Oracle® Solaris 10 1/13 Installation Guide: JumpStart Installations

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Preface

This book describes how to install and upgrade the Oracle Solaris operating system (OS) on both networked and nonnetworked SPARC and x86 architecture based systems. This book covers using the JumpStart, a feature of Oracle Solaris, installation method and the creation of RAID-1 volumes during installation.

This book does not include instructions about how to set up system hardware or other peripherals.

Note – This Oracle Solaris release supports systems that use the SPARC and x86 families of processor architectures. The supported systems appear in the *Oracle Solaris OS: Hardware Compatibility Lists*. This document cites any implementation differences between the platform types.

In this document, these x86 related terms mean the following:

- x86 refers to the larger family of 64-bit and 32-bit x86 compatible products.
- x64 relates specifically to 64-bit x86 compatible CPUs.
- "32-bit x86" points out specific 32-bit information about x86 based systems.

For supported systems, see the *Oracle Solaris OS: Hardware Compatibility Lists*.

Who Should Use This Book

This book is intended for system administrators responsible for installing the Oracle Solaris OS. This book provides both of the following types of information.

- Advanced Oracle Solaris installation information for enterprise system administrators who manage multiple Oracle Solaris machines in a networked environment
- Basic Oracle Solaris installation information for system administrators who perform infrequent Oracle Solaris installations or upgrades

Related Books

Table P–1 lists documentation for system administrators.

TABLE P–1 Are You a System Administrator Who is Installing Oracle Solaris?

Description	Information
Do you need system requirements or high-level planning information? Or want a high-level overview of Oracle Solaris ZFS installations, booting, Oracle Solaris Zones partitioning technology, or creating RAID-1 volumes?	*Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*
Do you need to install a single system from DVD or CD media? The Oracle Solaris installation program steps you through an installation.	*Oracle Solaris 10 1/13 Installation Guide: Basic Installations*
Do you need to upgrade or patch your system with almost no downtime? Save system downtime when upgrading by using Live Upgrade, a feature of Oracle Solaris.	*Oracle Solaris 10 1/13 Installation Guide: Live Upgrade and Upgrade Planning*
Do you need to install a secure installation over the network or Internet? Use WAN boot to install a remote client. Or, do you need to install over the network from a network installation image? The Oracle Solaris installation program steps you through an installation.	*Oracle Solaris 10 1/13 Installation Guide: Network-Based Installations*
Do you need to install or patch multiple systems quickly? Use Flash Archive, a feature of Oracle Solaris, software to create an archive and install a copy of the OS on clone systems.	*Oracle Solaris 10 1/13 Installation Guide: Flash Archives (Creation and Installation)*
Do you need to back up your system?	Chapter 19, "Backing Up and Restoring UFS File Systems (Overview/Tasks)," in *System Administration Guide: Devices and File Systems*
Do you need troubleshooting information, a list of known problems, or a list of patches for this release?	*Oracle Solaris Release Notes*
Do you need to verify that your system works on Oracle Solaris?	SPARC: *Oracle Solaris Sun Hardware Platform Guide*
Do you need to check on which packages have been added, removed, or changed in this release?	*Oracle Solaris Package List*
Do you need to verify that your system and devices work with Oracle Solaris SPARC and x86 based systems and other third-party vendors.	Solaris Hardware Compatibility List for x86 Platforms

Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info` or visit `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs` if you are hearing impaired.

Typographic Conventions

The following table describes the typographic conventions that are used in this book.

TABLE P–2 Typographic Conventions

Typeface	Description	Example
`AaBbCc123`	The names of commands, files, and directories, and onscreen computer output	Edit your `.login` file. Use `ls -a` to list all files. `machine_name% you have mail.`
`AaBbCc123`	What you type, contrasted with onscreen computer output	`machine_name%` **`su`** `Password:`
aabbcc123	Placeholder: replace with a real name or value	The command to remove a file is `rm` *filename*.
AaBbCc123	Book titles, new terms, and terms to be emphasized	Read Chapter 6 in the *User's Guide*. A *cache* is a copy that is stored locally. Do *not* save the file. **Note:** Some emphasized items appear bold online.

Shell Prompts in Command Examples

The following table shows UNIX system prompts and superuser prompts for shells that are included in the Oracle Solaris OS. In command examples, the shell prompt indicates whether the command should be executed by a regular user or a user with privileges.

TABLE P–3 Shell Prompts

Shell	Prompt
Bash shell, Korn shell, and Bourne shell	`$`

TABLE P–3 Shell Prompts *(Continued)*

Shell	Prompt
Bash shell, Korn shell, and Bourne shell for superuser	#
C shell	machine_name%
C shell for superuser	machine_name#

◆ ◆ ◆ CHAPTER 1

Where to Find Oracle Solaris Installation Planning Information

This book provides information on how to use the automated JumpStart, a feature of Oracle Solaris, installation program to install the Oracle Solaris operating system. This book provides all you need to know about installing with the JumpStart program, but a planning book in our collection of installation documentation might be useful to read before you begin preparing for a JumpStart installation. The following references provide useful information before you install your system.

Where to Find Planning and System Requirement Information

The *Oracle Solaris 10 8/11 Installation Guide: Planning For Installation and Upgrade* provides system requirements and high-level planning information, such as planning guidelines for file systems, and upgrade planning and much more. This section provides an overview of the chapters for this book.

Chapter Descriptions From the Planning Guide	Reference
This chapter provides you with information about decisions you need to make before you install or upgrade the Oracle Solaris OS. Examples are deciding when to use a network installation image or DVD media and descriptions of all the Oracle Solaris installation programs.	Chapter 2, "Oracle Solaris Installation and Upgrade Roadmap," in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*
This chapter describes system requirements to install or upgrade to the Oracle Solaris OS. General guidelines for planning the disk space and default swap space allocation are also provided. Upgrade limitations are also described.	Chapter 3, "System Requirements, Guidelines, and Upgrade Information," in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*
This chapter contains checklists to help you gather all of the information that you need to install or upgrade your system. This information is useful, for example, if you are performing an interactive installation. You'll have all the information in the checklist that you'll need to do an interactive installation.	Chapter 4, "Gathering Information Before an Installation or Upgrade," in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*

Chapter Descriptions From the Planning Guide	Reference
These chapters provide overviews of several technologies that relate to Oracle Solaris OS installation or upgrade. Guidelines and requirements related to these technologies are also included. These chapters include information about ZFS installations, booting, Oracle Solaris Zones partitioning technology, and RAID-1 volumes that can be created at installation.	Part II, "Understanding Installations Related to ZFS, Booting, Oracle Solaris Zones, and RAID-1 Volumes," in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*

◆ ◆ ◆ CHAPTER 2

JumpStart (Overview)

This chapter provides an introduction and overview to the JumpStart, a feature of Oracle Solaris, installation process.

Note – If you are installing an Oracle Solaris ZFS root pool, see Chapter 9, "Installing a ZFS Root Pool With JumpStart," for limitations and profile examples.

This chapter covers the following topics:

- "JumpStart Introduction" on page 13
- "How the JumpStart Program Installs Oracle Solaris Software" on page 15

JumpStart Introduction

The JumpStart installation method is a command–line interface that enables you to automatically install or upgrade several systems, based on profiles that you create. The profiles define specific software installation requirements. You can also incorporate shell scripts to include preinstallation and postinstallation tasks. You choose which profile and scripts to use for installation or upgrade. The JumpStart installation method installs or upgrades the system based on the profile and scripts that you select. Also, you can use a `sysidcfg` file to specify configuration information so that the JumpStart installation is completely automated.

Note – The root password for your client systems can be preset prior to the installation by including the `root_password` keyword in the `sysidcfg`. See the `sysidcfg(4)` man page.

Auto Registration, a feature of Oracle Solaris, is new in the Oracle Solaris 10 9/10 release. When you install or upgrade your system, configuration data about your system is, on rebooting, automatically communicated through the existing service tag technology to the Oracle Product Registration System. This service tag data about your system is used, for example, to help Oracle enhance customer support and services.

If you include the `auto_reg` keyword in the `sysidcfg` file prior to the installation or upgrade, the installation can remain completely automated. fHowever, if you do not include the `auto_reg` keyword, you will be prompted to provide your support credentials and proxy information for Auto Registration during the installation or upgrade.

JumpStart Example Scenario

This chapter describes the JumpStart process by using an example scenario. In this example scenario, the systems are set up with the following parameters:

- Oracle Solaris needs to be installed on 100 new systems.
- Seventy of the systems are SPARC based systems that are owned by the engineering group and need to be installed as stand-alone systems with the Oracle Solaris OS software group for developers.
- The remaining 30 systems are x86 based, and are owned by the marketing group. They need to be installed as stand-alone systems with the Oracle Solaris OS software group for end users.

First, the system administrator must create a `rules` file and a profile for each group of systems. The `rules` file is a text file that contains a rule for each group of systems or single systems on which you want to install the Oracle Solaris software. Each rule distinguishes a group of systems that are based on one or more system attributes. Each rule also links each group to a profile.

A profile is a text file that defines how the Oracle Solaris software is to be installed on each system in the group. Both the `rules` file and profile must be located in a JumpStart directory.

For the example scenario, the system administrator creates a `rules` file that contains two different rules, one for the engineering group and another for the marketing group. For each rule, the system's network number is used to distinguish the engineering group from the marketing group.

Each rule also contains a link to an appropriate profile. For example, in the rule for the engineering group, a link is added to the `eng_profile` profile which was created for the engineering group. In the rule for the marketing group, a link is added to the `market_profile` profile which was created for the marketing group.

You can save the `rules` file and the profiles on a diskette or on a server.

- A profile diskette is required when you want to perform JumpStart installations on nonnetworked, stand-alone systems.
- A profile server is used when you want to perform JumpStart installations on networked systems that have access to a server.

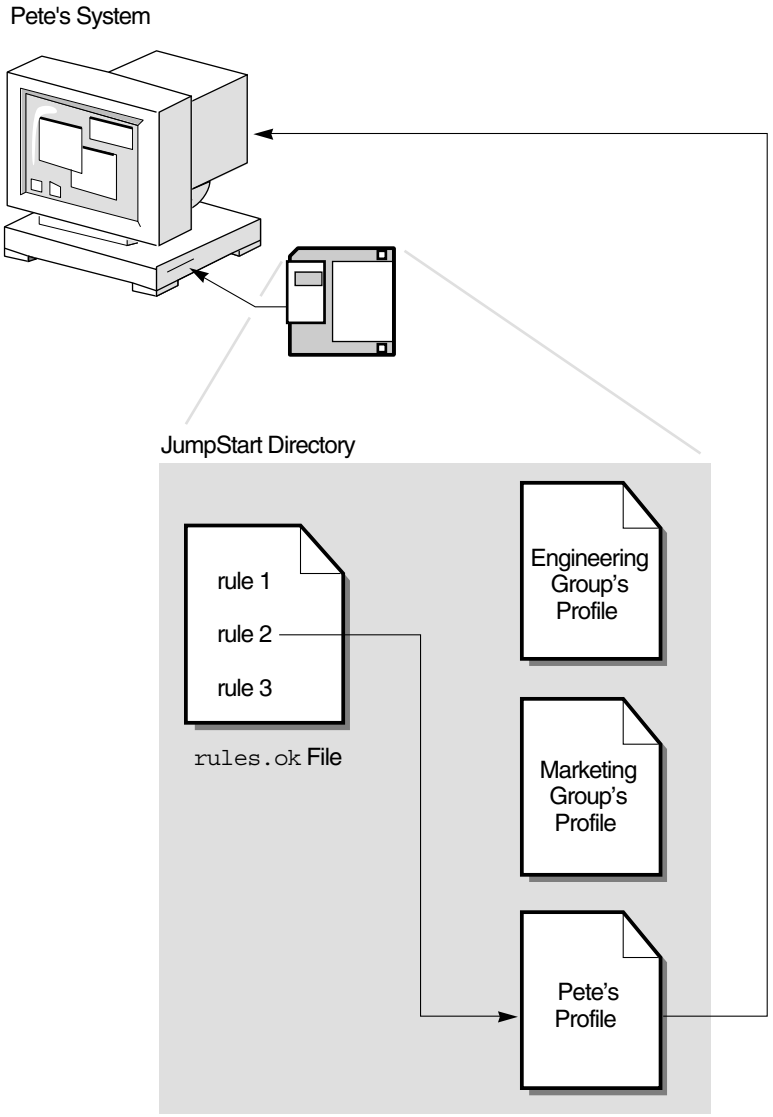
After creating the `rules` file and profiles, validate the files with the `check` script. If the `check` script runs successfully, the `rules.ok` file is created. The `rules.ok` file is a generated version of the `rules` file that the JumpStart program uses to install the Oracle Solaris software.

How the JumpStart Program Installs Oracle Solaris Software

After you validate the `rules` file and the profiles, you can begin a JumpStart installation. The JumpStart program reads the `rules.ok` file. Then, it searches for the first rule with defined system attributes that match the system on which the JumpStart program is attempting to install the Oracle Solaris software. If a match occurs, the JumpStart program uses the profile that is specified in the rule to install the Oracle Solaris software on the system.

The following figure illustrates how a JumpStart installation works on a stand-alone, nonnetworked system. The system administrator initiates the JumpStart installation on Pete's system. The JumpStart program accesses the rules files on the diskette in the system's diskette drive. The JumpStart program matches `rule 2` to the system. `rule 2` specifies that the JumpStart program use `Pete's profile` to install the Oracle Solaris software. The JumpStart program reads `Pete's profile` and installs the Oracle Solaris software, based on the instructions that the system administrator specified in `Pete's profile`.

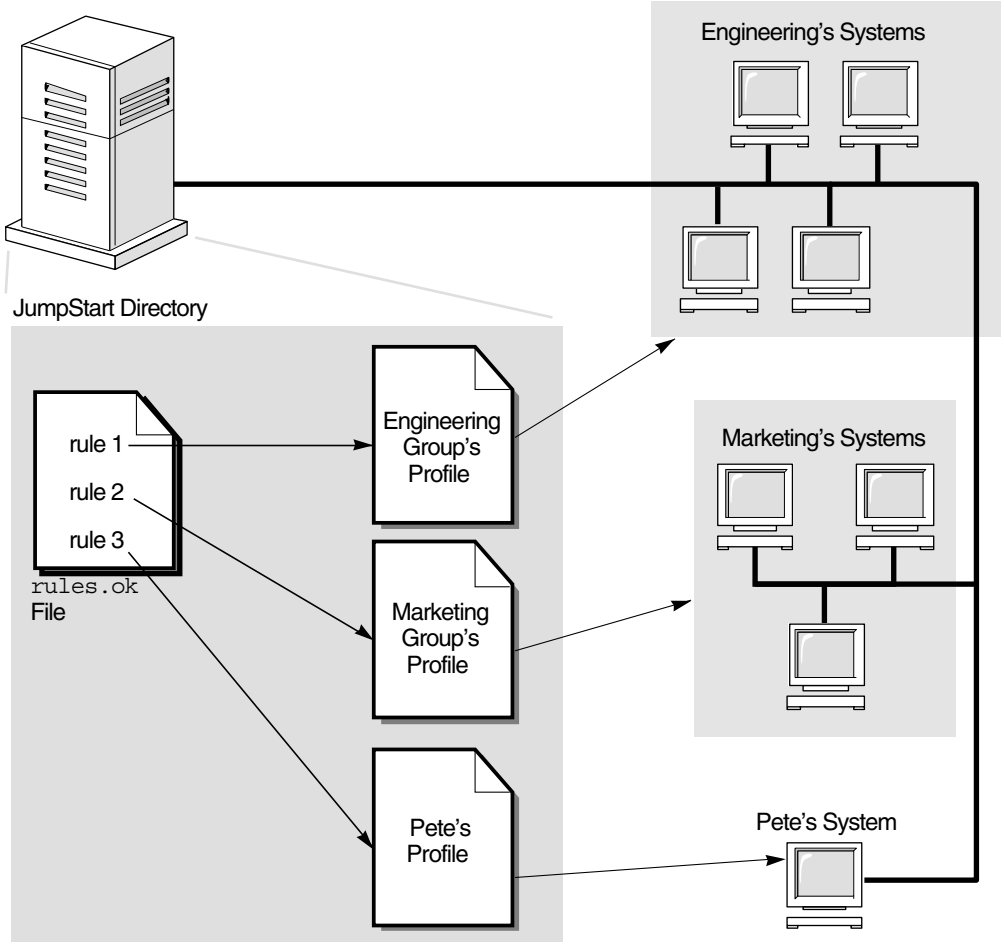
FIGURE 2–1 How a JumpStart Installation Works: Nonnetworked Example



The following figure illustrates how a JumpStart installation works with more than one system on a network. Previously, the system administrator set up different profiles and saved the profiles on a single server. The system administrator initiates the JumpStart installation on one of the engineering systems. The JumpStart program accesses the rules files in the `JumpStart/` directory on the server. It matches the engineering system to `rule 1`. `rule 1` specifies that the JumpStart program use `Engineering Group's Profile` to install the Oracle Solaris software.

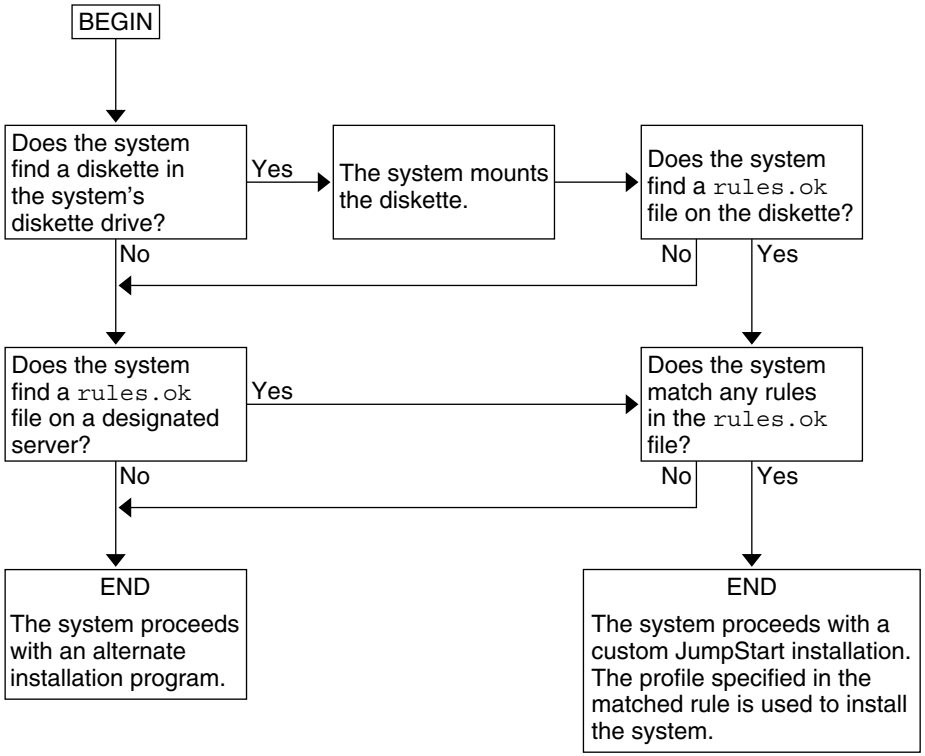
The JumpStart program reads `Engineering Group's Profile` and installs the Oracle Solaris software, based on the instructions that the system administrator specified in `Engineering Group's Profile`.

FIGURE 2–2 How a JumpStart Installation Works: Networked Example



The following figure describes the order in which the JumpStart program searches for JumpStart files.

FIGURE 2–3 What Happens During a JumpStart Installation



◆ ◆ ◆ CHAPTER 3

Preparing JumpStart Installations (Tasks)

This chapter provides step-by-step instructions about how to prepare the systems at your site from which and on which you intend to install the Oracle Solaris software by using the JumpStart, installation method.

Note – If you are installing an Oracle Solaris ZFS root pool, see Chapter 9, "Installing a ZFS Root Pool With JumpStart," for limitations and profile examples.

This chapter covers the following topics:

- "Task Map: Preparing JumpStart Installations" on page 19
- "Creating a Profile Server for Networked Systems" on page 21
- "Creating a Profile Diskette for Stand-alone Systems" on page 24
- "Creating the `rules` File" on page 28
- "Creating a Profile" on page 32
- "Testing a Profile" on page 44
- "Validating the `rules` File" on page 49

Task Map: Preparing JumpStart Installations

TABLE 3–1 Task Map: Preparing JumpStart Installations

Task	Description	For Instructions
Decide how to upgrade the system if a previous version of the Oracle Solaris software is installed on the system.	If a previous release of Oracle Solaris is installed on the system, you need to determine how to upgrade the system. Ensure that you know what to do before and after you upgrade a system. Planning helps you to create your profiles, begin scripts, and finish scripts.	"Upgrade Planning" in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*

TABLE 3–1 Task Map: Preparing JumpStart Installations *(Continued)*

Task	Description	For Instructions
Create a JumpStart directory.	**On a server** If you want to perform JumpStart installations on systems that are connected to a network, you must create a profile server. The profile server contains a JumpStart directory for the JumpStart files. **On a diskette** If you want to perform JumpStart installations on systems that are not connected to a network, you must create a profile diskette. A profile diskette contains the JumpStart files.	"Creating a Profile Server for Networked Systems" on page 21 "Creating a Profile Diskette for Stand-alone Systems" on page 24
Add rules to the `rules` file.	After you decide how you want each group of systems or single systems to be installed, create a rule for each group that you want to install. Each rule distinguishes a group, based on one or more system attributes. The rule links each group to a profile.	"Creating the `rules` File" on page 28
Create a profile for every rule.	A profile is a text file that defines how to install the Oracle Solaris software, for example, which software group to install on a system. Every rule specifies a profile to define how a system is to be installed with the Oracle Solaris software when the rule is matched. You usually create a different profile for every rule. However, the same profile can be used in more than one rule.	"Creating a Profile" on page 32
(Optional) Test the profiles.	After you create a profile, use the `pfinstall(1M)` command to test the profile before you use the profile to install or upgrade a system.	"Testing a Profile" on page 44
Validate the `rules` file.	The `rules.ok` file is a generated version of the `rules` file that the JumpStart program uses to match the system to be installed with a profile. You must use the `check` script to validate the `rules` file.	"Validating the `rules` File" on page 49

Creating a Profile Server for Networked Systems

When setting up JumpStart installations for systems on the network, you need to create a JumpStart directory on a server. The JumpStart directory contains all of the essential JumpStart files, for example, the `rules` file, `rules.ok` file, and profiles. You must save the JumpStart directory in the root (`/`) directory of the profile server.

The server that contains a JumpStart directory is called a profile server. A profile server can be the same system as an install server or a boot server, or the server can be a completely different server. A profile server can provide JumpStart files for different platforms. For example, an x86 server can provide JumpStart files for both SPARC based systems and x86 based systems.

Note – After you create a profile server, you must allow systems to access the server. For detailed instructions, see "Using a Wildcard Entry to Allow All Systems Access to the Profile Server" on page 23.

▼ How to Create a JumpStart Directory on a Server

Note – This procedure assumes that the system is running Solaris Volume Manager. If you are not using Solaris Volume Manager to manage discs, refer to *System Administration Guide: Devices and File Systems* for detailed information about managing removable media without Solaris Volume Manager.

---

1. **Locate the server on which you want to create the JumpStart directory.**

2. **Become superuser or assume an equivalent role.**

   Roles contain authorizations and privileged commands. For more information about roles, see "Configuring RBAC (Task Map)" in *System Administration Guide: Security Services*.

3. **Create the JumpStart directory anywhere on the server.**

   `# mkdir -m 755` *jumpstart-dir-path*

   In the command, *jumpstart-dir-path* is the absolute path of the JumpStart directory.

   For example, the following command creates a directory that is called `jumpstart` in the root (`/`) directory and sets the permissions to 755:

   ```
   # mkdir -m 755 /jumpstart
   ```

4. **Add the following entry to the `/etc/dfs/dfstab` file.**

   `share -F nfs -o ro,anon=0` *jumpstart-dir-path*

For example, the following entry shares the `/jumpstart` directory:

```
share -F nfs -o ro,anon=0 /jumpstart
```

5 Type `shareall` and press Return.

6 (Optional) Copy examples of JumpStart files to your JumpStart directory.

a. Access the installation disc or image.

Example Locations	Instructions
The Oracle Solaris Operating System DVD or the Oracle Solaris Software - 1 CD for your platform	Insert the Oracle Solaris Operating System DVD or the Oracle Solaris Software - 1 CD into the server's CD-ROM drive. Solaris Volume Manager automatically mounts the CD or DVD.
An image of the Oracle Solaris Operating System DVD or the Oracle Solaris Software - 1 CD for your platform on a local disk	Change directory to the location of the Oracle Solaris Operating System DVD or the Oracle Solaris Software - 1 image. For example, type the following command: `cd /export/install`

b. Copy the example JumpStart files into the JumpStart directory on the profile server.

`# cp -r` *media-path*`/Solaris_10/Misc/jumpstart_sample/*` *jumpstart-dir-path*

media-path	The path to the CD, DVD, or image on the local disk
jumpstart-dir-path	The path on the profile server where you are placing the example JumpStart files

For example, the following command copies the `jumpstart_sample` directory into the `/jumpstart` directory on the profile server:

```
cp -r /cdrom/cdrom0/Solaris_10/Misc/jumpstart_sample/* /jumpstart
```

c. Update the example JumpStart files so that the files work in your environment.

7 Ensure that `root` owns the JumpStart directory and that the permissions are set to 755.

8 Allow systems on the network to access the profile server.

For detailed instructions, see "Using a Wildcard Entry to Allow All Systems Access to the Profile Server" on page 23.

Allowing All Systems Access to the Profile Server

When you create a profile server, you must ensure that systems can access the JumpStart directory on the profile server during a JumpStart installation. Use one of the methods described in the following table to ensure access.

Command or File	Providing Access	Instructions
`add_install_client` command	Each time that you add a system for network installation, use the `-c` option with the `add_install_client` command to specify the profile server. **Note –** If you are not using NFS, then you must use another means to provide access. ■ **For SPARC based systems**, use the `boot` command ■ **For x86 based systems**, edit the GRUB menu. GRUB is a feature of Oracle Solaris.	■ For DVD media, see "Adding Systems to Be Installed From the Network With a DVD Image" in *Oracle Solaris 10 1/13 Installation Guide: Network-Based Installations* ■ For CD media, see "Adding Systems to Be Installed From the Network With a CD Image" in *Oracle Solaris 10 1/13 Installation Guide: Network-Based Installations*
Specify the location of the JumpStart directory when you boot the system	■ **For SPARC based systems**, use the `boot` command to boot the system. Specify the location of the JumpStart directory on the profile server when you boot the system. You must compress the JumpStart configuration files into one file. Then, save the compressed configuration file on an HTTP or HTTPS server.	■ "Creating a Compressed Configuration File" on page 58 ■ Step 3 in "SPARC: To Perform an Installation or Upgrade With the JumpStart Program" on page 78
	■ **For x86 based systems**, specify the location of the JumpStart directory on the profile server when you boot the system by editing the boot entry on the GRUB menu. You must compress the JumpStart configuration files into one file. Then, save the compressed configuration file on an HTTP or HTTPS server. When you edit the GRUB menu entry, specify the location of the compressed file.	■ "Creating a Compressed Configuration File" on page 58 ■ "x86: How to Perform an Installation or Upgrade With the JumpStart Program and GRUB" on page 82
`/etc/bootparams` file or naming service bootparam database	Add a wildcard.	

Using a Wildcard Entry to Allow All Systems Access to the Profile Server

You can use a wildcard entry to allow all systems access to the profile server only if you store network installation information in the following places:

- In the `/etc/bootparams` file
- In the naming service `bootparams` database

The systems must be of the same type, such as all SPARC systems.

Add the following entry to the file or database:

`* install_config=`*server:jumpstart-dir-path*

*	A wildcard character that specifies that all systems have access
server	The host name of the profile server where the JumpStart directory is located
jumpstart-dir-path	The absolute path of the JumpStart directory

For example, the following entry enables all systems to access the `/jumpstart` directory on the profile server that is named `sherlock`:

```
* install_config=sherlock:/jumpstart
```

Caution – Use of this procedure might produce the following error message when an installation client is booted:

```
WARNING: getfile: RPC failed: error 5: (RPC Timed out).
```

"Booting From the Network, Error Messages" in *Oracle Solaris 10 1/13 Installation Guide: Network-Based Installations* contains details about this error message.

All systems can now access the profile server.

Creating a Profile Diskette for Stand-alone Systems

A diskette that contains a JumpStart directory is called a profile diskette. A system that is not connected to the network does not have access to a profile server. As a result, you must create a JumpStart directory on a diskette if a system is not connected to a network. The system on which you create a profile diskette must have a diskette drive.

The JumpStart directory contains all of the essential JumpStart files, for example, the `rules` file, `rules.ok` file, and profiles. You must save the JumpStart directory in the root (`/`) directory of the profile diskette.

See one of the following procedures:

- "SPARC: How to Create a Profile Diskette" on page 25

■ "x86: How to Create a Profile Diskette With GRUB" on page 26

▼ SPARC: How to Create a Profile Diskette

Note – This procedure assumes that the system is running Solaris Volume Manager. If you are not using Solaris Volume Manager to manage diskettes, CDs, and DVDs, refer to *System Administration Guide: Devices and File Systems* for detailed information about managing removable media without Solaris Volume Manager.

1. **Locate a SPARC based system to which a diskette drive is attached.**

2. **Become superuser or assume an equivalent role.**

   Roles contain authorizations and privileged commands. For more information about roles, see "Configuring RBAC (Task Map)" in *System Administration Guide: Security Services*.

3. **Insert a blank diskette or a diskette that can be overwritten in the diskette drive.**

4. **Mount the diskette.**

   ```
   # volcheck
   ```

5. **Determine whether the diskette contains a UNIX file system (UFS) by examining the contents of the file `/etc/mnttab` on the system for an entry such as the following:**

   ```
   /vol/dev/diskette0/scrap  /floppy/scrap  ufs  suid,rw,largefiles,dev=1740008  927147040
   ```

   - If the entry exists, go to the next step.
   - If the entry does not exist, create a UFS on the diskette.

     ```
     # newfs /vol/dev/aliases/floppy0
     ```

6. **(Optional) Copy examples of JumpStart files to your JumpStart directory.**

   a. **Access the installation disc or image.**

Example Locations	Instructions
The Oracle Solaris Operating System for SPARC Platforms DVD or the Oracle Solaris Software for SPARC Platforms - 1 CD	Insert the Oracle Solaris Operating System for SPARC Platforms DVD or the Oracle Solaris Software for SPARC Platforms - 1 CD into the server's CD-ROM drive. Solaris Volume Manager automatically mounts the CD or DVD.

Example Locations	Instructions
An image of the Oracle Solaris Operating System for SPARC Platforms DVD or the Oracle Solaris Software for SPARC Platforms - 1 CD on a local disk	Change the directory to the location of the Oracle Solaris Operating System for SPARC Platforms DVD or the Oracle Solaris Software for SPARC Platforms - 1 CD image. For example, type the following command: `cd /export/install`

b. Copy the example JumpStart files into the JumpStart directory on the profile diskette.

`# cp -r` *media-path*`/Solaris_10/Misc/jumpstart_sample/*` *jumpstart-dir-path*

media-path	The path to the CD, DVD, or image on the local disk
jumpstart-dir-path	The path to the profile diskette where you want to place the example JumpStart files

Note – You must place all JumpStart installation files in the root (`/`) directory on the diskette.

For example, the following command copies the contents of `jumpstart_sample` on the Oracle Solaris Software for SPARC Platforms - 1 CD to the root (`/`) directory on a profile diskette that is named `scrap`:

```
cp -r /cdrom/cdrom0/Solaris_10/Misc/jumpstart_sample/* /floppy/scrap
```

c. Update the example JumpStart files on the profile diskette so that the files work in your environment.

7 Ensure that `root` owns the JumpStart directory and that permissions are set to 755.

8 Eject the diskette.

```
# eject floppy
```

You have completed the creation of a profile diskette. You can now update the `rules` file and create profiles on the profile diskette to perform JumpStart installations. To continue, go to "Creating the `rules` File" on page 28.

▼ x86: How to Create a Profile Diskette With GRUB

Use this procedure to create a profile diskette with GRUB. A GRUB menu is provided during the installation procedure that enables the boot process. The GRUB menu replaces the Oracle Solaris Device Configuration Assistant that might have been needed to boot a system in past releases.

Note – This procedure assumes that the system is running Solaris Volume Manager. If you are not using Solaris Volume Manager to manage diskettes, CDs, and DVDs, refer to *System Administration Guide: Devices and File Systems* for detailed information about managing removable media without Solaris Volume Manager.

1 **Locate an x86 based system to which a diskette drive is attached.**

2 **Become superuser or assume an equivalent role.**

Roles contain authorizations and privileged commands. For more information about roles, see "Configuring RBAC (Task Map)" in *System Administration Guide: Security Services*.

3 **Insert a blank diskette or a diskette that can be overwritten into the diskette drive.**

4 **Mount the diskette.**

```
# volcheck
```

5 **(Optional) Copy examples of JumpStart files to your JumpStart directory.**

a. **Access the installation disc or image.**

Example Locations	Instructions
The Oracle Solaris Operating System for x86 Platforms DVD or the Oracle Solaris Software for x86 Platforms - 1 CD	Insert the Oracle Solaris Operating System for x86 Platforms DVD or the Oracle Solaris Software for x86 Platforms - 1 CD into the server's CD-ROM drive. Solaris Volume Manager automatically mounts the DVD or CD.
An image of the Oracle Solaris Operating System for x86 Platforms DVD or the Oracle Solaris Software for x86 Platforms - 1 CD on a local disk	Change directory to the location of the Oracle Solaris Operating System for x86 Platforms DVD or the Oracle Solaris Software for x86 Platforms - 1 CD image. For example, type the following: `cd /export/install`

b. **Copy the example JumpStart files into the JumpStart directory on the profile diskette.**

```
# cp -r media-path/Solaris_10/Misc/jumpstart_sample/* jumpstart-dir-path
```

media-path The path to the CD, DVD, or image on the local disk

jumpstart-dir-path The path to the profile diskette where you want to place the example JumpStart files

Note – You must place all JumpStart installation files in the root (/) directory on the profile diskette.

For example, the following command copies the contents of `jumpstart_sample` on the Oracle Solaris Software for x86 Platforms - 1 CD to the root (/) directory on a profile diskette that is named `scrap`:

```
cp -r /cdrom/cdrom0/Solaris_10/Misc/jumpstart_sample/* /floppy/scrap
```

c. Update the example JumpStart files on the profile diskette so that the files work in your environment.

6 Ensure that `root` owns the JumpStart directory and that permissions are set to 755.

7 Eject the diskette by clicking Eject Disk in the File Manager window or by typing `eject floppy` on the command line.

8 In the Removable Media Manager dialog box, click OK.

9 Manually eject the diskette.

Next Steps You have completed the creation of a profile diskette. Now you can update the `rules` file and create profiles on the profile diskette to perform JumpStart installations. To continue, go to "Creating the rules File" on page 28.

Creating the `rules` File

The `rules` file is a text file that contains a rule for each group of systems on which you want to install the Oracle Solaris OS. Each rule distinguishes a group of systems that are based on one or more system attributes. Each rule also links each group to a profile. A profile is a text file that defines how the Oracle Solaris software is to be installed on each system in the group. For example, the following rule specifies that the JumpStart program use the information in the `basic_prof` profile to install any system with the `sun4u` platform group.

```
karch sun4u - basic_prof -
```

The `rules` file is used to create the `rules.ok` file, which is required for JumpStart installations.

Note – If you set up the JumpStart directory by using the procedures in "Creating a Profile Diskette for Stand-alone Systems" on page 24 or "Creating a Profile Server for Networked Systems" on page 21, an example `rules` file is already located in the JumpStart directory. The sample `rules` file contains documentation and some example rules. If you use the sample `rules` file, ensure that you comment out the example rules you do not intend to use.

Syntax of the `rules` File

The `rules` file must have the following attributes:

- The file must be assigned the name `rules`.
- The file must contain at least one rule.

The `rules` file can contain any of the following:

- Commented text

  Any text that is included after the # symbol on a line is treated by JumpStart as commented text. If a line begins with the # symbol, the entire line is treated as a comment.
- One or more blank lines
- One or more multiline rules

  To continue a single rule onto a new line, include a backslash character (\) just before pressing Return.

▼ How to Create a `rules` File

1 **Use a text editor to create a text file that is named `rules` or open the sample `rules` file in the JumpStart directory that you created.**

2 **Add a rule in the `rules` file for each group of systems on which you want to install the Oracle Solaris software.**

For a list of `rules` file keywords and values, see "Rule Keywords and Values" on page 97.

A rule within a `rules` file must adhere to the following syntax:

!*rule-keyword rule-value* && !*rule-keyword rule-value* ... *begin profile finish*

!	A symbol that is used before a keyword to indicate negation.
rule-keyword	A predefined lexical unit or word that describes a general system attribute, such as host name, `hostname`, or memory size, `memsize`. *rule-keyword* is used with the rule value to match a system with the same attribute to a profile. For the list of rule keywords, see "Rule Keywords and Values" on page 97.

rule-value — A value that provides the specific system attribute for the corresponding rule keyword. Rule values are described in "Rule Keywords and Values" on page 97.

&& — A symbol you must use to join rule keyword and rule value pairs in the same rule (a logical AND). During a JumpStart installation, a system must match every pair in the rule before the rule matches.

begin — The name of an optional Bourne shell script that can be executed before the installation begins. If no begin script exists, you must type a minus sign (-) in this field. All begin scripts must be located in the JumpStart directory.

Information about how to create begin scripts is presented in "Creating Begin Scripts" on page 51.

profile — The name of a text file that defines how the Oracle Solaris software is to be installed on the system when a system matches the rule. The information in a profile consists of profile keywords and their corresponding profile values. All profiles must be located in the JumpStart directory.

Note – Optional ways to use the profile field are described in "Using a Site-Specific Installation Program" on page 65 and "Creating Derived Profiles With a Begin Script" on page 52.

---

finish — The name of an optional Bourne shell script that can be executed after the installation is completed. If no finish script exists, you must type a minus sign (-) in this field. All finish scripts must be located in the JumpStart directory.

Information about how to create finish scripts is presented in "Creating Finish Scripts" on page 54.

At the minimum, each rule must contain the following:

- A keyword, a value, and a corresponding profile
- A minus sign (-) in the *begin* and *finish* fields if no begin or finish scripts are specified

3 Save the `rules` file in the JumpStart directory.

4 Ensure that `root` owns the `rules` file and that the permissions are set to 644.

rules File Example

The following example shows several example rules in a rules file. Each line has a rule keyword and a valid value for that keyword. The JumpStart program scans the rules file from top to bottom.

When the JumpStart program matches a rule keyword and value with a known system, the JumpStart program installs the Oracle Solaris software that is specified by the profile that is listed in the profile field.

For a complete list of rules file limitations, see "Syntax of the rules File" on page 29.

EXAMPLE 3–1 rule File

```
# rule keywords and rule values       begin script       profile       finish script
# ------------------------------       ------------       --------      -------------
  hostname eng-1                      -                  basic_prof    -
  network 192.168.255.255 && !model \
 'SUNW,Sun-Blade-100'                 -                  net_prof      -
  model SUNW,SPARCstation-LX          -                  lx_prof       complete
  network 192.168.2.0 && karch i86pc  setup              x86_prof      done
  memsize 64-128 && arch i386         -                  prog_prof     -
  any   -                             -                  generic_prof  -
```

Some of the keywords and values in this example are as follows:

hostname — The rule matches if the system's host name is eng-1. The basic_prof profile is used to install the Oracle Solaris software on the system that matches the rule.

network — The rule matches if the system is on subnet 192.168.255.255 and if the system is *not* a Sun Blade 100 (SUNW,Sun-Blade-100). The net_prof profile is used to install the Oracle Solaris software on systems that match this rule. This rule also provides an example of continuing a single rule onto a new line by using the backslash character (\).

model — The rule matches if the system is a SPARCstation LX. The lx_prof profile and the complete finish script are used to install the Oracle Solaris software on systems that match this rule.

network — The rule matches if the system is on subnet 192.168.2.0 and is an x86 based system. The setup begin script, the x864u_prof profile, and the done finish script are used to install the Oracle Solaris software on systems that match the rule.

memsize — The rule matches if the system has between 64 and 128 MB of memory and is an x86 based system. The prog_prof profile is used to install the Oracle Solaris software on systems that match the rule.

any — The rule matches any system that did not match the previous rules. The generic_prof profile is used to install the Oracle Solaris software on systems that match the rule. If any is used, it should always be the last rule in the rules file.

Creating a Profile

A profile is a text file that defines how to install the Oracle Solaris software on a system. A profile defines elements of the installation, for example, the software group to install. Every rule specifies a profile that defines how a system is to be installed. You can create different profiles for every rule or the same profile can be used in more than one rule.

A profile consists of one or more profile keywords and their values. Each profile keyword is a command that controls one aspect of how the JumpStart program is to install the Oracle Solaris software on a system. For example, the following profile keyword and value specify that the JumpStart program install the system as a server:

```
system_type  server
```

Note – Sample profiles are already located in the JumpStart directory if you created the JumpStart directory by using either of these procedures:

- "Creating a Profile Server for Networked Systems" on page 21
- "Creating a Profile Diskette for Stand-alone Systems" on page 24

Syntax of Profiles

A profile must contain the following:

- The `install_type` profile keyword as the first entry
- One keyword per line
- The `root_device` keyword if the systems that are being upgraded by the profile contain more than one root (`/`) file system that can be upgraded

A profile can contain the following:

- Commented text

  Any text that is included after the # symbol on a line is treated by the JumpStart program as commented text. If a line begins with the # symbol, the entire line is treated as a comment.
- One or more blank lines

▼ How to Create a Profile

1. **Use a text editor to create a text file or open a sample profile in the JumpStart directory that you created.**

   Name the profile to reflect how you intend to use the profile to install the Oracle Solaris software on a system. For example, you might name the profiles `basic_install`, `eng_profile`, or `user_profile`.

2. **Add profile keywords and values to the profile.**

   For a list of profile keywords and values, see "Profile Keywords and Values" on page 101.

   Note – Profile keywords and their values are case sensitive.

3. **Save the profile in the JumpStart directory.**

4. **Ensure that `root` owns the profile and that the permissions are set to 644.**

5. **(Optional) Test the profile.**

   "Testing a Profile" on page 44 contains information about testing profiles.

Profile Examples

The following examples of profiles show how to use different profile keywords and profile values to control how the Oracle Solaris software is installed on a system. "Profile Keywords and Values" on page 101 contains a description of profile keywords and values.

Note – If you are installing an Oracle Solaris ZFS root pool, see Chapter 9, "Installing a ZFS Root Pool With JumpStart," for limitations and profile examples.

EXAMPLE 3–2 Mounting Remote File Systems and Adding and Deleting Packages

```
# profile keywords        profile values
# -----------------       -----------------
  install_type            initial_install
  system_type             standalone
  partitioning            default
  filesys                 any 512 swap   # specify size of /swap
  cluster                 SUNWCprog
  package                 SUNWman delete
  cluster                 SUNWCacc
```

Some of the keywords and values in this example are as follows:

EXAMPLE 3–2 Mounting Remote File Systems and Adding and Deleting Packages *(Continued)*

`install_type` The `install_type` keyword is required in every profile.

`system_type` The `system_type` keyword defines that the system is to be installed as a stand-alone system.

`partitioning` The file system slices are determined by the software to be installed with the value `default`. The size of `swap` is set to 512 MB and is installed on any disk, value `any`.

`cluster` The Developer Oracle Solaris Software Group, `SUNWCprog`, is installed on the system.

`package` If the standard man pages are mounted from the file server `s_ref` on the network, the man page packages are not to be installed on the system. The packages that contain the System Accounting utilities are selected to be installed on the system.

EXAMPLE 3–3 Mounting Remote File Systems and Adding a Third-Party Package

```
# profile keywords        profile values
# -----------------       -----------------
  install_type            initial_install
  system_type             standalone
  partitioning            default
  filesys                 any 512 swap   # specify size of /swap
  cluster                 SUNWCprog
  cluster                 SUNWCacc
  package                 apache_server  \
                           http://package.central/packages/apache timeout 5
```

Some of the keywords and values in this example are as follows:

`install_type` The `install_type` keyword is required in every profile.

`system_type` The `system_type` keyword defines that the system is to be installed as a standalone system.

`partitioning` The file system slices are determined by the software to be installed with the value `default`. The size of `swap` is set to 512 MB and is installed on any disk, value `any`.

`cluster` The Developer Oracle Solaris Software Group, `SUNWCprog`, is installed on the system.

`package` A third-party package is installed on the system located on an HTTP server.

EXAMPLE 3–4 Specifying Where to Install File Systems

```
# profile keywords        profile values
# ----------------        -------------------
```

EXAMPLE 3–4 Specifying Where to Install File Systems *(Continued)*

```
  install_type            initial_install
  system_type             standalone
  partitioning            explicit
  filesys                 c0t0d0s0 auto /
  filesys                 c0t3d0s1 auto swap
  filesys                 any auto usr
  cluster                 SUNWCall
```

Some of the keywords and values in this example are as follows:

`partitioning` The file system slices are determined by the `filesys` keywords, value `explicit`. The size of root (`/`) is based on the selected software, value `auto`, and is installed on `c0t0d0s0`. The size of `swap` is set to the necessary size and is installed on `c0t3d0s1`. `usr` is based on the selected software and the installation program determines where `usr` is installed, based on the value `any`.

`cluster` The Entire Oracle Solaris Software Group, `SUNWCall`, is installed on the system.

EXAMPLE 3–5 Upgrading and Installing Patches

```
# profile keywords         profile values
# ----------------         -------------------
  install_type             upgrade
  root_device              c0t3d0s2
  backup_media             remote_filesystem timber:/export/scratch
  package                  SUNWbcp delete
  package                  SUNWxwman add
  cluster                  SUNWCacc add
  patch                    patch_list nfs://patch_master/Solaris_10/patches \
                           retry 5
  locale                   de
```

Some of the keywords and values in this example are as follows:

`install_type` The profile upgrades a system by reallocating disk space. In this example, disk space must be reallocated because some file systems on the system did not have enough space for the upgrade.

`root_device` The root file system on `c0t3d0s2` is upgraded.

`backup_media` A remote system that is named `timber` is to be used to back up data during the disk space reallocation. For more backup-media keyword values, see "`backup_media` Profile Keyword" on page 109.

`package` The binary compatibility package, `SUNWbcp`, is not installed on the system after the upgrade.

EXAMPLE 3–5 Upgrading and Installing Patches *(Continued)*

`package`	The code ensures that the X Window System man pages and the System Accounting utilities are to be installed if they are not already installed on the system. All packages already on the system are automatically upgraded.
`patch`	A list of patches that are installed with the upgrade. The patch list is located on an NFS server named `patch_master` under the directories `Solaris_10/patches`. In case of a mount failure, the NFS mount is tried five times.
`locale`	The German localization packages are to be installed on the system.

EXAMPLE 3–6 Reallocating Disk Space for an Upgrade

```
# profile keywords         profile values
# ----------------         -------------------
  install_type             upgrade
  root_device              c0t3d0s2
  backup_media             remote_filesystem timber:/export/scratch
  layout_constraint        c0t3d0s2 changeable 100
  layout_constraint        c0t3d0s4 changeable
  layout_constraint        c0t3d0s5 movable
  package                  SUNWbcp delete
  package                  SUNWxwman add
  cluster                  SUNWCacc add
  locale                   de
```

Some of the keywords and values in this example are as follows:

`install_type`	The profile upgrades a system by reallocating disk space. In this example, disk space must be reallocated because some file systems on the system did not have enough space for the upgrade.
`root_device`	The root file system on `c0t3d0s2` is upgraded.
`backup_media`	A remote system that is named `timber` is to be used to back up data during the disk space reallocation. For more backup-media keyword values, see "`backup_media` Profile Keyword" on page 109.
`layout_constraint`	The `layout_constraint` keywords designate that auto-layout can perform the following when auto-layout attempts to reallocate disk space for the upgrade. ■ Change slices 2 and 4. The slices can be moved to another location and the size can be changed. ■ Move slice 5. The slice can be moved to another location but its size cannot change.
`package`	The binary compatibility package, `SUNWbcp`, is not installed on the system after the upgrade.

EXAMPLE 3–6 Reallocating Disk Space for an Upgrade *(Continued)*

`package`	The code ensures that the X Window System man pages and the System Accounting utilities are to be installed if they are not already installed on the system. All packages already on the system are automatically upgraded.
`locale`	The German localization packages are to be installed on the system.

EXAMPLE 3–7 Retrieving a Flash Archive From an HTTP Server

In the following example, the profile indicates that the JumpStart program retrieves the flash archive from an HTTP server. (Flash Archive is a feature of Oracle Solaris.)

```
# profile keywords         profile values
# ----------------         -------------------
install_type               flash_install
archive_location           http://192.168.255.255/flasharchive/solarisarchive
partitioning               explicit
filesys                    c0t1d0s0 4000 /
filesys                    c0t1d0s1 512 swap
filesys                    c0t1d0s7 free /export/home
```

Some of the keywords and values in this example are as follows:

`install_type`	The profile installs a flash archive on the clone system. All files are overwritten as in an initial installation.
`archive_location`	The flash archive is retrieved from an HTTP server.
`partitioning`	The file system slices are determined by the `filesys` keywords, value `explicit`. The size of root (`/`) is based on the size of the flash archive. The root file system is installed on `c0t1d0s0`. The size of `swap` is set to the necessary size and is installed on `c0t1d0s1`. `/export/home` is based on the remaining disk space. `/export/home` is installed on `c0t1d0s7`.

EXAMPLE 3–8 Retrieving a Flash Archive From a Secure HTTP Server

In the following example, the profile indicates that the JumpStart program retrieves the flash archive from a secure HTTP server.

```
# profile keywords         profile values
# ----------------         -------------------
install_type               flash_install
archive_location           https://192.168.255.255/solarisupdate.flar
partitioning               explicit
filesys                    c0t1d0s0 4000 /
filesys                    c0t1d0s1 512 swap
filesys                    c0t1d0s7 free /export/home
```

Some of the keywords and values in this example are as follows:

EXAMPLE 3–8 Retrieving a Flash Archive From a Secure HTTP Server *(Continued)*

`install_type`	The profile installs a flash archive on the clone system. All files are overwritten as in an initial installation.
`archive_location`	The compressed flash archive is retrieved from a secure HTTP server.
`partitioning`	The file system slices are determined by the `filesys` keywords, value `explicit`. The size of root (`/`) is based on the size of the flash archive. The size of `swap` is set to the necessary size and is installed on `c0t1d0s1`. `/export/home` is based on the remaining disk space. `/export/home` is installed on `c0t1d0s7`.

EXAMPLE 3–9 Retrieving a Flash Archive and Installing a Third-Party Package

In the following example, the profile indicates that the JumpStart program retrieves the flash archive from an HTTP server.

```
# profile keywords         profile values
# ----------------         -------------------
install_type               flash_install
archive_location           http://192.168.255.255/flasharchive/solarisarchive
partitioning               explicit
filesys                    c0t1d0s0 4000 /
filesys                    c0t1d0s1 512 swap
filesys                    c0t1d0s7 free /export/home
package                    SUNWnew http://192.168.254.255/Solaris_10 timeout 5
```

Some of the keywords and values in this example are as follows:

`install_type`	The profile installs a flash archive on the clone system. All files are overwritten as in an initial installation.
`archive_location`	The flash archive is retrieved from an HTTP server.
`partitioning`	The file system slices are determined by the `filesys` keywords, value `explicit`. The size of root (`/`) is based on the size of the flash archive. The root file system is installed on `c0t1d0s0`. The size of `swap` is set to the necessary size and is installed on `c0t1d0s1`. `/export/home` is based on the remaining disk space. `/export/home` is installed on `c0t1d0s7`.
`package`	The `SUNWnew` package is added from the `Solaris_10` directory from the HTTP server `192.168.254.255`.

EXAMPLE 3–10 Retrieving a Flash Archive Differential Archive From an NFS Server

In the following example, the profile indicates that the JumpStart program retrieves the flash archive from an NFS server. The `flash_update` keyword indicates that this is a differential archive. A differential archive installs only the differences between two system images.

EXAMPLE 3–10 Retrieving a Flash Archive Differential Archive From an NFS Server *(Continued)*

```
# profile keywords         profile values
# ----------------         -------------------
install_type               flash_update
archive_location           nfs installserver:/export/solaris/flasharchive \
                           /solarisdiffarchive
no_master_check
```

Some of the keywords and values in this example are as follows:

`install_type` The profile installs a flash archive differential archive on the clone system. Only files that are specified by the archive are installed.

`archive_location` The flash archive is retrieved from an NFS server.

`no_master_check` The clone system is not checked for a valid system image. A valid system image would have been built from the original master system.

EXAMPLE 3–11 Creating an Empty Boot Environment

In the following example, the profile indicates that the JumpStart program creates an empty boot environment. An empty boot environment contains no file systems and no copy from the current boot environment occurs. The boot environment can be populated later with a flash archive and then activated.

```
# profile keywords        profile values
# ----------------        -------------------
  install_type            initial_install
  system_type             standalone
  partitioning            explicit
  filesys                 c0t0d0s0 auto /
  filesys                 c0t3d0s1 auto swap
  filesys                 any auto usr
  cluster                 SUNWCall
  bootenv createbe bename second_BE \
  filesystem /:/dev/dsk/c0t1d0s0:ufs \
  filesystem -:/dev/dsk/c0t1d0s0:swap \
  filesystem /export:shared:ufs
```

Some of the keywords and values in this example are as follows:

`partitioning` The file system slices are determined by the `filesys` keywords, value `explicit`. The size of root (`/`) is based on the selected software, value `auto`, and is installed on `c0t0d0s0`. The size of `swap` is set to the necessary size and is installed on `c0t3d0s1`. `usr` is based on the selected software and the installation program determines where `usr` is installed, based on the value `any`.

`cluster` The Entire Oracle Solaris Software Group, `SUNWCall`, is installed on the system.

EXAMPLE 3–11 Creating an Empty Boot Environment *(Continued)*

`bootenv createbe` An empty, inactive boot environment is set up on disk `c0t1d0`. File systems for root (`/`), swap, and `/export` are created, but left empty. This second boot environment can be installed with a flash archive at a later time. The new boot environment can then be activated to become the current boot environment.

For keyword values and background about using this keyword, see the following references:

- For descriptions of keyword values, see "Profile Keywords and Values" on page 101.
- For background about using the Live Upgrade, a feature of Oracle Solaris, that creates, upgrades, and activates inactive boot environments, see Chapter 2, "Live Upgrade (Overview)," in *Oracle Solaris 10 1/13 Installation Guide: Live Upgrade and Upgrade Planning*.
- For background about using a flash archive, see Chapter 1, "Flash Archive Overview," in *Oracle Solaris 10 1/13 Installation Guide: Flash Archives (Creation and Installation)*.

EXAMPLE 3–12 Creating RAID-1 Volumes When Installing a Flash Archive

In the following example, the profile indicates that the JumpStart program uses Solaris Volume Manager technology to create RAID-1 volumes (mirrors) for the root (`/`), `swap`, `/usr` and `/export/home` file systems. A flash archive is installed on the boot environment.

```
# profile keywords        profile values
# ----------------        -------------------
  install_type            flash_install
  arhcive_location        nfs server:/export/home/export/flash.s10.SUNWCall
  partitioning            explicit
  filesys                 mirror:d10 c0t0d0s0 c0t1d0s0 4096 /
  filesys                 mirror c0t0d0s1 2048 swap
  filesys                 mirror:d30 c0t0d0s3 c0t1d0s3 4096 /usr
  filesys                 mirror:d40 c0t0d0s4 c0t1d0s4 4096 /usr
  filesys                 mirror:d50 c0t0d0s5 c0t1d0s5 free /export/home
  metadb                  c0t1d0s7 size 8192 count 3
```

Some of the keywords and values in this example are as follows:

`install_type` The profile installs a flash archive on the clone system. All files are overwritten as in an initial installation.

`archive_location` The flash archive is retrieved from an NFS server.

`partitioning` The file system slices are determined by the `filesys` keywords, value `explicit`.

EXAMPLE 3–12 Creating RAID-1 Volumes When Installing a Flash Archive *(Continued)*

`filesys`	The root (`/`) file system is created and mirrored on the slices `c0t0d0s0` and `c0t1d0s0`. The size of the root (`/`) file system is set to 4096 MB. The RAID-1 volume that mirrors `c0t0d0s0` and `c0t1d0s0` is named `d10`.
`filesys`	The `swap` file system is created and mirrored on the slice `c0t0d0s1`, and is sized at 2048 MB. The JumpStart program assigns a name to the mirror.
`filesys`	The `/usr` file system is created and mirrored on the slices `c0t1d0s3` and `c0t0d0s3`. The size of the `/usr` file system is set to 4096 MB. The RAID-1 volume is named `d30`.
`filesys`	The `/usr` file system is created and mirrored on the slices `c0t1d0s4` and `c0t0d0s4`. The size of the `/usr` file system is set to 4096 MB. The RAID-1 volume is named `d40`.
`metadb`	Three state database replicas (metadbs) are installed on slice `c0t1d0s7`, and are sized at 8192 blocks (4 MB).

- For overview information about how to create mirrored file systems during your installation, see Chapter 8, "Creating RAID-1 Volumes (Mirrors) During Installation (Overview)," in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*.
- For guidelines and requirements of creating mirrored file systems, see Chapter 9, "Creating RAID-1 Volumes (Mirrors) During Installation (Planning)," in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*.
- For descriptions of keyword values, see "`filesys` Profile Keyword (Creating RAID-1 Volumes)" on page 122 and "`metadb` Profile Keyword (Creating State Database Replicas)" on page 129.

EXAMPLE 3–13 Creating a RAID-1 Volume to Mirror the Root File System

In the following example, the profile indicates that the JumpStart program uses Solaris Volume Manager technology to create a RAID-1 volume (mirror) for the root (`/`) file system.

```
# profile keywords        profile values
# ----------------        ------------------
  install_type            initial_install
  cluster                 SUNWCXall
  filesys                 mirror:d30 c0t1d0s0 c0t0d0s0  /
  filesys                 c0t0d0s3 512 swap
  metadb                  c0t0d0s4 size 8192 count 4
  metadb                  c0t1d0s4 size 8192 count 4
```

Some of the keywords and values in this example are as follows:

EXAMPLE 3–13 Creating a RAID-1 Volume to Mirror the Root File System *(Continued)*

`cluster` The Entire Oracle Solaris Software Plus OEM Support software group, `SUNWCXall` is installed on the system.

`filesys` The root (`/`) file system is created and mirrored on the slices `c0t1d0s0` and `c0t0d0s0`. The RAID-1 volume that mirrors `c0t1d0s0` and `c0t0d0s0` is named `d30`. The JumpStart program assigns names to the two submirrors.

`filesys` The `swap` file system is created and mirrored on the slice `c0t0d0s3`, and is sized at 512 MB.

`metadb` Four state database replicas (metadbs) are installed on slice `c0t0d0s4`, and are sized at 8192 blocks (4 MB).

`metadb` Four state database replicas (metadbs) are installed on slice `c0t1d0s4`, and are sized at 8192 blocks (4 MB).

EXAMPLE 3–14 Creating RAID-1 Volumes to Mirror Multiple File Systems

In the following example, the profile indicates that the JumpStart program uses Solaris Volume Manager technology to create RAID-1 volumes (mirrors) for the root (`/`), `swap`, and `/usr` file systems.

```
# profile keywords        profile values
# ----------------        -------------------
  install_type            initial_install
  cluster                 SUNWCXall
  filesys                 mirror:d100 c0t1d0s0 c0t0d0s0 200 /
  filesys                 c0t1d0s5 500 /var
  filesys                 c0t0d0s5 500
  filesys                 mirror c0t0d0s1 512 swap
  metadb                  c0t0d0s3 size 8192 count 5
  filesys                 mirror c0t1d0s4 c0t0d0s4 2000 /usr
  filesys                 c0t1d0s7 free /export/home
  filesys                 c0t0d0s7 free
```

Some of the keywords and values from in this example are as follows:

`cluster` The Entire Oracle Solaris Software Plus OEM Support software group, `SUNWCXall` is installed on the system.

`filesys` The root (`/`) file system is created and mirrored on the slices `c0t1d0s0` and `c0t0d0s0`. The size of the root (`/`) file system is set to 200 MB. The RAID-1 volume that mirrors `c0t1d0s0` and `c0t0d0s0` is named `d100`.

`filesys` The `/var` file system is installed on the slice `c0t1d0s5` and is sized at 500 MB. The root (`/`) file system is created and mirrored on the slices `c0t1d0s0` and `c0t0d0s0`. The size of the root (`/`) file system is set to 200 MB. The RAID-1 volume that mirrors `c0t1d0s0` and `c0t0d0s0` is named `d100`.

EXAMPLE 3–14 Creating RAID-1 Volumes to Mirror Multiple File Systems *(Continued)*

`filesys` The `swap` file system is created and mirrored on the slice `c0t0d0s1`, and is sized at 512 MB. The JumpStart program assigns a name to the mirror.

`metadb` Five state database replicas (metadbs) are installed on slice `c0t0d0s3`, and are sized at 8192 blocks (4 MB).

`filesys` The `/usr` file system is created and mirrored on the slices `c0t1d0s4` and `c0t0d0s4`. The size of the `/usr` file system is set to 2000 MB. The JumpStart program assigns a name to the mirror.

EXAMPLE 3–15 x86: Using the fdisk Keyword

```
# profile keywords      profile values
# ----------------      ------------------
  install_type          initial_install
  system_type           standalone

  fdisk                 c0t0d0 0x04 delete
  fdisk                 c0t0d0 solaris maxfree
  cluster               SUNWCall
  cluster               SUNWCacc delete
```

Some of the keywords and values in this example are as follows:

`fdisk` All `fdisk` partitions of type DOSOS16 (04 hexadecimal) are deleted from the `c0t0d0` disk.

`fdisk` An Oracle Solaris `fdisk` partition is created on the largest contiguous free space on the `c0t0d0` disk.

`cluster` The Entire Distribution software group, `SUNWCall`, is installed on the system.

`cluster` The system accounting utilities, `SUNWCacc`, are not to be installed on the system.

EXAMPLE 3–16 Creating a JumpStart Profile for An Initial iSCSI Installation

```
install_type   initial_install
partitioning  explicit
filesys rootdisk.s4 5000
filesys rootdisk.s1 2048
iscsi_target_name   iqn.1986-03.com.sun:02:358ddbf8-601a-e73a-df56-89
iscsi_target_ip   10.12.162.24
iscsi_target_lun 0
iscsi_target_port  3260
cluster  SUNWCrnet
```

The following example shows a sample JumpStart profile for an upgrade installation.

EXAMPLE 3–17 JumpStart Profile For An iSCSI Upgrade Installation

```
install_type upgrade
iscsi_target_name  iqn.1986-03.com.sun:02:358ddbf8-601a-e73a-df56-89
iscsi_target_ip  10.12.162.24
iscsi_target_lun 0
iscsi_target_port 3260
iscsi_target_slice 4
```

See "iSCSI Profile Keyword" on page 131 for details about the keywords used in the JumpStart profile for iSCSI upgrade and installation.

Caution – The following keywords are used in the JumpStart profile to indicate where the locations of the directories such as the `root` directory, swap space, the `/usr` directory and so on have to be created.

- `filesys`
- `pool`
- `boot_device`

Since the disk number is dynamically generated during an iSCSI installation, the user should not explicitly provide the disk nomenclature `(cXtXdXsX)` for the above keywords in the JumpStart profile during an iSCSI installation.

Caution – When the iSCSI key-value information is provided in the profile, the `boot_device` key-value pair and `root_device` key-value pair should not be included in the profile. The `root_device` key-value pair is dynamically assigned by the `pfinstall` command based on the iSCSI target.

Testing a Profile

After you create a profile, use the `pfinstall(1M)` command to test the profile. Test the profile before you use the profile to install or upgrade a system. Testing a profile is especially useful when you are creating upgrade profiles that reallocate disk space.

By looking at the installation output that is generated by `pfinstall`, you can quickly determine whether a profile works as you intended. For example, use the profile to determine if a system has enough disk space to upgrade to a new release of the Oracle Solaris software before you perform the upgrade on that system.

`pfinstall` enables you to test a profile against the following:

- The system's disk configuration where `pfinstall` is being run.

- Other disk configurations. You use a disk configuration file that represents a structure of a disk, for example, a disk's bytes/sector, flags, and slices. Creating disk configuration files is described in "Creating Disk Configuration Files" on page 59 and "x86: How to Create a Multiple-Disk Configuration File" on page 64.

Note – You cannot use a disk configuration file to test a profile you intend to use to upgrade a system. Instead, you must test the profile against the system's actual disk configuration and the software that is currently installed on that system.

How to Create a Temporary Oracle Solaris Environment to Test a Profile

To test a profile for a particular Oracle Solaris release successfully and accurately, you must test a profile within the Oracle Solaris environment of the same release. For example, if you want to test an Oracle Solaris initial installation profile, run the `pfinstall` command on a system that is running the Oracle Solaris OS.

You need to create a temporary installation environment if you are testing a profile under one of the following conditions:

- You want to test an Oracle Solaris 10 8/11 upgrade profile on a system that is running a previous version of the Oracle Solaris software.
- You do not have an Oracle Solaris 10 8/11 system installed yet to test Oracle Solaris 10 8/11 initial installation profiles.

1. **Boot a system from an image of one of the following:**

   For SPARC based systems:

   - Oracle Solaris Operating System for SPARC Platforms DVD
   - Oracle Solaris Software for SPARC Platforms - 1 CD

   For x86 based systems:

   - Oracle Solaris Operating System for x86 Platforms DVD
   - Oracle Solaris Software for x86 Platforms - 1 CD

   Note – If you want to test an upgrade profile, boot the system that you are upgrading.

2. **Respond to the system identification questions.**

3 **Exit from the installation program by typing ! at the prompt.**

```
The Solaris installation program  will assist you in installing software for Solaris.
<Press ENTER to continue> {"!" exits}
```

4 **Execute the `pfinstall` command from the shell.**

For details about using the `pfinstall` command, see Step 5 in "How to Test a Profile" on page 46.

▼ How to Test a Profile

x86 only – If you are using the `locale` keyword, the `pfinstall -D` command fails to test the profile. For a workaround, see the error message "could not select locale," in the section, "Upgrading the Oracle Solaris OS" in *Oracle Solaris 10 1/13 Installation Guide: Network-Based Installations*.

1 **Locate a system on which to test the profile that is the same type of platform, SPARC or x86, for which the profile was created.**

If you are testing an upgrade profile, you must test the profile on the actual system that you intend to upgrade.

2 **Test the profile.**

- **To test an initial installation profile if you have a system that is running the Oracle Solaris 10 8/11 software, become superuser on the system.**
- **To test an upgrade profile, or if you do not have a system that is running Oracle Solaris 10 8/11 to test an initial installation profile:**

  a. **Create a temporary Oracle Solaris 10 8/11 environment to test the profile. For details, see "How to Create a Temporary Oracle Solaris Environment to Test a Profile" on page 45. Then, go to Step 3.**

  b. **Create a temporary mount point.**

  ```
  # mkdir /tmp/mnt
  ```

  c. **Mount the directory that contains the profile or profiles that you want to test.**

  - **If you are mounting a remote NFS file system for systems on the network type the following:**

  ```
  mount -F nfs server-name:path /tmp/mnt
  ```

- **SPARC: If you are mounting a UFS-formatted diskette, type the following:**

  ```
  mount -F ufs /dev/diskette /tmp/mnt
  ```

- **If you are mounting a PCFS-formatted diskette, type the following:**

  ```
  mount -F pcfs /dev/diskette /tmp/mnt
  ```

3. **To test the profile with a specific system memory size, set `SYS_MEMSIZE` to the specific memory size in MB.**

   ```
   # SYS_MEMSIZE=memory-size
   # export SYS_MEMSIZE
   ```

4. **Mount the directory.**

   - If you mounted a directory in Substep c, change the directory to `/tmp/mnt`.

     ```
     # cd /tmp/mnt
     ```

   - If you did not mount a directory, change to the directory to where the profile is located, which is usually the JumpStart directory.

     ```
     # cd jumpstart-dir-path
     ```

5. **Test the profile with the `pfinstall(1M)` command.**

   ```
   # /usr/sbin/install.d/pfinstall -D:-d disk-config-file -c path profile
   ```

Caution – You *must* include the `-d` or `-D` option. If you do not include one of these options, `pfinstall` uses the profile you specify to install the Oracle Solaris software. All of the data on the system is overwritten.

`-D`	`pfinstall` uses the current system's disk configuration to test the profile. You must use the `-D` option to test an upgrade profile.
`-d` *disk-config-file*	`pfinstall` uses the disk configuration file to test the profile. If *disk-config-file* is not located in the directory where `pfinstall` is run, you must specify the path. For instructions about how to create a disk configuration file, see "Creating Disk Configuration Files" on page 59.

Note – You cannot use the `-d` *disk-config-file* option with an upgrade profile, `install_type upgrade`. You must always test an upgrade profile against a system's disk configuration and use the `-D` option.

`-c` *path*	The path to the Oracle Solaris software image. You use this option, for example, if the system is using Solaris Volume Manager to mount the Oracle Solaris Software - 1 CD for your platform.
	Note – The `-c` option is not required if you booted from Oracle Solaris Operating System DVD or an Oracle Solaris Software - 1 CD image for your platform. The DVD or CD image is mounted on `/cdrom` as part of the booting process.
profile	The name of the profile to test. If *profile* is not in the directory where `pfinstall` is being run, you must specify the path.

Profile Test Example

The following example shows how to use `pfinstall` to test a profile that is named `basic_prof`. The profile is tested against the disk configuration on a system on which the Oracle Solaris 10 8/11 software is installed. The `basic_prof` profile is located in the `/jumpstart` directory, and the path to the Oracle Solaris Operating System DVD image is specified because Solaris Volume Manager is being used.

EXAMPLE 3–18 Profile Test Using an Oracle Solaris 10 8/11 System

```
# cd /jumpstart
# /usr/sbin/install.d/pfinstall -D -c /cdrom/pathname basic_prof
```

The following example shows how to use `pfinstall` to test the profile that is named `basic_prof` on an Oracle Solaris 10 8/11 system. The test is performed against the `535_test` disk configuration file. The test checks for 64 MB of system memory. This example uses an Oracle Solaris Software for SPARC Platforms - 1 CD or Oracle Solaris Software for x86 Platforms - 1 CD image that is located in the `/export/install` directory.

EXAMPLE 3–19 Profile Test Using a Disk Configuration File

```
# SYS_MEMSIZE=64
# export SYS_MEMSIZE
# /usr/sbin/install.d/pfinstall -d 535_test -c /export/install basic_prof
```

Validating the rules File

Before you can use a profile and rules file, you must run the check script to validate that the files are set up correctly. If all rules and profiles are correctly set up, the rules.ok file is created, which is required by the JumpStart installation software to match a system to a profile.

The following table describes what the check script does.

TABLE 3–2 What Happens When You Use the check Script

Stage	Description
1	The rules file is checked for syntax. check verifies that the rule keywords are legitimate and that the *begin*, *class*, and *finish* fields are specified for each rule. The *begin* and *finish* fields can consist of a minus sign (-) instead of a file name.
2	If no errors are found in the rules file, each profile that is specified in the rules is checked for syntax.
3	If no errors are found, check creates the rules.ok file from the rules file, removes all comments and blank lines, retains all rules, and adds the following comment line at the end: # version=2 checksum=num

▼ How to Validate the rules File

1 Ensure that the check script is located in the JumpStart directory.

Note – The check script is in the Solaris_10/Misc/jumpstart_sample directory on the Oracle Solaris Operating System DVD or on the Oracle Solaris Software - 1 CD.

---

2 Change the directory to the JumpStart directory.

3 Run the check script to validate the rules file:

$ **./check -p** *path* **-r** *file-name*

-p *path* Validates the rules by using the check script from the Oracle Solaris software image instead of the check script from the system you are using. *path* is the image on a local disk or a mounted Oracle Solaris Operating System DVD or an Oracle Solaris Software - 1 CD.

Use this option to run the most recent version of check if your system is running a previous version of Oracle Solaris.

-r *file-name* Specifies a rules file other than the one that is named rules. Using this option, you can test the validity of a rule before you integrate the rule into the rules file.

As the check script runs, the script reports the checking of the validity of the rules file and each profile. If no errors are encountered, the script reports the following information.

```
The JumpStart configuration is ok
```

4 Ensure that root owns the rules.ok file and that the permissions are set to 644.

See Also After you validate the rules file, you can learn more about optional JumpStart features in Chapter 4, "Using Optional JumpStart Features (Tasks)." You can learn about performing JumpStart installations in Chapter 6, "Performing a JumpStart Installation (Tasks)."

◆ ◆ ◆ CHAPTER 4

Using Optional JumpStart Features (Tasks)

This chapter describes the optional features that are available to create additional JumpStart installation tools.

Note – If you are installing an Oracle Solaris ZFS root pool, see Chapter 9, "Installing a ZFS Root Pool With JumpStart," for limitations and profile examples.

This chapter covers the following topics:

- "Creating Begin Scripts" on page 51
- "Creating Finish Scripts" on page 54
- "Creating a Compressed Configuration File" on page 58
- "Creating Disk Configuration Files" on page 59
- "Using a Site-Specific Installation Program" on page 65

Note – Instructions in this chapter are valid for either a SPARC server or an x86 server that is being used to provide JumpStart files, called a *profile server*. A profile server can provide JumpStart files for different platform types. For example, a SPARC server can provide JumpStart files for both SPARC based systems and x86 based systems.

Creating Begin Scripts

A begin script is a user-defined Bourne shell script that you specify in the `rules` file. A begin script performs tasks before the Oracle Solaris software is installed on a system. You can use begin scripts only when using JumpStart to install the Oracle Solaris software.

Use a begin script to perform the following tasks:

- Creating derived profiles
- Backing up files before upgrading

- Record the duration of an installation

About Begin Scripts

- Do not specify something in the script that would prevent the mounting of file systems onto `/a` during an initial or upgrade installation. If the JumpStart program cannot mount the file systems onto `/a`, an error occurs and installation fails.
- During the installation, output from the begin script is deposited in `/tmp/begin.log`. After the installation is completed, the log file is redirected to `/var/sadm/system/logs/begin.log`.
- Ensure that `root` owns the begin script and that the permissions are set to 644.
- You can use JumpStart environment variables in your begin scripts. For a list of environment variables, see "JumpStart Environment Variables" on page 145.
- Save begin scripts in the JumpStart directory.

Note – For the Oracle Solaris 10 release, a sample JumpStart script, `set_nfs4_domain`, was provided on media to prevent being prompted during a JumpStart installation. This script suppressed the NFSv4 prompt during installation. This script is no longer required. Starting with the Solaris 10 5/09 release, use the `sysidcfg` keyword `nfs4_domain` to suppress the prompt. The `set_nfs4_domain` script no longer works to suppress a prompt.

If you have non-global zones installed and the new `nfs4_domain` keyword exists in the `sysidcfg` file, the first boot of a non-global zone sets the domain. Otherwise, the Oracle Solaris interactive installation program starts and you are prompted to provide a domain name before the boot process completes.

See "nfs4_domain Keyword" in *Oracle Solaris 10 1/13 Installation Guide: Network-Based Installations*

Creating Derived Profiles With a Begin Script

A derived profile is a profile that is dynamically created by a begin script during a JumpStart installation. Derived profiles are needed when you cannot set up the `rules` file to match specific systems to a profile. For example, you might need to use derived profiles for identical system models that have different hardware components, such as systems that contain different frame buffers.

To set up a rule to use a derived profile, you must perform the following tasks:

- Set the profile field to an equal sign (=) instead of a profile.
- Set the begin field to a begin script that creates a derived profile that depends on the system on which you intend to install Oracle Solaris.

When a system matches a rule with the profile field equal to an equal sign (=), the begin script creates the derived profile that is used to install the Oracle Solaris software on the system.

The following example shows a begin script that creates the same derived profile every time. You can write a begin script to create different derived profiles that depend on the evaluation of rules.

EXAMPLE 4–1 Begin Script That Creates a Derived Profile

```
#!/bin/sh
echo "install_type        initial_install"    > ${SI_PROFILE}
echo "system_type         standalone"        >> ${SI_PROFILE}
echo "partitioning        default"           >> ${SI_PROFILE}
echo "cluster             SUNWCprog"         >> ${SI_PROFILE}
echo "package       SUNWman     delete"      >> ${SI_PROFILE}
echo "package       SUNWolman   delete"      >> ${SI_PROFILE}
echo "package       SUNWxwman   delete"      >> ${SI_PROFILE}
```

In the example, the begin script must use the `SI_PROFILE` environment variable for the name of the derived profile, which is set to `/tmp/install.input` by default.

Note – If a begin script is used to create a derived profile, ensure the script does not have any errors. A derived profile is not verified by the `check` script because derived profiles are not created until the execution of the begin script.

Tracking Installation Duration With a Begin Script and Finish Script

You can include a begin script and a finish script to track the start time and end time of an installation, as shown in the following examples.

EXAMPLE 4–2 Begin Script That Tracks Starting Time

```
# more begin-with-date
#!/bin/sh
#

echo
echo "Noting time that installation began in /tmp/install-begin-time"
echo "Install begin time: `date`" > /tmp/install-begin-time
echo
cat /tmp/install-begin-time
echo
#
```

EXAMPLE 4–3 Finish Script That Tracks Ending Time

```
# more finish*with*date
#!/bin/sh
```

EXAMPLE 4–3 Finish Script That Tracks Ending Time *(Continued)*

```
#

cp /tmp/install-begin-time /a/var/tmp
echo
echo "Noting time that installation finished in /a/var/tmp/install-finish-time"
echo "Install finish time: ‘date‘" > /a/var/tmp/install-finish-time
echo
cat /a/var/tmp/install-finish-time
#
```

The start and end times will be recorded in the `finish.log` file.

Creating Finish Scripts

A finish script is a user-defined Bourne shell script that you specify in the `rules` file. A finish script performs tasks after the Oracle Solaris software is installed on a system but before the system reboots. You can use finish scripts only when using JumpStart to install Oracle Solaris.

Tasks that you can perform with a finish script include the following:

- Adding files
- Adding individual packages or patches in addition to the ones that are installed in a particular software group
- Customizing the root environment
- Installing additional software

About Finish Scripts

- The Oracle Solaris installation program mounts the system's file systems on `/a`. The file systems remain mounted on `/a` until the system reboots. You can use the finish script to add, change, or remove files from the newly installed file system hierarchy by modifying the file systems that are respective to `/a`.
- During the installation, output from the finish script is deposited in `/tmp/finish.log`. After the installation is completed, the log file is redirected to `/var/sadm/system/logs/finish.log`.
- Ensure that `root` owns the finish script and that the permissions are set to 644.
- You can use JumpStart environment variables in your finish scripts. For a list of environment variables, see “JumpStart Environment Variables” on page 145.
- Save finish scripts in the JumpStart directory.

- In the past, the chroot(1M) command was used with the pkgadd and patchadd commands in the finish script environment. In rare instances, some packages or patches do not work with the -R option. You must create a dummy /etc/mnttab file in the /a root path before issuing the chroot command.

  To create a dummy /etc/mnttab file, add the following line to your finish script:

  ```
  cp /etc/mnttab /a/etc/mnttab
  ```

Adding Files With a Finish Script

Through a finish script, you can add files from the JumpStart directory to an already installed system. You can add the files because the JumpStart directory is mounted on the directory that is specified by the SI_CONFIG_DIR variable. The directory is set to /tmp/install_config by default.

Note – You can also replace files by copying files from the JumpStart directory to already existing files on the installed system.

After you copy all of the files that you are adding to the installed system to the JumpStart directory, insert the following line in the finish script for each file that you want to be copied to the newly installed file system hierarchy:

```
cp ${SI_CONFIG_DIR}/filename  /a/path
```

EXAMPLE 4–4 Adding a File With a Finish Script

Assume you have a special application, site_prog, developed for all users at your site. If you place a copy of site_prog into the JumpStart directory, the following line in a finish script copies site_prog from the JumpStart directory into a system's /usr/bin directory:

```
cp ${SI_CONFIG_DIR}/site_prog  /a/usr/bin
```

Adding Packages or Patches With a Finish Script

You can create a finish script to automatically add packages or patches after the Oracle Solaris software is installed on a system. By adding packages with a finish script, you reduce time and ensure consistency in which packages and patches are installed on different systems at your site.

When you use the pkgadd(1M) or patchadd(1M) commands in finish scripts, use the -R option to specify /a as the root path.

- Example 4–5 shows an example of a finish script that adds packages.
- Example 4–6 shows an example of a finish script that adds patches.

EXAMPLE 4–5 Adding Packages With a Finish Script

```
#!/bin/sh

BASE=/a
MNT=/a/mnt
ADMIN_FILE=/a/tmp/admin

mkdir ${MNT}
mount -f nfs sherlock:/export/package ${MNT}
cat >${ADMIN_FILE} <<DONT_ASK
mail=root
instance=overwrite
partial=nocheck
runlevel=nocheck
idepend=nocheck
rdepend=nocheck
space=ask
setuid=nocheck
conflict=nocheck
action=nocheck
basedir=default
DONT_ASK

/usr/sbin/pkgadd -a ${ADMIN_FILE} -d ${MNT} -R ${BASE} SUNWxyz
umount ${MNT}
rmdir ${MNT}
```

The commands for this example are as follows:

- The following command mounts a directory on a server that contains the package to install.

  ```
  mount -f nfs sherlock:/export/package ${MNT}
  ```

- The following command creates a temporary package administration file, `admin`, to force the pkgadd(1M) command not to perform checks or prompt for questions when installing a package. Use the temporary package administration file to maintain a hands-off installation when you are adding packages.

  ```
  cat >${ADMIN_FILE} <<DONT_ASK
  ```

- The following `pkgadd` command adds the package by using the `-a` option, specifying the package administration file, and the `-R` option, specifying the root path.

  ```
  /usr/sbin/pkgadd -a ${ADMIN_FILE} -d ${MNT} -R ${BASE} SUNWxyz
  ```

EXAMPLE 4–6 Adding Patches With a Finish Script

```
 #!/bin/sh

########
#
# USER-CONFIGURABLE OPTIONS
#
########

# The location of the patches to add to the system after it's installed.
# The OS rev (5.x) and the architecture (`mach`) will be added to the
```

EXAMPLE 4–6 Adding Patches With a Finish Script *(Continued)*

```
# root.  For example, /foo on a 8 SPARC would turn into /foo/5.8/sparc
LUPATCHHOST=ins3525-svr
LUPATCHPATHROOT=/export/solaris/patchdb
#########
#
# NO USER-SERVICEABLE PARTS PAST THIS POINT
#
#########

BASEDIR=/a

# Figure out the source and target OS versions
echo Determining OS revisions...
SRCREV=‘uname -r‘
echo Source $SRCREV

LUPATCHPATH=$LUPATCHPATHROOT/$SRCREV/‘mach‘

#
# Add the patches needed
#
echo Adding OS patches
mount $LUPATCHHOST:$LUPATCHPATH /mnt >/dev/null 2>&1
if [ $? = 0 ] ; then
    for patch in ‘cat /mnt/*Recommended/patch_order‘ ; do
        (cd /mnt/*Recommended/$patch ; echo yes | patchadd -u -d -R $BASEDIR .)
    done
    cd /tmp
    umount /mnt
else
    echo "No patches found"
if
```

Customizing the Root Environment With a Finish Script

You can also use finish scripts to customize files that are already installed on a system. For example, the finish script in the following example customizes the root environment by appending information to the `.cshrc` file in the root (`/`) directory.

EXAMPLE 4–7 Customizing the Root Environment With a Finish Script

```
#!/bin/sh
#
# Customize root’s environment
#
echo "***adding customizations in /.cshrc"
test -f a/.cshrc || {
cat >> a/.cshrc <<EOF
set history=100 savehist=200 filec ignoreeof prompt="\$user@‘uname -n‘> "
alias cp cp -i
```

EXAMPLE 4–7 Customizing the Root Environment With a Finish Script *(Continued)*

```
alias mv mv -i
alias rm rm -i
alias ls ls -FC
alias h history
alias c clear
unset autologout
EOF
}
```

Non-Interactive Installations With Finish Scripts

You can use finish scripts to install additional software after the Oracle Solaris OS is installed. The Oracle Solaris installation program prompts you to enter information during the installation. To maintain a hands-off installation, you can run the Oracle Solaris installation program with the `-nodisplay` or `-noconsole` options.

TABLE 4–1 Oracle Solaris Installation Options

Option	Description
`-nodisplay`	Runs the installer without a graphic user interface. Uses the default product installation unless the installation was modified by the `-locales` option.
`-noconsole`	Runs the installation without any interactive text console device. Useful when paired with `-nodisplay` for UNIX script use.

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

Creating a Compressed Configuration File

Instead of using the `add_install_client` command to specify the location of the JumpStart configuration files, you can specify the location of the files when you boot the system. However, you can only specify the name of one file. As a result, you must compress all of the JumpStart configuration files into one file.

- **For SPARC based systems**, you specify the location of the file in the `boot` command
- **For x86 based systems**, you specify the location of the files by editing the GRUB entry in the GRUB menu

The compressed configuration file can be one of the following types:

- `tar`
- Compressed `tar`

- `zip`
- `bzip tar`

▼ How to Create a Compressed Configuration File

1 **Change the directory to the JumpStart directory on the profile server.**

`# cd` *jumpstart-dir-path*

2 **Use a compression tool to compress the JumpStart configuration files into one file.**

The compressed configuration file cannot contain relative paths. The JumpStart configuration files must be in the same directory as the compressed file.

The compressed configuration file must contain the following files:

- Profile
- `rules`
- `rules.ok`

You can also include the `sysidcfg` file in the compressed configuration file.

3 **Save the compressed configuration file on an NFS server, an HTTP server, or a local hard disk.**

The following example shows how to use the `tar` command to create a compressed configuration file that is named `config.tar`. The JumpStart configuration files are located in the `/jumpstart` directory.

Example 4–8 Creating a Compressed Configuration File

```
# cd /jumpstart
# tar -cvf config.tar *
a profile 1K
a rules 1K
a rules.ok 1K
a sysidcfg 1K
```

Creating Disk Configuration Files

This section describes how to create single-disk and multiple-disk configuration files. Disk configuration files enable you to use `pfinstall(1M)` from a single system to test profiles against different disk configurations.

▼ SPARC: How to Create a Single-Disk Configuration File

1 Locate a SPARC based system with a disk you want to test.

2 Become superuser or assume an equivalent role.

Roles contain authorizations and privileged commands. For more information about roles, see "Configuring RBAC (Task Map)" in *System Administration Guide: Security Services*.

3 Redirect the output of the `prtvtoc(1M)` command to a file.

```
# prtvtoc /dev/rdsk/device-name >disk-config-file
```

`/dev/rdsk/`*device-name*	The device name of the system's disk. *device-name* must be in the form c*w*t*x*d*y*s2 or c*x*d*y*s2.
disk-config-file	The name of the disk configuration file.

Example 4–9 SPARC: Creating a Disk Configuration File

The following example shows how to create a single–disk configuration file, `104_test`, on a SPARC based system with a 104 MB disk.

Redirect the output of the `prtvtoc` command to a single-disk configuration file that is named `104_test`:

```
# prtvtoc /dev/rdsk/c0t3d0s2 >104_test
```

The contents of the `104_test` file resemble the following example:

```
* /dev/rdsk/c0t3d0s2 partition map
*
* Dimensions:
*     512 bytes/sector
*      72 sectors/track
*      14 tracks/cylinder
*    1008 sectors/cylinder
*    2038 cylinders*    2036 accessible cylinders
* Flags:
*   1: unmountable
*  10: read-only
*
*                          First     Sector    Last
* Partition  Tag  Flags    Sector     Count    Sector  Mount Directory
       1      2    00          0     164304   164303   /
       2      5    00          0    2052288  2052287
       3      0    00     164304     823536   987839   /disk2/b298
       5      0    00     987840     614880  1602719   /install/298/sparc/work
       7      0    00    1602720     449568  2052287   /space
```

See Also "Testing a Profile" on page 44 contains information about using disk configuration files to test profiles.

▼ SPARC: How to Create a Multiple-Disk Configuration File

1 **Locate a SPARC based system with a disk you want to test.**

2 **Become superuser or assume an equivalent role.**

Roles contain authorizations and privileged commands. For more information about roles, see "Configuring RBAC (Task Map)" in *System Administration Guide: Security Services*.

3 **Redirect the output of the `prtvtoc(1M)` command to a file.**

`# prtvtoc /dev/rdsk/`*device-name* `>`*disk-config-file*

`/dev/rdsk/`*device-name*	The device name of the system's disk. *device-name* must be in the form `c`*w*`t`*x*`d`*y*`s2` or `c`*x*`d`*y*`s2`.
disk-config-file	The name of the disk configuration file.

4 **Concatenate the single–disk configuration files and save the output in a new file.**

`# cat` *disk-file1 disk-file2* `>`*multi-disk-config-file*

The new file becomes the multiple-disk configuration file, as in the following example.

```
# cat 104_disk2 104_disk3 104_disk5 >multi_disk_test
```

5 **If the target numbers in the disk device names are not unique in the multiple-disk configuration file, make the target numbers unique in the disk device names.**

For example, assume that the file contains the same target number, `t0`, for different disk device names, as shown here.

```
* /dev/rdsk/c0t0d0s2 partition map
...
* /dev/rdsk/c0t0d0s2 partition map
```

Change the second target number to `t2`, as shown here:

```
* /dev/rdsk/c0t0d0s2 partition map
...
* /dev/rdsk/c0t2d0s2 partition map
```

▼ x86: How to Create a Single-Disk Configuration File

1 **Locate an x86 based system that contains a disk that you are testing.**

2 **Become superuser or assume an equivalent role.**

Roles contain authorizations and privileged commands. For more information about roles, see "Configuring RBAC (Task Map)" in *System Administration Guide: Security Services*.

3 **Create part of the single-disk configuration file by saving the output of the `fdisk(1M)` command in a file.**

`# fdisk -R -W` *disk-config-file* `-h /dev/rdsk/`*device-name*

disk-config-file	The name of a disk configuration file.
`/dev/rdsk/`*device-name*	The device name of the `fdisk` layout of the entire disk. *device-name* must be in the form c*w*t*x*d*y*`s0` or c*x*d*y*`s0`.

4 **Append the output of the `prtvtoc(1M)` command to the disk configuration file:**

`# prtvtoc /dev/rdsk/`*device-name* `>>`*disk-config*

`/dev/rdsk/`*device-name*	The device name of the system's disk. *device-name* must be in the form c*w*t*x*d*y*`s2` or c*x*d*y*`s2`.
disk-config	The name of the disk configuration file.

Example 4–10 x86: Creating a Disk Configuration File

The following example shows how to create a single-disk configuration file, `500_test`, on an x86 based system that contains a 500 MB disk.

First, save the output of the `fdisk` command to a file that is named `500_test`:

```
# fdisk -R -W 500_test -h /dev/rdsk/c0t0d0p0
```

The `500_test` file looks like the following:

```
 * /dev/rdsk/c0t0d0p0 default fdisk table
* Dimensions:
*     512 bytes/sector
*      94 sectors/track
*      15 tracks/cylinder
*    1455 cylinders
*
*  HBA Dimensions:
*     512 bytes/sector
*      94 sectors/track
*      15 tracks/cylinder
*    1455 cylinders
```

```
*
* systid:
*  1:    DOSOS12
*  2:    PCIXOS
*  4:    DOSOS16
*  5:    EXTDOS
*  6:    DOSBIG
*  86:   DOSDATA
*  98:   OTHEROS
*  99:   UNIXOS
* 130:   SUNIXOS
*
* Id  Act Bhead Bsect   Bcyl  Ehead  Esect  Ecyl Rsect  Numsect
 130  128 44    3       0     46    30     1001 1410   2050140
```

Append the output of the `prtvtoc` command to the `500_test` file:

```
# prtvtoc /dev/rdsk/c0t0d0s2 >>500_test
```

The `500_test` file is now a complete disk configuration file:

```
* /dev/rdsk/c0t0d0p0 default fdisk table
* Dimensions:
*     512 bytes/sector
*      94 sectors/track
*      15 tracks/cylinder
*    1455 cylinders
*
*  HBA Dimensions:
*     512 bytes/sector
*      94 sectors/track
*      15 tracks/cylinder
*    1455 cylinders
*
* systid:
*  1:    DOSOS12
*  2:    PCIXOS
*  4:    DOSOS16
*  5:    EXTDOS
*  6:    DOSBIG
*  86:   DOSDATA
*  98:   OTHEROS
*  99:   UNIXOS
*  130:  SUNIXOS
*
* Id  Act Bhead Bsect Bcyl  Ehead  Esec  Ecyl Rsect  Numsect
 130  128 44    3     0     46    30    1001 1410   2050140
* /dev/rdsk/c0t0d0s2 partition map
*
* Dimensions:
*      512 bytes/sector
*       94 sectors/track
*       15 tracks/cylinder
*     1110 sectors/cylinder
*     1454 cylinders
*     1452 accessible cylinders
*
```

```
* Flags:
*   1: unmountable
*  10: read-only
*                          First    Sector    Last
* Partition  Tag  Flags    Sector     Count    Sector  Mount Directory
       2      5    01       1410   2045910   2047319
       7      6    00       4230   2043090   2047319  /space
       8      1    01          0      1410      1409
       9      9    01       1410      2820     422987
```

See Also "Testing a Profile" on page 44 contains information about using disk configuration files to test profiles.

▼ x86: How to Create a Multiple-Disk Configuration File

1 Locate an x86 based system that contains a disk that you are testing.

2 Become superuser or assume an equivalent role.

Roles contain authorizations and privileged commands. For more information about roles, see "Configuring RBAC (Task Map)" in *System Administration Guide: Security Services*.

3 Create part of the single-disk configuration file by saving the output of the `fdisk(1M)` command in a file.

`# fdisk -R -W` *disk-config-file* **`-h /dev/rdsk/`***device-name*

disk-config-file	The name of a disk configuration file.
`/dev/rdsk/`*device-name*	The device name of the `fdisk` layout of the entire disk. *device-name* must be in the form `c`*w*`t`*x*`d`*y*`s0` or `c`*x*`d`*y*`s0`.

4 Append the output of the `prtvtoc(1M)` command to the disk configuration file:

`# prtvtoc /dev/rdsk/`*device-name* **`>>`***disk-config*

`/dev/rdsk/`*device-name*	The device name of the system's disk. *device-name* must be in the form `c`*w*`t`*x*`d`*y*`s2` or `c`*x*`d`*y*`s2`.
disk-config	The name of the disk configuration file.

5 Concatenate the single-disk configuration files and save the output in a new file.

`# cat` *disk-file1 disk-file2* **`>`***multi-disk-config-file*

The new file becomes the multiple-disk configuration file, as in the following example.

```
# cat 104_disk2 104_disk3 104_disk5 >multi_disk_test
```

6 **If the target numbers in the disk device names are not unique in the multiple-disk configuration file, make the target numbers unique.**

For example, the file might contain the same target number, `t0`, for different disk device names as shown here:

```
* /dev/rdsk/c0t0d0s2 partition map
...
* /dev/rdsk/c0t0d0s2 partition map
```

Change the second target number to `t2`, as shown here:

```
* /dev/rdsk/c0t0d0s2 partition map
...
* /dev/rdsk/c0t2d0s2 partition map
```

Using a Site-Specific Installation Program

You can also use begin and finish scripts to create your own installation program to install Oracle Solaris software.

When you specify a minus sign (`-`) in the profile field, begin and finish scripts control how Oracle Solaris software is installed on a system instead of the profile and the Oracle Solaris installation program.

For example, if the following rule matches a system, the `x_install.beg` begin script and the `x_install.fin` finish script install Oracle Solaris software on the system that is named `clover`:

```
hostname clover x_install.beg - x_install.fin
```

◆ ◆ ◆ CHAPTER 5

Creating Custom Rule and Probe Keywords (Tasks)

This chapter provides information and procedures for creating your own custom rule and probe keywords.

Note – If you are installing an Oracle Solaris ZFS root pool, see Chapter 9, "Installing a ZFS Root Pool With JumpStart," for limitations and profile examples.

This chapter covers the following topics:

- "Probe Keywords" on page 67
- "Creating a `custom_probes` File" on page 68
- "Validating the `custom_probes` File" on page 70

Probe Keywords

A probe keywords are related to rule keywords. A rule keyword is a predefined lexical unit or word that describes a general system attribute, such as host name, `hostname`, or memory size, `memsize`. Rule keywords and the values that are associated with them enable you to match a system that has the same attribute to a profile. This match of a system's attributes defines how the Oracle Solaris software is to be installed on each system in the group.

JumpStart environment variables, which you use in begin and finish scripts, are set on demand. For example, information about which operating system is already installed on a system is only available in `SI_INSTALLED` after the `installed` rule keyword is used.

In some situations, you might need to extract the same information in a begin or finish script for a purpose other than to match a system and run a profile. Probe keywords provide the solution. Probe keywords extract attribute information and remove the need for you to set up a matching condition and run a profile.

For a list of probe keywords and values, see "Probe Keywords and Values" on page 147.

Creating a custom_probes File

The rule and probe keywords that are described in "Rule Keywords and Values" on page 97 and "Probe Keywords and Values" on page 147 might not be precise enough for your needs. You can define your own custom rule or probe keywords by creating a custom_probes file.

The custom_probes file is a Bourne shell script that contains two types of functions. You must save the custom_probes file in the same JumpStart directory where you saved the rules file. The two types of functions that you can define in a custom_probes file are as follows:

- Probe – Gathers the information you want or does the actual work and sets a corresponding SI_ environment variable that you define. Probe functions become probe keywords.
- Comparison – Calls a corresponding probe function, compares the output of the probe function, and returns 0 if the keyword matches or 1 if the keyword does not match. Comparison functions become rule keywords.

Syntax of the custom_probes File

The custom_probes file can contain any valid Bourne shell command, variable, or algorithm.

You can define probe and comparison functions that require a single argument in the custom_probes file. When you use the corresponding custom probe keyword in the rules file, the argument after the keyword is interpreted (as $1).

When you use the corresponding custom rule keyword in the rules file, the arguments are interpreted in sequence. The sequence starts after the keyword and ends before the next && or begin script, whichever comes first.

The custom_probes file must meet the following requirements:

- Have the name custom_probes
- Have root as its owner
- Be executable and have permissions set to 755
- Contain at least one probe function and one corresponding comparison function

To improve clarity and organization, define all probe functions first at the top of the file, followed by all comparison functions.

Syntax of Function Names in the custom_probes File

The name of a probe function must begin with probe_. The name of a comparison function must begin with cmp_.

Functions that begin with probe_ define new probe keywords. For example, the function probe_tcx defines the new probe keyword tcx. Functions that begin with cmp_ define new rule keywords. For example, cmp_tcx defines the new rule keyword tcx.

▼ How to Create a custom_probes File

1. **Create a Bourne shell script text file and name it `custom_probes`.**

2. **In the `custom_probes` text file, define your probe and comparison functions.**

   When you use corresponding custom probe keyword in the `rules` file, the arguments after the keyword are interpreted in sequence (as $1, $2, and so on).

   When you use the corresponding custom rule keyword in the `rules` file, the arguments are interpreted in sequence. The sequence starts after the keyword and ends before the next && or begin script, whichever comes first.

3. **Save the `custom_probes` file in the JumpStart directory next to the `rules` file.**

4. **Ensure that `root` owns the `rules` file and that the permissions are set to 644.**

Example 5–1 `custom_probes` File

```
#!/bin/sh
#
# custom_probe script to test for the presence of a TCX graphics card.
#

#
# PROBE FUNCTIONS
#
probe_tcx() {
  SI_TCX=‘modinfo | grep tcx | nawk ’{print $6}’‘
  export SI_TCX
}

#
# COMPARISON FUNCTIONS
#
cmp_tcx() {
  probe_tcx

  if [ "X${SI_TCX}" = "X${1}" ]; then
     return 0
  else
     return 1
  if
}
```

Example 5–2 Custom Probe Keyword Used in a `rules` File

This example `rules` file shows the use of the probe keyword that is defined in the preceding example, `tcx`. If a TCX graphics card is installed and found in a system, `profile_tcx` is run. Otherwise, `profile` is run.

```
probe tcx
tcx     tcx     -     profile_tcx     -
any     any     -     profile         -
```

See Also You can find additional examples of probe and comparison functions in the following directories:

- `/usr/sbin/install.d/chkprobe` on a system that has the Oracle Solaris software installed
- `/Solaris_10/Tools/Boot/usr/sbin/install.d/chkprobe` on the Oracle Solaris Operating System DVD or on the Oracle Solaris Software - 1 CD

Note – Always place probe keywords at or near the beginning of the `rules` file. This placement ensures that the keywords are read and run before other rule keywords that might rely on the probe keywords.

Validating the `custom_probes` File

Before you can use a profile, `rules`, and `custom_probes` file, you must run the `check` script to validate that the files are set up correctly. If all profiles, rules, and probe and comparison functions are correctly set up, the `rules.ok` and `custom_probes.ok` files are created.

When you use the `check` script, the following process occurs:

1. `check` searches for a `custom_probes` file.
2. If the file exists, `check` creates the `custom_probes.ok` file from the `custom_probes` file, removes all comments and blank lines, and retains all Bourne shell commands, variables, and algorithms. Then, `check` adds the following comment line at the end:

   ```
   # version=2 checksum=num
   ```

▼ How to Validate the `custom_probes` File

1 Verify that the `check` script is located in the JumpStart directory.

Note – The `check` script is in the `Solaris_10/Misc/jumpstart_sample` directory on the Oracle Solaris Operating System DVD or on the Oracle Solaris Software - 1 CD.

---

2 Change to the JumpStart directory.

3 Run the `check` script to validate the `rules` and `custom_probes` files.

```
$ ./check -p path -r file-name
```

`-p` *path* — Validates the `custom_probes` file by using the `check` script from the Oracle Solaris software image for your platform instead of the `check` script from the system you are using. *path* is the image on a local disk or a mounted Oracle Solaris Operating System DVD or Oracle Solaris Software - 1 CD.

Use this option to run the most recent version of `check` if your system is running a previous version of Oracle Solaris.

`-r` *file-name* — Specifies a file name other than the one that is named `custom_probes`. By using the `-r` option, you can test the validity of a set of functions before integrating the functions into the `custom_probes` file.

As the `check` script runs, the script reports the validity of the `rules` and `custom_probes` files and each profile. If no errors are encountered, the script reports `The JumpStart configuration is ok` and creates the `rules.ok` and `custom_probes.ok` files in the JumpStart directory.

4 If the `custom_probes.ok` file is not executable, type the following command:

```
# chmod +x custom_probes
```

5 Ensure that `root` owns the `custom_probes.ok` file and that the permissions are set to 755.

◆ ◆ ◆ CHAPTER 6

Performing a JumpStart Installation (Tasks)

This chapter describes how to perform a JumpStart installation on a SPARC based or an x86 based system. You need to follow these procedures on the system on which you intend to install the Oracle Solaris software.

Note – If you are installing an Oracle Solaris ZFS root pool, see Chapter 9, "Installing a ZFS Root Pool With JumpStart," for limitations and profile examples.

Note – If you are installing or upgrading the Oracle Solaris 10 OS on an iSCSI target system, see the following sections for iSCSi keywords and examples.

- "`iSCSI` Profile Keyword" on page 131
- Example 3–16
- Example 3–17

For detailed instructions about configuring iSCSI parameters, see Chapter 4, "Installing the Oracle Solaris 10 OS on an iSCSI Target Disk," in *Oracle Solaris 10 1/13 Installation Guide: Basic Installations*.

This chapter covers the following topics:

- "JumpStart Installation Issues" on page 74
- "SPARC: Setting Up a System for a JumpStart Installation (Task Map)" on page 75
- "SPARC: Performing a JumpStart Installation" on page 77
- "x86: Setting Up a System for a JumpStart Installation (Task Map) " on page 80
- "x86: Performing a JumpStart Installation" on page 82

JumpStart Installation Issues

You should be aware of some issues before performing a JumpStart installation. Review the following table for specific information.

TABLE 6–1 JumpStart Installation Limitations

Issue	Description	For More Information
The sample JumpStart script is no longer required to suppress the NFSv4 prompt	For the Solaris 10 release, a sample JumpStart script, `set_nfs4_domain`, was provided on media to prevent being prompted during a JumpStart installation. This script suppressed the NFSv4 prompt during installation. This script is no longer required. **Starting with the Solaris 10 8/07 release**, use the `sysidcfg` keyword, `nfs4_domain` to suppress the prompt. The `set_nfs4_domain` script no longer works to suppress a prompt. If you have non-global zones installed and the new `nfs4_domain` keyword exists in the `sysidcfg` file, the first boot of a non-global zone sets the domain. Otherwise, the Oracle Solaris interactive installation program starts and you are prompted to provide a domain name before the boot process completes.	"nfs4_domain Keyword" in *Oracle Solaris 10 1/13 Installation Guide: Network-Based Installations*
Providing Auto Registration information in the `sysidcfg` file keeps JumpStart installations hands-off	Auto Registration, a feature of Oracle Solaris, is new in the Oracle Solaris 10 9/10 release. When you install or upgrade your system, configuration data about your system is, on rebooting, automatically communicated through the existing service tag technology to the Oracle Product Registration System. This service tag data about your system is used, for example, to help Oracle enhance customer support and services. If you include the `auto_reg` keyword in the `sysidcfg` file prior to the installation or upgrade, the installation can remain completely hands-off. However, if you do not include the `auto_reg` keyword, you will be prompted to provide your support credentials and proxy information for Auto Registration during the installation or upgrade.	

Selecting a keyboard language in the `sysidcfg` file prevents a prompt	If your keyboard is not self-identifying and you want to prevent being prompted during your JumpStart installation, select the keyboard language in your `sysidcfg` file. For JumpStart installations, the default is for the U.S. English language. To select another language and its corresponding keyboard layout, set the keyboard keyword in your `sysidcfg` file.	■ "sysidcfg File Keywords" in *Oracle Solaris 10 1/13 Installation Guide: Network-Based Installations*
		■ For man pages, see:
		  ■ `sysidtool(1M)`
		  ■ `sysidcfg(4)`

TABLE 6–1 JumpStart Installation Limitations *(Continued)*

Issue	Description	For More Information
If you have non-global zones, use Live Upgrade to upgrade	You can upgrade a system that has non-global zones installed with JumpStart, but Live Upgrade is the recommended program to upgrade. JumpStart might require extensive upgrade time, because the time required to complete the upgrade increases linearly with the number of installed non-global zones.	*Oracle Solaris 10 1/13 Installation Guide: Live Upgrade and Upgrade Planning*
A flash archive cannot contain non-global zones	If you use a flash archive to install an archive that contains non-global zones is not properly installed on your system.	For general information about creating non-global zones, see *System Administration Guide: Oracle Solaris Containers-Resource Management and Oracle Solaris Zones*.
A flash archive cannot be properly created when a non-global zone is installed.	The Flash Archive feature is not compatible with the Oracle Solaris Zones partitioning technology. If you create a flash archive, the resulting archive is not installed properly when the archive is deployed under these conditions: ■ The archive is created in a non-global zone ■ The archive is created in a global zone that has non-global zones installed	
When using the `archive_location` keyword to install a flash archive, the archive and the installation media must contain identical operating system versions.	For example, if the archive is an Oracle Solaris 10 8/11 operating system and you are using DVD media, then you must use Oracle Solaris 10 8/11 DVD media to install the archive. If the operating systems versions do not match, the installation on the clone system fails.	
SPARC: Additional hardware requirements	Refer to your hardware documentation for any additional requirements for your platform that might be required to complete a JumpStart installation.	

SPARC: Setting Up a System for a JumpStart Installation (Task Map)

TABLE 6–2 Task Map: Setting Up a System for a JumpStart Installation

Task	Description	For Instructions
Check whether the system is supported.	Check the hardware documentation for system support in the Oracle Solaris environment.	*Oracle Solaris Sun Hardware Platform Guide* at `http://www.oracle.com/technetwork/indexes/documentation/index.html`

TABLE 6–2 Task Map: Setting Up a System for a JumpStart Installation *(Continued)*

Task	Description	For Instructions
Check whether the system has enough disk space for the Oracle Solaris software.	Verify that you have planned enough space to install the Oracle Solaris software on your system.	Chapter 3, "System Requirements, Guidelines, and Upgrade Information," in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*
(Optional) Set system parameters.	You can preconfigure system information to avoid being prompted for the information during the installation or upgrade.	Chapter 2, "Preconfiguring System Configuration Information (Tasks)," in *Oracle Solaris 10 1/13 Installation Guide: Network-Based Installations*
Prepare the system for JumpStart installation.	Create and validate a `rules` file and profile files.	Chapter 3, "Preparing JumpStart Installations (Tasks)"
(Optional) Prepare optional JumpStart features.	If you are using begin scripts, finish scripts, or other optional features, prepare the scripts or files.	Chapter 4, "Using Optional JumpStart Features (Tasks)," and Chapter 5, "Creating Custom Rule and Probe Keywords (Tasks)"
(Optional) Prepare to install the Oracle Solaris software from the network.	To install a system from a remote Oracle Solaris Operating System DVD or Oracle Solaris Software for SPARC Platforms CD image, you need to set up the system to boot and install from an install server or a boot server.	Chapter 5, "Installing From the Network With DVD Media (Tasks)," in *Oracle Solaris 10 1/13 Installation Guide: Network-Based Installations* Chapter 6, "Installing From the Network With CD Media (Tasks)," in *Oracle Solaris 10 1/13 Installation Guide: Network-Based Installations*
(Optional) Prepare for a Flash Archive installation.	Set up specifics for a Flash Archive installation.	"To Prepare to Install a Flash Archive With a JumpStart Installation" on page 77
Perform an installation or upgrade.	Boot the system to initiate the installation or upgrade.	"SPARC: To Perform an Installation or Upgrade With the JumpStart Program" on page 78

SPARC: Performing a JumpStart Installation

During a JumpStart installation, the JumpStart program attempts to match the system that is being installed to the rules in the `rules.ok` file. The JumpStart program reads the rules from the first rule through the last. A match occurs when the system that is being installed matches all the system attributes that are defined in the rule. When a system matches a rule, the JumpStart program stops reading the `rules.ok` file and begins to install the system, based on the matched rule's profile.

You can install a full archive for an initial installation or if you have already installed an archive, a differential archive for an update. You can use the JumpStart installation method or use Live Upgrade to install an archive on an inactive boot environment. For an overview of a full or differential archive, see Chapter 1, "Flash Archive Overview," in *Oracle Solaris 10 1/13 Installation Guide: Flash Archives (Creation and Installation)*.

▼ To Prepare to Install a Flash Archive With a JumpStart Installation

This procedure provides the instructions to install an archive with JumpStart. For procedures about installing an archive on an inactive boot environment by using Live Upgrade, see "How to Install a Flash Archive With a Profile" in *Oracle Solaris 10 1/13 Installation Guide: Live Upgrade and Upgrade Planning*.

Before You Begin Review the limitations on flash archive installations in Table 6–1

1 On the install server, create the JumpStart `rules` file.

For detailed instructions about creating JumpStart files, refer to Chapter 3, "Preparing JumpStart Installations (Tasks)."

2 On the install server, create the JumpStart profile file.

For examples of Flash Archive profiles, see "Profile Examples" on page 33.

For information about the only keywords valid when you install a Flash Archive, see Table 8–2,

a. Set the value of the keyword `install_type`.

- For a full archive installation, set the value to `flash_install`.
- For a differential archive installation, set the value to `flash_update`.

b. Add the path to the flash archive by using the `archive_location` keyword.

For details about the `archive_location` keyword, refer to "`archive_location` Keyword" on page 103.

c. **Specify the file system configuration.**

   The Flash Archive extraction process does not support auto-layout of partitions.

d. **(Optional) If you want to install additional packages at the same time you install an archive, use the `package` keyword.**

   For more information, see "`package` Profile Keyword (UFS and ZFS)" on page 132.

e. **(Optional) If you want to install an additional flash archive on the clone system, add one `archive_location` line for each archive that you want to install.**

3 **On the install server, add the clients that you are installing with the flash archive.**

For detailed instructions, refer to the following:

- "Adding Systems to Be Installed From the Network With a DVD Image" in *Oracle Solaris 10 1/13 Installation Guide: Network-Based Installations*
- "Adding Systems to Be Installed From the Network With a CD Image" in *Oracle Solaris 10 1/13 Installation Guide: Network-Based Installations*

4 **Perform the JumpStart installation on the clone systems.**

For detailed instructions, refer to "SPARC: To Perform an Installation or Upgrade With the JumpStart Program" on page 78.

▼ SPARC: To Perform an Installation or Upgrade With the JumpStart Program

Before You Begin

- If the system is part of a network, ensure that an Ethernet connector or similar network adapter is attached to your system.
- If you are installing a system that is connected through a `tip(1)` line, ensure that your window display is at least 80 columns wide and 24 rows long.

  To determine the current dimensions of your `tip` window, use the `stty(1)` command.

1 **If you are using the system's DVD-ROM or CD-ROM drive to install the Oracle Solaris software, insert the Oracle Solaris Operating System for SPARC Platforms DVD or the Oracle Solaris Software for SPARC Platforms - 1 CD in the drive.**

2 **If you are using a profile diskette, insert the profile diskette in the system's diskette drive.**

3 **Boot the system.**

- If the system is new and unmodified, turn on the system.

- If you want to install or upgrade an existing system, shut down the system. At the `ok` prompt, type the appropriate options for the boot command. The syntax of the `boot` command is the following.

  ```
  ok boot [cd–dvd|net] - install [url|ask] options
  ```

  For example, if you type the following command, the OS is installed over the network by using a JumpStart profile.

  ```
  ok boot net - install http://131.141.2.32/jumpstart/config.tar
  ```

  For a description of the boot command options, see the following table.

SPARC only – The system checks hardware and system components and your SPARC based system boots. Booting lasts several minutes.

---

4 If you did not preconfigure system information in the `sysidcfg` file, when prompted, answer the questions about system configuration.

Note – Starting with the Oracle Solaris 10 9/10 release, if you do not include the `auto_reg` keyword in the `sysidcfg` file, you will be prompted to provide your support credentials and proxy information for Auto Registration.

---

5 Follow the instructions on the screen to install the software.

When the JumpStart program finishes installing the Oracle Solaris software, the system reboots automatically.

After the installation is finished, installation logs are saved in a file. You can find the installation logs in the following directories:

- `/var/sadm/system/logs`
- `/var/sadm/install/logs`

SPARC: Command Reference for the `boot` Command

The syntax of the `boot` command is as follows:

```
ok boot [cd–dvd|net] - install [url|ask] options
```

The following table describes the command-line options for the `boot` command that are appropriate for a JumpStart installation.

Option	Description
[*cd–dvd*|net]	Specifies to boot from a CD or a DVD or to boot from an install server on the network. ■ *cd-dvd* - Use `cdrom` to boot from a CD or a DVD. ■ `net` - Specifies to boot from an install server on the network.

[*url*| ask]	Specifies the location of the JumpStart files or prompts you for the location.
	■ *url* – Specifies the path to the files. You can specify a URL for files that are located in an HTTP or HTTPS server:
	HTTP server
	`http://`*server-name:IP-address/jumpstart-dir/compressed-config-file&proxy-info*
	■ If you placed a `sysidcfg` file in the compressed configuration file, you must specify the IP address of the server that contains the file, as in the following example:
	`http://131.141.2.32/jumpstart/config.tar`
	■ If you saved the compressed configuration file on an HTTP server that is behind a firewall, you must use a proxy specifier during boot. You do not need to specify an IP address for the server that contains the file. You must specify an IP address for the proxy server, as in the following example:
	`http://www.shadow.com/jumpstart/config.tar&proxy=131.141.6.151`
	■ `ask` – Specifies that the installation program prompt you to type the location of the compressed configuration file. The prompt happens after the system boots and connects to the network. If you use this option, you are not able to do a completely hands-off JumpStart installation.
	If you bypass the prompt by pressing Return, the Oracle Solaris installation program interactively configures the network parameters. The installation program then prompts you for the location of the compressed configuration file.

x86: Setting Up a System for a JumpStart Installation (Task Map)

TABLE 6–3 x86: Task Map: Setting Up a System for a JumpStart Installation

Task	Description	For Instructions
Determine whether you need to preserve an existing operating system and user data.	If the existing operating system on the system uses the entire disk, you must preserve the existing operating system so it can co-exist with the Oracle Solaris 10 8/11 software. This decision determines how to specify the `fdisk`(1M) keyword in the system's profile.	"x86: `fdisk` Profile Keyword (UFS and ZFS)" on page 116

TABLE 6–3 x86: Task Map: Setting Up a System for a JumpStart Installation *(Continued)*

Task	Description	For Instructions
Check whether the system is supported.	Check the hardware documentation for system support in the Oracle Solaris environment.	Hardware manufacturer's documentation
Check whether the system has enough disk space for the Oracle Solaris software.	Verify that you have planned enough space to install the Oracle Solaris software on your system.	Chapter 3, "System Requirements, Guidelines, and Upgrade Information," in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*
(Optional) Set system parameters.	You can preconfigure system information to avoid being prompted for the information during the installation or upgrade.	Chapter 2, "Preconfiguring System Configuration Information (Tasks)," in *Oracle Solaris 10 1/13 Installation Guide: Network-Based Installations*
Prepare the system for JumpStart installation.	Create and validate a `rules` file and profile files.	Chapter 3, "Preparing JumpStart Installations (Tasks)"
(Optional) Prepare optional JumpStart features.	If you are using begin scripts, finish scripts, or other optional features, prepare the scripts or files.	Chapter 4, "Using Optional JumpStart Features (Tasks)," and Chapter 5, "Creating Custom Rule and Probe Keywords (Tasks)"
(Optional) Prepare to install the Oracle Solaris software from the network.	To install a system from a remote Oracle Solaris Operating System for x86 Platforms DVD or Oracle Solaris Software For x86 Platforms CD image, you need to set up the system to boot and install from an install server or a boot server.	Chapter 6, "Installing From the Network With CD Media (Tasks)," in *Oracle Solaris 10 1/13 Installation Guide: Network-Based Installations*
(Optional) Prepare for a Flash Archive installation.	Set up specifics for a Flash Archive installation.	"To Prepare to Install a Flash Archive With a JumpStart Installation" on page 77
Perform an installation or upgrade.	Boot the system to initiate the installation or upgrade.	"x86: How to Perform an Installation or Upgrade With the JumpStart Program and GRUB" on page 82

x86: Performing a JumpStart Installation

During a JumpStart installation, the JumpStart program attempts to match the system that is being installed to the rules in the `rules.ok` file. The JumpStart program reads the rules from the first rule through the last rule. A match occurs when the system that is being installed matches all of the system attributes that are defined in the rule. As soon as a system matches a rule, the JumpStart program stops reading the `rules.ok` file and begins to install the system, based on the matched rule's profile.

You can install a flash archive with JumpStart. For instructions, see "To Prepare to Install a Flash Archive With a JumpStart Installation" on page 77.

Choose the following procedures to perform an installation or upgrade with the JumpStart program and GRUB.

- For a standard JumpStart procedure, see "x86: How to Perform an Installation or Upgrade With the JumpStart Program and GRUB" on page 82.
- To perform a JumpStart by editing the GRUB command, see "x86: How to Perform an Installation or Upgrade With the JumpStart Program and GRUB" on page 82.

▼ x86: How to Perform an Installation or Upgrade With the JumpStart Program and GRUB

Use this procedure to install the Oracle Solaris OS for an x86 based system with the GRUB.

Before You Begin

- If the system is part of a network, ensure that an Ethernet connector or similar network adapter is attached to your system.
- If you want to install a system that is connected through a `tip(1)` line, ensure that your window display is at least 80 columns wide and 24 rows long.

  To determine the current dimensions of your `tip` window, use the `stty(1)` command.

1 If you are using a profile diskette, insert the profile diskette into the system's diskette drive.

A profile diskette is no longer used to boot the system but, a diskette can be prepared that includes only the JumpStart directory. The diskette can then be used situations such as performing a JumpStart installation and booting off the CD-ROM.

2 Boot the system.

- **If you boot from the Oracle Solaris Operating System DVD or the Oracle Solaris Software - 1 CD, insert the disc.**

  Your system's BIOS must support booting from a DVD or CD. If you are booting from a DVD or CD, change the boot setting in your system's BIOS and set to boot from DVD or CD media. For more information, See your hardware documentation.

- **If you boot from the network, use Preboot Execution Environment (PXE) network boot.**

  The system must support PXE. Enable the system to use PXE by using the system's BIOS setup tool or the network adapter's configuration setup tool.

3 If the system is off, turn the system on. If the system is on, reboot the system.

The GRUB menu is displayed. This menu provides a list of boot entries.

```
GNU GRUB version 0.95 (631K lower / 2095488K upper memory)
+-------------------------------------------------------------------------+
|Oracle Solaris 10 8/11 image_directory                                   |
|Solaris Serial Console ttya                                              |
|Solaris Serial Console ttyb (for lx50, v60x and v65x                     |
+-------------------------------------------------------------------------+
Use the ^ and v keys to select which entry is highlighted. Press
enter to boot the selected OS, 'e' to edit the commands before
booting, or 'c' for a command-line.
```

image-directory is the name of the directory where the installation image is located. The path to the JumpStart files was defined with the `add_install_client` command and the `-c` option.

4 Determine whether you want to perform a standard boot of the OS or modify the GRUB boot command before performing the JumpStart installation, for example, for debugging purposes.

- **To perform a standard boot process, press Enter with Oracle Solaris 10 8/11 highlighted.**
- **To modify the GRUB boot command and perform a custom boot process:**

  a. Stop the booting process by typing e.

  The GRUB edit menu is displayed.

  ```
  kernel /I86PC.Solaris_11-8/multiboot kernel/unix -B console=ttyb,\
  install_media=131.141.2.32:/export/mary/v11 \
  module /I86PC.Solaris_11-8/x86.new
  ```

  b. Use the arrow keys to select the boot entry.

  c. Type e to access the editor.

  A command that is similar to the following example displays.

  ```
  grub edit>kernel /I86PC.Solaris_11-8/multiboot kernel/unix -B \
  console=ttyb,install_media=131.141.2.32:/export/mary/_\
  module /I86PC.Solaris_11-8/x86.new
  ```

  d. Edit the command by typing the options that you need.

  The syntax for a JumpStart installation is the following.

  ```
  grub edit>kernel /I86PC.Solaris_11-image_directory/multiboot kernel/unix/ \
  - install [url|ask] options -B install_media=media-type
  ```

  For a description of JumpStart options, see "x86: Command Reference for Booting the System" on page 84.

In the following example, the OS is installed over the network with a JumpStart profile.

```
kernel /I86PC.Solaris_11-8/multiboot kernel/unix/ - install \
-B install_media=131.141.2.32:/export/mary/v11 \
module /I86PC.Solaris_11-8/x86.new
```

e. To accept the edits, press Enter.

Note – To return to the GRUB main menu without saving your changes, press Escape.

Your changes are saved and the GRUB main menu is displayed.

f. Type b to begin the boot process.

The installation menu is displayed.

5 Type 2 and press Enter to select the JumpStart method.

The JumpStart installation begins.

Note – If you do not make a selection within 30 seconds, the Oracle Solaris interactive installation program begins. You can stop the timer by typing any key at the command line.

---

6 If you did not preconfigure system information in the `sysidcfg` file, when prompted, answer the questions about system configuration.

Note – Starting with the Oracle Solaris 10 9/10 release, if you do not include the `auto_reg` keyword in the `sysidcfg` file, you will be prompted to provide your support credentials and proxy information for Auto Registration.

---

7 Follow the instructions on the screen to install the software.

When the JumpStart program finishes installing the Oracle Solaris software, the system reboots automatically. Also, the GRUB `menu.lst` file is automatically updated. Then the instance of Oracle Solaris that you have installed appears in the next use of the GRUB menu.

After the installation is finished, installation logs are saved in a file. You can find the installation logs in the following directories:

- `/var/sadm/system/logs`
- `/var/sadm/install/logs`

x86: Command Reference for Booting the System

The following table describes the command-line options for the GRUB menu boot command. The options listed are appropriate for a JumpStart installation.

The syntax of the boot command is as follows:

```
kernel /I86PC.Solaris_11-image-directory/multiboot kernel/unix/ - install \
[url|ask] options -B install_media=media-type
```

TABLE 6–4 GRUB Menu Boot Command Reference

Option	Description

`- install`	Performs a JumpStart installation.
	
	In the following example, the system boots from DVD media and the following options were used:
	■ `- install` performs a JumpStart
	■ `file://jumpstart/config.tar` finds the JumpStart profile on the local disk
	
	`kernel /I86pc.Solaris_11.8/multiboot - install file://jumpstart/config.tar \`
	`-B install_media=dvdrom module /I86Solaris_11.8/x86.new`

TABLE 6–4 GRUB Menu Boot Command Reference *(Continued)*

Option	Description

[*url*| ask]	Specifies the location of the JumpStart files or prompts you for the location.
	■ *url* – Specifies the path to the files. You can specify a URL for files that are located on an HTTP or HTTPS server:
	The syntax for an HTTP server is the following:
	`http://`*server-name:IP-address/jumpstart-dir/ compressed-config-file*&*proxy-info*
	■ If you placed a `sysidcfg` file in the compressed configuration file, you must specify the IP address of the server that contains the file, as in the following example:
	`kernel /I86pc.Solaris_11.8/multiboot install \`
	`http://192.168.2.1/jumpstart/config.tar \`
	`-B install_media=192.168.2.1/export/Solaris_11.8/boot \`
	`module /I86PC.Solaris_11.8/x86.new`
	■ If you saved the compressed configuration file on an HTTP server that is behind a firewall, you must use a proxy specifier during boot. You do not need to specify an IP address for the server that contains the file. You must specify an IP address for the proxy server, as in the following example:
	`kernel /I86pc.Solaris_11.8/multiboot install \`
	`http://www.shadow.com/jumpstart/config.tar&proxy=131.141.6.151 \`
	`-B install_media=192.168.2.1/export/Solaris_11.8/boot \`
	`module /I86PC.Solaris_11.8/x86.new`
	■ `ask` – Specifies that the installation program prompt you to type the location of the compressed configuration file. You are prompted after the system boots and connects to the network. If you use this option, you are not able to do a completely hands-off JumpStart installation.
	If you bypass the prompt by pressing Return, the Oracle Solaris installation program interactively configures the network parameters. The installation program then prompts you for the location of the compressed configuration file.
	The following example performs a JumpStart installation and boots from DVD media. You are prompted to type the location of the configuration file after the system connects to the network.
	`kernal /boot/multiboot kernel/unix` **`install ask`** `-B \`
	`install_media=192.168.2.1:export/sol_11_x86/boot module \`
	`/I86PC.Solaris_11.8_`

◆ ◆ ◆ CHAPTER 7

Installing With JumpStart (Examples)

This chapter provides an example of setting up and installing Oracle Solaris software on both SPARC based and x86 based systems by using a JumpStart installation.

Note – If you are installing an Oracle Solaris ZFS root pool, see Chapter 9, "Installing a ZFS Root Pool With JumpStart," for limitations and profile examples.

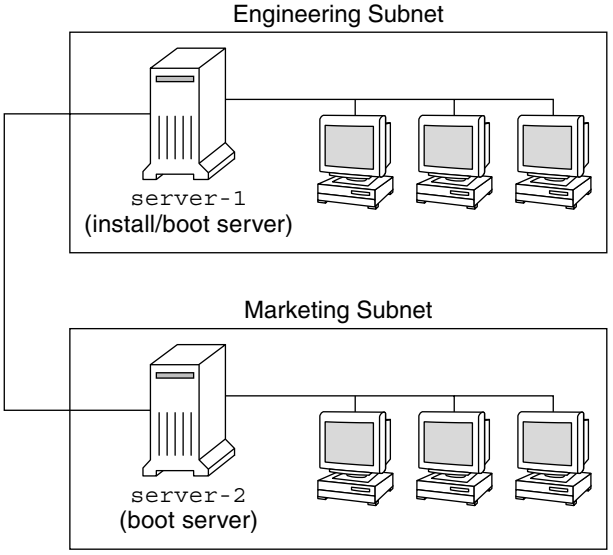
This chapter covers the following topics:

- "Sample Site Setup" on page 87
- "Create an Install Server" on page 89
- "x86: Create a Boot Server for Marketing Systems" on page 90
- "Create a JumpStart Directory" on page 91
- "Share the JumpStart Directory" on page 91
- "SPARC: Create the Engineering Group's Profile" on page 91
- "x86: Create the Marketing Group's Profile" on page 92
- "Update the `rules` File" on page 92
- "Validate the `rules` File" on page 93
- "SPARC: Set Up Engineering Systems to Install From the Network" on page 93
- "x86: Set Up Marketing Systems to Install From the Network" on page 94
- "SPARC: Boot the Engineering Systems and Install Oracle Solaris Software" on page 95
- "x86: Boot the Marketing Systems and Install Oracle Solaris Software" on page 95

Sample Site Setup

The following figure shows the site setup for this example.

FIGURE 7–1 Sample Site Setup



At this sample site, the conditions are as follows:

- SPARC: The engineering group is located on its own subnet. This group uses SPARCstation systems for software development.
- x86: The marketing group is located on its own subnet. This group uses x86 based systems for running word processors, spreadsheets, and other office productivity tools.
- The site uses NIS. The Ethernet addresses, IP addresses, and host names of the systems are preconfigured in the NIS maps. The subnet mask, date and time, and geographic region for the site are also preconfigured in the NIS maps.

  Note – The peripheral devices for the marketing systems are preconfigured in the `sysidcfg` file.

- Both the engineering and marketing systems are to be installed with Oracle Solaris 10 8/11 software from the network.

Create an Install Server

Because the groups need to install Oracle Solaris 10 8/11 software from the network, make `server-1` an install server for both groups. Use the `setup_install_server(1M)` command to copy the images to the `server-1` local disk (in the `/export/install` directory). Copy the images from the either of the following media.

- Oracle Solaris Software CDs and the Oracle Solaris Languages CDs

  Note – Starting with the Oracle Solaris 10 9/10 release, only a DVD is provided. Oracle Solaris Software CDs are no longer provided.

- Oracle Solaris Operating System DVD

The image must be copied from the disc to an empty directory, which in these examples are the `sparc_10` directory and the `x86_10` directory.

EXAMPLE 7–1 SPARC: Copying the Oracle Solaris 10 8/11 CDs

1. Insert the Oracle Solaris Software for SPARC Platforms - 1 CD in the CD-ROM drive that is attached to `server-1` and type the following commands:

   ```
   server-1# mkdir -p /export/install/sparc_10
   server-1# cd /mymountpoint/Solaris_10/Tools
   server-1# ./setup_install_server /export/install/sparc_10
   ```

2. Insert the Oracle Solaris Software for SPARC Platforms - 2 CD in the CD-ROM drive that is attached to `server-1` and type the following commands:

   ```
   server-1# cd /mymountpoint/Solaris_10/Tools
   server-1# ./add_to_install_server /export/install/sparc_10
   ```

3. Repeat the previous command for each Oracle Solaris software version you want to install.
4. Insert the first SPARC: Oracle Solaris Languages for SPARC Platforms CD in the CD-ROM drive that is attached to `server-1` and type the following commands:

   ```
   server-1# cd /mymountpoint/Solaris_10/Tools
   server-1# ./add_to_install_server /export/install/sparc_10
   ```

5. Repeat the previous command for each SPARC: Oracle Solaris Languages for SPARC Platforms CD.

EXAMPLE 7–2 SPARC: Copying the Oracle Solaris 10 8/11 DVD

Insert the Oracle Solaris Operating System for SPARC Platforms DVD in the DVD-ROM drive that is attached to `server-1` and type the following commands:

```
server-1# mkdir -p /export/install/sparc_10
server-1# cd /mymountpoint/Solaris_10/Tools
server-1# ./setup_install_server /export/install/sparc_10
```

EXAMPLE 7–3 x86: Copying the Oracle Solaris 10 8/11 CDs

1. Insert the Oracle Solaris Software for x86 Platforms - 1 CD in the CD-ROM drive that is attached to `server-1` and type the following commands:

   ```
   server-1# mkdir -p /export/install/x86_10
   server-1# cd /mymountpoint/Solaris_10/Tools
   server-1# ./setup_install_server /export/install/x86_10
   ```

2. Insert the Oracle Solaris Software for x86 Platforms - 2 CD in the CD-ROM drive that is attached to `server-1` and type the following commands:

   ```
   server-1# cd /mymountpoint/Solaris_10/Tools
   server-1# ./add_to_install_server /export/install/x86_10
   ```

3. Repeat the previous command for each Oracle Solaris software version you want to install.
4. Insert the first Oracle Solaris Languages for x86 Platforms CD in the CD-ROM drive that is attached to `server-1` and type the following commands:

   ```
   server-1# cd /mymountpoint/Solaris_10/Tools
   server-1# ./add_to_install_server /export/install/x86_10
   ```

5. Repeat the previous command for each Oracle Solaris Languages for x86 Platforms CD.

EXAMPLE 7–4 x86: Copying the Oracle Solaris Operating System for x86 Platforms DVD

Insert the Oracle Solaris Operating System for x86 Platforms DVD in the DVD-ROM drive that is attached to `server-1` and type the following commands:

```
server-1# mkdir -p /export/install/x86_10
server-1# cd /mymountpoint/Solaris_10/Tools
server-1# ./setup_install_server /export/install/x86_10
```

x86: Create a Boot Server for Marketing Systems

Systems cannot boot from an install server on a different subnet, so `server-2` must be a boot server on the marketing group's subnet. Use the `setup_install_server(1M)` command to copy the boot software from the Oracle Solaris Operating System for x86 Platforms DVD or the Oracle Solaris Software for x86 Platforms - 1 CD. The boot software is copied to the `server-2` local disk in the `/export/boot` directory.

Choose the media and install the boot software to local disk. With the CD or DVD inserted into the drive that is attached to `server-2`, you would issue the following commands:

```
server-2# cd /mymountpoint/Solaris_10/Tools
server-2# ./setup_install_server -b /export/boot
```

The `-b` specifies that `setup_install_server` is to copy the boot information to the `/export/boot` directory.

Create a JumpStart Directory

Now that the install server and boot server are set up, create a JumpStart directory on `server-1` using any system on the network. This directory holds files that are required for a JumpStart installation of Oracle Solaris software. Set up this directory by copying the sample directory from the Oracle Solaris Operating System DVD image or from the Oracle Solaris Software - 1 CD image that has been copied to `/export/install`:

```
server-1# mkdir /jumpstart
server-1# cp -r /export/install/sparc_10/Solaris_10/Misc/jumpstart_sample /jumpstart
```

Share the JumpStart Directory

To make the `rules` file and profiles accessible to systems on the network, share the `/jumpstart` directory. To enable the sharing of a directory, add the following line to the `/etc/dfs/dfstab` file:

```
share -F nfs -o ro,anon=0 /jumpstart
```

Then, at the command line, issue the `shareall` command:

```
server-1# shareall
```

SPARC: Create the Engineering Group's Profile

For the engineering systems, create a file that is named `eng_prof` in the `/jumpstart` directory. The `eng_prof` file contains the following entries, which define the Oracle Solaris 10 8/11 software to be installed on systems in the engineering group:

```
install_type  initial_install
system_type   standalone
partitioning  default
cluster       SUNWCprog
filesys       any 512 swap
```

The previous example profile specifies the following installation information:

`install_type` The installation is to be treated as an initial installation, as opposed to an upgrade.

`system_type` The engineering systems are stand-alone systems.

`partitioning` The JumpStart software uses default disk partitioning for installing Oracle Solaris software on the engineering systems.

`cluster` The Developer System Support software group is to be installed.

`filesys`	Each system in the engineering group is to have 512 MB of swap space.

x86: Create the Marketing Group's Profile

For the marketing systems, you create a file that is named `marketing_prof` in the `/jumpstart` directory. The `marketing_prof` file contains the following entries, which define the Oracle Solaris 10 8/11 software to be installed on systems in the marketing group:

```
install_type  initial_install
system_type   standalone
partitioning  default
cluster       SUNWCuser
package       SUNWaudio
```

The previous example profile specifies the following installation information:

`install_type`	The installation is to be treated as an initial installation, as opposed to an upgrade.
`system_type`	The marketing systems are stand-alone systems.
`partitioning`	The JumpStart software is to use default disk partitioning for installing Oracle Solaris on the marketing systems.
`cluster`	The End User Oracle Solaris Software Group is to be installed.
`package`	The audio demo software package is to be added to each system.

Update the `rules` File

The Oracle Solaris installation program uses the rules in the `rules` file to select the correct installation (profile) for each system during a JumpStart installation.

At this site, each department is located on its own *subnet* and has its own network address. The engineering department is located on subnet 255.222.43.0. The marketing department is located on 255.222.44.0. Use this information to control how the engineering and marketing systems are installed with the Oracle Solaris 10 8/11 software. In the `/jumpstart` directory, edit the `rules` file, delete all of the example rules, and add the following lines to the file:

```
network 255.222.43.0 - eng_prof -
network 255.222.44.0 - marketing_prof -
```

Basically, these rules state that systems on the `255.222.43.0` network are to be installed with the Oracle Solaris 10 8/11 software by using the `eng_prof` profile. The systems on the `255.222.44.0` network are to be installed with the Oracle Solaris 10 8/11 software by using the `marketing_prof` profile.

Note – You can use the sample rules to use a network address to identify the systems to be installed with the Oracle Solaris 10 8/11 software by using `eng_prof` and `marketing_prof`, respectively. You can also use host names, memory size, or model type as the rule keyword. Table 8–1 contains a complete list of keywords you can use in a `rules` file.

Validate the `rules` File

After the `rules` and profiles are set up, run the `check` script to verify that the files are correct:

```
server-1# cd /jumpstart
server-1# ./check
```

If the `check` script does not find any errors, the script creates the `rules.ok` file.

SPARC: Set Up Engineering Systems to Install From the Network

After setting up the `/jumpstart` directory and files, use the `add_install_client` command on the install server, `server-1`, to set up the engineering systems to install the Oracle Solaris software from the install server. `server-1` is also the boot server for the engineering group's subnet.

```
server-1# cd /export/install/sparc_10/Solaris_10/Tools
server-1# ./add_install_client -c server-1:/jumpstart host-eng1 sun4u
server-1# ./add_install_client -c server-1:/jumpstart host-eng2 sun4u
```

In the example `add_install_client` command, the options that are used have the following meanings:

`-c` Specifies the server (`server-1`) and path (`/jumpstart`) to the JumpStart directory. Use this option if you are using NFS.

Note – If you are not using NFS, you specify the path to the JumpStart directory by using the following commands:

- **For SPARC based systems**, specify the path in the `boot` command
- **For x86 based systems**, specify the path by editing the GRUB menu entry

`host-eng1` The name of a system in the engineering group.

`host-eng2` The name of another system in the engineering group.

`sun4u` Specifies the platform group of the systems that use `server-1` as an install server. The platform group is for Ultra 5 systems.

x86: Set Up Marketing Systems to Install From the Network

Next, you use the `add_install_client` command on the boot server (`server-2`). This command sets up the marketing systems to boot from the boot server and install the Oracle Solaris software from the install server (`server-1`):

```
server-2# cd /marketing/boot-dir/Solaris_10/Tools
server-2# ./add_install_client -s server-1:/export/install/x86_10 \
-c server-1:/jumpstart host-mkt1 i86pc
server-2# ./add_install_client -s server-1:/export/install/x86_10 \
-c server-1:/jumpstart host-mkt2 i86pc
server-2# ./add_install_client -d -s server-1:/export/install/x86_10 \
-c server-1:/jumpstart SUNW.i86pc i86pc
server-2# ./add_install_client -c server-1:/jumpstart host-mkt1 sun4u
server-2# ./add_install_client -c server-1:/jumpstart host-mkt2 sun4u
```

In the `add_install_client` command, the options that are used have the following meanings:

`-d` Specifies that the client is to use DHCP to obtain the network install parameters. This option is required for clients to use PXE network boot to boot from the network. `-d` is optional for network boot clients that do not use PXE network boot.

`-s` Specifies the install server (`server-1`) and the path to the Oracle Solaris software (`/export/install/x86_10`).

`-c` Specifies the server (`server-1`) and path (`/jumpstart`) to the JumpStart directory. Use this option if you are using NFS.

Note – If you are not using NFS, you specify the path to the JumpStart directory by using the following commands:

- **For SPARC based systems**, specify the path in the `boot` command
- **For x86 based systems**, specify the path by editing the GRUB menu entry

---

`host-mkt1` The name of a system in the marketing group.

`host-mkt2` The name of another system in the marketing group.

`sun4u` Specifies the platform group of the systems that use `server-1` as an install server. The platform group is for Ultra 5 systems.

`SUNW.i86pc`	The DHCP class name for all Oracle Solaris x86 clients. If you want to configure all Oracle Solaris x86 DHCP clients with a single command, use this class name.
`i86pc`	Specifies the platform group of the systems that use this boot server. The platform name represents x86 based systems.

SPARC: Boot the Engineering Systems and Install Oracle Solaris Software

After setting up the servers and files, boot the engineering systems by using the following `boot` command at the `ok` (PROM) prompt of each system:

```
ok boot net - install
```

The Oracle Solaris OS is automatically installed on the engineering group's systems.

x86: Boot the Marketing Systems and Install Oracle Solaris Software

You can boot the system from one of the following:

- Oracle Solaris Software for x86 Platforms - 1 CD
- Oracle Solaris Operating System for x86 Platforms DVD
- The network by using PXE network boot

Oracle Solaris software is automatically installed on the marketing group's systems.

◆ ◆ ◆ CHAPTER 8

JumpStart Keyword Reference

This chapter lists keywords and values that you can use in the `rules` file, profiles, and begin and finish scripts.

Note – If you are installing an Oracle Solaris ZFS root pool, see Chapter 9, "Installing a ZFS Root Pool With JumpStart," for limitations and profile examples. Also, for a list of ZFS-specific keywords and keywords that can be used within a profile, see Table 8–2.

This chapter covers the following topics:

- "Rule Keywords and Values" on page 97
- "Profile Keywords and Values" on page 101
- "JumpStart Environment Variables" on page 145
- "Probe Keywords and Values" on page 147

Rule Keywords and Values

The following table describes the keywords and values that you can use in the `rules` file. For detailed instructions to create a `rules` file, see "Creating the `rules` File" on page 28.

TABLE 8–1 Descriptions of Rule Keywords and Values

Keyword	Value	Matches
`any`	minus sign (`-`)	Anything. The `any` keyword always succeeds.
`arch`	*processor-type*	A system's processor type.
	Valid values for *processor-type* are as follows: ■ SPARC: `sparc` ■ x86: `i386`	The `uname -p` command reports the system's processor type.

TABLE 8–1 Descriptions of Rule Keywords and Values *(Continued)*

Keyword	Value	Matches

`disksize`	*disk-name size-range*
	
	disk-name – A disk name in the form `c`*x*`t`*y*`d`*z*, such as `c0t3d0` or `c0d0` or the special word `rootdisk`. If `rootdisk` is used, the disk to be matched is determined in the following order:
	■ SPARC: The disk that contains the preinstalled boot image, which is a new SPARC based system with factory JumpStart installed
	■ The `c0t3d0s0` disk, if the disk exists
	■ The first available disk that is searched in kernel probe order
	
	size-range – The size of the disk, which must be specified as a range of Mbytes (*x*-*x*).
	
	Note – When calculating *size-range*, remember that a MB equals 1,048,576 bytes. A disk might be advertised as a 535 MB disk, but the disk might contain only 510 million bytes of disk space. The JumpStart program views the 535 MB disk as a 510 MB disk because 535,000,000 / 1,048,576 = 510. A 535 MB disk does not match a *size-range* equal to 530–550.
		The name and size of a system's disk in MB.
		
		For example:
		
		`disksize c0t3d0 250-300`
		
		In the example, the JumpStart program attempts to match a system disk that is named `c0t3d0`. The disk can hold between 250 and 300 MB of information.
		
		For example:
		
		`disksize rootdisk 750-1000`
		
		In the example, the JumpStart program attempts to match a disk in the following order:
		1. A system disk that contains a preinstalled boot image
		2. The `c0t3d0s0` disk, if the disk exists
		3. The first available disk that can hold between 750 MB and 1 GB of information

`domainname`	*domain-name*	A system's domain name, which controls how a naming service determines information. If you have a system already installed, the `domainname` command reports the system's domain name.
`hostaddress`	*IP-address*	A system's IP address.
`hostname`	*host-name*	A system's host name. If you have a system that is already installed, the `uname -n` command reports the system's host name.

TABLE 8–1 Descriptions of Rule Keywords and Values *(Continued)*

Keyword	Value	Matches
`installed`	*slice version* *slice* – A disk slice name in the form `c`*w*`t`*x*`d`*y*`s`*z*, such as `c0t3d0s5`, or the special words `any` or `rootdisk`. If `any` is used, the JumpStart program attempts to match all of the system's disks in kernel probe order. If `rootdisk` is used, the disk to be matched is determined in the following order: ■ SPARC: The disk that contains the preinstalled boot image, which is a new SPARC based system with factory JumpStart installed ■ The `c0t3d0s0` disk, if the disk exists ■ The first available disk that is searched in kernel probe order *version* – A version name or the special words `any` or `upgrade`. If `any` is used, any Oracle Solaris release is matched. If `upgrade` is used, any Oracle Solaris release that is supported and can be upgraded is matched. If the JumpStart program finds an Oracle Solaris release but is unable to determine the version, the version that is returned is `SystemV`.	A disk that has a root (`/`) file system that corresponds to a particular version of Oracle Solaris software. For example: `installed c0t3d0s1 Solaris 10` In the example, the JumpStart program attempts to match a system that has an Oracle Solaris root (`/`) file system on `c0t3d0s1`.
`karch`	*platform-group* Valid values are `sun4u`, `i86pc`, and `prep`. For a list of systems and their corresponding platform groups, see *Oracle Solaris Sun Hardware Platform Guide* at `http://www.oracle.com/technetwork/indexes/documentation/index.html`.	A system's platform group. If you have a system that is already installed, the `arch -k` command or the `uname -m` command reports the system's platform group.
`memsize`	*physical-mem* The value must be a range of MB, *x*-*x*, or a single MB value.	A system's physical memory size in MB. Example: `memsize 64-128` The example tries to match a system with a physical memory size between 64 and 128 MB. If you have a system that is already installed, the output of the `prtconf` command, line 2, reports the system's physical memory size.

TABLE 8–1 Descriptions of Rule Keywords and Values *(Continued)*

Keyword	Value	Matches
`model`	*platform-name*	A system's platform name. See the *Oracle Solaris Sun Hardware Platform Guide* at `http://www.oracle.com/technetwork/indexes/documentation/index.html` for a list of valid platform names. To find the platform name of an installed system, use the `uname -i` command or the output of the `prtconf` command, line 5. **Note –** If *platform-name* contains spaces, you must replace spaces with underscores (_). For example: `SUNW, Sun_4_50`
`network`	*network-num*	A system's network number, which the JumpStart program determines by performing a logical AND between the system's IP address and the subnet mask. Example: `network 192.168.2.0` The example tries to match a system with a `192.168.2.8` IP address, if the subnet mask is `255.255.255.0`.
`osname`	`Solaris_`*x*	A version of Oracle Solaris software that is already installed on a system. For example: `osname Solaris 10` In the example, the JumpStart program attempts to match a system with the Oracle Solaris 10 8/11 OS already installed.

TABLE 8–1 Descriptions of Rule Keywords and Values *(Continued)*

Keyword	Value	Matches
`probe`	*probe-keyword*	A valid probe keyword or a valid custom probe keyword. For example: `probe disks` The example returns the size of a system's disks in MB and in kernel probe order, for example, `c0t3d0s1`, `c0t4d0s0`, on a SPARC based system. The JumpStart program sets the `SI_DISKLIST`, `SI_DISKSIZES`, `SI_NUMDISKS`, and `SI_TOTALDISK` environment variables. **Note –** The `probe` keyword is unique in that the keyword does not attempt to match an attribute and run a profile. The `probe` keyword returns a value. Consequently, you cannot specify begin scripts, profiles, and finish scripts with the `probe` rule keyword. Probe keywords are described in Chapter 5, "Creating Custom Rule and Probe Keywords (Tasks)."
`totaldisk`	*size-range* The value must be specified as a range of MB (*x*-*x*). **Note –** When calculating *size-range*, remember that one MB equals 1,048,576 bytes. A disk might be advertised as a 535 MB disk, but the disk might have only 510 million bytes of disk space. The JumpStart program views the 535 MB disk as a 510 MB disk because 535,000,000 / 1,048,576 = 510. A 535 MB disk does not match a *size-range* equal to 530–550.	The total disk space on a system in MB. The total disk space includes all the operational disks that are attached to a system. For example: `totaldisk 300-500` In the example, the JumpStart program tries to match a system with a total disk space between 300 and 500 MB.

Profile Keywords and Values

This section describes the profile keywords and values that you can use in a profile. For detailed instructions to create a profile, see "Creating a Profile" on page 32. These keywords are for installing UFS and ZFS file systems. If the keyword can be used in a ZFS profile, the term "ZFS" is noted.

Profile Keywords Quick Reference

The following table provides a quick way to determine which keywords you can use, based on your installation scenario. Unless otherwise noted in the keyword descriptions, the keyword can only be used with the initial installation option. Also, these keywords are for a UFS file system unless noted that the keyword can be used in a ZFS root pool profile.

TABLE 8–2 Profile Keywords Overview

	Installation Scenarios							
Profile Keyword	**Stand-alone System (Nonnetworked)**	**Stand-alone System (Networked) or Server**	**OS Server**	**Upgrade**	**Flash Archive**	**Flash Archive Differential Archive**	**Upgrade With Disk Space Reallocation**	**Both UFS and ZFS**
`archive_location`	X	X			X			X
`backup_media`							X	
`boot_device` (UFS and ZFS)	X	X	X					X
`bootenv` (UFS and ZFS)	X	X	X					X
`client_arch`			X					
`client_root`			X					
`client_swap`			X					
`cluster` (adding software groups)	X	X	X					X
`cluster` (adding or deleting clusters)	X	X	X	X			X	X
`dontuse`	X	X	X					X
`fdisk` (x86 only)	X	X	X					X
`filesys` (mounting remote file systems)		X	X					X
`filesys` (creating local file systems)	X	X	X					
`filesys` (creating mirrored file systems)	X	X	X					
`forced_deployment`	X	X				X		
`geo`	X	X	X	X			X	X
`install_type`	X	X	X	X	X		X	X

TABLE 8–2 Profile Keywords Overview *(Continued)*

	Installation Scenarios							
Profile Keyword	**Stand-alone System (Nonnetworked)**	**Stand-alone System (Networked) or Server**	**OS Server**	**Upgrade**	**Flash Archive**	**Flash Archive Differential Archive**	**Upgrade With Disk Space Reallocation**	**Both UFS and ZFS**
`layout_constraint`							X	
`local_customization`	X	X			X			
`locale`	X	X	X	X			X	X
`metadb` (creating state database replicas)	X	X	X					
`no_master_check`	X	X				X		
`no_content_check`	X	X				X		
`num_clients`			X					
`package`	X	X	X	X	X		X	X
`partitioning`	X	X	X					
`patch`	X	X	X	X			X	
`pool`	X	X	X					X (ZFS root pools only)
`root_device`	X	X	X	X	X		X	X
`system_type`	X	X	X					
`usedisk`	X	X	X					X
`iscsi_target_name`		X		X				
`iscsi_target_ip`		X		X				
`iscsi_target_lun`		X		X				
`iscsi_target_port`		X		X				
`iscsi_target_slice`				X				

Profile Keyword Descriptions and Examples

archive_location Keyword

`archive_location` *retrieval-type location*

retrieval-type The values of *retrieval-type* and *location* depend on where the Flash Archive is stored. The following sections contain the values you can use for *retrieval-type* and *location* and examples of how to use the `archive_location` keyword:

- "Archive Stored on an NFS Server" on page 104
- "Archive Stored on an HTTP or HTTPS Server" on page 105
- "Archive Stored on an FTP Server" on page 106
- "Archive Stored on a Local Tape" on page 107
- "Archive Stored on a Local Device" on page 108
- "Archive Stored on a Local File" on page 109

location Specifics for locations are noted in the following sections.

Caution – A flash archive cannot be properly created when a non-global zone is installed. The Flash Archive feature is not compatible with the Oracle Solaris Zones partitioning technology. If you create a flash archive, the resulting archive is not installed properly when the archive is deployed under these conditions:

- The archive is created in a non-global zone
- The archive is created in a global zone that has non-global zones installed

Archive Stored on an NFS Server

If the archive is stored on an NFS server, use the following syntax for the `archive_location` keyword.

`archive_location nfs` *server-name:/path/filename retry n*

server-name The name of the server where you stored the archive.

path The location of the archive to be retrieved from the specified server. If the path contains `$HOST`, the Flash Archive installation utilities replace `$HOST` with the name of the clone system that you are installing.

filename The name of the flash archive file.

retry n An optional keyword. *n* is the maximum number of times the Flash Archive utilities attempt to mount the archive.

EXAMPLE 8–1 Archive Stored on an NFS Server

```
archive_location nfs golden:/archives/usrarchive

archive_location nfs://golden/archives/usrarchive
```

Archive Stored on an HTTP or HTTPS Server

If the archive is stored on an HTTP server, use the following syntax for the `archive_location` keyword.

`archive_location http://`*server-name:port/path/filename optional-keywords*

If the archive is stored on an HTTPS server, use the following syntax for the `archive_location` keyword.

`archive_location https://`*server-name:port/path/filename optional-keywords*

server-name — The name of the server where you stored the archive.

port — An optional port. *port* can be a port number or the name of a TCP service that has a port number that is determined at runtime.

If you do not specify a port, the Flash Archive installation utilities use the default HTTP port number, 80.

path — The location of the archive to be retrieved from the specified server. If the path contains `$HOST`, the Flash Archive installation utilities replace `$HOST` with the name of the clone system that you are installing.

filename — The name of the flash archive file.

optional-keywords — The optional keywords that you can specify when you retrieve a flash archive from an HTTP server.

TABLE 8–3 Optional Keywords to Use With archive_location HTTP

Keyword	Value Definition
`auth basic` *user-name password*	If the archive is located on an HTTP server that is password protected, you must include the user name and password that you need to access the HTTP server in the profile file. **Note –** The use of this authentication method in a profile that is intended for use with JumpStart is risky. Unauthorized users might have access to the profile file that contains the password.

TABLE 8–3 Optional Keywords to Use With archive_location HTTP *(Continued)*

Keyword	Value Definition
`timeout` *min*	The `timeout` keyword enables you to specify, in minutes, the maximum length of time that is allowed to pass without receipt of data from the HTTP server. If a timeout occurs, the connection is closed, reopened, and resumed. If you specify a `timeout` value of 0 (zero), the connection is not reopened. ■ If a timeout reconnection occurs, the Flash Archive installation utilities attempt to resume the installation at the last known position in the archive. If the Flash Archive installation utilities cannot resume the installation at the last known position, the retrieval restarts from the beginning of the archive and the data that was retrieved prior to the timeout is discarded. ■ If a timeout reconnection occurs while a package is being installed, the package is retried from the beginning of the package and the data that was retrieved prior to the timeout is discarded.
`proxy` *host:port*	The `proxy` keyword enables you to specify a proxy host and proxy port. You can use a proxy host to retrieve a flash archive from the other side of a firewall. You must supply a proxy port when you specify the `proxy` keyword.

EXAMPLE 8–2 Archive Stored on a HTTP or HTTPS Server

```
archive_location http://silver/archives/usrarchive.flar timeout 5
```

Example of the `auth basic` *username password* keyword:

```
archive_location http://silver/archives/usrarchive.flar timeout 5 user1 secret
```

Archive Stored on an FTP Server

If the archive is stored on an FTP server, use the following syntax for the `archive_location` keyword.

`archive_location ftp://`*username*`:`*password*`@`*server-name*`:`*port*`/`*path*`/`*filename* *optional-keywords*

username:password	The user name and password that you need to access the FTP server in the profile file.
server-name	The name of the server where you stored the archive.
port	An optional port. *port* can be a port number or the name of a TCP service that has a port number that is determined at runtime. If you do not specify a port, the Flash Archive installation utilities use the default FTP port number, 21.
path	The location of the archive to be retrieved from the specified server. If the path contains `$HOST`, the Flash Archive installation utilities replace `$HOST` with the name of the clone system that you are installing.

filename The name of the flash archive file.

optional-keywords The optional keywords that you can specify when you retrieve a flash archive from an FTP server.

TABLE 8–4 Optional Keywords to Use With archive_location FTP

Keyword	Value Definition
`timeout` *min*	The `timeout` keyword enables you to specify, in minutes, the maximum length of time that is allowed to pass without receipt of data from the HTTP server. If a timeout occurs, the connection is closed, reopened, and resumed. If you specify a `timeout` value of 0 (zero), the connection is not reopened. ■ If a timeout reconnection occurs, the Flash Archive installation utilities attempt to resume the installation at the last known position in the archive. If the Flash Archive installation utilities cannot resume the installation at the last known position, the retrieval restarts from the beginning of the archive and the data that was retrieved prior to the timeout is discarded. ■ If a timeout reconnection occurs while a package is being installed, the package is retried from the beginning of the package and the data that was retrieved prior to the timeout is discarded.
`proxy` *host:port*	The `proxy` keyword enables you to specify a proxy host and proxy port. You can use a proxy host to retrieve a flash archive from the other side of a firewall. You must supply a proxy port when you specify the `proxy` keyword.

EXAMPLE 8–3 Archive Stored on an FTP Server

```
archive_location ftp://user1:secret@silver/archives/usrarchive.flar timeout 5
```

Archive Stored on a Local Tape

If the archive is stored on a tape, use the following syntax for the `archive_location` keyword.

```
archive_location local_tape device position
```

device The name of the tape drive where you stored the flash archive. If the device name is a canonical path, the Flash Archive installation utilities retrieve the archive from the path to the device node. If you supply a device name that is not a canonical path, the Flash Archive installation utilities add `/dev/rmt/` to the path.

position Designates the place on the tape drive where you saved the archive. If you do not supply a position, the Flash Archive installation utilities retrieve the archive from the current position on the tape drive. By specifying *position*, you can place a begin script or a `sysidcfg` file on the tape drive before the archive.

EXAMPLE 8–4 Archive Stored on a Local Tape

```
archive_location local_tape /dev/rmt/0n 5

archive_location local_tape 0n 5
```

Archive Stored on a Local Device

You can retrieve a flash archive from a local device if you stored the flash archive on a file system-oriented, random-access device, such as a diskette or a DVD. Use the following syntax for the `archive_location` keyword.

Note – You can retrieve an archive from stream-oriented devices, such as tape, by using the syntax for local tape.

`archive_location local_device` *device path/filename file-system-type*

device	The name of the drive where you stored the flash archive. If the device name is a canonical path, the device is mounted directly. If you supply a device name that is not a canonical path, the Flash Archive installation utilities add `/dev/dsk/` to the path.
path	The path to the flash archive, relative to the root of the file system on the device you specified. If the path contains `$HOST`, the Flash Archive installation utilities replace `$HOST` with the name of the clone system that you are installing.
filename	The name of the flash archive file.
file-system-type	Specifies the type of file system on the device. If you do not supply a file system type, the Flash Archive installation utilities attempt to mount a UFS file system. If the UFS mount fails, the Flash Archive installation utilities attempt to mount an HSFS file system.

EXAMPLE 8–5 Archive Stored on a Local Device

To retrieve an archive from a local hard drive that is formatted as a UFS file system:

```
archive_location local_device c0t0d0s0 /archives/$HOST
```

To retrieve an archive from a local CD-ROM that has an HSFS file system:

```
archive_location local_device c0t0d0s0 /archives/usrarchive
```

Archive Stored on a Local File

You can retrieve an archive that you stored in the miniroot from which you booted the clone system as a local file. When you perform a JumpStart installation, you boot the system from a DVD, CD, or an NFS-based miniroot. The installation software is loaded and run from this miniroot. Therefore, a flash archive that you stored in the DVD, CD, or NFS-based miniroot is accessible as a local file. Use the following syntax for the `archive_location` keyword.

`archive_location local_file` *path/filename*

path The location of the archive. The path must be accessible to the system as a local file while the system is booted from the Oracle Solaris Software - 1 CD or from the Oracle Solaris Operating System DVD. The system cannot access `/net` or any other automounted directory when it is booted from the Oracle Solaris Software - 1 CD or from the Oracle Solaris Operating System DVD.

filename The name of the flash archive file.

EXAMPLE 8–6 Archive Stored on a Local File

```
archive_location local_file /archives/usrarchive
```

backup_media Profile Keyword

`backup_media` *type path*

You can use `backup_media` only with the upgrade option when disk space reallocation is required.

`backup_media` defines the media that is to be used to back up file systems if space needs to be reallocated during an upgrade because of insufficient space. If multiple tapes or diskettes are required for the backup, you are prompted to insert tapes or diskettes during the upgrade.

Valid *type* Value	Valid *path* Value	Specification
`local_tape`	`/dev/rmt/`*n*	A local tape drive on the system that is being upgraded. *path* must be the character (raw) device path for the tape drive. *n* is the number of the tape drive.
`local_diskette`	`/dev/rdiskette`*n*	A local diskette drive on the system that is being upgraded. *path* must be the character (raw) device path for the diskette drive. *n* is the number of the diskette drive. Diskettes that you use for the backup must be formatted.

Valid *type* Value	Valid *path* Value	Specification
`local_filesystem`	`/dev/dsk/c`*w*`t`*x*`d`*y*`s`*z* */file-system*	A local file system on the system that is being upgraded. You cannot specify a local file system that is being changed by the upgrade. *path* can be a block device path for a disk slice. For example, the `t`*x* in `/dev/dsk/c`*w*`t`*x*`d`*y*`s`*z* might not be needed. Or, *path* can be the absolute path to a file system that is mounted by the `/etc/vfstab` file.
`remote_filesystem`	*host*`:`*/file-system*	An NFS file system on a remote system. *path* must include the name or IP address of the remote system, *host*, and the absolute path to the NFS file system, *file-system*. The NFS file system must have read/write access.
`remote_system`	*user*`@`*host*`:`*/directory*	A directory on a remote system that can be reached by a remote shell, `rsh`. The system that is being upgraded must have access to the remote system through the remote system's `.rhosts` file. *path* must include the name of the remote system *host* and the absolute path to the directory *directory*. If a user login ID *user* is not specified, `root` is used by default.

EXAMPLE 8–7 backup_media Profile Keyword

```
backup_media local_tape /dev/rmt/0

backup_media local_diskette /dev/rdiskette1

backup_media local_filesystem /dev/dsk/c0t3d0s4

backup_media local_filesystem /export

backup_media remote_filesystem system1:/export/temp

backup_media remote_system user1@system1:/export/temp
```

boot_device Profile Keyword (UFS and ZFS)

Note – The `boot_device` keyword can be used when you install either a UFS file system or a ZFS root pool. The usage for this keyword is the same in both UFS and ZFS installations. For a complete list of keywords that can be used in a UFS or ZFS installation, see Table 8–2.

`boot_device` *device eeprom*

`boot_device` designates the device where the JumpStart program is to install the root (`/`) file system and the system's boot device. `boot_device` must match any `filesys` keywords that specify the root (`/`) file system and the `root_device` keyword.

If you do not specify the `boot_device` keyword in a profile, the following `boot_device` keyword is specified by default during the installation:

```
boot_device any update
```

device Use one of the following values.

SPARC: c*w*t*x*d*y*s*z* or c*x*d*y*s*z*	The disk slice where the JumpStart program places the root (`/`) file system, for example, `c0t0d0s0`.
x86: c*w*t*x*d*y* or c*x*d*y*	The disk where the JumpStart program places the root (`/`) file system, for example, `c0d0`.
`existing`	The JumpStart program places the root (`/`) file system on the system's existing boot device.
`any`	The JumpStart program chooses where to place the root (`/`) file system. The JumpStart program attempts to use the system's existing boot device. The JumpStart program might choose a different boot device if necessary.

eeprom Choose to update or preserve the system's EEPROM.

The *eeprom* value enables you to update the system's EEPROM if you change the system's current boot device. By updating the system's EEPROM, the system can automatically boot from the new boot device.

Note – x86: You must specify the `preserve` value.

`update`	The JumpStart program updates the system's EEPROM to the specified boot device so that the installed system automatically boots from it.
`preserve`	The boot device value in the system's EEPROM is not changed. If you specify a new boot device without changing the system's EEPROM, you need to change the system's EEPROM manually so it can automatically boot from the new boot device.

EXAMPLE 8–8 boot_device Profile Keyword

```
boot_device c0t0d0s2 update
```

bootenv Profile Keyword (UFS and ZFS)

Note – The `bootenv` keyword can be used for either a UFS file system or a ZFS root pool installation. The usage is different for a ZFS installation.

- For a complete list of keywords that can be used in a UFS or ZFS installation, see Table 8–2
- For a description of how the `bootenv` keyword can be used when installing a ZFS root pool, see "JumpStart Keywords for a ZFS Root (/) File System (Reference)" on page 151

```
bootenv createbe bename new-BE-name filesystem mountpoint:device:fs-options
[filesystem...]
```

`bootenv createbe` keyword enables you to quickly create an empty and inactive boot environment at the same time you are installing the Oracle Solaris OS. At a minimum, you must create the root (`/`) file system. The slices are reserved for the file systems specified, but no file systems are copied. The boot environment is named, but not actually created until installed with a flash archive. When the empty boot environment is installed with an archive, file systems are installed on the reserved slices. The following lists the values for `bename` and `filesystem`.

`bename` *new-BE-name*
: `bename` specifies the name of the new boot environment to be created. *new-BE-name* can be no longer than 30 characters, can contain only alphanumeric characters, and can contain no multibyte characters. The name must be unique on the system.

`filesystem` *mountpoint*:*device*:*fs-options*
: `filesystem` determines the type and number of file systems that are to be created in the new boot environment. At least one slice that contains the root (`/`) file system must be defined. File systems can be on the same disk or spread across multiple disks.

  - *mountpoint* can be any valid mount point or – (hyphen), indicating a swap slice.
  - *device* must be available when the operating system that is being installed is first booted. The device has no relation to JumpStart special storage devices such as *free*. The device cannot be a Solaris Volume Manager volume or Veritas Volume Manager volume. *device* is the name of a disk device, of the form `/dev/dsk/c`*w*`t`*x*`d`*y*`s`*z*.
  - *fs-options* can be one of the following:
    - `ufs`, which indicates a UFS file system.
    - `swap`, which indicates a swap file system. The swap mount point must be a – (hyphen).

For a profile example and background about using this keyword, see the following references:

- For an example of a profile, see Example 3–11.
- For background about using Live Upgrade that creates, upgrades, and activates inactive boot environments, see Chapter 2, "Live Upgrade (Overview)," in *Oracle Solaris 10 1/13 Installation Guide: Live Upgrade and Upgrade Planning*.

- For background about using a flash archive, see Chapter 1, "Flash Archive Overview," in *Oracle Solaris 10 1/13 Installation Guide: Flash Archives (Creation and Installation)*.

client_arch Profile Keyword

`client_arch` *karch-value* `...`

`client_arch` specifies that the operating system server is to support a different platform group than the server uses. If you do not specify `client_arch` in the profile, any diskless client that uses the operating system server must contain the same platform group as the server. You must specify each platform group that you want the operating system server to support.

Valid values for *karch-value* are `sun4u` and `i86pc`. For a detailed list of platform names and various systems, see *Oracle Solaris Sun Hardware Platform Guide* at `http://www.oracle.com/technetwork/indexes/documentation/index.html`.

Note – You can use `client_arch` only when `system_type` is specified as `server`.

---

client_root Profile Keyword

`client_root` *root-size*

`client_root` defines the amount of root space, *root-size*, in MB, to allocate for each client. If you do not specify `client_root` in a server's profile, the installation software allocates 15 MB of root space per client. The size of the client root area is used in combination with the `num_clients` keyword to determine how much space to reserve for the `/export/root` file system.

Note – You can use `client_root` only when `system_type` is specified as `server`.

---

client_swap Profile Keyword

`client_swap` *swap-size*

`client_swap` defines the amount of swap space, *swap-size*, in MB, to allocate for each diskless client. If you do not specify `client_swap` in the profile, 32 MB of swap space is allocated by default.

Note – You can use `client_swap` only when `system_type` is specified as `server`.

EXAMPLE 8–9 client_swap Profile Keyword

The following example specifies that each diskless client is to have a swap space of 64 MB.

```
client_swap 64
```

How the Size of swap Is Determined

If a profile does not specify the size of `swap`, the JumpStart program determines the size of the swap space based on the system's physical memory. The following table shows how the size of `swap` is determined during a JumpStart installation.

TABLE 8–5 Determining swap Size

Physical Memory (in MB)	Swap Space (in MB)
16–64	32
64–128	64
128–512	128
Greater than 512	256

The JumpStart program makes the size of `swap` no more than 20 percent of the disk where `swap` is located. The allocation is different if the disk contains free space after laying out the other file systems. If free space exists, the JumpStart program allocates the free space to `swap`, and if possible, allocates the amount that is shown in the table.

Note – Physical memory plus swap space must total a minimum of 32 MB.

cluster Profile Keyword (Adding Software Groups) (UFS and ZFS)

The `cluster` keyword can be used when you install either a UFS file system or a ZFS root pool. The usage for this keyword is the same in both UFS and ZFS installations.

- For a complete list of keywords that can be used in a UFS or ZFS installation, see Table 8–2
- For a description of how the `cluster` keyword can be used in a profile for an installation of a ZFS root pool, see "JumpStart Profile Examples for a ZFS Root Pool" on page 154

`cluster` *group-name*

`cluster` designates the software group to add to the system.

A software group is a metacluster that contains a collection of clusters and packages. The software group is installed by using the `cluster` keyword and *group-name* variable. This cluster keyword can only be installed in an initial installation. This `cluster` keyword refers to metaclusters found in the `clustertoc`(4) file.

A cluster is a collection of packages that is named `SUNW`*name*. A cluster is installed by using the `cluster` keyword and *cluster-name* variable. A cluster can be added or removed from a software group (metacluster) in an initial install or an upgrade.

The *group-name* for each software group is listed in the following table.

Software Group	*Value*
Reduced Network Support Software Group	`SUNWCrnet`
Core System Support Software Group	`SUNWCreq`
End User Oracle Solaris Software Group	`SUNWCuser`
Developer Oracle Solaris Software Group	`SUNWCprog`
Entire Oracle Solaris Software Group	`SUNWCall`
Entire Oracle Solaris Software Group Plus OEM Support	`SUNWCXall`

The following limitations apply:

- You can specify only one software group in a profile.
- The software group must be specified before other `cluster` and `package` entries.
- If you do not specify a software group with `cluster` in the profile, the end user software group, `SUNWCuser`, is installed on the system.

For more information about software groups, see "Disk Space Recommendations for Software Groups" in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*.

cluster Profile Keyword (Adding or Deleting Clusters) (UFS and ZFS)

`cluster` *cluster-name* *[add | delete]*

Note – The `cluster` keyword can be used when you install either a UFS file system or a ZFS root pool. The usage for this keyword is the same in both UFS and ZFS installations.

- For a complete list of keywords that can be used in a UFS or ZFS installation, see Table 8–2
- For a description of how the `cluster` keyword can be used in a profile for an installation of a ZFS root pool, see "JumpStart Profile Examples for a ZFS Root Pool" on page 154

`cluster` designates whether a cluster is to be added or deleted from the software group that is to be installed on the system.

cluster-name The name of the cluster that must be in the form `SUNWC`*name*.

[add | delete] An optional keyword that indicates whether to add or delete the cluster that is specified. Use the value `add` or `delete`. If you do not specify `add` or `delete`, `add` is used by default.

When you use `cluster` during an upgrade, the following conditions apply:

- All clusters that are already on the system are automatically upgraded.

- If you specify *cluster-name* `add`, and *cluster-name* is not installed on the system, the cluster is installed.
- If you specify *cluster-name* `delete`, and *cluster-name* is installed on the system, the package is deleted *before* the upgrade begins.

Note – A software group is a metacluster that contains a collection of clusters and packages. The software group is installed by using the `cluster` keyword and *group-name* variable. This cluster keyword can only be installed in an initial installation. This `cluster` keyword refers to metaclusters found in the `clustertoc`(4) file.

A cluster is collection of packages. Clusters can be grouped together to form a software group (metacluster). A cluster name is always in the form of `SUNW`name. A cluster is installed by using the `cluster` keyword and *cluster-name* variable. A cluster can be added or removed from a software group (metacluster) in an initial install or an upgrade.

---

dontuse Profile Keyword (UFS and ZFS)

Note – The `dontuse` keyword can be used when you install either a UFS file system or a ZFS root pool. The usage for this keyword is the same in both UFS and ZFS installations.

For a complete list of keywords that can be used in a UFS or ZFS installation, see Table 8–2.

`dontuse` *disk-name* `...`

By default, the JumpStart program uses all of the operational disks on the system when `partitioning default` is specified. `dontuse` designates one or more disks that you do not want the JumpStart program to use. *disk-name* must be specified in the form c*x*t*y*d*z*or c*y*d*z*, for example, `c0t0d0`.

Note – You cannot specify the `dontuse` keyword and the `usedisk` keyword in the same profile.

---

x86: fdisk Profile Keyword (UFS and ZFS)

Note – The `fdisk` keyword can be used when you install either a UFS file system or a ZFS root pool. The usage for this keyword is the same in both UFS and ZFS installations. For a complete list of keywords that can be used in a UFS or ZFS installation, see Table 8–2.

`fdisk` *disk-name type size*

`fdisk` defines how the `fdisk` partitions are set up on an x86 based system. You can specify `fdisk` more than once. When `fdisk` partitions an x86 based system, the following occurs:

- All `fdisk` partitions on the disk are preserved unless you delete the partitions with the `fdisk` keyword by assigning *size* the value of `delete` or `0`. Also, all existing `fdisk` partitions are deleted when *size* is set to `all`.
- An Oracle Solaris `fdisk` partition that contains a root (`/`) file system is always designated as the active partition on the disk.

Note – The system boots from the active partition by default.

- If the `fdisk` keyword is not specified in a profile, the following `fdisk` keyword is used by default during the installation.

```
fdisk all solaris maxfree
```

- `fdisk` entries are processed in the order in which the entries are listed in the profile.

disk-name Use the following values to specify where the `fdisk` partition is to be created or deleted:

- c*x*t*y*d*z* or c*y*d*z* – A specific disk, for example, `c0t3d0`.
- `rootdisk` – The variable that contains the value of the system's root disk, which is where the installation takes place. The root disk is determined by the JumpStart program as described in "How the System's Root Disk Is Determined" on page 143.
- `all` – All the selected disks.

type Use the following values to specify the type of `fdisk` partition that is to be created or deleted on the specified disk:

- `solaris` – An Oracle Solaris `fdisk` partition (`SUNIXOS` `fdisk` type).
- `dosprimary` – An alias for primary DOS `fdisk` partitions, not for `fdisk` partitions that are extended or reserved for data DOS. When you delete `fdisk` partitions by assigning *size* the value `delete`, `dosprimary` is an alias for the `DOSHUGE`, `DOSOS12`, and `DOSOS16` `fdisk` types. When you create an `fdisk` partition, `dosprimary` is an alias for the `DOSHUGE` `fdisk` partition.
- *DDD* – An integer `fdisk` partition. *DDD* is an integer between 1 and 255 inclusive.

Note – You can specify this value only if *size* is `delete`.

- 0x*HH* – A hexadecimal `fdisk` partition. *HH* is a hexadecimal number between 01 and FF.

Note – You can specify this value only if *size* is `delete`.

The following table shows the integer and hexadecimal numbers for some of the `fdisk` types.

`fdisk` Type	*DDD*	*HH*
`DOSOS12`	`1`	`01`
`PCIXOS`	`2`	`02`
`DOSOS16`	`4`	`04`
`EXTDOS`	`5`	`05`
`DOSHUGE`	`6`	`06`
`DOSDATA`	`86`	`56`
`OTHEROS`	`98`	`62`
`UNIXOS`	`99`	`63`

size Use one of the following values:

- *DDD* – An `fdisk` partition of size *DDD* in MB is created on the specified disk. *DDD* must be an integer, and the JumpStart program automatically rounds the number up to the nearest cylinder boundary. Specifying a value of `0` is the same as specifying `delete`.
- `all` – An `fdisk` partition is created on the entire disk. All existing `fdisk` partitions are deleted.

---

x86 only – The `all` value can be specified only if *type* is `solaris`.

- `maxfree` – An `fdisk` partition is created in the largest contiguous free space on the specified disk. If an `fdisk` partition of the specified type already exists on the disk, the existing `fdisk` partition is used. A new `fdisk` partition is *not* created on the disk.

x86 only – The disk must contain at least one unused `fdisk` partition. Also, the disk must have free space or the installation fails. The `maxfree` value can be specified only if *type* is `solaris` or `dosprimary`.

- `delete` – All `fdisk` partitions of the specified type are deleted on the specified disk.

filesys Profile Keyword (Mounting Remote File Systems) (UFS and ZFS)

Note – The `filesys` keyword can be used when you install either a UFS file system or a ZFS root pool. The usage for this keyword is the same in both UFS and ZFS installations. For a complete list of keywords that can be used in a UFS or ZFS installation, see Table 8–2.

`filesys` *server*:*path server-address mount-point mount-options*

By using `filesys` with the listed values, the JumpStart program sets up the installed system to automatically mount remote file systems when the system boots. You can specify `filesys` more than once.

server — The name of the server where the remote file system is located, followed by a colon.

path — The remote file system's mount-point name, for example, `/usr` or `/export/home`.

server-address — The IP address of the server that is specified in *server*:*path*. If a naming service is not running on the network, the *server-address* value can be used to populate the `/etc/hosts` file with the server's host name and IP address. If you are not specifying the server's IP address, you must specify a minus sign (`-`). For example, if you have a naming service that is running on the network, you do not need to specify the server's IP address.

mount-point — The name of the mount point on which the remote file system is to be mounted.

mount-options — One or more mount options, which is the same as the `-o` option of the `mount(1M)` command. The mount options are added to the `/etc/vfstab` entry for the specified *mount-point*.

Note – If you need to specify more than one mount option, the mount options must be separated by commas and no spaces (`ro,quota` for example).

EXAMPLE 8–10 filsys Profile Keyword

```
filesys sherlock:/export/home/user2 - /home
```

filesys Profile Keyword (Creating Local File Systems)

`filesys` *slice size file-system optional-parameters*

By using `filesys` with the values that are listed, the JumpStart program creates local file systems during the installation. You can specify `filesys` more than once.

slice Use one of the following values:

`any` The JumpStart program places the file system on any disk.

Note – You cannot specify *any* when *size* is `existing`, `all`, `free`, *start*:*size*, or `ignore`.

c*w*t*x*d*y*s*z* or c*x*d*y*s*z* The disk slice where the JumpStart program places the file system, for example, `c0t0d0s0` or `c0d0s0`.

`rootdisk.s`*n* The variable that contains the value for the system's root disk, which is determined by the JumpStart program as described in "How the System's Root Disk Is Determined" on page 143. The `s`*n* suffix indicates a specific slice on the disk.

Note – The root disk is determined by the JumpStart program and determines where the OS is to be installed. The rules file uses a probe keyword `rootdisk`, but this keyword is used differently than the "rootdisk" keyword used in the JumpStart profile. You cannot set the place of installation by using the probe keyword `rootdisk` in the rules file. The probe keyword, `rootdisk`, determines where to boot from during the installation. See Table 8–10.

size Use one of the following values:

num The size of the file system is set to *num* in MB.

`existing` The current size of the existing file system is used.

Note – When you use the `existing` value, you can change the name of an existing slice by specifying *file-system* as a different *mount-point*.

`auto` The size of the file system is automatically determined, depending on the software that is selected.

`all` The specified slice uses the entire disk for the file system. When you specify the `all` value, no other file systems can be placed on the specified disk.

`free` The remaining unused space on the disk is used for the file system.

Note – If `free` is used as the value to `filesys`, the `filesys` entry must be the last entry in a profile.

start:*size* The file system is explicitly partitioned. *start* is the cylinder where the slice begins. *size* is the number of cylinders for the slice.

file-system The *file-system* value is optional and used when *slice* is specified as `any` or `c`*w*`t`*x*`d`*y*`s`*z*. If *file-system* is not specified, `unnamed` is set by default. If `unnamed` is set, you cannot specify the *optional-parameters* value. Use one of the following values:

mount-point The file system's mount-point name, for example, `/var`.

`swap` The specified slice is used as `swap`.

`overlap` The specified slice is defined as a representation of a disk region. The VTOC value is `V_BACKUP`. By default, slice 2 is an overlap slice that is a representation of the whole disk.

Note – You can specify `overlap` only when *size* is `existing`, `all`, or *start*:*size*.

	`unnamed`	The specified *slice* is defined as a raw slice, so slice does not have a mount-point name. If you do not specify *file-system*, `unnamed` is used by default.
	`ignore`	The specified slice is not used or recognized by the JumpStart program. You can use this option to specify that you want a file system to be ignored on a disk during installation. The JumpStart program creates a new file system on the same disk with the same name. You can use `ignore` only when `partitioning existing` is specified.
optional-parameters	Use one of the following values:	
	`preserve`	The file system on the specified slice is preserved.
		Note – `preserve` can be specified only when *size* is `existing` and *slice* is `c`*w*`t`*x*`d`*y*`s`*z*.
	mount-options	One or more mount options, which is the same as the `-o` option of the `mount(1M)` command. The mount options are added to the `/etc/vfstab` entry for the specified *mount-point*.
		Note – If you need to specify more than one mount option, the mount options must be separated by commas and no space (`ro,quota`, for example).

filesys Profile Keyword (Creating RAID-1 Volumes)

`filesys mirror[:`*name*`]`*slice* `[`*slice*`]` *size file-system optional-parameters*

By using the `filesys mirror` keywords with the values that are listed, the JumpStart program creates the RAID-1 and RAID-0 volumes that are necessary to create a mirrored file system. You can specify `filesys mirror` more than once to create RAID-1 volumes (mirrors) for different file systems.

Note – The `filesys mirror` keyword is only supported for initial installations.

name	This optional keyword enables you to name the RAID-1 volume (mirror). Mirror names must start with the letter "d" followed by a number between 0 and 127, for example, `d100`. If you do not specify a

mirror name, the JumpStart program assigns a mirror name for you. For guidelines about how to name mirrors, see "RAID Volume Name Requirements and Guidelines" in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*.

slice

This value specifies the disk slice where the JumpStart program places the file system you want to duplicate. The slice value must follow the format *cwtxdysz*, for example `c0t0d0s0` or `c0t0d0s5`. The JumpStart program creates a RAID-0 volume (single-slice concatenation) on the slice, and creates a RAID-1 volume to mirror the concatenation. You can specify up to two slices for two RAID-0 volumes.

size

This value specifies the size, in MB, of the file system.

file-system

This value specifies the file system that you are duplicating. The JumpStart program creates the RAID-1 volume from the slices that are specified and mounts the RAID-1 volume on the specified file system. In addition to critical file systems, such as root (`/`), `/usr`, and `/var`, you can also specify `swap` as the file system.

- If *file-system* is not specified, `unnamed` is set by default.
- If `unnamed` is set, you cannot specify the *optional-parameters* value. Use one of the following values:

  mount-point — Specifies the file system's mount-point name, for example, `/var`.

  `swap` — Defines the slice to be used as swap.

  `overlap` — Defines the slice as a representation of a disk region. The VTOC value is `V_BACKUP`. By default, slice 2 is an overlap slice that is a representation of the whole disk. You can specify `overlap` only when *size* is one of the following values:

  - `existing`
  - `all`
  - *start*:*size*.

  `unnamed` — Defines the slices as a raw slice. Therefore, the slice does not have a mount-point name. If you do not specify *file-system*, `unnamed` is used by default.

  `ignore` — Specifies that the slice is not to be used or recognized by the JumpStart program. You can use this option to specify that you want a file system to be ignored on a disk during installation. The JumpStart program creates a new file system

on the same disk with the same name. You can use `ignore` only when the `partitioning` keyword and the `existing` value is specified.

optional-parameters One or more mount options, which is the same as the `-o` option of the `mount(1M)` command. The mount options are added to the `/etc/vfstab` entry for the specified file system. If you need to specify more than one mount option, the mount options must be separated by commas and no spaces, for example, `ro,quota`.

Note – If `unnamed` is set for the *file-system* value, you cannot specify the *optional-parameters* value. See *file-system* for the values that can be set.

For more information about creating mirrored file systems during your installation, see Chapter 8, "Creating RAID-1 Volumes (Mirrors) During Installation (Overview)," in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*.

forced_deployment Profile Keyword (Installing Flash Archive Differential Archives)

`forced_deployment`

`forced_deployment` forces the installation of a Flash Archive differential archive onto a clone system that is different than the software expects.

Caution – If you use `forced_deployment`, all new files are deleted to bring the clone system to the expected state. If you are not certain that you want files deleted, use the default, which protects new files by stopping the installation.

geo Profile Keyword (UFS and ZFS)

Note – The `geo` keyword can be used when you install either a UFS file system or a ZFS root pool. The usage for this keyword is the same in both UFS and ZFS installations. For a complete list of keywords that can be used in a UFS or ZFS installation, see Table 8–2.

`geo` *region*

`geo` designates the regional locale or locales that you want to install on a system or to add when upgrading a system. *region* designates a geographical area that contains the locales that you want to install. Values you can specify for *region* are listed in the following table.

Value	Description
N_Africa	Northern Africa, including Egypt
C_America	Central America, including Costa Rica, El Salvador, Guatemala, Mexico, Nicaragua, Panama
N_America	North America, including Canada, United States
S_America	South America, including Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, Venezuela
Asia	Asia, including Japan, Republic of Korea, People's Republic of China, Taiwan, Thailand
Ausi	Australasia, including Australia, New Zealand
C_Europe	Central Europe, including Austria, Czech Republic, Germany, Hungary, Poland, Slovakia, Switzerland
E_Europe	Eastern Europe, including Albania, Bosnia, Bulgaria, Croatia, Estonia, Latvia, Lithuania, Macedonia, Romania, Russia, Serbia, Slovenia, Turkey
N_Europe	Northern Europe, including Denmark, Finland, Iceland, Norway, Sweden
S_Europe	Southern Europe, including Greece, Italy, Portugal, Spain
W_Europe	Western Europe, including Belgium, France, Great Britain, Ireland, Netherlands
M_East	Middle East, including Israel

For a complete list of the component locale values that compose each regional locale, see *International Language Environments Guide*.

Note – You can specify a geo keyword for each locale you need to add to a system.

install_type Profile Keyword (UFS and ZFS)

Note – The `install_type` keyword can be used for either a UFS file system or a ZFS root pool installation. The usage is limited for a ZFS installation. You can only use the `initial_install` option for a ZFS installation.

- If you want to migrate your UFS file system to a ZFS root pool or upgrade a ZFS root pool, you must use Live Upgrade. See Chapter 10, "Live Upgrade and ZFS (Overview)," in *Oracle Solaris 10 1/13 Installation Guide: Live Upgrade and Upgrade Planning*.
- For a complete list of keywords that can be used in a UFS or ZFS installation, see Table 8–2
- For a description of how the `install_type` keyword can be used when installing a ZFS root pool, see "JumpStart Keywords for a ZFS Root (/) File System (Reference)" on page 151.

`install_type` *type*

`install_type` defines whether to erase and install a new Oracle Solaris OS on a system, upgrade the existing Oracle Solaris OS on a system, or install a Flash Archive on the system.

Note – You must specify `install_type` in a profile, and `install_type` must be the first profile keyword in every profile.

You must use one of the following options for the *type*

`initial_install`	Specifies to perform an initial installation of the Oracle Solaris OS
`upgrade`	Specifies to perform an upgrade of the Oracle Solaris OS
`flash_install`	Specifies to install a flash archive that overwrites all files
`flash_update`	Specifies to install a Flash Archive differential archive that overwrites only the files that are specified

Note – Each of these options has a specific set of related profile keywords.

layout_constraint Profile Keyword

`layout_constraint` *slice constraint minimum-size*

`layout_constraint` designates the constraint that auto-layout has on a file system if auto-layout needs to reallocate space during an upgrade because of space problems.

Limitation	Description
This keyword is used only with the `upgrade` option.	You can use `layout_constraint` only for the `upgrade` option when you need to reallocate disk space.
If you do not specify the `layout_constraint` keyword	The JumpStart program lays out the disk as follows: ■ File systems that require more space for the upgrade are marked `changeable`. ■ File systems that are on the same disk as the file system that requires more space and that are mounted by the `/etc/vfstab` file are marked `changeable`. ■ Remaining file systems are marked fixed because auto-layout cannot change the file systems.
If you specify one or more `layout_constraint` keywords	The JumpStart program lays out the disk as follows: ■ File systems that require more space for the upgrade are marked `changeable`. ■ File systems for which you specified a `layout_constraint` keyword are marked with the specified constraint. ■ The remaining file systems are marked `fixed`.
If the file system is not marked `changeable`	You cannot change the constraint on file systems that require more space for the upgrade because the file systems must be marked `changeable`. You can use the `layout_constraint` keyword to change the *minimum-size* values on file systems that require more space for the upgrade.
If file systems require more space for upgrade	To help auto-layout reallocate space, select more file systems to be changeable or movable, especially those file systems that are located on the same disks as the file systems that require more space for the upgrade.

slice Specifies the file system's disk slice on which to specify the constraint. You must specify the system's disk slice in the form c*w*t*x*d*y*s*z* or c*x*d*y*s*z*.

constraint Use one of the following constraints for the specified file system:

`changeable` Auto-layout can move the file system to another location and it can change the file system size. The `changeable` constraint can only be specified on file systems that are mounted by the `/etc/vfstab` file. You can change the file system's size by specifying the *minimum-size* value.

When you mark a file system as changeable and *minimum-size* is not specified, the file system's minimum size is set to 10 percent more than the minimum size that is

required. For example, if the minimum size for a file system is 100 MB, the changed size is 110 MB. If *minimum-size* is specified, any free space that remains, original size minus minimum size, is used for other file systems.

`movable` Auto-layout can move the file system to another slice on the same disk or different disk. The file system size remains the same.

`available` Auto-layout can use all of the space on the file system to reallocate space. All of the data in the file system is lost. The `available` constraint can only be specified on file systems that are not mounted by the `/etc/vfstab` file.

`collapse` Auto-layout moves and collapses the specified file system into the parent file system. You can use the `collapse` option to reduce the number of file systems on a system as part of the upgrade. For example, if a system has the `/usr` and `/usr/share` file systems, collapsing the `/usr/share` file system moves the file system into `/usr`, the parent file system. You can specify the `collapse` constraint only on file systems that are mounted by the `/etc/vfstab` file.

minimum-size Specifies the size of the file system after auto-layout reallocates space. The *minimum-size* option enables you to change the size of a file system. The size of the file system might be larger if unallocated space is added to the file system. But, the size is never less than the value you specify. The *minimum-size* value is optional. Use this value only if you have marked a file system as `changeable` and the minimum size cannot be less than what the file system needs for the existing file system contents.

EXAMPLE 8–11 layout_constraint Profile Keyword

```
layout_constraint c0t3d0s1 changeable 200

layout_constraint c0t3d0s4 movable

layout_constraint c0t3d1s3 available

layout_constraint c0t2d0s1 collapse
```

local_customization Profile Keyword (Installing Flash Archives)

`local_customization` *local-directory*

Before you install a flash archive on a clone system, you can create custom scripts to preserve local configurations on the clone system. The `local_customization` keyword designates the directory where you have stored these scripts. *local-directory* is the path to the script on the clone system.

For information about predeployment and postdeployment scripts, see "Creating Customization Scripts" in *Oracle Solaris 10 1/13 Installation Guide: Flash Archives (Creation and Installation)*.

locale Profile Keyword (UFS and ZFS)

Note – The `locale` keyword can be used when you install either a UFS file system or a ZFS root pool. The usage for this keyword is the same in both UFS and ZFS installations. For a complete list of keywords that can be used in a UFS or ZFS installation, see Table 8–2.

`locale` *locale-name*

Note – You can use `locale` with both the initial installation and upgrade options.

`locale` designates the locale packages you want to install or add when upgrading for the specified *locale-name*. The locale name values are the same as those values that are used for the `$LANG` environment variable. *International Language Environments Guide* contains a list of valid locale values.

When you use the `locale` keyword, consider the following:

- If you have preconfigured a default locale, the locale is automatically installed. The English language packages are installed by default.
- You can specify a `locale` keyword for each locale you need to add to a system.

metadb Profile Keyword (Creating State Database Replicas)

`metadb` *slice* `[size` *size-in-blocks*`] [count` *number-of-replicas*`]`

The `metadb` keyword enables you to create Solaris Volume Manager state database replicas (mediates) during your JumpStart installation. You can use the `metadb` keyword multiple times in your profile file to create state database replicas on different disk slices.

slice — You must specify the disk slice on which you want the JumpStart program to place the state database replica. The *slice* value must follow the format c*w*t*x*d*y*s*z*.

`size` *size-in-blocks*	The `size` optional keyword enables you to specify the size, in blocks, of the state database replica to be created. If you do not specify a `size` value, the JumpStart program uses a default size of 8192 blocks for the state database replica.
`count` *number-of-replicas*	You can specify the number of state database replicas you are creating by setting the optional `count` keyword value in your profile. If you do not specify a `count` value, the JumpStart program creates three state database replicas by default.

For more information about creating Solaris Volume Manager state database replicas during your installation, see "State Database Replicas Guidelines and Requirements" in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*.

no_content_check Profile Keyword (Installing Flash Archives)

`no_content_check`

When installing a clone system with a Flash Archive differential archive, you can use the `no_content_check` keyword to ignore file-by-file validation. File-by-file validation ensures that the clone system is a duplicate of the master system. Avoid using this keyword unless you are sure the clone system is a duplicate of the original master system.

Caution – If you use `no_content_check`, all new files are deleted to bring the clone system to the expected state. If you are not certain that you want files deleted, use the default, which protects new files by stopping the installation.

For information about installing Flash Archive differential archives, see "To Prepare to Install a Flash Archive With a JumpStart Installation" on page 77.

no_master_check Profile Keyword (Installing Flash Archives)

`no_master_check`

When installing a clone system with a Flash Archive differential archive, you can use the `no_master_check` keyword to ignore checking the clone system to make sure it was built from the original master system. Avoid using this keyword unless you are sure the clone system is a duplicate of the original master system.

For information about installing Flash Archive differential archives, see "To Prepare to Install a Flash Archive With a JumpStart Installation" on page 77.

num_clients Profile Keyword

`num_clients` *client-num*

When a server is installed, space is allocated for each diskless client's root (`/`) and `swap` file systems. `num_clients` defines the number of diskless clients, *client-num*, that a server supports. If you do not specify `num_clients` in the profile, five diskless clients are allocated by default.

Note – You can use `num_clients` only when `system_type` is specified as `server`.

iSCSI Profile Keyword

When you are installing the Oracle Solaris OS on an iSCSI system, use the `iSCSI` keyword. See Example 3–16 and Example 3–17.

The following terms are defined for an iSCSI JumpStart installation.

`iSCSI Target IP` This is required when configuring iSCSI over TCP/IP. Each target IP may represent a physical device, such as a disk or a tape or a virtualized target.

`iSCSI Target Port` A port on which an iSCSI target server would listen on for requests from the Initiator. The default values is 3260.

`iSCSI Target LUN` LUN (Logical Unit Number) represents an individually addressable (logical) SCSI device that is a part of a physical SCSI device (target). In an iSCSI environment, LUNs are essentially numbered disk drives. An initiator negotiates with a target to establish connectivity to a LUN. The result is an iSCSI connection that emulates a connection to a SCSI hard disk. Initiators treat iSCSI LUNs the same way as they would a raw SCSI or IDE hard drive For instance, rather than mounting remote directories as in NFS or CIFS environments, iSCSI systems format and directly manage file systems on iSCSI LUNs. In enterprise deployments, LUNs usually represent slices of large RAID disk arrays, often allocated one per client. iSCSI imposes no rules or restrictions on multiple computers sharing individual LUNs. It leaves shared access to a single underlying filesystem as a task for the operating system.

LUN is required if the method if Static Discovery method is used for discovering the targets.

`iSCSI Target Name` The iSCSI target name includes a iSCSI Qualified Name (IQN) which is documented in RFC 3720, with more examples of names in RFC 3721. See the IETF site for details. For example, `iqn.1986-03.com.sun:02:358ddbf8-601a-e73a-df56-89`, is a typical iSCSI target name. The name consists of the following fields:

- Literal IQN
- Date (yyyy-mm) that the naming authority took ownership of the domain

- Reversed domain name of the authority
- Optional colon ":" prefixing a storage target name specified by the naming authority.

package Profile Keyword (UFS and ZFS)

Note – The `package` keyword can be used when you install either a UFS file system or a ZFS root pool. The usage for this keyword is the same in both UFS and ZFS installations. For a complete list of keywords that can be used in a UFS or ZFS installation, see Table 8–2.

`package` *package-name* `[add [`*retrieval-type location*`]| delete]`

You can use `package` with both the initial installation and upgrade options. The `package` keyword enables you to do the following:

- Add a package to the software group from the Oracle Solaris distribution that is to be installed.
- Add a package to the software group from outside the distribution that is being installed.
- Exclude or remove a package from the software group that is to be installed or upgraded.
- Add a package from outside the distribution that is being installed when installing a flash archive .

package-name — Specifies the package name in the form `SUNW`*name*. To view detailed information about packages and their names, on an installed system, use the `pkginfo -l` command.

`add | delete` — Specifies to add or remove the specified package. If you do not specify `add` or `delete`, `add` is used by default.

Note – You can add more than one package by adding another package entry to the profile and omitting the location. The location of the previous package is used for all subsequent packages if the location is left blank.

[*retrieval-type location*] — Specifies the addition of a package or packages that are located outside the Oracle Solaris distribution that is being installed. The values of *retrieval-type* and *location* depend on where the package is stored.

The following sections describe the values you can use for *retrieval-type* and *location* and examples of how to use the `package_name` keyword.

Packages Stored on an NFS Server

If the package is stored on an NFS server, use one of the following syntaxes for the `package` keyword.

```
package package-name add nfs server-name:/path [retry n]
package package-name add nfs://server-name:/path [retry n]
```

package-name Specifies the package name in the form `SUNW`*name*. To view detailed information about packages and their names, on an installed system, use the `pkginfo -l` command.

server-name Specifies the name of the server where you stored the package.

path Specifies the location of the package directory on the specified server. If the path contains `$HOST`, `$HOST` is replaced with the name of the host system that you are installing.

retry *n* Is an optional keyword. *n* is the maximum number of times the installation process attempts to mount the directory.

EXAMPLE 8–12 Adding a Package by Using NFS

In this example, the `package` profile keyword adds the `SUNWnew` package from the NFS location `nfs://golden/packages/Solaris_10/`. If a mount fails, the NFS mount is tried five times.

```
package SUNWnew add nfs golden:/packages/Solaris_10 retry 5
```

Packages Stored on an HTTP Server

If the package is stored on an HTTP server, use one of the following syntaxes for the `package` keyword.

```
package package-name add http://server-name[:port] path optional-keywords
package package-name add http server-name[:port] path optional-keywords
```

package-name Specifies the package name in the form `SUNW`*name*. To view detailed information about packages and their names, on an installed system, use the `pkginfo -l` command.

server-name Specifies the name of the server where you stored the package.

port Specifies an optional port. *port* can be a port number or the name of a TCP service that has a port number that is determined at runtime.

If you do not specify a port, the default HTTP port number 80 is used.

path Specifies the location of the package to be retrieved from the specified server. When using an HTTP server, the package must be in package datastream format.

optional-keywords Specifies the optional keywords to use when you retrieve a package from an HTTP server.

TABLE 8–6 Optional package Keywords to Use With HTTP

Keyword	Value Definition
`timeout` *min*	The `timeout` keyword enables you to specify, in minutes, the maximum length of time that is allowed to pass without receipt of data from the HTTP server. If a timeout occurs, the connection is closed, reopened, and resumed. If you specify a `timeout` value of 0 (zero), the connection is not reopened. If a timeout reconnection occurs, the package is retried from the beginning of the package and the data that was retrieved prior to the timeout is discarded.
`proxy` *host*:*port*	The `proxy` keyword enables you to specify a proxy host and proxy port. You can use a proxy host to retrieve an Oracle Solaris package from the other side of a firewall. You must supply a proxy port when you specify the `proxy` keyword.

EXAMPLE 8–13 Adding a Package by Using HTTP

In this example, the `package` profile keyword adds all the packages listed in the `Solaris 10` directory from the HTTP location `http://package.central/Solaris_10`. If five minutes pass and no data is received, the package data is retrieved again. Previous package data is discarded. Either of the following formats can be used.

```
package SUNWnew add http package.central/Solaris_10 timeout 5

package SUNWnew add http://package.central/Solaris_10 timeout 5
```

EXAMPLE 8–14 Adding a Package by Using HTTP with a Proxy Port

In this example, the `package` profile keyword adds all the packages listed in the `Solaris_10` directory from the HTTP location `http://package.central/Solaris_10`. The package is retrieved across a firewall by using the `proxy` keyword.

```
package SUNWnew add http://package.central/Solaris_10 proxy webcache.east:8080
```

Packages Stored on a Local Device

You can retrieve an Oracle Solaris package from a local device if you stored the package on a file system-oriented, random-access device, such as a diskette or a DVD-ROM. Use the following syntax for the `package` keyword:

`package` *package-name* `add local_device` *device path file-system-type*

package-name Specifies the package name in the form `SUNW`*name*. To view detailed information about packages and their names, on an installed system, use the `pkginfo -l` command.

device Specifies the name of the drive where the Oracle Solaris package resides. If the device name is a canonical path, the device is mounted directly. If you supply a device name that is not a canonical path, the installation utility adds `/dev/dsk/` to the path.

path Specifies the path to the Oracle Solaris package, relative to the root (`/`) file system on the device you specified.

file-system-type Specifies the type of file system on the device. If you do not supply a file system type, the installation utility attempts to mount a UFS file system. If the UFS mount fails, the installation utility attempts to mount an HSFS file system.

EXAMPLE 8–15 Adding a Package by Using a Local Device With a UFS File System

In this example, the `package` profile keyword adds the `SUNWnew` package from the directory `/Solaris_10/Product` from the local device `c0t6d0s0`. This is a UFS file system.

```
package SUNWnew add local_device c0t6d0s0 /Solaris_10/Product ufs
```

EXAMPLE 8–16 Adding a Package by Using a Local Device From an HSFS File System

In this example, the `package` profile keyword adds the `SUNWnew` package from the directory `/Solaris_10/Product` from the local device `c0t6d0s0`. This is an HSFS file system.

```
package SUNWnew add local_device c0t6d0s0 /Solaris_10/Product  hsfs
```

Packages Stored on a Local File

A package can be installed from the miniroot from which you booted the system. When you perform a JumpStart installation, you boot the system from a DVD, CD, or an NFS-based miniroot. The installation software is loaded and run from this miniroot. Therefore, a package that you stored in the DVD, CD, or NFS-based miniroot is accessible as a local file. Use the following syntax for the `package` keyword.

`package` *package-name* `add local_file` *path*

package-name Specifies the package name in the form `SUNW`*name*. To view detailed information about packages and their names, on an installed system, use the `pkginfo -l` command.

path Specifies the location of the package. The path must be accessible to the system as a local file while the system is booted from the Oracle Solaris Software - 1 CD or from the Oracle Solaris Operating System DVD. The system cannot access `/net` when it is booted from the Oracle Solaris Software - 1 CD or from the Oracle Solaris Operating System DVD.

EXAMPLE 8–17 Adding a Package by Using a Local File

In this example, the `package` profile keyword adds the `SUNWnew` package from the `/Solaris_10/Product` directory.

```
package SUNWnew add local_file /Solaris_10/Product
```

Limitations When Using the package Keyword

Note these limitations when using the `package` keyword:

- Some packages are required and cannot be deleted.
- You cannot individually add or delete localization packages by using the `package` profile keyword. To add localization packages, use the `locale` profile keyword.
- Packages cannot be retrieved from an FTP server location or local backup, such as tape.
- Packages within the Oracle Solaris distribution being installed cannot be added from alternate locations. If a package from the Oracle Solaris distribution is specified, the package cannot be followed by an alternative location in order to maintain consistency with the resulting installed system.
- In order to install without manual intervention, the package must be installable by using the `pkgadd` command. The same `admin` file must be used to install the software group packages and the package that resides in another location.
  - If the *retrieval-type* is HTTP, then the package must be in stream format.
  - If the *retrieval-type* is NFS server, local device, or local file, then the package should follow standard packaging format with the directory name being the same as the package being installed.
  - If a package is being added from a separate location and a package depends on another package that is not currently installed, the package is not installed. An error message is logged into the install or upgrade log file.
- If the package is being installed with a flash archive, follow these guidelines.
  - Any package installed must be compatible with the archive.
  - If a package is present in the archive, the JumpStart overwrites the existing package.

Upgrade Behavior When Using the package Keyword

When you use `package` for an upgrade, the JumpStart program performs the following actions:

- All packages already on the system are automatically upgraded.
- If you specify *package-name* `add` and *package-name* is not installed on the system, the package is installed.

- If you specify *package-name* `delete` and *package-name* is installed on the system, the package is deleted *before* the upgrade begins.
- If you specify *package-name* `delete` and *package-name* is not installed on the system, the package is not installed if the package is part of a cluster that is designated to be installed.

partitioning Profile Keyword

`partitioning` *type*

`partitioning` defines how the disks are divided into slices for file systems during the installation.

If you do not specify `partitioning` in the profile, the `default` type of partitioning is used by default.

type Use one of the following values:

`default` The JumpStart program selects the disks and creates the file systems on which to install the specified software, except for any file systems that are specified by the `filesys` keywords. `rootdisk` is selected first. The JumpStart program uses additional disks if the specified software does not fit on `rootdisk`.

`existing` The JumpStart program uses the existing file systems on the system's disks. All file systems except `/`, `/usr`, `/usr/openwin`, `/opt`, and `/var` are preserved. The JumpStart program uses the last mount-point field from the file system superblock to determine which file-system mount point the slice represents.

Note – When you use both the `filesys` and `partitioning existing` profile keywords, you must set *size* to `existing`.

`explicit` The JumpStart program uses the disks and creates the file systems that are specified by the `filesys` keywords. If you specify only the root (`/`) file system with the `filesys` keyword, all of the Oracle Solaris software is installed in the root (`/`) file system.

Note – If you use the `explicit` profile value, you must use the `filesys` keyword to specify the disks to use and file systems to create.

---

patch Profile Keyword

`patch` *patch-ID-list* | *patch-file patch-location optional-keywords*]

patch-ID-list — Specifies the patch ID numbers that are to be installed. The list should consist of comma-separated Oracle Solaris patch IDs. The patches are installed in the order specified in the list. Do not add a space after the comma, for example: 112467-01,112765-02.

patch-file — A file with a list of patches that is found in the *patch-location*. The patches are installed in the order specified in the file.

patch-location — Specifies the location where the patches reside. The following locations are allowed:

- NFS server
- HTTP server
- Local device
- Local file

optional-keywords — Optional keywords depend on where patches are stored. The following sections describe the possible locations and optional keywords.

Patches Stored on an NFS Server

If the patch is stored on an NFS server, use one of the following options for the `patch` keyword.

```
patch patch-ID-list | patch-file nfs server-name:/patch-directory [retry n]
patch patch-ID-list | patch-file nfs://server-name/patch-director  [retry n]
```

patch-ID-list — Specifies the patch ID numbers that are to be installed. The list should be a list of comma-separated Oracle Solaris patch IDs. The patches are installed in the order specified in the list.

patch-file — A file with a list of patches that is found in the *patch-location*. The patches are installed in the order specified in the file.

server-name — Specifies the name of the server where you stored the patches.

patch-directory — Specifies the location of the patch directory on the specified server. The patches must be in standard patch format.

`retry` *n* — An optional keyword. *n* is the maximum number of times the install utility attempts to mount the directory.

EXAMPLE 8–18 Adding a Patch With an Ordered List by Using NFS

In this example, the `patch` profile keyword adds all the patches listed in the `patch` file from the NFS patch directory `nfs://patch_master/Solaris/v10/patches`. Patches are installed in the order listed in the `patch`. If a mount fails, the NFS mount is tried five times.

```
patch patch_file nfs://patch_master/Solaris/v10/patches retry 5
```

EXAMPLE 8–19 Adding a Patch by Using NFS

In this example, the `patch` profile keyword adds the patches 112467–01 and 112765–02 from the patch directory `/Solaris/v10/patches` on the server `patch_master`.

```
patch 112467-01,112765-02 nfs patch_master:/Solaris/v10/patches
```

Patches Stored on an HTTP Server

If the patch is stored on an HTTP server, use the following options for the `patch` keyword.

`patch` *patch-ID-list* | *patch-file* `http://`*server-name [:port] patch-directory optional-http-keywords*

`patch` *patch-ID-list* | *patch-file* `http` *server-name [:port] patch-directory optional-http-keywords*

patch-ID-list — Specifies the patch ID numbers that are to be installed. The list should consist of comma-separated Oracle Solaris patch IDs. The patches are installed in the order specified in the list. Do not add a space after the comma, for example: 112467-01,112765-02.

patch-file — A file with a list of patches that is found in the *patch-location*. The patches are installed in the order specified in the file.

server-name — Specifies the name of the server where you stored the patch.

port — Specifies an optional port. *port* can be a port number or the name of a TCP service that has a port number that is determined at runtime.

If you do not specify a port, the default HTTP port number 80 is used.

patch-directory — Specifies the location of the patch directory to be retrieved from the specified server. When using an HTTP server, the patch must be in JAR format.

optional-keywords — Specifies the optional keywords to use when you retrieve a patch from an HTTP server.

TABLE 8–7 Optional patch Keywords to Use With HTTP

Keyword	Value Definition
`timeout` *min*	The `timeout` keyword enables you to specify, in minutes, the maximum length of time that is allowed to pass without receipt of data from the HTTP server. If a timeout occurs, the connection is closed, reopened, and resumed. If you specify a `timeout` value of 0 (zero), the connection is not reopened. If a timeout reconnection occurs, the package is retried from the beginning of the package and the data that was retrieved prior to the timeout is discarded.

TABLE 8–7 Optional patch Keywords to Use With HTTP *(Continued)*

Keyword	Value Definition
`proxy` *host*:*port*	The `proxy` keyword enables you to specify a proxy host and proxy port. You can use a proxy host to retrieve an Oracle Solaris package from the other side of a firewall. You must supply a proxy port when you specify the `proxy` keyword.

EXAMPLE 8–20 Adding a Patch With an Ordered List by Using HTTP

In this example, the `patch` profile keyword adds all the patches listed in the `patch_file` file from the HTTP location `http://patch.central/Solaris/v10/patches`. The patches are installed in the order specified in the file the `patch` file. If five minutes pass and no data is received, the patch data is retrieved again. Previous patch data is discarded.

```
patch patch_file http://patch.central/Solaris/v10/patches timeout 5
```

EXAMPLE 8–21 Adding a Patch by Using HTTP

In this example, the `patch` profile keyword entry adds the patches 112467–01 and 112765–02 from the patch location `http://patch_master/Solaris/v10/patches`.

```
patch 112467-01,112765-02 http://patch.central/Solaris/v10/patches
```

Patches Stored on a Local Device

You can retrieve an Oracle Solaris package from a local device if you stored the package on a file system-oriented, random-access device, such as a diskette or a DVD-ROM. Use the following syntax for the `patch` keyword.

`patch` *patch-ID-list* `|` *patch-file* `local_device \`
device path file-system-type

patch-ID-list Specifies the patch ID numbers that are to be installed. The list should consist of comma-separated Oracle Solaris patch IDs. The patches are installed in the order specified in the list. Do not add a space after the comma, for example: 112467-01,112765-02.

patch-file A file with a list of patches that is found in *patch-location*. The patches are installed in the order specified in the file.

device Specifies the name of the drive where the Oracle Solaris package resides. If the device name is a canonical path, the device is mounted directly. If you supply a device name that is not a canonical path, the installation utility adds `/dev/dsk/` to the path.

path Specifies the path to the Oracle Solaris patch, relative to the root (`/`) file system on the device you specified.

file-system-type Specifies the type of file system on the device. If you do not supply a file system type, the installation utility attempts to mount a UFS file system. If the UFS mount fails, the installation utility attempts to mount an HSFS file system.

EXAMPLE 8–22 Adding a Patch With an Ordered List by Using a Local Device

In this example, the `patch` profile keyword adds all the patches listed in the `patch_file` file from the directory `/Solaris_10/patches` from the local device `c0t6d0s0`. The `patch` file determines the order of patches to be installed.

```
patch patch_file c0t6d0s0 /Solaris_10/patches
```

EXAMPLE 8–23 Adding a Patch by Using a Local Device

In this example, the `patch` profile keyword adds the patches 112467–01 and 112765–02 from the patch directory `/Solaris_10/patches` from local device `c0t6d0s0`.

```
patch 112467-01,112765-02 local_device c0t6d0s0 /Solaris_10/patches
```

Patches Stored on a Local File

A patch can be installed from the miniroot from which you booted the system. When you perform a JumpStart installation, you boot the system from a DVD, CD, or NFS-based miniroot. The installation software is loaded and run from this miniroot. Therefore, a patch that you stored in the DVD, CD, or NFS-based miniroot is accessible as a local file. Use the following syntax for the `patch` keyword.

`patch` *patch-ID-list* | *patch-file* `local_file` *patch -directory*

patch-ID-list Specifies the patch ID numbers that are to be installed. The list should consist of comma-separated Oracle Solaris patch IDs. The patches are installed in the order specified in the list. Do not add a space after the comma, for example: 112467-01,112765-02.

patch-file A file with a list of patches that is found in the *patch-location*. The patches are installed in the order specified in the file.

patch-directory Specifies the location of the patch directory. The patch directory must be accessible to the system as a local file while the system is booted from the Oracle Solaris Software - 1 CD or from the Oracle Solaris Operating System DVD. The system cannot access `/net` when it is booted from the Oracle Solaris Software - 1 CD or from the Oracle Solaris Operating System DVD.

EXAMPLE 8–24 Adding a Patch With an Ordered List by Using a Local File

In this example, the `patch` profile keyword adds all the patches that are listed in the `patch_file` file from the `/Solaris_10/patches` directory. The `patch` file determines the order of patches to be installed.

```
patch patch_cal_file local_file /Solaris_10/patches
```

EXAMPLE 8–25 Adding a Patch by Using a Local File

In this example, the `patch` profile keyword adds the patches 112467–01 and 112765–02 from the patch directory `/Solaris_10/patches`.

```
patch 112467-01,112765-02 local_file /Solaris_10/patches
```

Limitations When Using the patch Keyword

Note the following limitations when using the `patch` keyword:

- Patches cannot be retrieved from FTP locations or local backup, such as tape.
- Signed patches cannot be added.
- Patches must be installable with the `patchadd` command.
- If a patch depends on a patch that is not currently installed, the patch is not installed. An error message is logged into the installation or upgrade log file.
- You must determine the correct order of the patches for a correct installation of the patches.

pool Profile Keyword (ZFS Only)

The `pool` keyword defines the installation of a ZFS root pool. The pool is installed with a software group specified with the `cluster` keyword. The *poolsize*, *swapsize*, *dumpsize*, and *vdevlist* options are needed for creating a new root pool.

For a complete description of the `pool` keyword and other keywords that can be used for a ZFS root pool, see "`pool` Profile Keyword (ZFS Only)" on page 153.

root_device Profile Keyword (UFS and ZFS)

Note – The `root_device` keyword can be used when you install either a UFS file system or a ZFS root pool. The usage for this keyword is the limited to a single system for ZFS installations.

- For a complete list of keywords that can be used in a UFS or ZFS installation, see Table 8–2
- For a description of how the `root_device` keyword can be used when installing a ZFS root pool, see "JumpStart Keywords for a ZFS Root (/) File System (Reference)" on page 151

`root_device` *slice*

`root_device` designates the system's root disk. "How the System's Root Disk Is Determined" on page 143 contains additional information.

Note – The root disk is determined by the JumpStart program and determines where the OS is to be installed. The rules file uses a probe keyword "`rootdisk`," but this keyword is used differently than the `rootdisk` keyword used in the JumpStart profile. You cannot set the place of installation by using the probe keyword "`rootdisk`" in the rules file. The probe keyword, `rootdisk`, determines where to boot from during the installation. See Table 8–10.

When you are upgrading a system, `root_device` designates the root (`/`) file system and the file systems that are mounted by its `/etc/vfstab` file to be upgraded. You must specify `root_device` if more than one root (`/`) file system can be upgraded on a system. You must specify *slice* in the form c*w*t*x*d*y*s*z* or c*x*d*y*s*z*.

When you use the `root_device` keyword, consider the following:

- If you specify `root_device` on a system with only one disk, the `root_device` and the disk must match. Also, any `filesys` keywords that specify the root (`/`) file system must match `root_device`.
- If you are upgrading a RAID-1 volume (mirror), the value that is specified for `root_device` should be one side of the mirror. The other side of the mirror is automatically upgraded.

EXAMPLE 8–26 root_device Profile Keyword

```
root_device c0t0d0s2
```

How the System's Root Disk Is Determined

A system's root disk is the disk on the system that contains the root (`/`) file system. In a profile, you can use the `rootdisk` variable in place of a disk name, which the JumpStart program sets to the system's root disk. The following table describes how the JumpStart program determines the system's root disk for the installation.

Note – The JumpStart program determines a system's root disk size only during an initial installation. You cannot change a system's root disk during an upgrade.

TABLE 8–8 How JumpStart Determines a System's Root Disk (Initial Installation)

Stage	Action
1	If the `root_device` keyword is specified in the profile, the JumpStart program sets `rootdisk` to the root device.
2	If `rootdisk` is not set and the `boot_device` keyword is specified in the profile, the JumpStart program sets `rootdisk` to the boot device.
3	If `rootdisk` is not set and a `filesys` c*w*t*x*d*y*s*z size* `/` entry is specified in the profile, the JumpStart program sets `rootdisk` to the disk that is specified in the entry.
4	If `rootdisk` is not set and a `rootdisk.s`*n* entry is specified in the profile, the JumpStart program searches the system's disks in kernel probe order for an existing root file system on the specified slice. If a disk is found, the JumpStart program sets `rootdisk` to the found disk.
5	If `rootdisk` is not set and `partitioning existing` is specified in the profile, the JumpStart program searches the system's disks in kernel probe order for an existing root file system. If a root file system is not found or more than one is found, an error occurs. If a root file system is found, the JumpStart program sets `rootdisk` to the found disk.
6	If `rootdisk` is not set, the JumpStart program sets `rootdisk` to the disk where the root (`/`) file system is installed.

system_type Profile Keyword

`system_type` *type-switch*

`system_type` defines the type of system on which the Oracle Solaris OS is to be installed.

type-switch represents the option `standalone` or `server`, which you use to indicate the type of system on which the Oracle Solaris software is to be installed. If you do not specify `system_type` in a profile, `standalone` is used by default.

usedisk Profile Keyword (UFS and ZFS)

The `usedisk` keyword can be used when you install either a UFS file system or a ZFS root pool. The usage for this keyword is the same in both UFS and ZFS installations.

- For a complete list of keywords that can be used in a UFS or ZFS installation, see Table 8–2
- For information on performing a ZFS installation, see Chapter 9, "Installing a ZFS Root Pool With JumpStart"

`usedisk` *disk-name* `...`

Each disk instance for this keyword requires a separate line item. Specify multiple disks for usage on separate lines, as shown in the following example:

```
usedisk                c0t0d0
    usedisk                c0t1d0
    usedisk                c0t2d0
```

By default, the JumpStart program uses all of the operational disks on the system when you specify `partitioning default`. The `usedisk` profile keyword designates one or more disks that you want the JumpStart program to use. You must specify *disk-name* in the form c*x*t*y*d*z* or c*y*d*z*, for example, `c0t0d0` or `c0d0s0`.

If you specify `usedisk` in a profile, the JumpStart program uses only the disks that you specify after the `usedisk` keyword.

Note – You cannot specify the `usedisk` keyword and the `dontuse` keyword in the same profile.

JumpStart Environment Variables

You can use environment variables in your begin and finish scripts. For example, a begin script might extract the disk size, `SI_DISKSIZES`, and install or not install particular packages on a system based on the actual disk size the script extracts.

Information that is gathered about a system is stored in these environment variables, which are generally set or not, depending on the rule keywords and values you use in the `rules` file.

For example, information about which operating system is already installed on a system is only available in `SI_INSTALLED` after the `installed` keyword is used.

The following table describes these variables and their values.

TABLE 8–9 Installation Environment Variables

Environment Variable	Value
`SI_ARCH`	The hardware architecture of the install client. The `SI_ARCH` variable is set when the `arch` keyword is used in the `rules` file.
`SI_BEGIN`	The name of the begin script, if one is used.
`SI_CLASS`	The name of the profile that is used to install the install client.
`SI_DISKLIST`	A comma-separated list of disk names on the install client. The `SI_DISKLIST` variable is set when the `disksize` keyword is used and matched in the `rules` file. The `SI_DISKLIST` and `SI_NUMDISKS` variables are used to determine the physical disk to use for the `rootdisk`. `rootdisk` is described in "How the System's Root Disk Is Determined" on page 143.
`SI_DISKSIZES`	A comma-separated list of disk sizes on the install client. The `SI_DISKSIZES` variable is set when the `disksize` keyword is used and matched in the `rules` file.
`SI_DOMAINNAME`	The domain name. The `SI_DOMAINNAME` variable is set when the `dommainname` keyword is used and matched in the `rules` file.
`SI_FINISH`	The name of the finish script, if one is used.

TABLE 8–9 Installation Environment Variables *(Continued)*

Environment Variable	Value
SI_HOSTADDRESS	The install client's IP address.
SI_HOSTNAME	The install client's host name. The SI_HOSTNAME variable is set when the hostname keyword is used and matched in the rules file.
SI_INSTALLED	The device name of a disk with a specific operating system on the disk, for example, Oracle Solaris or System V. The SI_INSTALLED variable is set when the installed keyword is used and matched in the rules file. SI_INST_OS and SI_INST_VER are used to determine the value of SI_INSTALLED.
SI_INST_OS	The name of the operating system. SI_INST_OS and SI_INST_VER are used to determine the value of SI_INSTALLED.
SI_INST_VER	The version of the operating system. SI_INST_OS and SI_INST_VER are used to determine the value of SI_INSTALLED.
SI_KARCH	The install client's kernel architecture. The SI_KARCH variable is set when the karch keyword is used and matched in the rules file.
SI_MEMSIZE	The amount of physical memory on the install client. The SI_MEMSIZE variable is set when the memsize keyword is used and matched in the rules file.
SI_MODEL	The install client's model name. The SI_MODEL variable is set when the model keyword is used and matched in the rules file.
SI_NETWORK	The install client's network number. The SI_NETWORK variable is set when the network keyword is used and matched in the rules file.
SI_NUMDISKS	The number of disks on an install client. The SI_NUMDISKS variable is set when the disksize keyword is used and matched in the rules file. The SI_NUMDISKS and SI_DISKLIST variables are used to determine the physical disk to use for the rootdisk. rootdisk is described in "How the System's Root Disk Is Determined" on page 143.
SI_OSNAME	The operating system release on the Oracle Solaris software image. For example, you can use the SI_OSNAME variable in a script if you are installing the Oracle Solaris software on systems that are based on the version of the operating system on the Oracle Solaris Operating System DVD or the Oracle Solaris Software - 1 CD image.
SI_ROOTDISK	The device name of the disk that is represented by the logical name rootdisk. The SI_ROOTDISK variable is set when the disksize or the installed keyword is set to rootdisk in the rules file. The SI_ROOTDISK variable sets the device to boot from during the installation. **Note –** You cannot set the place of installation by using the probe keyword rootdisk in the rules file. For information on the rootdisk variable that is set in a JumpStart profile, see "How the System's Root Disk Is Determined" on page 143.
SI_ROOTDISKSIZE	The size of the disk that is represented by the logical name rootdisk. The SI_ROOTDISKSIZE variable is set when the disksize or the installed keyword is set to rootdisk in the rules file.

TABLE 8–9 Installation Environment Variables *(Continued)*

Environment Variable	Value
SI_TOTALDISK	The total amount of disk space on the install client. The SI_TOTALDISK variable is set when the totaldisk keyword is used and matched in the rules file.

Probe Keywords and Values

The following table describes each rule keyword and its equivalent probe keyword.

Note – Always place probe keywords at or near the beginning of the rules file.

TABLE 8–10 Descriptions of Probe Keywords

Rule Keyword	Equivalent Probe Keyword	Description of Probe Keyword
any	None	
arch	arch	Determines the kernel architecture, i386 or SPARC, and sets SI_ARCH.
disksize	disks	Returns the size of a system's disks in MB in kernel probe order, c0t3d0s0, c0t3d0s1, c0t4d0s0. disksize sets SI_DISKLIST, SI_DISKSIZES, SI_NUMDISKS, and SI_TOTALDISK.
domainname	domainname	Returns a system's NIS or NIS+ domain name or blank and sets SI_DOMAINNAME. The domainname keyword returns the output of domainname(1M).
hostaddress	hostaddress	Returns a system's IP address, the first address that is listed in the output of ifconfig(1M) -a that is not lo0, and sets SI_HOSTADDRESS.
hostname	hostname	Returns a system's host name that is the output from uname(1) -n and sets SI_HOSTNAME.
installed	installed	Returns the version name of the Oracle Solaris OS that is installed on a system and sets SI_ROOTDISK and SI_INSTALLED. If the JumpStart program finds an Oracle Solaris release but is unable to determine the version, the version that is returned is SystemV.
karch	karch	Returns a system's platform group, for example i86pc or sun4u, and sets SI_KARCH. For a list of platform names, see *Oracle Solaris Sun Hardware Platform Guide* at http://www.oracle.com/technetwork/indexes/documentation/index.html.
memsize	memsize	Returns the size of physical memory on a system in MB and sets SI_MEMSIZE.
model	model	Returns a system's platform name and sets SI_MODEL. For a list of platform names, see the *Oracle Solaris Sun Hardware Platform Guide* at http://www.oracle.com/technetwork/indexes/documentation/index.html.

TABLE 8–10 Descriptions of Probe Keywords *(Continued)*

Rule Keyword	Equivalent Probe Keyword	Description of Probe Keyword
`network`	`network`	Returns a system's network number, which the JumpStart program determines by performing a logical AND between the system's IP address and the subnet mask. The system's IP address and the subnet mask are extracted from the first address that is listed in the output of `ifconfig(1M) -a` that is not `lo0`. The `network` keyword sets `SI_NETWORK`.
`osname`	`osname`	Returns the version and operating system name of the Oracle Solaris OS that is found on a CD and sets `SI_OSNAME`.
		If the JumpStart program finds an Oracle Solaris release but is unable to determine the version, the version that is returned is `SystemV`.
	`rootdisk`	Returns the name and size in MB of a system's root disk and sets `SI_ROOTDISK`.
`totaldisk`	`totaldisk`	Returns the total disk space on a system (in MB) and sets `SI_TOTALDISK`. The total disk space includes all of the operational disks that are attached to a system.

◆ ◆ ◆ CHAPTER 9

Installing a ZFS Root Pool With JumpStart

This chapter provides the information necessary for performing a JumpStart installation for a ZFS root pool. The following sections provides planning information, profile examples, and profile keyword descriptions:

- "JumpStart Installation for a ZFS Root (/) File System (Overview and Planning)" on page 150
- "JumpStart Profile Examples for a ZFS Root Pool" on page 154
- "JumpStart Keywords for a ZFS Root (/) File System (Reference)" on page 151

What's New in the Solaris 10 10/09 Release

Starting with the Solaris 10 10/09 release, you can set up a JumpStart profile to identify a flash archive of a ZFS root pool.

A flash archive can be created on a system that is running a UFS root file system or a ZFS root file system. A flash archive of a ZFS root pool contains the entire pool hierarchy except for the swap and dump volumes and any excluded datasets. The swap and dump volumes are created when the flash archive is installed.

You can use the Flash Archive installation method as follows:

- Generate a flash archive that can be used to install and boot a system with a ZFS root file system.
- Perform a JumpStart installation of a system by using a ZFS flash archive.

Note – Creating a ZFS flash archive backs up an entire root pool, not individual boot environments. Individual datasets within the pool can be excluded by using the `flarcreate` and `flar` command's `-D` option.

For detailed instructions and limitations, see "Installing a ZFS Root File System (Oracle Solaris Flash Archive Installation)" in *Oracle Solaris ZFS Administration Guide*.

JumpStart Installation for a ZFS Root (/) File System (Overview and Planning)

This section describes how to create a JumpStart profile to install a ZFS root pool.

Note – If you want to install a UFS root (/) file system, all existing profile keywords work as in previous Oracle Solaris releases. For a list of UFS profile keywords, see Chapter 8, "JumpStart Keyword Reference."

A ZFS specific profile must contain the `pool` keyword. The `pool` keyword installs a new root pool and a new boot environment is created by default. You can create a separate `/var` dataset with existing `bootenv installbe` keywords and the new `bename` and `dataset` options. Some keywords that are allowed in a UFS-specific profile are not allowed in a ZFS specific profile, such as those specifying the creation of UFS mount points.

For overall ZFS planning information, see Chapter 5, "ZFS Root File System Installation Planning," in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*.

Limitations for a JumpStart Installation for a ZFS Root Pool

Keep the following issues in mind before considering a JumpStart installation of a bootable ZFS root pool.

TABLE 9–1 JumpStart Limitations for ZFS Root Pools

Limitation	Description	For More Information

For a JumpStart installation, you cannot use an existing ZFS storage pool to create a bootable ZFS root pool.	You must create a new ZFS storage pool with syntax similar to the following:
	`pool rpool 20G 4G 4G c0t0d0s0`
	The complete `pool` keyword line is required because you cannot use an existing pool. The `bootenv` keyword line is optional. If you do not use `bootenv`, a default boot environment is created for you. For example:
	`install_type initial_install`
	`cluster SUNWCall`
	`pool rpool 20G 4g 4g any`
	`bootenv installbe bename newBE`
		"`pool` Profile Keyword (ZFS Only)" on page 153

TABLE 9–1 JumpStart Limitations for ZFS Root Pools *(Continued)*

Limitation	Description	For More Information
You cannot create a pool with whole disks.	You must create your pool with disk slices rather than whole disks. If in the profile you create a pool with whole disks, such as `c0t0d0`, the installation fails. You will receive an error message similar to the following. `Invalid disk name (c0t0d0)`	
Some keywords that are allowed in a UFS specific profile are not allowed in a ZFS specific profile, such as those specifying the creation of UFS mount points.		"Profile Keywords Quick Reference" on page 102
You cannot upgrade with JumpStart. You must use Live Upgrade.	With Live Upgrade, you can create a copy of the currently running system. This copy can be upgraded and then activated to become the currently running system.	Chapter 10, "Live Upgrade and ZFS (Overview)," in *Oracle Solaris 10 1/13 Installation Guide: Live Upgrade and Upgrade Planning*

JumpStart Keywords for a ZFS Root (/) File System (Reference)

This section provides descriptions of some of the ZFS specific keywords that you can use in a JumpStart profile. The keywords described in this section are either used differently from their usage in a UFS profile or used only in a ZFS profile.

- For a quick reference guide to UFS and ZFS profile keywords, see "Profile Keywords Quick Reference" on page 102.
- The following keywords can be used in a ZFS profile. The usage is the same for both UFS and ZFS profiles. For descriptions of these keywords, see "Profile Keyword Descriptions and Examples" on page 103.
  - `boot_device`
  - `cluster`
  - `dontuse`
  - `fdisk`
  - `filesys` (mounting remote file systems)
  - `geo`
  - `locale`
  - `package`
  - `usedisk`

bootenv Profile Keyword (ZFS and UFS)

The `bootenv` keyword identifies boot environment characteristics. A boot environment is created by default during installation with the `pool` keyword. If you use the `bootenv` keyword with the `installbe` option, you can name the new boot environment and create a `/var` dataset within the boot environment.

This keyword can be used in a profile for installing a UFS file system or a ZFS root pool.

- In a UFS file system, this keyword is used for creating an empty boot environment for the future installation of a flash archive. For more information, see "`bootenv` Profile Keyword (UFS and ZFS)" on page 112.
- For a ZFS root pool, the `bootenv` keyword changes the characteristics of the default boot environment that is created at install time. This boot environment is a copy of the root file system that you are installing.

  The `bootenv` keyword can be used with the `installbe`, `bename`, and `dataset` options. These options name the boot environment and create a separate `/var` dataset.

  ```
  bootenv installbe bename BE-name [dataset mount-point]
  ```

`installbe`	Changes the characteristics of the default boot environment that is created during the installation.
`bename` *BE-name*	Specifies the name of the new boot environment to be created. The name can be no longer than 30 characters, can contain only alphanumeric characters, and can contain no multibyte characters. The name must be unique on the system.
`dataset` *mount-point*	Use the optional `dataset` keyword to identify a `/var` dataset that is separate from the ROOT dataset. The *mount-point* value is limited to `/var`. For example, a `bootenv` syntax line for separate `/var` dataset would be similar to the following: `bootenv installbe bename zfsroot dataset /var`

For more information about upgrading and activating a boot environment, see Chapter 10, "Live Upgrade and ZFS (Overview)," in *Oracle Solaris 10 1/13 Installation Guide: Live Upgrade and Upgrade Planning*.

install_type Keyword (ZFS and UFS)

The `install_type` keyword is required in every profile. For a UFS installation, several options are available. The only option available for a ZFS installation is the `initial_install` keyword. This option installs a new Oracle Solaris OS on a system. The profile syntax is as follows:

```
install_type initial_install
```

The following UFS options are not available for a ZFS installation:

- `upgrade` - You can use Live Upgrade only to upgrade ZFS root pool. See Chapter 10, "Live Upgrade and ZFS (Overview)," in *Oracle Solaris 10 1/13 Installation Guide: Live Upgrade and Upgrade Planning*.
- `flash_install` - A flash archive cannot be installed.
- `flash_update` - A flash archive cannot be installed.

pool Profile Keyword (ZFS Only)

The `pool` keyword defines the new root pool to be created. The pool is then installed with a software group specified with the `cluster` keyword. All of the options shown in the syntax are needed for creating a new root pool.

`pool` *poolname poolsize swapsize dumpsize vdevlist*

Note – If you provide a specific size value, it is assumed to be in MB unless specified by `g` (GB).

poolname Specifies the name of the new pool to be created. A new pool is created with the specified *poolsize* and with the specified devices, *vdevlist*.

poolsize Size of the new pool to be created. You can either specify a size or use the `auto` option to allocate the largest possible pool size given the constraints, such as size of the disks and preserved slices.

Note – The meaning of `auto` for the *poolsize* keyword is different from the `filesys` keyword use of `auto` in a UFS file system. In ZFS, the size of the disk is checked to verify that the minimum size can be accommodated. If the minimize size is available, the largest possible pool size is allocated given the constraints, such as size of the disks and preserved slices.

swapsize Size of the swap volume (`zvol`) to be created within a new root pool. You can either provide a size or use the `auto` option to cause the swap area to be automatically sized. The default size is half the size of physical memory, but no less than 512 MB and no greater than 2 GB.

dumpsize Size of the dump volume to be created within a new pool. You can either provide a size or use the `auto` option to specify the default dump size.

vdevlist One or more devices used to create the pool.

Devices in the *vdevlist* must be slices for the root pool. Slice names should be provided in the form c*w*t*x*d*y*s*z*.

Note – The format of the *vdevlist* is the same as the format of the `zpool create` command.

Acceptable values for this option are:

A single device name	For example, `c0t0d0s0`
`mirror` [*device-names*|`any`]	`mirror` specifies the mirroring of the disk with either specified device names or the keyword `any`, which enables the installer to select a suitable device. At this time, only mirrored configurations are supported when multiple devices are specified. You can mirror as many as disks you like, but the size of the pool created is determined by the smallest of the specified disks. For more information about creating mirrored storage pools, see "Mirrored Storage Pool Configuration" in *Oracle Solaris ZFS Administration Guide*.
`any`	Enables the installer to select a suitable device.

root_device Profile Keyword (ZFS and UFS)

`root_device` c*w*t*x*d*y*s*z*

`root_device` specifies the device to be used for the root pool. The `root_device` keyword determines where the operating system is installed. This keyword is used the same in both ZFS and a UFS file system with some limitations. For the ZFS root pool, the root device is limited to a single system. This keyword is not useful for mirrored pools.

JumpStart Profile Examples for a ZFS Root Pool

This section provides examples of ZFS specific JumpStart profiles.

Note – For the ZFS root pool to be upgradeable and bootable, you must create your pool with disk slices rather than whole disks. If in the profile you create a pool with whole disks, such as `c0t0d0`, you will receive an error message similar to the following.

```
Invalid disk name (c0t0d0)
```

EXAMPLE 9–1 Installing a Mirrored ZFS Root Pool

```
install_type initial_install
cluster SUNWCall
pool newpool auto auto auto mirror c0t0d0s0 c0t1d0s0
bootenv installbe bename solaris10_6
```

The following keywords and values are used in this example.

`install_type initial_install` — The `install_type` keyword is required in every profile. The `initial_install` keyword performs an initial installation that installs a new Oracle Solaris OS in a new ZFS root pool.

`cluster` — The Entire Distribution software group, `SUNWCall`, is installed on the system. For more information about software groups, see "Disk Space Recommendations for Software Groups" in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*.

`pool` — The `pool` keyword defines the characteristics of the new ZFS root pool.

- `newpool` — Defines the name of the root pool.
- `auto` — Specifies the size of the disks automatically. The size is determined by the size of the specified disks.
- `auto` — The swap area is automatically sized with the `auto` keyword. The default size is half the size of physical memory, but no less than 512 MB and no greater than 2 GB. You can set the size outside this range by using the `size` option.
- `auto` — The dump device is automatically sized.
- `mirror` — The mirrored configuration of disks has the `mirror` keyword and disk slices specified as *c0t0d0s0* and *c0t1d0s0*.

EXAMPLE 9–1 Installing a Mirrored ZFS Root Pool *(Continued)*

`bootenv` — `installbe` changes the characteristics of the default boot environment that is created during the installation.

- `bename` — Names the new boot environment `solaris10_6`.

EXAMPLE 9–2 Customizing the Disk Size For a ZFS Root Pool

```
install_type initial_install
cluster SUNWCall
pool newpool 80g 2g 2g mirror any any
bootenv installbe bename solaris10_6
```

The following keywords and values are used in this example.

`install_type initial_install` — The `install_type` keyword is required in every profile. The `initial_install` keyword performs an initial installation that installs a new Oracle Solaris OS in a new ZFS root pool.

`cluster` — The Entire Distribution software group, `SUNWCall`, is installed on the system. For more information about software groups, see "Disk Space Recommendations for Software Groups" in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*.

`pool` — The `pool` keyword defines the characteristics of the new ZFS root pool.

- `newpool` — Specifies the name of the root pool.
- `80g` — Specifies the size of the disk slice.
- `2g` — The swap area and dump volumes are 2 GB.
- `mirror` — The mirrored configuration of disks has the `mirror` keyword and disk slices specified as `c0t0d0s0` and `c0t1d0s0`.

  The `any` options in the mirrored configuration finds any two available devices that are large enough to create a 80 GB pool. If two such devices are not available, the install fails.

`bootenv` — `installbe` changes the characteristics of the default boot environment that is created during the installation.

EXAMPLE 9–2 Customizing the Disk Size For a ZFS Root Pool *(Continued)*

`bename`	Names the new boot environment `solaris10_6`.

EXAMPLE 9–3 Specifying Where to Install the OS

```
install_type initial_install
cluster SUNWCall
root_device c0t0d0s0
pool nrpool auto auto auto rootdisk.s0
bootenv installbe bename bnv dataset /var
```

The following keywords and values are used in this example.

`install_type initial_install`

The `install_type` keyword is required in every profile. The `initial_install` keyword performs an initial installation that installs a new Oracle Solaris OS in a new ZFS root pool.

`cluster`

The Entire Distribution software group, `SUNWCall`, is installed on the system. For more information about software groups, see "Disk Space Recommendations for Software Groups" in *Oracle Solaris 10 1/13 Installation Guide: Planning for Installation and Upgrade*.

`root_device`

Specifies the disk slice where the OS is to be installed. The `c0t0d0s0` defines the specific disk and slice for the OS.

`pool`

The `pool` keyword defines the characteristics of the new ZFS root pool.

`nrpool`	Defines the name of the root pool.
`auto`	Specifies the size of the disks automatically. The size is determined by the size of the specified disks.
`auto`	The swap area is automatically sized with the `auto` keyword. The default size is half the size of physical memory, but no less than 512 MB and no greater than 2 GB. You can set the size outside this range by using the `size` option.
`auto`	The dump device is automatically sized.
`rootdisk.s0`	The device used to create the root pool is specified as slice 0.

EXAMPLE 9–3 Specifying Where to Install the OS *(Continued)*

`bootenv` `installbe` changes the characteristics of the default boot environment that is created during the installation.

- `bename` Names the new boot environment `bnv`.
- `dataset` Creates a `/var` dataset that is separate from the `ROOT` dataset. `/var` is the only value for `dataset`.

Additional Resources

For additional information about the topics included in this chapter, see the following resources:

- For ZFS information, including overview, planning, and step-by-step instructions, see *Oracle Solaris ZFS Administration Guide*.
- For a list of all JumpStart keywords, see Chapter 8, "JumpStart Keyword Reference."
- For information about using Live Upgrade to migrate from UFS to ZFS or create a new boot environment in a ZFS root pool, see Chapter 10, "Live Upgrade and ZFS (Overview)," in *Oracle Solaris 10 1/13 Installation Guide: Live Upgrade and Upgrade Planning*.

Glossary

archive A file that contains a collection of files that were copied from a master system. The file also contains identification information about the archive, such as a name and the date that you created the archive. After you install an archive on a system, the system contains the exact configuration of the master system.

An archive could be a differential archive, which is a Flash Archive that contains only the differences between two system images, an unchanged master image and an updated master image. The differential archive contains files to be retained, modified, or deleted from the clone system. A differential update changes only the files specified and is restricted to systems that contain software consistent with the unchanged master image.

begin script A user-defined Bourne shell script, specified within the `rules` file, that performs tasks before the Oracle Solaris software is installed on the system. You can use begin scripts only with JumpStart, a feature of Oracle Solaris, installations.

boot To load the system software into memory and start it.

boot environment A collection of mandatory file systems (disk slices and mount points) that are critical to the operation of the Oracle Solaris OS. 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 active boot environment can be booted. An inactive boot environment is not currently booted, but can be in a state of waiting for activation on the next reboot.

boot loader **x86 only**: The boot loader is the first software program that runs after you turn on a system. This program begins the booting process.

boot server A server system that provides client systems on the same network subnet with the programs and information that they need to start. A boot server is required to install over the network if the install server is on a different subnet than the systems on which Oracle Solaris software is to be installed.

Core Software Group A software group that contains the minimum software that is required to boot and run the Oracle Solaris OS on a system. Core includes some networking software and the drivers that are required to run the Common Desktop Environment (CDE) desktop. Core does not include the CDE software.

custom probes file A file, which must be located in the same JumpStart directory as the `rules` file, that is a Bourne shell script that contains two types of functions: probe and comparison. Probe functions gather the information you want or do the actual work and set a corresponding `SI_` environment variable you define. Probe functions become probe keywords. Comparison functions call a corresponding probe function, compare the output of the probe function, and return 0 if the keyword matches or 1 if the keyword doesn't match. Comparison functions become rule keywords. See also *rules file*.

dataset A generic name for the following ZFS entities: clones, file systems, snapshots, or volumes.

Developer Oracle Solaris Software Group A software group that contains the End User Oracle Solaris Software Group plus the libraries, include files, man pages, and programming tools for developing software.

DHCP (Dynamic Host Configuration Protocol) An application-layer protocol. Enables individual computers, or clients, on a TCP/IP network to extract an IP address and other network configuration information from a designated and centrally maintained DHCP server or servers. This facility reduces the overhead of maintaining and administering a large IP network.

differential archive A lash rchive that contains only the differences between two system images, an unchanged master image and an updated master image. The differential archive contains files to be retained, modified, or deleted from the clone system. A differential update changes only the files that are specified and is restricted to systems that contain software consistent with the unchanged master image.

End User Oracle Solaris Software Group A software group that contains the Core Software Group plus the recommended software for an end user, including the Common Desktop Environment (CDE) and DeskSet software.

Entire Oracle Solaris Software Group A software group that contains the entire Oracle Solaris release.

Entire Oracle Solaris Software Group Plus OEM Support A software group that contains the entire Oracle Solaris release plus additional hardware support for OEMs. This software group is recommended when installing Oracle Solaris software on SPARC based servers.

`/etc` directory A directory that contains critical system configuration files and maintenance commands.

`/export` file system A file system on an OS server that is shared with other systems on a network. For example, the `/export` file system can contain the root (`/`) file system and swap space for diskless clients and the home directories for users on the network. Diskless clients rely on the `/export` file system on an OS server to boot and run.

`fdisk` partition A logical partition of a disk drive that is dedicated to a particular operating system on x86 based systems. To install the Oracle Solaris software, you must set up at least one Oracle Solaris `fdisk` partition on an x86 based system. x86 based systems allow up to four different `fdisk` partitions on a disk. These partitions can be used to hold individual operating systems. Each operating system must be located on a unique `fdisk` partition. A system can only have one Oracle Solaris `fdisk` partition per disk.

file server A server that provides the software and file storage for systems on a network.

file system In the operating system, a tree-structured network of files and directories that you can access.

finish script A user-defined Bourne shell script, specified within the `rules` file, that performs tasks after the Oracle Solaris software is installed on the system but before the system reboots. You use finish scripts with JumpStart installations.

Flash Archive A Oracle Solaris installation feature that enables you to create an archive of the files on a system, called the *master system*. You can then use the archive to install other systems, making the other systems identical in their configuration to the master system. See also *archive*.

format To put data into a structure or divide a disk into sectors for receiving data.

function key One of the 10 or more keyboard keys that are labeled F1, F2, F3, and so on that are mapped to particular tasks.

global zone In Oracle Solaris Zones, the global zone is both the default zone for the system and the zone used for system-wide administrative control. The global zone is the only zone from which a non-global zone can be configured, installed, managed, or uninstalled. Administration of the system infrastructure, such as physical devices, routing, or dynamic reconfiguration (DR), is only possible in the global zone. Appropriately privileged processes running in the global zone can access objects associated with other zones. See also *Oracle Solaris Zones* and *non-global zone*.

GRUB **x86 only**: GNU GRand Unified Bootloader (GRUB) is an open source boot loader with a simple menu interface. The menu displays a list of operating systems that are installed on a system. GRUB enables you to easily boot these various operating systems, such as the Oracle Solaris OS, Linux, or Microsoft Windows.

GRUB edit menu **x86 only**: A boot menu that is a submenu of the GRUB main menu. GRUB commands are displayed on this menu. These commands can be edited to change boot behavior.

GRUB main menu **x86 only**: A boot menu that lists the operating systems that are installed on a system. From this menu, you can easily boot an operating system without modifying the BIOS or `fdisk` partition settings.

initial installation An installation that overwrites the currently running software or initializes a blank disk.

An initial installation of the Oracle Solaris OS overwrites the system's disk or disks with the new version of the Oracle Solaris OS. If your system is not running the Oracle Solaris OS, you must perform an initial installation. If your system is running an upgradable version of the Oracle Solaris OS, an initial installation overwrites the disk and does not preserve the OS or local modifications.

install server A server that provides the Oracle Solaris DVD or CD images from which other systems on a network can install Oracle Solaris (also called a *media server*). You can create an install server by copying the Oracle Solaris DVD or CD images to the server's hard disk.

JumpStart directory When you use a profile diskette for JumpStart installations, the JumpStart directory is the root directory on the diskette that contains all the essential JumpStart files. When you use a profile server for JumpStart installations, the JumpStart directory is a directory on the server that contains all the essential JumpStart files.

JumpStart installation A type of installation in which the Oracle Solaris software is automatically installed on a system by using the factory-installed JumpStart software.

Live Upgrade An upgrade method that enables a duplicate boot environment to be upgraded while the active boot environment is still running, thus eliminating downtime of the production environment.

locale A geographic or political region or community that shares the same language, customs, or cultural conventions (English for the U.S. is `en_US`, and English for the U.K. is `en_UK`).

mirror See *RAID-1 volume*.

mount The process of accessing a directory from a disk that is attached to a machine that is making the mount request or a remote disk on a network. To mount a file system, you need a mount point on the local system and the name of the file system to be mounted (for example, `/usr`).

mount point A workstation directory to which you mount a file system that exists on a remote machine.

networked systems A group of systems (called hosts) that are connected through hardware and software so that they can communicate and share information. Referred to as a local area network (LAN). One or more servers are usually needed when systems are networked.

non-global zone A virtualized operating system environment created within a single instance of the Oracle Solaris operating system. One or more applications can run in a non-global zone without interacting with the rest of the system. Non-global zones are also called zones. See also *Oracle Solaris Zones* and *global zone*.

`/opt` file system A file system that contains the mount points for third-party and unbundled software.

Oracle Solaris DVD or CD images The Oracle Solaris software that is installed on a system, which you can access on the Oracle Solaris DVDs or CDs or an install server's hard disk to which you have copied the Oracle Solaris DVD or CD images.

package A collection of software that is grouped into a single entity for modular installation. The Oracle Solaris software is divided into *software groups*, which are each composed of *clusters* and packages.

platform group A vendor-defined grouping of hardware platforms for the purpose of distributing specific software. Examples of valid platform groups are i86pc and sun4u.

platform name The output of the `uname -i` command. For example, the platform name for the Ultra 60 is SUNW,Ultra-60.

pool A logical group of devices describing the layout and physical characteristics of the available ZFS storage. Space for datasets is allocated from a pool.

probe keyword A syntactical element that extracts attribute information about a system when using the JumpStart method to install. A probe keyword does not require you to set up a matching condition and run a profile as required for a rule. See also *rule*.

profile A text file that defines how to install the Oracle Solaris software when using the JumpStart method. For example, a profile defines which software group to install. Every rule specifies a profile that defines how a system is to be installed when the rule is matched. You usually create a different profile for every rule. However, the same profile can be used in more than one rule. See also *rules file*.

profile diskette A diskette that contains all the essential JumpStart files in its root directory (JumpStart directory).

RAID-0 volume A class of volume that can be a stripe or a concatenation. These components are also called submirrors. A stripe or concatenation is the basic building block for mirrors.

RAID-1 volume A class of volume that replicates data by maintaining multiple copies. A RAID-1 volume is composed of one or more RAID-0 volumes called *submirrors*. A RAID-1 volume is sometimes called a *mirror*.

Reduced Network Support Software Group A software group that contains the minimum code that is required to boot and run a Oracle Solaris system with limited network service support. The Reduced Networking Software Group provides a multiuser text-based console and system administration utilities. This software group also enables the system to recognize network interfaces, but does not activate network services.

root The top level of a hierarchy of items. Root is the one item from which all other items are descended. See *root directory* or *root* (`/`) *file system*.

root (`/`) file system The top-level file system from which all other file systems stem. The root (`/`) file system is the base on which all other file systems are mounted, and is never unmounted. The root (`/`) file system contains the directories and files critical for system operation, such as the kernel, device drivers, and the programs that are used to start (boot) a system.

root directory The top-level directory from which all other directories stem.

rule A series of values that assigns one or more system attributes to a profile. A rule is used in a JumpStart installation.

`rules` file A text file that contains a rule for each group of systems or single systems that you want to install automatically. Each rule distinguishes a group of systems, based on one or more system attributes. The `rules` file links each group to a profile, which is a text file that defines how the Oracle Solaris software is to be installed on each system in the group. A `rules` file is used in a JumpStart installation. See also *profile*.

`rules.ok` file A generated version of the `rules` file. The `rules.ok` file is required by the JumpStart installation software to match a system to a profile. You *must* use the `check` script to create the `rules.ok` file.

slice The unit into which the disk space is divided by the software.

snapshot A read-only image of a ZFS file system or volume at a given point in time.

software group A logical grouping of the Oracle Solaris software (clusters and packages). During a Oracle Solaris installation, you can install one of the following software groups: Core, End User Oracle Solaris Software, Developer Oracle Solaris Software, or Entire Oracle Solaris Software, and for SPARC systems only, Entire Oracle Solaris Software Group Plus OEM Support.

standalone A computer that does not require support from any other machine.

state database A database that stores information about the state of your Solaris Volume Manager configuration. The state database is a collection of multiple, replicated database copies. Each copy is referred to as a *state database replica*. The state database tracks the location and status of all known state database replicas.

state database replica A copy of a state database. The replica ensures that the data in the database is valid.

submirror See *RAID-0 volume*.

swap space A slice or file that temporarily holds the contents of a memory area till it can be reloaded in memory. Also called the `/swap` or `swap` volume.

`sysidcfg` file A file in which you specify a set of special system configuration keywords that preconfigure a system.

update An installation, or to perform an installation, on a system that changes software that is of the same type. Unlike an upgrade, an update might downgrade the system. Unlike an initial installation, software of the same type that is being installed must be present before an update can occur.

upgrade An installation that merges files with existing files and preserves modifications where possible.

An upgrade of the Oracle Solaris OS merges the new version of the Oracle Solaris OS with the existing files on the system's disk or disks. An upgrade saves as many modifications as possible that you have made to the previous version of the Oracle Solaris OS.

upgrade option An option that is presented by the Oracle Solaris installation program . The upgrade procedure merges the new version of Oracle Solaris with existing files on your disk or disks. An upgrade also saves as many local modifications as possible since the last time Oracle Solaris was installed.

`/usr` file system A file system on a standalone system or server that contains many of the standard UNIX programs. Sharing the large `/usr` file system with a server rather than maintaining a local copy minimizes the overall disk space that is required to install and run the Oracle Solaris software on a system.

`/var` file system A file system or directory (on standalone systems) that contains system files that are likely to change or grow over the life of the system. These files include system logs, `vi` files, mail files, and UUCP files.

virtual device A logical device in a ZFS pool, which can be a physical device, a file, or a collection of devices.

volume A group of physical slices or other volumes that appear to the system as a single logical device. A volume is functionally identical to a physical disk for the purposes of an application or file system.

In some command-line utilities, a volume is called a metadevice. Volume is also called *pseudo device* or *virtual device* in standard UNIX terms.

Volume Manager A program that provides a mechanism to administer and obtain access to the data on DVD-ROMs, CD-ROMs, and diskettes.

ZFS A file system using storage pools to manage physical storage.

zone See *non-global zone*

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