

DECnet-ULTRIX

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Installation

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DECnet-ULTRIX

Installation

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This manual shows you step by step how to install your DECnet-ULTRIX software and how to configure and test your node's operation in the network.

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Software Version:	DECnet-ULTRIX V4.0

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Preface

This manual explains how to install DECnet-ULTRIX V4.0 software on any ULTRIX V4.0 system.

Using this manual, you can determine which type of installation procedure to use and which software subsets to install. The examples lead you step by step through the installation procedures.

This manual also tells you how to configure both the server and the system to run the optional DECnet-Internet Gateway software.

Finally, you learn how to verify that your node is running properly on the network.

Intended Audience

This manual is for the user who is either installing DECnet-ULTRIX software onto a running ULTRIX V4.0 system or testing a new DECnet-ULTRIX node in the network. Ideally, the person who installs the software has had system administration experience. Be aware that most of the procedures described in this manual require superuser privileges.

Structure of This Manual

This manual contains four chapters and an appendix:

- | | |
|------------|---|
| Chapter 1 | Reviews the four questions you must answer before you begin the DECnet-ULTRIX installation: Has DECnet been configured into the kernel yet? Have you used LMF to register your DECnet-ULTRIX V4.0 software license? Are you installing DECnet-ULTRIX onto a node or into a diskless environment? Which software subsets do you want to install? |
| Chapter 2 | Explains how to install DECnet-ULTRIX software onto a node. |
| Chapter 3 | Explains how to install DECnet-ULTRIX for a client to use in a diskless environment. |
| Chapter 4 | Describes how to check the node's operation on the network. |
| Appendix A | Lists all files that the DECnet-ULTRIX installation procedure copies to your system. |

Related Documents

For more information about DECnet-ULTRIX software, see the following documents:

- *DECnet-ULTRIX Release Notes*
This document contains miscellaneous information and updates not included in other books in the DECnet-ULTRIX documentation set.
- *DECnet-ULTRIX DECnet-Internet Gateway Use and Management*
This manual describes how to use and manage the DECnet-Internet Gateway.
- *DECnet-ULTRIX Programming*
This manual explains application programming concepts and guidelines to use in the DECnet-ULTRIX environment. The manual also describes DECnet-ULTRIX system calls and subroutines and shows DECnet-ULTRIX data structures and programming examples.
- *DECnet-ULTRIX Network Management*
This manual describes procedures for managing the network, such as defining the permanent and volatile databases, node identifications and addresses, and lines and circuits; enabling event logging; displaying network counter information; operating and controlling a DECnet-ULTRIX node; and testing the network operation.
- *DECnet-ULTRIX NCP Command Reference*
This manual tells network managers how to use the Network Control Program (ncp) to perform network management functions.

To obtain a detailed description of the Digital Network Architecture, see *DECnet Digital Network Architecture (Phase IV), General Description*.

For a detailed description of the License Management Facility (LMF), see *Guide to Software Licensing*.

For a beginner's introduction to the ULTRIX operating system, see *The Little Gray Book: An ULTRIX Primer*.

Graphic Conventions

This manual uses the following conventions:

- All numbers are decimal unless otherwise noted.
- All Ethernet addresses are hexadecimal.

Convention	Meaning
special	In running text, commands, command options, user names, file names, and directory names appear in special type.
example	Indicates an example of system output or user input. System output is in black type; user input is in red type.

Convention	Meaning
lowercase/UPPERCASE	Because the ULTRIX software is case sensitive, type all literal input in the case shown. In running text, UPPER CASE is also used for the names of all DECnet nodes, including DECnet-ULTRIX nodes. This convention follows DECnet protocol, which names and recognizes all nodes in UPPER CASE. However, node names are not case sensitive and need not be typed in the case shown.
<i>italic</i>	Indicates a variable, for which either you or the system specifies a value.
[]	Within the installation procedure, indicates the default value. Do not type the square brackets.
<u>key</u>	Indicates a key on your keyboard. <u>CTRL/key</u> represents a CONTROL key sequence, where you press the CONTROL key at the same time as the specified key. Note that keyboard keys are represented by this symbol, <key>, on line.
<u>RET</u>	Indicates the RETURN key.



Before You Start

Using this manual, you can install DECnet-ULTRIX V4.0 software onto VAX or RISC systems. There are only three differences between the two types of installations:

- The ULTRIX and DECnet-ULTRIX software subset names begin with a three-letter prefix, which indicates whether the subset is for a VAX or RISC system, as follows:

System Type	DECnet-ULTRIX Subset Names Prefix	ULTRIX Subset Names Prefix
VAX	DNU	ULT
RISC	DNP	UDT

- The DECnet-ULTRIX configuration files are named according to the type of system you have, as follows:

System Type	Configuration File Name
VAX	<i>/sys/conf/VAX/HOSTNAME</i>
RISC	<i>/sys/conf/mips/HOSTNAME</i>

- The amount of memory needed to install DECnet-ULTRIX software onto VAX and RISC systems differs. (Tables 2-1 and 3-1 list the installation requirements.)

Before you start the DECnet-ULTRIX installation procedure, answer the following questions:

- Has DECnet been configured into the kernel already? See Section 1.1.
- Have you already used the License Management Facility (LMF) to register your DECnet-ULTRIX V4.0 software license? See Section 1.2.
- Which of the two types of installation procedures do you want to use: the DECnet-ULTRIX basic installation or the DECnet-ULTRIX diskless environment installation? See Section 1.3.
- Which software subsets do you want to install: the DECnet-ULTRIX Base Software, the DECnet-Internet Gateway, the DECnet-ULTRIX On-Line Manual Pages, or the DECnet-ULTRIX Unsupported Software? See Section 1.4.

Section 1.5 explains how to use this manual.

1.1 Checking Whether DECnet Is Already Configured

Before you begin the DECnet-ULTRIX installation, check to see whether DECnet has already been configured in the ULTRIX kernel. You can install and configure DECnet-ULTRIX without configuring DECnet in the kernel; however, to run DECnet-ULTRIX, DECnet must be so configured.

The installation procedure automatically checks whether DECnet is already configured in the kernel. If DECnet is not configured, a message tells you to rebuild the kernel after the configuration is complete.

To see whether DECnet is already configured into the kernel before you start the DECnet-ULTRIX installation, enter this command:

```
% nm /vmunix | fgrep -s nsp_usrreq && echo yes RET
```

If the system displays **yes**, then DECnet is already configured. If not, configure DECnet in the kernel. You can rebuild the kernel now or after the installation and configuration are complete. (To add DECnet to the kernel, specify "options DECNET" and "pseudo-device decnet" in the appropriate configuration file and rebuild the kernel.)

1.2 Registering Your Software Before Installation

Use the ULTRIX LMF utility to register your software license for DECnet-ULTRIX V4.0. You must register your software license before you can perform any remote access. Use the information from your Product Authorization Key (PAK) to register your software.

Register and load your authorization key before you begin the DECnet-ULTRIX installation procedure. If you do not register beforehand the installation procedure reminds you to do so as soon as the installation is complete.

The License Management Facility (LMF) is a system management software tool that you use to comply with your license agreement. The LMF utility offers options for many kinds of license agreements. The terms and conditions of your contract determine your legal use of this software.

The LMF does the following:

- Maintains the file of registered PAKs (Product Authorization Keys)
- Updates the kernel cache
- Maintains a library of functions used by licensed software

NOTE

You need superuser privileges to use the LMF utility.

The *Guide to Software Licensing* introduces the LMF utility and describes how you use it. You can also refer to the LMF man page, `lmf(8)`, for information.

1.3 Choosing the Installation Procedure

How you plan to use DECnet-ULTRIX (on a node with a disk or in a diskless environment) determines which installation procedure you choose. In a diskless environment, diskless client nodes can use DECnet-ULTRIX.

- If you are installing DECnet-ULTRIX onto a node that has its own disk but does not support clients, use the DECnet-ULTRIX basic installation procedure described in Chapter 2.
- If you are installing DECnet-ULTRIX for a client to use in a diskless environment, use the installation procedure described in Chapter 3.
- If you are installing DECnet-ULTRIX onto a server node for the server's own use, use the basic installation procedure described in Chapter 2. You can perform this procedure even if you have already installed DECnet-ULTRIX into a diskless environment on the server.

1.4 Deciding Which Software Subsets to Install

Before you begin the installation, decide which subsets you want to install. The DECnet-ULTRIX software distribution media contains the following subsets:

- DECnet-ULTRIX Base Software
- DECnet-Internet Gateway
- DECnet-ULTRIX On-Line Manual Pages
- DECnet-ULTRIX Unsupported Software

Use the descriptions in Table 1-1 to determine which subsets to install. Tables 2-1 and 3-1 describe the software installation requirements for each subset.

Table 1-1: Summary of the DECnet-ULTRIX Software Subsets

Subset	DECnet-ULTRIX Base Software	DECnet-Internet Gateway	DECnet-ULTRIX On-Line Manual Pages	DECnet-ULTRIX Unsupported Software
Function	Provides the DECnet-ULTRIX functions that let you share information with remote DECnet users and programs over the network. Also required to install the DECnet-Internet Gateway.	Lets UNIX users on Internet networks and DECnet users exchange data. To set up your ULTRIX node to act as a DECnet-Internet Gateway, install the Gateway software.	Is an on-line reference manual. Gives the syntax, description, diagnostic messages, restrictions, and examples for DECnet-ULTRIX commands, system calls, and subroutines.	Contains utilities and sample programs that Digital Equipment Corporation supplies on an "as-is" basis for general customer use. However, Digital neither supports these utilities nor covers them under any Digital support contracts.
Subset For VAX Systems	DNUBASE400	DNUINETGW400	DNUMAN400	DNUUNS400
Subset For RISC Systems	DNPBASE400	DNPINETGW400	DNPMAN400	DNPUNS400

1.5 How to Use This Manual

This manual discusses the two kinds of installations you can perform in a separate chapter. Chapter 2 guides you through a DECnet-ULTRIX basic installation, and Chapter 3, a DECnet-ULTRIX diskless installation. Before you start an installation, make sure you meet the requirements shown at the beginning of the respective chapter. To check your progress during installation, see the examples in the chapter. For a complete list of the files that the installation procedure copies to your system, see Appendix A.

To make sure your node is operating on the network, follow the test procedures described in Chapter 4. The checkout procedures verify that your node can communicate with itself and other nodes on the network.

Installing DECnet-ULTRIX onto a Node

This chapter tells you how to install DECnet-ULTRIX onto a node, including:

- What to do first
- How to install the software
- How to delete the installed software
- How to restart the installation
- How to correct installation errors
- How to verify the installation

Before you start the installation, make sure you meet the requirements outlined in the next section.

2.1 DECnet-ULTRIX Basic Installation Requirements

For any DECnet-ULTRIX installation, you need superuser privileges. To install DECnet-ULTRIX onto a node, you must also meet the requirements in Table 2-1.

Table 2-1: DECnet-ULTRIX Basic Installation Requirements

Software Subset	Requirements	
	For VAX Systems	For RISC Systems
DECnet-ULTRIX Base Software		
DECnet-ULTRIX V4.0 Distribution media or network kit	1 1600-bpi nine-track magnetic tape, CDROM, or 1 TK50 cartridge	1 1600-bpi nine-track magnetic tape, CDROM, or 1 TK50 cartridge
Operating system	ULTRIX V4.0	ULTRIX V4.0
Installed software	ULTRIX V4.0 Base Software (ULTBASE400) ULTRIX V4.0 Kernel Configuration Files (ULTBIN400)	ULTRIX V4.0 Base Software (UDTBASE400) ULTRIX V4.0 Kernel Configuration Files (UDTBIN400)
Privileges	Superuser	Superuser
Disk space during installation	1750 kilobytes (KB) in /usr + 15 KB in the root file system	2730 KB in /usr + 15 KB in the root file system
Disk space after installation	Same as during installation	Same as during installation
Storage device on a MicroVAX	1 RD53 disk or equivalent	
Estimated time	10 to 30 minutes	10 to 30 minutes
DECnet-Internet Gateway Additional Requirements		
Installed software	DECnet-ULTRIX V4.0 Base Software (DNUBASE400) ULTRIX V4.0 Communications Utilities (ULTCOMM400)	DECnet-ULTRIX V4.0 Base Software (DNPBASE400) ULTRIX V4.0 Communications Utilities (UDTCOMM400)
Disk space	205 KB in /usr	340 KB in /usr
Estimated time	5 to 10 minutes	5 to 10 minutes
DECnet On-Line Manual Pages Additional Requirements		
Installed software	DECnet-ULTRIX V4.0 Base Software (DNUBASE400) ULTRIX V4.0 On-Line Manual Pages (ULTMAN400)	DECnet-ULTRIX V4.0 Base Software (DNPBASE400) ULTRIX V4.0 On-Line Manual Pages (UDTMAN400)
Disk space	135 KB in /usr/man	135 KB in /usr/man
Estimated time	5 minutes	5 minutes
DECnet-ULTRIX Unsupported Software Additional Requirements		
Installed software	DECnet-ULTRIX V4.0 Base Software (DNUBASE400)	DECnet-ULTRIX V4.0 Base Software (DNPBASE400)
Disk space	370 KB in /usr	535 KB in /usr
Estimated time	5 minutes	5 minutes

Before you install DECnet-ULTRIX:

1. Make sure you have enough free disk space to install the software subsets of your choice. To check the available disk space in /usr and root (/), enter the commands:

```
# df /usr [RET]
# df / [RET]
```

2. Make a backup copy of your system disk.
3. If you are using the distribution media to install the software, make sure that you have a complete distribution kit. Each DECnet-ULTRIX distribution kit consists of one or more volumes of software and a set of documentation. The Bill of Materials (BOM) included in the kit specifies its contents. Compare the items in the kit against those listed in the BOM.

If you are using an Internet network kit to install DECnet-ULTRIX, see the *ULTRIX Remote Installation Service* for requirements. The Internet network kit lets you install the software subsets on MicroVAX, VAXstation, and DECstation 3100 products over the network.

4. Make sure you have a guest account in your system password file. The guest account enables you to use DECnet-ULTRIX features without supplying access control information. The default user account for DECnet-supplied objects and the Gateway is defined as **guest**.

To define a guest account, log in as superuser and enter the **adduser** command. When the command prompts you for the login name of the new user, enter the name **guest** in lowercase. For example:

```
# adduser [RET]
```

```
Enter login name for new user (initials, first or last
name): guest [RET]
```

The **adduser** command then prompts you for information about the new user. For further instructions on using **adduser** to create a new account, see the *Guide to System Environment Setup* in your ULTRIX documentation set.

After setting up the guest account, use the ULTRIX **vipw** command to enter the string **NoLogin** in the password field. Otherwise, you will have a **guest** account with no password.

5. Check if you are currently running DECnet. To do so, enter this command:

```
# ncp show executor [RET]
```

If the system display includes "State = On," then DECnet is running. Turn DECnet off by entering the following command:

```
# ncp set executor state off [RET]
```

6. The DECnet installation procedure uses one of the following configuration files:
 - **/sys/conf/vax/HOSTNAME**, if you are installing DECnet-ULTRIX onto a VAX system.
 - **/sys/conf/mips/HOSTNAME**, if you are installing DECnet-ULTRIX onto a RISC system.

For the variable **HOSTNAME**, enter the name of your host in uppercase letters. Make sure that the communication device names and other information in this configuration file are current.

7. Make sure that you know this information about your node:

- Node name
- Node address
- DECnet node identification
- Device name

2.2 Installing or Reinstalling DECnet-ULTRIX

You can use either the DECnet-ULTRIX software distribution media or an Internet network kit to install DECnet-ULTRIX onto a node. Refer to the *ULTRIX Remote Installation Service* and *ris(8)* in the *ULTRIX Reference Pages, Section 8*, for information about setting up a network kit.

To start the installation script, first use `cd` to change the working directory to root. Then enter the ULTRIX `setld(8)` (set load) command.

The `setld` command requires different options, depending on whether you are installing the software for the first time or reinstalling it. Tables 2-2 and 2-3 summarize these options, and the next sections explain them in more detail.

Table 2-2: Commands to Install DECnet-ULTRIX for the First Time

From the distribution media:	<code>setld -l /dev/device</code>
From a network kit:	<code>setld -l hostname:</code>
From disk or CDROM:	<code>setld -l /mount_point</code>

Table 2-3: Commands to Reinstall DECnet-ULTRIX

From the distribution media:	<code>setld -d subset [...]</code> <code>setld -l /dev/device subset [...]</code>
From a network kit:	<code>setld -d subset [...]</code> <code>setld -l hostname: subset [...]</code>
From disk or CDROM:	<code>setld -d subset [...]</code> <code>setld -l /mount_point subset [...]</code>

2.2.1 Installing DECnet-ULTRIX for the First Time

- If you are using the distribution media to install the software for the first time, use the following `setld` format:

```
setld -l /dev/device
```

where

`device` is the name of the device where you mount the distribution media.

For example:

```
# cd / [RET]
# /etc/setld -l /dev/rmt0h [RET]
```

- If you are using a network kit over an Internet network to install the software for the first time, use this `setld` format:

```
setld -l hostname:
```

where

hostname is the name of the host from which you are loading the software.

2.2.2 Reinstalling DECnet-ULTRIX

If you are reinstalling DECnet-ULTRIX, use `setld` with the `-d` option to delete the product before installing it again. Then, restart the installation and specify the DECnet-ULTRIX subsets you wish to reinstall using `setld` with the `-l` option.

For a more detailed explanation on how to use `setld` with the `-d` and `-l` options, see Sections 2.8 and 2.9.

For more information about `setld(8)`, see the *ULTRIX Guide to System Environment Setup*.

2.3 Mounting the Distribution Media

If you are installing DECnet-ULTRIX from the distribution media, the installation script tells you to make sure the media is mounted. The script then asks if you are ready. When you have mounted the media, type `y` (yes) to answer the question.

If you are installing the software from a CDROM disk, specify the mount point of the disk. The DECnet kit is located in the `c` partition under the `/VAX/DECNET` and `/RISC/DECNET` subdirectories. Mount this partition before starting the installation. For example, if your CDROM is in drive `rz1` and the mount point `/mnt` is free, you would enter the following commands:

- If you are installing DECnet-ULTRIX onto a VAX system:

```
# mount /dev/rz1c /mnt [RET]
# setld -l /mnt/VAX/DECNET [RET]
```

- If you are installing DECnet-ULTRIX onto a RISC system:

```
# mount /dev/rz1c /mnt [RET]
# setld -l /mnt/RISC/DECNET [RET]
```

2.4 Selecting the Software Subsets

If you are reinstalling DECnet-ULTRIX, skip this section and go to Section 2.5.

If you are installing DECnet-ULTRIX for the first time, the script asks you to choose the software subsets that you want to install. Select the DECnet-ULTRIX Base Software and any of the optional subsets:

*** ENTER SUBSET SELECTIONS ***

The subsets listed below are optional:

- | | |
|------------------------------------|---------------------------------------|
| 1) DECnet-ULTRIX Base Software | 2) DECnet-Internet Gateway |
| 3) DECnet On-Line Manual Pages | 4) DECnet-ULTRIX Unsupported Software |
| 5) All of the above | |
| 6) None of the above | |
| 7) Exit without installing subsets | |

Enter your choice(s):

Type the numbers of the options that you want to install. If you type more than one number, separate each number with a space, not a comma. Next, the script allows you to verify your choice. For example:

You are installing the following subsets:

DECnet-ULTRIX Base Software	DECnet-Internet Gateway
DECnet On-line Manual Pages	DECnet-ULTRIX Unsupported Software

Is this correct (y/n)?

If you chose the wrong options, type **n** to indicate that the subsets are not correct; the subset menu redisplay, and you can reselect your subsets. If you chose the correct options, type **y**.

2.5 Copying the DECnet-ULTRIX Software

If you have not turned off DECnet, the installation script turns it off. The system copies the software subsets to your disk and verifies them. If you are installing more than one subset, the system copies and verifies the Base Software before the Gateway or DECnet On-line Manual Pages software.

In this example, the script displays the following messages as it copies all the software subsets onto a VAX system:

```
Copying DECnet-ULTRIX Base Software (DNUBASE400) from media
Verifying DECnet-ULTRIX Base Software (DNUBASE400)
```

```
Copying DECnet-Internet Gateway (DNUINETGW400) from media
Verifying DECnet-Internet Gateway (DNUINETGW400)
```

```
Copying DECnet On-line Manual Pages (DNUMAN400) from media
Verifying DECnet On-line Manual Pages (DNUMAN400)
```

```
Copying DECnet-ULTRIX Unsupported Software (DNUUNS400) from media
Verifying DECnet-ULTRIX Unsupported Software (DNUUNS400)
```

NOTE

If you are installing DECnet-ULTRIX onto a RISC system, the prefix **DNP**, rather than **DNU**, appears in the subsets.

If verification fails, look in `/usr/var/adm/fverifylog` and `/etc/setldlog` for information to help you correct the error. Make the correction and restart the installation by using the `setld` command with the `-l` option. See Section 2.9 for details.

2.6 Configuring the Node for DECnet-ULTRIX Base Software

To configure the node to run the DECnet-ULTRIX base software, the script prompts you for your node name, node address, DECnet node identification, and device name. If you need help responding to any of these prompts, type a question mark (?) and press **[RET]**.

If you type the wrong answer for any question, you can change it by typing **n** when asked to verify your answer. The procedure then redisplay the question so that you can enter the correct information.

The script begins the configuration by displaying these informational messages:

```
Configuring the node to run DECnet-ULTRIX V4.0 base software.
```

```
You will be asked a few questions during the DECnet-ULTRIX V4.0 configuration.
```

```
If you need more information to answer a question, you can type ? at the prompts, or consult the DECnet-ULTRIX Installation manual.
```

```
The DECnet library routines are now located in their own library, -ldnet.
```

If you have not registered your DECnet-ULTRIX license, the script displays this message:

```
*****      W A R N I N G      *****
*
* You have NOT registered the DECnet-ULTRIX License !!
* You will not be able to perform any remote access
* through DECnet-ULTRIX.
*
* In order to do remote access, use the lmf utility to
* register a licensed DECnet-ULTRIX PAK.
*
*****
```

```
[ Press the RETURN key to continue :]
```

This message is simply a reminder that you must register your DECnet-ULTRIX license after the installation and configuration are complete. You do not have to interrupt the configuration at this point.

The script then displays question 1:

```
The next question confirms that you are ready to configure your system to run DECnet at this time. To configure DECnet you need to know what your DECnet node name and address are. Also, if you want to configure your DECnet nodes database during this configuration process, you need to know the DECnet names and addresses of those nodes you wish to define.
```

```
If you answer n (no) to this question now, you are told how you can configure DECnet later.
```

```
1. Do you want to configure your system to run DECnet? (y/n) [y]:
```

To answer "yes," press **[RET]**. The script moves on to question 2.

If you do not wish to configure the system to run DECnet, answer "no" by typing **n**. The following message appears before you automatically exit the script:

```
You chose not to configure your system to run DECnet at this time. If you decide to configure DECnet later, issue the command:
```

```
setld -c DNUBASE400 INSTALL
```

If you are installing DECnet-ULTRIX onto a RISC system, the installation displays this command instead:

```
setld -c DNPBASE400 INSTALL
```

With question 2, the script prompts you for your DECnet node name.

2. What is your DECnet node name (1-6 chars)? []: *node*

Your node name is *node*

Is this correct? (y/n) [n]:

Enter a node name of 1 to 6 alphanumeric characters, including at least one alphabetic character. If possible, use the same node name that you specified as your Internet host name when you installed ULTRIX. Consult your DECnet network manager before choosing your node name and address. Respond by typing a **y** or **n**, as appropriate.

3. What is your DECnet node address (aa.nnnn)? []: *aa.nnnn*

Your node address is *aa.nnnn*

Is this correct? (y/n) [n]:

Your DECnet node address consists of an area number, a period, and a node number. The area number is a decimal integer from 1 to 63; the node number is a decimal number from 1 to 1023. Note that this address is different from your Internet host address. Respond by typing a **y** or **n**, as appropriate.

4. What is your DECnet Node Identification - string? (1-32 chars) []: *identification string*

Your node identification string is

identification string

Is this correct? (y/n) [n]:

Enter a string of 1 to 32 ASCII characters. You can include blanks but not shell metacharacters (! ? ' " *). The node identification string is a short message that appears next to the node ID in network management displays. Its purpose is to establish the node's identity on the network by indicating its type, use, users, or some other distinguishing feature. Respond by typing a **y** or **n**, as appropriate.

5. What is the name of the device on which you will be running the DECnet software (dev-c)? []: *dev-c*

The script asks question 5 only if it finds more than one DECnet-supported network device in the system configuration file. The name of the configuration file depends on the type of system (VAX or RISC) you have, as follows:

System Type	Configuration File Name
VAX	<i>/sys/conf/vax/HOSTNAME</i>
RISC	<i>/sys/conf/mips/HOSTNAME</i>

The variable *HOSTNAME* is the host name of your system in uppercase letters. The device name consists of three alphabetic characters, a dash, and an integer from 0 to 65535. Following is a list of the possible DECnet device names and ULTRIX equivalents:

DECnet Device Name	Equivalent ULTRIX Device Name
una-n	den
qna-n	qen
dmc-n	dmcn
dmv-n	dmvn
sva-n	lnn
bnt-n	nln
xna-n	xnan

2.6.1 Configuring the DECnet Nodes Database

Each node has a DECnet nodes database that may contain the following information:

- The DECnet names and addresses for the nodes on your DECnet network.
- The names, addresses, and down-line loading information for clients that you add to a diskless environment.

If any nodes or diskless clients are already defined in your database, the installation procedure keeps the database and displays this message:

```
A nodes database has been found on your system and will be retained.
If you wish to define new nodes, use the ncp define node command after
the installation is complete.
```

If the database does not exist, the installation procedure gives you the option of defining some DECnet nodes in the permanent nodes database. This message appears:

```
This part of the installation procedure builds your DECnet nodes database.
Questions 6 and 7 prompt you for a DECnet node and address for each node
that you want to define in the database.
```

Questions 6 and 7 will reoccur until you type <RET> at question 6.

If you plan to copy an existing database from another node, define that node when the script prompts you with questions 6 and 7. You add the node to your database so you can access it later to copy its nodes database. After the installation, you can use the `update_nodes -f node` command to copy the database. (The `update_nodes` command is an unsupported utility in the DECnet-ULTRIX Unsupported Software subset and documented in the *DECnet-ULTRIX Release Notes*.)

Questions 6 and 7 appear as follows:

```
6. Enter node name (1-6 chars or <RET> to continue): node RET
```

Enter a node name of 1 to 6 alphanumeric characters, including at least one alphabetic character.

```
7. Enter node's node address (aa.nnnn): aa.nnnn RET
```

The DECnet node address consists of an area number, a period, and a node number. The area number is a decimal integer from 1 to 63; the node number is a decimal number from 1 to 1023. Note that this address is different from the Internet host address.

If you enter a node name or address incorrectly, just reenter both the node name and address when the questions redisplay. The script deletes the error for you.

When you have finished entering the nodes in the database, press **RET** in response to question 6.

After installation, you can define nodes in the permanent database by using the **ncp define node** command. Also, you can delete node names and addresses by using the **ncp purge node** command. For more information, see the *DECnet-ULTRIX Network Management* manual and the *DECnet-ULTRIX NCP Command Reference*.

2.6.2 Modifying System Files

The installation procedure then modifies your system files. This generally takes no longer than 10 minutes.

Before the installation procedure edits any files, it saves each one in a file of the name:

```
filename.savn
```

where *n* is a version number that is incremented on each installation.

As the script modifies the files, it displays the following messages, as appropriate:

```
Modifying rc.local
Creating DECnet proxy file, /etc/dnet_proxy
Initializing DECnet database
```

After verifying that the system is operating properly with DECnet installed you may wish to remove the following saved file:

```
- /etc/rc.local.sav[n]
```

If a proxy file already exists on your system, the script does not display the message about creating a proxy file. For information about creating a proxy file, see the *DECnet-ULTRIX Network Management* manual.

If you have edited any system file to customize it prior to this installation, check the new file to make sure the modifications are compatible with your previous edits.

2.6.3 Preparing to Restart the Node

At this time, the installation procedure performs several checks and displays information messages as needed. Before you start DECnet on the node, you may need to make some final changes to your environment. For example:

- If DECnet is not already configured into your ULTRIX kernel, the script displays this message:

```
DECnet is not built into the currently running kernel. After
configuration, you should rebuild your kernel with DECnet and
then reboot to complete the installation.
```

This message is simply a reminder that you must rebuild the kernel when the configuration is complete. Do not interrupt the configuration to rebuild the kernel.

To add DECnet to the kernel, specify "options DECNET" and "pseudo-device decnet" in the appropriate configuration file and rebuild the kernel.

- If DECnet has already been configured into your kernel, the script reminds you to start DECnet:

```
8. Do you want to start DECnet now (y/n)? [y]:
```

Press **RET** or type **y** to answer "yes". If you answer "yes", the script automatically starts DECnet for you. If you answer "no", the script displays this message:

You can turn DECnet on manually by rebooting your system or by entering the following command:

```
/usr/bin/ncp set exec state on
```

- If you have a lat control program (lcp) command line in **/etc/rc.local**, the script displays this message:

A lat control program (lcp) command line was found in **/etc/rc.local**. When this procedure is finished, you should edit **rc.local** and move the lcp line(s) to follow the ncp command. If the lcp command precedes the ncp command, your lat terminal lines may not work properly.

- If you do not have a guest account in your system, the script displays this message:

There is no guest account in your system. If you wish to access this system from remote systems, you should have a guest account specified. A guest account is needed for the proper operation of **dlogind**, **dtermd**, and **dtr**.

You should set a password for this account to prevent unauthorized access to your system.

If you need instructions on how to create a new account, see the *ULTRIX Guide to System Environment Setup*.

- If you have not already registered your software license, the script displays this message:

Don't forget to register your DECnet-ULTRIX PAK (Product Authorization Key) using **lmf**. Otherwise you won't be able to access remote systems.

After you register your DECnet-ULTRIX PAK, you must either reboot or issue the following commands:

```
/usr/etc/lmf reset  
/usr/bin/ncp set exec state on
```

When you start DECnet, your system displays the following message:

Starting DECnet

Your system comes up with the executor and circuit states set to **ON**, as reported by the following event messages:

```
Event type 2.0, Local node state change  
Occurred 12-OCT-90 16:47:30.0 on node aa.nnnn (NODE)  
Operator commands  
Old state = off  
New state = on
```

```
Event type 4.10, Circuit up  
Occurred 12-OCT-80 16:47.32.0 on node aa.nnnn (NODE)  
Circuit DEV-C  
Adjacent node = aa.nnnn (NODE)
```

The default logging device for all events is the console. For instructions on how to disable logging or redirect it to another device, see the *DECnet-ULTRIX Network Management* manual.

Once your DECnet-ULTRIX node is running, you can log in and use the checkout procedure as described in Chapter 4. This procedure tests your node's operation in the network.

2.7 Configuring the Node to Run Gateway Software

If you chose to install the DECnet-Internet Gateway subset, the script now configures the node to run the DECnet-Internet Gateway software.

The script begins with question 1, which reads as follows:

The next question confirms that you are ready to configure your system to run the DECnet-Internet Gateway at this time. In order to run the Gateway you must have already configured your system to run DECnet.

The configuration procedure asks no questions. If you decide not to configure the Gateway at this time you will be told how to configure it at a later date.

1. Do you want to configure your system to run the DECnet-Internet Gateway? (y/n) [y]:

To answer "yes," press **RET**. The script stops asking questions.

If you do not wish to configure the system to run the DECnet-Internet Gateway, answer "no" to question 1. The following message appears before you automatically exit the script:

You chose not to configure your system to run the Gateway at this time. If you decide to configure the Gateway at a later date, you can issue the command:

```
setld -c DNUINETGW400 INSTALL
```

If you are installing DECnet-ULTRIX software onto a RISC system, the installation displays this command instead:

```
setld -c DNPINETGW400 INSTALL
```

If you answer "yes" to question 1, the installation script edits the `/etc/inetd.conf` file and displays this message:

```
The file /etc/inetd.conf will be edited to use
/usr/etc/ftpd.gw and /usr/etc/telnetd.gw instead
of /usr/etc/ftpd and /usr/etc/telnetd.
```

```
Editing /etc/inetd.conf
```

After verifying that the system is operating properly as a gateway you may wish to remove the following saved file:

```
- /etc/inetd.conf.sav[n]
```

NOTE

If you are installing the DECnet-ULTRIX Base Software and DECnet-Internet Gateway software for the first time, you must reboot the system to start the Gateway. If DECnet-ULTRIX was previously installed and you are installing only the Gateway, you can either kill and restart `inetd` without rebooting or send a hang-up signal to the `inetd` daemon.

The DECnet-Internet Gateway, by default, is configured as a bidirectional gateway, with access enabled in two directions: from DECnet to Internet systems, and from Internet to DECnet systems. When the installation and configuration are complete, you can configure the DECnet-Internet Gateway as a unidirectional gateway by disabling either DECnet-to-Internet or Internet-to-DECnet access. See the *DECnet-Internet Gateway Use and Management* manual for specific instructions on how to do this.

2.8 Deleting the DECnet-ULTRIX Software

To delete the DECnet-ULTRIX software from your system, log in as superuser and issue the `setld` command with the `-d` option, as follows:

```
setld -d subset [...]
```

where

subset is the name of the DECnet-ULTRIX software subsets that you are deleting. If you are reinstalling subsets, delete any subsets that you are reinstalling. You can include the names of one or more of the DECnet-ULTRIX subsets, as shown in the following table:

Software Subset	Subset Names for <i>subset</i> Variable	
	For VAX Systems	For RISC Systems
DECnet-ULTRIX Base Software	DNUBASE400	DNPBASE400
DECnet-Internet Gateway Software	DNUINETGW400	DNPINETGW400
DECnet On-Line Manual Pages	DNUMAN400	DNPMAN400
DECnet-ULTRIX Unsupported Software	DNUUNS400	DNPUNS400

If you select any of the optional subsets, make sure you list them before the base subset. The following command deletes the DECnet-Internet Gateway, the On-Line Manual Pages, and the Base Software from a VAX system:

```
# /etc/setld -d DNUINETGW400 DNUMAN400 DNUBASE400 
```

The system lists the subsets you are deleting. It then asks if you want to delete the DECnet database:

```
Do you want to delete the DECnet database from  
your system (y/n)?
```

Answer **y** (yes) to remove the DECnet database from `/usr/lib/dnet`. The system then displays the following messages:

```
The nodes database (/usr/lib/dnet/nodes_p and /usr/lib/dnet/nodes_v)  
has been retained for possible use by MOP. These files can be  
deleted manually if they are not needed.
```

```
Your DECnet software subset has been deleted.
```

```
You may also want to remove the following saved file:  
- /etc/rc.local.sav[n]
```

Note that the files `nodes_v` and `nodes_p`, which contain down-line loading information, are not removed when you delete the DECnet database. However, you can remove them separately.

2.9 Restarting the Installation

You can restart the installation by entering `setld` with the `-l` option and specifying the DECnet-ULTRIX subsets that you want to reinstall:

```
setld -l /dev/device subset [...]
```

where

/dev/device

is the name of the distribution media from which you are loading the software.

subset

is the name of the DECnet-ULTRIX software subset that you are installing. You can include the names of one or more of the DECnet-ULTRIX subsets, as shown in the following table:

Software Subset	Subset Names for <i>subset</i> Variable	
	For VAX Systems	For RISC Systems
DECnet-ULTRIX Base Software	DNUBASE400	DNPBASE400
DECnet-Internet Gateway Software	DNUINETGW400	DNPINETGW400
DECnet On-Line Manual Pages	DNUMAN400	DNPMAN400
DECnet-ULTRIX Unsupported Software	DNUUNS400	DNPUNS400

If you install any of the optional subsets with the base software, list the base software subset first. The following command deletes the Base Software and the DECnet-Internet Gateway from a VAX system:

```
# cd / [RET]
# /etc/setld -l /dev/rmt0h DNUBASE400 DNUINETGW400 [RET]
```

Notice that when you restart an installation, the order in which you list the subsets is opposite to the order in which you list them during a deletion.

2.10 Correcting Errors After the Installation Is Complete

This section describes how to correct errors after the installation is complete. For information on how to correct minor errors during the installation, see the respective sections in this chapter that describe the steps in the installation process. All such sections contain instructions for correcting errors.

If you receive an error message when you reboot the node, look in the `/usr/lib/dnet/ncp.log` file. The only errors you are likely to find when you reboot are `ncp` errors. You will be notified of any other errors as they occur.

If the installation software detects a serious error, it displays a message on your terminal and stops the procedure. In the event that the procedure stops, look for error messages in `/etc/setldlog`. When you have corrected the problem, restart the installation as described in the next paragraph.

After correcting any installation errors, restart installation by entering the `setld` command with the `-l` option. You will reinstall only the subsets that did not install correctly the first time. For a more detailed explanation of how to use the `setld` command with the `-l` option, see Section 2.9.

2.11 Verifying the Installation

To verify that DECnet-ULTRIX has been installed correctly on your node, run the checkout procedures described in Chapter 4. These procedures test whether your node can communicate with itself and with other nodes on the network. Before you begin testing your node, complete any postinstallation tasks that the script reminded you to do. For details, refer to Section 2.6.3.

Installing DECnet-ULTRIX into a Diskless Environment

If you are installing DECnet-ULTRIX software for a client to use in a diskless environment, be sure to make the following preparations:

- Designate a server node for the DECnet-ULTRIX installation.
- Make sure that the diskless environment already exists on the server node.
- Check that each registered client is licensed to use the software that the server provides.

You can add registered clients to the diskless environment either before or after installing DECnet-ULTRIX software. Each client is configured when you boot it for the first time after you install DECnet-ULTRIX software on the server.

To install DECnet-ULTRIX software into a diskless environment, run the Diskless Management Services (**dms**) utility from the server node. (You can run **dms** only on the server.) The following sections describe the full procedure.

Before starting with the installation, make sure you meet the requirements outlined in the next section.

3.1 DECnet-ULTRIX Diskless Installation Requirements

To install DECnet-ULTRIX into a diskless environment, you must meet the requirements in Table 3-1.

Table 3-1: DECnet-ULTRIX Diskless Installation Requirements

Software Subset	Requirements	
	For VAX Systems	For RISC Systems
DECnet-ULTRIX Base Software		
DECnet-ULTRIX V4.0 Distribution media	1 1600-bpi nine-track magnetic tape, CDROM, or 1 TK50 cartridge	1 1600-bpi nine-track magnetic tape, CDROM, or 1 TK50 cartridge
Diskless environment (OS)	ULTRIX V4.0	ULTRIX V4.0
Installed software	ULTRIX V4.0 Base Software (ULTBASE400) ULTRIX V4.0 Kernel Configuration Files (ULTBIN400)	ULTRIX V4.0 Base Software (UDTBASE400) ULTRIX V4.0 Kernel Configuration Files (UDTBIN400)
Privileges	Superuser	Superuser
Disk space during installation	1750 KB in the environment + 15 KB per client root file system	2730 KB in the environment + 15 KB per client root file system
Disk space after installation	Same as during installation	Same as during installation
Estimated time	30 minutes for base installation	30 minutes for base installation
DECnet-Internet Gateway Additional Requirements		
Installed software	DECnet-ULTRIX V4.0 Base Software (DNUBASE400) ULTRIX V4.0 Communications Utilities (ULTCOMM400)	DECnet-ULTRIX V4.0 Base Software (DNPBASE400) ULTRIX V4.0 Communications Utilities (UDTCOMM400)
Disk space	205 KB in /usr	340 KB in /usr
Estimated Time	5 to 10 minutes	5 to 10 minutes
DECnet-ULTRIX On-Line Manual Pages Additional Requirements		
Installed software	DECnet-ULTRIX V4.0 Base Software (DNUBASE400) ULTRIX V4.0 On-Line Manual Pages (ULTMAN400)	DECnet-ULTRIX V4.0 Base Software (DNPBASE400) ULTRIX V4.0 On-Line Manual Pages (UDTMAN400)
Disk space	135 KB in /usr/man	135 KB in /usr/man
Estimated time	5 minutes	5 minutes
DECnet-ULTRIX Unsupported Software Additional Requirements		
Installed software	DECnet-ULTRIX V4.0 Base Software (DNUBASE400)	DECnet-ULTRIX V4.0 Base Software (DNPBASE400)
Disk space	370 KB in /usr	535 KB in /usr
Estimated time	5 minutes	5 minutes

Before you install DECnet-ULTRIX into a diskless environment on a server node:

1. Set up a diskless environment for the clients. This is equivalent to installing ULTRIX V4.0 software for the clients. See the *ULTRIX Guide to Diskless Management Services* for details.
2. Make sure you have enough free disk space to install the software subsets of your choice. To check the available disk space in the environment or the root file system, enter the `df` command. For example:

```
# df /usr/var/diskless/dlenv0   
# df /usr/var/diskless/dlclient0 
```
3. Make a backup copy of the diskless environment.
4. Make sure you have the complete software distribution kit. Each DECnet-ULTRIX kit consists of one or more volumes of software and a set of documentation. The Bill of Materials (BOM) included with the kit specifies its contents. Compare the items in the kit with those listed in the BOM.
5. If DECnet-ULTRIX is already installed in the diskless environment, log in to each client using that environment and turn DECnet off. Do not turn DECnet off on the server node.

3.2 Running the DECnet-ULTRIX Diskless Installation Procedure

To start the DECnet-ULTRIX diskless installation procedure, log in to the server node as superuser. Then change to the root directory (`/`) and start the Diskless Management Service (`dms`) utility:

```
# cd /   
# dms 
```

The `dms` utility displays a licensing notice, then prompts you for the superuser password. When you type the superuser password and press , `dms` displays a menu of its services:

```
DISKLESS MANAGEMENT SERVICES (DMS) UTILITY MENU  
  
a - Add Client Processor  
m - Modify Client Parameters  
r - Remove Client Processor  
l - List Registered Clients  
s - Show Products in Diskless Environments  
i - Install Software  
c - Create Diskless Area on Disk  
k - Kernel Rebuild or Copy  
e - Exit
```

Enter your choice:

NOTE

Either before or after you install DECnet-ULTRIX, define the client nodes on which you will be using DECnet-ULTRIX. The `a` option defines a client. Refer to the ULTRIX documentation for more information about defining or adding clients.

To install DECnet-ULTRIX, type the **i** option at the prompt. This menu appears:

- 1 Install Operating System to New Area
- 2 Add Software to Existing Area
- 3 Return to Previous Menu

Enter your choice:

Choose option **2** to add DECnet-ULTRIX to an existing diskless area that already contains an operating system. This message appears with a list of the installation directories available:

You have chosen to install additional software into an existing diskless environment. These are the available installation directories:

- 1 /dlenv0/root0.vax
- 2 /dlenv0/root0.mips
- 3 /dlenv1/root1.mips

Enter your choice:

Choose the diskless environment into which you want to install the software by typing the appropriate option and pressing **[RET]**.

Next, **dms** prompts you for the name of the device special file or the mount point of the distribution media:

Enter the device special file name or mount point of the distribution media, for example, /dev/rmt0h

If the distribution kit is on a TK50 cartridge tape or a magnetic tape, enter the device special file name.

If the kit is on a CDROM disk, specify the mount point of the disk. The DECnet-ULTRIX kit is located in the **c** partition. Mount this partition before starting the installation (if you have not already mounted the partition, press **[CTRLZ]** to suspend the installation, type the **mount** command, and type **fg** to resume the installation). For example, if your CDROM is in drive **ra1** and the mount point **/mnt** is free, you would enter this **mount** command:

```
# mount /dev/ralc /mnt [RET]
```

If diskless clients have already been added to the chosen diskless environment, the **dms** utility asks the following question:

The product software will automatically be propagated to every registered client. Is that all right? (y/n):

If you answer **yes**, **dms** copies the software to each diskless client. If you answer **no**, **dms** terminates the installation.

3.3 Selecting Software Subsets

The script then asks you to choose the software that you want to install: the DECnet-ULTRIX Base Software, the DECnet-Internet Gateway software, the DECnet On-Line Manual Pages, the DECnet-ULTRIX Unsupported Software, or all four subsets:

*** ENTER SUBSET SELECTIONS ***

The subsets listed below are optional.

- | | |
|------------------------------------|---------------------------------------|
| 1) DECnet-ULTRIX Base Software | 2) DECnet-Internet Gateway |
| 3) DECnet On-Line Manual Pages | 4) DECnet-ULTRIX Unsupported Software |
| 5) All of the Above | |
| 6) None of the Above | |
| 7) Exit without installing subsets | |

Enter your choice(s):

Type the number of the option that you want to install. If you type more than one number, separate each number with a space, not a comma. Next, the script allows you to verify your choice. For example:

You are installing the following subsets:

DECnet-ULTRIX Base Software	DECnet-Internet Gateway
DECnet On-Line Manual Pages	DECnet-ULTRIX Unsupported Software

Is this correct (y/n)?

If you chose the wrong option, type **n** to indicate that the subsets are not correct. The subset menu redisplay, and you can reselect your subsets. If you chose the correct option, type **y**.

The installation script then copies and verifies the software subsets. If you are installing all subsets, it copies and verifies the base software, then the other subsets.

In this example, the script displays the following messages as it copies all the software subsets onto a VAX system:

```
Copying DECnet-ULTRIX Base Software (DNUBASE400) from media
Verifying DECnet-ULTRIX Base Software (DNUBASE400)

Copying DECnet On-Line Manual Pages (DNUMAN400) from media
Verifying DECnet On-Line Manual Pages (DNUMAN400)

Copying DECnet-Internet Gateway (DNUINETGW400) from media
Verifying DECnet-Internet Gateway (DNUINETGW400)

Copying DECnet-ULTRIX Unsupported Software (DNUUNS400) from media
Verifying DECnet-ULTRIX Unsupported Software (DNUUNS400)
```

NOTE

If you are installing DECnet-ULTRIX onto a RISC system, the prefix **DNP**, rather than **DNU**, appears in the subsets.

If verification fails, look in the diskless environment's `/usr/var/adm/verify` log file for information to help you correct the error. Make the correction and restart the installation by using the `dms` utility. See Section 3.2 for details.

3.4 Configuring the Client for DECnet-ULTRIX Base Software

Clients are configured when you boot them for the first time after you install DECnet-ULTRIX software on the server. This section describes the configuration script.

If you type the wrong answer for any question, you can change it by typing **n** when asked to verify your answer. The procedure then redisplay the question so that you can enter the correct information. If you need help responding to any of these prompts, type a question mark (?) and press **RET**.

The script begins the configuration by displaying some informational messages:

Configuring the node to run DECnet-ULTRIX V4.0 base software.

You will be asked a few questions during the DECnet-ULTRIX V4.0 configuration.

If you need more information to answer a question, you can type ? at the prompts, or consult the DECnet-ULTRIX Installation manual.

The DECnet library routines are now located in their own library, -ldnet.

If you have not registered your DECnet-ULTRIX license, the script displays this message:

```
*****      W A R N I N G      *****
*
* You have NOT registered the DECnet-ULTRIX License !!
* You will not be able to perform any remote access
* through DECnet-ULTRIX.
*
* In order to do remote access, use the lmf utility to
* register a licensed DECnet-ULTRIX PAK.
*
*****
```

[Press the RETURN key to continue :]

This message is simply a reminder that you must register your DECnet-ULTRIX license after the installation and configuration are complete. You do not have to interrupt the configuration at this point.

The script then displays question 1:

The next question confirms that you are ready to configure your system to run DECnet at this time. To configure DECnet you need to know what your DECnet node name and address are. Also, if you want to configure your DECnet nodes database during this configuration process, you need to know the DECnet names and addresses of those nodes you wish to define.

If you answer "no" to this question now, you will be told how you can configure DECnet later.

1. Do you want to configure your system to run DECnet? (y/n) [y]:

To answer "yes," press **RET**. The script moves on to question 2.

If you do not wish to configure the system to run DECnet, answer "no" by typing n. The following message appears before you automatically exit the script:

You chose not to configure your system to run DECnet at this time. If you decide to configure DECnet later, issue the command:

```
setld -c DNUBASE400 INSTALL
```

If you are installing DECnet-ULTRIX software onto a RISC system, the installation displays this command instead:

```
setld -c DNUBASE400 INSTALL
```

With question 2, the script prompts you for your DECnet node name:

2. What is your DECnet node name (1-6 chars)? []: node **RET**

Your node name is node

Is this correct? (y/n) [n]:

To specify the client's DECnet node name, enter a node name of 1 to 6 alphanumeric characters, including at least one alphabetic character. If possible, use the same node name that you specified as your Internet host name. Consult your DECnet network manager before choosing your node name and address. Respond by typing a **y** or **n**, as appropriate.

3. What is your DECnet node address (aa.nnnn)? []: aa.nnnn **RET**

Your node address is aa.nnnn

Is this correct? (y/n) [n]:

Your DECnet node address consists of an area number, a period, and a node number. The area number is a decimal integer in the range of 1 to 63; the node number is a decimal number from 1 to 1023. Note that this address is different from your Internet host address. Respond by typing a **y** or **n**, as appropriate.

4. What is your DECnet Node Identification - string (1-32 chars)? []: identification string **RET**

Your node identification string is

identification string

Is this correct? (y/n) [n]:

Enter a string of 1 to 32 ASCII characters. You can include blanks but not shell metacharacters (! ? ' " *). The node identification string is a short message that appears next to the node ID in network management displays. Its purpose is to establish the node's identity on the network by indicating its type, use, users, or some other distinguishing feature. Respond by typing a **y** or **n**, as appropriate.

5. What is the name of the device on which you will be running the DECnet software (dev-c)? []: dev-c **RET**

The device name consists of three alphabetic characters, a dash, and an integer from 0 to 65535. Here is a list of the possible DECnet device names and ULTRIX equivalents:

DECnet Device Names	Equivalent ULTRIX Device Names
qna-nn	qenn
dmv-nn	dmvnn
sva-nn	lnn
xna-nn	xnann

3.4.1 Configuring the DECnet Nodes Database

The root area for each client in a diskless environment contains a DECnet node database. The DECnet node database contains the DECnet names and addresses for the nodes on your DECnet network. If any nodes are already defined in your database, the installation procedure keeps the database and displays this message:

A nodes database has been found on your system and will be retained. If you want to define new nodes, use the ncp define node command after the installation is complete.

If the database does not exist, the installation procedure gives you the option of defining some DECnet nodes in the permanent nodes database. This message appears:

This part of the installation procedure builds your DECnet nodes database. Questions 6 and 7 prompt you for a DECnet node and address for each node that you want to define in the database.

Questions 6 and 7 will reoccur until you type <RET> at question 6.

If you plan to copy an existing database from another node, define that node when the script prompts you with questions 6 and 7. You add the node to your database so you can access it later to copy its nodes database. After the installation, you can use the `update_nodes -f node` command to copy the database. (The `update_nodes` command is an unsupported utility in the DECnet-ULTRIX Unsupported Software subset and documented in the *DECnet-ULTRIX Release Notes*.)

Questions 6 and 7 appear as follows:

6. Enter node name (1-6 chars or <RET> to continue): node

Enter a node name of 1 to 6 alphanumeric characters, including at least one alphabetic character.

7. Enter salem's node address (aa.nnnn): aa.nnnn

The DECnet node address consists of an area number, a period, and a node number. The area number is a decimal integer from 1 to 63; the node number is a decimal number from 1 to 1023. Note that this address is different from the Internet host address.

If you enter a node name or address incorrectly, just reenter both the node name and address when the questions redisplay. The script deletes the error for you.

When you have finished specifying the nodes in your network, press in response to question 6.

After installation, you can define nodes in the client's permanent database with the `ncp define node` command. Also, you can delete node names and addresses with the `ncp purge node` command. For more information, see the *DECnet-ULTRIX Network Management* manual and the *DECnet-ULTRIX NCP Command Reference*.

3.4.2 Modifying System Files

The installation procedure then modifies the client's system files. This generally takes no longer than 10 minutes.

Before the installation procedure edits any files, it saves each one in a file of the name:

```
filename.savn
```

where *n* is a version number that is incremented on each installation.

As the script modifies the files, it displays the following messages, as appropriate:

```
Modifying rc.local
Creating DECnet proxy file, /etc/dnet_proxy
Initializing DECnet database
```

After verifying that the system is operating properly with DECnet installed you may wish to remove the following saved file:

```
- /etc/rc.local.sav[n]
```

If a proxy file already exists on your system, the script does not display the message about creating a proxy file. For information about creating a proxy file, see the *DECnet-ULTRIX Network Management* manual.

If any of the client's system files were edited to customize them prior to this installation, check the new files to make sure the modifications are compatible with your previous edits.

3.4.3 Preparing to Start the Client

At this time, the installation procedure performs several checks and displays informational messages as needed. Before you start DECnet on the client, you may need to make some final changes to your environment. For example:

- If DECnet is not already configured into your ULTRIX kernel, the script displays the following message:

```
DECnet is not built into the currently running kernel. After
configuration, you should rebuild your kernel with DECnet and
then reboot to complete the installation.
```

This message is simply a reminder that you must rebuild the kernel when the configuration is complete. Do not interrupt the configuration to rebuild the kernel.

To include DECnet in the kernel, specify "options DECNET" and "pseudo-device decnet" in the appropriate configuration file and rebuild the kernel.

- If DECnet has already been configured into your kernel, the following question is displayed:

```
8. Do you want to start DECnet now (y/n)? [y]:
```

Press **RET** or type **y** to answer "yes". If you answer "yes," the script automatically starts DECnet for you. If you answer "no," the script displays this message:

```
You can turn DECnet on manually by rebooting your system
or by entering the following command:
```

```
/usr/bin/ncp set exec state on
```

- If you have a lat control program (lcp) command line in `/etc/rc.local`, the script displays this message:

```
A lat control program (lcp) command line was found in
/etc/rc.local. When this procedure is finished, you should
edit rc.local and move the lcp lines to follow the ncp command.
If the lcp command precedes the ncp command, your lat terminal
lines may not work properly.
```

- If you do not have a guest account in your system, the script displays this message:

```
There is no guest account in your system. If you wish to access
this system from remote systems, you should have a guest account
specified. A guest account is needed for the proper operation of
dlogind, dtermd, and dtr.
```

```
You should set a password for this account to prevent unauthorized
access to your system.
```

If you need instructions on how to create a new account, see the *ULTRIX Guide to System Environment Setup*.

- If you have not already registered your software license, the script displays this message:

Don't forget to register your DECnet-ULTRIX PAK (Product Authorization Key) using lmf. Otherwise you won't be able to access remote systems.

After you register your DECnet-ULTRIX PAK, you must either reboot or issue the following commands:

```
/usr/etc/lmf reset
/usr/bin/ncp set exec state on
```

When you start DECnet, your system displays the following message:

```
Starting DECnet
```

Your system comes up with the executor and circuit states set to **on**, as reported by the following event messages:

```
Event type 2.0, Local node state change
Occurred 14-OCT-90 16:34:30.0 on node aa.nnnn (NODE)
Operator commands
Old state = off
New state = on

Event type 4.10, Circuit up
Occurred 14-OCT-90 16:34:32.0 on node aa.nnnn
Circuit DEV-C
Adjacent node = aa.nnnn (NODE)
```

The default logging device for all events is the console. For instructions on how to disable logging or redirect it to another device, see the *DECnet-ULTRIX Network Management* manual.

Once your DECnet-ULTRIX node is running, you can log in and use the checkout procedure as described in Chapter 4. This procedure tests your node's operation in the network.

3.5 Configuring the System to Run the Gateway Software

If you chose to install the DECnet-Internet Gateway subset, the script must configure each client to run the DECnet-Internet Gateway software. The clients are configured when they are booted for the first time after the DECnet-ULTRIX software has been installed on the server. The configuration script is described in this section.

The script begins with question 1, which reads as follows:

The next question confirms that you are ready to configure your system to run the DECnet-Internet Gateway at this time. In order to run the Gateway you must have already configured your system to run DECnet.

The configuration procedure asks no questions. If you decide not to configure the Gateway at this time you will be told how to configure it at a later date.

```
1. Do you want to configure your system to run the
   DECnet-Internet Gateway? (y/n) [y]:
```

To answer "yes," press **RET**. The script stops asking questions.

If you do not wish to configure the system to run the DECnet-Internet Gateway, answer "no" to question 1. The following message appears before you automatically exit the script:

You chose not to configure your system to run the Gateway at this time. If you decide to configure the Gateway at a later date, you can issue the command:

```
setld -c DNUINETGW400 INSTALL
```

If you are installing DECnet-ULTRIX software onto a RISC system, the installation displays this command instead:

```
setld -c DNPINETGW400 INSTALL
```

If you answer "yes" to question 1, the installation script edits the `/etc/inetd.conf` file and displays the following message:

```
The file /etc/inetd.conf will be edited to use
/usr/etc/ftpd.gw and /usr/etc/telnetd.gw instead
of /usr/etc/ftpd and /usr/etc/telnetd.
```

```
Editing /etc/inetd.conf
```

After verifying that the system is operating properly as a gateway you may wish to remove the following saved file:

```
- /etc/inetd.conf.sav[n]
```

NOTE

If you are installing the DECnet-ULTRIX Base Software and DECnet-Internet Gateway software for the first time, you must reboot the system to start the Gateway. If DECnet-ULTRIX was previously installed and you are installing only the Gateway, you can either kill and restart `inetd` without rebooting or send a hang-up signal to the `inetd` daemon.

The DECnet-Internet Gateway, by default, is configured as a bidirectional gateway, with access enabled in two directions: from DECnet to Internet systems, and from Internet to DECnet systems. When the installation and configuration are complete, you can configure the DECnet-Internet Gateway as a unidirectional gateway by disabling either DECnet-to-Internet or Internet-to-DECnet access. See the *DECnet-Internet Gateway Use and Management* manual for specific instructions on how to do this.

3.6 Correcting Errors After the Installation Is Complete

This section describes how to correct errors after the installation is complete. For information on how to correct minor errors during the installation, see the respective sections in this chapter that describe the steps in the installation process. All such sections contain instructions for correcting errors.

If you receive an error message when you reboot the client, look in the `/usr/lib/dnet/ncp.log` file for the respective system. The only errors you are likely to find when you reboot are `ncp` errors. You will be notified of any other errors as they occur during installation.

If the installation software detects a serious error, it displays a message on your terminal and stops the procedure. In the event that the procedure stops, look for error messages in `/etc/setidlog`.

After you have corrected the problem, restart the installation by running `dms`, as described in Section 3.2.

3.7 Verifying the Installation

To verify that DECnet-ULTRIX has been installed correctly on your node, run the checkout procedures described in Chapter 4. These procedures test whether your node can communicate with itself and with other nodes on the network. Before you begin testing your node, complete any postinstallation tasks that the script reminded you to do. For details, see Section 3.5.3.

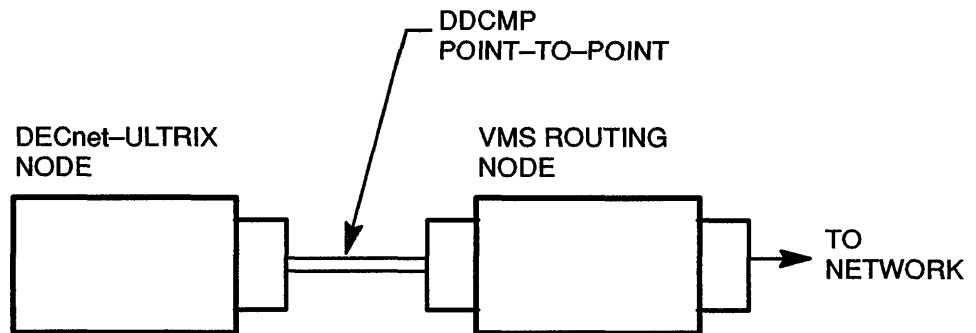
Checking Your Node's Operation on the Network

After installing DECnet-ULTRIX software onto your ULTRIX system, you can run a series of tests verifying that your node can communicate with itself and other nodes on the network. If you want to test the performance of an operating network, see the test procedures described in the *DECnet-ULTRIX Network Management* manual.

4.1 Overview of Checkout Tests

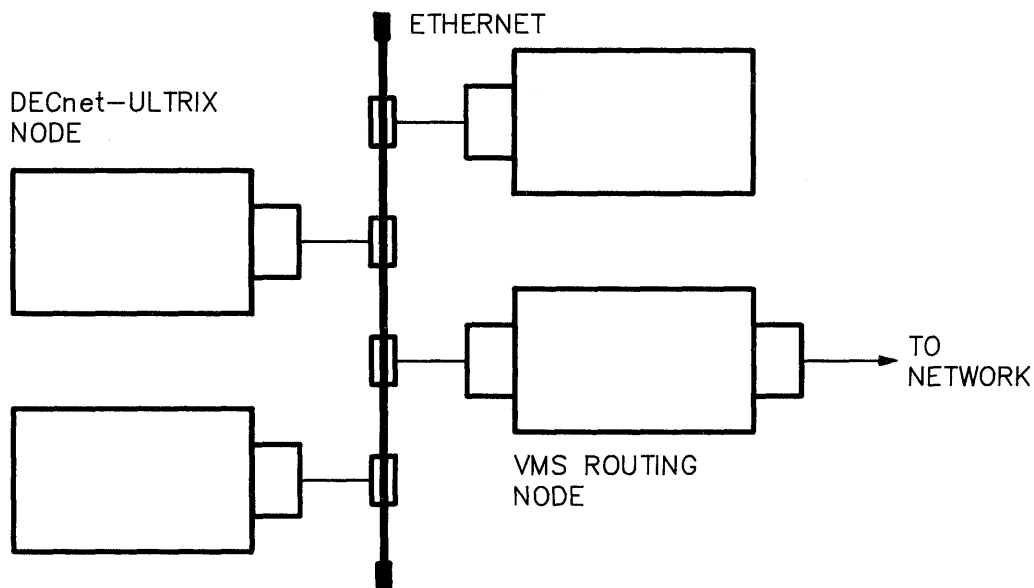
You can connect your node to a DECnet network using an Ethernet cable or a DDCMP point-to-point line. Figure 4-1 depicts a DDCMP point-to-point connection; Figure 4-2 depicts an Ethernet connection.

Figure 4-1: DDCMP Point-to-Point Connection



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Figure 4-2: Ethernet Connection



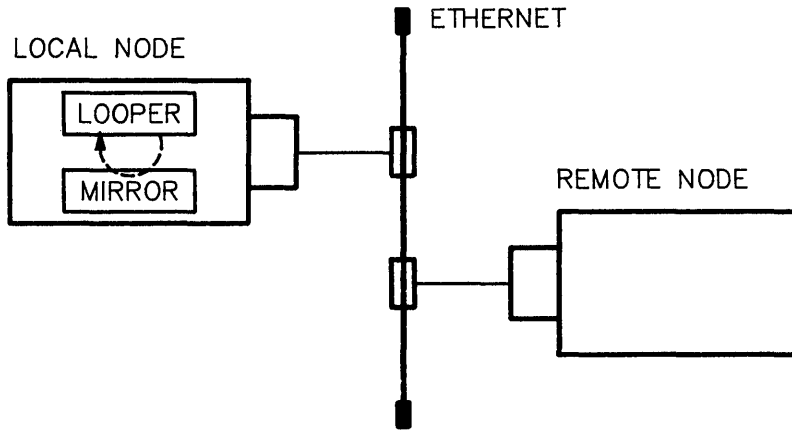
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You can use the checkout tests to verify both types of connections. If you have both Ethernet and DDCMP point-to-point hardware on your node, first run the checkout procedure on one device, then reconfigure the DECnet database and run the procedure on the second device. See the *DECnet-ULTRIX Network Management* manual for details about using `ncp` to list and define DECnet lines and circuits.

Figures 4-3 through 4-8 illustrate the series of tests that make up the checkout procedure. These figures illustrate tests on Ethernet connections; but tests on DDCMP point-to-point connections run in the same paths and test the same hardware components. Tests appear in the order you perform them (see steps 5, 6, and 7 in Section 4.2). In each figure, a broken line represents the test path for any of the tests described in the following list.

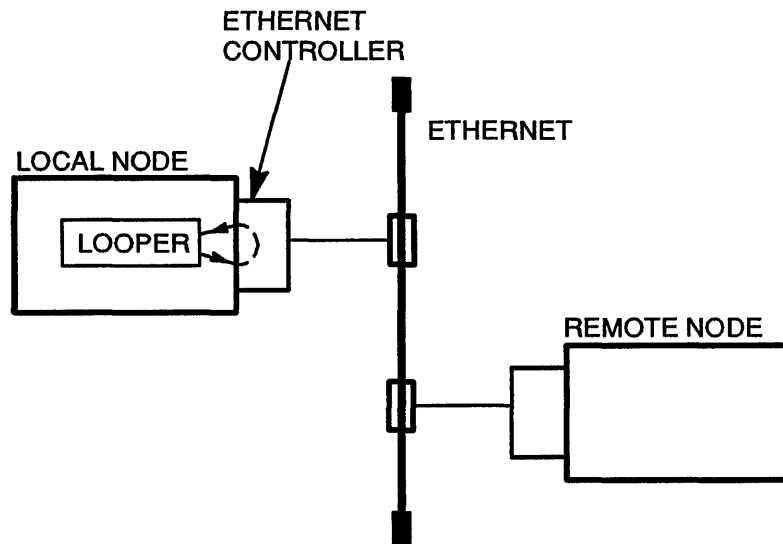
1. **Local node loopback test** (Figure 4-3). Tests the local node software.
2. **Controller loopback test** (Figure 4-4). Tests operation of the local line controller (do not perform this test if you are connected to the system over the network or through LAT). Do not use this test on a diskless client.
3. **Datalink loopback test to remote node** (Figure 4-5). Tests the physical connection to the Ethernet or DDCMP point-to-point wire and the remote system line controller and/or the datalink software.
4. **Node-level loopback test to remote node** (Figure 4-6). Tests your access to the remote network software (remote object mirror).
5. **DECnet file transfer to local node** (Figure 4-7). Tests your access to the local File Access Listener (`fal`).
6. **DECnet file transfer to remote node** (Figure 4-8). Tests your access to the remote File Access Listener (`fal`). You can use this test to check access from the Ethernet or a DDCMP point-to-point wire through a routing node to another remote node.

Figure 4-3: Local Node Loopback Test



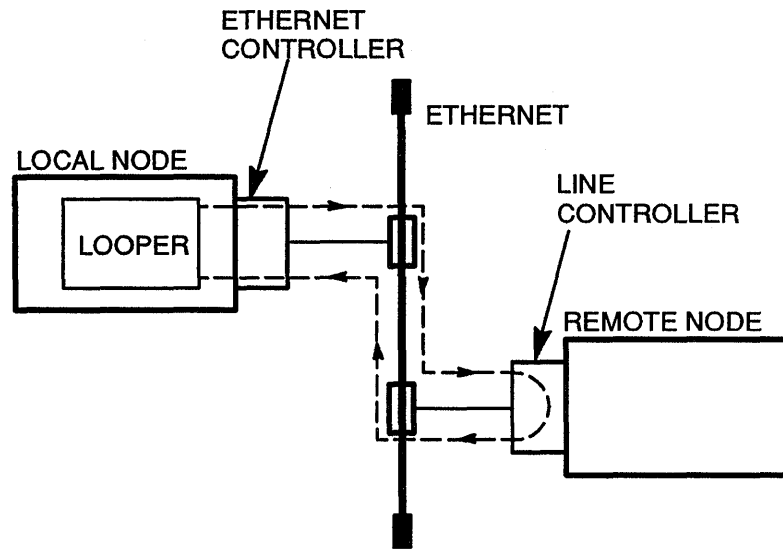
LKG-0267-87

Figure 4-4: Controller Loopback Test



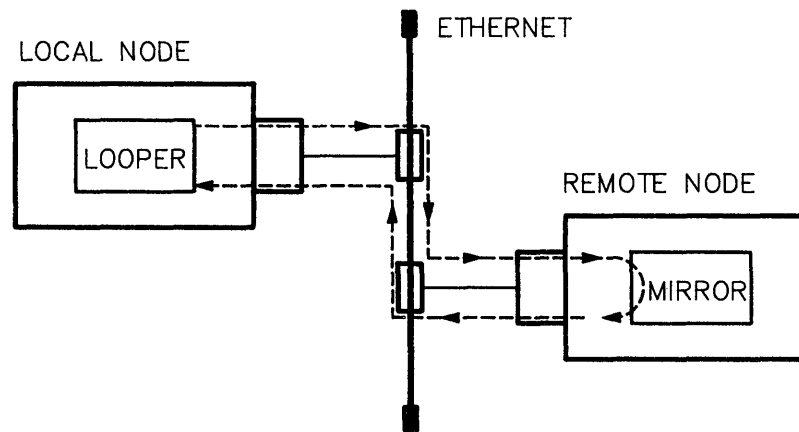
LKG-3695-891

Figure 4-5: Datalink Loopback Test to Remote Node



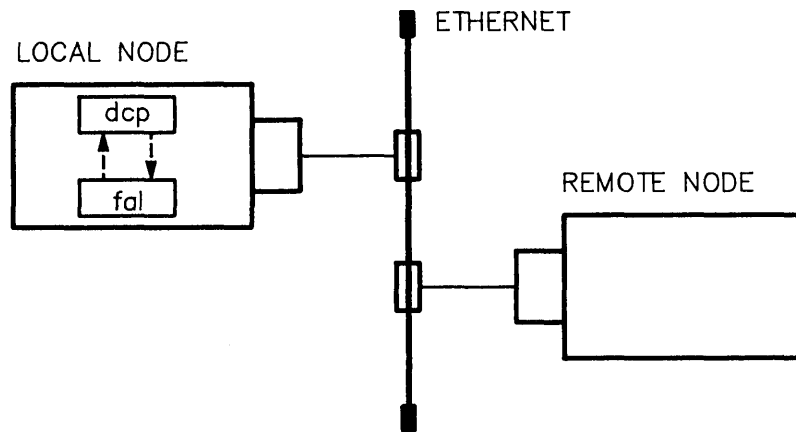
LKG-3696-891

Figure 4-6: Node-Level Loopback Test to Remote Node



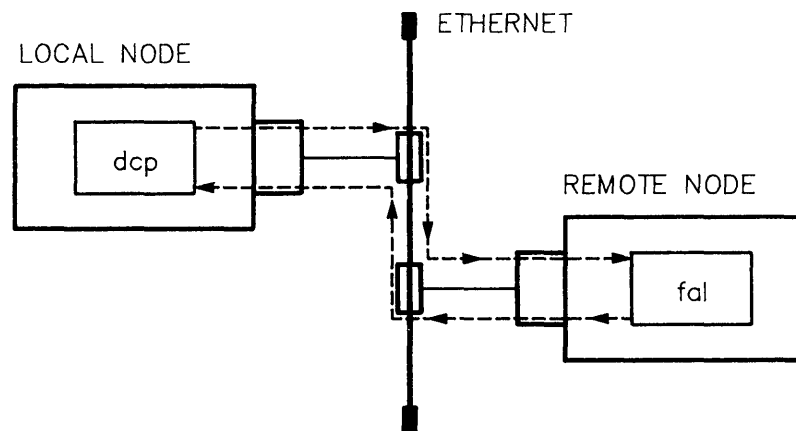
LKG-0270-87

Figure 4-7: DECnet File Transfer to Local Node



LKG-0271-87

Figure 4-8: DECnet File Transfer to Remote Node



LKG-0272-87

4.2 DECnet-ULTRIX Installation Checkout Procedure

To perform the checkout procedure described in this chapter, you must be a superuser and have a guest account on your system. The following pages describe each step in the checkout procedure and include examples of user input (red type) and system output (black type).

Follow the instructions and answer the questions that display on your terminal. If you need more information to answer a question, enter a question mark (?) at the prompt. Enter `CTRLZ` to interrupt the test at any time. When you are ready to resume the checkout procedure, enter `fg`.

Press `RET` to end all input lines. If you press `RET` without entering any input, the script prompts you again, unless you are waiving a password specification (see step 6).

If the checkout program detects an error, it instructs you to use an `ncp` command to correct it. For more information about `ncp`, refer to the *DECnet-ULTRIX Network Management* manual.

1. Enter `/usr/etc/dnet_check`. If you do not have a guest account set up on your system, the checkout program displays a message and exits so that you can create one. Once the checkout program confirms that you have a guest account, it displays some introductory text and then checks to see that `dcp`, `drm`, and `ncp` are properly installed. If they are not, the checkout program displays a message. You must then reinstall DECnet on your ULTRIX system before continuing (see Chapter 2 for basic installation procedures and Chapter 3 if you are installing DECnet-ULTRIX into a diskless environment).
2. If `dcp` and `ncp` are properly installed, the checkout program prompts you to specify the device that you want to test (`UNA-n`, `QNA-n`, `DMC-n`, `DMV-n`, `BNT-n`, `SVA-n`, or `XNA-n`, where *n* is a value from 0 to 65535). The program then displays summary information showing the device and its state, as in the following example:

```
Enter communication device to be tested (dev-c): una-0 RET
Line Volatile Summary as of Tue Mar 26 10:57:30 EST 1990
Line                State
UNA-0                On
```

3. Next, the program prompts you to enter the name of your local node for use in the first series of tests. If you are not sure of your node name, enter `CTRLZ` and execute the `ncp show executor` command.

If you enter a name that is not defined in the database, the program displays a message and exits. If the error was a typing mistake, rerun `dnet_check` and enter the correct name. If the local node is not defined in the database, use the `ncp set node` command to define the local node before you rerun `dnet_check`.

When you enter a valid local node name, the program displays summary information about the node.

```
Enter the name of your local node: boston RET
Node Volatile Summary as of Tue Mar 26 10:59:45 EST 1990
Executor node = 3.18 (BOSTON)
State = On
Identification = DECnet-ULTRIX System
```

- The checkout program prompts you to enter the name of a remote node for use in testing. Specify a DECnet node on your Ethernet or DDCMP point-to-point wire. You can display a list of known nodes by entering `CTRLZ` and executing the `ncp show known nodes` command. This command lists all nodes known to your node, which can include those beyond your local Ethernet or DDCMP point-to-point wire. You must remember which nodes are on your local wire and specify one of those for the test.

```

Enter the remote node to be used in test: CTRLZ
Stopped
# ncp show known nodes RET

Known Node Volatile Summary as of Tue Mar 26 10:59:45 EST 1990

Executor node = 3.18 (BOSTON)

State = On
Identification = DECnet-ULTRIX System
Node State Active Delay Circuit Next Node
Links
.
.
3.20 (SALEM) UNA-0 3.4 (STOW)
3.21 (WESTON) UNA-0 3.4 (STOW)
3.22 (GROTON) UNA-0 3.4 (STOW)
.
.
# fg RET
dnet_check
saalem

```

If you enter a name that is not defined in the database, the checkout procedure displays a message and exits. If the error was a typing mistake, or if you want to specify a different remote node that is defined, rerun `dnet_check`. If you want to use a remote node not currently defined in the database, use the `ncp set node` command to define the node before you rerun `dnet_check`.

When you enter a valid remote node name, the system displays summary information for that node. If your Ethernet has a designated router, its name appears in the Next Node field of the display.

```

Node Volatile Summary as of Tue Mar 26 10:59:45 EST 1990

Node State Active Delay Circuit Next Node
Links
3.20 (SALEM) UNA-0 3.4 (STOW)

```

- After you have specified both the local node and a remote node, the checkout program begins a series of tests (see Figures 4-3 through 4-8). As it performs each test, the program displays the actual `ncp` commands that it is executing.

The program gives you the option to bypass the second test, which is a controller loopback test. This test disconnects the communications device from the Ethernet or DDCMP point-to-point wire. Do not perform the test while connected to the host over the network using LAT (Local Area Transport), `rlogin`, or `dlogin`. Do not perform the test if you are a diskless client.

If all tests are performed and all succeed, the program displays the following sequence of test reports:


```
Performing local DECnet node loopback tests.
ncp loop executor
ncp loop node boston length 1 count 10 with zero
ncp loop node boston length 2047 count 50
```

Warning: answer "no" to this question if you are running as a diskless client, or you are logged in from a terminal server (LAT) as you will lose your file system and/or all currently connected LAT connections!

```
Do you want to perform a controller loopback test on
device una-0? (y = yes, n = no) Y  RET
ncp set line una-0 controller loopback
ncp loop circuit una-0 count 10 length 1486
ncp set line una-0 controller normal
```

```
Performing datalink loopback tests to node salem.
ncp loop circuit una-0 node salem length 5 count 20 with
ones
ncp loop circuit una-0 node salem length 1486 count 20
```

```
Performing node level loopback tests to node salem.
ncp loop node salem length 1 count 10 with zero
ncp loop node salem count 50
```

If a test fails, follow these suggestions for isolating the error condition:

- **Verify that the node is up on the network.** Check the display resulting from the `ncp show executor` command to determine the state of the local node. If the executor node state is `off`, issue an `ncp set executor state on` command to turn the executor on.

To check the state of a remote node, consult the system manager for that node.

- **Verify that the circuit is turned on.** Check the display resulting from the `ncp show circuit` command to determine the circuit's state. If the circuit state is `off`, execute an `ncp set circuit circuit-id state on` command to turn the circuit on.

If the circuit is on, check with the system manager at the remote node to see if the remote node is up on the network and to make sure that access control for the remote mirror is set properly.

- **Verify that your device is correctly connected to the Ethernet or DDCMP point-to-point wire.** Make sure the DDCMP wire is connected to the controller board, or that the Ethernet wire is connected to the transceiver or DELNI or DECOM.
- **Verify that access control for the target system's mirror object is properly set.** Check with the system manager on the target node to verify that connections can be made to the object mirror.
- **Verify that the service is properly enabled in the remote node, if applicable.**
- **Verify a problem with the remote node.** Rerun the checkout tests with a different remote node, if possible, and notify the original remote node of a possible problem.
- **Verify that the device's vector and csr switches are set to the correct addresses.** Make sure that the switch settings on the interface board of your device match the addresses defined in the system configuration file for your system. For more information, consult the user's guide for your device and refer to the ULTRIX system documentation for information on building configuration files.

- **Device failure.** Run the designated stand-alone diagnostics for the device, or call your local field service representative.
- **Rebuild the kernel.** Refer to the ULTRIX base system documentation for details.
- **Reinstall DECnet.** Follow the instructions in Chapter 2 if you are installing DECnet-ULTRIX onto a node and Chapter 3 if you are installing DECnet-ULTRIX into a diskless environment.

After you have corrected the error, rerun `/usr/etc/dnet_check`.

6. When the checkout program has successfully performed the preceding series of tests, it displays instructions for a second set of tests. It prompts you to enter the node name, user name, and password for the nodes you want to test. Enter this information for your local node first (see Figure 4-7). When you have completed that test, the program asks whether you want to test another node. Enter the corresponding data for a remote node (see Figure 4-8). You can repeat this test for as many remote nodes as you want.

For security reasons, your response to the password prompt does not echo. However, you can still display help information about passwords by typing a question mark (?). If no password is required on the account, just press `RET`. If the program accepts your specification without a password, it displays a message saying that it will not use a password in the test.

After you enter the data for the node you want to test, the program copies the file `dnet_check` to the specified node and back again. The checkout program then compares the contents of the original file to the one that was returned during the test. If the two files differ or if the test fails for some other reason, the program displays a message and prompts you for another node name. When the test completes, the program deletes the test file from your directory. If it cannot delete the test file, the checkout program displays a message asking you to delete the file when you complete the checkout test procedure.

```
Enter name of node for test: boston RET
Enter user login-name on node boston: jean RET
Enter password for user jean on node boston: RET
dcp dnet_check boston/jean/password/::dnetcheck.rnd
dcp boston/jean/password/::dnetcheck.rnd dnetcheck.lnd
cmp -s dnet_check dnetcheck.lnd
drm boston/jean/password/::dnetcheck.rnd
```

7. After you have performed the test described in step 6 on your local node, you can perform it on as many remote nodes as you want. When you are finished, enter `n` in response to the prompt for another test.

```
Do you want to run this test with another
node? (y = yes, n = no) n RET

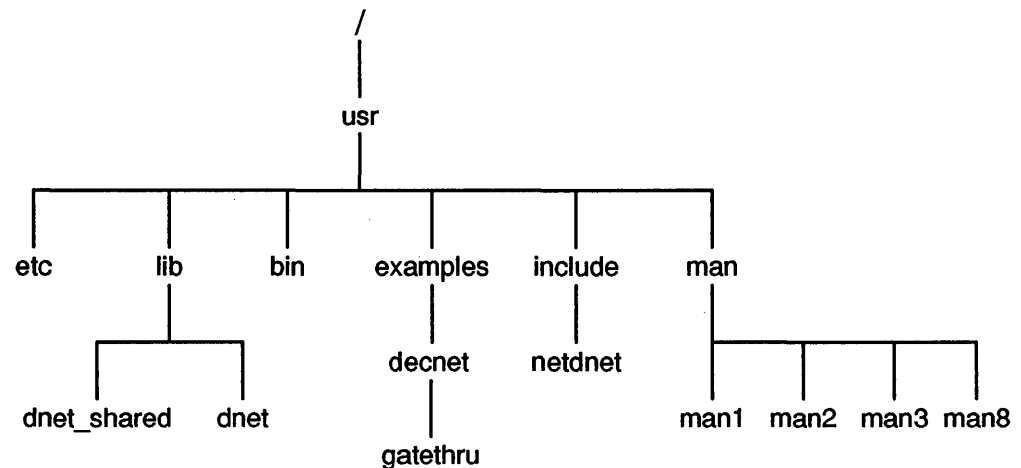
The installation test is finished.
Your current working directory is /etc.
#
```



DECnet-ULTRIX Distribution Files

This appendix lists the DECnet-ULTRIX distribution files by directory. Figure A-1 shows the overall structure of the directories.

Figure A-1: DECnet-ULTRIX Directory Tree



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NOTE

Digital Equipment Corporation supplies some of the files discussed in this appendix on an "as-is" basis for general customer use. Note that Digital does not offer any support for them, nor does Digital cover them under any of its support contracts.

Table A-1 shows the DECnet-ULTRIX distribution files by directory. The following key indicates which software subset each file belongs in:

- B = DECnet-ULTRIX Base System
- G = DECnet-Internet Gateway
- U = Unsupported Utilities
- M = On-Line Manual Pages

Table A-1: DECnet-ULTRIX Distribution Files by Directory

/usr/etc:		
dlogind ^B	evl ^B	mir ^B
dnet_check ^B	fal ^B	nml ^B
dnet_spawner ^B	ftpd.gw ^G	telnetd.gw ^G
dtermd ^B	GetnodeentServer	update_nodes ^U
dtr ^B	mail11dv3 ^B	
/usr/lib:		
libdnet_p.a ^B	libdnet.a ^B	
/usr/lib/dnet_shared:		
area.txt ^B	exec.txt ^B	mod_xp5_ctr.txt ^B
circ.tab ^B	exec_ctr.tab ^B	mod_xs5.tab ^B
circ.txt ^B	exec_ctr.txt ^B	mod_xs5.txt ^B
circ_ctr.tab ^B	keyword_table.txt ^B	mod_xs9.tab ^B
circ_ctr.txt ^B	line.tab ^B	mod_xs9.txt ^B
dap.errors ^B	line.txt ^B	nm_help.txt ^B
DECnet_release_notes ^B	line_ctr.tab ^B	node.tab ^B
DECnet-ULTRIX.PAK ^B	line_ctr.txt ^B	node.txt ^B
dtshlp.lng ^B	log.txt ^B	node_ctr.tab ^B
dtsmsg.lng ^B	mail11v3.fatal ^B	node_ctr.txt ^B
dtsprs.lng ^B	mod.txt ^B	obj.tab ^B
evl_errs.txt ^B	mod_xac.tab ^B	obj.txt ^B
evl_evts.txt ^B	mod_xac.txt ^B	
exec.tab ^B	mod_xp5.txt ^B	
/usr/lib/dnet:		
dnet_vers ^B	logging_p ^B	objects_p ^B
exec_v ^B		
/usr/lib/lint:		
llib-ldnet.ln ^U	llib-ldnet ^U	
/usr/bin:		
dcat ^B	drm ^B	netwatch ^U
dcp ^B	dts ^B	nfi ^U
dlogin ^B	mail11v3 ^B	nodename ^B
dls ^B	ncp ^B	tell ^U

(continued on next page)

Table A-1 (Cont.): DECnet-ULTRIX Distribution Files by Directory

/usr/examples/decnet:

dnet_echo1.c ^U	dnet_echo2.c ^U	tell.c ^U
dnet_echo1d.c ^U	dnet_echo2d.c ^U	TELL.COM ^U

/usr/examples/decnet/gatethru:

gateway ^U	Makefile ^U	README ^U
gatewayd.c ^U		

/usr/examples/dli:

dli_802.c ^U	dli_eth.c ^U	dli_setsockopt.c ^U
dli_802d.c ^U	dli_ethd.c ^U	

/usr/man/man1:

dcat.1dn ^M	dls.1dn ^M	nodename.1dn ^M
dcp.1dn ^M	drm.1dn ^M	nfi.1dn ^M
dlogin.1dn ^M	errors.1dn ^M	tell.1dn ^M

/usr/man/man2:

accept.2dn ^M	getsockopt.2dn ^M	send.2dn ^M
bind.2dn ^M	listen.2dn ^M	setsockopt.2dn ^M
close.2dn ^M	read.2dn ^M	shutdown.2dn ^M
connect.2dn ^M	recv.2dn ^M	socket.2dn ^M
getpeername.2dn ^M	select.2dn ^M	write.2dn ^M
getsockname.2dn ^M		

/usr/man/man3:

dnet_addr.3dn ^M	dnet_htoa.3dn ^M	getnodeent.3dn ^M
dnet_conn.3dn ^M	dnet_ntoa.3dn ^M	getnodename.3dn ^M
dnet_eof.3dn ^M	dnet_otoa.3dn ^M	nerror.3dn ^M
dnet_getalias.3dn ^M	getnodeadd.3dn ^M	

/usr/man/man8:

dts.8dn ^M
ncp.8dn ^M

/usr/include/netdnet:

dn.h ^B	node_params.h ^B	x25db.h ^B
dnetdb.h ^B		

Note: If you are installing DECnet-ULTRIX onto a RISC processor, you do not receive the /usr/lib/libdnet_p.a file.



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