Sun Management Center Change Manager 1.0.1 Administration Guide

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Contents

Preface

This administration guide describes the Sun™ Management Center Change Manager software product, henceforth referred to as Change Manager. Administrators can use this book to learn how Change Manager works.

Change Manager can be used to manage deployment and validation of software stacks on a large set of replicated systems.

The Change Manager application can install software stacks, which are encapsulated as Solaris™ Flash archives, on large numbers of replicated systems.

The Change Manager application can also validate the software contents of managed hosts. This validation is accomplished by comparing the contents of managed hosts over time with a baseline manifest.

Who Should Use This Book

This book is intended for anyone responsible for performing one or more of these Change Manager operations:

- Installing and configuring the Change Manager software on the Change Manager server
- Managing deployment objects and audit objects in the Change Manager repository
- Managing hosts on the Change Manager server
- Creating the Solaris Flash archives for use with Change Manager
- Deploying software stacks to managed hosts
- Auditing software on managed hosts

How This Book Is Organized

- Chapter 1 provides an overview of the Change Manager product.
- Chapter 2 describes the hardware and software requirements for using the Change Manager product.
- Chapter 3 provides instructions on installing and configuring the Change Manager software on the Change Manager server. This chapter also includes information about upgrading your Change Manager 1.0 server to run Sun Management Center 3.5 server software and other related tasks.
- Chapter 4 describes how to create customizable Solaris Flash archives that can be deployed to managed hosts.
- Chapter 5 describes how to set up the deployment-related files in the repository, add managed hosts, and deploy software.
- Chapter 6 describes how to set up the audit-related files in the repository, add managed hosts, run audit jobs, and view audit reports.
- Chapter 7 describes how to monitor jobs in the job queue, job log, and transaction log.
- Chapter 8 describes how to perform file maintenance tasks on the Change Manager repository. This chapter also describes how to view and modify file and folder properties.
- Chapter 9 describes how to perform maintenance tasks on the Sun Management Center topology. This chapter also describes how to view and modify managed host and host group properties.
- Chapter 10 describes the shared profile properties that must be set to deploy software to managed hosts. The chapter also shows the minimum set of properties that must be specified to successfully deploy software.
- Chapter 11 describes the file formats for the three audit-related files.
- Appendix A describes how to navigate through the Change Manager browser interface.
- Appendix B lists problems, warning messages, and error messages that you might see when using Change Manager, and provides solutions for these problems.
- Appendix C describes the security issues addressed by Change Manager.
- Glossary is a list of terms used in this book and their definitions.

Related Books

- *Sun Management Center Change Manager 1.0.1 Release Notes*

  Read this book for information about bugs and issues that pertain to the installation and configuration of the Change Manager server.

- *Sun Management Center Change Manager 1.0.1 Reference Manual*

  Read this book to see the Change Manager man pages.

- *Solaris 9 Installation Guide*

  Read this book for more detailed information about installing Solaris software. In particular, read the chapters that cover custom JumpStart™ installation, Solaris Flash installation, and Solaris Live Upgrade.

- *Sun Management Center 3.5 Installation and Configuration Guide*

  Read this book for information about installing the Sun Management Center 3.5 software. This book also provides information about authorized users and security for the product.

- *Sun Management Center 3.5 User's Guide*

  Read this book for information about using the Sun Management Center 3.5 product. In particular, read the chapters that cover administrative domains and access control.

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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 `.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 the *User's Guide*. These are called *class* options. Do *not* save changes yet.

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	`#`

CHAPTER 1

Sun Management Center Change Manager (Overview)

The Sun™ Management Center Change Manager, henceforth referred to as Change Manager, is a system management application that enables system administrators to quickly and efficiently install and manage *Solaris™ Flash archives* across a large number of *managed hosts*. System administrators can create consistent software configurations that are easier to manage. System administrators can also improve their ability to know exactly what is running on their managed hosts by using Change Manager.

Change Manager is based on the Sun Management Center service and agent infrastructure. The Sun Management Center 3.5 Console component does not support Change Manager 1.0.1. Instead, Change Manager is supported by the web-based Sun Management Center Web Console.

- Perform Sun Management Center tasks from the Sun Management Center Console.
- Perform Change Manager tasks from the Sun Management Center Web Console.

The primary difference between Change Manager 1.0.1 and Change Manager 1.0 is that Change Manager 1.0.1 is based on Sun Management Center 3.5, while Change Manager 1.0 is based on Sun Management Center 3.0.

The following topics are covered in this chapter:

Change Manager Features

Change Manager enables system administrators to quickly and easily install, configure, update, and audit software running on large groups of replicated systems.

Key to accomplishing these tasks is the *software stack*. A software stack is a set of one or more software elements installed as a Solaris Flash archive on managed hosts. The stack is a well-defined set of files, which must include, at a minimum, the Solaris operating environment. For example, a software stack might include the Solaris 9 operating environment, with the Apache web server, and the Oracle® database.

Following are the main features of Change Manager:

- Quick and easy deployment of integrated software stacks, which are in the form of Solaris Flash archives, to managed hosts
- Rapid reprovisioning of systems to adapt to changes in the computing needs of your business
- Installation of software on a cloned group of managed hosts while they continue to run, by using the Solaris Live Upgrade feature
- Easy creation and maintenance of reference software configurations for the managed hosts
- Scheduling and automation of software installations or reprovisioning of services
- Audit of a software stack that is running on any managed host or on one or more groups of managed hosts
- Easy-to-use browser-based interface (see Appendix A) as well as a command-line interface for scripting and for use by expert users (see the `changemgr`(1MCM) man page)

Change Manager Deployment Concepts

Change Manager is a tool that deploys software, in the form of a Solaris Flash archive, to a group of managed hosts. Change Manager 1.0.1 does not support traditional package-based installation or patch installation directly to managed hosts.

This section introduces these key concepts that relate to the Change Manager product and its usage:

- "Solaris Flash Archive" on page 19
- "Solaris Boot Image" on page 19
- "Managed Hosts" on page 20
- "Deployment Operations" on page 20

Solaris Flash Archive

Solaris Flash is a standard Solaris installation mechanism that installs a Solaris Flash archive on a system. The archive is a single file that encapsulates the entire software contents of a previously installed and configured Solaris system. Change Manager also refers to this file as an *integrated software stack*. The Solaris Flash archive is currently the only software object that can be deployed by Change Manager.

Change Manager cannot create a Solaris Flash archive itself. A Solaris Flash archive must be created from a *master system* that contains the software you want in the archive. The master system is typical of the systems on which you deploy the archive. The master system can be installed by using one of the standard Solaris installation methods:

- Solaris Web Start installation
- Interactive installation
- Custom JumpStart installation
- Solaris Flash installation

After the Solaris software is installed, you can customize the master system by applying patches and installing and configuring software applications.

For a Solaris Flash archive to be deployable by Change Manager, the archive must include the *Sun Management Center agent* and the *Change Manager agent module*. This software *must* be installed on the master system prior to creating the archive.

The Solaris Flash archive can be customized by defining a set of *archive parameters* and by writing *deployment finish scripts* to process these parameters. Archive customization on a per-host basis is achieved by modifying the archive parameter values in the shared profile or in the host properties.

For example, by creating an archive parameter to specify the software license key, you can specify a different key for each managed host that you install.

After a master system is installed and configured, use the `flar create` command to create the Solaris Flash archive. When the archive is ready, you must import it to the Change Manager repository before you can deploy it to managed hosts.

Solaris Boot Image

Each Solaris Flash archive is associated with a Solaris boot image. The boot image, also known as the miniroot, is a minimal Solaris bootstrap environment that supports the initial installation process. The Solaris version of the boot image and the archive must match. For example, a Solaris 9 archive requires a Solaris 9 boot image.

You must import the Solaris boot image to the Change Manager repository before you can deploy related Solaris Flash archives to managed hosts.

You can obtain a Solaris boot image from a Solaris installation CD.

Managed Hosts

After a Solaris Flash archive and matching Solaris boot image have been imported to the repository, you can set up managed hosts to be installed by using Change Manager. A *managed host* is a target system that can have software deployed to it by Change Manager. Managed hosts are added to the Sun Management Center topology. Managed hosts can be organized into administrative domains and host groups. You can perform a Change Manager operation on individual managed hosts or on host groups, which causes that action to be performed on each managed host in the host group.

Shared Profiles

When you add a managed host to the Sun Management Center topology, you must associate the host with a *shared profile*. The shared profile describes the configuration characteristics to be used for the installation of that managed host.

A shared profile can be used by one or more managed hosts. For example, if you have 100 managed hosts running search engine software and the hardware configurations of these managed hosts are the same, the same shared profile can be used by each managed host. Any per-host differences must be specified in the host properties.

A shared profile must specify the Solaris Flash archive you want to deploy. In addition to specifying the archive, the shared profile specifies configuration data that is used to install and configure the software on managed hosts. This configuration data (sometimes called `sysidcfg` data or custom JumpStart data) includes information about the network interface, naming service, security protocols, and disk layout.

Host Properties

When you add a managed host to the Sun Management Center topology, you must specify the following information:

- Ethernet (MAC) address
- Platform group (for example, `sun4u`)
- Shared profile

After you specify the shared profile, you can view and modify any archive parameters that are part of the Solaris Flash archive you specified. These archive parameter values, plus the configuration parameters specified in the shared profile, constitute the host properties for the particular host being added.

Deployment Operations

Change Manager supports three automated software deployment operations. Each of the following operations deploy software in the form of a Solaris Flash archive to managed hosts:

- Initial installation
- Reinstallation
- Live update

Initial Installation

After the managed host is added, you must create custom JumpStart data prior to performing the initial installation. The custom JumpStart data is based on the host properties for each specified managed host.

For initial installation, the Change Manager server acts as an installation server to deploy a Solaris Flash archive to managed hosts. The Solaris boot image and the custom JumpStart data are used to install the Solaris Flash archive on the managed host.

An initial installation must be initiated directly on the managed host by typing the following command at the OpenBoot™ prompt:

```
ok> boot net - install
```

This `boot` command cannot be initiated by Change Manager because the Sun Management Center agent and the Change Manager agent module are not yet available on the managed host.

The first time you use Change Manager to install a Solaris Flash archive on a managed host, you must use the initial installation operation. The Solaris Flash archive must include the Sun Management Center agent and the Change Manager agent module, which enable the managed host and the Change Manager server to communicate.

Reinstallation

A reinstallation is equivalent to an initial installation except that the operation is initiated by Change Manager rather than by you typing `boot net - install` at the OpenBoot prompt. A reinstallation can be initiated by Change Manager because the Sun Management Center agent and the Change Manager agent module are now available on the managed host. The system software on the managed host is overwritten by the software in the Solaris Flash archive.

Live Update

To perform a live update operation (also called update), the managed host must be running the Sun Management Center agent and the Change Manager agent module. The update uses the Solaris Live Upgrade feature to install the Solaris Flash archive on the inactive boot environment of a running managed host. When the installation completes, the inactive boot environment is marked as active and the system reboots to run the new software stack. The other boot environment is unchanged.

Note – You can fall back to the previous boot environment to ''undo'' the update operation. This fallback operation marks the previously running boot environment as the active boot environment, then reboots the system to run the previous software stack.

You can monitor the setup for installation, update, and reinstallation operations by viewing the Change Manager job queue. See Chapter 7.

Example—Getting Started With Change Manager

The following example outlines the process you might follow to use Change Manager to deploy software to managed hosts.

1. Install and configure the Change Manager server.

   The Change Manager server is used as a repository for installation files and audit files and to manage hosts.

   See Chapter 2 for server requirements. See Chapter 3 for the server installation procedures.

2. Create a Solaris Flash archive on a master system that you can deploy to the hosts you manage with Change Manager.

   Note that the Sun Management Center agent and the Change Manager agent module must be installed on the master system before you create the Solaris Flash archive.

   See Chapter 4 for information about creating the Solaris Flash archive.

3. Log in to the Change Manager browser interface at the following URL:

   ```
   https://cm01:6789
   ```

   In this example, `cm01` is the host name of the Change Manager server.

   At the login page, provide the user name and password of a valid Sun Management Center user.

   See "Authorizing Users to Access Change Manager" on page 50 for information about creating Sun Management Center users for Change Manager.

4. Import a Solaris boot image to the Change Manager repository.

   This boot image is required to perform the initial installation of managed hosts. The boot image must also match the version of the Solaris Flash archive that you want to install.

   The boot image must be completely imported to the repository before you can use it to deploy an archive to managed hosts. You can determine the status of the import job by monitoring the job queue.

- See "Solaris Boot Image" on page 77 for information about Solaris boot images.
- See "How to Import Solaris Boot Images to the Change Manager Repository (Web Browser)" on page 83 or "How to Import Solaris Boot Images to the Change Manager Repository (Command Line)" on page 92 for the procedure that shows how to import the boot images to the Change Manager repository.
- See Chapter 7 for information about monitoring jobs.

5. Import the Solaris Flash archive you created to the repository.

   The archive and the matching boot image must be stored in the repository for you to perform deployments of the archive to managed hosts.

   The archive must be completely imported to the repository before you can use it to deploy managed hosts. You can determine the status of the import job by monitoring the job queue.

   - See "Solaris Flash Archive" on page 78 for information about Solaris Flash archives.
   - See "How to Import Solaris Flash Archives to the Change Manager Repository (Web Browser)" on page 84 or "How to Import Solaris Flash Archives to the Change Manager Repository (Command Line)" on page 94 for the procedure that shows how to import the archives to the Change Manager repository.
   - See Chapter 7 for information about monitoring jobs.

6. Create a shared profile to describe the configuration of your managed hosts.

   When specifying the disk layout in this shared profile, you might want to specify a second boot environment to enable subsequent update operations.

   See Chapter 5 for procedures that show how to create shared profiles. See Chapter 10 for information about the host properties.

7. Add managed hosts to the Sun Management Center topology.

   These managed hosts are the target systems that are to be installed with the Solaris Flash archive you create. You must specify the shared profile you want to use to configure the managed hosts.

   You can organize the topology by creating a hierarchy of host groups. You can add managed hosts to the host groups.

   - See "How to Add a Managed Host (Web Browser)" on page 86 or "How to Add Managed Hosts (Command Line)" on page 96 for the procedure that shows how to add managed hosts.
   - See Chapter 9 for procedures that show how to organize and maintain the Sun Management Center topology.

8. Set up hosts for initial installation.

   Set up the custom JumpStart installation files by running the setup operation.

   The setup operation must complete before you can deploy managed hosts. You can determine the status of the setup job by monitoring the job queue.

- See "How to Perform an Initial Installation (Web Browser)" on page 87 or "How to Perform an Initial Installation (Command Line)" on page 98 for information about the setup operation.
- See Chapter 7 for information about monitoring jobs.

9. Perform initial installations of the managed hosts that you added.

   Manually start the initial installation operation on each managed host that you want to install by typing the following on each host's console:

   ```
   ok> boot net - install
   ```

   - See "How to Perform an Initial Installation (Web Browser)" on page 87 or "How to Perform an Initial Installation (Command Line)" on page 98 for the procedure that shows how to install managed hosts.
   - See Chapter 7 for procedures that show how to monitor jobs in the job queue.

10. After the managed hosts are successfully installed, you can issue other Change Manager commands to the managed hosts.

    By issuing these commands, you can verify whether the Change Manager server can successfully communicate with the managed hosts. For example, you can submit a get software status request to your managed hosts.

    When this operation succeeds, you can perform further deployment tasks and audit tasks on your managed hosts.

Change Manager Overview (Task Map)

The following task map provides an overview of the Change Manager workflow.

Typically, Change Manager operations can be performed by three classes of administrator: server administrator, deployment user, and software stack creator. Sometimes the duties performed by each user might overlap.

Task/Implementor	Description	For Instructions
Install the Change Manager server. Performed by server administrator.	Install and configure the Change Manager server with Sun Management Center 3.5 server software and Change Manager 1.0.1 server software. **Note –** If you want to install the Sun Management Center 3.5 Performance Reporting Manager add-on, install and configure the add-on before installing the Change Manager software.	See Chapter 3. See the *Sun Management Center 3.5 Installation and Configuration Guide*. See the *Sun Management Center 3.5 Performance Reporting Manager User's Guide*.
Create a customizable Solaris Flash archive. Performed by software stack creator.	Create a customizable Solaris Flash archive on a master system. ■ Install and configure software on a master system. ■ Determine which software parameters the deployment user should be able to set at deployment time. ■ Write deployment finish scripts to process the user-supplied values at deployment time. These scripts customize the software for its operational environment. ■ (Optional) Create a baseline manifest of the software stack. ■ Create a Solaris Flash archive.	See Chapter 4.
Populate the Change Manager repository and Sun Management Center topology. Performed by deployment user.	Populate the Change Manager repository with files needed to run deployment and audit jobs. You can create some files by using the user interface. You can also import existing files to the repository. Populate the Sun Management Center topology with managed hosts on which to run the deployment and audit jobs.	See Chapter 5 if you are preparing to perform software installations by using Change Manager. See Chapter 6 if you are preparing to audit managed hosts that are already installed by Change Manager.

Task/Implementor	Description	For Instructions
Run deployment jobs. Performed by deployment user.	Run deployment jobs on managed hosts or groups of managed hosts. ■ Set up installation profiles. ■ Install managed hosts. ■ Update managed hosts. ■ Reinstall managed hosts. ■ Fall back to the previous boot environment. ■ Reboot managed hosts. ■ Halt managed hosts.	See Chapter 5.
Run audit jobs and view audit reports. Performed by deployment user.	Run audit jobs on managed hosts or groups of managed hosts. ■ Build manifests for managed hosts. ■ Audit managed hosts. ■ Get the software status of managed hosts. Also, view the output of audit jobs.	See Chapter 6.
Monitor jobs. Performed by deployment user.	Monitor jobs by examining the job queue and logs.	See Chapter 7.

Task/Implementor	Description	For Instructions

Maintain the Change Manager repository and Sun Management Center topology.
 	
Performed by deployment user.
	Maintain deployment files and audit files in the Change Manager repository. Also, maintain managed hosts in the Sun Management Center topology.
	■ **Repository**
	  ■ Create folders.
	  ■ Rename files and folders.
	  ■ Import files.
	  ■ Export files.
	  ■ Create copies of shared profiles and audit rules files.
	  ■ Move files and folders to other folders.
	  ■ Delete files and folders.
	■ **Topology**
	  ■ Create host groups.
	  ■ Rename managed hosts and host groups.
	  ■ Copy managed hosts and host groups to other host groups.
	  ■ Move managed hosts and host groups to other host groups.
	  ■ Remove managed hosts and host groups.
		See Chapter 8 if you are maintaining the Change Manager repository.
		
		See Chapter 9 if you are maintaining the Sun Management Center topology.

CHAPTER 2

Hardware and Software Requirements (Planning)

This chapter describes the hardware and software requirements for the following:

The systems must meet these hardware and software requirements prior to installation of the Change Manager product.

Requirements are for the Change Manager server and the master system only. Managed hosts should match the configuration of the master system as much as possible. The software stack built on the master system is later installed on the managed hosts.

Change Manager Server

The *server* runs the Change Manager software. The server stores information about managed hosts. The server also stores files that are used for Change Manager operations.

Deployment files, such as Solaris Flash archives and shared profiles, are used as input for deployment tasks. Audit files, such as audit rules files and manifests, are used as input and output for audit tasks. These files must be stored in the Change Manager repository to be used for deployment tasks and audit tasks. See Chapter 5 and Chapter 6.

From the server, you can *deploy* software to one or more managed hosts. You can also audit one or more managed hosts.

You can access the server through the browser interface or through the command-line interface. The command-line interface *must* be run on the Change Manager server.

For instructions on installing the Change Manager server, see Chapter 3.

Change Manager Server Requirements

The Change Manager server must run Sun Management Center 3.5 server software as well as Change Manager 1.0.1 software.

The following requirements must be met before you install the Change Manager software on the Change Manager server:

- **One of these operating environments:**
  - Solaris 8 2/02, at least the Developer Software Group
  - Solaris 9, at least the Developer Software Group
- **Memory:** 512 Mbytes of RAM available to run the Sun Management Center server software
- **Disk space:**
  - 400 Mbytes for the Sun Management Center server software in `/opt`
  - 4 Mbytes for the Change Manager server software in `/opt`
  - 770 Mbytes for the Sun Management Center server software in `/var/opt/SUNWsymon`
  - 480 Mbytes for Sun Management Center patches in `/var/sadm/pkg`
  - 520 Mbytes for the Change Manager database in `/var/opt`
  - 10 Mbytes for the Sun Management Center Web Console software in `/usr`
  - A local disk *slice*, by default `/var/opt/ichange`, to hold the Change Manager database and repository. This slice should be allocated several Gbytes of disk space to store. To determine the amount of space you need, estimate the number and size of the Solaris Flash archives, Solaris boot image (about 200 Mbytes each in size), manifests, and other data you plan to store in the repository.

Caution – The Change Manager database and repository *must* be stored on a local disk of the Change Manager server.

- **Software:** Sun Management Center 3.5 Server component, which also installs the Agent component
- **Hardware:** Change Manager supports the same systems as those supported by Sun Management Center 3.5. See "Supported Platforms" in the *Sun Management Center 3.5 Installation and Configuration Guide*.

Master System

The *master system* is used to build a software stack. The master system's hardware configuration should represent the hardware configuration of the managed hosts. The software stack is to be deployed to the managed hosts. The software stack is encapsulated in the form of a Solaris Flash archive.

The master system must include some of the Change Manager packages. These packages include the agent software and the audit tools. This software enables the systems that are installed with the archive to be managed by the Change Manager server.

The software stack creator can make the stack customizable by embedding a description of the software parameters and *deployment finish scripts* in the archive. At deployment time, the finish scripts process the *parameter* values provided by the deployment user, customizing the software as required.

The deployment user specifies values for these software parameters as a *shared profile* or as being associated with the managed host itself, in which case the parameters are referred to as *host properties*.

For instructions on installing the master system, see Chapter 4.

Master System Requirements

The following requirements must be met before you install the Change Manager software on the master system:

- **Operating environment:** Solaris 8 2/02 or Solaris 9
- **Disk space:**
  - 20 Mbytes for Sun Management Center agent software and Change Manager agent software in `/opt`
  - 0.5 Mbytes for Change Manager agent software in `/var/opt`
- **Software:** Sun Management Center 3.5 Agent component
- **Hardware:** Change Manager supports the same systems as those supported by Sun Management Center 3.5. See "Supported Platforms" in the *Sun Management Center 3.5 Installation and Configuration Guide*.

Managed Hosts

Managed hosts are controlled by Change Manager operations, such as initial installation, update, and audit. Managed hosts *must* be added to the Change Manager server to act as Change Manager targets. Managed hosts also must be visible to the server through the appropriate *naming service* scheme.

For instructions on deploying software to managed hosts, see Chapter 5.

Managed Host Requirements

To simplify replicated system management, ensure that the hardware configuration of the master system and managed hosts match as closely as possible. The best match is an identical hardware configuration.

Each replicated managed host must have the following data registered in the appropriate naming service databases:

- Host name
- IP address

For example, if the network uses the NIS naming service, update the `hosts` database. Add the host name and *IP address* to the `hosts` database.

CHAPTER 3

Installing, Configuring, and Accessing the Change Manager Server (Tasks)

The *Change Manager server* is the system that runs the Change Manager software. This server is used to manage numerous systems, as well as to store deployment-related objects and audit-related objects.

The Change Manager server runs a web server that supports the web-based Change Manager applications. The server can also run the command-line interface version of the Change Manager applications.

Change Manager files and managed hosts must be on the Change Manager server to perform deployment tasks and audit tasks.

This chapter covers the following topics:

For an overview of the Change Manager workflow, see "Change Manager Overview (Task Map)" on page 24. For an example of using Change Manager, see "Example—Getting Started With Change Manager" on page 22.

Before you begin installing the Change Manager software, see "Change Manager Server Requirements" on page 30 to understand the hardware and software requirements for the Change Manager server.

Managed Data Objects

The data used and maintained by Change Manager exists in several places:

Change Manager Repository

The Change Manager repository is where files used to perform software deployment and audit tasks are stored. The repository is created and configured when you install the Change Manager server software. You must use Change Manager commands to manage the repository. The following lists some of the files stored in the repository:

- Solaris Flash archives
- Solaris boot images
- Shared profiles
- Manifests
- Reports

When you install the Change Manager server software, you must specify the Change Manager root directory. This directory is the place where all Change Manager data is stored. The directory you specify should be on a file system that has adequate space to store Change Manager data. See "Change Manager Server Requirements" on page 30.

Sun Management Center Topology

Sun Management Center maintains information about managed hosts and host groups in its topology database. Change Manager operates on the topology by adding and removing entries that correspond to managed hosts. The Sun Management Center Console presents a graphical view of the topology, while Change Manager presents a tabular view of the same data. Note that Change Manager maintains additional data about topology objects in its database tables. Both Change Manager commands and Sun Management Center commands can operate on data contained in the topology.

Change Manager Database Tables

"Metadata," additional information about objects in the repository and topology, is maintained in the Change Manager database tables. These tables share a schema in the Oracle database that is used by Sun Management Center. The metadata tables are created and managed by using the Sun Management Center `es-setup` command or the `es-guisetup` command.

During the Change Manager configuration process, you must specify the directory in which to create these database table files. Specify a directory that has about 0.5 Gbytes of available disk space. Note that these database table files are accessed and are updated only by Oracle software.

Change Manager Configuration Data

Change Manager maintains some of its operational parameters in the Sun Management Center configuration directory, `/var/opt/SUNWsymon/cfg`. This data is created when you install and set up the Change Manager server software. Generally, you do not make modifications to the configuration data. However, you can modify the `ichange.cfg` file, if necessary. See the `ichange.cfg`(4CM) man page.

Setting Up Change Manager

Initialization

When you install the Change Manager server software, you are asked whether the Change Manager data is to be configured. If setup is requested, the database table files, the repository structure, and the Change Manager configuration data are created. If you skip the Change Manager data configuration step during installation, you *must* run the setup before Change Manager functionality is available.

After the Change Manager data is configured, you can reinitialize or remove Change Manager data at any time. If you choose to reinitialize the data, the database tables are reset to factory settings and the Change Manager data is removed.

Uninstallation

You can remove all Change Manager server software and, optionally, data. If you choose to preserve Change Manager data, the contents of the repository and Change Manager database tables are saved. A subsequent reinstallation of Change Manager software can use the preserved data.

Note – Removing or initializing Change Manager data does not affect the topology, which is maintained by Sun Management Center.

Backup and Restore

The backup of Change Manager data involves both the Change Manager database tables and the Change Manager repository. You can back up the Change Manager database files by using the Sun Management Center `es-backup` command. `es-backup` backs up both Sun Management Center database files and Change Manager database files, including the Change Manager configuration data stored in the `/var/opt/SUNWsymon/cfg` directory. The `es-restore` command restores data that has been backed up by `es-backup`. For more information about `es-backup` and `es-restore`, see the *Sun Management Center 3.5 User's Guide*.

You can use Solaris tools, such as `backup` and `tar`, to back up the Change Manager repository. However, you *must* run `es-restore` to restore Change Manager and Sun Management Center database tables.

Installing and Configuring the Change Manager Server (Task Map)

The following table identifies the procedures related to the installation and configuration of the Change Manager server. These procedures must be performed in the order shown.

Task	Description	For Instructions
1. (Prerequisite) Install and set up the Sun Management Center 3.5 server software.	Use the `es-guiinst` command or the `es-inst` command to install the Sun Management Center 3.5 server software on the Change Manager server. Use the `es-guisetup` command or the `es-setup` command to perform postinstallation setup of the Sun Management Center 3.5 server software.	See "To Install Sun Management Center 3.5 on the Solaris Platform" or "To Install Sun Management Center Using the `es-inst` Script" in the *Sun Management Center 3.5 Installation and Configuration Guide*. See "To Set Up Sun Management Center 3.5 on the Solaris Platform" or "To Set Up Sun Management Center Using the `es-setup` Script" in the *Sun Management Center 3.5 Installation and Configuration Guide*.
2. Download the Change Manager 1.0.1 software.	Download the Change Manager software from the Change Manager 1.0.1 download page.	See "How to Download Change Manager Software From the Sun Download Center Web Site" on page 38.
3. Install and set up the Change Manager 1.0.1 server software.	Use the `es-guiinst` command or the `es-inst` command to install the Change Manager 1.0.1 server software on the Change Manager server.	See "How to Install and Set Up Change Manager 1.0.1 Server Software" on page 39.

Installing and Configuring the Change Manager Server

The Sun Management Center 3.5 Server component must be installed before the Change Manager 1.0.1 server software. None of the Sun Management Center add-on products are required by Change Manager.

For procedures that describe the installation of Sun Management Center 3.5 software, see the following sections in the *Sun Management Center 3.5 Installation and Configuration Guide*:

- To install software by using the GUI installation program, `es-guiinst`, see "To Install Sun Management Center 3.5 on the Solaris Platform."
- To install software by using the command-line installation program, `es-inst`, see "To Install Sun Management Center Using the `es-inst` Script."

After the Sun Management Center 3.5 Server component has been installed and set up, you can install the Change Manager 1.0.1 server software.

Before you begin installing the Change Manager software, see "Change Manager Server Requirements" on page 30 to understand the hardware and software requirements for the Change Manager server.

The following procedures show how to download the Change Manager 1.0.1 software product from the Sun Download Center and how to install the Change Manager 1.0.1 software on the Change Manager server.

▼ How to Download Change Manager Software From the Sun Download Center Web Site

1. **Go to the Change Manager 1.0.1 download page.**

   `http://wwws.sun.com/software/download/products/CM1.0.1.html`

2. **Click Download to go to the Sun Download Center login page.**

3. **Log in to the Sun Download Center.**

   If you are not a registered user, you must register before you can download the software from the web site.

   After you log in, the Terms of Use appear.

4. **Accept or reject the Terms of Use.**

   - Select Yes, then click Continue to accept the license agreement.

     The Download page for Change Manager 1.0.1 appears.
   - Select No, then click Continue to reject the license agreement.

     You are not permitted to download the software.

5. **Click the download icon next to the name and size of the tar file to start the download process.**

6. **Choose a directory in which to extract the Change Manager software product.**

   For example, create a directory called `/export/build/cm101`.

7. **Download the Sun Management Center Change Manager 1.0.1 tar file to that directory.**

8. **Extract the Change Manager software from the tar file.**

```
 # tar xvf sunmccm1_0_1.tar
...
```

After downloading the Change Manager software, you can install the Change Manager 1.0.1 software.

- To install the Change Manager 1.0.1 server software, see "How to Install and Set Up Change Manager 1.0.1 Server Software" on page 39.
- To install the Change Manager 1.0.1 agent software, see "How to Install the Change Manager Agent Module" on page 63.

▼ How to Install and Set Up Change Manager 1.0.1 Server Software

Before you begin installing the Change Manager software, see "Change Manager Server Requirements" on page 30 to understand the hardware and software requirements for the Change Manager server.

If you install the Change Manager server software, the agent software is also installed.

Note – Though the graphical installation program and command-line installation program perform the same tasks, they might appear somewhat differently on the screen.

---

1. **Become superuser.**
2. **Install the Change Manager 1.0.1 server software in one of the following ways:**
   - Install the Change Manager software by using the GUI.

     ```
     # /opt/SUNWsymon/sbin/es-guiinst
     ```
   - Install the Change Manager software by using the command line.

     ```
     # /opt/SUNWsymon/sbin/es-inst
     ```
3. **Specify the source directory of the Change Manager installation files.**

   For example, if the directory in which you downloaded the Change Manager 1.0.1 software is called `/export/build/cm101`, then specify this directory.

   The installation program checks for add-on products to be installed.
4. **Select the Change Manager product and any related patches to install.**

   The Change Manager software, patches, and if necessary, the Sun Management Center Web Console packages are installed.

   After the installation completes, you are asked to run the setup.
5. **Set up the Change Manager add-on product.**

The Sun Management Center components are stopped.

Configure the add-on products only.

The wizard checks for an existing Change Manager setup and none is found.

6. **Specify the directory in which to create the Change Manager repository.**

   By default, the directory is `/var/opt/ichange`.

   The repository must be a local disk slice, which should be allocated several gigabytes of disk space. To determine the amount of space you need, estimate the number and size of the Solaris Flash archives, Solaris boot image (about 200 Mbytes each in size), manifests, and other data you plan to store in the repository.

   If `/var/opt/ichange` does not have sufficient disk space, then specify another directory that does.

7. **Specify the password that was used to generate the security keys when you set up the Sun Management Center server.**

   Change Manager must use the same security keys as those used by the Sun Management Center server. To do this, you must specify the same password that you supplied when you set up the Sun Management Center server software. By using the same password, identical security keys are generated.

   These security keys are used to configure the agent on the managed host after initial installation or update operations have been performed.

   The Change Manager database environment is set up.

8. **Specify the directory in which to create the Change Manager database.**

   By default, the directory is `/var/opt/ichange`.

   If the `/var/opt/ichange` directory does not have at least 0.5 Gbytes of available disk space, specify another directory that does.

   The Change Manager database setup is performed.

9. **Specify whether to restart the Sun Management Center Web Console server.**

   If you are setting up Change Manager for the first time, then you must restart the Sun Management Center Web Console server. If you do not restart it, you cannot access the Change Manager web application.

   The only time it is safe to restart the web console server is when no other users are using the web console. If you decide to wait to restart the web console server, you must restart it manually by running the `/usr/sadm/bin/smcwebserver restart` command.

   If you decide to restart the web console server now, it is restarted.

10. **Start the Sun Management Center agent and server components.**

    Starting the agent and server components takes a while.

After the installation completes, you can access the Change Manager user interfaces.

- To access the browser interface, see "How to Log In to the Change Manager Server (Web Browser)" on page 52.

- To access the command-line interface, see "Accessing the Change Manager Server by Using the Command-Line Interface" on page 54.

Upgrading, Uninstalling, and Reinitializing Software on the Change Manager Server (Task Map)

The following table identifies the optional procedures that are related to the installation and configuration of the Change Manager server. These procedures do not depend on one another.

Task	Description	For Instructions
Upgrade a Change Manager 1.0 server to run Sun Management Center 3.5 server software. Then install the Change Manager 1.0.1 server software.	Use the `es-guiinst` command or the `es-inst` command to upgrade a Change Manager 1.0 server to run the Sun Management Center 3.5 server software. Then install the Change Manager 1.0.1 server software.	See "How to Upgrade a Change Manager 1.0 Server to Run Sun Management Center 3.5 Server Software" on page 43. See "How to Install and Set Up Change Manager Server Software After an Upgrade" on page 44.
Uninstall the Sun Management Center 3.0 server software if Change Manager 1.0 is installed.	Use the `es-uninst` command to uninstall the Sun Management Center 3.0 server software when Change Manager 1.0 is installed.	See "How to Uninstall Sun Management Center 3.0 Software When Change Manager 1.0 Is Installed" on page 46.
Uninstall the Change Manager 1.0.1 software.	Use the `es-guiuninst` command or the `es-uninst` command to uninstall the Change Manager software from the Change Manager server or from a master system.	See "How to Uninstall Change Manager Software" on page 46.
Reinitialize a Change Manager database that you have already set up.	Use the `es-guisetup -p ichange` command or the `es-setup -p ichange` command to reinitialize an existing Change Manager database setup.	See "How to Reinitialize an Existing Change Manager Database Setup" on page 47.

Task	Description	For Instructions
Regenerate the security keys.	Regenerate the security keys on the Change Manager server and each managed host controlled by that server.	See "Regenerating Security Keys" in the *Sun Management Center 3.5 Installation and Configuration Guide*.

Upgrading, Uninstalling, and Reinitializing Software on the Change Manager Server

Change Manager 1.0.1 is based on Sun Management Center 3.5, while Change Manager 1.0 is based on Sun Management Center 3.0. If you have a Change Manager 1.0 server and you want to run Sun Management Center 3.5, do the following:

1. Upgrade from Sun Management Center 3.0 server software to Sun Management Center 3.5 server software.
2. Install the Change Manager 1.0.1 server software.

Procedures for performing these tasks are provided in these sections:

- "How to Upgrade a Change Manager 1.0 Server to Run Sun Management Center 3.5 Server Software" on page 43
- "How to Install and Set Up Change Manager Server Software After an Upgrade" on page 44

You can also uninstall the Sun Management Center software or the Change Manager software from the Change Manager server or from a master system. Or you can reinitialize the Change Manager database on the Change Manager server.

Procedures for performing these tasks are provided in these sections:

- "How to Uninstall Sun Management Center 3.0 Software When Change Manager 1.0 Is Installed" on page 46
- "How to Uninstall Change Manager Software" on page 46
- "How to Reinitialize an Existing Change Manager Database Setup" on page 47

▼ How to Upgrade a Change Manager 1.0 Server to Run Sun Management Center 3.5 Server Software

If you want to run Sun Management Center 3.5 but have Change Manager 1.0 installed, first upgrade Sun Management Center 3.0 to Sun Management Center 3.5. Then you can install the Change Manager 1.0.1 server software. Follow this procedure:

1. **Become superuser.**

2. **From the SunSolve™ Patch Portal, download one of the following patches to your system.**

   - If Sun Management Center 3.0 is running on a Solaris 9 system, install patch 113106-01.
   - If Sun Management Center 3.0 is running on a Solaris 8 system, install patch 113105-01.

3. **Use the `unzip` command to expand the patch from the ZIP archive.**

   # **`unzip`** *patch-number*`.zip`

4. **Change to the patch directory.**

   # **`cd`** *patch-number*

5. **Install the patch.**

   # **`patchadd 'pwd'`**

6. **Upgrade the Sun Management Center 3.0 Server component to the Sun Management Center 3.5 Server component.**

   When you begin to install the Sun Management Center 3.5 Server component, choose to uninstall the Sun Management Center 3.0 server software.

   For more information, see the appropriate installation instructions in the *Sun Management Center 3.5 Installation and Configuration Guide*:

   - "To Install Sun Management Center 3.5 on the Solaris Platform"
   - "To Install Sun Management Center 3.5 Using the `es-inst` Script"

   If you preserve data during this upgrade procedure, the Change Manager 1.0 data is also preserved and can be restored.

7. **Install and set up the Change Manager 1.0.1 server software.**

   See "How to Install and Set Up Change Manager Server Software After an Upgrade" on page 44.

   If you preserved data during the Sun Management Center upgrade process, then you can restore the data when you install Change Manager 1.0.1 server software.

▼ How to Install and Set Up Change Manager Server Software After an Upgrade

Follow this procedure if you have just upgraded your Change Manager 1.0 server to run Sun Management Center 3.5 server software.

Note – Though the graphical installation program and command-line installation program perform the same tasks, they might appear somewhat differently on the screen.

---

1. **Become superuser.**
2. **Install the Change Manager 1.0.1 server software in one of the following ways:**
   - Install the Change Manager software by using the GUI.

     ```
     # /opt/SUNWsymon/sbin/es-guiinst
     ```
   - Install the Change Manager software by using the command line.

     ```
     # /opt/SUNWsymon/sbin/es-inst
     ```
3. **Specify the source directory of the Change Manager installation files.**

   For example, if the directory in which you downloaded the Change Manager 1.0.1 software is called `/export/build/cm101`, then specify this directory.

   The installation program checks for add-on products to be installed.
4. **Select the Change Manager product and any related patches to install.**

   The Change Manager software, patches, and if necessary, the Sun Management Center Web Console packages are installed.

   After the installation completes, you are asked to run the setup.
5. **Set up the Change Manager add-on product.**

   The Sun Management Center components are stopped.

   Configure the add-on products only.

   The wizard checks for preserved Change Manager data from a previous Change Manager installation.
6. **Specify whether to use or discard the preserved Change Manager data.**
   - If you did not preserve data during the upgrade of the Sun Management Center server software, an empty database and repository are created.
   - If you preserved data, you are prompted to use the preserved data.
     - If you want to use the preserved data, then the data is restored and available.

       Go to Step 8 to specify the password used to generate security keys.

- If you do not want to use the preserved data, then the data is removed and the database is initialized.

  Go to Step 7 to specify the location of the Change Manager repository.

7. **Specify the directory in which to create the Change Manager repository.**

   By default, the directory is `/var/opt/ichange`.

   The repository must be a local disk slice, which should be allocated several gigabytes of disk space. To determine the amount of space you need, estimate the number and size of the Solaris Flash archives, Solaris boot image (about 200 Mbytes each in size), manifests, and other data you plan to store in the repository.

   If `/var/opt/ichange` does not have sufficient disk space, then specify another directory that does.

8. **Specify the password that was used to generate the security keys when you set up the Sun Management Center server.**

   Change Manager must use the same security keys as those used by the Sun Management Center server. To do this, you must specify the same password that you supplied when you set up the Sun Management Center server software. By using the same password, identical security keys are generated.

   These security keys are used to configure the agent on the managed host after initial installation or update operations have been performed.

   The Change Manager database environment is set up.

9. **Specify the directory in which to create the Change Manager database.**

   By default, the directory is `/var/opt/ichange`.

   If the `/var/opt/ichange` directory does not have at least 0.5 Gbytes of available disk space, specify another directory that does.

   The Change Manager database setup is performed.

10. **Specify whether to restart the Sun Management Center Web Console server.**

    If you are setting up Change Manager for the first time, then you must restart the Sun Management Center Web Console server. If you do not restart it, you cannot access the Change Manager web application.

    The only time it is safe to restart the web console server is when no other users are using the web console. If you decide to wait to restart the web console server, you must restart it manually by running the `/usr/sadm/bin/smcwebserver restart` command.

    If you decide to restart the web console server now, it is restarted.

11. **Start the Sun Management Center agent and server components.**

    Starting the agent and server components takes a while.

    After the installation completes, you can access the Change Manager user interfaces.

    - To access the browser interface, see "How to Log In to the Change Manager Server (Web Browser)" on page 52.

- To access the command-line interface, see "Accessing the Change Manager Server by Using the Command-Line Interface" on page 54.

▼ How to Uninstall Sun Management Center 3.0 Software When Change Manager 1.0 Is Installed

Systems that run Change Manager 1.0 server software must be patched before you attempt to uninstall Sun Management Center 3.0 server software.

1. **Become superuser.**
2. **From the SunSolve Patch Portal, download one of the following patches to your system.**
   - If Sun Management Center 3.0 is running on a Solaris 9 system, install patch 113106-01.
   - If Sun Management Center 3.0 is running on a Solaris 8 system, install patch 113105-01.
3. **Use the `unzip` command to expand the patch from the ZIP archive.**

   # **`unzip`** *patch-number*`.zip`
4. **Change to the patch directory.**

   # **`cd`** *patch-number*
5. **Install the patch.**

   # **`patchadd 'pwd'`**
6. **Uninstall the Sun Management Center 3.0 Server component.**

   Use the `/opt/SUNWsymon/sbin/es-uninst` command to uninstall the Sun Management Center 3.0 server software. If you uninstall the Sun Management Center 3.0 software, the Change Manager 1.0 software is also uninstalled.

   For more information, see "Installing the Software on Your System" in the *Sun Management Center 3.0 Software Installation Guide*.

▼ How to Uninstall Change Manager Software

You can use the following procedure to uninstall the Change Manager server software or agent software. When you uninstall the software from the Change Manager server, you can specify whether to preserve or discard the Change Manager database and the Change Manager repository.

Note – Though the graphical uninstallation program and command-line uninstallation program perform the same tasks, they might appear somewhat differently on the screen.

1. **Become superuser.**
2. **Uninstall the Change Manager 1.0.1 software in one of the following ways:**
   - Uninstall the Change Manager software by using the GUI.

     ```
     # /opt/SUNWsymon/sbin/es-guiuninst
     ```
   - Uninstall the Change Manager software by using the command line.

     ```
     # /opt/SUNWsymon/sbin/es-uninst
     ```
3. **Uninstall the Change Manager product.**

   If you choose to uninstall the Production Environment, then Change Manager is also uninstalled.
   - If you are uninstalling the Change Manager server software, then determine whether you want to save Change Manager data.
     - If you save Change Manager data, it can be restored.
     - If you do not save Change Manager data, then the database and the data in the repository is removed.
   - If you are uninstalling the Change Manager agent software, then continue.
4. **Proceed with the uninstallation.**

   The Sun Management Center processes are stopped, which might take a while. Then, the Change Manager software is uninstalled.

▼ How to Reinitialize an Existing Change Manager Database Setup

Follow this procedure if you want to reinitialize the Change Manager database setup you created when you first installed Change Manager 1.0.1 server software.

Note – Though the graphical installation program and command-line installation program perform the same tasks, they might appear somewhat differently on the screen.

1. **Become superuser.**

2. **Set up the Change Manager 1.0.1 server software in one of the following ways:**

   - Set up the Change Manager software by using the GUI.

     ```
     # /opt/SUNWsymon/sbin/es-guisetup -p ichange
     ```

   - Set up the Change Manager software by using the command line.

     ```
     # /opt/SUNWsymon/sbin/es-setup -p ichange
     ```

   The Sun Management Center components are stopped.

   Configure the add-on products only.

   The wizard checks for an existing Change Manager database setup and finds one.

   - Go to Step 3 if the database is valid.
   - Go to Step 4 if the database is invalid.

3. **Specify whether to use or discard the Change Manager database that was found.**

   - If you want to use the database, then you are done with the Change Manager setup.

     Go to Step 9 to restart the Sun Management Center agent and server components.

   - If you do not want to use the database, then the database is reinitialized and the data is discarded.

     Go to Step 5 to specify the location of the Change Manager repository.

4. **Determine what to do if an invalid database was found.**

   - Try restoring the database from a backup, then rerun the check starting with Step 2.
   - If you do not want to use the database, then discard the data from the repository and reinitialize the database.

     If you choose to reinitialize the database, be sure to make a copy of the repository before it is discarded.

5. **Specify the directory in which to create the Change Manager repository.**

   By default, the directory is `/var/opt/ichange`.

   The repository must be a local disk slice, which should be allocated several gigabytes of disk space. To determine the amount of space you need, estimate the number and size of the Solaris Flash archives, Solaris boot image (about 200 Mbytes each in size), manifests, and other data you plan to store in the repository.

   If `/var/opt/ichange` does not have sufficient disk space, then specify another directory that does.

6. **Specify the password that was used to generate the security keys when you set up the Sun Management Center server.**

   Change Manager must use the same security keys as those used by the Sun Management Center server. To do this, you must specify the same password that you supplied when you set up the Sun Management Center server software. By using the same password, identical security keys are generated.

These security keys are used to configure the agent on the managed host after initial installation or update operations have been performed.

The Change Manager database environment is set up.

7. **Specify the directory in which to create the Change Manager database.**

   By default, the directory is `/var/opt/ichange`.

   If the `/var/opt/ichange` directory does not have at least 0.5 Gbytes of available disk space, specify another directory that does.

   The Change Manager database setup is performed.

8. **Specify whether to restart the Sun Management Center Web Console server.**

   If you are setting up Change Manager for the first time, then you must restart the Sun Management Center Web Console server. If you do not restart it, you cannot access the Change Manager web application.

   The only time it is safe to restart the web console server is when no other users are using the web console. If you decide to wait to restart the web console server, you must restart it manually by running the `/usr/sadm/bin/smcwebserver restart` command.

   If you decide to restart the web console server now, it is restarted.

9. **Start the Sun Management Center agent and server components.**

   Starting the agent and server components takes a while.

▼ How to Regenerate the Security Keys by Changing the Password

You should change the security keys periodically and when they have been compromised. For more information, see "Regenerating Security Keys" in the *Sun Management Center 3.5 User's Guide*.

This process requires you to make manual changes on the Change Manager server and on each managed host controlled by that server.

1. **Choose a new password.**

2. **Update the password on the Change Manager server.**

   a. **Become superuser on the Change Manager server.**

   b. **Set the new password.**

   ```
   # /opt/SUNWsymon/sbin/es_run base-usm-seed.sh -s new_seed \
   -u public
   ```

   c. **Update the value of `agentseed` in the `/var/opt/SUNWsymon/cfg/ichange.cfg` file to match the new password.**

d. **Restart the Sun Management Center server software on the Change Manager server.**

```
# /opt/SUNWsymon/sbin/es-start -A
```

3. **Update the password on each managed host.**

   a. **Become superuser on the managed host.**

   b. **Set the new password.**

```
# /opt/SUNWsymon/sbin/es_run base-usm-seed.sh -s new_seed \
-c agent -u public
```

   c. **Restart the Sun Management Center agent on the managed host.**

```
# /opt/SUNWsymon/sbin/es-start -A
```

Change Manager Configuration File

You can change the behavior of the Change Manager application by modifying certain runtime parameters. These parameters are stored in the application configuration file, `ichange.cfg`. The configuration file is located in the `/var/opt/SUNWsymon/cfg` directory.

Note – When you make changes to the `ichange.cfg` file, you must restart the Sun Management Center services before the changes can take effect.

Restart the Sun Management Center services by running the following command as superuser:

```
# /opt/SUNWsymon/sbin/es-start -S
```

For information about the parameters described by the `ichange.cfg` file, see the `ichange.cfg`(4CM) man page.

Authorizing Users to Access Change Manager

To perform Change Manager operations, you must be an authorized user of the Sun Management Center application. In addition, you must have certain permissions to perform particular tasks.

▼ How to Add Change Manager Users

When adding users to the Change Manager server, give them the general, administrator, and domain administrator permissions.

1. **Become superuser on the Change Manager server.**
2. **Add the names of the users, one valid UNIX® user name per line, to the `/var/opt/SUNWsymon/cfg/esusers` file.**

```
# tail /var/opt/SUNWsymon/cfg/esusers
esmaster
espublic
root
pat
suzi
chris
#
```

3. **Add the user names to the `esadm` and `esdomadm` stanzas in the `/etc/group` file.**

   Separate each user name with a comma.

```
esadm::1000:root,pat,suzi,chris
esdomadm::1001:root,pat,suzi,chris
```

   To delete users or user permissions, remove the user names from these files.

Related Information

For more information, see "Sun Management Center Security" in *Sun Management Center 3.5 User's Guide* for information about users and access control.

Accessing the Change Manager Server by Using the Browser Interface

To use the Change Manager browser interface, you need to access the Change Manager server with a web browser as an authenticated user. Therefore, you must log in to the browser application. The following procedures show how to access and log in to the browser interface, and how to get help.

▼ How to Log In to the Change Manager Server (Web Browser)

The browser user interface for the Change Manager supports the following web browsers:

- Netscape™ Communicator, at least Version 4.7 for Solaris 8 and Solaris 9
- Netscape Communicator, at least Version 4.7 for Microsoft Windows
- Microsoft Internet Explorer, at least Version 5 for Microsoft Windows

The Change Manager *URL* follows this form:

`https://`*server_name*`.`*domain*`:6789/changemgr`

Before beginning, make sure that you have a Sun Management Center user account. You can always log in as the Sun Management Center administrator (for example, `root`) that you set up during installation of the Change Manager server.

1. **Go to the Change Manager web site, for example:**

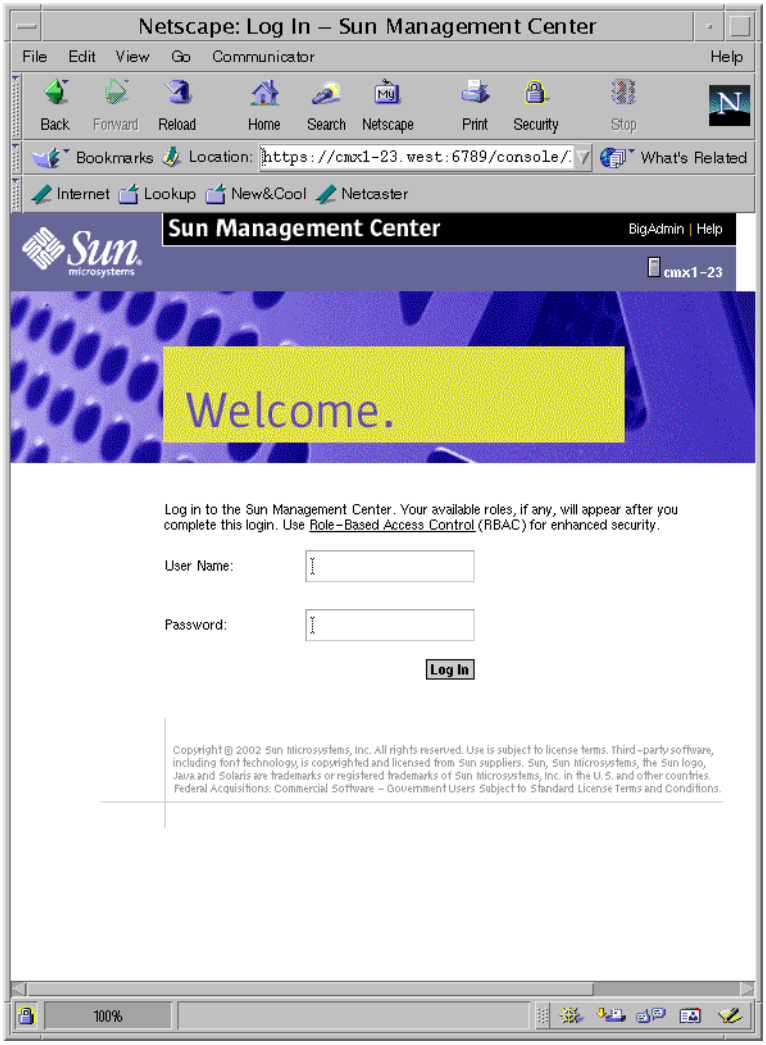
   `https://testserver.yourcompany.com:6789/changemgr`

   This URL accesses the Change Manager server called `testserver.yourcompany.com`.

2. **When a dialog box asks you to accept a certificate for the new site, accept it.**

   Follow the instructions on the dialog boxes.

   The login page for Change Manager appears.



3. **Type your user name.**
4. **Type your password.**
5. **Click Log In to open the browser interface.**

   Your browser console session times out after 15 minutes of inactivity. To change this time-out value, see "How to Change the Time-out Value for the Console Session (Web Browser)" on page 54.

▼ How to Change the Time-out Value for the Console Session (Web Browser)

Your browser console session logs out after *timeout* minutes. The default value for *timeout* is 15 minutes.

1. **Decide how long, in minutes, to make the timeout.**
2. **Update the value of `<session-timeout>` in the `/usr/sadm/lib/webconsole/conf/web.xml` file.**

   The format is `<session-timeout>`*timeout*`</session-timeout>`. The value of *timeout* represents the session timeout in minutes.
3. **Restart the web server for the new time-out value to take effect.**

   ```
   # /usr/sadm/bin/smcwebserver restart
   ```

▼ How to Get Help (Web Browser)

1. **Locate the general links area at the top of the web page.**
2. **Click Help in the section with the black background.**

   A new web browser window opens to the Change Manager help document.

▼ How to Get Glossary Definitions (Web Browser)

1. **Locate the general links area at the top of the web page.**
2. **Click Help in the section with the black background.**

   A new web browser window opens to the Change Manager help document.
3. **Click Help Glossary at the top of the help web page.**

Accessing the Change Manager Server by Using the Command-Line Interface

To use the command-line interface of Change Manager, you need to access the Change Manager server as an authenticated user. Therefore, you must log in to the Change Manager server. The following procedures show how to use the command-line interface to perform authorized Change Manager operations. See also the `changemgr`(1MCM) man page.

▼ How to Initiate a Change Manager Session (Command Line)

The `changemgr` command is in the `/opt/SUNWichange/bin` directory. Add this directory to your search path (`$PATH` environment variable).

- **Start a Change Manager session.**

```
$ changemgr session [ -u username ] [ -p file ] [ -d domain ] \
[ command [ command-arguments ] ]
```

`-u` *username*	Specifies the user name to authenticate. If this option is not specified, the user is the current UNIX user.
`-p` *file*	*file* consists of a single line, which contains the password. If *file* is `-`, then the user can supply the password as standard input. If the `-p` option is not supplied, then the `changemgr` command prompts the user for his password.
`-d` *domain*	Specifies the administrative domain on which to operate. In the context of a session, the default is the domain specified for the session. If no domain is specified, *domain* is the user's home domain. By default, *domain* is the user's home domain.
command	Normally, *command* is a `ksh` or `sh` script that contains Change Manager commands in the form of the command-line interface. If `command` is one of the `ksh` or the `sh` *shells*, you get an interactive session.
command-arguments	Specifies the optional arguments to *command*.

Example—Initiating an Interactive Change Manager Session

The following command line initiates an interactive Change Manager session that uses the `ksh` shell. The session is an authenticated subshell.

```
$ changemgr session ksh
```

Example—Initiating an Interactive Session by Using the Default Shell

The following command line initiates an interactive Change Manager session that uses the value of `$SHELL` to determine which shell to use. If, for example, the value of `$SHELL` is `/bin/ksh`, then `ksh` is used. The session is an authenticated subshell.

```
$ changemgr session
```

Example—Running Commands in an Interactive Change Manager Session

The following example shows an interactive Change Manager session. The `changemgr session` command starts a subshell in which you can run authenticated `changemgr` commands.

Suzi uses the command-line interface to purge a completed job from the job queue. This job, `IC_1`, was initiated from the browser interface. When Suzi is done with these tasks, she exits the session by typing `exit` at the subshell prompt.

```
$ changemgr session
Password: Suzi's password
$ changemgr jobs -l IC_1
IC_1     succeeded
$ changemgr ack IC_1
$ changemgr jobs -l IC_1
$ exit
```

Example—Running Scripts in a Change Manager Session

This example shows how to use the `changemgr session` command to run a script called `deploy-web`, which contains the following:

```
#/bin/sh
changemgr import "$1" /web-server
changemgr fileset -s MediaName=s9.miniroot "$1"
changemgr hostset -s base_config_flar_archive="/$1" "$2"
changemgr update "$2"
```

The following command line runs the `deploy-web` script.

```
$ changemgr session deploy-web web.flar host1
```

▼ How to Authenticate a User (Command Line)

1. **Authenticate the user for any one of the `changemgr` commands.**

   You can run the `changemgr help` commands as an unauthenticated user.

2. **To control user authentication, use the `-u` *username* option with the `-p` *file* option.**

   - If the `-u` option is not specified, then the user is the current UNIX user. In this case, you can supply a file with your password to the `-p` option.
   - If the `-p` option is not specified, then the user is prompted for his password.

Example—Using Default User Authentication With No Password File

Suzi creates a folder as herself. She does not specify a file with her password in it.

```
$ changemgr mkdir /web-server/apache
Password: Suzi's password
$
```

Example—Using Default User Authentication With a Password File

Suzi creates a folder as herself. She specifies a file with her password in it to authenticate.

```
$ changemgr mkdir -p .pfile /web-server/apache
```

Example—Authenticating Another User

Suzi creates a folder as `root`.

```
$ changemgr mkdir -u root /web-server/apache
Password: root password
$
```

CHAPTER 4

Creating a Deployable Solaris Flash Archive (Tasks)

This chapter describes how to create customizable Solaris Flash archives. Such archives are suitable for deployment by Change Manager.

The following topics are covered in this chapter:

Creating Software Stacks

The term *hardware and software integration* encompasses the combined tasks of installing and configuring a system. Integration means several things:

- Installing and configuring a software product correctly
- Binding the software product to a hardware platform
- Ensuring that several software products correctly function and interoperate with each other

The result of integrating several software products is referred to as an *integrated software stack* or simply a *software stack*.

Change Manager imports, manages, and deploys software stacks that are stored as *Solaris Flash archives*. Change Manager deploys these archives to managed hosts. Per-client customization is achieved through the use of archive parameters and custom JumpStart finish scripts that are included in the Solaris Flash archive.

The system that is used as the prototype from which the software stack is created is called the *master system*.

The following sections describe how to create software stacks on master systems.

Note – Do *not* create a Solaris Flash archive on a master system that is a Sun Management Center server or a Change Manager server. Sun Management Center cannot be deployed by using the Solaris Flash technology.

Choosing the Master System

Before you begin the installation of Change Manager software, see "Master System Requirements" on page 31 to understand the hardware and software requirements for the master system.

A master system is the prototype for other systems that will run the software staged on this master. Therefore, choose a master system that closely matches the hardware configurations of the managed hosts it represents. Ideally, you stage the software on an identical system to avoid software discrepancies caused by hardware differences (such as missing device drivers). However, choosing a master system that is similar to the managed hosts is sufficient.

You can create a Solaris Flash archive on one platform that is deployable to a range of similar platforms. For Change Manager 1.0.1, this range is restricted to platforms that use the same Sun Management Center agent. These agents can only be installed on the platform type for which they are intended. For instance, you *cannot* install a Netra™ agent on a Sun Enterprise™ 4500 system. Therefore, an archive created on the Sun Enterprise 4500 system cannot provide full functionality on a Netra system.

Current Sun Management Center agents are as follows:

- Desktop (Sun Blade™ 100, Sun Blade 1000, Ultra™ 1, Ultra 10, Ultra 2, Ultra 30, Ultra 450, Ultra 5, Ultra 60, Ultra 80)
- Netra (T1, T4, T/112x, X1)
- Workgroup Enterprise Server (220, 250, 420, 450, 280, 480, 880, 10, 150, 2)
- Sun Enterprise 3000-6500 Servers
- Sun Fire™ (3800, 4800, 4810, 6800)
- Sun Fire 15000

You must also consider hardware architecture when choosing a master system. Hardware independence is restricted by both instruction set and platform architecture. The master system and the managed hosts must have the same instruction set (namely, SPARC®) and platform architecture (namely, `sun4u`). Note that SPARC is the only processor type that Change Manager currently supports. Also, note that all current SPARC products are `sun4u`.

Ensure that the software required to support the platforms you plan to install is included on the master system before you create the archive. Such an archive can be used to deploy the Solaris Flash archive to a range of platforms. This software must be installed on the master system before you create the Solaris Flash archive. For more information, see "Addressing Hardware Differences Between a Master System and Managed Hosts" on page 61.

Installing Software on the Master System

Begin to create the software stack by installing software on the master system. First, install the Solaris operating environment and Solaris patches on the master system. Then, install the other software applications you want.

Note – Not all software applications can be deployed by using Solaris Flash technology. For example, Sun Management Center software retains instance-specific configuration information that cannot be unconfigured for redeployment. See the *Solaris 9 Installation Guide* for information about the limitations of this technology with respect to add-on software applications.

Addressing Hardware Differences Between a Master System and Managed Hosts

The master system might not match the hardware configuration of the other systems on which you might deploy the Solaris Flash archive. In such cases, ensure that the master system includes software to support all hardware. To support all hardware, install the Entire Solaris Software Group Plus OEM Support package cluster (`SUNWCXall`) on the master system. You must also install any third-party drivers or specialized device drivers on the master system.

For example, you select a PCI-based master system to create software stacks. Driver software for other buses, such as SBus, are not installed by default if a package cluster other than `SUNWCXall` is installed. Consequently, software stacks you build on this master system will not contain the SBus drivers. As a result, managed hosts that have SBus hardware will not have the appropriate software available to support the hardware.

To avoid this situation, do one or more of the following:

- Choose a master system that is identical or almost identical to the managed hosts.
- Include all possible Solaris driver software on the master system by installing all of the Solaris software.
- Select the required hardware support while installing Solaris software. Use either the custom JumpStart `package add` keywords or use the interactive installer's package customization feature.

- Add any missing software to the master system by using a custom JumpStart finish script after Solaris software is installed.

Installing the Change Manager Agent Module on a Master System (Task Map)

After the master system is installed with the software you want, you must also install the Sun Management Center agent and the Change Manager agent module. This software enables communication between the Change Manager server and the managed hosts that run the software stack you are now building. See "Creating Software Stacks" on page 59. This software must be installed on the master system so that it is included in the Solaris Flash archive.

Note – These procedures assume that you already have a Change Manager server installed and configured. See Chapter 3.

The following table identifies the tasks for installing the Sun Management Center agent and the Change Manager agent module on the master system. Perform the tasks in the order shown.

Task	Description	For Instructions
1. (Prerequisite) Install the Sun Management Center 3.5 agent software.	Install the Sun Management Center 3.5 agent software on the master system you use to create a Solaris Flash archive.	See the *Sun Management Center 3.5 Installation and Configuration Guide*.
2. Install the Change Manager 1.0.1 agent software.	Install the Change Manager 1.0.1 agent software on the master system you use to create a Solaris Flash archive.	See "How to Install the Change Manager Agent Module" on page 63.

Installing the Change Manager Agent Module on a Master System

The Sun Management Center 3.5 Agent component must be installed before the Change Manager 1.0.1 agent module. None of the Sun Management Center add-ons are supported on master systems that include the Change Manager 1.0.1 agent module.

For procedures that describe the installation of Sun Management Center 3.5 software, see the following sections in the *Sun Management Center 3.5 Installation and Configuration Guide*:

- To install software by using the GUI installation program, `es-guiinst`, see "To Install Sun Management Center 3.5 on the Solaris Platform."
- To install software by using the command-line installation program, `es-inst`, see "To Install Sun Management Center Using the `es-inst` Script."

Note – When you set up the Sun Management Center 3.5 Agent component on your master system, ensure that the following values match those used to set up the Sun Management Center server software:

- Password used to generate security keys
- SNMPv1 community string

Before you begin the installation of Change Manager software, see "Master System Requirements" on page 31 to understand the hardware and software requirements for a master system.

The following procedure shows how to install the Change Manager 1.0.1 agent module on a master system.

▼ How to Install the Change Manager Agent Module

1. **Become superuser.**
2. **Install the Change Manager agent module in one of the following ways:**
   - Install the Change Manager agent module by using the GUI.

     ```
     # /opt/SUNWsymon/sbin/es-guiinst
     ```
   - Install the Change Manager agent module by using the command line.

     ```
     # /opt/SUNWsymon/sbin/es-inst
     ```

3. **Specify the source directory of the Change Manager installation files.**

   For example, if the directory in which you downloaded the Change Manager 1.0.1 software is called `/export/build/cm101`, then specify this directory.

   The installation program checks for add-on products to be installed.

4. **Install the Change Manager product.**

   The Change Manager agent module is installed.

   After the installation completes, you are asked to run the setup.

5. **Set up the Change Manager add-on product.**

   The Sun Management Center components are stopped.

   Configure the add-on products only.

   The agent software is set up.

6. **Start the Sun Management Center agent component.**

   Starting the agent component takes only a few moments.

Unconfiguring Software Applications

Some applications are uninstalled and unconfigured by using specific procedures. For example, you might remove host-specific information, such as host names, from configuration files to unconfigure an application.

Be sure to unconfigure software applications before you create the Solaris Flash archive. After you unconfigure the applications, the software stack no longer contains host-specific information about the master system.

Note – You might not be able to unconfigure or remove the host-specific information created by an application. In such cases, you cannot use Solaris Flash technology to deploy the application. Some software stores configuration information outside of UNIX file systems. Such software does not always configure correctly on managed hosts that are installed with Solaris Flash archives. An example is Sun Management Center, which stores host-specific information in an Oracle database. Because its host-specific information cannot be removed, Sun Management Center cannot be deployed using the Solaris Flash feature.

Configuration information that is host-specific and instance-specific can be provided at deployment time by using archive parameters and custom JumpStart finish scripts as described in "Creating a Customizable Solaris Flash Archive" on page 67.

After you install the Solaris Flash archive on a managed host, some host-specific files are re-created for the managed host. The installation program uses the `sys-unconfig` command and the `sysidtool` command to delete and re-create the host-specific network configuration files. The files that are re-created include such files as `/etc/hosts`, `/etc/defaultrouter`, and `/etc/defaultdomain`. See the `sys-unconfig`(1M) man page and the `sysidtool`(1M) man page.

Other Considerations

Caution – Do *not* configure boot environments on the master system by manually using the Solaris Live Upgrade commands `lu`(1M) and `lucreate`(1M). Change Manager uses Solaris Live Upgrade tools to manage boot environments if they are specified in shared profiles and in host properties for managed hosts.

Do not provide runtime data for applications after installation on the master system. For example, do not create user data for a database server or an LDAP server after installing the database management software.

Note – Depending on the application, you might need to provide mechanisms for initializing this data when the managed host first boots.

Creating the Solaris Flash Archive From the Master System

Create the Solaris Flash archive of the integrated software stack after installing and configuring the software on the master system.

Use the `flar` command to create the Solaris Flash archive. See the `flar`(1MCM) man page.

For example, to create a Solaris Flash archive named `Netra082202.apache.flar`, type the following:

```
# /usr/sbin/flar create -n apacheServer -u ic_cfgparams \
  -c /flarchive/Netra082202.apache.flar
```

The `-n` option assigns its value, `apacheServer`, to the `content_name` keyword in the Solaris Flash archive. You can view archive keywords by using the browser interface or the command-line interface. See "How to View or Modify File Properties (Web Browser)" on page 141 or "How to View File or Folder Properties (Command Line)" on page 148.

`/flarchive` is the target directory name in which the Solaris Flash archive is created. The example command line creates an archive named `Netra082202.apache.flar` in the target directory.

Note – Ensure that the target directory has sufficient disk space to accommodate the Solaris Flash archive.

Archive parameters *must* be described in a text file called `ic_cfgparams`. The file must be located in the directory from which the `flar create` command is invoked. Or you can specify the path to the `ic_cfgparams` file as an argument to the `-d` option. Use `flar create -u` to include the `ic_cfgparams` file in the "user-defined section" of the Solaris Flash archive you create.

Import this archive to the Change Manager repository for deployment to managed hosts.

Creating a Customizable Solaris Flash Archive

An archive might require that the user deploying it supply the information required to customize the archive for its production environment. To accomplish this, when you create the archive, include a special section that describes the required parameters, *archive parameters*. Also, include custom JumpStart finish scripts that process the supplied values to modify the system accordingly.

Archive parameters are *name=value* pairs that are associated with the integrated software stack. These parameters provide the data to be processed by the finish scripts that are invoked to customize the software stack for the managed host. Custom JumpStart finish scripts are written by the stack creator. These scripts perform host-specific customizations on the managed host as part of the deployment process. Archive parameters obtain host-specific values through the Change Manager interface.

Creating the Archive Parameters File

An archive parameters file specifies application-specific parameters and default values. The archive parameters file contains entries in the following format:

- Parameter name (`name`)
- Label to be used by the browser interface (`label`)
- Optional default value (`default`)

The archive parameters file can be created by any text editor capable of saving files as plain ASCII text.

Following is a simple example of an archive parameters file:

```
name=telnet label="Do you want to enable telnet?" default=yes
name=ftp label="Do you want to enable ftp?" default=yes
name=finger label="Do you want to enable finger?" default=yes
```

Archive parameters *must* be described in a text file called `ic_cfgparams`. The file must be located in the directory from which the `flar create` command is invoked. Use `flar create -u` to include the `ic_cfgparams` file in the "user-defined section" of the Solaris Flash archive you create.

Processing the Archive Parameters File With Finish Scripts

As the final step in software stack deployment, Change Manager runs the finish scripts contained in the Solaris Flash archive. Change Manager provides a script that executes all user-supplied finish scripts that it finds in the `/etc/ichange.d` directory of the newly deployed software stack. This script provides access to the values that the user specified in the archive parameters file.

Following is an example of a finish script that processes the archive parameters file created in the previous section:

```
#! /bin/sh

case `cmgetprop telnet` in
[Nn]*)  telnet='#'      ;;
*)      telnet=         ;;
esac

case `cmgetprop ftp` in
[Nn]*)  ftp='#'         ;;
*)      ftp=            ;;
esac

case `cmgetprop finger` in
[Nn]*)  finger='#'      ;;
*)      finger=         ;;
esac

ed $SI_ROOT/etc/inetd.conf <</
/^#*telnet/s/^#*/$telnet/
/^#*ftp/s/^#*/$ftp/
/^#*finger/s/^#*/$finger/
w
q
/

exit 0
```

You might use two or more finish scripts to process the parameters in the `ic_cfgparams` file. Ensure that the `ic_cfgparams` file contains all of the parameters that the scripts process.

Store all the finish scripts in the `/etc/ichange.d` directory prior to creating the Solaris Flash archive of the master system. The finish scripts *must* be part of the archive. If you have more than one finish script, they are processed in lexical order by file name.

Set the finish script permissions to 755. If the scripts are not executable, the Solaris Flash archive cannot be customized.

Finish scripts use the following elements:

- `SI_ROOT` – This environment variable specifies the mount point of the file system being installed or updated.

  For example, `$SI_ROOT/etc/passwd` points to the password file on the boot environment currently being installed.

- `cmgetprop` – This tool is used by finish scripts to determine the current value of an archive parameter. Finish scripts use a `$PATH` that includes the `cmgetprop` command. See the `cmgetprop`(1MCM) man page.

  The following example is based on the `ic_cfgparams` file described in "Creating the Archive Parameters File" on page 67. You might use `cmgetprop` as follows:

  ```
  enable_telnet=`cmgetprop telnet`
  ```

  This command line assigns the value associated with the `telnet` parameter to the shell variable `enable_telnet`.

  The value of a parameter might come from one of the following sources:

  - Default value specified in the archive parameters file (`ic_cfgparams`)
  - *Shared profile* associated with the managed host
  - Host properties of the managed host

  You can use the browser interface to supply and modify parameter values on the shared profile property page or the managed host property page. You can also supply and modify parameter values by using the `changemgr fileset` and `changemgr hostset` commands of the command-line interface.

Using `flar` to Create a Customizable Solaris Flash Archive

Use the `flar` command to create the Solaris Flash archive. See the `flar`(1MCM) man page. The `-u` option includes the archive parameters file in the user section of the Solaris Flash archive.

For example, to create a customizable Solaris Flash archive named `082202.apache.flar`, type the following:

```
# /usr/sbin/flar create -n apacheServer -u ic_cfgparams \
-c /flarchive/082202.apache.flar
```

`/flarchive` is the target directory name in which the Solaris Flash archive is created. The example command line creates an archive named `082202.apache.flar` in the target directory.

CHAPTER 5

Installing Solaris Flash Archives on Managed Hosts (Tasks)

Caution – Change Manager uses the *Solaris Live Upgrade* software to perform software updates on managed hosts. Do *not* manually run Solaris Live Upgrade commands on managed hosts outside the context of Change Manager.

If you run Live Upgrade commands in this way, Change Manager might be presented with an inconsistent view of the state of the managed host.

This chapter provides step-by-step instructions for installing Solaris Flash archives on managed hosts.

The following topics are covered in this chapter:

Change Manager Deployment Operations

The main task performed by Change Manager is to deploy software stacks to managed hosts. Change Manager also performs remote operations on the managed hosts, such as *fallback*, *reboot*, and *halt*.

Change Manager supports the following *deployment* operations:

Initial Installation

You must perform an initial installation when a managed host is in one of the following states:

- No software is installed
- Existing software can be overwritten
- Existing software does not include the Sun Management Center agent and the Change Manager agent module

---

Note – Change Manager provides the network installation services for the managed host. You must first create custom JumpStart files for each managed host by running the Set Up for Install or `changemgr setup` operation.

To initiate an initial installation, you must manually run the following command on each managed host:

```
ok> boot net - install
```

Live Update

The managed hosts are running a Change Manager-compatible software stack that was installed by Change Manager. To be Change Manager-compatible, the software stack *must* include the Sun Management Center agent and the Change Manager agent module. A *live update* (also called update) uses the Solaris Live Upgrade feature to deploy software to the inactive boot environment. Initiate an update by running the Update or `changemgr update` operation.

Reinstallation

This operation is similar to an initial installation because the software installed on managed hosts is overwritten, software is *not* deployed to another boot environment. Initiate a *reinstallation* by running the Reinstall or `changemgr reinstall` operation.

Note – You must perform a Change Manager initial installation on a managed host before you can perform an update or reinstallation on that managed host.

To prepare a managed host for future updates, configure your managed host with two *boot environments*. To prepare a managed host for future reinstallation operations, configure your managed host with one boot environment. See "Minimum Set of Parameters to Deploy Software" on page 180.

Solaris Deployment Technologies Used by Change Manager

Change Manager employs the following deployment technologies for performing initial installation, update, and reinstallation operations:

- Solaris Flash installation
- Solaris Live Upgrade
- Custom JumpStart installation

Solaris Flash Installation

The *Solaris Flash installation* enables you to create a single reference installation of the Solaris operating environment and other software applications on a system. This system is called the *master system*. Then, you can replicate that reference installation on a number of systems by using Change Manager. These systems are called *managed hosts*. Installing managed hosts with the Solaris Flash archive is a four-part process that involves the following:

1. Installing the master system. Select a system and use any of the Solaris installation methods to install the Solaris operating environment and any other software.
2. Installing the Sun Management Center agent and the Change Manager agent module on the master system. This software is required for Change Manager to remotely control managed hosts once the software stack has been installed.
3. Creating the Solaris Flash archive. The *Solaris Flash archive* is a single file that contains a software stack. The archive is a copy of all the files on the master system.
4. Installing the Solaris Flash archive on managed hosts. When you install the Solaris Flash archive on a managed host, all of the files in the archive are copied to that managed host. The newly installed managed host now has the same installation configuration as the original master system.

See Chapter 4 for information about creating Solaris Flash archives.

Managed hosts are not updated by adding packages or installing patches. Instead, you update and reconfigure the master system. Then, you create a new Solaris Flash archive that contains the updated software stack. The new archive can be installed on the managed hosts in a single step.

The Solaris Flash archives *must* be imported to the *Change Manager repository* before they can be installed on managed hosts.

Solaris Live Upgrade

Solaris Live Upgrade substantially reduces the usual service outage that is associated with other operating system installation methods. While the active *boot environment* continues to run, you can install a Solaris Flash archive on the inactive boot environment. The original system configuration remains fully functional and unaffected by the installation of the Solaris Flash archive. When you *reboot* the system, this boot environment becomes the active boot environment.

If a failure occurs, you have a safety net. You can quickly revert to the original boot environment by performing a *fall back*. This fall back action eliminates the downtime associated with the normal test and evaluation process.

Change Manager uses Solaris Live Upgrade to perform *updates* of managed hosts. Before you can perform updates, you must perform an initial installation by using Change Manager. This initial installation must create two boot environments so that an alternate boot environment is available for the update.

For more information about Solaris Live Upgrade, see "Solaris Live Upgrade (Overview)" in *Solaris 9 Installation Guide*.

Custom JumpStart Installation

Custom JumpStart is a command-line interface that enables you to automatically install several systems, based on JumpStart profiles that you create. These profiles define specific software installation requirements. You can also incorporate shell scripts to include preinstallation tasks and postinstallation tasks. You choose which profile and scripts to use for installation. Custom JumpStart then installs the system.

Change Manager uses the custom JumpStart installation method to perform the initial installations and *reinstallations* of managed hosts.

See "Preparing Custom JumpStart Installations (Tasks)" in *Solaris 9 Installation Guide*.

Change Manager Deployment File Types

Change Manager uses deployment files as input for jobs.

You can use folders to create a hierarchy in which to organize these Change Manager files. These files and folders are stored in the repository. You can organize the folders and files in any way that you want.

Access the repository in the browser user interface by clicking the Set Up Files tab. Access the repository with the command-line interface by using the file management subcommands of the `changemgr` command.

You might organize the folders and files in the following ways:

- **Group like file types –** For example, store all the Solaris Flash archives in a single folder. Do the same for Solaris boot images, shared profiles, and manifests.
- **Group files related to a particular set of managed hosts –** Create a folder to hold all the files associated with a particular service's servers.

  For example, a *server farm* provides web services. Therefore, create a folder named `WebServer`. In the `WebServer` folder, store the files used by the web server, such as the archives, boot images, shared profiles, and manifests. Create a separate folder to hold files associated with a mail server.
- **Group by user name –** Store all files in folders owned by specific users. For example, store all of Joe's files in a folder named `joe`. Then, Joe can organize his folders and files in the way he wants.
- **Group all files associated with a particular archive –** Store all files associated with each archive in folders. For example, the archive and associated files for the Apache web server are stored in a folder named `apache-web-server`. Store the archive, boot image, and shared profile in the same folder.

Files stored in the Change Manager repository have a standard set of properties associated with them. The following properties are shared by all files:

`Description`	User-supplied string that describes the file.
`Owner`	Read-only property that names the owner of the file.
`State`	Read-only property that indicates the state of the file.

Note – When using the browser interface, you must perform the operations on the File Actions drop-down menu while in the appropriate folder.

For example, to create a folder inside an existing folder, go to that folder *before* choosing New Folder from the File Actions menu.

When using the browser interface, you can select items from a list. To select an item from a list, click the checkbox next to the item name. Then, choose the action to perform from the File Actions drop-down menu.

Shared Profile

A *shared profile* is a set of Solaris system configuration parameters that are used to install managed hosts in a consistent, repeatable manner. Once created, a shared profile becomes a template that can be applied to one or more managed hosts. A shared profile specifies customizations such as the following:

- Disk slicing
- Superuser (`root`) password
- Network interfaces
- Naming service
- Time zone
- Locale

Each profile can specify the Solaris Flash archive to be deployed to the managed host. Every managed host must have a shared profile associated with it.

Once applied to a specific managed host, the shared profile data becomes part of the *host properties* for that managed host.

Use the `changemgr fileset` command to change property values for a shared profile in the repository. You can also change property values by making changes to property values on the shared profile's property page. However, when the shared profile is outside of the repository, you manipulate properties by editing the properties and property values contained in the file. See the `cmsp`(4CM) man page.

The shared profile file name must use the `.cmsp` suffix.

To create or import shared profiles, see the appropriate section:

- "How to Create a Shared Profile (Web Browser)" on page 84
- "How to Import a Shared Profile to the Change Manager Repository (Web Browser)" on page 85
- "How to Import Shared Profiles to the Change Manager Repository (Command Line)" on page 95

To deploy software to a managed host by using the shared profile, see the appropriate section:

- "How to Perform an Initial Installation (Web Browser)" on page 87
- "How to Reinstall, Update, Fall Back, and Reboot Managed Hosts (Web Browser)" on page 88
- "How to Perform an Initial Installation (Command Line)" on page 98
- "How to Reinstall Managed Hosts (Command Line)" on page 99

- "How to Update Managed Hosts (Command Line)" on page 100

Understanding Shared Profiles and Host Properties

Shared profiles and host properties are used by Change Manager to describe how one or more managed hosts are to be configured with a software stack. Much of the information specified by shared profiles and host properties is the same as described in a custom JumpStart installation profile.

A *shared profile* can be used by one or more managed hosts to describe the way managed hosts are configured with the software stack.

Host properties describe *exactly one* managed host. These properties describe the exact configuration of the software stack on the particular managed host. The host properties point to the shared profile. You can further customize the managed host by doing the following:

- Overriding archive parameter values in the shared profile by providing new values for the same archive parameters
- Overriding parameter values in the shared profile by providing new values for the same parameters
- Providing values not already specified in the shared profile

Solaris Boot Image

A *Solaris boot image* is a set of files that is used with a matching archive to install and update managed hosts. The Solaris version of the boot image and the archive must be identical for installation tasks and update tasks to succeed. The Solaris boot image is used as input for an installation or an update action and is associated with an archive. A Solaris boot image is also known as a miniroot.

For installations, the boot image boots the Solaris operating environment on the managed host and runs the Solaris Flash installation program. For updates, the boot image runs the Solaris Flash installation program.

A single boot image can support several archives. The Solaris version of the boot image and the archive must match. For example, a Solaris 8 2/02 boot image must be used to deploy archives based on the Solaris 8 2/02 release.

The Solaris boot image file name must use the `.miniroot` suffix.

In addition to the general file properties, a Solaris boot image is associated with the following property:

`OSVersion` User-supplied string that describes the version of the Solaris operating system associated with the boot image.

To deploy software to a managed host, see the appropriate section:

- "How to Perform an Initial Installation (Web Browser)" on page 87
- "How to Reinstall, Update, Fall Back, and Reboot Managed Hosts (Web Browser)" on page 88
- "How to Perform an Initial Installation (Command Line)" on page 98
- "How to Reinstall Managed Hosts (Command Line)" on page 99
- "How to Update Managed Hosts (Command Line)" on page 100

Solaris Flash Archive

A *Solaris Flash archive* is a file that contains a software stack. This stack can be deployed to hosts managed by Change Manager. The Solaris version of the archive must match that of the boot image used for deployment. The archive is used as input for an installation, reinstallation, or update action. The managed host or a shared profile specifies the archive to use.

To deploy an archive, a matching Solaris boot image must already exist in the Change Manager repository.

The Solaris Flash archive file name must use the `.flar` suffix.

In addition to the general file properties, a Solaris Flash archive is associated with the following property:

`BootImage` User-supplied string that describes the Solaris boot image associated with this Solaris Flash archive.

To deploy software to a managed host, see the appropriate section:

- "How to Perform an Initial Installation (Web Browser)" on page 87
- "How to Reinstall, Update, Fall Back, and Reboot Managed Hosts (Web Browser)" on page 88
- "How to Perform an Initial Installation (Command Line)" on page 98
- "How to Reinstall Managed Hosts (Command Line)" on page 99
- "How to Update Managed Hosts (Command Line)" on page 100

For a description of the archive keywords, see the `flash_archive`(4CM) man page.

Folder

A *folder* is a container that can hold files and other folders. Click a folder name to go into that folder. Then, view the folder's contents. Change Manager files can be the following:

- Solaris Flash archive
- Solaris boot image
- Shared profile
- Manifest
- Audit rules file
- Report

Perform the following actions from the folder page:

- Create folders, shared profiles, and audit rules files.
- Import Solaris Flash archives, Solaris boot images, shared profiles, audit rules files, and manifests to the Change Manager repository.
- Rename folders and files.
- Export files.
- Create a copy of a shared profile or an audit rules file in the current folder.
- Move folders and files to another folder.
- Delete folders and files.

To create folders, see the appropriate section:

- "How to Create a Folder (Web Browser)" on page 138
- "How to Create a Folder (Command Line)" on page 143

Change Manager Naming Conventions

Change Manager file object names and path component names can include the following characters:

- Letters (`a-z` and `A-Z`)
- Numbers (`0-9`)
- At (`@`)
- Equals (`=`)
- Hyphen (`-`)
- Period (`.`)
- Plus (`+`)
- Underscore (`_`)

These characters can appear at any position in a name. However, the period character cannot appear at the beginning of a name.

Tab characters and newline characters are not permitted.

Path components are delimited by the slash (/) character.

Installing Solaris Flash Archives on Managed Hosts by Using the Browser Interface (Task Map)

The following table identifies the procedures to follow to install Solaris Flash archives on managed hosts by using the browser interface.

Task	Description	For Instructions
Import a Solaris boot image to the Change Manager repository.	Find a copy of the Solaris boot image that matches the Solaris version of the archive. Then, import the Solaris boot image to the Change Manager repository.	See "How to Import Solaris Boot Images to the Change Manager Repository (Web Browser)" on page 83.

Import a Solaris Flash archive to the repository.	■ If the software stack is already stored as a Solaris Flash archive in the Change Manager repository, then the archive can be deployed.
	■ If the archive is not in the repository, then do one of the following:
	  ■ Import the archive to the repository.
	  ■ Create the archive and import it to the repository.
		■ See Chapter 4.
		■ See "How to Import Solaris Flash Archives to the Change Manager Repository (Web Browser)" on page 84.

Create a shared profile.	Create a shared profile that describes how to configure a set of managed hosts.	See "How to Create a Shared Profile (Web Browser)" on page 84.

Task	Description	For Instructions
Import a shared profile.	Import a shared profile that describes how to configure a set of managed hosts.	See "How to Import a Shared Profile to the Change Manager Repository (Web Browser)" on page 85.
Add a host to be managed by Change Manager.	The managed host can use a shared profile. Parameter values in the host properties override those specified in the shared profile.	See "How to Add a Managed Host (Web Browser)" on page 86.
Perform an initial installation.	Perform an initial installation of the Solaris Flash archive on managed hosts. When installed with the archive, these managed hosts can be remotely controlled by Change Manager.	See "How to Perform an Initial Installation (Web Browser)" on page 87.
Reinstall a managed host with a Solaris Flash archive.	Reinstall a managed host with a Solaris Flash archive. Unlike initial installation, which must be initiated manually on each managed host, the reinstallation is initiated by Change Manager.	See "How to Reinstall, Update, Fall Back, and Reboot Managed Hosts (Web Browser)" on page 88.
Update a managed host with a Solaris Flash archive.	Use Solaris Live Upgrade to update a managed host with a Solaris Flash archive. The update is performed by installing the archive on the inactive boot environment of the managed host.	See "How to Reinstall, Update, Fall Back, and Reboot Managed Hosts (Web Browser)" on page 88.
Fall back to the previous boot environment after performing an update.	Fall back to the previous boot environment if you want to run the software stack on a previous boot environment. You might fall back because the stack running on the active boot environment is bad. You might also fall back when you want to run the software stack that is installed on the other boot environment. You can only perform a fallback of a managed host you updated.	See "How to Reinstall, Update, Fall Back, and Reboot Managed Hosts (Web Browser)" on page 88.
Reboot a managed host.	Reboot one or more managed hosts.	See "How to Reinstall, Update, Fall Back, and Reboot Managed Hosts (Web Browser)" on page 88.

Installing Solaris Flash Archives on Managed Hosts by Using the Browser Interface

Initiate deployment jobs from the Set Up Hosts & Jobs section. Click the Set Up Hosts & Jobs tab to go to the Set Up Hosts & Jobs section.

Navigate through the hierarchy of *host groups* and *managed hosts*. Host groups can contain managed hosts and other host groups. Perform actions on host groups and managed hosts.

Click a host group name to change to that host group and see its contents. Click a managed host's name to see its properties.

To learn how to create folders and perform management tasks in the Change Manager repository, see Chapter 8. The procedures described in Chapter 8 are not required to perform deployment tasks. However, you might want to create a hierarchy of folders in the repository.

To learn how to create host groups and perform management tasks on the Sun Management Center topology, see Chapter 9. The procedures described in Chapter 9 are not required to perform deployment tasks. However, you might want to create a hierarchy of host groups in the topology.

To learn how to navigate through the browser interface, see Appendix A.

▼ How to Access the Set Up Files Section and Appropriate Folder (Web Browser)

Note that the top of the Set Up Files section hierarchy is a folder.

1. **To go to the Set Up Files section, click the Set Up Files tab in the general links area.**

   The top-level Set Up Files page shows a table, which can contain files and folders. The table is a file manager.

2. **Drill down to the appropriate folder.**

   Click a folder name to go into that folder. Then, view the folder's contents. Continue to click folder names until you reach the folder or file you want.

▼ How to Import Solaris Boot Images to the Change Manager Repository (Web Browser)

The Solaris boot image is used to deploy software stacks to managed hosts.

For an initial installation, the managed host boots and mounts a small Solaris root. The root is contained in the boot image. Then, the managed host runs the Solaris installation program. For an update, the managed host runs the Solaris installation program, which is stored on the boot image.

The time required to import a file to the Change Manager repository depends on the size of the file and the speed of the network.

1. **If you are not already in the appropriate folder, see "How to Access the Set Up Files Section and Appropriate Folder (Web Browser)" on page 82.**
2. **From the File Actions menu, choose Import Boot Image.**
3. **Supply the pertinent information:**
   - Boot image name, which describes the version of Solaris and architecture supported, for example, `Solaris8_202_sun4u`. Add the `.miniroot` suffix to complete the boot image name, `Solaris8_202_sun4u.miniroot`.
   - Path to the boot image. Click Browse to find the boot image.

     The path to the boot image must point to the top directory of the Solaris installation media. The installation media can be on a CD or on another system on the network. The top directory of the Solaris installation media contains the `Copyright` and `installer` files, and either the `Solaris_8` or `Solaris_9` directory. These directories contain the Solaris packages and the Solaris boot image.

     Note – If you import the boot image from a CD, point to the directory named something like `/cdrom/`*Solaris-version*`/s0`. For example, the directory for a Solaris 9 boot image would be `/cdrom/sol_9_sparc/s0`.

   - Solaris version that the boot image supports, for example `Solaris 8 2/02`.
4. **When the information is complete, click Import to copy the Solaris boot image to the Change Manager repository.**

   Click Cancel to return to the previous page.

▼ How to Import Solaris Flash Archives to the Change Manager Repository (Web Browser)

Import a Solaris Flash archive from another system on the network, perhaps the master system on which it was created. This archive is a software stack that can be deployed to managed hosts.

The time required to import a file to the Change Manager repository depends on the size of the file and the speed of the network.

1. **If you are not already in the appropriate folder, see "How to Access the Set Up Files Section and Appropriate Folder (Web Browser)" on page 82.**
2. **From the File Actions menu, choose Import Archive.**
3. **Supply the following information:**
   - Archive name. Choose a meaningful name. For example, choose a name that describes the software contents or purpose of the archive, such as `apache_webserver`. Add the `.flar` suffix to complete the archive name, `apache_webserver.flar`.
   - Path to the archive outside the Change Manager repository. Click Browse to find the archive.
   - Path to the Solaris boot image in the Change Manager repository that supports the same Solaris version and architecture.
4. **When the information is complete, click Import to import the audit rules file.**
   Click Cancel to return to the previous page.

▼ How to Create a Shared Profile (Web Browser)

1. **If you are not already in the appropriate folder, see "How to Access the Set Up Files Section and Appropriate Folder (Web Browser)" on page 82.**
2. **From the File Actions menu, choose New Shared Profile.**
   The shared profile property page appears.
3. **Use the wizards in each section to create the shared profile.**
   Launch each wizard by clicking the Edit button associated with particular properties.
   Each page requires information that is used to create the profile. Return to previous pages by clicking buttons or clicking on the step description links in the left panel.
4. **After selecting values for the profile, click Finish to set the property values on the property page.**
   Click Cancel to exit the wizard and return to the previous page.

5. **When the properties have the values you want, click Save to create the shared profile.**

   Click Cancel to exit the shared profile property page without saving changes and to return to the previous page.

▼ How to Import a Shared Profile to the Change Manager Repository (Web Browser)

The shared profile describes how the managed hosts should be configured at deployment time. For a description of the shared profile's format, see "Shared Profile" on page 76.

If the shared profile contains a property with an invalid value, then the import fails. For example, the value of `base_config_flar_archive` is invalid if it does not refer to an archive in the repository. Check the job queue (see "How to View the Job Queue (Web Browser)" on page 128) to determine whether the import failed. If the import failed, correct the property value and reinitiate the import operation.

The time required to import a file to the Change Manager repository depends on the size of the file and the speed of the network.

1. **If you are not already in the appropriate folder, see "How to Access the Set Up Files Section and Appropriate Folder (Web Browser)" on page 82.**
2. **From the File Actions menu, choose Import Shared Profile.**
3. **Supply the following information:**
   - Profile name. Choose a meaningful name. For example, choose a profile name that describes the software customizations or the managed host's hardware type, such as `webserver_sun4u`. Add the `.cmsp` suffix to complete the shared profile name, `webserver_sun4u.cmsp`.
   - Path to the shared profile outside the Change Manager repository. Click Browse to find the profile.
4. **When the information is complete, click Import to copy the profile file to the Change Manager repository.**

   Click Cancel to return to the previous page.

▼ How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)

1. **To go to the Set Up Hosts & Jobs section, click the Set Up Hosts & Jobs tab in the general links area.**

- If more than one administrative domain exists, you go to a page showing a table that lists the available administrative domains. Go to Step 2.
- If only one administrative domain exists, the page shows a table that lists managed hosts and host groups in the default domain. Go to Step 3.

2. **(Optional) Click the name of the administrative domain to use.**

Note – Use Sun Management Center to create a new administrative domain. See "Using Sun Management Center Administrative Domains" in *Sun Management Center 3.5 Software User's Guide*.

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3. **Drill down to the appropriate host group.**

   Click a host group name to go into that host group. Then, view the host group's contents. Continue to click host group names until you reach the host group or managed host you want.

▼ How to Add a Managed Host (Web Browser)

Managed host properties are the same as those specified for shared profiles. For information about the properties and property values, see Chapter 10.

Note – A managed host can be managed by only *one* Change Manager server. To change control of a managed host to another Change Manager server, see "`Internal error: unable to establish probe connection` Appears When Running Jobs on a Managed Host" on page 202.

---

1. **If you are not already in the appropriate host group, see "How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)" on page 85.**
2. **From the Host Actions menu, choose Add Host.**

   The host property page appears.
3. **Supply the following information:**
   - Host name
   - Ethernet address of the managed host
   - *Platform group* of the managed host
   - Port number configured on the agent to communicate with the server

Note – If you change the value of the `AgentPort` property after installing a managed host, the Change Manager server can no longer communicate with it. To reestablish communication with the server by using the new agent port, you must reinitialize the managed host by performing an initial installation on it.

- Shared profile to use to install or update the managed host
- Parameter values that customize the Solaris Flash archive for the managed host

Note – If a shared profile already exists for this managed host, you only need to specify the name of the shared profile. You can override any archive-specific parameter values specified in the shared profile by clicking the Load button. Then, you can update these parameter value fields of the host properties.

4. **Click Add to add the managed host.**

   Click Cancel to return to the previous page.

▼ How to Perform an Initial Installation (Web Browser)

To perform an initial installation, you must first *set up for initial installation*. The setup creates the custom JumpStart files based on information in the shared profile and host properties. Then, you must initiate the initial installation from the console of each managed host to be installed.

1. **Make sure that the managed hosts you want to install have been added to the Change Manager server.**

   See "How to Add a Managed Host (Web Browser)" on page 86.

2. **Modify the shared profiles and host properties to reflect the configuration of the managed hosts you want.**

   - To configure the managed hosts for reinstallation operations, configure one boot environment.
   - To configure the managed hosts for updates, create two boot environments.

   See "Minimum Set of Parameters to Deploy Software" on page 180.

3. **If you are not already in the appropriate host group, see "How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)" on page 85.**

4. **From the Host Actions menu, choose Set Up for Install.**

This action creates the custom JumpStart files needed to perform the initial installation.

Caution – If you modify the associated shared profile or host properties before you perform the initial installation, you *must* re-create the JumpStart profiles. To re-create the JumpStart profiles, rerun Set Up for Install. Then, type `boot net - install` at the OpenBoot prompt.

5. **Supply a meaningful job name with which to track the job's progress.**
6. **Click Submit to initiate the action.**
   Click Cancel to return to the previous page.
7. **From the console of each of the managed hosts to be installed, do the following:**
   a. **Bring each managed host to the `ok>` prompt.**
      If the managed host is running, press Stop-A.
   b. **On each console, type `boot net - install` and press Return.**
      Be sure to include the space between the `-` and `install`.

Caution – Make sure that the managed host is *only* a network boot client of the Change Manager server.

The network boot of your managed host might fail with an error message such as `Panic: unable to mount file systems`. If such a message appears, then your managed host is probably being served by more than one network boot server. See "`Panic: unable to mount file systems` Message Appears While Booting From the Network" on page 210.

▼ How to Reinstall, Update, Fall Back, and Reboot Managed Hosts (Web Browser)

1. **If you are not already in the appropriate host group, see "How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)" on page 85.**
2. **Perform one of the following actions:**
   - To perform a *reinstallation*, choose Reinstall from the Host Actions menu.
   - To perform an *update*, choose Update from the Host Actions menu.

Note – First use Change Manager to perform an initial installation before using the *Solaris Live Upgrade* feature on a managed host. The initial installation creates two *boot environments* by using the `lucreate` command.

Modify the shared profiles and host properties to reflect the configuration of the managed hosts.

- To *fall back* to the previous version of the software stack, choose Fall Back from the Host Actions menu.

  The fallback operation "undoes" the last update attempt of a managed host, whether it finished or did not start.

  For example, three managed hosts are updated one host at a time. The update operation completes on the first managed host. Then, the update begins on the second managed host. When the first managed host boots the updated boot environment, you notice that there are problems with the system. You cancel the running update.

  Each of the three managed hosts are in a different state. The first managed host completed the update. The second managed host started the update, but did not complete it. The third managed host did not start the update.

  The fallback operation ensures that each of these managed hosts reverts to the boot environment running prior to the update attempt.

  The fallback feature fails if the system cannot boot. In such cases, see "Solaris Live Upgrade (Overview)" in *Solaris 9 Installation Guide*.

- To *reboot* managed hosts, choose Reboot from the Host Actions menu.

3. **Supply a meaningful job name.**

   For example, the job name might be `Update host1 and host2`.

4. **Determine when you want to run the job, either now or at another time.**

   - To initiate the job immediately, click the Start Now radio button.
   - To run the job at a later time, specify the start date and start time.
     - Start date. Click the date or specify the date in the *mm/dd/yyyy* format.

       mm and *dd* are two-digit forms for the month and day. *yyyy* is the four-digit form for the year.
     - Start time. Choose the start time from the hour and minute pull-down menus.

5. **Click Submit to initiate the action.**

   Click Cancel to return to the previous page.

Installing Solaris Flash Archives on Managed Hosts by Using the Command-Line Interface (Task Map)

The following table identifies the procedures to follow to install Solaris Flash archives on managed hosts by using the command-line interface. See the `changemgr`(1MCM) man page.

Task	Description	For Instructions
Import a Solaris boot image to the Change Manager repository.	Find a copy of the Solaris boot image that matches the Solaris version of the archive. Then, import the Solaris boot image to the Change Manager repository.	See "How to Import Solaris Boot Images to the Change Manager Repository (Command Line)" on page 92.

Import a Solaris Flash archive to the repository.	■ If the software stack is already stored as a Solaris Flash archive in the Change Manager repository, then the archive can be deployed.
	■ If the archive is not in the repository, then do one of the following:
	  ■ Import the archive to the repository.
	  ■ Create the archive and import it to the repository.
		■ See Chapter 4.
		■ See "How to Import Solaris Flash Archives to the Change Manager Repository (Command Line)" on page 94.

Import a shared profile.	Import a shared profile that describes how to configure a set of managed hosts.	See "How to Import Shared Profiles to the Change Manager Repository (Command Line)" on page 95.
Add a host to be managed by Change Manager.	The managed host can use a shared profile. Host property values override those specified in the shared profile.	See "How to Add Managed Hosts (Command Line)" on page 96.
Perform an initial installation.	Use custom JumpStart to perform an initial installation of a Solaris Flash archive on a managed host.	See "How to Perform an Initial Installation (Command Line)" on page 98.

Task	Description	For Instructions
Reinstall a managed host with a Solaris Flash archive.	Reinstall a managed host with a Solaris Flash archive. Unlike initial installation, which must be initiated manually on each managed host, the reinstallation is initiated by Change Manager.	See "How to Reinstall Managed Hosts (Command Line)" on page 99.
Update a managed host with a Solaris Flash archive.	Use Solaris Live Upgrade to update a managed host with a Solaris Flash archive. The update operation is performed by installing the archive on the inactive boot environment of the managed host.	See "How to Update Managed Hosts (Command Line)" on page 100.
Fall back to the previous boot environment after performing an update.	Fall back to the previous boot environment if you want to run the software stack on a previous boot environment. You might fall back because the stack running on the active boot environment is bad. You might also fall back when you want to run the software stack that is installed on the other boot environment. You can only perform a fallback of a managed host you updated.	See "How to Fall Back to the Previous Version of the Software Stack (Command Line)" on page 101.
Reboot a managed host.	Reboot one or more managed hosts.	See "How to Reboot Managed Hosts (Command Line)" on page 102.
Halt a managed host.	Halt one or more managed hosts.	See "How to Halt Managed Hosts (Command Line)" on page 102.

Installing Solaris Flash Archives on Managed Hosts by Using the Command-Line Interface

The following procedures describe how to perform deployment tasks by using the Change Manager command-line interface. You can use the command-line interface to perform tasks such as importing Solaris Flash archives and performing updates.

To learn how to create folders and perform management tasks in the Change Manager repository, see Chapter 8. The procedures described in Chapter 8 are not required to perform deployment tasks. However, you might want to create a hierarchy of folders in the repository.

To learn how to create host groups and perform management tasks on the Sun Management Center topology, see Chapter 9. The procedures described in Chapter 9 are not required to perform deployment tasks. However, you might want to create a hierarchy of host groups in the topology.

▼ How to Import Solaris Boot Images to the Change Manager Repository (Command Line)

The Solaris boot image is used to deploy software stacks to managed hosts.

The time required to import a file to the Change Manager repository depends on the size of the file and the speed of the network.

For an initial installation, the managed host boots and mounts a small Solaris root. The root is contained in the boot image. Then, the managed host runs the installation program. For an update, the managed host runs the installation program, which is stored on the boot image.

1. **Determine where the boot image exists and where to store it.**

   For example, copy the boot image from `/net/test1/home/suzi/s9fcs` to the `/` folder.

   The path to the boot image must point to the top directory of the Solaris installation media. The installation media can be on a CD or on another system on the network. The top directory of the Solaris installation media contains the `Copyright` and `installer` files, and either the `Solaris_8` or `Solaris_9` directory. These directories contain the Solaris packages and the Solaris boot image.

   Note – If you import the boot image from a CD, point to the directory named something like `/cdrom/`*Solaris-version*`/s0`. For example, the directory for a Solaris 9 boot image would be `/cdrom/sol_9_sparc/s0`.

   ---

2. **Import a Solaris boot image to the Change Manager repository by using one of these `changemgr import` commands.**

   - The following command line imports one file at a time. You can also use this command line to rename the file.

     ```
     $ changemgr import [ -u username ] [ -p file ] filepath[.type] \
     relfilepath.type
     ```

   - The following command line imports several files to a folder simultaneously.

```
$ changemgr import [ -u username ] [ -p file ] filepath.type ... \
reldirpath
```

`-u` *username*	Specifies the user name to authenticate. If this option is not specified, the user is the current UNIX user.
`-p` *file*	*file* consists of a single line, which contains the password. If *file* is `-`, then the user can supply the password as standard input. If the `-p` option is not supplied, then the `changemgr` command prompts the user for his password.
filepath	Specifies an absolute or relative path to a file. This file path is not within the Change Manager repository.
reldirpath	Specifies the path to a folder that is relative to the top of the Change Manager repository.
relfilepath	Specifies the path to a file, *not* including a folder, that is relative to the top of the Change Manager repository.
.type	Specifies the file name suffix that represents the file type. A Solaris boot image uses the `.miniroot` suffix.

Choose a file name that indicates the versions of the Solaris operating environment the boot image supports. For example, create a boot image named `Solaris9.miniroot`.

Example—Importing a Solaris Boot Image to the Change Manager Repository

Suzi copies the boot image from the `/net/test1/home/suzi/Solaris_9` directory to the `/` folder. She calls the boot image `Solaris_9.miniroot`.

```
$ changemgr import /net/test1/home/suzi/Solaris_9 \
/Solaris_9.miniroot
```

Example—Importing Solaris Boot Images to the Change Manager Repository

Suzi copies the boot images from the `/net/test1/home/suzi/Solaris_9` and `/net/test1/home/suzi/Solaris_8.202` directories to the `/BootImages` folder.

```
$ changemgr import /net/test1/home/suzi/Solaris_9 \
/net/test1/home/suzi/Solaris_8.202 /BootImages
```

▼ How to Import Solaris Flash Archives to the Change Manager Repository (Command Line)

Import a Solaris Flash archive from another system, typically the master system on which it was created, on the network. This archive contains a software stack that can be deployed to managed hosts.

The time required to import a file to the Change Manager repository depends on the size of the file and the speed of the network.

1. **Determine where the archive exists and where to store it.**

   For example, copy the archive from `/net/test1/home/suzi/apache.flar` to the `web-server` folder.

2. **Import a Solaris Flash archive to the Change Manager repository by using one of these `changemgr import` commands.**

   - The following command line imports one file at a time. You can also use the command line to rename the file.

     ```
     $ changemgr import [ -u username ] [ -p file ] filepath[.type] \
     relfilepath.type
     ```

   - The following command line imports several files to a folder simultaneously.

     ```
     $ changemgr import [ -u username ] [ -p file ] filepath.type ... \
     reldirpath
     ```

   .type Specifies the file name suffix that represents the file type. A shared profile uses the `.flar` suffix.

   For descriptions of the other options, see "How to Import Solaris Boot Images to the Change Manager Repository (Command Line)" on page 92.

   Choose a meaningful name that indicates the type of archive. For example, create an archive named `apache.flar`.

Example—Importing a Solaris Flash Archive to the Change Manager Repository

Suzi copies the archive called `/net/test1/home/suzi/apache.flar` to the `web-server` folder. She renames the file to be `Apache.flar`.

```
$ changemgr import /net/test1/home/suzi/apache.flar \
/web-server/Apache.flar
```

Example—Importing Solaris Flash Archives to the Change Manager Repository

Suzi copies the archives called `/net/test1/home/suzi/apache.flar` and `/net/test1/home/suzi/oracle.flar` to the `/` folder.

```
$ changemgr import /net/test1/home/suzi/apache.flar \
/net/test1/home/suzi/oracle.flar /
```

▼ How to Import Shared Profiles to the Change Manager Repository (Command Line)

The shared profile describes how the managed hosts should be configured at deployment time. For a description of the shared profile's format, see "Shared Profile" on page 76.

If the shared profile contains a property with an invalid value, then the import fails. For example, the value of `base_config_flar_archive` is invalid if it does not refer to an archive in the repository. Check the job queue (see "How to View the Job Queue (Web Browser)" on page 128) to determine whether the import failed. If the import failed, correct the property value and reinitiate the import operation.

The time required to import a file to the Change Manager repository depends on the size of the file and the speed of the network.

1. **Determine where the shared profile exists and where to store it.**

   For example, copy the shared profile from `/net/test1/home/suzi/apache.cmsp` to the `web-server` folder.

2. **Import a shared profile to the Change Manager repository by using one of these `changemgr import` commands.**

   - The following command line imports one file at a time. You can also use this command line to rename the file.

     ```
     $ changemgr import [ -u username ] [ -p file ] filepath[.type] \
     relfilepath.type
     ```

   - The following command line imports several files to a folder simultaneously.

     ```
     $ changemgr import [ -u username ] [ -p file ] filepath.type ... \
     reldirpath
     ```

   .type Specifies the file name suffix that represents the file type. A shared profile uses the `.cmsp` suffix.

   For descriptions of the other options, see "How to Import Solaris Boot Images to the Change Manager Repository (Command Line)" on page 92.

Choose a file name that indicates the unique features specified by the shared profile. For example, create a shared profile named `apache.cmsp` to configure the managed hosts that run the Apache web server.

Example—Importing a Shared Profile to the Change Manager Repository

Suzi copies the shared profile called `/net/test1/home/suzi/apache.cmsp` to the `web-server` folder at the top of the repository. She renames the file to be `Apache.cmsp`.

```
$ changemgr import /net/test1/home/suzi/apache.cmsp \
/web-server/Apache.cmsp
```

Example—Importing Shared Profiles to the Change Manager Repository

Suzi copies the shared profiles called `/net/test1/home/suzi/apache.cmsp` and `/net/test1/home/suzi/oracle.cmsp` to the `/MyProfiles` folder.

```
$ changemgr import /net/test1/home/suzi/apache.cmsp \
/net/test1/home/suzi/oracle.cmsp MyProfiles
```

▼ How to Add Managed Hosts (Command Line)

To simplify naming of managed hosts, you can make each name match the name of the actual machine.

Note – If you change the value of the `AgentPort` property after installing a managed host, the Change Manager server can no longer communicate with it. To reestablish communication with the server by using the new agent port, you must reinitialize the managed host by performing an initial installation on it.

Note – A managed host can be managed by only *one* Change Manager server. To change control of a managed host to another Change Manager server, see "`Internal error: unable to establish probe connection` Appears When Running Jobs on a Managed Host" on page 202.

---

1. **Determine where to create the managed host.**

   For example, create a managed host in the `web-server` host group.

2. **Use one of these `changemgr add` commands to add the managed host.**

   - The following command adds a managed host to be controlled by Change Manager. A managed host can be created in a host group that is part of the Sun Management Center topology. *hostpath* is the full path name or relative path name to the managed host, which includes the host group hierarchy.

     ```
     $ changemgr add [ -u username ] [ -p file ] [ -d domain ] \
     hostname hostpath
     ```

   - The following command adds the specified hosts to the specified host group. The topology names are the same as the host names.

     ```
     $ changemgr add [ -u username ] [ -p file ] [ -d domain ] \
     hostname ... grouppath
     ```

`-u` *username*	Specifies the user name to authenticate. If this option is not specified, the user is the current UNIX user.
`-p` *file*	*file* consists of a single line, which contains the password. If *file* is `-`, then the user can supply the password as standard input. If the `-p` option is not supplied, then the `changemgr` command prompts the user for his password.
`-d` *domain*	Specifies the administrative domain on which to operate. In the context of a session, the default is the domain specified for the session. If no domain is specified, *domain* is the user's home domain. By default, *domain* is the user's home domain.
hostname	Specifies the network name of a host, for example, `host1.yourcompany.com`.
hostpath	Specifies the path to a managed host that is relative to the top of the selected administrative domain.
grouppath	Specifies the path to a host group that is relative to the top of the selected administrative domain.

Example—Adding a Managed Host

Chris creates the `host1` managed host in the `web-server/apache` host group.

```
$ changemgr add host1 /web-server/apache
```

Example—Adding a Managed Host and Changing Its Name

Chris adds the `host1` managed host to the `web-server/apache` host group and changes the host name to `Host1`.

```
$ changemgr add host1 /web-server/apache/Host1
```

Example—Adding Managed Hosts to a Host Group

Chris adds the `host1` and `host2` managed hosts to the `web-server/apache` host group.

```
$ changemgr add host1 host2 /web-server/apache
```

▼ How to Perform an Initial Installation (Command Line)

The initial installation must be initiated from each managed host to be installed.

1. **Ensure that the managed hosts you want to install have been added to the Change Manager server.**

   See "How to Add Managed Hosts (Command Line)" on page 96.

2. **Determine which managed hosts you want to install.**

   For example, install the `/web-server/host1` and `/web-server/host2` managed hosts.

3. **Modify the shared profiles and host properties to reflect the configuration of the managed hosts.**

   - To configure the managed hosts for reinstallation operations, configure one boot environment.
   - To configure the managed hosts for updates, configure two boot environments.

4. **Set up the files for installation.**

   ```
   $ changemgr setup [ -u username ] [ -p file ] [ -d domain ] \
   topopath ...
   ```

   topopath Specifies the path to a managed host or host group. The managed host or host group is relative to the top of the specified administrative domain.

   For descriptions of the other options, see "How to Add Managed Hosts (Command Line)" on page 96.

Caution – If you modify the associated shared profile or host properties before you perform the initial installation, you must re-create the JumpStart profiles. To re-create the JumpStart profiles, rerun `changemgr setup`. Then type `boot net - install` at the OpenBoot prompt.

5. **Go to the console of each of the managed hosts to be installed and do the following:**

   a. **Bring each managed host to the `ok>` prompt.**

      If the managed host is running, press Stop-A.

   b. **On each console, type `boot net - install` and press Return.**

      Be sure to include the space between the `-` and `install`.

Caution – Make sure that the managed host is *only* a network boot client of the Change Manager server.

The network boot of your managed host might fail with an error message such as `Panic: unable to mount file systems`. If such a message appears, then your managed host is probably being served by more than one network boot server. See "`Panic: unable to mount file systems` Message Appears While Booting From the Network" on page 210.

▼ How to Reinstall Managed Hosts (Command Line)

Note – First use Change Manager to perform an initial installation that creates a single *boot environment* before performing a *reinstallation* of a managed host.

1. **Determine which managed hosts you want to reinstall.**

   For example, reinstall the `/web-server/host1` and `/web-server/host2` managed hosts.

2. **Modify the shared profiles and host properties to reflect the configuration of the managed hosts to reinstall.**

3. **Reinstall the specified managed hosts.**

```
$ changemgr reinstall [ -u username ] [ -p file ] [ -d domain ] \
topopath ...
```

topopath Specifies the path to a managed host or host group. The managed host or host group is relative to the top of the specified administrative domain.

For descriptions of the other options, see "How to Add Managed Hosts (Command Line)" on page 96.

Example—Reinstalling Managed Hosts

Suzi reinstalls the `/web-server/host1` and `/web-server/host2` managed hosts.

```
$ changemgr reinstall /web-server/host1 /web-server/host2
```

▼ How to Update Managed Hosts (Command Line)

Note – First use Change Manager to perform an initial installation before using the *Solaris Live Upgrade* feature on a managed host. The initial installation creates two *boot environments*.

---

1. **Determine which managed hosts you want to update.**

   For example, update the `/web-server/host1` and `/web-server/host2` managed hosts.

2. **Modify the shared profiles and host properties to reflect the configuration of the managed hosts to update.**

3. **Update the specified managed hosts.**

   ```
   $ changemgr update [ -u username ] [ -p file ] [ -d domain ] \
   [ -x operation ] topopath ...
   ```

   `-x` *operation* Specifies the action to take after the update completes. If *operation* is `reboot`, then activate the newly installed software stack and reboot. If *operation* is `halt`, then activate the newly installed software stack and halt. The default operation is to reboot.

   topopath Specifies the path to a managed host or host group. The managed host or host group is relative to the top of the specified administrative domain.

   For descriptions of the other options, see "How to Add Managed Hosts (Command Line)" on page 96.

Example—Updating Managed Hosts

Suzi updates the `/web-server/host1` and `/web-server/host2` managed hosts. When the update completes, the managed hosts are rebooted to run the newly updated boot environment.

```
$ changemgr update /web-server/host1 /web-server/host2
```

Example—Updating Managed Hosts and Halting the Managed Hosts When the Update Completes

Suzi updates the `/web-server/host1` and `/web-server/host2` managed hosts. When the update completes, the managed hosts are set up to run the newly updated boot environment. Then, the managed hosts are halted.

```
$ changemgr update -x halt /web-server/host1 \
/web-server/host2
```

▼ How to Fall Back to the Previous Version of the Software Stack (Command Line)

The fallback operation "undoes" the last update attempt of a managed host, whether it finished or did not start.

For example, three managed hosts are updated one host at a time. The update completes on the first managed host. Then, the update begins on the second managed host. When the first managed host boots the updated boot environment, you notice that there are problems with the system. You cancel the running update.

Each of the three managed hosts are in a different state. The first managed host completed the update. The second managed host started the update, but did not complete it. The third managed host did not start the update.

The fallback operation ensures that each of these managed hosts reverts to the boot environment running prior to the update attempt.

The fallback feature fails if the system cannot boot. In such cases, see "Solaris Live Upgrade (Overview)" in *Solaris 9 Installation Guide*.

1. **Determine which managed hosts you want to fall back to the previous active boot environment.**

   For example, perform the fallback operation on the `/web-server/host1` and `/web-server/host2` managed hosts.

2. **Fall back to the previous version of the software stack.**

```
$ changemgr fallback [ -u username ] [ -p file ] [ -d domain ] \
topopath ...
```

topopath Specifies the path to a managed host or host group. The managed host or host group is relative to the top of the specified administrative domain.

For descriptions of the other options, see "How to Add Managed Hosts (Command Line)" on page 96.

Example—Getting Managed Hosts to Fall Back to the Previous Active Boot Environment

Suzi wants the `/web-server/host1` and `/web-server/host2` managed hosts to fall back to the previous active boot environment.

```
$ changemgr fallback /web-server/host1 /web-server/host2
```

▼ How to Reboot Managed Hosts (Command Line)

1. **Determine which managed hosts you want to reboot.**

   For example, you can reboot the `/web-server/host1` and `/web-server/host2` managed hosts.

2. **Reboot the managed hosts.**

   ```
   $ changemgr reboot [ -u username ] [ -p file ] [ -d domain ] \
   topopath ...
   ```

   topopath Specifies the path to a managed host or host group. The managed host or host group is relative to the top of the specified administrative domain.

   For descriptions of the other options, see "How to Add Managed Hosts (Command Line)" on page 96.

Example—Rebooting Managed Hosts

Suzi wants to reboot the `/web-server/host1` and `/web-server/host2` managed hosts.

```
$ changemgr reboot /web-server/host1 /web-server/host2
```

▼ How to Halt Managed Hosts (Command Line)

1. **Determine which managed hosts you want to halt.**

For example, you can halt the `/web-server/host1` and `/web-server/host2` managed hosts.

2. **Halt the managed hosts.**

```
$ changemgr halt [ -u username ] [ -p file ] [ -d domain ] \
topopath ...
```

topopath Specifies the path to a managed host or host group. The managed host or host group is relative to the top of the specified administrative domain.

For descriptions of the other options, see "How to Add Managed Hosts (Command Line)" on page 96.

Example—Halting Managed Hosts

Suzi wants to halt the `/web-server/host1` and `/web-server/host2` managed hosts.

```
$ changemgr halt /web-server/host1 /web-server/host2
```

CHAPTER 6

Auditing Software Configurations (Tasks)

This chapter provides step-by-step instructions for gathering status about managed hosts.

The following topics are covered in this chapter:

For descriptions of the audit-related file formats, see Chapter 11.

Using Audit Software

Change Manager provides users with the ability to validate the contents of deployed *software stacks*. Stack validation is accomplished by comparing the contents of a managed host's file systems over time with those of a baseline configuration. The baseline configuration is known to be good. The audit features are implemented by using the `bart` command. See the `bart`(1MCM) man page.

The *audit rules file* enables you to track files and directories on managed hosts that are installed with a software stack. The audit tool enables you to determine which files were added to and deleted from managed hosts. You can also use the audit rules file to specify which file attribute changes you want to flag.

When an audit rules file is applied to one or more managed hosts configured with the same software stack, the results should be nearly identical. Note that the properties of some files might change legitimately across installed machines (`/etc/nodename`). Other files should not have properties that change (`/usr/bin/ls`). The author of the audit rules file must ensure that only relevant files are members of the stack definition.

The state of a file is described by the associated file attributes, such as file size, creation date, modification date, and access control list (*ACL*). Optionally, the state is described by a cryptographic checksum of the file's contents and most of the values retrieved by the `stat` system call. See the `stat`(2) man page.

The description of a software stack yields a list of files and associated attributes in a *manifest*. The manifests represent the software stacks on each managed host. Pairs of manifests can be compared to yield a manifest *comparison report*, which lists file-by-file differences.

Review the comparison report to determine whether the two manifests are "similar enough." Also, the review can determine whether the stack has changed so much as to no longer be valid.

Use the *audit* tool to perform a file-level check of the software contents of a managed host. Change Manager compares a *baseline manifest* against manifests generated for each managed host selected. The baseline manifest represents a baseline state of the managed host, which might match the original state of the software stack.

- **Build manifests for managed hosts –** Build a manifest for a managed host. The *manifest* is a list of files and associated file attributes for a managed host.
- **Audit managed hosts –** Audit managed hosts by comparing their manifests against a baseline manifest. The output of the comparison is a comparison report.
- **Get software status –** Get information about the patches and packages running on the managed host.

Change Manager Audit File Types

Change Manager uses files as input and output for audit jobs.

You can use folders to create a hierarchy in which to organize these Change Manager files. These files and folders are stored in the repository. You can organize the folders and files in any way that you want.

Access the repository in the browser user interface by clicking the Set Up Files tab. Access the repository with the command-line interface by using the file management subcommands of the `changemgr` command.

You might organize the folders and files in the following ways:

- **Group like file types –** For example, store all the Solaris Flash archives in a single folder. Do the same for Solaris boot images, shared profiles, and manifests.
- **Group files related to a particular set of managed hosts –** Create a folder to hold all the files associated with a particular service's servers.

  For example, a *server farm* provides web services. Therefore, create a folder named `WebServer`. In the `WebServer` folder, store the files used by the web server, such as the archives, boot images, shared profiles, and manifests. Create a separate folder to hold files associated with a mail server.
- **Group by user name –** Store all files in folders owned by specific users. For example, store all of Joe's files in a folder named `joe`. Then, Joe can organize his folders and files in the way he wants.
- **Group all files associated with a particular archive –** Store all files associated with each archive in folders. For example, the archive and associated files for the Apache web server are stored in a folder named `apache-web-server`. Store the archive, boot image, and shared profile in the same folder.

For information about naming conventions for file objects, see "Change Manager Naming Conventions" on page 79.

Files stored in the Change Manager repository have a standard set of properties associated with them. The following properties are shared by all files:

`Description`	User-supplied string that describes the file.
`Owner`	Read-only property that names the owner of the file.
`State`	Read-only property that indicates the state of the file.

Note – When using the browser interface, you must perform the operations on the File Actions drop-down menu while in the appropriate folder.

For example, to create a folder inside an existing folder, go to that folder *before* choosing New Folder from the File Actions menu.

When using the browser interface, you can select items from a list. To select an item from a list, click the checkbox next to the item name. Then, choose the action to perform from the File Actions drop-down menu.

Audit Rules File

An *audit rules file* determines what files and file attributes to audit on a managed host. The audit rules file serves two purposes:

- To specify which files and directories to catalog when building a manifest for a managed host
- To specify which files, directories, and file attributes in the manifests to compare when auditing managed hosts

For example, you might want to ignore the directory modification time for files. The modification time changes each time a file is created or deleted in the directory. You might also want to ignore `core` files or `.o` files.

The format of the audit rules file is described in "Audit Rules File Format" on page 181. The audit rules file name must use the `.brul` suffix.

To create or import a rules file from another system, see the appropriate section:

- "How to Create an Audit Rules File (Web Browser)" on page 112
- "How to Import an Audit Rules File to the Change Manager Repository (Web Browser)" on page 112
- "How to Import Audit Rules Files to the Change Manager Repository (Command Line)" on page 119

To import a manifest to the repository, see the appropriate section:

- "How to Import a Manifest to the Change Manager Repository (Web Browser)" on page 113
- "How to Import Manifests to the Change Manager Repository (Command Line)" on page 121

To build manifests of managed hosts, see the appropriate section:

- "How to Build Manifests for Managed Hosts (Web Browser)" on page 114
- "How to Build Manifests for Managed Hosts (Command Line)" on page 122

To audit managed hosts, see the appropriate section:

- "How to Audit Managed Hosts (Web Browser)" on page 115
- "How to Audit Managed Hosts (Command Line)" on page 123

Manifest

A *manifest* is a file that describes all the files on the managed host and the file attributes for each file. The audit feature uses this manifest to determine how the managed host's software has changed over time. The files described in the manifest are based on the audit rules.

The format of a manifest is described in the "Manifest File Format" on page 185. The manifest is output for the Build Manifests action or the `changemgr manifest` command. The manifest can be used as input for the Audit action or `changemgr audit` command. The manifest file name must use the `.bmft` suffix.

In addition to the general file properties, a manifest is associated with the following property:

`RulesFile` Read-only property that names the audit rules file used to build the manifest.

To import an existing manifest to the Change Manager repository, see the appropriate sections:

- "How to Import a Manifest to the Change Manager Repository (Web Browser)" on page 113
- "How to Import Manifests to the Change Manager Repository (Command Line)" on page 121

To build manifests of managed hosts, see the appropriate section:

- "How to Build Manifests for Managed Hosts (Web Browser)" on page 114
- "How to Build Manifests for Managed Hosts (Command Line)" on page 122

To audit managed hosts, see the appropriate section:

- "How to Audit Managed Hosts (Web Browser)" on page 115
- "How to Audit Managed Hosts (Command Line)" on page 123

Report

A *report* is a file that is created by two jobs: Audit and Get Software Status.

To audit or get software status of managed hosts, see the appropriate sections:

- "How to Audit Managed Hosts (Web Browser)" on page 115
- "How to Get the Software Status of Managed Hosts (Web Browser)" on page 117
- "How to Audit Managed Hosts (Command Line)" on page 123
- "How to Get the Software Status of Managed Hosts (Command Line)" on page 124

See a description of the "Comparison Report Format" on page 188.

The report file name must use the `.txt` suffix.

Folder

A *folder* is a container that can hold files and other folders. Click a folder name to go into that folder. Then, view the folder's contents. Change Manager files can be the following:

- Solaris Flash archive
- Solaris boot image

- Shared profile
- Manifest
- Audit rules file
- Report

Perform the following actions from the folder page:

- Create folders, shared profiles, and audit rules files.
- Import Solaris Flash archives, Solaris boot images, shared profiles, audit rules files, and manifests to the Change Manager repository.
- Rename folders and files.
- Export files.
- Create a copy of a shared profile or an audit rules file in the current folder.
- Move folders and files to another folder.
- Delete folders and files.

To create folders, see "How to Create a Folder (Web Browser)" on page 138 or "How to Create a Folder (Command Line)" on page 143.

Auditing Software Configurations by Using the Browser Interface (Task Map)

The following table identifies the procedures you need to audit managed hosts.

Task	Description	For Instructions
Create an audit rules file.	Create an audit rules file to determine which files and directories to list in the manifest.	See "How to Create an Audit Rules File (Web Browser)" on page 112.
Import an audit rules file to the Change Manager repository.	Import an existing audit rules file to the Change Manager repository.	See "How to Import an Audit Rules File to the Change Manager Repository (Web Browser)" on page 112.
Import manifests to the Change Manager repository.	Import existing manifests to the Change Manager repository. These manifests can be used in comparisons.	See "How to Import a Manifest to the Change Manager Repository (Web Browser)" on page 113.

Task	Description	For Instructions
Build manifests for managed hosts.	Build manifests for managed hosts. Each manifest includes a list of entries, an entry per file cataloged. Each file entry includes the file name and several file attribute values.	See "How to Build Manifests for Managed Hosts (Web Browser)" on page 114.
Audit managed hosts.	Audit managed hosts by comparing them against a baseline manifest. The existence of files, as well as file attribute values are compared.	See "How to Audit Managed Hosts (Web Browser)" on page 115.
Get software status of managed hosts.	Get information about the packages and patches installed on the managed hosts.	See "How to Get the Software Status of Managed Hosts (Web Browser)" on page 117.

Auditing Software Configurations by Using the Browser Interface

This section describes how to use the browser interface to audit managed hosts.

To learn how to create folders and perform management tasks in the Change Manager repository, see Chapter 8. The procedures described in Chapter 8 are not required to perform audit tasks. However, you might want to create a hierarchy of folders in the repository.

To learn how to create host groups and perform management tasks on the Sun Management Center topology, see Chapter 9. The procedures described in Chapter 9 are not required to perform audit tasks. However, you might want to create a hierarchy of host groups in the topology.

To learn how to navigate through the browser interface, see Appendix A.

▼ How to Access the Set Up Files Section and Appropriate Folder (Web Browser)

Note that the top of the Set Up Files section hierarchy is a folder.

1. **To go to the Set Up Files section, click the Set Up Files tab in the general links area.**

   The top-level Set Up Files page shows a table, which can contain files and folders. The table is a file manager.

2. **Drill down to the appropriate folder.**

   Click a folder name to go into that folder. Then, view the folder's contents. Continue to click folder names until you reach the folder or file you want.

▼ How to Create an Audit Rules File (Web Browser)

You create an audit rules file so that you can do the following:

- Build a manifest for a managed host
- Audit managed hosts by comparing manifests against a baseline manifest

1. **If you are not already in the appropriate folder, see "How to Access the Set Up Files Section and Appropriate Folder (Web Browser)" on page 111.**
2. **From the File Actions menu, choose New Audit Rules.**
3. **Supply the following information:**
   - Choose a meaningful audit rules file name. For example, choose a name that describes the rules, `usr-only`. Add the `.brul` suffix to complete the audit rules file name, `usr-only.brul`.
   - Customize the sample rules in the Contents field. For more information about creating the rules file, see "Audit Rules File Format" on page 181.
4. **When the audit rules are complete, click Save to create the audit rules file.**

   Click Cancel to return to the previous page.

▼ How to Import an Audit Rules File to the Change Manager Repository (Web Browser)

Import an audit rules file to the Change Manager repository. The audit rules file is used to build manifests and audit managed hosts.

The time required to import a file to the Change Manager repository depends on the size of the file and the speed of the network.

1. **If you are not already in the appropriate folder, see "How to Access the Set Up Files Section and Appropriate Folder (Web Browser)" on page 111.**
2. **From the File Actions menu, choose Import Audit Rules.**
3. **Supply the following information:**
   - Choose a meaningful audit rules file name. For example, choose a name that describes the type of rules or audit coverage, such as `usr-only`. Add the `.brul` suffix to complete the audit rules file name, `usr-only.brul`.

- Path name of the rules file to import. Click Browse to find the rules file.

4. **When the information is complete, click Import to copy the rules file to the Change Manager repository.**

   Click Cancel to return to the previous page.

▼ How to Import a Manifest to the Change Manager Repository (Web Browser)

The manifests are created by the Build Manifests command.

The time required to import a file to the Change Manager repository depends on the size of the file and the speed of the network.

1. **If you are not already in the appropriate folder, see "How to Access the Set Up Files Section and Appropriate Folder (Web Browser)" on page 111.**
2. **From the File Actions menu, choose Import Manifest.**
3. **Supply the following information:**
   - Manifest name. Choose a meaningful name. For example, choose a name that describes the audit rules used, the managed host's name, and the date and time of the audit. Add the `.bmft` suffix to complete the manifest name, `usr-only.host12.may122002.bmft`.
   - Path name to the manifest file to import. Click Browse to find the manifest.
4. **When the information is complete, click Import to copy the manifest to the Change Manager repository.**

   Click Cancel to return to the previous page.

▼ How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)

1. **To go to the Set Up Hosts & Jobs section, click the Set Up Hosts & Jobs tab in the general links area.**
   - If more than one administrative domain exists, you go to a page showing a table that lists the available administrative domains. Go to Step 2.
   - If only one administrative domain exists, the page shows a table that lists managed hosts and host groups in the default domain. Go to Step 3.
2. **(Optional) Click the name of the administrative domain to use.**

Note – Use Sun Management Center to create a new administrative domain. See "Using Sun Management Center Administrative Domains" in *Sun Management Center 3.5 User's Guide*.

3. **Drill down to the appropriate host group.**

   Click a host group name to go into that host group. Then, view the host group's contents. Continue to click host group names until you reach the host group or managed host you want.

▼ How to Build Manifests for Managed Hosts (Web Browser)

1. **If you are not already in the appropriate host group, see "How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)" on page 113.**

2. **Select the managed hosts and host groups for which you want to build manifests.**

   For example, select `host1` and `host2` by clicking the checkbox next to `host1` and `host2`.

3. **From the Host Actions menu, choose Build Manifests.**

4. **Supply a meaningful job name.**

   For example, the job name might be `Build manifests for host1 and host2`.

5. **Determine when you want to run the job, either now or at another time.**

   - To initiate the job immediately, click the Start Now radio button.
   - To run the job at a later time, specify the start date and start time.
     - Start date. Click the date or specify the date in the *mm/dd/yyyy* format.

       mm and *dd* are two-digit forms for the month and day. *yyyy* is the four-digit form for the year.
     - Start time. Choose the start time from the hour and minute pull-down menus.

6. **Specify the path name of the audit rules file to use.**

   Click Browse to open a file chooser to help in the search for the audit rules file in the Change Manager repository.

   To add an audit rules file to the Change Manager repository, see the following sections:

   - "How to Create an Audit Rules File (Web Browser)" on page 112
   - "How to Import an Audit Rules File to the Change Manager Repository (Web Browser)" on page 112

See the description of the "Audit Rules File Format" on page 181.

For example, the audit rules file is `/files/web-server/usr-only.brul`.

7. **Specify the path name of the folder in which to store the manifest.**

   For example, store the resulting manifests in the `/files/web-server` folder.

8. **Supply the prefix for the manifest file name.**

   The prefix helps identify the manifest.

   For example, the prefix name might be `usr-only` to indicate the rules file used to generate the manifests. The resulting manifest file name for `host1` might look like `usr-onlyhost1.brul`.

9. **Click Submit to build the manifests, or click Cancel to return to the previous page.**

   This operation takes some time to complete.

10. **When the operation completes, view the manifests.**

    a. **Click the Set Up Files tab at the top of the web page to go to the Set Up Files section.**

    b. **Drill down to the folder where you stored the manifests.**

    c. **Click the manifest name to go to its property page.**

       You can view one manifest at a time.

       If the manifest is very large, use the Prev and Next buttons to navigate between pages.

    d. **To return to the folder that holds the manifests, click Back.**

       Repeat Steps 10c and 10d to view more manifests.

    For example, Suzi can schedule a job to build manifests for the `/hosts/web-server/apache/host1` and `/hosts/web-server/apache/host2` managed hosts. The manifests will be stored in the `/files/web-server` folder. Each file name will use `usr-only` as the prefix. The audit rules file to be used is called `/files/web-server/usr-only.brul`. The operation is scheduled to start on June 27th at 3:00 a.m.

▼ How to Audit Managed Hosts (Web Browser)

Audit managed hosts by comparing them to a baseline manifest.

1. **If you are not already in the appropriate host group, see "How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)" on page 113.**

2. **Select the managed hosts and host groups to compare.**

For example, select `host1` and `host2` by clicking the checkbox next to `host1` and `host2`.

3. **From the Host Actions menu, choose Audit.**

4. **Supply a meaningful job name.**

   For example, the job name might be `Compare host1 and host2`.

5. **Determine when you want to run the job, either now or at another time.**

   - To initiate the job immediately, click the Start Now radio button.
   - To run the job at a later time, specify the start date and start time.
     - Start date. Click the date or specify the date in the *mm/dd/yyyy* format.

       mm and *dd* are two-digit forms for the month and day. *yyyy* is the four-digit form for the year.
     - Start time. Choose the start time from the hour and minute pull-down menus.

6. **Specify the path name of the audit rules file to use.**

   Click Browse to open a file chooser to help in the search for the audit rules file in the Change Manager repository.

   To add an audit rules file to the Change Manager repository, see the following sections:

   - "How to Create an Audit Rules File (Web Browser)" on page 112
   - "How to Import an Audit Rules File to the Change Manager Repository (Web Browser)" on page 112

   See the description of the "Audit Rules File Format" on page 181.

   For example, the audit rules file is `/files/web-server/usr-only.brul`.

7. **To specify the baseline manifest, do one of the following:**

   - Specify the path name of the baseline manifest.
   - Click Browse to find the baseline manifest.

   For example, the baseline manifest is `/files/web-server/usr-only.baseline.bmft`.

8. **To specify the report file, do one of the following:**

   - Specify the path name of the report file.
   - Click Browse to choose the report file in which to store the results.

   For example, the report file is stored in `/files/web-server/host1-host2.usr-only.compare.txt`.

9. **Click Submit to initiate the manifest comparison, or click Cancel to return to the previous page.**

   The compare operation takes some time to complete.

10. **When the operation completes, view the generated comparison reports.**

a. **Click the Set Up Files tab at the top of the web page to go to the Set Up Files section.**

b. **Drill down to the folder where you stored the comparison reports.**

c. **Click the comparison report name to go to the property page.**

   You can view one comparison report at a time.

   If the comparison report is very large, use the Prev and Next buttons to navigate between pages.

d. **To return to the folder that holds the comparison reports, click Back.**

   Repeat Steps 10c and 10d to view more comparison reports.

▼ How to Get the Software Status of Managed Hosts (Web Browser)

1. **If you are not already in the appropriate host group, see "How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)" on page 113.**

2. **Select the managed hosts and host groups for which you want to get the software status.**

   For example, select `host1` and `host2` by clicking the checkbox next to `host1` and `host2`.

3. **From the Host Actions menu, choose Get Software Status.**

4. **Supply a meaningful job name.**

   For example, the job name might be `Get Software Status for host1 and host2`.

5. **Determine when you want to run the job, either now or at another time.**

   - To initiate the job immediately, click the Start Now radio button.
   - To run the job at a later time, specify the start date and start time.
     - Start date. Click the date or specify the date in the *mm*/*dd*/*yyyy* format.

       mm and *dd* are two-digit forms for the month and day. *yyyy* is the four-digit form for the year.
     - Start time. Choose the start time from the hour and minute pull-down menus.

6. **To specify the report file, do one of the following:**

   - Specify the path name of the report file.
   - Click Browse to choose the report file in which to store the results.

   For example, the report file is stored in `/files/web-server/host1-host2.software.status.txt`.

7. **Click Submit to get the software status, or click Cancel to return to the previous page.**

   The software status operation takes some time to complete.

8. **When the operation completes, view the generated software status reports.**

   a. **Go to the Set Up Files section.**

      Click the Set Up Files tab at the top of the page.

   b. **Drill down to the folder where you stored the software status reports.**

   c. **Click the name of the software status report to go to the property page.**

      You can view one software status report at a time.

      If the software status report is very large, use the Prev and Next buttons to navigate between pages.

   d. **To return to the folder that holds the software status reports, click Back.**

      Repeat Steps 8c and 8d to view more software status reports.

Auditing Software Configurations by Using the Command-Line Interface (Task Map)

The following table identifies the procedures you need to audit managed hosts. See the `changemgr`(1MCM) man page.

Task	Description	For Instructions
Import an audit rules file to the Change Manager repository.	Import an existing audit rules file to the Change Manager repository.	See "How to Import Audit Rules Files to the Change Manager Repository (Command Line)" on page 119.
Import manifests to the Change Manager repository.	Import existing manifests to the Change Manager repository. These manifests can be used in comparisons.	See "How to Import Manifests to the Change Manager Repository (Command Line)" on page 121.

Task	Description	For Instructions
Build manifests for managed hosts.	Build manifests for managed hosts. Each manifest includes a list of entries, an entry per file cataloged. Each file entry includes the file name and several file attribute values.	See "How to Build Manifests for Managed Hosts (Command Line)" on page 122.
Audit managed hosts.	Audit managed hosts by comparing them against a baseline manifest. The existence of files, as well as file attribute values are compared.	See "How to Audit Managed Hosts (Command Line)" on page 123.
Get software status of managed hosts.	Get information about the packages and patches installed on the managed hosts.	See "How to Get the Software Status of Managed Hosts (Command Line)" on page 124.

Auditing Software Configurations by Using the Command-Line Interface

This section describes how to use the command-line interface to audit managed hosts.

To learn how to create folders and perform management tasks in the Change Manager repository, see Chapter 8. The procedures described in Chapter 8 are not required to perform audit tasks. However, you might want to create a hierarchy of folders in the repository.

To learn how to create host groups and perform management tasks on the Sun Management Center topology, see Chapter 9. The procedures described in Chapter 9 are not required to perform audit tasks. However, you might want to create a hierarchy of host groups in the topology.

▼ How to Import Audit Rules Files to the Change Manager Repository (Command Line)

The audit rules file is used to build manifests and audit managed hosts.

The time required to import a file to the Change Manager repository depends on the size of the file and the speed of the network.

1. **Determine where the audit rules file exists and where to store it.**

For example, copy the audit rules file from `/net/test1/home/suzi/usr-only.brul` to the `web-server` folder.

2. **Import an audit rules file to the Change Manager repository by using one of these `changemgr import` commands.**

   - The following command line imports one file at a time. You can also use this command line to rename the file.

     ```
     $ changemgr import [ -u username ] [ -p file ] filepath[.type] \
     relfilepath.type
     ```

   - The following command line imports several files to a folder simultaneously.

     ```
     $ changemgr import [ -u username ] [ -p file ] filepath.type ... \
     reldirpath
     ```

`-u` *username*	Specifies the user name to authenticate. If this option is not specified, the user is the current UNIX user.
`-p` *file*	*file* consists of a single line, which contains the password. If *file* is `-`, then the user can supply the password as standard input. If the `-p` option is not supplied, then the `changemgr` command prompts the user for his password.
filepath	Specifies an absolute or relative path to a file. This file path is not within the Change Manager repository.
reldirpath	Specifies the path to a folder that is relative to the top of the Change Manager repository.
relfilepath	Specifies the path to a file, *not* including a folder, that is relative to the top of the Change Manager repository.
.type	Specifies the file name suffix that represents the file type. An audit rules file uses the `.brul` suffix.

   Choose a name that indicates the type of audit specified by the audit rules file. Use the `.brul` suffix. For example, create an audit rules file named `usr-only.brul`, which indicates that only files from `/usr` are cataloged.

Example—Importing an Audit Rules File to the Change Manager Repository

Suzi copies the audit rules file called `/net/test1/home/suzi/usr-only.brul` to the `web-server` folder of the repository. She renames the file to be `usr_only.brul`.

```
$ changemgr import /net/test1/home/suzi/usr-only.brul \
/web-server/usr_only.brul
```

Example—Importing Audit Rules Files to the Change Manager Repository

Suzi copies the audit rules files called `/net/test1/home/suzi/usr-only.brul` and `/net/test1/home/suzi/opt-only.brul` to the `/` folder of the repository.

```
$ changemgr import /net/test1/home/suzi/usr-only.brul \
/net/test1/home/suzi/opt-only.brul /
```

▼ How to Import Manifests to the Change Manager Repository (Command Line)

The manifests are created by the `changemgr manifest` command, which performs a per-file audit of a managed host.

The time required to import a file to the Change Manager repository depends on the size of the file and the speed of the network.

1. **Determine where the manifest exists and where to store it.**

   For example, copy the manifest from `/net/test1/home/suzi/host1-usr-only.bmft` to the `web-server` folder.

2. **Import a manifest to the Change Manager repository by using one of these `changemgr import` commands.**

   - The following command line imports one file at a time. You can also use this command line to rename the file.

     ```
     $ changemgr import [ -u username ] [ -p file ] filepath[.type] \
     relfilepath.type
     ```

   - The following command line imports several files to a folder simultaneously.

     ```
     $ changemgr import [ -u username ] [ -p file ] filepath.type ... \
     reldirpath
     ```

   For descriptions of the options, see "How to Import Audit Rules Files to the Change Manager Repository (Command Line)" on page 119.

   Choose a name that indicates the name of the audited managed host and the type of audit specified by the audit rules file. Use the `.bmft` file suffix. For example, copy a manifest named `host1-usr-only.bmft`, which indicates that only files from `/usr` are cataloged for the `host1` managed host.

Example—Importing a Manifest to the Change Manager Repository

Suzi copies the manifest called `/net/test1/home/suzi/host1-usr-only.bmft` to the `web-server` folder. She renames the file to be `host1_usr_only.bmft`.

```
$ changemgr import \
/net/test1/home/suzi/host1-usr-only.bmft \
/web-server/host1_usr_only.bmft
```

Example—Importing Manifests to the Change Manager Repository

Suzi copies the manifests called `/net/test1/home/suzi/host1-usr-only.bmft` and `/net/test1/home/suzi/host1-opt-only.bmft` to the `/` folder.

```
$ changemgr import \
/net/test1/home/suzi/host1-usr-only.bmft \
/net/test1/home/suzi/host1-opt-only.bmft /
```

▼ How to Build Manifests for Managed Hosts (Command Line)

1. **Determine which managed hosts you want to audit.**

   For example, audit the `/web-server/host1` and `/web-server/host2` managed hosts.

2. **Build manifests for the managed hosts.**

   ```
   $ changemgr manifest [ -u username ] [ -p file ] [ -d domain ] \
   -o relfilepathprefix [ -r relfilepath.brul ] topopath ...
   ```

`-u` *username*	Specifies the user name to authenticate. If this option is not specified, the user is the current UNIX user.
`-p` *file*	*file* consists of a single line, which contains the password. If *file* is `-`, then the user can supply the password as standard input. If the `-p` option is not supplied, then the `changemgr` command prompts the user for his password.
`-d` *domain*	Specifies the administrative domain on which to operate. In the context of a session, the default is the domain specified for the session. If no domain is specified, *domain* is the user's home domain. By default, *domain* is the user's home domain.

`-o` *relfilepathprefix*	Specifies the prefix to be used when creating the output inventories. The name of the managed host and the `.bmft` suffix are appended to the prefix specified to form the name of the resulting manifest.
`-r` *relfilepath*`.brul`	Specifies the audit rules file to use to create the manifest.
topopath	Specifies the path to a managed host or host group that is relative to the top of the selected administrative domain.

Example—Building Manifests for Managed Hosts

Suzi builds manifests for the `/web-server/host1` and `/web-server/host2` managed hosts. She stores the files in the `/web-server` folder with a manifest file prefix of `usr-only`. The resulting file names are `/web-server/host1.bmft` and `/web-server/host2.bmft`.

```
$ changemgr manifest -o /web-server/ -r usr-only.brul \
/web-server/host1 /web-server/host2
```

Note – If the argument to `-o` is a folder, terminate the argument with a slash. For example, if the argument to `-o` is `/web-server/baseline`, then `baseline` is prefixed to manifests created in the `/web-server` folder. If you use this prefix, you might see a manifest with a name like `/web-server/baselinehost1.bmft`.

▼ How to Audit Managed Hosts (Command Line)

The baseline manifest does not need to be built on the managed host. You can build a baseline manifest on a master system before creating the Solaris Flash archive.

1. **Determine which managed hosts you want to audit.**

   For example, audit the `/web-server/host1` and `/web-server/host2` managed hosts.

2. **Audit managed hosts.**

   ```
   $ changemgr audit [ -u username ] [ -p file ] [ -d domain ] \
   -o relfilepath.txt [ -r relfilepath.brul ] relfilepath.bmft topopath ...
   ```

`-o` *relfilepath*`.txt`	Specifies where to write the report on manifest differences.
`-r` *relfilepath*`.brul`	Specifies the audit rules file to use to create the manifest.
relfilepath`.bmft`	Specifies the path to the manifest file that is relative to the top of the Change Manager repository.

topopath Specifies the path to a managed host or host group that is relative to the top of the selected administrative domain.

For descriptions of the other options, see "How to Build Manifests for Managed Hosts (Command Line)" on page 122.

Example—Auditing Managed Hosts

Suzi audits the `/web-server/host1` managed host. She stores the report in the `/web-server/usr-only.txt` file. She audits the managed host by comparing its manifest against the baseline manifest called `/web-server/baseline.bmft`.

```
$ changemgr audit suzi \
-o /web-server/usr-only.txt -r usr-only.brul \
/web-server/baseline.bmft /web-server/host1
```

To understand how to interpret the report results, see "Comparison Report Format" on page 188.

▼ How to Get the Software Status of Managed Hosts (Command Line)

1. **Determine the managed hosts for which you want to get the software status.**

   For example, get the software status for the `/web-server/host1` and `/web-server/host2` managed hosts.

2. **Get the software status for a managed host.**

   ```
   $ changemgr info [ -u username ] [ -p file ] [ -d domain ] \
   -o relfilepath.txt topopath ...
   ```

   `-o` *relfilepath*`.txt` Specifies the path of the file that contains the software status report.

   topopath Specifies the path to a managed host or host group that is relative to the top of the selected administrative domain.

   For descriptions of the other options, see "How to Build Manifests for Managed Hosts (Command Line)" on page 122.

Example—Getting the Software Status of Managed Hosts

Suzi gets the software status for the `/web-server/host1` managed host. She stores the report in the `/web-server/software-status.txt` file.

```
$ changemgr info -o /web-server/software-status.txt \
/web-server/host1
```

CHAPTER 7

Monitoring Jobs (Tasks)

Use Change Manager to initiate jobs to run on managed hosts, such as installation or audit. Also, use Change Manager to initiate jobs to run on the Change Manager server, such as import or export. Then, use the job log and job queue to get status about jobs that you created from the Set Up Hosts & Jobs and Set Up Files sections.

The following topics are described in this chapter:

Job Queue and Logs

A *job* is described by a job name and a unique *job ID* that Change Manager generates.

You can perform the following actions on jobs:

- View the status of submitted jobs
- Cancel running jobs
- *Purge* the completed jobs from the job queue

Job Queue

From the Monitor Jobs page, view the *job queue* to monitor current and recent pending, running, and completed jobs. Jobs are initiated on the Change Manager server to perform several tasks, such as installing a managed host. Initiate the jobs from the Set Up Hosts & Jobs section. Then, check the status of the jobs from the Monitor Jobs section. There are several job status values:

Canceled Job that has been terminated.

Canceling Job that is in the process of being terminated.

Complete Job that successfully completed.

Failed Job that failed to complete successfully. See the job log for failure details.

Pending Job that is scheduled to run, but the start time has not arrived.

Running Job that is currently running.

Job queue entries include the following information:

Job ID The unique generated ID of the job.

Job Name User-supplied name for the job.

User The user who initiated the command.

Start Time The time the job started.

End Time The time the job completed.

Status The status of the job.

Job Log

From the View Logs page, view the *job log* to see detailed information about the progress of jobs. A log entry is created to show each change to the job status. The entry includes the following information:

Date/Time Time the job starts or completes.

Job ID The unique generated ID of the job.

Command The command being run.

Host The managed host on which the job is initiated.

Status The status of the job, which indicates whether the job has started or has completed.

Message The status of the job. This field indicates that the job has been submitted or been dispatched. If the job fails, this field shows the

failure message.

Transaction Log

From the View Logs page, view the *transaction log*. The transaction log shows the actions that have been initiated from the Change Manager server. This log shows all actions, not just the long-running jobs included in the job log. Each log entry includes the following information:

Date/Time Time the job starts or completes.

User The user who initiated the command.

Operation The operation being run.

Object Type The type of object being used by the operation.

Message Status of the job. This field indicates that the job succeeded or failed. If the job fails, an error message is included with the status.

Monitoring Jobs by Using the Browser Interface (Task Map)

The following table identifies the procedures you need to monitor jobs by using the web browser.

Task	Description	For Instructions
View the job queue.	View the job queue to monitor current and recent *pending jobs*, running jobs, and completed jobs.	See "How to View the Job Queue (Web Browser)" on page 128.
Cancel jobs.	Cancel running jobs and pending jobs that appear in the job queue.	See "How to Cancel Jobs (Web Browser)" on page 128.
Reschedule running jobs.	Reschedule a running job to run at a different time.	See "How to Reschedule a Running Job (Web Browser)" on page 129.

Task	Description	For Instructions
Purge completed jobs from the job queue.	Purge completed jobs from the job queue. Jobs that are running or pending are not affected.	See "How to Purge Completed Jobs From the Job Queue (Web Browser)" on page 130.
View the job log.	View the job log to see detailed information about the progress of jobs.	See "How to View the Job Log (Web Browser)" on page 130.
View the transaction log.	View the transaction log to see Change Manager transactions.	See "How to View the Transaction Log (Web Browser)" on page 130.

Monitoring Jobs by Using the Browser Interface

The following procedures describe how to monitor jobs by using the job queue. In addition to viewing the job queue, you can purge completed jobs from the queue and cancel jobs from the queue. Other procedures describe how to view the job log and the transaction log.

▼ How to View the Job Queue (Web Browser)

1. **Click the Monitor Jobs tab to view the job queue.**
2. **Click the job ID to view job details and possible error messages.**

▼ How to Cancel Jobs (Web Browser)

Some Change Manager operations are interrupted when you cancel them, while some jobs are not.

When a cancel is issued for an *interruptable* job, the operation currently running on the managed hosts is immediately terminated. The job is canceled for any managed hosts waiting to run the job. The following operations *can* be interrupted:

- Audit
- Build Manifests
- Export

- Get Software Status
- Import

When a cancel is issued for an *uninterruptable* job, the operation currently running on the managed hosts completes. The job is canceled for any managed hosts waiting to run the job. The following operations *cannot* be interrupted:

- Fall Back
- Reboot
- Reinstall
- Set Up for Install
- Update

1. **Click the Monitor Jobs tab to go to the Monitor Jobs section.**
2. **Click the checkbox next to the job entries of pending jobs or running jobs to cancel.**
3. **Click Cancel Job.**

   The Cancel Jobs page shows the list of the selected jobs.
4. **Click Yes, Cancel the Job to cancel the selected jobs and return to the job queue.**

   An *alert* appears above the table of job entries, indicating the success or failure of the cancel action.

   Click No, Do Not Cancel Job to return to the job queue. The selected jobs are not canceled.

▼ How to Reschedule a Running Job (Web Browser)

1. **Click the Monitor Jobs tab to go to the Monitor Jobs section.**
2. **Select the entry of the running job to reschedule.**
3. **Click Cancel Job, then click Yes, Cancel the Job on the Cancel Jobs page.**
4. **Click the Set Up Hosts & Jobs tab to go to the Set Up Hosts & Jobs section.**
5. **Drill down to the host group where the host groups or managed hosts exist.**
6. **Select the host groups or managed hosts on which to reschedule the job.**
7. **Choose the action from the Host Actions drop-down menu.**

   Supply any input information or output information, as well as the date and time to run the job.
8. **Click Submit to reschedule the job.**

   An alert appears above the table of host groups and managed hosts, indicating the success or failure of the action initiation.

   Click Cancel to return to the host group page. The job is not rescheduled.

▼ How to Purge Completed Jobs From the Job Queue (Web Browser)

1. **Click the Monitor Jobs tab to go to the Monitor Jobs section.**
2. **Click the checkbox next to the job entries of completed jobs to purge from the job queue.**

   Completed jobs have status of Canceled, Complete, or Failed.
3. **Click Purge Completed Jobs.**

   The Cancel Jobs page shows the list of completed jobs to purge from the job queue.
4. **Click Purge to purge the selected jobs and return to the job queue.**

   An alert appears above the table of job entries, indicating the success or failure of the purge action.

   Click Cancel to return to the job queue. The selected jobs are not purged from the job queue.

▼ How to View the Job Log (Web Browser)

1. **Click the View Logs tab to go to the View Logs section.**
2. **From the View menu, choose Job Log.**

▼ How to View the Transaction Log (Web Browser)

1. **Click the View Logs tab to go to the View Logs section.**
2. **From the View menu, choose Transaction Log.**

Monitoring Jobs by Using the Command-Line Interface (Task Map)

The following table identifies the procedures you need to monitor jobs by using the command-line interface. See the `changemgr`(1MCM) man page.

Task	Description	For Instructions
View the job queue.	View the job queue to monitor current and recent pending jobs, running jobs, and completed jobs.	See "How to View the Status of Jobs (Command Line)" on page 131.
Cancel jobs.	Cancel running jobs and pending jobs that appear in the job queue.	See "How to Cancel Jobs (Command Line)" on page 133.
Purge completed jobs from the job queue.	Purge completed jobs from the job queue. Jobs that are running or pending are not affected.	See "How to Purge Completed Jobs From the Job Queue (Command Line)" on page 134.

Monitoring Jobs by Using the Command-Line Interface

The following procedures describe how to monitor jobs by using the job queue. In addition to viewing the job queue, you can purge completed jobs from the queue and cancel jobs from the queue.

▼ How to View the Status of Jobs (Command Line)

1. **Determine whether to view the status of particular jobs or all jobs.**

   To specify one or more jobs, use the associated *job ID*. Otherwise, information is provided for all running jobs.

2. **View the status of jobs.**

   ```
   $ changemgr jobs [ -u username ] [ -p file ] [ -l ] [ -o format ] [ id ... ]
   ```

`-u` *username*	Specifies the user name to authenticate. If this option is not specified, the user is the current UNIX user.
`-p` *file*	*file* consists of a single line, which contains the password. If *file* is `-`, then the user can supply the password as standard input. If the `-p` option is not supplied, then the `changemgr` command prompts the user for his password.
`-l`	Presents more detailed information about the jobs.
`-o` *format*	*format* is a blank-separated list or comma-separated list of property names. If you separate the property names with spaces, make sure that you surround the list of property names with quotes. The specified property values are displayed in a name-value format. If *format* is specified as `all`, then all properties are displayed. The output is suitable for programmatic parsing.
id	Specifies particular job IDs. The job ID number is automatically assigned when the operation is initiated.

Example—Viewing the Status of All Jobs

Pat wants to see the status of all jobs: those started from the browser interface and those started from the command-line interface.

```
$ changemgr jobs
```

Example—Viewing the Job Details

Pat wants to see the job details for all jobs.

```
$ changemgr jobs -l
```

Example—Viewing the Status of Specified Jobs

Pat wants to see the status of job `IC_1234`.

```
$ changemgr jobs IC_1234
```

Example—Viewing the Properties of a Specific Job

Pat wants to see all the properties of job `IC_1234`.

```
$ changemgr jobs -o all IC_1234
```

▼ How to Cancel Jobs (Command Line)

Some Change Manager operations are interrupted when you cancel them, while some jobs are not.

When a cancel is issued for an *interruptable* job, the operation currently running on the managed hosts is immediately terminated. The job is canceled for any managed hosts waiting to run the job. The following operations *can* be interrupted:

- `changemgr audit`
- `changemgr export`
- `changemgr import`
- `changemgr info`
- `changemgr manifest`

When a cancel is issued for an *uninterruptable* job, the operation currently running on the managed hosts completes. The job is canceled for any managed hosts waiting to run the job. The following operations *cannot* be interrupted:

- `changemgr fallback`
- `changemgr halt`
- `changemgr reboot`
- `changemgr reinstall`
- `changemgr setup`
- `changemgr update`

1. **Determine which jobs to cancel.**

   You can cancel pending jobs and running jobs.

   To specify one or more jobs, use the associated job ID.

2. **Cancel selected jobs.**

   $ **changemgr kill** [**-u** *username*] [**-p** *file*] *id* ...

   For descriptions of the options, see "How to View the Status of Jobs (Command Line)" on page 131.

Example—Canceling a Job

Pat wants to cancel jobs `IC_12345` and `IC_12346`.

```
$ changemgr kill IC_12345 IC_12346
```

▼ How to Purge Completed Jobs From the Job Queue (Command Line)

1. **Determine which completed jobs to purge from the job queue.**

   You can purge only completed jobs.

   To specify one or more jobs, use the associated job ID.

2. **Purge completed jobs from the job queue.**

   `$ changemgr ack [ -u username ] [ -p file ] id ...`

   For descriptions of the options, see "How to View the Status of Jobs (Command Line)" on page 131.

Example—Purging Completed Jobs From the Job Queue

Pat wants to purge the completed jobs, `IC_12347` and `IC_12348`, from the job queue.

```
$ changemgr ack IC_12347 IC_12348
```

CHAPTER 8

Maintaining the Change Manager Repository (Tasks)

The Change Manager repository is organized as a file manager. You can traverse through nested folders to view folder contents and file properties. You can also create folders and files.

Change Manager objects have properties associated with them. You can change properties for files by using the browser interface. You can change properties for files *and* folders by using the command-line interface.

The following topics are discussed in this chapter:

To perform operations, such as installation, update, and audit, go to the Set Up Hosts & Jobs section. See Chapter 5 and Chapter 6.

Maintaining the Change Manager Repository by Using the Browser Interface (Task Map)

The following table identifies the procedures you need to maintain files in the Change Manager repository.

Task	Description	For Instructions
Access the Set Up Files section and folder.	Access the Set Up Files section and the appropriate folder in the Change Manager repository.	See "How to Access the Set Up Files Section and Appropriate Folder (Web Browser)" on page 138.
Create a folder.	Create a folder in the Change Manager repository.	See "How to Create a Folder (Web Browser)" on page 138.
Rename a file or folder.	Rename a file or folder in the Change Manager repository.	See "How to Rename a File or Folder (Web Browser)" on page 138.
Export a file.	Export a file from the Change Manager repository.	See "How to Export a File From the Change Manager Repository (Web Browser)" on page 139.
Create a copy of a file.	Create a copy of a file in the current folder.	See "How to Create a Copy of a File (Web Browser)" on page 139.
Move files and folders.	Move files and folders to another folder in the Change Manager repository.	See "How to Move Files and Folders to Another Folder (Web Browser)" on page 140.
Delete files and folders.	Delete files and folders from the Change Manager repository.	See "How to Delete Files and Folders (Web Browser)" on page 140.
View folder contents.	View the contents of a folder.	See "How to View Folder Contents (Web Browser)" on page 140.

Task	Description	For Instructions
View or modify file properties.	View or modify the properties of files in the repository.	See "How to View or Modify File Properties (Web Browser)" on page 141.

Maintaining the Change Manager Repository by Using the Browser Interface

This section describes how to use the browser interface to manage the file hierarchy of the Change Manager repository.

Suffixes of file names in the Change Manager repository must reflect the type of file. The suffixes are as follows:

- `.bmft` for manifests
- `.brul` for audit rules files
- `.cmsp` for shared profiles
- `.flar` for Solaris Flash archives
- `.miniroot` for Solaris boot images
- `.txt` for reports

When you use the browser interface to name files in the repository, the appropriate suffix is *automatically* added to the file name you specify. However, if you specify the appropriate suffix in the file name, the name is used as-is.

For example, if you name a report file `cm08.status`, then the name of the report stored in the repository automatically becomes `cm08.status.txt`. If, however, you name the file `cm08.status.txt`, no `.txt` suffix is added because it is already the last part of the file name.

Note – When you use the command-line interface to name files in the repository, you *must* manually specify the suffix that indicates the type of the file.

To learn how to navigate through the browser interface, see Appendix A.

▼ How to Access the Set Up Files Section and Appropriate Folder (Web Browser)

Note that the top of the Set Up Files section hierarchy is a folder.

1. **To go to the Set Up Files section, click the Set Up Files tab in the general links area.**

   The top-level Set Up Files page shows a table, which can contain files and folders. The table is a file manager.

2. **Drill down to the appropriate folder.**

   Click a folder name to go into that folder. Then, view the folder's contents. Continue to click folder names until you reach the folder or file you want.

▼ How to Create a Folder (Web Browser)

Note that the top of the Set Up Files section hierarchy is a folder.

1. **If you are not already in the appropriate folder, see "How to Access the Set Up Files Section and Appropriate Folder (Web Browser)" on page 138.**
2. **From the File Actions menu, choose New Folder.**
3. **Supply a folder name.**

   For example, create a folder named `apache` in which to store objects related to the Apache web server.

4. **Click Create to create the folder, return to the parent folder, and see the new folder.**

   Click Cancel to return to the previous page.

▼ How to Rename a File or Folder (Web Browser)

The rename action can be taken on one file or folder at a time.

1. **If you are not already in the appropriate folder, see "How to Access the Set Up Files Section and Appropriate Folder (Web Browser)" on page 138.**
2. **Select the object to rename from the table.**
3. **From the File Actions menu, choose Rename.**

   A page appears that shows the current name of the folder or file.

4. **Supply a new file name or new folder name in the New Name field.**

   If the name you supply does not include the proper suffix, the application adds the suffix for you.

5. **Click Rename to change the name of the folder or file in the Change Manager repository.**
   Click Cancel to return to the previous page.

▼ How to Export a File From the Change Manager Repository (Web Browser)

You can use the browser interface to *export* only one file at a time.

Note – Folders cannot be exported. Only files can be exported.

---

1. **If you are not already in the appropriate folder, see "How to Access the Set Up Files Section and Appropriate Folder (Web Browser)" on page 138.**
2. **To select the file to export, click the checkbox next to the file name.**
3. **From the File Actions menu, choose Export File.**
   A page appears that shows the name of the file to export.
4. **Supply a path name to the place outside of the repository to copy the file.**
5. **Click Export to copy the file outside of the repository.**
   Click Cancel to return to the previous page.

▼ How to Create a Copy of a File (Web Browser)

You can create a copy of a shared profile or an audit rules file only. You can use the browser interface to copy only one file at a time.

The copy of the file must be created in the same folder as the original file. To simulate the creation of a copy of a file in another folder, do the following:

1. Use the Copy File action to create the copy (described in this section).
2. Use the Move action to move the copy to another folder (described in the next section).

1. **If you are not already in the appropriate folder, see "How to Access the Set Up Files Section and Appropriate Folder (Web Browser)" on page 138.**
2. **To select the file to copy, click the checkbox next to the file name.**
3. **From the File Actions menu, choose Copy File.**
   A page appears that shows the name of the file to copy.

4. **Supply a file name for the copy.**
   The copy of the file must be created in the same folder as the original file.
5. **Click Copy to create the copy of the file.**
   Click Cancel to return to the previous page.

▼ How to Move Files and Folders to Another Folder (Web Browser)

1. **If you are not already in the appropriate folder, see "How to Access the Set Up Files Section and Appropriate Folder (Web Browser)" on page 138.**
2. **To select the files and folders to move, click the checkbox next to the file and folder names.**
3. **From the File Actions menu, choose Move.**
   A page appears that shows the name of the files and folders to move.
4. **Supply a path name to the destination folder in the Change Manager repository.**
5. **Click Move to move the files and folders to the other folder.**
   Click Cancel to return to the previous page.

▼ How to Delete Files and Folders (Web Browser)

Folders must be empty before you delete them.

1. **If you are not already in the appropriate folder, see "How to Access the Set Up Files Section and Appropriate Folder (Web Browser)" on page 138.**
2. **To select the files and folders to delete, click the checkbox next to the file and folder names.**
3. **From the File Actions menu, choose Delete.**
   A page appears that shows the names of the files and folders to delete from the repository.
4. **Click Delete to delete the files and folders.**
   Click Cancel to return to the previous page.

▼ How to View Folder Contents (Web Browser)

1. **If you are not already in the appropriate folder, see "How to Access the Set Up Files Section and Appropriate Folder (Web Browser)" on page 138.**

A page appears that shows the contents of the folder.

2. **Click Cancel to return to the previous page.**

▼ How to View or Modify File Properties (Web Browser)

This procedure describes how to use the browser interface to view and modify file properties in the Change Manager repository. The browser interface shows properties and their values on property pages for the object. To view an object's property page, click the name of the object.

1. **If you are not already in the appropriate folder, see "How to Access the Set Up Files Section and Appropriate Folder (Web Browser)" on page 138.**
2. **Click the file name to access the file's property page to do either of the following:**
   - View the file's properties.

     The property pages for a manifest and a report are read-only.

     Click Cancel to return to the file's parent folder.
   - Modify the file's property values.

     Click Save to save the property value changes and return to the file's parent folder.

     Click Cancel to return to the file's parent folder.

Maintaining the Change Manager Repository by Using the Command-Line Interface (Task Map)

The following table identifies the procedures you need to manage files in the Change Manager repository. See the `changemgr`(1MCM) man page.

Task	Description	For Instructions
Create a folder.	Create a folder in the Change Manager repository.	See "How to Create a Folder (Command Line)" on page 143.

Task	Description	For Instructions
Rename a file or folder.	Rename a file or folder in the Change Manager repository.	See "How to Rename a File or Folder (Command Line)" on page 143.
Export a file.	Export a file from the Change Manager repository.	See "How to Export Files to Another System (Command Line)" on page 144.
Move files and folders.	Move files and folders to another folder in the Change Manager repository.	See "How to Move Files and Folders to Another Folder (Command Line)" on page 145.
Delete files and folders.	Delete files and folders from the Change Manager repository.	See "How to Delete Files and Folders (Command Line)" on page 146.
View folder contents.	View the contents of a folder.	See "How to View Folder Contents (Command Line)" on page 146.
View file properties.	View the properties of files in the repository.	See "How to View File or Folder Properties (Command Line)" on page 148.
Modify file properties.	Modify the properties of files in the repository.	See "How to Modify File or Folder Properties (Command Line)" on page 149.

Maintaining the Change Manager Repository by Using the Command-Line Interface

This section describes how to use the command-line interface to manage the file hierarchy of the Change Manager repository.

▼ How to Create a Folder (Command Line)

Note – The top of the Set Up Files section hierarchy is a folder.

1. **Determine where to create the folder.**
   For example, create a folder in the `web-server` folder.
2. **Create and name the folder.**

   `$` **`changemgr mkdir`** `[` **`-u`** *username* `]` `[` **`-p`** *file* `]` *reldirpath* `...`

`-u` *username*	Specifies the user name to authenticate. If this option is not specified, the user is the current UNIX user.
`-p` *file*	*file* consists of a single line, which contains the password. If *file* is `-`, then the user can supply the password as standard input. If the `-p` option is not supplied, then the `changemgr` command prompts the user for his password.
reldirpath	Specifies the path to a folder that is relative to the top of the Change Manager repository.

   Choose a meaningful name that indicates the types of files the folder contains. For example, create a folder named `apache` in which to store objects related to the Apache web server.

Example—Creating a Folder

Suzi creates the `apache` folder in the `web-server` folder.

```
$ changemgr mkdir -p .pfile /web-server/apache
```

▼ How to Rename a File or Folder (Command Line)

The rename action can be taken on one file or folder at a time.

1. **Determine which file or folder to rename.**
   For example, rename the `web-server/apache` folder to be `web-server/ApacheServer`.
2. **Rename the file or folder.**

   `$` **`changemgr filemove`** `[` **`-u`** *username* `]` `[` **`-p`** *file* `]` *old_relfilepath*`.`*type* `\`
   new_relfilepath`.`*type*

relfilepath Specifies the path to a file or folder. The path is relative to the top of the Change Manager repository.

.type Specifies the file name suffix that represents the file type. File type suffixes are as follows:

- `.bmft` for manifests
- `.brul` for audit rules files
- `.cmsp` for shared profiles
- `.flar` for archives
- `.miniroot` for boot images
- `.txt` for reports

Folders do not use a file suffix.

For descriptions of the other options, see "How to Create a Folder (Command Line)" on page 143.

Example—Renaming a File or Folder

Suzi renames the `web-server/apache` folder to be `web-server/ApacheServer`.

```
$ changemgr filemove /web-server/apache \
/web-server/ApacheServer
```

▼ How to Export Files to Another System (Command Line)

Only files, not folders and Solaris boot images, can be exported.

1. **Determine which files to export.**

   For example, *export* the `/web-server/apache/host1.bmft` file to `host2:/home/suzi`.

2. **Export the files:**

   - Export a single file, *relfilepath*, from the repository as *filepath*.

     ```
     $ changemgr export [ -u username ] [ -p file ] relfilepath filepath
     ```

   - Export one or more files to the specified folder, *dirpath*, outside of the repository.

     ```
     $ changemgr export [ -u username ] [ -p file ] relfilepath ... dirpath
     ```

   dirpath Specifies an absolute or relative path to a directory. This directory is not within the Change Manager repository.

   filepath Specifies an absolute or relative path to a file. This file path is not within the Change Manager repository.

relfilepath Specifies the path to a file, *not* including a folder, that is relative to the top of the Change Manager repository.

For descriptions of the other options, see "How to Create a Folder (Command Line)" on page 143.

Example—Exporting a File to Another System

Suzi exports the `/web-server/apache/host1.bmft` file to her home directory, `/net/host2/home/suzi`.

```
$ changemgr export /web-server/apache/host1.bmft \
/net/host2/home/suzi/host1.bmft
```

Example—Exporting Files to Another System

Suzi exports the `/web-server/apache/host1.bmft` file and the `/web-server/apache/host2.bmft` file to her home directory, `/net/host2/home/suzi`.

```
$ changemgr export /web-server/apache/host1.bmft \
/web-server/apache/host2.bmft /net/host2/home/suzi
```

▼ How to Move Files and Folders to Another Folder (Command Line)

1. **Determine which files and folders to move.**

   For example, move the `web-server/host1.bmft` file and the `web-server/host2.bmft` file to the `web-server/ApacheServer` folder.

2. **Move the files and folders to another folder in the Change Manager repository.**

   `$ changemgr filemove [ -u` *username* `] [ -p` *file* `] ` *relfilepath* `... \`
   reldirpath

   relfilepath Specifies the path to a file or folder that is relative to the top of the Change Manager repository.

   For descriptions of the other options, see "How to Create a Folder (Command Line)" on page 143.

Example—Moving Files and Folders to Another Folder

Suzi moves the `web-server/host1.bmft` file and the `web-server/host2.bmft` file to the `web-server/ApacheServer` folder.

```
$ changemgr filemove /web-server/host1.bmft \
/web-server/host2.bmft /web-server/ApacheServer
```

▼ How to Delete Files and Folders (Command Line)

Folders must be empty before you delete them.

1. **Determine which files and folders to delete.**

   For example, delete the `web-server/host1.bmft` file, the `host2.bmft` file, and the `web-server/ApacheServer` folder.

2. **Delete the files and folders.**

   `$ changemgr delete [ -u` *username* `] [ -p` *file* `]` *relfilepath* `...`

   relfilepath Specifies the path to a file or folder that is relative to the top of the Change Manager repository.

   For descriptions of the other options, see "How to Create a Folder (Command Line)" on page 143.

Example—Deleting Files and Folders

Suzi deletes the `web-server/host1.bmft` file, the `host2.bmft` file, and the `web-server/ApacheServer` folder.

```
$ changemgr delete /web-server/host1.bmft \
/web-server/host2.bmft /web-server/ApacheServer
```

▼ How to View Folder Contents (Command Line)

A folder can contain files and other folders.

To modify folder properties, see "How to Modify File or Folder Properties (Command Line)" on page 149.

1. **Determine which folder to view.**

   For example, view the contents of the `web-server/ApacheServer` folder.

2. **View the folder contents.**

```
$ changemgr files [ -u username ] [ -p file ] [ -l ] [ -d ] [ -R ] \
[ -o format ] [ relfilepath ... ]
```

`-l`	Presents detailed information in tabular form.
`-d`	Presents information about the folder itself, rather than about the folder's contents.
`-R`	Describes all the folder's descendents.
`-o` *format*	*format* is a blank-separated list or comma-separated list of property names. If you separate the property names with spaces, make sure that you surround the list of property names with quotes. The specified property values are displayed in a name-value format. If *format* is specified as `all`, then all properties are displayed. The output is suitable for programmatic parsing.
relfilepath	Specifies the path to a file or folder that is relative to the top of the Change Manager repository.

For descriptions of the other options, see "How to Create a Folder (Command Line)" on page 143.

Example—Viewing Contents of the Root of the Repository

Suzi views the contents of the root of the Change Manager repository, which is the root folder.

```
$ changemgr files
```

Example—Viewing Folder Contents

Suzi views the contents of the `web-server/ApacheServer` folder.

```
$ changemgr files /web-server/ApacheServer
```

Example—Viewing Information About the Folder

Suzi views the information about the `web-server/ApacheServer` folder.

```
$ changemgr files -d /web-server/ApacheServer
```

Example—Viewing Folder Contents in Table Form

Suzi views the contents of the `web-server/ApacheServer` folder in table form.

```
$ changemgr files -l /web-server/ApacheServer
```

Example—Viewing Folder Contents and Contents of the Folder's Descendents

Suzi views the contents of the `web-server/ApacheServer` folder and the folder's descendents.

```
$ changemgr files -R /web-server/ApacheServer
```

Example—Viewing Folder Contents and Specific Properties

Suzi views the contents of the `web-server/ApacheServer` folder. She wants to see the values of the `Description` property and the `save` property for each object. Note that you can use either format shown.

```
$ changemgr files -o Description,save /web-server/ApacheServer
```

```
$ changemgr files -o "Description save" /web-server/ApacheServer
```

Example—Viewing Folder Contents and All Properties

Suzi views the contents of the `web-server/ApacheServer` folder and wants to see the values of all the properties for each object.

```
$ changemgr files -o all /web-server/ApacheServer
```

Example—Viewing Detailed Information About the Contents and Properties of a Folder and Its Descendents

Suzi views detailed information in table form about the contents and all properties of the `web-server/ApacheServer` folder and the folder's descendents.

```
$ changemgr files -l -R -o all /web-server/ApacheServer
```

▼ How to View File or Folder Properties (Command Line)

- **To view file or folder properties, see "How to View Folder Contents (Command Line)" on page 146.**

▼ How to Modify File or Folder Properties (Command Line)

1. **Determine which file or folder properties you want to modify.**
   - **File –** For example, modify the properties of the `web-server/ApacheServer/ApacheWebServer.flar` file.
   - **Folder –** For example, modify the properties of the `web-server/ApacheServer` folder.
2. **To modify the properties, supply the property names and values.**

   ```
   $ changemgr fileset [ -u username ] [ -p file ] [ -s name=value ]  ... \
   [ -s name ] ... relfilepath ...
   ```

`-s` *name=value*	Specifies one or more name-value pairs. *name* is the property name, and *value* is the property value. Supply this option for each property value you want to set. If *value* is blank, then the property is assigned an empty value.
`-s` *name*	Specifies one or more property names to delete, where *name* is the property name. Supply this option for each property you want to delete.
relfilepath	Specifies the path to a file or folder that is relative to the top of the Change Manager repository.

   For descriptions of the other options, see "How to Create a Folder (Command Line)" on page 143.

Example—Modifying File Properties

Suzi modifies the `Description` property of the `web-server/ApacheServer/ApacheWebServer.flar` file.

```
$ changemgr fileset -s Description="Apache Web Server archive" \
/web-server/ApacheServer/ApacheWebServer.flar
```

Example—Deleting a File Property

Suzi deletes the `Description` property of the `web-server/ApacheServer/ApacheWebServer.flar` file.

```
$ changemgr fileset -s Description \
/web-server/ApacheServer/ApacheWebServer.flar
```

Example—Deleting File Properties

Suzi deletes the `Description` property and the `Name` property from the `web-server/ApacheServer/ApacheWebServer.flar` file.

```
$ changemgr fileset -s Description -s Name \
/web-server/ApacheServer/ApacheWebServer.flar
```

Example—Deleting a File Property From One or More Files

Suzi deletes the `Description` property from the `web-server/ApacheServer/ApacheWebServer.flar` file and the `web-server/ApacheServer/ApacheWebServer.txt` file.

```
$ changemgr fileset -s Description \
/web-server/ApacheServer/ApacheWebServer.flar \
/web-server/ApacheServer/ApacheWebServer.txt
```

Example—Modifying Folder Properties

Suzi modifies the `Description` property of the `web-server/Apache Server` folder.

```
$ changemgr fileset \
-s Description="Folder to hold Apache Web Server files" \
/web-server/ApacheServer
```

CHAPTER 9

Maintaining the Sun Management Center Topology (Tasks)

This chapter describes the Sun Management Center *topology* and procedures for organizing it. Sun Management Center can be configured with more than one *administrative domain*. In such cases, you can create a hierarchy of host groups and managed hosts in these administrative domains. A *managed host* is a host that is controlled by Change Manager. A *host group* is a collection of managed hosts and other host groups.

Like the Change Manager repository, the administrative domain is organized as a file manager. You can use host groups to organize managed hosts into logical units. You can perform actions on individual managed hosts or on host groups.

The following topics are covered in this chapter:

Change Manager Host Object Types

Change Manager supports three host object types: managed hosts, host groups, and administrative domains. Change Manager can perform operations on managed hosts and host groups.

You can use host groups to create a hierarchy in which to organize managed hosts. Managed hosts can belong to one or more host groups, which enables you to view the same managed hosts from different perspectives.

You can organize the host groups and managed hosts in the following ways:

- **Group like host types –** For example, store all Netra X1 machines in a single host group. Do the same for other hardware types.
- **Group managed hosts related to a particular service –** Create a host group to hold all the managed hosts associated with a particular service. For example, a *server farm* manages web services. Therefore, create a host group named `WebServer`. In the `WebServer` host group, store the managed hosts used in the web server farm.
- **Group managed hosts by geography –** Create a host group to hold all the managed hosts that exist in a city, office suite, building, floor, or rack. For example, your company's Los Angeles office is located on the 6th floor. Therefore, create a host group named `6th floor`. In the `6th floor` host group, store the managed hosts that are on the 6th floor of your office.
- **Group managed hosts by administrator –** Create a host group to hold all the managed hosts administered by a system administrator. For example, Pat and Chris administer the managed hosts for your company. Therefore, create host groups named `pat` and `chris`. In the `pat` host group, store the managed hosts that are administered by Pat. Store Chris's managed hosts in the `chris` host group.
- **Group managed hosts by organization –** Create a host group to hold all the managed hosts for each organization. For example, group managed hosts for your marketing and engineering organizations. Therefore, create host groups named `marketing` and `engineering`.

Host Group

A *host group* is a container that holds managed hosts and other host groups. Click a host group name to change into that host group and view its contents.

Perform the following actions from a host group:

- Create a host group
- Add a managed host
- Rename a managed host or host group
- Move a managed host or host group to another host group
- Remove a managed host or host group

Managed Host

A *managed host* is a host that is managed by Change Manager. You can perform actions and run jobs on managed hosts.

Managed hosts in the Sun Management Center topology have a standard set of properties associated with them:

`Description` User-supplied string that describes the managed host.

`AgentPort` Port number the agent uses to communicate with the Change Manager server.

Note – If you change the value of this property after installing a managed host, the Change Manager server will no longer be able to communicate with it. To reestablish communication with the server by using the new agent port, you must reinitialize the managed host by performing an initial installation on it.

`Owner` Read-only property that names the owner of the managed host.

`State` Read-only property that indicates the state of the managed host.

Modify the managed host's configuration by specifying the following:

- Ethernet address
- Platform group of the hardware
- Shared profile to use
- Values for archive-specific parameters

Perform the following actions on this managed host:

- Rename a managed host
- Copy a managed host to another host group
- Move the managed host to another host group
- Remove the managed host

Maintaining the Sun Management Center Topology by Using the Browser Interface (Task Map)

The following table identifies the procedures you need to add hosts in your administrative domain.

Task	Description	For Instructions
Access the Set Up Hosts & Jobs section, administrative domain, and host group.	Access the Set Up Hosts & Jobs section and the appropriate host group in your administrative domain.	See "How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)" on page 156.
Create a host group.	Create a host group in your administrative domain.	See "How to Create a Host Group (Web Browser)" on page 156.
Rename a managed host or host group.	Rename a managed host or host group in your administrative domain.	See "How to Rename a Managed Host or Host Group (Web Browser)" on page 156.
Copy a managed host.	Copy a managed host to another host group in your administrative domain.	See "How to Copy Managed Hosts to Another Host Group (Web Browser)" on page 157.
Move managed hosts and host groups.	Move managed hosts and host groups to another host group in your administrative domain.	See "How to Move Managed Hosts and Host Groups to Another Host Group (Web Browser)" on page 158.
Remove managed hosts and host groups.	Remove managed hosts and host groups from your administrative domain.	See "How to Remove Managed Hosts and Host Groups (Web Browser)" on page 158.
View host group contents.	View the contents of a host group in your administrative domain.	See "How to View the Contents of a Host Group (Web Browser)" on page 159.

Task	Description	For Instructions
View and modify managed host properties.	View and modify the properties of a managed host in your administrative domain.	See "How to View or Modify Managed Host Properties (Web Browser)" on page 159.

Maintaining the Sun Management Center Topology by Using the Browser Interface

The following procedures describe some of the tasks to perform from the Set Up Hosts & Jobs section. To initiate deployment jobs, see Chapter 5. To initiate audit jobs, see Chapter 6.

You can create administrative domains by using the Sun Management Center application. If more than one administrative domain exists, the top-level Set Up Hosts & Jobs page lists the administrative domains available to Change Manager. Click the name of the domain in which your managed hosts reside. If only the default domain exists, then the top-level page lists the host groups and managed hosts in the default domain. Then, from the Set Up Hosts & Jobs section, initiate jobs on managed hosts.

Note – Perform the actions on the Host Actions drop-down menu while in the appropriate host group. For example, to create a host group inside an existing host group, go to the existing host group *before* choosing Add Group.

To learn how to navigate through the browser interface, see Appendix A.

Caution – Do *not* remove the managed host element that represents your Change Manager server. This host is created automatically when the Sun Management Center server software is installed on the Change Manager server.

▼ How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)

1. **To go to the Set Up Hosts & Jobs section, click the Set Up Hosts & Jobs tab in the general links area.**
   - If more than one administrative domain exists, you go to a page showing a table that lists the available administrative domains. Go to Step 2.
   - If only one administrative domain exists, the page shows a table that lists managed hosts and host groups in the default domain. Go to Step 3.
2. **(Optional) Click the name of the administrative domain to use.**

   Note – Use Sun Management Center to create a new administrative domain. See "Using Sun Management Center Administrative Domains" in *Sun Management Center 3.5 User's Guide*.

   ---

3. **Drill down to the appropriate host group.**

   Click a host group name to go into that host group. Then, view the host group's contents. Continue to click host group names until you reach the host group or managed host you want.

▼ How to Create a Host Group (Web Browser)

1. **If you are not already in the appropriate host group, see "How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)" on page 156.******
2. **From the Host Actions menu, choose Add Group.**
3. **Supply a host group name.**

   Choose a meaningful name, for example, a name that indicates the types of managed hosts and host groups that the host group contains.
4. **Click Add to create the host group.**

   Click Cancel to return to the previous page.

▼ How to Rename a Managed Host or Host Group (Web Browser)

Rename only one managed host or host group at a time.

Note – Changing the name of a managed host with Change Manager *only* changes how that managed host is labeled in that particular host group.

Changing the name does *not* change the following:

- How that managed host is labeled in other host groups
- The name by which the managed host is known in the naming service
- The name the managed host calls itself

1. **If you are not already in the appropriate host group, see "How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)" on page 156.**
2. **Click the checkbox next to the managed host name or host group name to select it.**
3. **From the Host Actions menu, choose Rename.**

   A page appears that shows the current managed host name or host group name and a field in which to type the new name.
4. **Supply a new name.**
5. **Click Rename to change the name of the managed host or host group in your administrative domain.**

   Click Cancel to return to the previous page.

▼ How to Copy Managed Hosts to Another Host Group (Web Browser)

Managed hosts can belong to one or more host groups. To learn why you might want to have managed hosts belong to one or more host groups, see "Change Manager Host Object Types" on page 151.

Note – Managed hosts can only be copied to existing host groups. To create a host group in which to copy a managed host, see "How to Create a Host Group (Web Browser)" on page 156.

1. **If you are not already in the appropriate host group, see "How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)" on page 156.**
2. **Select the managed host or managed hosts to copy.**
3. **From the Host Actions menu, choose Copy Hosts.**

A page appears that shows the name of the managed host and a field in which to type the other host group.

4. **Supply a path name to another host group in your administrative domain.**
   Click Browse to launch a chooser window. Use the chooser to locate the other host group.
5. **Click Copy to copy the managed host to the other host group.**
   Click Cancel to return to the previous page.

▼ How to Move Managed Hosts and Host Groups to Another Host Group (Web Browser)

1. **If you are not already in the appropriate host group, see "How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)" on page 156.****
2. **Select the managed hosts and host groups to move.**
3. **From the Host Actions menu, choose Move.**
   A page appears that shows the current managed host name and host group name and a field in which to input the other host group.
4. **Supply a path name to another host group in your administrative domain.**
   Click Browse to launch a chooser window. Use the chooser to locate the other host group.
5. **Click Move to move the managed hosts and host groups to the other host group.**
   Click Cancel to return to the previous page.

▼ How to Remove Managed Hosts and Host Groups (Web Browser)

Remove only empty host groups.

1. **If you are not already in the appropriate host group, see "How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)" on page 156.****
2. **Select the managed hosts and host groups to remove.**
3. **From the Host Actions menu, choose Remove.**
   A page appears that shows the names of the managed hosts and host groups to remove.

4. **Click Remove to remove the managed hosts and host groups.**
   Click Cancel to return to the previous page.

▼ How to View the Contents of a Host Group (Web Browser)

1. **If you are not already in the appropriate host group, see "How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)" on page 156.**
2. **Click the host group name to view that host group.**
   A page appears that shows the contents of the host group.
3. **To return to the previous host group, click the name of the parent host group in the bread crumbs.**

▼ How to View or Modify Managed Host Properties (Web Browser)

1. **If you are not already in the appropriate host group, see "How to Access the Set Up Hosts & Jobs Section and Appropriate Administrative Domain and Host Group (Web Browser)" on page 156.**
2. **Click the managed host's name to do either of the following:**
   - View the managed host's properties.
     Click Cancel to return to the managed host's parent host group.
   - Modify the property values of the managed host.
     Click Save to save the property value changes and return to the parent host group.
     Click Cancel to return to the parent host group.

Maintaining the Sun Management Center Topology by Using the Command-Line Interface (Task Map)

The following table identifies the procedures you need to manage the Sun Management Center topology. See the `changemgr`(1MCM) man page.

Task	Description	For Instructions
Specify an administrative domain.	Specify the administrative domain to use for creating managed hosts and host groups.	See "How to Specify the Administrative Domain in Which to Add Hosts (Command Line)" on page 161.
Create a host group.	Create a host group in your administrative domain.	See "How to Create a Host Group (Command Line)" on page 162.
Rename a managed host or host group.	Rename a managed host or host group in your administrative domain.	See "How to Rename a Managed Host or Host Group (Command Line)" on page 163.
Copy a managed host.	Copy a managed host to another host group in your administrative domain.	See "How to Copy Managed Hosts to Another Host Group (Command Line)" on page 163.
Move managed hosts and host groups.	Move managed hosts and host groups to another host group in your administrative domain.	See "How to Move Managed Hosts and Host Groups to Another Host Group (Command Line)" on page 164.
Remove managed hosts and host groups.	Remove managed hosts and host groups from your administrative domain.	See "How to Remove Managed Hosts and Host Groups (Command Line)" on page 165.
View host group contents.	View the contents of a host group in your administrative domain.	See "How to View the Contents of a Host Group (Command Line)" on page 165.

Task	Description	For Instructions
View managed host properties.	View the properties of a managed host in your administrative domain.	See "How to View Managed Host Properties (Command Line)" on page 167.
Modify managed host properties.	Modify the properties of a managed host in your administrative domain.	See "How to Modify Managed Host Properties (Command Line)" on page 169.
View host group properties.	View the properties of a host group in your administrative domain.	See "How to View Host Group Properties (Command Line)" on page 170.
Modify host group properties.	Modify the properties of a host group in your administrative domain.	See "How to Modify Host Group Properties (Command Line)" on page 171.

Maintaining the Sun Management Center Topology by Using the Command-Line Interface

To initiate deployment jobs, see Chapter 5. To initiate audit jobs, see Chapter 6.

▼ How to Specify the Administrative Domain in Which to Add Hosts (Command Line)

1. **Determine the name of the administrative domain you want to use.**
2. **Use the `-d` *domain* option with the `changemgr` command to supply the name of the administrative domain.**

   `$` **`changemgr`** *subcommand other-options* **`-d`** *domain operands*

   For example, specify an administrative domain named `web-domain` in which to store the topology.

Example—Specifying an Administrative Domain in Which to Add Hosts

Chris views the contents of the `web-server/ApacheServer` host group, which is in the `web-domain` administrative domain.

```
$ changemgr hosts -d web-domain /web-server/ApacheServer
```

▼ How to Create a Host Group (Command Line)

1. **Determine where to create the host group.**

   For example, create a host group in the `web-server` host group.

2. **Create a host group.**

   `$` **`changemgr mkgroup`** `[` **`-u`** *username* `]` `[` **`-p`** *file* `]` `[` **`-d`** *domain* `]` \
   grouppath `...`

`-u` *username*	Specifies the user name to authenticate. If this option is not specified, the user is the current UNIX user.
`-p` *file*	*file* consists of a single line, which contains the password. If *file* is `-`, then the user can supply the password as standard input. If the `-p` option is not supplied, then the `changemgr` command prompts the user for his password.
`-d` *domain*	Specifies the administrative domain on which to operate. In the context of a session, the default is the domain specified for the session. If no domain is specified, *domain* is the user's home domain. By default, *domain* is the user's home domain.
grouppath	Specifies the path to a host group that is relative to the top of the selected administrative domain.

   Choose a host group name that indicates the types of managed hosts the host group contains. For example, create a host group named `apache` in which to group managed hosts that run the Apache web server.

Example—Creating a Host Group

Chris creates the `apache` host group in the `web-server` host group.

```
$ changemgr mkgroup /web-server/apache
```

▼ How to Rename a Managed Host or Host Group (Command Line)

You can rename only one managed host or host group at a time.

Note – Changing the name of a managed host with Change Manager *only* changes how that managed host is labeled in that particular host group.

Changing the name does *not* change the following:

- How that managed host is labeled in other host groups
- The name by which the managed host is known in the naming service
- The name the managed host calls itself

---

1. **Determine which managed host or host group to rename.**

   For example, rename the `web-server/apache` host group to be `web-server/ApacheServer`.

2. **Rename the managed host or host group.**

   ```
   $ changemgr hostmove [ -u username ] [ -p file ] [ -d domain ] \
   old_topopath  new_topopath
   ```

   topopath Specifies the path to a managed host or host group that is relative to the top of the selected administrative domain.

   For descriptions of the other options, see "How to Create a Host Group (Command Line)" on page 162.

Example—Renaming a Managed Host or Host Group

Chris renames the `web-server/apache` host group to be `web-server/ApacheServer`.

```
$ changemgr hostmove /web-server/apache \
/web-server/ApacheServer
```

How to Copy Managed Hosts to Another Host Group (Command Line)

To copy a managed host to another host group, you must add a managed host to that group. See "How to Add Managed Hosts (Command Line)" on page 96.

Note – Managed hosts can only be copied to an existing host group. To create a host group in which to copy a managed host, see "How to Create a Host Group (Command Line)" on page 162.

▼ How to Move Managed Hosts and Host Groups to Another Host Group (Command Line)

1. **Determine which managed hosts and host groups to move and the destination host group.**

   For example, move `/web-server/host1` and `/web-server/host2` to the `web-server/ApacheServer` host group.

2. **Move the managed hosts and host groups to the other host group.**

   ```
   $ changemgr hostmove [ -u username ] [ -p file ] [ -d domain ] \
   old_topopath ... new_grouppath
   ```

   topopath Specifies the path to a managed host or host group that is relative to the top of the selected administrative domain.

   For descriptions of the other options, see "How to Create a Host Group (Command Line)" on page 162.

Example—Moving Managed Hosts to Another Host Group

Chris moves the `/web-server/host1` and `/web-server/host2` managed hosts to the `web-server/ApacheServer` host group.

```
$ changemgr hostmove /web-server/host1 /web-server/host2 \
/web-server/ApacheServer
```

Example—Moving Host Groups to Another Host Group

Chris moves the `ApacheServer` and `NewServer` host groups to the `web-server` host group.

```
$ changemgr hostmove ApacheServer NewServer /web-server
```

▼ How to Remove Managed Hosts and Host Groups (Command Line)

You can only remove a host group that is empty.

1. **Determine which managed hosts and host groups to remove.**

   For example, remove the `/web-server/host1` and `/web-server/host2` managed hosts and the `/web-server` host group.

2. **Remove the managed hosts and host groups.**

   ```
   $ changemgr remove [ -u username ] [ -p file ] [ -d domain ] \
   topopath ...
   ```

   topopath Specifies the path to a managed host or host group that is relative to the top of the selected administrative domain.

   For descriptions of the other options, see "How to Create a Host Group (Command Line)" on page 162.

Example—Removing Managed Hosts and Host Groups

Chris removes the `/web-server/host1` and `/web-server/host2` managed hosts and the `/web-server` host group.

```
$ changemgr remove /web-server/host1 /web-server/host2 \
/web-server
```

▼ How to View the Contents of a Host Group (Command Line)

A host group can contain managed hosts and other host groups.

To view host group properties, see "How to View Host Group Properties (Command Line)" on page 170. To modify host group properties, see "How to Modify Host Group Properties (Command Line)" on page 171.

1. **Determine which host group to view.**

   For example, view the contents of the `web-server` host group.

2. **View the host group.**

   ```
   $ changemgr hosts [ -u username ] [ -p file ] [ -d domain ] \
   [ -l ] [ -g ] [ -R ] [ -o format ] [ topopath ... ]
   ```

   `-l` Presents detailed information about the specified managed hosts and host groups in tabular form.

`-g`	Presents information about the host group itself, rather than about the host group's contents.
`-R`	Describes all the host group's descendents.
`-o` *format*	*format* is a blank-separated list or comma-separated list of property names. If you separate the property names with spaces, make sure that you surround the list of property names with quotes. The specified property values are displayed in a name-value format. If *format* is specified as `all`, then all properties are displayed. The output is suitable for programmatic parsing.
topopath	Specifies the path to a managed host or host group that is relative to the top of the selected administrative domain.

For descriptions of the other options, see "How to Create a Host Group (Command Line)" on page 162.

Example—Viewing the Contents of the Current Host Group

Chris views the contents of the host group at the root of the administrative domain.

```
$ changemgr hosts
```

Example—Viewing Host Group Contents

Chris views the contents of the `web-server/ApacheServer` host group.

```
$ changemgr hosts /web-server/ApacheServer
```

Example—Viewing Information About the Host Group

Chris views the information about the `web-server/ApacheServer` host group.

```
$ changemgr hosts -g /web-server/ApacheServer
```

Example—Viewing Host Group Contents in Table Form

Chris views the contents of the `web-server/ApacheServer` host group in table form.

```
$ changemgr hosts -l /web-server/ApacheServer
```

Example—Viewing Host Group Contents and Contents of the Host Group's Descendents

Chris views the contents of the `web-server/ApacheServer` host group and its descendents.

```
$ changemgr hosts -R /web-server/ApacheServer
```

Example—Viewing Host Group Contents and Specific Properties

Chris views the contents of the `web-server/ApacheServer` host group. Chris wants to see the values of the `Description` property and the `base_config_templateName` property for each of the managed hosts in `/web-server/ApacheServer`. Note that you can use either format shown.

```
$ changemgr hosts -o Description,base_config_templateName \
/web-server/ApacheServer
```

```
$ changemgr hosts -o "Description base_config_templateName" \
/web-server/ApacheServer
```

Example—Viewing Host Group Contents and All Properties

Chris views the contents of `web-server/ApacheServer` and wants to see the values of all the properties for each managed host and host group.

```
$ changemgr hosts -o all /web-server/ApacheServer
```

▼ How to View Managed Host Properties (Command Line)

To modify managed host properties, see "How to Modify Managed Host Properties (Command Line)" on page 169.

1. **Determine which managed host's properties to view.**

   For example, view the properties of `web-server/ApacheServer/host1`.

2. **View the properties of the managed host.**

   ```
   $ changemgr hosts [ -u username ] [ -p file ] [ -d domain ] \
   [ -l ] [ -g ] [ -R ] [ -o format ] [ topopath ... ]
   ```

`-l`	Presents detailed information about the specified managed hosts and host groups in tabular form.
`-g`	Presents information about the host group itself, rather than about the host group's contents.
`-R`	Describes all the host group's descendents.
`-o` *format*	*format* is a blank-separated list or comma-separated list of property names. If you separate the property names with spaces, make sure that you surround the list of property names with quotes. The specified property values are displayed in a name-value format. If *format* is specified as `all`, then all properties are displayed. The output is suitable for programmatic parsing.
topopath	Specifies the path to a managed host or host group that is relative to the top of the selected administrative domain.

For descriptions of the other options, see "How to Create a Host Group (Command Line)" on page 162.

Example—Viewing a Managed Host Property

Chris views the value of the `Description` property of `web-server/ApacheServer/host1`.

```
$ changemgr hosts -o Description /web-server/ApacheServer/host1
```

Example—Viewing Managed Host Properties

Chris views the values of the `Description` and `AgentPort` properties of `web-server/ApacheServer/host1`.

```
$ changemgr hosts -o Description,AgentPort /web-server/ApacheServer/host1
```

Example—Viewing All Managed Host Properties

Chris views the values of all the properties of `web-server/ApacheServer/host1`.

```
$ changemgr hosts -o all /web-server/ApacheServer/host1
```

▼ How to Modify Managed Host Properties (Command Line)

For the list of properties, see Chapter 10.

1. **Determine the managed host's properties that you want to modify.**

   For example, modify the properties of the `web-server/ApacheServer/host2` managed host.

2. **Modify the property values of the managed host.**

   ```
   $ changemgr hostset [ -u username ] [ -p file ] [ -d domain ] \
   [ -s name=value ] ... [ -s name ] ... topopath ...
   ```

`-s` *name=value*	Specifies one or more name-value pairs. *name* is the property name, and *value* is the property value. Supply this option for each property value you want to set. If *value* is blank, then the property is assigned an empty value.
`-s` *name*	Specifies one or more property names to delete, where *name* is the property name. Supply this option for each property you want to delete.
topopath	Specifies the path to a managed host or host group that is relative to the top of the selected administrative domain.

   For descriptions of the other options, see "How to Create a Host Group (Command Line)" on page 162.

Example—Modifying a Managed Host Property

Chris modifies the `Description` property of the `web-server/ApacheServer/host2` managed host.

```
$ changemgr hostset -s Description="Apache Web Server: host2" \
/web-server/ApacheServer/host2
```

Example—Modifying Managed Host Properties

Chris modifies the `Description` and `base_config_target_arch` properties for `web-server/ApacheServer/host2`.

```
$ changemgr hostset -s Description="Apache Web Server: host2" \
-s base_config_target_arch=sun4u /web-server/ApacheServer/host2
```

Example—Deleting a Managed Host Property

Chris deletes the `Description` property of the `web-server/ApacheServer/host2` managed host.

```
$ changemgr hostset -s Description /web-server/ApacheServer/host2
```

▼ How to View Host Group Properties (Command Line)

To modify host group properties, see "How to Modify Host Group Properties (Command Line)" on page 171.

1. **Determine which host group's properties to view.**

   For example, view the properties of the `web-server/ApacheServer` host group.

2. **View host group properties.**

   ```
   $ changemgr hosts [ -u username ] [ -p file ] [ -d domain ] \
   [ -l ] [ -g ] [ -R ] [ -o format ] [ topopath ... ]
   ```

   `-l` — Presents detailed information about the specified managed hosts and host groups in tabular form.

   `-g` — Presents information about the host group itself, rather than about the host group's contents.

   `-R` — Describes all the host group's descendents.

   `-o` *format* — *format* is a blank-separated list or comma-separated list of property names. If you separate the property names with spaces, make sure that you surround the list of property names with quotes. The specified property values are displayed in a name-value format. If *format* is specified as `all`, then all properties are displayed. The output is suitable for programmatic parsing.

   topopath — Specifies the path to a managed host or host group that is relative to the top of the selected administrative domain.

   For descriptions of the other options, see "How to Create a Host Group (Command Line)" on page 162.

Example—Viewing a Host Group Property

Chris views the value of the `Description` property of `web-server/ApacheServer`.

```
$ changemgr hosts -g -o Description /web-server/ApacheServer
```

Example—Viewing Host Group Properties

Chris views the values of the `Description` and `Name` properties of `web-server/ApacheServer`.

```
$ changemgr hosts -g -o Description,Name /web-server/ApacheServer
```

Example—Viewing All Host Group Properties

Chris views the contents of the `web-server/ApacheServer` host group.

```
$ changemgr hosts -g -o all /web-server/ApacheServer
```

▼ How to Modify Host Group Properties (Command Line)

For the list of properties, see Chapter 10.

1. **Determine the host group's properties that you want to modify.**
   For example, modify the properties of the `web-server/ApacheServer` host group.
2. **Modify host group properties.**

   ```
   $ changemgr hostset [ -u username ] [ -p file ] \
   [ -s name=value ] ... [ -s name ] ... topopath ...
   ```

`-s` *name=value*	Specifies one or more name-value pairs. *name* is the property name, and *value* is the property value. Supply this option for each property value you want to set. If *value* is blank, then the property is assigned an empty value.
`-s` *name*	Specifies one or more property names to delete, where *name* is the property name. Supply this option for each property you want to delete.
topopath	Specifies the path to a managed host or host group that is relative to the top of the selected administrative domain.

   For descriptions of the other options, see "How to Create a Host Group (Command Line)" on page 162.

Example—Modifying Host Group Properties

Chris modifies the `Description` property of the `web-server/ApacheServer` host group.

```
$ changemgr hostset \
-s Description="Host group to hold Apache Web Server hosts" \
/web-server/ApacheServer
```

CHAPTER 10

Parameters for Shared Profiles and Host Properties (Reference)

Both shared profiles and host properties describe how one or more managed hosts are configured with a software stack. Much of the information in these profiles is the same as described in an installation profile. See the `cmsp`(4CM) man page.

The following topics are discussed in this chapter:

In this chapter, the term *parameter* is interchangeable with the term *property*.

Parameters Used by Shared Profiles and Host Properties

The parameters that you can set to configure managed hosts are as follows:

Managed Host Parameters

The following parameters are used by managed hosts (host properties) only. These parameters specify information about a single managed host.

`base_config_templateName`
Name of a shared profile associated with this managed host.

This parameter can only be specified by host properties.

`base_config_target_ether_addr`
Ethernet (MAC) address of this managed host.

This parameter can only be specified by host properties.

`base_config_sysidcfg_hostname`
A fully qualified name of the managed host.

`base_config_sysidcfg_ipaddr`
IP address of the managed host. This read-only parameter's value is set in the naming service.

Archive Parameters

The following parameters specify information about the particular Solaris Flash archive.

`base_config_flar_archive`
Name of the archive to be used. The name is a path relative to the top of the Change Manager repository.

parameter_name=value
Parameters that are defined by the archive itself. These parameters names are *not* prefixed with `base_config_`. These parameters are made available to the finish scripts that run on the managed host.

Sysid Parameters

The following parameters specify `sysid` information for the managed host.

`base_config_target_arch`
Platform architecture of the managed host. Run the `uname -m` command to obtain this information.

This parameter can be set either in the host properties or in the shared profile.

`base_config_sysidcfg_rootpw`
Superuser password you want the managed hosts that are installed with this shared profile to have. Specify the password you want to use in one of the following ways:

- Specify the password in cleartext form on a shared profile property page by using the browser interface. Use the wizard to encrypt the password.
- Specify the encrypted form of the password by using either the browser interface or the command-line interface.

  Obtain the encrypted password from the second field of any `/etc/shadow` file that has the password you want. Copy it to the `root` password field on a shared profile property page, or supply it as the value of the

base_config_sysidcfg_rootpw parameter by using the command-line interface.

base_config_sysidcfg_nameservice
One of the following values: *NIS*, *NIS+*, *DNS*, *LDAP*, or NONE.

The default value is NONE.

The required parameters depend on the value of base_config_sysidcfg_nameservice as follows:

- **NONE –** No other parameters are required.
- **NIS or NIS+ –** You must specify values for the base_config_sysidcfg_nameserver and base_config_sysidcfg_domainname parameters.
- **DNS –** You must specify values for the base_config_sysidcfg_nameserver, base_config_sysidcfg_domainname, base_config_sysidcfg_dnsservers, and base_config_sysidcfg_searchdomains parameters.
- **LDAP –** You must specify values for the base_config_sysidcfg_domainname, base_config_sysidcfg_ldap_profile, and base_config_sysidcfg_ldap_server parameters.

base_config_sysidcfg_nameserver

- If the value of base_config_sysidcfg_nameservice is NIS or NIS+, then the value of this parameter is the fully qualified name server name. If no value is set, then the naming service looks for a name server.
- If the value of base_config_sysidcfg_nameservice is DNS, then this parameter's value is a comma-separated list of fully qualified DNS server names.

base_config_sysidcfg_domainname
A fully qualified DNS, LDAP, NIS+, or NIS domain name.

base_config_sysidcfg_dnsservers
If base_config_sysidcfg_nameservice is DNS, then the value of this parameter must list at least one DNS server. DNS server names are separated by commas.

base_config_sysidcfg_searchdomains
If base_config_sysidcfg_nameservice is DNS, then the value of this parameter must list DNS search domains. DNS search domains are separated by commas.

base_config_sysidcfg_ldap_profile
Name of the LDAP profile.

base_config_sysidcfg_ldap_server
IP address of the LDAP server that contains the LDAP profile.

`base_config_sysidcfg_networkinterface`
The *network interface* to be used. Choose one of the following values: `PRIMARY` or *value*.

The default value is `PRIMARY`.

- `PRIMARY` – Use the first-up, non-loopback interface that is found on the system. The order is the same as with `ifconfig`. If no interfaces are up, then the first non-loopback interface is used. If no non-loopback interfaces are found, then the system is set to NON-NETWORKED.
- *value* – Specifies the particular interface by name. For example, *value* can be `le0` or `hme0`.

`base_config_sysidcfg_netmask`
The default value is `255.255.255.0`.

`base_config_sysidcfg_ipv6`
The value is either `yes` or `no`. If `yes`, IPv6 is to be used.

The default value is `no`.

`base_config_sysidcfg_defaultroute`
You must set this parameter to the IP address, `none`, `auto`, or `findone`.

- **IP address –** Specify the IP address of the default *router*.
- `none` – Specify no default router. This keyword is supported starting with the Solaris 9 release.
- `auto` **or** `findone` – Attempt to find a default router that broadcasts itself.

The default value is `none`.

`base_config_sysidcfg_systemlocale`
Specify the locale to use on the managed host. See the subdirectories in `/usr/lib/locale` for valid locale values.

The default value is `C`.

`base_config_sysidcfg_terminal`
Specify the terminal type to use on the managed host. See the subdirectories in `/usr/share/lib/terminfo` for valid terminal values.

The default value is `vt100`.

`base_config_sysidcfg_timezone`
Specify the time zone to use for the managed host. See the directories and files in `/usr/share/lib/zoneinfo` for valid time zone values. The time zone value is the name of the path relative to the `/usr/share/lib/zoneinfo` directory. For example, the time zone value for mountain standard time in the United States is `US/Mountain`. The time zone value for Japan is `Japan`. You can also specify any valid Olson time zone.

`base_config_sysidcfg_timeserver`
Optionally set a time server, which defaults to `localhost`. If you specify `localhost` as the time server, the system's time is assumed to be correct. To specify a time server when you are not running a naming service, specify the fully qualified host name or IP address of the system.

The default value is `localhost`.

`base_config_sysidcfg_security_policy`
Determine which security policy to use. Set to `none`, the default, if there no security policy. Set to `kerberos` to use *Kerberos security*.

If you use Kerberos security, you must specify values for the following parameters:

- `base_config_sysidcfg_default_realm`
- `base_config_sysidcfg_admin_server`
- `base_config_sysidcfg_kdc`

`base_config_sysidcfg_default_realm`
If the value for `base_config_sysidcfg_security_policy` is `kerberos`, specify the *Kerberos default realm*. The default realm must be a fully qualified domain name.

`base_config_sysidcfg_admin_server`
If the value for `base_config_sysidcfg_security_policy` is `kerberos`, specify the *Kerberos admin server*. The admin server must be a fully qualified domain name.

`base_config_sysidcfg_kdc`
If the value for `base_config_sysidcfg_security_policy` is `kerberos`, specify a comma-separated list of fully qualified *Kerberos key distribution center* host names. The list must contain at least one key distribution center.

Disk Layout Parameters

The following parameters specify how to lay out the disks of the managed host. The parameters that describe the device names and slice sizes must be specified in `filesys` keyword format for custom JumpStart. For information about the `filesys` custom JumpStart keyword, see "Custom JumpStart (Reference)" in *Solaris 9 Installation Guide*.

Note – The value for *size* can only be *num*, in Mbytes, or *slice*:*size*, in cylinders, for Solaris Flash installations.

`base_config_be_0_root_device`
The device name of the main boot environment's root slice.

`base_config_be_0_root_size`
The size of the main boot environment's root slice.

`base_config_be_0_swap_device`
The device name of the main boot environment's swap slice.

`base_config_be_0_swap_size`
The size of the main boot environment's swap slice.

`base_config_be_0_usr_device`
The device name of the main boot environment's `/usr` slice.

`base_config_be_0_usr_size`
The size of the main boot environment's `/usr` slice.

`base_config_be_0_var_device`
The device name of the main boot environment's `/var` slice.

`base_config_be_0_var_size`
The size of the main boot environment's `/var` slice.

`base_config_be_0_opt_device`
The device name of the main boot environment's `/opt` slice.

`base_config_be_0_opt_size`
The size of the main boot environment's `/opt` slice.

`base_config_be_1_root_device`
The device name of the alternate boot environment's root slice.

`base_config_be_1_root_size`
The size of the alternate boot environment's root slice.

`base_config_be_1_swap_device`
The device name of the alternate boot environment's swap slice.

`base_config_be_1_swap_size`
The size of the alternate boot environment's swap slice.

`base_config_be_1_usr_device`
The device name of the alternate boot environment's `/usr` slice.

`base_config_be_1_usr_size`
The size of the alternate boot environment's `/usr` slice.

`base_config_be_1_var_device`
The device name of the alternate boot environment's `/var` slice.

`base_config_be_1_var_size`
The size of the alternate boot environment's `/var` slice.

`base_config_be_1_opt_device`
The device name of the alternate boot environment's `/opt` slice.

`base_config_be_1_opt_size`
The size of the alternate boot environment's `/opt` slice.

`base_config_local_swap`*x*`_device`
The device name of the swap slice. This swap slice can be shared among boot environments.

`base_config_local_swap`*x*`_size`
The size of the swap slice. This swap slice can be shared among boot environments.

`base_config_local_mnt`*x*`_device`
The physical device for the local mount *x*.

`base_config_local_mnt`*x*`_mtpt`
The mount location for the local mount *x*.

`base_config_local_mnt`*x*`_options`
The mount options for the local mount *x*.

`base_config_local_mnt`*x*`_size`
The size for the local mount *x*.

`base_config_remote_mnt`*x*`_mtpt`
The mount location for the remote mount *x*.

`base_config_remote_mnt`*x*`_hostname`
The name of the remote system that has the file system to be mounted for the remote mount *x*.

`base_config_remote_mnt`*x*`_hostaddress`
The IP address of the *host* that has the file system to be mounted for the remote mount *x*.

`base_config_remote_mnt`*x*`_path`
The path on the remote system to be mounted for the remote mount *x*.

`base_config_remote_mnt`*x*`_options`
The mount options for the remote mount *x*.

Minimum Set of Parameters to Deploy Software

The following table describes the minimum set of parameters you must specify to be able to deploy software to managed hosts. For reinstallations, configure your managed hosts with one boot environment. For live updates, configure your managed hosts with two boot environments.

One Boot Environment	Two Boot Environments
base_config_target_arch	base_config_target_arch
base_config_target_ether_addr	base_config_target_ether_addr
base_config_flar_archive	base_config_flar_archive
base_config_sysidcfg_rootpw	base_config_sysidcfg_rootpw
base_config_sysidcfg_networkinterface	base_config_sysidcfg_networkinterface
base_config_local_swap1_device	base_config_local_swap1_device
base_config_local_swap1_size	base_config_local_swap1_size
base_config_be_0_root_device	base_config_be_0_root_device
base_config_be_0_root_size	base_config_be_0_root_size
	base_config_be_1_root_device
	base_config_be_1_root_size

CHAPTER 11

Audit Tool File Formats (Reference)

This chapter describes the file formats for the three audit-related files.

The following topics are described in this chapter:

Audit Rules File Format

The rules file is a text file that is used by the audit commands. The rules file determines which files to validate and which file attributes of those files to ignore.

To create an audit rules file, see "How to Create an Audit Rules File (Web Browser)" on page 112 and "How to Import an Audit Rules File to the Change Manager Repository (Web Browser)" on page 112 or "How to Import Audit Rules Files to the Change Manager Repository (Command Line)" on page 119.

Some lines are ignored by the manifest comparison tool. Ignored lines include blank lines, lines that consist only of white space, and comments that begin with #.

The rules file supports three directives: `CHECK`, `IGNORE`, and a subtree directive, which is an absolute path name plus optional pattern matching modifiers. The rules file uses the directives to create logical blocks.

Syntax

The syntax for the rules file is as follows:

```
[IGNOREattribute...]*
[CHECK] [attribute...]*

subtree1 [pattern...]*
[IGNORE attribute...]*
[CHECK] [attribute...]*

subtree2 [pattern...]*
subtree3 [pattern...]*
subtree4 [pattern...]*
[IGNORE attribute...]*
[CHECK] [attribute...]*
...
```

Rule Blocks

Rule blocks are composed of statements that are created by using directives and arguments. There are three types of blocks.

Global block	The first block in the file. The block is considered "global" if it specifies `CHECK` and `IGNORE` statements, but no previous subtree statement. A global block pertains to all subsequent blocks.
Local block	A block that specifies `CHECK` and `IGNORE` statements as well as a subtree directive. The rules in this block pertain to files and directories found in the specified subtree.
Heir block	A block that contains a null `CHECK` statement, no arguments. This block inherits the global `CHECK` statements and global `IGNORE` statements.

Note – The order in which `CHECK` and `IGNORE` statements appear in blocks is important. The `CHECK` and `IGNORE` statements are processed in the order in which they are read, with later statements overriding earlier statements.

Subtree specifications must appear one per line. Each specification must begin with an absolute path name. Optionally, each specification can be followed by pattern-matching arguments.

When a file being tracked belongs to more than one subtree directive, the resolution is performed by doing the following:

- Applying the `CHECK` and `IGNORE` statements set in a global block. Note that all `CHECK` and `IGNORE` statements are processed in order.
- Finding the last subtree directive that matches the file.

- Processing the `CHECK` and `IGNORE` statements that belong to the last matching subtree directive. These statements are processed in the order in which they are read, overriding global settings.

Pattern Matching Statements

The syntax for the audit rules file enables you to perform ANDing and ORing operations.

AND Statement

For a given subtree directive, all pattern matching statements are logically ANDed with the subtree. Patterns have the following syntax:

- Wildcards are permitted for both the subtree and pattern matching statements.
- The exclamation point (`!`) character represents logical NOT.
- A pattern that terminates with a slash is a subtree. The absence of a slash indicates that the pattern is not a directory. The subtree itself does not require an end slash.

For example, the following subtree example includes the contents of `/home/nickiso/src` except for object files, core files, and all of the SCCS subtrees. Note that directory names that terminate with `.o` and directories named `core` are *not* excluded because the patterns specified do not terminate with `/`.

```
/home/nickiso/src !*.o !core !SCCS/
CHECK    all
```

OR Statement

Group multiple subtree directives together. Such subtree directives are logically ORed together.

```
/home/nickiso/src !*.o !core
/home/nickiso/Mail
/home/nickiso/docs *.sdw
CHECK    all
IGNORE    mtime lnmtime dirmtime
```

The files included in the previous example are as follows:

- Everything under `/home/nickiso/src` except for `*.o` and `core` files
- Everything under `/home/nickiso/Mail`
- All files under `/home/nickiso/docs` that end in `*.sdw`

For these files, all attributes are checked except for modification times.

File Attributes

The audit rules file uses `CHECK` and `IGNORE` statements to define which attributes to track or ignore. Each attribute has an associated keyword.

The attribute keywords are as follows:

- `acl`
- `all`
- `contents`
- `dest`
- `devnode`
- `dirmtime`
- `gid`
- `lnmtime`
- `mode`
- `mtime`
- `size`
- `type`
- `uid`
- `xattrs`

The `all` keyword refers to all file attributes. See "Manifest File Format" on page 185.

Rules File Example

```
# Global rules, track everything except dirmtime.
CHECK    all
IGNORE    dirmtime

# The files in /data* are expected to change, so don't bother
# tracking the attributes expected to change.
# Furthermore, by specifying "IGNORE contents," you save
# time and resources.
/data*
IGNORE    contents mtime size

/home/nickiso f* bar/
IGNORE    acl

# For /usr, apply the global rules.
/usr
CHECK

# Note: Since /usr/tmp follows the /usr block, the /usr/tmp
# subtree is subjected to the "IGNORE all."
/usr/tmp
/home/nickiso *.o
/home/nickiso core
```

```
/home/nickiso/proto
IGNORE    all
```

The following files are cataloged based on the sample rules file:

- All attributes, except for `dirmtime`, `mtime`, `size`, and `contents`, are tracked for files under the `/data*` subtrees.
- Files under the `/usr` subtree, except for `/usr/tmp`, are cataloged by using the global rules.
- If the `/home/nickiso/foo.c` file exists, its attributes, except for `acl` and `dirmtime`, are cataloged.
- All `.o` and `core` files under `/home/nickiso`, as well as the `/home/nickiso/proto` and `/usr/tmp` subtrees, are ignored.
- If the `/home/nickiso/bar/foo.o` file exists, it is ignored because it is subject to the last block.

Manifest File Format

The software audit generates a manifest that describes the contents of a managed host. A manifest consists of a header and entries. Each entry represents a single file. Entries are sorted in ascending order by file name. Any nonstandard file names, such as those that contain embedded newline or tab characters, have the special characters quoted prior to being sorted. See “Quoting Syntax” on page 187.

Lines that begin with `!` supply metadata about the manifest. The manifest version line indicates the manifest specification version. The date line shows the date on which the manifest was created, in `date` form. See the `date`(1) man page.

Some lines are ignored by the manifest comparison tool. Ignored lines include blank lines, lines that consist only of white space, and comments that begin with #.

In addition to metadata lines, the header contains the format comment block. This comment block lists the attributes reported for each file type.

To see the format of a manifest, see “Manifest Output Example” on page 187.

Manifest File Entries

Each manifest file entry is a single line of one of the following forms, depending on the file type:

fname `D` *size mode acl dirmtime uid gid* [*xattr xcontents*]*
fname `P` *size mode acl mtime uid gid* [*xattr xcontents*]*
fname `S` *size mode acl mtime uid gid* [*xattr xcontents*]*
fname `F` *size mode acl mtime uid gid contents* [*xattr xcontents*]*
fname `L` *size mode acl lnmtime uid gid dest* [*xattr xcontents*]*
fname `B` *size mode acl mtime uid gid devnode* [*xattr xcontents*]*
fname `C` *size mode acl mtime uid gid devnode* [*xattr xcontents*]*

Each entry begins with *fname*, which is the name of the file. To prevent parsing problems that are caused by special characters embedded in file names, file names are encoded as described in "Quoting Syntax" on page 187.

Subsequent fields represent the following file attributes:

type	Type of file. Possible values are as follows: ■ `B` for a block device node ■ `C` for a character device node ■ `D` for a directory ■ `F` for a file ■ `L` for a symbolic link ■ `P` for a pipe ■ `S` for a socket
size	File size in bytes.
mode	Octal number that represents the permissions of the file.
acl	ACL attributes for the file. For a file with ACL attributes, this field contains the output from `acltotext()`.
uid	Numerical user ID of the owner of this entry.
gid	Numerical group ID of the owner of this entry.
dirmtime, *lnmtime*, *mtime*	Last modification time, in seconds since 00:00:00 UTC, January 1, 1970, for directories, links, and other files, respectively.
contents	Checksum value of the file. This attribute is only specified for regular files. If you turn off context checking or if checksums cannot be computed, the value of this field is `-`.
dest	Destination of a symbolic link.
devnode	Value of the device node. This attribute is for character device files and block device files only.
[*xattr xcontents*]*	Zero or more checksum values for files with extended attributes. The attributes are described in alphabetical order. If the `-n` option or the `IGNORE contents` directive is specified, the value of *xcontents* is `-`.

Quoting Syntax

The rules file supports a quoting syntax for representing nonstandard file names.

When generating a manifest for file names that embed tab, space, or newline characters, the special characters are encoded in their octal forms.

The following table shows the quoted form of special characters.

Input Character	Quoted Character
(space)	\(space)
(tab)	\(tab)
(newline)	\(newline)
?	\?
[	\[
*	*

Manifest Output Example

Following is a sample system manifest. The file entries are sorted by the encoded versions of the file names to correctly handle special characters.

```
! Version 1.0
! Mon Feb 11 10:55:30 2002
# Format:
# fname D size mode acl dirmtime uid gid [xattr xcontents]*
# fname P size mode acl mtime uid gid [xattr xcontents]*
# fname S size mode acl mtime uid gid [xattr xcontents]*
# fname F size mode acl mtime uid gid contents [xattr xcontents]*
# fname L size mode acl lnmtime uid gid dest [xattr xcontents]*
# fname B size mode acl mtime uid gid devnode [xattr xcontents]*
# fname C size mode acl mtime uid gid devnode [xattr xcontents]*
/etc D 3584 40755 user::rwx,group::r-x,mask::r-x,other::r-x, 3c6803d7 0 3
/etc/.login F 524 100644 user::rw-,group::r--,mask::r--,other::r--, 3c165878
    0 3 27b53d5c3e844af3306f1f12b330b318
/etc/.pwd.lock F 0 100600 user::rw-,group::---,mask::---,other::---,
        3c166121 0 0 d41d8cd98f00b204e9800998ecf8427e
/etc/.syslog_door L 20 120777 user::rw-,group::r--,mask::rwx,other::r--,
    3c6803d5 0 0 /var/run/syslog_door
/etc/autopush L 16 120777 user::r-x,group::r-x,mask::r-x,other::r-x,
        3c165863 0 0 ../sbin/autopush
/etc/cron.d/FIFO P 0 10600 user::rw-,group::---,mask::---,other::---,
        3c6803d5 0 0
```

Comparison Report Format

The Audit command produces output that describes differences between two manifests on a per-file basis.

filename
    attribute `control:`*xxxx* `test:`*yyyy*

filename Name of the file that differs between *control-manifest* and *test-manifest*. For file names that contain embedded whitespace or newline characters, see "Quoting Syntax" on page 187.

attribute The name of the file attribute that differs between the manifests that are compared. *xxxx* is the attribute value from *control-manifest*, and *yyyy* is the attribute value from *test-manifest*. When discrepancies for multiple attributes occur for the same file, each difference is noted on a separate line.

The following default output shows the attribute differences for the `/etc/passwd` file. The output indicates that the `size`, `mtime`, and `contents` attributes have changed.

```
/etc/passwd:
  size  control:74  test:81
  mtime  control:3c165879  test:3c165979
  contents  control:daca28ae0de97afd7a6b91fde8d57afa
    test:84b2b32c4165887355317207b48a6ec7
```

APPENDIX **A**

Change Manager Browser Interface Navigation (Reference)

This appendix describes how to navigate through the Change Manager browser interface and covers the following navigation topics:

General Change Manager Links Area

The *general links area* appears at the top of each page of the browser interface. The general links area contains section tabs, and ways to log out and get help.

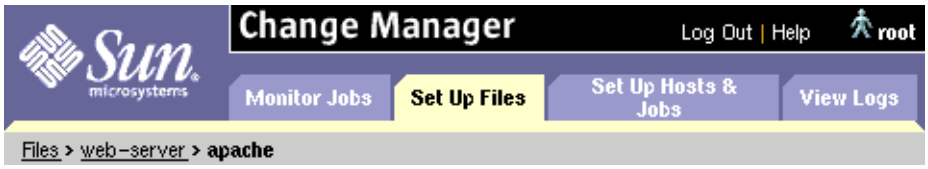

FIGURE A–1 Change Manager General Links Area and Bread Crumbs

Logging Out and Getting Help

You can log out or get help by clicking Log Out or Help in the area with a *black* background:

Log Out Exit Change Manager and return to the login page.

Help Display help in a separate browser window. Help consists of a general Change Manager overview, a glossary of terms, and detailed help.

Section Tabs

The tabs for the four sections appear on a *blue* background.

Set Up Files Manage the files needed for *deployment* tasks and *audit* tasks.

Files and folders are stored in the Change Manager repository, which is located on the Change Manager server.

You can arrange files in a hierarchy of folders. Files managed are Solaris Flash archives, Solaris boot images, manifests, audit rules files, shared profiles, and reports.

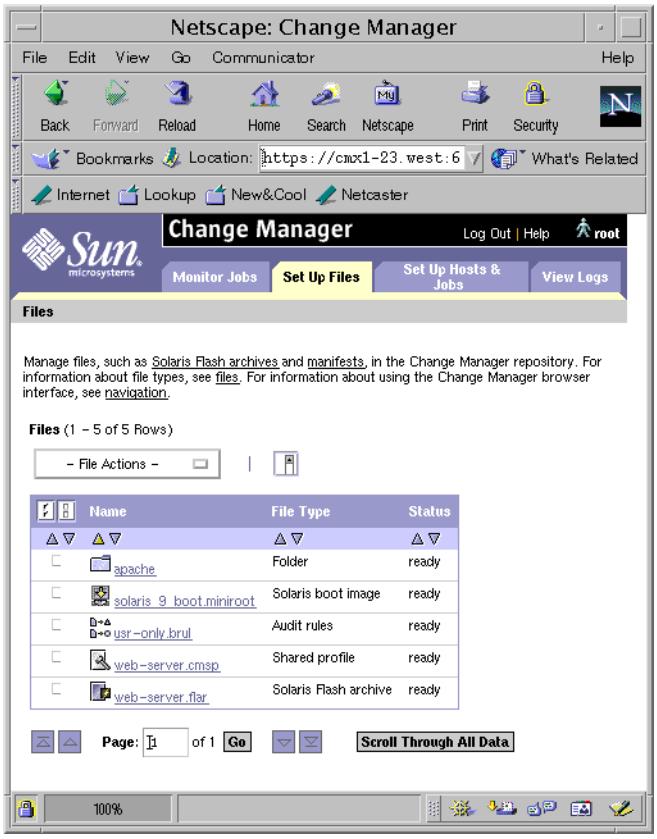

FIGURE A–2 Change Manager Set Up Files Section

You can perform the following actions in the Set Up Files section:

- Create folders, shared profiles, and audit rules files.
- Import Solaris Flash archives, Solaris boot images, shared profiles, manifests, and audit rules files to the repository.
- Rename a file or folder.
- Export a file from the repository.
- Move files and folders to another folder.
- Create a copy of a shared profile or an audit rules file in the current folder.
- Delete files and folders.
- View and modify file properties and property values.
- View folder contents.

Set Up Hosts & Jobs

Manage host groups and managed hosts. You can arrange managed hosts in a hierarchy of host groups. This hierarchy can be in an administrative domain that you create by using Sun Management Center.

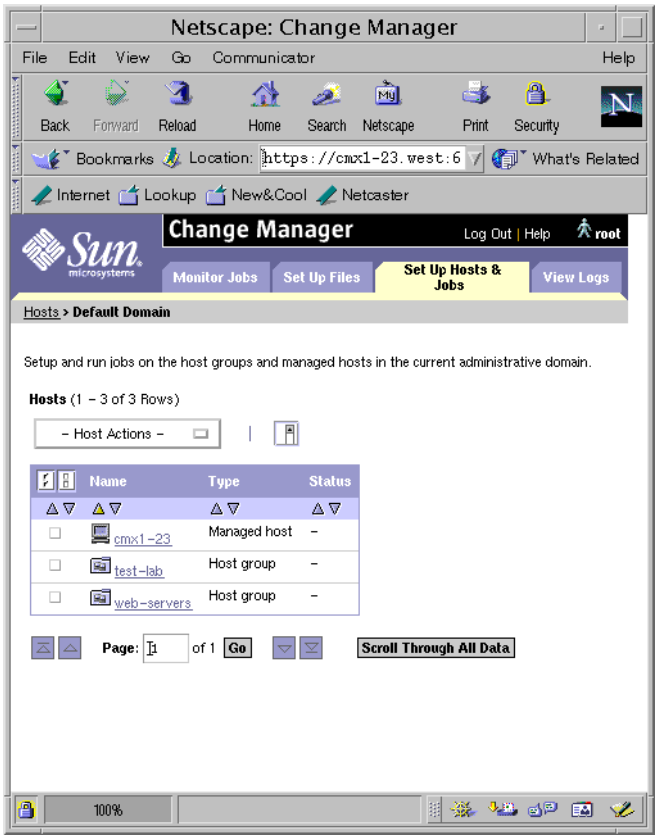

FIGURE A–3 Change Manager Set Up Hosts & Jobs Section

You can perform the following actions in the Set Up Hosts & Jobs section:

- Optionally, select an administrative domain.

Note – Administrative domains are created and managed by the Sun Management Center application. When using Change Manager, you can only select from existing administrative domains.

- Create host groups.
- Add managed hosts with specific properties.
- Import one or more hosts simultaneously by means of a file that contains host names and host property values.
- Rename a managed host or host group.
- Copy a managed host to another host group.
- Move managed hosts and host groups to another host group.
- Remove managed hosts and host groups.
- View and modify managed host properties and property values.
- View host group contents.

Run deployment commands and audit commands on host groups and managed hosts from the Set Up Hosts & Jobs section. Long-running operations, such as updates, imports, and exports, become jobs.

- Perform an initial installation of managed hosts.
- Update managed hosts.
- Reinstall managed hosts.
- Fall back to the previous boot environment.
- Build manifests for managed hosts.
- Audit managed hosts by comparing their manifests against a baseline manifest.
- Get the software status of managed hosts.
- Reboot managed hosts.
- Halt the operating system of managed hosts.

Monitor Jobs

View the status of current jobs and recent jobs in the *job queue*. A *job* is a task running on a managed host or on the Change Manager server. A job is initiated from the Set Up Files section or Set Up Hosts & Jobs section of the browser interface. The queue shows the status of current jobs and recent jobs that have been submitted to run on managed hosts.

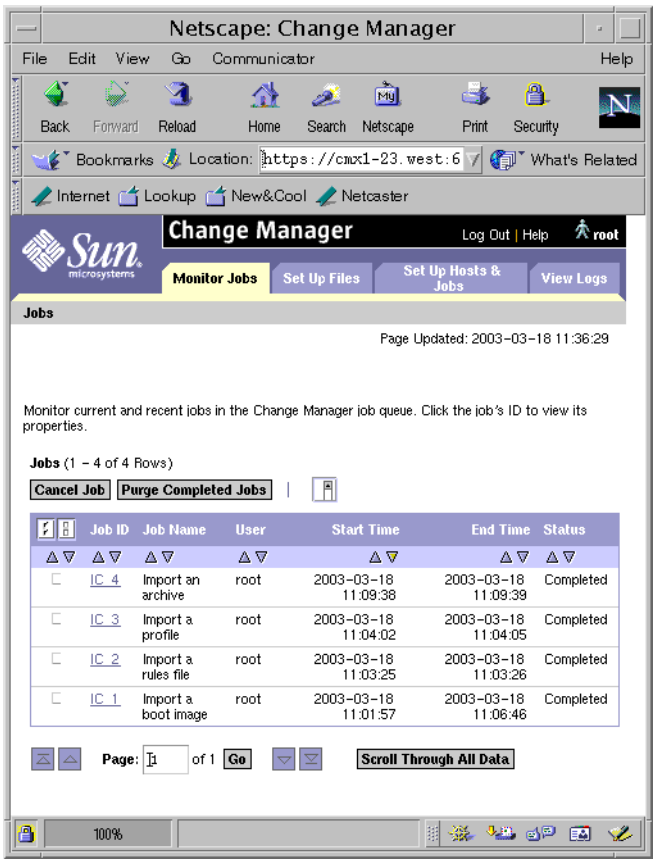

FIGURE A–4 Change Manager Job Queue

You can perform the following actions in the Monitor Jobs section:

- Cancel pending jobs or running jobs.
- Purge completed jobs from the job queue.

View Logs

View the job log and transaction log to diagnose failures. The log entries detail Change Manager operations. The *job log* shows jobs started, such as import, update, and audit. The *transaction log* shows all actions initiated by Change Manager.

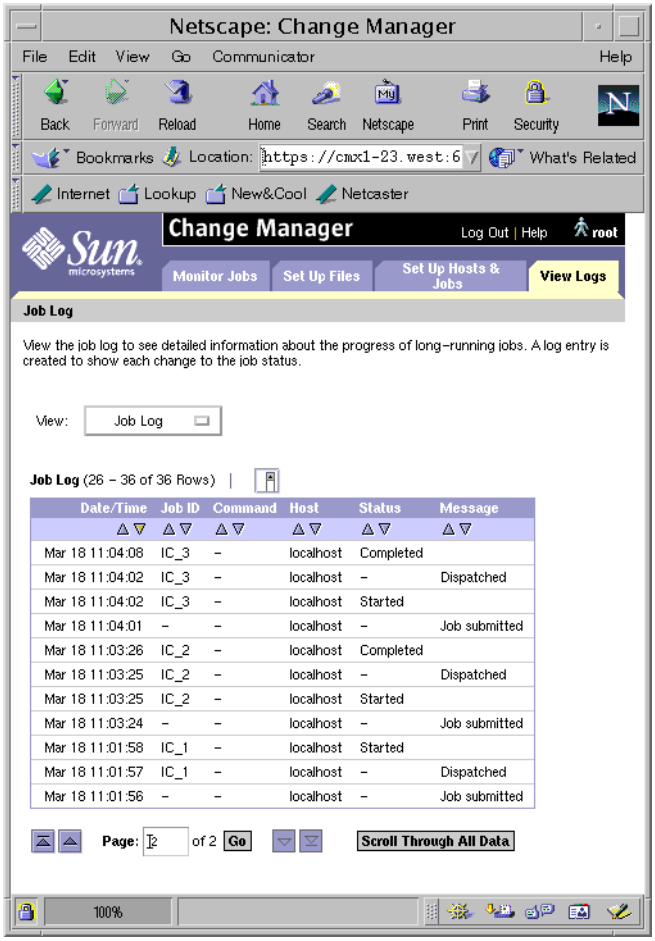

FIGURE A–5 Change Manager Job Log

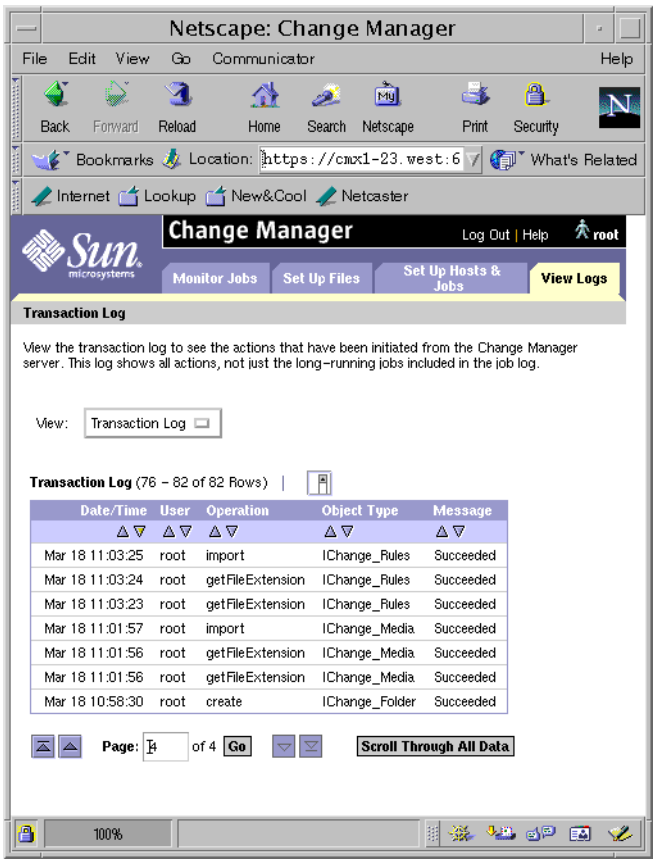

FIGURE A–6 Change Manager Transaction Log

Navigation Bread Crumbs

The bread crumbs appear on a *gray* background. The *bread crumbs* are links that indicate the present location in the Change Manager folders and host groups. The underlined words in the bread crumbs are links. Click the links to go to the named folder or host group.

Drop-Down Menus

The pages in the Set Up Files, Set Up Hosts & Jobs, and Monitor Jobs sections, as well as some property pages, have drop-down menus.

- When you select actions from the Actions drop-down menus, *action pages* appear. You specify information on the action pages to perform various actions.
- The Jump To menus take you to another part of the current page.

Guidelines for Navigating Folders and Host Groups

Information that is managed from the Set Up Files section is organized hierarchically by means of *folders*. Information that is managed from the Set Up Hosts & Jobs section is organized hierarchically by means of *host groups*. Click a folder name or a host group name to change to that folder or host group and view its contents. Click a file name or a managed host's name to view its properties.

- Use folders to organize Change Manager file *objects*, such as Solaris Flash archives, manifests, and audit rules files.
- Use host groups to organize related managed hosts. The same managed host can be in several host groups. Initiate tasks by selecting particular managed hosts or by selecting host groups.

To perform an action on particular items, do the following:

- Select the item by clicking the checkbox next to its name.
- Choose the action from the Actions drop-down menu.

Guidelines for Navigating the Wizards

Change Manager uses *wizards* to create shared profiles. A wizard steps you through to the completion of a task. You can launch a wizard by clicking the Edit button that appears next to a parameter you want to update. Click these buttons to perform the following actions:

Back	Return to the previous page of the wizard.
Browse	Launch a file chooser window to search for files or directories on the Change Manager server or on other systems on the network.
Cancel	Exit the wizard. No shared profile or host properties are created.
Finish	Create the shared profile or host properties based on the parameter values.
Help	Get page-specific help. The help appears in the left *panel* of the wizard. The help panel replaces the list of steps.
Next	Go to the next page of the wizard.
Steps	View the steps used to create a shared profile or host properties. The steps appear in the left panel of the wizard, which is also used to display help.

APPENDIX **B**

Troubleshooting (Reference)

This appendix lists problems, warning messages, and error messages that you might see when using Change Manager.

The information for each problem can include three sections:

- **Description –** The description section describes the problem. If necessary, warning messages and error messages are included.
- **Cause –** The cause section, when applicable, describes the reason the problem occurred.
- **Solution –** The solution section describes the steps you must take to correct the problem.

Troubleshooting information is provided for the following problem areas:

For problems that have been discovered since the publication of this book, see the *Sun Management Center Change Manager 1.0.1 Release Notes*.

Change Manager Server Installation Problems

The following troubleshooting issues relate to the installation of Sun Management Center 3.5 and Change Manager 1.0.1 on the designated Change Manager server.

Sun Management Center Agent Cannot Communicate With the Change Manager Server After Installing a Managed Host

Description: When you upgrade your Change Manager 1.0 server to be a Change Manager 1.0.1 server (see "How to Upgrade a Change Manager 1.0 Server to Run Sun Management Center 3.5 Server Software" on page 43), you might experience a problem when installing managed hosts. After you install a Solaris Flash archive on a managed host, the managed host fails to communicate with the Change Manager server.

Cause: The custom JumpStart files that were created for the Change Manager 1.0 server are retained. So, if you install a managed host by using these old custom JumpStart files, then the Sun Management Center agent might not communicate with the Change Manager server.

This problem *will* occur if you change the value of the "Sun Management Center server seed" during the upgrade of the Change Manager server.

Solution: Run Set Up for Install or `changemgr setup` for each managed host that you want to install. This step re-creates the custom JumpStart files for each managed host you specify.

Stale Custom JumpStart Data Not Removed When Change Manager 1.0 Server Software Is Uninstalled

Description: If you upgrade your Change Manager 1.0 server to run Sun Management Center 3.5 server software and you do not preserve the data, then only the Change Manager 1.0 server software is uninstalled. None of the Change Manager data (the custom JumpStart data and the Change Manager repository) is removed from the Change Manager server.

Cause: This situation occurs when Change Manager 1.0 server software is uninstalled in one of the following two ways:

- Using the `es-guiinst` command or the `es-inst` command to upgrade from Sun Management Center 3.0 to Sun Management Center 3.5
- Using the `es-uninst` command to uninstall Sun Management Center 3.0 server software

Solution: Manually clean up entries in the `/etc/dfs/dfstab` file and in the `/etc/bootparams` file. Then, delete the Change Manager 1.0 repository. The directory that holds the Change Manager repository is specified by the value of the `cmdataroot` property in the `/var/opt/SUNWsymon/cfg/ichange.cfg` file.

Information About Managed Hosts and Host Groups Created by Change Manager Remains in the Topology Database Even After Change Manager Software Is Uninstalled

Description: Managed hosts and host groups created by Change Manager appear in the Sun Management Center topology database even after Change Manager has been uninstalled and data has been discarded.

You can access these managed hosts and host groups from the Sun Management Center Console. If you reinstall Change Manager later, you can also access these managed hosts and host groups. However, you will be unable to run any Change Manager operations, such as an update, on them.

Cause: Change Manager needs more information about managed hosts than Sun Management Center does. The information that remains in the Sun Management Center topology database must be augmented before such hosts can be fully managed by Change Manager.

Solution: If you intend to reinstall Change Manager software, you must first update the host configuration for each of the existing managed hosts.

Update the configuration by setting all of the required host properties and by associating each managed host with a shared profile or Solaris Flash archive. Once these changes have been made, you can perform Change Manager operations on these managed hosts.

If you do not intend to reinstall Change Manager software, remove the managed hosts and host groups from the Sun Management Center topology database. You can perform this cleanup by using the Sun Management Center Console.

User Interface Problems

This section describes problems using the browser interface and the command-line interface. Problems seen when using both user interfaces are described first.

General User Interface Problems

`Managed Host Not Added` Error Appears When You Try to Add a New Host

Description: You attempt to add a new host, and the following message appears:

```
Managed Host Not Added
SNMP request returned error status 6 (no access)
snmp://129.153.72.86:164/mod/topology+view-#/entityAdder#0
```

Other similar types of requests might yield a similar error.

Solution: Ensure that you are an authorized Sun Management Center domain administrator by checking that you are a member of both the `esadm` and `esdomadm` groups.

`Internal error: unable to establish probe connection` Appears When Running Jobs on a Managed Host

Description: When you run jobs on a managed host, you might see the following error message:

```
Internal error: unable to establish probe connection
```

Cause: This message appears when you run jobs on a managed host that is managed by more than one Change Manager server.

Solution: Ensure that the managed host is managed by only one Change Manager server.

To change control of a managed host to another Change Manager server, perform the following steps:

1. Remove the managed host from the current server.
2. Add the managed host to the new Change Manager server.

3. Create a shared profile for the managed host.
4. Run Set Up for Install or `changemgr setup` for the managed host.
5. Type the `boot net - install` command at the OpenBoot prompt of the managed host to perform the initial installation.

Import of a Solaris Boot Image Fails (4733369)

Description: When you import a Solaris boot image, you might see the following error message:

```
Aug 29 10:03:27 IC_1 - -
  Failed [Execution failed [import failed: ]]
```

Cause: This error usually indicates that the disk is full.

Solution: Check to see if the file system that contains the Change Manager repository is full. If it is, see "File System That Contains Change Manager Repository Is Full" on page 203.

`File copy did not run` Error Message Issued During Import Operation (4753374)

Description: When you perform an import operation, you might see the following error message:

```
File copy did not run
```

Cause: This error message might indicate that `/tmp` is full.

Solution: Free space in `/tmp` to make room for the file that you want to import.

File System That Contains Change Manager Repository Is Full

Description: Change Manager issues errors if the file system that contains the repository is full and you perform tasks that write to the repository. Such tasks include importing files to the repository or performing some Change Manager operations such as an audit.

Solution: If the file system that contains the repository is full, do one of the following:

- Create more space by deleting unneeded file objects from the repository, using either of the Change Manager user interfaces.

- Move the repository to a file system on a local disk that has sufficient space. Do the following as superuser on the Change Manager server:

  1. Stop the Sun Management Center services.

     ```
     # /opt/SUNWsymon/sbin/es-stop -S
     ```

  2. Disable the custom JumpStart configuration for the existing managed hosts.

     a. Remove entries from the `/etc/dfs/dfstab` file that represent directories that are exported from the repository.
     b. Remove entries for all managed hosts that are registered in the `/etc/bootparams` file.

  3. Copy the Change Manager repository to the new location.

     For example, if the full repository is `/var/opt/ichange` and the new repository is called `/export/cm101`, do the following:

     ```
     # cd /var/opt/ichange
     # find root hostdata jobdata -print | cpio -pudm \
     /export/cm101
     ...
     #
     ```

  4. Update the value of the `cmdataroot` parameter to point to the new repository location.

     ```
     # cd /var/opt/SUNWsymon/cfg
     # cp ichange.cfg ichange.cfg.orig
     # /bin/sed -e '/^cmdataroot/s/=.*$/=\/export\/cm101/' \
     ichange.cfg.orig >ichange.cfg
     #
     ```

  5. Restart the Sun Management Center services.

     ```
     # /opt/SUNWsymon/sbin/es-start -S
     ```

  6. Recreate the custom JumpStart data for all your managed hosts.

     - If you use the browser interface, run the Set Up for Install operation.
     - If you use the command-line interface, run the `changemgr setup` command.

Caution – If the `ichange_db` directory exists in the original repository location, do *not* remove it. This situation occurs if you specify the same location for the repository and the Change Manager database. The information in this directory is required for Change Manager database operations.

7. Verify that you can access files and manage files in the new repository before removing the repository from its original location.

Browser Interface Problems

The following troubleshooting issues relate to the browser interface.

Unable to Reach the Change Manager Login Page

Description: You provide the correct Change Manager URL, but you are unable to reach the login page. Following is the correct form of the URL:

`https://`*server_name*`.`*domain*`:6789/changemgr`

Solution: Try restarting the web server.

```
# /usr/sadm/bin/smcwebserver restart
```

Unable to Log In to the Change Manager Browser Interface With Valid User Name and Password

Description: You type a valid Change Manager user name and password on the Change Manager login page, but the login attempt fails.

Solution: Try restarting the Sun Management Center server.

```
# /opt/SUNWsymon/sbin/es-start -A
```

Change Manager Does Not Appear in the Application List or `Not Authorized to Use Requested Application` Is Displayed When You Try to Log In

Description: You provide a valid Solaris user name and password, but are unable to start the Change Manager application.

Solution: Ensure that you are an authorized Sun Management Center user by inspecting the file `/var/opt/SUNWsymon/cfg/esusers`.

Note – To access all areas of Change Manager, you need to be an authorized Sun Management Center domain administrator. Ensure that you are a member of both the `esadm` and `esdomadm` groups.

`document contained no data` Error Appears When Trying to Access the Change Manager URL

Description: You provide the correct Change Manager URL, but the following error message appears in a dialog box:

```
document contained no data.
```

Solution: Verify that the URL is correct.

The following example shows the correct form of the Change Manager URL:

`https://`*server_name*`.`*domain*`:6789/changemgr`

Ensure that the URL begins with `https`, not `http`.

If the URL is correct, try restarting the web server.

```
# /usr/sadm/bin/smcwebserver restart
```

Netscape Communicator Reports That Certificate Has an Invalid Signature

Description: Netscape Communicator Version 4 produces this message:

```
The server's certificate has an invalid signature. You will
not be able to connect to this site securely.
```

Solution: Restart the Netscape Communicator, then access the page again.

Cannot Browse Directories in the File Chooser Wizards That Are Not Publicly Readable (4735785)

Description: The browser interface cannot display the contents of directories that are not publicly readable. This problem prevents the file browser from accessing private directories even though the user has appropriate permissions.

Solution: Directly specify files in such a directory by supplying a full path name to the file.

JavaScript and Request-Handling Errors Occur When You Access the Web Application After You Upgrade Your Server From Change Manager 1.0 to Change Manager 1.0.1

Description: The Sun Management Center Web Console server continues to use the cached Change Manager 1.0 JSP classes instead of recompiling them from the new Change Manager 1.0.1 JSP sources.

Cause: This happens because the JSP classes have a later timestamp than the JSP source files.

Solution: Stop the Sun Management Center Web Console server, remove the cached Change Manager 1.0 JSP classes, then restart the web console server.

The procedure differs, depending on the version of Solaris you are running on the Change Manager server.

- If you are running Solaris 9 12/02, or an earlier release of Solaris, run these commands:

```
# /usr/sadm/sbin/smcwebserver stop
# rm -rf /var/sadm/webconsole/work/localhost/changemgr
# /usr/sadm/bin/smcwebserver start
```

- If you are running at least Solaris 9 4/03, run these commands:

```
# /usr/sadm/bin/smcwebserver stop
# rm -rf /var/sadm/webconsole/work/Standalone/localhost/changemgr
# /usr/sadm/bin/smcwebserver start
```

Command-Line Interface Problems

The following troubleshooting issues relate to the command-line interface.

Cannot Use the Command-Line Interface to Create Shared Profiles

Description: You cannot use the command-line interface to create a shared profile.

Solution: To create a shared profile, do one of the following:

- Create a shared profile by using the browser interface, see "How to Create a Shared Profile (Web Browser)" on page 84.
- Import an existing shared profile to the repository:

  1. Create a shared profile outside of the repository. The shared profile is a text file that contains the parameters and parameter values described in "Parameters Used by Shared Profiles and Host Properties" on page 173.
  2. Import the shared profile to the repository. See "How to Import Shared Profiles to the Change Manager Repository (Command Line)" on page 95.

After the shared profile is in the repository, you can modify property values by using the `changemgr fileset` command. See "How to Modify File or Folder Properties (Command Line)" on page 149.

Software Deployment Problems

The following troubleshooting issues relate to the deployment of software to managed hosts.

Custom JumpStart Installation Launches the Interactive Installation Program

Description: If the installation program detects an invalid parameter or invalid parameter value in a shared profile or in host properties, the hands-off installation terminates. Then, the interactive installation program launches so you can correct the problem or otherwise continue with the installation.

Note that the questions asked by the interactive installation program provide clues as to which parameters caused the problem.

This scenario occurs if you provide an invalid parameter value. For information about custom JumpStart keywords, see "Preconfiguring System Configuration Information (Tasks)" in *Solaris 9 Installation Guide*.

Note – The custom JumpStart keywords correspond to the Change Manager parameters, but the names are different. Change Manager parameters begin with the `base_config_` string, but the content part of the string matches closely to the custom JumpStart keyword names. To see a description of the Change Manager parameters, see Chapter 10.

Cause: The installation program detects the parameter problem, but cannot correct it. The custom JumpStart installation cannot continue, so it launches the interactive installation program.

Solution: To correct the problem, review the parameters and parameter values for the managed host that failed to perform the custom JumpStart installation.

Ensure that the parameters and parameter values are correct. See Chapter 10 for a description of the parameters specified in shared profiles and by host properties.

Note – Be careful when copying the encrypted root password from `/etc/shadow` to the shared profile. Do not include the colon (`:`) field delimiters as part of the `base_config_sysidcfg_rootpw` property value.

If you find the problem and correct it, restart the initial installation.

If you do not find the problem, review the parameters and parameter values in the shared profile or in the host properties.

Note – If you are installing only one managed host, you might continue with the interactive installation. This solution is not advisable unless you are installing just one managed host with a simple software stack.

Managed Host Hangs While Booting From the Network (4656587)

Description: While loading the bootstrap, the managed host hangs. You can tell when the bootstrap is being loaded because of the hex count to 24000.

This problem might occur more often when the network is heavily loaded.

Cause: An `in.tftpd` bug causes this intermittent failure. As a result of this bug, the transfer hangs.

Solution: Reset the hung managed host. Try the network boot again.

`Panic: unable to mount file systems` Message Appears While Booting From the Network

Description: The network boot of your managed host might fail with an error message such as:

```
Panic: unable to mount file systems
```

Cause: If such a message appears, then your managed host is probably being served by more than one network boot server.

You must first identify all network boot servers on which your managed host is registered, other than the Change Manager server.

Solution: Use the `hostconfig` command to identify the network boot servers that manage your managed host.

Perform the following steps to determine whether your managed host is managed by more than one network boot server:

1. Remove your managed host from the Change Manager server from which you *want* to boot.

   Use the browser interface or the command-line interface to remove your managed host from the Sun Management Center topology.
2. Run the `hostconfig` command to determine whether your managed host is managed by another network boot server.

   `$` **`hostconfig -p bootparams -f`** *hostname* **`-n -v`**
3. See if the `hostconfig` command identifies a network boot server for your managed host.

- If an IP address appears in square brackets on the first line of output, your managed host is managed by another boot server. The IP address represents the boot server.

  ```
  From [192.153.72.132]: hostname = host1
      ypdomain = yourCompany.COM
      router = 192.153.72.1
  ```

- If no IP address appears, then your managed host is not managed by a boot server. Go to Step 7.

See the `hostconfig`(1M) man page.

4. Determine the name of the boot server specified by the IP address.

   If you use the NIS naming service, for example, use `ypmatch` to associate the IP address with the host name of the boot server.

   ```
   $ ypmatch 192.153.72.132 hosts.byaddr
   129.153.72.132  cmserver
   ```

   See the `ypmatch`(1) man page.

5. Remove your managed host entries from the `/etc/bootparams` file on the boot server.

   a. Log in to the boot server as superuser.

   b. Change to the `Tools` directory of the Solaris boot image associated with the Solaris version you want to install.

   c. Run the `rm_install_client` command to remove the entries for your managed host from the `/etc/bootparams` file.

      ```
      # ./rm_install_server hostname
      ```

6. Repeat Steps 2-4 to find additional boot servers. Then, perform Step 5 for any boot servers found.

7. When no more boot servers are indicated by the `hostconfig` command, add your managed host to the Sun Management Center topology of the Change Manager server. Set up the files for installation. Then, restart the `boot net - install` from your managed host's console.

APPENDIX C

Security (Reference)

You will likely use Change Manager on networks that are connected to the Internet. Therefore, security is key, especially in these areas:

- Identity
- Authentication
- Authorization
- Confidentiality
- Integrity
- Availability
- Accountability

This appendix describes the security issues that Change Manager addresses:

Users As Security Risks

The following users present different security risks for Change Manager:

- **Superuser on the Change Manager server –** Anyone with superuser privileges on the Change Manager server is trusted. If superuser privileges are penetrated, security is breached.
- **Authorized users on the Change Manager server –** Authorized users are trusted because their access is controlled by Sun Management Center access control lists. Change Manager does not provide direct tools for managing these lists. Change Manager also does not provide mechanisms for protecting one user's Change Manager data and managed hosts from another authorized user.

- **Other users on the Change Manager server –** Other users that are logged in to the Change Manager server are not trusted. These users are not permitted to take unauthorized actions, nor are they permitted to see unauthorized data.
- **Superuser on managed hosts –** Anyone with superuser privileges on a managed host is trusted with respect to that managed host. If superuser privileges on a managed host are penetrated, security is breached on all managed hosts. Such a user must be prevented from using Change Manager to further penetrate the network.
- **Other users on managed hosts –** Other users that are logged in to managed hosts are not trusted. These users are not permitted to take unauthorized actions, nor are they permitted to see unauthorized data.
- **Users on other systems –** Users on systems that are not related to Change Manager are not trusted. These users must be prevented from taking unauthorized actions and seeing unauthorized data.

Secure Communication and File Transfer Channels

Change Manager uses secure communication and file transfer channels when available and as described for these security issues:

- Browser to user interface
- Secure file transfers
- User interfaces to Change Manager server
- Change Manager data storage
- Sun Management Center SNMP control
- Using Sun Management Center probe connection to retrieve bulk data from managed hosts
- Performing initial installations by using RARP
- Performing initial installations by using `bootparams`
- Performing initial installations by using TFTP
- NFS access by managed hosts
- Terminal access

Browser to User Interface

Communications between the browser and the browser user interface is achieved by using secure HTTP. Users are required to log in to the browser interface.

Identity	Each user is identified by his or her UNIX user name. A server is identified by its host name.
Authentication	User identity is initially proven using standard Solaris mechanisms. Subsequent transactions use reauthentication provided by the servlet session framework. Server identity is proven through the use of a self-signed certificate.
Authorization	Authorization is performed by standard Sun Management Center mechanisms, as described in the *Sun Management Center 3.5 User's Guide*. These mechanisms offer per-user, per-operation control at the service level and per-user, per-operation, and per-target control at the agent level. Change Manager respects Sun Management Center authorization data, but does not provide a user interface mechanism to manipulate it. Only rudimentary access control to Change Manager data is currently supported. All users who are authorized to use a Change Manager service are able to access all Change Manager data associated with that service.
Confidentiality	Secure HTTP mechanisms are used to encrypt traffic between the browser and the user interface.
Integrity	The combination of encryption and authentication precludes productive corruption of the traffic.
Availability	Flood attacks and corruption attacks can disrupt service. Underlying Solaris authentication mechanisms might optionally implement an authentication failure lockout policy. Such a lockout policy might enable denial of service attacks.
Accountability	Logins and user-level actions are logged.

Secure File Transfers

The file import function is performed by using HTTP and traditional file system mechanisms. The file export function is performed by using traditional file system mechanisms. Using secure HTTP to perform file transfers is not planned at this time.

Identity	File system-based import and export functions use the user's UNIX identity. File imports that use HTTP are anonymous.
Authentication	No particular authentication is done as the user's UNIX identity is already authenticated. Note that file system mechanisms include NFS, and NFS authentication is notoriously weak.
Authorization	File system access is performed by using the user's UNIX identity and by applying traditional file system access controls. HTTP access does not provide for authorization.

Confidentiality	Local file system access is confidential. NFS access is likely to be exposed. HTTP access will be exposed.
Integrity	Local file system access is considered trustworthy. NFS access is likely to be vulnerable to productive corruption. HTTP access is likely to be vulnerable to productive corruption.
Availability	Flood attacks and corruption attacks might disrupt service.
Accountability	User-level actions are logged by Change Manager. For local and NFS access, little or no logging is performed, although file ownership and timestamps provide some accountability. HTTP access provides very limited logging.

User Interfaces to Change Manager Server

The browser user interface and the command-line interface use Sun Management Center Remote Method Invocation (RMI) mechanisms to communicate with the server layer. Security issues are exactly as for Sun Management Center's other user interfaces.

Identity	UNIX user name.
Authentication	UNIX password.
Authorization	Authorization is performed by Sun Management Center service and agent authorization mechanisms. Only rudimentary access control to Change Manager data is currently supported. All users who are authorized to use a Change Manager service are able to access all Change Manager data associated with that service.
Confidentiality	Traffic cannot be intercepted by applications such as `snoop`.
Integrity	Traffic cannot be corrupted.
Availability	Flood attacks might disrupt service. Underlying Solaris authentication mechanisms might optionally implement an authentication failure lockout policy. Such a lockout policy might enable denial of service attacks.
Accountability	Logins and user-level actions are logged.

Change Manager Data Storage

Identity	UNIX user name.
Authentication	This issue is covered by other areas. The authenticated UNIX user identity is trusted.

Authorization	Standard file system access controls are used to prevent unauthorized access to Change Manager data files. Files and directories are owned by superuser and are not publicly readable or writable. Standard Sun Management Center and Oracle access controls are used to prevent unauthorized access to Change Manager database contents. Note that NFS allows some access to Change Manager data.
Confidentiality	Files are protected as described for Authorization.
Integrity	Local file access is considered to be trustworthy.
Availability	Denial of service through disk space exhaustion is a possible issue. In such cases, the user is advised to locate Change Manager data on a dedicated file system that does not allow access by ordinary users.
Accountability	Only standard file system ownership mechanisms are provided to address accountability.

Sun Management Center SNMP Control

Identity	Same as for Sun Management Center.
Authentication	Same as for Sun Management Center and SNMPv2usec.
Authorization	Same as for Sun Management Center. Per-user, per-target, and per-operation ACLs are respected, although the Change Manager user interface does not offer a mechanism to manage them.
Confidentiality	Same as for Sun Management Center.
Integrity	Same as for Sun Management Center.
Availability	Flood attacks and corruption attacks might disrupt service.
Accountability	Same as for Sun Management Center. Managed hosts log all actions.

Using Sun Management Center Probe Connection to Retrieve Bulk Data From Managed Hosts

Change Manager uses a private protocol between the Sun Management Center server and agent to perform particular management operations. This protocol relies on a Sun Management Center "probe connection," which provides a data stream between server and agent. The *probe* mechanism relies on standard Sun Management Center authentication to ensure proper access to the Change Manager components on the agent. The agent must be properly configured and must be in the appropriate server context before a probe connection can be established.

Identity	The server and the agent are in a "trusted" relationship according to Sun Management Center server context security.
Authentication	The user must be authorized on the server. An interloper might eavesdrop on the initiation of the probe connection and grab credentials from the agent during initial handshake. This ability would allow unauthenticated access to the agent from a rogue server. Access by a rogue agent to server data through this mechanism is impractical, according to standard Sun Management Center server context security mechanisms.
Authorization	An authenticated Sun Management Center user must have SNMP-set and SNMP-write access to the Change Manager management information base (MIB). This access is managed by agent-side access control lists (ACLs) according to Sun Management Center. The default access enables any authorized Change Manager user to have access to the Change Manager MIB.
Confidentiality	Same as for Sun Management Center, which means little or no confidentiality.
Integrity	Data is vulnerable to productive corruption attacks.
Availability	Flood attacks and corruption attacks might disrupt service. Service might be disrupted by unauthorized use of a snooped connection startup request. The interruption of Change Manager processes on an agent causes management operations to fail. Excessive system load or other resource constraints on an agent can affect Change Manager processes.
Accountability	Data transfers are logged by both the Change Manager server and the managed host, including managed host identification and the responsible user.

Performing Initial Installations by Using RARP

Change Manager supports the standard Reverse Address Resolution Protocol (*RARP*) services for initial installations.

Identity	MAC address.
Authentication	None.
Authorization	No authorization check is performed for the requesting client, which does not appear as a serious vulnerability. No authorization check is done for the responding server, which is a potentially serious vulnerability. This check might allow a rogue server to subvert an initial installation.
Confidentiality	None.
Integrity	None.
Availability	Flood attacks and corruption attacks might disrupt service.
Accountability	None.

Performing Initial Installations by Using `bootparams`

Change Manager supports the standard `bootparams` services for initial installations.

Identity	IP address.
Authentication	None.
Authorization	No authorization check is done for the requesting client, which does not appear as a serious vulnerability. No authorization check is done for the responding server, which is a potentially serious vulnerability. This check might allow a rogue server to subvert an initial installation.
Confidentiality	None.
Integrity	None.
Availability	Flood attacks and corruption attacks might disrupt service.
Accountability	None.

Performing Initial Installations by Using TFTP

Identity	None.
Authentication	None.
Authorization	No authorization check is done for the requesting client, which does not appear as a serious vulnerability. The only data transferred is a standard Solaris bootstrap. No authorization check is done for the supplying server, which is a potentially serious vulnerability as a rogue server could subvert the installation process.
Confidentiality	None, which does not appear as a serious vulnerability, as the only data transferred is a standard Solaris bootstrap.
Integrity	None. Initial installation is vulnerable to productive corruption attacks.
Availability	Flood attacks and corruption attacks might disrupt service.
Accountability	None.

NFS Access by Managed Hosts

Identity	IP address.
Authentication	**Host –** None. The IP address is presumed trustworthy, which is a serious vulnerability. This presumption might allow a villain using a spoofed IP address to retrieve sensitive data. Notably, if a managed host is enabled for initial installation, a villain might be able to retrieve a Solaris Flash archive. **User –** Weak. The target is assumed trustworthy. A villain with superuser privileges on the target can retrieve potentially sensitive data.
Authorization	By IP address, using NFS share restrictions. By standard file access controls.
Confidentiality	None, which is a serious vulnerability, as on initial installation it might allow a villain to snoop retrieval of a Solaris Flash archive.
Integrity	None, which is a serious vulnerability as it might allow productive corruption attacks on both initial installation and update.
Availability	Flood attacks and corruption attacks might disrupt service.
Accountability	None.

Terminal Access

Terminal access is not strictly a part of the Change Manager product. However, a user that accesses the Change Manager command-line interface through mechanisms such as `telnet` or `ssh` might encounter the traditional vulnerabilities of those mechanisms.

Glossary

The following terms are used throughout this document.

ACL Access control list. A table that describes the access rights each user has to particular system objects, such as files and directories.

action page A page that appears when you select an action from one of the Actions drop-down menus in the browser interface. For example, if you select New Folder, the New Folder action page appears. On this action page, you type the name of the folder to create.

administrative domain A hierarchical collection of managed hosts and host groups. Host groups contain managed hosts and other host groups.

alert Graphic that indicates the status of an action.

archive See *Solaris Flash archive*.

archive parameters A set of user-supplied parameters that can be used to customize the archive when installed in the production environment.

audit An action that performs a file-level check of the software contents of a system. An audit consists of two parts: building a baseline manifest and comparing managed hosts against that manifest. Use the audit rules file to specify the type of audit to perform. For instance, perform a full system audit or a per-directory audit.

audit rules file Rules file used by the audit tool. The audit rules file specifies the files to be placed in the manifest. The audit rules file also specifies which files and file attributes are significant when comparing manifests.

baseline manifest A manifest of files on a managed host that you use for comparisons. The baseline manifest often represents the original installation of the software stack. File-level changes that occur within a software stack can be tracked relative to this baseline manifest.

boot environment The collection of mandatory file systems (disk slices and mount points) and contents that are critical to the operation of the Solaris operating environment. These disk slices might be on the same disk or distributed across multiple disks.

The active boot environment is the one that is currently booted. Exactly one boot environment can be the active boot environment. An inactive boot environment is not currently booted, but can be in a state of waiting to be activated on the next reboot.

Change Manager requires that each managed host have no more than two boot environments. The active boot environment contains the currently running system image. The inactive boot environment is available for installation with a new Solaris Flash archive.

bread crumb In web navigation, an ordered set of links that offers the web site visitor easy navigation through a hierarchy. These links represent the path through the hierarchy to the current web page. The bread crumbs appear in the gray line below the *general links area*.

Change Manager agent module A module that plugs into a Sun Management Center agent to enable a particular aspect of system operation to be managed. For instance, the Change Manager agent module enables the Sun Management Center agent to perform change management tasks at the request of the Sun Management Center server.

Change Manager repository Location where Change Manager files are stored on the Change Manager server. You can import files to the repository and export them from the repository. You must import files to the repository before they can be used for Change Manager operations. You can import files from other directories on the Change Manager server or from other systems by using NFS.

Change Manager server A system that runs the Change Manager software. This system can be used to install, update, and manage software across a large number of managed hosts. This server stores the software to be installed in the Change Manager repository. The server also stores information about each managed system.

comparison report The output from the audit operation.

custom JumpStart A command-line interface that enables you to automatically install several systems, based on JumpStart profiles that you create.

deploy An action that installs software on a clone system by using the Change Manager application.

deployment The process of delivering software from a server to another system. In the Change Manager context, deployment means installation of a Solaris Flash archive by using one of the following:

- Initial installation

- Reinstallation
- Updating the inactive boot environment on a system with two boot environments

deployment finish scripts Scripts that the software stack creator writes. The finish scripts enable you to customize a newly installed software stack on a managed host at deployment time. These scripts are embedded in the archive and run after installation. The finish scripts are passed the user-defined parameter values set by the Change Manager deployment user.

DNS Domain Name System. A naming service method by which Internet domain names are translated into IP addresses.

export An action that copies a file from the Change Manager repository to another system on the network or to a directory outside the repository. The files that can be exported from the Change Manager repository are: Solaris Flash archives, shared profiles, manifests, audit rules files, and reports.

fallback A reversion to the environment that ran previously. Use fallback if the updated boot environment fails to boot or shows some undesirable behavior.

folder A container that can hold files and other folders. Use folders to organize files such as Solaris Flash archives and shared profiles.

general links area The information at the top of web pages in the browser interface. The general links area contains tabs with which you can navigate through Change Manager tasks. The general links area also contains general links for help and to log out.

halt An action that stops a running operating system.

host Any hardware system or device that is accessible over the network. A host can be a managed host, a clone system, or another network device, such as a router.

host group A container that can hold managed hosts and other host groups.

host properties The properties associated with a managed host. The property values define how the managed host is to be installed with the specified Solaris Flash archive. These host properties can be used in conjunction with a shared profile. A host property value overrides the value of the same property assigned in the shared profile.

Use this mechanism when a managed host requires a slightly different configuration than the rest of the managed hosts that use the same shared profile.

import An action that copies a file to the Change Manager repository from another system on the network or from a directory outside the repository. The files that can be imported to the Change Manager

	repository are: Solaris Flash archives, Solaris boot images, shared profiles, manifests, audit rules files, and reports.
initial installation	An installation that overwrites a blank disk or the currently running software. An initial installation of the Solaris operating environment overwrites the system's disk or disks with the new version of the Solaris operating environment. If your system is not running the Solaris operating environment, you must perform an initial installation. If you plan to install your system by using Change Manager, you must perform an initial installation if your system is not running the Sun Management Center agent and the Change Manager agent module. Performing an initial installation by using Change Manager is a two-part process. First, set up the files for installation in the Change Manager repository. Then, initiate the installation from the managed host.
IP address	In TCP/IP, a unique 32-bit number that identifies each system in a network. The address must contain four sets of numbers separated by periods, for example `192.168.1.1`.
job	A task that runs on a managed host or on the Change Manager server. Some Change Manager jobs are initial installation, update, audit, import, and export.
job ID	Job identification number generated by Change Manager when a command is initiated.
job log	File that contains information about jobs. A log entry is made when the job starts. Another log entry is made when the job completes. If a job encounters problems, the problem is also reported to the log.
job queue	A list of current and recent jobs. A user can clean up the job queue by purging completed jobs. From the job queue, a user can cancel running or pending jobs.
Kerberos admin server	The Kerberos server that corresponds to the particular Kerberos realm.
Kerberos key distribution center	The Kerberos server that stores the principal and policy databases.
Kerberos realm	Part of the Kerberos name, which corresponds to the Kerberos service that provides authentication for the principal database. For example, you might have a realm for each project organization in your company.
Kerberos security	A method to securely authenticate a request for a service across a network. Kerberos was developed at the Massachusetts Institute of Technology as part of the Athena Project.

LDAP Lightweight Directory Access Protocol. A software protocol that enables anyone to locate organizations, individuals, and other resources such as files and devices in a given network.

live update The action of installing a Solaris Flash archive on the inactive boot environment by using the Solaris Live Upgrade feature. The update takes place on the inactive boot environment while the system continues to run on the active boot environment.

managed host A host that is controlled by Change Manager. Change Manager can "see" other hosts created by Sun Management Center, but these hosts are not necessarily managed hosts. A managed host must be registered for use by Change Manager and have the Sun Management Center agent and the Change Manager agent module installed on it.

manifest A list of files on a system. Each file entry includes several file attribute values. The entry attributes can be compared to track system changes. Manifests are created by running the build manifests operation.

master system A system on which a software stack is installed and configured for the purpose of creating a Solaris Flash archive. The master system should be representative of the systems to which the software stack is to be deployed.

naming service Method of tracking networked objects, such as systems, routers, and printers, on a network. Some naming services are DNS, LDAP, NIS, and NIS+.

network interface Hardware and software a computer system uses to connect to the network.

NIS and NIS+ Network Information System. A naming service method similar to DNS, but used primarily for local area networks. The NIS and NIS+ naming services were developed by Sun Microsystems, Inc.

object A Change Manager object that is managed by the application. Objects include folders, files, host groups, managed hosts, and jobs.

page A web page in which the application displays forms with which the user interacts.

panel A container for organizing the contents of a window or web page. The panel might collect and confirm user input. Panels might be used by wizards and follow an ordered sequence to fulfill a designated task.

For example, Change Manager wizards use four panels.

- A title panel
- A scrolling panel that lists the steps the wizard takes
- A scrolling form panel where you specify parameter values
- A button panel

parameter A variable name, which is assigned a value. Parameters appear on property pages. Some of the parameters can be changed from the property pages, but many parameters are read-only.

pending job A job that is scheduled to run in the future.

platform group The general type of a system, for example, `sun4u`.

probe Change Manager uses a private protocol between the Sun Management Center server and agent to perform particular management operations. This protocol relies on a Sun Management Center "probe connection," which provides a data stream between server and agent. The probe mechanism relies on standard Sun Management Center authentication to ensure proper access to the Change Manager components on the agent. The agent must be properly configured and must be in the appropriate server context before a probe connection can be established.

property See *parameter*.

purge An action that removes completed jobs from the job queue. Completed jobs have a status of canceled, complete, or failed.

RARP Reverse Address Resolution Protocol. A protocol that allows a system to obtain its IP address by broadcasting its MAC address to the subnet. A server retrieves the corresponding IP address from the `/etc/ethers` database file and sends the address to the requester.

reboot An action that restarts a running operating system.

reinstallation An installation, automatically initiated by Change Manager, that overwrites the system's disk or disks with the new version of the Solaris operating environment. You can perform a reinstallation if the system is already running the Solaris operating environment that contains the Sun Management Center agent and the Change Manager agent module. The reinstallation operation requires only one boot environment.

You might perform a reinstallation when you cannot use Solaris Live Upgrade, for example, when the root slice is mirrored.

report The output from one of two operations: an manifest comparison (Audit) or software status check (Get Software Status).

repository See *Change Manager repository*.

router A bridge between two physical networks. Traffic between the networks flows through the router.

security key password The password used to generate security keys. The password value authenticates the Change Manager server to the agents on managed hosts and vice versa.

	The password is an alphanumeric string of up to 8 characters. Be sure to record it for later reference.
server	See *Change Manager server*.
server farm	Multiple systems working together to offer specific services.
set up for initial installation	The action of setting up the custom JumpStart files needed to perform an initial installation of a Solaris Flash archive on a system. This action takes information provided in the shared profile and host properties to build the installation files. Also, the managed host is registered as a network installation client of the Change Manager server. When the custom JumpStart files are ready, you can manually initiate the initial installation from the console of the managed host.
shared profile	A text file that defines a shared set of properties that customizes one or more managed hosts being installed by Change Manager. The profile is shared by one or more managed hosts. Each shared profile is associated with a Solaris Flash archive. To use the same customizations for a different archive, create a separate shared profile.
shell	A programmable command interpreter. The command shell provides direct communication between the user and the operating system. UNIX systems use the C shell, Bourne shell, and Korn shell.
slice	Large portions of a disk that are set aside for operating systems. Boot environments are disk slices used by the Solaris Live Upgrade feature.
software stack	A set of software installed and configured together to provide a solution or to perform a specific function. A software stack must contain at least an operating system. In addition to the operating system, the stack can include middleware and applications.
Solaris boot image	The CD image required by the Change Manager software to perform an initial Solaris installation. This CD image can also be used to troubleshoot Solaris software issues. For an initial installation, the boot image is used by the managed host to boot the Solaris kernel. Then, the clone system runs the installation program from the boot image. For a Solaris Live Upgrade, the boot image is used to run the installation program.
Solaris Flash archive	A file that represents a collection of files that were copied from a master system. The file contains information to identify the archive, such as the archive name and the date you created the archive. The file can also contain scripts supplied by the system administrator that customize the archive. When you install an archive on a system, the system then contains the exact configuration of the master system that you used to create the archive.

	Change Manager supports customizable Solaris Flash archives. The archive can be customized if the software stack creator makes software-related parameters available to the Change Manager user interfaces. When you add a managed host, you can specify parameter values on a per-host basis. When you create a shared profile, you can supply parameter values for a number of managed hosts.
Solaris Flash installation	An installation method that enables you to install Solaris Flash archives on managed hosts.
Solaris Live Upgrade	A method of upgrading a system in which the service outage time associated with an operating system update is substantially reduced. The inactive boot environment is updated while the operating system continues to run on the active boot environment.
Sun Management Center agent	A component of Sun Management Center that runs on the managed host, providing a mechanism for managing that host.
topology	The logical layout of a network. Change Manager uses the Sun Management Center topology, which is a tree of host groups and managed hosts. Each domain has a separate topology. The Sun Management Center topology only reflects the managed hosts and host groups you specify. The topology might not be a complete representation of the network.
transaction log	A log that shows every action that has been initiated from the Change Manager server, not just the long-running jobs.
update	See *live update*.
URL	Universal Resource Locator. A path to data on the web. Data on a web server can be accessed through URLs that begin with `http://`*pathname*. Data on the local system, including NFS mounts, can be accessed through URLs that begin with `file:/`*pathname*.
wizard	An application that steps you through to the completion of a task. Change Manager uses wizards to help you create shared profiles and host properties, or managed hosts. Wizards are comprised of four panels: the title panel, the step panel, the form panel, and the button panel.

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