

Install NetBSD 9.2 on HP 9000/300 Series Computer

NetBSD is currently still supported on HP 9000 series 300 computers that meet minimum hardware requirement as detailed on the NetBSD/hp300 website. In principle, installation follows “Installation procedures for NetBSD/hp300” in the INSTALL(8) section of the NetBSD System Manager’s Manual. Unfortunately, the description is rather difficult to follow. Furthermore, the `miniroot.fs` installation system in NetBSD versions prior to 9.2 contained bugs that prevented installation of packages from either CD-ROM or ftp download. These notes refer to installation of version 9.2.

If you have a non-HP machine already running NetBSD, Linux or a few other variants of Unix then it is possible to net boot the HP300 and install the system from your local machine. It is necessary to compile and install `sun-rbootd` on the source machine so that the HP300 can boot via to the Remote Maintenance Protocol. Packages can then be loaded from e.g. CD or by ftp download. This installation route is described further in the official installation notes.

Prior to installing, you need to design the disc partition table. As a minimum, one requires three partitions: partition ‘a’ for the root file system; partition ‘b’ for swap space; and partition ‘c’ for the bootstrap program. The following table illustrates such a layout for an HP C2246 SCSI disc with a capacity of approximately 1 Gb (exactly, 2,050,100 512-byte sectors). Note that this creates a single large ‘a’ partition for the operating system and user files.

Example Partition Table

Partition	Size (sectors)	Offset (sectors)	ftype	Use
a	1,849,800	200	ffs	root
b	200,100	1,850,000	swap	swap
c	2,050,100	0	boot	boot

Disc Usage Diagram (not to scale)



Partition ‘a’ is offset from the start of the disc by 200 sectors to leave room the NetBSD boot program. Partitions a + b plus the 200-sector offset add up to the total available space on the disc. Partition c is defined to cover the entire disc, overlapping the others; however, only part of the first 200 sectors will be used for the bootstrap code. If you are using an HP-IB disc, design all partitions to start on cylinder boundaries and make the offset of the ‘a’ partition one full cylinder. Disc geometries can be obtained from the HP-UX file `/etc/disktab` but note that the number of sectors per track and the total sector count are based on 1024-byte sectors, whereas NetBSD uses 512-byte sectors. For the example HP C2247 disc, we have the following geometry parameters based on 512-byte sectors:

- Number of sectors per track: 76 (double the figure in `/etc/disktab`)
- Number of tracks per cylinder: 13
- Number of cylinders: 2075

- Total sector count: 2050100
- Block size: 8192 bytes
- Fragment size: 1024 bytes
- Rotation speed: 5400 rpm

To install NetBSD, download the files `SYS_INST` and `miniroot.fs` from the NetBSD/hp300 website or mirror services, version 9.2 or higher. Use any computer to dump the bootstrap program `SYS_INST` to the beginning of the disc and `miniroot.fs` to the start of where the swap partition will be created. Raw binary copies are required. For example, using HP-UX and a SCSI disc which will be partitioned as detailed in the table above, the commands would be similar to the following:

```
mediainit /dev/rdisk/cFd5s0          #SCSI disc, interface select code 15, address 5
dd if=SYS_INST of=/dev/dsk/cFd5s0
dd if=miniroot.fs of=/dev/dsk/cFd5s0 seek=1850000
```

The offset in the second `dd` command will result in a delay while the miniroot file is written. Shutdown the computer.

Now you are ready to install NetBSD. Power-up the HP300, press the space bar after the keyboard is recognised to allow system selection, and then select `SYS_INST` as the system to boot. The `SYS_INST` program is used to partition the system disc into three or more partitions and then to boot the `miniroot.fs` installation system which will create the file system and actually install NetBSD on the disc. The process advances with dialog as follows (example responses are based on a SCSI disk at address 5 on the first (or only) SCSI interface and assumes the partition table is as detailed above).

Prompt	Example response	Comment
sys_inst>	disklabel	
Disk to label?	sd5	SCSI address 5
(z)zap, (e)edit, (s),show, (d)one, (w)rite	z	Zap, clears the disk label area
sys_inst>	disklabel	
Disk to label?	sd5	SCSI unit 5 [note 1]
Select disk type	4	SCSI drive
Disk model name	HP C2247	
Disk pack name		Leave blank
Bad sectoring	n	
Ecc?	n	
Removable?	n	
Interleave?	1	
RPM?	5400	Can be found in /etc/disktab
Trackskew?	0	
Cylinderskew?	0	
Headswitch?	0	
Track-to-track?	0	

Drivedata #?	0	Asked for #=0,1,2,3,4
Bytes/sector?	512	Always 512
Sectors/track?	76	
Tracks/cylinder?	13	
Sectors/cylinder	988	Product of last two numbers
Cylinders?	2075	
Total sectors?	2050100	Product of last two numbers
a partition: offset?	200	From partition table
size?	1849800	
fstype?	ffs	
FFS block size?	8192	b0 from /etc/disktab
FFS fragment size?	1024	f0 from /etc/disktab
b partition: offset?	1850000	From partition table
size?	200100	
fstype?	swap	
c partition: offset?	0	From partition table
size?	2050100	
fstype?	boot	
# partition: offset?	0	Repeat for # = d,e,f,g,h
size?	0	Repeat for # = d,e,f,g,h
(z)zap, (e)edit, (s),show, (d)one, (w)rite	s	Displays disk details for checking
(z)zap, (e)edit, (s),show, (d)one, (w)rite	w	If the table is OK, write to disc
(z)zap, (e)edit, (s),show, (d)one, (w)rite	d	Done with disklabel
sys_inst>	boot	Reboot
Disk to boot from?	sd5	Same as before, loads miniroot file system
<i>NetBSD boots from the miniroot file system and installation script takes over</i>		
Terminal type?	vt100	Accept default
(I)nstall or (U)pgrade	l	Install option
Proceed with installation?	y	
Which disk is the root disk?	sd0	Different from above [note 1]
Do you wish to edit the root disklabel?	n	
Label which disk?	done	One could label other drives
Device name?	<RETURN>	All devices setup

OK to configure sd0b as the swap device?	y	Disc sd0, partition b is for swap
Edit?	n	The file system is then created
Configure the network?	y	Optional but let's do it
Enter system hostname:	<host_name>	Your host name
Enter DNS domain name:	<domain_name>	Can be dummy
Configure which interface?	le0	or other network card listed
IP address?	<IP_address>	Your IP address
Symbolic (host) name?	<host_name>	As above
Netmask?	255.255.255.0	Usual subnet mask
Additional media type arguments?	none	
Additional link-layer arguments?	none	
Configure which interface?	done	
Enter IP address of default route:	<Gateway_IP>	Router IP address
Enter IP address of primary nameserver:	<DNS_IP>	DNS server IP address
Would you like to use the nameserver now?	y	
Would you like to edit the host table?	n	
Escape to shell?	n	
Edit fstab?	n	Unless a mistake was made
Use verbose listing for extractions?	y	To see what's going on
Install from (f)tp, (t)ape, (C)D-ROM, (N)FS or local (d)isk?	f	This example is for ftp source
Server IP?	193.166.3.2	Example NetBSD ftp mirror
Login?	anonymous	
Password?	anything	Any text
Server directory?	/pub/NetBSD/NetBSD-9.2/hp300/binary/sets	Directory containing binary distribution sets
Repeat the following two steps to select all file sets that are to be loaded		
<List of sets> Continue to add filenames	y	To add file sets
File name [base.tgz]?	<RETURN> or <file.tgz>	Accepts selection Skips to file.tgz
<List of sets> Continue to add filenames	n	When all desired sets have been selected [Note 2].
<i>File sets will be downloaded, unpacked and installed</i>		

Extract more sets?	n	If no more required
What time zone are you in	GMT	Enter your time zone, ? to obtain valid list

Note 1. `SYS_INST` numbers disc drives as $n = (\text{interface number}) * 8 + (\text{bus address})$, counting HP-IB and SCSI interfaces separately, ordered by select code and starting at zero. HP-IB drives are designated rdn , while SCSI drives are designated sdn , where n is the number obtained from the interface number and bus address. For example, a drive at bus address 5 on the first (or only) SCSI interface is designated $sd5$ while a drive at bus address 2 on the second HP-IB interface is designated $rd10$. Once the NetBSD kernel boots from the miniroot file system, a different numbering scheme takes over whereby HP-IB and SCSI discs are numbered sequentially from the lowest bus address. For example, if unit 5 on the first (or only) SCSI interface has the lowest bus address on that interface, it becomes $sd0$.

Note 2. As a minimum, file sets base, etc and kern-GENERIC must be installed.

The process of downloading and installing the file sets will take several hours to complete. At the conclusion, use the `halt` command to stop NetBSD and, when the disc(s) have been synced, power down. As part of the installation, the `SYS_INST` boot program is replaced by the universal boot code `SYS_UBOOT`, so when restarting that is the system to select. On the first reboot, further time-consuming processing is undertaken.

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