DECnet/OSI for OpenVMS

Applications Installation and Advanced Configuration

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Documentation Comments

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Operating Systems: OpenVMS Alpha
OpenVMS VAX

Software Versions: DECnet/OSI for OpenVMS
X.25 for OpenVMS Alpha

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Preface

This is the **second book** you should read in order to successfully install and configure:

- X.25 for OpenVMS Alpha
- VAX P.S.I. and VAX P.S.I. Access for OpenVMS VAX
- OSI layered software applications
  - File Transfer, Access, and Management (FTAM)
  - Virtual Terminal (VT)
  - OSI Applications Kernel (OSAK)

It also describes how to configure DECnet/OSI for OpenVMS using the ADVANCED configuration option and information about name services.

Note

This book assumes you have already installed DECnet/OSI which is a prerequisite for installing the applications discussed in this book.

Intended Audience

This book is written for:

- Network planners and managers
- OpenVMS system managers
- DECnet/OSI software installers

Structure of This Book

This book has five parts:

Part I	Describes how to run an ADVANCED configuration for DECnet/OSI for OpenVMS, as well as steps to change a current configuration.
Part II	Describes how to configure VAX P.S.I. and VAX P.S.I. Access for a DECnet/OSI for OpenVMS VAX system.
Part III	Describes the pre-installation, installation, and configuration steps necessary to install X.25 for a DECnet/OSI for OpenVMS Alpha system.
Part IV	Describes the pre-installation, installation, and configuration steps necessary to install the OSI Applications: FTAM, VT, and OSAK.
Part V	Describes how to configure asynchronous connections and the NSP and OSI Transport Service.

Related Documents

The following books provide additional information.

- *DECnet/OSI for OpenVMS Installation and Basic Configuration*

  The first book to read in order to successfully install DECnet/OSI for OpenVMS. It also includes how to configure DECnet/OSI using the BASIC configuration and information about name services.

- *DECnet/OSI for OpenVMS Introduction and User's Guide*

  Introduces the DECnet/OSI for OpenVMS features and tools, and how to use and manage a DECnet/OSI for OpenVMS end system. Also provides a comprehensive glossary of DECnet/OSI terminology.

- *DECnet/OSI Planning Guide*

  Explains in detail the transition from DECnet Phase IV to DECnet/OSI, providing configuration guidelines and planning tasks.

- *DECdns Management*
- *DECnet/OSI DECdts Management*
- *DECnet/OSI Network Management*
- *X.25 for OpenVMS Configuration Guide*
- *DECnet/OSI FTAM and Virtual Terminal Use and Management*
- *OpenVMS License Management Utility Manual*
- *OpenVMS System Management Utilities Reference Manual*
- *OpenVMS VAX Version 6.3 Upgrade and Installation Manual*
- *OpenVMS Alpha Version 6.3 Upgrade and Installation Manual*
- *DECwindows Motif Version 1.2-3 for OpenVMS Installation Guide*
- *OpenVMS Backup Utility Manual*

Terminology

The following terms are used interchangeably in this book.

- Alpha and AXP
- Transition and migration
- Phase IV and DECnet™ Phase IV
- End system and end node
- Intermediate system and router
- DECnet/OSI and Phase V

Conventions

The following conventions are used in this book.

Convention	Meaning
`special type`	Indicates a literal example of system output or user input. In text, indicates command names, keywords, node names, file names, directories, utilities and tools.
UPPERCASE	Indicates keywords that you enter. You can type the characters in uppercase or lowercase. You can abbreviate command keywords to the smallest number of characters that OpenVMS, NCP, NCL, or the other tools accept. Uppercase also indicates the names of files, directories, utilities, tools, commands, parameters, and procedures.
italic type	Indicates a variable.
bold	Indicates a new term defined in the text or important information.
Return	Indicates that you press the Return key.
Ctrl/*x*	Indicates that you press the Control key while you press the key noted by *x*.
[YES]	Brackets indicate that the enclosed item is a default value in an installation prompt.
{ }	In command format descriptions, indicates you must enter at least one listed element.

How To Order Additional Documentation

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Table 1 Telephone and Direct Mail Orders

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Internal Orders	DTN: 264-3030 603-884-3030	Fax: 603-884-3960	U.S. Software Supply Business Digital Equipment Corporation 10 Cotton Road Nashua, NH 03063-1260

Part I

ADVANCED Configuration for DECnet/OSI for OpenVMS

Part I describes the steps necessary to use the ADVANCED configuration option for DECnet/OSI for OpenVMS. It includes the following chapters:

- Chapter 1 — Using the ADVANCED Configuration Option
- Chapter 2 — Managing Name Services
- Chapter 3 — Modifying a Current Configuration

1 Using the ADVANCED Configuration Option

This chapter describes how to configure the DECnet/OSI for OpenVMS base components using the ADVANCED configuration option so that the system becomes a DECnet/OSI end system on a network. The ADVANCED configuration option allows you to customize your system's network configuration.

If you have already configured the DECnet/OSI for OpenVMS software and you want to modify the configuration, see Chapter 3.

1.1 Invoking the ADVANCED Configuration Option

To invoke the `net$configure.com` procedure using the ADVANCED configuration option, enter the following command:

```
$ @sys$manager:net$configure advanced
```

The procedure starts:

```
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   DECnet/OSI for OpenVMS ADVANCED network configuration procedure

This procedure will help you create or modify the management scripts
needed to operate DECnet on this machine. You may receive help about
most questions by answering with a question mark '?'.

You have chosen the ADVANCED configuration option.  This option enables
you to do some specific tailoring of your system's network configuration
by answering some specific questions.  If you do not want to do specific
tailoring of your system's network configuration but instead want to
quickly configure your system using most of the default answers, you
should invoke NET$CONFIGURE.COM with the BASIC configuration option, ie:
               @SYS$MANAGER:NET$CONFIGURE BASIC

* Do you want to continue?                             [YES] :
```

Press Return to continue with the `net$configure` ADVANCED configuration option.

The following illustrates the main menu options from which you can choose:

```
        Configuration Options:

        [0]     Exit this procedure

        [1]     Perform an entire configuration
        [2]     Change naming information
        [3]     Configure Devices on this machine
        [4]     Configure Transports
        [5]     Configure Timezone Differential Factor
        [6]     Configure Event Dispatcher
        [7]     Configure Application database
        [8]     Configure MOP Client database
        [9]     Configure Cluster Alias

* Which configuration option to perform?                [1] : 1
```

If you select Option 1, the procedure informs you that this is the first time you are configuring your system to use DECnet/OSI for OpenVMS:

```
%NET$CONFIGURE-I-SETUPNEW, setting up for new configuration
```

If a Phase IV database exists on the system, the following message displays:

```
%NET$CONFIGURE-I-PHASEIVDATA, Phase IV DECnet database found
```

You have the option of using the existing Phase IV database to generate the Network Control Language (NCL) scripts and configure the system. If you do not want to use the existing Phase IV database to generate the NCL scripts and configure the system, then `net$configure` configures the system based on your answers to the configuration questions.

```
* Do you want to convert Phase IV databases?            [NO]:
```

If you answer YES, the `net$configure` procedure uses the system's existing Phase IV database to generate NCL scripts and configure the system.

If you answer NO, the `net$configure` procedure does not use the system's existing Phase IV database to generate NCL scripts and proceeds to ask all the configuration questions. If you need more information to answer a question, you can type ? at the prompts. To configure DECnet, you need to know your node's full name and network address or addresses.

1.2 Directory Name Services

DECnet/OSI provides access to the node name and addressing information stored in one or more name services. DECnet/OSI supports the following directory name services:

- Local namespace — A discrete, nondistributed namespace that stores name and address information locally in database files, the Local namespace replaces the DECdns Local Naming Option (LNO). It also has the ability to hold 100,000 nodes, and can scale beyond that number. The actual number of nodes that the Local namespace can hold depends on the space available on your system. For more detailed information on namespaces, refer to Section 2.1.
- DECdns distributed namespace — Digital's Distributed Name Service, DECdns is a distributed, global name service. For more information, refer to Section 2.1.2.

- Domain Name System — The Domain Name System (DNS/BIND) is supported for storage of IP addresses. For more information refer to Section 2.1.3.

If you choose to enter more than one directory name service for your system, enter them in order of priority. The ordering of this list is **very** important: the first directory service entered in this list is considered the primary directory service to use on the system. The primary directory service is considered the first choice to use when looking up naming information for the system.

Enter an ordered list of the directory services you want to use on the system. If you enter more than one directory service, separate each service with a comma.

For example, if you enter `LOCAL,DECDNS,DOMAIN` at the prompt, this means the following:

- You want to use the name services DECdns, Local, and DNS/BIND.
- The primary name service is DECdns.
- The secondary name services are Local and DNS/BIND.

Note

If your node is also a DECdns server, the primary name service must be DECdns.

```
* Enter the directory services to use on the system [LOCAL,DECDNS,DOMAIN] :
```

1.2.1 Node Full Name

Enter a node full name for each directory service chosen. The node full name is the name of your system's node object in the directory service. It includes the namespace nickname and the full list of directories leading to the node object name. Examples of node full names include:

```
Local namespace -  LOCAL:.TomThumb
DECdns          -  ACME:.wabbit.Elmer
Domain          -  elmer.wabbit.acme.edu
```

For the Local namespace, the namespace nickname LOCAL is prepended to the full name and is terminated with a colon (:). The namespace nickname LOCAL means that the Local namespace is used. The node object name must begin with a dot (.), and no element of the name (namespace name, directory, or node object name) can be a null string. Note that the namespace nickname LOCAL is reserved, and indicates that the Local namespace is used on this system. For example, if you enter "DECdns,Local,Domain" at the previous prompt, you will be asked for a DECdns full name, a Local full name, and a fully qualified host name for DNS/BIND.

```
* Enter the full name for directory service LOCAL   : LOCAL:.ELMER

* Enter the full name for directory service DECDNS  : ACME:.WABBIT.ELMER

* Enter the fully qualified host name for DNS/BIND  : ELMER.WABBIT.ACME.EDU
```

1.2.2 Node Synonym

The node synonym is an alphanumeric character string between one and six characters long. The first character must be an alphabetic character; after the first character, the string can contain either alphabetic or numeric characters.

If this system had previously been running DECnet Phase IV software, then you should use the old Phase IV node name as the synonym. If this system is joining a DECnet network for the first time, you can use any name for the synonym, as long as it meets the criteria listed above, and is unique within the network.

```
* What is the synonym name for this node?           [ELMER] :
```

For more information on node synonym directories, see Section 2.4.

1.2.3 Naming Cache Timeout Value

A naming cache is used to improve the performance of node name address resolution. This cache supersedes the existing DECdns cache and is used when looking for addresses in the Domain and Local services, in addition to DECdns. Note that other applications that use DECdns directly continue to use the DECdns cache.

The naming cache includes a mechanism to "time out" old entries. In this way, these entries are refreshed periodically to accurately reflect the actual network environment.

```
* Naming cache timeout value?                  [30-00:00:00] :
```

You have the option to set a value for the naming cache timeout interval. Enter any legal OpenVMS delta time value (the default is 30 days).

1.2.4 Naming Cache Checkpoint Interval

Periodically, DECnet/OSI saves a snapshot of the in-memory naming cache to disk. This allows systems, during startup, to have a naming cache that is already populated with entries, thereby preserving the contents of the naming cache across system reboots.

```
* Naming cache checkpoint interval?               [08:00:00] :
```

You have the option of setting the naming cache checkpoint interval. Enter any legal OpenVMS delta time value (the default is 8 hours). If you want to change the frequency of this checkpoint operation, enter the following NCL comand:

```
$ mcr ncl set session control naming cache checkpoint interval 12:00:00
```

1.2.5 Specifying a Phase IV-Compatible Address

If you want your system to communicate with Phase IV nodes, you must specify a Phase IV address and a Phase IV prefix. These will be used to construct a DECnet Phase IV-compatible address.

A DECnet Phase IV-compatible address is a DECnet/OSI address (NSAP) that conforms to the Phase IV area and node limits; that is, the area number is from 1 to 63, and the node number is from 1 to 1023.

If there are no Phase IV systems on your network or you do not want to communicate with Phase IV systems, you do not need a Phase IV-compatible address. Entering a Phase IV address of 0.0 at configuration time indicates that this DECnet/OSI system will not have a Phase IV-compatible address, and will not communciate with Phase IV nodes.

```
* Enter PhaseIV Address                          [15.27] :
```

Enter the Phase IV address you want to use, or enter 0.0 if you do not want to communicate with Phase IV nodes.

1.2.6 Specifying a Phase IV Prefix

The default value for the Phase IV prefix is 49:: which represents the private network IDP. This is appropriate for a Phase IV DECnet network that contains some DECnet/OSI systems. All nodes within a single addressing domain contain the same IDP in their network addresses.

If you are using a Phase IV prefix other than 49::, it **must** be assigned by an authorized standards organization, such as ANSI, or you must construct a Phase IV prefix that you know will be globally unique (based on your telephone number, for instance). If your organization has allocated its own Phase IV prefix, you can enter that value instead of 49::. The *DECnet/OSI Planning Guide* contains a detailed description of how to construct an IDP and how to apply to a standards organization for an IDP.

1.2.7 Configuring Network Addresses

Your system must have at least one unique network address in order to use DECnet/OSI communications features. DECnet/OSI systems can be multihomed; that is, they can have more than one network address. You can assign up to three network addresses to your system.

Having multiple addresses allows you to have both a DECnet/OSI extended address and a Phase IV-compatible address, so you can communicate with both Phase IV and DECnet/OSI systems on the same network. It also allows you to belong to more than one OSI network. This feature is particularly useful when you want to combine two (or more) networks. Rather than assign new addresses to all systems in both networks to reflect the new combined network, those systems that participate in both networks can have an address in each one.

Network addresses are sometimes referred to in OSI terminology as network entity titles (NETs). NETs are network service access points (NSAPs) with a selector of 00. There are two ways to configure NETs: by autoconfiguring addresses or by manually configuring addresses.

Note

If you have an OSI router from a supplier other than Digital Equipment Corporation adjacent to your system, do not choose autoconfiguration unless you know that the router uses NETs with a selector of 00. This restriction applies even if you have a Digital Equipment Corporation WANrouter as well as another supplier's OSI router on the same LAN. OSI routers that specify NETs differently can cause you to autoconfigure your network addresses incorrectly. If you have such a router, you must choose to manually configure your NETs by answering NO to the autoconfiguration question.

Choice 1: Autoconfiguring Addresses

If you want to have your network address autoconfigured for you, answer YES to the following question during network configuration when using the `net$configure` tool:

```
* Autoconfigure network addresses?                     [YES] :
```

Choice 2: Manually Configuring Addresses

You can assign a maximum of three network addresses to the system including the Phase IV network address.

To create a NET manually, you need to know your system's network IDP, network local area, and node ID.

For example, given the following information:

A network IDP of `41:45436192:`
A network local area of `43`
A node ID of `258`

The NET is constructed as follows:

```
IDP and selector    = 41:45436192:local-area:node-id:00
43 decimal          = 2B    hexadecimal (local area)
(43 * 1024) + 258   = 44290 decimal
44290 decimal       = AD02  hexadecimal
AD02 swapped        = 02AD  hexadecimal (node ID)
```

```
The resulting NET is 41:45436192:00-2B:AA-00-04-00-02-AD:00
```

Note

NETs can be entered in OSI format, DNA format, or hexadecimal format. Make sure you include the 00 selector when you manually specify a NET.

For more information on how to construct DNA and OSI NETs, see the chapter on NSAPs in the *DECnet/OSI Planning Guide*.

1.2.8 DNA Address Format

You have the option of setting the value of the routing characteristic "DNA Address Format" to either TRUE or FALSE.

```
* DNA Address Format                                  [TRUE] :
```

The Digital Network Architecture (DNA) Address Format attribute controls the interpretation of address structuring. It does not control autoconfiguration. To control autoconfiguration, you need to use the Manual Network Entity Titles attribute by manually adding or removing NETs.

1.2.9 Segregated Mode Routing and Integrated Mode Routing

You have the option of using integrated mode routing or segregated mode routing. If you answer NO to this question, you will default to Integrated mode.

```
* Do you want to use segregated mode routing?          [NO] :
```

Integrated mode is the only mode in which pre-Version 6.0 versions of DECnet /OSI will operate. Adjacent DECnet/OSI or Connectionless Network Protocol (CLNP) routers are used rather than Phase IV routers, if available. Most customers using Digital routers should continue using this mode of operation.

Integrated mode routing works in the following way:

If a DECnet/OSI router is present, the packet is sent to it. If a DECnet/OSI router is not present, a check is made to determine if the packet is Phase IV-compatible. If the packet is Phase IV-compatible, then it checks to see if a Phase IV router is present. If it is, the packet is sent to the Phase IV router. If there is no Phase IV router present, the packet is sent directly in Phase IV format to the destination end system and multicast to all end systems in DECnet/OSI format.

If the packet is not Phase IV-compatible and a DECnet/OSI router is not present, the packet is multicast to all end systems in DECnet/OSI format.

If you answer YES to this question, you will enter Segregated mode. **Segregated mode** directs routing to choose a Phase IV router for those packets whose destination address can be translated to Phase IV format. All other packets are sent to a DECnet/OSI router. This allows customers to operate their OSI and DECnet Phase IV networks separately. To configure your node to use segregated mode, you must invoke `net$configure` in ADVANCED mode. If you are using non-Digital routers that do not use DECnet/OSI to Phase IV translation software, you may want to use this option.

Segregated mode routing works in the following way:

A special check is made on the packet to determine if the packet is Phase IV translatable. If the packet is Phase IV translatable, it translates the packet. It then sends the translated Phase IV packet (or the DECnet/OSI packet if it could not be translated) to the appropriate router if a Phase IV or DECnet/OSI router is present. If no suitable router is present, the packet is sent directly to the destination end system. (Essentially, Phase IV-compatible packets are routed via the Phase IV backbone, and extended address packets are routed via the DECnet/OSI backbone.)

```
* Routing default ESHello Timer?                        [600] :
```

The default ESHello Timer attribute determines the interval, in seconds, when the end system (ES) sends out its hello. This interval multiplied by three is the amount of time the other end of a routing adjacency will wait before determining that this system is no longer able to accept connections.

1.3 Configuring Devices

The `net$configure` procedure checks for network devices on the system that are supported by `net$configure` and then configures them. If the procedure finds that you have WANDD or X.25 installed but not configured, you will see the following information:

```
You have installed wide area device support, but it has not been
configured.  You may configure it now if you want.

* Do you want to configure Wide Area devices?         [YES] : N
%NET$CONFIGURE-I-SCANCONFIG, scanning device configuration - please wait
```

Answer YES if you want to configure WANDD.

Note

If you answer NO to configuring wide area devices, you will not see any information regarding X.25 or P.S.I. configurations.

1.3.1 Configuring Asynchronous Connections

If you have installed and configured WANDD software on this system, you have the option of configuring it to support asynchronous connections.

```
* Do you want asynchronous datalink support?           [NO] :
```

You now need to supply names for the data links and routing circuits you have on your system. Specify the simple name that you want to use for each data link and routing circuit.

```
* Data Link name to use for ESA0 (DESVA)?         [CSMACD-0] :
* Routing Circuit Name for Data Link 'CSMACD-0'?  [CSMACD-0] :
```

For more information on configuring asynchronous connections, see Appendix A.

1.3.2 FDDI Large Packet Support

If you have an FDDI-type circuit on your system, you have the option of enabling FDDI large packet support. (A large packet is 4KB in size, where an Ethernet packet is 1500 bytes in size.) FDDI large packet support allows you to fully use the bandwidth of FDDI. (A DECnet/OSI router on the LAN, preferably on the FDDI, is required to enable large packet support.)

If you choose not to enable FDDI large packet support on the system, the FDDI circuit uses the bandwidth of Carrier Sense, Multiple Access with Collision Detection (CSMA-CD) instead.

If there is an FDDI-type circuit on the system, the procedure displays the following message:

```
An FDDI-type circuit has been found on the system.  You have the
option of enabling FDDI large packet support on the system.  Note
that a DECnet/OSI router on the LAN (preferably on the FDDI) is
required in order to use FDDI large packet support.
```

```
* Enable FDDI large packet support?                    [NO] :
```

If you want to enable FDDI large packet support, answer YES.

1.3.3 Configuring an Alpha System

1. For an Alpha system, the procedure displays the following information:

   ```
   DEC X.25 software has been installed on this system.  You have
   the option of configuring DECnet to run over X.25.
   ```

   ```
   * Do you want to configure DECnet over X.25?           [NO] :
   ```

   Answer YES if you want to configure DECnet over X.25.

   If you answer YES, you will see a list of choices for the type of X.25 circuit to use:

   ```
       Types of X.25 circuits:

        [1] - X.25 Dynamic Assigned (DA)
        [2] - X.25 Static Incoming (IN)
        [3] - X.25 Static Outgoing (OUT)
        [4] - X.25 Permanent (PVC)

   * Which type of X.25 circuit do you want to use?            : 4
   ```

This prompt allows you to select the type of routing circuit you want to use over X.25. The menu offers four choices:

- A dynamically assigned routing circuit (Menu Option 1) operates over a number of X.25 switched virtual circuits (SVCs), both incoming and outgoing.
- A static incoming routing circuit (Menu Option 2) operates over a single incoming X.25 switched virtual circuit (SVC).
- A static outgoing routing circuit (Menu Option 3) operates over a single outgoing X.25 switched virtual circuit (SVC).
- A permanent routing circuit (Menu Option 4) uses a permanent virtual circuit (PVC) instead of an SVC.

Enter the number for the type of circuit you want.

2. The procedure then asks for information about the routing circuit.

```
* Routing Circuit Name to use?                    [X25-PVC-0] :
```

Specify the simple name you want to use for the routing circuit. You can use the default or you can supply a name (for example, X25-PSI-0).

3. The procedure then asks for a template name to use for the circuit you just specified.

```
* Template name?                                  [X25-PVC-0] :
```

Specify the simple name of an X25 Access template. A default name is provided or you may enter your own name (for example, X25-DA-1).

All X.25 routing circuits use an X25 Access template to either make or accept a network connection.

- For a static outgoing (OUT) circuit, the X25 Access template must specify DTE class, destination DTE address, and call data. The X25 Access template can also specify other call characteristics to make the outbound network connection.
- For a static incoming (IN) routing circuit, the X25 Access template can specify call characteristics to accept the inbound network connection.
- For a dynamically assigned (DA) routing circuit, the X25 Access template must specify DTE class and call data. The X25 Access template can also specify other call characteristics to make the outbound or accept the inbound network connections.

Use the X.25 configuration program to configure X25 Access templates.

4. If you chose to configure an X.25 dynamically assigned (DA) circuit or an X.25 static incoming (IN) circuit, the procedure asks for a filter name.

```
* Filter name?                                     [X25-DA-0] :
```

Specify the simple name of an X25 Access filter. You may accept the default or you may enter your own name (for example, X25-IN-0).

Static incoming and dynamically assigned X.25 circuits use an X25 Access filter to receive inbound network connections.

For a static incoming circuit, the X25 Access filter must specify inbound DTE class, sending DTE address, call data value, and call data mask.

For a dynamically assigned circuit, the X25 Access filter must specify inbound DTE class, call data value, and call data mask.

Use the X.25 configuration program to configure X25 Access filters.

5. If you choose to configure an X.25 dynamic assigned (DA) circuit, the procedure displays this prompt:

```
* Do you want to configure any reachable addresses?     [NO] :
```

If you answer NO, the procedure skips to the question, "Configure another PSI routing circuit for DECnet?".

If you want to configure any Reachable Address subentities, answer YES. The procedure displays the following prompt:

```
* Reachable address name?                                    :
```

Specify the simple name of the reachable address subentity that you want to create (for example, ACCOUNTS_DEPT).

6. The procedure then asks for the reachable address prefix:

```
* Reachable address prefix                                   :
```

The reachable address subentity name is used to select the remote DTE address to where a routing packet is sent. The selection is done by finding a reachable address subentity that has an address prefix matching the beginning of the remote NSAP in the routing packet.

Specify the address prefix for this reachable address entity. The address prefix is a string of characters that is a valid beginning of an NSAP (for example, 41:45436192:). The address prefix matches all NSAPs.

7. The procedure then prompts for the reachable address data terminal equipment (DTE) list:

```
* Reachable address dte list?                                :
```

You can configure a reachable address subentity with one or more DTE addresses. If more than one DTE address is configured, then only one is selected each time a packet is sent. All the remote DTE addresses must be accessible by the DTE class configured in the X25 Access template already configured for the associated dynamic assigned circuit.

Specify the list of remote DTE addresses for this reachable address entity. A DTE address consists of 1 to 15 decimal characters. The DTE addresses in the list should be separated by commas (for example, 2,3,4).

8. The procedure then prompts for additional reachable addresses:

```
* Any more reachable addresses you wish to configure?   [NO] :
```

If you want to configure another reachable address subentity for this circuit, answer YES.

9. When you have entered the circuit, template, and filter names and you have specified the appropriate reachable address information, the procedure asks if you want to configure any other circuits.

```
* Configure another PSI routing circuit for DECnet?     [NO] :
```

If you do not want to configure any other PSI routing circuits, press Return for the default ([NO]). The configuration procedure continues with the next series of questions (such as FDDI large packet support or transports, for example).

10. If no devices are found on the Alpha system, the procedure displays the following prompt:

```
* Should a SYSMAN IO AUTO be executed?                        :
```

If you answer YES, the net$configure procedure invokes the SYSMAN IO AUTO command to find devices on the system. If you answer NO, there are no devices to configure.

1.3.4 Configuring a VAX System

If you answer YES to the question, "Do you want to configure wide area devices?" and you are using a VAX system, the procedure displays the following information:

```
The VAX P.S.I. software has been installed on this system.  You have
the option of configuring DECnet over P.S.I. (i.e., configuring
DECnet over X.25 datalink mapping).

* Do you want to configure DECnet over P.S.I.?         [NO] :
```

Answer YES if you want to configure DECnet over P.S.I. If you answer YES, the procedure displays the following list of choices:

```
     Types of X.25 circuits:

     [1] - X.25 Dynamic Assigned (DA)
     [2] - X.25 Static Incoming (IN)
     [3] - X.25 Static Outgoing (OUT)
     [4] - X.25 Permanent (PVC)

* Which type of X.25 circuit do you want to use?            :
```

The procedure continues to ask for information. Refer to Section 1.3.3 for the types of questions you will see and possible responses you can enter. This section also provides detailed information about X.25 circuits, templates, and filters.

If no devices are found on the VAX system, the procedure displays the following prompt:

```
* Should a SYSGEN AUTOCONFIGURE ALL be executed?            :
```

If you answer YES, the net$configure procedure invokes the SYSGEN AUTOCONFIGURE ALL to find devices on the system. If you answer NO, there are no devices to configure.

1.4 Configuring the Network Service Protocol (NSP) Transport

If you want the system to communicate with DECnet Phase IV nodes, answer YES to the following question.

```
* Configure the NSP Transport?                        [YES] :
```

If you answer NO, the procedure still loads the NSP Transport image. However, NSP Transport is not configured or usable until you run the net$configure procedure and answer YES to the question, "Continue the NSP Transport?"

To determine the maximum number of active transport connections allowed at any one time to this transport, the procedure displays the following prompt:

```
* Maximum number of logical links?                    [200] :
```

You are then prompted to set the following values:

```
* Maximum transmit and receive window?                [20] :
```

```
* Maximum receive buffers?                          [4000] :
```

Digital recommends setting a value of 20 for the `maximum transmit and receive window` option. The recommended value to set the `maximum receive buffers` is no more than (`maximum window` × `maximum transport connections`) for normal network operation in a typical network environment.

Selecting other values than these can significantly alter the behavior of your system and network and should only be done after a thorough analysis of your network traffic and application requirements.

High values of maximum receive buffers may require considerable buffering capacity on your node; therefore, a non-paged pool should be allocated accordingly. If your node does not have enough non-paged pool, maximum receive buffers should be set to a smaller value than (`maximum window` × `maximum transport connections`).

The transport receiver's window is determined by a combination of `maximum transport connections`, `maximum receive buffers`, and `maximum window`. During the life of the connection, the receiver quota fluctuates according to the value of (`maximum receive buffers` ÷ `currently active connections`). The credit window sent to the remote transmitter may or may not be this quota value, depending on the value of maximum window. If maximum window is set to less than the determined receiver quota, this value is used instead for the credit granted to the remote transmitter.

The transmitter of a transport connection uses the credit sent by the remote receiver as its transmit window, unless its maximum window is a lower value. In that case, maximum window is used for the transmitter window.

1.5 Configuring the OSI Transport

If you want the system to communicate with DECnet/OSI nodes or if you plan to install the OSAK, FTAM, or VT software, answer YES. If you want to use the DECnet over TCP/IP and/or OSI applications over TCP/IP, answer YES.

```
* Configure the OSI Transport?                       [YES] :
```

If you answer NO the procedure still loads the OSI Transport images. However, OSI Transport is not configured or usable until you run the `net$configure` procedure and answer YES to the OSI Transport question.

To determine the maximum number of active transport connections allowed at any one time to this transport, the procedure displays the following prompt:

```
* Maximum number of logical links?                   [200] :
```

You are then prompted to set the following values:

```
* Maximum transmit and receive window?                [20] :
```

```
* Maximum receive buffers?                          [4000] :
```

Digital recommends setting a value of 20 for the `maximum transmit and receive window` option. The recommended value to set the `maximum receive buffers` is no more than (`maximum window` × `maximum transport connections`) for normal network operation in a typical network environment.

Selecting other values than these can significantly alter the behavior of your system and network and should only be done after a thorough analysis of your network traffic and application requirements.

High values of maximum receive buffers may require considerable buffering capacity on your node; therefore, a non-paged pool should be allocated accordingly. If your node does not have enough non-paged pool, maximum receive buffers should be set to a smaller value than (`maximum window` × `maximum transport connections`).

The transport receiver's window is determined by a combination of `maximum transport connections`, `maximum receive buffers`, and `maximum window`. During the life of the connection, the receiver quota fluctuates according to the value of (`maximum receive buffers` ÷ `currently active connections`). The credit window sent to the remote transmitter may or may not be this quota value, depending on the value of maximum window. If maximum window is set to less than the determined receiver quota, this value is used instead for the credit granted to the remote transmitter.

The transmitter of a transport connection uses the credit sent by the remote receiver as its transmit window, unless its maximum window is a lower value. In that case, maximum window is used for the transmitter window.

You are then prompted:

```
* Run OSI Applications over TCP/IP?                    [YES] :
```

Answer YES to this question if you want to run any of your OSI applications over TCP/IP. This will cause the configuration utility to build the appropriate RFC1006 template and establish a listener port for Port 102.

```
* Run DECnet over TCP/IP?                              [YES] :
```

Answering YES to this question enables DECnet/OSI to run over a TCP/IP network to any system that has enabled this same feature. The configuration utility will build the appropriate RFC1006+ template and establish a listener port for Port 399.

If you answered YES to the "Configure the OSI Transport?" question, the procedure displays the following prompt:

```
* Username for OSI loopback test application to use? [SYSTEST] :
```

Press Return to accept the default user name for the application loopback test account. The procedure displays a message stating that the default OSI templates have been created.

```
%NET$CONFIGURE-I-CREDEFOSITEMPLATE, created default OSI templates
* Do you want to create additional OSI templates?       [NO] :
```

If you configure OSI Transport, `net$configure` automatically creates the default OSI templates required by the OSAK and FTAM installation and verification procedures (IVPs).

If you answer YES to the previous prompt, the procedure displays prompts to obtain the information required to configure the OSI template; otherwise, the procedure skips to the Event Dispatcher question (see Section 1.7).

```
* Type of network service (CLNS/CONS/RFC1006)?        [CLNS] :
```

For more information on configuring the OSI Transport, see Appendix B.

1.5.1 Congestion Avoidance

One feature of OSI Transport is the ability to use the Congestion Experienced field in the Connectionless-mode Network Service (CLNS) routing header, and to implement a Congestion Avoidance scheme in heavily congested networks. The CLNS Congestion Experienced field is used by routers that support this feature (such as DECNIS) to give an early indication of congestion. When OSI Transport receives data that passed through a network path where the Congestion Experienced bit is set, OSI Transport reduces the transmit rate of the sending end system to help alleviate network congestion.

This feature works well in networks where all protocols support Congestion Avoidance mechanisms. However, it has been noted that in some heavily congested multi-protocol networks, this feature can negatively impact the performance of DECnet compared to other protocols.

Digital recognizes that most of its customers have multi-protocol networks. In this environment, not all network protocols have Congestion Avoidance mechanisms. Therefore, the default of this characteristic has been changed to disabled.

If you operate in an environment where you can take advantage of Congestion Avoidance mechanisms, Digital recommends that you enable the feature again.

You are asked a new question about multi-protocol networks:

```
* Is this system operating in a multi-protocol network? [YES] :
```

If you take the default answer of YES, then the OSI Transport Congestion Avoidance characteristic are set to FALSE.

A NO answer to this question sets the characteristic to TRUE.

To change Transport Congestion Avoidance values, you must invoke `net$configure` in ADVANCED mode and use Option 4 (Configure Transports) and answer NO to the question.

1.5.2 Selecting A Network Service

If you want to use Connectionless-mode Network Service (CLNS), press Return. If you want to use Connection Oriented Network Service (CONS), enter `CONS`. If you want to use DECnet over TCP/IP and/or OSI applications over TCP/IP enter `RFC1006`.

For more information about types of network service, refer to the *DECnet/OSI Network Management* guide or type a question mark (?) at the prompt.

Depending on which network service you select, you will see one of the following prompts:

```
* Name of the OSI template?              [OSIT$CLNS_Default0] :

* Name of the OSI template?              [OSIT$CONS_Default0] :

* Name of the OSI template?              [OSIT$RFC1006_Default0] :
```

Enter the name you want to use for the OSI template (for example, OSI_TEMPLATE_1) or press Return to accept the default OSI template name.

```
* Will this template be used for inbound packets?           :
```

If you want this template to be used for inbound connections, enter YES. If you want this template to be used for outbound connections, enter NO.

```
* Transport Classes to support?                      [4] :
```

Enter the number of the Transport Protocol class you want to use for this template. DECnet/OSI for OpenVMS supports three Transport Protocol classes: 0, 2, and 4. If you select CONS as the network service type, the default is 0,2,4. If you select CLNS, the default is 4. If you select RFC1006, the default is 0,2. You can also configure multiple OSI templates. For more information about Transport Protocol classes, refer to the *DECnet/OSI Network Management* guide or type a question mark (?) at the prompt.

1.5.2.1 CLNS Network Service

If you select the network service CLNS, you will see the following prompt:

```
* Use full CLNP or Null Internet?           [Full CLNP] :
```

A CLNS OSI Transport template can specify use of Internet/ES-IS routing protocols or Null Internet routing protocol. The Null Internet protocol only operates over LAN routing circuits.

A CLNS OSI Transport template for use with Internet/ES-IS routing protocols can use any routing circuits configured; the Routing module determines the most suitable circuit to use. A CLNS OSI Transport template for use with Null Internet routing protocol can only use one routing circuit; routing circuit selection is based on its inactive area address.

If you want to create additional OSI templates and you answer Null Internet to the "Use full CLNP or Null Internet?" prompt, the procedure displays the following prompt:

```
* Which routing circuit is this Null Internet template for?  [CSMACD-0] :
```

Enter the routing circuit you want to use for the CLNS OSI Transport template (for use with Null Internet routing protocol).

```
* Which CLNS Inactive Area to use?                   [49::FF-00] :
```

A CLNS OSI Transport template that specifies the Null Internet routing protocol selects the routing circuit based on the inactive area address of the routing circuit.

If you plan to support Null Internet routing, you must configure an inactive area address for the circuit. The inactive area address for the circuit must be different than any area addresses used by DECnet/OSI routers on the same LAN. If you plan to configure more than one LAN routing circuit on this system, and you need Null Internet on each circuit, then each circuit should have a different inactive area address.

The CLNS inactive area must be the same as the inactive area set in routing for Null Internet to be used.

1.5.2.2 CONS Network Service

If you selected CONS as the network service type, the procedure displays the following prompt:

```
* CONS template name?                                          :
```

Enter the CONS template name you want to use.

The CONS template name must be the same as the name used for the X25 Access template for you to make any CONS connections.

If the CONS template is used for inbound packets, you will see the following prompt:

```
* CONS filter name?                                          :
```

Enter the CONS filter name you want to use. The CONS filter name should be the same as the name being used for the X25 Access filter. If it is not, you will not be able to make any CONS connections.

For the network services CLNS, CONS, and RFC1006, the following prompts are displayed:

```
* Allow use of expedited data?                         [YES] :
```

If you want to support the use of expedited data, answer YES.

```
* Allow use of Checksums?                              [YES] :
```

If you want to use the error correction feature, answer YES.

1.5.2.3 RFC1006 Network Service

If you select the network service RFC1006, you will see the following prompt:

```
* Local RFC1006 port number?                           [102] :
```

Enter the outgoing port number to use when establishing a transport connection at the TCP level. For pure RFC1006, use 102 as the port number. If you want to use DECnet over TCP/IP, use 399 as the port number.

If the RFC1006 template is used for inbound packets, you will see the following prompt:

```
* RFC1006 listener port number?                        [102] :
```

Enter the incoming port number to use when establishing a transport connection at the TCP level. This number must be the same as the local RFC1006 port number for the template to be used for inbound traffic.

```
* Do you want to create additional OSI templates?       [NO] :
```

This prompt allows you to create additional customized OSI templates. If you answer YES to this prompt, the template questions are repeated. If you answer NO, the procedure proceeds to the Event Dispatcher question.

For more information on configuring DECnet/OSI over TCP/IP, and the OSI applications over TCP/IP, refer to Section B.4.3.

1.6 Configuring Time Zone Differential Factors

The DECdts software needs to determine which time zone rule (TZR) you want to use. You need to answer a number of questions for DECdts to configure the time zone for your system.

```
        Timezone Options:

        [0] Exit Timezone Configuration

        [1] Choose a timezone using menus
        [2] Use Universal Coordinated Time (UTC)
        [3] Type in your own timezone rule

* Enter an option number                                  [1]: 1
```

DECdts software offers three time zone options. Option 1 is most commonly used and is discussed here. For discussions of Options 2 and 3, refer to Section 3.7.2.2 and Section 3.7.2.3.

To choose the geographical region and conventional time zone rule, press Return to select Option 1. The procedure displays a menu of continental regions:

```
 Timezone Region Options:

[0] Return to Timezone Options menu

[1] Europe
[2] North America
[3] Central & South America
[4] Africa
[5] Asia
[6] South Pacific
[7] Antarctica

* Enter a timezone region number                            : 2
```

Enter the option number for the region where the system resides and press Return, or return to the previous menu by typing 0.

If you select a region, the procedure displays a menu of subregions within the region you select. For example, if you select Option 2 (North America), the procedure displays:

```
 Timezone Subregion Options:

[0] Return to Region Options menu

[1] US/Eastern
[2] US/East-Indiana
[3] US/Central
[4] US/Mountain
[5] US/Pacific
[6] US/Alaska
[7] US/Arizona
[8] US/Navajo
[9] US/Michigan
[10] US/Aleutian
[11] US/Hawaii
[12] US/Samoa
[13] Canada/Newfoundland
[14] Canada/Atlantic
[15] Canada/Eastern
[16] Canada/Central
[17] Canada/East-Saskatchewan
[18] Canada/Mountain
[19] Canada/Pacific
[20] Canada/Yukon

* Enter a timezone subregion number            :
```

Enter the option corresponding to the subregion where the system resides and press Return, or type 0 to return to the previous menu. The subregion you select from this menu determines the time zone rule for the system.

1.7 Configuring an Event Dispatcher

The Event Dispatcher is a utility to receive and display event messages. You can either take the default Event Dispatcher configuration, or you can choose to customize the Event Dispatcher configuration.

```
* Do you want to customize the Event Dispatcher?     [NO] :
```

Answer YES if you want to customize the Event Dispatcher configuration. Answer NO if you want the default Event Dispatcher configuration only.

If you answer YES, the procedure displays prompts that allow you to customize the Event Dispatcher. The specific prompts are listed and explained in Section 3.8.

If you answer NO, the procedure displays:

```
%NET$CONFIGURE-I-EVDDEFAULT, providing default Event Dispatcher configuration
```

If you chose the default Event Dispatcher configuration, you have the option of displaying the events that are logged to the console of this machine. If you do not want to see the events logged to the console of this machine, `net$configure` will block the events for you.

```
* Display the events logged to the console of this machine? [YES] :
```

1.8 Configuring an Application Database

The following questions determine if you want to set up and use a default account for application objects. You can create default accounts for the following applications: FAL, CML, MAIL, VPM, MIRROR, and PHONE.

```
* Do you want to use a default account for the 'FAL' application? [NO] :
```

File Access Listener (FAL) is an image that provides authorized access to the file system of a DECnet node on behalf of processes executing on any DECnet node in the network. FAL communicates with the initiating node by means of the Data Access Protocol (DAP). If you want an account set up or used for FAL, answer YES.

```
* Do you want to use a default account for the 'CML' application? [YES] :
```

CMIP Management Listener (CML) is the DECnet/OSI management module that implements the Common Management Information Protocol (CMIP). It is a utility that provides access to CMIP. If you want an account set up and used for CML, answer YES.

```
%NET$CONFIGURE-I-MAKEACCOUNT, this procedure creates user account CML$SERVER
```

```
* Do you want to use a default account for the 'MAIL' application? [YES] :
```

If you want to use the OpenVMS MAIL utility, answer YES.

```
%NET$CONFIGURE-I-MAKEACCOUNT, this procedure creates user account MAIL$SERVER
```

```
* Do you want to use a default account for the 'VPM' application? [YES] :
```

If you want the system to be a VMScluster node, answer YES. The VMScluster Performance Monitor (VPM) needs an account on your system to support the OpenVMS Monitor utility command `monitor cluster`. Answer NO if the system is to be a non-cluster end system.

If you answer YES, you will see the following message:

```
%NET$CONFIGURE-I-MAKEACCOUNT, this procedure creates user account VPM$SERVER
```

```
* Do you want to use a default account for the 'MIRROR' application? [YES] :
```

MIRROR is used for some forms of loopback testing. If you want to use MIRROR, answer YES.

```
%NET$CONFIGURE-I-MAKEACCOUNT, this procedure creates user account MIRRO$SERVER
```

```
* Do you want to use a default account for the 'PHONE' application? [YES] :
```

The PHONE utility allows users on the same or different OpenVMS systems to communicate interactively. If you intend to use the OpenVMS PHONE utility, answer YES.

```
%NET$CONFIGURE-I-MAKEACCOUNT, this procedure creates user account PHONE$SERVER
```

1.9 Configuring a Cluster Alias

The following steps describe how to configure a cluster alias.

1. If the node is a VMScluster member or if `net$configure` finds an alias NCL script on the system, the procedure prompts you to enter the full name of a cluster alias.

   ```
   * Full name of Cluster Alias                          : ACME:.WABBIT.HELP
   ```

   If you do not want the node to participate in a cluster alias, press Return.

   If you want the node to participate in a cluster alias, specify the full name that uniquely identifies the cluster alias node (for example, `ACME:.WABBIT.HELP`).

2. If you entered a cluster alias full name in response to the previous prompt, the procedure displays the following prompt:

   ```
   * Cluster Alias Phase IV Address (aa.nnnn OR AA-00-04-00-xx-xx) : 12.139
   ```

   Specify either the DECnet Phase IV node address or Ethernet physical address of the alias.

   The Phase IV node address has the format `area-number.node-number` (for example, 12.139).

   The Ethernet physical address has the format `AA-00-04-00-`*`xx-xx`*, where *`xx-xx`* is calculated from the Phase IV node address. To determine the Ethernet physical address, proceed as follows:

   a. Convert the Phase IV node address to its decimal equivalent as follows:

      ```
      (area-number * 1024) + node-number = decimal equivalent
      (For example, (12 * 1024) + 139 = 12427 decimal)
      ```

   b. Convert the decimal node address to its hexadecimal equivalent and reverse the order of the bytes to form the hexadecimal node address. For example:

      ```
      (12427 decimal = 308B hex, reversed = 8B30 hexnodeaddress)
      ```

   c. Incorporate the hexadecimal node address in the following format:

      ```
      AA-00-04-00-hexnodeaddress
      (For example, AA-00-04-00-8B-30)
      ```

3. If you entered a cluster alias full name and a Phase IV address, the procedure displays the following prompt:

```
* Selection weight for this cluster node [0 for satellites]  :
```

   The selection weight determines the number of sequential incoming connects passed to this alias member node in the round-robin sequence before proceeding to the next member node in the sequence. A value of zero means this node is not eligible to receive incoming connections to this alias address. Selection weight apportions incoming alias connections according to the capacity of each alias member. For example, nodes with greater capacity should have larger values of selection weight, while VMScluster satellites should generally have a value of zero. Specify a nonzero selection weight if this node is connected locally to a dual-ported disk, or if it will be serving any multihost disks, such as RFxx or HSC-connected disks, to other cluster members. Digital recommends values between 0 and 10.

4. The procedure then displays:

```
                   Summary of Configuration

 Node Information
        Directory Services Chosen:      DECDNS,LOCAL,DOMAIN
        Primary Directory Service:      DECDNS
        DECdns Full name:       ACME:.WABBIT.ELMER
        Local Full name:        LOCAL:.ELMER
        Fully Qualified
        Host name:              ELMER.WABBIT.ACME.EDU
        Node Synonym:           ELMER
        Phase IV Address:       15.27
        Phase IV Prefix:        49::
        Autoconfiguration of Network Addresses: Enabled

        Alias Name:     ACME:.WABBIT.HELP

 Device Information:
        Device: ESA0 (DESVA):
                Data Link name: CSMACD-0
                Routing Circuit Name:   CSMACD-0

 Transport Information:

       NSP Transport:                          Configured
          Maximum number of logical links:         200
          Maximum Transmit and Receive Window:     20
          Maximum Receive Buffers:                 4000

        OSI Transport:                         Configured
          Maximum number of logical links:         200
          Maximum Transmit and Receive Window:     20
          Maximum Receive Buffers:                 4000

        Congestion Avoidance Disabled

 Event Dispatcher Configuration:

        Sinks:            local_sink
        Outbound Streams: local_stream
        Phase IV Relay:   Enabled

* Do you want to generate NCL configuration scripts?   [YES] :
```

Answer YES to accept the configuration you just specified. The procedure automatically generates the NCL scripts and then configures the system according to the information you supplied.

```
%NET$CONFIGURE-I-CHECKSUM, checksumming NCL management scripts
```

Note

The `net$configure` procedure only provides checksums of those NCL management scripts it creates or modifies. It does *not* provide checksums of user-modified NCL scripts.

---

5. The procedure displays the following prompt:

```
 * Do you want to start the network?                   [YES] :
```

Answer YES if you want to start the network and complete your system's network configuration.

If you want to postpone starting the network, answer NO. When you answer NO, the procedure displays the following message:

```
*********************************************************************
You have decided not to start the network. NET$CONFIGURE.COM
cannot complete your system's network configuration since it needs
the network to be partially started in order to perform certain
operations.  As a result, your system may be left in an inconsistent
state if you try to startup the network manually or if you decide
to reboot your system.

Once you are ready to start the network, please invoke the
NET$CONFIGURE.COM procedure, choose menu Option 2 (Change node
name/namespace name), and respond YES to starting the network so
that the configuration procedure can finish your system's network
configuration.
*********************************************************************

Network Startup Incomplete
```

Digital recommends that you answer YES and start the network.

6. When you choose to start the network, the procedure displays information similar to the following:

```
  Copyright (c) Digital Equipment Corporation 1995. All rights reserved.
  .
  .
  .
  %NET$STARTUP-I-OPERSTATUS, DECnet/OSI for OpenVMS operational status is
  RUNNING-MAJOR

  sys$manager:net$dns_clerk_startup.ncl changed to use the new default namespac

  Your default namespace nickname is ACME.

  Your default namespace NSCTS is 08-00-2B-0D-2E-89-23-5B-15-9E-F1-85-95-00.

  Node 0
  at 1995-05-26-14:12:24.170-04:00I0.404

  %NET$CONFIGURE-I-NODERENAMED, node successfully renamed to ACME:.WABBIT.ELMER

  Directory Service: DECdns
```

7. You can ignore the `Error - Node name lookup failure` message during startup.

```
Error - Node name lookup failure
     ACME:.WABBIT.ELMER

Number of nodes reported on:  0

%NET$CONFIGURE-W-NODENOTREG, node is not completely registered yet in the
DECdns directory service

Directory Service: Local name file

Error - Node name lookup failure
     LOCAL:.ELMER

Number of nodes reported on:  0

%NET$CONFIGURE-W-NODENOTREG, node is not completely registered yet in the
LOCAL directory service
%NET$CONFIGURE-I-IMPORTFILECREATED, created the DECNET_REGISTER import file

Directory Service: DECdns

Updating nodes listed in SYS$MANAGER:DECNET_REGISTER_IMPORT_FILE_ELMER.TXT

Number of nodes registered: 1
Number of nodes modified:   0

%NET$CONFIGURE-I-REGSUCCESS, node has been successfully registered in the
DECdns directory service

Directory Service: Local name file

Updating nodes listed in SYS$MANAGER:DECNET_REGISTER_IMPORT_FILE_ELMER.TXT

Number of nodes registered: 1
Number of nodes modified:   0

%NET$CONFIGURE-I-REGSUCCESS, node has been successfully registered in the
LOCAL directory service

Node 0
at 1995-05-26-14:13:25.980-04:00I0.411

%NET$CONFIGURE-I-NODERENAMED, node successfully renamed to
ACME:.WABBIT.ELMER

Node 0 Session Control Tower Maintenance ACME:.WABBIT.ELMER
at 1995-05-26-14:13:35.360-04:00I0.411

%NET$CONFIGURE-I-TOWERSUPDATED, updated address towers for node

Node 0 Session Control Backtranslation Softlink *
at 1995-05-26-14:13:43.360-04:00I0.412

Node 0 Session Control Backtranslation Softlink *
at 1995-05-26-14:13:43.370-04:00I0.412

%NET$CONFIGURE-I-BCKTRNUPDATED, updated backtranslation softlink for node
%NET$CONFIGURE-I-CONFIGCOMPLETED, DECnet/OSI for OpenVMS configuration
completed
$
```

You have just completed the initial configuration of a DECnet/OSI for OpenVMS system. It should now be operational as an end system on the network. You can now use the `set host` command to connect to other network nodes.

2

Managing Name Services

If this is the first time you are configuring the DECnet/OSI for OpenVMS software on your system, the information in this chapter further explains some of the topics that appear as you run the configuration procedure.

2.1 Names Services Overview

DECnet/OSI includes a Local namespace. While configuring DECnet/OSI, the system administrator specifies one or more of the following directory name services to use on the node: the Local namespace, DECdns, or Domain (for DNS/BIND).

- Local namespace — A discrete, nondistributed namespace that stores name and address information locally in database files.
- DECdns — Digital's Distributed Name Service, a distributed, global name service.
- Domain Name System — The Domain Name System (DNS/BIND) supported for storage of IP addresses.

For more information on Name Services, refer to the *DECnet/OSI Planning Guide*.

2.1.1 The Local Namespace

DECnet/OSI includes a new Local namespace, independent of DECdns, that replaces functionality previously provided by the DECdns Local Naming Option (LNO). Depending on the number of address towers stored, the Local namespace is designed to scale to at least 100,000 nodes.

The Local namespace is a discrete, nondistributed namespace that exists on a single node and provides that node with a local database of name and address information. The prefix `LOCAL:` (or `local:`) is reserved to indicate that the information for the node is stored in the Local namespace. DECnet /OSI recognizes that when a node full name begins with `LOCAL:`, information for that node is stored in a Local namespace. The following are typical node full names properly formatted for the Local namespace: `LOCAL:.xyz.abc` and `local:.maximum`.

Unlike DECdns, the Local namespace does not employ backtranslation directories for address to node name translation.

2.1.1.1 Creating a Local Namespace

If you want to create a Local namespace, enter LOCAL:.*DirectoryPath.NodeObject* at the following prompt:

```
* Enter the full name for directory service LOCAL:
```

The directory path identifies the namespace subdirectory (if any). The node object is the system's node name.

2.1.1.2 Converting an Existing LNO Text File to a Local Namespace

The decnet_register_lno tool translates an existing LNO text file into a new Local namespace file. Run decnet_register_lno with the following command:

```
$ mcr sys$system:decnet_register_lno
```

This tool is supplied for backward compatibility only. You must have an existing LNO text file to use this procedure.

2.1.1.3 Managing the Local Namespace

The DECdns distributed namespace is no longer a requirement for DECnet/OSI and the new Local namespace is not dependent on DECdns. However, in this version the DECdns clerk software is still required on each node. You cannot use the DECdns Control Program (DNSCP) to manage information stored in the Local namespace. Instead, use decnet_register to manage the node name and address information stored in your namespace. The new decnet_register tool is described in the *DECnet/OSI Network Management* guide.

2.1.2 The Digital Distributed Name Service (DECdns)

DECdns is a network-wide service that makes it possible to use network resources without knowing their physical location. Users and applications can assign DECnet/OSI names to resources such as nodes. The creator of a name also supplies other relevant information, such as the resource's network address, for DECdns to store. Users then need to remember only the name, and DECdns acts as a lookup service, providing the rest of the data when necessary.

2.1.2.1 Creating a New Namespace

You only need to create a new DECdns namespace if you are configuring the first DECdns server for the network or if you are creating an additional namespace. If you already have a DECdns namespace, you do not need to create a new namespace to be able to run DECnet/OSI. However, if this is the first system in a network where no namespace exists and you do not intend to use the Local namespace, you must create (and populate) a DECdns namespace.

If you are unsure about whether you need to create a new namespace or configure your system as a server, see your network manager. For information about namespace planning, see the *DECnet/OSI Planning Guide*.

When you create a namespace, you need a namespace nickname and clearinghouse name. The namespace nickname is part of the full name of every subsequent system in the network and should be unique to your network. The namespace nickname that you specify becomes the actual name of the namespace. A clearinghouse is a collection of directory replicas that contains the names and addresses of objects (for example, servers, clerks, files).

Use the decnet_register manage command to invoke sys$manager:decnet_register_decdns.com to create the namespace directories before invoking net$configure.com to create the new namespace.

2.1.2.2 Creating a DECdns Namespace

If you select DECdns as a directory service, net$configure prompts you for the full name you want to use:

```
* Enter the full name for directory service DECDNS:   new_ns:.mrv042
```

If this is a new DECdns namespace, `net$configure` prompts you for more information once the configuration procedure completes and you have started the network. The startup information will be similar to the following:

```
%NET$STARTUP-I-OPERSTATUS, DECnet/OSI for OpenVMS operational status is RUNNING-
MAJOR

The namespace you specified was NEW_NS.

%DNS-E-NOMATNS, The specified namespace is not being served on your LAN.
        please choose from the following list

 [ 1]  BB_NS
 [ 2]  DOMAIN
 [ 3]  LOCAL
 [ 4]  X500

 [ 0]  - Reject this list -

  Pick a number from the list: 0
```

Because you are creating a new namespace, the namespace you specified at the prompt, "What is the full name of this node ?" does not appear in the list. To continue, enter 0 and press Return to reject the list.

```
       If you are installing DECnet/OSI for VMS for the first time
       and you want to create a namespace, type Y.  If you want to
       attempt a WAN connection to a remote DECdns server,
       type N (default) at the following prompt:

Do you want to proceed with creating a new namespace [n]: y
```

At this point, the configuration procedure needs to determine whether you intend to configure your system as a clerk on a WAN (connect to an off-LAN server), or create a new namespace. Since you cannot create a new namespace unless you have installed DECdns server software on the system, the procedure first verifies that the server software has been installed.

If you want to create a new namespace, type YES at the prompt and press Return. The procedure continues prompting you for information necessary to create the namespace and the appropriate directories. The procedure displays information about the namespace, the directories, and other network parameters, then tells you when the configuration is complete.

```
       Your next input will determine the name of the clearinghouse
       in your namespace new_ns.  Enter the clearinghouse name as
       alphanumeric and/or underscore characters.

Enter a simple name for the clearinghouse: .mrv042_new_ns_ch

Node 0
at 1995-04-06-15:49:35.420-04:00Iinf

Creating DECdns Server process ...
%RUN-S-PROC_ID, identification of created process is 00000122

Your default namespace nickname is new_ns.

Node 0
at 1995-04-06-15:49:42.100-04:00Iinf

%NET$CONFIGURE-I-FLUSHCACHE, flushing selected cache entries

Node 0
at 1995-04-06-15:49:47.180-04:00Iinf
```

```
%NET$CONFIGURE-I-NODERENAMED, node successfully renamed to new_ns:.mrv042
%NET$CONFIGURE-I-NEWNAMESPACE, a new namespace has been created

%NET$CONFIGURE-I-ADDGROUP, adding .WorldRead_Group to the new namespace

Create the initial namespace directories.
Press Ctrl/Z at any question to cancel the initialization.

* Phase IV prefix value [afi:idi:predsp, Def=47:0027:]:
* Maximum Phase IV area to use [1-63, Def=63]: 2

The DECdns namespace groups and directories will now be created.  This might
take up to 6 minutes or more, depending on the speed of the DECdns
server system and the amount of traffic on the network.

Creating the NEW_NS:.DNA_Registrar group.
Creating the NEW_NS:.DNA_BackTranslation directory.
Creating the NEW_NS:.DNA_BackTranslation.%X470027 directory.
Creating the NEW_NS:.DNA_BackTranslation.%X470027.%X0001 directory.
Creating the NEW_NS:.DNA_BackTranslation.%X470027.%X0002 directory.
Creating the NEW_NS:.DNA_NodeSynonym directory.
Creating the NEW_NS:.DTSS_GlobalTimeServers directory.

DECdns namespace initialization for DECnet use is complete.


If this is the first time you have initialized the namespace for DECnet
use, use SYS$SYSTEM:DECNET_REGISTER.EXE to:


  - Create a command file to automatically register previously defined
    Phase IV nodes.  Execute this command file before you manually
    register any other nodes using SYS$SYSTEM:DECNET_REGISTER.EXE.

  - Create any directories you need for node names that should be registered
    immediately, according to your namespace design.  This includes the node
    you are currently running on.

  - Be sure to add backtranslation directories for any non PhaseIV areas/IPDs.
    Failure to do so will lead to Backtranslation Failures.  Once you've added
    the necessary backtranslation directories, you may need to use the
    ncl flush session control naming cache entry "*" command.

  - Change the local node's registered name from its default name to its
    final full name.  The local node will be registered as a Phase IV node
    with a default name when you execute the Phase IV node registration
    command file above.

  - Change the currently registered names of other nodes from their default
    names to their final full names when appropriate (for example, when they
    are upgraded to run DECnet/OSI software).

Continue to use SYS$SYSTEM:DECNET_REGISTER.EXE to:

  - Create any additional directories you need for node names, as new nodes
    are brought up on the network.

  - Register new nodes as they are brought up on the network.

  - Add members to the NEW_NS:.DNA_Registrar access control group.


Additionally, you can use the DECdns control utility to:

  -  Add specific access control to individual directories, objects, and
     soft links.

  -  Create replicas of directories.


The following were created:
```

```
     Group:       NEW_NS:.DNA_Registrar
     Directory:   NEW_NS:.DNA_BackTranslation
     Directory:   NEW_NS:.DNA_BackTranslation.%X470027
     Directories: NEW_NS:.DNA_BackTranslation.%X470027.*
     Directory:   NEW_NS:.DNA_NodeSynonym
     Directory:   NEW_NS:.DTSS_GlobalTimeServers

%NET$CONFIGURE-I-CREATEINITDIR, created initial namespace directories

Registering the node NEW_NS:.mrv042
  Type is DECnet/OSI
  Synonym is MRV042

%NET$CONFIGURE-I-REGSUCCESS, node has been successfully registered in the
!NEW_NS directory service

Node 0
at 1995-04-06-15:50:29.390-04:00Iinf

%NET$CONFIGURE-I-NODERENAMED, node successfully renamed to new_ns:.mrv042

 .  .  .
 .  .  .
 .  .  .
 .  .  .
 .  .  .

%NET-I-LOADED, executive image NET$LOOP_APPLICATION.EXE loaded
%NET$STARTUP-I-OPERSTATUS, DECnet/OSI for OpenVMS operational status is RUNNING-
ALL
%NET$CONFIGURE-I-CONFIGCOMPLETED, DECnet/OSI for OpenVMS configuration completed
```

2.1.3 Domain Name System

Refer to your BIND server documentation for specific installation and configuration instructions. For a list of supported vendors, refer to the *DECnet /OSI for OpenVMS Installation and Basic Configuration* guide. Any properly constructed DNS/BIND nodename is supported by DECnet/OSI.

2.1.4 Namespace Management

DECnet/OSI includes a new in-memory naming cache to improve performance of name and address resolution for all supported name services. See the section on Naming Cache in the *DECnet/OSI Network Management* guide for more information.

DECnet/OSI includes several new features to ease namespace management including `decnet_register` (a new namespace management tool), several new Network Control Language (NCL) commands, and Common Trace Facility (CTF) support for monitoring node name and address resolution.

The `decnet_register` tool, an executable image located in SYS$SYSTEM:, centralizes and simplifies namespace management tasks by replacing functionality previously provided by both the `decnet_dns_register` and `decnet_loc_register` command procedures, which were located in SYS$MANAGER:. The `decnet_register` tool manages information in both the DECdns distributed name service and the Local namespace. The `decnet_register manage` command assists with setting up tasks for the DECdns Name Service. For example, it creates namespace directories and access groups, and enables autoregistration. See the section on `decnet_register` in the *DECnet /OSI Network Management* guide for more information.

2.2 Name Service Search Path

The name service search path applies systemwide and allows DECnet/OSI to search a list of name services in a predetermined order when looking up names or addressing information. The search path includes naming templates that tell DECnet/OSI how to interpret any abbreviated node names entered by users.

The **primary** name service (the name service to be searched first) is listed before the **secondary** name services. The secondary name services are listed in the order in which they are to be searched after the primary name service.

If you choose to use a search path and configure more than one name service on your system, the ordering of the name services is **very** important. The first name service listed is the primary name service to use on the system. The primary name service is considered the first choice to use when looking up names and addressing information. The remaining name services listed are considered to be the secondary services to use on the system.

The search path contains a list of name service keywords, each followed by a **naming template** that specifies a "defaulting rule" so users can enter shorter node names.

2.2.1 Configuring the Search Path Information

During DECnet/OSI configuration, the system administrator uses `net$configure.com` to set up one, two, or three name services on each node.

From the information provided by the system administrator, `net$configure` creates NET$SEARCHPATH_STARTUP.NCL, the standard search path NCL startup script which contains the name service search path information for the node.

The system administrator supplies one or two properly formatted DECnet/OSI node full names (in the case of the Local namespace and the DECdns distributed name service) and one fully qualified host name for DNS/BIND (if DNS/BIND is to be used on the node).

The first full name is specified in the proper format for the name service to be searched first. The second and third node names are properly formatted for the name services to be searched second and last.

If more than one name service is to be used on the node, the name services are searched in the order specified by the system administrator. For example, if the system administrator specifies Local, DECdns or Domain for the name services to use on the system, the Local namespace is searched before the DECdns namespace and DNS/BIND.

The following configuration example illustrates how to upgrade to DECnet/OSI Version 6.3 and use the new name service access features. Invoke `net$configure.com` and select Option 2 (Change node name/namespace name). The following prompt is displayed:

```
* Enter the directory services to use on the system:
```

You can choose the following name services for the system: `LOCAL`, `DECDNS`, and `DOMAIN`. At the prompt, enter an ordered list of the name services you want to use on the system. If you enter more than one name service, separate each name with a comma.

For example, entering `DECDNS,LOCAL,DOMAIN` at the prompt, means the following:

- You want to use the name services DECdns, Local, and DNS/BIND.
- The primary name service is DECdns.
- The secondary name services are Local and DNS/BIND.

Note

If your node is also a DECdns server, the primary name service must be DECdns.

2.2.1.1 Naming Search Path in a Cluster

All members in a cluster should have identical naming search paths configured. This will help to ensure that nodes are recognized in the various services you have identified.

For example, if you receive mail on one node in the cluster, the "from" node name would be LOCAL:.NODE::SMITH. If you attempt to reply to this node from a node in the cluster that does not have Local configured, the system would indicate that there is no such node.

2.2.2 Displaying the Search Path Information

The system maintains two separate search paths:

- One search path supports forward translation or naming (node name to address translation).

  ```
  $ mcr ncl show session control naming search path
  ```

- Another separate search path supports backtranslation (address to node name translation).

  ```
  $ mcr ncl show session control backtranslation search path
  ```

2.2.3 Modifying the Search Path Information

Digital recommends that you rerun `net$configure.com` to revise the standard search path NCL script (NET$SEARCHPATH_STARTUP.NCL) whenever it is necessary to reorder access to the name services on the node. To modify the standard search path startup script, run `net$configure.com` and use Option 2 (Change node name/namespace name).

Note

Whenever you directly edit an existing NET$SEARCHPATH_STARTUP.NCL script, or when you use the NCL `set` command to change the script (rather than changing the script by rerunning `net$configure.com`), your edits are overwritten by any new NET$SEARCHPATH_STARTUP.NCL scripts you subsequently generate by rerunning `net$configure.com`.

2.2.4 Creating a Site-Specific Search Path NCL Script

Digital recommends that you allow `net$configure.com` (and in some cases `net$startup.com`) to create and use the standard NCL search path script (NET$SEARCHPATH_STARTUP.NCL).

However, if you need to make site-specific changes to your search path NCL script and you do not want `net$configure` to overwrite these changes, you can create a site-specific search path NCL script by renaming the standard search path script (NET$SEARCHPATH_STARTUP.NCL) to NET$SEARCHPATH_LOCAL.NCL and making your changes to the new file.

For example, you might want to use the NCL `set` command described in Section 2.2.6 to create site-specific naming templates in NET$SEARCHPATH_LOCAL.NCL.

`net$configure.com` and `net$startup.com` check for the presence of a site-specific search path script (NET$SEARCHPATH_LOCAL.NCL) on the node. If NET$SEARCHPATH_LOCAL.NCL is present on the node, it is invoked instead of the standard script. A message similar to the following is displayed:

```
   ***************************************************************
   A site-specific searchpath NCL script has been found on the
   system (SYS$SYSROOT:[SYSMGR]NET$SEARCHPATH_LOCAL.NCL;). The
   configuration procedure will use this script to set the
   searchpath instead of using the standard searchpath script
   that is created by NET$CONFIGURE (NET$SEARCHPATH_STARTUP.NCL).
   ***************************************************************
%NET$CONFIGURE-I-SITESEARCHPATH, invoking site-specific searchpath
   NCL script found on system
```

`net$configure.com` and `net$startup.com` do not modify the site-specific search path NCL script; rather, they invoke the site-specific search path script as it currently exists. Therefore, when using a site-specific search path NCL script, you must modify it prior to invoking `net$configure.com` whenever you change any of the following name service information:

- The number of name services used on the node
- The order of the name services used on the node
- The specific name services used on the node

2.2.5 Using the Search Path to Ease Migration

A search path can be used to simplify migration from one name service to another. The system administrator can create a search path designating the currently used name service as the primary name service (to be searched first) and the new name service as the secondary name service (to be searched second after the primary name service is searched). As the secondary name service becomes populated with node and addressing information, the system administrator can rerun `net$configure.com` and select Option 2 to reverse the positions of the name services in the search path. This causes the current secondary service to become primary, to be searched first for node and addressing information.

2.2.6 Setting Up Naming Templates

In each template, the user-supplied portion of the name (usually the node's terminating name or rightmost simple name) is indicated with an asterisk (*). For example, if the DECdns template is: `"ABCDE:.xyz.*"` and a user supplies the name `fin`, then the following full name: `ABCDE:.xyz.fin` is looked up in namespace ABCDE in the DECdns name service.

You should specify only one asterisk per template. Only the first occurrence of an asterisk (*) in the template is substituted with the user-supplied name. Any additional asterisks are passed to the name service as part of the full name. When you specify a template without an asterisk, the template string is passed to the name service unchanged.

If the user-supplied name should be passed to the name service as entered by the user, the template should be specified as follows: `"*"`.

DECnet/OSI provides an NCL `set` command for modifying the naming templates associated with the naming and backtranslation search paths. Do not use the NCL `set` command to modify aspects of the search path other than the naming templates. The following NET$SEARCHPATH_LOCAL.NCL script creates typical naming and backtranslation search paths. In this script `ABCDE` represents the namespace nickname. Your namespace nickname will appear in your NCL script:

```
$ type sys$manager:net$searchpath_local.ncl
  set node 0 session control naming search path ( -
 [Directory Service = Local ,Template = ".*"], -
 [Directory Service = Local ,Template = "*"], -
 [Directory Service = DECdns ,  Template = "ABCDE:.xyz.*" ], -
 [Directory Service = DECdns ,  Template = "ABCDE:*" ], -
 [Directory Service = DECdns ,  Template = "*"], -
 [Directory Service = DECdns_synonym ,  Template = "ABCDE:.dna_nodesynonym.*"

$ set node 0 session control backtranslation search path ( -
 [Directory Service = Local ,Template = ""], -
 [Directory Service = DECdns , Template = "ABCDE:.dna_backtranslation" ] )
```

2.3 Domain Synonyms

Support for the Domain Name System (DNS/BIND) provides for the use of node synonyms. This allows for backward compatibility with older applications that cannot use long domain names.

There are two ways to configure node synonyms for use with DNS/BIND:

- By constructing an appropriate set of naming search path templates
- By defining local aliases

2.3.1 Search Path Naming Template Support for Domain Synonyms

You can provide synonym support for entire domains by constructing an appropriate set of search path templates. Note that excessively long search paths (search paths with many entries) can increase the time it takes to look up node addresses. See Section 2.2 for general information on name service search paths.

Entering the following NCL command sets up a search path for a system using DNS/BIND:

```
$ mcr ncl set session control naming search path =       -
    { [Directory Service = Domain, Template = "*"],       -
      [Directory Service = Domain, Template = "*.finbar.com"],     -
      [Directory Service = Domain, Template = "*.abc.finbar.com"], -
      [Directory Service = Domain, Template = "*.xyz.finbar.com"]}
```

This NCL command results in the following DNS/BIND naming templates:

```
*
*.finbar.com
*.abc.finbar.com
*.xyz.finbar.com
```

When DECnet/OSI receives a connection from node `koi.abc.finbar.com`, it determines that `koi` is a usable synonym for this node, and DECnet/OSI will return the name `koi` to applications that require Phase IV style node names.

Using search path naming templates for synonym support allows the user to enter any of the following node names: `koi`, `koi.abc`, or `koi.abc.finbar.com` for node `koi`.

2.3.2 Local Aliases

Another way to define a node synonym for a particular node is by adding DNS /BIND `alias names` to the local host's database. The following is an example using Digital TCP/IP Services for OpenVMS:

```
$ ucx set host koi.abc.finbar.com/address=aa.bb.cc.dd/alias=koi
```

DECnet/OSI will now return the node synonym `koi` to applications that require Phase IV-style node names.

2.4 Node Synonym Directories

The default node synonym directory is `.DNA_NodeSynonym`. If you plan to use a node synonym directory other than this default directory, you must define the logical name DECNET_MIGRATE_DIR_SYNONYM to the synonym directory name you want to use in `sys$manager:net$logicals.com`. (If you do not have a `sys$manager:net$logicals.com` procedure on your system, you can create one using `sys$manager:net$logicals.template`.) This makes the definition permanent (that is, it will not be deleted when you reboot the system).

2.4.1 Defining an Alternate Node Synonym Directory

Use the following format to define an alternate node synonym directory:

```
$ define decnet_migrate_dir_synonym "alt-directory-name"
```

If you use a synonym directory name that includes special characters or three or more dots, the system might produce an error. To avoid this, enclose the synonym directory name in quotes. For example:

```
$ define/system decnet_migrate_dir_synonym ".ch.noun.synonym"
```

`net$configure` needs this logical name to be defined at all times if you wish to use a synonym directory other than `.DNA_NodeSynonym`. Be sure to add this definition to `net$logicals.com` to ensure that the definition of the synonym directory will be permanent.

2.4.2 When to Use the New Logical Name

You can use this logical name for either the BASIC or the ADVANCED configuration option.

This logical name must be defined before using any of following procedures:

```
net$configure.com
decnet_register.exe
decnet_migrate.exe
```

If synonym lookup fails in the namespace, the software does one of the following:

- The startup procedure defines SYS$NODE, SYS$CLUSTER_NODE, or both to be the first six characters of the last simple name of the respective node full name or cluster full name.
- The configuration procedure defines SYS$NODE to be the node synonym name that was entered during configuration.

The system displays a message that it has redefined the logical names.

2.5 Using a DNS Version 1 Namespace with DECdns Version 2

If you are already using a namespace created with Version 1 of the VAX Distributed Name Service (DNS) (running on DECnet Phase IV), you can continue to use the namespace when you upgrade your networking software to DECnet/OSI for OpenVMS. However, because of differences in the way that DNS Version 1 and DECdns Version 2 handle access control, you must prepare your DNS Version 1 namespace for use by DECnet/OSI. DNS Version 1 and DECdns Version 2 interpret principal specifications in access control entries (ACEs) differently.

In DNS Version 1, servers recognize principals only in the form *nodename::username*. In DECdns Version 2, servers recognize principals primarily in the form *nodename.username*. For DECdns Version 2 clerks and servers to interpret and process existing DNS Version 1-style access control entries in the namespace, you need to create a backtranslation directory (`.DNA_BackTranslation`) and a node synonym directory (`.DNA_NodeSynonym`) in the root directory of the namespace. You must then populate these directories by registering all the nodes participating in the Version 1 namespace.

2.5.1 Preparing a DNS Version 1 Namespace for Use by DECdns Version 2

To prepare a namespace created with DNS Version 1 for use by DECnet/OSI, follow these steps:

1. Install and configure DECnet/OSI for OpenVMS on any node in your namespace that is **not** currently functioning as a DNS Version 1 server. Configure the node as a DECdns Version 2 clerk. Refer to the *DECnet/OSI for OpenVMS Installation and Basic Configuration* guide (Chapters 3 and 5) if you plan to use the BASIC configuration option. If you plan to use the ADVANCED configuration option, refer to Section 1.1.
2. From any node running DNS Version 1 server software, use the DNS Version 1 control program (DNS$CONTROL) `add access` command to grant the following DNS Version 1-style access on behalf of the SYSTEM account on the new Version 2 clerk node that you configured in Step 1:
    - Read, write, delete, test, and control access to the root directory of the namespace

- Read, write, delete, test, and control access to the clearinghouse that stores the master replica of the root directory

For example, if the DECnet/OSI full name of the new clerk is .pastry, and the master replica of the Version 1 namespace is stored in the .paris_ch clearinghouse, enter the following two commands:

```
DNS> add access pastry::system directory . /rights=(r,w,d,t,c)
```

```
DNS> add access pastry::system clearinghouse .paris_ch /rights=(r,w,d,t,c)
```

You need to grant this access to ensure that the SYSTEM account on the new Version 2 clerk has sufficient access to run the decnet_register utility. The Version 2 clerk must also have permission to create and populate a backtranslation directory (.DNA_BackTranslation) and node synonym directory (.DNA_NodeSynonym) in the root directory of the namespace during the next step of this procedure.

Note

If the node you configured as a Version 2 clerk in Step 1 is a new node, or is being assigned a new DECnet Phase IV-compatible address, you should update the DECnet node databases on all Version 1 servers in the namespace to include the new address before you proceed.

3. Log in to the new Version 2 clerk node under the SYSTEM account and invoke the sys$manager:decnet_register_decdns.com utility. Do the following:
   a. Choose Option 3 on the decnet_register_decdns.com menu to create and populate a backtranslation directory (.DNA_BackTranslation). Choose Option 2 to create a node synonym directory (.DNA_NodeSynonym).
   b. Choose Option 2 on the decnet_register menu to register the new Version 2 clerk node (the node you are logged in to) and to register all other DECnet Phase IV nodes in the namespace including all nodes that are currently functioning as DNS Version 1 servers.

See the *DECnet/OSI Network Management* guide for complete information on how to use the decnet_register utility and the decnet_register_decdns.com utility to perform these steps.

2.5.2 Using the DNS Version 1 Namespace

When you have completed this step, the DNS Version 1 namespace is ready for use by other nodes running DECdns Version 2 on DECnet/OSI for OpenVMS software.

Perform this procedure only once to prepare a DNS Version 1 namespace for use with DECnet/OSI. After the node synonym and backtranslation directories are populated, you can configure new DECdns clerks, new DECdns servers (for VAX only) into an existing namespace (refer to the section Section 3.4.5), or convert existing DNS Version 1 servers to DECdns Version 2 format in the normal manner. See the *DECdns Management* guide for information on how to convert a DNS Version 1 clearinghouse to DECdns Version 2 format.

2.6 Registering a Node in the Namespace

The `net$configure.com` procedure creates an Export/Import file to register your node in the appropriate namespace. If your node is already registered, the `decnet_register` Export/Import file is not created.

2.6.1 Export/Import File Format

The `decnet_register` Export/Import file is a text file that has the following format:

`sys$manager:decnet_register_import_file_`<*synonym*>`.TXT`

where <*synonym*> is the node synonym name you selected during configuration.

2.6.2 Problems Registering a Node

If you encounter problems registering your node in the Local namespace or in the DECdns namespace, you will see information similar to the following:

```
.
.
.
Updating nodes listed in SYS$MANAGER:DECNET_REGISTER_IMPORT_FILE_ELMER.TXT

 1) local:.elmer

Error - Node registration was unsuccessful
        Please correct any problems and re-register the node
    LOCAL:.elmer

  The specified node name is already in use as a synonym
        Used by node: LOCAL:.WABBIT.ELMER
        Synonym:      elmer

You can choose to stop processing this command, continue executing this
command until completion or until the next error, or ignore further errors
and continue to completion.


Number of nodes registered: 0
Number of nodes modified:   0
Number of update failures: 1

%NET$CONFIGURE-E-COULDNOTREG, could not automatically register node in the LOCAL
 directory service
     **********************************************************************
                                WARNING

     This node could not be registered in one or more of the directory
     services you have chosen.  When this procedure completes you or your
     network manager will have to manually register this node in the directory
     service(s) for which the error occurred.  See the DECnet/OSI Installation
     and Configuration guide for more details, or contact your network manager.

     Once the problem has been rectified, you or your namespace manager can
     use the following DECNET_REGISTER command(s) to register your node in the
     appropriate directory service(s):

        For the LOCAL directory service:
        DECNET_REGISTER IMPORT DIRECTORY LOCAL FILE -
                SYS$MANAGER:DECNET_REGISTER_IMPORT_FILE_ELMER.TXT

     Once the node has been successfully registered in the appropriate
     directory service(s), invoke option 2 of NET$CONFIGURE.COM (Change
     node name/namespace name) to complete the node's network configuration
     and startup.

     **********************************************************************
```

If `net$configure.com` cannot access the DECdns namespace you have selected, it is most likely because:

- The namespace is not available at the moment.
- Your node does not have proper access to the DECdns namespace.
- The namespace you are using is new and the directories have not been created yet.

When this happens, you will see the following message (this example uses ACME: as the namespace that is not accessible):

```
*************************************************************************
                               WARNING
NET$CONFIGURE.COM cannot access the ACME: namespace, either because
the namespace is not available at the moment, your node does
not have proper access to the namespace, or because the namespace
you are using is new and the directories have not been created yet.
Therefore, the DECNET_REGISTER tool cannot attempt to look up or register
your node into the ACME: namespace.

When the problem is rectified, please use the DECNET_REGISTER import file
to register your node into the ACME: namespace.

*************************************************************************
```

If you receive this message because the namespace you are using is new and the namespace directories have not been created yet, use the `decnet_register manage` command to invoke `decnet_register_decdns.com` (located in SYS$MANAGER:) to create the proper directories. For more details, refer to the *DECnet/OSI Network Management* guide.

If you see the preceding warning messages, `net$configure` will display another message indicating how you or your namespace manager can attempt node registration once the problem is resolved. For example:

```
**********************************************************************
                            WARNING

This node could not be registered in one or more of the directory
services you have chosen.  When this procedure completes you or your
network manager will have to manually register this node in the directory
service(s) for which the error occurred.  See the DECnet/OSI Installation
and Configuration guide for more details, or contact your network manager.

Once the problem has been rectified, you or your namespace manager can
use the following DECNET_REGISTER command(s) to register your node in the
appropriate directory service(s):

   For the DECdns directory service:
   DECNET_REGISTER IMPORT DIRECTORY DECDNS FILE -
       DECNET_REGISTER_IMPORT_FILE_ELMER.TXT

   For the LOCAL directory service:
   DECNET_REGISTER IMPORT DIRECTORY LOCAL FILE -
       DECNET_REGISTER_IMPORT_FILE_ELMER.TXT

Once the node has been successfully registered in the appropriate
directory service(s), invoke option 2 of NET$CONFIGURE.COM (Change
node name/namespace name) to complete the node's network configuration
and startup.

**********************************************************************
```

You may see the previous messages if the following exist:

- You enter `LOCAL` for the primary directory service and `DECDNS` for the secondary directory service and,
- Your primary Local node full name does not have the proper access necessary to look up or register your secondary DECdns node full name.

  If this is the case, you or your network manager need to perform the following steps on the node that has the DECdns server in order for your primary Local node to obtain this access to the DECdns namespace:

  1. Make sure the `.WorldRead_Group` is created on the DECdns server node. If the `.WorldRead_Group` has not been created yet, use the `decnet_register manage` command to invoke `decnet_register_decdns.com` (located in `sys$manager:`) to create the `.WorldRead_Group`. For more details, refer to the *DECnet/OSI Network Management* guide.
  2. Once you or your namespace manager knows that the `.WorldRead_Group` has been created, invoke the `dns$control` utility on the node with the DECdns server and enter the following commands:

     ```
     $ mcr dns$control
     DNS>add group <ns>:.worldread_group member local:.*...
     DNS>add clear <ns>:.<ch_name> access <ns>:.worldread_group as group for r,t
     ```

     where <ns> is the DECdns namespace name to which you want your `LOCAL` node to have access and <ch_name> is the clearinghouse name of the DECdns namespace you are using.

These commands will give your primary Local full name the proper access it needs to look up information regarding the secondary DECdns full name you have chosen.

Note

If you use `DECDNS` for the primary directory service and `LOCAL` for the secondary directory service, these steps are not necessary.

---

3 Modifying a Current Configuration

3.1 Steps for Changing the Configuration

If your system has already been configured, you can modify it with the `net$configure basic` configuration option (the default) or with the `net$configure advanced` configuration option.

Table 3–1 provides some guidelines for making your configuration choice.

If you prefer to use the BASIC configuration option, refer to the *DECnet/OSI for OpenVMS Installation and Basic Configuration* guide, Chapter 4. If you want to customize your system's network configuration with the ADVANCED configuration option, continue to Section 3.2.

Table 3–1 Choosing Your Configuration

Use the Basic Option if ...	Use the Advanced Option if ...
You want the option to use more than one directory service (DECdns, Local namespace, Domain, or all of these).	You want the option to use more than one directory service (DECdns, Local namespace, Domain, or all of these).
You will be using a Local namespace on your system, your system is going to be a DECdns clerk in an existing distributed namespace, you will be using the Domain Name System, or all of these.	You will be using a Local namespace on your system, your system is going to be a DECdns clerk in an existing distributed namespace, you will be using the Domain name system, or all of these.
You only have one communications device, or you have multiple devices, all of which will be used for DECnet/OSI communications.	Your system has multiple communication devices, and you want them to run a mix of protocols.
You want the option to configure your DECnet/OSI software to use X.25 services.	You want more flexibility in configuring your DECnet/OSI software to use X.25 services.
You want to use the default names for all devices and routing circuits.	You want the option to give specific names to all devices and routing circuits. You also want the option of not configuring all of your devices for DECnet/OSI.
You want to use a Phase IV Prefix value of 49::	You want the option of using a Phase IV Prefix value other than 49::
You want to autoconfigure your network addresses only.	You want the option of manually entering your network addresses.
You want to configure both the NSP and OSI Transports and only want to create default OSI templates. You want to enable both DECnet over TCP/IP or OSI applications over TCP/IP.	You want to configure either the NSP Transport or the OSI Transport (or both). You want the option to create additional OSI templates. You want the option of enabling/disabling DECnet over TCP/IP or OSI Applications over TCP/IP.
You want the default Event Dispatcher configuration.	You want the default Event Dispatcher configuration, or the option to customize the Event Dispatcher configuration.
You do not want to enable FDDI large packet support (if you have an FDDI-type circuit).	You want the option of enabling FDDI large packet support (if you have an FDDI-type circuit).
You want to set the routing characteristic DNA Address Format to TRUE (this attribute controls the interpretation of address structuring).	You want the option of setting the routing characteristic DNA Address Format to TRUE or FALSE (to control the interpretation of address structuring).
You want to use integrated mode routing.	You want the option of using either integrated mode routing or segregated mode routing.
You want default accounts created for CML, MAIL, VPM, MIRROR, and PHONE, but not FAL.	You want the option to provide default accounts for FAL, CML, MAIL, VPM, MIRROR, and PHONE.

3.2 Steps for Changing a Current Configuration

Changing your DECnet/OSI for OpenVMS configuration with the ADVANCED option involves the following steps:

1. Run `net$configure` procedure using the ADVANCED configuration option with the following command:

```
$ @sys$manager:net$configure advanced
```

The procedure starts:

```
   DECnet/OSI for OpenVMS ADVANCED network configuration procedure

This procedure will help you create or modify the management scripts
needed to operate DECnet on this machine. You may receive help about
most questions by answering with a question mark '?'.

You have chosen the ADVANCED configuration option.  This option enables
you to do some specific tailoring of your system's network configuration
by answering some specific questions.  If you do not want to do specific
tailoring of your system's network  configuration but instead  want  to
quickly  configure your  system using most  of the default answers, you
should invoke net$configure.com with the BASIC configuration option, ie:
            @SYS$MANAGER:NET$CONFIGURE BASIC

* Do you want to continue?                            [YES] :
```

2. Answer YES if you want to continue. You will now see the date that the checksum file was last modified:

```
   Checksum file updated last by SYSTEM on 18-SEP-1995 16:04:24.19

  %NETCONFIGURE-I-VERCHECKSUM, verifying checksums
```

Note

If this is the first time you are invoking the `net$configure` procedure, or if you have deleted the checksum file, the following menu is *not* displayed. Instead, the prompts shown in Section 5.1 of the *DECnet/OSI for OpenVMS Installation and Basic Configuration* guide appear for the BASIC option, and the prompts shown in Section 1.1 in this book appear for the ADVANCED option.

```
           Configuration Options:

         [0]     Exit this procedure

         [1]     Perform an entire configuration
         [2]     Change naming information
         [3]     Configure Devices on this machine
         [4]     Configure Transports
         [5]     Configure Timezone Differential Factor
         [6]     Configure Event Dispatcher
         [7]     Configure Application database
         [8]     Configure MOP Client database
         [9]     Configure Cluster Alias
        [10]    Configure satellite nodes
        [11]    Configure cluster script locations

 * Which configuration option to perform?          [1] :
```

3. Choose the option you want. Selecting an option allows you to modify either the entire configuration or a particular portion.

Note

In order to select Options 10 or 11, you must have already configured the system using the ADVANCED configuration option, and `net$configure` is executing on a cluster system. Refer to Section 3.13 and Section 3.14 for more information.

4. After you have completed the configuration dialog, the system displays the following question:

```
* Do you want to generate NCL configuration scripts [YES] :
```

If you answer YES, the configuration program uses the information you entered to generate modified NCL scripts and, in some cases, automatically modify the system's configuration. The configuration program then returns to the Configuration Options menu. If you answer NO, the configuration procedure returns to the Configuration Options menu and does not generate any modified NCL scripts.

You can use the `net$configure` procedure to modify the current configuration. Depending upon which menu option you select, `net$configure` either modifies the configuration automatically or produces modified NCL scripts which you can use to modify the system's configuration.

You can execute modified NCL scripts in two ways:

- Rebooting the system
- Disabling the entity to which the script applies and executing the modified script

To execute the NCL script, use the format `ncl> do` *`script-file`*. For example:

```
ncl> do sys$manager:net$nsp_transport_startup.ncl
```

Note

`net$configure` does not automatically execute the modified NCL scripts for you. However, it will execute the search path NCL script (NET$SEARCHPATH_STARTUP.NCL).

To customize your system beyond what the `net$configure` procedure provides, you must edit the NCL scripts produced by `net$configure.com` (see the *DECnet /OSI Network Management* guide). Digital recommends that you use the `net$configure` procedure for major modifications involving an entire entity.

3.3 Changing an Entire Configuration

To make changes to the entire configuration, proceed as follows:

```
* Which configuration option to perform?            [1] :
```

Select Option 1.

The system displays the same prompts that were displayed for the initial configuration. The prompts show the current configuration values as the default. If you do not want to change the current values, accept the default value. Refer to Section 1.1 for an explanation of the prompts shown for a `net$configure` ADVANCED configuration. Refer to the *DECnet/OSI for OpenVMS Installation and Basic Configuration* guide, Chapter 6, for an explanation of the prompts shown for a `net$configure` BASIC configuration.

At the end of the procedure, you see the following prompt:

```
* Do you want to generate NCL configuration scripts? [YES] :
```

If you answer YES, the configuration program uses the information you entered to generate modified NCL scripts. If you answer NO, the configuration procedure does not generate NCL scripts.

If you generate NCL scripts, the procedure displays another prompt:

```
* Do you want to start the network?              [YES] :
```

Answer YES to start the network and to complete the network configuration. To implement the NCL scripts, reboot the system.

3.4 Changing the Node Name/Namespace Name

To change the directory name services used on the system, the system's full names or the fully qualified host name, the namespace that the system uses, or the system's node synonym, proceed as follows:

```
* Which configuration option to perform?           [1] :2
```

Select Option 2 and press Return.

If you are using either the BASIC or ADVANCED configuration option, you will see the following prompt:

```
* Enter the directory services to use for the system   [LOCAL,DECDNS,DOMAIN]:
```

3.4.1 Changing Directory Name Services

Enter the directory name services you want to use. (The first service you enter is considered your primary directory service; the default is the directory service you entered for the previous configuration.)

Depending on the directory services you choose, you may see one or more of the following prompts:

```
* Enter the full name for directory service LOCAL:
* Enter the full name for directory service DECDNS:
* Enter the fully qualified host name for DNS/BIND:
```

3.4.2 Changing Node Name or Namespace

To change the node name or the namespace that it uses, enter the node's new full name. The format is:

```
NamespaceNickname:.DirectoryPath.NodeObject
```

For DECdns, the namespace nickname is the name that a DECdns manager assigns to a namespace when installing and configuring DECdns server software. If the namespace has a nickname, you must enter the nickname as part of the node's full name. However, not all namespaces have nicknames. Namespaces are required to have nicknames only if there is more than one namespace on the network.

If you use the Local namespace, the namespace nickname is LOCAL:.

3.4.3 Changing Node Synonym

Next you will be prompted for the node synonym:

```
* What is the synonym name for this node?          [YEWHO1] :
```

The synonym name is a Phase IV-compatible node name. It can be one to six alphanumeric characters long, must not start with a number, and must be unique within the namespace. It is required for Phase IV nodes using the namespace and DECnet/OSI nodes that need to communicate with Phase IV nodes.

The following display shows the system response to a node name change.

```
.
.
.
 %NET$CONFIGURE-I-NODERENAMED, node successfully renamed to
 PHASEV:.ENG.SSG.TEST.ELMER1
 Update Node 0 Session Control Tower Maintenance
 PHASEV:.ENG.SSG.TEST.ELMER1
  at 1995-04-13-14:44:14.821-04:00I0.532
.
.
.
 %NET$CONFIGURE-I-TOWERSUPDATED, updated address towers for node

        Summary of Configuration

 Node Information:
        Directory services chosen:      DECDNS,LOCAL,DOMAIN
        Primary directory service:      DECdns
        DECdns full name:       PHASEV:.ENG.SSG.TEST.ELMER1
        Local full name:        LOCAL:.ELMER1
        Fully Qualified
        Host name:              ELMER1.WABBIT.ACME.EDU
        Node Synonym:   ELMER1
        Phase IV Address:       15.27
        Phase IV Prefix:        49::
        Autoconfiguration of Network Addresses: Enabled

 Device Information:
        Device: ESA0 (DESVA):
                Data Link name:         CSMACD-0
                Routing Circuit Name:   CSMACD-0

 Transport Information:
        NSP Transport:                          Configured
          Maximum number of logical links:         200
          Maximum Transmit and Receive Window:     20
          Maximum Receive Buffers:                 4000

        OSI Transport:                          Configured
          Maximum number of logical links:         200
          Maximum Transmit and Receive Window:     20
          Maximum Receive Buffers:                 4000

        Congestion Avoidance Disabled

 Event Dispatcher Configuration:
        Sinks:            local_sink
        Outbound Streams: local_stream
        Phase IV Relay:   enabled
```

The configuration program uses the information you entered to automatically modify the system's configuration. The program then returns you to the Configuration Options menu.

3.4.4 Configuring a DECdns Clerk System to Use a WAN DECdns Server

If your node is a DECdns clerk and the `net$configure` procedure detects that the namespace you identified in the system's DECdns full name is not served by a DECdns server on the LAN, it displays a list of all the namespaces that do exist on the LAN as shown below:

```
 The namespace you specified was IAF2.

%DNS-E-NOMATNS, The specified namespace is not being served on your LAN.
       Please choose from the following list:

[ 1]  APOLLO
[ 2]  IAF
[ 3]  MIDAS_NS

[ 0]  - Reject this list -

 Pick a number from the following list:
```

When you see this display, type 0 and press Return to reject the list of namespaces currently known on your LAN.

The procedure then asks if you want to continue with the WAN configuration process.

```
   Attempts to configure DECdns via a LAN connection have failed.

   Type Y to attempt a WAN connection to a remote DECdns
   server.  To stop DECdns Configuration and return
   control to the NET$CONFIGURE  utility, type N at the
   following prompt:

 Do you want to connect to a remote DECdns server via a WAN [y]:
```

Answer YES to connect to a remote server via a WAN. The procedure then prompts you for the remote server's Phase IV-compatible address (if it has one) or its network service access point (NSAP). The NSAP is the network entity title (NET) with a valid transport selector. To find this information, contact the server's system administrator. The server system probably has a number of different NSAPs. You can use any of these NSAPs to connect to the server system, but you must enter the NSAP in the format in which it is displayed.

```
    Attempting to configure a clerk via a WAN connection.

 Enter the NSAP or Phase IV compatible address of the server
 you want to connect to:
```

After you enter the server's address (for example, 4.456), your system connects to the server.

You then receive a confirmation message listing your namespace nickname and its namespace creation timestamp (NSCTS), as in the following:

```
Getting server data, please wait...

sys$manager:net$dns_clerk_startup.ncl changed to use the new default namespace.

Your default namespace nickname is XYZ_CORP

Your default namespace NSCTS is 00-12-34-56-77-A0-A1-A2-A3-A4-A5-A6-A7-B0
```

Note

If you are joining a Distributed Name Service (DNS) Version 1.1 namespace, make sure you have access to the remote server's sys$library:dns$ns_def_file.dat file.

Invoke the procedure `sys$manager:dns$configure.com` and use Option 2 on the DECdns Configuration menu to connect to a remote DNS Version 1 server. Make sure the SYSTEM account on your DECdns Version 2 clerk has DECnet_FAL access or proxy access to the `sys$library:dns$ns_def_file.dat` file on the remote Version 1 server. These accounts need this access to successfully copy the Version 1 server information contained in the `sys$library:dns$ns_def_file.dat` file. If you are running the DECdns configuration program under a privileged account other than SYSTEM, the account still requires the appropriate access.

If you cannot connect to the remote server, the procedure displays the following message:

```
%DNS-E-NOCONFIG, DECdns clerk is not configured.
```

3.4.5 Configuring a DECdns Server System in an Existing Namespace

To configure additional DECdns servers into an existing namespace, you must use the DECdns configuration program, `sys$system:dns$configure.exe`. Be sure to refer to the *DECdns Management* guide for DECdns access control information and for complete information about using the DECdns configuration program to configure a DECdns server into an existing namespace.

3.4.5.1 Configuring a DECdns Server in a DNS Version 1 Namespace

If you are already using a DNS Version 1 namespace (a namespace created with Version 1 of the Distributed Name Service), you can configure one or more DECdns Version 2 servers into that namespace. Before you try to configure a DECdns server into a DNS Version 1 namespace, make sure that the namespace has been prepared for use by DECnet/OSI, (see Section 2.5). For complete information on how to prepare a DNS Version 1 namespace for use by DECnet /OSI, and refer to the *DECdns Management* guide for DECdns access control information.

Note

The DECdns configuration program allows you to convert your DNS Version 1 clearinghouses to DECdns Version 2 format. By doing so, you get the improved performance offered by the DECdns Version 2 server while using your existing DNS Version 1 namespace. If you intend to convert your DNS Version 1 clearinghouses to DECdns Version 2 format, Digital strongly recommends that you do *not* configure DECnet/OSI for OpenVMS on any of your DNS Version 1 server nodes until you have prepared your DNS Version 1 namespace for use by DECnet/OSI.

3.5 Reconfiguring Devices

To reconfigure the devices, proceed as follows from the Configuration Options menu:

```
* Which configuration option to perform?           [1] :3
```

Select Option 3 and press Return.

Before proceeding with this menu option, the procedure determines whether the system has network devices that are supported by `net$configure`.

```
%NET$CONFIGURE-I-SCANCONFIG  scanning device configuration - please wait
```

If no supported network devices are found or new devices are found that were not detected the last time you ran `net$configure` procedure on this system, the procedure displays the following prompt for Alpha systems:

```
* Should a SYSMAN IO AUTO be executed?                       :
```

For VAX systems, you will see the following prompt:

```
* Should a SYSGEN AUTOCONFIGURE ALL be executed?       :
```

If you answer YES, the `net$configure` procedure invokes the SYSMAN IO AUTO or the SYSGEN AUTOCONFIGURE ALL command to find devices. If you answer NO, then there will be no devices to configure and the procedure exits.

The BASIC configuration guide automatically configures your devices and no further questions are asked concerning device configuration. If you choose the ADVANCED configuration, the procedure prompts you for data link names and routing circuit names to use for each device.

```
* Data Link name to use for ESA0 (DESVA)           [CSMACD-0] :
```

Specify the simple name that you want to use for the data link device or accept the system-supplied default. If you do not want this device configured for DECnet /OSI, enter NONE.

```
* Routing Circuit Name for Data Link 'CSMACD-0'     [CSMACD-0] :
```

Specify the simple name that you want to use for the routing circuit or accept the system-supplied default. Digital recommends that you use the default name even if you configure multiple lines of the same type.

3.6 Reconfiguring the NSP and OSI Transports

To reconfigure the NSP, OSI Transports, or both, select Option 4 from the Configuration Options menu and press Return.

```
* Which configuration option to perform?            [1] : 4
```

The BASIC configuration automatically configures the NSP and OSI Transports. If you choose the ADVANCED configuration option, the procedure asks if you want to configure the NSP and OSI Transports.

The following sections describe the prompts that are required to reconfigure the transports.

```
* Configure the NSP Transport?                         [YES] :
*   Maximum number of logical links ?                  [200] :
*   Maximum Transmit and Receive Window ?               [20] :
*   Maximum Receive Buffers  ?                        [4000] :
* Configure the OSI Transport?                         [YES] :
*   Maximum number of logical links ?                  [200] :
*   Maximum Transmit and Receive Window ?               [20] :
*   Maximum Receive Buffers  ?                        [4000] :
*   Run OSI Applications over TCP/IP ?                 [YES] :
*   Run DECnet over TCP/IP ?                           [YES] :
* Is this system operating in a multi-protocol network? [YES] :
* Do you want to replace the existing NSP transport script? [NO] :
* Are the point-to-point lines utilizing line speeds less than 9600 BPS? [NO]
* Do you want to replace the existing OSI transport script? [NO] :
```

```
* Configure the NSP Transport?                         [YES] :
```

If you want to communicate with any DECnet Phase IV nodes, answer YES.

To determine the maximum number of active transport connections allowed at any one time to this transport, the procedure displays the following prompt:

```
* Maximum number of logical links?                     [200] :
```

You are then prompted to set the following values:

```
* Maximum transmit and receive window?                  [20] :
```

```
* Maximum receive buffers?                            [4000] :
```

Digital recommends setting a value of 20 for the `maximum transmit and receive window` option. The recommended value to set the `maximum receive buffers` is no more than (`maximum window` × `maximum transport connection`) for normal network operation in a typical network environment.

Selecting other values than these can significantly alter the behavior of your system and network and should only be done after a thorough analysis of your network traffic and application requirements.

High values of maximum receive buffers may require considerable buffering capacity on your node; therefore, a non-paged pool should be allocated accordingly. If your node does not have enough non-paged pool, maximum receive buffers should be set to a smaller value than (`maximum window` × `maximum transport connections`).

The transport receiver's window is determined by a combination of `maximum transport connections`, `maximum receive buffers`, and `maximum window`. During the life of the connection, the receiver quota fluctuates according to the value of (`maximum receive buffers` ÷ `currently active connections`). The credit window sent to the remote transmitter may or may not be this quota value, depending on the value of maximum window. If maximum window is set to less than the determined receiver quota, this value is used instead for the credit granted to the remote transmitter.

The transmitter of a transport connection uses the credit sent by the remote receiver as its transmit window, unless its maximum window is a lower value. In that case, maximum window is used for the transmitter window.

```
* Configure the OSI Transport?                         [YES] :
```

If you want the system to communicate with DECnet/OSI nodes or if you plan to install the OSAK, FTAM, or VT software, answer YES. If you want to use the DECnet over TCP/IP and/or OSI applications over TCP/IP, answer YES.

If you answer NO the procedure still loads the OSI Transport images. However, OSI Transport is not configured or usable until you run the `net$configure` procedure and answer YES to the OSI Transport question.

To determine the maximum number of active transport connections allowed at any one time to this transport, the procedure displays the following prompt:

```
* Maximum number of logical links?                    [200] :
```

You are then prompted to set the following values:

```
* Maximum transmit and receive window?                 [20] :
```

```
* Maximum receive buffers?                           [4000] :
```

Digital recommends setting a value of 20 for the `maximum transmit and receive window` option. The recommended value to set the `maximum receive buffers` is no more than (`maximum window` × `maximum transport connections`) for normal network operation in a typical network environment.

Selecting other values than these can significantly alter the behavior of your system and network and should only be done after a thorough analysis of your network traffic and application requirements.

High values of maximum receive buffers may require considerable buffering capacity on your node; therefore, a non-paged pool should be allocated accordingly. If your node does not have enough non-paged pool, maximum receive buffers should be set to a smaller value than (`maximum window` × `maximum transport connections`).

The transport receiver's window is determined by a combination of `maximum transport connections`, `maximum receive buffers`, and `maximum window`. During the life of the connection, the receiver quota fluctuates according to the value of (`maximum receive buffers` ÷ `currently active connections`). The credit window sent to the remote transmitter may or may not be this quota value, depending on the value of maximum window. If maximum window is set to less than the determined receiver quota, this value is used instead for the credit granted to the remote transmitter.

The transmitter of a transport connection uses the credit sent by the remote receiver as its transmit window, unless its maximum window is a lower value. In that case, maximum window is used for the transmitter window.

You are then prompted:

```
* Run OSI Applications over TCP/IP?                   [YES] :
```

Answer YES to this question if you want to run any of your OSI applications over TCP/IP. This will cause the configuration utility to build the appropriate RFC1006 template and establish a listener port for Port 102.

```
* Run DECnet over TCP/IP?                             [YES] :
```

Answering YES to this question enables DECnet/OSI to run over a TCP/IP network to any system that has enabled this same feature. The configuration utility will build the appropriate RFC1006+ template and establish a listener port for Port 399.

You are then prompted about multi-protocol networks:

```
* Is this system operating in a multi-protocol network?  [YES] :
```

If you take the default answer of YES, then the OSI Transport and NSP Congestion Avoidance characteristic are set to FALSE. Note that currently NSP does not support the Congestion Avoidance attribute.

A NO answer to this question sets the characteristic to TRUE.

To change Transport Congestion Avoidance values, you must invoke `net$configure` in ADVANCED mode and use Option 4 (Configure Transports) and answer NO to the question.

If an NCL script already exists for an NSP Transport and you answer YES to the "Configure the NSP Transport?" prompt, the procedure displays the following prompt:

```
* Do you want to replace the existing NSP transport script? [NO] :
```

If you reconfigure the NSP Transport, you have the option of accepting the existing transport script or replacing it with a new one. Answer YES if you want to replace the existing NSP transport script.

```
* Are the point-to-point lines utilizing line speeds less than 9600 BPS? [NO]
```

You will be prompted this only if you have any point-to-point lines (i.e., any synchronous and/or asynchronous lines) configured. If you have any point-to-point lines running at low line speeds (lower than 9600 bps), answer YES. This will place additional NSP NCL commands into the NSP Transport NCL script in order to accommodate the lower line speeds. If you do not have any point-to-point lines being utilized at low line speeds, answer NO.

```
* Do you want to replace the existing OSI transport script? [NO] :
```

Answer YES if you want to replace the existing OSI Transport script.

If you answer YES to the "Configure OSI Transport?" prompt and you want to replace the existing OSI Transport NCL script, the procedure displays the following prompt (ADVANCED configuration option only):

```
* Username for OSI loopback test application to use? [SYSTEST] :
```

Press Return to accept the default user name for the application loopback test account.

The procedure displays:

```
%NET$CONFIGURE-I-CREDEFOSITEMPLATE, created default OSI templates
```

If you use the BASIC configuration option, you will see the "Summary of Configuration" display after the default OSI templates are created.

If you use the ADVANCED configuration option, you will see the following prompts:

```
* Do you want to create additional OSI templates?      [NO] :
```

This prompt allows you to create additional customized OSI templates. If you answer YES, the template questions are repeated. Refer to the section Configuring Transports to review the OSI templates available to you.

If you answer NO, the procedure displays:

```
                    Summary of Configuration

 Node Information:
      Directory services chosen:      DECDNS,LOCAL,DOMAIN
      Primary directory service:      DECDNS
      DECdns Full Name:       ACME:.WABBIT.ELMER
      Local Full name:        LOCAL:.ELMER
      Fully Qualified
      Host name:              ELMER.WABBIT.ACME.EDU
      Node Synonym:           ELMER
        .       .
        .       .

 Device Information:
     Device: ESA0 (DESVA):
               Data Link name:       csmacd-0
               Routing Circuit Name: csmacd-0

 Transport Information:
        NSP Transport:                         Configured
          Maximum number of logical links:        200
          Maximum Transmit and Receive Window:    20
          Maximum Receive Buffers:                4000

        OSI Transport:                         Configured
          Maximum number of logical links:        200
          Maximum Transmit and Receive Window:    20
          Maximum Receive Buffers:                4000

        Congestion Avoidance Disabled
               .               .
               .               .
* Do you want to generate NCL configuration scripts?   [YES] :
```

If you answer YES, the configuration program uses the information you have entered to create the Transport NCL scripts. The configuration program then returns to the Configuration Options menu. To implement the modified NCL scripts, reboot the system or disable the transport entities and execute the scripts.

If you answer NO, the configuration procedure returns to the Configuration Options menu and does not generate NCL scripts.

3.7 Reconfiguring the Time Zone Differential Factor (DECdts)

DECdts binary time values are based on Coordinated Universal Time (UTC), an international time standard that has largely replaced Greenwich Mean Time (GMT) as a reference. For most measurement purposes, UTC is the equivalent of GMT. However, time zones are still determined by their relationship to the prime meridian in Greenwich, England. The local time in each time zone or locale is determined by its offset, or differential, from the Greenwich time zone. This value is commonly expressed as a Time Differential Factor (TDF) of a positive or negative number of hours.

3.7.1 Selecting the DECdts Configuration Option

To reconfigure DECdts, proceed as follows from the Configuration Options menu:

```
* Which configuration option to perform?           [1] :5
```

Select Option 5 and press Return.

The system displays:

```
DTSS$CONFIG-I-LOGS Deassigning system timezone logicals

DTSS$CONFIG-I-STOPDTS  Deleting the DTSS Entity

Node 0 DTSS
at 1995-08-04-18:36:19.740+00:00Iinf

Node 0 DTSS
at 1995-08-04-18:36:23.960+00:00Iinf

       Timezone Options:

       [0]     Exit Timezone Configuration

       [1]     Choose a timezone using menus
       [2]     Use Universal Coordinated Time (UTC)
       [3]     Type in your own timezone rule

* Enter an option number                           [1] :
```

The following sections explain each of the DECdts menu options.

Note

Changes made to DECdts take effect immediately.

3.7.2 Configuring Your System's Local Time

When you are initially configuring a system, you must determine its geographical location and designate its time zone rule (TZR), which is based on the location. The TZR contains the abbreviated name of the system's time zone and the applicable TDF, so that DECdts can calculate UTC from the system (local) time during the initial configuration of the DECdts software. The TZR also contains information on any seasonal adjustments to the TDF that normally apply in the selected time zone.

If you want to select the commonly accepted TZR for a given area and system, you can use the `net$configure` procedure menus to select the geographical location of the system. Based on your selection, the `net$configure` procedure automatically sets the TZR. After you configure your system, it displays the local time even though the DECdts software uses UTC in the background. Because the default value of the DECdts management attribute AUTOMATIC TDF CHANGE is TRUE, DECdts also changes the displayed local time automatically if there is a seasonal adjustment to the system's TDF.

In rare instances, you may want to customize the TZR for your system, thereby modifying its TDF from the one that normally applies in a given time zone or location. The `net$configure` menus also provide a selection for entering a custom TZR for your system, although you must know the TZR syntax to enter it. See Section 3.7.2.3 for further information on customizing the system's TZR.

After the initial system configuration, you can reconfigure the system's time zone rule (TZR) by selecting Option 5 in the top-level `net$configure` menu. For example, this may be necessary because you moved the system to a different location. To reconfigure the TZR, you must know the system's geographical location, or in some cases, the time zone. If you do not know the system's time zone and the configuration procedure requires you to enter it for your locale, refer to the World Time Zone Map in the *DECnet/OSI DECdts Management* guide. Additionally, when you reconfigure the DECdts software, you are given the option of setting the system's time to UTC time or customizing the system's time to any time zone.

3.7.2.1 Configuring Your System's Local Time Using Menus (Menu Option 1)

Option 1 of the Timezone Options menu allows you to choose the geographical region and conventional TZR for the system. DECdts uses the TZR to automatically convert UTC to the local time whenever the time is displayed.

To use Option 1, proceed as follows:

```
* Enter an option number                           [1] :
```

Press Return to select Option 1.

The procedure displays a menu of continental regions:

```
         Timezone Region Options:

        [0]     Return to the Timezone Options menu

        [1]     Europe
        [2]     North America
        [3]     Central & South America
        [4]     Africa
        [5]     Asia
        [6]     South Pacific
        [7]     Antarctica

* Enter a timezone region number                        :2
```

Enter the option number for the region where the system resides and press Return, or return to the previous menu by typing 0.

If you select a region, the procedure displays a menu of subregions within the region you select. The subregion you select determines the time zone rule for the system. For example, if you enter Option 2 (North America), the procedure displays the following menu:

```
         Timezone Subregion Options:

       [0]     Return to Region Options menu

       [1]     US/Eastern
       [2]     US/East-Indiana
       [3]     US/Central
       [4]     US/Mountain
       [5]     US/Pacific
       [6]     US/Alaska
       [7]     US/Arizona
       [8]     US/Navajo
       [9]     US/Michigan
       [10]    US/Aleutian
       [11]    US/Hawaii
       [12]    US/Samoa
       [13]    Canada/Newfoundland
       [14]    Canada/Atlantic
       [15]    Canada/Eastern
       [16]    Canada/Central
       [17]    Canada/East-Saskatchewan
       [18]    Canada/Mountain
       [19]    Canada/Pacific
       [20]    Canada/Yukon

* Enter a timezone subregion number                   : 1
```

Enter the option corresponding to the subregion where the system resides; in the example, the system is in the eastern United States. After you make a selection, the procedure executes and displays information on the NCL DTSS module subroutines that initialize the DECdts software with the new settings:

```
DTSS$CONFIG-I-LOGS Defining system timezone logicals
DTSS$CONFIG-I-SETLCL Setting Local Clock
%RUN-S-PROC_ID, identification of created process is 00000059

Node 0 DTSS
at 1995-02-25-08:17:29.520-05:00Iinf

Node 0 DTSS
at 1995-02-25-08:17:30.790-05:00Iinf

Node 0 Event Dispatcher Outbound Stream *
at 1995-02-25-08:17:30.950-04:00Iinf

Node 0 DTSS
at 1995-02-25-08:17:39.978-05:00I0.327

Node 0 DTSS
at 1995-02-25-08:17:45.868-05:00I0.328

Characteristics

   Automatic TDF Change = True

Node 0 DTSS
at 1995-02-25-08:17:51.898-05:00I0.328

DTSS$CONFIG-I-STARTDTS Restarting the DTSS Entity
%RUN-S-PROC_ID, identification of created process is 0000006B

Node 0 DTSS
at 1995-02-25-08:18:06.138-05:00Iinf

Node 0 DTSS
at 1995-02-25-08:18:07.488-05:00Iinf

Node 0 Event Dispatcher Outbound Stream *
at 1995-02-25-08:18:08.560-04:00Iinf
```

This completes changes to DECdts configuration using Option 1.

3.7.2.2 Configuring Your System's Local Time as UTC (Menu Option 2)

If your system is located in the GMT time zone or Antarctica, and you do not want to make seasonal adjustments to the TDF, you may want to use UTC as your system's local time. You can also configure all network systems with UTC if you consider local time irrelevant for your applications. If you select UTC as the local time and later enter the NCL command `show dtss current time`, the local time displayed has a TDF of 0 (zero).

The following example shows how to select UTC for the system's local time.

```
         Timezone Options:

        [0]     Exit Timezone Configuration

        [1]     Choose a timezone using menus
        [2]     Use Universal Coordinated Time (UTC)
        [3]     Type in your own timezone rule

* Enter an option number                           [1] :2
```

3.7.2.3 Customizing Your System's Time Zone Rule (Menu Option 3)

The `net$configure` procedure allows you to create a customized time zone rule (TZR) for your system, rather than selecting a location and having the procedure configure a TZR for you. When you create a customized TZR, you must supply the correct abbreviation for the system's time zone, the zone's offset from GMT, and optional seasonal time-change information. If you do not know the system's time zone or time zone abbreviation, see Table 3–2 in this book, and the World Time Zone Map in the appendix of the *DECnet/OSI DECdts Management* guide.

The following example shows the TZR syntax and describes the TZR fields; you can also display similar information by typing ? after you choose Option 3 from the Timezone Options menu.

```
         Timezone Options:

        [0]     Exit Timezone Configuration

        [1]     Choose a timezone using menus
        [2]     Use Universal Coordinated Time (UTC)
        [3]     Type in your own timezone rule

* Enter an option number                                  [1] :3
```

STDoffset[DSToffset,start[/time],end[/time]]

STD
DST
: Specify three or more characters that are the designation for the standard (*STD*) or summer/daylight-savings time (*DST*) time zone. The variable *STD* is required; if *DST* is missing, then summer time does not apply in this locale. Uppercase and lowercase letters are explicitly allowed. Any characters except a numeral, comma (,), minus (−), plus (+), space, and ASCII NUL are allowed.

offset
: Specifies the value to be added to the local time to arrive at UTC. The *offset* has the format *hh*[:*mm*[:*ss*]]; the hour (*hh*) is required and can be a single digit. The minutes (*mm*) and seconds (*ss*) are optional. One or more digits can be used; the value is always interpreted as a decimal number. The hour must be between zero and 24; the minutes and seconds (if present) between zero and 59. If preceded by a minus (−), the time zone is east of Greenwich; if preceded by a (+) or not signed, it is west of Greenwich. Note that the signing conventions are based on POSIX rules, which reverse ISO signing conventions.

start
end
: Indicate when to change to and from summer time. The variable *start* describes the date of the change to summer time, and *end* describes the date of the change back to standard time. The *start* and *end* format follows:

J*n* — The Julian day *n* (1 < *n* < 365). Leap days are not counted. That is, in all years (including leap years) February 28 is day 59 and March 1 is day 60. It is impossible to explicitly refer to the occasional February 29.
n — The zero-based Julian day (0 < *n* < 365). Leap days are counted, and it is possible to refer to February 29.
M*m.n.d* — The *n*th *d* day of month *m* (1 < *n* < 5, 0 < *d* < 6, 1 < *m* < 12). When *n* is 5 it refers to the last *d* day of month *m*. Day 0 is Sunday.
time — The *time* field describes the time when, in current time, the change to or from summer time occurs. The variable *time* has the same format as *offset* except that no leading sign (− or +) is allowed. The default, if *time* is not given, is 02:00:00.

As an example of a typical TZR, if the rule has the value **EST5EDT4,M4.1.0,M10.5.0**, it describes the rule for the eastern United States, which became effective in 1987. EST is the designation for Eastern Standard Time, which is 5 hours behind GMT. EDT is the designation for Eastern Daylight-Savings Time, which is 4 hours behind GMT. EDT starts on the first Sunday in April and ends on the last Sunday in October. In both cases, because the time is not specified, the change to and from EDT occurs at the default time of 2:00 a.m.

Since the TZR format is complex, you may want to refer to Table 3–2 to copy the rule for your locale onto the command line, and then edit the rule as desired.

Table 3–2 Time Zone Rules

Region Name	Time Zone Rule	Notes
Europe		
Eastern European Time	EET-2EET_DST-3,M3.5.0/3,M9.5.0/3	
Iceland	WET0	
Middle European Time	MET-1MET_DST-2,M3.5.0/2,M9.5.0/2	
Poland	MET-1MET_DST-2,M3.5.0/1,M9.5.0/1	
Turkey	EET-3EET_DST-4,M3.5.0/1,M9.5.0/1	
UK-Ireland	GMT0BST-1,M3.5.0/1,M10.5.0/1	
Western European Time	WET0WET_DST-1,M3.5.0/1,M9.5.0/1	
North America		
Canada/Atlantic	AST4ADT3,M4.1.0/2,M10.5.0/2	
Canada/Central	CST6CDT5,M4.1.0/2,M10.5.0/2	
Canada/Eastern	EST5EDT4,M4.1.0/2,M10.5.0/2	
Canada/East-Saskatchewan	CST6	
Canada/Mountain	MST7MDT6,M4.1.0/2,M10.5.0/2	
Canada/Newfoundland	NST3:30NDT2:30,M4.1.0/2,M10.5.0/2	
Canada/Pacific	PST8PDT7,M4.1.0/2,M10.5.0/2	
Canada/Yukon	YST9YDT8,M4.1.0/2,M10.5.0/2	
US/Alaska	AKST9AKDT8,M4.1.0/2,M10.5.0/2	
US/Aleutian	HAST10HAST9,M4.1.0/2,M10.5.0/2	
US/Arizona	MST7	
US/Central	CST6CDT5,M4.1.0/2,M10.5.0/2	
US/Eastern	EST5EDT4,M4.1.0/2,M10.5.0/2	
US/East-Indiana	EST5	
US/Hawaii	HST10	
US/Michigan	EST5EDT4,M4.1.0/2,M10.5.0/2	
US/Mountain	MST7MDT6,M4.1.0/2,M10.5.0/2	
US/Navajo	MST7MDT6,M4.1.0/2,M10.5.0/2	
US/Pacific	PST8PDT7,M4.1.0/2,M10.5.0/2	
US/Samoa	SST11	

(continued on next page)

Table 3–2 (Cont.) Time Zone Rules

Region Name	Time Zone Rule	Notes
Central & South America		
Brazil/Acre	AST5ADT4,M10.4.6/2,M2.2.6/2	
Brazil/DeNoronha	FST2FDT1,M10.4.6/2,M2.2.6/2	
Brazil/East	EST3EDT2,M10.4.6/2,M2.2.6/2	
Brazil/West	WST4WDT3,M10.4.6/2,M2.2.6/2	
Chile/Easter	EST6EDT5,M10.2.0/0,M3.2.0/0	(Easter Islands)
Chile/Regional	CST4CDT3,M10.2.0/0,M3.2.0/0	
Cuba	CST5CDT4,M5.2.0/0,M10.2.0/0	
Jamaica	EST5EDT4,M4.1.0/2,M10.5.0/2	
Mexico/General	CST6	
Mexico/BajaNorte	PST8PDT7,M4.1.0/2,M10.5.0/2	
Mexico/BajaSur	MST7	
Africa		
Egypt	EET-2EET_DST-3,J152/2,J305/2	
Libya	EET-2EET_DST-3,J121/2,J303/2	
Asia		
Hong Kong	HKT-8	
Iran	IST-3:30IDT-4:30,M3.5.0/2,M9.3.0/2	
Israel	IST-3IDT-4,M4.3.0/2,M8.4.6/2	
Japan	JST-9	
PRC	CST-8CDT-9,M4.2.0/2,M9.2.0/3	
ROC	CST-8	
ROK	KST-9KDT-10,M5.2.0/2,M10.2.0/3	
Singapore	SST-8	
South Pacific		
Australia/North	CST-9:30	
Australia/NSW	EST-10EST-11,M10.5.0/2,M3.1.0/3	
Australia/Queensland	EST-10	(Standard Time)
Australia/Queensland	EST-10EST-11,M10.5.0/2,M3.1.0/3	(NSW time)
Australia/South	CST-9:30CST-10:30,M10.4.0/2,M3.3.0/3	
Australia/Tasmania	EST-10EST-11,M10.4.0/2,M3.3.0/3	
Australia/Victoria	EST-10EST-11,M10.4.0/2,M3.3.0/3	
Australia/West	WST-8	
New Zealand	NZST-12NZDT-13,M10.5.0/2,M3.1.0/3	

(continued on next page)

Table 3–2 (Cont.) Time Zone Rules

Region Name	Time Zone Rule	Notes
Antarctica		
Antarctica	UTC0	

3.8 Reconfiguring the Event Dispatcher

1. To reconfigure the Event Dispatcher, proceed as follows from the Configuration Options menu:

```
* Which configuration option to perform?           [0] : 6
```

2. Select Option 6 and press Return.

```
%NETCONFIGURE-I-EVDFND, Event dispatcher NCL script already exists
* Replace Event Dispatcher NCL script file?        [NO] :
```

   If you want to create a new Event Dispatcher NCL script file, answer YES. If you want to keep the previously generated Event Dispatcher NCL script file, answer NO.

   The BASIC configuration option automatically creates a default Event Dispatcher configuration for you. You will then see the display summary.

3. With the ADVANCED configuration, you have the option to customize your Event Dispatcher configuration.

```
* Do you want to customize the Event Dispatcher?    [NO] :
```

   If you answer NO, the procedure uses the default configuration. You will see the following message:

```
%NET$CONFIGURE-I-EVDDEFAULT, providing default Event Dispatcher configuration
```

   You will then see the following prompt (for the ADVANCED configuration):

```
* Display events logged to the console of this machine?   :
```

4. If you answer YES to the "Customize the Event Dispatcher?" question, the procedure displays:

```
* Configure a Sink?                                [YES] :
```

   If you want to customize information pertinent to the sink, answer YES (for example, if you want to change where to send the output: a terminal, a printer, or a file). If you answer YES, the procedure displays the following prompt:

```
* Sink name?                                [local_sink] :
```

   Specify the name of the sink you want to use for the local node (for example, local_sink).

```
* Maximum buffer size?                                   :
```

   Specify the maximum number of octets that the sink allows to process events (for example, 16384).

```
* Object name?                                          :
```

Specify the DECdns full name of the object for which the sink accepts incoming connections. Unless the value of this characteristic is null, the sink employs the Session Control layer's *Keep me Here* function to maintain the object name in the namespace.

```
* End user specification?                               :
```

Specify the Digital Network Architecture (DNA) Session Control local address for which the sink accepts incoming connections (for example, number=82).

```
* Catch all filter action?                              :
```

Specify the action to take if neither the specific filter setting nor the global filter setting matches an event, or if a filter setting that matches an event is set to *ignore*. The choices are:

- BLOCK — Discard the event.
- PASS — Report the event.

```
* Description?                                          :
```

Specify an informational string that can be used to describe the sink.

```
* Display UIDs?                                         :
```

Answering YES displays the entity's unique identifier, which is generated when the entity is created.

```
* Client type?                                          :
```

Specify how the application is to accept the events received by the sink. The choices are:

- CONSOLE — Events go the operator's console (OPCOM).
- DEVICE — Events go to a device.
- FILE — Events go to a file.

If you answer FILE to the "Client type?" prompt, the procedure displays the following prompt:

```
* File name?                                             :
```

Enter the file specification you want to use to capture events (for example, `sys$manager:evd_events.log`).

If you answer DEVICE to the "Client type?" prompt, the procedure displays the following prompt:

```
* Device name?                                           :
```

Enter the device you want to use to capture events (for example, TWA1:).

```
* Configure another Sink?                           [NO] :
```

If you do not want to configure another sink, press Return to proceed to the next prompt. If want to configure another sink, enter YES and press Return. The procedure returns you to the "Sink name?" prompt and repeats the prompts required to configure another sink.

5. If you want to configure an outbound stream, answer YES.

```
* Configure an Outbound Stream?                    [YES] :
```

Specify the outbound stream name that you want to manage with this command (for example, local_stream).

```
* Outbound Stream name?                    [local_stream] :
```

Specify the number of octets that the outbound stream allows to process events. This value is derived from (but is not necessarily equal to) the value specified in the `maximum buffer size` argument of the `create` command (for example, 16384).

```
* Maximum buffer size?                                    :
```

Specify the number of seconds to wait between connection attempts. The connect retry timer operates continuously from the time the outbound stream is enabled until the stream is disabled or until the `connect timer enabled` characteristic is set to FALSE. If the outbound stream is already connected to the sink when the timer expires, no connection is attempted at that time. The timer resets and connection attempts continue whenever the timer expires.

```
* Connect retry timer?                                    :
```

Answer YES to have the connect retry timer operational. Answer NO to disable it.

```
* Connect timer enabled?                                  :
```

Specify the number of seconds to wait before shutting down an idle connection. A 0 value indicates that the disconnect timer is not operating and that connections are never disconnected automatically.

```
* Disconnect timer?                                       :
```

Specify the action to take if neither the specific filter setting nor the global filter setting matches an event or if a filter setting that matches an event is set to Ignore. The choices are:

- BLOCK — Discard the event.
- PASS — Report the event.

```
* Catch all filter action?                                :
```

Specify the full DECdns object name of the sink associated with this outbound stream. This object name is used to make the connection with the sink.

```
* Sink object?                                             :
```

Specify the full node name (DECdns namespace name included) of the sink associated with outbound stream.

```
* Sink node?                                               :
```

Specify the sink Session Control end user specification of the sink associated with this outbound stream (for example, number=82).

```
* Sink end user?                                           :
```

Specify the sink address tower of the sink associated with this outbound stream.

```
* Sink address?                                            :
```

If you do not want to configure another outbound stream, press Return to proceed to the next prompt. If you want to configure another outbound stream, enter YES and press Return. The procedure returns you to the "Outbound Stream name?" prompt and repeats the prompts required to configure another outbound stream.

```
* Configure another Outbound Stream?                 [NO] :
```

6. Answer YES to use the Phase IV Relay. This allows you to record and process events that occur on an OpenVMS system running DECnet–VAX Phase IV software. The Phase IV Relay entity receives the events from a Phase IV node, encapsulates them, and posts them in the DECnet/OSI system Event Dispatcher.

```
* Configure Phase IV Relay?                         [YES] :
```

The procedure displays:

```
                   Summary of Configuration

 Node Information:
      Directory services chosen:       DECDNS,LOCAL,DOMAIN
      Primary directory service:       DECDNS
      DECdns full name:       ACME:.WABBIT.ELMER
      Local Full name:        LOCAL:.ELMER
      Fully Qualified
      Host name:              ELMER.WABBIT.ACME.EDU
      Node Synonym:       ELMER
      Phase IV Address        15.27
      Phase IV Prefix:        49::
      Autoconfiguration of Network Address: Enabled

 Device Information:
      Device: XQA0 (DELQA):
               Data Link name: CSMACD-0
               Routing Circuit Name: CSMACD-0

      Device: ASYNC (floating async line):
               Data Link name: ASY_DDCMP-0
               Routing Circuit Name: ASY_DDCMP-0

 Transport Information:
         NSP Transport:                         Configured
          Maximum number of logical links:        200
          Maximum Transmit and Receive Window:    20
          Maximum Receive Buffers:                4000

        OSI Transport:                         Configured
          Maximum number of logical links:        200
          Maximum Transmit and Receive Window:    20
          Maximum Receive Buffers:                4000
        Congestion Avoidance Disabled

 Event Dispatcher Configuration:
       Sinks:           local_sink
       Outbound Streams: local_stream
       Phase IV Relay:   Enabled

* Do you want to generate NCL configuration scripts? [YES] :
```

If you answer YES, the configuration program uses the information you entered to create the Event Dispatcher NCL script. The configuration program then returns to the Configuration Options menu. To implement the Event Dispatcher NCL script, reboot the system or disable the entity and execute the script.

If you answer NO, the configuration procedure returns to the Configuration Options menu and does not generate NCL scripts.

3.9 Reconfiguring the Application Database

To reconfigure the application database, proceed as follows from the Configuration Options menu:

```
* Which configuration option to perform?                [1] : 7
```

Select Option 7 and press Return.

```
* Do you want to ADD or DELETE an Application?         [ADD] :
```

Answer ADD to create the application entity on the local node, allocate resources for it, and open the service interface. Answer DELETE to delete the entity and reclaim associated resources. Entering either ADD or DELETE in reply to this prompt displays the following prompt. The NOTES application is used here as an example.

```
* What is the name of the Application?                        : NOTES
```

When defining an application, you must identify the name of the object. DECnet object names are descriptive alphanumeric strings of up to 12 characters.

If you are deleting an application, the procedure displays the following two prompts. If you are adding an application, the procedure skips the next two prompts.

```
* Are you sure you want to DELETE this application?     [NO]:
```

If you want to delete the application, answer YES.

```
* Do you want to generate NCL configuration scripts?   [YES] :
```

If you want to generate the NCL configuration scripts, answer YES.

If you are adding an application, the procedure displays the following prompt:

```
* What is the destination type for 'notes'?          [NAME] :
```

The destination type can be either NAME or NUMBER. To select NAME, press Return. To select NUMBER, enter NUMBER and press Return.

If you select NAME, the procedure displays the following prompt:

```
* What is the destination name for 'notes'?                 :
```

Your reply to this prompt can be either the application name (for example, NOTES) or a destination object name (for example, IAF:.SALES.BOSTON). The destination name is the DECdns full name of the node that provides the application.

The application name can be from 1 to 16 characters. The destination object name can be a maximum of 512 characters and is entered in this format:

```
NamespaceNickname:.DirectoryPath.NodeObject
```

If you enter NUMBER, the procedure displays the following prompt:

```
* What is the destination number for 'notes'?              : 33
```

DECnet software uses object numbers as unique object identifiers. Object numbers have a range of 1 to 255. Generic objects such as MAIL and FAL have object numbers that are recognized throughout the network. User-defined images can have unique object numbers; numbers between 128 and 255 are reserved for this purpose.

For the NOTES application, enter 33 at this prompt. (This is the number that Digital uses for this application.)

If you are adding a user-defined application, choose a number from 128 to 255. If you are adding an application defined by Digital, select the appropriate number from Table 3–3.

Table 3–3 Object Type Numbers

Number	Mnemonic	Description
0	Task	User program
1–16		Reserved for Digital use
17	FAL	File Access Listener for remote file and record access
18	HLD	Host loader for RSX–11S downline task loading requests
19	CML	CMIP Management Listener Object
20		RSTS/E media transfer program (NETCPY)
21–22		Reserved for Digital use
23	REMACP	Network terminal handler (host side)
24		Network terminal handler (terminal side)
25	MIRROR	Loopback mirror
26	EVL	Event receiver
27	MAIL	OpenVMS MAIL utility
28		Reserved for Digital use
29	PHONE	OpenVMS Phone utility and RSX–11M/M–PLUS Phone utility
30–41		Reserved for Digital use
42	CTERM	Network terminal handler
43–62		Reserved for Digital use
63	DTR	DECnet Test Receiver object
64–127		Reserved for Digital use
128–255		Reserved for customer use

```
* Do you want to specify another application address?   [NO]:
```

If a node has more than one application address, enter YES and the previous prompts are repeated.

```
* What is the name of the Client for 'notes'?              :
```

Specify the name of the local user that you want activated upon receipt of the connect request containing the destination name matching one of the values in the `destination names:` attribute.

```
* What is the Image name for 'notes'? :Sys$system:notes$server.exe
```

Specify the file name of the program you want invoked upon receipt of a Connect Request containing a destination name matching one of the values in the `destination names:` attribute.

```
* Incoming Alias for 'notes' enabled?                [TRUE] :
```

Specify how the specified application responds to incoming connect requests directed to the alias node address. If you specify FALSE, the application does not accept incoming connect requests that have been directed to the alias node address.

```
* Incoming Proxy for 'notes' enabled?                [TRUE] :
```

Controls whether incoming proxy requests are honored. If you specify FALSE, requests to invoke proxies on incoming requests are ignored.

```
* Outgoing Alias for 'notes' enabled?                [TRUE] :
```

Specify whether a particular object uses the alias node identifier in its outgoing connect requests. If you specify FALSE, the specified object cannot use the alias node address in its outgoing connect requests.

```
* Outgoing Proxy for 'notes' enabled?                [TRUE] :
```

Specify the default action to execute when a user does not explicitly specify whether to invoke a proxy. If you specify FALSE, there will be no default action.

```
* Require node synonym for 'notes' enabled?          [TRUE] :
```

If you specify TRUE, then by default the remote node name is passed to the application in synonym form. If a synonym is not available, the full name is used. If you specify FALSE, the full name is passed to the application by default.

```
* What is the Incoming OSI TSEL for 'notes'?                :
```

Specify the transport service access point (TSAP) identifier for which the specified application accepts connections.

Note

This function is currently not implemented. Press Return to continue to the next prompt.

```
* What is the User Name for 'notes'?         [NOTES$SERVER] :
```

Enter the user name that you want to use when creating the account for the application you are configuring.

If you do *not* want to create an account for that application, you can either enter NONE and press Return, or press the space bar and press Return.

If you decide to create an account for that application, the following two questions appear:

```
* What UIC should 'notes' use?        [[200,200]] : [376,377]
```

Specify the UIC allocated upon creation of this application entity instance.

```
* Rights identifiers for 'NOTES$SERVER'?         :net$examine,
 net$declareobject,net$decnetaccess
```

Specify the rights identifiers (if any) needed by the application. If there are two or more rights identifiers, separate them with commas.

The procedure then creates the account for the application you want configured and displays the following messages:

```
%NET$CONFIGURE-I-MAKEACCOUNT, this procedure creates user account NOTES$SERVER
* Do you want to generate NCL configuration scripts?   [YES] :
```

If you answer YES, the configuration program uses the information you entered to create an application NCL script and displays the following information:

```
%NET$CONFIGURE-I-CHECKSUM, checksumming NCL management scripts modified by
NET$CONFIGURE
%NET$CONFIGURE-I-CONFIGCOMPLETED, DECnet/OSI for OpenVMS configuration completed
```

Note

The `net$configure` procedure only provides checksums of those NCL management scripts it creates or modifies. It does *not* provide checksums of user-modified NCL scripts.

The configuration program then returns to the Configuration Options menu. To implement the application NCL script, reboot the system or disable the entity and execute the script.

If you answer NO, the configuration procedure returns to the Configuration Options menu and does not generate NCL scripts.

3.10 Reconfiguring the MOP Client Database

To reconfigure the MOP client database, proceed as follows from the Configuration Options menu:

```
* Which configuration option to perform?                [1] :
```

Select Option 8 and press Return.

```
* Do you want to ADD or DELETE a MOP Client?          [ADD] :
```

Answer ADD to create an entity on the specified node, allocate resources for it, and open the service interface. Answer DELETE to delete the entity from the specified node and reclaim associated resources.

```
* Name of the MOP Client?                             : SUPERX
```

Specify the simple name of the client (for example, SUPERX).

If you elect to delete the MOP client, the procedure displays the following prompt:

```
* Are you sure you want to DELETE this client?              :
```

If you want to delete this client, answer YES.

```
* Circuit for 'superx'?                                     :
```

Specify the name of the MOP circuit you want to use for this client.

```
* Physical addresses for 'superx'?                          :
```

Specify the set of LAN addresses for the client on the circuit specified by the CIRCUIT characteristic.

```
* Secondary Loader for 'superx'?                                   :
```

Specify the files you want loaded when the client requests a secondary loader during a downline load operation. File identifications are interpreted according to the file system of the local system.

```
* Tertiary Loader for 'superx'?                                    :
```

Specify the files you want loaded when the client requests a tertiary loader during a downline load operation. File identifications are interpreted according to the file system of the local system.

```
* System Image for 'superx'?                                       :
```

Specify the files you want loaded when the client requests a system image during a downline load operation. File identifications are interpreted according to the file system of the local system.

```
* Diagnostic Image for 'superx'?                                   :
```

Specify the files you want loaded when the client requests a diagnostic image during a downline load operation. File identifications are interpreted according to the file system of the local system.

```
* Management Image for 'superx'?                                   :
```

Specify the files you want loaded when the client requests a management image during a downline load operation. File identifications are interpreted according to the file system of the local system.

```
* Script File for 'superx'?                                        :
```

Specify the files you want loaded when the client requests a CMIP initialization script during a downline load operation. File identifications are interpreted according to the file system of the local system.

```
* Dump File for 'superx'?                                          :
```

Specify the files to write to when the client is upline dumped.

```
* Dump Address for 'superx'?                                   [0] :
```

Specify the address of the files to write to when the client is upline dumped.

```
* Verification for 'superx'?             [%X0000000000000000] :
```

Specify the verification string you want sent in a boot message to the specified client.

```
* Phase IV Client Address (aa.nnn) for 'superx'?                   :
```

Specify the Phase IV node address you want given to the client system when it is loaded. This address is passed in a load characteristics message; whether it is needed depends on the software being loaded.

```
* Phase IV Client Name for 'superx'?                            [] :
```

Specify the Phase IV node name you want given to the client system when it is loaded. This name is passed in a load characteristics message; whether it is needed depends on the software being loaded.

```
* Phase IV Host Address for 'superx'?                              :
```

Specify the Phase IV node address you want passed as the host node address when a client is loaded. This address is passed in a load characteristics message; whether it is needed depends on the software being loaded.

```
* Phase IV Host Name for 'superx'?                        [] :
```

Specify the Phase IV node name you want passed as the host node name when a client is loaded. This name is passed in a load characteristics message; whether it is needed depends on the software being loaded.

```
* Do you want to generate NCL configuration scripts?   [YES] :
```

If you answer YES, the configuration program uses the information you have entered to create the MOP client NCL script. The configuration program then returns to the Configuration Options menu. To implement the MOP client NCL script, reboot the system or disable the entity and execute the script.

If you answer NO, the configuration procedure returns to the Configuration Options menu and does not generate NCL scripts.

3.11 Reconfiguring Event, MOP Client, and Application Entities

You can now use user-defined site-specific NCL scripts for the Event Dispatcher, MOP client, and application entities. The network startup procedure calls three site-specific NCL scripts (if they exist) when the network is started. These scripts must be in SYS$MANAGER. They are called immediately after their Digital-supplied counterparts are executed. The following table lists the scripts and their counterparts.

User-Defined Site-Specific Script	Digital-Supplied Script
NET$EVENT_LOCAL.NCL	NET$EVENT_STARTUP.NCL
NET$APPLICATION_LOCAL.NCL	NET$APPLICATION_STARTUP.NCL
NET$MOP_CLIENT_LOCAL.NCL	NET$MOP_CLIENT_STARTUP.NCL

These scripts are user-defined and user-maintained and thus will not be overwritten or deleted by `net$configure`. Digital recommends that whenever possible, you place your site-specific changes in these user-defined NCL scripts.

Note

If `net$configure.com` is invoked to edit a standard NCL script (NET$*entity*STARTUP.NCL), the standard NCL script is superseded and renamed to NET$*entity*_STARTUP.NCL-OLD (where *entity* is a particular entity name).

If you must make changes to the standard NCL scripts and you want to retain your modifications after invoking `net$configure`, you can either manually edit the NCL script to replace the user modifications or rename the appropriate NET$*entity*_STARTUP.NCL-OLD script back to NET$*entity*_STARTUP.NCL. Be sure to incorporate any new changes as well. `net$configure.com` will then flag these modifications the next time it checksums the scripts.

3.12 Reconfiguring the Cluster Alias

All or some nodes that are VMScluster members can be represented in the network as a single node by establishing an alias for the cluster. The alias allows users access to common resources on the VMScluster without knowing which nodes are members of the cluster. It is not necessary for every member of the cluster to join the alias. Refer to the *DECnet/OSI Network Management* guide for more information about setting up a VMScluster alias.

To reconfigure the cluster alias, proceed as follows:

```
* Which configuration option to perform?                 [1] : 9
```

Select Option 9 and press Return.

```
* Do you want to ADD or DELETE an alias?               [ADD] :
```

Answer ADD to add the specified node to the cluster. Answer DELETE to remove the specified node from the cluster.

```
* Full name of Cluster Alias                                 :
```

Specify the full name that uniquely identifies the cluster alias node (for example, IAF:.SALES.BOSTON).

If you are removing a node from the cluster, the procedure displays the following prompt:

```
* Are you sure you want to DELETE this alias?            [NO]:
```

If you answer YES to this prompt, the node is removed from the cluster.

3.12.1 Specifying an Address

If you are adding a node to the cluster, the procedure displays the following prompt:

```
* Cluster Alias Phase IV Address (aa.nnnn OR AA-00-04-00-xx-xx) :
```

Specify either the DECnet Phase IV node address or Ethernet physical address of the alias. The Phase IV node address has the format *area-number.node-number* (for example, 63.171). The Ethernet physical address has the format AA-00-04-00-*xx-xx*, where *xx-xx* is calculated from the Phase IV node address. To determine the Ethernet physical address, proceed as follows:

1. Convert the Phase IV node address to its decimal equivalent as follows:

   ```
   (area-number * 1024) + node-number = decimal equivalent
   (For example, (63 * 1024) + 171 = 64683 decimal)
   ```

2. Convert the decimal node address to its hexadecimal equivalent and reverse the order of the bytes to form the hexadecimal node address.

   ```
   (For example, 64683 decimal = FCAB hexadecimal,
      reversed = ABFC hexnodeaddress)
   ```

3. Incorporate the hexadecimal node address in the following format:

   ```
   AA-00-04-00-hexnodeaddress
   (For example, AA-00-04-00-AB-FC)
   ```

3.12.2 Determining Selection Weight

The selection weight determines the number of sequential incoming connects passed to this alias member node in the round-robin sequence before proceeding to the next member node in the sequence. A value of zero means this node is not eligible to receive incoming connections to this alias address. Selection weight apportions incoming alias connections according to the capacity of each alias member. For example, nodes with greater capacity should have larger values of selection weight, while LAVC satellites should generally have a value of zero. Specify a nonzero selection weight if this node is connected locally to a dual-ported disk, or if it will be serving any multihost disks, such as RFxx or HSC-connected disks, to other cluster members. Values between 0 and 10 are suggested.

```
* Selection weight for this cluster node [0 for satellites]  :
```

Enter a selection weight and press Return.

3.13 Configuring Satellite Nodes

To select this option, you must have already configured the system using the ADVANCED configuration option, and `net$configure` is executing on a cluster system.

From the ADVANCED Configuration Option menu, select Option 10.

```
Configuration Options:

        [0]     Exit this procedure

        [1]     Perform an entire configuration
        [2]     Change naming information
        [3]     Configure Devices on this machine
        [4]     Configure Transports
        [5]     Configure Timezone Differential Factor
        [6]     Configure Event Dispatcher
        [7]     Configure Application database
        [8]     Configure MOP Client database
        [9]     Configure Cluster Alias
        [10]    Configure satellite nodes
        [11]    Configure cluster script locations

* Which configuration option to perform?                 [1] : 10
```

A submenu appears:

```
        Configuration Options:

        [0]     Return to main menu

        [1]     Autoconfigure Phase IV cluster nodes
        [2]     Full configuration of cluster node
        [3]     Configure local node

* Which configuration option to perform?                 [1] :
```

Autoconfigure Phase IV Cluster Nodes (Submenu Option 1)

If you select Option 1, it scans the system disk for evidence of satellite nodes that have not yet been configured to run DECnet/OSI. If it finds one, it creates `sys$specific:[sys$startup]net$autoconfigure.com`, causing the cluster member to automatically configure DECnet/OSI the next time it reboots. The procedure prompts you to enter the full name of a cluster alias.

```
* Fullname of cluster alias:                                     :
```

Supply the full node name of the cluster alias. If none is supplied, no cluster alias will be configured for the systems being upgraded.

```
* Device containing system roots           [SYS$SYSDEVICE:] :
```

Configuring cluster satellites involves finding the system root from which the satellite boots. Normally, this is SYS$SYSDEVICE:, although it is possible to install system roots to a different volume.

The device given in response to this question is searched for all system roots. Those found that do not contain a checksum database are assumed to be Phase IV nodes, and are candidates for being flagged for DECnet/OSI autoconfiguration.

```
* Upgrade Phase IV cluster member FIGS?                [Yes] :
```

A system root was found that does not contain a DECnet/OSI checksum database, and is therefore assumed to be a Phase IV system. Answering YES to this question causes that cluster node to be flagged to run a DECnet/OSI autoconfiguration on its next reboot.

```
* What is the synonym name for this system?           [FIGS] :
```

Full Configuration of Cluster Node (Submenu Option 2)

```
* Which configuration option to perform?               [1] : 2
```

If you select Option 2, it prompts for a cluster member name (and system root location). Once supplied, all `net$configure` modifications are made to the DECnet configuration for that cluster member. Note that this only allows a subset of configuration options.

```
* Cluster node name to be configured:                         : TPZERO
```

This is simply the node name of the cluster member to configure. `net$configure` attempts to find the system root for that cluster member (by scanning NET$MOP_CLIENT_STARTUP.NCL) to supply defaults for the two questions that follow.

```
* Device for TPZERO root:                  [SYS$SYSDEVICE] :
```

In configuring a cluster member other than the system on which `net$configure` executes, you must specify the location of the member's system root. The location is the disk device on which the cluster member's system root resides.

The default answer to this is either SYS$SYSDEVICE or the root device found for that system in NET$MOP_CLIENT_STARTUP.NCL

```
* Directory for TPZERO root:                                  : SYS2
```

In configuring a cluster member other than the system on which `net$configure` executes, you must specify the system root directory. The system root directory is of the form "SYSxxxx," where "xxxx" is the hexadecimal root number from which that member loads.

Note that before `net$configure` returns to the main menu, it warns that all subsequent options will be applied to the cluster node just specified. Notice also that Option 5 (Configure Timezones) is not present when configuring other cluster members.

```
%NET$CONFIGURE-I-VERCHECKSUM, verifying checksums

All configuration options will be applied to cluster node TPZERO
```

Configure Local Node (Submenu Option 3)

If you select Option 3, it clears the action of Option 2; all subsequent `net$configure` modifications are made to the local system (as when `net$configure` was started).

```
* Which configuration option to perform?              [1] : 3
```

3.14 Configuring Cluster Script Locations

This option allows the system manager to make the network startup scripts for NET$APPLICATION_STARTUP, NET$MOP_CLIENT_STARTUP, and NET$EVENT_STARTUP to be common for all cluster nodes. That is, a single copy of the script will be shared by all systems in the cluster. This allows a single configuration for those scripts to be common to all systems, ensuring that all systems have the same application, MOP client and event logging configuration.

It does this by copying the script from the SYS$SPECIFIC directory to the SYS$COMMON directory. Note that when it does so, it does not delete the script from the SYS$SPECIFIC directories for the other cluster systems. You must do this by rerunning the dialog for all cluster members.

To select this option, you must have already configured the system using the ADVANCED configuration option, and `net$configure` is executing on a cluster system.

From the ADVANCED Configuration Option menu, select Option 11.

```
Configuration Options:

        [0]     Exit this procedure

        [1]     Perform an entire configuration
        [2]     Change naming information
        [3]     Configure Devices on this machine
        [4]     Configure Transports
        [5]     Configure Timezone Differential Factor
        [6]     Configure Event Dispatcher
        [7]     Configure Application database
        [8]     Configure MOP Client database
        [9]     Configure Cluster Alias
        [10]    Configure satellite nodes
        [11]    Configure cluster script locations

* Which configuration option to perform?              [1] : 11
```

For this example, the system manager selects Option 11 to create cluster common scripts for APPLICATION, EVENT and MOP_CLIENT. These cluster common scripts are created from the latest configuration on the currently executing system.

```
* Move the APPLICATION startup script to the cluster common area? [YES] :
%NET$CONFIGURE-I-MOVESCRIPT, created cluster common APPLICATION startup script
from SYS$SPECIFIC:[SYSMGR]NET$APPLICATION_STARTUP.NCL;
* Move the EVENT startup script to the cluster common area? [YES] :
%NET$CONFIGURE-I-MOVESCRIPT, created cluster common EVENT startup script from
SYS$SPECIFIC:[SYSMGR]NET$EVENT_STARTUP.NCL;
* Move the MOP_CLIENT startup script to the cluster common area? [YES] :
%NET$CONFIGURE-I-MOVESCRIPT, created cluster common MOP_CLIENT startup script
from SYS$SPECIFIC:[SYSMGR]NET$MOP_CLIENT_STARTUP.NCL;
%NET$CONFIGURE-I-MODCHECKSUM, checksumming NCL management scripts modified by
NET$CONFIGURE
%NET$CONFIGURE-I-CONFIGCOMPLETED, DECnet/OSI for OpenVMS configuration completed
%NET$CONFIGURE-I-USECOMMON, using cluster common APPLICATION script
%NET$CONFIGURE-I-USECOMMON, using cluster common EVENT script
%NET$CONFIGURE-I-USECOMMON, using cluster common MOP_CLIENT script
```

However, these cluster common scripts will not be used by the system "TPZERO," because it still has local copies. So, the system manager selects Option 10 to manage cluster nodes, and from there suboption 2 to manage the configuration for node TPZERO.

```
       Configuration Options:

        [0]     Exit this procedure

        [1]     Perform an entire configuration
        [2]     Change naming information
        [3]     Configure Devices on this machine
        [4]     Configure Transports
        [5]     Configure Timezone Differential Factor
        [6]     Configure Event Dispatcher
        [7]     Configure Application database
        [8]     Configure MOP Client database
        [9]     Configure Cluster Alias
        [10]    Configure satellite nodes
        [11]    Configure cluster script locations

* Which configuration option to perform?              [0] : 10

        Configuration Options:

        [0]     Return to main menu

        [1]     Autoconfigure Phase IV cluster nodes
        [2]     Full configuration of cluster node
        [3]     Configure local node

* Which configuration option to perform?              [0] : 2
* Cluster node name to be configured:                     : TPZERO
* Device for TPZERO root:                 [SYS$SYSDEVICE] :
* Directory for TPZERO root:                              : SYS2
%NET$CONFIGURE-I-OVERRIDECOMMON, node specific APPLICATION script overrides
the cluster common settings
%NET$CONFIGURE-I-OVERRIDECOMMON, node specific EVENT script overrides the
cluster common settings
%NET$CONFIGURE-I-OVERRIDECOMMON, node specific MOP_CLIENT script overrides
the cluster common settings

All configuration options will be applied to cluster node TPZERO
```

Upon doing so, we are informed that TPZERO has local versions of these scripts that override the cluster common defaults. Selecting Option 11 allows the manager to delete these local overrides so that TPZERO will use the cluster common versions.

```
        Configuration Options:

        [0]     Exit this procedure

        [1]     Perform an entire configuration
        [2]     Change naming information
        [3]     Configure Devices on this machine
        [4]     Configure Transports
        [6]     Configure Event Dispatcher
        [7]     Configure Application database
        [8]     Configure MOP Client database
        [9]     Configure Cluster Alias
        [10]    Configure satellite nodes
        [11]    Configure cluster script locations

* Which configuration option to perform?                [0] : 11
* Delete the local APPLICATION startup script?         [No] : yes
%NET$CONFIGURE-I-DELETEDOVERRIDE, deleted system specific copy of the
APPLICATION startup script
* Delete the local EVENT startup script?               [No] : yes
%NET$CONFIGURE-I-DELETEDOVERRIDE, deleted system specific copy of the EVENT
startup script
* Delete the local MOP_CLIENT startup script?          [No] : yes
%NET$CONFIGURE-I-DELETEDOVERRIDE, deleted system specific copy of the
MOP_CLIENT startup script
%NET$CONFIGURE-I-MODCHECKSUM, checksumming NCL management scripts modified by
NET$CONFIGURE
%NET$CONFIGURE-I-CONFIGCOMPLETED, DECnet/OSI for OpenVMS configuration completed
%NET$CONFIGURE-I-USECOMMON, using cluster common APPLICATION script
%NET$CONFIGURE-I-USECOMMON, using cluster common EVENT script
%NET$CONFIGURE-I-USECOMMON, using cluster common MOP_CLIENT script

All configuration options will be applied to cluster node TPZERO
```

3.15 Completing Configuration Changes

After you have made all your selections, the procedure displays a summary of your changes:

```
         Summary of Configuration

 Node Information:
        Directory Services Chosen:      DECDNS,LOCAL,DOMAIN
        Primary directory service:      DECDNS
        DECdns full name:       PHASEV:.ENG.SSG.TEST.ELMER
        Local Full name:        LOCAL:.ELMER
        Fully Qualified
        Host name:              ELMER.WABBIT.ACME.EDU
        Node Synonym:           ELMER
        Phase IV Address:       15.27
        Phase IV Prefix:        49::
        Autoconfiguration of Network Address: Enabled

        Alias Name:     ACME:.WABBIT.HELP

 Device Information:

        Device: XQA0 (DELQA):

 Data Link name: CSMACD-0
                Routing Circuit Name:   CSMACD-0
                .           .
                .           .
                .           .
```

At the end of the summary, the procedure asks if you want to generate NCL configuration scripts (which now contain your updated information):

```
* Do you want to generate NCL configuration scripts?   [YES] :
```

If you answer YES, the configuration program uses the information you entered to create the alias NCL script. The configuration program then returns to the Configuration Options menu. To implement the alias NCL script, reboot the system or disable the entity and execute the script.

If you answer NO, the configuration procedure returns to the Configuration Options menu and does not generate any NCL scripts.

Part II

Configuring VAX P.S.I. and VAX P.S.I. Access for OpenVMS VAX Systems

Part II describes the steps necessary to configure VAX P.S.I. and VAX P.S.I Access on a DECnet/OSI for OpenVMS VAX system. It includes the following chapter:

4 Configuring VAX P.S.I. and VAX P.S.I. Access

This chapter describes how to configure the VAX P.S.I. and VAX P.S.I. Access software.

4.1 Steps in Configuring VAX P.S.I.

Refer to Figure 4–1 and follow these steps to configure your VAX P.S.I. system:

1. Plan your configuration (see the *DECnet/OSI Planning Guide* and Section 4.2).
2. Make a note of the information you need during the configuration program, using Section 4.3.
3. Run the configuration program (see Section 4.4).
4. Run the `net$configure` procedure (in either BASIC or ADVANCED mode) to configure your network.
5. Carry out the postconfiguration tasks: starting VAX P.S.I. and testing your configuration (see Section 4.5).

4.2 Planning Your VAX P.S.I. Configuration

This section introduces the aspects of your proposed configuration that you need to consider before you run the configuration program.

4.2.1 Configuring Access, Native, and Multihost Systems

There are three types of VAX P.S.I. systems:

- Access
- Native
- Multihost

Refer to the *DECnet/OSI Planning Guide* for an explanation of VAX P.S.I. systems.

The type(s) you can configure depends on the license(s) that you have installed. Table 4–1 summarizes the various possible configurations.

Figure 4–1 Installation and Configuration Flowchart

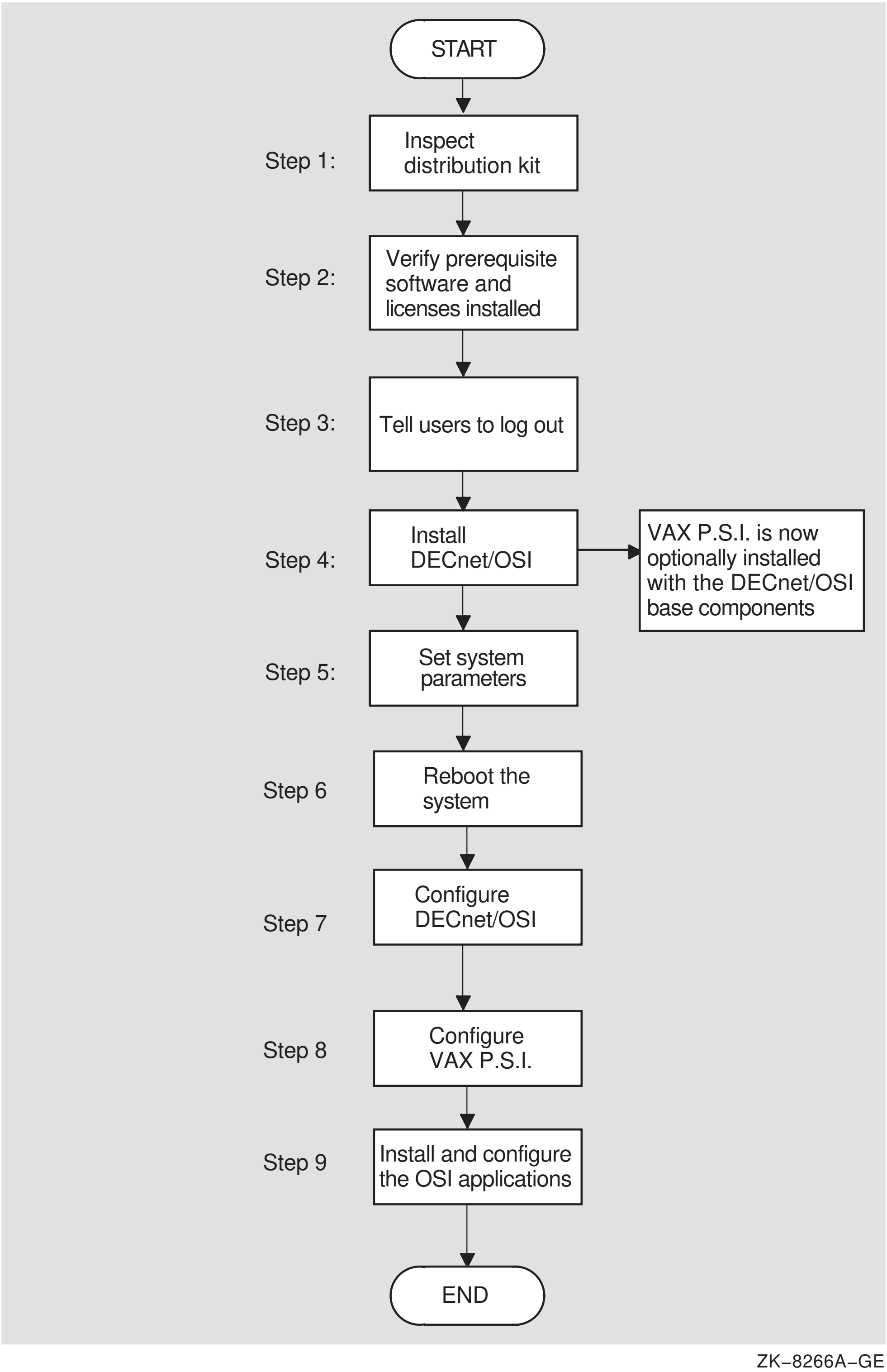


Table 4–1 VAX P.S.I. Configurations and License Requirements

License(s)	Possible VAX P.S.I. Configurations
DECnet–VAX only	VAX P.S.I. Access
Native only	VAX P.S.I. Native
DECnet–VAX and Native	VAX P.S.I. Access VAX P.S.I. Native VAX P.S.I. Multihost VAX P.S.I. Access + Native VAX P.S.I. Access + Multihost

4.2.2 The VAX P.S.I. Configuration Program

The VAX P.S.I. configuration program has many sections, but not all sections are relevant to all types of systems. Table 4–2 shows the sections that apply to each type of system.

Table 4–2 VAX P.S.I. Configuration Sections Required for Access, Native and Multihost Systems

Section	Applies to Access?	Applies to Native?	Applies to Multihost?	Required or Optional
Set Up Lines and DTEs	No	Yes	Yes	O[1]
Set Up PVCs	No	Yes	Yes	O
Set Up Groups	No	Yes	Yes	O
Set Up LLC2	No	Yes	Yes	O[1]
Set Up Remote DTE Classes	Yes	No	No	R
Choose X.29 and P.S.I. MAIL Support	Yes	Yes	Yes	O
Set Up Gateway Clients	No	No	Yes	R
Set Up Applications	Yes	Yes	Yes	O
Declaring a Network Process	Yes	Yes	Yes	O
Set Up Templates	Yes	Yes	Yes	O
Select X.25 Security Option	Yes	Yes	Yes	O
Set Up Incoming Security for Applications	Yes	Yes	Yes	O
Set Up Outgoing Security for Local Processes	Yes	Yes	Yes	O
Set Up Incoming Security for Network Processes	Yes	Yes	Yes	O
Set Up Incoming Security for Gateway Clients	No	No	Yes	O
Set Up Outgoing Security for Accessing Systems	No	No	Yes	O
Create the NCL Script	Yes	Yes	Yes	O

[1] You must set up at least one synchronous line and associated DTE or at least one LLC2 DTE.

The VAX P.S.I. configuration program automatically skips sections that do not apply to your type of system.

4.2.3 Sections in the VAX P.S.I. Configuration Program

This section explains the purpose of each section in the P.S.I. configuration program.

Lines and DTEs

Choose a line on your system to configure for X.25 communications. You must configure at least one synchronous line unless you intend to use LLC2 exclusively.

PVCs

Your DTE can communicate with a remote DTE using either an SVC (switched virtual circuit) or a PVC (permanent virtual circuit). A PVC is a permanent association between two specific DTEs.

Two DTEs connected by a PVC can communicate without the need for call clearing or call setup.

Complete this section if you have requested this facility from your PSDN.

Groups

If your DTE belongs to a closed user group (CUG), it can communicate freely with remote DTEs that are also members of that CUG. Its communications with other DTEs may be restricted, depending on your PSDN subscription options.

You must complete this section if you have requested this facility from your PSDN.

LLC2

LLC2 is a data link protocol used on LANs, over which the X.25 Packet-Level Protocol (PLP) is run.

You must set up an LLC2 DTE for each remote system to which you want to connect on the LAN. You can set up one or more LLC2 DTEs per LAN connection.

Remote DTE Classes

Use this section to specify the Connector system(s) that your Access system uses.

X.29 and P.S.I. MAIL

This section allows you to add support for X.29 communications and for P.S.I. MAIL.

You need X.29 support if your VAX P.S.I. system is to communicate with character-mode terminals.

P.S.I. MAIL is an extension of OpenVMS MAIL that lets you send mail messages to and receive them from other VAX P.S.I. systems across a PSDN.

Gateway Clients

You must create Gateway Clients to allow your Multihost system to pass incoming calls to the correct Client system. A Gateway Client identifies a Client system or group of Client systems that use this Multihost system to receive incoming calls.

In this section, you also set up filter(s) for Gateway Clients. You must set up at least one filter for each Gateway Client. See **Filters** for more about filters.

Filters

Filters are sets of characteristics that can be matched to fields in an incoming call request packet. If the characteristics in an incoming call match the characteristics you set in a filter, then the call is passed to the Gateway Client or the application associated with that filter.

You must supply a filter name and a priority for each filter. You may leave all the other parameters unspecified.

The more parameters you specify in a filter, the more specific is that filter. For example, you could create a filter with most of its parameters unspecified and with a low priority to act as a 'catchall' for unexpected calls.

Applications

You must specify any X.25 or X.29 applications on your system to allow incoming calls for those applications to succeed.

You must supply the name of the command file that starts the application. You may also supply a user name for the application.

Do not specify any applications that do not receive calls.

In this section, you also set up filter(s) for applications. You must set up at least one filter for each application. See **Filters** for more about filters.

Declaring a Network Process

X.25 and X.29 programs on your system can issue $QIO(IO$_ACPCONTROL) calls to declare themselves as network processes. Each $QIO(IO$_ACPCONTROL) specifies a filter used to determine which calls are able to access the program.

The filter specified by $QIO(IO$_ACPCONTROL) can be one of two types:

- Static

  In this case, $QIO(IO$_ACPCONTROL) names a filter that already exists on your system. Complete this section if you want to create static filters for use by $QIO(IO$_ACPCONTROL).

- Dynamic

  In this case, the filter characteristics are specified in the $QIO(IO$_ACPCONTROL) call. The filter created in this way by the $QIO(IO$_ACPCONTROL) call ceases to exist when the program exits. Complete this section if you want to name the dynamic filters created by $QIO(IO$_ACPCONTROL).

If your programs issues only $QIO(IO$_ACPCONTROL) calls that use unnamed dynamic filters, you do not need to complete this section.

Templates

Your system uses a template to make outgoing calls. A template sets various parameters for each call made using that template.

A template called 'default' is created automatically on your system.

Security

Set up security to prevent unauthorized use of your VAX P.S.I. system. There are six security sections:

- X.25 Security

  This allows you to choose whether to set up X.25 security. If you do not set up X.25 security, any remote DTE can make a call to your system (provided it matches one of your filters), and any user on your system can make outgoing calls to any remote DTE. If you choose not to set up X.25 security, you do not see the following five security sections.

- Incoming Security for Applications

  You see this section only if you have an Access, Native or Multihost system on which you have set up applications.

  Complete this section if you want your applications to be able to receive calls from remote systems.

- Outgoing Security for Local Processes

  Complete this section if you want users on your system to be able to make calls to remote systems.

- Incoming Security for Network Processes

  Complete this section if you have X.25 or X.29 programs that issue $QIO(IO$_ACPCONTROL) calls to declare themselves as network processes.

- Incoming Security for Gateway Clients

  You see this section only if you have a Multihost system on which you have set up Gateway Clients.

  Complete this section if you want your system to be able to pass incoming calls to Client systems.

- Outgoing Security for Accessing Systems

  You see this section only if you have a Multihost system.

  Complete this section if you want your system to be able to make outgoing calls on behalf of Client systems.

NCL Script

When you are satisfied that all the information you have entered is complete and correct, the configuration program creates two NCL scripts using the information you have provided.

When the NCL scripts have been created, you are asked if you want to run a command file called `psi$security_identifiers.com`.

This file is created by the configuration program to add certain rights identifiers to the System Rights database on your system. The rights to be added depend on the security information you have supplied.

You can run the command file from within the configuration procedure, or you can exit from the configuration program and run the command file later. Note that you cannot start VAX P.S.I. until you have run this command file. This is true even if you have selected not to set up X.25 security for your system.

If you edit the command procedure before running it, you must make corresponding changes to the NCL scripts before attempting to start VAX P.S.I.

4.3 Recording the Information You Need for VAX P.S.I. Configuration

This section details the information you need to provide during the configuration program.

Tables 4–3 to 4–18 list all the information you require during the configuration.

Table 4–3 lists the information you need to complete the lines and DTEs section of the configuration program.

Table 4–3 VAX P.S.I. Configuration Information: Lines and DTEs (Native and Multihost Systems Only)

Information required	Form in which it is required	Where to find it	Default
Select device	–	You select	–
Select line speed	–	Supplier of line	4.8 Kbits/s
DTE name	Max. 32 characters	You supply	DTE–*n*
DTE address	Max. 15 digits	PSDN subscription information	–
Logical channel range(s)	Number(s) or range(s) of numbers	PSDN subscription information	–
Profile name	As supplied by Digital	PSDN/Digital	–
Flow control negotiation[1]	Yes or No	You select	No
Extended packet sequence numbering[1]	Yes or No	You select	No
Minimum packet size[2]	Decimal number	You supply (subject to PSDN restrictions)	Profile dependent
Maximum packet size[2]	Decimal number	You supply (subject to PSDN restrictions)	Profile dependent
Default packet size	Decimal number	You supply (subject to PSDN restrictions)	Profile dependent
Minimum window size (packet level)[2]	Decimal number	You supply (subject to PSDN restrictions)	Profile dependent

[1] You need to make this choice only if the profile you have entered supports the facility.

[2] You need to enter values here only if you have chosen to use packet-level negotiation.

(continued on next page)

Table 4–3 (Cont.) VAX P.S.I. Configuration Information: Lines and DTEs (Native and Multihost Systems Only)

Information required	Form in which it is required	Where to find it	Default
Maximum window size (packet level)[2]	Decimal number	You supply (subject to PSDN restrictions)	Profile dependent
Default window size (packet level)	Decimal number	You supply (subject to PSDN restrictions)	Profile dependent
Interface mode[3]	DTE or DCE	You select	DTE
Extended frame sequence numbering[1]	Yes or No	You select	No
Window size (frame level)	Decimal number	You supply (subject to PSDN restrictions)	Profile dependent
DTE Class	Max. 32 characters	You supply	Profile name

[1] You need to make this choice only if the profile you have entered supports the facility.

[2] You need to enter values here only if you have chosen to use packet-level negotiation.

[3] You need to make this choice only if the profile you have entered is ISO 8208 or NPSI.

Table 4–4 lists the information you need to complete the PVCs section of the configuration program.

Table 4–4 VAX P.S.I. Configuration Information: PVCs (Native and Multihost Systems Only)

Information required	Form in which it is required	Where to find it	Default
Select a DTE	–	You select	–
PVC name	Max. 32 characters	You supply	PVC-*n*
Channel number	Decimal number	PSDN subscription information	–
PVC packet size	Decimal number	PSDN subscription information	Default DTE packet size
PVC window size	Decimal number	PSDN subscription information	Default DTE window size

Table 4–5 lists the information you need to complete the Groups section of the configuration program.

Table 4–5 VAX P.S.I. Configuration Information: Groups (Native and Multihost Systems Only)

Information required	Form in which it is required	Where to find it	Default
Group name	Max. 32 characters	You supply	GROUP-*n*
Group type	BCUG or CUG	PSDN subscription information	BCUG
DTE name[1]	–	You select	–
CUG number[1]	Decimal number	PSDN subscription information	–
Remote DTE address[2]	Max. 15 digits	PSDN subscription information	–

[1] You may specify more than one DTE/CUG number pair for groups of type CUG.

[2] You need to supply this information only if the Group type is BCUG.

Table 4–6 lists the information you need to complete the LLC2 section of the configuration program.

Table 4–6 VAX P.S.I. Configuration Information: LLC2 (Native and Multihost Systems Only)

Information required	Form in which it is required	Where to find it	Default
Choose LAN device	–	You select	–
DTE name	Max. 32 characters	You supply	DTE-*n*
DTE address	Max. 15 digits	You supply	–
Logical channel range(s)	Number(s) or range(s) of numbers	PSDN subscription information	–
Local LSAP	2 Hex digits	You supply	7E
Remote MAC address	LAN hardware address	Remote system	–
Remote LSAP	2 Hex digits	Remote system	7E
Flow control negotiation	Yes or No	You select	No
Extended packet sequence numbering	Yes or No	You select	No
Minimum packet size[1]	Decimal number	You supply	16
Maximum packet size[1]	Decimal number	You supply	1024
Default packet size	Decimal number	You supply	128

[1] You need to supply these values only if you have chosen to use packet-level negotiation.

(continued on next page)

Table 4–6 (Cont.) VAX P.S.I. Configuration Information: LLC2 (Native and Multihost Systems Only)

Information required	Form in which it is required	Where to find it	Default
Minimum window size (packet level)[1]	Decimal number	You supply	1
Maximum window size (packet level)[1]	Decimal number	You supply	7
Default window size (packet level)	Decimal number	You supply	2
DTE class	Max. 32 characters	You supply	LLC2-CLASS-*n*

[1]You need to supply these values only if you have chosen to use packet-level negotiation.

Table 4–7 lists the information you need to complete the Remote DTE Classes section of the configuration program.

Table 4–7 VAX P.S.I. Configuration Information: Remote DTE Classes (Access Systems Only)

Information required	Form in which it is required	Where to find it	Default
Name	Max. 32 characters	You supply	REMOTE-CLASS-*n*
Gateway node name(s)	Max. 6 characters	You supply	–

Table 4–8 lists the information you need to complete the X.29 and P.S.I. MAIL Support section of the configuration program.

Table 4–8 VAX P.S.I. Configuration Information: X.29 and P.S.I. MAIL Support (All Systems)

Information required	Form in which it is required	Where to find it	Default
X.29 support	Yes or No	You select	Yes
P.S.I. MAIL support	Yes or No	You select	Yes
P.S.I. MAIL account user name[1]	Max. 31 characters	You supply	No

[1] You are asked for this information only if you request P.S.I. MAIL support.

Table 4–9 lists the information you need to complete the Gateway Clients section of the configuration program.

Table 4–9 VAX P.S.I. Configuration Information: Gateway Client Nodes (Multihost Systems Only)

Information required	Form in which it is required	Where to find it	Default
Name	Max. 32 characters	You supply	CLIENT-*n*
Node name	Max. 32 characters	You supply	–
Filter name(s)	Max. 32 characters	You supply	–

Table 4–10 lists the information you need to complete the Applications section of the configuration program.

Table 4–10 VAX P.S.I. Configuration Information: Applications (All Systems)

Information required	Form in which it is required	Where to find it	Default
Name	Max. 32 characters	You supply	APPLICATION-*n*
Type	X.25, X.29, or X.29 Login	You select	X.25
Command file to start application[1]	OpenVMS filename	You supply	–
User name for application[1]		You supply	–
Filter name(s)	Max. 32 characters	You supply	–

[1] You are not asked for this information if the application type is X.29 Login

Table 4–11 lists the information you need to complete the Declaring a Network Process section of the configuration program.

Table 4–11 VAX P.S.I. Configuration Information: Declaring a Network Process (All Systems)

Information required	Form in which it is required	Where to find it	Default
Dynamic filters?	Yes or No	You supply	Yes
Dynamic filter name(s)	Max. 32 characters	You supply	–
Static filters?	Yes or No	You supply	Yes
Filter name(s)	Max. 32 characters	You supply	–

Table 4–12 lists the information you need to supply when you create filters in the Gateway Clients, Applications and Declaring a Network Process sections of the configuration program.

Table 4–12 VAX P.S.I. Configuration Information: Filters—for Applications and Network Processes (All Systems) and Gateway Clients (Multihost Systems Only)

Information required	Form in which it is required	Where to find it	Default
Name	Max. 32 characters	You supply	FILTER-*n*
Priority	Decimal number	You supply	1
Incoming DTE address	Max. 15 digits	You supply	Not specified
Call data value	Hex digits	You supply	Not specified
Call data mask	Hex digits	You supply	Not specified
Subaddress range	Range of numbers	You supply	Not specified
DTE class	Max. 32 characters	You supply	Not specified
Sending DTE address	Max. 15 digits	You supply	Not specified
Receiving DTE address	Max. 15 digits	You supply	Not specified
Group	Max. 32 characters	You supply	Not specified
Originally called address	Max. 15 digits	You supply	Not specified
Redirect reason	One of: Not specified Busy Out of order Systematic	You supply	Not specified
Called address extension value	Hex digits	You supply	Not specified
Called address extension mask	Hex digits	You supply	Not specified
Called NSAP	Hex digits	You supply	Not specified

Table 4–13 lists the information you need to complete the Templates section of the configuration program.

Table 4–13 VAX P.S.I. Configuration Information: Templates (All Systems)

Information required	Form in which it is required	Where to find it	Default
Name	Max. 32 characters	You supply	TEMPLATE-*n*
DTE class	Max. 32 characters	You supply	Not specified
Call data	Hex digits	You supply	Not specified
Packet size	Hex digits	You supply	Not specified
Window size	Decimal number	You supply	Not specified
Destination DTE address	Max. 15 digits	You supply	Not specified
Fast select option	One of: Not specified Fast select With response No fast select	You supply	Not specified
Reverse charging	True or False	You supply	False
Selected group	Max. 32 characters	You supply	Not specified
Throughput class request	A range of values, the max. and min. to be chosen from: 0 75 150 300 600 1200 2400 4800 9600 19200 48000	You supply	{0..0}
Network user identity	Max. 32 characters	You supply	Not specified
Local facilities	Max. 32 characters	You supply	Not specified
Charging information	True or False	You supply	False
RPOA sequence	Decimal number	You supply	Not specified
Local subaddress	Decimal number	You supply	Not specified
Target address extension	Hex digits	You supply	Not specified
NSAP mapping	True or False	You supply	False
Calling address extension	Hex digits	You supply	Not specified
Transit delay selection	Decimal number	You supply	Not specified
End-to-end delay	Decimal number	You supply	Not specified
Quality of service	Max. 32 characters	You supply	Not specified
Expedited data option	One of: Not specified Use Do not use	You supply	Not specified

Table 4–14 lists the information you need to complete the Incoming Security for Applications section of the configuration program.

Table 4–14 VAX P.S.I. Configuration Information: Incoming Security for Applications (All Systems)

Information required	Form in which it is required	Where to find it	Default
Select an application	–	You supply	–
DTE addresses of systems that can call this application only if the remote system is charged for the call	Max. 15 digits[1]	You supply	–
DTE addresses of systems that can call this application irrespective of who pays for the call	Max. 15 digits[1]	You supply	–
DTE addresses of systems that cannot call this application	Max. 15 digits[1]	You supply	*[2]

[1]The value required is a Remote Address Prefix (RAP). This can be a full DTE address, or it can be an address prefix, which would stand for all DTEs with an address beginning with this prefix.

[2]The wildcard character (*) means all unspecified DTEs. If you enter the wildcard character to stand for DTEs that have Remote Charge or All access, there is no default for this value, and the only DTEs that are not allowed access are those that you specify explicitly.

Table 4–15 lists the information you need to complete the Outgoing Security for Local Processes section of the configuration program.

Table 4–15 VAX P.S.I. Configuration Information: Outgoing Security for Local Processes (All Systems)

Information required	Form in which it is required	Where to find it	Default
Enter a rights identifier	–	You supply	–
DTE addresses of systems that can be called by processes with this rights identifier only if they pay for the call	Max. 15 digits[1]	You supply	–
DTE addresses of systems that can be called by processes with this rights identifier irrespective of who pays for the call	Max. 15 digits[1]	You supply	–
Names of PVCs that can be accessed by processes with this rights identifier[3]	Max. 32 characters	You supply	–
DTE addresses of systems that cannot be called by processes with this rights identifier[3]	Max. 15 digits[1]	You supply	*[2]
Names of PVCs that cannot be accessed by processes with this rights identifier[3]	Max. 32 characters	You supply	*[2]

[1]The value required is a Remote Address Prefix (RAP). This can be a full DTE address, or it can be an address prefix, which would stand for all DTEs with an address beginning with this prefix.

[2]The wildcard character (*) means all unspecified DTEs or PVCs. If you enter the wildcard character to stand for DTEs or PVCs that have Remote Charge or All access, there is no default for these values, and the only DTEs or PVCs that are not allowed access are those that you specify explicitly.

[3]You are asked for this information only if PVCs have been set up.

Table 4–16 lists the information you need to complete the Incoming Security for Network Processes section of the configuration program.

Table 4–16 VAX P.S.I. Configuration Information: Incoming Security for Network Processes (All Systems)

Information required	Form in which it is required	Where to find it	Default
Select a filter	–	You supply	–
DTE addresses of systems that can call access this filter only if remote system is charged for the call	Max. 15 digits[1]	You supply	–
DTE addresses of systems that can access this filter irrespective of who pays for the call	Max. 15 digits[1]	You supply	–
DTE addresses of systems that cannot access this filter	Max. 15 digits[1]	You supply	*[2]

[1]The value required is a Remote Address Prefix (RAP). This can be a full DTE address, or it can be an address prefix, which would stand for all DTEs with an address beginning with this prefix.

[2]The wildcard character (*) means all unspecified DTEs. If you enter the wildcard character to stand for DTEs that have Remote Charge or All access, there is no default for this value, and the only DTEs that are not allowed access are those that you specify explicitly.

Table 4–17 lists the information you need to complete the Incoming Security for Gateway Clients section of the configuration program.

Table 4–17 VAX P.S.I. Configuration Information: Incoming Security for Gateway Clients (Multihost Systems Only)

Information required	Form in which it is required	Where to find it	Default
Select a Gateway Client	–	You supply	–
DTE addresses of systems that can call the Client systems associated with this Gateway Client only if remote system is charged for the call	Max. 15 digits[1]	You supply	–
DTE addresses of systems that can call the Client systems associated with this Gateway Client irrespective of who pays for the call	Max. 15 digits[1]	You supply	–
DTE addresses of systems that cannot call the Client systems associated with this Gateway Client	Max. 15 digits[1]	You supply	*[2]

[1]The value required is a Remote Address Prefix (RAP). This can be a full DTE address, or it can be an address prefix, which would stand for all DTEs with an address beginning with this prefix.

[2]The wildcard character (*) means all unspecified DTEs. If you enter the wildcard character to stand for DTEs that have Remote Charge or All access, there is no default for this value, and the only DTEs that are not allowed access are those that you specify explicitly.

Table 4–18 lists the information you need to complete the Outgoing Security for accessing Systems section of the configuration program.

Table 4–18 VAX P.S.I. Configuration Information: Outgoing Security for Client Systems (Multihost Systems Only)

Information required	Form in which it is required	Where to find it	Default
Client system	Max. 400 characters	You supply	–
Security name for Client system	Max. 32 characters	You supply	–
DTE addresses of systems that can be called by this Client system only if the remote systems pay for the call	Max. 15 digits[1]	You supply	–
DTE addresses of systems that can be called by this Client system irrespective of who pays for the call	Max. 15 digits[1]	You supply	–
Names of PVCs that can be accessed by this Client system[3]	Max. 32 characters	You supply	–
DTE addresses of systems that cannot be called by this Client system[3]	Max. 15 digits[1]	You supply	*[2]
Names of PVCs that cannot be accessed by this Client system[3]	Max. 32 characters	You supply	–[1]

[1]The value required is a Remote Address Prefix (RAP). This can be a full DTE address, or it can be an address prefix, which would stand for all DTEs with an address beginning with this prefix.

[2]The wildcard character (*) means all unspecified DTEs or PVCs. If you enter the wildcard character to stand for DTEs or PVCs that have Remote Charge or All access, there is no default for these values, and the only DTEs or PVCs that are not allowed access are those that you specify explicitly.

[3]You are asked for this information only if PVCs have been set up.

4.4 Running the VAX P.S.I. Configuration Program

To configure your VAX P.S.I. system, you need to run the `psi$configure.com` command procedure.

This procedure allows you to set up the VAX P.S.I. system's permanent configuration database.

4.4.1 Starting the VAX P.S.I. Configuration Program

To start the program, log in to any account that has OPER and SYSPRV privileges and enter the command:

```
$ @sys$manager:psi$configure
```

4.4.2 Using the VAX P.S.I. Configuration Program

The configuration program consists of a number of sections, each corresponding to a logical group of information. Each section consists of one or more screens on which you can enter data. All sections (with the exception of the X.29 and MAIL support section) also have an introductory information screen.

Most sections are optional; you do not have to enter information unless you want to. These begin with a question of the form: "Do you want to set up *X*?" If you select Yes, you go through the rest of the section. If you select No, you go directly to the next new section, although you can decide at a later stage to complete that section (See Section 4.4.3).

4.4.2.1 Entering Information

The program prompts you for information in two ways:

- For some questions, you choose your answer from a menu by using the arrow keys and pressing Return.
- For other questions, you type data into a field and press Return.

Horizontal Scrolling

Usually, when you type data into a field, you can see the entire field on the screen. However, in some cases, the maximum length of the data you are allowed to type is too long to fit into the field shown on the screen; for example, a node name, which may be up to 400 characters. In such cases, the field scrolls horizontally as you enter data.

Note that horizontal scrolling works only if the keyboard is in Insert mode, not if it is in Overstrike mode. The words Insert or Overstrike appear in the upper right-hand corner of the screen to indicate which mode you are using. Press Ctrl/A to change from one mode to the other.

When you have entered all the required information on a screen, a new screen appears automatically. You cannot move forward until you have completed the required fields.

Note

The configurator program indicates it is processing input by flashing the message *working* in the bottom left-hand corner of the screen.

4.4.2.2 Moving Within a Section

To move backward within a section, press Prev Screen. You are allowed to move backward within a section whether you have finished it or not. However, you can move backward only as far as the first screen of the section. To reach another section, use the Sections Menu (see Section 4.4.3).

If you have moved back to look at completed screens, you can move forward again by pressing Next Screen. Do this until you reach an incomplete screen. Then complete the required fields on that screen before moving on.

4.4.3 Options Menu

When you leave the last screen in a section, an Options menu appears.

Generally, the Options menu for a section provides the following choices:

- Continue to new section
- Add an *x*
- Modify an *x*
- Delete an *x*
- Go to Sections menu

where *x* is the item you created in that section.

For example, the PVC Options menu provides these choices:

- Continue to a new section
- Add a PVC

- Modify a PVC
- Delete a PVC
- Go to Sections menu

These options are described here.

Continue

Choose this option when you finish entering or amending information in the current section. The configuration program then displays the first screen in the next unseen section.

Add

Choose this option to add another item in this section.

For example, when you finish entering data for a PVC, and you want to add another PVC choosing this option takes you back to the first data entry screen for PVCs.

Modify

Choose this option to modify some or all of the information you provided previously about an item.

For example, if you choose this option from the PVC Options menu, the next screen lists all the PVCs defined so far. You select one of these (PVC1, for example), and then go back to the first data entry screen for PVCs. The fields contain the information you provided when you first set up PVC1. You can modify any of this information. Use Next Screen and Prev Screen to move between screens that you do not want to alter.

Delete

Choose this option to delete an item in this section.

For example, if you choose this option from the PVC Options menu, a list of all PVCs defined on your system so far appears on the screen. Select one of these (PVC2, for example), and you are asked for confirmation that this is the one you want to delete.

Go to Sections Menu

Choose this option to go to the Sections menu. From there you can go on to the Options menu of a different section.

4.4.4 Creating NCL Script

The final section in the configuration program is Create the NCL Script. You are asked if you want to create the NCL script.

- If you answer YES, the configuration program uses the information you have entered to create two files of NCL commands.
- If you answer NO, you see a Sections menu, showing all the completed sections. At this point, you can return to any of these sections and modify, add, or delete information. When you want to create an NCL script, go to the Sections menu from any of the Options menus, and select **Create the NCL Script**.
- After the NCL scripts are created, you are asked if you want to run a command file called `psi$security_identifiers.com`.

This file is created by the configuration program, to add certain rights identifiers to the System Rights database on your system. The rights to be added depend on the security information you have supplied.

You can run the command file from within the configuration procedure, or you can exit from the configuration program and run the command file later. Note that you cannot start VAX P.S.I. until you have run this command file. This is true even if you have selected not to set up X.25 security for your system.

If you edit the command procedure before running it, you must make corresponding changes to the NCL scripts before attempting to start VAX P.S.I.

4.4.5 Exiting the Program

Once it has created the NCL scripts, the program returns to the Main Menu. You can then choose the **Exit** option to exit the program.

If, for some reason, the program cannot create the NCL script, an error message appears at the foot of the screen and the cursor stays on the question, "Do you wish to create the NCL scripts now?" You must correct the problem before you answer YES to this question.

To quit the program, without creating a set of NCL scripts, press F8; however, this deletes all the information you have entered so far.

4.4.6 Requirement to Complete VAX P.S.I. Configuration

You cannot leave the configuration program unfinished. That is, you cannot retain the data you entered if you exit before you create a valid configuration.

If you quit prematurely by pressing F8, you receive a warning message, asking for confirmation. If you confirm that you want to quit, everything you have entered so far is lost.

4.4.7 Getting Help

You can get help at any time during the program by pressing the Help key.

4.4.7.1 Getting Help on a Specific Field or Menu Choice

If you press Help while the cursor is on a particular field or menu choice, three lines of text appear near the bottom of the screen. These lines tell you what sort of value is expected in that field, or what the implications are of making that choice.

If you press Help again, the screen is replaced by additional information about that field or menu choice. Press F10 to leave help and return to the screen from which you pressed Help originally.

4.4.7.2 Getting General Help

If you press Help while on any of the introductory screens, the screen is replaced by general information about that section. For example, pressing Help while on the PVC introduction screen brings up general information on PVCs.

You can also reach this section help from the Options menu for any particular section.

4.4.7.3 Getting Help on the Program

You can get help on the configuration program (for example, which keys you can use, how to navigate between screens) by pressing Help while you are on any other Help screen.

4.5 Testing VAX P.S.I.

This section explains how to run the VAX P.S.I. Configuration Test Program.

Note

Before you can test the VAX P.S.I. configuration, you must run the `net$configure.com` configuration procedure (in either BASIC or ADVANCED mode) to configure the system on the network.

You use the Configuration Test Program (CTP) to check any synchronous DTEs (and associated PVCs) that your system uses to make or receive calls.

You can operate the CTP in one of three modes:

- Send/Receive
- Receive Only
- Send Only

In Send/Receive mode, you can do two types of testing:

- Loopback testing, in which calls are sent to the PSDN and then looped back to your system. The PSDN used for the CTP must allow loopback from the network to your system.
- Testing to a remote DTE, in which calls are sent to and received from a remote DTE.

In Receive Only and Send Only modes, you can only test to a remote DTE.

4.5.1 Preparing to Run the CTP

This section describes the checks you must make before running the CTP.

Privileges Required

- NETMBX
- TMPMBX
- WORLD
- CMKRNL
- DETACH
- SYSPRV

System Quotas Required

- ASTLM = 100
- BIOLM = 100
- BYTLM = 40000
- BIOLM = 100

- TQELM = 30

VAX P.S.I. Software

- VAX P.S.I. must be configured and running on your system.
- The DTE you want to use to make and receive calls must be up and running. To check, enter the following commands.

  Native or Multihost:

  ```
  ncl> show x25 protocol dte dte-name state
  ```

  Access:

  ```
  ncl> show node connector-node-id -
  _ncl> x25 protocol dte dte-name state
  ```

  If the status of your DTE is not shown as RUNNING, wait for 2 minutes and try again. If your DTE is still not RUNNING, refer to the *X.25 Problem Solving* guide.

Remote System

- The remote system must have VAX P.S.I. V4.3 or later configured and running.
- You must know the DTE address and subaddress of the remote system.

4.5.2 Running the CTP

You can run the CTP either interactively or as a network object. When the CTP is set up as a network object, it can only handle incoming calls (either from a remote system or calls that have been looped back from the PSDN).

4.5.2.1 Running the CTP Interactively

Enter the following command:

```
$ run sys$test:psi$ctp
```

After some introductory screens, you are asked if you want to run the CTP in Send/Receive mode, Receive Only mode, or Send Only mode.

- If you run the CTP in Send/Receive mode, you can test your system's ability to communicate with a PSDN (loopback testing) or with remote systems.
- If you run the CTP in Receive Only mode or Send Only mode, you can test your system's ability to make calls to or receive calls from remote systems.

4.5.2.2 Running the CTP as a Network Object

Enter the following command:

```
$ mcr ncl @sys$test:psi$ctp_add_netobj
```

To run the CTP as a network object automatically when you start VAX P.S.I., you should add the above line to `psi$startup.com`.

To remove the CTP as a network object, enter the following command:

```
$ mcr ncl @sys$test:psi$ctp_rem_netobj
```

4.6 Changing Your VAX P.S.I. Configuration

To modify an existing configuration:

- Run `psi$configure.com` (Section 4.4.1).
- At the Main Menu, choose **Modify**.
- The next screen is the Sections Menu, from which you can modify, add to, or delete any of the information entered previously.

Note

When you run the configuration program to modify your existing configuration, the configuration program retrieves the information you supplied the last time you ran the program.

If you manually changed the NCL script produced by the configuration program, or if you dynamically changed your configuration by issuing NCL commands interactively, this changed information is lost when you select **Modify**, unless you quit the program (by pressing F8) before asking it to create the NCL script.

4.7 Creating a New VAX P.S.I. Configuration

To delete your existing configuration and create a new set of NCL scripts:

- Run psi$configure.com (Section 4.4.1).
- At the Main Menu, choose **Create**.

Part III

Installing and Configuring X.25 for OpenVMS Alpha Systems

Part III describes the prerequisite steps necessary to install and configure X.25 for OpenVMS Alpha. It includes the following chapters:

- Chapter 5 — Planning the Installation
- Chapter 6 — Preparing to Install X.25 for OpenVMS Alpha
- Chapter 7 — Installing X.25 for OpenVMS Alpha
- Chapter 8 — Post-installation Tasks

5

Planning to Install X.25 for OpenVMS Alpha

5.1 Product Description

X.25 for OpenVMS Alpha enables appropriately configured systems to connect to an X.25 Packet Switched Data Network (PSDN) via an X.25 relay node on the same Local Area Network (LAN), via an X.25 connector node, or directly using a synchronous communications device. Full details of the features and facilities provided by X.25 for OpenVMS Alpha are provided in the Software Product Description. For more conceptual information on PSDNs, refer to the *DECnet/OSI for OpenVMS Introduction and User's Guide*.

Throughout the rest of this section, the product X.25 for OpenVMS Alpha is referred to as X.25. Please note, Alpha and AXP are used interchangeably.

5.2 Required Hardware

To install X.25, you need the following hardware:

- A CD reader (if installing an Alpha version)
- A CD reader, magnetic tape drive, or TK50 tape drive (if installing a VAX version)
- A terminal

You can use either a hardcopy or video terminal to communicate with the operating system and respond to prompts from the installation procedure.

If you intend to access a PSDN directly, an appropriate synchronous interface card is required. For details of the synchronous communications devices supported, refer to the System Support Addendum (SSA). The SSA is supplied with the X.25 Software Product Description (SPD) on the Media CD.

5.3 Required Software

X.25, Version 1.0-D, requires Version 6.2 of the OpenVMS operating system. Future X.25 releases may require higher versions of the operating system, as described in the online release notes associated with each product release.

During the installation of X.25, a check is made for the required DECnet/OSI and WANDD software. If the DECnet/OSI software is not present, you are prompted to install it before proceeding. If the WANDD software is not present, the X.25 installation procedure automatically installs it. Note that X.25 **cannot** be run without the DECnet/OSI for OpenVMS software.

The following X.25 installation kits must be installed using the POLYCENTER Software Installation (PCSI) utility:

- DEC-AXPVMS-X25-V0100-D-1.PCSI
- DEC-AXPVMS-WANDD-V0100-D.1.PCSI

5.4 Kit Location

To obtain the directory location of the X.25 kit on the CD, refer to the *OpenVMS Layered Products Compact Disc User's Guide* that accompanies the CD distribution kit, or before starting installation, complete the following steps:

1. To determine whether the CD drive is already mounted (`mount command`), enter the following command:

   ```
   $ show device device-name
   ```

2. If it is not mounted, enter the appropriate `mount` command to mount to CD (omit the /FOREIGN qualifier).
3. To obtain the save-set name, use a `directory` command specifying the directory file from the previous command:

   ```
   $ directory dka400:[kits]*.pcsi
   ```

If you are installing from a magnetic tape or a TK50, refer to the appropriate users guide for further instructions.

5.5 Time Required to Install

The time required to install X.25 depends on the media type, the CPU type, and your system configuration. In general, the procedure should require less than 5 minutes.

6 Preparing to Install X.25 for OpenVMS Alpha

This chapter details the tasks you need to complete or consider before attempting to install X.25.

6.1 Inspecting the Distribution Kit

The software bill of materials (BOM) included with your distribution kit shows the components of the kit. Compare the items you received against the BOM. Report any damaged or missing components to Digital before continuing with the installation.

6.2 Logging In to a Privileged Account

To install X.25, you must be logged into an account that has SETPRV or at least the following privileges:

- CMKRNL
- WORLD
- SYSPRV

The POLYCENTER Software Installation utility turns off BYPASS privilege at the start of the installation.

To determine the default privileges of the installing account. Log in and enter the following DCL command:

```
$ show process/privileges
```

If the account lacks the SETPRV privilege, do one of the following:

- Ask your system manager to use the AUTHORIZE utility to modify the default privileges of the account to include the SETPRV privilege
- Run the AUTHORIZE utility and make the changes yourself, if your account has the SYSPRV privilege:

  ```
  $ set default sys$system
  $ run authorize
  UAF> modify account-name/privileges=(setprv)
  UAF> exit
  ```

To activate the change in privileges, log out and then log in again.

6.3 Accessing the Online Release Notes

You should review the Release Notes for a description of new features, differences between multiple versions of X.25, and changes in the installation procedure.

To access the release notes, issue the following command:

```
$ product extract release_notes x25 /source=dka400:[kits]
          /file=filename
```

In the above example, the directory on the CD in which the installation kit is located is referred to as `dka400:[kits]`. You should substitute this directory name with the actual directory location of the X.25 kit. Details on how to determine the directory location of the X.25 kit are provided in the Section 5.4.

The product selected is displayed and you are prompted whether to continue with the extraction.

To extract the Release Notes, type YES and press Return. The Release Notes are written to the specified file, which you can display or print.

If you do not use the /FILE qualifier to define the required location of the extracted Release Notes, the Release Notes are extracted into the file DEFAULT.PCSI$RELEASE_NOTES in the current directory.

To cancel the extraction, type NO and press Return.

Note

After X.25 and WANDD have been installed, the Release Notes file will be located in SYS$HELP in the form of:

X25*RELEASE_NOTES.*
WANDD*RELEASE_NOTES.*

6.4 Determining Process Account Quotas

The POLYCENTER Software Installation utility requires that the installation account has, as a minimum, the quotas shown in Table 6–1.

Table 6–1 Process Quotas for the Installing Account

Quota	Value
ASTLM	24
BIOLM	18
BYTLM	32768
DIOLM	18
ENQLM	200
FILLM	100

Use the OpenVMS Authorize utility to verify and change process quotas for the installation account in the user authorization file (SYSUAF.DAT). (Some sites may restrict the use of the OpenVMS Authorize utility to certain accounts or people.)

For example, to verify and then change the BYTLM quota for the `account-name` installation account, enter the following command sequence:

To...	Enter...
Invoke the Authorize utility	`$ run sys$system:authorize`
Show the account quotas	`UAF> show` *`account-name`*
Modify the BYTLM quota	`UAF> modify` *`account-name`* `/BYTLM = 32768`
Exit from the Authorize utility	`UAF> exit`
Log out	`$ logout`

After you have changed the quotas for the installation account, log out of the installation account and log in again for the new quotas to take effect. You can then proceed with the installation.

User account quotas are stored in the file SYSUAF.DAT. For more information about modifying account quotas, see the description of the Authorize utility in the OpenVMS System Management documentation subkit.

6.5 Determining Disk Space

To install X.25 and WANDD on your system requires approximately 12000 blocks of free disk storage space. This figure includes space to store the Release Notes in SYS$HELP.

To determine the number of free disk blocks on the current system disk, enter the following command at the DCL prompt:

```
$ show device sys$sysdevice
```

If necessary, create enough free disk space to accommodate the installation of X.25.

7
Installing X.25 for OpenVMS Alpha

This chapter describes the tasks necessary for installing X.25. It also provides details on how to display a list of the files installed on your system during X.25 installation.

Refer to Figure 7–1 as a guideline when installing X.25 for OpenVMS Alpha. Section 7.4 provides annotated examples of typical prompt and response sequences that are displayed during X.25 installation.

7.1 Registering the X.25 Software License

Before you run X.25 on a newly licensed node, you must first register a License Product Authorization Key (License PAK) using the License Management Facility (LMF). The License PAK may be shipped along with the kit if you ordered the license and media together; otherwise, it is shipped separately to a location based on your license order. If you are installing X.25 as an update on a node already licensed for this software, you have already completed the License PAK registration requirements.

For information on using LMF, refer to the *OpenVMS License Management Utility Manual*.

If you are installing prerequisite or optional software along with X.25, review the PAK status and install the PAKs for any prerequisite or optional software before you install X.25.

You must register and load your license for X.25 to use the software. The X.25 license is required if you want to:

- Use X.25 applications
- Allow incoming X.29 logins
- Use X.25 over a synchronous communications line

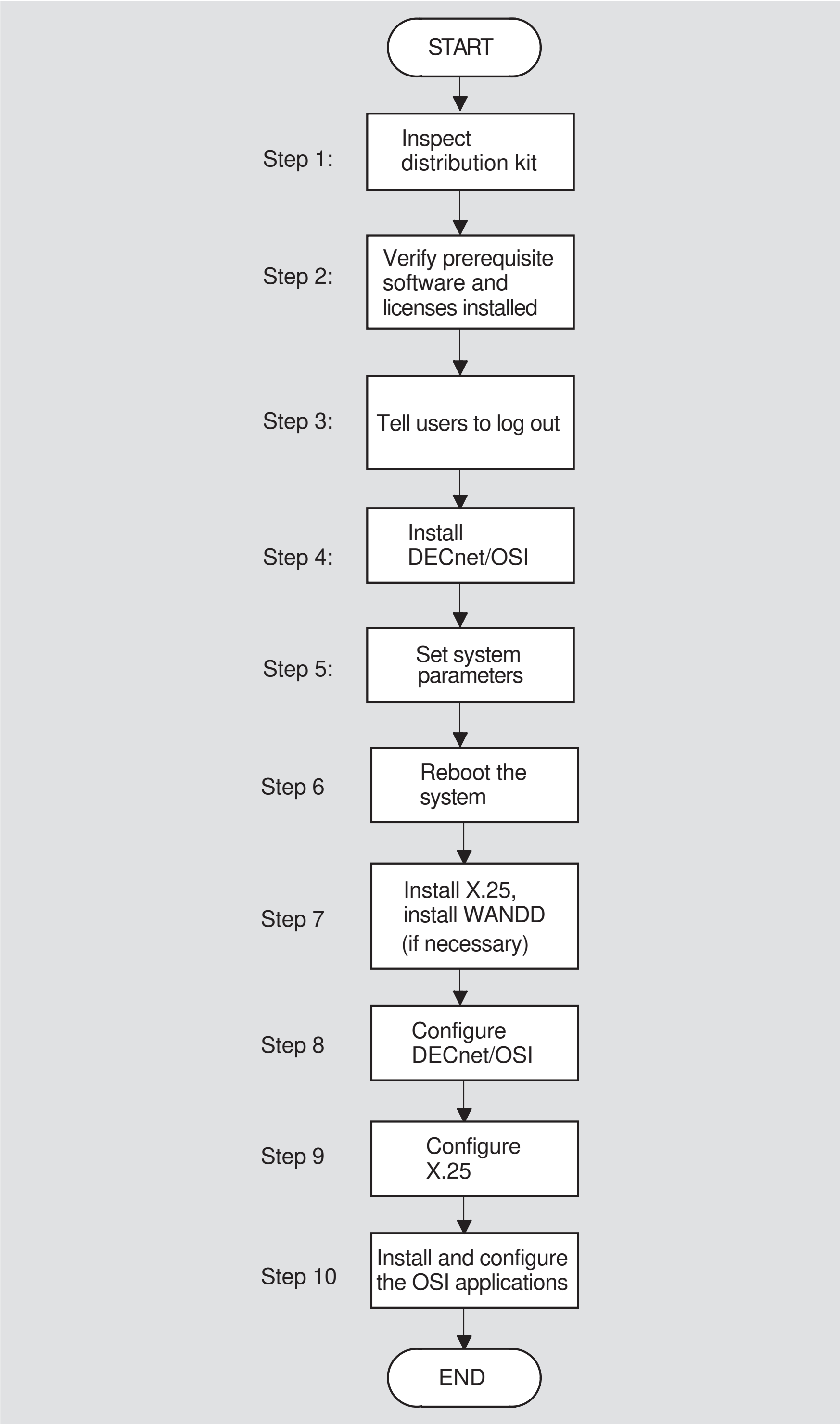
A DECnet/OSI license allows the use of:

- X.25 over LLC2 for DECnet routing over X.25 or to provide Connection-Oriented Network Service (CONS) for OSI Transport
- DECnet routing over DEC HDLC (High-level Data Link Control) over a synchronous communications line

The X.25 product can now be installed and used on a system using the PAK associated with the X.25 Client product. If you are installing the X.25 product on such a system, remove the X.25 Client product before installing the X.25 product.

Full details of the licensing requirements are provided in the Software Product Description (SPD) on the media CD.

Figure 7–1 Installation and Configuration Flowchart



LKG–8982–94R

7.2 Installing X.25

You can install X.25 using the DCL or Motif interface. The following sections detail how to use each of these interfaces to install X.25.

For a description of all the features you can request when starting an installation (such as purging files and using a product configuration file), refer to DCL help for the `product install` command or Motif help.

7.2.1 Using the DCL Interface

To install X.25, enter the following command:

```
$ product install x25 /source=dka400:[kits]
```

If you do not use the /SOURCE qualifier, the system attempts to read the installation kit from `pcsi$source:[kits]`.

In the above example, the directory on the CD in which the installation kit is located is referred to as `dka400:[kits]`. You should substitute this directory name with the actual directory location of the X.25 kit. Details on how to determine the directory location of the X.25 kit are provided in Section 5.4.

7.2.2 Using the Motif Interface

To invoke the Motif interface, enter the following commands at the DCL prompt ($):

```
$ set display /create /node=name /transport=transport-name
$ PRODUCT
```

name is the node name of the workstation on which you want to display the Motif interface.

transport-name can be either `DECNET` or `LOCAL`. The default is `LOCAL`.

You can now install X.25.

7.3 Files Installed on Your System

The X.25 installation procedure installs a number of files on your system. To list the files, enter the following command:

```
$ product show object /product=x25
```

7.4 X.25 Installation and De-Installation Sample

This section provides two annotated examples that show the prompt and response sequence presented when the POLYCENTER Software Installation utility is run to install X.25.

This section also provides an annotated example that shows the prompt and response sequence presented when the POLYCENTER Software Installation utility is run to de-install X.25.

In all examples, numbered callouts (❶, ❷, ❸, . . .) indicate parts of the prompt and response sequence for which additional explanatory notes are provided. The notes are given at the end of each example.

7.4.1 Example 1

This example shows a typical prompt and response sequence when X.25 is installed as a separate product. This prompt and response sequence assumes that OpenVMS, DECnet/OSI, and WANDD for OpenVMS are already installed on the target system.

```
$ product install x25 /source=sys$login /dest=sys$sysroot    ❶

The following product has been selected:
DEC VMS X25 V1.0

Do you want to continue? [YES] Return

*** DEC VMS X25 V1.0: X.25 V1.0 for OpenVMS

    Copyright 1995 -- All rights reserved

    Digital Equipment Corporation

    Do you want all the default values for this product? [YES] No    ❷

    This product uses the PAK: <X.25>

    The X.25 License PAK should be loaded before continuing installation
    Do you want to continue? [YES] Return          ❸

        *** DEC VMS VMS 6.1           [Available]      ❹
%PCSIUI-I-ALRDYINST, product already installed; use RECONFIGURE to modify

        *** DEC VMS DECNET_OSI 6.2          [Available]
%PCSIUI-I-ALRDYINST, product already installed; use RECONFIGURE to modify

        *** DEC VMS WANDD 1.0:   X.25 V1.0 for OpenVMS
- WAN Device Drivers     [Available]

    Copyright 1995 -- All rights reserved

    Digital Equipment Corporation
%PCSIUI-I-ALRDYINST, product already installed; use RECONFIGURE to modify

          X.29 Support [YES] Return

    X.25 Mail Support [YES] Return

    Do you want to view the values? [NO] Return     ❺

%PCSIUI-I-DONEASK, execution phase starting
The following product will be installed:
DEC VMS X25 V1.0
The following product will be reconfigured:
DEC VMS WANDD V1.0
%PCSI-I-VOLINFO, estimated space information for volume DISK$VMSSYS
-PCSI-I-VOLSPC, 7756 required; 118620 available; 110864 net
Portion Done: 10%...20%...30%...40%...50%...60%...70%...80%...90%...100%
The following product has been installed:
DEC VMS X25 V1.0
The following product has been reconfigured:
DEC VMS WANDD V1.0

$
```

Notes on Example Prompt and Response Sequence

❶ This command invokes the installation procedure for X.25. The SOURCE and DESTINATION qualifiers have been used to define the location of the source files and the required location for the installed software.

❷ To accept the default values for the available installation options, type YES or press Return.

To enter values other than the default values, type NO. In this case, the installation procedure prompts you to enter values for each of the installation options.

❸ The X.25 License PAK must be registered and loaded before X.25 can be started. Details about registering the X.25 License PAK are given in Section 7.1. If the X.25 License PAK is not loaded before completing the installation, X25$STARTUP (which is normally run automatically at the end of the installation) must be run manually after loading the License PAK.

❹ The installation utility has determined that this product has dependencies on three products:

- OpenVMS Version 6.1 (minimum version)
- DECnet/OSI for OpenVMS Version 6.3
- WANDD Version 1.0 for OpenVMS

Each of these products have been installed.

If one or more of the products on which X.25 depends has not been installed, you are prompted whether to continue with the installation of X.25 and install the missing product later, or discontinue the installation.

❺ Responding YES to this question displays the currently selected values for the installation options and prompts you to verify that the selections are correct. If you do not want to view and confirm the options selected, type NO or press Return.

7.4.2 Example 2

This example shows a typical prompt and response sequence when installing both X.25 and WANDD for OpenVMS. It assumes that OpenVMS and DECnet/OSI are already installed on the target system.

```
$ product install x25 /source=sys$login /dest=sys$sysroot    ❶

The following product has been selected:
DEC VMS X25 V1.0

Do you want to continue? [YES] Return

*** DEC VMS X25 V1.0: X.25 V1.0 for OpenVMS  Systems

    Copyright 1995 -- All rights reserved

    Digital Equipment Corporation

    Do you want all the default values for this product? [YES] No    ❷

    This product uses the PAK: <X.25>

    The X.25 License PAK should be loaded before continuing installation
    Do you want to continue? [YES] Return             ❸

        *** DEC VMS VMS V6.1          [Available]      ❹
%PCSIUI-I-ALRDYINST, product already installed; use RECONFIGURE to modify

        *** DEC VMS DECNET_OSI V6.2           [Available]
%PCSIUI-I-ALRDYINST, product already installed; use RECONFIGURE to modify

        *** DEC VMS WANDD V1.0: X.25 V1.0 for OpenVMS
- WAN Device Drivers

    Copyright 1995 -- All rights reserved

    Digital Equipment Corporation
%PCSIUI-I-NOITEMS, there are no items to answer for this product

    X.29 Support [YES] Return

    X.25 Mail Support [YES] Return

    Do you want to view the values? [NO] Return      ❺

%PCSIUI-I-DONEASK, execution phase starting
The following products will be installed:
DEC VMS WANDD V1.0
DEC VMS X25 V1.0
%PCSI-I-VOLINFO, estimated space information for volume DISK$VMSSYS
-PCSI-I-VOLSPC, 11167 required; 122016 available; 110849 net
Portion Done: 10%...20%...30%...40%...50%...60%...70%...80%...90%...100%
The following products have been installed:
DEC VMS WANDD V1.0
DEC VMS X25 V1.0

$
```

Notes on Example Prompt and Response Sequence

❶ This command invokes the installation procedure for X.25. The SOURCE and DESTINATION qualifiers have been used to define the location of the source files and the required location for the installed software.

❷ To accept the default values for the available installation options, type YES or press Return.

To enter values other than the default values, type NO. In this case, the installation procedure prompts you to enter values for each of the installation options.

❸ The X.25 License PAK must be registered and loaded before X.25 can be started. Details about registering the X.25 License PAK are given in Section 7.1. If the X.25 License PAK is not loaded before completing the installation, X25$STARTUP (which is normally run automatically at the end of the installation) must be run manually after loading the License PAK.

❹ The installation utility has determined that this product has dependencies on three products:

- OpenVMS Version V6.1 (minimum version)
- DECnet/OSI V6.3 for OpenVMS
- WANDD V1.0 for OpenVMS

WANDD is the only product on which the X.25 installation depends that is not currently installed; the PCSI utility automatically installs WANDD.

If one or more of the products on which X.25 depends is not installed, you are prompted whether to continue with the installation of X.25 and install the missing product later, or discontinue the installation.

❺ Responding YES to this question displays the currently selected values for the installation options and prompts you to verify that the selections are correct. If you do not want to view and confirm the options selected, type NO or press Return.

7.4.3 Example 3

This example shows a typical prompt and response sequence when de-installing X.25.

```
$ product remove x25     ❶

The following product has been selected:
DEC VMS X25 V1.0

Do you want to continue? [YES] Return

%PCSI-E-CONREMUNR, optionally remove product DEC VMS DECNET_OSI
V6.2 that is no longer required by another product
Do you want to take this action? [NO] Return      ❷
Do you want to continue? [YES] Return   ❸
The following product will be removed:
DEC VMS X25 V1.0
%PCSI-I-VOLINFO, estimated space information for volume DISK$VMSSYS
-PCSI-I-VOLSPC, -7666 required; 111678 available; 119344 net
Portion Done: 10%...30%...40%...50%...60%...70%...80%...90%...100%
The following product has been removed:
DEC VMS X25 V1.0
$
```

Notes on Example Prompt and Response Sequence

❶ This command invokes the de-installation procedure for X.25.

❷ Whenever all the dependencies on a product are removed that product can also be removed. In this example, de-installing X.25 removes all the dependencies on DECnet/OSI for OpenVMS. You are therefore prompted whether to remove the specified version of DECnet/OSI in addition to X.25. To remove the specified product, type YES, otherwise type NO or press Return.

❸ To continue with the de-installation, type YES or press Return in response to this question. To terminate the de-installation, type NO. This action should be taken only if you decide not to de-install the product.

8
X.25 Post-Installation and Configuration Tasks

This chapter describes the tasks you should perform after X.25 has been installed.

8.1 Configuring X.25

Once X.25 has been installed, you need to configure your system.

You can use the DECnet/OSI configuration procedure (`net$configure.com`) to first configure X.25 and then configure DECnet over X.25. You can use either the BASIC or ADVANCED configuration option.

The following steps summarize what you need to do to complete an X.25 configuration:

1. Start the `net$configure` procedure.
2. Select "Perform the entire configuration." This will step you through to the X.25 series of configuration steps.
3. Select the defaults for each of the questions by pressing Return after each one. When you see the question, "Do you want to configure X.25?" type YES and press Return.
4. Answer YES to the next several questions, then select either the X25 BASIC or X25 ADVANCED configuration.
5. Provide responses to the questions when prompted by the configurator. This sets up your system using the information given to you by your X.25 provider (the X.25 Access service you are using).
6. When you have entered all the information required to configure your X.25 system, the X.25 configurator saves all your information in a CONFIG.DAT file (for example, `sys$startup:x25$basic_config.dat`).
7. After the X.25 configurator saves your information, that portion of the configuration is complete. The X.25 configurator then returns to the `net$configure` procedure, which is still in progress.
8. Enter the appropriate data link and routing circuit names to use as they are requested (you can also use the defaults by pressing Return).
9. When the `net$configure` procedure asks, "Do you want to configure DECnet over X.25?" type YES and press Return.
10. Select the type of X.25 circuit you want to use.
11. Enter the Routing circuit name to use (or press Return for the default).
12. Enter the Template name (or press Return for the default).
13. The `net$configure` procedure then continues with other configuration questions for different transports.

When you have provided answers to all of the configuration questions, the procedure displays a Summary of Configuration. It then redisplays the Configuration Options menu. At this point, the procedure is complete and you can exit.

For a sample X.25 and DECnet over X.25 configuration, see Section 8.5.

Full details on how to configure the product are provided in the *X.25 for OpenVMS Alpha Configuration Guide*. This guide is available in a separate kit. Refer to the SPD for appropriate part numbers to use for ordering the X.25 kit.

8.2 Restart DECnet/OSI

You must restart DECnet/OSI before starting the X.25 software. To restart DECnet, enter the following command on each node:

```
$ @sys$startup:net$startup
```

8.3 Rebooting the System

Once you have completed the required post-installation tasks, **reboot the system**.

X.25 software is started automatically when you reboot the system on which it is installed.

To start the X.25 software manually, enter the following command from the SYSTEM account:

```
$ @sys$startup:x25$startup.com
```

8.4 Deinstalling X.25

To deinstall X.25, type the following command:

```
$ product remove x25
```

Invoking this command automatically removes the product files. Complete shutdown of X.25 does not occur until the system is next rebooted. An annotated example of the deinstallation prompt and response sequence is provided in Section 7.4.

To invoke the shutdown procedure manually, enter the following command from the SYSTEM account:

```
$ @sys$startup:x25$shutdown.com
```

Note

You do not have to remove X.25 before re-installing the same or a different version. If a version of the product exists on the system where you are attempting to install the same or another version of the product, the Software Integrator will warn you that a version of the product is already installed. You can then choose whether to continue with the installation.

8.5 Sample X.25 Configuration

This section provides a sample configuration that you might see when you use `net$configure.com` to configure X.25 and then configure DECnet over X.25.

```
$
$ @net$configure advanced
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        DECnet/OSI for OpenVMS ADVANCED network configuration procedure

     This procedure will help you create or modify the management scripts
     needed to operate DECnet on this machine. You may receive help about
     most questions by answering with a question mark '?'.

     You have chosen the ADVANCED configuration option.  This option enables
     you to do some specific tailoring of your system's network configuration
     by answering some specific questions.  If you do not want to do specific
     tailoring of your system's network  configuration but instead  want  to
     quickly  configure your  system using most  of the default answers, you
     should invoke NET$CONFIGURE.COM with the BASIC configuration option, ie:
                 @SYS$MANAGER:NET$CONFIGURE BASIC

* Do you want to continue?                            [YES] :
     Checksum file updated last by SYSTEM on 17-JAN-1995 12:01:48.66

%NET$CONFIGURE-I-VERCHECKSUM, verifying checksums


        Configuration Options:

        [0]     Exit this procedure

        [1]     Perform an entire configuration
        [2]     Change node name/namespace name
        [3]     Configure Devices on this machine
        [4]     Configure Transports
        [5]     Configure Timezone Differential Factor
        [6]     Configure Event Dispatcher
        [7]     Configure Application database
        [8]     Configure MOP Client database
        [9]     Configure Cluster Alias


* Which configuration option to perform?                [1] :
* Enter the directory services to use on the system [DECDNS] :
* Enter the full name for directory service DECDNS [bb_ns:.area39.arv011] :
* What is the synonym name for this node?          [ARV011] :
* Enter PhaseIV Address                             [39.11] :
* Enter Phase IV Prefix                          [47:0027:] :
* Autoconfigure network addresses?                    [YES] :
* DNA Address Format?                                [TRUE] :
* Do you want to use segregated mode routing?          [NO] :
* Do you want to configure X.25?                      [YES] :

  Configuring WANDD... ['?' for HELP]


%WANDD$CONFIGURE-I-WANDDNOTCONFIG, WANDD has not been configured.
Configure WANDD? [YES]
Are you satisfied with your answers? [YES]
%NET-I-LOADED, executive image X25$KERNEL_RTL.EXE loaded
%NET-I-LOADED, executive image X25$MEL.EXE loaded
%NET-I-LOADED, executive image X25$L2.EXE loaded
%RUN-S-PROC_ID, identification of created process is 00000125
%NET-I-LOADED, executive image X25$L1.EXE loaded
```

```
%SYSMAN-I-OUTPUT, command execution on node ARV011
%IOGEN-I-PREFIX, searching for ICBM with prefix DECW$GRAPHICS_
%IOGEN-W-NOICBM, failed to find ICBM with prefix DECW$GRAPHICS_
%IOGEN-I-PREFIX, searching for ICBM with prefix SYS$
%IOGEN-I-PREFIX, searching for ICBM with prefix X25$
%IOGEN-I-SCSIPOLL, scanning for devices through SCSI port PKA0
%IOGEN-I-CONFIGURED, configured device ZEA
%IOGEN-I-CONFIGURED, configured device ZEB

  Available Synchronous Communication Ports:

        1.  ZEA0   -  DNSES-0-0
        2.  ZEA1   -  DNSES-0-1
        3.  ZEB0   -  DNSES-1-0
        4.  ZEB1   -  DNSES-1-1


Use X25 BASIC or ADVANCED configrator? [BASIC]
The screen will be cleared.  Press RETURN to continue...

                      X.25 for OpenVMS Alpha(TM) Systems
                              Introduction

This program allows you to configure an X.25 for OpenVMS Alpha(TM)
system. The program is divided into sections. Each section takes
you through a series of configuration data entry screens.
The following sections can be configured:
1. X.25 Connection                      4. X.29 Support
2. PVCs                                 5. X.25 Mail
3. X.25 Incoming Call Security

      When you have provided all the information required, the program
                          Press RETURN to continue


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                       X.25 for OpenVMS Alpha(TM) Systems

                        Create a new configuration script
                      Modify an existing configuration script

                       X.25 for OpenVMS Alpha(TM) Systems
                             Basic Configuration
                             Configuration Type


You can configure your OpenVMS Alpha system to connect to PSDNs
directly, or through a connector node, such as a gateway.

Select the type of X.25 connection you want to configure:

X.25 over Wide Area Network
X.25 over Local Area Network
X.25 Client


                        X.25 for OpenVMS Alpha(TM) Systems
                           X.25 Over Wide Area Network

Enter the Network profile name and DTE details below.

Profile Name:

X.25 Address:

Select a synchronous line for this DTE:
```

```
DNSES-0-0
DNSES-0-1
DNSES-1-0
DNSES-1-1

Logical channels used for Switched Virtual Circuits and Permane
Virtual Circuits are assigned in the following way:

             <------------------------------------->
     PVCs      Incoming          Two-way          Outgoing
|------------|----------|-------------------------|-------------|
1               SVCs              SVCs              SVCs     4095
<------------>          <--------------------------------------->

If you intend to configure PVCs, select SVC Logical Channel Ranges
that leave enough channels free for the required PVCs.

Incoming Logical Channel Range(s):  {[1..4095]}
Outgoing Logical Channel Range(s):  {[1..4095]}

                              PVCs

A PVC (Permanent Virtual Circuit) is a permanent association
between two specific DTEs. Two DTEs connected by a PVC can
communicate without the need for call clearing or call setup.

Your subscription options will provide details of any PVCs
you can set up.

Do you wish to set up any PVCs ?  No   Yes

                        Incoming Call Security

This section allows you to configure Incoming Call Security.
You can choose to allow all incoming calls, to allow no incoming
calls, or to restrict incoming access to particular systems.
If you choose to restrict incoming access you will be prompted
to enter the remote address prefixes (RAPs) of systems that
will be permitted to make calls to the local system.
Separate entry screens are presented for RAPs with Remote-
Charge, and  All access.

Do you want to:
                  Allow All Incoming Access
                  Allow No Incoming Access
                  Restrict Incoming Access

                  Allow All Incoming Access
                  Allow No Incoming Access
                  Restrict Incoming Access

                  Allow No Incoming Access
                  Restrict Incoming Access

                  Access: REMOTE CHARGE

Enter the Remote Address Prefixes (RAPs) of remote systems
associated with the specified network that are permitted to call
the local system only if the remote DTE pays for the call.

Do you want to add another RAP ?   Yes    No

Do you want to add another RAP ?   Yes    No

Do you want to add another RAP ?   Yes    No

Do you want to add another RAP ?   Yes    No

This section allows you to configure the local system for
X.29 access.
```

```
     X.29 access will allow users to access the local system remotely via
     an X.25 network and to access remote systems via the X.25 network
     from the local system.

     Do you want X.29 support?   Yes   No

     Your system will be configured for X.29 access, which will allow
     users to access the local system remotely via an X.25 network
     and to access remote systems via the X.25 network from the
     local system.

     You can specify a Network User Identity (NUI) to identify the
     party to charge for the outgoing X.29 call.

     X29 Network User Identity:

                                X.25 Mail

     X.25 mail is an addition to VMS mail which enables this system
     to send and receive mail messages over a PSDN.

     Do you want to use X.25 MAIL ?     Yes   No

                                NCL Script

      You have now entered all the information required to configure
      your X.25 for OpenVMS Alpha system. If you do not want to modify
      your answers, an NCL script will be created and your answers
      Do you want to modify your answers ?   No    Yes

      Please read the following messages:

The NCL script, sys$startup:x25$config.ncl, has been created.

The NCL script, sys$startup:x25$enable_decnet_clients.ncl, has been created.

Working ...

The current X25 configuration has been saved in sys$startup:x25$basic_config.dat
                   X.25 for OpenVMS Alpha(TM) Systems

                    Create a new configuration script
                  Modify an existing configuration script

                  ******* Configuration Complete *******

        You must grant the rights identifier 'x25_outgoing_all' to all users
        and processes that are allowed to make outgoing calls.

%NET$CONFIGURE-I-SCANCONFIG, scanning device configuration - please wait
* Enable FDDI large packet support?                       [NO] : y
* Data Link name to use for EWA0 (TULIP)?         [CSMACD-0] :
* Routing Circuit Name for Data Link 'CSMACD-0'?  [CSMACD-0] :
* Data Link name to use for EWB0 (TULIP)?         [CSMACD-1] :
* Routing Circuit Name for Data Link 'CSMACD-1'?  [CSMACD-1] :
* Data Link name to use for FRA0 (DEFEA)?           [FDDI-0] :
* Routing Circuit Name for Data Link 'FDDI-0'?      [FDDI-0] :
* Data Link protocol for ZEA0 (DNSES)?                [HDLC] :
* Data Link name to use for ZEA0 (DNSES)?           [HDLC-0] :
* Routing Circuit Name for Data Link 'HDLC-0'?      [HDLC-0] :
* Data Link protocol for ZE-0-1 (DNSES)?              [HDLC] : none
* Data Link protocol for ZEB0 (DNSES)?                [HDLC] : none
* Data Link protocol for ZE-1-1 (DNSES)?              [HDLC] : none
* Do you want to configure DECnet over X.25?            [NO] : y

    Types of X.25 circuits:
```

```
    [1] - X.25 Dynamic Assigned (DA)
    [2] - X.25 Static Incoming (IN)
    [3] - X.25 Static Outgoing (OUT)
    [4] - X.25 Permanent (PVC)

* Which type of X.25 circuit do you want to use?            : 4
* Routing Circuit Name to use?                   [X25-PVC-0] :
* Template name?                                 [X25-PVC-0] :
*  Configure another PSI routing circuit for DECnet?    [NO] :

        Timezone Options:

        [0]     Exit Timezone Configuration

        [1]     Choose a timezone using menus
        [2]     Use Universal Coordinated Time (UTC)
        [3]     Type in your own timezone rule

* Enter an option number                                 [1] : 0
* Configure the NSP Transport?                         [YES] :
* Configure the OSI Transport?                         [YES] :
* Do you want to replace the existing NSP transport script? [NO] :
* Do you want to replace the existing OSI transport script? [NO] :
%NET$CONFIGURE-I-EVDFND, Event Dispatcher NCL script already exists
* Replace Event Dispatcher NCL script file?             [NO] :
%NET$CONFIGURE-I-APPLICATIONFND, application NCL script already exists
* Replace application script file?                      [NO] :
%NET$CONFIGURE-I-MOPCLIENTFND, MOP client NCL script already exists
* Replace MOP Client script file?                       [NO] :


                      Summary of Configuration

 Node Information:
        Directory Services Chosen:      DECDNS
        Primary Directory Service:      DECDNS
        DECdns Full name:       bb_ns:.area39.arv011
        Node Synonym:           ARV011
        Phase IV Address:       39.11
        Phase IV Prefix:        47:0027:
        Autoconfiguration of Network Addresses: Enabled

 Device Information:
        Device: EWA0 (TULIP):
                Data Link name: CSMACD-0
                Routing Circuit Name:   CSMACD-0

        Device: EWB0 (TULIP):
                Data Link name: CSMACD-1
                Routing Circuit Name:   CSMACD-1

        Device: FRA0 (DEFEA):
                Data Link name: FDDI-0
                Routing Circuit Name:   FDDI-0

        Device: ZEA0 (DNSES):
                Data Link name: HDLC-0
                Routing Circuit Name:   HDLC-0

        Device: X25-PVC-0:
                Routing Circuit Name:   X25-PVC-0

Transport Information:
        NSP Transport:                          Configured
          Maximum number of logical links:         200
          Maximum Transmit and Receive Window:     20
          Maximum Receive Buffers:                 4000
```

```
                OSI Transport:                           Configured
                  Maximum number of logical links:          200
                  Maximum Transmit and Receive Window:      20
                  Maximum Receive Buffers:                  4000

                Congestion Avoidance Disabled

         Event Dispatcher Configuration:
                Sinks:            local_sink
                Outbound Streams: local_stream
                Phase IV Relay:   Enabled

* Do you want to generate NCL configuration scripts?   [YES] :
%NET$CONFIGURE-I-MODCHECKSUM, checksumming NCL management scripts modified by NET$CONFIGURE
%NET$CONFIGURE-I-NOTREPLACED, SYS$SYSROOT:[SYSMGR]NET$APPLICATION_STARTUP.NCL; was not replaced
%NET$CONFIGURE-I-NOTREPLACED, SYS$SYSROOT:[SYSMGR]NET$EVENT_STARTUP.NCL; was not replaced
%NET$CONFIGURE-I-NOTREPLACED, SYS$SYSROOT:[SYSMGR]NET$MOP_CLIENT_STARTUP.NCL; was not replaced
* Do you want to start the network?                    [YES] :
Copyright (c) Digital Equipment Corporation 1993, 1995. All rights reserved.
%NET$STARTUP-I-OPERSTATUS, DECnet/OSI for OpenVMS operational status is RUNNING-ALL

sys$manager:net$dns_clerk_startup.ncl changed to use the new default namespace.

Your default namespace nickname is BB_NS.

Your default namespace NSCTS is 08-00-2B-17-F4-BC-F5-B2-38-FB-C4-7B-96-00.
%NET$CONFIGURE-I-FLUSHCACHE, flushing selected cache entries


               Node 0
               at 1995-01-23-15:32:52.583-05:00Iinf

               %NET$CONFIGURE-I-NODERENAMED, node successfully renamed to bb_ns:.area39.arv011

               Node 0 Session Control
               at 1995-01-23-15:32:52.906-05:00Iinf


               Node 0 Session Control
               at 1995-01-23-15:32:52.918-05:00Iinf


               Node 0 Session Control
               at 1995-01-23-15:32:52.926-05:00Iinf


               Node 0 Session Control
               at 1995-01-23-15:32:54.427-05:00Iinf


               Node 0 Session Control
               at 1995-01-23-15:32:54.545-05:00Iinf

               Characteristics

                   Maintain Backward Soft Links      = True

                                    SHOW
                               DIRECTORY  BB_NS:.area39
                                      AT  23-JAN-1995:15:32:55
                                 DNS$CTS = 1993-02-06-16:50:34.908990700/08-00-2b-17-f4-bc

               Directory Service: DECdns

               Node name:         BB_NS:.AREA39.ARV011
               Phase IV synonym:  ARV011
```

```
Address tower protocol and selector values:
  Session:   DNA_SessionControlV3 (SC3)
             00 13
  Transport: DNA_OSItransportV1 (TP4)
             DE C0
  Routing:   DNA_OSInetwork (CLNS)
             47:0027:00-27:AA-00-04-00-0B-9C:21 (39.11)

  Session:   DNA_SessionControlV3 (SC3)
             00 13
  Transport: DNA_NSP (NSP)
             (no selector value)
  Routing:   DNA_OSInetwork (CLNS)
             47:0027:00-27:AA-00-04-00-0B-9C:20 (39.11)

  Session:   DNA_SessionControlV3 (SC3)
             00 13
  Transport: DNA_OSItransportV1 (TP4)
             DE C0
  Routing:   DNA_OSInetwork (CLNS)
             47:0027:00-5E:08-00-2B-E4-54-1C:21

  Session:   DNA_SessionControlV3 (SC3)
             00 13
  Transport: DNA_NSP (NSP)
             (no selector value)
  Routing:   DNA_OSInetwork (CLNS)
             47:0027:00-5E:08-00-2B-E4-54-1C:20

Synonym softlink name:
    BB_NS:.DNA_NodeSynonym.ARV011

Reverse address mapping (backtranslation) softlink names:
    BB_NS:.DNA_BackTranslation.%X470027.%X0027.%XAA0004000B9C
    BB_NS:.DNA_BackTranslation.%X470027.%X005E.%X08002BE4541C


Number of nodes reported on:  1

%NET$CONFIGURE-I-NODEISREG, node is already registered in the DECdns directory
service

Node 0
at 1995-01-23-15:32:56.524-05:00Iinf

%NET$CONFIGURE-I-NODERENAMED, node successfully renamed to bb_ns:.area39.arv011

Node 0 Session Control Tower Maintenance BB_NS:.AREA39.ARV011
at 1995-01-23-15:32:56.699-05:00Iinf

%NET$CONFIGURE-I-TOWERSUPDATED, updated address towers for node

Node 0 Session Control Backtranslation Softlink *
at 1995-01-23-15:32:56.823-05:00Iinf


Node 0 Session Control Backtranslation Softlink *
at 1995-01-23-15:32:56.823-05:00Iinf

%NET$CONFIGURE-I-BCKTRNUPDATED, updated backtranslation softlink for node
%NET$CONFIGURE-I-CONFIGCOMPLETED, DECnet/OSI for OpenVMS configuration completed

        Configuration Options:

        [0]     Exit this procedure
```

```
            [1]     Perform an entire configuration
            [2]     Change node name/namespace name
            [3]     Configure Devices on this machine
            [4]     Configure Transports
            [5]     Configure Timezone Differential Factor
            [6]     Configure Event Dispatcher
            [7]     Configure Application database
            [8]     Configure MOP Client database
            [9]     Configure Cluster Alias

    * Which configuration option to perform?                [0] :
```

Part IV

Installing OSI Applications for OpenVMS Systems

Part IV describes the steps necessary to plan, install, and configure the OSI Applications for OpenVMS Alpha and VAX systems. It includes the following chapters:

- Chapter 9 — Planning for the Installation
- Chapter 10 — Preparing to Install the OSI Applications
- Chapter 11 — Installing the OSI Applications
- Chapter 12 — Configuring the OSI Applications

Note

DECnet/OSI **must** be installed and configured before installing the OSI Applications.

9
Planning for the Installation

9.1 Product Descriptions

FTAM

FTAM is an Open Systems Interconnection (OSI) product that implements the OSI File Transfer, Access, and Management standard ISO 8571 developed by the International Organization for Standards (ISO). Using FTAM, you can copy, append, delete, rename, and inspect the file attributes of local files, remote files, or both.

Virtual Terminal

DECnet/OSI Virtual Terminal is Digital's implementation of the OSI Virtual Terminal standard. Virtual Terminal (VT) enables applications and systems supporting different types of terminals to interoperate with each other. Using VT, you can use your terminal to access any other system running VT, regardless of the type of system. You can also use the VT gateways for access to and from non-OSI systems.

OSAK

Open System Application Kernel (OSAK) is Digital's implementation of the OSI upper layers. It provides OSI Session, Presentation and Application services. These services are used by OSI applications such as FTAM, VT, X.400, and X.500. In addition, by using the OSAK programming interfaces which provide access to OSI Session, Presentation and Application layers, users can develop applications that layer on Digital's implementation of the OSI stack.

9.2 Required Hardware

The OSI Applications installation procedure requires the following hardware:

- A CD reader (if installing an Alpha version)
- A CD reader, magnetic tape drive, or TK50 tape drive (if installing a VAX version)
- A terminal

  You can use either a hardcopy or video terminal to communicate with the operating system and respond to prompts from the installation procedure.

9.3 Required Software

The OSI Applications installation kit must be installed using the POLYCENTER Software Installation (PCSI) utility. This utility is provided as part of the operating system software.

To install FTAM and VT, you must first install DECnet/OSI, and then install OSAK.

To run the VT/Telnet gateways, you must have the Digital TCP/IP Services for OpenVMS installed on your system.

9.4 Kit Location

To obtain the directory location of the OSI Applications kit on the CD, refer to the *OpenVMS Layered Products Compact Disc User's Guide* that accompanies the CD distribution kit, or before starting installation, complete the following steps:

1. To determine whether the CD drive is already mounted, enter the following command:

   ```
   $ show device device-name Return
   ```

2. If it is not mounted, enter the appropriate `MOUNT` command to mount to CD.
3. To obtain the save-set name, use a `DIRECTORY` command specifying the device name from the previous command. For example:

   ```
   $ directory DKA400:[kits]*.pcsi Return
   ```

If you are installing from a TK50 or magnetic tape drive, refer to the appropriate user guide for further instructions.

9.5 Time Required to Install

The time required to install the OSI Applications depends on the media type, the CPU type, and your system configuration. In general, the procedure should require less than 15 minutes.

10 Preparing to Install the OSI Applications

This chapter details the tasks you need to complete or consider **before** attempting to install the OSI Applications.

10.1 Inspecting the Distribution Kit

The software bill of materials (BOM) included with your distribution kit shows the components of the kit. Compare the items you received against the BOM. Report any damaged or missing components to Digital before continuing with the installation.

10.2 Logging In to a Privileged Account

To install the OSI Applications, you must be logged in to an account that has the following privileges:

For FTAM and VT:

- SETPRV

For OSAK:

- CMKRNL
- SETPRV

Determine your account privileges as follows:

1. Determine the default privileges of the installing account. Log in and enter the DCL command:

   ```
   $ show process/privileges Return
   ```

   If the account lacks the SETPRV privilege, proceed to Step 2.

2. Do either of the following:

   - Ask your system manager to use the Authorize utility to modify the default privileges of the account to include the SETPRV privilege
   - Run the Authorize utility and make the changes yourself, if your account has the SYSPRV privilege:

     ```
     $ set default sys$system Return
     $ run authorize Return
     UAF> modify account-name/privileges=(SETPRV) Return
     UAF> exit Return
     ```

3. To activate the change in privileges, log out and then log in again.

10.3 Accessing the Online Release Notes

The release notes for the OSI Applications are provided as part of the DECnet/OSI release notes. You should review these release notes prior to installation because they describe new features and differences among multiple versions, as well as changes to the installation procedure.

To access the release notes, issue the command:

```
$ product extract release_notes -
    decnet_osi/source=DKA400:[kits]/file=filename Return
```

Note that in this example, the directory on the CD in which the installation kit is located is referred to as `DKA400:[kits]`. You should substitute this directory name with the actual directory location of your DECnet/OSI kit.

The product selected is displayed and you are prompted whether to continue with the extraction.

To extract the release notes, type YES and press Return. The release notes are written to the specified file, which you can display or print.

To cancel the extraction, type NO and press Return.

Note

After DECnet/OSI has been installed, the release notes file is located in:

SYS$HELP:DECNET_OSI-V#_#.RELEASE_NOTES

#_# is the version number of the DECnet/OSI version you are installing.

10.4 Memory Requirements

To install and run the OSI Applications, you must have sufficient free global memory. Table 10–1 shows the global memory requirements:

Table 10–1 Required Global Pages, Global Pagelets and Sections

Software	Alpha	VAX
FTAM	5068 global pagelets	4402 global pages
	24 global sections	19 global sections
VT	1136 global pagelets	422 global pages
	8 global sections	14 global sections
OSAK	3296 global pagelets	1344 global pages
	6 global sections	13 global sections

You must first find out your available system resources, and then use the AUTOGEN utility if you need to increase the global pages, global pagelets or global sections system parameters. Do this as follows:

1. Use the WRITE command with the F$GETSYI lexical function to find the number of free global pages and global sections. The following example shows how to get this information at your terminal (the default for SYS$OUTPUT):

```
$ write sys$output f$getsyi("contig_gblpages") Return
15848
$ write sys$output f$getsyi("free_gblsects") Return
24
```

2. Compare the values displayed with those required for the OSI Applications.
   - If the values displayed by the system are greater than the values required for the OSI Applications, you do not need to change the system parameter settings.
   - If one of the values is less than the value required for OSI Applications, you must increase the system parameter setting using the AUTOGEN utility. Proceed to the next section.

10.4.1 Changing System Parameter Values with AUTOGEN

Use the AUTOGEN command procedure to change system parameters. AUTOGEN automatically adjusts values for parameters that are associated with the values you reset manually.

For more information about using the AUTOGEN utility, refer to your OpenVMS system management documentation.

10.5 Process Quotas

The POLYCENTER Software Installation utility requires that the installation account has as a minimum the quotas shown in Table 10–2.

Table 10–2 Process Quotas for the Installing Account

Quota	Value
ASTLM	24
BIOLM	18
BYTLM	32768
DIOLM	18
ENQLM	200
FILLM	100

The number of available global sections on the system limits the number of simultaneous connect requests that the OSAK software can support. OSAK buffers store each connect request in a global section until the intended application has either accepted or rejected it, or does not accept an inbound connection within a given period, in which case the OSAK software rejects the connection on behalf of the application. The process running the OSAK software, OSAK$SERVER_V3, is started automatically by the installation procedure. Therefore the installing account requires these process quotas, as does the SYSTEM account if you start OSAK$SERVER_V3 in SYSTARTUP_VMS.COM.

Table 10–3 summarizes the required process account quotas for the OSAK$SERVER_V3 process.

Table 10–3 OSAK$SERVER_V3 Process Account Quotas

Quota	Value
ASTLM	2 units for each global section + 10
ENQLM	1 unit for each OSI process
TQELM	2 units for each global section + 10

OSAK$SERVER_V3 Process Account Calculation Example

The following calculations determine the correct process account quota values for 20 global sections:

- For ASTLM: 20 global sections × 2 units + 10 = 50
- For TQELM: 20 global sections × 2 units + 10 = 50

Table 10–4 summarizes the minimum process account quotas required for processes that use the OSAK software.

Table 10–4 Account Quotas for Processes that use OSAK Software

Quota	Value
ASTLM	10
ENQLM	2
TQELM	10

Users of the OSI Applications will also need a minimum TMPMBX and NETMBX privileges.

Use the OpenVMS Authorize utility to verify and change process quotas and user privileges for the installation and user accounts in the user authorization file (SYSUAF.DAT). (Some sites may restrict the use of the OpenVMS Authorize utility to certain accounts or users.)

After you have changed the quotas for the installation account, log out of the installation account and log in again for the new quotas to take effect.

For more information on modifying account quotas, refer to the description of the Authorize utility in the OpenVMS System Management documentation subkit.

10.6 Determining Disk Space

Table 10–5 shows the approximate minimum disk space required to install the individual OSI Applications.

Table 10–5 Minimum Disk Space Requirements

Software	Alpha	VAX
FTAM	28,000 blocks	12,000 blocks
VT	4,000 blocks	2,000 blocks
OSAK	5,000 blocks	3,000 blocks
TOTAL	**37,000 blocks**	**17,000 blocks**

To determine the number of free disk blocks on the current system disk, enter the following command at the DCL prompt:

```
$ show device sys$sysdevice Return
```

If necessary, create enough free disk space to accommodate the installation of the OSI Applications.

Chapter 7 describes options the POLYCENTER Software Installation utility provides, if there is insufficient disk space to complete the OSI Applications installation.

10.7 Notifying Users

You may want to notify the users on the system that you are installing the OSI Applications. Log in to an account that has OPER privileges.

The command is:

```
$ reply/all/bell "Now installing the OSI Applications" Return
```

11

Installing the OSI Applications

This chapter describes how to install the optional OSI Applications. These applications are:

- FTAM
- Virtual Terminal (VT)
- OSAK

It also includes how to list the files installed on your system during the OSI Applications installation. See Section 11.11 for the list of commands.

You install these optional components using the POLYCENTER Software Installation (PCSI) utility. For information about how to run the PCSI utility, refer to the *DECnet/OSI for OpenVMS Installation and Basic Configuration*, Appendix A.

11.1 Prerequisite Steps

Install the OSI Applications only after you have installed DECnet/OSI for OpenVMS, rebooted, and configured the DECnet/OSI for OpenVMS base components.

11.2 Register the OSI Applications Software License

If you are installing prerequisite or optional software along with OSI Applications, review the PAK status and install the PAKs for any prerequisite or optional software before you install the OSI Applications.

The DVNETEND PAK is required to install DECnet/OSI. This PAK also allows you to install and run the base FTAM, VT, and OSAK applications.

To use the FTAM and VT gateways, you need the extended function license. The PAK names are:

- For Alpha: DVNETEXT
- For VAX: DVNETRTG

11.3 Starting the Installation of the OSI Applications

You can install the OSI Applications using the DCL or Motif interface to PCSI. The following sections detail how to use these interfaces.

For a description of all the features you can request when starting an installation (such as purging files and using a product configuration file), refer to DCL help for the `product install` command or Motif help.

11.3.1 Using the DCL Interface

To install the OSI Applications, choose from the following commands.

For OSAK only:

```
$ product install osak /source=DKA400:[kits]
```

For FTAM and VT:

```
$ product install ftam,vt /source=DKA400:[kits]
```

For FTAM only:

```
$ product install ftam /source=DKA400:[kits]
```

For VT only:

```
$ product install vt /source=DKA400:[kits]
```

If you do not use the `/SOURCE` qualifier, the default is to read the installation kit from `PCSI$SOURCE:`.

Note that in the above example, the directory on the CD in which the installation kit is located is referred to as `DKA400:[kits]`. You should replace this directory name with your actual directory location of the OSI Applications kit.

Details on determining the directory location of the OSI Applications kit are provided in Section 9.4.

11.3.2 Using the Motif Interface

To invoke the Motif interface, enter the following commands at the DCL prompt ($):

```
$ set display /create /node=name /transport=transport-name Return
$ product Return
```

name is the node name of the workstation on which you want to display the Motif interface.

transport-name can be either `DECNET` or `LOCAL`. The default is `LOCAL`.

You can now install the OSI Applications.

11.4 Installing the OSI Applications

To install the OSI Applications, log into the SYSTEM account and perform the following steps:

1. If you have previously installed the OSI Applications on your system, be sure to shut down any FTAM, VT, or OSAK processes currently running by executing the appropriate shutdown procedures(s).

   You must shut down FTAM and VT first, before shutting down OSAK.

   - `$ @sys$startup:osif$stop`
   - `$ @sys$startup:vt_stop`
   - `$ @sys$startup:osak$stop`

2. Deinstall the OSI Applications.

   If you have previously installed the OSI Applications on your system, then deinstall the applications, using the `product remove` command:

   ```
   $ product remove application Return
   ```

application is FTAM, VT, or OSAK.

Note that you must deinstall FTAM and VT before deinstalling OSAK.

3. Mount the software CD-ROM.

Note

Refer to the *OpenVMS Layered Products Compact Disc User's Guide* for instructions on mounting and removing a compact disc.

4. Decide which products to install. OSAK must be installed before installing FTAM or VT. You can install FTAM and VT either together or separately.

   See Section 11.3.1 for the FTAM, VT, and OSAK installation commands.

5. To install FTAM and VT together, type:

```
$ product install ftam,vt/source=device:[directory] Return
```

   device:[directory] is the location of the files on the distribution media.

Note

The following code examples are from an Alpha installation. A VAX installation varies slightly in the PAK name and in disk space requirements.

6. PCSI displays the selected products and requests confirmation. Press Return to continue, or enter NO to exit.

```
The following products have been selected:
DEC AXPVMS FTAM V3.2-D
DEC AXPVMS VT V2.1-C

Do you want to continue? [YES] Return
```

7. PCSI displays the pre-installation messages for FTAM including the copyright notice, license notice, and OSAK notice, and asks if you want to continue.

```
*** DEC AXPVMS FTAM V3.2-D: DECnet/OSI for OpenVMS OSI File Transfer,
Access, and Management (FTAM)

    Copyright (c) Digital Equipment Corporation 1995. All rights reserved.

    This product uses the PAKS: DVNETEND and the Gateway requires DVNETEXT.

    The DECnet/OSI OSAK software must be installed and started before
 continuing this installation.
    Do you want to continue? [YES] Return
```

8. PCSI displays the pre-installation messages for VT including the copyright notice, license notice, OSAK notice, and gateway notice, and asks if you want to continue.

```
*** DEC AXPVMS VT V2.1-C: DECnet/OSI for OpenVMS Virtual Terminal V2.1-C

    Copyright (c) Digital Equipment Corporation 1995. All rights reserved.

    This product uses the PAKS: DVNETEND and the Gateways require DVNETEXT.

    The DECnet/OSI OSAK software must be installed and started before
 continuing this installation.
    Do you want to continue? [YES] Return
```

```
    VT Gateway startup requires LAT and DEC TCP/IP Services started first.
    Do you want to continue? [YES] Return
```

9. PCSI enters the execution phase, in which it installs the products, executes the startup command files, and runs the VT IVP. Note that the FTAM IVP is not run during this installation, and must be run separately.

```
%PCSIUI-I-DONEASK, execution phase starting
The following products will be installed:
DEC AXPVMS FTAM V3.2-D
DEC AXPVMS VT V2.1-C
%PCSI-I-VOLINFO, estimated space information for volume DISK$OVMSSYSTEM
-PCSI-I-VOLSPC, 31060 required; 484479 available; 453419 net
Portion Done: 0%...10%...20%...30%...40%...70%...80%...90%
%PCSI-I-PRCOUTPUT, output from subprocess follows...
%%% Process VT_RESPONDER is already running
%%% VT not started
Portion Done: 100%
The following products have been installed:
DEC AXPVMS FTAM V3.2-D
DEC AXPVMS VT V2.1-C
%PCSI-I-EXETSTSTART, start of test procedure
%PCSI-I-EXETSTOK, end of test procedure; completed with no errors
```

10. PCSI displays the post-installation messages for FTAM and lists required system resources, configuration and IVP tasks you must complete, release notes location, and completion message.

```
*** DEC AXPVMS FTAM V3.2-D: DECnet/OSI for OpenVMS OSI File Transfer,
Access, and Management (FTAM)

    Insert the following lines in SYS$MANAGER:SYSTARTUP_VMS.COM:
        @SYS$STARTUP:OSIF$STARTUP.COM
    Insert the following lines in SYS$MANAGER:SYSHUTDWN.COM:
        @SYS$STARTUP:OSIF$STOP.COM

    The following messages are informational and indicate the amount of
each resource used by FTAM.

    This product requires the following SYSGEN parameters:
        GBLSECTIONS add 24

    This product requires the following SYSGEN parameters:
        GBLPAGES add 5068

    After installing DECnet/OSI FTAM you must do
"$ @SYS$STARTUP:OSIF$CONFIGURE.COM" to setup necessary accounts.

    The DECnet/OSI FTAM IVP may be run at any time by doing
"$ @SYS$TEST:OSIF$IVP.COM"


    Release notes are available in SYS$HELP:DECNET*.RELEASE_NOTES

    DECnet/OSI for OpenVMS FTAM Installation Completed
```

11. PCSI displays the VT post-installation messages and lists release notes location, and completion message.

```
*** DEC AXPVMS VT V2.1-C: DECnet/OSI for OpenVMS Virtual Terminal V2.1-C

    Insert the following lines in SYS$MANAGER:SYSTARTUP_VMS.COM:
        @SYS$STARTUP:VT_START.COM
    Insert the following lines in SYS$MANAGER:SYSHUTDWN.COM:
        @SYS$MANAGER:VT_STOP.COM

    Previous VT_SYSTART.COM changes are in SYS$STARTUP:VT_SYSTART.COM_OLD

    Release notes are available in SYS$HELP:DECNET*.RELEASE_NOTES
```

```
DECnet/OSI for OpenVMS Virtual Terminal Installation Completed
```

11.5 Starting Up and Shutting Down OSI Applications

The installation procedure for each OSI Application executes the startup procedure automatically.

To enable automatic restart of the applications once you have installed them on your system, edit the system startup file (sys$manager:systartup_vms.com) and add the following command lines to the file, beginning with the OSAK command:

```
$ @sys$startup:osak$start.com ! OSAK startup command file
$ @sys$startup:osif$startup.com ! FTAM startup command file
$ @sys$startup:vt_start.com ! VT startup command file
```

See Section 11.4, Step 1, for instructions on shutting down the OSI Applications.

11.6 The OSAK Installation Verification Procedure

The OSAK installation verification procedure (IVP) is run automatically during the installation. However, you can run it at any time by entering the following command:

```
$ @sys$test:osak_ivp
```

If the IVP runs successfully, you see the following:

```
Starting OSAK Installation Verification Procedure ...
OSAK Installation Verification Procedure completed successfully
```

If the IVP finishes with errors, you see a message similar to this:

```
OSAK Installation Verification Procedure completed with errors
```

In both cases, the OSAK software produces a log file called OSAK$IVP.LOG in the default directory, SYS$TEST. If the IVP fails during installation, you can check the log file to help you identify the source of the problem. You can also forward the log file to Digital to assist you when discussing the problem.

When you have finished running the IVP and you are sure that the OSAK software is properly installed, back up the system disk. Save the distribution kit for future installations.

11.7 Running the OSIF$CONFIGURE.COM Procedure

Following the FTAM PCSI installation, you should execute the osif$configure.com procedure located in SYS$STARTUP. This procedure first verifies the existence of the OSIT$DEFAULT and OSIGTWY accounts, then asks whether you want to run the installation verification procedure (IVP).

If the procedure finds that either of the OSIT$DEFAULT and OSIGTWY accounts are not present, the procedure creates the account(s) and prompts for user input. The IVP question is asked whether or not it was necessary to create accounts.

Following is an example of running the script on a system where the accounts already exist:

```
$ @sys$startup:osif$configure.com
  This setup procedure will verify the existence of the OSIT$DEFAULT
  and OSIGTWY accounts.  If these accounts are not present, you will
  be asked some questions about UIC and default device, as well as
  being required to choose passwords from a computer generated list.

  Do you wish to continue with this procedure [Yes] :


  The OSIT$DEFAULT and OSIGTWY accounts are present.  The OSIT$DEFAULT
  account is useful as an account to specify when running the DECnet/OSI
  FTAM IVP.  The OSIGTWY account is the mechanism by which users may access
  the DAP/FTAM Gateway.  For more information about this Gateway, see the
  FTAM Use and Management Guide.

  DECnet/OSI FTAM setup complete.

  Would you like to run the IVP [Yes] : No
```

11.8 The FTAM Installation Verification Procedure

You can verify the FTAM installation by running the FTAM installation verification procedure (IVP). The IVP is an internal test of the FTAM initiator and responder using the underlying OSI layers of the local system through the Network layer. This testing verifies that your installation can set up and accept an application association and its underlying presentation and session connections. The IVP tests the FTAM DCL commands on the local system and also exercises the DAP-FTAM Gateway.

The PCSI installation does not automatically run the IVP. You must do this manually.

The DCL commands tested by the IVP are:

- COPY/APPLICATION_PROTOCOL=FTAM
- DIRECTORY/APPLICATION_PROTOCOL=FTAM
- DELETE/APPLICATION_PROTOCOL=FTAM
- RENAME/APPLICATION_PROTOCOL=FTAM

11.8.1 Preparing for the FTAM IVP

Before you run the IVP:

1. Ensure that the OSI Transport is running and enabled. It will be running if you answered YES to the "Configure Transport?" question during the `net$configure` procedure.
2. If you are running the IVP for the first time, be sure to run the OSIF$CONFIGURE.COM beforehand. Instructions on running this procedure are in Section 11.7. The last question in the procedure asks if you want to run the IVP. To do so, type YES and press Return.

11.8.2 Running the FTAM IVP

You can issue the IVP commands from any directory on the system. The IVP prompts you for an account and the corresponding password. The OSIT$DEFAULT account is a reasonable choice since it will be configured correctly. However, you may specify any valid account and password.

```
$ @sys$test:osif$ivp.com

  DECnet/OSI FTAM Installation Verification Procedure

  It is 20-APR-1995 at 10:50.

  The DECnet/OSI FTAM IVP assigns the LOCAL_FTAM alias to be:

          :::RMS.FTAM.OSIF.%x21,template=osit$loop_clns:

  The DECnet/OSI FTAM IVP copies a small data file, SYS$TEST:OSIF$IVP.TMP,
  to LOCAL_FTAM::OSIFILE.TMP. The IVP requests a directory listing
  of the new file, before copying it back to SYS$LOGIN:OSIF$IVP.CPY.
  Next, the IVP requests a difference of the original file,
  SYS$TEST:OSIF$IVP.TMP, and the second new file, SYS$LOGIN:OSIF$IVP.CPY.
  The LOCAL_FTAM::OSIFILE.TMP file, that was originally copied is then
  renamed to LOCAL_FTAM::OSIFILE.RNM. The IVP then deletes the two
  new files.

  To perform these actions, a valid username and password with
  the following privileges must be supplied by the user:

          NETMBX, TMPMBX, SYSNAM, SYSLCK, PRMMBX

Please enter the USERNAME for use by the IVP: osit$default

Please enter the PASSWORD for use by the IVP:

  $ COPY /APPLICATION_PROTOCOL=FTAM /LOG SYS$TEST:OSIF$IVP.TMP
    LOCAL_FTAM"OSIT$DEFAULT password"::OSIFILE.TMP

%COPY-S-COPIED, SYS$COMMON:[SYSTEST]OSIF$IVP.TMP;1 copied to
:::RMS.FTAM.OSIF.%x21,template=osit$loop_clns:"OSIT$DEFAULT password"::
SYS$COMMON:[OSIT$DEFAULT]OSIFILE.TMP;1 (403 records)

  $ DIRECTORY /APPLICATION_PROTOCOL=FTAM -
    LOCAL_FTAM"OSIT$DEFAULT password"::OSIFILE.TMP

Directory :::RMS.FTAM.OSIF.%x21,template=osit$loop_clns:::
   "OSIT$DEFAULT password"

SYS$COMMON:[OSIT$DEFAULT]OSIFILE.TMP;1

Total of 1 file.

  $ COPY /APPLICATION_PROTOCOL=FTAM /LOG -
    LOCAL_FTAM"OSIT$DEFAULT password"::OSIFILE.TMP -
    SYS$LOGIN:OSIF$IVP.CPY

%COPY-S-COPIED, :::RMS.FTAM.OSIF.%x21,template=osit$loop_clns:"OSIT$DEFAULT
password"::SYS$COMMON:[OSIT$DEFAULT]OSIFILE.TMP;1 copied
 to DKA100:[SMITH]OSIF$IVP.CPY;8 (403 records)

  $ DIFFERENCE SYS$TEST:OSIF$IVP.TMP SYS$LOGIN:OSIF$IVP.CPY
Number of difference sections found: 0
Number of difference records found: 0

DIFFERENCES /IGNORE=()/MERGED=1-
   SYS$COMMON:[SYSTEST]OSIF$IVP.TMP;1-
   DKA100:[SMITH]OSIF$IVP.CPY;8

  $ DELETE/LOG SYS$LOGIN:OSIF$IVP.CPY;
```

```
  $ RENAME /APPLICATION_PROTOCOL=FTAM /LOG -
    LOCAL_FTAM"OSIT$DEFAULT password"::OSIFILE.TMP -
    OSIFILE.RNM
%RENAME-I-RENAMED, :::RMS.FTAM.OSIF.%x21,template=osit$loop_clns:
   "OSIT$DEFAULT password"::SYS$COMMON:[OSIT$DEFAULT]OSIFILE.TMP;1
   renamed to OSIFILE.RNM

  $ DELETE /APPLICATION_PROTOCOL=FTAM /LOG -
    LOCAL_FTAM"OSIT$DEFAULT password"::OSIFILE.RNM
%DELETE-I-FILDEL, :::RMS.FTAM.OSIF.%x21,template=osit$loop_clns:
"OSIT$DEFAULT password"::SYS$COMMON:[OSIT$DEFAULT]OSIFILE.RNM;1
deleted (0 blocks)

Would you like to test the DAP Gateway (this requires the OSIGTWY password)? Y

  Checking SYS$SYSTEM:ISOAPPLICATIONS.DAT for OSINOD...

Please enter the PASSWORD for the OSIGTWY account:

  $ COPY /APPLICATION_PROTOCOL=FTAM /LOG SYS$TEST:OSIF$IVP.TMP
    LOCAL_FTAM"OSIT$DEFAULT password"::GTWYFILE.TMP

%COPY-S-COPIED, SYS$COMMON:[SYSTEST]OSIF$IVP.TMP;1 copied to
:::RMS.FTAM.OSIF.%x21,template=osit$loop_clns:"OSIT$DEFAULT password"::
SYS$COMMON:[OSIT$DEFAULT]GTWYFILE.TMP;1 (403 records)

  $ DIR 0"OSIGTWY password"::OSINOD"OSIT$DEFAULT password"::
      SYS$LOGIN:GTWYFILE.TMP

Directory 0"OSIGTWY password"::

OSINOD"OSIT$DEFAULT OSIT$DEFAULT"::SYS$COMMON:[OSIT$DEFAULT]GTWYFILE.TMP;1
                          24  20-APR-1995 10:53:47.00  (RWED,RWED,RWED,RWED)

Total of 1 file, 24 blocks.

  $ DELETE /LOG 0"OSIT$DEFAULT password"::GTWYFILE.TMP;
%DELETE-I-FILDEL, 0"OSIT$DEFAULT
password"::SYS$COMMON:[OSIT$DEFAULT]GTWYFILE.TMP;1 deleted (24 blocks)

  DECnet/OSI FTAM Installation Verification Procedure
  completed successfully at 10:53.
```

11.9 The VT Installation Verification Procedure

The VT installation verification procedure (IVP) is run automatically during the installation. However, you can run it at any time by entering the following command:

```
$ @sys$test:vt_ivp
```

If the IVP ran successfully, you see the following:

```
VT_IVP: Test successful
```

```
%IVP-S-END, IVP ended
```

If the IVP finishes with errors, you see a message similar to this:

```
VT_IVP: <Failure message>
```

```
%IVP-S-END, IVP ended
```

In both cases, the VT software produces a log file called VT_IVP.LOG in the SYS$SCRATCH directory. You can check the log file to help you identify the source of the problem. You can also forward the log file to Digital to assist you when discussing the problem.

11.10 Deinstalling OSI Applications

To deinstall the OSI Applications, you must be logged into an account with the same privileges required to install the OSI Applications. See Section 10.2 for this list of privileges.

You may optionally shut down the OSI Applications before deinstalling them. See Section 11.4 for instructions.

Note that you must deinstall FTAM and VT before you deinstall OSAK.

To deinstall any of the OSI Applications, enter the command:

```
$ product remove application
```

application is FTAM, VT, or OSAK.

Invoking this command shuts down the application if it is running and removes the product files. An example of the deinstallation response sequence for each application is provided in Section 11.13.

Note

You do not have to remove a product before re-installing the same version, or installing a different version. If the product is already installed on the system, PCSI removes it automatically before beginning the installation.

11.11 Files Installed on Your System

The OSI Applications installation procedure installs a number of files on your system. To list the files, enter the following command:

```
$ product show object /product=application
```

application is FTAM, VT, or OSAK.

11.12 Sample OSI Application Installations

This section provides sample OSI Applications installations.

11.12.1 Sample OSAK Installation

```
$ prod install osak/source=sys$sysdevice:[kits]

The following product has been selected:
DEC AXPVMS OSAK T3.0-H

Do you want to continue? [YES] Return

*** DEC AXPVMS OSAK T3.0-H: DEC OSAK V3.0 for OpenVMS AXP

    Copyright © Digital Equipment Corporation 1995. All rights reserved.

    Digital Equipment Corporation

    Do you want all the default values for this product? [YES] Return

    OSAKserver and OSAK network management will be stopped.
    Do you want to continue? [YES] Return

    Do you want to view the values? [NO] Return
```

```
%PCSIUI-I-DONEASK, execution phase starting
The following product will be installed:
DEC AXPVMS OSAK T3.0-H
%PCSI-I-VOLINFO, estimated space information for volume DISK$OVMSSYSTEM
-PCSI-I-VOLSPC, 6785 required; 350277 available; 343492 net
Portion Done: 0%...10%...20%...30%...60%...70%...80%...90%...100%
The following product has been installed:
DEC AXPVMS OSAK T3.0-H
%PCSI-I-EXETSTSTART, start of test procedure
%PCSI-I-EXETSTOK, end of test procedure; completed with no errors

*** DEC AXPVMS OSAK T3.0-H: DEC OSAK V3.0 for OpenVMS AXP

    OSAKserver and OSAK network management processes have been started.

    Insert the following lines in SYS$MANAGER:SYSTARTUP_VMS.COM:
        $ @sys$startup:osak$start
```

11.12.2 Sample Virtual Terminal Installation

```
$ prod install vt/source=sys$sysdevice:[kits]

The following product has been selected:
DEC AXPVMS VT V2.1-C

Do you want to continue? [YES] Return

*** DEC AXPVMS VT V2.1-C: DECnet/OSI for OpenVMS Virtual Terminal V2.1-C

    Copyright (c) Digital Equipment Corporation 1995. All rights reserved.

    This product uses the PAKS: DVNETEND and the Gateways require DVNETEXT.

    The DECnet/OSI OSAK software must be installed and started before
 continuing this installation.
    Do you want to continue? [YES] Return

    VT Gateway startup requires LAT and DEC TCP/IP Services started first.
    Do you want to continue? [YES] Return

%PCSIUI-I-DONEASK, execution phase starting
The following product will be installed:
DEC AXPVMS VT V2.1-C
%PCSI-I-VOLINFO, estimated space information for volume DISK$OVMSSYSTEM
-PCSI-I-VOLSPC, 3506 required; 343419 available; 339913 net
Portion Done: 0%...10%...20%...50%...60%...80%
%PCSI-I-PRCOUTPUT, output from subprocess follows...
%%% Process VT_RESPONDER is already running
%%% VT not started
Portion Done: 90%...100%
The following product has been installed:
DEC AXPVMS VT V2.1-C
%PCSI-I-EXETSTSTART, start of test procedure
%PCSI-I-EXETSTOK, end of test procedure; completed with no errors

*** DEC AXPVMS VT V2.1-C: DECnet/OSI for OpenVMS Virtual Terminal V2.1-C

    Insert the following lines in SYS$MANAGER:SYSTARTUP_VMS.COM:
        @SYS$STARTUP:VT_START.COM
    Insert the following lines in SYS$MANAGER:SYSHUTDWN.COM:
        @SYS$MANAGER:VT_STOP.COM

    Previous VT_SYSTART.COM changes are in SYS$STARTUP:VT_SYSTART.COM_OLD

    Release notes are available in SYS$HELP:DECNET*.RELEASE_NOTES

    DECnet/OSI for OpenVMS Virtual Terminal Installation Completed
```

11.12.3 Sample FTAM Installation

```
$ product install ftam/source=sys$sysdevice:[kits] Return

The following product has been selected:
DEC AXPVMS FTAM V3.2-D

Do you want to continue? [YES]  Return

*** DEC AXPVMS FTAM V3.2-D: DECnet/OSI for OpenVMS OSI File Transfer,
        Access, and Management (FTAM)

    Copyright (c) Digital Equipment Corporation 1995. All rights reserved.

    This product uses the PAKS: DVNETEND and the Gateway requires DVNETEXT.

    The DECnet/OSI OSAK software must be installed and started before
 continuing this installation.
    Do you want to continue? [YES]  Return

%PCSIUI-I-DONEASK, execution phase starting
The following product will be installed:
DEC AXPVMS FTAM V3.2-D
%PCSI-I-VOLINFO, estimated space information for volume DISK$OVMSSYSTEM
-PCSI-I-VOLSPC, 27584 required; 423237 available; 395653 net
Portion Done: 0%...10%...20%...30%...40%...50%...80%...90%...100%
The following product has been installed:
DEC AXPVMS FTAM V3.2-D

*** DEC AXPVMS FTAM V3.2-D: DECnet/OSI for OpenVMS OSI File Transfer,
Access, and Management (FTAM)

    Insert the following lines in SYS$MANAGER:SYSTARTUP_VMS.COM:
        @SYS$STARTUP:OSIF$STARTUP.COM
    Insert the following lines in SYS$MANAGER:SYSHUTDWN.COM:
        @SYS$STARTUP:OSIF$STOP.COM

    The following messages are informational and indicate the amount of
each resource used by FTAM.

    This product requires the following SYSGEN parameters:
        GBLSECTIONS add 24

    This product requires the following SYSGEN parameters:
        GBLPAGES add 5068

    After installing DECnet/OSI FTAM you must do
"$ @SYS$STARTUP:OSIF$CONFIGURE.COM" to setup necessary accounts.

    The DECnet/OSI FTAM IVP may be run at any time by doing
"$ @SYS$TEST:OSIF$IVP.COM"

    Release notes are available in SYS$HELP:DECNET*.RELEASE_NOTES

    DECnet/OSI for OpenVMS FTAM Installation Completed
```

11.13 Sample OSI Application Deinstallations

This section provides sample OSI Applications deinstallations.

11.13.1 Sample Virtual Terminal Deinstallation

```
$ product remove vt

The following product has been selected:
DEC AXPVMS VT V2.1-C
```

```
Do you want to continue? [YES] Return
The following product will be removed:
DEC AXPVMS VT V2.1-C
%PCSI-I-VOLINFO, estimated space information for volume DISK$OVMSSYSTEM
-PCSI-I-VOLSPC, -3436 required; 310692 available; 314128 net
Portion Done: 0%
%PCSI-I-PRCOUTPUT, output from subprocess follows...
%%% VT_RESPONDER is running in process 0000050D
%%% Process will be stopped
%%% VT_LAT_GTWY is running in process 00000518
%%% Process will be stopped
%%% LAT_VT_GTWY is running in process 00000519
%%% Process will be stopped
%%% VT_TELNET_GTWY is running in process 0000029E
%%% Process will be stopped
%%% TELNET_VT_GTWY is running in process 0000029F
%%% Process will be stopped
Portion Done: 20%
%PCSI-I-PRCOUTPUT, output from subprocess follows...
%%% VT_RESPONDER is not running
%%% Process will not be stopped
%%% VT_LAT_GTWY is not running
%%% Process will not be stopped
%%% LAT_VT_GTWY is not running
%%% Process will not be stopped
%%% VT_TELNET_GTWY is not running
%%% Process will not be stopped
%%% TELNET_VT_GTWY is not running
%%% Process will not be stopped
Portion Done: 50%...60%...70%...80%...90%...100%
The following product has been removed:
DEC AXPVMS VT V2.1-C
```

11.13.2 Sample FTAM Deinstallation

```
$ product remove ftam

The following product has been selected:
DEC AXPVMS FTAM V3.2-D

Do you want to continue? [YES] Return
The following product will be removed:
DEC AXPVMS FTAM V3.2-D
%PCSI-I-VOLINFO, estimated space information for volume DISK$OVMSSYSTEM
-PCSI-I-VOLSPC, -27578 required; 314199 available; 341777 net
Portion Done: 0%...20%...40%...50%...60%...70%...80%...90%...100%
The following product has been removed:
DEC AXPVMS FTAM V3.2-D
```

11.13.3 Sample OSAK Deinstallation

```
$ product remove osak

The following product has been selected:
DEC AXPVMS OSAK T3.0-H

Do you want to continue? [YES] Return

PCSI-E-CONREMUNR, optionally remove product DEC AXPVMS DECNET_OSI
  T6.3-K3_B that is no longer required by another product
Do you want to take this action? [NO] Return
Do you want to continue? [YES] Return
The following product will be removed:
DEC AXPVMS OSAK T3.0-H
%PCSI-I-VOLINFO, estimated space information for volume DISK$OVMSSYSTEM
-PCSI-I-VOLSPC, -6735 required; 344094 available; 350829 net
Portion Done: 0%...20%
%PCSI-I-PRCOUTPUT, output from subprocess follows...
%%% OSAK$SERVER_V3 is running in process 0000054A
%%% Process will be stopped
%%% OSAK$NETMAN is running in process 0000054B
%%% Process will be stopped
Portion Done: 40%...50%...60%...70%...80%...90%...100%
The following product has been removed:
DEC AXPVMS OSAK T3.0-H
```

12
Configuring the OSI Applications

This chapter describes how to configure FTAM and Virtual Terminal (VT) on an OpenVMS system.

12.1 FTAM and Virtual Terminal Terminology

- An **initiator**, or **client**, is the program on one system that initiates a request to a program on another system, and awaits a response.
- A **responder**, or **server**, is the program on a system providing a response to a request initiated on another system.
- A **listener** is a job running on the responding system that fulfills incoming requests from an initiating system.

12.2 About the OSI Application Entity Database

The FTAM and VT applications require you to manage the OSI application entity database. This database stores addressing information for aliases that represent FTAM and VT applications and listeners.

On OpenVMS, the location of this file is:

```
sys$system:isoapplications.dat
```

The entries in the `isoapplications` database define aliases and contain information about local listeners, remote responders, and source addresses for local initiators. The aliases are used by local FTAM and VT initiators and listeners, and by users who specify these aliases in FTAM and VT commands.

There are three types of formats you can use in this `isoapplications` database. They are:

- Address – Information on local listeners, remote applications, and local initiator source address.
- Distinguished Name – X.500 Directory Service fixed entries.
- Pattern – X.500 Directory Service variable entries.

The `isoapplications` database can contain any combination of these formats.

For detailed information on the Address, Distinguished Name and Pattern formats, refer to Chapter 9 in *DECnet/OSI FTAM and Virtual Terminal Use and Management*.

12.3 Getting Started Configuring Initiating and Responding Entities

This section provides basic configuration task checklist items and examples for setting up the initiating and responding systems or entities.

Refer to *DECnet/OSI FTAM and Virtual Terminal Use and Management* for detailed information about managing initiating and responding systems.

If you are already familiar with configuring FTAM and VT, then you can continue the configuration procedure starting at Section 12.4.

12.3.1 Setting Up Responding Entities

On OpenVMS, the FTAM and VT installation and startup procedures provide default FTAM and VT responders. When the `vt_start.com` and `osif$startup.com` command procedures are run, these responders are started automatically.

12.3.2 Setting Up Initiating Entities

A responding entity needs to be defined in the `isoapplications` database before you can access it. To get the information that you need for an alias, you need to contact the person responsible for configuring and managing the remote OSI system running FTAM or VT. The remote FTAM or VT implementation may be from Digital or from another vendor.

Following are the tasks you need to perform on your system to set up the `isoapplications` database for a specific remote FTAM or VT application.

1. Determine the available transports between your Digital system and the remote OSI system and select one.
2. Collect the information needed to define an alias. Complete the Address Format Worksheet Form shown in Table 12–3 as follows:
   a. Choose an alias name for the remote responder. This name is local to your system and can be any name you choose.
   b. Specify whether the remote application is FTAM or VT.
   c. Obtain the AP-title and the AE-qualifier that the remote application requires, if any. If they are not required, leave these fields blank.
   d. Obtain the SAP selectors (PSEL,SSEL,TSEL) that the remote application requires.
   e. Obtain the NSAP of the remote application. The format of this field depends upon which transport provider you are using.
      - For OSI Transport: Obtain the remote NSAP.
      - For RFC1006: Obtain the remote Internet address and RFC1006 daemon port.
      - For CONS over X.25: Obtain the remote X.25 NSAP.
   f. Specify the transport provider you selected in step 1.
   g. Determine the local transport template you want to use.
      - For OSI Transport: Default template is `default`.
      - For RFC1006: Do not specify a template.
      - For CONS over X.25: Use a CONS template.

3. Define the alias in `isoapplications` in Address format with the information that you collected in the prior steps. You can edit this database using a text editor.

Once the setup is complete, you can invoke initiator requests using the alias.

12.3.3 Example: Performing An FTAM File Copy

Use the task list from Section 12.3.2 to configure your system to perform an FTAM file copy.

In this example, you copy remote file `system_a_filename` on `System-A`, to file `system_b_filename` on `System-B`.

`System-A` is the responding entity, and `System-B` is the initiating entity. `System-A` and `System-B` are OpenVMS systems.

Use the OSI Provider and use the following account information on `System-A`:

```
username: system_a_user  Return
password: system_a_pwd  Return
```

Use the default FTAM responder on `System-A`. There is no setup required on `System-A`.

Using information collected in Section 12.3.2, perform the following steps on **initiating entity** `System-B` from a privileged account:

1. Determine available transports and choose one. For this example, use OSI transport.
2. Perform the following steps:
   a. Choose an alias. For this example, use `system_a_alias`.
   b. Specify FTAM or VT. For this example, the remote application is FTAM.
   c. Obtain the AP-title and AE-qualifier. For this example, the responder does not require this information.
   d. Obtain the SAP selectors. The FTAM responder on OpenVMS uses RMS.FTAM.OSIF.
   e. Obtain the remote NSAP. For this example, the responder's OSI transport NSAP is %X410004AA000400001321.
   f. Specify transport provider. For this example, use OSI. Note that because OSI is the default provider, you can omit it for this example.
   g. Determine the transport template. For this example, use `default`. Note that because `default` is the default template, you can omit it for this example.
3. Define the alias in `isoapplications`:

```
system_a_alias  :FTAM:::RMS.FTAM.OSIF. \
                        %X410004AA000400001321, \
                        provider=osi,template=default:
```

Once the setup is complete, you can start the FTAM copy command:

```
$ copy/application=ftam -  Return
system_a_alias"system_a_user system_a_pwd"::system_a_filename -  Return
system_b_filename  Return
```

12.3.4 Example: Performing A Virtual Terminal Login

Use the task list from Section 12.3.2 to configure your system to perform a Virtual Terminal login.

In this example, you perform a VT `set host/vtp` from `System-B` to `System-A`.

`System-A` is the responding entity, and `System-B` is the initiating entity. `System-A` and `System-B` are OpenVMS systems.

Use the RFC1006 provider and the following account information from `System-A`:

```
username: system_a_user  Return
password: system_a_pwd  Return
```

Use the default VT responder on responding entity `System-A`. There is no setup required on `System-A`.

Using the information from Section 12.3.2, perform the following steps on **initiating entity** `System-B` from a privileged account:

1. Determine available transports and choose one. For this example, use RFC1006.
2. Perform the following steps:
   a. Choose an alias. For this example, use `system_a_alias`.
   b. Specify FTAM or VT. For this example, the remote application is VT.
   c. Obtain the AP-title and AE-qualifier. For this example, the responder does not require this information.
   d. Obtain the SAP selectors. The VT responder on OpenVMS uses %x0001.%x0001.%x0002.
   e. Obtain the remote NSAP. For this example, the responder's RFC1006 internet address is 16.20.8.42 and the daemon port is 102.
   f. Specify transport provider. For this example, use RFC1006.
   g. Determine the transport template. Since the transport provider is RFC1006, you must omit it for this example.
3. Define the alias in `isoapplications`:

```
system_a_alias  :VT:::%x0001.%x0001.%x0002. \
                       16.20.8.42.102, \
                       provider=rfc1006:
```

Once the setup is complete, you can start the VT `set host/vtp` command:

```
$ set host/vtp system_a_alias  Return

Username:  SYSTEM_A_USER  Return
Password:  system_a_pwd  Return
```

12.4 About Responding Entities

As stated in Section 12.3.1, the FTAM and VT responders come preconfigured on OpenVMS. The installation also supplies an initial `isoapplications` file with local aliases used by the FTAM and VT responders, gateways, and initiators.

The default addresses (PSEL, SSEL, TSEL) for the FTAM and VT responders and gateways are as follows:

Table 12–1 Default Addresses

Gateway/Responder	Default Address
FTAM Responder	RMS.FTAM.OSIF
VT Responder	%x0001.%x0001.%x0002
VT/LAT Gateway	%x0001.%x0001.%x0003
VT/TELNET Gateway	%x0001.%x0001.%x0004

Each of these responders and gateways can accept connections through all of the transports that FTAM and VT support: OSI transport, RFC1006, and X.25/CONS.

You can set up your own responder for FTAM in addition to or instead of the default one. You cannot set up your own responder for VT; however, you can change the aliases and change the local addresses (PSEL, SSEL, TSEL) that the VT responder and gateways use. For these operations, refer to *DECnet/OSI FTAM and Virtual Terminal Use and Management*, Chapter 10 and Chapter 11.

12.5 Configuring Addresses for Remote FTAM and VT Applications

The primary job of configuring FTAM and VT on OpenVMS is to add entries to the `isoapplications` database for the remote FTAM and VT applications on your network. On OpenVMS, you add entries to `isoapplications` by using a text editor.

Refer to Chapter 9 in *DECnet/OSI FTAM and Virtual Terminal Use and Management* for a complete description of managing the `isoapplications` database.

As mentioned in Section 12.2, every entry in `isoapplications` has one of three formats:

- Address format
- Distinguished Name format
- Pattern format

If you have the DEC X.500 Directory Service product installed, you have the option of adding entries of the Distinguished Name format and the Pattern format. You have the option of adding entries of the Address format regardless of whether X.500 is installed.

If you are not using X.500, complete an Address Format Worksheet in Table 12–3 for each remote application. If you are using X.500, complete the checklist in Table 12–2.

To complete the Address Format worksheet forms, see Section 12.3.2 for collecting relevant information.

Table 12–2 X.500 Configuration Checklist

Question	Yes	No
Do you want to register the local listeners in the X.500 Directory? If yes, you need an X.500 Distinguished Name to identify each of the local listeners. Specify a Distinguished Name for each local listener. • X.500 Distinguished Name(s): ________________________________ ____	☐	☐
Do you want to add entries to `isoapplications`? If yes, then continue on with this checklist to add entries of the Distinguished Name, Pattern, and Address formats.	☐	☐
Do you want to add entries of the Distinguished Name format? If yes, complete the following information for each remote application: • Alias name: ________________________________ • Application (FTAM or VT): ________________________________ • Distinguished Name: ________________________________ • Transport Template List: ________________________________	☐	☐
Do you want to add entries of the Pattern format? If yes, you need to determine what your pattern(s) should look like. You may be able to get this information from your network administrator, or you may be able to use the DEC X.500 Administration Utility (DXIM) to examine the structure of the X.500 Directory Information Tree for your organization to determine what your Pattern format entries should be. Complete the following information for each pattern entry. The Distinguished Name should be incomplete (contain at least one *). • Application (FTAM or VT): ________________________________ • Distinguished Name: ________________________________ • Transport Template List: ________________________________	☐	☐
Do you want to add entries of the Address format? If yes, complete a form in Table 12–3 for each remote application.	☐	☐

Table 12–3 Address Format Worksheet

Configuration Information	Answer/Entry
Alias name:	
Application (FTAM or VT):	
AP-title:	
AE-qualifier:	
PSEL:	
SSEL:	
TSEL:	
NSAP(s):	
Transport provider name(s):	
Transport template name(s):	

12.5.1 Adding Address Format Entries

Refer to Section 9.2.1 in *DECnet/OSI FTAM and Virtual Terminal Use and Management* for a complete description of Address format entries. Entries of the Address format take the following form:

```
alias   :application:ap-title:ae-qualifier:psel.ssel.tsel.
                                           nsap,transport_options;
                                           nsap,transport_options; ...
                                           nsap,transport_options:
```

Use the information you completed in the Address Format Worksheet to add the Address format entries. For example, an Address format entry for VT could look like the following:

```
remote1 :VT:::psap.ssap.tsap.%x41454187150041080002B23569821, \
                             provider=osi,template=default:
```

Note that you can enter more than one NSAP per alias.

12.5.2 Adding Distinguished Name Format Entries

Refer to Section 9.2.2 in *DECnet/OSI FTAM and Virtual Terminal Use and Management* for a complete description of Distinguished Name entries. Entries of the Distinguished Name format take the following form:

```
alias   :application:template_list:x500_distinguished_name:
```

Use the information you completed in the configuration checklist to add the Distinguished Name format entries. For example, a Distinguished Name format entry for FTAM could look like the following:

```
remote2 :FTAM:template=default:/c=us/o=org/ou=org_unit/cn=remote2/cn=ftam:
```

12.5.3 Adding Pattern Format Entries

Refer to Section 9.2.3 in *DECnet/OSI FTAM and Virtual Terminal Use and Management* for a complete description of Pattern format entries. Entries of the Pattern format take the following form:

```
*    :application:template_list:incomplete_distinguished_name:
```

You need only one Pattern format entry in `isoapplications` for each application (FTAM or VT). Use the information you completed in the configuration checklist to add the Pattern format entries.

For example, the aliases passed to the FTAM and VT commands could correspond to the value of the common name attribute of the application process entries in the X.500 directory. In this case, you might use the following two `isoapplications` entries:

```
*    :VT:template=default:/c=us/o=org/ou=org_unit/cn=*/cn=vt:
*    :FTAM:template=default:/c=us/o=org/ou=org_unit/cn=*/cn=ftam:
```

12.6 Registering Responders To X.500 Directory

If you have DEC X.500 Directory Service available to you, you have the option of storing the addresses of the local FTAM and VT responders in the X.500 Directory database. Use the information you completed in the configuration checklist to register your local responders.

For example, you could use the following DEC X.500 Administration Facility (DXIM) command to register your local FTAM responder on node `srchr`, assuming that `srchr` already exists in the database as an application process.

```
dxim> create /c=us/o=local_org/ou=local_org_unit/cn=srchr/cn=ftam - Return
_dxim> attributes objectclass=applicationentity, - Return
_dxim> presentationaddress="RMS"/"FTAM"/"OSIF"/NS+410004AA000400001321 Return
```

Part V

Appendixes

Part V includes two appendixes that are referred to in the text. It includes the following appendixes:

- Appendix A — Configuring Asynchronous Connections
- Appendix B — Configuring NSP and the OSI Transport Service

A

Configuring Asynchronous Connections

The following sections describe how to configure asynchronous connections, which give you the option of connecting your OpenVMS system to another system by means of a low-cost, low-speed asynchronous line. Asynchronous connections are implemented in software and can be run over any directly connected terminal line that the OpenVMS system supports. The Asynchronous Protocol provides for a full-duplex connection and can be used for remote asynchronous communications over a telephone line using a modem. Asynchronous connections are not supported for maintenance operations or for controller loopback testing.

A.1 Asynchronous DECnet Connections

Normally, the OpenVMS system controls lines connected to terminal ports, as in interactive logins. You can, however, switch the line so the DECnet/OSI software can use the line for an asynchronous connection to another system. You can establish two types of asynchronous DECnet connections:

- A **static asynchronous connection**, which creates a permanent DECnet link to a single remote node. Two nodes are connected by either a dialup line or by a physical line attached to a terminal port at each end. Before the DECnet connection is made, the terminal lines must be converted to static asynchronous DDCMP lines. (See Section A.1.1.)
- A **dynamic asynchronous connection**, which provides a temporary DECnet link. A dynamic asynchronous line is normally switched on for network use only for the duration of a dialup connection between two nodes. When the telephone is hung up, the line reverts to being a terminal line. You can establish dynamic connections to different remote nodes at different times. When using a dynamic connection, you can have the terminal line switched automatically to a DECnet line, or you can switch it to a DECnet line manually. (See Section A.1.2.)

The asynchronous software is optional. You can load and configure it by using the `net$configure.com`, `net$startup.com`, and `wandd$startup.com` procedures.

Note

The `net$configure.com`, `net$startup.com`, and `wandd$startup.com` procedures automatically set up static asynchronous connections for you.

The information in Section A.1.1 is necessary only if you want to set up a configuration outside of the configuration provided by the procedures.

The `net$configure.com`, `net$startup.com`, and `wandd$startup.com` procedures load all the necessary images and NCL files to preconfigure your system for dynamic asynchronous connections. The user making the dynamic connection needs only to log in and invoke the dynamic switch.

Most of the information in Section A.1.2 is necessary only if you want to set up a configuration outside of the configuration provided by the procedures. Section A.1.2.2 provides information about the dynamic switch.

The asynchronous software consists of three pieces:

- `asydriver`
- `asyswitch`
- `asydynswitch`

To switch a terminal line to a DECnet line or a DECnet line back to a terminal line, you use DCL `set` commands such as the following:

- To switch a DECnet line back to `ttdriver`:

  ```
  $ set terminal/nonetwork terminal-port
  ```

- To switch a terminal line to a static asynchronous line (`asydriver`):

  ```
  $ set terminal/network terminal-port
  ```

- To switch a terminal line to a dynamic asynchronous line (`asydriver`):

  ```
  $ set terminal/network/switch=decnet
  ```

- To switch a terminal line to a dynamic manual asynchronous line (`asydriver`):

  ```
  $ set terminal/network/switch=decnet/manual
  ```

Switching the line is only one step in setting up asynchronous communications. You must also configure your DECnet lines, links, and circuits. Setting up a link and circuit for asynchronous connections is the same as when you set up a synchronous link and circuit. The difference occurs when you configure your line in the Modem Connect module. The communications port attribute for the `modem connect line` has special significance.

To set up a dynamic asynchronous connection, you need to preconfigure the protocol stack. This means that you need to map a routing circuit to a DDCMP logical station. The logical station, in turn, uses a line created with the Modem Connect module that specifies a communications port with either a "floating" line or an explicit line for your dynamic connection. A "floating" line is not tied to a specific terminal device, while an explicit line is tied to a specific device. You must configure the protocol stack (at both ends of the link when using two DECnet/OSI for OpenVMS systems) before you set host to the remote system and switch the dynamic asynchronous line into operation.

Note

Non OpenVMS systems that support OSI standards can make asynchronous DECnet/OSI connections to OpenVMS systems. The asynchronous connection can be between two routers, a router and an end node, or two end nodes.

A.1.1 Establishing a Static Asynchronous Connection

A static asynchronous DECnet connection is a permanent connection between two nodes. This type of connection can be made in one of two ways:

- The nodes can be connected by a physical line (a null modem cable) attached to a terminal port at each system. No modems are required. You can communicate with the other system at any time.
- The connection can be made over a dialup line using modems at both ends of the line. For example, your OpenVMS system can establish a static asynchronous connection to a remote node over a telephone line.

Follow the steps outlined in this section to manually establish a static asynchronous connection. For the connection to be successful, the node with which you are creating a DECnet link must also establish an asynchronous DECnet connection with your node. (The line speeds at each end of the connection must be the same.)

Note

If you use the `net$configure.com` procedure to set up your static asynchronous lines, then the `net$startup.com` and `wandd$startup.com` procedures will load `asydriver` and configure the lines for you.

1. Log in to the SYSTEM account on your OpenVMS system.
2. DECnet must be running on both nodes for the remaining steps. If not already done, you and the remote system manager must turn on the network by entering the following command:

   ```
   $ @sys$startup:net$startup
   ```

3. Load the asynchronous driver, `asydriver`.

   Enter the following commands at your terminal (or include them in the `sys$manager:systartup_vms.com` command procedure before you boot the system):

   ```
   $ run sys$system:sysgen
   SYSGEN> connect asy0/noadapter/driver=asydriver
   SYSGEN> exit
   ```

   The asynchronous driver must be loaded before any asynchronous connection can be made.

4. Next, install the asynchronous shareable images required for a static asynchronous connection. Use the following command:

   ```
   $ install add sys$library:asyswitch.exe/open/head/share
   ```

5. To change a terminal line into a static asynchronous DECnet line, use the DCL command `set terminal` *`terminal-port-name`* with the appropriate qualifiers. (See examples a and b.) *`terminal-port-name`* represents the device where you want to connect the static asynchronous DECnet line. If you have more than one terminal attached to your OpenVMS system, you must specify a `set terminal` command for each terminal line used for a static asynchronous DECnet connection.

   a. **Nondialup line:** The following command converts the terminal line connected to the port into a DECnet line with no modem control:

   ```
   $ set terminal/permanent/nomodem/notype_ahead -
   _$ /network terminal-port-name
   ```

   The *`terminal-port-name`*, for instance, could be `tta0`.

   b. **Dialup line:** The following command converts the terminal line connected to the port (which can be used as a dialup line) into a DECnet line with modem control:

   ```
   $ set terminal/permanent/notype_ahead/network/modem -
   _$ /noautobaud/nohangup terminal-port-name
   ```

   The *`terminal-port-name`*, for instance, could be `ttb0`.

   You can change the line speed by resetting the line to non-network mode with the `set terminal/nonetwork` command. After you do this, switch the line back to network mode with the `set terminal/network` command. You cannot use the `set` command to change the line speed or any other parameters while the line is in network mode.

   You can ensure that these `set terminal` commands will be executed automatically each time the network is started in the future. Modify your `sys$manager:systartup_vms.com` command procedure to include all required `set terminal` commands after the network has started up but before executing the commands in the next step that configure the `modem connect line`.

6. Next, configure your line. If the configuration procedures have not already created the Modem Connect module, create it manually before configuring the line. Use the following example to set up the necessary `modem connect` entities.

   ```
   $ run sys$system:ncl

   ncl> create modem connect line static_asynch -
   _ncl> communications port async_port_name ➊

   ncl> set modem connect line static_asynch speed 2400 ➋

   ncl> enable modem connect line static_asynch
   ```

   ➊ For an asynchronous line or circuit, the `communications port` attribute, (*`async_port_name`*), has one of two formats:

   - *`devcu`* as in `txa0`:
   - *`dev-c-u`* as in `tx-0-0`

   where *`dev-c-u`* is defined as follows:

`dev`	The first two letters of the asynchronous device name (possible values are `tt` and `tx`).

c — A decimal number (0 or a positive integer) designating a device's hardware controller. If the third letter of the device name is A, *c* equals 0. If the third letter of the device name is B, *c* equals 1, and so on.

u — The unit number of the device name; *u* is always equal to 0 or a positive integer.

For example, *dev-c-u* would be `tx-0-0` for unit `txa0:`.

❷ The line speeds at both sides of the connection should be the same.

7. Next, configure your data link and routing circuit. For information about configuring your data link and routing circuit, see the chapters on managing network security and network management tasks in *DECnet/OSI Network Management*.
8. For security over a dialup connection, run NCL and establish optional routing initialization passwords. For more information about using verifiers, refer to the *DECnet/OSI Network Management* guide.

A.1.1.1 Terminating a Static Asynchronous Connection

The following steps tell you how to terminate a static asynchronous connection:

1. Use NCL to disable (turn off) and delete the routing circuit and the static asynchronous line, as follows:

```
$ run sys$system:ncl

ncl> disable modem connect line static_asynch

ncl> disable ddcmp link static_asynch -
_ncl> logical station static_asynch

ncl> disable ddcmp link static_asynch

ncl> disable routing circuit static_asynch

ncl> delete modem connect line static_asynch

ncl> delete ddcmp link static_asynch -
_ncl> logical station static_asynch

ncl> delete ddcmp link static_asynch

ncl> delete routing circuit static_asynch
ncl> exit
```

2. The following command switches your asynchronous line back to a terminal line:

```
$ set terminal/permanent/nonetwork/typeahead terminal_port_name
```

A.1.1.2 Reasons for Failure of Static Asynchronous Connections

If the initial `set terminal` command fails, check that:

- WANDD has been started up.
- The `asydriver` has been loaded (the `asy0` device must be present).
- The `asyswitch` has been installed.

If the `logical station` is in the `on-starting` state, check that:

- The line speeds at both ends of the connection are set to the same value.
- The `modem control` characteristic of the `modem connect line` at both ends of the link are the same.
- The routing circuits have been configured correctly.

- The parity is correct. Asynchronous DECnet requires the parity on the asynchronous line be set to `none` and the terminal line be set to use 8-bit characters. If you are using a system other than OpenVMS, the terminal line must be set to the correct parity.

If your terminal line cannot be set up as a static asynchronous DDCMP line, check whether the following condition exists:

- If data is stored in a type-ahead buffer, the line appears as a terminal line even if a startup command procedure attempts to set it up as a DDCMP line. This generally occurs when the remote node is running and its asynchronous DDCMP line is on. The DDCMP start messages being transmitted are stored in the type-ahead buffer associated with your terminal line. Before you can start up your line in DDCMP mode, terminate the process that owns your terminal line.

To verify that the asynchronous line is connected properly, check the following:

- For local connections, verify that the cable is a null modem cable.
- For modem connections, verify that the cable is a straight-through cable and that if the modem is put in analog loopback, the circuit comes up with the local node as the adjacent node.
- For both types of connections, verify that the port is operational by resetting it to terminal-type characteristics and plugging in a terminal and logging in.

If your connection is timing out or losing DDCMP packets, you might not have a sufficient number of receive buffers set up on the DDCMP link for the asynchronous line.

For more information about solving problems in your DECnet/OSI network, refer to the *DECnet/OSI Problem Solving* guide.

A.1.2 Establishing a Dynamic Asynchronous Connection

A dynamic asynchronous DECnet connection is a temporary connection between two nodes, usually over a telephone line through the use of modems. You can switch the line at each end of the connection from a terminal line to a dynamic asynchronous DECnet line. A dynamic asynchronous connection is usually maintained only for the duration of a telephone call.

Dynamic switching of terminal lines to asynchronous DDCMP lines can occur between DECnet/OSI systems or between a DECnet/OSI system and a non DECnet/OSI system. Assuming that both the remote node and the local node are OpenVMS operating systems, the system manager at each node must have loaded the asynchronous driver, `asydriver`, and installed the shareable images `asyswitch` and `asydynswitch`. (If the local node is a personal computer, there is no need to load `asydriver` and install `asydynswitch`.) The system manager at the remote node must have enabled the use of virtual terminals on the system. First, the system manager must have enabled virtual terminals by issuing the `sysgen connect` command. The system manager must also have enabled virtual terminals on the system. The terminal devices, which you plan to use for dynamic connections, should be set up with the `/disconnect` qualifier.

Note

Any OpenVMS node that supports DECnet asynchronous connections can initiate a dynamic asynchronous connection to an OpenVMS node.

Setting up a dynamic asynchronous connection involves two distinct sets of steps.

1. At some point, you must configure your dynamic asynchronous line. See Section A.1.2.1 for more information about this.
2. You dynamically switch the line to a DECnet line. See Section A.1.2.2 for more information about this.

A.1.2.1 Setting Up Dynamic Asynchronous Connections

Use the following steps to manually set up your dynamic asynchronous line any time prior to the dynamic switch. This example assumes the local OpenVMS node is originating the connection and switching the terminal line on for DECnet use. The connection must be to an OpenVMS node on which you have an account with `net$decnetaccess` rights.

To set up a dynamic asynchronous connection, you must execute the instructions discussed in this section at both the local and remote OpenVMS systems. If the remote system is a system other than OpenVMS, refer to the remote system's documentation for information about setting up a dynamic asynchronous connection.

Note

If you use the `net$configure.com` procedure to set up your dynamic asynchronous lines, then the `net$startup.com` and `wandd$startup.com` procedures will load the `asydriver`, install the asynchronous shareable images, and configure the lines for you.

---

1. Log in to the SYSTEM account on your OpenVMS node.
2. DECnet must be running on both nodes for the remaining steps. If not already done, you and the remote system manager must start up the network by entering the following command:

   ```
   $ @sys$startup:net$startup
   ```

3. Load the asynchronous driver, `asydriver`.

   Enter the following commands at your terminal (or include them in the `sys$manager:systartup_vms.com` command procedure before you boot the system):

   ```
   $ run sys$system:sysgen
   SYSGEN> connect asy0/noadapter/driver=asydriver
   SYSGEN> exit
   ```

   The asynchronous driver must be loaded before you can make any asynchronous connection.

4. Next, install the asynchronous shareable images. Use the following command:

   ```
   $ install add sys$library:asyswitch.exe/open/head/share
   ```

   ```
   $ install add sys$library:asydynswitch.exe/open/head/share/protected
   ```

   The following commands enable the use of virtual terminals for the terminal line that is to be switched, and set the `disconnect` characteristic for the terminal line. (The virtual terminal capability permits the process to continue running if the physical terminal you are using becomes disconnected.)

```
$ run sys$system:sysgen
SYSGEN> connect vta0/noadapter/driver=ttdriver
SYSGEN> exit
```

```
$ set terminal/eight_bit/permanent/modem/disconnect terminal-port-name:
```

terminal-port-name is the name of the terminal port on the remote node to which the dynamic asynchronous connection is made. The *terminal-port-name*, for instance, could be `txa3`.

5. After you load `asydriver` and install the asynchronous shareable images, you need to preconfigure the protocol stack for the dynamic asynchronous line. A protocol stack for a dynamic asynchronous connection is a `routing circuit` that is mapped to a `ddcmp logical station`. The `ddcmp logical station` uses a `modem connect line` created with the `communications port` attribute specified as either `async` or `async-terminal_name` (for example: `async-tx-0-3`). You must configure the protocol stack before you switch the dynamic asynchronous line into operation by means of the DCL `set terminal` command. The following steps explain how to do this.

   If the configuration procedures have not already created the Modem Connect module, create it manually before configuring the line. Use the following example to set up the necessary `modem connect` entities:

```
$ run sys$system:ncl

ncl> create modem connect line dynamic_asynch -
_ncl> communications port async_port_name ❶

ncl> set modem connect line dynamic_asynch speed 2400

ncl> enable modem connect line dynamic_asynch
```

❶ In dynamic asynchronous connections, you can specify the `communications port` attribute (*async_port_name*) in one of two ways when creating the `modem connect line` entity:

- `async` — When you specify `async`, a unique number is given to the `modem connect line` as an "-*n*" extension to the `async` name each time a `modem connect line` with a communications port attribute of ASYNC is created. This creates a "floating" `modem connect line`, which is not tied to a specific terminal device or unit. For example:

```
ncl> create modem connect line dynamic_asynch -
_ncl> communications port async
```

  If you now display information about the port, you will see that the line has a new communications port name of `async-`*n*. For example:

```
ncl> show modem connect line dynamic_asynch communications port
```

- `async-`*dev-c-u* — Specifying `async-`*dev-c-u* allows you to set up a dynamic protocol tower on an explicit line.

  For a dynamic line or circuit, the communications port has one of two formats:

  - *devcu* as in `txa0`:
  - *dev-c-u* as in `tx-0-0`

where *dev-c-u* is defined as follows:

dev	The first two letters of the asynchronous device name (possible values are tt and tx).
c	A decimal number (0 or a positive integer) designating a device's hardware controller. If the third letter of the device name is A, *c* equals 0. If the third letter of the device name is B, *c* equals 1, and so on.
u	The unit number of the device name; *u* is always equal to 0 or a positive integer.

```
ncl> create modem connect line dynamic_asynch -
_ncl> communications port async-tx-0-3
```

If you request a specific device, txa3 (with the set terminal command; see Section A.1.2.2, step 13), for a dynamic asynchronous connection, the asydriver first searches for an available modem connect line with a communications port attribute of async-tx-0-3. If this search fails, the asydriver then searches for a "floating" modem connect line with a communications port attribute of async-*n*. If asydriver finds a "floating" line, it uses it. For the duration of this connection, the communications port attribute is modified to async-tx-0-3 so you can tell which terminal devices are actively running dynamic asynchronous connections.

If asydriver does not find a "floating" line, the dynamic switch fails. Either you have set up the protocol stack incorrectly, or else all modem connect lines are in use.

6. Next, configure your data link and routing circuit. For information about configuring your data link and routing circuit, see the chapters on managing network security and network management tasks in the *DECnet/OSI Network Management* guide.

7. For security over a dialup connection, run NCL and establish optional routing initialization passwords. For more information about using verifiers, refer to the *DECnet/OSI Network Management* guide.

A.1.2.2 Switching on Dynamic Asynchronous Connections

This section explains how to dynamically switch your line for communication.

Figure A–1 shows a typical configuration in which dynamic asynchronous switching occurs over a dialup line. The local node in Figure A–1 is a standalone VAXstation™ 3100 system; the remote node is a VAX 8800. After the user at the local node dials in to the remote node, he or she can switch the lines connected to terminal ports tta2 and txb1 to dynamic asynchronous DDCMP.

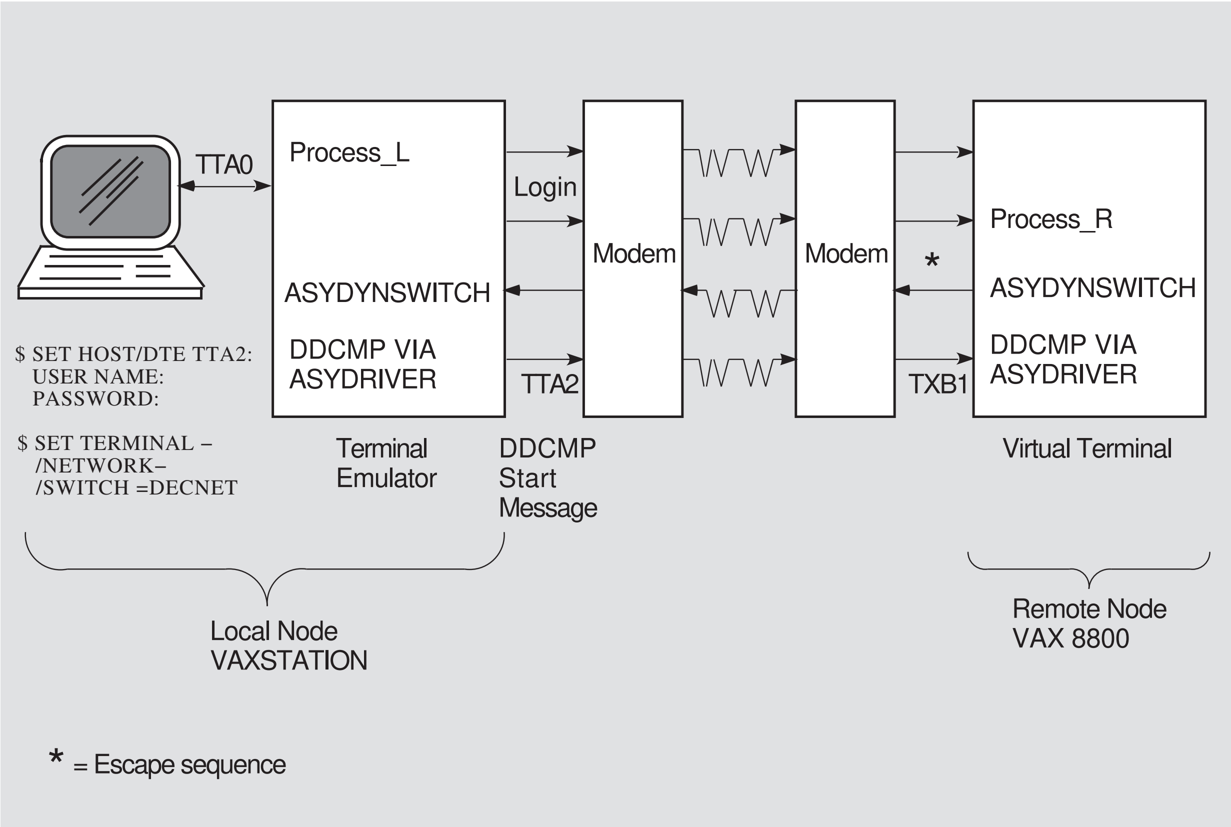
1. The following steps can be performed by any OpenVMS user.

2. Log in to your local OpenVMS system. This login creates a process (identified by Process_L in Figure A–1).

3. Enter the following DCL command:

   $ set host/dte *terminal-port-name*:

Figure A–1 Dynamic Switching of Asynchronous DDCMP Lines



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`terminal-port-name` is the name of your local terminal port that is connected to the modem. If both systems use modems with autodial capabilities (for example, DF03, DF112, or DF224 modems), you can optionally include the `/dial` qualifier on the `set host/dte` command to cause automatic dialing of the modem on the remote node, as follows:

```
$ set host/dte/dial=number:number terminal-port-name:
```

4. If you do not specify the `/dial` qualifier in the previous step, dial the remote system manually. After the dialup connection is made and you receive the remote system welcome message, log in to your account on the remote node. In this case, you would supply your user name and password to the remote OpenVMS operating system.
5. If you are not using automatic dialing, dial in to the remote node manually.
6. Once the dialup connection is made and you receive the remote OpenVMS system welcome message, log in to your account on the remote node. This process is identified by Process_R in Figure A–1.
7. You can initiate the dynamic switch by specifying the following DCL command on the remote node:

   ```
   $ set terminal/network/switch=decnet
   ```

   The `set terminal` command is an OpenVMS DCL command. If you are on a node other than an OpenVMS node, specify the equivalent function for your system.

8. When the SET image on the remote system recognizes the `/NETWORK` and `/switch=decnet` qualifiers, it calls the shareable image `asydynswitch` (see Figure A–1). The `asydynswitch` image verifies the link and sends an escape sequence to the terminal emulator on the local system. The escape sequence notifies the local terminal emulator that the line connected to the remote system is becoming a dynamic asynchronous line.

9. When the terminal emulator at the local system receives the escape sequence, it calls the `asydynswitch` image (see Figure A–1) on the local system. The `asydynswitch` image verifies the line on the local system and switches it to an asynchronous DECnet line.

10. When the switch occurs on the local system, `asydriver` first searches for an explicitly named dynamic asynchronous line. For example, if the switch is on device `tta1:`, it searches for a line with a `communications port` attribute of `async-tt-0-1`. If `asydriver` cannot find that line, it searches for a "floating" line (created with a `communications port` attribute of `async`). Because a protocol stack previously had been preconfigured over this line, the Data Link protocol now attempts to start the link.

11. The local system then sends a `ddcmp start` message (see Figure A–1) to the remote system that initiated the dynamic switch. When `asydynswitch` on the remote system detects the `start` message, it activates the preconfigured local protocol stack. (For information about the protocol stack, see Section A.1.2.1, steps 5–7.)

    The remote system first searches for an explicitly named dynamic asynchronous line. When it searches for an explicitly named dynamic line it searches for one that refers to the physical terminal over which the original switch was made. In Figure A–1, the remote system searches for a line associated with port `txb1`. Therefore, it looks for a line with a `communications port` attribute of `async-tx-1-1`. If it does not find one, it uses a "floating" `async-`*n* line. If this fails, the dynamic switch fails.

12. Since both ends of the link have a preconfigured protocol stack, the DECnet link comes up over both circuits. Any preconfigured security checks also occur at this time.

    The following message indicates that the terminal emulator on the local system has exited and that the DECnet link is being established:

    ```
    %REM-S-END - control returned to local-nodename::
    $
    ```

    To check whether the communications link has come up, specify the following command on the local system:

    ```
    $ run sys$system:ncl
    ```

    ```
    ncl> show routing circuit dynamic_asynch adjacency adjacent-node all
    ncl> exit
    ```

    If there is an adjacency, you can start to communicate with the remote system over the asynchronous DECnet connection.

13. As an alternative to switching the terminal line to a DECnet line automatically, you can switch the line manually. If you originate a dynamic connection to an OpenVMS node from a system other than OpenVMS, manual switching is required; from an OpenVMS system, it is optional. If you are

originating the connection from a node other than OpenVMS, follow system-specific procedures to log in to the remote OpenVMS node by means of terminal emulation.

Once you are logged in to the remote node, two steps are required to perform manual switching:

a. Using your account on the remote OpenVMS node, specify the `set terminal` command described in Step 7, but add the `/manual` qualifier. For more information see Section A.1.2.1, Step 5.

```
$ set terminal/network/switch=decnet/manual
```

You will receive the following message from the remote node indicating the remote system is switching its line to DECnet use:

```
%SET-I-SWINPRG The line you are currently logged over is becoming
               a DECnet line
```

b. You should exit from the terminal emulator and switch your line manually to a DECnet line. The procedure depends on the specific operating system on which you are logged in.

The following example shows how an OpenVMS user originating a dynamic connection exits from the terminal emulator and turns on the DECnet line.

1. Exit from the terminal emulator: Press and hold down the Control key while you press the \ (backslash) key on your OpenVMS system.
2. Enter the following command to switch your terminal line to a DECnet line manually:

```
$ set terminal/network tta0:
```

`tta0` is the name of the terminal port on the local node.

3. Next, you must manually turn on the lines, data links, and routing circuits connected to your terminal port. See Steps 5 through 7 in Section A.1.1 for information about setting up your static asynchronous link.

Asynchronous DECnet is then started on the local OpenVMS node.

A.1.2.3 Managing Dynamic Asynchronous Resources

You can define the following system logical names in `sys$manager:net$logicals.com` to manage the resources used by a dynamic asynchronous connection:

- `asy$dynamic_maxlines`

  Specifies the maximum number of dynamic asynchronous `modem connect lines` that can be active on a system at any one time. You can specify values in the range of 0–65534 lines. The default is 16 lines. For example:

  ```
  $ define/system asy$dynamic_maxlines 16
  ```

- `asy$dynamic_line_timeout`

  Specifies the amount of time in seconds that a dynamic asynchronous line waits before deciding that a dynamic connection has broken. When the dynamic asynchronous line decides that a link is broken, the line is automatically switched back to a terminal line. You can specify values in the range of 10–65535 seconds. The default is 300 seconds. For example:

```
$ define/system asy$dynamic_line_timeout 300
```

A.1.2.4 Terminating a Dynamic Asynchronous Connection

This section explains how to terminate a dynamic asynchronous connection:

1. To terminate a dynamic asynchronous connection, disable the `modem connect line` and then re-enable it. For example:

   ```
   $ run sys$system:ncl

   ncl> disable modem connect line dynamic_asynch

   ncl> enable modem connect line terminal_line
   ncl> exit
   ```

2. Switch your asynchronous line back to a terminal line.

   ```
   $ set terminal/permanent/nonetwork/typeahead terminal_port_name
   ```

The dynamic asynchronous connection can also terminate, if the time specified by the logical name `asy$dynamic_line_timeout` expires. The link is considered idle if it has no input or output for the timeout interval. When this occurs, the link is broken and the line automatically switches from a DECnet line back to a terminal line. For more information about `asy$dynamic_line_timeout`, see Section A.1.2.3.

A.1.2.5 Reasons for Failure of Dynamic Asynchronous Connections

If you are using dynamic switching and the asynchronous DECnet connection is not made, check that:

- DECnet/OSI has been started.
- WANDD has been started.
- The `asydriver` has been loaded (the `asy0` device is present).
- The `asyswitch` has been installed.
- The `asydynswitch` has been installed.
- The `modem connect lines` have been configured correctly.
- Virtual terminals must be enabled both on the remote node and, in particular, for the terminal at which you are logged in. The terminal line at the remote node must have the attribute `disconnect` set.
- After you enter a `set terminal` command with the `/manual` qualifier, you must specify NCL commands to turn on the DECnet line within approximately 2 minutes or the line returns to terminal mode.

If the `logical station` is in the `on-starting` state, check that:

- The routing circuits have been configured correctly.
- The routing initialization passwords on each node must be set correctly. (Refer to the *DECnet/OSI Network Management* guide.)
- The parity is correct. Asynchronous DECnet requires the parity on the asynchronous line to be set to `none` and the terminal line to be set up to use 8-bit characters. If you are using a non OpenVMS system, you must check that the terminal line is set to the correct parity.

For more information about solving problems in your DECnet/OSI network, refer to the *DECnet/OSI Problem Solving* guide.

B

Configuring NSP and the OSI Transport Service

B.1 Configuring NSP

This section describes how to configure the Network Services Protocol (NSP). The following example shows the commands to create the nsp entity on your system. Digital recommends that you accept the default settings (used in the example) for the various attributes and change these only if you need to. Refer to the *DECnet/OSI Network Control Language Reference* for more information about these attributes.

```
ncl> create nsp

ncl> set nsp delay factor 2, delay weight 3, - ❶
_ncl> maximum remote nsaps 200, maximum transport connections 200, - ❷
_ncl> maximum window 20, nsap selector 32, -
_ncl> retransmit threshold 5
ncl> enable nsp
```

❶ The effect of `delay factor` is to increase the retransmission time by increasing the average round-trip delay time, thus allowing for additional network delay.

The value of the weighting factor is given by the `delay weight` characteristic. Basically, `delay weight` determines how quickly the retransmission timer responds to variations in actual round-trip delay times. A low value of `delay weight` means that the retransmission timer responds quickly to each sample of round-trip delay time; a `delay weight` of `0` means that an estimate will be nearly the same as the last actual sample of round-trip delay. A high value for `delay weight` will reduce the impact of recent variations in network delay; the higher the value, the closer each estimate of round-trip delay will be to the average of all estimates.

The default values of `delay factor` and `delay weight` should be suitable for most networks. However, consider increasing these values if there are wide variations in round-trip delay times on your network.

❷ You can save memory resources by reducing the value of `maximum remote nsaps`. However, you will not have access to the information provided by this entity's counters and status attributes (except through information in event logs). The maximum NSAPs cannot be smaller than the maximum transport connection.

For some NSP characteristics, such as `maximum remote nsaps`, or `maximum transport connections`, you can raise values at any time, but you cannot lower the value without first disabling NSP.

The following is an example of how to set up NSP:

```
ncl> create nsp
ncl> set nsp maximum window 8
ncl> set nsp maximum transport connections 200
ncl> set nsp maximum receive buffers 2000
ncl> enable nsp
ncl> create session control transport service nsp protocol %x04
```

B.1.1 Transmit and Receive Window

NSP receiver's window is controlled by a combination of Maximum Transport Connections, Maximum Receive Buffers, and Maximum Window.

The receiver initial quota is determined by dividing Maximum Receive Buffers by Maximum Transport Connections. During the life of the connection, the receiver quota fluctuates, using the value of Maximum Receive Buffers divided by Currently Active Connections. The credit window sent to the remote transmitter may or may not be this quota value, depending on the value of Maximum Window. If Maximum Window is set to less than the determined receiver quota, this value is used instead for the credit granted to the remote transmitter.

The transmitter on an NSP connection uses the credit sent by the remote receiver as its transmit window, unless Maximum Window is a lower value. In that case, Maximum Window is used for the transmitter window.

By controlling the transmitter's and receiver's window as above a dynamic balance of system resource consumption and network performance may be achieved and maintained.

B.2 Configuring the OSI Transport Service

This section describes how to configure the OSI Transport service. The following example shows the commands to create the `osi transport` entity on your system. Digital recommends that you accept the default settings (used in the example) for the various attributes and change these only if you need to. Refer to the *DECnet/OSI Network Control Language Reference* for more information about these attributes.

The characteristics specified in the following command example are those that apply to all types of network service. For details of `osi transport` entity characteristics that are specific to Connection-Oriented Network Service (CONS) or Connectionless-Mode Network Service (CLNS), see Section B.2.2 or Section B.2.3.

```
ncl> create osi transport

ncl> set osi transport delay factor 4, delay weight 5,- ❶
_ncl> maximum receive buffers 96, maximum remote nsaps 64, - ❷
_ncl> maximum transport connections 33, maximum window 20

ncl> enable osi transport
```

❶ The effect of `delay factor` is to increase the retransmission time by increasing the average round-trip delay time, thus allowing for additional network delay.

The value of the weighting factor is given by the `delay weight` characteristic. Basically, `delay weight` determines how quickly the retransmission timer responds to variations in actual round-trip delay times. A low value of `delay weight` means that the retransmission timer responds very quickly to each sample of round-trip delay time; a `delay weight` of `0` means that an estimate will be nearly the same as the last actual sample of round-trip delay. A high value for `delay weight` will reduce the impact of recent variations in network delay; the higher the value, the closer each estimate of round-trip delay will be to the average of all estimates.

The default values of `delay factor` and `delay weight` should be suitable for most networks. However, consider increasing its value if there are wide variations in round-trip delay times on your network.

For a complete discussion of `delay factor` and `delay weight` and how to calculate round-trip delay, refer to *DECnet/OSI Network Management*.

❷ You can save memory resources by reducing the value of `maximum remote nsaps`. However, you will not have access to the information provided by this entity's counters and status attributes (except through information in event logs). The maximum remote NSAPs cannot be lower than the maximum transport connections.

You must disable the `osi transport` entity before you can modify any of its characteristics.

B.2.1 Transmit and Receive Window

OSI Transport receiver's window is controlled by a combination of Maximum Transport Connections, Maximum Receive Buffers, and Maximum Window. The receiver initial quota is determined by dividing Maximum Receive Buffers by Maximum Transport Connections. During the life of the connection, the receiver quota fluctuates, using the value of Maximum Receive Buffers divided by Currently Active Connections. The credit window sent to the remote transmitter may or may not be this quota value, depending on the value of Maximum Window. If Maximum Window is set to less than the determined receiver quota, this value is used instead for the credit granted to the remote transmitter.

The transmitter on an OSI Transport connection uses the credit sent by the remote receiver as its transmit window, unless Maximum Window is a lower value. In that case, Maximum Window is used for the transmitter window.

By controlling the transmitter's and receiver's window as above a dynamic balance of system resource consumption and network performance may be achieved and maintained.

The following NCL script creates and sets up OSI Transport, including the Connection-Oriented Network Service (CONS), and the Connectionless-mode Network Service (CLNS) services.

```
ncl> create node 0 osi transport
ncl> create node 0 osi transport application osit$ivp
ncl> set node 0 osi transport application osit$ivp file name sys$test:osit$ivpresp.com
ncl> set node 0 osi transport application osit$ivp user name "systest"
ncl> set node 0 osi transport application osit$ivp called tsels {%X564f5453495650}
ncl> create node 0 osi transport template osit$loop_clns
ncl> set node 0 osi transport template osit$loop_clns network service clns, -
_ncl> classes {4}, -
_ncl> expedited data true, -
_ncl> checksums false, -
_ncl> inbound false, -
_ncl> loopback true

ncl> create node 0 osi transport template osit$loop_cons
ncl> set node 0 osi transport template osit$loop_cons network service cons, -
_ncl> classes {4,2,0}, -
_ncl> expedited data true, -
_ncl> checksums false, -
_ncl> inbound false, -
_ncl> loopback true

ncl> create node 0 osi transport template osit$rfc1006
ncl> set node 0 osi transport template osit$rfc1006 network service RFC1006, -
_ncl> classes {0}, -
_ncl> inbound true

ncl> create node 0 osi transport template osit$rfc1006plus
ncl> set node 0 osi transport template osit$rfc1006plus network service RFC1006, -
_ncl> classes {2}, -
_ncl> RFC1006 port number 399, -
_ncl> inbound true

ncl> set osi transport RFC1006 listener ports = { 102, 399 }
ncl> enable node 0 osi transport
```

B.2.2 Configuring the Connection-Oriented Network Service

The following sections describe how to configure the Connection-Oriented Network Service (CONS). CONS is a network service that operates according to a connection-oriented model. Before data can be exchanged, a connection must first be established. X.25 provides this type of service.

B.2.2.1 Establishing Outbound Connections Using CONS

To establish an outbound transport connection that uses CONS as its network service, an application makes a connection request in which it specifies:

- The OSI Transport address of the destination host.
- The OSI Transport service access point identifier (TSAP-ID) of the remote application. A TSAP-ID identifies a TSAP. A TSAP is a unique identifier for a single transport user.
- Optionally, other transport connection parameters.

The OSI Transport address consists of:

- The name of the OSI Transport template to be used in setting up the transport connection.The specified OSI Transport template must have its `network service` characteristic set to `cons`.
- A network address that uniquely identifies the destination host. The network address for a CONS connection is a DTE address.

OSI Transport either creates a new network connection (using either X.25 or X25 Access), or uses an existing outbound network connection (provided the transport connection is class 2 or class 4). If a new connection is to be created, X.25 uses the DTE address from the OSI Transport address and the X25 Access template specified in the OSI Transport template to set up a network connection.

B.2.2.2 Establishing Inbound Connections Using CONS

To establish an inbound transport connection:

1. OSI Transport must be listening to one or more X25 Access filters.

   X.25 or X25 Access passes calls from these filters up to OSI Transport.

2. OSI Transport must have an OSI Transport template for CONS connections with its `inbound` characteristic set to TRUE. This OSI Transport template must also specify an X25 Access template with the same name (including matching case) as the X25 Access filter on which a call arrives.

3. If a suitable OSI Transport template for CONS connections is found, it is used to accept the call, using the X25 Access template specified in the OSI Transport template.

4. The incoming transport connection can then be received. If an application is found to receive the inbound request, the application can accept or reject the request.

5. If the application accepts the inbound request, the OSI Transport template for CONS connections is used for the accept.

For incoming connections to applications that are invoked by passive TSAP association, you must also configure one or more OSI Transport application entities to represent the passive association between a TSAP-ID and an application. Refer to the *DECnet/OSI Network Management* guide for information about managing application entities.

B.2.2.3 Configuring Support for the Connection-Oriented Network Service

To configure CONS support, each element in the set of the `CONS filters` attribute of the OSI Transport entity must have a corresponding X25 Access filter of the same name. By default, the `CONS filters` attribute of the OSI Transport entity is set to OSI Transport.

Similarly, the `CONS template` attribute of the OSI Transport template subentity must contain a name that is a PSI filter and is contained in the set of `CONS filters` of the OSI Transport entity. The default value of the `CONS template` attribute of an OSI Transport Template subentity is *OSI Transport*.

The following steps list the commands required to configure CONS. The *characteristics* added or set up for OSI Transport in this example are relevant to CONS. In addition, consider setting some of the more general characteristics shown in Section B.2.

For the *variables*, substitute values appropriate to your configuration. Digital recommends that you accept the default settings (used in the example) for the various attributes. Change them only if you need to. Refer to the the *DECnet/OSI Network Control Language Reference* guide for more information about these attributes.

1. The following example shows how to create the OSI Transport module, set its characteristics, and enable it.

```
ncl> create osi transport

ncl> add osi transport cons filters {filter-name} ❶

ncl> set osi transport disconnect holdback 0, - ❷
_ncl> maximum multiplexing 65535, maximum network connections 65535 ❸

ncl> enable osi transport
```

❶ Specifies the names of one or more X.25 filters used to listen for incoming transport connection requests. If you do not specify any X.25 filters, a default filter called OSI Transport is used.

❷ Set a high value for `disconnect holdback` if you want to keep idle network connections. This will save the cost of re-establishing network connections. You should be aware, however, that this is unnecessarily costly if the network connection remains idle.

Set `disconnect holdback` to `0` if you want to lose idle network connections as soon as possible.

`disconnect holdback` is supported only for transport protocol classes 2 and 4.

❸ Sets the value of `maximum multiplexing`. Increasing the value saves on the cost of network connections but reduces the throughput for each transport connection that uses a multiplexed network connection.

`maximum multiplexing` is supported only for transport protocol classes 2 and 4.

If you set `maximum network connections` too low, local transport users might be unable to make transport connection requests, particularly if all the active network connections are inbound. For example, if the limit is 7 and there are 7 active network connections, all inbound, then local transport users will be unable to make transport connections unless you either increase the value of `maximum network connections` or one of the network connections is released by a remote host.

2. The following example shows how to create the OSI Transport templates:

```
ncl> create osi transport template template-name ❶

ncl> set osi transport template template-name -
_ncl> acknowledgment delay time 1, -
_ncl> checksums false, classes {4}, - ❷
_ncl> cons template osi transport, cr timeout 30, er timeout 30, - ❸
_ncl> inbound true, initial retransmit time 15, loopback false, - ❹
_ncl> keepalive time 60, maximum nsdu size 2048, -
_ncl> network service cons, retransmit threshold 8 ❺

ncl> enable osi transport template template-name
```

❶ OSI Transport templates are used by OSI Transport to supply connection parameters not provided by the requesting OSI Transport application.

An OSI Transport template name must contain only alphanumeric characters, underscores (_), hyphens (-), or dollar ($) signs. OSI Transport template names should not be more than 16 characters long.

You can configure two types of OSI Transport templates for CONS connections:

- For outbound connections only

You can configure as many outbound OSI Transport templates as you want.

- For both outbound and inbound connections

  You should configure a single outbound–inbound OSI Transport template for each X25 Access filter used by inbound transport connections.

❷ Including checksums reduces data throughput. Use checksums only if you have reason to believe that data will be corrupted by the network.

❸ The default value for `cr timeout` is adequate for most networks. However, consider increasing the value if you find that a high proportion of transport connection requests are being timed out.

❹ When `true`, `inbound` specifies that this OSI Transport template for CONS connections can be used for inbound as well as outbound connections.

The default `initial retransmit time` value should be suitable for most networks. It is set to a relatively high value to reflect the fact that a transport connection request Transport layer protocol data unit (TPDU) usually has a longer round-trip delay than a data TPDU. Consider increasing the value if transport connection requests frequently time out.

You can set up different OSI Transport templates to provide different values of this characteristic for networks with significantly different round-trip delay. For example, round-trip delay on an X.25 PSDN is usually much greater than on an 802.3 LAN.

❺ `network service cons` indicates that transport connections set up using a specified template will use CONS. An OSI Transport template for CONS connections configured with the `net$configure` procedure will have this characteristic set correctly. However, if you create a CONS OSI Transport template directly, you must set this characteristic, since the default is CLNS. The default value for `retransmit threshold` should be suitable for most networks. However, consider increasing the value for networks with a high probability of losing data.

3. The following example creates the X25 Access module, and enables it:

```
ncl> create x25 access
ncl> enable x25 access
```

4. The following example shows how to create the `x25 access template` and set its characteristics:

```
ncl> create x25 access template template-name ❶

ncl> set x25 access template template-name -
_ncl> call data hex-string, dte class dte-class-name ❷
```

❶ Outbound transport connections that use X.25 network connections use X25 Access templates to supply most of the parameters for setting up the network connection. Inbound transport connections that use X.25 connections use X25 Access templates to negotiate network connection parameters.

Each OSI Transport template for CONS connections that you configure names an X25 Access template in its `cons template` characteristic. You must, therefore, configure each of the X25 Access templates named in your OSI Transport templates for CONS connections.

❷ When you create an X25 Access template for use with CONS, set the value of the `call data` characteristic to `%X03010100`. The destination host will recognize this value as indicating that the call should be passed to CONS.

5. The following example shows how to create the `x25 access filter`:

```
ncl> create x25 access filter filter-name ❶

ncl> set x25 access filter filter-name -
_ncl> call data mask mask, call data value value, - ❷
_ncl> inbound dte class dte-class-name
```

❶ If your system is to accept inbound transport connections over X.25 network connections, you need to configure one or more X25 Access filters. An X25 Access filter listens for incoming network connection requests and passes these requests to the appropriate destination. One or more X25 Access filters are required for each X25 Access DTE class that CONS will want to use.

Each outbound-inbound OSI Transport template for CONS connections that you configure specifies the name of an X25 Access template in its `cons template` characteristic. This X25 Access template will be used to accept an inbound network connection. The name of this X25 Access template must be the same as the name of an X25 Access filter that will be used to receive inbound network connections.

❷ When you create an X25 Access filter for use by CONS, set `call data mask` to `%Xffffffff`.

When you create an X25 Access filter for use by CONS, set `call data value` to `%X03010100`.

B.2.3 Configuring the Connectionless-Mode Network Service

The following sections describe how to configure the Connectionless-Mode Network Service (CLNS). CLNS is a network service that operates according to a datagram model. Each message is routed and delivered to its destination independently of any other. When using CLNS, only TP4 is available in the default configuration.

B.2.3.1 Establishing Outbound Connections Using CLNS

To establish an outbound transport connection that uses CLNS as its network service, an application makes a connection request in which it specifies:

- The OSI Transport address of the destination host.
- The TSAP-ID of the responding application. A TSAP-ID identifies a TSAP. A TSAP is a unique identifier for a single transport user.
- Optionally, other transport connection parameters.

The OSI Transport address consists of:

- The name of the OSI Transport template for CLNS connections to be used in setting up the transport connection. The specified OSI Transport template for CLNS connections must have its `network service` characteristic set to `clns`.
- An address that uniquely identifies the destination host. The address can be:
  - An NSAP (for a transport connection using CLNS/ES-IS)

- A LAN address (for a transport connection using CLNS with Null Internet)

The Routing module selects a routing circuit to be used for the underlying network connection; the basis for this selection is the area address part of the NSAP address.

B.2.3.2 Establishing Inbound Connections Using CLNS

To establish an inbound transport connection that uses CLNS:

1. The Routing module passes an incoming transport connection to OSI Transport. OSI Transport must have an OSI Transport template for CLNS connections with its `inbound` characteristic set to TRUE. If the transport connection uses Null Internet, the OSI Transport template for CLNS connections must also have its `clns inactive area address` characteristic set to the same area address as the `inactive area address` characteristic of the routing circuit on which the transport connection arrived.
2. If a suitable OSI Transport template for CLNS connections is found, an application is found to process the connection. The application can either accept or reject the connection.
3. If the application accepts the connection, the OSI Transport template for CLNS connections is used to accept the connection.

B.2.3.3 Steps for Configuring the Connectionless-Mode Network Service

The following steps show the commands to configure CLNS. The characteristic added or set up for OSI Transport in this example is relevant to CLNS. In addition, consider setting some of the more general characteristics shown in Section B.2.

For the variables, substitute values appropriate to your configuration. Digital recommends that you accept the default settings (used in the example) for the various attributes. Change them only if you need to. Refer to the *DECnet/OSI Network Control Language Reference* guide for more information about these attributes.

1. The following example creates the OSI Transport module and enables it:

```
ncl> create osi transport

ncl> set osi transport nsap selector 33 ❶
ncl> enable osi transport
```

❶ `nsap selector` is used for transport connections using CLNS/ES-IS.

2. The following example shows how to create the OSI Transport template and set its characteristics:

```
ncl> create osi transport template template-name ❶

ncl> set osi transport template -
_ncl> acknowledgment delay time 1, -
_ncl> checksums false, classes {4}, clns inactive area address {}, - ❷

_ncl> inbound true, initial retransmit time 15, keepalive time 60, - ❸
_ncl> loopback false, network service clns, retransmit threshold 8, - ❹
_ncl> security empty, use clns error reports false

ncl> enable osi transport template
```

❶ OSI Transport templates are used by OSI Transport to supply connection parameters not provided by the requesting OSI Transport application.

An OSI Transport template name must contain only alphanumeric characters, underscores (_), hyphens (-), or dollar ($) signs. OSI Transport template names should not be more than 16 characters long.

You can configure two types of OSI Transport templates for CLNS connections:

- For outbound transport connections only

  You can configure as many outbound OSI Transport templates for CLNS connections as you want.

- For both outbound and inbound transport connections

  A CLNS OSI transport template is configured to use either the CLNS /ES-IS or Null Internet Routing Protocol.

  If you configure Null Internet OSI Transport templates, you must configure one outbound-inbound OSI Transport template for each inactive area address used.

❷ Including checksums reduces data throughput, so you should use checksums only if you have reason to believe that data will be corrupted by the network.

❸ The default `initial retransmit time` value should be suitable for most networks. It is set to a relatively high value because a transport connection request TPDU usually has a longer round-trip delay than a data TPDU. Consider increasing the value if transport connection requests frequently time out.

❹ The default value for `retransmit threshold` should be suitable for most networks. However, consider increasing the value for networks with a high probability of losing data.

3. The following example shows how to set up routing for end systems using the Connectionless-mode Network Service.

```
ncl> create routing type endnode

ncl> set routing dna address format true, lifetime 63, -
_ncl> manual network entity titles {}, probe rate 20

ncl> enable routing
```

4. The following example shows how to set up a `routing circuit` for end systems using the Connectionless-mode Network Service.

```
ncl> create routing circuit hdlc-0 type hdlc ❶

ncl> set routing circuit hdlc-0 data link entity -
_ncl> hdlc link hdlc-0 logical station hdlc-0, - ❷
_ncl> manual data link sdu size 1492, - ❸
_ncl> template template-name ❹

ncl> enable routing circuit hdlc-0
```

❶ You need to configure routing circuits:

- For CLNS connections over a LAN. You can configure a routing circuit for each LAN device on your system. Each LAN routing circuit supports the CLNS/ES-IS Routing Protocol; it can optionally also support Null Internet.

- For CLNS connections over synchronous links. You can configure two types of synchronous circuits:
  - HDLC
  - DDCMP
- For CLNS connections over an X.25 network.

  You can configure four types of X.25 routing circuit:
  - Static outgoing (for outbound connections only)
  - Static incoming (for inbound connections only)
  - Dynamic assigned (for both outbound and inbound connections)
  - Permanent (for both outbound and inbound connections)

The following table lists the supported routing circuits for CLNS.

Circuit	Description
`csma-cd`	LAN routing circuit
`hdlc`	Synchronous HDLC circuit
`ddcmp`	Synchronous DDCMP circuit
`x.25 static incoming`	X.25 inward switched virtual circuit
`x.25 static outgoing`	X.25 outward switched virtual circuit
`x.25 da`	Dynamic assigned X.25 virtual circuit
`x.25 permanent`	Permanent X.25 virtual circuit

❷ The `data link entity` characteristic is valid for all circuits.

For broadcast circuits, this characteristic is set to:

`csma-cd station` *`station-name`*

where *`station-name`* is the generic name of the LAN adapter (for example, `csmacd-0`).

For `hdlc` circuits, this characteristic is set to:

`hdlc link` *`link-name`* `logical station` *`station-name`*

where *`link-name`* is the generic name of the link (for example, `hdlc-0`) and the logical station (for example, `hdlc-0`).

For `ddcmp` circuits, this characteristic is set to:

`ddcmp link` *`link-name`* `logical station` *`station-name`*

where *`link-name`* is the generic name of the link (for example, `ddcmp-0`) and the logical station (for example, `ddcmp-0`).

For `x.25` circuits, this characteristic is set to:

`x25 access`

❸ The `manual data link sdu size` characteristic is valid for all circuits.

❹ The `template` characteristic is ignored for LAN circuits and valid for all other circuits.

Table B–1 lists additional characteristics to consider when setting up a `routing circuit` with CLNS. It also shows the circuits for which the characteristics are valid.

Table B–1 Additional Routing Circuit Characteristics for CLNS

Characteristic	Valid Circuit Type
idle timer	x.25 da
inactive area address	csma-cd
initial minimum timer	x.25 static incoming x.25 static outgoing x.25 da
manual routers	csma-cd
maximum call attempts	x.25 static outgoing
maximum svc adjacencies	x.25 da
recall timer	x.25 static outgoing
reserved adjacency	x.25 da
reserve timer	x.25 da
x25 filters	x.25 static incoming x.25 da

For `inactive area address`:

Each LAN circuit that supports Null Internet must specify a different inactive area address.

For circuits using only CLNS/ES-IS, this characteristic is an empty set (this is the default value).

For `initial minimum timer`:

On X.25 static incoming or outgoing circuits, if no adjacency has been established when this timer expires, the circuit is cleared.

5. The following example configures a reachable address for an X.25 routing circuit.

Note

You have to configure a reachable address only if you have configured one or more dynamic assigned routing circuits.

```
ncl> create routing circuit hdlc-0 -
_ncl> reachable address reachable-address - ❶
_ncl> address prefix address-prefix ❷

ncl> set routing circuit hdlc-0 -
_ncl> dte addresses dte-addresses

ncl> enable routing circuit hdlc-0 -
_ncl> reachable address
```

❶ If you configure a dynamic assigned X.25 routing circuit, you must configure one or more reachable addresses to be used to manage the circuit. Each reachable address specifies a mapping of an NSAP address to a DTE address.

❷ Specify the `address prefix` when you create the entity. You cannot modify this characteristic with the `set` command.

6. The following example creates the X25 Access module and enables it:

```
ncl> create x25 access
ncl> enable x25 access
```

7. The following example shows how to create the `x25 access template` and set its characteristics:

```
ncl> create x25 access template template-name ❶

ncl> set x25 access template template-name -
_ncl> destination dte address dte-address, -
_ncl> dte class dte-class-name
```

❶ A routing circuit that invokes outbound X.25 calls uses an X25 Access template to supply most of the parameters for setting up the call. A routing circuit that receives inbound X.25 calls uses an X25 Access template to negotiate call parameters.

Each X.25 routing circuit that you configure names an X25 Access template in its `template` characteristic. You must therefore configure each of the X25 Access templates named in your X.25 routing circuits.

8. The following example creates the `x25 access filter`:

```
ncl> create x25 access filter filter-name ❶

ncl> set x25 access filter filter-name -
_ncl> inbound dte class dte-class-name,  -
_ncl> sending dte address dte-address

ncl> enable x25 access filter
```

❶ A routing circuit that receives inbound X.25 calls requires one or more X25 Access filters. An X25 Access filter listens for incoming calls and passes them to the appropriate destination.

Each X.25 static-incoming or X.25 dynamic-assigned routing circuit that you configure specifies the name of one or more X25 Access filters in its `filter` characteristic. You must, therefore, configure the specified X25 Access filters.

When setting up a filter for use with an `x.25 static incoming` or `x.25 da` circuits, specify the following X25 Access filter values:

- `call data mask %xff`
- `call data value %x81`

B.2.3.4 Providing Communications Between OSI Transport Systems and VOTS Systems Using CLNS

If you need communication between a VOTS system and an OSI Transport system using the full Internet CLNS protocol, you must use an intermediate system (router). OSI Transport implements only the Internet protocol. An OSI Transport system has no way of finding another end system that does not support ES-IS without using an intermediate system.

If a DEC WANrouter is used as an intermediate system, it must be configured as a link state router (see the previous section).

If the VOTS system and the DEC WANrouter reside on the same LAN subnetwork **and** the VOTS system is configured with a DECnet/OSI-compatible NSAP address, the DEC WANrouter need only be configured as a level 1 router.

If the VOTS system does not have a DECnet/OSI DNA-compatible NSAP address, or if the VOTS system and the DEC WANrouter do not reside on the same LAN subnetwork, the DEC WANrouter must be configured as a level 2 router.

When using a level 1 router, you must create a manual adjacency on the router for the VOTS system. When using a level 2 router, you must create a reachable address on the router for the VOTS system. See the DEC WANrouter Configuration and Management guides for details about how to configure manual adjacencies and reachable addresses.

OSI Transport systems and VOTS systems on the same LAN can communicate without an intermediate system, using the Null Internet CLNS protocol.

B.3 Configuring OSI Transport Network Applications

This section describes how to configure applications to receive connection requests from remote hosts. One of the attributes of a transport connection request is a transport service access point identifier (TSAP-ID), which uniquely identifies the transport application on the remote host to which the connection request is to be passed.

An application that expects to receive a connection request must therefore associate itself with a particular TSAP-ID, so that the transport service knows which application a particular connection request is intended for.

There are two ways in which an application can associate itself with a TSAP-ID: active association or passive association.

Active association is entirely under the control of the transport user, and requires no support from you. Passive association, on the other hand, requires that you configure the `osi transport application` entities that describe the association between TSAP-IDs and applications.

In active association, the transport application issues a `$qio(io$_acpcontrol)` system service call in which it requests an association with a specified TSAP-ID. When a connection request arrives with that TSAP-ID, a mailbox message containing details of the connection request is sent to the associated application, which can then process the request, either accepting or rejecting it.

`osi transport` dynamically creates the `osi transport port` entity so that the active association is available by means of network management.

In passive association, you create a `osi transport application` entity, whose characteristics specify:

- A TSAP-ID.
- The name of an image or command file.
- The user name of an account under which the image or command file is to run.

When a connection request arrives with a TSAP-ID that is associated with a `osi transport application` entity, the transport service creates a new process in which it runs `loginout.exe`. `loginout.exe` validates any access control information and invokes DCL to execute the image or command file associated with that TSAP-ID. Details of the connection request are passed in the logical name `sys$net`.

The following command example shows the commands to configure a `osi transport application` entity. For the variables, substitute values appropriate to your configuration. Digital, however, recommends that you accept the default settings (used in the example) for the various attributes and change these only if you need to. Refer to the *DECnet/OSI Network Control Language Reference* for more information about these attributes.

```
ncl> create osi transport
ncl> enable osi transport

ncl> create osi transport application application-name

ncl> set osi transport application application-name -
_ncl> called tsels set-of-hex-string, - ❶
_ncl> file name file-spec, user name user-account ❷

ncl> enable osi transport application
```

❶ `called tsels` specifies the set of TSAP-IDs with which this entity is to be associated.

❷ `file name` specifies the name of the command or image file to be executed when a connection request is received with a TSAP-ID that matches one of the values of the `called tsels` characteristic.

`user name` specifies the user account under which the application is to run.

B.3.1 Customizing End Selector for OSI Transport

The Network Service Access Points (NSAP) selector determines which transport service is used by a network connection. The default NSAP selector for Digital's OSI Transport implementations is 33 (decimal). Other vendors might use different NSAP selectors and might require that the NSAP selectors match.

You can only change the NSAP selector for OSI Transport when OSI Transport is disabled. Valid NSAP selectors are in the range from 2 to 255, with the exception of 32. In order to maintain interoperability between DNA Phase IV and DECnet/OSI, you cannot use NSP's NSAP selector, 32.

The command to change the NSAP selector for OSI Transport is:

```
ncl> disable osi transport
ncl> set osi transport nsap selector new_selector_number

ncl> enable osi transport
```

B.3.2 Enabling Use of CLNS Error Reports

OSI Transport can recognize the unavailability of a remote node during connection establishment using CLNS (Routing) error reports.

This feature is disabled for all templates (used by DNA Session Control), but you can enable it by editing the OSI Transport NCL initialization script, `sys$manager:net$osi_transport_startup.ncl`, and using the following command to set the default to true:

```
ncl> set osi transport template default use clns error reports = true
```

B.4 Using DECnet Applications and OSI Applications over TCP/IP

DECnet/OSI for OpenVMS allows you to run DNA and OSI applications over an IP network backbone. Applications include those supplied by Digital, third-party applications, and user-written applications.

B.4.1 Using RFC1006 Extension and RFC1006

RFC1006 is a standard of the Internet community. It defines how to implement ISO 8073 Class 0 on top of TCP. Hosts that implement RFC1006 are expected to listen on TCP port 102.

RFC1006 Extension is an informational RFC. It defines how to implement ISO 8073 Transport Class 2 Non-use of Explicit Flow Control on top of TCP. Hosts that implement RFC1006 Extension are expected to listen on TCP port 399.

The DECnet over TCP/IP feature (RFC1006 Extension) allows traditional DECnet applications (such as MAIL, CTERM, and FAL) to accept IP names and addresses. The OSI applications over TCP/IP feature (RFC1006) allows OSI applications (such as FTAM and VTP) to accept IP names and addresses.

B.4.2 Configuring RFC1006 and RFC1006 Extension

When configuring RFC1006, RFC1006 Extension, or both, each element in the set of RFC1006 listener ports attribute corresponds to a TCP listener port. By default, `net$configure` sets the OSI Transport RFC1006 listener ports attribute to { 102, 399 }.

The RFC1006 port number attribute of the OSI Transport template subentity must contain a TCP port number that is one of the chosen RFC1006 listener ports. The default value for the RFC1006 port number attribute is 102. If you create an OSI Transport template subentity to use with DECnet over TCP/IP, then set the RFC1006 port number attribute to 399.

B.4.3 Configuring DECnet/OSI over TCP/IP and/or RFC1006

If you want to use DECnet over TCP/IP or OSI applications over TCP/IP, invoke `net$configure.com advanced` and select Option 4 (Configure Transports). You can then create a new OSI Transport NCL script (or replace an old script). You must also include Domain in your Session Control naming search path as described in Section 2.2.

If you want to create templates in addition to the default RFC1006 template, use Option 4 under the ADVANCED configuration option. `net$configure.com` will ask you if you want to create additional OSI templates. You may then create additional RFC1006 templates (as well as create additional CLNS and CONS templates).

For the changes to take effect, either disable the OSI Transport entity and invoke the new OSI Transport NCL script, or reboot the system.

```
ncl> disable osi transport
ncl> do sys$manager:net$osi_transport_startup.ncl
```

You must also invoke `net$configure` Option 2 in order to rename your node using a Domain secondary node name.

B.4.4 Disabling DECnet/OSI over TCP/IP and/or RFC1006

DECnet/OSI will only try to locate TCP/IP if the RFC1006 listener ports attribute set of the OSI Transport entity is not empty.

To disable DECnet/OSI over TCP/IP, issue the following command:

```
ncl> set osi transport rfc1006 listener ports {}
```

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