Tru64 UNIX New Hardware Delivery

Release Notes and Installation Instructions

Part Number: 00-2NHD5-07

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Product Version: NHD-5 for Tru64 UNIX Version 5.1A

The *New Hardware Delivery Release Notes and Installation Instructions* for NHD-5 describes the contents of this release and tells you how to install the NHD-5 kit on your system. NHD-5 requires Tru64 UNIX Version 5.1A.

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About This Manual

New Hardware Delivery (NHD) provides installable kernel support for new hardware without requiring a new release of the operating system. NHD kits can be ordered on CD or downloaded from the World Wide Web. This manual describes the contents of an NHD kit and how to acquire the current NHD distribution. It also tells you how to create a CD image of the NHD distribution from a downloaded NHD kit and how to install NHD onto your system.

Audience

This manual is for people who install NHD kits, typically experienced UNIX system administrators.

Organization

This manual is organized as follows:

Chapter 1	Explains New Hardware Delivery concepts and describes the hardware supported in the NHD-5 kit.
Chapter 2	Provides notes and restrictions pertaining to the NHD-5 kit and its supported hardware.
Chapter 3	Tells you where to get the NHD-5 kit and how to install it on your system.

Related Documentation

You may find the following HP Tru64 UNIX documents helpful when you install NHD-5:

- The documentation for the hardware supported in NHD-5.

- The *Installation Guide* describes the procedures to perform an Update Installation or a Full Installation of the operating system on all supported processors and single-board computers. It explains how to prepare your system for installation, boot the processor, and perform the installation procedure.

- The *Installation Guide — Advanced Topics* manual describes advanced installation procedures such as Installation Cloning, Configuration Cloning, and how to customize the installation process with user supplied files.

- The *Cluster Installation* manual describes cluster preparation, installation, and creation and how to perform a rolling upgrade on the Tru64 UNIX operating system.

- The *Recording a Data CD-ROM* Best Practice describes an efficient method of saving up to 650 MB of information from a Tru64 UNIX file system to CD-ROM using the `mkisofs` and `cdrecord` commands. You can find this Best Practice on the World Wide Web at the following URL:

  `http://www.tru64unix.compaq.com/docs/best_practices/BP_CDRECORD/TITLE.HTM`

- The *Sharing Software on a Local Area Network* manual describes Remote Installation Services (RIS) for installing software over a LAN and Dataless Management Services (DMS) for sharing a `/usr` file system on a network server.

- The *System Administration* manual describes how to configure, use, and maintain the operating system. It includes information on general day-to-day activities and tasks, changing your system configuration, and locating and eliminating sources of trouble. This manual is intended for the system administrators responsible for managing the operating system.

- The *Hardware Management* manual describes how to administer the hardware components and storage devices controlled by the operating system. This manual is intended for experienced system administrators who are familiar with maintaining the system for high availability.

- *Reference Pages Sections 8 and 1m* describe commands for system operation and maintenance and are intended for system administrators. In printed format, this is divided into two volumes.

The Tru64 UNIX documentation is available on the World Wide Web at the following URL:

`http://www.tru64unix.compaq.com/docs/`

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- The section numbers and page numbers of the information on which you are commenting.

- The version of Tru64 UNIX that you are using.

- If known, the type of processor that is running the Tru64 UNIX software.

The Tru64 UNIX Publications group cannot respond to system problems or technical support inquiries. Please address technical questions to your local system vendor or to the appropriate Compaq technical support office. Information provided with the software media explains how to send problem reports to Compaq.

Conventions

The following conventions are used in this manual:

% $	A percent sign represents the C shell system prompt. A dollar sign represents the system prompt for the Bourne, Korn, and POSIX shells.
#	A number sign represents the superuser prompt.
% **cat**	Boldface type in interactive examples indicates typed user input.
file	Italic (slanted) type indicates variable values, placeholders, and function argument names.
[|] { | }	In syntax definitions, brackets indicate items that are optional and braces indicate items that are required. Vertical bars separating items inside brackets or braces indicate that you choose one item from among those listed.
. . .	In syntax definitions, a horizontal ellipsis indicates that the preceding item can be repeated one or more times.
cat(1)	A cross-reference to a reference page includes the appropriate section number in parentheses. For example, cat(1) indicates that you can find information on the cat command in Section 1 of the reference pages.
Return	In an example, a key name enclosed in a box indicates that you press that key.
Ctrl/*x*	This symbol indicates that you hold down the first named key while pressing the key or mouse button that follows the slash. In examples, this key combination is enclosed in a box (for example, Ctrl/C).

1
Introduction

This chapter explains the New Hardware Delivery (NHD) process and describes the contents of the NHD-5 kit.

All system hardware requires supporting modules in the operating system kernel. Without this kernel support, the operating system cannot interact with the hardware and may fail to function altogether.

A New Hardware Delivery (NHD) kit includes kernel modules that let your system support new or upgraded hardware. The kit is distributed on CD-ROM and also can be downloaded from the World Wide Web.

NHD lets you install new hardware support without reinstalling the base operating system. However, you must reboot your system to build a kernel that includes the modules that support your new hardware. The bootlink process builds a generic kernel in memory, using generic kernel modules along with those included in your NHD kit. This bootlinked kernel is not written to disk, but allows the `boot` utility to include the hardware support modules into your running kernel.

_____ **Note** _____

If you need to boot `genvmunix` after you have installed hardware support, your system will not recognize the hardware you installed with NHD. To access all of the kernel modules supplied by `genvmunix` and NHD, use the following command to boot `/GENERIC`:

```
>>> boot -fi GENERIC
```

_____

The NHD-5 release includes support for the following hardware:

- AlphaServer/AlphaStation DS25 system (Section 1.1)
- Tigon3 gigabit network interface adapter on DS25 motherboard (Section 1.2)
- Recordable CD drives (Section 1.3)
- Smart Array 5300A series RAID controllers (Section 1.4)

1.1 AlphaServer/AlphaStation DS25 System

The AlphaServer/AlphaStation DS25 system is provided in either a tower
configuration with expanded storage capacity or as a rack-mounted system.
It supports up to two Alpha 21264C processors at speeds up to 1,000 MHz
with 8 MB level 2 dual data rate (DDR) cache per processor, and four 125
MHz PCI buses. This system includes dual Ethernet adapters (10/100 and
10/100/1000), dual UltraSCSI adapters, a 32X recordable CD drive, and a
remote management console (RMC) for environmental monitoring. The
DS25 system can support up to 16 GB of 125 to 133 MHz SDRAM memory
in sixteen 200-pin dual inline memory modules (DIMMs) and provides six
64–bit PCI slots (both 33 MHz and 66 MHz) for I/O expansion.

The differences between the AlphaServer and AlphaStation configurations
consist of the factory installed software (FIS) and the number of included
user licenses. See your DS25 system documentation for more information.

The following are the orderable part numbers for Tru64 UNIX DS25 systems
with different memory options:

Table 1–1: Supported DS25 System Part Numbers

Memory Option	AlphaServer DS25	AlphaStation DS25
512 MB	DA-57AAA-CA	DA-57AAA-CW
1 GB	DA-57AAA-DA	DA-57AAA-DW
2 GB	DA-57AAA-EA	DA-57AAA-EW
4 GB	DA-57AAA-FA	DA-57AAA-FW

1.2 Tigon3 Gigabit Network Interface Adapter

The Tigon3 gigabit network interface adapter is a 10/100/1000 base-T
full/half duplex device. NHD-5 supports the LAN-on-motherboard (LOM)
implementation of the Tigon3 as one of the two integral Ethernet adapters
on the DS25 system.

_____ **Caution** _____

The Tigon3 gigabit network interface adapter support in NHD-5
is qualified for network interface, and is not yet qualified for
cluster interconnect.

_____

The bcm(7) and sysattrs_bcm(5) reference pages are new for NHD-5.
Table 1–4 shows the location of these reference page files in the NHD-5
kit distribution.

Table 1–2: Locations of Tigon3 reference page Files

File	Description
./DOC/man7/bcm.*	bcm(7) reference page in source, HTML, PDF, PostScript, and text format
./DOC/man5/sysattrs_bcm.*	sysattrs_bcm(5) reference page in source, HTML, PDF, PostScript, and text format

1.3 Recordable CD

Recordable CD (CD-R) drives provide writable media for systems without diskette drives. They also can be used to move up to 650 MB of data from one system to another in a format supported by multiple operating systems. For NHD-5, recordable CD drives are supported on DS25 systems.

NHD-5 support for CD-R drives is provided by an updated mkisofs utility and a new cdrecord command:

- The mkisofs utility creates a hybrid ISO9660/JOLIET/HFS file system with optional Rock Ridge attributes.

  The mkisofs utility and the mkisofs(8) reference page are updated for NHD-5. Table 1–3 shows the location of mkisofs utility files in the NHD-5 kit distribution.

Table 1–3: Locations of mkisofs Utility Files

File	Description
./520/usr/sbin/mkisofs	mkisofs utility
./DOC/man8/mksiofs.*	mkisofs(8) reference page in source, HTML, PDF, PostScript, and text format

- The `cdrecord` command records audio or data compact discs (CDs) from a master.

  The `cdrecord` command and the `cdrecord(1)` reference page are new for NHD-5. Table 1–4 shows the location of `cdrecord` utility files in the NHD-5 kit distribution.

Table 1–4: Locations of cdrecord Utility Files

File	Description
`./520/usr/sbin/cdrecord`	`cdrecord` command
`./DOC/man1/cdrecord.*`	`cdrecord(1)` reference page in source, HTML, PDF, PostScript, and text format

The *Recording a Data CD-ROM* Best Practice is available on the World Wide Web at the following URL:

`http://www.tru64unix.compaq.com/docs/best_practices/BP_CDRECORD/TITLE.HTM`

1.4 Smart Array 5300A RAID Controllers

The Smart Array (SA) 5300A series RAID controllers are two-channel (128 MB memory) and four-channel (256 MB memory) Ultra3 SCSI hard drive array controllers with battery-backed cache. The SA5300A series controllers support Ultra3 LVD SCSI technology for improved data transfer rates (160 MB/second per channel) and are backward compatible with devices using older SCSI technologies.

The following are the orderable part numbers for SA5300A series RAID controllers:

- 3X-KZPDC-BE (two-channel SA5302A controller with 128 MB cache)

- 3X-KZPDC-DF (four-channel SA5304A BPR controller with 256 MB cache)

2

NHD-5 Release Notes

This chapter describes known issues and restrictions pertaining to the NHD-5 kit, and includes notes on the following areas:

- Documentation (Section 2.1)
- Patch kit compatibility (Section 2.2)
- Full Installation only on DS25 (Section 2.3)
- DS25 startup with no IDE disks (Section 2.4)
- Shell access during Full Installation (Section 2.5)
- Smart Array 5300A (Section 2.6)
- Installation messages (Section 2.7)

2.1 Documentation

The files and their layout in the NHD-5 kit are updated before production. Subsequently, the listings and messages documented in this manual may differ slightly from what you see on your system. This should have no effect on your installation.

Some listings and messages may have a backslash (\ ) at the end of a line to indicate line continuation. The backslash character does not appear in the actual display.

2.2 Patch Kit Compatibility

When you install NHD-5, you also must install the most current Version 5.1A patch kit before you return your system to production. It does not matter which one you install first.

Tru64 UNIX Version 5.1A patch kits are available on the World Wide Web at the following URL:

http://ftp.support.compaq.com/public/unix/v5.1a/

Section 2.7.5 describes messages you may see if you install the current Version 5.1A patch kit before you install NHD-5.

2.3 Full Installation Only on DS25

You must install the NHD-5 kit during a Full Installation of the operating system on a DS25 system. The kernel modules to support the DS25 are included in the NHD-5 kit.

2.4 DS25 Startup with No IDE Disks

You may encounter the following behavior when starting up a DS25 system configured with SCSI disks but no IDE disks:

- If you power on a DS25 system and it has no IDE disks installed, the IDE controller driver may detect and report a stray interrupt. Subsequent boots without cycling power do not exhibit this behavior. This is a known issue and can be ignored.

- If you boot a DS25 system from a SCSI disk and it has no IDE disks installed, the system may report IDE probe errors during the boot process. Boot time may be increased as the system issues bus resets. This is a known issue.

2.5 Shell Access During Full Installation

If you are installing NHD-5 from the *New Hardware Delivery* CD during a Full Installation and you try to launch a shell window, it will fail. You see the following message in the console window:

```
Error acquiring pty slave as controlling terminal: Not a typewriter.
```

Perform the following steps to access the shell:

1. Exit the Full Installation process to access the shell from the console device.

2. At the shell prompt, perform the intended actions.

3. Enter **restart** and press Return to restart the Full Installation process.

2.6 Setting Up SA5300A Controllers

This section discusses issues related to installing NHD-5 onto a system that includes SA5300A series RAID controllers.

- If you want to use a disk managed by an SA5300A series RAID controller as a boot device, you must install the NHD-5 kit during a full installation of the operating system. If you install NHD-5 onto an existing system with the `nhd_install` script, disks managed by SA5300A series RAID controllers cannot be used as boot devices.

- If your system includes SA5300A series RAID controllers, you must perform certain actions from the SRM console before you install NHD-5 during a Full Installation of the operating system. If you are installing NHD-5 onto a system already running Version 5.1A of the operating system, you must perform the same actions from the SRM console and may need to take additional steps to rebuild the kernel before you run the `nhd_install` script.

  - If you are installing NHD-5 during a Full Installation, follow the instructions in Section 2.6.1 before you install the NHD-5 kit. This applies whether you are installing to an SA5300A–backed disk or to a non-SA5300A disk.

  - If you are installing NHD-5 onto a system already running Version 5.1A of the operating system and you have changed the value of the `heap_expand` console variable, follow the instructions in both Section 2.6.1 and Section 2.6.2 before you install the NHD-5 kit.

2.6.1 Performing SRM Console Actions

Before you install NHD-5 onto a system that includes SA5300A series RAID controllers, follow these steps:

1. At the console prompt, use the following command to determine the console device name of the SA5300A controller:

   ```
   >>> show config | more
   ```

   Look for devices with a `py` prefix; you see output similar to the following:

   ```
   CPQ SmartArray 5300  pya.0.0.10.0
   ```

   In this example, the console device name of SA5300A controller is `pya0`. SA5300A controllers are assigned console device name `pya0`, `pyb0`, `pyc0`, and so on, in the order that they are scanned by the system upon powering up.

2. Determine the value of the `heap_expand` console variable. For example:

   ```
   >>> show heap_expand
   heap_expand = nMB
   ```

   - If the value is `2MB`, go to the next step.

   - If the value is anything else, set the value to `2MB`:

     ```
     >>> set heap_expand 2MB
     ```

_____ **Caution** _____

> If your system is already running Version 5.1A of the
> operating system and you change the value of the
> `heap_expand` console variable, you may not be able to
> reboot your system unless you follow the kernel rebuilding
> instructions in Section 2.6.2 first.

_____

3. Initialize the system:

   ```
   >>> init
   ```

4. Set the value of the `bootbios` console variable to the SA5300A console
   device name. For example:

   ```
   >>> set bootbios pya0
   ```

5. Initialize the system again:

   ```
   >>> init
   ```

6. If you are installing NHD-5 to an SA5300A-backed disk, you must
   create at least one logical volume first. See the SA5300A series RAID
   controller *Installation and Configuration Guide* for the procedure to
   create logical volumes with the Option ROM Configuration for Arrays
   (ORCA) offline configuration utility.

The target SA5300A BIOS now runs whenever the console is initialized. The
console `show dev` command will show SA5300A-backed logical disks such
as `DYA0`, `DYA1`, and so on when `bootbios` is set to `pya0`.

If you have more than one SA5300A series RAID controller, you will only see
the devices backed by the controller specified by the `bootbios` setting.

- If you are installing NHD-5 during a Full Installation, you are ready to
  follow the instructions in Chapter 3.

- If you are installing NHD-5 onto a system that includes SA5300A series
  RAID controllers and is already running Version 5.1A of the operating
  system and you have changed the value of the `heap_expand` console
  variable, follow the steps in Section 2.6.2 before you install NHD-5.

2.6.2 Rebuilding the Kernel After Changing HEAP_EXPAND

If you are installing NHD-5 onto a system that includes SA5300A series RAID controllers and is already running Version 5.1A of the operating system, make sure you have performed all of the SRM console actions in Section 2.6.1. If you have changed the value of the heap_expand console variable, follow these steps:

1. From the console prompt, boot the generic kernel. For example:

    ```
    >>> boot -fi /genvmunix
    ```

    If you do not have a generic kernel on your boot disk, boot the generic kernel from the operating system software distribution CD.

2. At the root shell prompt, use the sizer command to create a temporary configuration file in the /tmp directory. For example:

    ```
    # sizer -n filename
    ```

    Make sure that *filename* or *filename*.dev does not already exist in the /tmp directory.

3. Search the temporary configuration file for the embedded value of the LOADADDR parameter. For example:

    ```
    # grep LOADADDR /tmp/myfile
    makeoptions     LOADADDR="fffffc0000230000"
    ```

4. Edit the current system configuration file /sys/conf/*SYSNAME* and change the existing value of the LOADADDR parameter to the value in the temporary configuration file. In this example, the value from the previous step is fffffc0000230000.

5. Use the doconfig command to build a new custom kernel. For example:

    ```
    # doconfig -c /sys/conf/SYSNAME
    ```

6. Copy the newly built kernel to /vmunix. For example:

    ```
    # cp /sys/conf/SYSNAME/vmunix /vmunix
    ```

7. Reboot your system.

2.7 Installation Messages

The following sections describe messages related to installing the NHD-5 kit and tells you whether to ignore them or take corrective action.

2.7.1 DS25 Boot Messages

During a DS25 system boot, you may see the following PCI table error message:

```
PCI device at bus 0, slot 3, function 0 could not be configured:
Vendor ID 0x1000, Device ID 0x21, Base class 0x1, Sub class 0x0
Sub-VID 0x14d9
Sub-DID 0x8002
has no matching entry in the PCI option table
```

You also may see the following unrelated driver error message:

```
<FDI: FATAL ERROR #174  sra:000000ff dor:000000ff msr:000000ff>
fd internal driver error: FDI PROBE FAIL (A,11).
```

Both of these messages reflect known errors and can be ignored.

2.7.2 DS25 daemon.log Error Messages

After booting a DS25 system, you may see error messages similar to the following in the daemon.log files:

```
Sep 24 11:28:37 hpsq16 [616]: Initializing the threshold structure
Sep 24 11:28:38 hpsq16 [616]: **ERROR svrsys_fru_parse.c line 1264: \
    FRU Table TLV tag of 0 is not ISOLATIN1
```

These messages are generated when there is no FRU table available on the system, and can be ignored.

2.7.3 Tag File Creation Message

During the Setup Stage of a Rolling Upgrade, you may see a message similar to the following during tag file creation:

```
clubase: Entry not found in /cluster/admin/tmp/stanza.stdin.530756
```

This reflects a known error and can be ignored.

2.7.4 Rolling Upgrade Status Messages

If you check the cluster upgrade status during a Rolling Upgrade, you see output similar to the following example, done after the Setup Stage is complete:

```
# clu_upgrade -v
Retrieving cluster upgrade status.
            Upgrade Status

Stage           Status                  Date

setup           started:                Thu Jun 20 08:59:48 EDT 2002
                lead member:            1
                patch kit source:       /mnt
                completed:              Thu Jun 20 09:05:29 EDT 2002

                Member Status                        Tagged File Status

  ID Hostname                State Rolled   Running with   On Next Boot

   1 member01.site.place.net UP    No       No             No
  10 member10.site.place.net UP    No       Yes            Yes
  20 member20.site.place.net UP    No       Yes            Yes
```

This output incorrectly indicates `patch kit source` rather than `nhd kit source`. The source information (in this example, `/mnt`) is correct, the label is in error.

2.7.5 Older File Installation Error Messages

If you install the current Version 5.1A patch kit before you install the NHD-5 kit, you may see multiple error messages similar to the following when you install the patch kit.

```
OSHHWBASE521 version ./path/file is older than the previous,
restoring previous version
```

These messages indicate that the files in the NHD-5 kit have been superseded by the files in the patch kit and that the patch kit's version of the files will be used instead. You can ignore these messages.

2.7.6 RIS Installation Error Messages

If you are installing NHD-5 from a RIS server, you may see messages similar to the following before the system is configured:

```
The /usr/sbin/versw -setnew command failed. This error is not fatal,
and the operating system installation will continue. The following
message was received from /usr/sbin/versw -setnew:

Failure to set the new version identifier
```

The kernel that is running at this point includes NHD bits, but NHD support has not yet been loaded or configured on your system. This reflects a known issue and can be ignored.

2.7.7 mknod Installation Error Message

When you install NHD-5 either during a Full Installation or with the
`nhd_install` utility from either a CD or CD image, you may see messages
similar to the following when the installation process is loading the NHD
base subset:

```
   Copying from /instkit1//520/kit (disk)
/usr/sbin/setld: mknod: not found
/usr/sbin/setld: /var/tmp/pipe5255: cannot open
       Working....Thu May 23 14:23:11 EDT 2002
   Verifying
mkfifo: /var/tmp/pipe5255: File exists
```

These reflect known issues and can be ignored.

3

NHD-5 Installation Instructions

This chapter tells you how to prepare for installation, where to get the NHD-5 kit, and how to install it on your system. This includes the following topics:

- Preparing to install NHD (Section 3.1)
- Getting the NHD kit (Section 3.2)
- Installing the NHD kit (Section 3.3)

3.1 Preparing for NHD-5 Installation

Follow these steps to get ready to install NHD-5:

1. If your system already is running Version 5.1A of the operating system, perform a full backup of your system.

2. Get the NHD-5 kit as described in Section 3.2.

3. Determine the NHD kit to install. In the NHD-5 kit distribution, the installable kit is located at `/520/usr/sys/hardware/base.kit` on the distribution media.

4. If necessary, create an NHD-5 kit CD image as described in Section 3.2.3.

5. If you are installing from a RIS server, perform the following tasks:

   a. Set up the RIS area as described in Section 3.2.4.1.

   b. Register your system as a RIS client as described in Section 3.2.4.2.

   See the *Sharing Software on a Local Area Network* manual.

6. If your system already is running a version of the operating system, shut down your system.

7. Upgrade your system to the latest version of firmware for your processor.

8. Determine the console name of your system disk and any devices you will use for software distributions such as the NHD-5 kit, the *Base Operating System* distribution, and the *Associated Products Volume 2* for TruCluster software. This could include the following:

   • Any CD drives where you are mounting CD-ROMs

   • Any spare disk used to create a CD image

   • Your network interface adapter if you are installing from a RIS server

9. At the console prompt, set the value of the `bootdef_dev` variable to null. For example:

   ```
   >>> set bootdef_dev ""
   ```

10. At the console prompt, set the value of the `auto_action` variable to `halt`. For example:

    ```
    >>> set auto_action halt
    ```

11. At the console prompt, set the value of the `boot_osflags` variable to `a`. For example:

    ```
    >>> set boot_osflags a
    ```

12. Power down your system.

13. Review your hardware documentation and install your new hardware.

14. Power up your system.

15. Install NHD-5 according to the instructions in Section 3.3.

_____ **Note** _____

You can install NHD-5 from a CD or a CD image that you create from the downloaded kit.

If you are installing NHD-5 during a Full Installation, you can install from a RIS area.

_____

_____ **Caution** _____

Before you install NHD-5 onto a system that includes SA5300A series RAID controllers, see the release notes in Section 2.6. Failure to follow these instructions can cause your NHD-5 installation to fail.

_____

3.2 Getting the NHD-5 Kit

This section tells you how to acquire the NHD-5 kit and what to do before you install it.

- You can get the NHD-5 kit from two sources:
  - Order it on CD-ROM from your Tru64 UNIX sales or service representative (Section 3.2.1)
  - Download it from the World Wide Web (Section 3.2.2)
- If you download the NHD-5 kit, you must create a CD image on disk (Section 3.2.3)
- If you are going to install NHD-5 from a RIS server, you must prepare for RIS installation (Section 3.2.4)

3.2.1 Ordering the NHD-5 Kit on CD

Contact your Tru64 UNIX sales or service representative at 1–800–888–0220. Order part number QA—MT4AX—H8 to get the NHD-5 kit on CD-ROM.

3.2.2 Downloading the NHD-5 Kit

You can download the NHD-5 kit from the World Wide Web at the following URL:

http://ftp.support.compaq.com/public/unix/v5.1a/nhd/5.0/

This directory includes the following files:

```
nhd5.CHKSUM - NHD-5 kit checksum information
nhd5.README - NHD-5 customer letter
nhd5.tar.gz - compressed and archived NHD-5 kit
```

3.2.3 Creating an NHD-5 Kit CD Image

These instructions assume that you have downloaded the NHD-5 kit to `/usr/tmp`. Before you create a CD image, you must have a spare disk with at least 750 MB of free space to use for the CD image.

_____ **Note** _____

This procedure creates a CD image of the NHD-5 kit distribution for installation purposes. It does not allow you to burn a CD from this image.

_____

Follow these steps to create the NHD-5 CD image on disk:

1. Log in as `root`.

2. Create a new UFS file system on the spare disk. For example:

   # **newfs /dev/rdisk/dsk2c**

   You see output similar to this:

   ```
   Warning: /dev/rdisk/dsk2c and overlapping partition(s) are marked in use.
   If you continue with the operation you can
   possibly destroy existing data.
   CONTINUE? [y/n]
   ```

3. Enter **y** to continue. You see output similar to this:

   ```
   /dev/rdisk/dsk2c:       8380080 sectors in 3708 cylinders of 20 tracks, \
       113 sectors
   4091.8MB in 232 cyl groups (16 c/g, 17.66MB/g, 4288 i/g)
   super-block backups (for fsck -b #) at:
   32, 36320, 72608, 108896, 145184, 181472, 217760, 252048,
   290336, 326624, 362912, 399200, 435488, 471776, 508064, 544352,
   580640, 616928, 653216, 689504, 725792, 762080, 798368, 834656,
   870944, 907232, 943520, 979808, 1016096, 1052384, 1088672, 1124960,
   1157152, 1193440, 1229728, 1266016, 1302304, 1338592, 1374880, 1411168,
   1447456, 1483744, 1520032, 1556320, 1592608, 1628896, 1665184, 1701472,
   1737760, 1774048, 1810336, 1846624, 1882912, 1919200, 1955488, 1991776,
   2028064, 2064352, 2100640, 2136928, 2173216, 2209504, 2245792, 2282080,
   2314272, 2350560, 2386848, 2423136, 2459424, 2495712, 2532000, 2568288,
   2604576, 2640864, 2677152, 2713440, 2749728, 2786016, 2822304, 2858592,
   2894880, 2931168, 2967456, 3003744, 3040032, 3076320, 3112608, 3148896,
   3185184, 3221472, 3257760, 3294048, 3330336, 3366624, 3402912, 3439200,
   3471392, 3507680, 3543968, 3580256, 3616544, 3652832, 3689120, 3725208,
   3761696, 3797984, 3834272, 3870560, 3906848, 3943136, 3979424, 4015712,
   4052000, 4088288, 4124576, 4160864, 4197152, 4233440, 4269728, 4306016,
   4342304, 4378592, 4414880, 4451168, 4487456, 4523744, 4560032, 4596320,
   4628512, 4664800, 4701088, 4737376, 4773664, 4809952, 4846240, 4882528,
   4918816, 4955104, 4991392, 5027680, 5063968, 5100256, 5136544, 5172832,
   5209120, 5245208, 5281696, 5317984, 5354272, 5390560, 5426848, 5463136,
   5499424, 5535712, 5572000, 5608288, 5644576, 5680864, 5717152, 5753440,
   5785632, 5821920, 5858208, 5894496, 5930784, 5967072, 6003360, 6039648,
   6075936, 6112224, 6148512, 6184800, 6221088, 6257376, 6293664, 6329952,
   6366240, 6402528, 6438816, 6475104, 6511392, 6547680, 6583968, 6620256,
   6656544, 6692832, 6729120, 6765208, 6801696, 6837984, 6874272, 6910560,
   6942752, 6979040, 7015328, 7051616, 7087904, 7124192, 7160480, 7196768,
   7233056, 7269344, 7305632, 7341920, 7378208, 7414496, 7450784, 7487072,
   7523360, 7559648, 7595936, 7632224, 7668512, 7704800, 7741088, 7777376,
   7813664, 7849952, 7886240, 7922528, 7958816, 7995104, 8031392, 8067680,
   8099872, 8136160, 8172448, 8208736, 8245024, 8281312, 8317600, 8353888,
   ```

4. Mount the spare disk where you will create the CD image. For example:

   # **mount /dev/disk/dsk2c /mnt**

5. Change directory to the new file system:

   # **cd /mnt**

6. Enter the following command to extract the NHD-5 kit into the CD image:

```
# gzcat /usr/tmp/nhd5.tar.gz | tar xvf -
```

You see a list of files as they are extracted.

7. Return to the root directory and unmount the CD image:

```
# cd /
# umount /mnt
```

You have created an NHD-5 CD image on the disk at `/dev/disk/dsk2c`.

3.2.4 Preparing for RIS installation

If you are installing NHD-5 from a RIS server, you first must do the following:

1. Set up the RIS area on the RIS server (Section 3.2.4.1)

2. Register the RIS client (Section 3.2.4.2)

_____ **Note** _____

Although the examples in this section show the NHD-5 distribution on CD, you can use a CD image created from the downloaded NHD-5 kit as described in Section 3.2.2 and Section 3.2.3.

_____

See the *Sharing Software on a Local Area Network* manual for RIS information. The *Troubleshooting RIS* chapter is especially helpful if you encounter difficulties.

3.2.4.1 Setting Up the RIS Area

Follow these steps to create a RIS area for NHD-5 on your RIS server:

1. Use the `ris` utility to install the base operating system Version 5.1A into a new RIS area.

_____ **Caution** _____

Use the standard method to create the RIS area, not the bootlink method.

Extract the base operating system; do not use symbolic links.

_____

You optionally may install TruCluster Server and Worldwide Language Support in the same RIS area.

2. Load the NHD-5 CD into the RIS server's CD-ROM drive.

3. Mount the NHD-5 distribution. For example:

   # **mount /dev/disk/cdrom0a /mnt**

4. Run the update_ris script to install the NHD-5 kit into the RIS area.
   For example:

   # **/mnt/tools/update_ris**

   You see messages similar to the following:

   ```
   Please select one of the following products to add NHD support to


      1)  /usr/var/adm/ris/ris9.alpha
      'Tru64 UNIX V5.1A Operating System (Rev 1885)'

      2)  /usr/var/adm/ris/ris8.alpha
      'Tru64 UNIX V5.1 Operating System (Rev 732)'

      3)  /usr/var/adm/ris/ris6.alpha
      'Tru64 UNIX V5.1A Operating System ( Rev 1885 )'

   Enter your selection or press <return> to quit:
   ```

   _____ **Note** _____

   The RIS areas depends upon how you have set up your RIS
   server.
   _____

5. In this example, enter **3** and press Return. You see messages similar
   to the following:

   ```
   You are updating ris area /usr/var/adm/ris/ris6.alpha for:
    V5.1A Operating System ( Rev 1885 )
   with NHD support.
   Is this correct? (y/n):
   ```

6. In this example, enter **y** and press Return. You see messages similar
   to the following:

   ```
   'Tru64 UNIX New Hardware for V5.1A'
      3    'Tru64 UNIX New Hardware for V5.1A'
   Building new network bootable kernel
   /usr/var/adm/ris/ris6.alpha/kit has been updated with NHD-5 support
   ```

3.2.4.2 Registering the RIS Client

See the *Sharing Software on a Local Area Network* manual for instructions on how to register RIS clients for a RIS area.

_____ **Caution** _____

When you register a cluster as a RIS client, remember to register both the cluster alias and the lead cluster member. During client registration, you see the following prompt:

```
Is this client a cluster alias? (y/n) [n]:
```

- When you register a cluster alias, enter **y** and press Return.

- When you register the lead cluster member, press Return. When prompted, enter the hardware address.

_____

3.3 Installing the NHD-5 Kit

This section tells you how to install the NHD-5 kit on a system in one of the following configurations:

- Single system already running Version 5.1A (Section 3.3.1)

- Single system during Full Installation of Version 5.1A:
  - Installing from a CD or CD image (Section 3.3.2.1)
  - Installing from RIS (Section 3.3.2.2)

- Cluster already running Version 5.1A (Section 3.3.3)

- Cluster during Full Installation of Version 5.1A (Section 3.3.4)

_____ **Note** _____

You can install NHD-5 from CD or a CD image that you create from the downloaded kit.

If you are installing NHD-5 during a Full Installation, you can install from a RIS area.

_____

3.3.1 Installing on a Single System Running Version 5.1A

Before you start this procedure, you must have the NHD-5 distribution. See Section 3.2 for information about how to get the NHD-5 kit and, if necessary, create an NHD-5 kit CD image as described in Section 3.2.3.

_____ **Note** _____

You cannot use RIS to install NHD-5 with this method.

You cannot use this method to install NHD-5 on a DS25 system. See Section 3.3.2 for instructions on installing NHD-5 on a single system during a Full Installation of Version 5.1A.

_____

_____ **Caution** _____

Before you install NHD-5 onto a system that includes SA5300A series RAID controllers, see the release notes in Section 2.6. Failure to follow these instructions can cause your NHD-5 installation to fail.

_____

Follow these steps to install NHD-5 on a single system that already is running Version 5.1A of the operating system:

1. Log in as `root`.

2. Mount the NHD-5 kit. For example:

   # **mount /dev/disk/cdrom0a /mnt**

3. Change directory to the mounted NHD-5 kit. For example:

   # **cd /mnt**

4. Run the `nhd_install` script:

   # **./nhd_install**

   You see output similar to the following:

   ```
   Using kit at /mnt/520

   Checking file system space required to install specified subsets:

   File system space checked OK.

   2 subsets will be installed.

   Loading subset 1 of 1 ...

   New Hardware Base System Support V4.0
      Copying from /mnt/520/kit (disk)
            Working....Thu Jun 20 13:59:55 EDT 2002

      Verifying
   ```

```
1 of 1 subsets installed successfully.

Configuring "New Hardware Base System Support V4.0" (OSHHWBASE520)

Rebuilding the /GENERIC file to include the kernel modules for the
new hardware.  This may take a few minutes.

Successful setting of the new version identifier
Successful switch of the version identifiers
```

5. At the shell prompt, shut down the system. For example:

   # **shutdown -h now**

6. At the console prompt, boot the generic kernel. For example:

   >>> **boot -fi genvmunix dqb0**

7. After the system boots, log in as root.

8. At the shell prompt, use the doconfig utility to rebuild the custom
   kernel. For example:

   # **doconfig**

   You see messages similar to the following:

   ```
   *** KERNEL CONFIGURATION AND BUILD PROCEDURE ***

   Enter a name for the kernel configuration file. [SYSNAME]:

   A configuration file with the name 'SYSNAME' already exists.
   Do you want to replace it? (y/n) [n]:
   ```

9. Enter **y** and press Return. You see messages similar to the following:

   ```
   Saving /sys/conf/SYSNAME as /sys/conf/SYSNAME.bck

   *** KERNEL OPTION SELECTION ***

   Selection   Kernel Option
   -------------------------------------------------------------
   1       System V Devices
   2       NTP V3 Kernel Phase Lock Loop (NTP_TIME)
   3       Kernel Breakpoint Debugger (KDEBUG)
   4       Packetfilter driver (PACKETFILTER)
   5       IP-in-IP Tunneling (IPTUNNEL)
   6       IP Version 6 (IPV6)
   7       Point-to-Point Protocol (PPP)
   8       STREAMS pckt module (PCKT)
   9       X/Open Transport Interface (XTISO, TIMOD, TIRDWR)
   10      Digital Versatile Disk File System (DVDFS)
   11      ISO 9660 Compact Disc File System (CDFS)
   12      Audit Subsystem
   13      ATM UNI 3.0/3.1 ILMI (ATMILMI3X)
   14      IP Switching over ATM (ATMIFMP)
   15      LAN Emulation over ATM (LANE)
   16      Classical IP over ATM (ATMIP)
   17      ATM UNI 3.0/3.1 Signalling for SVCs (UNI3X)
   18      Asynchronous Transfer Mode (ATM)
   19      All of the above
   20      None of the above
   21      Help
   22      Display all options again
   ```

```
        -----------------------------------------------------------

        Enter your choices.

        Choices (for example, 1 2 4-6) [20]:
```

10. Select the kernel options you want built into your new custom kernel.
    This should include the same options you were already running on your
    system. For example, if you want to select all listed kernel options,
    enter **19** and press Return.

    You see messages similar to the following:

```
        You selected the following kernel options:
        System V Devices
        NTP V3 Kernel Phase Lock Loop (NTP_TIME)
        Kernel Breakpoint Debugger (KDEBUG)
        Packetfilter driver (PACKETFILTER)
        IP-in-IP Tunneling (IPTUNNEL)
        IP Version 6 (IPV6)
        Point-to-Point Protocol (PPP)
        STREAMS pckt module (PCKT)
        X/Open Transport Interface (XTISO, TIMOD, TIRDWR)
        Digital Versatile Disk File System (DVDFS)
        ISO 9660 Compact Disc File System (CDFS)
        Audit Subsystem
        ATM UNI 3.0/3.1 ILMI (ATMILMI3X)
        IP Switching over ATM (ATMIFMP)
        LAN Emulation over ATM (LANE)
        Classical IP over ATM (ATMIP)
        ATM UNI 3.0/3.1 Signalling for SVCs (UNI3X)
        Asynchronous Transfer Mode (ATM)

        Is that correct? (y/n) [y]:
```

11. Enter **y** to confirm your selection and press Return. You see the following
    prompt:

```
        Do you want to edit the configuration file? (y/n) [n]:
```

12. Enter **n** and press Return. You see messages similar to the following:

```
        *** PERFORMING KERNEL BUILD ***

        A log file listing special device files is located in /dev/MAKEDEV.log
        Working....Thu Jun 20 14:59:36 EDT 2002
        Working....Thu Jun 20 15:01:53 EDT 2002
        Working....Thu Jun 20 15:05:32 EDT 2002

        The new kernel is /sys/SYSNAME/vmunix
```

13. Copy the new custom kernel to /vmunix. For example:

    # **cp /sys/SYSNAME/vmunix /vmunix**

14. Shut down the system. For example:

    # **shutdown -h now**

15. At the console prompt, boot the system with the new custom kernel. For example:

```
>>> boot -fi "vmunix" dqb0
```

_____ **Caution** _____

When you install NHD-5, you also must install the most current Version 5.1A patch kit before you return your system to production. It does not matter which one you install first.

Tru64 UNIX Version 5.1A patch kits are available on the World Wide Web at the following URL:

http://ftp.support.compaq.com/public/unix/v5.1a/

_____

3.3.2 Installing on a Single System During Full Installation of Version 5.1A

You can install NHD-5 on a single system during a Full Installation of the operating system from either of the following sources:

- NHD-5 kit on CD or on a CD image that you created from the downloaded kit (Section 3.3.2.1)

- NHD-5 kit in a RIS area along with the base operating system. (Section 3.3.2.2)

See Section 3.2 for information on getting the NHD kit and, creating a CD image, and setting up a RIS area.

_____ **Caution** _____

Before you install NHD-5 onto a system that includes SA5300A series RAID controllers, see the release notes in Section 2.6. Failure to follow these instructions can cause your NHD-5 installation to fail.

_____

3.3.2.1 Installing from a CD or CD Image

Before you start this procedure, see the *Installation Guide* for information about the Full Installation process. You must have both the NHD-5 kit and the *Base Operating System* distribution. See Section 3.2 for information about how to get the NHD-5 kit and, if necessary, create an NHD-5 kit CD image.

Follow these steps to install NHD-5 on a single system during a Full Installation:

1. If your system already is running a version of the operating system, log in as `root` and shut down the system.

2. What you do next depends upon the media you are using.

   - If you are using a single CD drive, load the Version 5.1A *Base Operating System* CD into your CD drive.

   - If you are using multiple CD drives, load the Version 5.1A *Base Operating System* CD into one CD drive and the *New Hardware Delivery* CD into another CD drive.

   - If you are using one or more CD images, make sure that the disks containing the CD images are on line and available.

   - If you are using a combination of CDs and CD images, make sure that all distribution media are on line and available.

3. At the console prompt, boot the generic kernel. For example:

   ```
   >>> boot -fl fa -fi "GENERIC" dqb0
   ```

   You see messages similar to the following:

   ```
   (boot dqb0.0.1.16.0 -file GENERIC -flags fa)
   block 0 of dqb0.0.1.16.0 is a valid boot block
   reading 15 blocks from dqb0.0.1.16.0
   bootstrap code read in
   base = 200000, image_start = 0, image_bytes = 1e00
   initializing HWRPB at 2000
   initializing page table at 3ff48000
   initializing machine state
   setting affinity to the primary CPU
   jumping to bootstrap code

   UNIX boot - Wednesday, August 01, 2001

   Loading GENERIC ...
   Loading at fffffc0000250000

   Enter all Foreign Hardware Kit Names.
   Device Names are entered as console names (e.g. dkb100).

   Enter Device Name, or <return> if done:
   ```

   _____ **Note** _____

   The message to enter foreign kit names starts the phase of the process where you specify kits and their locations. Do not enter a kit name here. Look at the actual prompt and enter the device name where the NHD-5 kit is located.

   _____

4. Enter the console device name of the device where the NHD-5 kit is located.

   • If you are installing from a CD, enter the console device name of the CD drive. For example, **dqb0**.

   • If you are installing from a CD image on disk, enter the console device name of that disk. For example, **dka400**.

5. Press Return. You see a prompt similar to the following:

   ```
   Enter Hardware Kit Name, or <return> if done with dqb0:
   ```

6. Enter the NHD-5 kit name:

   /520/usr/sys/hardware/base.kit

   You see a prompt similar to the following:

   ```
   Insert media for kit 'dqb0:/520/usr/sys/hardware/base.kit'
   hit <return> when ready, or 'q' to quit this kit:
   ```

7. What you do next depends upon the media you are using.

   • If you are installing from a single CD-ROM drive, remove the *Base Operating System* CD and load the *New Hardware Delivery* CD.

   • If you are installing from multiple CD-ROM drives, CD images, or both, do nothing.

8. Press Return. You see the following prompt:

   ```
   Enter Hardware Kit Name, or <return> if done with dqb0:
   ```

9. Press Return. You see the following prompt:

   ```
   Enter Device Name, or <return> if done:
   ```

10. Press Return, and the boot process verifies the NHD-5 kit. You see the following prompt:

    ```
    Insert boot media, hit <return> when ready:
    ```

11. What you do next depends upon the media you are using.

    • If you are installing from a single CD-ROM drive, remove the *New Hardware Delivery* CD and load the *Base Operating System* CD.

    • If you are installing from multiple CD-ROM drives, CD images, or both, do nothing.

12. Press Return. As the base operating system kernel modules are linked, you see messages similar to the following:

```
Linking nnn objects: nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn
         …
         …
 105 104 103 102 101 100 99 98 97 96 95 94 93 92 91 90 89 88 87 86 85 84 83
 82 81 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60 59 58
 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33
 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9
```

_____ **Note** _____

You may see a different number of objects linked, as the NHD-5 kit is updated several times before the distribution is finalized.

_____

You see a prompt similar to the following:

```
Insert media for kit 'dqb0:/520/usr/sys/hardware/base.kit'
hit <return>  when ready or 'q' to quit:
```

13. What you do next depends upon the media you are using.

   - If you are installing from a single CD-ROM drive, remove the *Base Operating System* CD and load the *New Hardware Delivery* CD.

   - If you are installing from multiple CD-ROM drives, CD images, or both, do nothing.

14. Press Return. As the NHD-5 kit kernel modules are linked, you see messages similar to the following:

```
8 7 6 5 4 3 2 1
```

_____ **Note** _____

You may see a different number of objects linked, as the NHD-5 kit is updated several times before the distribution is finalized.

_____

You see a prompt similar to the following:

```
Insert boot media, hit <return>  when ready:
```

15. What you do next depends upon the media you are using.

   - If you are installing from a single CD-ROM drive, remove the *New Hardware Delivery* CD and load the *Base Operating System* CD.

   - If you are installing from multiple CD-ROM drives, CD images, or both, do nothing.

16. Press Return. You see the operating system boot and the Full Installation user interface start.

17. Enter host information, select subsets and target disks, and continue the Full Installation process as described in the *Installation Guide*.

    After the final reboot, the Full Installation process configures the system and reboots the system.

    You see messages similar to the following:

    ```
    UNIX boot - Wednesday, August 01, 2001

    Loading /GENERIC ...
    Loading at fffffc0000250000

    Enter all Foreign Hardware Kit Names.
    Device Names are entered as console names (e.g. dkb100).

    Enter Device Name, or <return> if done:
    ```

18. Enter the console device name for the NHD-5 kit, for example: **dqb0**. You see the following prompt:

    ```
    Enter Hardware Kit Name, or <return>  if done with dqb0:
    ```

19. Enter the NHD-5 kit name:

    /520/usr/sys/hardware/base.kit

    You see a prompt similar to the following:

    ```
    Insert media for kit 'dqb0:/520/usr/sys/hardware/base.kit'
    hit <return> when ready, or 'q' to quit this kit:
    ```

20. What you do next depends upon the media you are using.

    • If you are installing from a single CD-ROM drive, remove the *Base Operating System* CD and load the *New Hardware Delivery* CD.

    • If you are installing from multiple CD-ROM drives, CD images, or both, do nothing.

21. Press Return. You see a prompt similar to the following:

    ```
    Enter Hardware Kit Name, or <return> if done with dqb0:
    ```

22. Because there are no other kits included in NHD-5, press Return. You see the following prompt:

    ```
    Enter Device Name, or <return> if done:
    ```

23. Again, because there are no other kits to install, press Return. You see the following prompt:

```
Insert boot media, hit <return>  when ready:
```

——————————————— **Note** ———————————————

Although this prompt asks you to insert the boot media, do not insert the *Base Operating System* CD. At this point in the installation process you are booting from the system disk, and no media change is necessary.

———————————————————————————————————————

24. Press Return. You see a prompt similar to the following:

```
Linking nnn objects: nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn nnn
          …
          …
 105 104 103 102 101 100 99 98 97 96 95 94 93 92 91 90 89 88 87 86 85 84 83
 82 81 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60 59 58
 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33
 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9
Insert media for kit 'dka400:/520/usr/sys/hardware/base.kit'
hit <return> when ready or 'q' to quit:
```

25. If you removed the NHD-5 kit media, replace it. When the NHD-5 kit media is in place, press Return.

You see messages similar to the following:

```
8 7 6 5 4 3 2 1
Insert boot media, hit <return>  when ready:
```

——————————————— **Note** ———————————————

Although this prompt asks you to insert the boot media, do not insert the *Base Operating System* CD. At this point in the installation process you are booting from the system disk, and no media change is necessary.

———————————————————————————————————————

26. Press Return. You see the standard subset installation and configuration messages.

When the hardware kit is loaded and configured, you see messages similar to the following:

```
*** START LOAD HARDWARE KIT (Thu Jun 20 16:07:30 EDT 2002) ***

Validating distribution media...

The Hardware Support product has been successfully located.

Checking file system space required to install specified subsets:

File system space checked OK.
```

```
1 subsets will be installed.

Loading subset 1 of 1 ...

New Hardware Base System Support V4.0
   Copying from /instkit1//520/kit (disk)
   Verifying

1 of 1 subsets installed successfully.

*** SYSTEM CONFIGURATION ***

Configuring "New Hardware Base System Support V4.0" (OSHHWBASE520)

Rebuilding the /GENERIC file to include the kernel modules for the
new hardware.  This may take a few minutes.

Rebuilding the /GENERIC file to include the kernel modules for the
new hardware.  This may take a few minutes.

*** END LOAD HARDWARE KIT (Thu Jun 20 16:09:35 EDT 2002) ***
```

_____ **Note** _____

> If you are installing the Worldwide Language Support (WLS)
> subsets, you are prompted to insert the *Associated Products
> Volume 1* CD. See the *Installation Guide* for information
> about installing WLS subsets.

_____

You see messages similar to the following as the kernel is rebuilt:

```
The system name assigned to your machine is 'sysname'.
*** KERNEL CONFIGURATION AND BUILD PROCEDURE ***

     The system will now automatically build a kernel
     with all options and then reboot.  This can take
     up to 15 minutes, depending on the processor type.

     When  the login prompt appears after the system
     has rebooted, use 'root' as the  login name and
     the SUPERUSER  password that was entered during
     this procedure, to log into the system.

*** PERFORMING KERNEL BUILD ***
      Working....Thu Jun 20 16:13:24 EDT 2002

The new version ID has been successfully set on this system.
The entire set of new functionality has been enabled.

This message is contained in the file /var/adm/smlogs/it.log for
future reference.syncing disks... done
rebooting.... (transferring to monitor)
```

The system reboots with the custom kernel, and you see the login
prompt.

27. Log in as root and configure your system from the System Setup
    Checklist. See the System Setup Checklist online help for more
    information.

3.3.2.2 Installing from RIS

Before you start this procedure, see the *Installation Guide* for information
about the Full Installation process. You must have both the NHD-5 kit and
the *Base Operating System* distribution. See Section 3.2 for information
about how to get the NHD-5 kit and how to prepare for RIS installation.

1. If your system already is running a version of the operating system, log
    in as root and shut down the system.

2. At the console prompt, boot from the RIS server. For example:

    ```
    >>> boot ewa0
    ```

    You see the operating system boot and the Full Installation user
    interface start.

3. Enter host information, select subsets and target disks, and continue
    the Full Installation process as described in the *Installation Guide*.

    The following list describes differences you may see when you install
    NHD-5 from a RIS server:

    *   After the base operating system subsets are installed, you see the
        New Hardware Base System Support V4.0 subset installed
        from the RIS server.

    *   During system configuration you see messages similar to the
        following as NHD-5 is configured and the generic kernel is rebuilt:

        ```
        Configuring "New Hardware Base System Support V4.0" (OSHHWBASE520)

        Rebuilding the /GENERIC file to include the kernel modules for the
        new hardware.  This may take a few minutes.
        ```

4. You see messages similar to the following as the kernel is rebuilt before
    the final reboot:

    ```
    The system name assigned to your machine is 'sysname'.
    *** KERNEL CONFIGURATION AND BUILD PROCEDURE ***


            The system will now automatically build a kernel
            with all options and then reboot.  This can take
            up to 15 minutes, depending on the processor type.

            When  the login prompt appears after the system
            has rebooted, use 'root' as the  login name and
            the SUPERUSER  password that was entered during
            this procedure, to log into the system.
    ```

```
*** PERFORMING KERNEL BUILD ***
 Working....Thu Jun 20 14:06:34 EDT 2002

The new version ID has been successfully set on this system.
The entire set of new functionality has been enabled.

This message is contained in the file /var/adm/smlogs/it.log for
future reference.syncing disks... done
rebooting.... (transferring to monitor)
```

The system reboots with the custom kernel, and you see the login prompt.

5. Log in as `root` and configure your system from the System Setup Checklist. See the System Setup Checklist online help for more information.

_____ **Caution** _____

When you install NHD-5, you also must install the most current Version 5.1A patch kit before you return your system to production. It does not matter which one you install first.

Tru64 UNIX Version 5.1A patch kits are available on the World Wide Web at the following URL:

http://ftp.support.compaq.com/public/unix/v5.1a/

_____

3.3.3 Installing on a Cluster Running Version 5.1A

Before you install NHD-5 on an existing cluster, see the *Rolling Upgrade* chapter in the Tru64 UNIX *Cluster Installation* manual. You must have the NHD-5 kit distribution, the Version 5.1A *Base Operating System* CD, and the *Associated Products Volume 2* CD that includes the Version 5.1B TruCluster Server software. See Section 3.2 for information about how to get the NHD-5 kit and, if necessary, create an NHD-5 kit CD image or prepare for RIS installation.
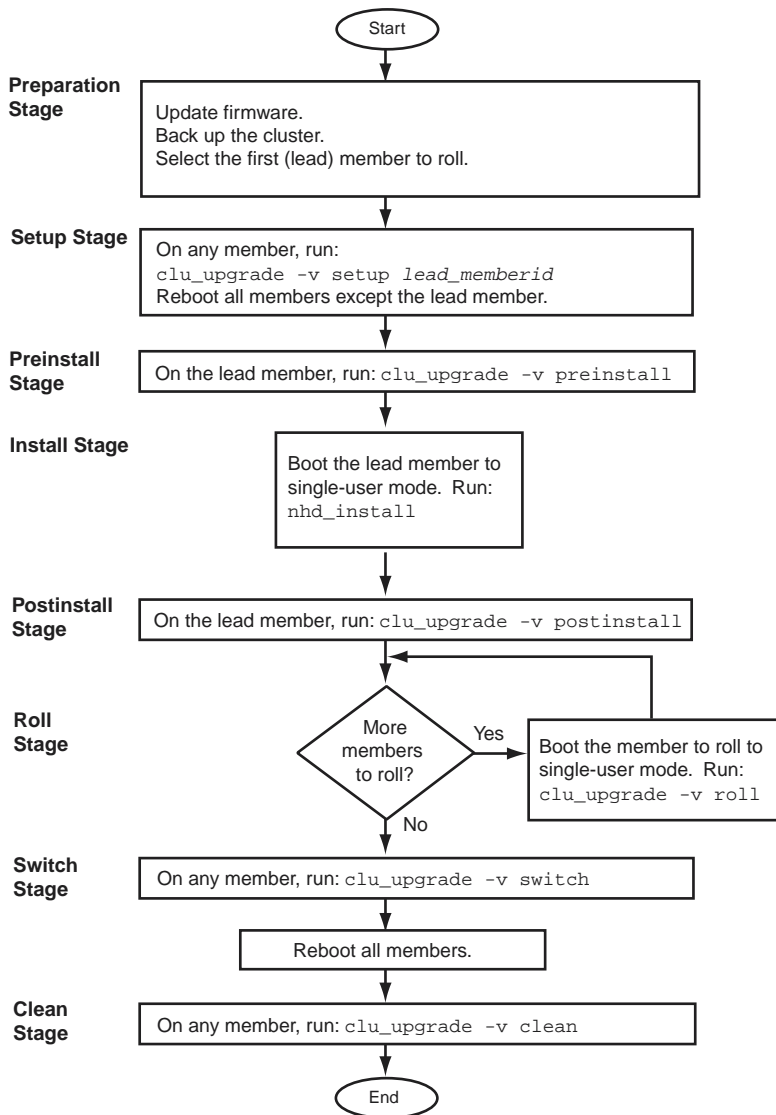
_____ **Caution** _____

Before you install NHD-5 onto a system that includes SA5300A series RAID controllers, see the release notes in Section 2.6. Failure to follow these instructions can cause your NHD-5 installation to fail.

_____

Perform a Rolling Upgrade as described in the following sections to install NHD-5 on an existing cluster. See the *clu_upgrade Quick Reference* Best Practice and the *Rolling Upgrade* chapter in the Tru64 UNIX *Cluster Installation* manual for additional information.

Figure 3–1 shows a simplified flow chart of the tasks and stages that are part of an NHD rolling upgrade.

Figure 3–1: NHD Rolling Upgrade


```
                            ( Start )
                                |
Preparation    +-----------------------------------------------+
Stage          | Update firmware.                              |
               | Back up the cluster.                          |
               | Select the first (lead) member to roll.       |
               +-----------------------------------------------+
                                |
Setup Stage    +-----------------------------------------------+
               | On any member, run:                           |
               | clu_upgrade -v setup lead_memberid            |
               | Reboot all members except the lead member.    |
               +-----------------------------------------------+
                                |
Preinstall     +-----------------------------------------------+
Stage          | On the lead member, run: clu_upgrade -v preinstall |
               +-----------------------------------------------+
                                |
Install Stage       +-----------------------------+
                    | Boot the lead member to     |
                    | single-user mode.  Run:     |
                    | nhd_install                 |
                    +-----------------------------+
                                |
Postinstall    +-----------------------------------------------+
Stage          | On the lead member, run: clu_upgrade -v postinstall |
               +-----------------------------------------------+
                                |
Roll                      /  More  \        Yes   +-----------------------------+
Stage                    <  members  >----------->| Boot the member to roll to  |
                          \ to roll? /            | single-user mode.  Run:     |
                                |                  | clu_upgrade -v roll         |
                               No                  +-----------------------------+
                                |
Switch         +-----------------------------------------------+
Stage          | On any member, run: clu_upgrade -v switch      |
               +-----------------------------------------------+
                                |
                    +-----------------------------+
                    | Reboot all members.         |
                    +-----------------------------+
                                |
Clean          +-----------------------------------------------+
Stage          | On any member, run: clu_upgrade -v clean       |
               +-----------------------------------------------+
                                |
                            ( End )
```

ZK-1870U-AI

3.3.3.1 Preparation Stage

Perform the tasks in the Rolling Upgrade Preparation Stage. See the *Rolling Upgrade* chapter in the Tru64 UNIX *Cluster Installation* manual.

3.3.3.2 Setup Stage

1. Use the `clu_upgrade` command to start the Setup Stage. For example, if the lead member has member ID `1`:

    # **clu_upgrade -v setup 1**

    You see the following messages:

    ```
    Retrieving cluster upgrade status.

    This is the cluster upgrade program.
    You have indicated that you want to perform the 'setup' stage of the
    upgrade.

    Do you want to continue to upgrade the cluster? [yes]:
    ```

2. Press Return. You see the following messages:

    ```
    What type of rolling upgrade will be performed?

         Selection   Type of Upgrade
    -------------------------------------------------------------------
            1        An upgrade using the installupdate command
            2        A patch using the dupatch command
            3        A new hardware delivery using the nhd_install command
            4        All of the above
            5        None of the above
            6        Help
            7        Display all options again
    -------------------------------------------------------------------
    Enter your Choices (for example, 1 2 2-3):
    ```

3. Enter **3** and press Return. You see the following messages:

    ```
    You selected the following rolling upgrade options: 3
    Is that correct? (y/n) [y]:
    ```

4. Enter **y** and press Return. You see the following messages:

    ```
    Enter the full pathname of the nhd kit mount point ['???']:
    ```

5. Enter the NHD kit mount point, for example: **/mnt**, and press Return. You see the following messages:

    ```
    A nhd kit has been found in the following location:

    /mnt

    This kit has the following version information:

    'Tru64 UNIX New Hardware for V5.1A'

    Is this the correct nhd kit for the update being performed? [yes]:
    ```

6.   Enter **yes** and press Return. You see the following messages:

```
Checking inventory and available disk space.
Marking stage 'setup' as 'started'.
Copying NHD kit '/mnt' to '/var/adm/update/NHDKit/'.
nhd_install -copy 520 /var/adm/update/NHDKit/

Creating tagged files.
......
The cluster upgrade 'setup' stage has completed successfully.
Reboot all cluster members except member: '1'
Marking stage 'setup' as 'completed'.

The 'setup' stage of the upgrade has completed successfully.
```

_____ **Note** _____

You may see the following message during this step:

```
clubase: Entry not found in /cluster/admin/tmp/stanza.stdin.530756
```

This is a known error and can be ignored.

_____

7.   Reboot all your cluster members except the lead member. See the
     Rolling Upgrade chapter in the Tru64 UNIX *Cluster Installation*
     manual.

3.3.3.3 Preinstall Stage

1.   Use the `clu_upgrade` command to start the Preinstall Stage:

     # **clu_upgrade -v preinstall**

     You see the following messages:

```
Retrieving cluster upgrade status.

This is the cluster upgrade program.
You have indicated that you want to perform the 'preinstall' stage of the
upgrade.

Do you want to continue to upgrade the cluster? [yes]:
```

2.   Enter **yes** and press Return. You see the following messages:

```
clu_upgrade has previously created the required tagged files and would
normally check and repair any tagged files which may have been modified
since they where created. If you feel that the tagged files have not changed
since they where created you may bypass these checks and continue with the
rolling upgrade.

Do you wish to skip tag file checking? [no]:
```

3. If the Preinstall Stage is performed right after the Setup Stage, you can skip tagged file checking. If a period of time has elapsed between the Setup Stage and Preinstall Stage, you may want to check the tagged files.

- The prompt asks if you want to skip tagged file checking. If you do want to check tagged files, Enter **no** at the prompt and press Return. You see the following message, followed by a progress indicator:

```
Checking tagged files.
...............................................................
```

- If you want to skip tagged file checking, enter **yes** and press Return.

4. Enter **yes** and press Return. You see the following messages:

```
Marking stage 'preinstall' as 'started'.

Backing up member-specific data for member: 1

Marking stage 'preinstall' as 'completed'.
The cluster upgrade 'preinstall' stage has completed successfully.
You can now run the nhd_install command on the lead member.

The 'preinstall' stage of the upgrade has completed successfully.
```

_____ **Note** _____

You may see the following message during this step:

```
. find: bad starting directory
.
```

This is a known error and can be ignored.

_____

3.3.3.4 Install Stage

1. Make sure that the NHD-5 distribution is still mounted.

2. Change directory to the mounted NHD-5 kit:

   # **cd /mnt**

3. Use the nhd_install script to install the NHD-5 kit on the lead member:

   # **./nhd_install**

   You see messages similar to the following:

```
Using kit at /var/adm/520
-rw-r--r--   1 root      system         0 Jan 29 15:06 \
  ./usr/sys/hardware/database.nhd
the file/files above have changed since initial system load
and the changes cannot be accounted for through the normal
patch or NHD process. If you continue with the installation
these files will be replaced
```

```
continue (y or n)y

2 subsets will be installed.

Loading subset 1 of 2 ...

New Hardware Base System Support V4.0
   Copying from /var/adm/520/kit (disk)
   Verifying

Loading subset 2 of 2 ...

New Hardware TruCluster(TM) Support V4.0
   Copying from /var/adm/520/kit (disk)
   Verifying

2 of 2 subsets installed successfully.

*** Starting protofile merges for Tru64 UNIX New Hardware for V5.1A ***

*** Finished protofile merges for Tru64 UNIX New Hardware for V5.1A ***

*** SYSTEM CONFIGURATION ***

Configuring "New Hardware Base System Support V4.0" (OSHHWBASE520) \
  on member0

Configuring "New Hardware TruCluster(TM) Support V4.0" (OSHTCRBASE520) \
  on member0

The installation of the New Hardware TruCluster(TM) Support V4.0 \
  (OSHTCRBASE520) software subset is complete.

Configuring "New Hardware Base System Support V4.0" (OSHHWBASE520) \
  on member1

Configuring "New Hardware TruCluster(TM) Support V4.0" (OSHTCRBASE520) \
  on member1
rebuilding kernel SYSNAME

*** KERNEL CONFIGURATION AND BUILD PROCEDURE ***

Saving /sys/conf/SYSNAME as /sys/conf/SYSNAME.bck

*** PERFORMING KERNEL BUILD ***
        Working....Thu Jun 20 16:56:41 EDT 2002

The new kernel is /sys/SYSNAME/vmunix

The installation of the New Hardware TruCluster(TM) Support V4.0 \
  (OSHTCRBASE520) software subset is complete.
```

4. Copy the custom kernel to the member-specific directory on the lead
    member. For example:

    # **cp /sys/SYSNAME/vmunix**
    /cluster/members/member1/boot_partition

5. Reboot the lead member.

6. Log in as root on the lead member.

7. Use the `clu_upgrade` command to check the installation status:

    # **clu_upgrade -v**

    You see messages similar to the following:

    ```
    Retrieving cluster upgrade status.
                Upgrade Status

    Stage         Status               Date

    setup         started:             Thu Jun 20 16:50:43 EDT 2002
                  lead member:         1
                  patch kit source:    /mnt
                  completed:           Thu Jun 20 16:52:34 EDT 2002

    preinstall    started:             Thu Jun 20 16:54:46 EDT 2002
                  completed:           Thu Jun 20 16:55:16 EDT 2002

    nhd           started:             Thu Jun 20 16:55:57 EDT 2002
                  completed:           Thu Jun 20 16:57:42 EDT 2002

              Member Status                        Tagged File Status
      ID Hostname               State Rolled    Running with   On Next Boot

       1 member01.site.place.net  UP    Yes      No             No
    ```

    _____ **Note** _____

    This output incorrectly indicates `patch kit source` rather than `nhd kit source`. The source information (in this example, `/mnt`) is correct, the label is in error.

    _____

3.3.3.5 Postinstall Stage

1. On the lead member, use the `clu_upgrade` command to start the Postinstall Stage:

    # **clu_upgrade -v postinstall**

    You see the following messages:

    ```
    Retrieving cluster upgrade status.

    This is the cluster upgrade program.
    You have indicated that you want to perform the 'postinstall' stage of the
    upgrade.

    Do you want to continue to upgrade the cluster? [yes]:
    ```

2. Enter **yes** and press Return. You see the following messages:

    ```
    Marking stage 'postinstall' as 'started'.
    Marking stage 'postinstall' as 'completed'.

    The 'postinstall' stage of the upgrade has completed successfully.
    ```

3. Use the `clu_upgrade` command to check the installation status:

   # **clu_upgrade -v**

   You see messages similar to the following:

```
Retrieving cluster upgrade status.
             Upgrade Status

Stage        Status              Date

setup        started:            Thu Jun 20 16:50:43 EDT 2002
             lead member:        1
             patch kit source:   /mnt
             completed:          Thu Jun 20 16:52:34 EDT 2002

preinstall   started:            Thu Jun 20 16:54:46 EDT 2002
             completed:          Thu Jun 20 16:55:16 EDT 2002

nhd          started:            Thu Jun 20 16:55:57 EDT 2002
             completed:          Thu Jun 20 16:57:42 EDT 2002

postinstall  started:            Thu Jun 20 16:58:28 EDT 2002
             completed:          Thu Jun 20 16:58:28 EDT 2002

roll         started:            Thu Jun 20 16:58:29 EDT 2002
             members rolled:     1
             completed:          Thu Jun 20 16:58:29 EDT 2002

             Member Status                      Tagged File Status
   ID Hostname                 State Rolled    Running with   On Next Boot

    1 member01.site.place.net  UP    Yes       No             No
   10 member10.site.place.net  UP    No        Yes            Yes
```

   _____ **Note** _____

   This output incorrectly indicates `patch kit source` rather
   than `nhd kit source`. The source information (in this
   example, `/mnt`) is correct, the label is in error.

   _____

3.3.3.6 Roll Stage

Before running the Roll Stage, see the *Rolling Upgrade* chapter in the Tru64
UNIX *Cluster Installation* manual.

Perform the following steps for each additional cluster member:

1. Log in to the cluster member as `root`.

2. Shut down the cluster member. For example:

   # **shutdown -h now**

3. At the console prompt, boot the cluster member to single-user mode.
    For example:

    >>> **boot -fl s**

4. Use the init s command to initialize process control. For example:

    # **init s**

5. Use the bcheckrc command to mount and check local file systems.
    For example:

    # **bcheckrc**

    You see output similar to the following:

    ```
    Checking device naming:
        Passed.
    CNX QDISK: Successfully claimed quorum disk, adding 1 vote.
    Checking local filesystems
    Mounting / (root)
    user_cfg_pt: reconfigured
    root_mounted_rw: reconfigured
    Mounting /cluster/members/member57/boot_partition (boot file system)
    user_cfg_pt: reconfigured
    root_mounted_rw: reconfigured
    user_cfg_pt: reconfigured
    dsfmgr: NOTE: updating kernel basenames for system at /
        scp kevm tty00 tty01 lp0 dsk3 dsk4 dsk5 dsk6 dsk7 dsk8 floppy1 cdrom1 dmapi
    Mounting local filesystems
    exec: /sbin/mount_advfs -F 0x14000 cluster_root#root /
    cluster_root#root on / type advfs (rw)
    exec: /sbin/mount_advfs -F 0x4000 cluster_usr#usr /usr
    cluster_usr#usr on /usr: Device busy
    exec: /sbin/mount_advfs -F 0x4000 cluster_var#var /var
    cluster_var#var on /var: Device busy
    /proc on /proc type procfs (rw)
    ```

6. Use the lmf reset command to copy license information into the
    kernel cache. For example:

    # **lmf reset**

7. Use the clu_upgrade command to start the Roll Stage:

    # **clu_upgrade -v roll**

    You see messages similar to the following:

    ```
    This is the cluster upgrade program.
    You have indicated that you want to perform the 'roll' stage of the
    upgrade.

    Do you want to continue to upgrade the cluster? [yes]:
    ```

8. Enter **yes** and press Return.

_____ **Note** _____

You may see the following message during this step:

```
clubase: Entry not found in /cluster/admin/tmp/stanza.stdin.530756
```

This is a known error and can be ignored.

You also may see messages similar to the following:

```
*** Warning ***
The cluster upgrade command was unable to find or verify the configuration
file used to build this member's kernel. clu_upgrade attempts to make a
backup copy of the configuration file which it would restore as required
during a clu_upgrade undo command. To use the default configuration file
or to continue without backing up a configuration file hit return.
Enter the name of the configuration file for this member [SYSNAME]:
```

Press Return to use *SYSNAME* as the configuration file name.

_____

You see messages similar to the following:

```
Backing up member-specific data for member: 10

The 'roll' stage has completed successfully.  This
member must be rebooted in order to run with the newly installed software.
Do you want to reboot this member at this time? []:
```

9. Enter **y** and press Return. You see the following message:

```
You indicated that you want to reboot this member at this time.
Is that correct? [yes]:
```

10. Enter **y** and press Return. You see messages similar to the following:

```
The 'roll' stage of the upgrade has completed successfully.
Terminated
# syncing disks... done
drd: Clean Shutdown
rebooting.... (transferring to monitor)
```

The cluster member reboots and reconfigures.

11. Use the clu_upgrade command to check the installation status:

```
# clu_upgrade -v
```

You see messages similar to the following:

```
Retrieving cluster upgrade status.
          Upgrade Status

Stage        Status               Date

setup        started:             Thu Jun 20 16:40:07 EDT 2002
             lead member:         1
             patch kit source:    /var/adm
             tagged files list:   /cluster/admin/clu_upgrade/tag_files.list
             tagged files missing: /cluster/admin/clu_upgrade/tag_files.miss
```

```
             completed:           Thu Jun 20 16:42:48 EDT 2002

preinstall   started:             Thu Jun 20 16:51:09 EDT 2002
             completed:           Thu Jun 20 16:52:32 EDT 2002

nhd          started:             Thu Jun 20 16:54:49 EDT 2002
             completed:           Thu Jun 20 16:58:08 EDT 2002

postinstall  started:             Thu Jun 20 17:18:12 EDT 2002
             completed:           Thu Jun 20 17:18:12 EDT 2002

roll         started:             Thu Jun 20 17:22:24 EDT 2002
             members rolled:      1 10
             completed:           Thu Jun 20 17:32:42 EDT 2002

            Member Status                     Tagged File Status
  ID Hostname               State Rolled    Running with   On Next Boot

   1 member01.site.place.net UP    Yes       No             No
  10 member10.site.place.net UP    Yes       No             No
```

_____ **Note** _____

This output incorrectly indicates patch kit source rather
than nhd kit source. The source information (in this
example, /mnt) is correct, the label is in error.

_____

Repeat this process for each remaining cluster member.

3.3.3.7 Switch Stage

1. After the Roll Stage is complete, use the clu_upgrade command to
   start the Switch Stage on any cluster member:

   # **clu_upgrade -v switch**

   You see the following messages:

   ```
   Retrieving cluster upgrade status.

   This is the cluster upgrade program.
   You have indicated that you want to perform the 'switch' stage of the
   upgrade.

   Do you want to continue to upgrade the cluster? [yes]:
   ```

2. Enter **yes** and press Return. You see the following messages:

   ```
   Initiating version switch on cluster members
   .Marking stage 'switch' as 'started'.
   Switch already switched

   Marking stage 'switch' as 'completed'.
   The cluster upgrade 'switch' stage has completed successfully.
   All cluster members must be rebooted before running the 'clean' command.

   The 'switch' stage of the upgrade has completed successfully.
   ```

3. After you complete the Switch Stage, reboot all cluster members. After each member reboots, you see the login prompt.

4. Log in to the system as `root`.

5. Use the `clu_upgrade` command to check the installation status:

    ```
    # clu_upgrade -v
    ```

    You see messages similar to the following:

    ```
    Retrieving cluster upgrade status.
                Upgrade Status

    Stage          Status                  Date

    setup          started:                Thu Jun 20 16:40:07 EDT 2002
                   lead member:            1
                   patch kit source:       /var/adm
                   tagged files list:      /cluster/admin/clu_upgrade/tag_files.list
                   tagged files missing:   /cluster/admin/clu_upgrade/tag_files.miss
                   completed:              Thu Jun 20 16:42:48 EDT 2002

    preinstall     started:                Thu Jun 20 16:51:09 EDT 2002
                   completed:              Thu Jun 20 16:52:32 EDT 2002

    nhd            started:                Thu Jun 20 16:54:49 EDT 2002
                   completed:              Thu Jun 20 16:58:08 EDT 2002

    postinstall    started:                Thu Jun 20 17:18:12 EDT 2002
                   completed:              Thu Jun 20 17:18:12 EDT 2002

    roll           started:                Thu Jun 20 17:22:24 EDT 2002
                   members rolled:         1 10
                   completed:              Thu Jun 20 17:32:42 EDT 2002

    switch         started:                Thu Jun 20 16:37:50 EDT 2002
                   completed:              Thu Jun 20 16:38:20 EDT 2002

               Member Status                        Tagged File Status
      ID Hostname               State Rolled    Running with   On Next Boot

       1 member01.site.place.net  UP    Yes       No             No
    ```

    _____ **Note** _____

    This output incorrectly indicates `patch kit source` rather
    than `nhd kit source`. The source information (in this
    example, `/mnt`) is correct, the label is in error.

    _____

3.3.3.8 Clean Stage

1. After the Switch Stage is complete, use the `clu_upgrade` command to start the Clean Stage on any cluster member:

   # **clu_upgrade -v clean**

   You see the following messages:

   ```
   Retrieving cluster upgrade status.

   This is the cluster upgrade program.
   You have indicated that you want to perform the 'clean' stage of the
   upgrade.

   Do you want to continue to upgrade the cluster? [yes]:
   ```

2. Enter **yes** and press Return. You see the following messages:

   ```
   .Marking stage 'clean' as 'started'.

   Deleting tagged files.
   ....
   Removing back-up and kit files

   Marking stage 'clean' as 'completed'.

   The 'clean' stage of the upgrade has completed successfully.
   ```

3. Use the `clu_upgrade` command to check the installation status:

   # **clu_upgrade -v**

   You see messages similar to the following:

   ```
   Retrieving cluster upgrade status.
   There is currently no cluster upgrade in progress.

   The last cluster upgrade completed succesfully on:
     Thu Jun 20 17:05:25 EDT 2002
   History for this upgrade can be found in the directory:
     /cluster/admin/clu_upgrade/history/Compaq.Tru64.UNIX.V5.1A.Rev.1885-1
   ```

   _____ **Caution** _____

   When you install NHD-5, you also must install the most current Version 5.1A patch kit before you return your system to production. It does not matter which one you install first.

   Tru64 UNIX Version 5.1A patch kits are available on the World Wide Web at the following URL:

   http://ftp.support.compaq.com/public/unix/v5.1a/

   _____

3.3.4 Installing on a Cluster During Full Installation of Version 5.1A

Before you start this procedure, see the *clu_upgrade Quick Reference* Best
Practice and the Tru64 UNIX *Cluster Installation* manual for information
about creating a cluster. You must have the NHD-5 kit distribution, the
Version 5.1A *Base Operating System* CD, and the *Associated Products
Volume 2* CD that includes the Version 5.1B TruCluster Server software.

_____ **Caution** _____

Before you install NHD-5 onto a system that includes SA5300A
series RAID controllers, see the release notes in Section 2.6.
Failure to follow these instructions can cause your NHD-5
installation to fail.

_____

Follow these steps to install NHD-5 on a new cluster during a Full
Installation:

1. Install NHD-5 during a Full Installation on the system that will be the
   first cluster member, as described in Section 3.3.2.

2. Load the Version 5.1A *Associated Products Volume 2* CD into the CD
   drive.

3. Mount the *Associated Products Volume 2* CD. For example:

   # **mount /dev/disk/cdrom0a /mnt**

4. Use the setld -l command to load the TruCluster Server software:

   # **setld -l /mnt/TruCluster/kit**

   You see output similar to the following:

   ```
   *** Enter subset selections ***

   The following subsets are mandatory and will be installed automatically
   unless you choose to exit without installing any subsets:

        * TruCluster Base Components

   The subsets listed below are optional:

        There may be more optional subsets than can be presented on a single
        screen. If this is the case, you can choose subsets screen by screen
        or all at once on the last screen. All of the choices you make will
        be collected for your confirmation before any subsets are installed.

    - TruCluster(TM) Software :
        1) TruCluster Migration Components
        2) TruCluster Reference Pages

   Estimated free diskspace(MB) in root:269.2 usr:18175.4 var:18665.0

   Choices (for example, 1 2 4-6):
   ```

```
Or you may choose one of the following options:

      3) ALL mandatory and all optional subsets
      4) MANDATORY subsets only
      5) CANCEL selections and redisplay menus
      6) EXIT without installing any subsets

Estimated free diskspace(MB) in root:269.2 usr:18175.4 var:18665.0

Enter your choices or press RETURN to redisplay menus.

Choices (for example, 1 2 4-6):
```

5. Enter **3** to select all mandatory and optional subsets. You see output
    similar to the following:

```
You are installing the following mandatory subsets:

        TruCluster Base Components

You are installing the following optional subsets:

 - TruCluster(TM) Software :
        TruCluster Migration Components
        TruCluster Reference Pages

Estimated free diskspace(MB) in root:269.2 usr:18173.6 var:18665.0

Is this correct? (y/n):
```

6. Enter **y** to confirm your selection. You see output similar to the
    following:

```
Checking file system space required to install selected subsets:

File system space checked OK.

3 subsets will be installed.

Loading subset 1 of 3 ...

TruCluster Migration Components
   Copying from /mnt/TruCluster/kit (disk)
   Verifying

Loading subset 2 of 3 ...

TruCluster Reference Pages
   Copying from /mnt/TruCluster/kit (disk)
   Verifying

Loading subset 3 of 3 ...

TruCluster Base Components
   Copying from /mnt/TruCluster/kit (disk)
   Verifying
```

```
3 of 3 subsets installed successfully.

Configuring "TruCluster Migration Components" (TCRMIGRATE520)

Configuring "TruCluster Reference Pages" (TCRMAN520)
Running : /usr/lbin/mkwhatis : in the background...

Configuring "TruCluster Base Components" (TCRBASE520)

Use /usr/sbin/clu_create to create a cluster.
```

7. Change to the root directory and unmount the *Associated Products Volume 2* CD:

    # **cd /**
    # **umount /mnt**

8. Remove the *Associated Products Volume 2* CD and load the *New Hardware Delivery* CD.

9. Mount the NHD-5 kit. For example:

    # **mount /dev/disk/cdrom0a /mnt**

10. Change directory to the mounted NHD-5 kit. For example:

    # **cd /mnt**

11. Enter the following command to install the NHD cluster kit:

    # **./install_nhd -install_cluster**

    You see output similar to the following:

    ```
    Checking file system space required to install specified subsets:

    File system space checked OK.

    1 subsets will be installed.

    Loading subset 1 of 1 ...

    New Hardware TruCluster(TM) Support V4.0
       Copying from /mnt/520/kit (disk)
            Working....Thu Jun 20 18:16:41 EDT 2002
       Verifying

    1 of 1 subsets installed successfully.

    Configuring "New Hardware TruCluster(TM) Support V4.0" (OSHTCRBASE520)

    The installation of the New Hardware TruCluster(TM) Support V4.0 (OSHTCRBASE520)
    software subset is complete.
    ```

12. After installing the NHD cluster kit, use the `clu_create` command to create a single-member cluster as described in the Tru64 UNIX *Cluster Installation* manual.

13. Add additional cluster members as needed. See the Tru64 UNIX *Cluster Installation* manual.

_____ **Caution** _____

When you install NHD-5, you also must install the most current Version 5.1A patch kit before you return your system to production. It does not matter which one you install first.

Tru64 UNIX Version 5.1A patch kits are available on the World Wide Web at the following URL:

`http://ftp.support.compaq.com/public/unix/v5.1a/`

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