting to a provider over a single DSL device.

For further information on PPP, see the `pppd(1m)`, `chat(1m)`, and `pppstats(1m)` man pages.

For further information on PPPoE, see the `pppoed(1m)`, `pppoec(1m)`, `sppptun(1m)`, and `snoop(1m)` man pages.

Further information is also provided in the *System Administration Guide: Resource Management and Network Services* in the Solaris 9 System Administration Collection. For instructions on how to access Solaris 9 documentation, see "Early Access" on page 8 in this document.

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`

Solaris Network Cache and Accelerator (NCA)	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. Web servers such as Apache, iPlanet™ Web Server, and Zeus are able to make use of NCA performance by using standard socket library functions.

For more information about NCA, see "Solaris Network Cache and Accelerator (NCA)" in the *System Administration Guide, Volume 3*.

Feature Description	Release Date
Berkeley Internet Name Domain (BIND)	4/01

Berkeley Internet Name Domain (BIND) version 8.2.2 new functionality includes:
- Configuration options for in.named – See the 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.

Further information is provided in "Administering DNS (Tasks)" in the *System Administration Guide: Naming and Directory Services* in the Solaris 9 System Administrator Collection. For instructions on how to access Solaris 9 documentation, see "Early Access" on page 8 in this document.

Enhancements to sendmail	4/01
Enhancements to sendmail version 8.10 include new command-line options, new and revised configuration file options, new defined macros, new and revised m4 configuration macros, new and modified compile flags, new delivery agent flags, new equates for delivery agents, new queue features, new uses for LDAP, new rule set features, new file locations, and a new built-in mailer feature.	Updated 7/01

For more information, see "Mail Services" in the *Solaris 8 System Administration Supplement*. "Mail Services" also describes changes to mail.local, changes to mailstats, and changes to makemap.

IP Network Multipathing	10/00
IP network multipathing provides your system with recovery from single-point failures with network adapters and increased traffic throughput. In the 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

In the 4/01 release, dynamic reconfiguration (DR) uses IP network multipathing to decommission a specific network device, with no impact on existing IP users.

The 7/01 release introduces 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 the *IP Network Multipathing Administration Guide*.

Feature Description	Release Date
Mobile Internet Protocol (IP)	6/00
Mobile Internet Protocol (IP) enables the transfer of information to and from mobile computers, such as laptop and wireless communications. In the 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
In the 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, see the *Mobile IP Administration Guide*.	
SPARC: Lightweight Directory Access Protocol (LDAP)	1/01
Lightweight Directory Access Protocol (LDAP) is now supported in the iPlanet Web Server directory server. To set up the iPlanet directory server to support Solaris clients, see the *LDAP Setup and Configuration Guide*.	

XServer Features

Feature Description	Release Date
Using Xsun Server as a Display-Only Device	2/02
Two new options enable the Xsun server to run as a display-only device. With these options, users can run the Solaris window manager in display-only mode without the need for 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.

System Performance Enhancements

Feature Description	Release Date
Performance Improvement for Servers	1/01
Enhancements have been made to the algorithm that controls virtual or 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)	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 that consists of large locked memory pages. The ISM number of locked pages remains constant (cannot 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 the release or addition of more physical memory to the system during dynamic reconfiguration. The size of the DISM can span available physical memory plus disk swap.	
For further information on shared memory control operations, see the `shmop(2)` man page.	
DNLC Improvements	6/00
The enhanced directory name look-up cache (DNLC) improves performance when you access files in large directories.	
For information on how to use this feature, see "DNLC Improvements" in the *Solaris 8 System Administration Supplement*.	
Updates to the *Solaris Tunable Parameters Reference Manual*	1/01
The *Solaris Tunable Parameters Reference Manual* has been updated. Information on the *semsys:seminfo_semmnu* parameter has been added to this book.	Updated 7/01
This book has also been updated in the Solaris 8 7/01 release to describe a new parameter, *logevent_max_q_sz*, first available in the Solaris 8 1/01 release, and corrections to the *tcp_slow_start_initial* and *tmpfs:tmpfs_minfree* parameters.	
For further information, see the *Solaris Tunable Parameters Reference Manual*.	

System Administration Tools

Feature Description	Release Date
Dynamic Reconfiguration (DR) 3.0	10/01

Dynamic Reconfiguration (DR) 3.0 replaces DR 2.0. DR model 3.0 uses the domain configuration server, `dcs(1M)`, to control DR operations on the domain. You use the automated dynamic reconfiguration (ADR) commands to perform DR operations. DR lets users reconfigure resources on their servers while the servers continue to operate.

Dynamic Reconfiguration 3.0 has a framework that offers enhanced integration with applications. DR model 3.0 works with the Reconfiguration Coordination Manager (RCM), which enables you to coordinate DR operations with other applications that are running on the domain such as database, clustering, and volume management software. Such applications can register to receive notification of DR operations and coordinate their software activities with DR.

DR 3.0 also supports multipathing with the use of IPMP.

For further information, see the *Sun Enterprise 10000 Dynamic Reconfiguration User Guide*. The DR user guide is intended for Sun Enterprise™ 10000 system administrators who are familiar with the Solaris operating environment.

Solaris Management Console	1/01

Solaris™ Management Console 2.0 software is a GUI-based "umbrella application" that serves as the launching point for a variety of management tools. The console comes complete with a default toolbox that contains the following tools:

- Processes – Suspend, resume, monitor, and control processes.
- Users – Set up and maintain user accounts, user templates, groups, mailing lists, and 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 user can perform.
- Scheduled Jobs – Schedule, start, and manage jobs.
- Mounts and Shares – View and manage mounts, shares, and usage information.
- Disks – Create and view disk partitions.
- Serial Ports – Configure and manage existing serial ports.
- Log Viewer – View application and command-line messages and manage log files.

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

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 Solaris Management Console Toolbox Editor.

For more information about using the command-line interface, see "Solaris Management Console Overview" in the *Solaris 8 System Administration Supplement*. For information on how to start the console, see "Starting Solaris Management Console" in the *Solaris 8 System Administration Supplement*. Also, see the help that is associated with each tool.

Feature Description	Release Date
Web-Based Enterprise Management (WBEM)	10/00
Web-Based Enterprise Management (WBEM) includes standards for web-based management of systems, networks, and devices on multiple platforms. This standardization enables system administrators to manage desktops, devices, and networks.	Updated 1/01 and 4/01

In the 10/00 Update release, additions include a description of the system properties that the CIM Object Manager uses and descriptions of the new `Solaris_Printer` and other printing definition classes.

In the 1/01 Update release, additions include:
- Updated description of `init.wbem` command, which now starts the Solaris Management Console server as well as the CIM Object Manager
- Added section that describes how to upgrade the CIM Object Manager repository
- Updated Security chapter refers the user to Solaris Management Console for implementing role-based access control (RBAC)
- Solaris Management Console Log Viewer replaced the `wbemlogviewer` application for viewing log file information
- Added description of new `Solaris_Network1.0.mof` file and `Solaris_Users1.0.mof` file

In the 4/01 Update release, additions include:
- Sun WBEM SDK 2.4 – Prior to this update, Sun WBEM SDK had been delivered as a component of the Solaris Management SDK CD.
  Sun WBEM SDK 2.4 implements the CIM Event model.
  The documentation for the Sun WBEM SDK includes man pages, context-sensitive online help for CIM Workshop, Javadoc reference pages for the WBEM application programming interfaces, and an AnswerBook™ version of the *Sun WBEM SDK Developer's Guide*.
- New providers:
  - SNMP Provider
  - Product Registry Provider
  - Performance Provider
  The providers are documented with HTML pages derived from the related MOF files at `/usr/sadm/lib/wbem/doc`.
- MOF Compiler (`mofcomp`), which contains enhancements to support standalone mode and conversion of MOF files to XML. Two arguments have been added to the `mofcomp` command:
  `-x` converts CIM classes that are defined in the MOF file to XML documents.
  `-o dirname` sets the MOF Compiler to run in standalone mode, without a CIM Object Manager.

For further information, see the *Solaris WBEM Services Administrator's Guide*.

Device Management

Feature Description	Release Date
USB Dual Framework	2/04

The Solaris 8 2/04 release features a dual USB framework. This dual framework, USBA 1.0, is more evolved than the original framework. It supports high speed USB 2.0 devices, and operates devices connected to the computer's USB 2.0 ports. The original framework is also provided for compatibility with all preexisting USB drivers.

For further information about the USB dual framework, see "USB Dual Framework" in the *Solaris 8 2/04 Release Notes Supplement for Sun Hardware*.

Feature Description	Release Date
USB Support and USB Audio Support	10/01

The USB technology and the USB audio support in Solaris provide a low-cost way to add keyboards, mouse devices, printers, and audio devices to a system. Support for USB Audio devices that are USB Audio 1.0 compliant has been integrated for both SPARC and Intel platforms. Recommended devices are listed on `http://www.sun.com/io`. The USB Audio driver is based on the new `audio mixer(7I)` architecture.

For further information, see the *USB Administration Guide*. Solaris system administrators who intend to administer new Sun hardware with USB support should review this book to become familiar with the USB technology and features.

Feature Description	Release Date
USB Devices	1/01

The Solaris 8 1/01, Solaris 8 4/01, Solaris 8 7/01, Solaris 8 10/01 and Solaris 8 2/02 releases include 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, Solaris 8 10/01 and Solaris 8 2/02 releases provide USB device support.
- Sun Ray™ systems also support USB devices.

See the man page `scsa2usb(7D)` for further information. See also the *USB Administration Guide*.

Feature Description	Release Date
USB Printer Support	10/00
You can use Solaris Print Manager to set up a Universal Serial Bus (USB) printer that is attached to a SPARC system with USB ports. For more information, see "USB Printer Support" in the *Solaris 8 System Administration Supplement*.	Updated 1/01 and 4/01

For an overview of USB, see "Overview of USB Devices" in the *Solaris 8 System Administration Supplement*.

Feature Description	Release Date
Reconfiguration Coordination Manager (RCM)	1/01 (SPARC)
The Reconfiguration Coordination Manager (RCM) is the framework that manages the dynamic removal of system components.	Updated 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 1/01 release.

By using the Reconfiguration Coordination Manager, 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 *Solaris 8 System Administration Supplement* and the `rcmscript(4)` man page for further information.

Sun Gigaswift Ethernet Driver	7/01

The Solaris 7/01 release adds support for the Sun Gigaswift 1000Base-T Ethernet driver. This product provides enhanced performance of a 1-Gbit, twisted-pair copper Ethernet link.

For further information, see the `ce(7D)` man page.

`mp` **Program Enhancement**	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, `Rmp(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 *Solaris 8 Software Developer Supplement*.

Improved Dynamic Reconfiguration Error Messages	1/01

Improved dynamic reconfiguration error messages are intended to help system administrators troubleshoot problems when they remove a system resource, such as a configured swap area or a dedicated dump device.

For more information on dynamic reconfiguration, see "New Dynamic Reconfiguration Error Messages" in the *Solaris 8 System Administration Supplement*.

Server and Client Management

Feature Description	Release Date
Dynamic Host Configuration Protocol (DHCP)	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 *Solaris DHCP Administration Guide*.

Diskless Client Management	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 Clients" in the *Solaris 8 System Administration Supplement*.

Security Enhancements

Feature Description	Release Date
Role-Based Access Control (RBAC)	1/01
The role-based access control (RBAC) databases can be managed through the Solaris Management Console graphical interface. Rights can contain other rights. Rights can now be assigned by default in the `policy.conf` file.	
For more information, see "Role-Based Access Control" in the *Solaris 8 System Administration Supplement*.	
SPARC: Smart Cards Administration	1/01
SPARC: The *Solaris Smart Cards Administration Guide* has been updated for the Solaris 8 1/01 release. Information on setting up internal card readers has been added. Step-by-step instructions for setting up smart-card support have been streamlined to make setting up smart cards easier.	Updated 4/01
In the 4/01 release, previous technical inaccuracies have been corrected. Also, a new chapter describes the tasks that you need to perform for smart-card setup. Another new chapter describes additional configuration tasks that you might need to perform if the default smart-card properties are not sufficient for your security environment.	
To view this book, see the *Solaris Smart Cards Administration Guide*.	
Generic Security Services Application Programming Interface (GSS-API)	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 know 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*.	

File System Enhancements

Feature Description	Release Date
Improved UFS Direct I/O Concurrency The performance of direct I/O, which is used by database applications to access unbuffered filesystem data, has been improved by allowing concurrent read access and write access to regular UFS files. For more information on direct I/O concurrency, see "Improved UFS Direct I/O Concurrency" in the *Solaris 8 System Administration Supplement.*	1/01
UFS Snapshots (`fssnap`) UFS Snapshots provides the new `fssnap` command for backing up a file system while the file system is mounted. A snapshot is a temporary image of a file system, intended for backup operations. Previously, the documentation recommended that, when you use the `ufsdump` command, you bring the system to single-user mode to keep the file system inactive during a backup. For more information on UFS Snapshots, see "Creating UFS Snapshots" in the *Solaris 8 System Administration Supplement*.	1/01
Updated `mkfs` Command 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. Further information is provided in the *System Administration Guide: Basic Administration* in the Solaris 9 System Administrator Collection. For instructions on how to access Solaris 9 documentation, see "Early Access" on page 8 in this document.	1/01

Removable Media Management

Feature Description	Release Date
Improved Removable Media Management	6/00
Removable media management now fully supports removable media such as DVD-ROMs, Zip drives, Jaz drives, CD-ROMs, and diskettes. For information on how to use this feature, see "Managing Removable Media" in the *Solaris 8 System Administration Supplement*.	Updated 10/00

System Resources Enhancements

Description	Release Date
Extended Accounting	6/00
Extended accounting introduces a new variable-length, general-purpose accounting file format that represents general groups of accounting data. Also included is the ability to configure resource utilization that was recorded by the kernel in the various accounting files.	
For information on how to use this feature, see "Extended Accounting Features" in the *Solaris 8 System Administration Supplement*.	

What's New for Developers

This chapter highlights new features for software developers that have been added to the Solaris 8 Update releases.

Note – For the most current man pages, use the `man` command. The Solaris 8 Update release man pages include new feature information not found in the *Solaris 8 Reference Manual Collection*.

Development Tools

Feature Description	Release Date
WBEM Process Indication	2/02

The WBEM event mechanism has been extended. Process indications in the Common Information Model (CIM) enable instrumentation providers to register their own event classes in addition to the intrinsic events that are predefined with any class declaration in the CIM. These classes can be used to generate events that cannot be expressed as creation, deletion, access, modification, and method invocations of classes already modeled in the CIM. This capability enhances the existing events support.

Further information is provided in the *Solaris WBEM SDK Developer's Guide* in the Solaris 9 Software Developer Collection. For instructions on how to access Solaris 9 documentation, see "Early Access" on page 8 in this document.

Feature Description	Release Date
Modifications to Alternate Libthread	2/02

The Solaris 8 2/02 release includes an improved alternative multithreading library that provides better performance, reliability, and simplicity.

Further information is provided in the `threads.3thr` man page and the *Multithreaded Programming Guide* in the Solaris 9 Software Developer Collection. For instructions on how to access Solaris 9 documentation, see "Early Access" on page 8 in this document.

SPARC: Application Interface to Remote Shared Memory on Clusters	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.

The `librsm(3LIB)` man pages and the `section (3RSM)` "Section 3: Extended Library Functions" man pages include references to RSM.

Dynamic Host Configuration Protocol (DHCP)	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 this release, DHCP configuration data could only be stored in text files or NIS+. In this release, 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.

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

A vectored sendfile system call, `sendfilev()` enables better performance for sending out 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 SSI 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**	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 *Solaris 8 Software Developer Supplement*.

Feature Description	Release Date
Sun WBEM Software Developer's Toolkit (SDK)	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 *Sun WBEM SDK Developer's Guide*.

SPARC: Updated Multithreaded Programming Documentation	1/01

The *Multithreaded Programming Guide* has been updated with bug fixes: 4308968, 4356675, 4356690.

For further information, see the *Multithreaded Programming Guide*.

Revisions to the *Linkers and Libraries Guide*	10/00

The *Linkers and Libraries Guide* has been updated with new features. For the 10/00 release, updates include:	Updated 1/01 and 7/01

- The environment variable, `LD_BREADTH`, is ignored by the runtime linker. See the section, "Initialization and Termination Routines."
- The runtime linker and its debugger interface have been extended for better runtime and core file analysis. This update is identified by a new version number. See the section, "Agent Manipulation." This update expands the `rl_flags`, `rl_bend`, and `rl_dynamic` fields of the `rd_loadobj_t` structure. See the section, "Scanning Loadable Objects."
- The validation of displacement-relocated data in regard to its use, or possible use, with copy relocations is now provided. See the section, "Displacement Relocations."
- 64-bit filters can be built solely from a mapfile by using the `link-editors -64` option. See the section, "Generating a Standard Filter."
- Some explanatory notes are provided on why `$ORIGIN` dynamic string token expansion is restricted within secure applications. See the section, "Security."
- By using `dlinfo(3DL)`, you can inspect the search paths that are used to locate the dependencies of dynamic objects.
- `dlsym(3DL)` and `dlinfo(3DL)` look-up semantics have been expanded with a new handle, `RTLD_SELF`.
- The runtime symbol look-up mechanism that is used to relocate dynamic objects can be significantly reduced by establishing direct binding information within each dynamic object. See the sections, "External Bindings" or "Direct Binding."

Revisions to the *Linkers and Libraries Guide***, Continued**

For the 1/01 release, updates include:
- The symbolic information available from dladdr(3DL) has been enhanced with the introduction of dladdr1().
- You can obtain the $ORIGIN of a dynamic object from dlinfo(3DL).
- The maintenance of runtime configuration files that were created with the crle(1) has been simplified with the display of the command-line options that were used to create the configuration file. Also available is an update capability. (See the -u option.)
- The runtime linker and its debugger interface have been extended to detect procedure-linkage-table entry resolution. This update is identified by a new version number. See the section, "Agent Manipulation." This update extends the rd_plt_info_t structure. See the section, "Procedure Linkage Table Skipping."
- An applications stack can be defined non-executable by using the new mapfile segment descriptor STACK. See the section, "Segment Declarations."

Revisions to the *Linkers and Libraries Guide***, Continued**

For the 7/01 release, updates include:
- Unused dependencies can be determined by using ldd(1) . (See the -u option.)
- Various ELF ABI extensions have been added and the associated documentation revised. See "Initialization and Termination Sections," "Initialization and Termination Routines," Table 6, Table 9, Table 16, Table 17, "Section Groups," Table 19, Table 24, Table 45, Table 46, and "Program Loading (Processor-Specific)."
- Greater flexibility in the use of link-editor environment variables has been provided with the addition of _32 and _64 variants. See "Environment Variables" in the *Linker and Libraries Guide*.

For further information, see the *Linker and Libraries Guide*.

Updates to the *System Interface Guide*	6/00

The *System Interface Guide* is updated to incorporate bug fixes. This release corrects several typographical errors in text and source code examples.

For further information, see the *System Interface Guide*.

Language Support

Feature Description	Release Date
Support for the new Chinese `GB18030-2000` **Locale Encoding**	2/02
The Solaris platform now allows for input, display, and print of the entire `GB18030-2000` character set (including nearly 30,000 characters). Any application that runs on Solaris 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 this 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`.	
For further information, see the *International Language Environments Guide* in the Solaris 9 Software Developer Collection. For instructions on how to access Solaris 9 documentation, see "Early Access" on page 8 in this document.	
Expanded Unicode Support	10/00
The File System Safe Universal Transformation Format, or UTF-8, is an encoding 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. For the 10/00 release, Russian and Polish and two new locales for Catalan are added. For the 4/01 release, two additional languages, Turkish UTF-8 Codeset and Russian UTF-8 Codeset, are added to a table of already existing Eastern European locales.	Updated 4/01
For more information, see "Additional Partial Locales for European Solaris Software" in the *Solaris 8 Software Developer Supplement*.	
Print Filter Enhancement – the `mp` **Program**	4/01
The `mp` program accepts international text files of various Solaris locales and produces output that is proper for the specified locale. The output will also contain proper text layout, for instance, bidirectional text rendering and shaping, as the complex text layout (CTL) is supported in `mp`. Depending on each locale's system font configuration for `mp`, 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 *Solaris 8 Software Developer Supplement*.	

Feature Description	Release Date
Thai Wordbreaker	1/01

The Solaris 8 1/01 release includes a new text boundary resolution framework for Asian languages. With this framework, CDE applications and Motif libraries do the proper locale-specific text boundary resolution in all locales. The feature, including changes to the CDE/Motif library, is included in `libXm.so.4`. The Thai text boundary resolution module is a new feature that provides correct word breaks for sentence strings in the Thai language. The Thai locale now supports correct word-boundary handling of Motif widgets.

For further information about the Thai locale, see the *International Language Environments Guide*.

Writing Device Drivers

Feature Description	Release Date
Frame Buffer Power Management	10/01

Some devices, such as certain tape drives and frame buffers, should not lose power when their drivers are detached. A new interface, `ddi_removing_power(9F)`, checks if a device may 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 further information about power management issues, see the `ddi_removing_power` `(9F)` and `no-involuntary-power-cycles(9P)` man pages.

SPARC: Driver Hardening Test Harness	4/01

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 "Driver Hardening Test Harness" in the *Solaris 8 Software Developer Supplement*.

High-Availability Drivers Documentation	10/00

"High-Availability Drivers" provides a detailed description of how to design drivers to support high availability through driver hardening and ensuring serviceability. This material extends information provided in the Solaris 8 *Writing Device Drivers*.

For more information, see "High-Availability Drivers" in the *Solaris 8 Software Developer Supplement*.

Feature Description	Release Date
Generic `LAN` Driver (GLD)	10/00
You 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 the 4/01 release, GLD is updated with bug fixes.	
For more information, see "Drivers for Network Devices" in the *Solaris 8 Software Developer Supplement*.	

Java Releases

Feature Description	Release Date
Java 2 SDK, Standard Edition v. 1.2.2_10	2/02
The Java™ 2 SDK 1.2.2_10 has the latest bug fixes integrated since the last release. For further information about Java 2 SDK 1.2, see the Web site at `http://java.sun.com/products/jdk/1.2/ReleaseNotes.html`.	
Java 2 SDK, Standard Edition v. 1.3.1	10/01
The Java 2 SDK Standard Edition (J2SE™) version 1.3.1 is a maintenance release that contains fixes for bugs that were identified in J2SE 1.3.0. For a list of significant bug fixes that are included in J2SE 1.3.1, see the Web site at `http://java.sun.com/j2se/1.3/fixedbugs/1.3.1/BugIndex.html`.	

Feature Description	Release Date

Java 2 SDK, Standard Edition v. 1.3.0   4/01

The Java 2 SDK Standard Edition v. 1.3.0, also known as J2SE 1.3.0, is an upgrade release for
Java 2 SDK. The J2SE release includes the following new features and enhancements.

- Performance Improvements
  Java HotSpot™ technology and performance-tuned runtime libraries make J2SE 1.3.0
  the fastest Java platform to date.
- Easier Web Deployment
  New features, such as applet caching and automatic installation of optional packages by
  J2SE 1.3.0's Java™ Plug-in component, enhance the speed and flexibility with which you
  can deploy programs on the web.
- Enterprise Interoperability
  The addition of RMI/IIOP and the Java Naming and Directory Interface™ in J2SE 1.3.0
  enhance the interoperability of the Java 2 Platform.
- Security Advances
  New support for RSA electronic signing, dynamic trust management, X.509 certificates,
  and verification of Netscape-signed files mean more ways for developers to protect their
  electronic data.
- Java Sound
  J2SE 1.3.0 includes a powerful new sound API. Previous releases of the platform limited
  audio support to basic playback of audio clips. With this release, the Java 2 Platform
  defines a set of standard classes and interfaces for low-level audio support.
- Enhanced APIs and Improved Ease of Development
  In response to requests from the development community, J2SE 1.3.0 adds new features
  to various areas of the Java 2 Platform. These features expand the functionality of the
  platform to enable development of more powerful applications. In addition, many of the
  new features make the development process itself faster and more efficient.

For more J2SE improvements, see "Java 2 SDK, Standard Edition, version 1.3.0" in the
Solaris 8 Software Developer Supplement.

Java 2 SDK, Standard Edition v. 1.2.2_07a   4/01

The J2SE 1.2.2_07a contains fixes for bugs that were identified in previous releases in the
J2SE 1.2.2 series. An important bug fix is a fix for a performance regression that was
introduced in J2SE 1.2.2_05. For more information about bug fixes in J2SE 1.2.2_07a, see the
web site at `http://java.sun.com/j2se/1.2/ReleaseNotes.html`.

Java 2 SDK 1.2.2_06 and JDK 1.1.8_12   1/01

The Java 2 SDK 1.2.2_06 and JDK 1.1.8_12 are improved with bug fixes since the last release.

Feature Description	Release Date
Java 2 SDK 1.2.2_05a	10/00

The Java 2 SDK 1.2.2_05a includes the following new features.
- Scalability improvements to over 20 CPUs
- Improved just-in time (JIT) compiler optimizations
- Text-rendering performance improvements
- `poller` class demo package
- Swing improvements

For more information, see "Java 2 SDK, Standard Edition, version 1.2.2_07a and Previous Releases" in the *Solaris 8 Software Developer Supplement*.

32–bit: Java Servlets Support	10/00

With the addition of the `mod_jserv` module and related files, the Apache web server now supports Java servlets.

For more information, see "Java Servlet Support in Apache Web Server" in the *Solaris 8 Software Developer Supplement*.

What's New for Desktop Users

This chapter highlights new desktop features that have been added to the Solaris 8 Update releases.

Note – For the most current man pages, use the `man` command. The Solaris 8 Update release man pages include new feature information not found in the *Solaris 8 Reference Manual Collection*.

Window Manager Enhancements

Feature Description	Release Date
Graphical Workspace Manager	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. With the 4/01 release, 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 8 Desktop User Supplement*.	

Feature Description	Release Date
Workspace Manager	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 8 Desktop User Supplement*.	
Window List	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. With the 4/01 release, you can choose to display or not display the Workspace column.	Updated 4/01
For more information, see "Window List" in the *Solaris 8 Desktop User Supplement*.	

Other Desktop Features

Feature Description	Release Date
Stereo Viewing in `sdtaudio`	10/01
Stereo viewing provides desktop users with the ability to view data delivered from individual channels. This is an improvement over the previous method of averaging all channels and presenting the data to the user as a single waveform. In addition, the audio user gains control over more recording parameters through the Record interface, and can see a description of the audio file format on the desktop.	
For further information on video and audio features, see the *Solaris Common Desktop Environment: User's Guide* in the Solaris 9 User Collection. For instructions on how to access Solaris 9 documentation, see "Early Access" on page 8 in this document.	

Feature Description	Release Date
Added Support for Play-Only and Record-Only Devices to `sdtaudio` **and** `sdtaudiocontrol`	10/01

CDE audio tools have traditionally operated in a framework in which all supported audio devices support both play and record. With the introduction of support for more audio device types, some of which are play-only or record-only, functionality was added to display details pertinent only to the specific device. In this way, users are not faced with a confusing or misleading interface.

For further information on video and audio features, see the *Solaris Common Desktop Environment: User's Guide* in the Solaris 9 User Collection. For instructions on how to access Solaris 9 documentation, see "Early Access" on page 8 in this document.

Feature Description	Release Date
Energy Star Standards	10/01

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.

See also the Frame Buffer Power Management feature description in the "What's New for Developers" chapter.

Feature Description	Release Date
IA: Three-Button Mouse Emulation Available for a Two-Button Mouse	4/01

Beginning with the release of Solaris 8 4/01 *(Intel Platform Edition)*, 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.

Feature Description	Release Date
Adding Multiple Files to Email	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, see "Adding Multiple Files to Email" in the *Solaris 8 Desktop User Supplement*.

Feature Description	Release Date
Removable Media Manager	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.	Updated 10/00

For more information, see "Removable Media" in the *Solaris 8 Desktop User Supplement*.