



Solaris 7 (Intel Platform Edition) Installation Library

Sun Microsystems, Inc.
901 San Antonio Road
Palo Alto, CA 94303-4900
U.S.A.

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Planning and Starting Your Installation

This chapter describes how to plan and install the Solaris™ operating environment.

Note - The Solaris software may be pre-installed on your system. For information, see your hardware documentation.

To Plan Your Installation

1. Make sure these instructions are for you.

If You Are Installing Solaris Software From ...	Then Go To ...
A CD-ROM drive attached to your system	Step 2.
A remote CD-ROM drive on the network	<i>Solaris Advanced Installation Guide.</i>

2. Does your system have a previous version of the Solaris operating environment installed?

- If yes, go to Chapter 6 in this book.
- If no, go to Step 3.

3. Make sure your hardware is supported.

See the *Solaris 7 (Intel Platform Edition) Hardware Compatibility List*.

4. Do you want to preserve the system's existing operating system data?

Many x86-based systems come preinstalled with an operating system that uses the entire disk. For the existing operating system to coexist on the same disk with the Solaris operating environment you must:

- Back up your operating system and/or user data
- Create an `fdisk` partition for both operating environments when you're installing the Solaris operating environment
- Restore the files to the non-Solaris `fdisk` partition after the Solaris operating environment is installed.

For detailed instructions, see Chapter 5.

5. If your system is attached to a network, gather system information.

Use the following table to gather system information that you may be asked to supply during installation. Collecting this information now will save you time during installation.

- If the system you're installing already has a previous version of the Solaris operating environment, you can find system information by using the commands shown.
- If the system you're installing does not have the Solaris operating environment installed, get this information from your system administrator or whoever has set up your network.

System Information You May Need to Supply	Example	Command for Finding Information
System's name (host name)	<code>crater</code>	<code>uname -n</code>
Primary network interface	<code>le0</code>	<code>ifconfig -a</code>
IP address	<code>129.221.2.1</code>	<code>ypmatch system_name hosts</code> or <code>nismatch system_name hosts.org_dir</code>
Domain name	<code>chandy.West.Arp.COM</code>	<code>domainname</code>
System part of a subnet?	<code>Yes</code>	Check for existing subnet in <code>/etc/netmasks</code>
Netmask	<code>255.255.255.0</code>	<code>more /etc/netmasks</code>

6. Plan disk space.

Before installing the Solaris operating environment, determine your disk space needs. Consider the following items:

- Solaris software group
See the following table for software group space recommendations.
- Co-packaged software
See the co-packaged software documentation for estimated space required. Also, if you run Admintool to add the software to your Solaris system, the Add Software screen displays estimated package sizes if available. See Chapter 8 for instructions on using Admintool to add software to your system.
- Vendor or third-party software
See the vendor or third-party software documentation.
- Space for home directories
Home directories may store user files such as mail, text or data files, or application files.

Software Group	Recommended Space
Entire Distribution Plus OEM	801 Mbytes
Entire Distribution	787 Mbytes
Developer System Support	716 Mbytes
End User System Support	438 Mbytes

Note - Swap space is already included in the disk space recommendations.

To Install the Solaris Operating Environment

1. **Decide which installation method to use for installing the software in your product box.**

With This Method ...	You Can ...	You Can't ...
Solaris Web Start	<ul style="list-style-type: none"> ■ Install all the software in your product box (the Solaris operating environment and co-packaged software) at once from a single, browser-based tool ■ Install all the software with the default option, or pick only the software you want to install with the customize option 	<ul style="list-style-type: none"> ■ Upgrade from a previous version of the Solaris operating environment ■ Customize the software installations at the lowest levels (for example, selecting/deselecting packages) ■ Use this method on systems with less than 48 Mbytes of system memory ■ Use this method on systems with less than a 2-Gbyte boot disk¹
Solaris Interactive Installation program, followed by other product installation programs	<ul style="list-style-type: none"> ■ Install the Solaris operating environment first, and then install the co-packaged software separately ■ Upgrade from a previous version of the Solaris operating environment ■ Customize the software installations at the lowest levels (for example, selecting/deselecting packages) ■ Install on systems with the minimum hardware requirements specified for the Solaris operating environment 	<ul style="list-style-type: none"> ■ Install all the software in your product box (Solaris operating environment) and co-packaged software) at once from a single tool

1. This restriction applies only to the size required to run Solaris Web Start; Solaris Web Start will determine whether your system has enough disk space to install the products you select.

2. Insert the Configuration Assistant diskette into the system's A: diskette drive.

3. Insert the Solaris CD into the system's CD-ROM drive.

4. Prepare the system to boot.

- If the system is off, turn on the system components.
- If the system is on, enter the following commands:

```
$ su root
```

```
# init 0
```


If prompted, type any key to reboot the system, or use the reset button to restart the system if the system is shutdown.

Upon turning on your system, a diagnostic program (called the Configuration Assistant) checks your hardware for any devices that you've added to a supported system that are in conflict. If there are any, you'll be prompted to fix them before continuing.

5. Boot the system from the local CD-ROM (CD).

```
Boot Solaris

Select one of the identified devices to boot Solaris.

> To make a selection, use the arrow keys, then press Enter to mark it [X].

Boot Solaris
-----
[ ] NET : Xircom Pocket Ethernet parallel port card
      Port: 3BC-3BF; IRQ: 7
[ ] CD  : IDE(ATA) IBM-H2344-A4
      Target: 0; Port 1F0-1F7, 3F6-3F7; IRQ: 14
```

6. Choose the Interactive or Solaris Web Start option.

Do not select 2 - Custom JumpStart; this is an advanced installation that requires previous setup to automate installations. It is described in the *Solaris Advanced Installation Guide*.

```
Select the type of installation you want to perform:

      1 Solaris Interactive
      2 Custom JumpStart
      3 Solaris Web Start

Enter the number of your choice followed by the <ENTER> key.

If you enter anything else, or if you wait for 30 seconds,
an interactive installation will be started.
```

If you experience any problems from this point on, see Chapter 7.

7. Follow the on-screen instructions to install the Solaris operating environment.

The Solaris installation program is a menu-driven, interactive step-by-step guide to installing the Solaris operating environment. It also provides online help to answer your questions.

8. Determine if you want to install other software.

- To add other co-packaged software, see Chapter 8.
- To install Solaris online documentation, see Chapter 9.
- To install patches to the Solaris operating environment, see the *Solaris Release Notes*.

What's New at a Glance

This chapter highlights new features of the Solaris™ 7 operating environment. Table 2-1 provides a brief description of new features in this release. For more extensive descriptions of these features, see .

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. As reliable as the dial tone on your phone, Solaris software is the WebTone for the Internet. The new 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.

Why Upgrade to the Solaris 7 Release

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

- Solaris software includes a new applications environment that enables the construction and execution of 64-bit applications while retaining compatibility and functionality for the existing 32-bit environment. (For SPARC™ Platform Edition only).
- UFS logging increases file system reliability by preventing file systems from becoming inconsistent, and it reduces the time to reboot a system after it crashes.
- LDAP protocol improves managing name databases.
- The Java™ Developer Kit for Solaris significantly improves scalability and performance for Java applications.

- 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. (This feature is available for certain SPARC™ servers only.)
- The AnswerBook2™ server can run on top of an existing web server, such as Sun™ WebServer™. It does not require an additional web server running on your system solely for AnswerBook2 support.
- Unicode locales include six new UTF-8 locales, and the Unicode locales have been enhanced with multiscrypt capabilities so that users can input and display text from different writing scripts.
- RPC has been modified based on the GSS-API. This increases security integrity and confidentiality, and NFS™ services are no longer tied to a specific or a single security mechanism.
- The Solaris Common Desktop Environment (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.

TABLE 2-1 Solaris 7 Features at a Glance

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.
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 <code>fsck(1M)</code> . And, because <code>fsck</code> can be bypassed, UFS logging reduces the time required to reboot a system if it crashes, or after an unclean halt.
<code>-o noatime</code> UFS mount option	To ignore access time updates on files, you can specify the <code>-o noatime</code> 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).

TABLE 2-1 Solaris 7 Features at a Glance (continued)

Feature	Description
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: <code>pgrep</code> and <code>pkill</code>	The <code>pgrep</code> 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 <code>pkill</code> command works the same way as the <code>pgrep</code> command except that each matching process ID is signaled by <code>kill(2)</code> instead of having the process ID displayed.
<code>sendmail 8.9</code>	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 <code>sendmail</code> 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: <ul style="list-style-type: none"> ■ The <code>dumpadm</code> command enables system administrators to configure crash dumps of the operating system. ■ Dump data is now stored in compressed format on the dump device. ■ Saving core files is run in the background when a dedicated dump device—not the primary swap area—is part of the dump configuration.
Network Performance	
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	
<code>RPCSEC_GSS</code>	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.

TABLE 2-1 Solaris 7 Features at a Glance *(continued)*

Feature	Description
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 Deamon (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 Web Start	The 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.
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 <code>ab2cd</code> 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, <code>AB2_DEBUG</code> , can be set on the AnswerBook2 server. It controls whether style sheet errors are displayed to the user with a red "BUG."
Language Support	

TABLE 2-1 Solaris 7 Features at a Glance (continued)

Feature	Description
Enhanced language framework	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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	
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 <code>LD_LIBRARY_PATH</code> and makes the loading of shared libraries even more efficient.
<code>man</code> utility now displays SGML code	The <code>man</code> utility is now able to display man pages that are coded with SGML, as well as the traditional <code>nroff</code> .

TABLE 2-1 Solaris 7 Features at a Glance (continued)

Feature	Description
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	
XIL™	<p>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.</p> <p>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.</p> <p>The XIL Developer's Kit is now separate from Solaris and is available free of charge.</p>
Desktop	
Common Desktop Environment, (CDE)	<p>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.</p> <p>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.</p>
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.

TABLE 2-1 Solaris 7 Features at a Glance (continued)

Feature	Description
Intel Platform Edition Hardware Support	
SCSI disk driver sd	The <code>sd</code> 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 <code>cmdk</code> . The <code>cmdk</code> 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).

Features Added in Previous Solaris Releases

This section describes features introduced in previous Solaris releases.

Solaris 2.6 Release

Table 2-2 describes new and enhanced features of the Solaris 2.6 release.

TABLE 2-2 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.)

TABLE 2-2 Solaris 2.6 Features *(continued)*

Feature	Description
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	
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.

TABLE 2-2 Solaris 2.6 Features *(continued)*

Feature	Description
x86 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.
x86 configuring peripherals	The <code>kdmconfig</code> program is used to configure the mouse, graphics adapter, and monitor on an x86 system. If an <code>owconfig</code> file already exists, <code>kdmconfig</code> will extract any usable information from it. In addition, this updated version of <code>kdmconfig</code> will also retrieve information left in the <code>devinfo</code> tree by the <code>devconf</code> 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 <code>upgrade</code> 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 <code>pfinstall</code> 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 <code>sysidcfg</code> 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 <code>-en_XX</code> 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.
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.

TABLE 2-2 Solaris 2.6 Features *(continued)*

Feature	Description
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 multiscrypt 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	<ul style="list-style-type: none"> - 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.
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 <code>-PRIORITIZED I/O</code> option) and some new extensions to support 64-bit files, (see "Large Files").

TABLE 2-2 Solaris 2.6 Features *(continued)*

Feature	Description
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.
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.

TABLE 2-2 Solaris 2.6 Features (continued)

Feature	Description
XIL	<p>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:</p> <ul style="list-style-type: none"> - Is MT-hot - Supports the 32-bit, single-precision, floating-point data type - Supports temporary images - Supports the new <code>XIL_GENERAL</code> storage format - Includes Kodak Color Management System™ (KCMS) support - Supports the new <code>XIL_BAND_SEQUENTIAL</code> storage format for all data types - Saves on memory use with tiled storage
PEX™ 3.0.2 runtime environment	<p>The PEX application programmer interface (API) provides application portability across platforms and 3-D graphics on local and remote displays.</p>
KCMS multithreaded programming	<p>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.</p>
X11R6 base window system	<p>The X11R6 Base Windowing System includes the latest fixes and patches from the X Consortium.</p>
X11 double buffer extension	<p>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/</p>
Large Files Support	
Large files	<p>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 <code>-mount</code> option is available to disable the large-file support on UFS file systems. This <code>-mount</code> 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.</p>

TABLE 2-2 Solaris 2.6 Features *(continued)*

Feature	Description
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.
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.

TABLE 2-2 Solaris 2.6 Features *(continued)*

Feature	Description
Variable length subnet mask (VLSM)	VLSM enables more efficient use of IP address space by enabling the TCP/IP administrator to use Classless Inter-Domain 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.
<code>autofs</code>	The new <code>autofs</code> 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+ <code>backup</code> and <code>restore</code> 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 <code>patchadd</code> and <code>patchrm</code> commands to add and remove patches, are now part of the Solaris software, rather than shipping with each individual patch as <code>installpatch</code> and <code>backoutpatch</code> commands.
<code>isalist</code> utilities	<code>isalist</code> 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	

TABLE 2-2 Solaris 2.6 Features (continued)

Feature	Description
Printing	<p>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:</p> <ul style="list-style-type: none"> - Redesign of print packages - Print protocol adapter - SunSoft™ 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.

Solaris 2.5.1 Release

Table 2-3 describes new and enhanced features of the Solaris 2.5.1 release.

TABLE 2-3 New Features in Solaris 2.5.1

Feature	Description
Security	
Large user IDs and group ID	The limit on User ID and Group ID values has been raised to 2147483647, or the maximum value of a signed integer. The <i>nobody</i> user and group (60001) and the <i>no access</i> user and group (60002) retain the same UIDs and GIDs as previous Solaris 2.x releases.

TABLE 2-3 New Features in Solaris 2.5.1 *(continued)*

Feature	Description
Graphics/Imaging	
KCMS calibrator tool	KCMS includes a loadable driver module for the X-Rite DTP92 Incident Colorimeter. The driver supports the X-Rite colorimeter, which connects to the serial port to obtain color measurement data. Includes new procedures for adding and removing color calibration modules to the system configuration file, <code>OWconfig</code> .

What's New: A Closer Look

This chapter describes new features of the Solaris 7 release in detail. For a list of features with brief descriptions, see Chapter 2.

The Solaris 7 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.

Here are some of the new features:

- Solaris 64-bit operating environment added (SPARC Platform Edition only)
- UFS logging improves file system support
- LDAP protocol improves managing name databases
- Java Developer Kit for Solaris significantly improves scalability and performance for Java applications
- Dynamic reconfiguration significantly decreases system downtime
- AnswerBook2 server runs on a web server
- Unicode locales enhanced with multiscrypt capabilities and six new Unicode locales added
- RPC security is enhanced with integrity and confidentiality
- The Solaris Common Desktop Environment (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

SPARC: Solaris 64-bit Operating Environment

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 the limitations of the 32-bit system, most notably by supporting a 64-bit virtual address space and removing other 32-bit system limitations.

The key limitations overcome by the 64-bit Solaris operating environment are the following:

- 64-bit virtual address space for applications and the kernel allows large tasks to be handled in primary memory, which can provide big performance benefits.
- 256 file descriptor limit for `stdio` expanded to 32-bit quantity for 64-bit applications.
- 64-bit `time_t` (avoids 2038 problems) for 64-bit applications.
- Full 64-bit integer arithmetic for 64-bit applications. Though 64-bit arithmetic has been available in all Solaris 2.x releases, the 64-bit implementation now uses full 64-bit machine registers for integer operations and parameter passing. This allows an application to take full advantage of the capabilities of the 64-bit CPU hardware.
- Greater than 2 Gbytes tmpfs on the 64-bit system.
- Greater than 2 Gbytes per swap device on the 64-bit system.

The compatibility and interoperability in the 64-bit Solaris operating environment is so complete that there is no noticeable difference. Existing applications just work and `PATH` settings remain unchanged.

The new `isainfo` program helps determine whether you are running on a 32-bit or 64-bit system. `isainfo` prints information about all the supported Instruction Set Architectures (ISA) of the running system.

Finally, there is the option of booting either the 32-bit or 64-bit Solaris operating environment on UltraSPARC machines.

See “Software Developer Environment” on page 37 for more detailed 64-bit information for developers. Also, for more information on using the 64-bit operating system, see *Solaris 7 64-bit Developer’s Guide*.

Web Browser

Solaris 7 software includes a new web browser.

Netscape Communicator

Solaris 7 software now ships with Netscape Communicator.

Network Management and System Administration

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.

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.

UFS logging is not enabled by default. To enable UFS logging, you must specify the `-o logging` option with the `mount(1M)` command when mounting the file system. Also, the `fsdb(1M)` command has been updated with new debugging commands for UFS logging.

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

UFS Mount Option to Ignore Access Time Updates

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). See the `mount_ufs(1M)` man page for more details.

Lightweight Directory Access Protocol (LDAP)

The Lightweight Directory Access Protocol (LDAP) is an open-standard, platform-independent, access protocol based on the X.500 informational model. 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.

SPARC: Dynamic Reconfiguration for Hot-Pluggable System Boards

Dynamic reconfiguration (DR) allows the service provider to add, or remove and replace, hot-pluggable system boards in a running system, eliminating the time lost in rebooting. Also, if a replacement board is not immediately available, the system administrator can use DR to shut down a failing board while allowing the server to continue operations. Only certain SPARC servers support this version of DR.

See your hardware manufacturer's documentation for information about whether DR supports your server.

New Commands, `pgrep` and `pkill`, to Manage Processes

The Solaris 7 release provides the `pgrep` and `pkill` commands, which replace the combination of the `ps`, `grep`, `egrep`, `awk`, and `kill` commands that were used to manage processes in previous Solaris releases. 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.

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

`sendmail`

The `sendmail` 8.9 includes hooks that permit restriction of spam (unsolicited, bulk email); virtual hosting, which allows email to be received using different domain

names; and an improved configuration hierarchy that makes building your own `sendmail` configuration file much easier.

For more information, see *Mail Administration Guide*.

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. Traceroute uses the IP protocol ttl (time to live) field and attempts to elicit an `ICMP TIME_EXCEEDED` response from each gateway along the path, and `PORT_UNREACHABLE` (or `ECHO_REPLY`) from the destination host. The traceroute utility starts sending probes with a ttl of 1, and increases by one until it gets to the intended host or has passed through a maximum number of intermediate hosts.

The traceroute utility is especially useful for determining routing configuration problems and routing path failures. If a particular host is unreachable, the traceroute utility can be used to see what path the packet follows to the intended host and where possible failures occur. The traceroute utility also displays the round-trip time for each gateway along the path to the target host. This information can be useful for analyzing where traffic is slow between the two hosts.

For more information, see *TCP/IP and Data Communications Administration Guide*.

System Crash Dump Utility

The Solaris 7 system crash dump features are the following:

- The `dumpadm` command enables system administrators to configure crash dumps of the operating system. The `dumpadm` configuration parameters include the dump content, dump device, and the directory to which core files are written. This command can set and change parameters as well as verify the validity of a crash dump configuration.
- The `savecore` command is now enabled by default.
- Dump data is now stored in compressed format on the dump device. Kernel crash dump images can be as big as 4 Gbytes or more. Compressing the data means faster dumping and less disk space needed for 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. A booting system doesn't have to wait for the `savecore` command to complete before going to the next step. On large memory systems, the system can be available before `savecore` completes.

See *System Administration Guide, Volume II* for more information about system crash dump features.

Network Performance Improvements

Solaris 7 performance enhancements focus on solving problems with congestion and multiple packet drops when using TCP on the network.

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 making use of TCP large windows (RFC 1323) over satellite links or transcontinental links.

Without TCP with SACK, the receiving TCP application only acknowledges the last packet received in order. For instance, if the TCP application receives packet 1, packet 2, and packet 3, and then receives packet 5, it will only acknowledge receiving up to packet 3 and will discard all subsequent packets until it receives packet 4. This can cause massive retransmission. With TCP with SACK, the receiving location can acknowledge the packets as they are received and the transmitting side can determine which packets never were received. For instance, if the receiving side receives packet 1, packet 2, and packet 3, and then receives packet 5 and packet 6, it can acknowledge each of these packets and the transmitting side only needs to resend the lost packet 4, rather than having to retransmit packet 4, packet 5, and packet 6.

For more information, see *TCP/IP and Data Communications Administration Guide*.

Network Security

The Solaris operating environment provides a sophisticated security system that controls the way users access files, protect system databases, and use system resources. Solaris security is network-wide security, providing security over several different systems, not just one. The Solaris security system is designed to accommodate different security models, giving users the flexibility to choose the model that best fits their needs now and in the future. Here are a number of new features added to the Solaris security system.

RPCSEC_GSS

The kernel-level RPC implementation adds support for a new authentication flavor based on the GSS-API. NFS services are no longer tied down to a specific or a single security mechanism. The user-level RPC implementation has been modified to support two stronger security services—integrity and confidentiality. This implementation also supports multiple security mechanisms.

For more information, see *NFS Administration Guide*.

NIS+ Extended Diffie-Hellman (DH)

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

For more information, see *NIS+ Transition Guide*, *Solaris Naming Administration Guide*, or *Solaris Naming Setup and Configuration Guide*.

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).

The `/etc/named.conf` (BIND 8.1.2) file replaces the `/etc/named.boot` (BIND 4.9.6 file and older).

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

Ease-of-Use and Management Improvements

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

Installation

This section describes new features in the Solaris 7 software that affect installation.

Installing the 64-bit Operating Environment

The Solaris 7 installation programs have a new check box for selection of 64-bit support. The check box is active (not grayed-out) if 64-bit support is a valid option for either the hardware or the software group (metacluster) selected for installation.

Selection of 64-bit support is appropriate if the system is to be used to either develop or run applications compiled for the 64-bit SPARC instruction set. The 64-bit SPARC instruction set is currently supported on UltraSPARC systems.

Deselection of 64-bit support for an UltraSPARC system removes the ability to run or compile a 64-bit program. An UltraSPARC system with 64-bit support should execute 32-bit programs at comparable speeds (typically within a few percent) to a system running without 64-bit support.

Installing AnswerBook with Web Start

The Solaris 7 Documentation CD includes a new choice for installing software from the CD. Standard utilities, such as `pkgadd`, can be used to install everything on the CD or the install icon can be clicked to use the Web Start product. The Web Start product provides a point-and-click interface with selections for installing the AnswerBook2 server, all document collections on this CD, or selected document collections.

For more information, see Chapter 9.

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.

Note - Note that more than one locale may be associated with a particular language. This allows for regional differences such as currency notation. For example, an English-speaking user in the United States can select the `en_US` locale (English for the United States). An English-speaking user in Great Britain can select `en_GB` (English for Great Britain).

Documentation

The AnswerBook2 online documentation system uses a web browser-based interface that enables you to view and print a variety of Solaris information, including existing AnswerBook documents and man pages. The following are new features for AnswerBook2.

Solaris Reference Manual (Man Pages) Available in AnswerBook2 Format

Man pages are available in AnswerBook2 (SGML), rather than AnswerBook1 format. This provides improvements in navigation and links to them directly from other AnswerBook2 documents.

Running an AnswerBook2 Server Directly from the Documentation CD

With the 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.

For detailed information, see the `DOC CD README` file on the Documentation CD, Chapter 9, or AnswerBook2 online Help.

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 running on a system solely for AnswerBook2 support.

For detailed information about how to change servers, and some possible limitations, see Chapter 9 or the AnswerBook2 online Help.

Ability to Control Display of Stylesheet Errors

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

For detailed information on setting this variable, see the AnswerBook2 online Help.

Language Support

The Solaris operating environment adds new language support for complex text layout languages, the Internet Intranet Input Method Protocol, management of third-party fonts, Unicode, and over 30 new or enhanced locales.

Enhanced Language Framework

The Solaris operating environment has expanded its language support in major areas:

- Expanded Unicode support for multiscrypt development and deployment
- Support for complex text layout languages, such as Arabic, Hebrew, and Thai
- Support for the Internet Intranet Input Method Protocol (IIIMP) so thin client users can take advantage of server-based input methods
- Support for the downloading and management of PostScript fonts to PostScript printers

Expanded Unicode Support

Sun Microsystems has a vision of multilingual computing in which multiscrypt Unicode locales play a starring role. Solaris has been a strong supporter of open, industry standards, and with this release offers expanded support for the Unicode standard, v2.0. with six new Unicode UTF-8 locales - French, German, Italian, Spanish, Swedish, and Europe. (Europe will return the Euro as the default currency symbol.)

Of particular interest to users and developers is the inclusion of multiscrypt capabilities. For example, in the Solaris 7 operating environment, enhancements have been made to each of the en_US.UTF-8 locales so that users can input and display text from different writing scripts such as Japanese, Thai, and Russian. They can easily switch between the scripts as needed without having to change or install a new locale. Here are some of the scripts users can input and display in when using any locale: Arabic, Simplified and Traditional Chinese, Japanese, Korean, Hebrew, Thai, Cyrillic, the Western, Eastern, and Northern European scripts, Turkish, and Greek. In addition, a graphical codeset converter is included for ease in converting user data between the various codesets.

Complex Text Support

Solaris 7 software has integrated support 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. Developers can take advantage of the new text processing and rendering support to create applications tailored for these markets.

Internet Intranet Input Method Protocol Support

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 IIIMP protocol defines how input

methods for non-X Window systems-based applications (including Java applications and applets) should perform, and provides a platform-independent solution for customers who have thin clients such as network computers or JavaStations™ and want to be able to take advantage of the input methods on the server.

Enhanced Font Management

Solaris 7 has enhanced its font support through a new Desktop Font Downloader application so that users can easily use and manage third-party PostScript Type 1 and TrueType fonts in their Solaris environments.

Expanded Locale Support

The proper support of the user environment is important to Sun, and with this release, Solaris software provides enhancements to over thirty locales to better meet user needs. These include changes to support the new "Euro" currency scheduled to take effect January 1999.

"Euro" Currency Support

In 1997, the European Community (EC) has agreed to standardize on a single currency, called "Euro." 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 sixteen new user locales. These are described in the following tables. The input mechanism for the Euro currency symbol in these locales conforms to the short-term proposal on Euro symbol input recommendations of the European Commission. These optional locales are for use by developers and users who need to work with the Euro. Local currency symbols are still available for backwards compatibility.

New User Locales

Solaris software already supports most of the European locales and with this release has focused on expanding its support for the Eastern European, Thai, and the Middle Eastern regions. New user locales in the Solaris 7 operating environment are listed in the following tables.

TABLE 3-1 New and Changed User Locales

Region	Locale Name	ISO Code Set	Comments
Albania	sq_AL	8859-2	
Bosnia	nr	8859-2	
Bulgaria	bg_BG	8859-5	
Croatia	hr_HR	8859-2	
Estonia	et	8859-15	The default codeset has been changed to ISO 8859-15 from ISO 8859-1.
Finland	su changed to fi	—	Changed to comply with ISO standards
France	fr.UTF-8	UTF-8	
Germany	de.UTF-8	UTF-8	
Israel	he	8859-8	
Italy	it.UTF-8	UTF-8	
Latvia	lv	8859-13	The default codeset has been changed to ISO 8859-4 from ISO 8859-13.
Lithuania	lv	8859-13	The default codeset has been changed to ISO 8859-4 from ISO 8859-13.
Macedonia	mk_MK	8859-5	
Norway	no_NY	8859-1	
Romania	ro_RO	8859-2	

TABLE 3-1 New and Changed User Locales *(continued)*

Region	Locale Name	ISO Code Set	Comments
Russia	ru	KOI-8	The default codeset has been changed to KOI-8 from ISO 8859-5. The ISO8859-5 based Russian locale will still be available as ru. The new locale will be ru.KOI8-R.
Saudi Arabia	ar	8859-6	
Serbia	sr_SP	8859-5	
Slovakia	sl_SK	8859-2	
Slovenia	sl_SI	8859-2	
Spain	es.UTF-8	UTF-8	
Sweden	sv.UTF-8	UTF-8	
Thailand	th_TH	TIS 620-2533	
United Kingdom	en_UK changed to en_GB		Changed to comply with ISO standards

TABLE 3-2 New User Locales To Support the Euro Currency

Region	Locale Name	ISO Code Set
Austria	de_AT.ISO8859-15	8859-15
Belgium	fr_BE.ISO8859-15	8859-15
Denmark	da.ISO8859-15	8859-15
Finland	fi.ISO8859-15	8859-15

TABLE 3-2 New User Locales To Support the Euro Currency *(continued)*

Region	Locale Name	ISO Code Set
France	fr.ISO8859-15	8859-15
Germany	de.ISO8859-15	8859-15
Greece	el.sun_eu_greek	8859-7 (modified)
Ireland	en_IE.ISO8859-15	8859-15
Italy	it.ISO8859-15	8859-15
Netherlands	nl.ISO8859-15	8859-15
Portugal	pt.ISO8859-15	8859-15
Spain	es.ISO8859-15	8859-15
Sweden	sv.ISO8859-15	8859-15
United Kingdom	en_GB.ISO8859-15	8859-15
Europe	en_EU.ISO8859-15	8859-15

Standards

Many customers rely on the Solaris operating environment as the foundation for mission critical applications. UNIX 98 branding shows Sun's continuing involvement in providing a stable operating environment.

UNIX 98 Branding

Solaris 7 software is branded UNIX 98 and includes the following changes to UNIX 95:

- Interfaces previously defined in the ISO POSIX-2 standard, C language binding, shared memory, enhanced internationalization, and the transfer of the X/Open UNIX Extension Feature Groups into the BASE
- The addition of threads and a Realtime Threads Feature Group to align with POSIX
- Multibyte extension (MSE) to align with the ISO/IEC
- Large file summit (LFS) extensions for support of 64-bit or larger files and filesystems
- X/Open-specific threads extensions and dynamic linking
- Year 2000 compliance

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. This section describes new features relating to the 64-bit Solaris operating environment, shared objects, and the `man` command.

SPARC: 64-bit Developer Environment

The Solaris 7 operating environment provides developers with complete 32-bit and 64-bit development environments. Here are some of the highlights:

- 32-bit Solaris APIs are unchanged.
- 64-bit Solaris APIs are the same as 32-bit XPG5 (UNIX 98) APIs.
- Can build 32-bit and 64-bit applications and drivers on SPARC systems running 32-bit Solaris 7 software (with 64-bit support installed) or UltraSPARC systems running 64-bit Solaris 7 software.
- Shared header files support 32-bit and 64-bit programs.
- Separate libraries for 32-bit and 64-bit programs.
- Separate drivers for 32-bit and 64-bit kernels.

- PATHs unchanged.
- Large Files — If an application requires only large files support, then it can remain 32-bit and use the Large Files interface. However, an application should be converted to 64-bit to take full advantage of 64-bit capabilities.
- *\$ORIGIN* — The linker supports a new keyword *\$ORIGIN* that can be embedded in path names (specified with the *-R* flag) to enable library locations to be specified relative to the location of the running executable. For more information on *\$ORIGIN*, see *Linker and Libraries Guide*.
- The bundled assembler on SPARC systems has been updated to support assembling both 32-bit and 64-bit SPARC assembler programs. The supported instructions sets include SPARC V8, SPARC V9 and the UltraSPARC-specific VIS instructions.

For more information, see *Solaris 7 64-bit Developer's Guide*.

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.

- Shared objects can now be loaded at runtime relative to where the requesting object is located.
- The loading of a shared object can now be deferred until the object is actually referenced by the running program.

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

The 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`.

For more information on SGML man pages, see the `man(1)` man page.

SPARC: 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. There are no changes to the API for any of these libraries. All of these libraries are installed in the `/usr/openwin/lib/sparcv9` directory. No 64-bit X11 application programs are provided. There are four 64-bit X11 packages:

- `SUNWxwix` (X Window System ICE 64-bit library)

- SUNWxwplx (X Window System 64-bit library software)
- SUNWxwrtx (X Window System 64-bit runtime compatibility Package)
- SUNWxwslx (X Window System 64-bit lint libraries for programmers)

Java Development Kit Improvements

Java Development Kit for Solaris 1.1.5 has been specially tuned and tested. As a result, this release of the Java Development Kit for Solaris offers significantly improved scalability and performance for Java applications developed for, and deployed in, the enterprise and across the network. The following JDK for Solaris performance improvements have been made:

- Improved computational application performance with one processor. Running with one processor, the performance of many computational applications is improved compared to previous versions of the Java Development Kit for Solaris.
- Improved performance for multithreaded programs running on multiple processors. Applications with many threads and a significant amount of networking running with two or more processors will typically run much faster, due to improvements in scalability.

For more information on the Java Development Kit for Solaris, see the Java web site at <http://www.sun.com/solaris/java>.

WebNFS

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. It provides access to WebNFS or conventional NFS servers by way of URL file naming. The file access API is modeled after the classes in the `java.io.*` package and provides seamless access to both local and remote files. For updates to this SDK, go to the web site: <http://www.sun.com/webnfs>.

The `truss` Utility 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. Optional shell-like patterns specify the functions and the library to be traced.

Other `truss` enhancements include optional time stamps and the ability to leave the traced process stopped and abandoned on selected events. A debugger or other process inspection tool can then be applied to the stopped process.

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

Improved Library for Device Configuration

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

Graphics/Imaging

The Solaris VISUAL™ software includes several graphics and multimedia software foundation libraries. Foundation libraries are the lowest-level device-independent layer of the Solaris software. This level of interface is designed to support a wide variety of common functions. You can build higher-level libraries on top of the foundation libraries, or the foundation libraries can be used directly by a software application. These foundation libraries create applications that incorporate 2-D and 3-D graphics, imaging, and digital video. The libraries are the XGL graphics library and XIL imaging library. The new XIL stereoscopic image display feature is described below.

XIL 1.4 Runtime Environment

The XIL library is an imaging API that provides a basic set of functions for imaging and video applications. The library provides a strategy for low-level software interfaces (foundation libraries) and enables APIs and API developers to port their code to these foundation libraries.

The XIL 1.4 runtime environment (RTE) should be installed if users at your site are running imaging applications. Whether an application requires the XIL RTE is not always obvious; therefore, you should install the XIL RTE if you are installing either OpenWindows or CDE software, since an application may reference the XIL libraries.

The XIL developer components are now separate from Solaris and are available free of charge on Sun's web site: <http://www.sun.com/solaris/xil>. The developer components are the following:

- The XIL man pages describing use of the XIL API
- The XIL Programmer's Guide
- The XIL header files for support of the XIL API

The XIL runtime libraries is included to ensure continuing support for applications employing XIL.

The XIL RTE has been improved with the following new functionality.

- XIL is adding support for stereoscopic image display. This will initially be supported on the Creator 3D frame buffer. Access to these capabilities is provided by a simple set of API calls. Stereoscopic display enables the presentation of image pairs representing a left-eye/right-eye view of the world. The left and right images are alternately displayed at a frame rate above the eye's flicker frequency. When used in conjunction with electro-optic shuttering eyeglasses, an image display with depth perception, just like normal binocular human vision is produced. Both double-buffered and stereo display can be combined so that stereo updates can be swapped between back and front buffers.

Common Desktop Environment

The Common Desktop Environment (CDE) 1.3 release contains a set of tools that supplement the CDE 1.2 functionality. It provides simplified end-user access, improved local system administration, and enhanced productivity capabilities. The new tools include:

- Organization and customization of the desktop environment
 - File Finder, which enables you to easily search for files using specified criteria
 - Reorganized, customizable, graphical Front Panel and Workspace menu
 - Per-screen Front Panel for multiple monitor configurations
- Improved local system administration
 - Process Manager, which displays information about system processes
 - Perfmeter, which displays system performance graphically
 - System Info, which displays information about your workstation
- Enhanced Productivity
 - Address Manager, which enables you to create and search for electronic addresses
 - Text and voice notes

CDE applications support Complex Text Layout (CTL) locales.

Motif 2.1

Solaris 7 software supports 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.

The five new Motif widgets include the following:

- XmNotebook, a full featured widget, provides functionality similar to a notebook or “tab” widget
- XmContainer is a full featured GUI icon "tree" display widget
- XmSpinBox is a user control to increase and decrease a numerical text field.
- XmComboBox is a combination of a text field and a list widget. It provides a popup list of valid choices which automatically puts the selection into the text field.
- XmScale widget has changed to provide a new vertical display

Printing

For PostScript printers, a new printing feature manages third-party PostScript fonts.

Enhanced Font Management

Solaris 7 has enhanced its font support through a new Desktop Font Downloader application so that users can easily use and manage third-party Postscript Type 1 and TrueType fonts in their Solaris environments. The Desktop Font Downloader allows users to download, remove, re-encode and convert fonts, check status, and perform other administrative tasks on their Postscript printer.

Hardware Support

The Solaris operating environment continues to provide the software needed to support new hardware.

x86: SCSI Disk Driver `sd`

In previous Solaris releases, SCSI disk support on x86-based systems was handled by the `cmdk` driver. In the Solaris 7 release, this support is handled by the `sd` driver, the SCSI disk driver used on Solaris (SPARC Platform Edition) systems. Although derived from the same code base, there are a few differences between the SPARC and Intel versions in this release. For example, special x86-specific volume label support is provided in the Intel version so applications (which use logical disk names in `/dev/dsk`) will not be affected by the driver change. The Intel version also provides x86-specific disk geometry support not required in the SPARC version. In addition, ATAPI CD-ROM support is now provided by the `sd` driver.

For more information, see these man pages: `cdio(7I)`, `cmdk(7D)`, `dkio(7I)`, `scsi(4)`, `sd(7D)`.

x86: Intelligent I/O Framework Support

Intelligent I/O (I2O) is an emerging industry standard for modular, high-performance I/O subsystems defined and promoted by a special interest group, the I2OSIG. The goals of I2O are to:

- Improve system I/O throughput by off-loading low-level I/O handling from the host CPU to a dedicated I/O processor.
- Make it easier for OS and hardware vendors to write device drivers by defining a "split-driver" model. This includes a standard operating system module (OSM), provided by OS vendors, and a hardware-dependent module (HDM) provided by hardware vendors. An OSM for a given device type works with any HDM for that device type.

I2O support is currently available only in the Solaris (Intel Platform Edition). The Solaris 7 release includes the basic framework to enable support for I2O-capable hardware. The implementation supports I2O Specification 1.5. This framework includes:

- I2O message/transport functionality necessary for OSMs to control I2O devices
- Block storage and SCSI OSMs

In this release, booting from an I2O device is not supported. I2O hardware and non-Solaris software and firmware (such as HDMs and IRTOS) configuration from within the Solaris environment is also not supported. For a list of specific I2O hardware tested with Solaris 7, refer to the *Solaris 7 (Intel Platform Edition) Hardware Compatibility List*.

Using Solaris Web Start

This chapter explains how to use the Solaris Web Start utility to install the contents of the Solaris software product box only. For information about using Web Start to install software from a product CD after installation of the Solaris operating environment, see “Adding Software With Solaris Web Start” on page 71.

For instructions on what to do, turn to “Running Solaris Web Start” on page 49.

For background and reference information, turn to:

- “What Is Solaris Web Start?” on page 45
- “About Solaris Web Start’s Default Behavior and Limitations” on page 46
- “About Using Solaris Web Start With an Install Server” on page 47
- “About Manual File System Layout” on page 48

Before using Solaris Web Start, be sure to refer to the *Solaris Release Notes* to find out if there are limitations of this installation method for your system.

For general instructions on planning installations or choosing an installation method, refer to Chapter 1.

What Is Solaris Web Start?

Solaris Web Start is the Sun point-and-click “virtual assistant” for installing software.

Through Solaris Web Start, you can easily select and install all the software in your Solaris software product box, including the Solaris software group, Solstice™ utilities, and other co-packaged software.

Use Solaris Web Start to select exactly the software combination to suit your needs, or just click the Default Installation button to install the default software selections immediately.

How Does Solaris Web Start Work?

Solaris Web Start lets you choose the software you want to install on your machine and creates a profile that reflects your software selections (or the default selections). Solaris Web Start uses the Solaris JumpStart™ utility to read the profile automatically, thus installing the Solaris software and the other selected software products with minimal intervention.

About Solaris Web Start's Default Behavior and Limitations

Table 4-1 summarizes what Solaris Web Start does and does not let you do, as well as what it does by default.

TABLE 4-1 Solaris Web Start's Default Behavior and Limitations

By Default ...	Lets You ...	Doesn't Let You ...
Creates <code>root</code> and swap partitions on the system disk	Change the size of partitions	—
Sets up the system disk	Set up other disks using Lay Out File Systems in the Customized Installation option	—
Creates an <code>/opt</code> partition for co-packaged software	Create additional partitions and file systems	Store co-packaged software in a partition other than <code>/opt</code>
Installs English versions of the Solaris operating environment	Choose additionally to install localized Solaris versions	Omit installation of the English version of the Solaris operating environment

Solaris Web Start determines dynamically what products to install by default. This decision is based on:

- Which product box you purchased

- Whether you're installing a server or a desktop system
- What Solaris language you're installing
- How large your computer's boot disk is

The Solaris Web Start interface always reflects the appropriate defaults for your situation. These defaults are summarized in tabular form when you select the Default Installation option.

Product-Specific Defaults

Some default decisions are made by Solaris Web Start on a per-product basis. For Solaris Documentation, Solaris Web Start installs both the server and data packages. If you want only one of these packages, install it manually after running Solaris Web Start.

Limitations of Default Installation on Multiple-Disk Systems

If you are installing software on a system that has multiple disks, you should be aware that the Default Installation option sets up only the system disk. Other disks will not be recognized by the operating system unless you manually set up file systems on them, mount the file systems, and create entries for them in `/etc/vfstab`. For details, see the "Managing File Systems" chapter of *System Administration Guide, Volume I*, as well as the reference manual page for `format`.

If you want Solaris Web Start to set up *all* the disks in your system, use the Customized Installation option and select all those disks using Lay Out File Systems.

About Using Solaris Web Start With an Install Server

The typical way to install Solaris software on a computer is through the system's CD-ROM drive. However, you can install Solaris over the network instead of from the system's CD-ROM drive.

Doing this involves setting up an *install server*: a machine on which an image of Solaris software exists. This image can be transferred over the network to other computers, so you can easily perform replicated installations.

The details of setting up an install server and performing network-based installations are beyond the scope of this document (see *Solaris Advanced Installation Guide*). However, having set up an install server with a Solaris image, you can use Solaris Web Start in conjunction with it.

Getting Started

When you boot a system to start the installation, choose to boot from an install server on the network (NET) instead of the system's CD-ROM (CD). This will bring up Solaris Web Start.

Solaris Web Start Install Server Process

Use Solaris Web Start in the usual way, selecting the desired software and configurations, or accepting the defaults.

Solaris Web Start checks your selections against the image on the install server. If the software you request exists on the install server, it is transferred over the network and installed on the client. If a particular program you requested does not exist on the install server, Solaris Web Start prompts you to supply the appropriate CD-ROM.

About Manual File System Layout

Solaris Web Start lays out file systems for you automatically. It mirrors what the Solaris Interactive Installation program does.

The file system configurations that Solaris Web Start automatically provides will be adequate for virtually any situation. However, you might consider laying out file systems manually if:

- There are other products, not included in your product box, that you need to install, and these products must share the same file systems (`root`, `/usr`, and `/swap`) used by the co-packaged software in the product box.
- Your experience has been that the file systems provided by Solaris Interactive Installation do not work for your situation.

If you do need to lay out file systems manually, Solaris Web Start gives you the tools to do so easily. A series of simple screens break down the job of setting up file systems into manageable chunks in which you:

- Select which disks you want
- Select which file systems you want

- Create, rename, move, delete, expand, or shrink file systems
- View a summary of your choices and confirm them

Note - Editing file systems requires advanced system administrator's knowledge. You should not alter file system layouts unless you are experienced in this area.

Running Solaris Web Start

You can use Solaris Web Start to install the Solaris software on a new system or over a previously installed system. You can't use Solaris Web Start to upgrade a system from a previous version of the Solaris software.



Caution - Installing Solaris over a previous installation wipes out all the software and data that was previously stored on the system disk. Depending on the size of the system disk and on what software you choose to install, Solaris Web Start may also wipe out existing data on other disks.

1. **Insert the Solaris CD into the system's CD-ROM drive.**
2. **Insert the Solaris Device Configuration Assistant diskette into the system's boot diskette drive (usually the A: drive).**
3. **If the system is off, turn it on. If the system is on, reboot it.**
The Device Configuration Assistant program runs to identify the system's devices.
4. **Boot from the system's CD-ROM drive (CD) or from an install server on the network (NET).**

```
Boot Solaris

Select one of the identified devices to boot Solaris.

> To make a selection, use the arrow keys, then press Enter to mark it [X].

Boot Solaris
-----
[ ] NET : Xircom Pocket Ethernet parallel port card
      Port: 3BC-3BF; IRQ: 7
[ ] DISK: IDE(ATA) QUANTUM FIREBALL1080A
      Target: 0; Port: 1F0-1F7, 3F6-3F7; IRQ: 14
[ ] CD  : IDE(ATA) IBM-H2344-A4
```

(continued)

(Continuation)

```
Target: 0; Port 1F0-1F7, 3F6-3F7; IRQ: 14
```

If you choose to boot from an install server on the network, you must have an install server set up. See “About Using Solaris Web Start With an Install Server” on page 47 for more details.

5. Select Solaris Web Start.

```
Select the type of installation you want to perform:
```

- 1 Solaris Interactive
- 2 Custom JumpStart
- 3 Solaris Web Start

```
Enter the number of your choice followed by the ENTER key.
```

```
If you enter anything else, or if you wait for 30 seconds,  
an interactive installation will be started.
```

6. Follow the instructions that appear on your computer's screen.

Preserving Existing Operating Systems and User Data

Many Intel-based systems are preinstalled with other operating systems such as MS-DOS, Microsoft Windows, Microsoft Windows NT, OS/2, or some other vendor's UNIX[®] implementation. The preinstalled operating system commonly uses the entire disk on the system (on one `fdisk` partition) and contains data that you don't want to lose. Installing the Solaris operating environment on that `fdisk` partition will overwrite the current operating system and its associated user data. If you want to keep an existing operating system on the system and have it coexist with the Solaris operating environment, you must create multiple `fdisk` partitions on the disk.

The following section describes procedures for preserving existing data on a single-disk system and making the existing operating system (MS-DOS or other) coexist with the Solaris operating environment.

How to Preserve Existing Operating Systems and User Data

1. Make sure your existing operating system can coexist with the Solaris operating environment.

Always check the documentation for your existing operating system for notice of any potential problems.

For the Linux operating system, there is a known problem. The Solaris `fdisk` partition is the same as the Linux swap partition; you must delete the Linux swap partitions before you install Solaris software. See the Linux documentation for instructions.

2. **Make sure you have media (CD-ROM or diskettes) containing the existing operating system.**
Some preloaded systems do not automatically come with media for reinstalling the operating system. If you are in this situation, create a copy of the operating system on media using vendor-supplied tools.
3. **Back up the existing operating system customizations and/or user data using the backup program of your choice.**
4. **Start the Solaris installation program using the instructions described in Chapter 1.**
5. **When prompted, select the Solaris Interactive Installation option.**
Do not select the Solaris Web Start option; Solaris Web Start does not let you create `fdisk` partitions.
6. **Create a Solaris `fdisk` partition for Solaris, and an `fdisk` partition for the existing operating system.**
Because the existing operating system takes up the entire disk, you'll have the option to manually or automatically create a Solaris `fdisk` partition.
7. **When prompted during installation, select Manual Reboot.**
8. **After Solaris software is installed, halt the system from the command line.**
9. **Reboot the system using the media for the previously existing operating system.**
10. **If the non-Solaris `fdisk` partition that you created was 'Other', use the `fdisk` utility for that operating system and re-label the `fdisk` partition.**
11. **Reinstall the operating system on the non-Solaris `fdisk` partition using the operating system's installing software.**

Note - MS-DOS Users Only: The MS-DOS setup program will recognize that the MS-DOS partition is unformatted and prompt you for permission to format it. The setup message suggests that the setup program will format the entire disk (and overwrite the Solaris `fdisk` partition). However, the setup program only formats the MS-DOS `fdisk` partition and leaves the Solaris `fdisk` partition intact.

12. **Restore any backed-up data to the non-Solaris `fdisk` partition.**
Use the appropriate operating system restore program to restore backed-up files.

13. Reboot the system and change the active partition to the Solaris operating environment.

To ensure that the Solaris operating environment automatically runs each time you reboot the system in the future, you must make the Solaris `fdisk` partition the active partition. To do this, follow the instructions on the Boot Solaris screen after rebooting.

Upgrading a System

This chapter describes how to upgrade an existing Solaris system. Topics include:

- “Frequently Asked Questions About Using the Upgrade Option” on page 56
- “Upgrade Instructions” on page 57
- “To Clean Up After Upgrading” on page 60

Ways to Upgrade a System

When you install a new version of Solaris software on an existing Solaris system, the installation program lets you choose one of the following options to install the Solaris operating environment:

- *Upgrade* – This option merges the new version of the Solaris operating environment with the existing files on the system’s disks. It saves as many modifications as possible that you have made to the previous version of the Solaris operating environment.
- *Initial* – This option overwrites the system’s disk with the new version of the Solaris operating environment. You must back up any local modifications that you have made to the previous version of the Solaris operating environment before you begin the installation and restore the local modifications after the installation completes.

Frequently Asked Questions About Using the Upgrade Option

- Will I be able to use the upgrade option on my system?

You can use the upgrade option if you are running Solaris 2.5, Solaris 2.5.1, or Solaris 2.6 software.

To see which version of the Solaris operating environment the system is running, type:

```
$ uname -a
```

- Do I have to back out patches before I use the upgrade option?

No.

- What if the Solaris installation program doesn't provide the upgrade option, but the system should be upgradeable?

See Chapter 7 for information.

- What if the system's file systems don't have enough space for the upgrade?

The upgrade option in the Solaris Interactive Installation program lets you reallocate disk space if the current file systems don't have enough space for the upgrade. By default, an auto-layout feature tries to determine how to reallocate the disk space so the upgrade can succeed. If auto-layout can't determine how to reallocate disk space, you must specify which file systems can be moved or changed, and then run auto-layout again based on your input.

- Can I automatically upgrade to another software group?

No. For example, if you previously installed the End User software group on your system, you cannot use the upgrade option to upgrade to the Developer software group. However, you can always add software to the system during the upgrade that is not part of the currently installed software group.

- Where does the installation program indicate local modifications that the upgrade couldn't preserve?

- Before the system reboots: `/a/var/sadm/system/data/upgrade_cleanup`
- After the system reboots: `/var/sadm/system/data/upgrade_cleanup`

- Where does the installation program indicate what happened during the upgrade?

- Before the system reboots: `/a/var/sadm/system/logs/upgrade_log`
- After the system reboots: `/var/sadm/system/logs/upgrade_log`

Upgrade Instructions

This section provides information on upgrading and backing up a system.

▼ To Upgrade a System

1. Consider the following information before you upgrade an existing system to a new version of the Solaris operating environment.

- Check the section Software Features No Longer Supported in the *Solaris Release Notes* to see if any software that you use is no longer provided in the new release.
- Check Chapter 2 to see if any of the changes or enhancements to the Solaris operating environment will affect anything that you currently do.
- Check the *Solaris 7 (Intel Platform Edition) Hardware Compatibility List* to make sure your system and devices are supported by the new release.
- Check other software documentation.



Caution - To avoid loss of data during upgrade, note the following information about Solstice DiskSuite. Also, always check co-packaged and third-party software documentation for upgrade instructions.

If you are using Solstice DiskSuite™, note that metadevices cannot be upgraded automatically. For instructions, see Appendix B, "Upgrading to Other Solaris Versions," in the *Solstice DiskSuite Reference Guide*.

- Check for all the available patches that you may need. The most updated patch list is provided by SunSolve on the internet (<http://sunsolve.sun.com/>).

2. Back up your system.

Always back up existing file systems before using the upgrade option and installing a new version of Solaris software. Backing up file systems means copying file systems to removable media (such as tape) to safeguard your data against loss, damage, or corruption. If you do not have a backup procedure in place, see Procedure, To Back Up a System on page 59 to find out how to perform a full backup of file systems. For information on setting up scheduled backups and using other backup commands, see *System Administration Guide, Volume I*.

3. Insert the Configuration Assistant boot diskette into the system's A: diskette drive.

4. Insert the Solaris CD into the CD-ROM drive.

5. Prepare the system to boot.

TABLE 6-1 Booting Instructions

If System Is ...	Then ...
New (out of the box) and turned off	Turn on the system components.
Turned on, and running Solaris	Access a command tool or shell and type: <code>\$ su root</code> <code># init 0</code> Follow the prompts to reboot.

Upon turning on your system, a diagnostic program (Configuration Assistant) checks your hardware for any devices that you've added to your system that are in conflict. If there are any, you'll be prompted to fix them before continuing.

6. Choose the CD option to boot the system from the CD-ROM.

7. Choose the Interactive option.

Do not choose 2- custom JumpStart; this is an advanced installation option. It requires previous setup. To automate installations using custom JumpStart, see the *Solaris Advanced Installation Guide*.

Do not choose Solaris Web Start; it does not support upgrading in this release.

Note - If you experience any problems from this point on, see Chapter 7.

8. Follow the on-screen instructions to install the Solaris operating environment.

The Solaris installation program is a menu-driven, interactive step-by-step guide to installing the Solaris operating environment. It also provides online help to answer your questions.

9. Wait as the Solaris operating environment is installed on the system.

A log of the installation (how the system was installed) is saved to the following files:

- Before the system reboots: `/a/var/sadm/system/logs/upgrade_log`
- After the system reboots: `/var/sadm/system/logs/upgrade_log`

10. Reboot the system.

▼ To Back Up a System

- 1. Become superuser.**
- 2. Shut down the system.**

```
# init 0
```

- 3. Bring the system to run-level S (single-user mode).**

```
ok boot -s
```

- 4. (Optional) Check the file system for consistency with the `fsck` command.**

Running the `fsck` command using the `-m` option checks for consistency for file systems. For example, power failure can leave files in an inconsistent state.

```
# fsck -m /dev/rdisk/device-name
```

- 5. (Optional) If you will be backing up file systems onto a remote tape drive:**
 - a. Add the following entry to the `./rhosts` file of the system that is initiating the backup:**

```
host root
```

- b. Verify that the host name added to the `./rhosts` file above is accessible via the local `/etc/inet/hosts` file or available through an NIS or NIS+ name server.**

- 6. Identify the device name of the tape drive.**

The default tape drive is `/dev/rmt/0`.

- 7. Insert a tape that is not write-protected into the tape drive.**

8. Back up file systems using one of `ufsdump` commands listed in Table 6-2.

TABLE 6-2 Full Backup Commands

To Do Full Backups To...	Use This Command...
Local diskette	<code>ufsdump9ucf /vol/dev/ files_to_backup</code>
Local cartridge tape drive	<code>ufsdump9ucf /dev/rmt files_to_backup</code>
Remote cartridge tape drive	<code>ufsdump0ucf remote_host:/ files_to_backup</code>

9. When prompted, remove the tape and replace it with the next volume.
10. Label each tape with the volume number, level, date, system name, and file system.
11. Bring the system back to run-level 3 by pressing Control-D.
12. Verify the backup was successful by using the `ufsrestore` command to display the tape contents.

To Clean Up After Upgrading

After the system finishes upgrading, the installation program leaves it at the superuser prompt in single-user mode.

1. Clean up the system if necessary.

When you use the upgrade option, the Solaris installation program merges local software modifications of the existing system with the new software; however, in some cases, the merge is not possible. See the following file to see if you need to fix any of the local modifications that the upgrade could not preserve:

`/a/var/sadm/system/data/upgrade_cleanup`



Caution - Make sure you look at all the information in the `upgrade_cleanup` file. Your system may not boot if you fail to fix the unpreserved local modifications.

2. Reboot the system.

```
# reboot
```


Troubleshooting

This chapter provides a list of specific error messages and generic problems that you may encounter when installing the Solaris software. Start by using the following list to identify where in the installation process the problem is occurring.

- “Booting a System” on page 63
- “Installing the Solaris Operating Environment (Initial)” on page 67
- “Upgrading Solaris Software” on page 68

Booting a System

Error Messages

```
le0: No carrier - transceiver cable problem
```

Problem

The system is not connected to the network.

How to Fix the Problem

If this is a non-networked system, ignore this message. If this is a networked system, make sure the Ethernet cabling is attached securely.

```
The file just loaded does not appear to be executable
```

Problem

The system cannot find the proper media for booting.

How to Fix the Problem

Verify that the system has been set up properly to install over the network from an install server. For example, make sure you specified the right platform group for the system when you set it up. Also, if you did not copy the Solaris CD, make sure the Solaris CD on the install server is mounted and accessible.

Can't boot from file/device

Problem

The installation program can't find the Solaris CD in the system's CD-ROM drive.

How to Fix the Problem

Make sure:

- The CD-ROM drive is installed properly or is turned on
- The Solaris CD is inserted into the CD-ROM drive

Not a UFS filesystem

Problem

x86-based systems only.

When Solaris software was installed (either through the interactive or custom JumpStart method), the default boot drive was not selected. When an alternate boot disk is selected, you must use the Configuration Assistant diskette to boot the system from that point on.

How to Fix the Problem

Insert the Solaris Device Configuration Assistant/Boot diskette into the system's boot diskette drive (usually the A: drive).

General Problems

Problem

x86-based systems only.

The Solaris root slice must reside within the first 1024 cylinders of the disk. If it does not, the installation fails after booting.

How to Fix the Problem

If the first `fdisk` partition is primary DOS (PRI DOS), use the `fdisk` program to delete space from it. Try booting again. If the first `fdisk` partition is extended DOS (EXT DOS) or another operating system, use the `fdisk` program to delete it. Try booting again.

Problem

How to Fix the Problem

x86-based systems only.
System hangs or panics when non-memory PC cards are inserted.

Non-memory PC cards cannot use the same memory resources used by other devices. To correct this, use a DOS debugger to identify device memory usage, then manually reserve memory resources for the PC card device using the following instructions.

1. Boot the system using the Configuration Assistant diskette.
2. Select Review/Edit Devices from the Device Tasks menu..
3. Select Add Device.
4. Select Define Device.
5. Enter a unique name following the EISA ID naming conventions (for example, ITD4001), and choose Continue.
6. Select Memory Address from the list of resources, and choose Continue.
7. Enter the address range to reserve (for example, CA800–CFFFF), and choose Continue.
8. Choose Save Configuration from the Device Tasks menu.
9. Reboot the Solaris operating environment.

Problem	How to Fix the Problem
<p>x86-based systems only.</p> <p>The BIOS primary drive on your system was not detected by the Configuration Assistant program during the pre-booting phase.</p>	<ul style="list-style-type: none"> ■ If you are using old drives, they may be unsupported. Check the <i>Solaris 7 (Intel Platform Edition) Hardware Compatibility List</i>. ■ Make sure the ribbon and power cables are plugged in correctly. Check the manufacturer's documentation. ■ If only one drive is attached to the controller, designate the drive as the master drive by setting jumpers. Some drives have different jumper settings for a single master, as opposed to a master operating with a slave. Connect the drive to the connector at the end of the cable to reduce signal ringing that occurs when an unused connector is dangling at the end of the cable. ■ If two drives are attached to the controller, jumper one drive as the master (or as a master operating with a slave), and jumper the second drive as a slave. ■ If one drive is a hard disk and the second a CD-ROM drive, designate the drive as the slave drive by setting jumpers. Any drive can be plugged into any drive connection on the cable. ■ If there are persistent problems with two drives on a single controller, attach one drive at a time to verify that each works. Jumper the drive as master or single master and use the drive connector at the end of the IDE ribbon cable to attach the drive. Verify that each drive works, then jumper the drives back into a master and slave configuration. ■ If the drive is a disk drive, use the BIOS setup screen to ensure that the drive type (which indicates the number of cylinders, heads, and sectors) is correctly configured. Some BIOS software may have a feature that automatically detects the drive type. ■ If the drive is a CD-ROM drive, use the BIOS setup screen to configure the drive type as a CD-ROM drive, when the BIOS software has this capability. ■ If MS-DOS does not recognize the drive, there is probably a hardware or BIOS configuration problem. For many systems, IDE CD-ROM drives are only recognized by MS-DOS if an MS-DOS CD-ROM driver has been installed.

Problem	How to Fix the Problem
<p>x86-based systems only.</p> <p>The IDE or CD-ROM drive on your system was not found by the Configuration Assistant program in the pre-booting phase.</p>	<ul style="list-style-type: none"> ■ If disks are disabled in the BIOS, use the Solaris Device Configuration Assistant/Boot diskette to boot from the hard disk. ■ If the system has no disks, it may be a diskless client.

Problem**How to Fix the Problem**

x86-based systems only.
System hangs before displaying the prompt.

See the *Solaris 7 (Intel Platform Edition) Device Configuration Guide*.

Installing the Solaris Operating Environment (Initial)

Problem**How to Fix the Problem**

x86-based systems only.
IDE disk drives do not automatically map out bad blocks like other drives supported by Solaris software. Before installing Solaris on an IDE disk, you may want to perform a surface analysis on the disk.

To perform surface analysis on an IDE disk, follow this procedure:

1. Start the Solaris Interactive Installation program, as described in . The Solaris Interactive Installation program will start either a graphical user interface (GUI) or a character user interface (CUI), depending on whether you have a graphics or non-graphics monitor.
2. When either the GUI or CUI program starts, enter information and select the Continue option on the first few screens.
3. When you see the *Installing Solaris - Initial* screen, select the Exit option and exit the installation.
4. If you are using the GUI installation program, open a Command Tool window for the remaining steps in this procedure. If you are using the CUI installation program, use the system shell for the remaining steps in this procedure.
5. Start the `format` program by typing `format`.
6. Specify the IDE disk drive on which you want to perform a surface analysis.

Note - IDE drives do not include a target number. The IDE drive naming convention is `cx``dy`, where `cx` is the controller number and `dy` is the device number.

7. At the `format>` prompt, type `fdisk`. Use the `fdisk` program to create a Solaris partition on the disk. (If a Solaris `fdisk` partition already exists, leave it alone.)
 8. At the `format>` prompt, type `analyze`.
-

Problem**How to Fix the Problem**

9. At the `analyze>` prompt, type `config`. This will show you the current settings for a surface analysis. If you want to change any settings, type `setup`.
10. At the `analyze>` prompt, type `read`, `write`, or `compare` for the type of surface analysis to be performed. If `format` finds bad blocks, it will re-map them.
11. At the `analyze>` prompt, type `quit`.
12. (Optional) You may want to specify blocks to re-map. If so, at the `format>` prompt, type `repair`.
13. Type `quit` to quit the `format` program.
14. Choose Restart Install from the Workspace menu to resume the GUI installation or type `suninstall` to resume the CUI installation.

Upgrading Solaris Software

This section describes possible solutions for problems you may encounter when upgrading Solaris software.

Error Messages

No upgradeable disks

Problem

Bug ID: 1191792

A swap entry in the `/etc/vfstab` file is causing the upgrade to fail.

How to Fix the Problem

Comment out the following lines in the `/etc/vfstab` file:

- All swap files and slices on disks not being upgraded
- Swap files that are no longer present
- Any unused swap slices

General Problems

Problem	How to Fix the Problem
The upgrade fails because the installation program could not mount metadevices on the system.	Metadevices cannot be upgraded automatically. For instructions, see Appendix B, "Upgrading to Other Solaris Versions," in the <i>Solstice DiskSuite Reference Guide</i> .
Problem	How to Fix the Problem
Bug ID: 1170953	
The upgrade option is not presented even though there is a version of Solaris software that's upgradable on the system.	
<i>Reason 1:</i> The <code>/var/sadm</code> directory is a symlink or it is mounted from another file system.	<i>Solution for Reason 1:</i> Move the <code>/var/sadm</code> directory into the root (<code>/</code>) or <code>/var</code> file system.
<i>Reason 2:</i> The <code>/var/sadm/softinfo/INST_RELEASE</code> file is missing.	<i>Solution for Reason 2:</i> Create a new <code>INST_RELEASE</code> file by using the following template: <pre>OS=Solaris VERSION=2.x REV=0</pre> where <code>x</code> is the version of Solaris software on the system.
Problem	How to Fix the Problem
The upgrade fails for reasons beyond your control, such as a power failure or a network connection failure, and the system is left in an unbootable state.	<ol style="list-style-type: none">1. Reboot the system from the Solaris CD or from the network.2. Choose the upgrade option for installation. The Solaris Interactive Installation program will determine if the system has been partially upgraded and will continue the upgrade.

Problem	How to Fix the Problem
<p>The upgrade fails because the installation program could not mount a file system. During an upgrade, the installation program attempts to mount all the file systems listed in the system's <code>/etc/vfstab</code> file on the root file system being upgraded. If the installation program cannot mount a file system, it fails and exits.</p>	<p>Make sure all file systems in the system's <code>/etc/vfstab</code> file can be mounted. Comment out any file systems in the <code>/etc/vfstab</code> file that can't be mounted or that may cause the problem, so the installation program doesn't try to mount them during the upgrade.</p> <hr/> <p>Note - Any system-based file systems that contain software to be upgraded (for example, <code>/usr</code>) cannot be commented out.</p>

Problem	How to Fix the Problem
<p>There is not enough space on the system for the upgrade. See if you can fix this problem without using auto-layout to rearrange space, by checking the following reasons for the space problem:</p>	
<p><i>Reason 1:</i> Since the automounter is not active during an upgrade, the installation program installs any package's files or directories that are symbolic links to automounted file systems. If a symbolic link is overwritten, the upgrade may fail because of insufficient disk space.</p>	<p><i>Solution for Reason 1:</i> During the upgrade, delete software packages in the Customize Software screen that will create files or directories on the automounted file systems. Then the installation program will not overwrite the symbolic link with a package's files or directories.</p>
<hr/> <p>Note - The <code>/var/mail</code> and <code>/var/news</code> directories, which usually reside on an automounted file system, are not affected by an upgrade.</p> <hr/>	
<p><i>Reason 2:</i> New software has been added to the software group that you are upgrading or some of the existing software has increased in size. During an upgrade, the installation program installs any new software that is part of the software group previously installed on the system, and it also upgrades any existing packages on the system.</p>	<p><i>Solution for Reason 2:</i> During the upgrade, delete software packages in the Customize Software screen that install into the file systems that need more space. Especially look for any new packages that have been added to the Solaris release that you don't want.</p>

Adding Software After Solaris Installation

This chapter describes how to add software to a system from the Solaris CD or another product CD, and how to remove software from a system. There are several methods for performing these tasks:

- Using the Solaris Web Start utility on product CDs
- From the command line
- From a graphical user interface, Admintool

For more information on adding and removing software packages on client systems in a variety of computing environments, see the *System Administration Guide, Volume I*.

This is a list of the step-by-step instructions in this chapter.

- “To Add Software With Solaris Web Start” on page 72
- “To Add Packages With the `pkgadd` Command” on page 72
- “To Remove Packages With the `pkgrm` Command” on page 74
- “To Add Packages With Admintool” on page 75
- “To Remove Packages With Admintool” on page 76

Adding Software With Solaris Web Start

This section explains how to add software from a product CD using the Solaris Web Start utility.

Note - After the Solaris operating environment software has been installed, you cannot use Solaris Web Start to install additional software from the Solaris CD, but you can use it to install software from another CD. To install additional software from the Solaris CD, you can use `pkgadd` or `Admintool` as described later in this chapter.

▼ To Add Software With Solaris Web Start

1. **Log in as root.**
2. **Insert the product CD into your CD-ROM drive.**
Solaris Web Start opens automatically, displaying its Welcome screen.
3. **Follow the instructions on the Web Start screens.**

Adding and Removing Packages Using Commands

This section describes how to add and remove packages using commands at the command line.

▼ To Add Packages With the `pkgadd` Command

1. **Log in to the installed system and become root.**
At the shell prompt, type:

```
$ su
```

2. **Load the CD that contains the packages to be added into the CD-ROM drive.**
Volume Manager will automatically mount the CD.
3. **Add one or more packages to the system using the `pkgadd` command.**

```
# /usr/sbin/pkgadd -d device_name pkgid
```

In this command,

<i>device_name</i>	Is the path to the CD with the software to be added to the installed system.
<i>pkgid</i>	Is the name of the software package to be added to the installed system. For example, SUNWaudio.

If the `pkgadd` process encounters a problem during installation of the package, it displays a message related to the problem, followed by this prompt:

```
Do you want to continue with this installation?
```

Respond with `yes`, `no`, or `quit`. If more than one package has been specified, type `no` to stop the installation of the package being installed. The `pkgadd` process continues to install the other packages. Type `quit` to stop the installation.

4. Verify that the package has been installed correctly.

```
# /usr/sbin/pkgchk -v pkgid
```

If the `pkgchk` command determines there are no errors, it returns a list of installed files. Otherwise, it reports the error.

Example: Installing Software From a Mounted CD

The following example shows a command to install the `SUNWaudio` package from a mounted Solaris CD. The example also shows the use of the `pkgchk` command to verify that the package files were installed properly.

Note - The name of this product is Solaris 7 but code and path or package path names may use Solaris 2.7 or SunOS 5.7. Always follow the code or path as it is written.

```
# /usr/sbin/pkgadd -d /cdrom/cdrom0/s0/Solaris_2.7 SUNWaudio.  
. .  
Installation of <SUNWaudio> was successful.  
# pkgchk -v SUNWaudio  
/usr  
/usr/bin  
/usr/bin/audioconvert  
/usr/bin/audioplay  
/usr/bin/audiorecord  
#
```

▼ To Remove Packages With the `pkgrm` Command

1. Log in to the installed system and become root.

At the shell prompt, type:

```
$ su
```

2. Remove one or more packages from the system using the `pkgrm` command.

```
# /usr/sbin/pkgrm pkgid
```

In this command,

pkgid

Is the name of the software package to be removed from the installed system. For example, SUNWaudio.

3. Verify that the package has been removed correctly.

```
# /usr/sbin/pkgchk pkgid
```

If the `pkgchk` command determines that the package is not installed, it will print a warning message.

Example: Removing Software From a System

The following example shows a command to remove the `SUNWaudio` package from a system. The example also shows the use of the `pkgchk` command to verify that the package files were removed.

```
# /usr/sbin/pkgrm SUNWaudio
The following package is currently installed:
  SUNWaudio      Audio applications^M
                (sparc) 3.0,REV=1.2.13^M

Do you want to remove this package? y
.
.
.
Removal of <SUNWaudio> was successful.
# pkgchk -v SUNWaudio
WARNING: no pathnames were associated with <SUNWaudio>
#
```

Adding and Removing Packages Using Admintool

This section describes how to add and remove software packages through the Admintool graphical user interface.

▼ To Add Packages With Admintool

1. Log in to the installed system and become superuser.

At the shell prompt, type:

```
$ su
```

Unless you are a member of the UNIX `sysadmin` group (group 14), you must become superuser on your system to add or remove software packages with Admintool.

2. Load the CD that contains the package to be added into the CD-ROM drive.

Volume Manager will automatically mount the CD.

3. Start Admintool.

```
# admintool &
```

The Users window is displayed.

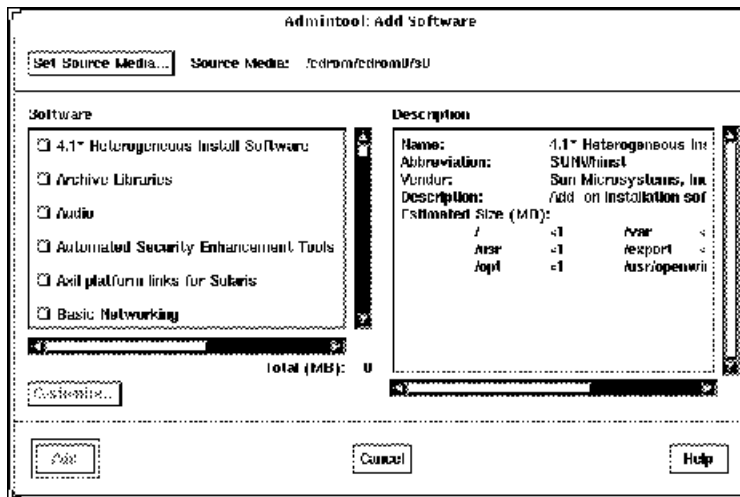
4. Choose Software from the Browse menu.

The Software window is displayed.

5. Choose Add from the Edit menu.

The Set Source Media window may appear. If so, specify the path to the installation media and click on OK. The default path is a mounted SPARC Solaris CD.

The Add Software window is displayed.



6. Select the software you want to install on the local system.

In the Software portion of the window, select the software you want to install.

7. Click Add.

A Command Tool window appears for each package being installed, displaying the installation output.

The Software window refreshes to display the packages just added.

▼ To Remove Packages With Admintool

1. Log in to the installed system and become root.

At the shell prompt, type:

```
$ su
```

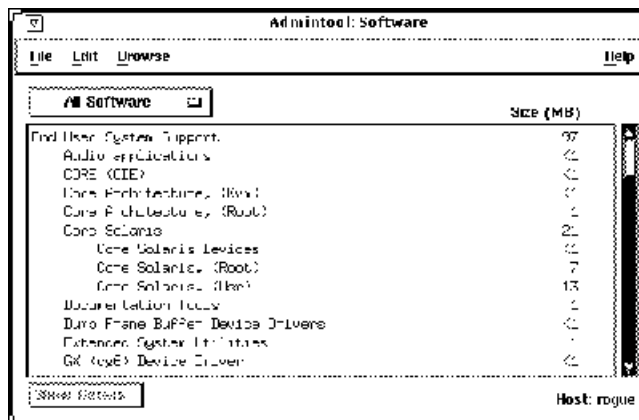
Unless you are a member of the UNIX sysadmin group (group 14), you must become root on your system to add or remove software packages with Admintool.

2. Start Admintool.

```
# admintool &
```

3. Choose Software from the Browse menu.

The Software window is displayed.



4. Select the software you want to remove from the local system.

5. Choose Delete from the Edit menu.

A warning window is displayed to confirm whether you really want to delete the software.

6. Click Delete to confirm that you want to remove the software.

For each package that is being deleted, a Command Tool window is displayed that asks for confirmation, again, on deleting the software. Type *y*, *n*, or *q*. If you choose to delete the software, the output from the removal process is displayed.

The Software window refreshes, and no longer displays the packages just removed.

Accessing Online Documentation

This chapter explains how to install and use the AnswerBook2™ product to browse, search, and print online documentation. It includes the following information:

- “Introduction to the AnswerBook2 Product” on page 79
- “Where’s the Documentation?” on page 83
- “Getting Started” on page 89
- “Installing Documentation Server Software” on page 92
- “Solving AnswerBook2 Problems” on page 108

Note - The name of this product is Solaris 7 but code and path or package path names may use Solaris 2.7 or SunOS 5.7. Always follow the code or path as it is written.

Introduction to the AnswerBook2 Product

The AnswerBook2 product is the Sun online documentation system. It uses a web-browser interface that lets you view and print a variety of Solaris™ information, including SGML-based AnswerBook™ collections, Display PostScript™ AnswerBook collections, and man pages.

The AnswerBook2 product provides a search engine that lets you find information throughout the documentation library. You can install document collections on a centralized documentation server or on a local server.

Note - Throughout the AnswerBook2 documentation, the term *AnswerBook1* refers to the version of the AnswerBook product provided with pre-2.6 versions of the Solaris operating environment.

AnswerBook2 Features and Functions

The AnswerBook2 product provides the following features and functions:

- Uses a web-browser-based interface so that you can view online documentation from any platform (running any operating system), provided that your web browser supports HTML 3.2
- Depending on your web browser's functionality, lets you copy information from AnswerBook2 documents and paste it into other locations, such as your command line
- Provides a search interface for finding words and word phrases throughout the documentation library
- Gives you the ability to print chapters and books directly from the AnswerBook2 interface in a PostScript format that is near print-quality output
- Lets you view old and new AnswerBook documents using a single interface
- Lets you define a subset of document collections (a Personal Library) to be displayed when using a specific document server
- Allows you to choose a language in which to view on-screen instructions and Help information
- Uses a client-server architecture that allows the documents to be stored in a single location (server) and accessed from the user's desktop (client)
- Provides a command-line interface (CLI) and a browser-based interface (GUI) for performing administrative functions

New AnswerBook2 Features for This Release

The following list identifies the new or substantially enhanced features provided in this release of the AnswerBook2 software.

- Man pages (Reference Manual) in AnswerBook2 format
Traditional UNIX[®]-style manual (man) pages are available in AnswerBook2 format. The search interface allows you to choose to search only the SGML-based man pages installed on the documentation server.
- Support for multimedia content

If the document source includes audio or video files, the AnswerBook2 system lets you access them according to what you have defined in your browser for audio and video support.

- Ability to run an AnswerBook2 server directly from the Solaris 7 Documentation CD (server administrators only)

You can run the AnswerBook2 server directly from the Solaris 7 Documentation CD using the `ab2cd` script, if you have the CD and you have `root` access to the system on which the CD is connected. For detailed information about this feature, see “To Run a Documentation Server From the Solaris 7 Documentation CD” on page 100.

- Ability to use various CGI-based web servers (server administrators only)

The AnswerBook2 server can run either as an NSAPI plug-in using the server that is included in the AnswerBook2 server packages or as a CGI-based application using any `httpd` server that supports CGI (such as Netscape Server™ or Sun WebServer™). For detailed information about changing to a CGI-based web server and some possible limitations, see “Running the AnswerBook2 Server as a CGI Process” on page 103.

- Ability to control display of style sheet errors (server administrators only)

To control whether the word “BUG” is displayed to the users in red when style sheet errors occur, turn on or off the AnswerBook2 debugging function. You set this when you start up the document server. For more information, see *Starting and Stopping the Documentation Server* in the AnswerBook2 Help.

Pieces and Parts

The AnswerBook2 product consists of the following elements:

- A client web browser – The Solaris 7 release includes the Netscape browser; however, you can use any HTML 3.2-compliant browser to view Sun’s online documentation.

Note - If you just want to view online documentation and you have access to a documentation server’s URL, you only need this element. All other elements are part of the documentation server system (a machine on which the document collections are installed and which runs a web-based server to deliver them to you). If you do not have access to a documentation server at your site, you can view all released Solaris documentation at: <http://docs.sun.com>

- A documentation server – Performs query functions and “serves” documents to the client browser. Includes templates that provide a common “look and feel” for document viewing and printing; and provides both web-browser and command-line administration interfaces that perform database, password authentication, and other administrative functions.

- Document collections – Can be new (SGML) documents or old (Display PostScript) documents.

Frequently Asked Questions

This section lists some common questions about the AnswerBook2 product along with answers to those questions.

- What is AnswerBook2?

The AnswerBook2 product uses a standards-based document server to deliver online documentation through your favorite web browser. The AnswerBook2 interface lets you browse, search, and print a variety of Solaris information, including AnswerBook1 collections and man pages.

- How is AnswerBook2 different from AnswerBook1?

The previous AnswerBook product (now called AnswerBook1) used Display PostScript to display electronic versions of documents primarily developed for paper delivery. The AnswerBook2 product uses a web browser to display documentation developed for online delivery using SGML and to display existing AnswerBook1 documents.

Some key differences between the products are:

- Web-browser interface – You can use any HTML 3.2-compliant browser on any platform to view online documentation with the AnswerBook2 product.
 - Source flexibility – The AnswerBook2 server can deliver AnswerBook1 (Display Postscript™) documents or AnswerBook2 (SGML) documents.
 - Client-server support – The AnswerBook2 product allows you to install the server and document collections in a central location and view the documents from other systems. In addition, it includes a “fail-over” mechanism in which the document administrator can define multiple documentation servers so that links between documents always work.
 - Cross-platform – For this release, the AnswerBook2 document server must run in the Solaris 7 operating environment (SPARC or Intel). However, AnswerBook2 clients can run on any platform, and future releases might provide server functionality on additional platforms.
 - Default search behavior – The AnswerBook2 product uses AND for its default search behavior rather than OR (the default search behavior in the AnswerBook1 product).
- Can I still view my old AnswerBook collections with AnswerBook2?

Yes, unless your old AnswerBook documents were created before the release of the Solaris 2.2 operating environment. To add AnswerBook1 collections to the AnswerBook2 server’s database, the document administrator uses the

AnswerBook2 “add collection” function and points to the directory containing the AnswerBook1 `ab_cardcatalog` file.

- Does AnswerBook2 provide the same functionality for AnswerBook1 and AnswerBook2 documents?

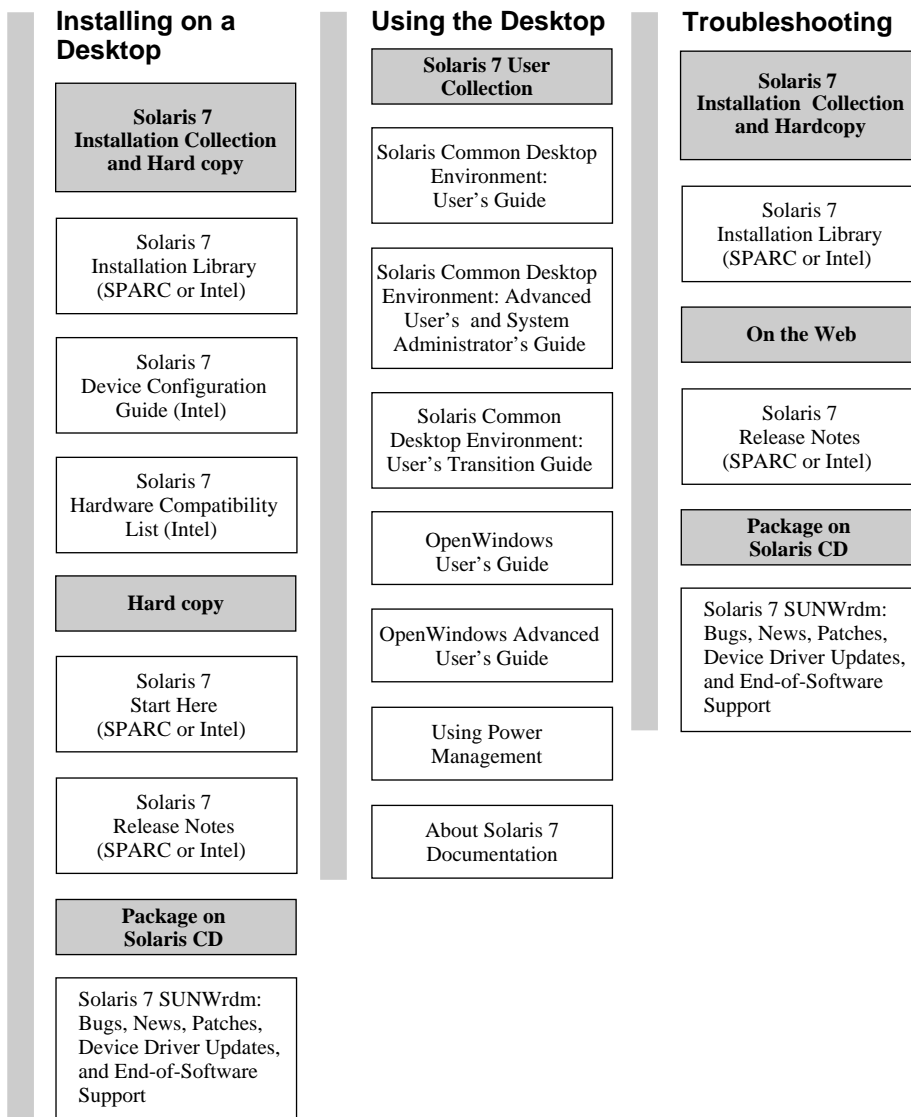
No. For consistency, the AnswerBook2 interface for AnswerBook1 documents is similar to the AnswerBook1 product interface. Thus, the AnswerBook2 product provides the following differences in functionality for AnswerBook1 and AnswerBook2 collections:

- You cannot show or hide all levels of an AnswerBook1 table of contents listing; you can only show or hide details for a specific section within the table of contents.
- AnswerBook1 content pages do not include Other Topics sections. To navigate from one page to another, you can use the **Next Topic** link or return to the table of contents and select another section in the book.
- AnswerBook1 content pages display the entire chapter at one time, not smaller sections.
- Search results icons poorly represent the probability of a match for AnswerBook1 information; the icons tend to be either completely filled or completely empty.
- Search terms are not highlighted in AnswerBook1 text.
- Some AnswerBook1 graphics cannot be displayed inline; they are identified by an icon that, when clicked displays a PostScript image of the graphic.
- A **Man Pages by Keyword** search includes only the AnswerBook2 (SGML-based) man pages on the server, not the AnswerBook1 man pages.
- The AnswerBook1 man pages use the same interface as other AnswerBook1 documents; they do not have a special man page interface.

Where’s the Documentation?

The document server software and Solaris 7 document collections are on the Solaris 7 Documentation CD. Figure 9-1 through Figure 9-6 list the specific document collections available and identify those documents that are available only in hard-copy (printed) format.

Solaris 7 Desktop Documentation



Note: Online documentation is available on the Solaris 7 Documentation CD except for the SUNWrmd package which is available on the Solaris 7 (SPARC Platform Edition) CD or the Solaris 7 (Intel Platform Edition) CD.

Figure 9-1 Desktop Documentation

Solaris 7 Man Page Documentation

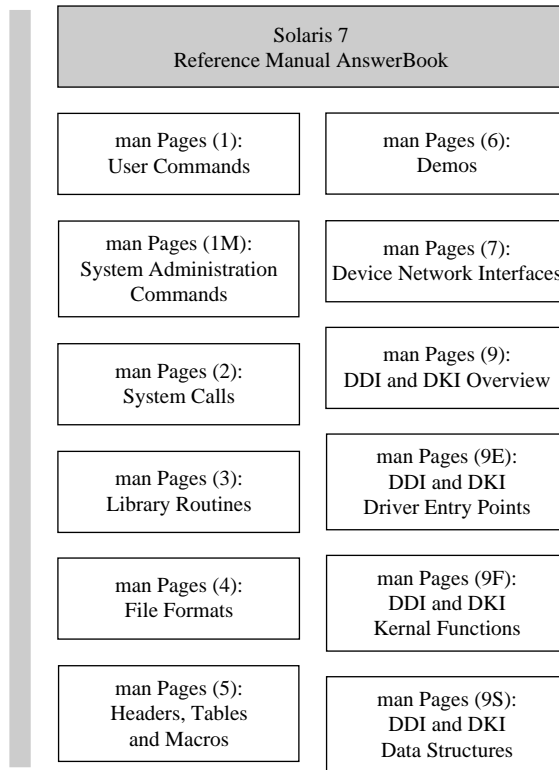


Figure 9-2 Reference Documentation (Man Pages)

Solaris 7 System Administration Documentation

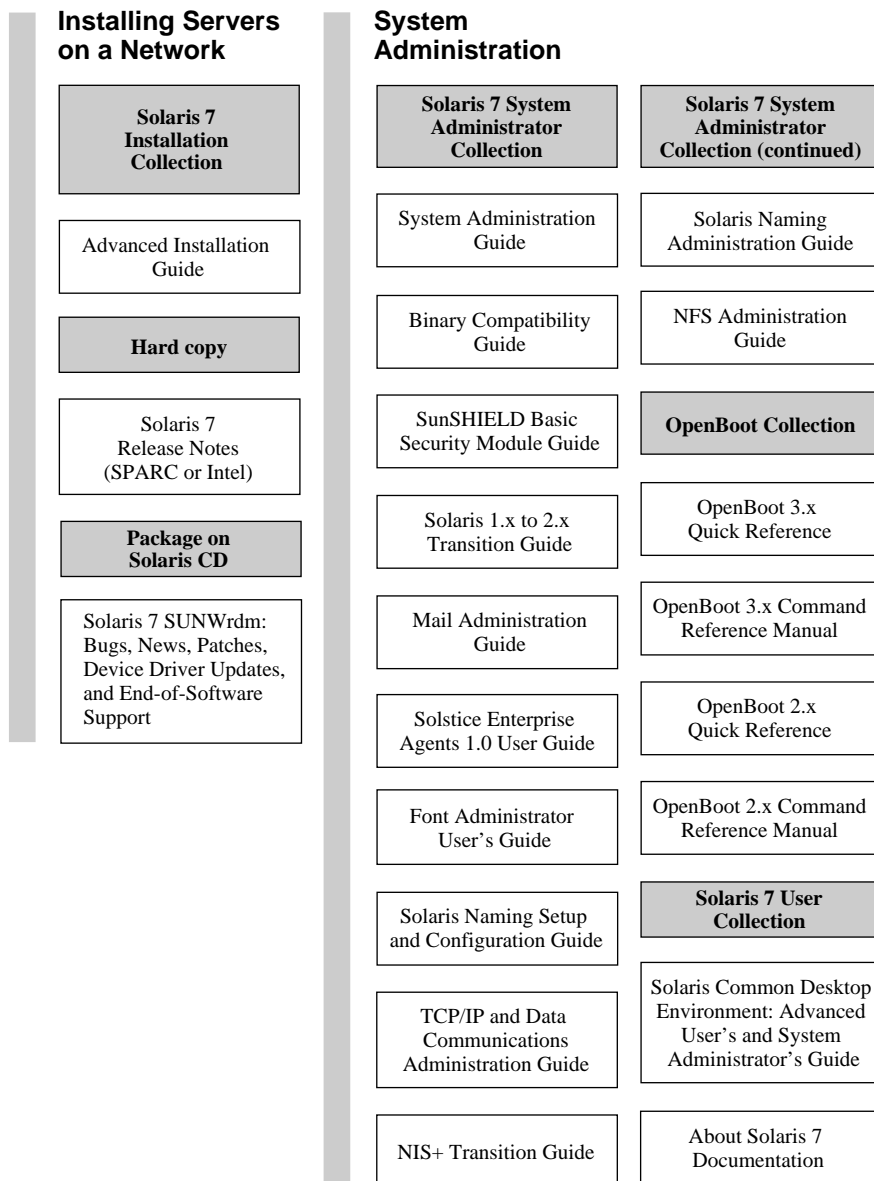


Figure 9-3 System Administration Documentation — Part 1

Solaris 7 System Administration Documentation (Continued)

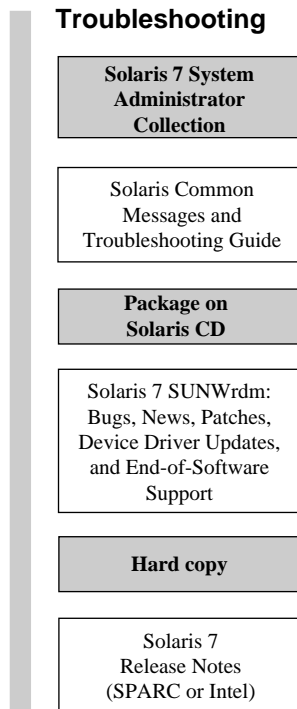


Figure 9-4 System Administration Documentation — Part 2

Solaris 7 Developer Documentation

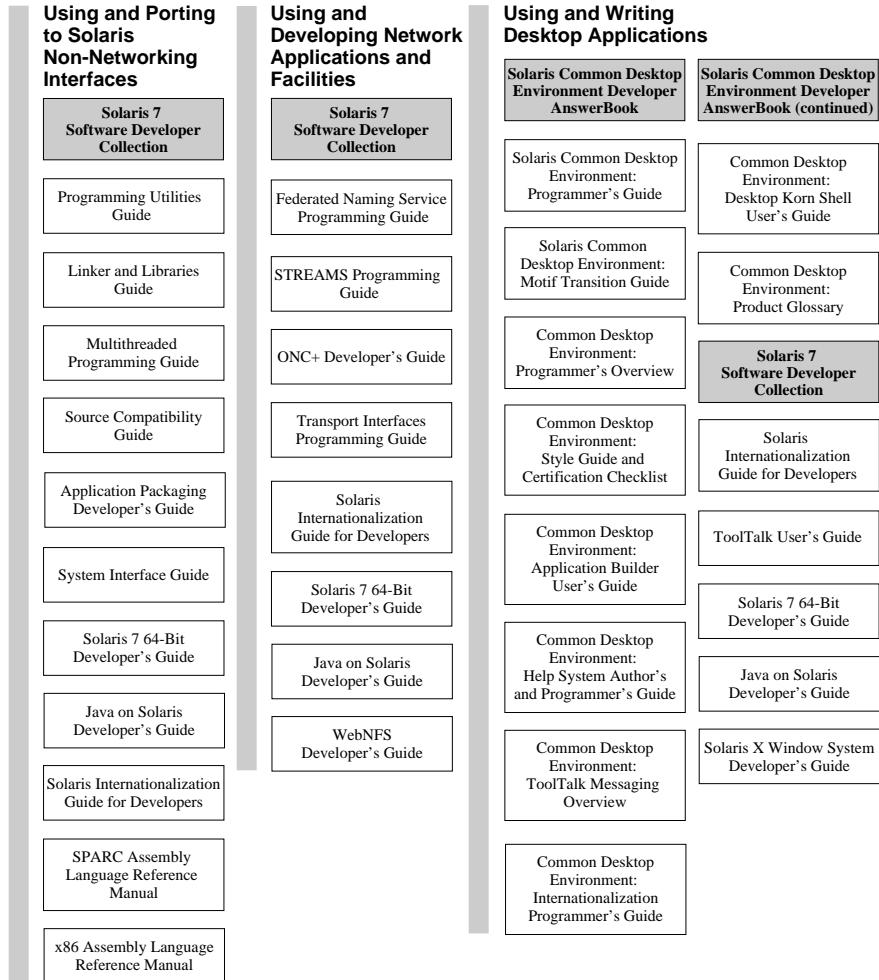


Figure 9-5 Developer Documentation — Part 1

Solaris 7 Developer Documentation (Continued)

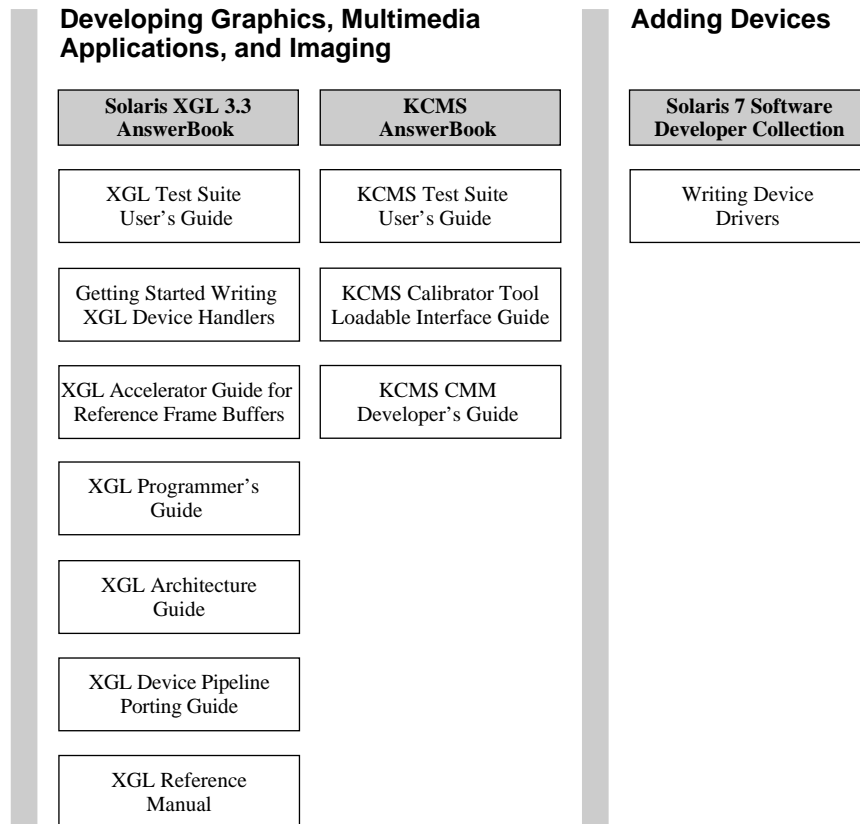


Figure 9-6 Developer Documentation — Part 2

Getting Started

To view online documentation using the AnswerBook2 system, you need an HTML 3.2-compatible browser (such as HotJava™, Netscape Navigator™, or Lynx™), and access to a documentation server (a URL that identifies a machine on which the document collections are installed and which runs a web-based server to deliver them to you). For more information, choose from the following:

- “Do I Need to Install Anything?” on page 90
- “Launching the AnswerBook2 Viewer” on page 90
- “Viewing Information” on page 91

For detailed information about using the AnswerBook2 product or administering a documentation server, use the AnswerBook2 Help once you have a documentation server to access.

Do I Need to Install Anything?

The following table indicates what you need to do or install to provide specific AnswerBook2 functionality.

TABLE 9-1 When and What to Install

If you want to do this...	Then do this...
View online documentation from your desktop (any platform, any operating environment).	Start a web browser and enter the documentation server's URL (for example, <code>http://imaserver:8888/</code>). See "Launching the AnswerBook2 Viewer" on page 90.
Automatically launch a web browser with the appropriate server URL from your desktop.	If you are running the Solaris 7 operating environment, identify a documentation server and select the AnswerBook2 option from the CDE Help menu or the OpenWindows™ Programs menu. See "Launching the AnswerBook2 Viewer" on page 90.
Enable your system (machine) to deliver (serve) documentation.	Install the documentation server software from the Solaris 7 Documentation CD. See "Installing Documentation Server Software" on page 92.
Add documentation from the Solaris 7 Documentation CD or other locations to your document server.	The document administrator is the only user authorized to perform this function. See "To Install Document Collections Onto the Server" on page 96.

Launching the AnswerBook2 Viewer

The system launches a web browser with the URL for the document server if you are running the Solaris 2.6 (or later version) operating environment and you either:

- Select the AnswerBook2 icon from the Help menu on the CDE Front Panel.
- Select AnswerBook2 from the OpenWindows Programs menu.

- Enter the `answerbook2` command at the command line.

The system determines the web browser to launch by searching your path and launching Netscape Navigator™ or the first web browser it finds. For information on how the system determines the URL for the documentation server, see “Finding a Documentation Server” on page 91.

You can also access the AnswerBook2 product from any HTML 3.2-compliant web browser. Start your web browser and enter the appropriate documentation server URL. For example, if your system administrator installed an AnswerBook2 documentation server on the system `imaserver` using the default port number, you would type the URL: `http://imaserver:8888/`

Viewing Information

Once you have launched the AnswerBook2 viewer, you click on underlined text (depending on how your browser is configured to display its links) to navigate to a book or chapter. For more information about how to navigate through the AnswerBook2 system, see the AnswerBook2 Help.

Finding a Documentation Server

When you launch the AnswerBook2 viewer from the Solaris operating environment, the software displays a list of collections installed on the default documentation server. The default server is identified using the following mechanisms in this sequence:

1. If you have defined the environment variable `AB2_DEFAULTSERVER` the AnswerBook2 viewer launches using the URL defined by that variable.

For example, you might have the following line in your `.cshrc` file:

```
setenv AB2_DEFAULTSERVER http://imaserver.eng.sun.com:8888/
```

2. If the machine from which you initiated the AnswerBook2 function is a documentation server, the AnswerBook2 viewer launches using the URL:
`http://localhost:port`

Where *port* is the port number on which the documentation server is running and defaults to **8888**.

3. If your document administrator has registered the AnswerBook2 server with FNS (Federated Naming Service), the AnswerBook2 viewer uses the URL of the registered server.

If you have no document servers available and you have Internet access, you can also access Sun’s master document server at: `http://docs.sun.com/`

Installing Documentation Server Software

This section explains the requirements you must meet and decisions you should make before you install the AnswerBook2 server software.

This section applies only to the person who is administering an AnswerBook2 server system. Users who are only viewing online documentation do not need to read this section. There is no specific installation needed to be an AnswerBook2 client.

Note - There is no client-level access control for this product. If a client machine can access the URL for a documentation server, it can view the documents on that server.

This section contains the following information:

- “Before Installing Server Software” on page 92
- “To Install the AnswerBook2 Server Software” on page 94
- “To Install Document Collections Onto the Server” on page 96
- “Registering the Server” on page 98
- “To Run a Documentation Server From the Solaris 7 Documentation CD” on page 100
- “Running the AnswerBook2 Server as a CGI Process” on page 103

For detailed information about administering a documentation server, use the online Help available from the AnswerBook2 interface once you have installed the documentation server software.

Before Installing Server Software

Before you start the installation process, verify that your system meets the requirements listed in “Hardware and Software Requirements” on page 92 and decide where you want to install the software as explained in “Installation Choices” on page 93.

Hardware and Software Requirements

Before you start the installation process, verify that the systems on which you plan to install AnswerBook2 server software meet the hardware and software requirements listed in Table 9-2 and Table 9-3.

TABLE 9-2 Hardware and Software Requirements

Component	Requirement
Documentation server system hardware	SPARCstation™ 2 computer or higher (SPARCstation 5 computer recommended) Intel-based personal computer
Operating environment	Solaris 7 (for SPARC or x86, as appropriate)
Admin GUI and AnswerBook2 client viewer	Any HTML 3.2-compliant browser, such as Netscape Navigator, HotJava, or Lynx

TABLE 9-3 Disk Space Requirements Table

Directory Path	Description	Space
<code>/usr/lib/ab2/</code>	Contains executable files, server processing files, library files, and graphics and document source files for the product interface.	26.0 Megabytes
<code>/var/log/ab2/</code>	Contains catalog files and log files, if logging functions are enabled.	5.0 Megabytes (recommended – grows as server is used)
<code>/etc/init.d/ab2mgr</code>	Server start-up file	0.01 Megabytes

In addition, you need to set aside some amount of disk space (600 Megabytes recommended) for the actual book files. The exact amount of space depends on the specific collections. For a list of collections available on the Solaris 7 Documentation CD, see the `README` file located on that CD.

Installation Choices

Before you install the AnswerBook2 server software, you should consider your installation choices:

- Install everything on one system

The AnswerBook2 server software and Solaris 7 document collections are on the Solaris 7 Documentation CD. If you install both parts of the server product on a

single system, when you finish the installation process and start the server, it will be ready to serve documents to all clients. See “To Install the AnswerBook2 Server Software” on page 94 for more information.

- **Install server and documentation on separate systems**

You can install the documentation server software on one system and point to document collections that are located on a different system. You might want to do this if you have minimal space available on your server’s system or if you have existing collections on another system. To do this, you need to add each collection manually to the server’s database and the **Scan for Locally Installed Collections** function will not find these collections. See “To Install the AnswerBook2 Server Software” on page 94 for more information.

- **Run a server from the CD**

If you are operating in a non-networked environment (stand-alone) or you only occasionally view the online documentation, you can run the AnswerBook2 server directly from the Solaris 7 Documentation CD. A documentation server run from the CD tends to be slower than a documentation server installed on your system. Do not use this approach if you expect other users to access this documentation server. For more information, see “To Run a Documentation Server From the Solaris 7 Documentation CD” on page 100.

▼ To Install the AnswerBook2 Server Software

To install documentation server software, you can use the point-and-click interface available from the Solaris Web Start™ utility, or you can use standard installation utilities, such as `pkgadd`.

- 1. Insert the Solaris 7 Documentation CD into your CD-ROM drive.**

The Volume Manager should automatically mount the CD.

- 2. If you choose to use the Solaris Web Start utility to install your products, double-click on the `installer` icon, follow the instructions on the Web Start screens, and go to Step 6 on page 95.**

The Web Start utility provides pre-selected groups of packages for you to install. Follow the instructions on the Web Start screens to continue.

- 3. If you choose to use the `pkgadd` utility or the `swmtool` utility, log in as `superuser` on the documentation server machine.**

For example, enter the following at the command line:

```
% su -
```

4. Change directory to the location of the documentation server packages.

For example, you might enter a command similar to the following to go to the location of the server software packages for a SPARC server:

```
# cd cdrom/Solaris_2.7_Doc/sparc/Product/
```

Where *cdrom* is the mount-point for the CD-ROM device and defaults to:
/cdrom/sol_2_7_doc

5. Launch the installation utility and select the server software packages.

For example, use the following command to launch the `pkgadd` utility:

```
# pkgadd -d .
```

Select these server software packages:

- `SUNWab2r` (0.25 Megabytes) – Installs in root partition and provides configuration and start-up files.
- `SUNWab2s` (1.00 Megabytes) – Provides shared files for performing document processing.
- `SUNWab2u` (26.00 Megabytes) – Provides executable and back-end processing files for server and administration functions.

6. Start up the server, if needed.

Installing the packages should cause the server to start up on the default port of 8888. If it does not start, use the following command to start it:

```
# /usr/lib/ab2/bin/ab2admin -o start
```

7. Install the book collections.

Your documentation server cannot do its job if no documents are installed for it to serve. You can install collections from the Solaris 7 Documentation CD or from other locations, such as existing document collections or collections that come on other CDs. For more information about installing document collections, see “To Install Document Collections Onto the Server” on page 96.

8. (Optional) Change configuration files and create links to run the documentation server as a CGI process on an existing `httpd` server.

If you already run an `httpd` server on your system, you can run the documentation server as a CGI process on that server. You must install the

standard documentation server software, then change several configuration files and create links to run the documentation server as a CGI process. For more information, see “Running the AnswerBook2 Server as a CGI Process” on page 103.

9. (Optional) Register the server.

If you want other users to automatically find your documentation server through Federated Naming Service (FNS), you need to register the server. To register your server, use the following command:

```
# /usr/lib/ab2/bin/ab2regsvr server_url
```

Where *server_url* is the fully qualified URL to get to this server (for example: <http://imaserver.eng.sun.com:8888/>). See “Registering the Server” on page 98 for more information.

▼ To Install Document Collections Onto the Server

Your documentation server cannot do its job if no documents are installed for it to serve. You can install collections from the Solaris 7 Documentation CD or from other locations, such as existing document collections or collections that come on other CDs.

To install document collection packages from the Solaris 7 Documentation CD, you can use the point-and-click interface available from the Solaris Web Start utility, or you can use standard installation utilities, such as `pkgadd`. To install document collections:

1. Insert the Solaris 7 Documentation CD into your CD-ROM drive.

The Volume Manager should automatically mount the CD.

2. If you choose to use the Solaris Web Start utility to install your products, double-click on the `installer` icon, follow the instructions on the Web Start screens, and go to Step 6 on page 97.

The Web Start utility provides pre-selected groups of packages for you to install. Follow the instructions on the Web Start screens to continue.

3. If you choose to use the `pkgadd` utility or the `swmtool` utility, log in as `superuser` on the documentation server machine.

For example, enter the following at the command line:

```
% su -
```

4. Change directory to the location of the document collection packages.

For example:

```
# cd cdrom/Solaris_2.7_Doc/common/Product/
```

Where *cdrom* is the mount-point for the CD-ROM device and defaults to `/cdrom/sol_2_7_doc`.

5. Launch the installation utility and select document collection packages to install.

For example, to launch the `pkgadd` utility:

```
# pkgadd -d .
```

For a detailed list of document collections included on the Solaris 7 Documentation CD, see the `README` file located on that CD.

6. The document collection packages included on the Solaris 7 Documentation CD include a post-install script that add the collections to the server's database and restart the server.

If you install collection packages from any other location besides the Solaris 7 Documentation CD, you might need to use either the Admin GUI's **Add Collection to List** function or the `ab2admin -o add_coll` command to add these collections to the documentation server's database.

If you have document collections already installed on your system, you can use either the Admin GUI's **Scan for Locally Installed Collections** function or the `ab2admin -o scan` command to have them found and added to the documentation server's database. This function only works for locally-installed packages.

To serve document collections located on some other system, use the **Add Collection to List** function or the `ab2admin -o add_coll` command and provide the full path name to the `ab_cardcatalog` or `collinfo` file. For example, if the documentation server is **imaserver** and you want it to serve document collections located on the system **elsewhere**, you might use the following command:

```
# /usr/lib/ab2/bin/ab2admin -o add_coll -d /net/elsewhere/books/SUNWdtad/collinfo
```

Registering the Server

To give users the ability to locate your documentation server without knowing the URL, you can register the name of your server with the FNS system. Users can still access unregistered documentation servers if they know the URL.

How you register your server depends on two things:

- Your familiarity with FNS commands

If you are familiar with standard FNS commands, such as `fnbind`, you can use those commands to register the server. However, to simplify the registration process, the `/usr/lib/ab2/bin/ab2regsvr` command can register your server for you. For more information, see “Registering Your Server Using the `ab2regsvr` Command” on page 98 and “Registering Your Server Using Standard FNS Commands” on page 99.

- What name service you are using

NIS+ (*Network Information Service Plus*) is the primary name service used for Solaris 2.6 and later operating environments. If your system is using NIS+ and you have administrative privileges, you can register the server while logged in on either the NIS+ master or NIS+ client system.

NIS (*Network Information Service*) was the standard name service provided in SunOS 4.x (Solaris 1.x) environments. If your system is using NIS, you must be logged in as `root` on the NIS master system to register the documentation server.

The AnswerBook2 product also works with a file system-defined naming system (*files*) in which all names are manually entered into data files. These files are stored in the directory `/var/fn/`. In this case, to register the server, you must have `root` access to the system and registration applies only on the machine on which it is registered. Other machines cannot see a server registered under a file system mechanism.

Registering Your Server Using the `ab2regsvr` Command

To register your server, use the `ab2regsvr` command. The `ab2regsvr` command looks at your system's configuration and sets up the appropriate name space for your server.

To register your server, type:

```
# /usr/lib/ab2/bin/ab2regsvr server_url
```

Where *server_url* is the fully qualified URL to get to this server (for example: `http://imaserver.eng.sun.com:8888/`).

The `ab2regsvr` command also provides some other options you might find useful:

- To view a list of registered AnswerBook2 server URLs:

```
# /usr/lib/ab2/bin/ab2regsvr -l
```

- To remove a registered server from the list:

```
# /usr/lib/ab2/bin/ab2regsvr -d
```

- To change the URL for the currently registered AnswerBook2 server:

```
# /usr/lib/ab2/bin/ab2regsvr -r server_url
```

Where *server_url* is the new URL to get to this server (for example: `http://aserver.eng.sun.com:8888/`). This replaces any existing URLs with the specified URL.

For more information about the `ab2regsvr` command, see the `ab2regsvr(1m)` *man page*.

Registering Your Server Using Standard FNS Commands

If you want to use FNS commands to register your server and you already have FNS installed at your location, use the following command to register the specified URL as a documentation server for your organization (domain):

```
# fnbind -r thisorgunit/server/answerbook2 onc_answerbook2 \ onc_addr_answerbook2 server_url
```

Where *server_url* is the fully qualified URL to get to this server (for example: `http://imaserver.eng.sun.com:8888/`).

To find out what servers are currently registered, use the following command:

```
% fnlookup -v thisorgunit/service/answerbook2
```

This returns a list of registered servers that looks similar to the following:

```
Reference type: onc_answerbook2
Address type: onc_addr_answerbook2
length: 19
data: 0x68 0x74 0x74 0x70 0x3a 0x2f 0x2f 0x61 0x6e 0x73 http://ans
      0x77 0x65 0x72 0x73 0x3a 0x38 0x38 0x38 0x38 wers:8888
```

In this example, the registered server is `http://answers:8888/`.

If you get a response similar to the following, then no documentation servers are registered with FNS:

```
Lookup of 'thisorgunit/service/answerbook2' failed: \  
Name Not Found: 'answerbook2'
```

For more information about FNS, including how to install it, see the FNS documentation.

Name Services and AnswerBook2 Users

Rather than using the described name services to find a documentation server, the user can define a default AnswerBook2 server using the environment variable `AB2_DEFAULTSERVER`. For example, the user could have the following line in the `.cshrc` file:

```
setenv AB2_DEFAULTSERVER http://imaserver.eng.sun.com:8888
```

If the user has not defined an environment variable, when the user launches the AnswerBook2 product from the desktop, the product looks to see if the system from which it was launched is running a documentation server. If so, it launches using the URL: `http://localhost:port`, where *port* defaults to `8888`.

If the user has not defined an environment variable and the current system is not a documentation server, when the user launches AnswerBook2 from the desktop, the system performs an `fnlookup thisorgunit/service/answerbook2` command to find out what documentation servers are available. It then chooses one of those servers and launches the AnswerBook2 browser using that server name for the URL.

▼ To Run a Documentation Server From the Solaris 7 Documentation CD

1. Insert the Solaris 7 Documentation CD into your CD-ROM drive.
2. Make sure you are logged in as superuser.

```
% su -
```

3. Change the directory to (or bring up File Manager and go to) the top level of the CD-ROM volume.

This should look similar to the following location:

```
/cdrom/sol_2_7_doc/
```


This directory contains one directory, a README file, the `installer` utility, and the `ab2cd` script. Use the `ab2cd` script to run the documentation server directly from the CD.

4. Type the following command:

```
# ./ab2cd
```

5. Access the documentation server using the URL:

```
http://server:8888/
```

Where *server* is the name of the machine to which the CD-ROM drive is attached. Note that a documentation server run from the CD always runs on port 8888.

6. If document collections are installed already on your server machine and you want the CD-driven server software to recognize those collections, use the following command: .

```
# ab2cd -s
```

This form of the command causes the CD-driven server software to look for other collections installed on this system and add them to its database.

7. To stop running the server from the CD, type:

```
# /cdrom/sol_2_7_doc/ab2cd stop
```



Caution - Running the documentation server directly from the CD tends to be slow. Do not use this approach if you expect other users to access this documentation server.

Important Notes When Running the AnswerBook2 Server From the CD

Keep these things in mind when you run the server from the CD:

- The AnswerBook2 server always runs on port 8888 when run from the CD. If you already have an AnswerBook2 server running on your system using the default port (8888), the `ab2cd` script will display the following message:

```
A document server is already running on this system as server:8888.
```

```
Please shut down the current server before running the ab2cd command.
```

Use the following command to shut down the existing server:

```
# /usr/lib/ab2/bin/ab2admin -o stop
```

- Always use `ab2cd stop` to stop the server running from the CD. Do not use `/etc/init.d/ab2mgr stop` to stop the CD-based server.

The `ab2cd stop` command stops the AnswerBook2 server process and cleans up all files in the `/tmp/ab2/` and `/tmp/ab2cd_config/` directories. The `/etc/init.d/ab2mgr stop` command stops all server processes, but does not clean up the files in the `/tmp/ab2/` and `/tmp/ab2cd_config/` directories.

Notes About Running Two Servers

To run two AnswerBook2 servers (one on your system, one from the CD), keep these rules in mind:

- Starting up the server
 - The `/etc/init.d/ab2mgr start` command always starts the server on your system.
 - The `ab2cd` command always starts the server from the CD.
- Shutting down the server
 - Always use the `ab2cd stop` command to stop the server running from the CD.
 - To stop both servers, first use the `ab2cd stop` command to stop the server running from the CD, then use either `/etc/init.d/ab2mgr stop` or `/usr/lib/ab2/bin/ab2admin -o stop` to stop the server running on your system.

Running the AnswerBook2 Server as a CGI Process

By default, the AnswerBook2 documentation server runs as an NSAPI plug-in on top of the httpd server that is included in the SUNWab2u package. Because the AnswerBook2 server complies with standard web protocols, you can choose to run the documentation server as a CGI (Common Gateway Interface) process on top of some other web server already on your system (for example, Netscape Server or Sun Web Server).

Be aware that the following functions will not work if you change from the default AnswerBook2 web server:

- `/usr/lib/ab2/bin/ab2admin -o start`
- `/usr/lib/ab2/bin/ab2admin -o stop`
- `/etc/init.d/ab2mgr start`
- `/etc/init.d/ab2mgr stop`
- restart from the Admin GUI

You will need to use your server's start and stop functions instead.

▼ To Change To a CGI-based Server

Because specific details differ by web server, this procedure describes the general steps you need to follow to use a CGI-based web server rather than the default (NSAPI plug-in) server. Specific examples are included below for Sun Web Server and Netscape Server.

1. Shut down the AnswerBook2 server if it is running.

Use one of the following commands:

```
# /usr/lib/ab2/bin/ab2admin -o stop
# /etc/init.d/ab2mgr stop
```

2. Edit your web server's configuration file and make icons available.

Your web server's documentation should explain specific details, such as where to find the configuration file. The entry `/icons/` should point to `/usr/lib/ab2/data/docs/icons/`.

If `/icons/` is already being used, link all files in `/usr/lib/ab2/data/docs/icons/` to the existing `/icons/` directory.

3. Link AnswerBook2 Help documents to the current documentation root directory.

Go to your web server's documentation root directory and create a soft link to `/usr/lib/ab2/data/docs/`.

4. Make AnswerBook2 cgi-bin files available to your server.

Go to your web server's `cgi-bin` directory and create soft links to the following:

```
/usr/lib/ab2/bin/cgi/admin  
/usr/lib/ab2/bin/cgi/nph-dweb  
/usr/lib/ab2/bin/cgi/gettransbitmap  
/usr/lib/ab2/bin/cgi/getepsf  
/usr/lib/ab2/bin/cgi/getframe  
/usr/lib/ab2/bin/cgi/ab2srwrap
```

5. Edit your web server's configuration file and map `/ab2/` to call AnswerBook2 cgi.

Your web server's documentation should explain specific details, such as where to find the configuration file. You need to change the entry for `/ab2/` to `/usr/lib/ab2/bin/cgi/nph-dweb/ab2/`.

6. Edit the AnswerBook2 administration configuration file.

You need to edit the `/usr/lib/ab2/bin/cgi/nph-dweb` file and change the entries for `servertime`, `errorlog`, and `accesslog`.

▼ To Run an AnswerBook2 Server as a CGI Process on Sun WebServer

By default, the Sun Web Server configuration file is `/etc/http/httpd.conf` and files are in `/var/http/demo/`. If you did not install SUNWab2u in the default location (`/usr/`), all paths that begin `/usr/lib/ab2/` should be the path where you installed the files (for example, `/usr2/lib/ab2/`).

1. Edit the `/etc/http/httpd.conf` file and put the following line in the `server` section of the file:

```
map /icons /usr/lib/ab2/data/docs/icons
```

When you have made this change, use the following command to restart the SWS server:

```
# /etc/init.d/httpd start
```

To verify your changes, enter the following URL in your web browser to see a Help icon:

```
http://localhost:port/icons/ab2_help.gif
```

Where *port* is the port number on which your documentation server is running and defaults to 8888.

2. Go to the `/var/http/demo/public/` directory and put in the following soft link:

```
# ln -s /usr/lib/ab2/data/docs/Help Help
```

To verify your changes, enter the following URL in your web browser to see a Help icon:

```
http://localhost:port/Help/C/Help/books/Help/figures/ab2_help.gif
```

Where *port* is the port number on which your documentation server is running and defaults to 8888.

3. Go to the `/var/http/demo/cgi-bin/` directory and create the following soft links:

```
# ln -s /usr/lib/ab2/bin/cgi/admin  
# ln -s /usr/lib/ab2/bin/cgi/nph-dweb  
# ln -s /usr/lib/ab2/bin/cgi/gettransbitmap  
# ln -s /usr/lib/ab2/bin/cgi/getepsf  
# ln -s /usr/lib/ab2/bin/cgi/getframe  
# ln -s /usr/lib/ab2/bin/cgi/ab2srwrap
```

To verify your changes, enter the following URL in your web browser to see the AnswerBook2 library page:

```
http://localhost:port/cgi-bin/nph-dweb/ab2
```

Where *port* is the port number on which your documentation server is running and defaults to 8888.

4. **Edit the `/etc/http/httpd.conf` file and add the following entry in the host section of the file:**

```
map /ab2 /var/http/demo/cgi-bin/nph-dweb/ab2 cgi
```

Restart the SWS server using the following command:

```
# /etc/init.d/httpd start
```

To verify your changes, enter the following URL in your web browser to see the AnswerBook2 library page:

```
http://localhost:port/ab2
```

Where *port* is the port number on which your documentation server is running and defaults to **8888**.

5. **Edit the `/usr/lib/ab2/bin/cgi/nph-dweb` file and change the following entries:**

```
setenv servertime sws
setenv errorlog
setenv accesslog /var/http/logs/http.elf.1
```

▼ To Run an AnswerBook2 Server as a CGI Process on Netscape Server

For this example, the Netscape Server configuration file is `/ul/netscape/suitespot/httpd-threads1/config/obj.conf` and files are in `/ul/netscape/suitespot/docs/`. If you did not install SUNWab2u in the default location (`/usr/`), all paths that begin `/usr/lib/ab2/` should be the path where you installed the files (for example, `/usr2/lib/ab2/`).

1. **Edit the `/ul/netscape/suitespot/httpd-threads1/config/obj.conf` file and add the following line:**

```
NameTrans fn="pfx2dir" from="/icons" dir="/usr/lib/ab2/data/docs/icons"
```

To verify your changes, restart the Netscape Server. Then, enter the following URL in your web browser to see a Help icon:

```
http://localhost:port/icons/ab2_help.gif
```

2. **Go to the** `/ul/netstcape/suitespot/docs/` **directory and put in the following soft link:**

```
# ln -s /usr/lib/ab2/data/docs/Help Help
```

To verify your changes, enter the following URL in your web browser to see a Help icon:

```
http://localhost:port/Help/C/Help/books/Help/figures/ab2_help.gif
```

Where *port* is the port number on which your documentation server is running and defaults to **8888**.

3. **Go to the** `/ul/netstcape/suitespot/cgi-bin/` **directory and create the following soft links:**

```
# ln -s /usr/lib/ab2/bin/cgi/admin  
# ln -s /usr/lib/ab2/bin/cgi/nph-dweb  
# ln -s /usr/lib/ab2/bin/cgi/gettransbitmap  
# ln -s /usr/lib/ab2/bin/cgi/getepsf  
# ln -s /usr/lib/ab2/bin/cgi/getframe  
# ln -s /usr/lib/ab2/bin/cgi/ab2srwrap
```

To verify your changes, enter the following URL in your web browser to see the AnswerBook2 library page:

```
http://localhost:port/cgi-bin/nph-dweb/ab2
```

Where *port* is the port number on which your documentation server is running and defaults to **8888**.

4. **Edit the** `/ul/netstcape/suitespot/httpd-threads1/config/obj.conf` **file and add the following entry:**

```
NameTrans fn='pfx2dir' from='/ab2'  
dir='/ul/netnscape/suitespot/cgi-bin/nph-dweb/ab2' name='cgi'
```

To verify your changes, restart the Netscape server and enter the following URL in your web browser to see the AnswerBook2 library page:

```
http://localhost:port/ab2
```

Where *port* is the port number on which your documentation server is running and defaults to **8888**.

5. **Edit the /usr/lib/ab2/bin/cgi/nph-dweb file and change the following entries:**

```
setenv servertype netscape  
setenv errorlog /ul/netnscape/suitespot/httpd-threads1/logs/errors  
setenv accesslog /ul/netnscape/suitespot/httpd-threads1/logs/access
```

Solving AnswerBook2 Problems

Table 9-4 lists some areas of known confusion in the AnswerBook2 product and provides suggestions for how to respond to them.

TABLE 9-4 Possible Server Problems

For this issue...	Consider this...	See also...
<p>Browser proxy error</p>	<p>Edit the <code>/usr/lib/ab2/dweb/data/config/dwhttpd.cfg</code> file and change the host name to <code>hostname.domain</code>.</p> <p>For example, instead of the following line:</p> <pre>set ServerHost imaserver ;#</pre> <p>Use this line:</p> <pre>set ServerHost imaserver.eng.sun.com ;#</pre> <p>Then, restart the documentation server.</p>	<p>If the problem persists, try turning off the proxies on the web browser.</p>
<p>Browser errors indicating documentation server is not responding</p>	<p>If the documentation server is not responding, restart it.</p>	<p>For information on stopping and starting the server, see the AnswerBook2 Help.</p>
<p>Error 404, File not Found when trying to access the documentation server</p>	<p>A server process is running, however the server software has been removed. Reinstall the server software.</p>	<p>For information on installing the software, see "Installing Documentation Server Software" on page 92.</p>
<p>User indicates that library page displays only the navigation bar and no document collections</p>	<p>Verify that the collections template file (<code>/usr/lib/ab2/dweb/data/config/ab2_collections.template</code>) does not contain any empty or duplicate entries.</p>	<p>If fixing the template file does not correct the problem, you might need to reinstall document collections or server software. For information about installing the software, see "To Install the AnswerBook2 Server Software" on page 94.</p>
<p>User reports seeing red text and the word "BUG" in a book (or several books)</p>	<p>The book's source contains markup tags that AnswerBook2 does not recognize and the <code>AB2_DEBUG</code> environment variable is set to "1" on the server.</p>	<p>To turn off the bug display, set the <code>AB2_DEBUG</code> environment variable to "0," stop the server and start the server.</p> <p>Contact whoever provided the book to get the markup fixed.</p>

TABLE 9-4 Possible Server Problems (continued)

For this issue...	Consider this...	See also...
Unable to access administrative functions on documentation server	The documentation server uses access control mechanisms to identify users who can perform administrative functions. The AnswerBook2 administration tools allow the document administrator for the server machine to add and remove administrative users for the server and change their passwords.	To add or remove administrative users for your server, see the AnswerBook2 Help. If you need access to another server, contact the document administrator for that server.
Cannot perform administrative commands from AnswerBook2 Administration GUI (browser interface)	Certain functions do not work from the Admin GUI because of permission issues. Try to perform the same function from the <code>ab2admin</code> command-line interface.	For information about the command line options, see the <code>ab2admin(1m)</code> <i>man</i> page.
A Scan for Locally Installed Collections function does not list document collections that are installed on a local mount point	Verify that the directory into which the collections were installed has <i>read</i> access set for <i>others</i> .	
You added an AnswerBook1 collection, but users do not see it in their libraries	Verify that the information in <code>/var/log/ab2/catalog/ab1_cardcatalog</code> is correct.	This means something is wrong with the collection's data in the <code>ab_cardcatalog</code> file.
You see the message <code>Failed to add collection.</code> when trying to add a collection through the Admin GUI	Verify that the path to the collection's <code>collinfo</code> or <code>ab_cardcatalog</code> file is correct.	
Using the <code>restart</code> command to restart the documentation server failed or did not produce the expected results	In some instances, the <code>restart</code> command does not work correctly.	Use the <code>stop</code> and <code>start</code> commands instead.
Document collections appear to be corrupted and need to be reinstalled	Use the <code>ab2admin -o del_coll</code> function or Delete Collections from List in the Admin GUI to remove these collections from the documentation server's database. Then, use <code>pkgrm</code> to remove them from the server before installing the new packages.	For more information about removing collections, see the AnswerBook2 Help.

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