



# Solaris 9 Maintenance Update 4 Installation Guide

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# Preface

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The *Solaris 9 Maintenance Update 4 Installation Guide* explains how to install and back out the Solaris™ 9 Maintenance Update 4 (MU4) software. For late-breaking MU4 issues that were identified too late to be included in this guide, refer to the *Solaris 9 Maintenance Update 4 Installation Guide* at <http://docs.sun.com>.

If you need more information on general procedures for system administration, refer to the Solaris 9 8/03 System Administrator Collection.

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## Who Should Use This Book

This guide is for system administrators who are installing the MU4 software.

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## How This Book Is Organized

Chapter 1 contains an introduction to the Solaris 9 MU4.

Chapter 2 describes the installation requirements and procedures for the Solaris 9 MU4 software.

Chapter 3 describes the procedures to back out the Solaris 9 MU4 software.

Chapter 4 contains a listing of the known bugs.

Chapter 5 contains the error messages generated by the installation and backout scripts.

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## Typographic Conventions

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

**TABLE P-1** Typographic Conventions

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

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## Shell Prompts in Command Examples

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

**TABLE P-2** Shell Prompts

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



## Introduction

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This chapter of the *Solaris 9 Maintenance Update 4 Installation Guide* explains what the Solaris 9 MU4 is and when it is appropriate to install the Maintenance Update.

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## End of Software Support Statement

### Solaris Maintenance Updates (MUs)

The separate patch collections provided in conjunction with Solaris Update Releases, the Solaris Maintenance Updates, might not be made available at future releases.

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## What Is the Solaris 9 Maintenance Update 4?

The Solaris 9 MU4 contains almost the same set of patches as the patches prepackaged on the Solaris 9 8/03 Software CDs. The MU4 installation automatically updates your system without regressing any patches that you have previously installed.

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**Note** – The Solaris 9 8/03 Software CDs contain a number of additional patches which are required to build the Solaris 9 8/03 image and therefore are not included in the Solaris 9 MU4. For more information, see “Identifying the Version of Your Solaris 9 Maintenance Update” on page 15.

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The Solaris 9 MU4 is available as a file for downloading from the Web.

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## When to Install the Solaris 9 Maintenance Update 4

First, your system must be running the Solaris 9 operating environment.

You can then install the Solaris 9 MU4, if you meet both of the following conditions:

- You are applying patches that were released in the Solaris 9 8/03 operating environment.
- You are retaining patches that you previously applied to your system.

If your system is running the Solaris 9 operating environment, or a Solaris 9 Update release, and you want to fully upgrade to new features and hardware support, install the Solaris 9 8/03 operating environment. The patches that were applied by installing the Solaris 9 8/03 operating environment replace previously installed Solaris 9 patches. The newly installed patches cannot be backed out of the release.

Maintenance Updates are primarily designed to update the Solaris operating environment to a known, tested patch level. If you want to apply a particular patch, and only that patch, do so through your normal support channels.

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**Note** – The name of this product is Solaris 9 MU4. Code or package path names might use Solaris 2.9 or SunOS™ 5.9. Always follow the code or path as it is written in this document.

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# Installing the Solaris 9 Maintenance Update 4

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This chapter describes how to install the Solaris 9 MU4 software. If you are installing the Solaris 9 MU4 software as part of a custom JumpStart™ installation, refer to the *Solaris 9 Installation Guide*.

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## Time Considerations

The amount of time it takes to install the Solaris 9 MU4 varies, depending on the following factors:

- CPU speed of your machine
- `install_mu` option that you select
- Transfer speed of the hard drive or network that you use to access the `install_mu` code and patch set

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**Note** – If you install the MU4 with the `-d` option disabled, the installation proceeds more quickly. However, if you use this option when you install the MU, you cannot back out any of the patches MU4 delivers.

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## Installation Requirements

The MU4 can only be installed on a system that is running the Solaris 9 operating environment.

Space requirements for each file system vary, depending on the following criteria:

- Whether you select the `-d` option
- The location of the backout directory when saving backout data
- The disk partitions and the space that is available in each file system, relative to the patch disk space that is needed for each file system
- Your system's locale
- Whether some of the Maintenance Update patches are already installed on your system

The `install_mu` script performs a space analysis. The script reports the space that is needed for each file system, including backout space if applicable. The space calculations are completed in several minutes.

The `install_mu` script does not proceed if the script determines that space is lacking in one or more file systems. The patch installation space that is needed is calculated with some precision. However, the backout data space need is estimated. The reported need might be higher than the actual need.

Run the `install_mu` script with the `-f` option if you meet both of the following conditions:

- You know that you have enough disk space to apply the patch set and backout data if desired.
- If you are bypassing the space calculation.

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## Installing the Solaris 9 MU4

Solaris 9 MU4 software can only be installed if the system that is running `install_mu` is already running the Solaris 9 operating environment.

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**Note** – Relocatable root and service areas are not supported in the Solaris 9 MU4.

---

Ideally, reboot the system in single-user mode before installing MU4, because MU4 applies patches to system libraries. Avoid introducing instability to individual systems in a multiuser system. Ensure that no processes have mapped to an unpatched version of a library. Otherwise, those processes might later attempt to map to different sections of the old library.

In single-user mode, network services are not available. You must first copy the MU4 image from the network to your local system before booting the system in single-user mode.

You need to install MU4 by using NFS in multiuser mode, if you meet one of the following conditions:

- You cannot reboot the system in single-user mode.
- You do not have enough disk space to make a local copy of the MU4 image.

In this case, you should have the system in as quiet a state as possible. No users should be logged in or running any jobs.

When in single-user mode or multiuser mode, you must reboot your system after MU4 is installed. Do not use the `exit` command. If the `exit` command is used, the system is brought to `init 3`, and no user can log in until the system is rebooted. If the `root` user has logged out, and no other `root` users remain logged in, the system must be rebooted. See Chapter 4, "Known Problems", for more details.

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**Note** – Ensure that you have backed up your operating system before proceeding.

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To install the Solaris 9 MU4 software, perform the following steps:

1. **Ensure that no important user or important system processes are running.**

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**Note** – You must kill the `powerd` process if that process is running.

---

2. **Exit the current session.**

The CDE login screen is displayed.

3. **Click the Options button and select Command Line Login.**

The system prompts you to log in.

4. **Type your login name as `root` and type the root password:**

```
login: root
password: root password
```

5. **Reboot the system in single-user mode. From the root shell prompt, type the following command:**

```
# reboot -- -s
```

6. **Type the root password.**

Check that the system displays the following message and is now in system maintenance mode:

```
Entering System Maintenance Mode
```

```
Sun Microsystems Inc. SunOS 5.9 Generic May 2002
#
```

7. Run the `install_mu` script. From a local copy of the MU4 image, type the following commands:

```
# cd local-directory
# ./install_mu options
```

The following table lists options you can use from the command line.

TABLE 2-1 Command-Line Options for `install_mu` Script

Option	Description
-d	Specifies that patches are not backed up. Use of this argument decreases the time to install the software, but it also prevents you from backing out individual patches. Cannot be specified with -B option.
-p <i>patchdir</i>	Specifies directory that includes all the patches.
-q	Disables the display of dots that indicate <code>install_mu</code> activity.
-B <i>backoutdir</i>	Specifies that the backout data is saved in the indicated directory. Cannot be specified with the -d option.
-f	Forces installation of patch set without checking for sufficient disk space. Use of this option is quicker. However, use this option only if you know that you have enough space.

8. When the installation is complete, check that the following message is displayed:

```
install_mu completed at date-time.
```

- If this message is displayed, proceed to Step 9.
- If you encounter any errors, refer to Chapter 5.

9. Reboot the system by typing the following command:

```
# sync ; reboot
```

You are then prompted for a login.

---

**Note** – To prevent the library conflict problem, you must reboot your system after installing MU4.

---

10. Type your login name and password:

```
login: login
password: password
```

---

# Identifying the Version of Your Solaris 9 Maintenance Update

To identify the version of your Solaris 9 MU software, type the following command:

```
# cat /etc/release
```

To identify the patches the MU software applied to your system, type the following command:

```
# showrev -p
```

---

**Note** – If you compare the `showrev -p` output from applying the Solaris 9 MU4 software to the `showrev -p` output from installing the Solaris 9 8/03 operating environment, you will note that the following patches are not applied in the MU4 installation:

---

■ Solaris 9 MU4 SPARC® Platform Edition:

113088-01  
113089-01  
113090-01  
113113-01  
113168-02  
113409-01  
113477-02  
113503-01  
113717-06  
113908-01  
113909-01  
114249-01  
114520-06  
114566-02  
114607-01  
114963-01  
114965-01  
115107-01  
115177-01  
115284-02  
115296-01  
115322-01

■ Solaris 9 MU4 x86 Platform Edition:

114124-05  
114250-01  
114253-01  
114521-06  
114567-02  
114964-01  
114966-01  
115178-01  
115547-01

## Backing Out the Solaris 9 Maintenance Update 4

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If you need to remove one of the patches, you can do so. However, you must not have used the `-d` option of the `install_mu` script during the installation of the Solaris 9 MU4 software.

Instructions for backing out individual patches are located in each patch directory. Patch directories are located in the `/var/sadm/patch/` directory.

---

**Note** – Backing out the entire MU is not possible if you selected the `-d` option of the `install_mu` script.

---

---

## Backing Out the Solaris 9 MU4

Ideally, reboot the system in single-user mode before backing out the MU4. The MU4 applies patches to system libraries. Avoid introducing instability to individual systems in a multiuser system. Ensure that no processes have mapped to a patched version of a library. Otherwise, those processes might later attempt to map to different sections of the old library.

In single-user mode, network services are not available. You must copy the MU4 image from the network to your local system before booting your system in single-user mode.

You need to back out MU4 by using NFS in multiuser mode, if you meet one of the following conditions:

- You cannot reboot the system in single-user mode.
- You do not have enough disk space to make a local copy of the MU4 image.

The `backout_mu` script that is provided by MU4 enables you to back out an entire MU.

To back out the Solaris 9 MU4 software, follow these steps:

**1. Ensure that no important user or important system processes are running.**

**2. Exit the current session.**

The CDE login screen is displayed.

**3. Click the Options button and select Command Line Login.**

The system prompts you to log in.

**4. Type your login name as `root` and type the root password:**

```
login: root
password: root password
```

**5. Reboot the system in single-user mode. From the root shell prompt, type the following command:**

```
# reboot -- -s
```

**6. Type the root password.**

Check that the system displays the following message and is now in system maintenance mode:

```
Entering System Maintenance Mode

Sun Microsystems Inc. SunOS 5.9 Generic May 2002
#
```

**7. Run the `backout_mu` script. From a local copy of the MU4 image, type the following commands:**

```
# cd local-directory
# ./backout_mu options
```

**TABLE 3-1** Command-Line Options for `backout_mu` Script

Option	Description
-q	Disables the display of dots that indicate <code>backout_mu</code> activity
-B <i>backoutdir</i>	Specifies an alternate directory for storing the information that is required to back out a patch

**8. When the backout is complete, check that the following message is displayed:**

```
backout_mu completed at date-time.
```

- If this message is displayed, proceed to Step 9 to complete the backout.
- If you encounter any errors, refer to Chapter 5.

**9. Reboot the system by typing the following command:**

```
# sync ; reboot
```

You are then prompted for a login.

---

**Note** – To prevent the library conflict problem, you must reboot your system after backing out MU4.

---

**10. Type your login name and password:**

```
login: login
```

```
password: password
```



## Known Problems

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This chapter describes known problems that relate to the installation and use of the Solaris 9 MU4 software.

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### Installation Bugs

#### SPARC: Removing Patches After Upgrade Might Corrupt WBEM Repository (4820614)

The WBEM Repository CIM database can be corrupted under the following conditions:

1. You apply a revision of patch 112945 for a Solaris 9 Update Release to a system that is running the Solaris 9 operating environment.
2. You then remove the patch that was applied to the system.

If the WBEM Repository is corrupted, the following error message is displayed in the Solaris Management Console Log Viewer:

```
CIM_ERR_FAILED:
/usr/sadm/lib/wbem/../../../../var/sadm/wbem/logr/
preReg/PATCH113829install/Solaris_Application.mof,18,ERR_SEM,
ERR_EXC_SET_CLASS,CIM_ERR_FAILED:Other Exception:
java.io.StreamCorruptedException: invalid stream header
```

**Workaround:** Choose one of the following workarounds.

- Follow these steps to prevent the WBEM Repository from being corrupted.
  1. Become superuser.

2. Before you apply the patch, back up the WBEM Repository.

```
# cp -r /var/sadm/wbem/logr path/logr
```

In the previous example, *path* is the path to the backup WBEM Repository.

3. If the WBEM Repository is corrupted after you back out the patch, stop the WBEM server.

```
# /etc/init.d/init.wbem stop
```

4. Restore the backup WBEM Repository.

```
# cp -rf path/logr /var/sadm/wbem/logr
```

5. Restart the WBEM server.

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

- Follow these steps to create a new WBEM Repository.

---

**Note** – This workaround does not restore the WBEM data if the WBEM Repository is corrupted. Any data that was added to the repository during the installation is lost.

---

1. Become superuser.

2. Stop the WBEM server.

```
# /etc/init.d/init.wbem stop
```

3. Remove the files from the /logr directory.

```
# rm /var/sadm/wbem/logr/*
```

4. Remove the /notFirstTime directory.

```
# rmdir notFirstTime
```

5. Start the WBEM server.

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

6. Manually compile any proprietary MOFs.

```
# /usr/sadm/bin/mofcomp MOF-filename
```

## patchadd Command Displays Error Message if a Patch That Supports Multiple Patch Architecture Is Installed (4706994)

If you install a patch that supports multiple package architecture, an error similar to the following benign error message might be displayed in the `/var/sadm/install_data/Maintenance_Update_log`:

```
Installing xxxxx-yy (x of xx)
See /var/sadm/patch/xxxxx-yy log for details
grep: can't open pdgabbrev.extension/pkginfo
```

For example, if patch 123456-01 contains patch packages SUNWcar and SUNWcar.u, the following error message is displayed.

```
grep: can't open SUNWcar.u/pkginfo
```

**Workaround:** Ignore the error message. The message does not affect the installation of the patch. The message indicates that the `patchadd` command does not pass the correct parameter to the `remove_PATCH_PROPERTIES` function.

For more information, refer to the `patchadd(1M)` man page.

## install\_mu Does Not Function Correctly if Started With sh (4062334)

Because of problems that stem from the interactions between `sh(1)` and `ksh(1)`, the `install_mu` utility might fail to install certain patches correctly. This failure occurs when you start the utility by using the following command from the command line or from an administrative script:

```
# /bin/sh ./install_mu options
```

**Workaround:** Execute `install_mu` from the command line or from an administrative script as follows:

```
# ./install_mu options
```

## patchadd Command Displays an Error That It Is Terminating

One of the following benign messages might be displayed in the `Maintenance_Update_log` in the `/var/sadm/install_data` directory:

```
One or more patch packages included in
XXXXXX-YY are not installed on this system.
```

```
Patchadd is terminating.
```

Or:

```
Installation of XXXXXX-YY failed:
Attempting to patch a package that is not installed.
```

These messages indicate the `patchadd` command could not locate on your system any of the packages that the command intended to patch, so the indicated patch was skipped.

The message is displayed when the `patchadd` command discovers a discrepancy while installing a patch of one architecture onto a system with a different architecture. For example, a `sun4u` patch on a `sun4m` system.

This message might also be the result of one or more missing packages. The package might have been removed by the administrator, or was never installed. An example of this type of error would be if a cluster that was smaller than the Entire Distribution was installed.

**Workaround:** Ignore the error message.

## Cannot Log In if System Is Not Rebooted (4423853)

When installing the MU in single-user mode, do not use the `exit` command when you are done. Use the `reboot` command. If the `exit` command is used instead of the `reboot` command, the following problems occur:

- The system is brought to `init 3`, and you cannot log in until the system is rebooted.
- No other users can log in until the system is rebooted.
- The `pam_projects.so.1` module dumps core when any user or process tries to log in. The following message is displayed:

```
NOTICE: core_log: in.rshd[1479] core dumped:
/var/crash/core.in.rshd.1479
```

- If a process attempts to access the `pam_projects.so.1` module, load module messages are displayed on the system console. A message similar to the following is displayed:

```
cron[1433]: load_modules: can not open module
/usr/lib/security/pam_projects.so.1
```

These messages are also displayed if the MU is installed in multiuser mode. In both cases, the messages are no longer displayed after the system is rebooted.

**Workaround:** If the `exit` command is used after installing in single-user mode, reboot the system.

If the `exit` command is used after installing the MU in multiuser mode, and no `root` users remain logged in, reboot the system.

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## Error Messages

---

The screen messages that are displayed during the execution of the `install_mu` and `backout_mu` scripts do not include all the errors that might have occurred. Therefore, check the detail log file for additional information about any patches or packages that were not installed or backed out.

```
# more /var/sadm/install_data/log-file.mu-version-name.date-time
```

In the preceding example, the following information applies:

- *log-file* is the name of the log file for the process you completed. For install, the name is `Maintenance_Update_log`. For backout, the name is `MU_Backout_log`.
- *mu-version-name* is the name of the MU (for MU4, it is `Solaris_9 MU4`)
- *date-time* is the designated date and time that was copied from `date +%Y%m%d%H%M%S` (*yyyymmddHHMMSS* or *year-month-day-hour-minute-second*).

---

**Note** – `/var/sadm/install_data/log-file` is a symbolic link to the most recent MU log file.

Only the text of the message is displayed. The error code number that is included here is not displayed. The error code numbers have been included here for reference purposes only. You can choose to write a script that calls the `install_mu` or `backout_mu` script. Your script then needs to check the return values for the failure conditions.

---

```
signal detected.
```

```
install_mu (backout_mu) is terminating.
```

**Explanation and recommended action:** (Error Code 1) You interrupted `install_mu` (or `backout_mu`) by pressing Control-C. Reinvoke the program. If you reinvoke `install_mu`, error messages about previously applied patches are displayed in the log file. Ignore the error messages.

install\_mu (backout\_mu) is unable to find the INST\_RELEASE file for the target file system. This file must be present for install\_mu (backout\_mu) to function correctly.

**Explanation and recommended action:** (Error Code 2) The program cannot find the file /var/sadm/system/admin/INST\_RELEASE on the system. The system has become corrupted. The system must be reinstalled.

ERROR: Cannot find *\$xcommand* which is required for proper execution of install\_mu (backout\_mu).

**Explanation and recommended action:** (Error Code 3) install\_mu and backout\_mu require certain system utilities (for example awk, sed, grep) to be present in the /usr/bin and /usr/sbin directories. One of these utilities is missing. Contact your system administrator for assistance.

The -B and -d arguments are mutually exclusive.

**Explanation and recommended action:** (Error Code 4) The -d option requests that no backout data be saved. The -B option specifies a directory to store backout data. You cannot use these two options together. Reinvoke install\_mu with only one of these options.

The -p parameter must be a directory. *\$uPATCHDIR* is not a directory.

**Explanation and recommended action:** (Error Code 5) You selected the -p option and supplied a path that is not a valid directory. Reinvoke install\_mu (or backout\_mu) with a valid path to the -p option.

The -B parameter must be a directory. *\$l* is not a directory.

**Explanation and recommended action:** (Error Code 6) You supplied an option to -B that is not a directory. Reinvoke install\_mu (or backout\_mu) with a valid path to the -B option.

Permissions on backout directory *\$BACKOUTDIR* not adequate.

**Explanation and recommended action:** (Error Code 7) You supplied an option to -B that is not a writable directory. Contact your system administrator for assistance.

Invalid option.

**Explanation and recommended action:** (Error Code 10) You selected an unrecognized option. Read the usage message that is displayed and reinvoke install\_mu (or backout\_mu).

Can't write to Log File: *\$LOGFILE*

**Explanation and recommended action:** (Error Code 11) install\_mu and backout\_mu need to write the script's log into the /var/sadm/install\_data directory. Check that the install\_data directory is writable, then reinvoke install\_mu (or backout\_mu).

SUNWcar (core architecture root) package does not exist in /var/sadm/pkg.

**Explanation and recommended action:** (Error Code 12) The /var/sadm/pkg/SUNWcar directory is missing on the system. Your system has become corrupted. Contact your system administrator for assistance.

install\_mu (backout\_mu) only supports the sparc and x86 architectures. install\_mu has detected ARCH=\$LPROC

**Explanation and recommended action:** (Error Code 13) You ran install\_mu (or backout\_mu) on a system that is not based on SPARC or x86 architecture. Reinvoke install\_mu (or backout\_mu) on a SPARC or x86 platform.

-p parameter does not point to a directory containing a .order file. Looked in \$uPATCHDIR and in \$uPATCHDIR/MU/sparc/Patches.

**Explanation and recommended action:** (Error Code 14) You provided a path to a patch directory. However, install\_mu could not find a .order file in that directory, which the script needs to determine the correct patch installation order. install\_mu checked the \$path\_you\_specified and in the \$path\_you\_specified, where \$arch is either "SPARC" or "x86". Check for the existence of a .order file and reinvoke install\_mu.

install\_mu cannot locate patch order (.order) file. Paths searched: ./sparc/Patches, MU/sparc/Patches, ./\$uPATCHDIR/MU/sparc/Patches.

**Explanation and recommended action:** (Error Code 15) You did not supply install\_mu (or backout\_mu) with the -p option to identify the patch directory and install\_mu (or backout\_mu) could not locate the patch directory. Reinvoke install\_mu (or backout\_mu) with the -p option.

You must be root to execute this script.

**Explanation and recommended action:** (Error Code 16) You need root privileges to run install\_mu or backout\_mu because only user root can apply and remove patches. Reinvoke the program as root.

install\_mu (backout\_mu) can only patch version 2.9 systems. Target system is version \$TrgOSVers.

**Explanation and recommended action:** (Error Code 17) You asked install\_mu to apply patches to a system that is not running Solaris 9, or you asked backout\_mu to back out patches from a system that is not running Solaris 9. install\_mu and backout\_mu must be run on a Solaris 9 system.

Not enough disk space to apply entire patch set.

**Explanation and recommended action:** (Error Code 22) install\_mu analyzed your system and determined that not enough disk space was on one or more file systems to install the entire patch set. Make disk space available in the deficient file systems reported and reinvoke install\_mu. If you believe that you have enough disk space to apply the Maintenance Update, reinvoke install\_mu with the -f option.

Not enough disk space to save patch backout data.

**Explanation and recommended action:** (Error Code 23) `install_mu` analyzed your system and determined that not enough disk space was in the backout directory to save patch backout data. Select a backout directory with enough space, then reinvoke `install_mu`. If you believe that you have enough disk space in the backout directory, reinvoke `install_mu` with the `-f` option.

Dry run disk space check failed.

**Explanation and recommended action:** (Error Code 24) `install_mu` invokes `pkgadd` with a special option to check for sufficient disk space. `pkgadd` failed, probably because `/` or `/var` is very low on disk space or because your system has become corrupted. Contact your system administrator for assistance.

The `-f` and `-D` options are mutually exclusive.

**Explanation and recommended action:** (Error Code 25) The `-f` option instructs `install_mu` to skip the dry-run disk space calculation phase. The `-D` option requests that only the dry-run calculations be made. Choose one option or the other option, but not both options.

Cannot find state file. Looked for a file of the form `/var/sadm/install_data/.mu_state.{$root_or_usr.date_time}`.

**Explanation and recommended action:** (Error Code 27) To determine which patches to back out, `backout_mu` requires a file that contains a list of the patches that `install_mu` applied. If this file is missing, `backout_mu` cannot function. To back out the MU4 patch set, use the `patchrm` command to manually back out the unwanted patches. Patches should be removed in reverse order from the order that the patch appears in the `MU/{arch}/Patches/.order` file. The `MU/{arch}/Patches/.order` file is located in the MU4 distribution kit.