

Installing NetBSD via netboot on a Sparcstation 5

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Though old Sparc-machines aren't really suitable for anything productive, they still do a good job as small scale servers or test-boxes. Among the operating systems supporting that platform are traditionally NetBSD and OpenBSD. NetBSD is said to run very smooth on those machines, so we decided to check this one out. Sun Sparcstations frequently have no drives for removable media at all. Thus the only option to install such a system is by utilizing the netboot-function

1 Overview

Booting NetBSD over the network is quite good documented by official writeups (see the appendix). Note that all informations contained in this document - and much more - can be found there, too. Anyway, due to some minor pitfalls and uncertainties during the setup, we decided to put down a few notes regarding the process.

We recently got our hands on some worn-out Sparcstations 5, so we thought we should give it a go. Our network already contained a machine running OpenBSD, which acted as the server. We configured it to answer all RARP, DHCP, TFTP and NFS requests made by the clients during startup. Therefore those services had to be deployed on the OpenBSD box at first.

The only thing necessary from the clients so far is their MAC-address. It appears directly after powering up the boxes. To stop the boot-process, hit [STOP] and [a]. An "ok" prompt should appear.

To download files to an OpenBSD machine, use lynx, which is installed by default:

```
$ lynx -source ftp://ftp.de.netbsd.org/PATH/boot.net > /tmp/boot.net
```

1.1 Steps:

- RARP Request
- rarpd answers ARP request (/etc/ethers)
- BOOTP request
- dhcpd answers (/etc/dhcpd.conf) with IP and root-partition
- TFTP request for bootloader: 0A000002.SUN4M (renamed boot.net from installation/netboot)
- tftp serves /tftpboot/0A000002.SUN4M (/etc/inetd.conf, filename: client-IP in hex + suffix)
- boot.net starts
- BOOTP request for NFS-root
- Kernel (/netbsd, renamed netbsd-GENERIC.gz from binary/kernel) gets loaded out of NFS-root
- Kernel starts and uses the system found in NFS-root (extracted rootfs.tgz from installation/netboot)
- Installation-scripts get started ...

2 RARP

Starting RARP involves associating the clients MAC-addresses in `/etc/ethers`:

```
08:00:20:76:91:34 sparc1
```

```
08:00:20:A1:44:12 sparc2
```

rarpd must be started afterwards:

```
$ rarpd -a
```

3 DHCP

The sample `dhcpd.conf` config should work well enough, just append the following lines, changed to the values that reflect your setup:

```
host sparc1 {
    hardware ethernet 08:00:20:76:31:94;
    fixed-address 172.16.3.100;
    option root-path "/exports/sparc";
}
host sparc2 {
    hardware ethernet 08:00:20:7D:E6:DC;
    fixed-address 172.16.3.200;
    option root-path "/exports/sparc";
}
```

4 TFTP

Uncomment the entry that would start up the TFTP service in `/etc/inetd.conf`. Then create the directory, where `tftpd` looks for its files to serve. The bootfile can be found in the sparc-tree of the stable NetBSD repository under `installation/netboot`.

You have to rename it from `boot.net`; the name must consist of the clients IP in hexadecimal notion plus the suffix `.SUN4M`. This can be easily done with `bc`.

```
$ bc
```

```
obase=16
```

Then translate all four 8-bit values into hex. Don't forget to send `inetd` a hangup after completion.

```
$ mkdir /tftpboot
```

```
$ cp -p /tmp/boot.net /tftpboot/<IPinHEX>.SUN4M
```

```
$ kill -HUP `cat /var/run/inetd.pid`
```

5 NFS

First, create an appropriate `/etc/exports` to grant the clients access to the servers shares:

```
/exports/sparc -maproot=root:wheel sparc1 sparc2
```

The directory specified must of course exist. It would be of no use without a working installation base. The `rootfs.tgz` from `installation/netboot` does the deed. Extract it under `/exports/sparc`. It contains everything except a kernel, so you have to choose one. Take the `netbsd-GENERIC.gz` kernel from `binary/kernel` and rename it to `/exports/sparc/netbsd`.

```
$ mkdir /exports
$ mkdir /exports/sparc
$ cd /exports/sparc
$ tar xzvf /tmp/rootfs.tgz && cp -p /tmp/netbsd-GENERIC.gz netbsd
```

The main part of the installation should be set by now. (Re)start `mountd` to reread the `exports-list` and get `nfsd` running.

```
$ /usr/sbin/portmap
$ /sbin/mountd
$ /sbin/nfsd -tun 4
```

6 Clients

After power-cycling your clients, stop the bootstrapping process by hitting `[STOP]` and `[a]`. At the "ok" prompt, type "boot net" and you should immediately get some more or less informative messages that the client starts booting. Loading the kernel can take some minutes, but the remainder should be quite straightforward and self-explaining. Select `ksh` if you're asked for choosing a shell.

If you encounter problems, get a hub and try to sniff the packets exchanged with `tcpdump` or `ethereal` with another machine. This will tell you quite accurate where the dog is buried.

7 Afterboot

After the first reboot, it's likely that you want to install additional software, like another shell etc. pp.

To get started, get at least the following things done:

- Read the afterboot manpage (`man afterboot`)
- Install `pkgsrc` (see packages link below)

8 Useful Ressources

<http://www.netbsd.org/Documentation/network/netboot/>

<ftp://ftp.NetBSD.org/pub/NetBSD/NetBSD-2.0/sparc/INSTALL.html>

<http://www.netbsd.org/Documentation/software/packages.html>