SGI SystemImager™ Software Installation and Administration Guide

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About This Guide

This guide documents the graphical user interface (GUI) for the SGI SystemImager tool running on SGI 1450, SGI 1400, and SGI 1200 systems. It includes instructions for installing and administering SystemImager.

Related Publications and Web Sites

The following publications and Web sites contain additional information that may be helpful:

- ACE Web Site: http://oss.sgi.com/projects/ace
- SGI ProPack:
 - SGI ProPack site: http://oss.sgi.com/projects/sgipropack1.2
 - SGI ProPack 1.4 for Linux Start Here
- General Linux Clusters:
 - How to Build a Beowulf: A Guide to the Implementation and Application of PC Clusters. Thomas L. Sterling, John Salmon, Donald J. Becker, Daniel F. Savarese. ISBN: 026269218X.
 - How to Build a Beowulf: a Tutorial http://www.cacr.caltech.edu/ beowulf/tutorial/tutorial.html
 - Beowulf Installation and Administration HOWTO http:// buweb.parl.clemson.edu/doc_project/BIAA-HOWTO/ Beowulf-Installation-and-Administration-HOWTO.html
- VA SystemImager Web site: http://www.systemimager.org

Obtaining Publications

To obtain SGI documentation, go to the SGI Technical Publications Library at http://techpubs.sgi.com.

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Conventions

The following conventions are used in this document:

Convention	Meaning						
command	This fixed-space font denotes literal items such as commands, files, routines, path names, signals, messages, and programming language structures.						
manpage(x)	Man page section identifiers appear in parentheses after man page names. The following list describes the identifiers:						
	1	User commands					
	1B	User commands ported from BSD					
	2	System calls					
	3	Library routines, macros, and opdefs					
	4	Devices (special files)					
	4P	Protocols					
	5	File formats					
	7	Miscellaneous topics					
	7D	DWB-related information					
	8	Administrator commands					
	_assign_as	al routines (for example, the sgcmd_info() routine) do not have man ated with them.					
Italic	Italic typefac concepts bein	e denotes variable entries and words or ng defined.					

Reader Comments

If you have comments about the technical accuracy, content, or organization of this document, please tell us. Be sure to include the title and document number of the manual with your comments. (Online, the document number is located in the front matter of the manual. In printed manuals, the document number is located at the bottom of each page.)

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Introduction

SGI SystemImager enables system administrators to easily replicate an entire Linux system onto a set of Linux machines, even when the machines have unformatted and unpartitioned disks. The user interface makes it easy to keep the hard drives of those systems synchronized after initial replication.

One machine in the set of Linux machines acts as a master (called the *golden master*). The golden master contains the image that will be replicated to the other machines in the set of Linux machines. The *image* of the golden master consists of a record of the golden master's partition information and a copy of all of the data on all of the golden master's locally mounted (that is, not NFS) ext2 filesystems. The machines that receive the image from the golden master are the *clients*. The clients receive the image through a *server*, which can be the same *console* that you log onto to run SystemImager or a separate machine. Figure 1-1, page 1 illustrates the SystemImager replication process in which the server and the console are the same machine. Figure 1-2, page 2 illustrates the SystemImager replication process in which the server and the console are different machines.

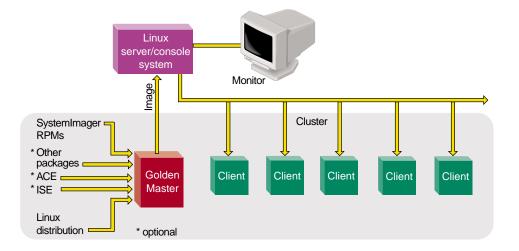


Figure 1-1 SystemImager server and console as the same machine

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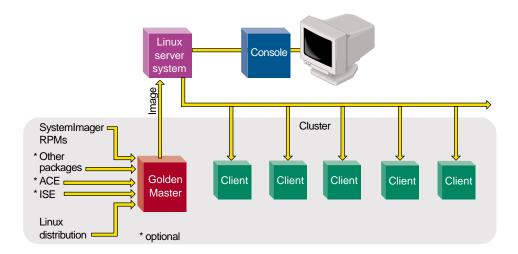


Figure 1-2 SystemImager server and console as different machines

The server is the machine that holds the images and synchronizes the clients. You use the SystemImager tool to copy the golden master's hard drive image to the server. Then, you create a boot diskette for the client machines. This boot diskette can boot Linux, connect the client to the server, and copy the hard drive image onto the client machine.

With SystemImager, you can add clients, modify clients' parameters, or exclude clients from the list of machines that will be replicated. Once the client systems have had the initial image replicated to them, you can update any of them by making a change to the golden master and then resynchronizing the clients. As long as the changes to the golden master do not involve changing the partitioning information, resynchronization does not require the use of a boot diskette, and can be performed while the clients are up and running.

The SGI SystemImager tool is based on the VA SystemImager product. VA SystemImager is available freely as open source and available for download from the following site:

http://www.systemimager.org

VA SystemImager is bundled with SGI SystemImager.

If you are a system administrator who manages mostly identical machines, you will find the SystemImager tool useful in any or all of the following situations:

- You are managing a new cluster with preinstalled or nonpreinstalled machines.
- You need to add preinstalled or nonpreinstalled machines to a cluster.
- You need to recover a machine or group of machines from a crashed hard disk.
- You are installing or upgrading software.
- You need to change configurations (for example, to modify system files).
- You want to add or delete files or directories to the cluster.

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Preinstallation Requirements

This chapter describes the hardware and software requirements for using the SGI SystemImager tool.

Installation Prerequisites

Before you are ready to install the SystemImager tool, you must meet the following prerequisites:

- Ensure that a cluster of machines is connected to the network.
- Install on the golden master all software packages and value-add packages, such as Advanced Cluster Environment (ACE), Internet Server Environment (ISE), and so on, that you want to replicate on the clients.

Hardware Requirements

To use the SGI SystemImager tool, you must have at least a server machine, a console (the server and the console can be the same machine), a golden master, and one or more clients. The golden master and all of the clients should be SGI 1200, SGI 1400, or SGI 1450 systems. All of the machines must be connected via an Ethernet network. One common configuration is to have the clients share a private network with the server. The server can have two network interface cards, one for the private network, and one for the external network.



Warning: SGI SystemImager will totally reconfigure the client machines' hard drives; any existing data will be overwritten.

Server Requirements

The server is the machine that holds the images and synchronizes the clients. The server must have enough disk space to hold its own operating system plus at least one copy of the golden master's hard disk. The more hard drive space that is available, the more images the server can hold.

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The server should have two network interfaces - one connected to the outside world and the other to a hub or switch connected to the master and client(s). If that is impossible, the server can work with only one interface, but you should not connect the machines to the public network. On the public network, there may be various hosts that will answer Dynamic Host Configuration Protocol (DHCP) requests. When booting, the clients issue DHCP requests and the server answers those requests. For SystemImager to work, the server must be the only host that is running as a DHCP server on the clients' network.

Console Requirements

The console is the machine that SystemImager runs on. The console must have a monitor connected and X Windows installed. The X Windows machine must be running with a resolution of at least 1024x768 pixels. You can let the server function as a console. If you want to run SystemImager from multiple machines, you can configure more than one console.

Golden Master Requirements

The golden master is the machine whose hard drive is copied to all of the clients. You must set up this machine the way that you want all of the client machines set up. This machine should be installed and configured before you prepare an image or synchronize clients. It is necessary that the server be able to use rsh(1) to remotely connect as root to the golden master without a password. To accomplish this, create a ~root/.rhosts file and enter the name of the server.

Client Requirements

The clients are the machines that will receive the golden master's image. The clients' disks must be able to hold at least as much data as the golden master's disk, and the types (SCSI or IDE) must be the same on the clients and the master. The clients should be similar enough to each other and to the master so that the same hard drive image will work on all of the clients.

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Software Requirements

To run SystemImager, you must have one of the following Linux distributions installed on the server, the console (if it is not the server), and the golden master:

- Red Hat version 6.2
- TurboLinux version 6.0
- SuSE version 6.4

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Installing SGI SystemImager

This chapter outlines the procedure for installing the SystemImager tool on the server, console (if one exists), and golden master. For installation prerequisites, see "Installation Prerequisites", page 5.

Installing on the Server

This section lists the RPMs that you must install on the server machine.

Red Hat and TurboLinux RPMs on the Server

If you have Red Hat or TurboLinux on your server machine, install the following RPMs:

- dhcp-2.0-5.i386.rpm
- nasm-0.98-1.i386.rpm
- rsync-2.4.3-1.i386.rpm
- syslinux-1.48-2.i386.rpm
- tftp-hpa-0.13-1.i386.rpm
- va-systemimager-1.1.1sgi-1.i386.rpm
- fam-2.6.5-1.i386.rpm
- sysadm_base-tcpmux-1.3.5-1.i386.rpm
- sysadm_base-lib-1.3.5-1.i386.rpm
- sysadm_base-server-1.3.5-1.i386.rpm
- sysadm_systemimager-server-0.0.4-1.i386.rpm

SuSE RPMs on the Server

If you have SuSE on your server machine, install the following RPMs:

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• dhcp.rpm

This RPM can be found on your SuSE CD or atftp://ftp.suse.com/pub/suse/i386/6.4/suse/n1/dhcp.rpm.

- nasm-0.98-1.i386.rpm
- rsync-2.4.3-1.i386.rpm
- syslinux-1.48-2.i386.rpm
- va-systemimager-1.1.1sgi-1suse.i386.rpm

This RPM depends on the mkdosfs RPM. If you do not have that RPM installed already, you can find it on your SuSE CD or at ftp://ftp.suse.com/pub/suse/i386/6.4/suse/ap1/mkdosfs.rpm.

- fam-2.6.5-1.i386.rpm
- sysadm_base-tcpmux-1.3.5-1.i386.rpm
- sysadm_base-lib-1.3.5-1.i386.rpm
- sysadm_base-server-1.3.5-1.i386.rpm
- sysadm_systemimager-server-0.0.4-1suse.i386.rpm

Installing on the Console

This section lists the RPMs that you must install on the console machine.

Red Hat and TurboLinux RPMs on the Console

If you have Red Hat or TurboLinux on your console, install the following RPMs (If the console and server are the same machine, install them on the server also):

- IBMJava118-JRE-1.1.8-4.0.i386.rpm
- sysadm_base-client-1.3.5-1.i386.rpm
- sysadm_systemimager-client-0.0.4-1.i386.rpm

SuSE RPMs on the Console

If you have SuSE on your console, install the following RPMs (If the console and server are the same machine, install them on the server also):

- IBMJava118-JRE-1.1.8-4.0.i386.rpm
- sysadm_base-client-1.3.5-1.i386.rpm
- sysadm_systemimager-client-0.0.4-1suse.i386.rpm

Installing on the Golden Master

This section lists the RPMs that you must install on the golden master machine.

Red Hat and TurboLinux RPMs on the Golden Master

If you have Red Hat or TurboLinux on the golden master, install the following RPMs:

- rsync-2.4.3-1.i386.rpm
- va-systemimager-client-1.1.1sqi-1.i386.rpm

SuSE RPMs on the Golden Master

If you have SuSE on the golden master, install the following RPMs:

- rsync-2.4.3-1.i386.rpm
- va-systemimager-client-1.1.1sgi-1suse.i386.rpm

Completing Installation

After you have installed SystemImager, log out and log back in on the console machine. You are now ready to use SystemImager to replicate and synchronize the clients. For details of using SystemImager, see Chapter 4, "Running SGI SystemImager", page 13.

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Running SGI SystemImager

This chapter describes what you need to know before you begin to run SystemImager and how to start the tool. The remainder of the chapter provides a description of the main window and each of the tasks that SystemImager performs.

The SystemImager tool enables you to replicate the data you have configured on the golden master to each client in a set of Linux machines. This replication process overwrites and repartitions the client disk. Subsequently, you can use the synchronization feature of this tool to change the content of any or all of the replicated clients.

Before You Begin

Before you begin running SystemImager, ensure that the console (if there is one), server, golden master, and client(s) are connected to the network with the necessary software and that the golden master has been configured with all of the components and characteristics that you want your clients to have. For specific files to install, refer to Chapter 3, "Installing SGI SystemImager", page 9.

Starting SystemImager

To start SystemImager, log onto the console machine. An **SGI SystemImager** icon will appear in the applications section of your KDE or GNOME **Start** menu. If you cannot find the icon, run the following command:

/usr/bin/simgr

Logging in to SystemImager

After you have started SystemImager, a login dialog box appears, allowing you to establish a connection to a server. You must provide the following information:

Server name

Server name is the name of the machine that holds the images and synchronizes the clients.

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Login name Login name is either root or the user account name

that will be used to administer the server.

Password is the password for the root or the user

account.

When you have provided this information, click the OK button. There is also a Help button and a Cancel button.

Main Window

The main SGI SystemImager window (see Figure 4-1, page 15) is divided into client view, configurations area, and task buttons.

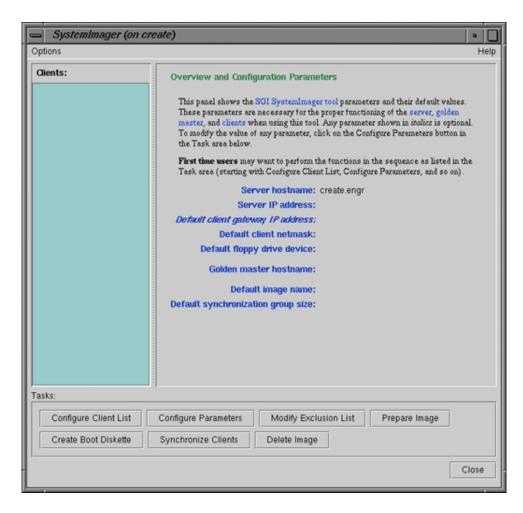


Figure 4-1 SGI SystemImager main window

Client View Area

The client view area shows the list of clients in the cluster in the form of icons with labels. This area is labeled "Clients." When you bring up SystemImager for the first time, this area is blank because you have not yet defined the clients. When icons are present, clicking on the icon or the icon's label displays a small window with the following information about the client:

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- · Hostname, which is the user-assigned name of the machine
- IP address, which is the user-assigned interface address
- Ethernet address, which is the Ethernet address of the network card that is connected to the network that is connected to the server

Configurations Area

When the main window first comes up, the Configurations area displays the configuration fields and their current or default values. This area is labeled "Overview and Configuration Parameters." For more information about any of the configuration fields and their possible values, simply click on the field label to pop up a glossary window. These fields are not editable from the main window. To edit these fields, use the Configure Parameters task (see "Configure Parameters", page 18).

When you activate a task (see "Task Button Area", page 16), the activated task covers the Configurations area. When the task is done, the configuration fields and their values appear again. If you used the task to change the value of any configuration field, that new value appears.

Task Button Area

The Task Button area contains a button for each task that SystemImager performs. The buttons are placed in the general order in which you will perform the tasks. If you are running SystemImager for the first time, you must configure the clients before configuring parameters or performing any of the other tasks. If you attempt to perform a task that depends on the results of another task, you will receive a warning that the prerequisite task has not yet been performed. For a description of each task, see "Tasks", page 16. To activate a task, click on the task button. The content of the task is displayed in the Configurations area. While a task is running, the other task buttons are unavailable.

Tasks

Each task contains editable fields. The labels for the fields are displayed in blue, indicating that you can click on them. Clicking on a blue label brings up a pop-up window that contains a description of the field. The fields whose labels are displayed in italic font are optional and can be left blank. When you edit a field whose label is

marked with an asterisk (*), the value that you supply applies only for the duration of that task.

At the bottom of each task are **OK**, **Cancel**, and **Help** buttons. When you click **OK**, the task is performed, using the parameters you specified. When you click **Cancel**, the task exits with no action performed. When you click **Help**, a help window appears with the appropriate help for that task.

Each task ends with either a result dialog box when it completes successfully or an error message dialog box if it fails. If the task fails, you can try changing the data you entered and try clicking **OK** again. When the task completes successfully and you dismiss the dialog box, the Configurations area replaces the task and the task buttons are available again.

The following sections describe the SystemImager tasks.

Configure Client List

The Configure Client List task lets you define the clients in the cluster. Whenever you reconfigure the machines in your cluster, you must update this list. The information you supply for this task is used subsequently to synchronize the clients (see "Synchronize Clients", page 20).

To add a client to the cluster, enter the client hostname, IP address, and Ethernet address in their respective boxes and click on the **Add** button. When you enter this information, it will appear in the list under the boxes. If you do not know the Ethernet address, you can obtain it in one of the following ways:

• If the client is running Linux, log in to the client and enter the following command:

ifconfig eth0

The Ethernet address will be listed in the following format:

HWaddr XX:XX:XX:XX:XX

• If the client is not running Linux, boot your distribution's boot CD, go to rescue mode (for example, on Red Hat, enter linux rescue at the prompt), and run ifconfig as described in the previous example.

If you need to make changes to the listed information, use the **Modify** button and then enter your changes. To delete a client from the list, highlight the client and use the **Delete** button.

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After you click **OK** and the clients are added successfully, SGI SystemImager adds to the /etc/hosts file any clients that are not already in /etc/hosts or in the NIS database.

Configure Parameters

The Configure Parameters task lets you specify default values for the following parameters. Some of these values can be changed from other tasks but those changes last only for the duration of the task in which they are changed.

- **Server hostname** A name not longer than 255 characters. The server hostname is the name of the machine that holds the images and synchronizes the clients.
- **Server IP address** An address in dot notation, such as 192.68.1.1. The server IP address is the address that the the golden master will use to access the server.
- **Default client gateway IP address** An address in dot notation, such as 192.68.1.1. This parameter is optional and can be left blank. The client gateway IP address is the gateway address that the tool will configure the clients to use. For gateway information, check with your network administrator.
- **Default client netmask** A value in dot notation, such as 255.255.255.0. The default client netmask is the netmask that the tool will configure the clients to use. For netmask information, check with your network administrator.
- Default floppy drive device A value such as /dev/fd0. The floppy drive
 device will be used by the server when the Create Boot Diskette task is used to
 create a bootable floppy disk. The location of the device is permanent unless
 changed by the Configure Parameters task.
- **Golden master hostname** A name such as master.sgi.com. The golden master is the machine with which the clients synchronize.
- Default image name A name such as image1 (you can select the name from the menu). The image name is the name of a copy of the hard disk of the golden master machine. The default image is the image that will be used to update the clients during synchronization. If there are no images created yet, this field should be left blank.
- **Default synchronization group size** A number that represents the number of clients to be synchronized at a time, such as 10. If the actual number of clients to be synchronized exceeds this number, the additional clients are synchronized one by one, as the other client synchronizations finish. The sychronization process

puts a lot of traffic on the network and load on the server, so it is important to choose the number of clients that your network and server can handle.

Modify Exclusion List

During initial replication with the boot diskette, the entire image from the golden master is replicated to all of the clients. For subsequent synchronizations via the Synchronize Clients task, you can use the Modify Exclusion List task to specify files and directories that are not to be replicated from the golden master to the clients. Adding a file or directory to the exclusion list modifies the exclusion list on the golden master. However, when you add a file or directory to the exclusion list, that file or directory does not actually get excluded from replication until the following tasks have been performed:

- 1. You must run the Prepare Image task to update the image on the server. The modified exclusion list will be copied to the server along with any other changed files as part of the image. However, the Prepare Image task does not check the exclusion list that it puts on the server, so the file or directory that you have added to the exclusion list is not yet excluded.
- 2. You must then run the Synchronize Clients task to copy the image (including the exclusion list) to the clients. The Synchronize Clients task **does** check an exclusion list, but the exclusion list it checks is the list that is already on the client's disk, not the new one that is being copied to the disk. So the file or directory that you have added to the new exclusion list is not yet excluded.
- 3. The next time you run the Synchronize Clients task, the exclusion list that the task checks is the one with your file or directory added. Now your file or directory is excluded from replication.

Each line that you enter in the **Exclusion list** box must be the full path name of either a file or a directory (for example, /usr/tmp). Blank lines and lines that begin with "#" are treated as comments.

Prepare Image

The Prepare Image task lets you create or update an image of the golden master. If you want to create a new image, you need to have enough free disk space on the server to hold the disk image of the golden master. Creating a new image can take a while, depending on the size of the disk.

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In this task, you must specify the name of the golden master. (The new name of the golden master lasts for the duration of this task only.) Then indicate whether you are creating a new image or updating an existing image by selecting the appropriate button. You must also specify the name of the image to be created or updated. If you are creating a new image, enter the new name. If you are updating an existing image, either enter the name of the existing image or select a name from the menu.

If you want this image to be the default, click the **Set image to be default** checkbox on. If there is no existing image, the new image to be created will be the default image.

Create Boot Diskette

The Create Boot Diskette task lets you create a boot diskette to be used for replicating a client for the first time. If your clients are SGI 1200 machines, you have an option to boot the clients over the network. Whether you are booting with the diskette or over the network, before you can replicate a client, you must have at least one image prepared and a default image set. To create and set up an image, see "Prepare Image", page 19. To set or change the default image, see "Configure Parameters", page 18.

To create the boot diskette, either supply the floppy drive device name, such as / dev/fd0, in the indicated box or use the default. (Changing the name of the floppy drive device lasts for the duration of this task only.) Before pressing OK, remember to insert a blank diskette.

For the steps to complete the replication process, see "Using the Boot Diskette", page 21. For the steps for booting over the network, see "Booting over the Network", page 22.

Synchronize Clients

The Synchronize Clients task lets you use an image file (that you created using the Prepare Image task) to resynchronize the clients. You must specify the image file in the **Image name** box by entering the image name or by selecting an image from the menu. (A new image name lasts for the duration of this task only.)

Indicate the number of clients to be synchronized at one time in the **Synchronization group size** box. The sychronization process puts a lot of traffic on the network and load on the server, so it is important to choose the number of clients that your network and server can handle. Consider the amount of data to be synchronized and

the total number of clients to be synchronized. The default synchronization group size is 10. (A new synchronization group size lasts for the duration of this task only.)

To indicate the names of clients to synchronize, use the **Clients to synchronize** box. Enter the names of the clients to be synchronized or select them from the menu and click on the **Add** button. If you are synchronizing all of the clients, simply click on the **All** button.

To delete a client, use the **Delete** button. To clear the entire list, use the **Clear** button.

Delete Image

The Delete Image task lets you delete an image. You must indicate the image to delete in the **Image to delete** box. Either enter the image name or select an image from the menu. If you select the default image, you will be prompted to select another image to be the default.

Replicating a Client for the First Time

This section provides steps for replicating a client for the first time with a boot diskette or over the network.

Using the Boot Diskette

After you have created the boot diskette (see "Create Boot Diskette", page 20) and a default image is set up, to complete the replication process, perform the following steps:

- 1. Insert the diskette into the disk drive of the server, which, if your console is not the same as your server, will not be the machine on which the SGI SystemImager GUI is running.
 - The boot diskette that is created will work for all clients. The image that will be transferred to the client is determined by the default image on the server when the diskette is booting.
- 2. Insert the diskette into a client machine and reboot. The image designated as the default image will be replicated onto the client.
- 3. After the replication is complete, remove the diskette and reboot the client again.

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Booting over the Network

If your clients are SGI 1200 machines, you can boot the clients over the network instead of using the Create Boot Diskette task. To boot a client over the network, perform the following steps:

- 1. Reboot the client.
- 2. During start up, press the ESC key.
- 3. Choose PXE from the menu.

Using the Tasks

This section provides a guide for using SGI SystemImager to perform common system administrator tasks.

Table 4-1 Using tasks

If you want to	Follow these steps
Set up a new cluster	
	1. Use the Configure Client List task to define all clients.
	2. Use the Configure Parameters task to specify parameters for your environment.
	3. Use the Modify Exclusion List task to specify files or directory to be excluded.
	4. Use the Prepare Image task to copy image from golden master to server.
	5. Use the Create Boot Diskette task to create a boot diskette to be used to replicate the clients. This step is not necessary if you are booting over the network (see "Booting over the Network", page 22).
	6. Insert the boot diskette into each client and reboot the system.

If you want to . . .

Follow these steps . . .

Add a client to the cluster or recover a client after a disk failure

- 1. Use the Configure Client List task to define the new client. (This step applies only to adding a client to a cluster.)
- 2. Insert the boot diskette into the client and reboot the system or boot over the network (see "Booting over the Network", page 22).

Install or upgrade software, change configurations, or add or delete files or directories

- 1. Update the golden master.
- 2. Use the Prepare Image task to update the existing image or create a new one.
- 3. Use the Synchronize Clients task to update the clients with the new image.

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Frequently Asked Questions

This chapter provides answers to questions you might have about SGI SystemImager.

How Does SGI SystemImager Compare to the Red Hat KickStart Script?

KickStart is a script that drives a Red Hat installation. With KickStart, you answer all of the questions that the Red Hat installation asks, then package up those answers in a way that makes it easy to replicate Red Hat installs. KickStart does not support upgrades, installations other than Red Hat, or configuration files. SGI SystemImager is a disk cloning product. You install one machine with exactly the configuration you desire (for example, you can install Red Hat 6.2, then add the Propack 1.2, then ACE). Then you use SGI SystemImager's Prepare Image task to clone an image of the disk to the server machine. Next, you use the Create Boot Diskette task to create a boot diskette. You insert that disk into a cluster node and boot it. It boots up, contacts the server, and downloads the image onto its hard drive. When the client node is rebooted, it will look exactly like the original machine (minus specifically excluded directories like /tmp, /proc, and so on).

Can SGI SystemImager install and update data in an automated manner while the cluster is running?

It can install and update patches, files, administrative changes (application, printers, hostname, networks, and so on) on all, selected, or single, nodes in the cluster. You make the changes to the master, then pull the image onto the server with the Prepare Image task. It copies only the changes to the server. Then you run the Synchronize Clients task to push over the new image to the selected clients. Once again, only changes are copied. No reboot is necessary unless you are copying a new kernel or other system files that would require a reboot to occur.

Can updates of an entire disk, a filesystem, selected directories, or files be propagated while the system is up?

Yes. By default, the entire disk is copied. There is an exclude list that you can modify to exclude any directories you wish to exclude from the synchronization.

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Can SGI SystemImager scan and compare files on the nodes against a reference and then perform any necessary updates?

Yes. It uses the rsync program for this. For example, by default, when the client is resynchronized with the image from the server, all new and modified files are copied over, and any files that exist on the client but not in the image are deleted.

What is the price and distribution mechanism for SGI SystemImager?

SGI SystemImager is not priced separately for individual sale. It is bundled with other products, which have their own pricing. VA SystemImager (the command line interface) is available freely as open source and available for download from the following web site: http://www.systemimager.org/

Why not distribute directly from master to clients?

One advantage to using a separate server is that the server machine can hold multiple images, and might be the only machine that needs a lot of disk space. The server machine also acts as the Dynamic Host Configuration Protocol (DHCP) server. If the master were to act as the DHCP server, the clients, being exact copies of the master, would want to act as the DHCP server as well.

How identical do the client disks need to be to the master disks?

When SystemImager records the golden master's partition information, it also records the type of disk (for example, SCSI or IDE), and expects to find a disk of the same type and with the same name (for example, /dev/sda) on the clients. This means that you must match the types of disks installed on the master and clients.

SystemImager attempts to make the partitions on the clients match the partitions of the master. SystemImager records the partitions on the master in terms of sectors. The clients are partitioned to match. On some systems, partitions should begin only on cylinder boundaries, which do not necessarily correspond to sector boundaries if the geometries of the disks are different. SystemImager forces the partitions to be created exactly the same size as the master's, which works fine on many systems, but not necessarily on all systems. If it does not, you should contact your customer services representative for assistance.

What if the machine designated as the master crashes?

If the master crashes, the performance of the rest of the cluster is unaffected. The server can continue serving out the images as it did before. Only when a new image needs to be created or an existing image needs to be updated would you need to create a new master. Because the master and all of the clients are identical, you can promote a client to a master by renaming the client as the master.

What if the machine designated as the server crashes?

If the server machine crashes, the machines already running in the cluster will be unaffected. However, no synchronizations will be possible. Also, when a client machine reboots, it will be unable to obtain an IP address from the server and will likely fail to restart correctly.

Why is DHCP required?

After an image is copied to the server, the next step is to prepare a boot diskette that can boot the clients. The clients need to connect via the network to retrieve the image, and to do this, an IP address is required. The boot diskette that is created is generic — the same one works for all clients — and therefore, does not contain a hardcoded IP address. Therefore, the client uses DHCP to contact the server and obtain its name and IP address.

Can SystemImager show the differences between an image and the client?

No. While SystemImager does not currently support investigative capabilities such as performing a "diff" with the golden master image, you could accomplish these capabilities with very little effort by issuing a single rsync command from the client (use the -n argument).

Is there a way to track changes in the master image?

No. If you have a lot of disk space, you can implement a kind of version control by getting a complete image from the master each time you retrieve an image, rather than overwriting the old one.

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Can I specify several multiple master image types?

Yes. The server can hold as many images as the disk can hold. However, when a client is booted from a diskette, it synchronizes itself with the default image, and there is only one default image at a time. If you want to specify compute nodes and I/O nodes, for example, you would have to set the default image to be the compute nodes image, then boot the compute nodes with the boot diskette, then set the default to be the IP image and boot the I/O images. When resynchronizing via the SGI SystemImager, if you boot over the network, you can specify the image to use.

How do I view log messages?

To view log messages from SystemImager on the server machine, do the following:

- 1. On the server, rename the file /var/lib/sysadm/sysadmd.conf.example to /var/lib/sysadm/sysadmd.conf.
- 2. Edit /var/lib/sysadm/sysadmd.conf, as follows: Uncomment the logFile: and logFile.filter lines. Set logFile: to /tmp/sysadmd-log (or similar).
- 3. Restart (or start) SGI SystemImager on the console.

To view log messages from SGI SystemImager on the console machine, do the following:

- 1. On the console machine, edit the /usr/bin/simgr file. Replace /usr/jre118/bin/jre with /usr/jre118/bin/jre -DLog.debugLevel=ALL
- 2. Run /usr/bin/simgr.

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