

Administrator's Guide for Diskless Workstations

IRIS-4D Series



SiliconGraphics
Computer Systems

Administrator's Guide for Diskless Workstations

Version 1.0

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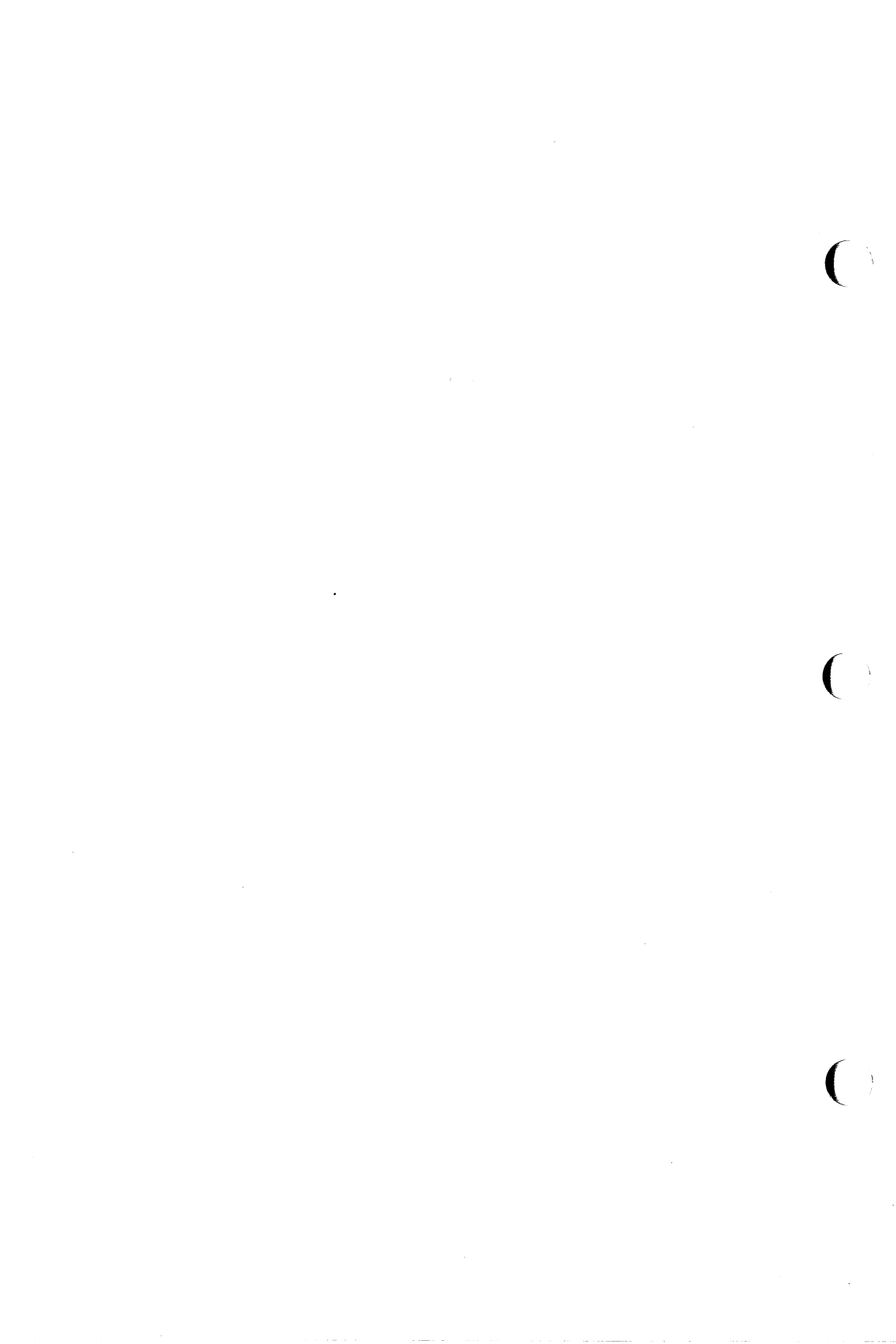
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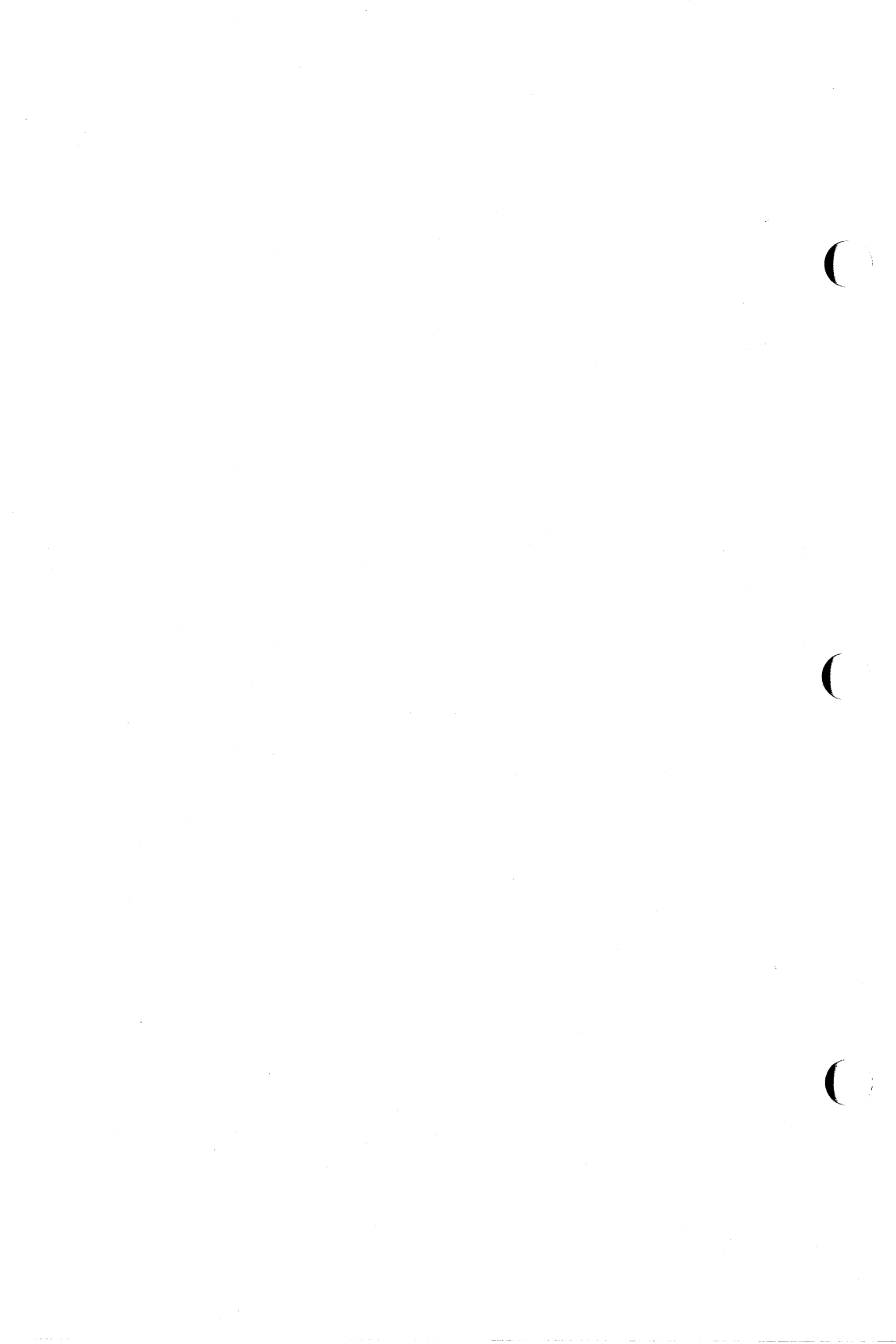
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1. Introduction

This book explains how to be the system administrator for one or more IRIS™ 4D/20 diskless workstations. It is intended for readers with some basic knowledge of the IRIX™ Operating System. Every diskless 4D/20 must have a host workstation to provide disk space. Any IRIS-4D Series workstation can be used as the host workstation, provided it meets the disk requirements described in Chapter 2, “Building the Diskless Tree”. Several diskless 4D/20s can share one host workstation if disk space allows.

This book makes the following assumptions:

- The server (host) workstation is an IRIS-4D Series workstation running at least system software version 4D1-3.2.
- Your server workstation is completely set up, running, and is already on your local network. If this is not the case, see the *IRIS-4D Series Owner's Guide*.
- You have installed the NFS option on the server workstation.
- Your client (diskless) workstation is an IRIS 4D/20.
- Your diskless workstation is completely assembled and hooked up. If this is not the case, set it up following the instructions in Chapter 1 of your *Personal IRIS Owner's Guide*.

There are four chapters in this book. The introduction is designed to familiarize you with the basic setup for a diskless system, as well as with some of the terminology you need in the rest of the book. The second chapter is a step-by-step guide to setting up a workstation for use as a host for one or more diskless workstations. The third chapter contains instructions for some alterations to the completed setup, such as upgrading software, or moving the diskless workstation to a different server. The fourth chapter explains how to deal with a disk upgrade for a diskless workstation.

1.1 The Diskless Tree

Since the diskless workstation has no disk of its own, it must use part of the disk space of some other workstation. The diskless IRIS accesses this borrowed space through the local network. The workstation that supplies the disk storage for a diskless workstation is called the *server*, and the diskless workstation itself is called the *client*. Each server has directories set aside that contain all the files needed by the client workstations. These directories form the *diskless tree*. Figure 1-1 is an example of a diskless tree serving two client workstations named Wally and Beaver. In this example, the directory */usr/diskless* has been set aside for use by the client workstations. This directory, and all its subdirectories, form the diskless tree for this system.

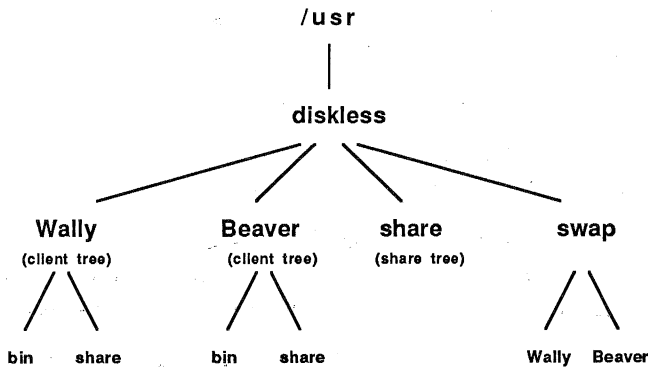


Figure 1-1. The Diskless Tree

A diskless tree has these components:

- separate directory for each client (the client tree)
- share tree
- swap directory with a subdirectory for each client

The *swap* directory contains the swap space for each client. The sections that follow describe the other components in detail.

1.1.1 The Client Tree

The diskless tree must have a separate *client tree* for each client on the server. The directory pathname of the client tree is exported to this client. The client's boot parameter designates the top of the client tree as the root directory (for more information see *bootparams(1M)* in your *IRIX System Administrator's Reference Manual*). For example, in Figure 1-1 the directory named *Wally* is the client tree for a workstation named Wally, and the directory named *Beaver* is the client tree for a workstation named Beaver. The workstation Wally mounts the directory */usr/diskless/Wally* as its root. A user working on Wally cannot *cd* to *diskless* or over to *Beaver* or to any of the server's other directories. To reach these directories, the user must issue the *rlogin* or *rsh* command. Figure 1-2 shows how the tree would look to a user on Wally.

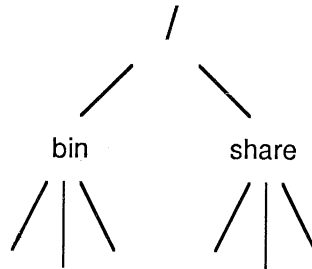


Figure 1-2. The Client Tree

1.1.2 The Share Tree

Since the software requires quite a bit of disk space (about 80Mb), it is not practical to install it in each client tree. Instead, the software is copied from the installation tape into the *share tree*, which is then mounted on each client tree. The share tree provides access to all the software used by the clients.

Each share tree represents a *class* in which all clients share the same software. The class must be uniquely named in the network and that name must be used as the directory name of the share tree. In Figure 1-1 the class is called *share*. Note that the directory name of the share tree is also *share*.

The directory name of the share tree is the name of the class of workstations using that share tree.

The software in the share tree need not be identical to that running on the server workstation. In fact, different clients can run different software, if you make a separate share tree for each different version of software. The client's boot parameter indicates which share tree it is using.

It is possible to create more than one class on the server, provided there is enough disk space available. For instance, suppose you want to add two new IRIS 4D/20 workstations to the diskless tree in Figure 1-1, but you want them to be running a different version of software. You first have to create a new share tree directory, which you might call *share_2*. Then you copy the new installation tape into the new share tree. Figure 1-3 illustrates the example.

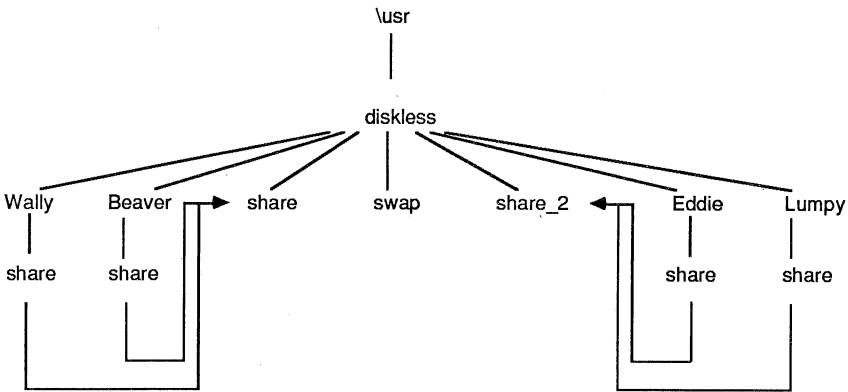
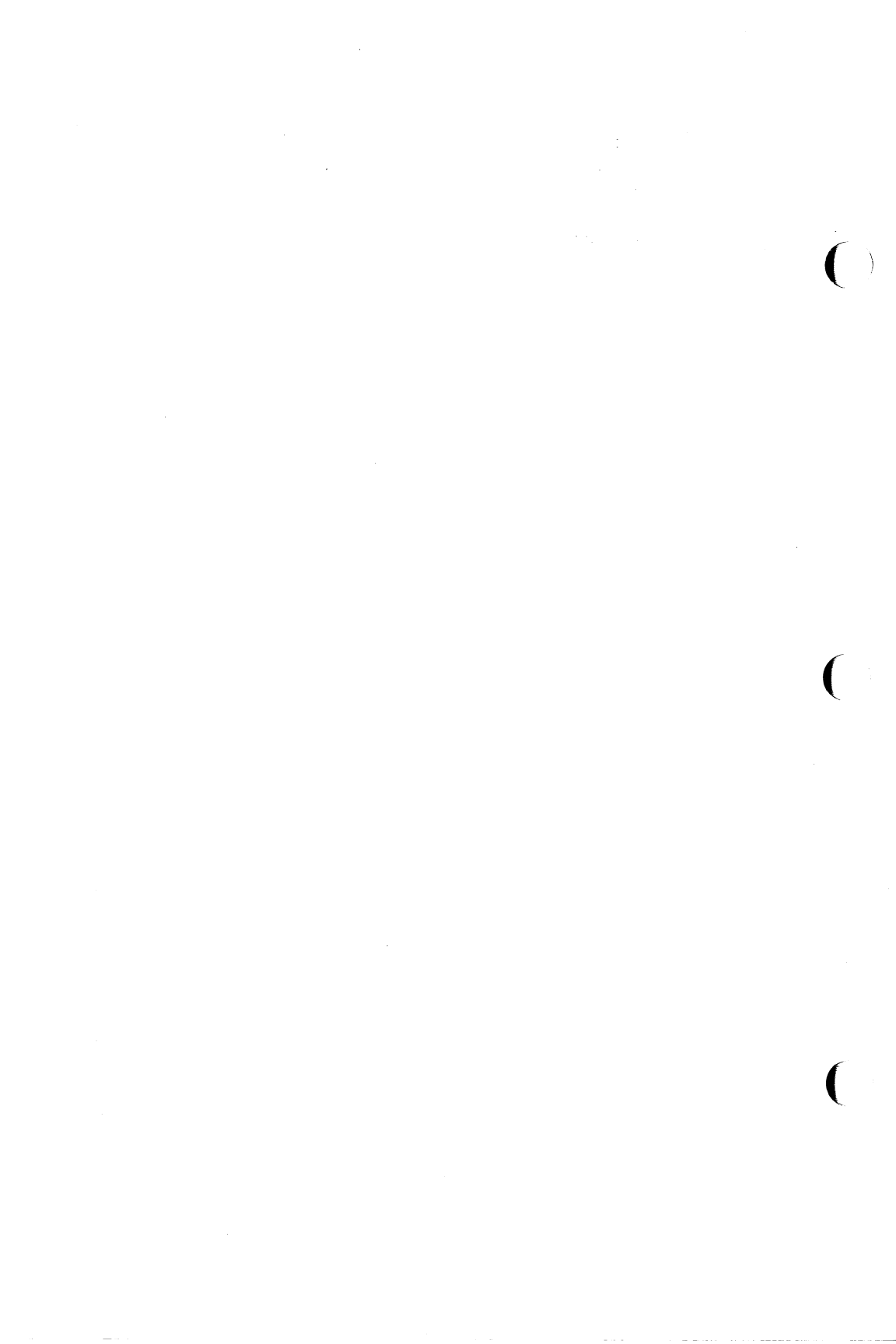


Figure 1-3. The Diskless Tree/Two Classes

Here you have added another class, called *share_2*. The new clients, Eddie and Lumpy, are using whatever software has been copied into *share_2*. There are now directories called *Eddie* and *Lumpy* (and *Wally* and *Beaver*) in the *swap* directory. Remember, the client workstations are isolated from the rest of the server's tree, so a user on Lumpy cannot access the files in *Eddie*, *Wally*, or *Beaver*.

It is important to recognize that each share tree uses a significant amount of disk space above and beyond the disk space needed for each client's own client tree. Therefore, the configuration in Figure 1-3 requires much more disk space than would have been necessary had you simply added Eddie and Lumpy to the existing share tree. Disk requirements are discussed in greater detail in Chapter 2.



2. Building the Diskless Tree

This chapter explains how to set up your IRIS-4D Series workstation as a server for one or more diskless workstations. The first section discusses the disk space requirements for your setup, and the second section contains some general guidelines for planning your diskless tree. The third section contains step-by-step instructions for setting up the server workstations.

2.1 Disk Space

Before building the diskless tree on your server workstation, you must make sure there is enough disk space available for the configuration you're planning. This section gives you an idea of how much disk space to reserve for each client and each share tree.

The entries in Table 2-1 indicate the suggested amount of disk space to reserve for each client and share tree. These figures are intended only as guidelines. The amount of disk space you need depends on the version of software installed on the share tree, as well as the amount of work space the individual users require.

Area	Space Suggested
Each client	50 Megabytes
Each share tree	80 Megabytes

Table 2-1. Estimated Disk Space Requirements

Table 2-2 gives a breakdown of the 50Mb suggested disk space for each client, including swap space. Remember, these figures are only estimates.

Area	Space Suggested
Client root area	6 Megabytes
Client working area	24 Megabytes
Default client swap area	20 Megabytes

Table 2-2. Suggested Space for Client Tree

Example

Look at the setup illustrated in Figure 1-1. There are two clients, Wally and Beaver, and they each need about 50Mb of disk space. There is only one share tree, and it requires about 80Mb of disk space. So, the server needs approximately 180Mb of free disk space to support this configuration.

2.2 Planning for Installation

Before you begin the installation, you need to make a few decisions:

1. If you have not already done so, decide which workstation to use as the server. Here are some guidelines for choosing a server:
 - If the workstation is not completely reserved for use as a server, try to pick one with a low workload. A heavy workload on the server reduces client performance. Similarly, the presence of one or more clients reduces the overall performance on the server.
 - Make sure that all users on the server are aware of the existence of the client workstations. Client users must be warned if the server is going to be brought down for some reason.
2. Decide on a name for each class.

Note: Remember that each class must be uniquely named in the network, and the name of the class is the name of the share directory for that class.

3. Decide where to put the diskless tree.

To find out how much free space you have in your various file systems, in kilobytes, type:

```
df
```

Choose a file system of type “efs” with enough free space for the diskless tree. Remember to leave enough extra disk space for client and server expansion. If you do not have a file system with enough free space, you can put the diskless tree’s various directories into several different file systems. Section 2.3.6, “Installing into Multiple File Systems”, explains this procedure.

For more information on the *df* command, see the *df(1)* man page in your *IRIX User’s Reference Manual*. If you’re not sure how much disk space to allow for the client work areas, you may want to know how much disk space is currently in use on other workstations in your work place. Just log in to any IRIS-4D Series workstation, *cd* to the home directory, and type:

```
du -s
```

You can get a worst-case estimate for the required swap space by typing:

```
sar -r 2 100
```

when the system is heavily loaded.

For more information about these commands see the *du(1M)* and *sar(1M)* man pages in your *IRIX System Administrator’s Reference Manual*.

2.3 Installation

This section contains step-by-step instructions for setting up your IRIS-4D Series workstation as a diskless server. These are the steps for the basic setup:

1. Create the class configuration file.
2. Edit the class configuration file.
3. Create the share tree.
4. Allocate the Internet address.
5. Install the client tree.

The following sections explain each step in detail.

There are two other sections in this chapter. Section 2.3.6, “Installing into Multiple File Systems”, explains how to spread the diskless tree’s directories over several file systems. Section 2.3.7, “Troubleshooting”, suggests possible causes for failed installations.

2.3.1 Creating the Class Configuration File

The *class configuration* file assigns values to certain variables for each class. The template for this file is the *clinst.dat* file in the */usr/etc/boot* directory on the server workstation. You must make a copy of this template for each class on the server.

1. Become superuser.

```
su
```

2. Move to the directory called */usr/etc/boot* on the server machine.

```
cd /usr/etc/boot
```

3. Copy the template file, *clinst.dat*, to the class configuration file.

```
cp clinst.dat class.dat
```

where *class* is the name of the class. For example, if the class is called *share*, you type:

```
cp clinst.dat share.dat
```

4. Repeat step 3 for each additional class of diskless workstations on the server.

2.3.2 Editing the Class Configuration File

After you make a configuration file for each class on the server, you must edit each of them to reflect the configuration and local environment.

The template file, *clinst.dat*, contains a list of variables with default values. Some of these variables must be changed to list specific pathnames on your system. Some need not be changed at all.

If you are setting up a diskless tree in a single file system and it is structured like those in Figure 1-1 and Figure 1-3, the only variables you need to set are DISKLESS and YP. You can leave the other variables as they are.

If you are spreading the directories in your diskless tree over multiple file systems, you have to change the values of several of the variables in *clinst.dat*. Section 2.3.6, “Installing into Multiple File Systems”, explains how to do this.

These are the variables and their definitions:

DISKLESS	You must set this variable to be the pathname to the top of the diskless tree. For example, in Figure 1-1 the pathname to the top of the tree is <i>/usr/diskless</i> .
CLROOT	This variable is set to the pathname of a client tree. Since the same class configuration file is used by all the clients in a particular class, this pathname must always end in the string "\$HOST", which identifies the client. If your client directories are in the directory specified by the DISKLESS variable (e.g., <i>/usr/diskless</i>), you can leave CLROOT as it is. Otherwise, go to Section 2.3.6 and follow the instructions there.

SHAREHOST	This variable is set to the hostname of the server where the share tree lives. This variable should not be changed.
SHARE	This variable is set to the pathname of the share tree. It must end with the string "\$CLASS". If your share tree is in the directory specified by the DISKLESS variable above, you can leave SHARE as it is. However, if you're installing into multiple file systems and have put the share tree somewhere else, you need to change the pathname so that it points to the top of the share tree. This procedure is explained in Section 2.3.6.
SWAP	This variable specifies the pathname to the top of the swap directory. It must always end in the string "\$HOST", which specifies the client.
SWAPSIZE	The swap file size to be created. The default is set to 20 Megabytes. If you change the value, be sure to use "m", rather than "Mb" or "MB" to specify megabytes. The value must be in megabytes.
GFXBOARD	This variable is set to "ECLIPSE" for an IRIS 4D/20 workstation.
CPUBOARD	For an IRIS 4D/20 workstation, this variable should be "IP6".
MACH	For an IRIS 4D/20 workstation, this variable should be "IP6".
BOOTP_DIR	The home directory for the <i>bootp</i> server. Unless you have changed the <i>/usr/etc/bootptab</i> file, the default setting is correct. For more details, see the <i>bootp(1M)</i> man page.
YP	If your network runs a YP (Yellow Pages) server, and the YP master is a Silicon Graphics workstation running system software release 4D1-3.2 or greater, then set YP = yes. Otherwise, set YP = no. Note: Setting this variable to "no" does not mean the diskless workstation cannot use Yellow Pages. It means only that the installation tools used to set up the diskless workstation do not use Yellow Pages.

DLMAJOR Do not change this variable.

The class configuration file is an executable shell script. After editing the configuration file, check the syntax by executing it:

```
sh class.dat
```

where *class* is the name of the class.

Example

Here is what the *clinst.dat* file looks like for the example illustrated in Figure 1-1:

```
"HOSTNAME=" `hostname `"  
#  
#  
#  
DISKLESS="/usr/diskless"  
CLROOT="$DISKLESS/$HOST"  
SHAREHOST="$HOSTNAME"  
SHARE="$DISKLESS/$CLASS"  
SWAP="$DISKLESS/swap/$HOST"  
SWAPSIZE="20m"  
GFXBOARD="ECLIPSE"  
CPUBOARD="IP6"  
MACH="IP6"  
BOOTP_DIR="/usr/local/boot"  
YP="no"  
#  
#
```

Notice that, in this case, the only altered variables are DISKLESS and YP. The other variables were not changed.

2.3.3 Creating the Share Tree

To create the share tree, follow these steps:

1. Become the superuser.

```
su
```

2. Move to the directory `/usr/etc/boot`.

```
cd /usr/etc/boot
```

3. Install the share tree.

```
clinst -c class share
```

where *class* is the name of the class.

Note: Remember, the name of the share directory is the name of the class!

4. When the system prompts you, confirm your request.

```
y
```

5. The *clinst* menu appears on your screen. *clinst* is the installation tool that handles the creation and removal of share and client trees from the server workstation. The *clinst* command works a lot like the *inst* command, so if you're familiar with *inst* you should have no trouble with *clinst*. You have two choices:

- If you are installing the software directly from a tape, you can select the first item on the menu, "Install software automatically". This automatically installs everything from the tape. When the installation is complete, you can go directly to Step 6.
- If you want to install selectively, or if you want to install the software from another location, select the second item on the menu, "Use manual installation features". When you select this item, another menu appears.

There are several items on the manual installation menu. If you are unsure about any of them, you can use the “help” selection.

- Select the item labeled “from” to tell *clinst* where to get the software you want to install. For example, suppose you want to get software from a workstation called *gilligan*, in a directory called */little/buddy*. You would select “from” from the menu, then type the following line:

```
guest@gilligan:/little/buddy
```

- Select the item labeled “select” to choose particular subsystems to install. (If you want to install everything, you don’t need this step.)
- Select the item labeled “quit” to leave the menu when the installation is complete.

For more information about using *clinst*, see the *clinst(1M)* man page in your *IRIX System Administrator’s Reference Manual*, or type:

```
man clinst.
```

6. Install the NFS option. Follow the instructions in Section 3.2.1, “Adding an Option to the Share Tree”.

2.3.4 Allocating the Internet Address

Before installing a client tree, you must allocate an official hostname and internet address for it. You do this by editing the *etc/hosts* file. If you need more information on the procedure, see the *hosts(1M)* man page in the *IRIX Programmer’s Reference Manual*.

2.3.5 Installing the Client Tree

Be sure to allocate an internet address for each client before beginning this procedure. See Section 2.3.4, "Allocating the Internet Address", for instructions.

To create a client tree from the server machine, follow these steps:

1. Become superuser.

```
su
```

2. Create the client tree on the server.

```
/usr/etc/boot/clinst -c class -h client client
```

where *class*, is the name of the class, and *client* is the name of the client workstation.

3. Confirm your request.

```
y
```

4. The *clinst* menu appears on your screen. Select the first item, "Install software automatically".

```
1
```

5. When the process is complete, quit the menu.

```
q
```

6. Go to the diskless workstation.

Note: If the diskless workstation is not yet set up (i.e., unpacked, put together, and hooked up to the network), you must do this now. Follow the instructions in Chapter 1 of your *Personal IRIS Owner's Guide*.

7. Press the **<Reset>** button.
8. The System Maintenance menu appears on your screen. There is only one item on the menu. Go to the PROM command monitor mode by selecting:

5

9. This prompt appears on your screen:

>>

Set the *netaddr*, *bootfile*, and *diskless* variables using the *setenv* command.

```
setenv diskless 1  
setenv netaddr address  
setenv bootfile bootp () servername:kernelpath
```

where *address* is the internet address of the client workstation, *servername* is the name of the server, and *kernelpath* is the client kernel pathname.

The client kernel is a file called *unix* in the client tree. The client kernel pathname is just the pathname of the client tree with the file name *unix* appended. For example, in Figure 1-3 the diskless workstation named Wally has this client kernel pathname:
/usr/diskless/Wally/unix.

10. Type:
11. The System Maintenance menu again appears on your screen. There are now three items on this menu. Start the system by typing:

1

12. When the system asks if you want to auto-reconfigure, type:

yes

13. When this procedure is complete, reboot the workstation:

reboot

14. Add the NFS option to the client tree if it is not there. See Section 3.2.2, “Adding an Option to the Client Tree”, for instructions.
15. Repeat all the above steps for each additional client you add to the share tree.

2.3.6 Installing into Multiple File Systems

If you do not have enough free disk space for the diskless tree in any one file system, you can put the different directories in different file systems by editing the class configuration file accordingly. The diskless tree can be divided into these smaller chunks:

- each share tree
- the client trees for all the clients of a single class
- the swap area for all clients of a single class

These chunks can be placed in separate file systems, thus spreading the total space requirement for the diskless tree over several file systems. To divide the diskless tree, you simply edit the class configuration file to make the pathname for each directory point where you want it. Follow these steps:

1. On the server workstation, move to the class configuration file for the class you’re dividing.
2. Find the variable that describes the directory you want to move, and replace \$DISKLESS with the new pathname for that directory.

Example

In the example illustrated in Figure 1-1, the total disk space requirement can be divided into the following sections:

- 80Mb share tree for the class, *share*
- 12Mb total root area for the two clients
- 40Mb total swap area for the two clients
- 24Mb working space for Wally
- 24Mb working space for Beaver

The total amount of space required for this diskless tree is 180Mb. Suppose the server has two available file systems, */disk1* and */disk2*. Further, assume that */disk1* has 60Mb of free disk space, and that */disk2* has 150MB of free disk space. Neither of these file systems has enough free space for the whole diskless tree, so you must put the various directories in separate file systems. For example, you can put the swap directory on */disk1*, and the share and client trees on */disk2*. To do this, just edit the appropriate variables in the class configuration file, *share.dat*. The affected variables then read:

- `CLROOT="/disk2/$HOST"`
- `SHARE="/disk2/$CLASS"`
- `SWAP="/disk1/swap/$HOST"`

The other variables need not be changed.

2.3.7 Troubleshooting

If you can't get the system to start, first check the *netaddr* and *bootfile* variables to make sure you typed them correctly. You can do this from the PROM command monitor mode by typing:

```
printenv
```

For example, look at Figure 1-1 again. Suppose the internet address for Wally is 192.26.61.104. Assume the server is called SitComs. After setting

the variables in the PROM command monitor, as described above, Wally's user issues the *printenv* command.

Here is the output that appears on Wally's screen:

```
netaddr= 192.26.61.104
dbaud= 9600
rbaud= 9600
bootfile= bootp() SitComs:/usr/diskless/Wally/unix
bootmode= d
console= g
diskless= 1
path= bootp()
cpufreq= 12
gfx= alive
```

If the *netaddr* and *bootfile* variables are correctly set but the system won't start, check to make sure you have allocated the internet address properly in the */etc/hosts* file. See Section 2.3.4 for more information.

If your problem is in the */etc/hosts* file, it is probably best to remove the client tree completely and start again after correctly editing the */etc/hosts* file. Instructions for removing the client tree are in Section 3.2, "Removing a Client from the Server".

Other possible pitfalls:

- Look for mistakes in the class configuration file. Make sure all the pathnames in this file point to the right place. Make sure you have correctly set the YP variable. See Section 2.3.2 for more information.
- Check the class name. The name must be unique for the whole network, not just locally.
- Make sure you installed the NFS option in the both the share and the client trees. The server itself must also have the NFS option.

3. Changing the Diskless Tree

This chapter contains instructions for some simple changes to your diskless tree. The first section explains how to upgrade the software, the second section contains instructions for removing the diskless tree, the third section explains how to remove a share tree, and the last section explains how to move a client to another server.

3.1 Software Upgrade

To upgrade the software, you must first copy the new version of software into the share tree, then upgrade each client tree separately. This section explains the procedure in detail.

3.1.1 Upgrading the Share Tree

Before starting this procedure, warn the client users that you're upgrading the software on the share tree. The client workstations should not be used while the share tree is being changed. This procedure is almost exactly identical to installing a share tree.

1. Become the superuser.

```
su
```

2. From the server workstation, move to the `/usr/etc/boot` directory.

```
cd /usr/etc/boot
```

3. Use the *clinst* command to install software on the share tree.

```
clinst -c class share
```

where *class* is the name of the class of workstations.

4. Enter confirmation.

```
y
```

5. The *clinst* menu appears on your screen. You have two choices:
 - If you are installing the software directly from a tape, you can select the first option on the menu, “Install software automatically”. This automatically installs everything from the tape.
 - If you want to do a more selective installation, select the second option on the menu, “Use manual installation features”. When you select this option, another menu appears on your screen.
 - Use the first item, “from”, to tell *clinst* where to get the software you want to install.
 - Use the fifth item, “select”, to select particular subsystems.
 - Use the ninth item, “help”, for help using these menus.

For more information, see the *clinst(1M)* man page in your *IRIX System Administrator's Reference Manual*, or type **man clinst**.

3.1.2 Upgrading the Client Tree

To upgrade the software on the client tree, you must completely replace the existing client tree. You can do this by creating a new client tree with the same pathname as the tree you're replacing. Follow the instructions in Section 2.3.5, “Installing the Client Tree”.

3.2 Adding a Software Option

When adding a software option, you must update each client tree as well as the share tree. Update the share tree first.

3.2.1 Adding an Option to the Share Tree

To add a software option to the share tree, follow these steps:

1. Log in to the server workstation.
2. Become the superuser.

```
su
```

3. Type:

```
inst -r class -mGFXBOARD=ECLIPSE -mCPUBOARD=IP6 -mIP6
```

where *class* is the name of the class.

4. Select the manual installation option from the menu.
5. Use the “from” option to tell *inst* where to find the software you want to install. For example, if the software is on the workstation called SitComs, in the directory */GreenAcres/4D1-3.2*, you type:

```
from guest@SitComs:/GreenAcres/4D1-3.2
```

6. Use the “select” option to choose the subsystems you want to install.
7. Select “install” to install the selected option.
8. When the installation is complete, type:

```
quit
```

If you are confused about how to use *inst*, select “help” from the menu. You can also look at the *inst(1M)* man page in your *IRIX System Administrator's Reference Manual*.

3.2.2 Adding an Option to the Client Tree

This section describes the procedure for adding a software option to the client tree. The steps below must be completed for each client that uses the new option.

1. Install the image on the client tree.

```
inst -r client -mGFXBOARD=ECLIPSE -mCPUBOARD=IP6 -mIP6
```

where *client* is the name of the client.

2. Select the manual installation option from the *inst* menu.
3. Select “from” from the new menu.

```
from
```

When the system asks you where the software is, type a line in this form:

```
path /usr/lib/inst
```

where *path* is the directory pathname of the share tree.

For example, suppose the class is named share, and the diskless tree is in the directory called */usr/diskless*. You would type:

```
/usr/diskless/share/usr/lib/inst
```

3.3 Removing a Client from the Server

Before removing the client from the server, be sure to back up everything in the client tree onto tape. If you are also going to remove the share tree from the server, be sure to remove the client trees first. This procedure assumes that your client tree is set up as detailed in Chapter 1 and Chapter 2 of this book.

1. Back up everything in the client tree using *tar* or *cpio*.
2. Remove the client tree.

```
clinst -c class -h client -d client
```

where *class* is the name of the class and *client* is the name of the client.

3. Enter confirmation.

```
y
```

4. *clinst* asks if you want to remove the host name from the database. You probably don't want to do this unless you're moving the client to another network.

For more information on *clinst*, see the *clinst(1M)* man page in your *IRIX System Administrator's Reference Manual*, or type **man clinst**.

3.4 Removing a Share Tree

You don't need to back up the share tree before removing it, unless you have installed private software in the tree. To remove the share tree, type:

```
clinst -c class -d share
```

where *class* is the name of the class of workstations. Confirm your request when *clinst* asks you to do so.

For more information on *clinst*, see the *clinst(1M)* man page in your *IRIX System Administrator's Reference Manual*, or type **man clinst**.

3.5 Moving the Client to Another Server

This section explains how to move a client tree to a different server.

1. Log in to the present server workstation.
2. Become superuser.

```
su
```

3. Copy the client working area onto tape using *tar*.
4. Remove the client from the server, as described in Section 3.3, “Removing a Client from the Server”.
5. *clinst* asks if you want to remove the host name from the database. If the client is going to use the same host name and internet address, answer:

```
no
```

Otherwise, answer:

```
yes.
```

6. Log in to the new server workstation.
7. If the share tree on the new server is different from the old share tree, you must check to make sure that your client tree is compatible with the new software. If you do not yet have a share tree on the new server, create the new share tree first. See Section 2.3.3, “Creating the Share Tree”, for instructions on this procedure.
8. Install the client workstation (see Chapter 2). Make sure the host name is valid.
9. Move to the */usr/etc/boot* directory.

```
cd /usr/etc/boot
```

10. Use *clinst* to install the tape copy of your client working area.

```
clinst -c class -h client client
```

where *class* is the name of the class and *client* is the name of the client workstation.

11. When the *clinst* menu appears, select the automatic installation option.
12. When the installation is complete, copy the tape backup to the new working directory.
13. Edit the client file system mount table, */etc/fstab*, so it includes the working directory mount entry. The new working directory should be exported by the new server.
14. Go to the client workstation.
15. Press the **<Reset>** button.
16. A menu appears on your screen. Go to the PROM command monitor mode by selecting:
5
17. This prompt appears on your screen:

```
>>
```

Set the internet address and *bootfile* using the *setenv* command.

```
setenv netaddr address  
setenv bootfile bootp()servername:kernelpath
```

where *netaddr* is the internet address of the client workstation, *servername* is the name of the server workstation, and *kernelpath* is the client kernel pathname. See Section 2.3.5, “Installing the Client Tree”, for more on the kernel pathname.

18. Type:

exit

19. Go back to the server workstation.

20. Copy any private system files from the old server to the new server.

4. Upgrading the Diskless Workstation

Eventually, you may buy a disk upgrade for one or more of your diskless workstations. Obviously, a disk improves the performance of the workstation, and by removing a client tree you improve the server's performance as well.

The first section of this chapter explains how to configure the new disk drive. The second section offers guidelines for turning on the network software and adding accounts to the workstation. It also explains where to find more detailed instructions for these procedures. The final section explains how to get a list of modified configuration files, and copy some or all of them onto the new disk.

Before beginning this chapter, the new disk must be installed in the workstation.

4.1 Configuring a Disk Drive

To configure a disk drive, follow these steps:

1. After installing the drive, power on the workstation. After the power-on diagnostics run, you see this message:

```
Starting up the system...
```

```
To perform System Maintenance instead, press <Esc>
```

```
Press <Esc>.
```

2. The System Maintenance menu appears. Enter the Command Monitor by typing:

5

3. This prompt appears on the screen:

>>

Use the hardware inventory command to check that the software knows there is a new disk drive. Type:

hinv

Look for this line in the listing:

SCSI Disk: dksc(#, #)

Note: If the drive does not appear in the listing, it is not correctly installed. The drive must be removed and installed again.

4. Find out what your internet address is by typing:

printenv

Several variables are listed on the screen. If you want to keep the same internet address, make a note of the value of the variable *netaddr*. This is the internet address for the client. You will need this information when you turn on the network software. (The procedure is described in Section 4.2, "Turning on Network Software".)

5. Set the *diskless* variable to zero by typing:

setenv diskless 0

6. Type:

init env

7. Type:

exit

8. The System Maintenance menu again appears on the screen. This time all five menu items should appear. Select item one, “Start System”.

1

4.2 Turning On Network Software

Before you can bring files over from the server, you must turn on the network software so that you can communicate with other workstations. Chapter 4 of the *Personal IRIS Owner's Guide* explains this procedure. Before you begin, you need these pieces of information:

- an internet address for the workstation
- a host name for the workstation
- the domain name

If you do not have the YP software option, you must add the host name of the server workstation manually. Otherwise, you can't retrieve your working directories and modified files over the network. To do this, follow the instructions for adding a host in Chapter 4 of the *Personal IRIS Owner's Guide*.

You should add an account on the workstation for everyone who needs one. Again, the *Personal Iris Owner's Guide* explains the procedure.

Each user can copy over her working directories and files using the *rcp -r* command. For more information about *rcp*, see the *rcp(1C)* man page in your *IRIX System Administrator's Reference Manual*.

4.3 Copying Modified Configuration Files

If there are modified configuration files in the diskless tree, you may want to copy some of them onto the disk. To get a list of files that have been modified, follow these steps:

1. Log in to the server workstation.
2. Become the superuser by typing:

```
su
```

3. Generate a list of the modified files by typing:

```
versions -c -m -v -r path
```

where *path* is the path to the top of the diskless tree.

4. A list of files appears on the screen. Decide which of these modified files you want to transfer to the new disk. If you're not sure about some of the files, you can *rcp* them to the new disk, then use the *diff* command to see how they are different from the unmodified versions.

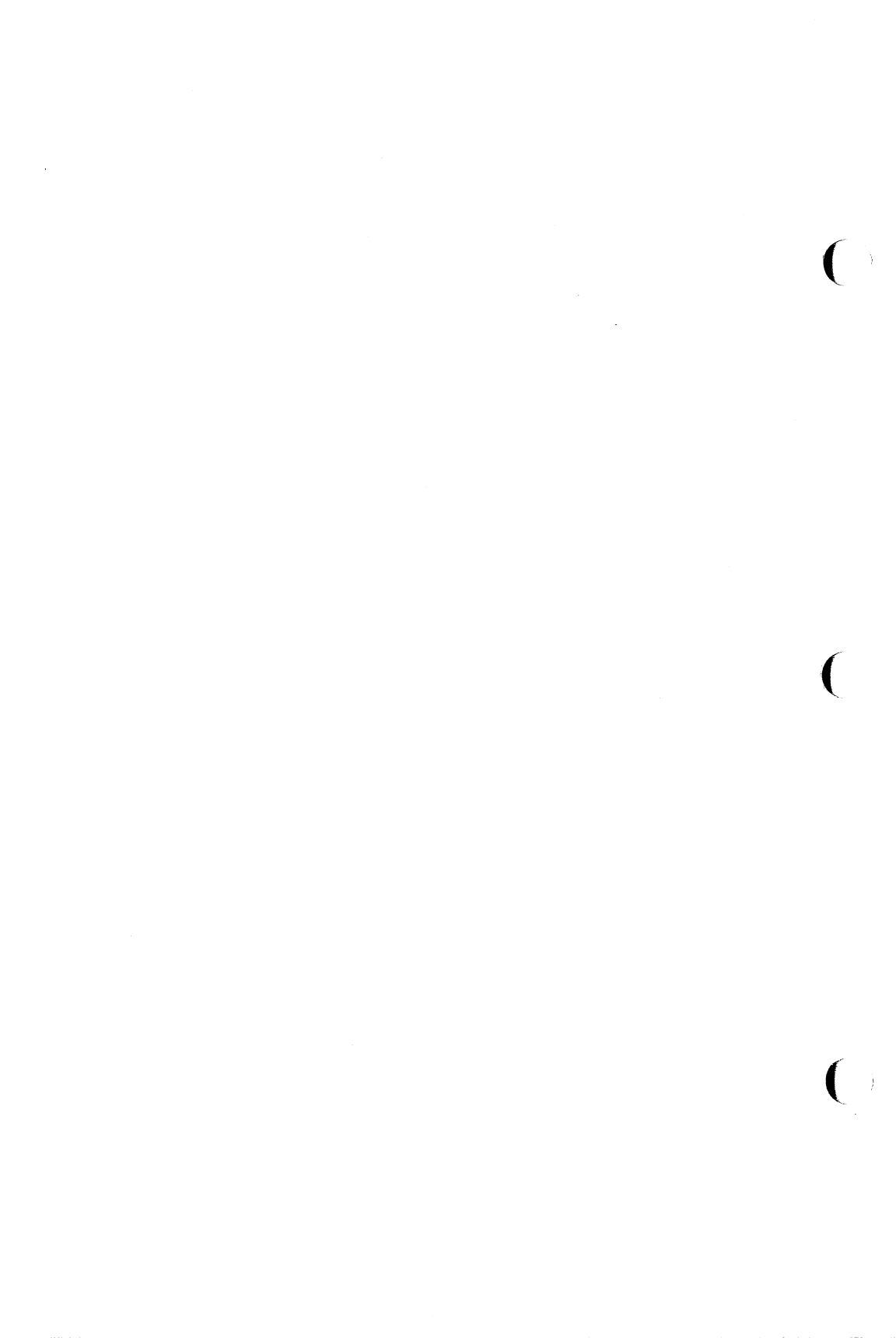
Note: When you copy the files over from the server, remember to rename them. If you don't, you overwrite the existing file of the same name.

Remove any files you don't want, and move the files you do want to the correct file name, overwriting the unmodified version of the file.

4.4 Removing the Client Tree

Once you have copied all the useful files from the server to the new disk, you should remove the client tree from the server. There are instructions for this procedure in Chapter 3, “Changing the Diskless Tree”.

If there are no longer any client workstations on the server, you should remove the share tree as well. Again, the instructions are in Chapter 3.



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