ESV Workstation

Diskless Node User's Manual

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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.
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/bootsparams
Adding toddler to /usr/etc.exports
Running /usr/etc/exportfs...
Client Setup Instructions

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

Creating link in /tftpboot for toddler
Starting /etc/rpc.bootparamd... done.
Client Setup Instructions

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.
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:

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

where:

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

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

```bash
>> 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.
Booting

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 boottmode =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.