

ESV Workstation

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# Diskless Node User's Manual

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Salt Lake City, Utah

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# 1. Introduction

This manual contains the following information:

- An overview of the diskless node,
- Client setup instructions,
- Booting information.

## Overview

The characteristic that distinguishes a diskless workstation from a workstation with disks is that the diskless workstation obtains its **root** filesystem from a network, not from a local disk. A workstation with disks may be booted as a diskless workstation, which may be a useful systems administration configuration, allowing a workstation to obtain its **root** and **swap** filesystems from a network fileserver but still making full use of its local disks.

A diskless workstation mounts all its file systems from a *server*, or the *Serving* machine. The serving machine has one **usr** filesystem for the diskless clients that is shared by all clients. Each diskless client also has several filesystems of its own on the server (*i.e.*, **root**, **var**, and **swap**).

There are several steps to setting up a diskless workstation:

- The software is installed on the network fileserver.
- Filesystems for the diskless workstation are created.
- The diskless workstation mounts these filesystems at boot time.

A diskless workstation's **root** filesystem contains the ES/os kernel and various configuration files and device files (usually found in **/dev**). The **/var** file system contains directories that are usually found in the **usr** filesystem but which must be writable by the diskless client.

The directory **/tftpboot** must exist on the server and be readable by everyone. A link to the kernel to be booted by the diskless client resides in this directory.

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## 2. Client Setup Instructions

This chapter shows examples of adding, cloning, and deleting a client. System output is shown in `Courier` normal font, and user responses are shown in **`Courier bold`** font. For some questions, `client.setup` will show a default response in bracket([...]). You can type either a carriage return (<CR>), if that is the correct response, or the correct response.

### Adding a Client

This procedure uses the example machine name `toddler`. You should substitute your own machine's name where necessary.

Type `cd /usr/disklessDB`

Type `./client.setup`

MIPS diskless client installation

Operation (add clone modify move del) [add]? **add**

New Client Machine Name? []? **toddler**

Enter toddler's inet address [130.62.10.xx]? **130.62.10.35**

Adding toddler to /etc/hosts.

Mode (master slave client none) [none]? **none**

Swap Space Size [32M]? **32M**

**Note:** Your swap space should be twice the physical memory of the client.

Client Root Directory [/usr/diskless/clients/toddler]? <CR>

Client Swap File Directory [/usr/diskless/clients/toddler]? <CR>

Client Dump File Directory [/usr/diskless/clients/toddler]? <CR>

Read Only usr Directory [/usr/diskless/dl\_usr]? <CR>

Building environment for toddler.

Copying root directory... done.

Copying var directory... done.

Creating swap file... done.

Building devices... done.

Copying /etc/hosts for toddler

Creating etc/fstab for toddler

Creating etc/local\_hostname for toddler

Adding toddler to /etc/bootparams

Adding toddler to /usr/etc/exports

Running /usr/etc/exportfs...

## Client Setup Instructions

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```
exported /usr/diskless/dl_usr  
exported /usr/diskless/clients/toddler  
done.
```

```
Creating link in /tftpboot for toddler
```

```
Starting /etc/rpc.bootparamd... done.
```



## Cloning (Copying) a Client

This procedure uses an example machine name **baby**. You should substitute your own machine's name where necessary.

Type **cd /usr/disklessDB**

Type **./client.setup**

MIPS diskless client installation

Operation (add clone modify move del) [add]? **clone**

New Client Machine Name? []? **baby**

Enter baby's inet address [130.62.10.xx]? **130.62.10.35**

Adding baby to /etc/hosts.

Copying toddler to baby... done.

Copying devices from toddler to baby... done.

Copying swapfile and dump from toddler to baby... done.

Copying /etc/hosts for baby

Creating etc/fstab for baby

Creating etc/local\_hostname for baby

Adding baby to /etc/bootparams

Adding baby to /usr/etc/exports

Running /usr/etc/exportfs...

re-exported /usr/diskless/dl\_usr

re-exported /usr/diskless/clients/toddler

exported /usr/diskless/clients/baby

done.

Creating link in /tftpboot for baby

Done.

## Client Setup Instructions

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### Deleting a Client

This procedure uses the example machine name **toddler**. You should substitute your own machine's name where necessary.

Type **cd /usr/disklessDB**

Type **./client.setup**

MIPS diskless client installation

Operation (add clone modify move del) [add]? **del**

Client Machine Name []? **toddler**

Delete client toddler (y n) [y]? **y**

\*\*\*\* IMPORTANT \*\*\*\*

By deleting toddler, all data written to toddler's root and var file systems will be destroyed.

directories/Files to be deleted:

/usr/diskless/clients/toddler

/usr/diskless/clients/toddler/dump

/usr/diskless/clients/toddler/swapfill

This is your last chance to abort.

Are you sure that you want to delete client: toddler (y n) [y]? **y**

Deleting toddler... done.

Done.

Type **rm /tftpboot/toddler**

### 3. Booting the ESV Diskless Workstation

The major characteristic distinguishing a diskless workstation from a workstation with disks is that the diskless workstation obtains its **root** (or base) filesystem from a network, not from a local disk. A diskless workstation requires no disks, although it is important to remember that a workstation with disks can be booted as a diskless workstation (sometimes this is a useful systems administration configuration). In other words, a workstation can obtain its **root** and

**swap** filesystems from a network fileserver, and still make full use of its local disks.

There are three parts to the diskless workstation boot.

- 1) A network fileserver must be configured to contain the **root** and **swap** filesystems of the diskless workstation. This is accomplished during the installation of the tape. Refer to the latest *Release Notes* for tape installation instructions.
- 2) A **boot** command is issued at the system console. The syntax for this command is as follows:

```
>> boot -f <boot device type>()<kernel>
      [use_bootparams][root=<root path>]
      [swap=<swap path>]
```

where:

<b>boot device type</b>	Identifies the type of peripheral that you want to use as your filesystem.
<b>kernel</b>	The file that contains the operating system.
<b>root path</b>	The directory on the network fileserver that contains the diskless workstation's <b>root</b> filesystem.
<b>swap path</b>	The directory on the network fileserver that contains the diskless workstation's <b>swap</b> file.

The command to boot an ESV diskless workstation looks like this:

```
>> boot -f bfs ()/tftpboot/xxxxx use_bootparams
```

where *xxxxx* is the name of your client as it was entered in the last line of "Adding a Client" and "Cloning a Client." For additional information, contact your system administrator.

The **boot** command invokes a PROM resident routine that issues broadcast queries to the network. These broadcast queries make a request for a server to provide an operating system kernel to the workstation. A server responds, and an operating system kernel is downloaded and executed. Downloading is currently accomplished using the **bfsd** (boot filesystem daemon) which employs UDP (user datagram protocol).

- 3) As the operating system boots, it parses the **boot** command line arguments to determine where its **root** and **swap** filesystems are located.

If the argument **use\_bootparams** is specified, the kernel queries the network asking for a server to provide the **root** and **swap** filesystem paths; otherwise, these paths must be specified on the **boot** command line and are used directly.

The argument **use\_bootparams** tells the kernel to establish communication with the network daemon **bootparamd** (boot parameter daemon). **bootparamd** uses a file, **/etc/bootparams**, of host addresses and filesystem paths. When **bootparamd** receives a query for a specific host, it returns the applicable filesystem path information to the requester.

From this point on, booting the diskless workstation is the same as booting a workstation with disks, except that the **root** and **swap** filesystems are mounted from the network fileserver.

**Note:** If your ESV Workstation has an early CPU, the diskless **boot** command cannot be added to the **bootfile** environment variable. This means that you cannot type **auto** or **set bootmode =c** to have the machine autoboot on power up and still have the workstation boot diskless. You must type the complete command on the command line as shown on the previous page. This has been corrected in the latest CPU.