Solaris 7 (Intel Platform Edition) Release Notes

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Contents

Preface vii

1. Installation Issues 1

Solaris Web Start Bugs 1

Cannot Move The Root Partition (4046659) 2

Products May Not Use All Reserved Space (4059182) 2

The Root (/) Partition Extends Beyond HBA Cylinder 1023 (4062008) 2

Interactive Installation Issues 2

Solaris `dtlogin` Screen 2

`dtlogin` Notes For System Administrators 3

Interactive Installation Bugs 3

Installation Fails With A False Non-Mountable File System Error (4164303) 3

TotalNET Advanced Server (SunLink) Drivers Cause Panic After A Reboot (4121961) 3

Installation Bugs That Occur Before the Start of an Interactive Installation 4

Installation Bugs That Occur During an Interactive Installation 4

Installation Bugs You Need to Know About Before the Start of an Upgrade 6

Installation Bugs That May Occur During an Upgrade 6

2. Late-Breaking Solaris Runtime Issues 9

Localization Bugs 9

Cannot Add a New User With Solstice™ AdminTools in Arabic or Hebrew Locales (4159527) 9

Some Custom Arabic TrueType Fonts May Cause an Intel XServer To Crash (4161002) 10

Arabic 16–Bit Proportional Fonts Clip Characters (4167851) 10

Static Desktop Text Is Not Enabled For Complex Text Layout (4170194) 10

OW Is Not Supported As a Desktop Option In Some Locales 10

Hardware Bugs 12

`ncrs:` Mismatch of Narrow and Wide SCSI Operations on Intel N440BX Motherboard (4165916) 12

`kdmconfig`: JumpStart Installation Fails With `pnp` Monitor (4166376) 13

Security Bugs 13

Security Vulnerability In `ufsdump` And `ufsrestore` (4132365) 13

3. Late-Breaking News 15

Solaris Name Change 15

Euro Unit Support 16

Arabic and Hebrew Support 16

No Support for 3.3V 17

4. End-of-Support Statements 19

Future End-of-Software Support Statements 19

HotJava Browser 19

5. Documentation Issues 21

Documentation Errata 21

Adding `SUNWhinst` To Support SunOS Release 4.x on a Solaris 7 Server 21

Euro Currency Support 21

Additional Devices for x86–Based Systems 22
SunOS 5.7 **ncrs**(7D) man page Is Out-Of-Date 22

Preface

The *Solaris™ 7 (Intel Platform Edition) Release Notes* contain installation problem details and other information that were not available until immediately before the release of the Solaris 7 operating environment and arrived too late to be included in the `SUNWrdm` package that is resident on the Solaris CD. This document complements the information that is available in the `SUNWrdm` package, the online release notes except for the information in Chapter 1.

Chapter 1 supersedes the information in the `installation_bugs` file that is part of the online release notes.

You can access the online release notes (the `SUNWrdm` package) as follows:

- When booting from the Solaris 7 CD, information about this release can be found in the directory:

  `/cdrom/sol_7_x86/s2/Solaris_2.7/Docs/release_info/C`

- The default installed location for information about this release can be found in the directory:

  `/usr/share/release_info/Solaris_2.7/C`

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.

Who Should Use This Book

These notes are for users and system administrators who are installing and using Solaris 7 software.

If you are using any Solaris locale other than the C / POSIX locale, be sure to check to locale-specific bugs in the “Localization Bugs” on page 9.

How This Book is Organized

- Chapter 1 lists installation problems and installation news that arrived too late for publication in other documents. When booting from the Solaris 7 CD, the `installation_bugs` file is located in the directory:

  /cdrom / sol_7_x86 / s2 / Solaris_2.7 / Docs / release_info / C

  The installed location for the `installation_bugs` file is the directory:

  `/usr/share/release_info/Solaris_2.7/C`

- Chapter 2 describes non-installation problems that arrived too late for publication in other documents. When booting from the Solaris 7 CD, the `runtime_bugs` file is located in the directory:

  `/cdrom/sol_7_x86/s2/Solaris_2.7/Docs/release_info/C`

  The installed location for the `runtime_bugs` file is the directory:

  `/usr/share/release_info/Solaris_2.7/C`

- Chapter 3 lists the new Solaris features that arrived too late to be included in the “What’s New: A Closer Look” of the *Solaris 7 (Intel Platform Edition) Installation Library* or the `new_features` file in the `SUNWrdm` package located on the Solaris CD.

  When booting from the Solaris 7 CD, the `new_features` file is located in the directory:

  `/cdrom/sol_7_x86/s2/Solaris_2.7/Docs/release_info/C`

  The installed location for the `new_features` file is the directory:

  `/usr/share/release_info/Solaris_2.7/C`

- Chapter 4 provides statements about end-of-support for certain software features and some hardware products that arrived too late for publication in the `eof` file of the `SUNWrdm` package on the Solaris CD. When booting from the Solaris 7 CD, the `eof` file is located in the directory:

  `/cdrom/sol_7_x86/s2/Solaris_2.7/Docs/release_info/C`

  The installed location for the `eof` file is the directory:

  `/usr/share/release_info/Solaris_2.7/C`

- Chapter 5 describes documentation issues that arrived too late for publication in the Solaris product documents.

Other software that may be included can have installation issues or important news that arrived too late for publication. Be sure to read any separate Release Notes of any additional software products that may be selected for installation.

All Solaris bug IDs are enclosed in () parenthesis.

Related Books

You may need to refer to the following manuals when installing Solaris software:

- *Solaris 7 (Intel Platform Edition) Start Here*
- *Solaris 7 (Intel Platform Edition) Installation Library*
- *Solaris 7 (Intel Platform Edition) Device Configuration Guide*
- *Solaris 7 (Intel Platform Edition) Hardware Compatibility List*

Ordering Sun Documents

The SunDocs℠ program provides more than 250 manuals from Sun Microsystems, Inc. If you live in the United States, Canada, Europe, or Japan, you can purchase documentation sets or individual manuals using this program.

For a list of documents and how to order them, see the catalog section of the SunExpress™ Internet site at `http://www.sun.com/sunexpress`.

Contacting Customer Support

If you have any support issues, call your authorized service provider. For further information about support, see `http://access1.sun.com`. To find out more about Sun Microsystems, Inc., see `http://www.sun.com`.

Accessing Sun Documentation Online

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

What Typographic Changes Mean

TABLE P–1 Typographic Conventions

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

Shell Prompts in Command Examples

TABLE P–2 Shell Prompts

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

CHAPTER 1

Installation Issues

This chapter describes known problems relating to the installation of the Solaris 7 software environment.

Note - The information in this chapter supersedes any information listed in the `installation_bugs` file that is part of the `SUNWrdm` package on the Solaris 7 CD. If you boot from the Solaris 7 CD, the `installation_bugs` file is located in the directory:

`/cdrom/sol_7_x86/s2/Solaris_2.7/Docs/release_info/C`

The default installed location for the `installation_bugs` file is located in the directory:

`/usr/share/release_info/Solaris_2.7/C`

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.

Solaris Web Start Bugs

This section only describes known installation bugs that may occur when using Solaris Web Start, the browser-based program that enables you to install both the Solaris software and copackaged software. These problems do not occur when using the Solaris Interactive Installation program.

Cannot Move The Root Partition (4046659)

You can choose a system disk in Solaris Web Start but you cannot move the root partition off the system disk afterwards.

Workaround: If you need to do this, use the Solaris Interactive Installation program instead of Solaris Web Start.

Products May Not Use All Reserved Space (4059182)

Solaris Web Start reserves disk space based on the total requirements of all the products that you install. If you check disk space allocation after installing but before using the products, you may find a substantial amount of apparently unused space. Some of this space may be taken up when you run the software; some of it may remain unused.

Workaround: If you want to allocate less total disk space than Solaris Web Start requires, use the Solaris Interactive Installation program instead.

The Root (/) Partition Extends Beyond HBA Cylinder 1023 (4062008)

If a manual file system layout is used in Solaris Web Start on IDE systems, an error message may display after the start of an installation because too much space has been allocated in the root (/) partition.

Workaround: Restart Solaris Web Start and use the Automatic File System Layout.

Interactive Installation Issues

Solaris `dtlogin` Screen

The Solaris 7 as well as the Solaris 2.6 operating environments default to a login screen when you initially boot your workstation, regardless of which desktop you are using. You can select your desktop from the login screen. The login screen requires the user's name and password. Your desktop is displayed upon authentification of your login name and password. For more information about the login screen, see the `dtlogin` man page (provided with the Solaris Common Desktop Environment (CDE) man pages) or the *Common Desktop Environment: Advanced User's and System Administrator's Guide*.

`dtlogin` Notes For System Administrators

A system administrator who is new to CDE needs to know about CDE's graphical login program, `dtlogin`. Review the `dtconfig` man pages.

Interactive Installation Bugs

Installation Fails With A False Non-Mountable File System Error (4164303)

The following message may be displayed:

```
The Solaris operating environment on slice c0t0d0s0 cannot be upgraded.
A file system listed in the file system table (vfstab) could not be mounted.
```

The installation software may interpret inodes that are stored on striped DiskSuite™ meta devices for root inodes and attempt to mount the meta devices as upgradable slices. When this problem occurs, the mounts fail and the installation aborts.

TotalNET Advanced Server (SunLink) Drivers Cause Panic After A Reboot (4121961)

Warning - Warning: mod_install: MT-unsafe driver 'tnatp' rejected panic[cpu0] / thread=7051e040:mutex-enter:bad_mutex lp=1046aa20 owner=7051e040 thread=7051e040

An upgrade to TotalNET Advanced Server (SunLink™) version 5.2 is required with the Solaris 7 operating environment because of a driver conflict. Version 5.0 and version 5.1 for the TotalNET Advanced Server cause the Solaris 7 operating environment to not boot correctly.

Workaround: Before you install the Solaris 7 operating environment, you must upgrade all installations to version 5.2 for the TotalNET Advanced Server, which is available on the Solaris Easy Access Server 2.0 CD. Follow the instructions provided to upgrade existing TotalNET Advanced Server installations.

Installation Bugs That Occur Before the Start of an Interactive Installation

Caution - Be sure to read bug description ID 4121281 before you start upgrading your x86 based system to the Solaris 7 operating environment.

DiskSuite May Cause Data Loss (4121281)

If you are running DiskSuite™ and upgrading to Solaris 7, you must also upgrade to DiskSuite 4.2. The DiskSuite 4.2 distribution includes a script called `metacvt` that automates removal and replacement of the `metadb` replicas. You can use that script to change the SCSI driver name stored in the replicas from `cmdk` to `sd` when you upgrade to Solaris 7 and DiskSuite 4.2.

Workaround: To avoid potential data loss during upgrades to the Solaris 7 operating environment, you must save the system's meta device configurations in text files and remove their `metadb` replicas before upgrading any x86 based system that is running DiskSuite. After you finish upgrading your x86 based system, you must restore the meta device configurations by using the DiskSuite command line interface.

The *DiskSuite Version 4.2 Release Notes* contain a procedure for saving `metadb` configurations, removing `metadb` replicas, upgrading x86 based systems to the Solaris 7 operating environment, upgrading DiskSuite to version 4.2, and restoring meta device configurations. Bourne shell scripts that automate the procedure are available for the Solaris 7 operating environment.

Installation Bugs That Occur During an Interactive Installation

Erroneous Messages Indicating Packages Added A Second Time (1235464)

This appears as an attempt to install the same architecture and version of a package that is already installed. This installation overwrites this package.

When upgrading a system with the Entire Distribution plus OEM Cluster, the following packages seem to be added twice:

- `SUNWolinc`
- `SUNWxwdim`
- `SUNWxwinc`

- SUNWxwman
- SUNWxwpmn
- SUNWxwsrc
- SUNWolbk
- SUNWoldim
- SUNWolman
- SUNWolsrc

Installation Progress Bar May Be Inaccurate (1266156)

The “Installing Solaris Software - Progress” bar sometimes indicates that an installation is complete when it is still in progress. The install program may add packages for several minutes after the progress bar has indicated that the installation is complete. Do not rely on the progress bar to indicate that the installation is complete. The installation displays the following message when the program has completed all installation operations:

```
Installation complete
```

JumpStart Installs on Wrong Default Boot Disk (4027156)

JumpStart does not install the default boot on the current default boot disk under some conditions. A condition under which the problem has been observed involves using a fully automated install on a SPARCstation™ 5 with two hard disk drives. Therefore, the previous version of the Solaris operating environment is booted instead of the current one when you reboot.

Workaround: Install the Solaris operating environment without JumpStart™.

Installation of Diskless Client Does Not Preserve Changes In The `dfstab` File On A Server (4045544)

When you upgrade the Solaris operating environment on a server with diskless clients, the options on the `dfstab` line are not preserved for `/usr`. For example, if you entered the following in the `dfstab` file:

```
share -F nfs -o rw /export/exec/Solaris_2.7_sparc.all/usr
```

then this entry is automatically replaced with the following entry during the upgrade:

```
share -F nfs -o ro /export/exec/Solaris_2.7_sparc.all/usr
```

Workaround: Before you attempt to upgrade the Solaris operating environment on an OS server that has a diskless client or Solstice™ AutoClient™, back up the `/etc/dfs/dfstab` file for the clients.

Installation Bugs You Need to Know About Before the Start of an Upgrade

Be sure to read bug description ID 4121281 mentioned in"Installation Bugs That Occur Before the Start of an Interactive Installation" on page 4 earlier in this chapter as well as any other bug description listed in this section before you start upgrading your x86 based system to the Solaris 7 operating environment. This problem may cause data loss.

Installation Bugs That May Occur During an Upgrade

Multiple Architecture Server Cannot Be Patched (1249343)

After upgrading a server with diskless clients of more than one SPARC kernel architecture, such as a sun4u server with diskless sun4c, sun4d, and sun4m clients, the `SUNWkvm` packages for clients whose kernel architectures differ from that of the server cannot be patched.

Workaround: Manually add all of the *SUNWkvm* packages before applying any patches that affect them.

```
# pkgadd -d  SUNWkvm.*
```

Disk Space Requirements Can Be Exaggerated By The Upgrade Process (4041733)

The upgrade program can exaggerate by as much as 30 percent the amount of space required for upgrades to systems with the Solaris software. Therefore, it prevents many systems from being upgraded without deselecting packages or finding more space.

Workaround: You can manually reallocate disk space among file systems or use the Software Customization menu to remove software packages that are not needed.

CHAPTER 2

Late-Breaking Solaris Runtime Issues

This chapter describes known runtime problems. You may also want to refer to the online `runtime_bugs` file in the `SUNWrdm` package on the Solaris CD for additional runtime problems.

Note - The information in this chapter supplements any information listed in the `runtime_bugs` file that is part of the `SUNWrdm` package on the Solaris 7 CD. If you boot from the Solaris 7 CD, the `runtime_bugs` file is located in the directory:

`/cdrom/sol_7_x86/s2/Solaris_2.7/Docs/release_info/C`

The default installed location for the `runtime_bugs` file is the directory:

`/usr/share/release_info/Solaris_2.7/C`

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.

Localization Bugs

Cannot Add a New User With Solstice™ AdminTools in Arabic or Hebrew Locales (4159527)

If you log in as `root` in the Arabic or Hebrew locale, you cannot add or modify users with the Solstice™ AdminTools™. The Add User window is displayed but is

blank. This problem occurs whenever you add or modify information about the user in all subwindows.

Workaround: Use `root` to add or modify information about users.

Some Custom Arabic TrueType Fonts May Cause an Intel XServer To Crash (4161002)

If applications are using custom fonts rather than system fonts, the XServer may crash on x86 platforms. The problem occurs because some characters in the font are exceeding the height limitation specified with the font.

Workaround: Provide an unhinted version of the offending font. The height of unhinted versions is usually lower.

Arabic 16–Bit Proportional Fonts Clip Characters (4167851)

If you use Arabic 16–bit proportional fonts in the Solaris 7 operating environment, the characters are only partially displayed on the screen.

Workaround: Only use monospace fonts.

Static Desktop Text Is Not Enabled For Complex Text Layout (4170194)

Static text, such as icon text and Workspace panel text, has not been enabled for Complex Text Layout. Therefore, the Arabic and Hebrew translations of English static text do not display correctly.

OW Is Not Supported As a Desktop Option In Some Locales

OW is not supported as a desktop option in the following locales and partial locales:

TABLE 2–1 Desktop Options Not Supported

Desktop Option	Name of Country
en_GB.ISO8859-15	Britain
de.ISO8859-15	Germany
fr.ISO8859-15	France
it.ISO8859-15	Italy
es.ISO8859-15	Spain
sv.ISO8859-15	Sweden
da.ISO8859-15	Denmark
de_AT.ISO8859-15	Austria
en_IE.ISO8859-15	Ireland
pt.ISO8859-15	Portugal
nl_BE.ISO8859-15	Belgium
nl.ISO8859-15	Netherlands
fr_BE.ISO8859-15	Belgium
fi.ISO8859-15	Finland
el_EURO	Greece
th	Thailand
th_TH	Thailand
he	Israel
ar	Egypt

TABLE 2–1 Desktop Options Not Supported *(continued)*

Desktop Option	Name of Country
de.UTF-8	Germany
fr.UTF-8	France
it.UTF-8	Italy
es.UTF-8	Spain
sv.UTF-8	Sweden
en_EU.UTF-8	Europe
ja_JP.UTF-8	Japan
ja_JP.PCK	Japan
ko.UTF-8	Korea
zh.GBK	PRC
zh_TW.BIG5	Taiwan

Hardware Bugs

ncrs: Mismatch of Narrow and Wide SCSI Operations on Intel N440BX Motherboard (4165916)

If there are Wide Small Computer System Interface (SCSI) targets attached to the Symbios adapter but your boot device is not one of these targets, then the Solaris driver does not successfully negotiate Wide SCSI data transfer and the devices do not operate correctly.

Workaround: Set the adapter firmware to 8-bit/narrow mode using the Symbios BIOS Configuration Utility:

- Enter the Symbios Configuration Utility by typing CTRL-C when prompted on boot.
- From the Main Menu, select the adapter with wide targets attached.
- From the Utilities Menu, choose Device Selection. Select the device and set the Width (bits) to 8.

  The Solaris driver still renegotiates to the highest shared data-transfer mode, resulting in no performance loss.

`kdmconfig`: JumpStart Installation Fails With `pnp` Monitor (4166376)

JumpStart installations configured to use a Plug-and-Play monitor cannot be properly installed. The monitor information on the installed system is incomplete.

Workaround: Configure the JumpsStart installation to use a comparable multi-frequency monitor.

Security Bugs

Security Vulnerability In `ufsdump` And `ufsrestore` (4132365)

A security vulnerability exists in the `ufsdump(1M)` and `ufsrestore(1M)` commands. If you have already gained access to a given Solaris system, you can exploit this vulnerability to obtain `root` access. Fixes for these problems are available for this release by installing patch ID 106793-01, a patch for SPARC systems, or patch ID 106794-01, a patch for x86 based systems.

If you have not yet obtained and installed the appropriate patch, you can apply the following workaround on your system.

Workaround: If you use the `chmod` command on the `ufsdump` and `ufsrestore` programs such that the `set-uid` bit is removed, the programs are then no longer vulnerable. You can remove the `set-uid` bit by executing the following command as root:

```
# chmod 0555  /usr/lib/fs/ufs/ufsdump /usr/lib/fs/ufs/ufsrestore
```

Some of the `ufsdump/ufsrestore` functionality is now only available to `root`, specifically having access to backup devices on the network using the `rmt(1M)` protocol.

CHAPTER 3

Late-Breaking News

This chapter lists late-breaking new features that arrived too late to be included in the "What's New: A Closer Look" in the *Solaris 7 (Intel Platform Edition) Installation Library*. You may also want to refer to the online `new_features` file in the `SUNWrdm` package on the Solaris CD for additional information on new features.

Note - The information in this chapter supplements any information listed in the `new_features` file that is part of the `SUNWrdm` package on the Solaris 7 CD. If you boot from the Solaris 7 CD, the `new_features` file is located in the directory:

```
/cdrom/sol_7_x86/s2/Solaris_2.7/Docs/release_info/C
```

The default installed location for the `new_features` file is the directory:

```
/usr/share/release_info/Solaris_2.7/C
```

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.

Solaris Name Change

This release of Solaris is called Solaris 7 instead of Solaris 2.7. As the Solaris product line continues to grow, this name change will make it easier for you to determine which products in the Solaris line you might want to use.

In Solaris 7, the transition to the new name change is in progress. That means that you will still see references to Solaris 2.7, and even to Solaris 2.x.

The name of the core operating system has not changed. In this release, it is SunOS 5.7.

Euro Unit Support

Support for the new Euro currency has been added to the Units command. This new feature enables you to enter, display, and print the new Euro currency symbol. It also adds system support for monetary string formatting in Euros.

However, exchange rate conversion between the Euro and other currencies is not supported. This should be handled at the application level.

Arabic and Hebrew Support

Arabic and Hebrew support forms a part of the overall Complex Text Layout (CTL) support in the Solaris 7 operating environment of which Thai is also a part. The following information outlines the major features of this support including language features, information on how to enter Arabic and Hebrew characters, and printing.

The following Arabic and Hebrew features are supported in the Solaris 7 operating environment:

- Language Features
  - Bidirectional Text
  - Character Shaping
  - Ligatures
  - Diacritics
  - Symmetrical Swapping
  - English and Hindi numerals
- Split cursor

  A split cursor or two cursors appear on the same line is a new feature to solve the ambiguity when the text insertion point is in the boundary between Hebrew and English text.
- Input Support

  An input mode window is located at the bottom of each desktop application window. This window initially displays in English. Press Control—T simultaneously to switch to Arabic or Hebrew input mode. The input window now displays in Arabic or in Hebrew. You can now enter Arabic or Hebrew text.

- Printing support

  A new man page called `ctlmp` has been added to the Solaris 7 operating environment to provide information on how to print CTL language documents. Type **`man ctlmp`** to display the `ctlmp` man page.

No Support for 3.3V

The `pcic nexus` driver for the PCMCIA interface does not support 3.3V on devices. Cards that are 3.3V only do not work correctly; they seem to hang a system. There are several related causes for this problem:

- The `pcic` driver cannot determine if it is a 3.3V only card (needs to read this information from the bus bridge and refuse to set 5V)
-

  The pcic driver cannot specify that 3.3V is needed

Some of the new PC cards are now available as 3.3V only. This includes variations of supported devices such as PC ATA and SRAM. New bus bridges, such as the TI PCI1130/1131, support 3.3V as well as 5V.

CHAPTER 4

End-of-Support Statements

This chapter lists late-breaking end-of—support statements that arrived too late to be included in the online `eof` file in the `SUNWrdm` package on the Solaris CD.

Note - The information in this chapter supplements any information listed in the `eof` file that is part of the `SUNWrdm` package on the Solaris 7 CD. If you boot from the Solaris 7 CD, the `eof` file is located in the directory:

`/cdrom/sol_7_x86/s2/Solaris_2.7/Docs/release_info/C`

The default installed location for the `eof` file is the directory:

`/usr/share/release_info/Solaris_2.7/C`

Future End-of-Software Support Statements

The following features may no longer be supported in a future release.

HotJava Browser

Sun's current plan is that the HotJava Browser may not be included in a future Solaris release. However, this plan is subject to change at Sun's sole discretion.

CHAPTER 5

Documentation Issues

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.

Documentation Errata

Adding SUNWhinst To Support SunOS Release 4.x on a Solaris 7 Server

Book Affected: *Solaris Transition Guide*

As explained in "Adding SunOS Release 4.x Support to a Solaris 2.7 Server" in *Solaris Transition Guide*, the `SUNWhinst` package must be installed on any Solaris 7 server configured to support SunOS 4.x diskless clients. The `SUNWhinst` package is available on the Solaris Easy Access Server 2.0 software CD in the `AdminSuite_2.3+AutoClient_2.1/4.x` directory.

Euro Currency Support

Book Affected: *Solaris 7 (Intel Platform Edition) Installation Library*

In "Language Support" in *Solaris 7 (Intel Platform Edition) Installation Library*, the Euro Currency Support section states that there are sixteen new user locales for the new Euro currency. There are actually fifteen, as shown in "New User Locales To Support the Euro Currency" in *Solaris 7 (Intel Platform Edition) Installation Library*.

Additional Devices for x86–Based Systems

Book Affected: *Solaris 7 (Intel Platform Edition) Device Configuration Guide* in the *Solaris 7 Installation Collection*.

- Preface: Add Pentium Xeon to the note that lists the family of Intel 8086 microprocessor chips.
- IBM PC ServeRAID Device Reference Page: Add IBM PC ServeRAID II Ultra SCSI HBA.

SunOS 5.7 **ncrs**(7D) man page Is Out-Of-Date

man page Affected: ncrs(7D)

The SunOS 5.7 **ncrs**(7D) man page is out-of-date. A synopsis of the new functionality is provided here; an updated **ncrs**(7D) man page is available at `Driver Developer Site` located at `http://www.sun.com/developers/driver`.

The `ncrs` Host Bus Adapter driver is a SCSI-compliant nexus driver that supports the Symbios 53c810, 53c815, 53c820, 53c825, 53c860, 53c875, and 53c895 SCSI chips. It supports the standard functions provided by the SCSI interface: tagged and untagged queuing, Wide/Fast/Ultra SCSI, and autorequest sense, but it does not support linked commands.

The `ncrs` driver can be configured by defining properties in `ncrs.conf`. These properties override the global SCSI settings. `ncrs` supports these properties, which can be modified by the user: `–scsi-options`, `–target-scsi-options`, `–scsi-reset-delay`, `–scsi-tag-age-limit`, `–scsi-watchdog-tick`, and `–scsi-initiator-id`.

`n –target-scsi-options` overrides the `–scsi-options` property value for target. *n* can vary from decimal 0 to 15. `ncrs` supports these scsi-options:

- `–SCSI_OPTIONS_DR(0x8)`
- `–SCSI_OPTIONS_SYNC(0x20)`
- `–SCSI_OPTIONS_TAG(0x80)`
- `–SCSI_OPTIONS_FAST(0x100)`
- `–SCSI_OPTIONS_WIDE(0x200)`
- `–SCSI_OPTIONS_FAST20(0x400)`

After periodic interval `–scsi-watchdog-tick`, the `ncrs` driver searches through all current and disconnected commands for time outs.

`–scsi-tag-age-limit` is the number of times that the `ncrs` driver attempts to allocate a particular tag ID that is currently in use after going through all tag IDs in a

circular fashion. After finding the same tag ID in use –`scsi-tag-age-limit` times, no more commands will be submitted to this target until all outstanding commands complete or time out.

Note - The `ncrs` hardware (53c895/53c875) supports Wide, Fast, and Ultra SCSI modes. The maximum SCSI bandwidth is 40 MB/sec.

Note that Ultra™ SCSI is disabled by default; to enable it, edit the `ncrs.conf` file and set the scsi-options property to `0x1ff8`.
