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What's New in the Solaris 8 Operating Environment

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Contents

Preface

What's New in the Solaris 8 Operating Environment highlights and describes the new features of the Solaris™ 8 operating environment.

Note - The Solaris operating environment runs on two types of hardware, or platforms - SPARC and IA. 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.

Note - 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, and Pentium III Xeon processors and compatible microprocessor chips made by AMD and Cyrix.

How This Book Is Organized

Chapter 1 contains tables that list new features and functionality in the Solaris 8 software release and previous releases of the Solaris operating environment.

Chapter 2 provides more extensive descriptions of the new features and functionality in the Solaris 8 operating environment.

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What Typographic Conventions Mean

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:`

TABLE P–1   Typographic Conventions   *(continued)*

Typeface or Symbol	Meaning	Example
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 at a Glance

This chapter highlights new features of the Solaris 8 operating environment. Table 1–1 provides a brief description of new features in this release. For more extensive descriptions of these features, see Chapter 2.

The Solaris operating environment is the foundation for web-based computing. It is scalable and has the capacity to run and grow businesses on the Internet. The Solaris 64–bit operating environment provides the capacity, performance, and precision needed for handling very large files. Reliable, solid, and multifaceted, Solaris software is built to provide capacity, security, interoperability, manageability, and global connectivity.

Key Features of the Solaris 8 Release

The following key features are the highlights of this release. Table 1–1 overviews these new features and Chapter 2 provides details on each feature.

■ Internet Protocol version 6 (IPv6) adds increased address space and improves Internet functionality using a simplified header format, support for authentication and privacy, autoconfiguration of address assignments, and enables new quality-of-service capabilities.

■ The Solaris 8 operating environment provides the Naming Service switch back-end support for Lightweight Directory Access Protocol (LDAP) based directory service.

■ The Java™ 2 Software Development Kit (SDK) for Solaris significantly improves scalability and performance of Java applications.

■ The Solaris Installation CD provides a graphical, wizard based, Java powered application to install the Solaris operating environment and other software.

- The Solaris 8 operating environment supports the Universal Disk Format (UDF) file system, enabling users to exchange data stored on CD-ROMs, disks, diskettes, DVDs, and other optical media.

- The Solaris Smart Card feature enables security administrators to protect a computer desktop or individual application by requiring users to authenticate themselves by means of a smart card.

- The PDA Synchronization (PDA sync) application synchronizes the data from applications such as Desktop Calendar, Desktop Mail, Memo, and Address, with data in similar applications on a user's Personal Digital Assistant (PDA).

- The Solaris 8 Software CDs and Languages CD include support for more than 90 locales, covering 37 languages.

- The Solaris Common Desktop Environment (CDE) contains new and enhanced features that incorporate easy to use desktop productivity tools, PC interoperability, and desktop management tools.

- The X Server is upgraded to the X11R6.4 industry standard which includes features that increase user productivity and mobility, including 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 tool kits.

Note - In the tables below, the "(more)" term is an online link to sections in the Closer Look chapter.

TABLE 1–1   Solaris 8 Features

Feature	Description
Next Generation Internet Protocol	
IPv6	IPv6 adds increased address space and improves Internet functionality using a simplified header format, support for authentication and privacy, autoconfiguration of address assignments, and enables new quality-of-service capabilities. (more)
Directory Services and Naming Enhancements	
Native Lightweight Directory Access Protocol (LDAP)	Native LDAP provides the Naming Service switch back-end support for LDAP based directory service. (more)
Java Enhancements	

TABLE 1–1   Solaris 8 Features   *(continued)*

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. It 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 (more)
Installation and Management	
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. (more)
Booting a system over the network with Dynamic Host Configuration Protocol (DHCP)	Network installs can now use DHCP to acquire boot parameters and network configuration information needed to boot a client over the network. DHCP booting is supported on certain SPARC and IA based systems. (more)
IA: Boot partition in Solaris 8	Users running Solaris *Intel Platform Edition* can now designate a separate IA boot partition. (more)
IA: CD-ROM boot	This new feature enables the user to boot a system from an installation CD (rather than the Device Configuration Assistant diskette, as was the case in the past) using the "El Torito" standard. (more)
DHCP Manager	DHCP Manager provides a Java-based graphical interface for configuring and managing the Solaris DHCP server and DHCP databases. It allows 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. (more)
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. (more)

TABLE 1–1   Solaris 8 Features   *(continued)*

Feature	Description
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. (more)
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. (more)
Support for IPv6 in system identification utilities	Systems can now be configured at install time to use IPv6 in addition to IPv4. (more)
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`). (more)
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. It 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. (more)
Product Registry	The Solaris Product Registry is a tool to manage software installed using Solaris Web Start 3.0 or the Solaris package management commands (`pkgadd`, for example). It enables you to: ■ View a list of installed and registered software and some software attributes ■ Install additional software products ■ Uninstall software ■ Browse for and launch an installer (more)
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. (more)
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. (more)

TABLE 1–1   Solaris 8 Features   *(continued)*

Feature	Description
IPv6 NFS/RPC compliant	This feature adds IPv6 support to NFS™ and RPC in a seamless manner. There are no changes to existing commands related to NFS. Most RPC applications will also run over IPv6 without any change. Some advanced RPC applications with transport knowledge might require updates. (more)
Logical Link Controller 2 (LLC2)	The Class II logical link control driver (LLC2) interfaces network software (NetBIOS, SNA, OSI), running under the Solaris operating environment to a physical LAN network controlled by one of the supported communications adapters. This version of the LLC2 driver includes support for both connectionless and connection-oriented logical link control class II LLC2 operations for Ethernet, Token Ring, and FDDI adapters when accessed through the appropriate Solaris MAC layer driver. (more)
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. (more)
`sendmail` **8.9.3**	New options and utilities improve the storage and security functionality of `sendmail`. (more)
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 allow developers to write SLP-enabled applications, and provides system administrators a framework for ease of network extensibility. (more)
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. (more)
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. (more)
File System Enhancements	

TABLE 1–1   Solaris 8 Features   *(continued)*

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. The UDF file system can be used 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 (more)
NFS server logging	NFS server logging allows an NFS server to provide a record of file operations performed on its file systems. This feature is particularly useful for sites that make anonymous FTP archives available to NFS and WebNFS™ clients. (more)
IA: Extended Memory (XMEM) support	XMEM support provides a mechanism that allows 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. (more)
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). Using XFileChooser an application can access a file on a local disk or on an NFS server through the use of NFS URL naming. (more)
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 enabled, writing access time updates for the file system may be deferred until the disk is accessed for a reason other than updating access times. (more)
Diagnostic and Availability Enhancements	
The coreadm command	The coreadm command provides flexible core file naming conventions and better core file retention. (more)
Examining core files with proc tools	Some of the proc tools have been enhanced to examine process core files as well as live processes. The proc tools are utilities that can manipulate features of the /proc file system. (more)
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. (more)

TABLE 1–1   Solaris 8 Features   *(continued)*

Feature	Description
Improved system error messages	The system boot and error message format now provides a numeric identifier, module name, and time stamp to messages 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. (more)
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. (more)
TCP/IP internal trace support	TCP/IP now provides internal trace support by logging TCP communication when a connection is terminated by a reset (RST) packet. (more)

Performance and Scalability Enhancements	
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. (more)
`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 may show the series of events leading up to a point of failure. (more)
SPARC: `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. (more)
Faster boot for servers	Large servers now require significantly less time to boot. (more)
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 `poll(2)`; it does not replace `poll(2)`. (more)
`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. (more)

TABLE 1–1 Solaris 8 Features *(continued)*

Feature	Description
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). (more)
Security Enhancements	
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. (more)
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. (more)
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. (more)
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. It is no longer necessary to set up the audit events for a user on each system to which the user has access.
Realtime Systems Enhancement	
High resolution timers	The high resolution timers (HRTs) bypass the traditional 10 millisecond 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 multi-processor system) and operate to any required degree of precision in timing events. (more)
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. (more)
Common Desktop Environment (CDE) Desktop Enhancements	
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. (more)
Hot Key Editor	The Hot Key Editor enables users to predefine a series of commands to a given function key, resulting in increased productivity and efficiency. (more)

TABLE 1–1   Solaris 8 Features   *(continued)*

Feature	Description
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 enables users to take advantage of the real-time video creation and broadcast functionality. (more)
SPARC: Audio Mixer	CDE now includes a new GUI tool, `sdtaudiocontrol`, that supersedes `audiocontrol`. `sdtaudiocontrol`, uses the features of the audio mixer, and provides more features. (more) See also "SPARC: Audio Mixer" on page 70
SPARC: PC launcher 1.0	PC launcher 1.0 for SunPCi enables users to get 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. (more)
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. (more)
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. (more)
SDTImage enhancements	The SDTImage screen snapshot feature now enables users to easily and quickly capture a screenshot image from the command line. (more)
Smart card support	CDE now supports smart card authentication security technology. Users can now use smart cards to authenticate their identity when 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. (more)
ToolTips	ToolTips provides users with Balloon Help, a simple and short description of an icon function. (more)
X11R6.4 support	The X Server is upgraded to the X11R6.4 industry standard which includes key features that increase user productivity and mobility, including 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 tool kits. (more)
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.

TABLE 1–1 Solaris 8 Features *(continued)*

Feature	Description
Web Services	
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 using Java Runtime Environment (JRE) 1.2 instead of the default Java Virtual Machine (JVM) bundled with Navigator. (more)
Netscape Communicator 4.7	Solaris 8 includes Netscape Communicator 4.7 and now installs it by default on your system. (more)
Solaris Network Cache and Accelerator (NCA)	The Solaris NCA increases web server performance by maintaining an in-kernel cache of web pages accessed during HTTP requests. (more)
Apache web server	The open source Apache web server is now bundled with Solaris. It includes all the standard Apache modules, including proxy server support, as well as the `mod_perl` module. (more)
Printing	
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. (more)
Solaris Print Manager	Solaris Print Manager is a Java-based graphical user interface that enables you to manage local and remote printer access. This tool can be used in the following name service environments: NIS, NIS+, NIS+ with Federated Naming Service (FNS), and files. (more)
Language Support	
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. (more)
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. (more)
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. (more)

TABLE 1–1   Solaris 8 Features   *(continued)*

Feature	Description
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. (more)
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 China and Korea ■ `iconv` for various Unicode encoding formats and international and de facto industry standard codesets (more)
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. (more)
Documentation	
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, improved support for non-English locales, and minor changes to improve overall performance and stability. (more)
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 Realtime 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. (more)
SPARC: Audio Mixer	

TABLE 1–1   Solaris 8 Features   *(continued)*

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. (more)
Software Developer Environment	
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. (more)
Always ready Power Management™	With the Solaris 8 operating environment, a device driver using the new device Power Management interfaces will be power managed automatically. (more)
`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. (more)
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. (more)
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 automating complex system administration tasks. (more)
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. (more)
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. (more)
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. (more)
`strftime()` function update	The `%u` conversion specification for the `strftime()` function has been changed. (more)

TABLE 1–1   Solaris 8 Features   *(continued)*

Feature	Description
Alternate one-level libthread	An alternate threads implementation provides a one-level model in which user-level threads are associated one-to-one with lightweight processes (LWPs). This implementation is simpler than the standard implementation and may be beneficial to some multithreaded applications. (more)
SPARC: audio mixer driver	The audio mixer driver now allows multiple applications to play and record audio simultaneously. (more)
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. (more)
8–bit visual support	The 8-bit visual shared library enables device drivers with only 24-bit hardware to display 8-bit visual applications.
IA Hardware Enhancements	
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. (more)
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. (more)
Universal Serial Bus (USB) support for keyboards and mouse devices	Solaris *Intel Platform Edition* now provides USB support for keyboards and mouse devices. (more)
X Server video driver enhancement	Solaris *Intel Platform Edition* now provides support for more video devices. (more)
IA SCSI Drivers	
IA: `cadp` driver enhancements	The Solaris `cadp` driver now supports Adaptec Ultra2 adapters. (more)
IA: `ncrs` device driver enhancements	The Solaris `ncrs` device driver now supports the SCSI hot-plugging functionality and Ultra2 devices, in addition to general functionality and performance improvements. (more)
IA: `symhisl` device driver	The `symhisl` device driver, which supports the adapters SYM22910 and SYM21002, is now included in Solaris *Intel Platform Edition*. (more)

TABLE 1–1   Solaris 8 Features   *(continued)*

Feature	Description
Other Software	
Early Access Software	The Solaris 8 release includes an Early Access (EA) directory with EA software. For more information, refer to the README on the Solaris Software CD 2 of 2.
Freeware	Several freeware tools and libraries are included in the Solaris 8 release. These tools assist the development of tools for administration and development tasks. (more)

Features Added in Previous Solaris Releases

This section describes features introduced in previous Solaris releases.

Solaris 7 Release

Table 1–2 describes new and enhanced features of the Solaris 7 release.

TABLE 1–2   Solaris 7 Features

Feature	Description
Solaris 64-bit Operating Environment	
64-bit operating environment (SPARC only)	The 64-bit Solaris operating environment is a complete 32-bit and 64-bit application and development environment supported by a 64-bit operating system. This 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 by supporting a 64-bit virtual address space as well as removing other existing 32-bit system limitations. (For SPARC Platform Edition only.)
Web Browser	
Netscape Communicator	Solaris 7 software now ships with Netscape Communicator.

TABLE 1–2   Solaris 7 Features   *(continued)*

Feature	Description
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. Once 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 required to reboot a system if it crashes, or after an unclean halt.
−o noatime UFS mount option	To ignore access time updates on files, you can specify the −o noatime option when mounting a UFS file system. This option reduces disk activity on file systems where access times are unimportant (for example, a Usenet news spool).
LDAP	The Lightweight Directory Access Protocol (LDAP) is an open-standard, platform-independent, access protocol based on the X.500 informational model. It is designed to run over TCP/IP and uses simple string encodings. LDAP applications are client-server applications and the client library included in this release enables developers to write LDAP applications and users to run LDAP enabled applications.
Dynamic reconfiguration	Dynamic reconfiguration allows the service provider to add, or remove and replace, hot-pluggable system boards in a running system, eliminating the time lost in rebooting. (For certain SPARC systems only.)
New commands: `pgrep` and `pkill`	The `pgrep` command looks at the active processes on the system and displays the process IDs of the processes whose attributes 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.
`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.
Traceroute utility	Solaris 7 software bundles the popular traceroute utility. The traceroute utility is used to trace the route an IP packet follows to an Internet host. It 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.

TABLE 1–2   Solaris 7 Features   *(continued)*

Feature	Description
Network Performance	
TCP with SACK	TCP selective acknowledgment (TCP SACK) provides the support described in RFC 2018 to solve the problems related to congestion and multiple packet drops, especially in applications using TCP large windows (RFC 1323) over satellite links or transcontinental links.
Network Security	
RPCSEC_GSS	RPC has been modified based on the GSS-API. This increases security integrity and confidentiality, and NFS services are no longer tied down to a specific or a single security mechanism.
NIS+ extended Diffie-Hellman	NIS+ enhances NIS+ security by increasing the authentication key length from 192 bits to 640 bits.
BIND 8.1.2	Berkeley Internet Name Daemon (BIND), the most popular DNS implementation, has been upgraded to 8.1.2. It provides a new configuration file that enhances network security through the use of access control lists (ACLs).
Ease-of-Use and Management Improvements	
Installation	
SPARC: Installing a 64-bit operating environment	The Solaris 7 installation programs have a new check box for selection of 64-bit support; it is selected by default when installing 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	
Man pages available in AnswerBook2 format	Man pages are available in AnswerBook2 (SGML), rather than AnswerBook format. This provides improvements in navigation and links to man pages directly from other AnswerBook2 documents.

TABLE 1–2   Solaris 7 Features   *(continued)*

Feature	Description
Running an AnswerBook2 server directly from the 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 using the `ab2cd` script. The documentation can be viewed from the CD.
Ability to use CGI-based web servers	The AnswerBook2 server can run on top of an existing web server, such as Sun WebServer™, rather than requiring an additional web server run on the system solely for AnswerBook2 support.
Ability to control display of style sheet errors	An environment variable, *AB2_DEBUG*, can be set on the AnswerBook2 server. It controls whether style sheet errors are displayed to the user with a red "BUG."
Language Support	
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 input and display text from different writing scripts such as Japanese, Thai, and Russian, and 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 pre-processing 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 changeover, 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 the Middle Eastern regions.
Standards	

TABLE 1–2   Solaris 7 Features   *(continued)*

Feature	Description
UNIX 98 branding	Solaris 7 software is branded UNIX® 98.
Software Developer Environment	
64-bit developer environment (SPARC only)	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.
`man` utility now displays SGML code	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`) for programmers provided 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 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 using WebNFS. Since it implements the NFS™ protocol directly, it requires no NFS support on the host system.
`truss` now performs function-call tracing	The `truss` utility traces the system calls, signals, and machine faults of a process. It has been enhanced with a new option to enable entry and exit tracing of user-level function calls executed by the traced process.
Improved device configuration library	The `libdevinfo` library, 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/Imaging	

TABLE 1–2   Solaris 7 Features   *(continued)*

Feature	Description
XIL™	The XIL foundation imaging library is suitable for libraries or applications requiring 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 representing a left-eye/right-eye view. This provides an image display with depth perception.
	The XIL Developer's Kit is now separate from Solaris and is available free of charge.
Desktop	
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 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 allows 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	
SCSI disk driver sd	The sd SCSI disk target driver, 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 framework 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*).

Solaris 2.6 Release

Table 1–3 describes new and enhanced features of the Solaris 2.6 release.

TABLE 1–3   Solaris 2.6 Features

Feature	Description
Java	
Java Virtual Machine	The Java Virtual Machine 1.1 integrates the Java platform for the Solaris operating environment. It includes the Java runtime environment and the basic tools needed to develop Java applets and applications.
HotJava™ browser	The HotJava browser provides an easy-to-use, customizable user interface for exploring the Internet and corporate intranets. It can run executable content in the form of applets. (Applets are Java programs that can be included in an HTML page, much like images can be included.)
Intranet/Internet Services	
WebNFS software	The WebNFS software enables file systems to be accessed through the Web using the NFS protocol. This protocol is very reliable and provides greater throughput under a heavy load.
Performance Improvements	
Database Performance	
UFS direct I/O	For UFS files, direct I/O enables a program to read and write data directly from and to the disk, bypassing the virtual memory buffer cache. An example of a bulk I/O operation is downloading large amounts of satellite data to a file.
Raw I/O	Improvements were made to low-level I/O support routines that dramatically improve throughput for I/O to disk devices without a file system (raw devices often used for database files.). The driver for the SPARCstorage™ Array was rewritten to improve its throughput.
Network/Web Performance	
Kernel sockets	The kernel sockets implementation provides improved compatibility with SunOS 4.x and BSD sockets, and enables higher socket performance.
TCP large windows	TCP large windows provides the support described in RFC1323. It improves performance over high-bandwidth networks such as ATM, or high-delay networks such as satellite links, by using windows that exceed the normal 64-Kbyte limit.
Zero copy TCP/ hardware checksum	Zero copy TCP has been used to eliminate copying from user-space to kernel-space.
	Support for hardware checksum has been added as well. Performance is improved by avoiding software computation of the checksum, off-loading the work to a network adapter that supports it. This is currently only supported on the SunATM™ card.
Ease-of-Use and Management Improvements	
Installation	

TABLE 1–3   Solaris 2.6 Features   *(continued)*

Feature	Description
Solaris Web Start browser-based installation	Solaris Web Start is a browser-based utility that guides users through selection and installation of both Solaris and bundled application software.
Installation documentation	A documentation reorganization makes finding information on how to install Solaris software easier.
IA device configuration	The Configuration Assistant interface is part of the new booting system for the Solaris (*Intel Platform Edition*) software. It determines which hardware devices are in the machine, accounts for the resources each device uses, and enables users to choose which device to boot from.
IA configuring peripherals	The kdmconfig program is used to configure the mouse, graphics adapter, and monitor on an IA based system. If an Owconfig file already exists, kdmconfig will extract any usable information from it. In addition, this updated version of kdmconfig will also retrieve information left in the devinfo tree by the devconf program, and use that information to automatically identify devices.
Changed Solaris CD layout	Slice 0 on the Solaris CD has been reorganized to make it more intuitive and extensible.
Upgrade with disk space reallocation	The upgrade option provides an auto-layout feature to reallocate disk space if the current file systems don't have enough space for the upgrade.
Testing upgrade profiles	The pfinstall command is now available to test profiles that use the upgrade option.
Changing a system's boot device	A system's boot device is now changeable during installation.
Preconfiguring system Configuration information	Using the sysidcfg file, you can now preconfigure system configuration information through a set of keywords. You can choose to provide one or more of the keywords to preconfigure varying levels of system information.
Optional 8-bit locales	The installation window in the English Solaris 2.6 CD offers several English language locales. To use 8-bit characters, users should install through one of the −en_XX options. The locale used in the installation becomes the default system locale.
Documentation	
AnswerBook2 documentation	Solaris online documentation can be accessed with any popular browser. The AnswerBook2 viewer uses a web browser-based interface that enables users to view and print a variety of Solaris information, including existing AnswerBook™ documents and man pages.

TABLE 1–3   Solaris 2.6 Features   *(continued)*

Feature	Description
Desktop	
Common Desktop Environment (CDE)	Solaris CDE is an advanced Motif-based desktop with an easy-to-use interface that provides a consistent look and feel across UNIX® platforms. With Solaris CDE you can run OpenWindows™ applications without modifications. In addition, CDE applications are integrated with the Web; for example, you can click on an HTTP address in a CDE Mailer message and a browser will open to the selected address.
Power Management for SPARC desktops	Power Management software enables users to be more frugal with power consumption on desktop systems when they are not being used. By default, all UltraSPARC desktop systems power off when left alone for 30 minutes. Users can modify or turn off Power Management if needed.
OpenWindows desktop	The OpenWindows 3.6 desktop and libraries have been updated with bug fixes and prepared for the year 2000.
New user locales	Ten new locales are added for Eastern European, Russian, Greek, and Baltic states.
Unicode 2.0 support	Two locales that are Unicode 2.0 and ISO 10646 compliant have been added. These locales enable multiscript input and output and are the first locales provided in the Solaris environment with this capability. These locales support the CDE environment only, including the Motif and CDE libraries
Font administration	- Font Admin enables easy installation and usage of fonts for the X Window System. It supports TrueType, Type0, Type1, and CID fonts for multibyte languages, and provides comparative font preview capability. It is fully integrated into the CDE desktop. - TrueType fonts are supported through X and Display PostScript. Font Admin enables easy installation and integration of third-party fonts into the Solaris environment.
Asian language enhancements	Solaris 2.6 software has been re-architected to the historical dependency on the Extended UNIX Codeset (EUC). Additional codeset support and locales for popular Asian PC encoding standards (ShiftJIS (PCK) in Japan, Big5 in PRC, and Johap) in Korea are also provided. These locales support the CDE environment only, including the Motif and CDE libraries.
Solaris user registration	Users who register using Solaris electronic registration will receive information about new Solaris offerings and support.
Standards	
Year 2000 compliance	The Solaris 2.6 operating environment is year-2000 ready. It uses unambiguous dates and follows the X/Open guidelines where appropriate.
X/Open UNIX 95 (Spec 1170)	The previous release of the Solaris software was compliant with much of Spec 1170. The Solaris 2.6 release now meets all the requirements.

TABLE 1–3   Solaris 2.6 Features   *(continued)*

Feature	Description
X/Open XFN CAE	Federated Naming Service (FNS) is now compliant with the X/Open XFN CAE definition.
POSIX 1003.1b	POSIX real-time functionality is added. This includes full support for POSIX AIO (with the exception of the −PRIORITIZED I/O option) and some new extensions to support 64-bit files (see "Large Files").
ISO 10646	The ISO 10646 standard defines Unicode 2.0, including UCS-2 and UTF-8 (the standard UNIX implementation). All implementations specified in this standard are Unicode 2.0 compliant.
Robust Software Developer Environment	
Large files	Large files are supported on UFS, NFS, and CacheFS™ file systems. The interfaces defined by the Large File Summit are supported.
Versioning/ scoped libraries	Developers of shared libraries can now have better control over the public interfaces that they offer. This helps to control the dependencies that applications have on these shared libraries. It also means the applications are more portable and less affected by changes in the shared libraries, thus leading to higher-quality products for both. In the Solaris 2.6 operating environment, the system libraries take advantage of this technology and have been both scoped and versioned.
Scheduler activations	Scheduler activations provide additional kernel scheduling support for multithreaded applications.
Pre-emption control	Pre-emption control allows application control over kernel pre-emption.
/proc File system and watchpoints	The previous flat /proc file system has been restructured into a directory hierarchy that contains additional subdirectories for state information and control functions. It also provides a watchpoint facility to monitor access to and modifications of data in the process address space. The adb(1) command uses this facility to provide watchpoints.
Federated naming service (FNS)	FNS is now compliant with the X/Open XFN CAE definition. FNS has also been enhanced to include support for Lightweight Directory Access Protocol (LDAP) and provides improved support for the files and NIS back ends.
Asynchronous I/O	Asynchronous I/O support for tapes provides an interface to improve performance on high-performance tape devices. With the ability to queue up I/O requests, this feature significantly improves the I/O throughput.
Solaris Developer Kit (SDK)	The SDK software is now built into the Solaris operating environment and is no longer an unbundled product. All the information a developer needs to produce applications and graphics handlers for end-user Solaris runtime environments is now available in this Solaris release.

TABLE 1–3 Solaris 2.6 Features *(continued)*

Feature	Description
Graphics	
XGL™	The XGL 2-D and 3-D immediate-mode API provides portability across hardware platforms and optimal performance from graphics acceleration. The XGL API includes support for raster text, environment and vertex-level texture mapping, four-component texture mapping, DGA transparent overlay, and triangle list Gcache.
XIL	The XIL foundation imaging library is suitable for libraries or applications requiring imaging or digital video, such as document imaging, color prepress, or digital video generation and playback. The following features are new in the Solaris 2.6 release. The XIL 1.3 library: - Is MT-hot - Supports the 32-bit, single-precision, floating-point data type - Supports temporary images - Supports the new `XIL_GENERAL` storage format - Includes Kodak Color Management System (KCMS) support - Supports the new `XIL_BAND_SEQUENTIAL` storage format for all data types - Saves on memory use with tiled storage
PEX™ 3.0.2 runtime environment	The PEX application programmer interface (API) provides application portability across platforms and 3-D graphics on local and remote displays.
KCMS multithreaded programming	KCMS now supports multithreaded programs: it is multithread safe (MT-safe). A KCMS application using multithreaded capabilities does not require locks around KCMS library calls.
X11R6 base window system	The X11R6 Base Windowing System includes the latest fixes and patches from the X Consortium.
X11 double buffer extension	The double buffer extension (DBE) provides a standard way to use double-buffering within the framework of the X Window System. Double-buffering uses two buffers, called "front" and "back," that hold images. The front buffer is visible to the user; the back buffer is not. A detailed specification is available via an Internet browser at `ftp://ftp.x.org/pub/DOCS/DBE/`
Large Files Support	

TABLE 1–3   Solaris 2.6 Features   *(continued)*

Feature	Description
Large files	Large files are supported on UFS, NFS, and CacheFS file systems. Applications can create and access files up to one Tbyte on UFS-mounted file systems and up to the limit of the NFS server for NFS- and CacheFS-mounted file systems. A new –mount option is available to disable the large-file support on UFS file systems. This –mount option gives the system administrator a way to ensure that older applications that are not able to safely handle large files will not accidentally operate on large files.
64-bit AIO	The Solaris operating environment provides a new set of interfaces for developers who want to do asynchronous I/O to large files. These interfaces are integrated with KAIO in an implementation technique that optimizes I/O to raw files. They are automatically selected by either the Solaris AIO interfaces or the new POSIX AIO interfaces. KAIO is the optimized path for doing I/O to raw files. When using the interfaces with KAIO to raw files, there is a significant performance improvement.
Network Security	
NFS Kerberos	Kerberos authentication uses DES encryption to improve security over the network. The kernel implementations of NFS and RPC network services now support a new RPC authentication flavor that is based on the Generalized Security Services API (GSS-API). This support contains the hooks to add stronger security to the NFS environment.
RPCSEC_GSS	The user-level RPC implementation supports a new authentication flavor. This flavor is based on the GSS-API and provides the hooks to add stronger authentication, privacy, and integrity for RPC-based services.
Authentication modules (PAM)	The PAM framework enables you to "plug in" new authentication technologies.
BIND version 4.9.4-P1	Berkeley Internet Name Daemon (BIND), the most popular DNS implementation, has been upgraded to 4.9.4-P1. It addresses many of the security problems found in earlier versions of the implementation.
Network Management and System Administration	
Network time protocol (NTP)	Solaris software now supports NTP, which provides both precise time and/or network clock synchronization for use in distributed computing environments. In the past, Solaris customers could use a publicly available version of NTP. The new support provides increased time precision.
Solstice™ Enterprise Agents™	Solstice Enterprise Agents (SEA) is based on the new extensible agent technology or master/subagent technology. SEA is for component developers and system and network managers who want to develop custom Simple Network Management Protocol (SNMP), or Desktop Management Interface (DMI) subagents, to instrument different components, subsystems, and applications within a device to enable management from an SNMP management console.

TABLE 1–3   Solaris 2.6 Features   *(continued)*

Feature	Description
DHCP	Dynamic Host Configuration Protocol (DHCP) enables a host to get an Internet protocol address and other system configuration parameters without preconfiguration by the administrator.
NFS client failover	Client failover provides a high level of availability of read-only file systems by enabling the client to automatically mount the file system from another server if the first server becomes unavailable.
Variable length subnet mask (VLSM)	VLSM enables more efficient use of IP address space by enabling the TCP/IP administrator to use Classless InterDomain Routing (CIDR) to partition this space in a flexible manner.
Routing sockets	Conformance with the de facto routing socket interface as implemented by 4.4 BSD, which allows use of CIDR-aware routing protocols such as OSPF, BGP-4, and RIPv2, is now included.
autofs	The new `autofs` automount daemon is now fully multithreaded. This enables concurrent servicing of multiple mount requests and increases reliability.
Processor sets	Processor sets give the system administrator control over the allocation of processes to sets of processors.
NIS+ `backup`/ fast `restore`	NIS+ `backup` and `restore` provide a quick and efficient method of backing up and restoring NIS+ namespaces.
NIS+ over a wide area network (WAN)	Server-use customization enables NIS+ administrators to specify NIS+ server search order for clients that need naming services. Server use can be balanced among various clients by designating different servers for different clients as "preferred" (primary). If a client cannot obtain information from its preferred servers, the order in which the client seeks out other servers can be specified. This feature is particularly useful when a NIS+ domain spans a WAN link, because administrators can reduce network traffic over the WAN link by specifying that clients first try to obtain the naming service from servers on the client's side of the link.
NIS server	Solaris software now natively supports the NIS server. In previous Solaris releases, the NIS server was supported under emulation mode by the NIS+ server or using an unbundled product named NSkit.
CFS boot	CFS Boot enables AutoClient™ systems to boot more quickly with less network traffic by booting from a local CacheFS disk cache. The first system boot populates the cache. System boots that follow are satisfied from the cache.
Patch tools	Patch tools, including `patchadd` and `patchrm` commands to add and remove patches, are now part of the Solaris software, rather than shipping with each individual patch as `installpatch` and `backoutpatch` commands.

TABLE 1–3 Solaris 2.6 Features *(continued)*

Feature	Description
`isalist` utilities	`isalist` is a set of utilities that enables users to find out which instruction sets are supported on their machines and also to determine which one performs best for them.
Printing	
Printing	The Solaris 2.6 print software offers a better solution than the LP print software in previous Solaris releases. System administrators can easily set up and manage print clients using the NIS or NIS+ name services. This means print administration can be centralized for a network of systems and printers. New features include: - Redesign of print packages - Print protocol adapter - Print Client - Network printer support
Hardware Support	
PCMCIA PC card	PCMCIA delivers a PCMCIA supplement into a Solaris Device Driver Kit to enable OEMs and third parties to develop PC Card device drivers that will be source-compatible across all Solaris platforms.
Nomadic Support	
`filesync`	`filesync` ensures that data is moved automatically between a portable computer and a server.

What's New: A Closer Look

This chapter describes new features of the Solaris 8 release in detail. For a list of features with brief descriptions, see Chapter 1.

The Solaris 8 operating environment includes advanced technologies for multithreading, symmetric multiprocessing, integrated TCP/IP-based networking, large file handling on the 64–bit operating environment, and centralized network administration tools. This Solaris release provides many new features that improve an already powerful, stable, operating environment.

Some of the key features are:

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

- The Solaris 8 operating environment provides the Naming Service switch back-end support for Lightweight Directory Access Protocol (LDAP) based directory service.

- The Java 2 Software Development Kit (SDK) for Solaris significantly improves scalability and performance of Java applications.

- The Solaris 8 Installation CD provides a graphical, wizard based, Java powered application to install the Solaris operating environment and other software.

- The Solaris 8 operating environment supports the Universal Disk Format (UDF) file system, enabling users to exchange data stored on CD-ROMs, disks, diskettes, DVDs, and other optical media.

- The Solaris Smart Card feature enables security administrators to protect a computer desktop or individual application by requiring users to authenticate themselves by means of a smart card.

- The PDA Synchronization (PDA Sync) application synchronizes the data from applications such as Desktop Calendar, Desktop Mail, Memo, and Address, with data in similar applications on a user's Personal Digital Assistant (PDA).

- The Solaris 8 Software CDs and Languages CD include support for more than 90 locales, covering 37 languages.

- The Solaris Common Desktop Environment (CDE) contains new and enhanced features that incorporate easy to use desktop productivity tools, PC interoperability, and desktop management tools.

- The X Server is upgraded to the X11R6.4 industry standard which includes features that increase user productivity and mobility, including 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 tool kits.

IPv6

The Internet Protocol (IP), version 6 (IPv6), is an evolutionary step from the current version, IPv4. Deploying IPv6, using defined transition mechanisms, does not disrupt current operations. IPv6 adds increased address space and improves Internet functionality using a simplified header format, support for authentication and privacy, autoconfiguration of address assignments, and enables new quality-of-service capabilities.

For more information, see the *System Administration Guide, Volume 3.*

Native LDAP

Native Lightweight Directory Access Protocol (LDAP) provides the Naming Service switch back-end support for LDAP based directory service. With the Solaris 8 operating environment, network administrators can now specify LDAP as the desired name service to directory entry access by copying the nsswitch.ldap template file to /etc/nsswitch.conf.

For more information, see the *Solaris Naming Administration Guide* and the *Solaris Naming Setup and Configuration Guide.*

Java 2 SDK for Solaris

The Java 2 SDK, Standard Edition version 1.2.1_04, provides substantially increased scalability and performance compared to the 1.1 releases, especially for server-class applications. The Java 2 SDK for Solaris 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

Java 2 has replaced JDK 1.1 as the default JDK in the Solaris 8 operating environment. JDK 1.1.8_09 is still available for applications that encounter incompatibility with the default Java 2 JDK.

For more information, see the *Java 2 SDK for Solaris Developer's Guide.*

Installation and Management

The Solaris operating environment is a large, feature-rich environment; its structure gives customers the flexibility to meet their needs. New features enable customers to easily install and manage the Solaris environment.

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. Solaris Web Start also now includes an upgrade capability and the "Kiosk," a browser-based environment in which information such as documentation, web pages, and other content is displayed as the user installs the Solaris operating environment.

For more information, see the *Solaris 8 (SPARC Platform Edition) Installation Guide* or the *Solaris 8 (Intel Platform Edition) Installation Guide.*

Booting a System Over the Network With DHCP

Dynamic Host Configuration Protocol (DHCP) support for booting a system over the network has been added to this Solaris release.

A system on the network can now use DHCP to acquire boot parameters and network configuration information needed to boot over the network. DHCP booting is supported on certain SPARC systems and IA based systems.

Previously, a system was booted over the network using Reverse Address Resolution Protocol (RARP) by default. Now you can choose either DHCP or RARP for network booting.

A DHCP server must be installed and configured for your network prior to using DHCP to boot a system over the network. For information on setting up a DHCP server, see the *System Administration Guide, Volume 3*.

For information on booting a system over the network, see the *System Administration Guide, Volume 1.*

IA: Boot Partition in Solaris 8

Users running Solaris *Intel Platform Edition* can now designate a separate IA boot partition. This boot partition, which requires 10 Mbytes of disk space, can be installed on a disk separate from the rest of the Solaris operating environment, thus enabling the user to install more than one operating system on a machine. Only the boot partition needs to be located on the boot disk.

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

IA: CD-ROM Boot

This new feature enables the user to boot a system from an installation CD (rather than the Device Configuration Assistant diskette, as was the case in the past) using the "El Torito" standard.

The BIOS on most IA based motherboards manufactured since late 1997 supports the "El Torito" standard and thus recognizes CD-ROM drives as boot devices. To turn on this capability, the user runs the system's BIOS setup tool.

DHCP Manager

DHCP Manager provides a Java-based graphical interface for configuring and managing the Solaris DHCP server and DHCP databases. It 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.

DHCP Manager can be used instead of the Solaris DHCP command-line utilities, or in combination with them.

DHCP Manager provides the following benefits:

- A convenient, integrated point-and-click interface for the Solaris DHCP server's most sophisticated functions

- DHCP management wizards that guide you through tasks such as configuring the DHCP server, configuring networks, and adding addresses

- A graphical view of the relationships between dhcptab macros and options, making it easier for you to determine where to place option values for the most efficient client configurations

For more information about DHCP Manager, see the dhcpmgr(1M) man page and the *System Administration Guide, Volume 3.*

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. Previously, only the first 8 Gbytes of any IDE disk could be used by Solaris *Intel Platform Edition*; also, only the first 8 Gbytes could be used for a root slice by either SCSI or IDE disks. Both of these restrictions have been removed on systems with improved BIOS interfaces.

For more information, see the *Solaris 8 (Intel Platform Edition) Installation Guide.*

Solaris WBEM Services

Solaris WBEM Services software is an implementation of Web-Based Enterprise Management (WBEM) on the Solaris 8 operating environment. WBEM is an industry-wide initiative that includes standards for web-based management of systems, networks, and devices on multiple platforms. Solaris WBEM Services software makes it easier for software developers to create management applications that run in the Solaris operating environment and makes the Solaris operating environment easier to manage. Solaris WBEM Services sofware provides secure access and manipulation of management data. The product includes a built-in Solaris provider that enables management applications to access information about managed resources (devices and software) in the Solaris operating environment.

Solaris WBEM Services software provides the following services:

- Management services, in the form of a CIM Object Manager that checks the semantics and syntax of CIM data and distributes data between applications, the CIM Repository, and managed resources.

- Security services that enable administrators to control user access to CIM information.

- Logging services that consist of classes developers can use to create applications that dynamically record event data to a log record and retrieve data from a log record. Administrators can use this data to track and determine the cause of events.

- XML services that convert XML data into CIM classes, enabling XML/HTTP-based WBEM clients to communicate with the CIM Object Manager.

For detailed information about using Solaris WBEM Services, see the *Solaris WBEM Services Administrator's Guide*.

Support for DNS in System Identification Utilities

Domain name system (DNS) has been added to the list of name services that can be configured through the system identification utilities. DNS is presented as a choice if no other name services are auto-detected, but can also be specified in the `sysidcfg` file. DNS cannot be auto-detected without the `sysidcfg` file.

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

This feature was first available in the Solaris 7 5/99 release.

Support for IPv6 in the System Identification Utilities

Systems can now be configured at install time to use IPv6 in addition to IPv4. There is currently no way to auto-detect IPv6, so users are asked at install time whether or not a system is to be configured to use IPv6 unless a user specifies that IPv6 be used in a `sysidcfg` file.

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

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`). In previous releases, only 48 pseudo-terminals were allocated by default. Solaris 8 software now allocates pseudo-terminals dynamically when they are needed, automatically adapting to the work load. This

benefits desktop users and system administrators who deal with large numbers of open terminal sessions.

Reading Documentation on the Solaris 8 Documentation CD

The `ab2cd` script enables all users to read AnswerBook documentation directly from the Solaris 8 Documentation CD. It 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.

For more information about the `ab2cd`, see the man page, `ab2cd`(1M).

This feature was first available in the Solaris 7 8/99 release.

Product Registry

The Solaris Product Registry is a tool to manage software installed using Solaris Web Start 3.0 or the Solaris package management commands (`pkgadd`, for example). It enables you to:

- View a list of installed and registered software and some software attributes

- Install additional software products

- Uninstall software

- Browse for and launch an installer

For more information, see *Solaris 8 (Intel Platform Edition) Installation Guide* or *Solaris 8 (SPARC Platform Edition) Installation Guide*.

This feature was first available in the Solaris 7 3/99 release.

Networking

The Solaris operating environment provides a stable and reliable networking environment. New network management and system administration features in this release expand tools for managing this environment.

SPARC: InterDomain Networks

InterDomain Networks (IDNs) enable the user to set up high-speed network connections between dynamic system domains without special hardware. Only certain SPARC servers support IDN. See your hardware manufacturer's documentation for information about whether your server supports IDNs.

For more information, see the *Sun Enterprise 10000 InterDomain Networks User Guide.*

This feature was first available in the Solaris 7 11/99 release.

IPsec for IPv4

The IP Security Architecture (IPsec) provides protection for IP datagrams. The protection can include confidentiality, strong integrity of the data, partial sequence integrity (replay protection), and data authentication. IPsec is the authentication and encryption mechanism that affects the IP layer and can be effective with or without the knowledge of applications.

For more information, see the *System Administration Guide, Volume 3.*

IPv6 NFS/RPC Compliant

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

For more information, see the *System Administration Guide, Volume 3.*

LLC2 Protocol

The Class II logical link control driver (LLC2) interfaces network software (NetBIOS, SNA, OSI) running under the Solaris operating environment to a physical LAN network controlled by one of the supported communications adapters. The LLC2 driver, which appears as a driver to the network software, resides in the kernel and is accessed by standard UNIX STREAMS functions.

This version of the LLC2 driver includes support for both connectionless and connection-oriented logical link control class II LLC2 operations for Ethernet, Token Ring, and FDDI adapters when accessed through the appropriate Solaris MAC layer driver. The Data Link Provider Interface (DLPI) to the LLC2 driver enables multiple and different protocol stacks, (including NetBIOS and SNA), to operate simultaneously over one or more local area networks.

For more information on LLC2, see the *System Administration Guide, Volume 3*. For more information on DLPI, see the *STREAMS Programming Guide* and the man page `dlpi`(7P).

This feature was first available in the Solaris 7 8/99 release.

NIS/NIS+ Over IPv6 Transports

Users can store IPv6 addresses in the NIS, NIS+, and DNS naming services, and also use NIS and NIS+ over IPv6 RPC transports to retrieve any NIS or NIS+ data. Two new maps have been added for NIS: `ipnodes.byname` and `ipnodes.byaddr`. These maps can contain both IPv4 and IPv6 information. A new table, `ipnodes.org_dir`, has been added for NIS+, and it can also contain both IPv4 and IPv6 addresses. While use of the new `ipnodes`(4) database is preferred for both IPv4 and IPv6, the `hosts`(4) database continues to be supported for IPv4 addresses.

For more information, see the *System Administration Guide, Volume 3*.

`sendmail` 8.9.3

This version includes a new option, `MaxHeadersLength`, that limits the length of the sum of all header lines in any given message, which can prevent a denial-of-service attack. Also included is a new version of `mail.local` that implements the Local Mail Transfer Protocol, RFC 2033. This change allows for re-queuing of mail to the recipients that did not receive a message, rather than re-sending the message to all of the recipients if an error occurs. A new file called `/etc/default/sendmail` can be used to store options to start `sendmail`, so that the options are not touched during an upgrade. In addition, a new utility called `smrsh` increases security by reducing the number of commands that can be run using the `|program` syntax of `sendmail`.

For more information, see the *System Administration Guide, Volume 3*.

Service Location Protocol

The Service Location Protocol (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.

For more information, see the *Service Location Protocol Administration Guide*.

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.

The Solaris **8** operating environment also enforces conformance to the Solaris operating environment DDI specified interfaces for the following Solaris STREAMS support functions:

- `WR(queue_t)`

- `RD(queue_t)`

- `OTHERQ(queue_t)`

- `SAMESTR(queue_t)`

Conformance to the Solaris operating environment DDI specified interfaces has been implemented by redirecting the functions listed above to the `ddi.h` implementations of these same functions in all cases of usage.

Caution - This enforced conformance introduces a risk of system failure in DDI non-compliant drivers and modules that incorrectly use the functions listed above. For DDI non-compliant drivers and modules, a version update of the non-compliant driver/module is required but no code changes are necessary.

For more detailed specifications of the functions listed above, see the *STREAMS Programming Guide.*

Network Time Protocol (NTP)

NTP is upgraded from 3.4y to 3-5.93e and includes the following new features:

- `ntpdate(1m)` supports:

  - The −B flag, to force time to be slowed using `adjtime(2)`, even if the offset is greater than 128 ms
  - The −q flag, to query only, not setting the clock
  - The −v flag, to be verbose, and include the version in logging

- `xntpd(1m)` supports the −A flag, to disable authentication mode

- `xntpdc(1m)` is a new daemon control program

For more information, see *System Administration Guide, Volume 2.*

File System Enhancements

This section describes new features in the Solaris 8 operating environment that affect file system management and logging.

Universal Disk Format File System

The Universal Disk Format (UDF) file system, the industry-standard format for storing information on optical media technology, is supported in this Solaris release. The UDF file system can be used 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

The UDF file system is provided as dynamically loadable, 32–bit and 64–bit modules, and contains system administration utilities for creating, mounting, and checking the file system on both SPARC and IA platforms.

When a UDF file system is mounted, users can read, write, or list files from the device, and applications can access UDF file and directories with standard system calls.

See the *System Administration Guide, Volume 1* and the man page `mount_udfs`(1M) for more information.

This feature was first available in the Solaris 7 11/99 release.

NFS Server Logging

NFS server logging allows an NFS server to provide a record of file operations performed on its file systems. The record includes information to keep track of what is accessed, when it is accessed, and who accessed it. The location of the logs that contain this information can be specified through a set of configuration options. These options also can be used to select the operations that should be logged. This feature is particularly useful for sites that make anonymous FTP archives available to NFS and WebNFS clients.

For more information, see the *System Administration Guide, Volume 3.*

IA: XMEM Support

Extended Memory (XMEM) support provides a mechanism that allows 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.

For more information, see the man pages `mount_xmemfs`(1M) and `xmemfs`(7FS).

This feature was first available in the Solaris 7 11/99 release.

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). Using XFileChooser, an application can access a file on a local disk or on an NFS server by using NFS URL naming.

For more information, see the *WebNFS Developer's Guide.*

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 enabled, writing access time updates for the file system may be deferred until the disk is accessed for a reason other than updating access times. The default behavior is `dfratime`. Use the `nodfratime` option to disable this feature. In addition, the `mount` option, `noatime`, turns off access time recording regardless of the dfratime/nodfratime value.

For specific information about UFS mount options, see the `mount_ufs`(1M) man page.

This feature was first available in the Solaris 7 3/99 release.

Diagnostic and Availability Enhancements

This section describes new features in the Solaris 8 operating environment that affect system configuration and troubleshooting.

Improved Core File Management

The `coreadm` command

This release introduces the `coreadm` command, which provides flexible core file naming conventions and better core file retention. For example, you can use the `coreadm` command to configure a system so that all process core files are placed in a single system directory. This means it is easier to track problems by examining the core files in a specific directory whenever a Solaris process or daemon terminates abnormally.

Two new configurable `core` file paths, per-process and global, can be enabled or disabled independent of each other. When a process terminates abnormally, it produces a `core` file in the current directory as in previous Solaris releases. But if a global core file path is enabled and set to `/corefiles/core`, for example, then each process that terminates abnormally produces *two* core files: one in the current working directory and one in the `/corefiles` directory.

By default, the Solaris core paths and core file retention remain the same.

See the *System Administration Guide, Volume 2* and the man page `coreadm`(1M) for more information.

This feature was first available in the Solaris 7 8/99 release.

Examining Core Files With Proc Tools

Some of the proc tools have been enhanced to examine process core files as well as live processes. The proc tools are utilities that can manipulate features of the `/proc` file system.

The `/usr/proc/bin/pstack`, `pmap`, `pldd`, `pflags`, and `pcred` tools can now be applied to core files by specifying the name of the core file on the command line, similar to the way you specify a process ID to these commands. For example:

```
$ ./a.out
Segmentation Fault(coredump)
$ /usr/proc/bin/pstack ./core
core './core' of 19305: ./a.out
 000108c4 main     (1, ffbef5cc, ffbef5d4, 20800, 0, 0) + 1c
 00010880 _start   (0, 0, 0, 0, 0, 0) + b8
```

For more information on using proc tools to examine core files, see the man page `proc`(1).

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.

In previous Solaris releases, device configuration was handled by `drvconfig`, which managed the physical device entries in the `/devices` directory, and five link generators, `devlinks`, `disks`, `tapes`, `ports`, and `audlinks`, which managed the logical device entries in the `/dev` directory. For compatibility purposes, `drvconfig` and the other link generators are symbolic links to the `devfsadm` utility.

Both reconfiguration boot processing and updating the `/dev` and `/devices` directories in response to dynamic reconfiguration events are handled by `devfsadmd`, the daemon version of the `devfsadm` command. This daemon is started from the `/etc/rc*` scripts when a system is booted.

Since `devfsadmd`, the `devfsadm` daemon, automatically detects device configuration changes generated by any reconfiguration event, there is no need to run this command interactively.

This feature was first available in the Solaris 7 11/99 release.

For more information, see the man page `devfsadm`(1M).

Improved System Error Messages

The system boot and error message format now provides a numeric identifier, module name, and time stamp to messages generated by the `syslog`(1M) logging facility. In addition, messages that were previously lost after a system panic and reboot are now saved.

This feature was first available in the Solaris 7 3/99 release.

Modular Debugger

Modular debugger (`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. `mdb` provides a completely customizable environment for debugging complex software systems, such as an operating system, for programs that are highly optimized, have had their debug information removed, or are themselves low-level debugging tools. `mdb` also handles customer situations where developers can access only post-mortem information.

For more information, see *Solaris Modular Debugger Guide* and the `mdb`(1) man page.

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.

This feature enables you to dial in to a serial port with a modem to monitor console messages and participate in `init` state transitions.

For more information, see the man page `consadm`(1M) and the *System Administration Guide, Volume 2*.

This feature was first available in the Solaris 7 5/99 release.

TCP/IP Internal Trace Support

TCP/IP now provides internal trace support by logging TCP communication when a connection is terminated by a reset (RST) packet. When an RST packet is transmitted or received, information on as many as 10 packets, transmitted or received immediately before on that connection, is logged with the connection information.

For more information, see the *System Administration Guide, Volume 3*.

This feature was first available in the Solaris 7 5/99 release.

Performance and Scalability Enhancements

This section describes new tools in the Solaris 8 operating environment for monitoring and improving system performance.

IA: Added Support for PAE Mode

With the release of Pentium Pro, Intel introduced a mode called Physical Address Extension (PAE) on its advanced processors. By using PAE, Solaris *Intel Platform Edition* can address up to 32 Gbytes of physical memory. Individual processes are still limited to a maximum of 3.5 Gbytes of virtual address space.

PAE mode enables the user to run multiple instances of databases and memory-intensive applications, and to support large numbers of online users on a machine.

It is best to use PCI disk controllers that support Dual Address Cycle (DAC) in your machine because they can transfer data to and from any physical location. Other cards are limited to 4 Gbytes of physical memory, and as a result performance may slow down because the system needs to copy additional memory to transfer data.

Caution - Some device drivers are not yet able to take advantage of PAE mode. Sun has tested PCI device drivers written by Sun on IA based machines with more than 4 Gbytes of memory. Sun's OEM partners intend to test their machines with devices they supply on IA based machines with more than 4 Gbytes of memory. In some cases however, if you add a third-party device driver to your system, it may become unstable, and panics and data corruption may result. If your system becomes unstable and you need that driver, you must disable PAE mode support. For more information, see the *Solaris 8 (Intel Platform Edition) Device Configuration Guide*.

This feature was first available in the Solaris 7 3/99 release.

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 may show the series of events leading up to a point of failure.

The `apptrace` tool provides more reliable call-tracing than the previously available `sotruss` command. It also provides better display of function arguments, return values, and error cases for any Solaris library interface.

By default, `apptrace` traces calls directly from the executable object, specified on the command line, to every shared library the executable depends on.

For more information, see the man page `apptrace`(1).

SPARC: busstat

A new system monitoring tool, `busstat` provides command line access to the bus-related hardware performance counters in the system. It enables the gathering of system-wide bus performance statistics directly from the system hardware. The current list of supported hardware is SBus, AC and PCI devices. These are all SPARC system devices. Currently, there are no IA supported devices.

The `busstat` command enables the measurement of system-wide statistics such as memory bank reads/writes, clock cycles, number of interrupts, streaming DVMA read/write transfers and so on.

Superuser can use `busstat` to program these counters. Other users can only read counters programmed previously by superuser.

The busstat command lists the devices in a system that are found to support these hardware performance counters. If no supported devices are found in the system, the following message is displayed:

```
busstat: No devices available in system.
```

For more information on using this monitoring tool, see the man page busstat(1M).

Faster Boot for Servers

In the Solaris 8 operating environment, large servers now require significantly less time to boot. As a part of the boot performance improvement, the operating system probes for SCSI devices in parallel. Some old dual-port SCSI devices do not support parallel probing and should be removed from the system before installing or upgrading to the Solaris 8 operating environment.

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 poll(2); it does not replace poll(2).

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

This feature was first available in the Solaris 7 5/99 release.

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. prstat can also be used to report microstate accounting information and to summarize CPU and memory usage.

For more information, see the man page prstat(1M).

IA: Xeon Enhancements

To maximize performance, Solaris 8 *Intel Platform Edition* now supports the Page Attribute Table (PAT) feature of IA 32–bit processors (Pentium II and Pentium III). This support enables a device driver writer to take advantage of the write combining feature for a device that can exploit write combining, even if the BIOS does not set up the device for write combining.

For more information, see *Writing Device Drivers.*

Security Enhancements

This section describes new features in the Solaris 8 operating environment that affect system security and file system and directory ownership.

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. Each host to be secured by Solaris Smart Cards requires a card reader. To gain access to secured desktops or applications, users first insert their smart cards into the readers and then type the PINs for their cards. Host machines use the PINs and the users' passwords embedded on their cards to verify that users are whom they claim to be.

Solaris Smart Cards supports two external card readers, the Sun Smart Card Reader I and the iButton Reader. Three smart cards are supported, the Java-based iButton and Cyberflex cards, and the Payflex smart card.

The *Solaris Smart Cards Administration Guide* tells security administrators how to set up smart card support for their sites. It also introduces users to the smart cards technology.

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. The default ownership and permissions changes are:

- Default file and directory ownership has been changed from `bin` to `root`
- Files and directories previously with default permissions of `775` now have default permissions of `755`
- Files and directories previously with default permissions of `664` now have default permissions of `644`
- Default `umask` of the system is `022`

Keep the following in mind when creating a package to be added to a system running the Solaris 8 release:

- All files and directories must have root as the default owner
- Directories and executables must have default permissions of `555` or `755`
- Ordinary files must have default permissions of `644` or `444`
- `set-uid` and `set-gid` files cannot be writable by the owner, unless the owner is root

These changes do not apply to all files and directories in this release; for example, the changes do not apply to OpenWindows or CDE files and directories.

Role-Based Access Control

Traditional superuser-based systems grant full superuser powers to anyone who can become superuser. With role-based access control (RBAC) in the Solaris 8 operating environment, administrators can assign limited administrative capabilities to normal users. This is achieved through three new features:

- Authorizations — user rights that grant access to a restricted function
- Execution profiles — bundling mechanisms for grouping authorizations and commands with special attributes, typically superuser ID
- Roles — special types of user accounts intended for performing a set of administrative tasks

The administrator creates an execution profile containing authorizations and privileged commands for a specific task or set of tasks. That profile can be assigned directly to a user or to a role. Roles, in turn, are assigned to users. To gain access to a role, a user with the assigned role executes the `su` command. Roles have the advantage of being shared accounts that do not need to be updated when individual responsibilities change. The following new files support RBAC:

- `/etc/user_attr` — stores extended security attributes related to users and roles
- `/etc/security/auth_attr` — lists and describes authorizations
- `/etc/security/prof_attr` — lists execution profiles and associated authorizations
- `/etc/security/exec_attr` — associates execution attributes with execution profiles
- `/etc/security/policy.conf` — provides the security policy configuration for user-level attributes

For more information, see *System Administration Guide, Volume 2*

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. It is no longer necessary to set up the audit events for a user on each system to which the user has access.

Sun Enterprise Authentication Mechanism (Kerberos V5) Client Support

This feature provides the Kerberos V5 client-side infrastructure, an addition to the Pluggable Authentication Module (PAM), and utility programs that can be used to secure RPC based applications, such as the NFS service. Kerberos provides selectable strong user or server level authentication, integrity, or privacy support. The Kerberos clients can be used in conjunction with Sun Enterprise Authentication Mechanism (SEAM) (a part of SEAS 3.0) or other Kerberos V5 software (for instance, the MIT distribution) to create a complete single network sign-on solution.

For more information, see the *System Administration Guide, Volume 2.*

Realtime Systems Enhancements

This section describes new features in the Solaris 8 operating environment that affect real time processes.

High Resolution Timers

High resolution timers (HRTs) bypass the traditional 10 millisecond 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 multi-processor system) and operate to any required degree of precision in timing events.

This is the last element needed to allow traditional real-time applications to be run under Solaris.

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

User-level Priority Inheritance

Real-time (RT) applications may run more than one thread in the real-time scheduling class at a time. It is possible for an RT thread with a low priority to get a mutual exclusion lock that then is required by an RT thread with a higher priority. The high priority thread must then wait for the low priority thread to get done with the mutex lock and release it. This condition is called "priority inversion."

The RT 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.

RT threads that use priority inheritance or priority ceiling locks should use `PTHREAD_SCOPE_SYSTEM` scheduling scope (or bound threads). Unbound threads use `PTHREAD_SCOPE_PROCESS` scheduling and are unsuitable for the needs of real-time applications.

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

Common Desktop Environment Desktop Enhancements

The Common Desktop Environment (CDE) provides an advanced Motif-based desktop with an easy-to-use interface. The latest release of CDE includes new comprehensive features in desktop productivity, interoperability, and desktop management.

PDA Support

The PDA Synchronization (PDASync) application synchronizes the data from Sun applications such as Desktop Calendar, Desktop Mail, Memo, and Address, with data in similar applications on a user's Personal Digital Assistant (PDA). The PDASync software also enables users to install applications and databases from their workstation or server to their PDA. PDASync supports Palm OS compatible devices.

For more information on the PDASync application, see the Help information on the PDASync software.

This feature was first available in the Solaris 7 11/99 release.

Hot Key Editor

The Hot Key Editor enables users to automate repetitive tasks, such as running executables or CDE actions, by predefining a series of commands to a given function key. This feature provides a GUI that enables users to view a hot key list containing the key, context and function, as well as the ability to edit, delete, and create new hot keys.

For more information, see the *Solaris Common Desktop Environment: User's Guide*.

Java Media Framework

The Java Media Framework (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 enables users to take advantage of the real-time video creation and broadcast functionality.

For more information, see the *Solaris Common Desktop Environment: User's Guide*.

SPARC: Audio Mixer

CDE now includes a new GUI tool, `sdtaudiocontrol`, that supersedes `audiocontrol`. `sdtaudiocontrol` uses the features of the audio mixer and provides:

- A graphical method to enable and disable the audio mixer
- Volume and balance control for each application
- Volume and balance control for mixed audio when the audio mixer is enabled
- Controls enabling and disabling of the input and output ports
- Display of status information on each application using audio, and on the audio hardware

See also "SPARC: Audio Mixer" on page 70.

SPARC: PC Launcher 1.0

PC launcher 1.0 for SunPCi users enables 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. By incorporating PC launcher into the Solaris CDE desktop, users can share attachments and files created by Microsoft Word, Excel, PowerPoint, Lotus 1–2–3, and AutoCAD applications.

This feature was first available in the Solaris 7 5/99 release.

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, thus simplifying access to Netscape applications.

For more information, see the *Solaris Common Desktop Environment: User's Guide*.

This feature was first available in the Solaris 7 11/99 release.

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.

For more information, see the *Solaris Common Desktop Environment: User's Guide*.

SDTImage Enhancements

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

For more information, see the *Solaris Common Desktop Environment: User's Guide*.

Smart Card Support

CDE now supports smart card authentication security technology. Users can now use smart cards to authenticate their identity when 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.

For more information, see the *Solaris Common Desktop Environment: User's Guide*.

ToolTips

ToolTips provides users with Balloon Help, a simple and short description of an icon function. Users can now place their cursor on an icon and the function of the icon is displayed.

For more information, see the *Solaris Common Desktop Environment: User's Guide*.

This feature was first available in the Solaris 7 3/99 release.

X11R6.4 Support

This new and enhanced version of XServer includes key features that increase user productivity and mobility. These new features include:

- Web-enabled X application access on any browser-based desktop, providing users with access to corporate X applications through the Internet or intranet
- Xinerama, one logical screen image support that enables users to display an image across multiple monitors
- X Print support
- Color Utilization Policy (CUP), minimized color-map flashing
- EnergyStar support
- Developer Toolkit includes new APIs and documentation

This feature was first available in the Solaris 7 11/99 release.

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

This section describes a new web server as well as new features that affect web browsing and running Java applications on Web pages.

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 using Java Runtime Environment (JRE) 1.2 instead of the default Java Virtual Machine (JVM) bundled with Navigator.

For more information, see the *Solaris Java Plug-in User's Guide*.

Netscape Communicator 4.7

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

Netscape Communicator enables users to communicate, share, and access information over the Internet, and consists of the following tools:

- Netscape Navigator — to find and view information on the Web
- Netscape Messenger — to send and receive email and participate in news groups and chat groups
- Netscape Composer — to create and publish web pages

Solaris Network Cache and Accelerator

The Solaris Network Cache and Accelerator (NCA) increases web server performance by maintaining an in-kernel cache of web pages accessed during HTTP requests. NCA provides full HTTP (up to version 1.1) protocol support by either handling the request or by passing it to the web server for processing. This feature requires a NCA-compatible web server.

For more information, see the *System Administration Guide, Volume 3.*

Apache Web Server

Apache is an open source implementation of an HTTP web server. It is one of the most popular web servers on the Internet. The open source Apache web server is now shipped with Solaris. It includes all the standard Apache modules, including proxy server support, as well as the `mod_perl` module.

This product includes software developed by the Apache Group for use in the Apache HTTP server project. See their website, `http://www.apache.org`.

For more information, see the `apache(1)` man page.

Printing

This section describes new features in the Solaris 8 operating environment that affect printer configuration and management.

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.

By including the `printers` database and corresponding sources of information in the name service switch file, print clients automatically have access to printer configuration information without having to add it to their own systems.

If you use Solaris Print Manager to set up printing in your network, the source of the printer configuration information is selected from the Select Naming Service menu rather than the `printers` database in the `/etc/nsswitch.conf` file.

The following table describes the default `printers` entry in the `/etc/nsswitch.conf` file for the files, NIS, and NIS+ environments. The `nisplus` keyword represents the `printers.org_dir` table. The `xfn` keyword represents the FNS printer contexts.

If Your Name Service Is ...	The Default `printers` Entry Is ...
files	printers: user files
nis	printers: user files nis
nis+	printers: user nisplus files xfn

For example, if your name service is NIS, printer configuration information on print clients is looked up in the following sources in this order:

1. `user` — represents the user's `$HOME/.printers` file
2. `files` — represents the `/etc/printers.conf` file
3. `nis` — represents the `printers.conf.byname` table

For more information, see the man page `nsswitch.conf`(4) and the *Solaris Naming Administration Guide*.

Solaris Print Manager

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

Using Solaris Print Manager is the preferred method for managing printer access instead of Admintool:Printers because Solaris Print Manager centralizes printer information when it is used in a name service environment.

Solaris Print Manager recognizes existing printer information on the printer servers, print clients, and in the name service databases. There are no conversion tasks required to use the new Solaris Print Manager as long as the print clients are running the Solaris 2.6 release or a compatible version.

For more information, see the *System Administration Guide, Volume 2.*

Language Support

The Solaris 8 operating environment provides support for over 90 locales, a new, intuitive interface for installing languages, expanded Unicode support, and improved data interoperability utilities.

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.

The Solaris 8 Software CDs provide an English interface to input, display, and print text in a target language, including multibyte locales. In addition, the Solaris 8 Languages CD provides localized interface and documentation.

This new packaging approach greatly simplifies the development and testing of applications for international markets and eliminates the need to purchase an optional media kit to set up a non-English development or production environment.

Customers will also notice a new locale installation mechanism. In previous Solaris releases the locale support included with the operating environment depended on the software cluster installed. The new installation interface in the Solaris 8 operating environment enables users to install only those regions for which they require locale support.

For more information, see the *International Language Environments Guide.*

Improved Language Installation and Setup

Users will find the setup and installation to be significantly easier, whether installing only a single language or the full range of 37 languages packaged with the Solaris 8 operating environment.

Changes to packaging on the Solaris 8 CD have reduced the storage requirements for a mixed language installation and a redesign of the install interface makes language selection and grouping extremely intuitive.

For more information, see the *Solaris 8 (SPARC Platform Edition) Installation Guide* or the *Solaris 8 (Intel Platform Edition) Installation Guide.*

Expanded Unicode Support

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

Also, complete support for Complex Text Layout (CTL) scripts has been enabled. This allows proper rendering of text for bidirectional and also context-sensitive shaping scripts like Arabic, Hebrew, and Thai in the Unicode locale.

Unicode is often used in a mixed script environment, where it is necessary to display text from multiple languages in a single environment. In those cases where it is necessary to provide support for cultural-specific conventions such as date and time, monetary format, and collation, the multiple Unicode locales provided in Solaris are quite useful.

For more information, see the *International Language Environments Guide.*

Customer-Extensible Codeset Conversion (`geniconvtbl`)

Developers have the ability, with the Solaris 8 operating environment, to create user-defined codeset converters, enabling table driven creation and easy addition of new codeset conversions by using the `geniconvtbl` utility.

This permits user-defined and user-customizable codeset conversions with a standard system utility and interface like `iconv(1)` and `iconv(3C)`. This new capability enhances the ability of an application to deal with incompatible data types, particularly data generated from proprietary or legacy applications. Modification to existing Solaris codeset conversions is also supported.

For more information, see the *International Language Environments Guide.*

Improved Data Interoperability

Data interoperability with non-Solaris environments has been improved in the Solaris 8 operating environment 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 China and Korea
- `iconv` for various Unicode encoding formats and international and de facto industry standard codesets

For more information, see the *International Language Environments Guide.*

New Locales Added

Two new locales have been added to the Solaris 8 operating environment 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.

For more information, see the *International Language Environments Guide.*

Documentation

This section describes improvements in the AnswerBook2 server software and the reorganization of the Solaris 8 Reference Manual.

For more information on changes in the Solaris 8 documentation set, see *About Solaris 8 Documentation.*

AB2 1.4.2 AnswerBook2 Server

The AnswerBook2 version 1.4.2 server software provides improved performance, a textual, rather than graphical, navigation interface, and the ability to view and search information by collection.

For more information, see the *Solaris 8 (SPARC Platform Edition) Installation Guide* or the *Solaris 8 (Intel Platform Edition) Installation Guide.*

This feature was first available in the Solaris 7 8/99 release.

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 Realtime 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 (for example, all man pages describing functions contained in `libnsl` now have the suffix `.3NSL`).

For more information, see the `Intro`(1) man page and *About Solaris 8 Documentation*.

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.

The audio mixing function is turned on by default and can be turned off as well as on using the new `mixerctl`(1) utility, or through other methods described in the man page `audiocs` 7D.

Note - When running SunVTS™ the mixing function should be disabled.

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:

- A graphical method to enable and disable the audio mixer
- Volume and balance control for each application
- Volume and balance control for mixed audio when the audio mixer is enabled
- Controls enabling and disabling the input and output ports
- Display of status information on each application using audio and on the audio hardware

For more information, see the man pages `audiocs`(7D), `audio_support`(7I), and `mixer`(7I).

Software Developer Environment

The Solaris operating environment provides developers with the documentation, development software libraries, productivity tools, sample code, and testing tools needed to develop software applications for the Solaris runtime environments.

64-bit SPARC: 64–bit 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.

For more information, see the *KCMS Application Developer's Guide* and the *KCMS CMM Developer's Guide.*

Always Ready Power Management

The Solaris 8 operating environment provides a new automatic device Power Management framework. A device driver using the new interfaces will be automatically power managed on the appropriate platforms. Unlike previous releases, the `/etc/power.conf` file no longer needs to be manually updated to start power management of the device.

For more information, see *Writing Device Drivers.*

The `cpustat` and `cputrack` Commands

System administrators can use the new `cpustat` and `cputrack` commands to monitor the performance of a system or a process.

The `cpustat` command gathers system-wide CPU information. This command must be run by the superuser. The `cputrack` command is similar to the `truss` command for displaying information about an application or a process. This command can be run by regular users.

Developers can create their own versions of these monitoring tools by using the same library APIs that were used to build the `cpustat` command.

See `cpustat`(1M) and `cputrack`(1) for more information.

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.

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

Perl 5

Practical Extraction and Report Language (Perl) 5.005_03, a powerful general purpose programming language, generally available as free software, is included in this Solaris release.

Perl has emerged as the standard development tool for complex system administration tasks, such as graphic, network, and web programming because of its excellent process, file, and text manipulation features.

Perl 5 includes a dynamically loadable module framework, which allows the addition of new functionality for specific tasks. Many modules are freely available from the Comprehensive Perl Archive Network (CPAN), at http://www.cpan.org.

Some of the core modules included with this Solaris Perl installation are CGI, NDBM_File, and Getopt. These modules reside in the /usr/perl5/5.00503 directory. The site_perl directory is initially empty and is intended to store your locally installed Perl 5 modules.

To access the Perl5 man pages, add /usr/perl5/man to your MANPATH environment variable. See the man page, perl(1), for general Perl information.

Role-Based Access Control for Developers

The addition of role-based access control (RBAC) to the Solaris operating environment gives developers the opportunity to deliver fine-grained security in new and modified applications. RBAC is an alternative to the all-or-nothing security model of traditional superuser-based systems. With RBAC, an administrator can assign privileged functions to specific user accounts (or special accounts called roles). Developers can now create privileged functions that check for authorizations instead of checking for specific IDs such as superuser.

For more information, see the *System Administration Guide, Volume 2* and the man page rbac(5).

`strftime()` Function Update

The `%u` conversion specification for the `strftime()` function represents a weekday as a decimal number `[1,7]`, with `1` now representing Monday (rather than Sunday, as was the case in the Solaris 7 operating environment). This new behavior conforms to the X/Open CAE Specification, System Interfaces and Headers.

For more information, see the *International Language Environments Guide*.

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.

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

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.

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

Alternate One-level Libthread

The standard Solaris threads implementation is a two-level model, in which user-level threads are multiplexed over possibly fewer lightweight processes, (LWPs). An LWP is the fundamental unit of execution that is dispatched to a processor by the operating system.

Solaris 8 software provides an alternate threads implementation, a one-level model, in which user-level threads are associated one-to-one with LWPs. This implementation is simpler than the standard implementation and may be beneficial to some multithreaded applications. It provides the same interfaces for POSIX threads and Solaris threads as for the standard implementation.

Existing multithreaded programs can be bound with the alternate libthread at run time using the LD_LIBRARY_PATH and LD_LIBRARY_PATH_64environment variable.

See the `threads`(3THR) man page for details of usage.

Updated DDI Interfaces for Cluster-aware Device Drivers

An overview introduces the concept of device classes and the necessary interface modifications and additions for device driver writers. The overview is found in *Writing Device Drivers.*

This feature was first available in the Solaris 7 3/99 release.

8–bit Visual Support

The 8–bit visual shared library provides a set of translation functions, enabling 8-bit visual applications to run on hardware that only provides support for 24-bit visual depth. The functions use the device driver's native 24-bit rendering function calls for applications requesting 8-bit visual support. This is done by translating 8-bit pseudocolor colormap pixel data into 24-bit truecolor colormap pixel data before rendering an image on the 24-bit hardware visual supported platform.

This feature was first available in the Solaris 7 8/99 release.

IA Hardware

This section describes new features in the Solaris 8 operating environment specific to the IA platform.

IA: ACPI

Advanced Configuration and Power Interface (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 a valid ACPI configuration is available on your IA based system, the Solaris 8 operating environment automatically uses it to configure the hardware. The Solaris 8 operating environment does not yet support ACPI-based power management.

IA: 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.

For more information, see the *System Administration Guide, Volume 1* and *Writing Device Drivers.*

This feature was first available in the Solaris 7 11/99 release.

IA: Universal Serial Bus Support for Keyboards and Mouse Devices

Solaris *Intel Platform Edition* now provides Universal Serial Bus (USB) support for keyboards and mouse devices. USB is an emerging I/O bus standard that supports a wide variety of peripherals, such as speakers, modems, printers, and cameras, as well as keyboards and mouse devices. While a fairly new standard, USB is quickly gaining wide acceptance in the Intel market. USB ports are becoming a standard on many IA based machines, and USB support is being integrated into all Intel PCI chip sets.

IA: X Server Video Driver Enhancement

Solaris *Intel Platform Edition* now provides support for the following video devices:

- Cirrus Logic GD5465
- 3Dlabs Permedia2 (Diamond Fire GL 1000 Pro)
- S3 Trio3D
- Matrox Productiva G100
- Matrox Millennium G200
- Matrox Millennium G400
- Matrox Mystique G200
- Matrox Mystique G400
- NVIDIA RIVA TNT2 (Diamond Viper V770)

For more information, see the *Solaris 8 (Intel Platform Edition) Hardware Compatibility List.*

IA SCSI Drivers

This section describes enhancements in the Solaris 8 *Intel Platform Edition* operating environment.

`cadp` Driver Enhancements

The Solaris `cadp` driver has been enhanced to include support for:

- PCI and SCSI Hot-Plug capability
- Physical Address Extension (PAE) mode
- Ultra devices
- Cluster and multi-initiator configurations

as well as improvements in quality and performance.

For more information, see the *Solaris 8 (Intel Platform Edition) Device Configuration Guide*.

This feature was first available in the Solaris 7 8/99 release.

`ncrs` Device Driver Enhancements

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

For more information, see the *Solaris 8 (Intel Platform Edition) Device Configuration Guide* and the *Solaris 8 (Intel Platform Edition) Hardware Compatibility List*.

`symhisl` Device Driver

The `symhisl` device driver, which supports the SYM53C896 chip and the SYM22910 and SYM21002 adapters, is now included in Solaris *Intel Platform Edition*.

For more information, see the *Solaris 8 (Intel Platform Edition) Hardware Compatibility List*.

Other Software

Early Access Software

The Solaris 8 release includes an Early Access (EA) directory with EA software. For more information, refer to the README on the Solaris Software CD 2 of 2.

Freeware

Several freeware tools and libraries are included in the Solaris 8 release. These tools include:

- `bash` - `Sh`- compatible command language interpreter
- `bzip2` - Block-sorting file compressor
- `gpatch` - Used to apply patch files to originals
- `gzip` - GNU zip compression utility
- `less` - A pager, like `more`
- `libz` - Also known as 'zlib', this is a library that performs compression (specifically, RFCs 1950-1952)
- `mkisofs` - Builds a CD image using a iso9660 file system
- `rpm2cpio` - Transforms a package in RPM format (Red Hat Package Manager) to a cpio archive
- `tcsh` - C shell with file name completion and command line editing
- `zip` - Compression and file packaging utility
- `zsh` - Command interpreter (shell) usable as an interactive login shell and as a shell script command processor