

TCPware[®] for OpenVMS Installation & Configuration Guide

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This document provides the system manager with the procedures for installing, configuring, and starting up the TCPware for OpenVMS Product.

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Operating System/Version: VAX/VMS V5.5-2 or later, OpenVMS VAX V6.0 or later, or OpenVMS Alpha V6.1 or later

Software Version: 5.6

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Reader’s Comment

Preface

Introducing This Guide

This guide describes the TCPware software installation, configuration, and startup procedures. It is for system managers, administrators, or operators.

What You Need to Know Beforehand

Before using TCPware, you should be familiar with:

- The TCPware for OpenVMS products, components, features, and capabilities (see the *User's Guide* for more information)
- Computer networks in general
- Compaq Computer Corporation's OpenVMS operating system and file system

How This Guide Is Organized

This guide has the following contents:

- Chapter 1, *Before You Begin*, explains the installation and configuration procedures, and what you need to prepare for an installation.
- Chapter 2, *Installing TCPware*, provides a step by step procedure for executing the software installation.
- Chapter 3, *Configuring the TCP/IP Core Environment*, explains how to configure the TCP-OpenVMS component (the TCP/IP core environment).
- Chapter 4, *Configuring the TCP/IP Services*, provides step by step procedures for configuring each of the TCP/IP Services components.
- Chapter 5, *Configuring the NetWare Services*, provides step by step procedures for configuring the IPX/SPX core environment and each NetWare Services component.

- Chapter 6, *Starting and Testing TCPware*, explains how to get TCPware up and running and to test its configuration.
- Appendixes, including a sample installation and configuration, and a list of installed files.
- Index to this guide.

Online Help

You can use help at the DCL prompt to find the following:

- Topical help — Access TCPware help topics only as follows:

```
$ HELP TCPWARE [topic]
```

The topic entry is optional. You can also enter topics and subtopics at the following prompt and its subprompts:

```
TCPWARE Subtopic?
```

Online help is also available from within certain TCPware components: FTP-OpenVMS Client and Server, Network Control Utility (NETCU), TELNET-OpenVMS Client, NSLOOKUP, and TRACEROUTE. Use the HELP command from within each component.

Example:

```
NETCU> HELP [topic]
```

- Error messages help—Access help for TCPware error messages only as follows:

```
$ HELP TCPWARE MESSAGES
```

If the error message is included in the MESSAGES help, it identifies the TCPware component and provides a meaning and user action. See the `Instructions` under `MESSAGES`.

Obtaining Customer Support

You can use the following customer support services for information and help about TCPware and other Process Software products if you subscribe to our Product Support Services. (If you bought TCPware products through an authorized TCPware reseller, contact your reseller for technical support.) Contact Technical Support directly using the following methods:

- **Electronic Mail**

E-mail relays your question to us quickly and allows us to respond, as soon as we have information for you. Send e-mail to **support@process.com**. Be sure to include your:

- Name
- Telephone number
- Company name

- Process Software product name and version number
- Operating system name and version number

Describe the problem in as much detail as possible. You should receive an immediate automated response telling you that your call was logged.

- **Telephone**

If calling within the continental United States or Canada, call Process Software Technical Support toll-free at 1-800-394-8700. If calling from outside the continental United States or Canada, dial +1-508-628-5074. Provide your name, company name, and telephone number. If no one is available to take your call immediately, a technical support representative will return your call as soon as possible.

- **FAX**

Sending a FAX to +1-508-879-0042 is another way to log a technical support call. Be sure the FAX includes all the information listed under "Electronic Mail" plus your FAX number as reference. Describe the problem in as much detail as possible. A diagram of your network is often very useful.

- **World Wide Web**

There is a variety of useful technical information available on our World Wide Web home page, <http://www.process.com> (select **Customer Support**).

- **Internet Newsgroup**

You can also access the VMSnet newsgroup, `vmsnet.networks.tcp-ip.tcpware`. Process Software's Engineering and Technical Support professionals monitor and respond to this open forum newsgroup on a timely basis.

License Information

TCPware for OpenVMS includes a software license that entitles you to install and use it on one machine. Please read and understand the *Software License Agreement* before installing the product. If you want to use TCPware on more than one machine, you need to purchase additional licenses. Contact Process Software or your distributor for details.

Maintenance Services

Process Software offers a variety of software maintenance and support services. Contact us or your distributor for details about these services.

Reader's Comments Page

TCPware guides may include Reader's Comments as their last page. If you find an error in this guide or have any other comments about it, please let us know. Return a completed copy of the

Reader's Comments page, or send e-mail to techpubs@process.com.

Please make your comments specific, including page references whenever possible. We would appreciate your comments about our documentation.

Documentation Set

The documentation set for TCPware for OpenVMS consists of the following:

- ***Installation & Configuration Guide*** — For system managers and those installing the software. The guide provides installation and configuration instructions for the TCPware for OpenVMS products.
- ***Management Guide*** — For system managers. This guide contains information on functions not normally available to the general network end user. It also includes implementation notes and troubleshooting information.
- ***Network Control Utility (NETCU) Command Reference*** — For users and system managers. This reference covers all the commands available with the Network Control Utility (NETCU) and contains troubleshooting information.
- **Online help** —
 - Topical help, using **HELP TCPWARE [topic]**
 - Error messages help, using **HELP TCPWARE MESSAGES**
- ***Programmer's Guide*** — For network application programmers. This guide gives application programmers information on the callable interfaces between TCPware for OpenVMS and application programs.
- ***Release Notes*** for the current version of TCPware for OpenVMS — For all users, system managers, and application programmers. The *Release Notes* are available online on your TCPware for OpenVMS media and are accessible before or after software installation.
- ***User's Guide*** — For all users. This guide includes an introduction to TCPware for OpenVMS products as well as a reference for the user functions arranged alphabetically by product, utility, or service.

Conventions Used

Convention	Meaning
host	Any computer system on the network. The local host is your computer. A remote host is any other computer.
monospaced type	System output or user input. User input is in bold type . Example: Is this configuration correct? YES Monospaced type also indicates user input where the case of the entry should be preserved.
italic type	Variable value in commands and examples. For example, <i>username</i> indicates that you must substitute your actual username. Italic text also identifies documentation references.
[<i>directory</i>]	Directory name in an OpenVMS file specification. Include the brackets in the specification.
[optional-text]	(Italicized text and square brackets) Enclosed information is optional. Do not include the brackets when entering the information. Example: START/IP line address [info] This command indicates that the <i>info</i> parameter is optional.
{ <i>value</i> <i>value</i> }	Denotes that you should use only one of the given values. Do not include the braces or vertical bars when entering the value.
Note!	Information that follows is particularly noteworthy.
CAUTION!	Information that follows is critical in preventing a system interruption or security breach.
key	Press the specified key on your keyboard.
Ctrl/key	Press the control key and the other specified key simultaneously.
Return	Press the Return or Enter key on your keyboard.

Chapter 1

Before You Begin

Introduction

This chapter introduces you to and prepares you for TCPware product installation, configuration, startup, and testing. It is for the OpenVMS system manager or technician responsible for product installation and configuration.

Steps to Get TCPware Up and Running

To get TCPware up and working, you must perform the following steps:

Table 1-1 Getting TCPware Up and Running

1	Install the software (see the following section to prepare for installation).	See Chapter 2, <i>Installing TCPware</i>
2	Configure the TCP/IP core environment.	See Chapter 3, <i>Configuring the TCP/IP Core Environment</i>
3	Configure the individual TCP/IP components.	See Chapter 4, <i>Configuring the TCP/IP Services</i>
4	Configure the NetWare components. NetWare is no longer supported.	See Chapter 5, <i>Configuring the NetWare Services</i>
5	Start and test the software.	See Chapter 6, <i>Starting and Testing TCPware</i>

Prepare for Installation

TCPware installation involves using Compaq's VMSINSTAL procedure. Preparing for installation involves:

- Understanding the hardware and software requirements
- Determining if you have sufficient disk space and global pages for the installation
- Determining where to install the software
- Deciding which TCPware products to install

Note! You must shut down all other TCP/IP products previously running on the system without executing any of the other products' startup files, and reboot the system.

Hardware Requirements

TCPware requires one or more of the following devices:

- Compaq Ethernet, FDDI, Token Ring (except DEQRA), LAN Emulation over Asynchronous Transfer Mode (ATM), or Classical IP over ATM controller
- IP-over-X.25 controller; all Compaq interfaces supported by VAX PSI (for VAX)
- Compaq controller for VAX WAN Device Drivers
- Network Systems HYPERchannel controller (for VAX)
- Proteon proNET-10/80 controller (VAX), or proNET-4/16 EISA NIC controller (Alpha)
- For the NetWare Services, an IPX/SPX controller (limited to Ethernet only)

Software Requirements

TCPware requires at least the following operating system versions:

- OpenVMS Alpha V6.1 and later
- OpenVMS VAX V5.5-2 and later

Disk Space and Global Pages

The destination device for your TCPware software must have enough disk space so that you can run the software. If you plan to install every TCPware product, your system must have approximately the following values.

System	Number of Blocks Needed to Install TCPware	Number of Blocks Needed After Installation
VAX	90,000	about 31,500
Alpha	190,300	about 58,300

The runtime values are slightly higher once you configure and start TCPware.

You should also have at least 2,524 free global pages (GBLPAGES) on your system before installing TCPware. Use SHOW GBLPAGES in the SYSGEN utility to determine the parameter value and change it using SET GBLPAGES if necessary.

Insufficient GBLPAGES can abort the installation and leave your system command tables

disconnected. The only way to recover is through a system reboot.

General Requirements

Check at this point that you:

- Have OPER, SYSPRV, or BYPASS privileges
- Can log in to the system manager's account
- Are the only user logged in (recommended)
- Backed up your system disk on a known, good, current, full backup (recommended)
- Need to reinstall TCPware after performing a major VMS upgrade
- If TCPware is currently running, shut it down. This is mandatory.

Where to Install TCPware

Install TCPware in a location depending on the following:

- Generally, on your system disk, but you can install TCPware anywhere, just answer the question when it appears. This is also where you would keep your "common" files. Node-specific files should always be on your system disk.
- If the machine is in a single node cluster, on a common disk.
- If the machine is in a mixed node cluster, once on the Alpha system disk (or disks) and once on the VAX common system disk.

Which TCPware Components to Install

Be careful to install only those components for which you have a license. If you answer YES during the VMSINSTAL procedure for a product for which you do not have a license, it is still installed and consumes disk space, but you cannot use that product.

Obtain IP Addresses for Your Network Devices

Each of your network devices should be assigned a unique IP address. You can apply for these IP addresses by sending mail to:

Network Solutions
www.networksolutions.com
ATTN: InterNIC Registration Services
505 Huntmar Park Drive
Herndon, VA 22070

You can also contact Network Solutions by phone at 1-703-742-4777 between 7:00 A.M. and 7:00 P.M. ET, or by email at **HOSTMASTER@RS.INTERNIC.NET**. The network address of the Registration Services domain root server is 198.41.0.4.

Using Private Addresses

The Internet Assigned Numbers Authority (IANA) also reserves a range of IP addresses for hosts that use TCP/IP but do not need network layer connectivity outside their enterprise. The reserved address ranges for these "private" networks are listed in Table 1-2.

Table 1-2 Private Network Addresses

Class	Has the reserved address range	For network (range)
A	10.0.0.0 —10.255.255.255	10
B	172.16.0.0 —172.31.255.255	172.16—172.31
C	192.168.0.0 —192.168.255.255	192.168

You can use these host numbers without coordinating them with IANA or an Internet registry. However, the addresses must be unique to your enterprise. If you ever want to connect the host directly to the Internet without using an application layer gateway, you must obtain another "global" address for it from a registry.

Release Notes and Online Documentation

The TCPware for OpenVMS *Release Notes* provide important information on the current release. TCPware also provides PostScript versions of its full documentation on CD-ROM.

- If you are installing from CD-ROM, you can access the *Release Notes* and the full TCPware documentation as PostScript files using a viewing facility such as the CDA Viewer. View the PostScript files directly or copy them. They are in the [DOCUMENTATION] directory. The *Release Notes* are in the first file listed, TCPWARE056.RELEASE_NOTES. The documentation encompasses the eight remaining files.
- If you are installing from disk, you can read or print the *Release Notes* as a text file, which you can obtain in one of three ways:
 - By performing a partial installation
 - During the full installation
 - After the installation

To perform a partial installation (see Example 1-1):

1 Invoke VMSINSTAL at the system prompt:

```
$ @SYSS$UPDATE:VMSINSTAL TCPWARE056 device OPTIONS N
```

The *device* is the mount location of the distribution volumes.

2 Press **Return** at the prompt

```
Are you satisfied with the backup of your system disk [YES]?.
```

3 Select the option by number as to whether you want to display or print the *Release Notes*, or both.

- 4 If you requested a printout, enter the queue name for the printer. The default is SYS\$PRINT.
- 5 Press **Return** at the prompt
Do you want to continue the installation [NO]?:.
(Note that if you enter YES at the prompt, you proceed with the full installation.)
- 6 You see the message
Product's release notes have been moved to SYS\$HELP.
- 7 If you want to read or print the *Release Notes* after you exit the installation, access the TCPWARE056.RELEASE_NOTES file in the SYS\$HELP directory, as in:
\$ TYPE SYS\$HELP:TCPWARE056.RELEASE_NOTES

Note! For this command to work as desired, do not redefine the SYS\$HELP directory logical.

Example 1-1 Performing a Partial Installation to Obtain the *Release Notes*

```
$ @SYS$UPDATE:VMSINSTAL TCPWARE056 MUA0: OPTIONS N           [1]

      OpenVMS AXP Software Product Installation Procedure V7.1
It is 3-NOV-2002 at 11:01.
Enter a question mark (?) at any time for help.
* Are you satisfied with the backup of your system disk [YES]? Return [2]
The following products will be processed:
TCPWARE V5.6
      Beginning installation of TCPWARE V5.6 at 11:01
%VMSINSTAL-I-RESTORE, Restoring product save set A ...
      Release notes included with this kit are always copied to SYS$HELP.
Additional Release Notes Options:
      1. Display release notes
      2. Print release notes
      3. Both 1 and 2
      4. None of the above

* Select option [2]: Return [3]

* Queue name [SYS$PRINT]: Return [4]
Job TCPWARE056 (queue SYS$PRINT, entry 1) started on SYS$PRINT

* Do you want to continue the installation [NO]? Return [5]
%VMSINSTAL-I-RELMOVED, Product's release notes have been moved to SYS$HELP.
      VMSINSTAL procedure done at 11:02

.
.
.
$ TYPE SYS$HELP:TCPWARE056.RELEASE_NOTES [6]
```

Chapter 2

Installing TCPware

Introduction

This chapter takes you through the TCPware product installation procedure and certain post-installation tasks. It is for the OpenVMS system manager, administrator, or technician responsible for product installation.

To prepare for installation, see Chapter 1, *Before You Begin*.

Note! Once you have installed TCPware, you need to reinstall it after you have done a major VMS upgrade.

To install TCPware:

- 1 Load the software.
- 2 Run the VMSINSTAL procedure.
- 3 Install other products, if needed, and perform post-installation tasks.

Load the Software

TCPware for OpenVMS is shipped to you on one of the following media:

CD-ROM	9-track 1600-BPI tape (16MT9)	TK50 tape cartridge	4MM DAT tape (DDS-90)
--------	----------------------------------	---------------------	--------------------------

There are three steps to loading the TCPware software:

- 1 Log in to the system manager's account.
- 2 If TCPware is currently running, shut it down:

```
$ @TCPWARE:SHUTNET
```

If you are installing on a VMSCluster, shut down TCPware on each node in the cluster:

```
$ RUN SYS$SYSTEM:SYSMAN
$ SET ENVIRONMENT/CLUSTER
$ DO @TCPWARE:SHUTNET
$ EXIT
```

3 Physically load the distribution media onto the appropriate device. If on multiple volumes, load the first volume first.

From magnetic media, do not define a logical name when you mount the media. VMSINSTAL does this later.

From CD-ROM:

- In a VAX cluster environment, if you want to access the media from more than one node, enter the following:

\$ MOUNT/CLUSTER/SYSTEM *device volume-label*
- On a standalone system, or if you want to prevent multiple users from accessing the software, enter the following:

\$ MOUNT *device volume-label*

Note! If you install TCPware on a VMSCluster that has a common system disk, install the software on only one node in the cluster. **If reinstalling or upgrading TCPware, first shut down TCPware on all nodes in the cluster.**

If you install TCPware on a mixed architecture cluster and the TCPware license is for at least one VAX and one Alpha system. Install TCPware once on a VAX and once more on an Alpha system.

Start VMSINSTAL

VMSINSTAL is Compaq’s installation program for layered products. VMSINSTAL prompts you for any information it needs. Here are the first steps to follow (see Example 2-1):

Table 2-1 Starting VMSINSTAL

Step	For this task...	Enter this response...
1	Make sure that you are logged in to the system manager’s account, and invoke VMSINSTAL	@SYS\$UPDATE:VMSINSTAL
2	Determine if you are satisfied with your system disk backup	Return or Y (Yes) or N (No)

Table 2-1 Starting VMSINSTAL (Continued)

Step	For this task...	Enter this response...
3	Determine where the distribution volumes will be mounted	The disk (and directory) or tape device where you want the software to be mounted.
4	Enter the products you want processed from the first distribution volume set	TCPWARE056
5	Enter the installation options you wish to use (such as obtaining the <i>Release Notes</i>)	Return for no options or N for <i>Release Notes</i> .
6	Specify the directory where you want the common files installed	Return if accepting default of SYS\$COMMON or The device and directory of your choice.
7	Specify the directory where you want the node specific files installed	Return if accepting default of SYS\$SPECIFIC or The device and directory of your choice.

Example 2-1 Starting VMSINSTAL

```
$ @SYS$UPDATE:VMSINSTAL          [1]
```

```

VAX/VMS Software Product Installation Procedure V5.6
It is 1-NOV-2001 at 17:13.
Enter a question mark (?) at any time for help.
```

```

* Are you satisfied with the backup of your system disk [YES]? Return    [2]
* Where will the distribution volumes be mounted: MUA0:      [3]
Enter the products to be processed from the first distribution volume set.
* Products: TCPWARE056      [4]
* Enter installation options you wish to use (none): Return    [5]
```

```
The following products will be processed:
```

```
TCPWARE V5.6
```

```

Beginning installation of TCPWARE V5.6 at 17:14
%VMSINSTAL-I-RESTORE, Restoring product save set A ...
%VMSINSTAL-I-REMOVED, Product's release notes have been moved to SYS$HELP.
TCPware(R) for OpenVMS Version 5.6
Copyright (c) 2001, by Process Software.
```

```

Refer to the "Installation" chapter of the TCPware for OpenVMS(R)
Installation & Configuration Guide.
```

You can specify the directory where you want the TCPware common files installed. The default location for the TCPware common files is SYS\$COMMON. A [.TCPWARE] subdirectory will be created in the directory you specify.

* Where do you want to install the TCPware common files SYS\$COMMON]:**Return** [6]

You can specify the directory where you want node specific files installed. This directory must not be used by any other nodes in a cluster. The default location is SYS\$SPECIFIC:[TCPWARE]. A [.TCPWARE] subdirectory will be created in the directory you specify.

* Where do you want to install the TCPware node specific files SYS\$SPECIFIC]:
Return [7]

TCP-OpenVMS will be installed.

Installing the TCPware Components

VMSINSTAL continues by prompting you about rebooting the system, reinstalling TCPware in case of an upgrade, selecting the components, and confirming the installation.

VMSINSTAL continues as follows (see Example 2-2):

Table 2-2 Installing the TCPware Components

Step	For this task...	Enter this response...
1	If you started an earlier version of TCPware since the system booted, reboot the system. You can reboot now or later. If you reboot later, do so before starting TCPware.	Y (Yes) or N (No)
2	If you answered N at the previous prompt, decide if you want to proceed with the installation. If you already installed one or more TCPware component, select the ones you want to reinstall.	Y or N * Do you want to reinstall <i>component</i> ? Y if upgrading TCPware, or upgrading from VMS Version 4 to VMS Version 5 or later N in most other cases
3	Decide if you want to have online HELP available. The DCL HELP library is in the SYS\$HELP:HELPLIB.HLB file	Return or Y or N

Table 2-2 Installing the TCPware Components (Continued)

Step	For this task...	Enter this response...
4	If you are installing one or more TCPware components for the first time, select the ones you want to install. VMSINSTAL displays the selections you made.	Return or Y or N
5	Confirm your selections.	Return or Y or N If you answer YES, OpenVMS takes a short time to complete the installation. If you enter NO, go back to step 3 to make corrections.

VMSINSTAL restores the product save sets, installs each component, and confirms completion of the procedure. If you have an existing TCPWARE:SERVICES. file, the installation includes any services listed in it in the new file the installation creates.

For a complete sample installation, see Appendix A, *Sample Installation*.

Example 2-2 Installing the TCPware Components

- ```
* Is it OK for the system to be REBOOTed after this installation? N [1]
 You may choose to proceed with this installation. However, if you do so,
 you will NOT be able to start TCPware until AFTER you have rebooted the
 system.

* Do you want to proceed with this installation? Y [2]
 TCPware for OpenVMS includes online HELP. You may add this HELP to the
 DCL HELP library (SYS$HELP:HELPLIB.HLB). The HELP text will display
 under the heading "TCPware".

* Do you want to add online HELP to the DCL HELP library [YES]? Return [3]
 Select the products to install by answering YES or NO to the following
 prompts. Install only those products for which you have a Product
 authorization Key. Installing products for which you do not have a
 Product Authorization Key does you no good (a Product Authorization Key
 is required which only allows you to use licensed products).

* Do you want to install FTP-OpenVMS (TCP/IP Services) [YES]? Return [4]
* Do you want to install NFS-OpenVMS Client(TCP/IP Services)[YES]? Return
* Do you want to install NFS-OpenVMS Server(TCP/IP Services)[YES]? Return
* Do you want to install SMTP-OpenVMS (TCP/IP Services) [YES]? Return
* Do you want to install TELNET-OpenVMS (TCP/IP Services) [YES]? Return
* Do you want to install SSH-OpenVMS (TCP/IP Services) [YES]? Return
* Do you want to install Kerberos Services (TCP/IP Services) [YES]? Return
* Do you want to install FSS-OpenVMS (NetWare Services) [YES]? NO Return
```

## Installing TCPware

---

- \* Do you want to install NPS-OpenVMS (NetWare Services) [YES]? **NO Return**
- \* Do you want to install TES-OpenVMS (NetWare Services) [YES]? **NO Return**

The following products will be installed:

```
TCP-OpenVMS
ONC RPC Services (TCP/IP Services)
FTP-OpenVMS (TCP/IP Services)
NFS-OpenVMS Client (TCP/IP Services)
NFS-OpenVMS Server (TCP/IP Services)
SMTP-OpenVMS (TCP/IP Services)
TELNET-OpenVMS (TCP/IP Services)
SSH-OpenVMS (TCP/IP Services)
Kerberos Services (TCP/IP Services)
```

- \* Is this correct [YES]? **Return**     **[5]**

This concludes the question and answer portion of the installation.

Your system will now be updated to include TCPware for OpenVMS. This will take a short while.

```
%VMSINSTAL-I-RESTORE, Restoring product save set B
```

---

## Installing TCPware on Multiple System Disks

Because TCPware creates files in some of the system directories like SYS\$LIBRARY and SYS\$SYSTEM, you need to install TCPware on each system disk. Because nodes of the same architecture can share the TCPware common files, be sure to specify a common directory when the installation instructions ask where to install the TCPware common files.

## Installing TCPware on Mixed Platform Clusters

In a mixed platform cluster of both VAX and Alpha systems, the cluster needs to be set up to share the data files. You can do this by having separate TCPWARE\_LOGICALS.COM files for the VAX and Alpha nodes.

On the VAX nodes, the TCPWARE\_LOGICALS.COM file looks something like this:

```
$ DEFINE/SYSTEM/NOLOG/EXEC TCPWARE_COMMON SYS$COMMON, -
 ALPHA$DKA300:[VMS$COMMON.]
$ DEFINE/SYSTEM/NOLOG/EXEC TCPWARE_SPECIFIC SYS$SPECIFIC:
$ DEFINE/SYSTEM/NOLOG/EXEC TCPWARE_ROOT SYS$SYSROOT:, -
 ALPHA$DKA300:[VMS$COMMON.]
$ DEFINE/SYSTEM/NOLOG/EXEC TCPWARE "TCPWARE_ROOT:[TCPWARE]"
$ DEFINE/SYSTEM/NOLOG TCPWARE_INCLUDE -
 "TCPWARE_ROOT:[TCPWARE.INCLUDE]"
```

On the Alpha nodes, the TCPWARE\_LOGICALS.COM file looks something like this (being the "normal" one):

```
$ DEFINE/SYSTEM/NOLOG/EXEC TCPWARE_COMMON SYS$COMMON:
$ DEFINE/SYSTEM/NOLOG/EXEC TCPWARE_SPECIFIC SYS$SPECIFIC:
$ DEFINE/SYSTEM/NOLOG/EXEC TCPWARE_ROOT SYS$SYSROOT:
$ DEFINE/SYSTEM/NOLOG/EXEC TCPWARE "TCPWARE_ROOT:[TCPWARE] "
$ DEFINE/SYSTEM/NOLOG TCPWARE_INCLUDE -
 "TCPWARE_ROOT:[TCPWARE.INCLUDE] "
```

The common files reside on ALPHA\$DKA300:[VMS\$COMMON.TCPWARE...], the Alpha system disk.

Keep in mind:

- Before you install a new version of TCPware, "restore" the logicals to their original values. Upon startup, TCPware checks for the logicals TCP, UDP, IP, INET, RMT, RCD, BG, and QX. If any of these logicals have been previously defined on your system, the following warning is generated:

```
%TCPWARE-W-BADLOGICAL
```

- After installing TCPware on VAX systems, make sure to delete (or rename) the SYSSYSROOT:[TCPWARE...]\*\_CONTROL.COM files. Otherwise, TCPware fails to start because it finds two sets of the control files and tries to execute each set, which can cause problems.
- After installing on VAX systems, delete any of the data files TCPware creates during installation and which it can no longer locate because of the new logical definitions.
- For the VAX, restore the TCPWARE\_LOGICALS.COM file to that shown above.

## Installing Other Products

You can install other products at the same time you install TCPware.

### VAX P.S.I. for IP-over-X.25 Support

If you plan to use IP-over-X.25 support:

- 1 Install, configure, and have running the full VAX P.S.I. V4.3 (or later) software and any required hardware.
- 2 Choose a name for the local carrier network. This can be the name that your local carrier provides or a name of your own. Use this name during VAX P.S.I. configuration and when you build your IP-over-X.25 mapping database later on.
- 3 Have your supplier:
  - Connect you to X.25 through the Direct Access Facility (DAF), not the packet assembly/

disassembly (PAD) facility.

- Provide you with the number sequence (escape code or codes) the local carrier uses to translate X.25 addresses to the digits that go over the local carrier network. You need this to build your IP-over-X.25 mapping database later on.

Also see the documentation with your VAX P.S.I. products.

### INGRES/Net

Install and start TCPware before you install INGRES/Net.

After TCPware installation, configuration, and startup, see Chapter 6, *Starting and Testing TCPware, the Installing and Configuring INGRES/Net* section.

### Oracle's SQL\*Net

Install and operate TCPware before installing SQL\*Net.

After TCPware installation, configuration, and startup, see Chapter 6, *Starting and Testing TCPware, the Installing and Configuring Oracle's SQL\*Net* section.

### Post-Installation Tasks

If you are reinstalling or upgrading TCPware or the OpenVMS operating system, there are some additional tasks to perform. Perform these tasks after you get confirmation of a successful installation:

- 1 Unload the distribution media from the device.
- 2 Reboot the system.

**CAUTION!** Do not use the **STOP PROCESS/ID** command to stop TCPware or any of its components. Use the **SHUTNET** command as described in Chapter 6.

**Note!** Be aware that TCPware provides new versions of the existing TCPWARE:NETWORKS., TCPWARE:SERVICES., and TCPWARE:PROTOCOLS. files. Any customizations that you made to these files should be merged with the new versions.

## Chapter 3

---

# Configuring the TCP/IP Core Environment

## Introduction

This chapter describes the steps you need to take before using CNFNET to configure TCPware's core environment, TCP-OpenVMS. This chapter is for the OpenVMS system manager or operator responsible for the TCP/IP core environment configuration.

This chapter covers the TCP/IP core configuration only. You later configure the individual TCP/IP components in Chapter 4, *Configuring the TCP/IP Services*. To configure the NetWare Services core environment and components, see Chapter 5, *Configuring the NetWare Services*.

## Preconfiguration Steps

Before you run CNFNET, there are certain things you need to do first:

- 1 Define the file location logicals.
- 2 Obtain Internet addresses for your network devices.

Each of these steps are described in detail in later sections of this chapter.

## CNFNET Procedure

You run the CNFNET.COM procedure file to configure the TCPware core environment and the TCP/IP components. You can access CNFNET using either of two options. Each option provides different configuration choices.

## Define the File Location Logicals

TCPware file definitions include a number of logicals. You can define these logicals using the `SYS$SYSROOT:[TCPWARE]TCPWARE_LOGICALS.COM` command file. The `VMSINSTAL`

procedure (from the previous chapter) generates this command file.

**Note!** Execute TCPWARE\_LOGICALS.COM before performing any other TCPware procedure.

Table 3-1 shows the TCPware logicals and how they relate to OpenVMS system logicals. The system logical equivalents apply only if the TCPware installation is on the default locations on the system disk.

**Table 3-1 TCPware Logicals**

| This logical...   | Has this system logical equivalent... |
|-------------------|---------------------------------------|
| TCPWARE_ROOT:     | SY\$SYSROOT:                          |
| TCPWARE:          | SY\$SYSROOT:[TCPWARE]                 |
| TCPWARE_INCLUDE:  | SY\$SYSROOT:[TCPWARE.INCLUDE]         |
| TCPWARE_SPECIFIC: | SY\$SPECIFIC:                         |
| TCPWARE_COMMON:   | SY\$COMMON:                           |

You can also set customized filenames and locations for TCPware component files by using a customized logicals command file. This can help prevent duplicate databases in mixed architecture systems. TCPware provides a CUSTOM\_LOGICALS.TEMPLATE file containing logicals (such as TCPWARE\_NFS\_PROXY\_DB) you can redefine from their given defaults. Rename this file to CUSTOM\_LOGICALS.COM to put the new file locations into effect on a system-wide basis.

See Appendix C, *Installed Files*, for the default component filenames and locations.

## Configuration Methods

Depending on how you want to configure the TCP/IP core environment (TCP-OpenVMS) and the TCP/IP components, you can choose either a command-driven method or a menu-driven method. Using either method, you can perform a basic, full, or component configuration.

However, if you are configuring TCPware for the first time, you need to configure TCP-OpenVMS first.

- The basic configuration allows you to configure TCP-OpenVMS and some of the basic TCP/IP component settings.
- The full configuration allows you to configure TCP-OpenVMS and the full TCP/IP components.
- The component configuration allows you to specify a component to configure. Use this if you are not configuring TCPware for the first time and you need to configure certain services components only.

The CNFNET.COM procedure creates the configuration data file, TCPWARE\_SPECIFIC:[TCPWARE]TCPWARE\_CONFIGURE.COM.

Command-driven Method

To use the command-driven method, enter the CNFNET command followed by the option choice you want:

```
@TCPWARE:CNFNET option
```

Your option choices and description are listed in Table 3-2.

Table 3-2 Command-driven Option Choices

| Use this option...            | If you want to...                                                                                            |
|-------------------------------|--------------------------------------------------------------------------------------------------------------|
| TCPWARE or TCP or (no option) | Configure core environment plus TCPware component defaults                                                   |
| BASIC                         | Configure core environment plus basic TCPware components                                                     |
| PRODUCT                       | To do a FULL configuration on a specific product or component (product can be ALL).                          |
| FULL                          | Configure core environment plus full TCPware components                                                      |
| @TCPWARE:CNFNET TCP           | Change the IP address without reinstalling TCPware.<br>Change a subnet mask. (You must wait for the prompt.) |

Menu-driven Method

The menu-driven method provides configuration options as convenient menu selections. Your selection choices are shown in Example 3-1. The menus that appear as you make your choices move from one function to the next, and you can back up and make corrections as you go. You can use the menus to configure TCP-OpenVMS specifically.

To describe the configuration process for the core environment, this chapter uses the menu-driven method.

Start the Configuration Process

These are the steps to the TCP/IP core environment configuration:

- 1 Start CNFNET.
- 2 Enter your Maintenance Agreement Number.
- 3 Enter line identification codes for the network devices.
- 4 Enter host addresses for the network devices.
- 5 Enter the default gateway host address.
- 6 Enter the local time zone.

- 7 Enter the local hostname or update the HOSTS. file.

## Start CNFNET

To start CNFNET using the menu-driven method:

- 1 At the DCL prompt, enter:

```
$ @TCPWARE:CNFNET MENU
```

- 2 Press **Return** at the

Type <return> to continue... prompt.

The menu in Example 3-1 appears.

---

### Example 3-1 TCPware Configuration Menu

---

TCPware(R) for OpenVMS Configuration Menu

Configuration Options:

- 1 - Configure TCPware Services
- 2 - Configure NetWare Services
  
- 3 - Startup/Restart all TCPware Services
- 4 - Shutdown all TCPware Services
  
- L - Display the software licensing information (PASSWORD)
- E - Exit the configuration procedure (changes will be saved)

Enter configuration option: **1 Return**

---

- 3 Enter **1**(Configure TCPware Services) at the Enter configuration option: prompt. CNFNET displays the TCPware Services Configuration Menu shown in Example 3-2.

- 4 Enter **1**(Core environment for TCP/IP services) at the Enter configuration option: prompt. CNFNET displays the message and prompt:

```
Configuring the core TCP/IP environment...
Enter your Maintenance Agreement (MAS) number []:
```

---

### Example 3-2 TCP/IP Services Configuration Menu

---

TCPware Services Configuration Menu

Configuration Options:

- 1 - Core environment for TCP/IP services
- 2 - Configure all TCP/IP components
- 3 - Configure a specific TCP/IP component



- 4 - Startup/Restart TCP/IP services
- 5 - Shutdown TCP/IP services
- 6 - Startup/Restart a specific TCP/IP component
- 7 - Shutdown a specific TCP/IP component

E - Exit to previous menu

Enter configuration option: **1 Return**

---

## Enter Your Maintenance Agreement Number

If you have a maintenance agreement with Process Software, you can find your "Master Agreement No." (MAS) on your *Software Maintenance and Support Acknowledgment* form. The MAS number helps in future communications with Process Software.

**Note!** If you decided to start the configuration using either the `@TCPWARE:CNFNET TCPWARE` or `@TCPWARE:CNFNET TCP` command, a different screen appears. It contains a message that CNFNET creates the `TCPWARE_SPECIFIC:[TCPWARE]TCPWARE_CONFIGURE.COM` file to reflect your configuration. Press **Return** to continue and the MAS number request prompt appears. (See Example 3-3.) CNFNET purges up to the last five versions of the `TCPWARE_CONFIGURE.COM` file. **You are strongly advised not to edit this file directly.**

---

### Example 3-3 Entering Your Maintenance Agreement Number

---

This procedure creates the configuration data file, `TCPWARE_SPECIFIC:[TCPWARE]TCPWARE_CONFIGURE.COM`, to reflect your system's configuration.

Please enter your Process Software Maintenance Agreement (MAS) number if you have one and have it available. This number can be found on the top of your *Software Maintenance and Support Acknowledgment* form.

If you do not have this number, press <RETURN> at the prompt. If you would like to enter this information later, you can set it using the command:

```
$ @TCPWARE:CNFNET MAS
```

Enter your Maintenance Agreement (MAS) number []: **M123456 Return**

---

Enter the MAS number now, or later using the `@TCPWARE:CNFNET MAS` command. Once entered, this number appears when you use the `NETCU SHOW VERSION /ALL` command.

CNFNET prompts you for the necessary information during the rest of the procedure. Default answers, if available, are provided in square brackets as part of some prompts, based on information extracted from your environment. If you want to accept the default, press **Return**. If not, enter the value or information you need and then press **Return**.

## Enter Line Identification Codes

You now need to define the network devices and information for each device. Entering line identification codes is the first step.

CNFNET displays the text and prompt in Example 3-4.

### Example 3-4 Entering Line Identification Codes

---

You need to enter the line identifications for the available network devices. The following is a partial list of the network devices that are supported:

| Line Id  | Network Device                                    | [1] |
|----------|---------------------------------------------------|-----|
| -----    |                                                   |     |
| QNA-n    | for Digital's DELQA, DESQA, or DEQNA (XQDRIVER)   |     |
| UNA-n    | for Digital's DELUA or DEUNA (XEDRIVER)           |     |
| BNA-n    | for Digital's DEBNI, DEBNA, or DEBNT (ETDRIVER)   |     |
| SVA-n    | for Digital's DESVA (ESDRIVER)                    |     |
| MNA-n    | for Digital's DEMNA (EXDRIVER)                    |     |
| ISA-n    | for Digital's VAX 4000 (EZDRIVER)                 |     |
| MFA-n    | for Digital's DEMFA FDDIcontroller 400 (FXDRIVER) |     |
| FZA-n    | for Digital's DEFZA FDDIcontroller 700 (FCDRIVER) |     |
| PRO-n    | for Proteon's proNET (PNDRIVER)                   |     |
| HYP-n    | for NSC's HYPERchannel (NxDRIVER)                 |     |
| SLIP-n   | for (static) Serial Line IP (any terminal device) |     |
| DECNET-n | for IP over DECnet (requires DECnet)              |     |
| DSB-n    | for Digital's DSB32 (SLDRIVER)                    |     |
| DST-n    | for Digital's DST32 (ZSDRIVER)                    |     |
| DSV-n    | for Digital's DSV11 (SJDRIVER)                    |     |
| X25-n    | for VAX P.S.I. (IP over X.25)                     |     |
| LPB-0    | for local loopback (no device driver)             |     |

Unless your system has more than one controller, n is 0.

Enter the line identifications [LPB-0,SVA-0]: **Return** [2]

---

For a full list of supported network devices, see Table 3-3.

## Line Identification Codes

The network device line identification (line ID) consists of a line name and controller number combination, such as QNA-0 or UNA-1 (see Example 3-4).

- 1 Find each network device over which you plan to run TCPware on your system in Table 3-4 and note its line ID.
- 2 Enter the line ID or IDs at the following prompt:  
Enter the line identifications [default-lines]:

The system displays any default line IDs that exist on your system in the square brackets. Press **Return** to accept them or add additional devices. You can enter up to sixteen devices, separated by commas.

Always enter the local loopback device (LPB-0) first. This is a pseudo-device not associated with any physical device. TCPware uses the loopback device only if no other hosts are connected to the network. TCPware always configures the LPB-0 device unless you specify not to do so.

For example, to support the DELQA controller (QNA) and a HYPERchannel (HYP) device, enter:

```
LPB-0,QNA-0,HYP-0
```

**Note!** If your system runs Oracle software with TCPware as the transport, make sure that you configure the **LPB-*n*** device. Otherwise, Oracle sends a message stating that it cannot connect. Note that you must have TCPware fully installed and operating before you can install Oracle's SQL\*Net.

## HYPERchannel Lines

If you are configuring HYPERchannel devices, respond to the prompt:

```
What is the local HYPERchannel address for line...:
```

The format of the 32-bit HYPERchannel address combination is:

```
aa-bb-cc-dd
```

For each HYPERchannel device selected, also enter the Address Resolution Protocol (ARP) server's HYPERchannel address for line **HYP-*n*** at the prompt:

```
What is the ARP server's HYPERchannel address?
```

You can enter **NONE** or press **Return** at the prompt if there is no ARP server address.

See the *Management Guide*, Chapter 1, *Common Interfaces*, the *HYPERchannel* section for further information. Also see the *NETCU Command Reference*, Chapter 2, *NETCU Commands*, the **ADD ARP** command for populating ARP tables.

## IP-over-DECnet Lines

If you are configuring IP-over-DECnet devices, use the following format at the prompt:

```
What is the DECnet link information:
```

```
node-name::"TASK=object-name"
```

If you enter **N** at the prompt:

```
Is this the LISTENER end of the DECnet link?
```

TCPware assumes that you are issuing commands for the master node.

See the *Management Guide*, Chapter 1, *Common Interfaces*, the *IP-over-DECnet* section for further information.

**Table 3-3 Network Devices and Line IDs**

| <b>This controller...</b>               | <b>Has line ID...</b> | <b>For device driver</b> |
|-----------------------------------------|-----------------------|--------------------------|
| Classical IP over ATM                   | CLIP- <i>n</i>        | CLDRIVER                 |
| PMAD Communications Link                | MXE- <i>n</i>         | ECDRIVER                 |
| LAN Emulation Driver**                  | ELA- <i>n</i>         | ELDRIVER                 |
| EISA Bus Adapter (DE422/425)**          | ERA- <i>n</i>         | ERDRIVER                 |
| DESVa VAXstation 2000/3100/4000         | SVA- <i>n</i>         | ESDRIVER                 |
| DEBNA/DEBNI/DEBNT VAXBI Ethernet*       | BNA- <i>n</i>         | ETDRIVER                 |
| PCI Bus Adapter (TULIP)**               | EWA- <i>n</i>         | EWDRIVER                 |
| DEMNA XMI Ethernet                      | MNA- <i>n</i>         | EXDRIVER                 |
| VAX 4000 Ethernet (SGEC*, TGEC**)       | ISA- <i>n</i>         | EZDRIVER                 |
| DE600-AA, DE602-AA (NC3123, NC3131)**   | EIA- <i>n</i>         | EIDRIVER                 |
| DEFAA FDDIcontroller                    | FAA- <i>n</i>         | FADRIVER                 |
| DEFTA/DEFZA FDDIcontroller              | FZA- <i>n</i>         | FCDRIVER                 |
| DEFQA FDDIcontroller*                   | FQA- <i>n</i>         | FQDRIVER                 |
| DEFEA FDDIcontroller**                  | FEA- <i>n</i>         | FRDRIVER                 |
| DEFPA FDDIcontroller                    | FPA- <i>n</i>         | FWDRIVER                 |
| DEMFA FDDIcontroller                    | MFA- <i>n</i>         | FXDRIVER                 |
| DETRA TRNcontroller 700**               | TRA- <i>n</i>         | ICDRIVER                 |
| Proteon PRONet-4/16 EISA NIC (DW300)**  | TRE- <i>n</i>         | IRDRIVER                 |
| HYPERchannel H269                       | HYP- <i>n</i>         | NxDRIVER***              |
| Proteon proNET-10/80                    | PRO- <i>n</i>         | PNDRIVER***              |
| Compaq WAN DSV11                        | DSV- <i>n</i>         | SJDRIVER***              |
| Compaq WAN DSB32                        | DSB- <i>n</i>         | SLDRIVER***              |
| DELUA/DEUNA UNIBUS Ethernet*            | UNA- <i>n</i>         | XEDRIVER                 |
| DELQA/DEQNA/DEQTA/DESQA Q-BUS Ethernet* | QNA- <i>n</i>         | XQDRIVER                 |
| Compaq WAN DST32                        | DST- <i>n</i>         | ZSDRIVER***              |

**Table 3-3 Network Devices and Line IDs (Continued)**

| <b>This controller...</b> | <b>Has line ID...</b> | <b>For device driver</b> |
|---------------------------|-----------------------|--------------------------|
| IP-over-DECnet            | DECNET- <i>n</i>      | DECnet                   |
| Serial lines              | SLIP- <i>n</i>        | various                  |
| IP-over-X.25              | X25-0                 | VAX P.S.I.               |
| Local loopback            | LPB-0                 |                          |

\*VAX-specific

\*\*Alpha-specific

\*\*\*PNDRIVER, NxDRIVER, SJDRIVER, SLDRIVER, and ZSDRIVER are not provided as part of OpenVMS, MicroVMS, or TCPware for OpenVMS. Purchase the proNET driver directly from Proteon, Inc. (part number p5330). The HYPERchannel drivers include NADRIVER for Q-BUS and UNIBUS, NBDRIVER for MASSBUS, and NCDRIVER for VAXBI; you must purchase the H269 drivers directly from Network Systems Corporation. Purchase the Compaq WAN drivers directly from Compaq Computer (see Software Product Description 29.64.xx).

## IP-over-X.25 Devices

If you plan to use IP-over-X.25 support:

- 1 Install, configure, and have running the full VAX P.S.I. V4.3 (or later) software and any required hardware.

See Chapter 2, *Installing TCPware, the Installing Other Products* section.

- 2 During CNFNET, enter the IP-over X.25 line ID as **x25-n**. Do not enter it as DSV-n. If you are using only X.25, enter the IP address for the X.25 interface at the What is the local host's INTERNET ADDRESS prompt. If your interface is unnumbered, press **Return** at the Is this interface unnumbered: prompt. If you have a unique IP address for X.25, enter **n** at the prompt.

See the *Management Guide*, Chapter 8, *X.25 Interface*. Also see the documentation with your VAX P.S.I. products.

## Oracle Software

If your system will be running Oracle software with TCPware as the transport, make sure that you configure the **LPB-n** device. Otherwise, Oracle sends a message stating that it cannot connect. Note that you must have TCPware fully installed and operating before you can install Oracle's SQL\*Net.

## Serial Line IP (SLIP) Devices

If you are configuring Serial Line IP (SLIP) devices, you can use any valid OpenVMS terminal device as a SLIP line. Unlike other line ID controller numbers, the one for SLIP lines is not related to the actual device name. To configure SLIP devices, respond to the prompt with:

What is the device name for line...:

You can also create the TCPWARE:SLIP\_SETUP.COM file. The network startup command procedure executes this command procedure, if it exists, before starting the SLIP lines. SLIP\_SETUP.COM should contain the commands necessary to configure the terminal devices for proper operation. Typically, it would include SET TERMINAL commands to set the baud rate and other terminal characteristics.

See the *Management Guide*, Chapter 1, *Common Interfaces*, the *Serial Line IP (SLIP) Interface* section for further information. See Chapter 6 in the *Installation and Configuration Guide*, the *System Parameters* section.

### Wide Area Network (WAN) Device Drivers

If you are configuring Compaq WAN device drivers, the configuration options include the protocol, type of duplex mode, clocking method, type of CRC, line speed, number of receive buffers, and retransmission time to use. To configure Compaq WAN devices, respond to the prompt:

What are the configuration options for line...:

See the *Management Guide*, Chapter 1, *Common Interfaces*, the *Compaq Wide Area Network (WAN) Device Drivers* section for further information, especially Table 1-1.

## Enter Network Device Addresses

The next step in defining your network devices is to enter the local host internet address, hostname, and host subnet mask for each device (see Example 3-5):

- 1 Enter each network device's local host internet address. (See Table 3-5 below for tips.)
- 2 Enter each network device's local hostname. (You may have to enter the fully qualified domain name, as in Example 3-5; see Table 3-5 for an explanation.)
- 3 Enter each network device's local host subnet mask (if it exists). For help, see Table 3-6.
- 4 Respond to the prompt asking if you want trailer packet (default=NO) and Reverse ARP (RARP) support (default=YES) for the configured network line. This does not apply to VMS Communications Interface (VCI) support.

For details on RARP and trailer packets, see the *Management Guide*, Chapter 1, *Common Interfaces*, the appropriate subsections under the *Ethernet*, *FDDI*, *Token Ring*, and *ATM Interfaces* section.

- 5 Indicate whether the configuration is correct. If the answer is **n**, start the network device configuration process over again

**Table 3-4 Tips for Entering Network Device Information**

| Internet Address                                                                                                                                                                                                                                                                                                                                                                                                                                        | Hostname                                                                                                                                                                                                                                                                                                                                                                                                                              | Subnet Mask                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The local loopback device (LPB-0) automatically gets an internet address of 127.0.0.1.</p> <p>Each network device connects the host to a different network. The host must have a unique internet address on each connected network.</p> <p>For most lines, the internet address is not related to the physical address. For some interfaces, the Address Resolution Protocol (ARP) resolves the mapping between internet and physical addresses.</p> | <p>If you are using Domain Name Services to resolve hostnames, enter the fully qualified domain name (including the machine name) of the local host. If not using the Domain Name Services, enter just the machine name as it appears in the local TCPware:Hosts.file.</p> <p>Enter the host name only once. Its case is preserved.</p> <p>You do not need to enter a name for each network. Indicate only the "primary" network.</p> | <p>If a device is on a subnet, you should assign a subnet mask. This mask "extends" the network portion of the address to cover part of the host portion to divide the latter into subnets. For example, host 192.168.4.56 is on a subnet of network 192.168.0.0 encompassing addresses 192.168.4.1 through 192.168.7.254 (comprising 1022 hosts). The mask to use would be 255.255.252.0.</p> <p>The subnet mask must include at least the network mask.</p> <p>Do not use a subnet mask with an unnumbered interface. See the next section for details.</p> |

**Table 3-5 Internet Address Classes**

| Address Class | First Byte Range | Network Mask  |
|---------------|------------------|---------------|
| Class A       | 1. — 127.        | 255.0.0.0     |
| Class B       | 128. — 191.      | 255.255.0.0   |
| Class C       | 192. — 223.      | 255.255.255.0 |
| Class D       | 224. — 239.      | None          |

**Example 3-5 Entering Host Address Information**

You need to supply the following information for each network:

- The internet address for this host
- The host name for the local internet address
- The subnet mask for the network
- The line specific information (depends on line)

If a network is not subnetted, press return at the subnet mask prompt. Otherwise, enter the subnet mask for the network as an internet address. These are the default subnet masks for each network class:

| Network Class | Default Subnet Mask |
|---------------|---------------------|
| -----         | -----               |
| A             | 255.0.0.0           |
| B             | 255.255.0.0         |
| C             | 255.255.255.0       |

Using LOOPBACK (127.0.0.1) as host name for line LPB-0. [1]

What is the local host's INTERNET ADDRESS for line SVA-0:198.168.1.56 Return

What is the HOST NAME for line SVA-0: NUNKI.NENE.COM Return [2]

What is the SUBNET MASK for line SVA-0 [255.255.255.0]: Return [3]

Do you want to enable TRAILER packet support for line SVA-0 [NO]: Return

Do you want to enable RARP (Reverse ARP) support for line SVA-0 [YES]:Return [4]

The network devices are configured as follows:

| Line  | Address      | Name           | Options             |
|-------|--------------|----------------|---------------------|
| ----  | -----        | ----           | -----               |
| LPB-0 | 127.0.0.1    | LOOPBACK       |                     |
| SVA-0 | 198.168.1.56 | NUNKI.NENE.COM | /FLAGS=(NOTRAILERS) |

Is this configuration correct [YES]: Return [5]

---

## Define the Default Gateway

The next step is to define the internet address of your default gateway (see Example 3-6):

Enter the internet address of the default gateway, if the network or networks connected to your host connect to other networks, for example.

The address must be on a network to which your host is directly connected. If the network has more than one gateway, enter the gateway that is "closest" to the networks with which you will communicate most frequently.

If you want to remove a previously assigned default gateway, or if your network does not have a gateway, enter 0.0.0.0 as the default gateway internet address.



**Example 3-6 Sample Defining a Default Gateway**

---

If your network is connected to other networks, you need to enter the internet address of a default gateway. If your network has more than one gateway, enter the gateway "closest" to the networks that you will be connecting to most frequently. The (sub)network portion of the internet address for the gateway **MUST** match that of a locally connected (sub)network.

Enter 0.0.0.0 if you need to remove a previously defined default gateway or your network does not have any gateways.

Your routing requirements might be more complex if your network has several gateways. Handle this by adding the appropriate NETCU commands (such as ADD ROUTE) to the TCPWARE\_COMMON:[TCPWARE]ROUTING.COM command procedure.

For more information on routing, refer to the TCPware(R) for OpenVMS documentation.

Enter the internet address of the default gateway [0.0.0.0]: **Return**

---

## Daylight Savings Time Support

Support for automatic Daylight Savings Time (DST) changes has now been added to the existing method of specifying time zone information. You can configure time zone and DST information, which can be used by the Network Time Protocol (NTP) to change the system clock and the time offset information automatically.

To understand time zone configuration, time zone offset, and the hardware clock in relation to choosing the time zone settings you need, please read the following sections.

### Time Zone Configuration and Hardware Clock Overview

By convention, the hardware clock is usually set to the local time, but network protocols represent time in Greenwich Mean Time (GMT), also known as Universal Coordinated Time (UTC).

To convert between local time and GMT, TCPware uses built-in rules or rules provided by the system manager. Each country or geographical area has its own names for time zones and its own rules for Daylight Savings Time (DST). The names for these time zones and rules are not necessarily unique; for example, "EST" could refer to the United States Eastern Standard Time, the Canadian Eastern Standard Time (which used different DST rules), or the Australian Eastern Standard Time (which is a different offset from GMT as well).

TCPware uses the name of the local time zone specified by a system manager to calculate the offset between the local time and GMT, so it is important that an appropriate set of time zone rules be selected for your area.

TCPware assumes that the hardware clock is always set exactly to local time. For a smooth transition to and from Daylight Savings Time (DST), the hardware clock must be reset at the appropriate time. If NTP is used to synchronize the clock to a time server, NTP resets the clock automatically when the Daylight Savings Time transition occurs. Note that using a military time zone or an explicit GMT offset disables automatic Daylight Savings Time transitions.

**TCPware Time Zone Support**

It is not possible to consider every country or area in which TCPware might be used, and because the Daylight Savings Time rules are subject to change by local governmental action, you can write your own site-specific time zone rules.

Time zone rules are either compiled-in or defined in the time zone rule definition file and converted by the time zone rule logical at startup, or by entering a specific NETCU command (DEFINE TIMEZONE).

- Compiled-in rules are geographically centered around the United States but also include foreign time zones having names that do not conflict with the U.S. time zones.
- User-defined rules are specified by using the NETCU command DEFINE TIMEZONE. Use the NETCU command to override the compiled-in rules.

TCPware includes a database of the most common loadable rules; you can select these rules as is, or modify them to conform to the correct local time zone rules.

When TCPware searches the time zone rules looking for a zone, it first searches the loaded rules in the order they are selected, then searches the compiled-in rules by loading rules that override them.

In addition to the standard one-letter U.S. military time zones and time zones of the form GMT+hh:mm or GMT-hh:mm, there are compiled-in time zone rules supported by TCPware, which are shown in Table 3-7.

**Compiled-In Time Zone Rules**

When a time zone is compiled-in, the logical "TCPWARE\_ TIMEZONE\_NAME" specifies which rule is to be compiled in; for example, EST. The compiled-in time zone rules are listed in the following table.

**Table 3-6    Compiled-In Time Zone Rule**

| Time Zone Name | GMT Offset (hours) | DST Rules    | Area or Country        |
|----------------|--------------------|--------------|------------------------|
| EST or EDT     | -5                 | U.S. Federal | Eastern United States  |
| CST or CDT     | -6                 | U.S. Federal | Central United States  |
| MST or MDT     | -7                 | U.S. Federal | Mountain United States |
| PST or PDT     | -8                 | U.S. Federal | Pacific United States  |

**Table 3-6 Compiled-In Time Zone Rule (Continued)**

| <b>Time Zone Name</b> | <b>GMT Offset (hours)</b> | <b>DST Rules</b> | <b>Area or Country</b>         |
|-----------------------|---------------------------|------------------|--------------------------------|
| YST or YDT            | -9                        | U.S. Federal     | Yukon                          |
| HST                   | -10                       | none             | Hawaii                         |
| NST or NDT            | -3:30                     | Canadian         | Canadian Newfoundland          |
| AST or ADT            | -4                        | Canadian         | Canadian Atlantic              |
| JST                   | +9                        | none             | Japan                          |
| SST                   | +8                        | none             | Singapore                      |
| GMT                   | +0                        | none             | Greenwich Mean Time            |
| GMT or BST            | +0                        | British          | Britain                        |
| WET or WET-DST        | 0                         | European         | Western Europe                 |
| MET or MET-DST        | +1                        | European         | Middle Europe                  |
| CET or CET-DST        | +1                        | European         | Central Europe (Middle Europe) |
| EET or EET-DST        | +2                        | European         | Eastern Europe                 |
| NZST or NZDT          | +12                       | New Zealand      | New Zealand                    |

## User-Defined Time Zone Rules

Loadable time zone rules provided with TCPware are in the text file TCPWARE:TIMEZONES.DAT. You can add user-written time zone rules to the file TCPWARE:TIMEZONES.LOCAL to override the zones in TIMEZONES.DAT. The user-defined time zone rule format has three parts:

- **COUNTRY** is a collection of time zones (ZONES); for example, the country US selects all U.S. time zones. This provides a convenient way to select groups of time zones.
- **ZONE** is a specification of a particular time zone, including the name of the zone, the GMT offset, the DST rules in effect, and the name to use while DST is in effect.
- **RULE** is a rule for determining when DST is in effect.

## Format of COUNTRY Specification

```
COUNTRY countryname zonename [zonename . . .]
```

The COUNTRY specification gives the name of the geographical area and the names of the time zones associated with it. This provides a way to group time zones so they can be selected more

conveniently.

The following example shows the definition of the country “US” listing the zones corresponding to the United States. The example for Arizona is slightly different, showing the zone “US/Arizona” instead of “US/Mountain.” (US/Arizona is the definition of a Mountain time zone that does not observe Daylight Savings Time.)

```
Country US US/Eastern US/Central US/Mountain US/Pacific US/Yukon US/
Country -
US/Arizona US/Eastern US/Central US/Arizona US/Pacific US/Yukon US/H
```

### Format of ZONE Specification

```
ZONE zonename gmtoffset rulename standard-name dst-name [COMPILED_IN]
```

In the ZONE specification format:

- zonename is the name by which this zone can be selected, or the name by which it is referred to in a COUNTRY specification.
- gmtoffset is this zone’s standard time offset from GMT.
- rulename is the name of the RULE specification that determines when DST is in effect for this zone. The rulename may be an underscore (\_) to indicate that this zone does not use DST.
- standard-name and dst-name are the names by which this zone is referred to during standard time, and during Daylight Savings Time, respectively. These are the names by which DEFINE TIMEZONE selects the local time zone.

If there are no DST rules, the dst-name should be specified as an underscore (\_). The optional COMPILED\_IN keyword indicates that this rule is compiled-in and need not be loaded, as long as no other rules conflict with it. If you edit a COMPILED\_IN ZONE specification, you must remove the COMPILED-IN keyword to force the ZONE specification to be loaded.

The first of the following examples shows the definition of the normal United States Mountain time zone. The second example, for Arizona, shows the definition of a Mountain time zone that does not observe Daylight Savings Time.

```
Zone US/Mountain -7:00 US MST MDT COMPILED_IN
Zone US/Arizona -7:00 _ MST
```

### Format of RULE Specification

```
RULE rulename startyear ruletype save start-date end-date
```

The RULE specification describes a set of rules for determining the times DST is in effect:

- rulename is the name of the RULE specification in ZONE specifications.
- startyear is the year during which this DST rule takes effect. The rule remains in effect until a later startyear is specified in a rule with the name rulename.
- ruletype specifies the type of DST rules. There are three permitted values:

- DST indicates normal Northern Hemisphere Daylight Savings Time rules, which change at the time and date indicated.
  - REV\_DST indicates normal Southern Hemisphere Daylight Savings Time rules.
  - NULL indicates that no Daylight Savings Time is in effect during the specified years.
  - save indicates the difference between Standard Time and DST.
- START DATE
  - END DATE

The following example illustrates the United States Federal Daylight Savings Time rules:

```
Rule US 1987 DST 1:00 First Sunday April 2:00 Last Sunday October 2:00
Rule US 1976 DST 1:00 Last Sunday April 2:00 Last Sunday October 2:00
Rule US 1975 DST 1:00 23 February 2:00 Last Sunday October 2:00
Rule US 1974 DST 1:00 6 January 2:00 Last Sunday October 2:00
Rule US 1970 DST 1:00 Last Sunday April 2:00 Last Sunday October 2:00
```

### Loadable Time Zone Rules Provided with TCPware

The next table shows the loadable rules provided in the TCPWARE:TIMEZONES.DAT file; you may modify or augment as appropriate for your location.

| Country Name | Rule Name      | Time Zone Name | GMT Offset (hours) |
|--------------|----------------|----------------|--------------------|
|              | GMT            | GMT            | 0                  |
|              | UT             | UT*            | 0                  |
| US-Military  | US-Military/Z* | Z              | 0                  |
| US-Military  | US-Military/A* | A              | -1                 |
| US-Military  | US-Military/B* | B              | -2                 |
| US-Military  | US-Military/C* | C              | -3                 |
| US-Military  | US-Military/D* | D              | -4                 |
| US-Military  | US-Military/E* | E              | -5                 |
| US-Military  | US-Military/F* | F              | -6                 |
| US-Military  | US-Military/G* | G              | -7                 |
| US-Military  | US-Military/H* | H              | -8                 |
| US-Military  | US-Military/I* | I              | -9                 |
| US-Military  | US-Military/K* | K              | -10                |
| US-Military  | US-Military/L* | L              | -11                |

| Country Name    | Rule Name            | Time Zone Name | GMT Offset (hours) |
|-----------------|----------------------|----------------|--------------------|
| US-Military     | US-Military/M*       | M              | -12                |
| US-Military     | US-Military/N*       | N              | 10                 |
| US-Military     | US-Military/O*       | O              | 2                  |
| US-Military     | US-Military/P*       | P              | 3                  |
| US-Military     | US-Military/Q*       | Q              | 4                  |
| US-Military     | US-Military/R*       | R              | 5                  |
| US-Military     | US-Military/S*       | S              | 6                  |
| US-Military     | US-Military/T*       | T              | 7                  |
| US-Military     | US-Military/U*       | U              | 8                  |
| US-Military     | US-Military/V*       | V              | 9                  |
| US-Military     | US-Military/W*       | W              | 10                 |
| US-Military     | US-Military/X*       | X              | 11                 |
| US-Military     | US-Military/Y*       | Y              | 12                 |
| US              | US/Eastern*          | EST/EDT        | -5                 |
| US              | US/Central*          | CST/CDT        | -6                 |
| US              | US/Mountain*         | MST/MDT        | -7                 |
| US              | US/Pacific*          | PST/PDT        | -8                 |
| US              | US/Yukon*            | YST/YDT        | -9                 |
| US              | US/Hawaii*           | HST            | -10                |
| US/East-Indiana | US/East-Indiana*     | EST            | -5                 |
| US/Arizona      | US/Arizona*          | MST            | -7                 |
| Canada          | Canada/Newfoundland* | NST/NDT        | -3:30              |
| Canada          | Canada/Atlantic*     | AST/ADT        | -4                 |
| Canada          | Canada/Eastern       | EST/EDT        | -5                 |
| Canada          | Canada/Central       | CST/CDT        | -6                 |
| Canada          | Canada/Mountain      | MST/MDT        | -7                 |

| Country Name | Rule Name            | Time Zone Name | GMT Offset (hours) |
|--------------|----------------------|----------------|--------------------|
| Canada       | Canada/Pacific       | PST/PDT        | -8                 |
| Canada       | Canada/Yukon         | YST/YDT        | -9                 |
| Canada       | Canada/Saskatchewan  | CST            | -6                 |
| Israel       | Israel               | IST/IDT        | +2                 |
| Australia    | Australia/Tasmania   | EST/EST        | 10                 |
| Australia    | Australia/Queensland | EST            | 10                 |
| Australia    | Australia/North      | CST            | 9:30               |
| Australia    | Australia/West       | WST            | 8:00               |
| Australia    | Australia/South      | CST            | 9:30               |
| Australia    | Australia/Victoria   | EST/EST        | 10                 |
| Australia    | Australia/NSW        | EST/EST        | 10                 |
| Australia    | Australia/Yancowinna | CST/CST        | 9:30               |
| Europe       | Britain              | GMT/BST        | 0                  |
| Europe       | Europe/Western*      | WET/WET-DST    | 0                  |
| Europe       | Europe/Middle*       | MET/MET-DST    | 1                  |
| Europe       | Europe/Central*      | CET/CET-DST    | 1                  |
| Europe       | Europe/Eastern*      | EET/EET-DST    | 2                  |
|              | Poland               | MET/MET-DST    | 2                  |
|              | Turkey               | EET/EET-DST    | 3                  |
| Japan        | Japan*               | JST            | +9                 |
| Singapore    | Singapore*           | SST            | +8                 |
| New Zealand  | NewZealand*          | NZST/NZDT      | +12                |

\* This time zone is compiled in.

## Define the Local Time Zone

The next step is to define your local time zone information (see Example 3-7):

Using CNFNET, you need to specify your local time zone information as it relates to the offset from Universal time. You can choose to either:

- Specify a time zone offset or name as a fixed value that you must set manually for each Daylight Savings Time change. This is the existing method.
- Choose to have the Network Time Protocol (NTP) server change the system clock and time offset automatically according to information you provide. This is the new feature and has been added to the configuration prompts.

If you enter an unknown time zone name, the system prompts you for the Universal time offset for the time zone.

For the offset from Universal time, enter **+hhmm** or **-hhmm**, the number of hours (*hh*) and minutes (*mm*) offset from Universal time; + is for east and - is for west of the central meridian. Example 3-7 uses an offset for Eastern Standard Time (-0500). Make sure the specification is five characters long, so include any leading and trailing zeros.

The following describes the CNFNET process for configuring the time zone information (see Table 3-7).

---

### Example 3-7 Sample Defining Your Local Time Zone

---

You need to specify local time zone information. Time zones may be specified as a fixed value, which must be set manually for the Daylight Savings Time change, or you can use the NTP (Network Time Protocol) server to change the system clock and time offset

Do you want to have NTP set the time zone and time offset automatically [N]?

- If you accept the default [N], then the screen displays:

Offset from Universal time in hours and minutes:

+HHMM (east) or -HHMM (west)

Universal time zone: UT, UTC, GMT

North American time zone: EST, EDT, CST, CDT, MST, MDT, PST, PDT

Military time zone: Any single letter A through Z except J

You may enter a non-standard time zone name, although this is discouraged for Internet use. If you use a non-standard name, you are prompted to enter the offset from Universal time as well.

Enter the offset from UT or the local time zone name [UT]: **-0500 Return**

---

If you enter an unknown time zone name, you are prompted for the Universal time offset for the time zone.



For the offset from Universal time, enter +HHMM or -HHMM, for the number of hours (HH) and minutes (MM) the time is offset. The + is for east of the Central Meridian and the - is for west of the Central Meridian. Your entry must be five characters long, so include any leading or trailing zeros.

- If you enter Y at the prompt in the first display, the following appears on the screen:

Enter the time zone name and time zone rules (if different from default rules). TCPWARE:TIMEZONE.DAT contains a list of available time zone rules, or local definitions may be defined in TCPWARE.TIMEZONES.LOCAL.

Enter the time zone name: EST  
Enter the time zone rule:

When you use CNFNET to configure time zones, you are prompted for information that defines symbols in the TCPWARE\_CONFIGURATION.COM file.

- Zone Name
- Time Zone Rule

You can skip the Time Zone Rule prompt when a compiled-in time zone is specified.

Define your local time zone information according to its offset from Universal time. You can either manually change the offset as needed or configure the offset to be done automatically. If you have it done automatically, you need to run NTP.

Enter your local time zone's offset from Universal time or its symbolic time zone abbreviation. See Table 3-7.

**Table 3-7    Symbolic Time Zones**

| This time zone...   | Is abbreviated as...                                                                                                                                    |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Universal Time      | UT, TUC, or GMT                                                                                                                                         |
| North American Time | EST, EDT, CST, CDT, MST, MDT, PST, PDT*<br>*Standard "S" times are one hour later than Daylight "D" times; for example, EST is -0500 while EDT is -0400 |
| Military Time       | Any single uppercase letter A through Z except J (this format not recommended).                                                                         |

## Define the Local Hostname

The next step is to define your local host's name (see Example 3-8):

Enter the official host-domain name for your local host. Press **Return** if the default shown is correct. Make sure you enter the full host-domain name, especially if you plan to use the Domain Name Services.

Define the official host-domain name as other hosts on the network know it. Your hostname defines the TCPWARE\_DOMAINNAME logical that the Domain Name Services use to determine the current domain. The Domain Name Services determines the domain by dropping the hostname and dot from the beginning of the entry you make.

The official name of the local host is usually the same as what you specified at the prompt:

What is the HOST NAME for line...

in the *Enter Address Information for the Network Devices* section. If your network uses domain-name style hostnames, enter the full domain name for your host. Otherwise, enter the full hostname.

Although the hostname is not case-sensitive, TCPware preserves the case as you enter it.

---

### Example 3-8 Sample Defining Your Local Host's Name

---

You need to enter the official name of this host as it is known locally and by other hosts on the network.

If your system will use Domain Name Services, you must enter the full domain name of the host.

Enter the official host-domain name for this host [NUNKI.NENE.COM]:**Return**

---

If you are using the Domain Name Services, continue to the next section, *Update the Hosts. File*. If you are not using the Domain Name Services, this completes the TCP/IP core configuration. If you need to configure the TCP/IP components, continue to the next chapter.

## Update the Hosts. File

Ignore this section if you are using the Domain Name Services (DNS).

If you are not using DNS, you need to define a host definition (HOSTS.) file. Some Socket Library routines use this file when looking up hostnames and internet addresses. If you configure TCPware for the first time, TCPware creates the HOSTS. file automatically.

Follow these steps to update the host definition (HOSTS.) file (see Example 3-9):

**Note!** If this is not a first-time installation, CNFNET may identify that a HOSTS. file already exists and asks if you want to use it or create a new one. The default is NO (do not use the existing file). If you accept this default, a new HOSTS. file is created. Make sure that you properly define these hosts in the file. If you answer **Y**, the core configuration ends here.

- 1 The local loopback and the hostname you entered previously become the first entries in the HOSTS. file. Enter the next hostname at the prompt:

Next host name (<return> to end):

- 2 Enter the Internet address of the hostname.

- 3** Continue entering hostnames until you define all the hosts and their Internet addresses. Then press **Return** at the prompt:

Next host name (<return> to end):

Although hostnames are not case-sensitive, TCPware preserves their case as you enter them.

---

### **Example 3-9 Creating the HOSTS. File**

---

You can enter the host name and the corresponding internet address for the hosts on the network.

The host definition file, TCPWARE\_COMMON:[TCPWARE]HOSTS., contains the host names and internet addresses for the hosts on the network. You may also edit this file manually.

localhost LOOPBACK (127.0.0.1) added to host definition file.

NUNKI.NENE.COM (192.168.1.56) added to host definition file.

Next host name (<return> to end): **DAISY Return** [1]

Internet address for DAISY.NENE.COM: **192.168.1.57 Return** [2]

DAISY.NENE.COM (192.168.1.57) added to host definition file.

Next host name (<return> to end): **Return** [3]

---

If you need to define additional hostnames later, or correct names already entered, edit the TCPWARE:HOSTS. file directly. The syntax of entries in the file is:

***address hostname [alias [alias...]]***

If you need to configure TCP/IP components, continue to the next chapter now.



## Chapter 4

---

# Configuring the TCP/IP Services

## Introduction

This chapter describes how to configure the TCP/IP Services of TCPware. It is for the OpenVMS system manager or operator responsible for product configuration.

Proceed with this chapter after you install TCPware (Chapter 2) and configure the TCP/IP core environment (Chapter 3).

This chapter focuses on using the CNFNET menu-driven method (see Chapter 3) and the text and prompts that appear for a full configuration. Your configuration might differ, especially if you are changing specific component configurations.

For a basic configuration, accept the default values for each component, which appear in brackets after a prompt. This also helps you step through the process more quickly.

Each component configuration is described in its own section and in the order it occurs during the full configuration process. You can return to a specific component after you complete the full configuration procedure. Instructions to access the specific component configuration are given in each section.

**Note!** If you did not configure the core environment, the following message appears:  
Please configure the core environment before configuring a specific component  
Return to Chapter 3, the *Start CNFNET* section.

**Note!** You do not need to reboot your system after the configuration.

A full configuration example appears in Appendix B.

## Configure the TCP/IP Services

How you start to configure the TCP/IP Services components depends on how you chose to configure the core environment.

## Basic Configuration Choice

If you invoked CNFNET in one of the following ways, you transition into the basic configuration after you complete the TCP/IP core configuration (in Chapter 3):

- @TCPWARE:CNFNET
- @TCPWARE:CNFNET TCPWARE
- @TCPWARE:CNFNET TCP
- @TCPWARE:CNFNET BASIC

After you complete the core environment configuration, you transition to the first prompt for the ACE/Client configuration, as in Example 4-1.

### Example 4-1 Transition to a Basic Configuration

---

You can enter the host name and the corresponding internet address for the hosts on the network.

The host definition file, TCPWARE\_COMMON:[TCPWARE]HOSTS., contains the host names and internet addresses for the hosts on the network. You may also edit this file manually.

localhost LOOPBACK (127.0.0.1) added to host definition file.

NUNKI.NENE.COM (192.168.1.56) added to host definition file.

Next host name (<return> to end): **DAISY Return**

Internet address for DAISY.NENE.COM: **192.168.1.57 Return**

DAISY.NENE.COM (192.168.1.57) added to host definition file.

Next host name (<return> to end): **Return**

Do you want to use the TCPware ACE/Client to authenticate user login?[YES]

---

## Full Configuration Choice

Use the full configuration choice when you want to configure all the TCPware components. You perform a full configuration when you invoke CNFNET using

**@TCPWARE:CNFNET MENU,**

enter **1** (Configure TCPware Services) at the Enter configuration option: prompt, and enter **2** (Configure all TCP/IP components) after you perform the TCP/IP core configuration and return to the TCPware Services Configuration Menu (see Example 4-2).

You also perform a full configuration when you invoke CNFNET using

**@TCPWARE:CNFNET FULL.**

You usually perform a full configuration when you are familiar with each TCPware component and

want to customize your settings.

Proceed directly to the *Configure the TCPware ACE/Client* section.

---

**Example 4-2 Invoking a Full Configuration**

---

TCPware Services Configuration Menu

Configuration Options:

- 1 - Core environment for TCP/IP services
- 2 - Configure all TCP/IP components
- 3 - Configure a specific TCP/IP component
- 4 - Startup/Restart TCP/IP services
- 5 - Shutdown TCP/IP services
- 6 - Startup/Restart a specific TCP/IP component
- 7 - Shutdown a specific TCP/IP component

E - Exit to previous menu

Enter configuration option: **2 Return**

---

## Component Configuration Choice

The component configuration is most useful for fine tuning an individual component configuration. It is essentially a full configuration, but for a single component only. You start a component configuration when you invoke CNFNET using

**@TCPWARE:CNFNET MENU**

complete the core configuration, return to the TCPware Services Configuration Menu (as in Example 4-2), and enter 3 (Configure a specific TCP/IP component) at the prompt: Enter configuration option:.

You then access the Configuring a Specific TCP/IP Component menu (see Example 4-3). Enter the number next to the component listed at the prompt:

Enter menu option:

For example, to configure the NFS-OpenVMS Client, enter 2. (You can also enter the component name, such as **CNFS**.)

You can also perform a component configuration when you invoke CNFNET as follows:

**\$ @TCPWARE:CNFNET component**

Substitute the component name abbreviation for *component* in the command. Use the abbreviations listed after the numbers in Example 4-3. For example, to configure the NFS-OpenVMS Client, enter

**@TCPWARE:CNFNET CNFS.**

Proceed directly to the *Configure the TCPware ACE/Client* section.

### Example 4-3 Configuring a Specific TCP/IP Services Component

---

Configuring a Specific TCP/IP Component

Configuration options:

- 1 - ACCOUNTING Configure the TCP/IP Services accounting facility
- 2 - ACECLIENT Configure the ACE/Client Service
- 3 - CNFS Configure the NFS-OpenVMS Client
- 4 - DHCP Configure the Dynamic Host Configuration Protocol Server
- 5 - DNIP Configure DECnet over IP tunnels
- 6 - DNS Configure the Domain Name Server
- 7 - FTP Configure the FTP-OpenVMS Server
- 8 - GATED Configure the Gate Daemon
- 9 - IMAP Configure the Internet Message Access Protocol Server
  
- 10 - IPP Configure the Internet Printer Protocol
- 11 - KERBEROS Configure the Kerberos Services
- 12 - LPS Configure the Line Printer Services
- 13 - MISC Configure the Miscellaneous Services
- 14 - NFS Configure the NFS-OpenVMS Server
- 15 - NTP Configure the Network Time Protocol Daemon
- 16 - POP3 Configure the Post Office Protocol V3 Server
- 17 - PWIP Configure the PWIPDRIVER
- 18 - RCMD Configure the Berkeley R Commands
- 19 - SMTP Configure the Simple Mail Transfer Protocol Services
- 20 - SNMP Configure the Simple Network Management Protocol Agents
- 21 - SSH Configure the SSH-OpenVMS Server
- 22 - TALK Configure the TALK server
- 23 - TELNET Configure the TELNET-OpenVMS Server
- 24 - TIMED Configure the TIMED Server
- 25 - XDM Configure the XDM Server

Enter menu option (E to exit):

## Configure the TCPware ACE/Client

CNFNET begins the component configuration by asking you questions about the TCPware ACE/Client part of Token Authentication, if you decide to configure it. Token Authentication provides secure logins.

### Prepare

Determine the value of the parameters for the Access Control Encryption Client (ACE/Client) to enable authentication through the Security Dynamics ACE/Server:

- Make sure the Security Dynamics ACE/Server is set up.
- Determine if you want to authenticate user remote logins, such as with SET HOST, and user network logins, such as with RLOGIN or TELNET.



- Determine how often you want the PASSCODE to regenerate on the SecurIDW "smart card" (usually every 60 seconds).
- Determine the directory where you want the TCPware ACE/Client data file to reside (usually in TCPWARE\_COMMON:[TCPWARE.ACECLIENT\_DATA]).

## CNFNET Steps

Configure TCPware's ACE/Client as part of the general CNFNET configuration or specifically as @TCPWARE:CNFNET ACECLIENT (see Example 4-4):

### 1 Respond to the prompt

Do you want to use the TCPware ACE/CLIENT to authenticate user login ?  
[YES]: **Return.**

### 2 Respond to the prompt

Do you want to configure the TCPware ACE/CLIENT [YES]: **Return.**

### 3 If you want to authenticate users over remote terminal connections such as with SET HOST, respond to the prompt

Do you want to authenticate user remote logins? [YES]: **Return.**

### 4 If you want to authenticate users over network terminal connections such as with RLOGIN and TELNET, respond to the prompt

Do you want to authenticate user network logins? [YES]: **Return.**

### 5 The PASSCODE timeout parameter is the maximum time TCPware ACE/Client waits for a user to type in the PASSCODE. The default value is 60 seconds. Provide the PASSCODE timeout in seconds at the prompt

Enter the PASSCODE input timeout time [60]: **Return .**

### 6 The TCPware ACE/Client requires a data directory. The default directory location where the data files reside is TCPWARE\_COMMON:[TCPWARE.ACECLIENT\_DATA]. The logical TCPWARE\_ACECLIENT\_DATA\_DIRECTORY points to the TCPware ACE/Client data directory. Enter the directory where the TCPware ACE/Client data file should reside at the prompt

Enter directory where the TCPware ACE/Client data file resides  
[TCPWARE\_COMMON:[TCPWARE.ACECLIENT\_DATA]]: **Return .**

### 7 CNFNET displays the current TCPware ACE/Client configuration parameters. Confirm that they are correct at the prompt

Is this configuration correct [YES]: **Return.**

---

## Example 4-4 Configuring the ACE/Client

```
Do you want to use the TCPware ACE/CLIENT to authenticate user login?[YES]:
Return [1]
```

Do you want to configure the TCPware ACE/CLIENT [YES]: **Return** [2]

Remote terminal devices can be sessions that are connected via the SET HOST command.

Do you want to authenticate user remote logins? [YES]: **Return** [3]

Network terminal devices can be sessions that are connected via TELNET, RLOGIN, etc.

Do you want to authenticate user network logins? [YES]: **Return** [4]

Provide the following time in seconds.

The PASSCODE timeout parameter is the maximum time TCPware ACE/Client waits for a user to type in the PASSCODE. The default value is 60 seconds.

Enter the PASSCODE input timeout time [60]: **Return** [5]

The TCPware ACE/Client requires a data directory. The default directory location where the data files reside is  
TCPWARE\_COMMON:[TCPWARE.ACECLIENT\_DATA]: The logical  
TCPWARE\_ACECLIENT\_DATA\_DIRECTORY points to TCPware ACE/Client data directory.

Enter directory where the TCPware ACE/Client data file resides  
[TCPWARE\_COMMON:[TCPWARE.ACECLIENT\_DATA]]: **Return** [6]

The current TCPware ACE/Client configuration parameters are:

```
PASSCODE timeout (sec): 60
TCPware ACE/Client Data Directory: TCPWARE_COMMON:[TCPWARE.ACECLIENT_DATA]
Authenticate remote logins: 1
Authenticate network logins: 1
```

Is this configuration correct [YES]: **Return** [7]

---

## Other Tasks

- 1 Be sure that the ACE/Server functions are administered on the server (through the sdadmin program).
- 2 Be sure that the ACE/Server configuration file, SDCONF.REC, was copied from the server to the ACE/Client machine's TCPWARE\_ACECLIENT\_DATA\_DIRECTORY.
- 3 Use NETCU commands to monitor and control which users should be authenticated before granting access.

For details, see the *Management Guide*, Chapter 22, *Managing Token Authentication*.

## Configure the NFS-OpenVMS Client

Because you need to install, configure, and start TCPware for OpenVMS before you can set up the NFS-OpenVMS Client, you might want to enter **N** at the prompt:

Do you want the NFS Client [YES]

This lets you continue with CNFNET. You can always go back later to invoke the NFS-OpenVMS Client component configuration using

```
@TCPWARE:CNFNET CNFS.
```

You need to first use the Network Control Utility (NETCU) to define entries for the PROXY and GROUP databases to enforce file system protection across the network.

## Prepare

Before you add users to the PROXY and GROUP databases, you need to:

- Be sure the network is up and running.
- Identify which OpenVMS client users need to access NFS served files on the network.
- Match the OpenVMS users with valid accounts on the host running the NFS server software. In some cases, you might need to create new usernames to accommodate these accounts.

---

### Example 4-5 Adding Users to the Client PROXY Database

---

```
$ NETCU
NETCU> SHOW PROXY
%TCPWARE_NETCU-I-NOENTRIES, no PROXY entries found

NETCU> ADD PROXY SMITH /UID=1127 /GID=15 /CLIENT/SERVER
NETCU> SHOW PROXY
NFS PROXY Database V5.6 Copyright (c) 2002 Process Software

Username UID GID Host(s)

SMITH 1127 15
```

| Username | UID  | GID | Host(s) |
|----------|------|-----|---------|
| SMITH    | 1127 | 15  |         |

```
NETCU> RELOAD PROXY SMITH
```

---

## Add GROUP Users

To add users to the client GROUP database (see Example 4-6):

- 1 Access the UNIX server and issue the `cat /etc/group` command at the UNIX system prompt. The format of each entry in the `/etc/group` file is:

```
unix-group:encrypted-password:GID:user-list
```

- 2 Select the file record with the *unix-group* that you want to associate with the OpenVMS user, and record the GID number. For example, select the following accounting group:

```
accounting:*:30:smith,jones
```

Then record the GID as the number 30.

- 3 Log out of the UNIX NFS server system.
- 4 Set the default to SYSS\$SYSTEM on the OpenVMS system and run AUTHORIZE.

- 5 Enter the SHOW/IDENT command and check the list of authorized rights identifiers.
- 6 Enter the ADD /IDENTIFIER command along with an OpenVMS rights identifier that corresponds to your chosen entry on the UNIX server.
- 7 Grant the ACCOUNTING identifier to all client users you want to have group access to the server file. These users should correspond to the *user-list* entries for the entry in the /etc/group file. Use the GRANT /IDENTIFIER command for each user.
- 8 Exit AUTHORIZE.

### Example 4-6 Adding Users to the GROUP Database

---

```
> cat /etc/group
wheel:*:0:
nogroup:*:65534:
daemon:*:1:
kmem:*:2:
bin:*:3:
tty:*:4:
operator:*:5:
news:*:6:
uucp:*:8:
audit:*:9:
login:*:15:joe2
staff:*:10:peters,henry
other:*:20:
accounting:*:30:smith,jones|
> exit
logout
$ SET DEF SYS$SYSTEM
$ RUN AUTHORIZE
UAF> SHOW/IDENT *
```

| Name        | Value           | Attributes |
|-------------|-----------------|------------|
| BART        | [001000,000127] |            |
| DECNET      | [000376,000376] |            |
| DIALUP      | %X80000002      |            |
| FAL\$SERVER | [000376,000373] |            |
| INTERACTIVE | %X80000003      |            |
| LOCAL       | %X80000004      |            |
| SYSTEM      | [000001,000004] |            |
| USER        | [000200,000200] |            |

```
UAF> ADD/IDENTIFIER ACCOUNTING
%UAF-I-RDBADDMMSG, identifier ACCOUNTING value: %X80010006 added to
rights
data base
UAF> GRANT/ID ACCOUNTING SMITH
%UAF-I-GRANTMSG, identifier ACCOUNTING granted to SMITH
UAF> GRANT/ID ACCOUNTING SMITH
%UAF-I-GRANTMSG, identifier ACCOUNTING granted to SMITH
UAF> EXIT (continued on next page)
```

```
%UAF-I-NOMODS, no modifications made to system authorization file
%UAF-I-NAFNOMODS, no modifications made to network proxy data base
%UAF-I-RDBDONEMSG, rights data base modified
```

---

## Add GROUP Groups

To add a group to the GROUP database (see Example 4-7):

- 1 Run NETCU.
- 2 Enter an ADD GROUP command for the new group. Use the format:

```
ADD GROUP nfs-group identifier
```

*nfs-group* is the same number as the group in the /etc/group file on the server; for example, 30 in the accounting:\*:30:smith,jones entry.

*identifier* is the rights identifier you previously defined with the ADD /IDENTIFIER command; for example, ACCOUNTING.

- 3 Enter the SHOW GROUP command in NETCU to confirm that the GROUP database contains the correct information. The value can be either hexadecimal (as in Example 4-7) or in UIC format (such as [1000,1000]).
- 4 Enter the RELOAD GROUP command if you added a group to an existing GROUP database. This command ensures that new entries take effect by reloading the database on the client.
- 5 Exit NETCU.
- 6 Repeat the process for each new group definition; for example, group 10 in Example 4-6 (the staff:\*:10:peters,henry entry in the /etc/group file on the server).

---

### Example 4-7 Adding the Group to the GROUP Database

---

```
$ NETCU
NETCU> ADD GROUP 30 ACCOUNTING

NETCU> SHOW GROUP
NFS GROUP Database V5.6 Copyright (c) 2002 Process Software

Group Name Value Host(s)

30 ACCOUNTING %X80010006

NETCU> RELOAD GROUP
NETCU> EXIT

$ RUN AUTHORIZE
UAF> ADD /ID STAFF
%UAF-I-RDBADDMMSGU, identifier STAFF added
UAF> GRANT /ID STAFF PETERS
%UAF-I-GRANTMSG, identifier STAFF granted to PETERS
UAF> GRANT /ID STAFF HENRY
```

```
%UAF-I-GRANTMSG, identifier STAFF granted to HENRY
$ NETCU
NETCU> ADD GROUP 10 STAFF
```

---

See the *Management Guide*, Chapter 13, *Managing NFS-OpenVMS Client*.

## Configure the Dynamic Host Configuration Protocol Client (DHCP Client)

Before setting up a DHCP client, you should talk to your network administrator. The administrator may want to assign a host name to your DHCP client.

If this is your first time using the DHCP client on the host, you need to do the following:

```
$ COPY TCPWARE:DHCLIENT_CONF.TEMPLATE TCPWARE:DHCLIENT.CONF
```

Then, edit the file “TCPWARE:DHCLIENT.CONF” to replace this line:

```
#Send host-name "testing";
```

with this line:

```
Send host-name "any hostname you want";
```

You can configure your local host to use the DHCP client when you run the TCPware configuration utility CNFNET. There are two ways to do it:

```
$ @TCPWARE:CNFNET
```

```
$ @TCPWARE:CNFNET DHCLIENT
```

After you configure the local host to use DHCP client, you can run

```
@TCPWARE:STARTNET
```

to start TCPware. You can also use the same method above to disable the DHCP client on the host. Here are two examples:

### Example 4-1 Using CNFNET

---

```
$ @TCPWARE:CNFNET
```

```
TCPware (R) for OpenVMS Version 5.5-1 Network Configuration procedure for:
TCP/IP Services: NetWare Services:
```

|                    |             |
|--------------------|-------------|
| FTP-OpenVMS        | FSS-OpenVMS |
| NFS-OpenVMS Client | NPS-OpenVMS |
| NFS-OpenVMS Server | TES-OpenVMS |
| SMTP-OpenVMS       |             |
| TELNET-OpenVMS     |             |
| Kerberos Services  |             |
| SSH-OpenVMS Server |             |

This procedure helps you define the parameters needed to get TCPware (R) for OpenVMS running on this system.

This procedure creates the configuration data file, TCPWARE\_SPECIFIC:[TCPWARE]TCPWARE\_CONFIGURE.COM, to reflect your system's configuration.

Type **Return** to continue... **Return**

... ..  
... ..

You need to supply the following information for each line:

- The internet address for the line
- The name for the line (same as the host name if single line host, fully qualified domain name if using DNS)
- The subnet mask for the line
- The line specific information (depends on the line)

If there is a DHCP server running on the network and this is a single line host, you may get the information from DHCP server automatically. To do so, please select 2.

1. Configure Internet address and related items manually.
2. Configure Internet address and related items automatically

Continue with selection [1]:2 **Return**

Configure line SVA-0:

Set DHCP client Host Name

You can press Enter to let the system choose a host name. Or you can specify a name you would like to use for the host. However, the final name for the host will be up to the DHCP server to decide, it may not be the name you specify.

Host Name (**Return** to end) []:**Return**

You need to specify local time zone information. Time zone maybe specified as fixed value which must be manually set for the daylight savings time change, or you can use NTP (Network Time Protocol) Daemon to change the system clock and time offset automatically.

Do you want to have NTP set the time and time offset automatically [NO]?

... ..  
... ..

### Example 4-2 Using CNFNET DHCLIENT

---

\$ @TCPWARE:CNFNET DHCLIENT

TCPware(R) for OpenVMS Version 5.5-1 Network Configuration procedure for:  
TCP/IP Services:                      NetWare Services:

|                    |             |
|--------------------|-------------|
| FTP-OpenVMS        | FSS-OpenVMS |
| NFS-OpenVMS Client | NPS-OpenVMS |
| NFS-OpenVMS Server | TES-OpenVMS |
| SMTP-OpenVMS       |             |
| TELNET-OpenVMS     |             |
| Kerberos Services  |             |
| SSH-OpenVMS Server |             |

This procedure helps you define the parameters needed to get  
TCPware(R) for OpenVMS running on this system.

This procedure creates the configuration data file,  
TCPWARE\_SPECIFIC:[TCPWARE]TCPWARE\_CONFIGURE.COM, to reflect your system's  
configuration.

Type **Return** to continue... **Return**

Configuring the Dynamic Host Configuration Protocol (DHCP) Client:

Do you want to use the DHCP Client [YES]: **Return**

The DHCP Client can perform error logging and debug message logging to  
OPCOM.

You can choose whether to log debug messages to OPCOM (errors are always  
logged to OPCOM).

Log error/debug messages to OPCOM [NO]: **Return**

Set DHCP client Host Name :

You can press Enter to let the system choose a host name. Or you can  
specify a name you would like to use for the host. However, final name for  
the host will be up to the DHCP server to decide, it may not be the name  
you specify.

Host Name (**Return** to end) []:



```
Do you want to restart DHCPCLIENT [NO]:Return
$
```

## Configure the Dynamic Host Configuration Protocol Server (DHCP)

The Dynamic Host Configuration Protocol (DHCP) Server supports the DHCP protocol and the BOOTP (bootstrap) protocol. Both protocols allow you to supply IP addresses and network configuration data to remote client systems.

### CNFNET Steps

You can configure the DHCP server as part of the general CNFNET configuration or specifically using @TCPWARE:CNFNET DHCP (see Example 4-8):

- 1 At the prompt, enter **Y** if you want DHCPD, or press **Return** or enter **N** if you do not want DHCPD.
- 2 If you responded **Y** in step 1, you must also specify what kind of error logging and debug logging you want and where you want the logging to go.
  - a Specify the debug logging level you want, or press **Return** to accept the default, which is to log severe errors and warnings.
  - b Specify the name of the debug log file you want, or press **Return** to accept the default (TCPWARE:DHCPDEBUG.LOG). Enter **\_NL:** to have no log file.
  - c At the prompt, enter **Y** if you want the date included in each log file entry (the time is always included), or press **Return** or enter **N** if you do not want the date included.
  - d At the prompt, enter **Y** if you want debug messages logged to OPCOM, or press **Return** or enter **N** if you do not.

For more information on DHCP, see the *Management Guide*, Chapter 2, *DHCP/BOOTP Server*.

---

### Example 4-8 Configuring DHCP

---

Configuring the Dynamic Host Configuration Protocol (DHCP) Server:

```
Do you want to enable the Dynamic Host Configuration/Bootstrap Protocol
Server (DHCPD) [YES]: Y Return [1]
```

The DHCP server can perform error logging and debug message logging to OPCOM or a file or both. You can set the error/debug logging level, the name of the file to log to (if any), whether to include the date on each entry in the log file, and whether to log debug messages to OPCOM (errors are always logged to OPCOM). The logging level value is a decimal integer that is a bitmask of levels of increasing severity. The levels are (in decimal):

- ```
1   Severe Errors
3   Warnings
```

```
7   Informationals
15  Debug Messages
31  Dump Packets (Formatted)
63  Dump Packets (Hex)
It is recommended that the value be set to log at least severe errors
and warnings.
```

```
Error/Debug logging level [3]:      Return    [2a]
```

```
Debug file name (use _NL: for none) [TCPWARE:DHCPDEBUG.LOG]: Return
[2b]
```

```
Include date on each log entry [NO]: Return    [2c]
```

```
Log debug messages to OPCOM [NO]:    Return    [2d]
```

Configure DECnet over IP Tunnels

The next step is to configure DECnet over IP tunnels. Tunneling DECnet over IP allows you to configure a DECnet line and circuit between two OpenVMS systems running TCPware.

Prepare

To configure DECnet over IP tunneling, you need:

- The Internet address of the remote host that establishes the tunnel.
- The port number for this tunnel on the remote host (the default port number is 64215).

CNFNET Steps

You can configure TCPware's DECnet over IP tunnels as part of the general CNFNET configuration or specifically as **@TCPWARE:CNFNET DNIP** (see Example 4-9).

- 1 Respond to the prompt **Do you want to configure DECnet over IP tunnels [NO]:** with **Y**.
- 2 Specify the DECnet line name for the first DECnet over IP tunnel. If this is the first DECnet over IP tunnel, enter **DNIP-0-0**.
- 3 Enter the Internet address of the remote host.
- 4 Enter the port number for this tunnel on the remote host. To accept the default port number [64215], press **Return**.
- 5 Enter the port number for this tunnel on the local host. If the one given is correct, press **Return**.
- 6 Enter **Y** if you want to configure another DECnet over IP tunnel. If you answer **N**, return to step 2 and configure the next DECnet over IP tunnel.
- 7 To end configuring tunnels, enter **N** or press **Return** when the **Do you want to configure another tunnel** prompt reappears.
- 8 If the DNIP configuration is correct, enter **END** or **E** at the **What would you like to do (ADD, CHANGE, DELETE, or END):** prompt.

Example 4-9 Configuring DECnet over IP Tunnels

Configuring DECnet over IP tunnels:

DECnet over IP tunneling allows you to establish DECnet lines and circuits over a TCP/IP network.

Do you want to configure DECnet over IP tunnels [NO]: **Y Return [1]**

Specify DECnet line name for the tunnel [DNIP-0-0]: **Return [2]**

You need to specify the internet address of the remote host with which you want to establish the tunnel.

Specify remote host internet address: **192.168.2.10 Return [3]**

You need to specify the TCP port number for the tunnel on both the local and remote hosts. Normally you should use the default port number (64215, an unassigned port that is unlikely to be used on your systems). If for any reason you need a different port number, specify it here.

The local port number and remote port number do not have to be the same.

You can use the same port number for more than one tunnel.

Specify port number for this tunnel on remote host 192.168.2.10 [64215]: **Return [4]**

Specify port number for this tunnel on this host [64215]: **Return [5]**

Do you want to configure another tunnel [NO]: **Y Return [6]**

Specify DECnet line name for the tunnel [DNIP-0-1]: **Return**

Specify remote host internet address: **192.168.2.65 Return**

Specify port number for this tunnel on remote host 192.168.2.65 [64215]: **Return**

Specify port number for this tunnel on this host [64215]: **Return**

Do you want to configure another tunnel [NO]: **Return [7]**

The currently configured tunnels are:

DECnet Line	Remote Host	Local Port	Remote Port
-----	-----	-----	-----
DNIP-0-0	192.168.2.10	64215	64215
DNIP-0-1	192.168.2.65	64215	64215

You may enter:

ADD	To add a new tunnel or tunnels
CHANGE	To change an existing tunnel or tunnels
DELETE	To delete an existing tunnel or tunnels
END	To end configuring the DECnet over IP tunneling

What would you like to do (ADD, CHANGE, DELETE, or END): **END Return [8]**

Configure the Domain Name Services (DNS)

If you entered a domain-style hostname when you defined your local hostname during the core configuration, CNFNET asks additional questions about the Domain Name Services.

You can configure the Domain Name Services as part of the general CNFNET configuration or specifically as

@TCPWARE:CNFNET DNS

If this is not a first time installation, CNFNET asks if you want to change the existing configuration. Press **Return** for YES, or enter **N** for NO.

Enabling the DNS server creates a default caching server if there was no previous configuration. If there was a previous configuration in the BIND version 4 format, the configuration is converted to a BIND version 8 format.

If you intend to run a server other than the default caching server, you must edit the DNS configuration. See the *Editing Database Files* section in Chapter 3 of the *Management Guide*.

Example 4-10 Configuring the Domain Name Services

Configuring the Domain Name Services (DNS):

Do you want to change the DNS configuration [YES]: **Return**

Do you want to enable the DNS Server [NO]: **Y Return**

Cluster Load balancing is used to order a list of IP addresses based on their perceived system load. This server must be authoritative for any cluster names that are to use cluster load balancing, and the server must know what those cluster names are. If you would like to use cluster load balancing, enter yes to be prompted to enter cluster names. Use spaces to separate cluster names

Do you want to configure a list of cluster names [NO]: **Y Return**
Enter the cluster name(s) []: **cluster.nene.com Return**

Do you want to enable DNS client support [YES]: **Return**

The client needs to obtain information from an DNS server.

Provide the internet address(es) of up to three DNS servers. Use spaces to separate multiple addresses.

Note: If the local host is configured as a server, you can enter the loopback internet address or the local host's internet address to make use of that server.

Enter the internet address of the server(s) [192.168.1.1]: **Return**

By default, the client appends the local domain name to local queries, and queries that fail resolving as fully qualified names. If you would like other domains appended, provide the name(s) of up to six domains to append. If you do not want to append a domain other than your default

domain, answer no to skip to the next section. Use spaces to separate multiple domains.

Do you want to configure a list of domains [NO]: **Y Return**

Enter the name(s) of the domains in search list []: **nene.com com Return**

By default, the client resolves host names with 1 or more dots absolutely before appending your domain name. If you would like host names with 1 or more dots to be resolved with your domain name first, or you would like host names with no dots to be resolved absolutely, you want to change the number of dots.

Do you want to configure number of dots [NO]: **Y Return**

Enter the minimum number of dots to be resolved absolutely [1]: **2 Return**

This is how your DNS client is configured:

```
Domain Name:      nene.com
Name Server(s):   192.168.1.1
Domain List:      nene.com com
Number of Dots:   2
```

Is this configuration correct [YES]: **Return**

Configure the FTP-OpenVMS Server

CNFNET Steps

You can configure the FTP-OpenVMS Server as part of the general CNFNET configuration or specifically as

```
@TCPWARE:CNFNET FTP.
```

Note! It is advisable, if you want automatic startup of this component, to include the **\$ SET NOON** line in your SYLOGIN.COM file to prevent the component from failing should there be an error in the file.

Example 4-11 Configuring FTP

Configuring FTP-OpenVMS:

Do you want to enable the FTP server [YES]: **Return**

Do you want to enable FTP accounting [NO]: **Y Return**

Name of host that will run accounting collection program [localhost]:

Port number that accounting collection program listens on []:

CNFNET then continues with the resolver configuration, as in the previous section.

Configure the Gateway Routing Daemon

The Gateway Routing Daemon (GateD) manages multiple routing protocols, including the Routing Information Protocol (RIP), Local Network Protocol (HELLO), Open Shortest Path First (OSPF), Exterior Gateway Protocol (EGP), Border Gateway Protocol (BGP), and ICMP Router Discovery.

GateD allows you to control the flow of routing information by means of a configuration language. Once you start GateD, it makes routing decisions based on the data gathered by the routing protocols.

CNFNET Steps

You can configure GateD as part of the general CNFNET configuration or specifically as

@TCPWARE:CNFNET GATED

Press **Return** for YES or enter **N** for NO at the prompt (see Example 4-12).

Example 4-12 Configuring GateD

Configuring the GateDaemon (GateD):

GateD is a routing process that automatically exchanges routing information with other hosts using a variety of protocols. The supported protocols are: RIP Version 1, RIP Version 2, DCN HELLO, OSPF Version 2, EGP Version 2, BGP Versions 2 through 4, and Router Discovery.

Please follow the procedure described in the TCPware for OpenVMS Installation & Configuration Guide to configure GateD.

Do you want to use the TCPware GateDaemon [YES]: **Return**

CAUTION! If using GateD, do not also have route settings in the ROUTING.COM file, since these ROUTES can conflict.

Create the GATED.CONF File

Create the TCPWARE:GATED.CONF configuration file. For example, the statements in the GATED.CONF file shown in Example 4-13 address a situation where the gateway announces a default route to the backbone and announces all the subnet routes to the outside world.

Example 4-13 Default RIP Announcements

```
# enable RIP:
#
rip yes;

# using RIP, announce all local subnets via interface 192.168.12.3:
#
```

```

export proto rip interface 192.168.12.3 metric 3
{
    proto rip interface 192.168.1.5
    {
        all;
    };
};

#
# Using RIP, announce default via interface 192.168.1.5:
#
export proto rip interface 192.168.3.1
{
    proto rip interface 192.168.1.5
    {
        default;
    };
};

```

See the *Management Guide*, Chapter 8, *Routing and GateD*.

Configure the Internet Message Protocol (IMAP) Server

The Internet Message Protocol (IMAP) Server lets remote PC systems receive mail in your system's mailboxes. TCPware's implementation is IMAP Version 4 revision1.

CNFNET Steps

You can configure the IMAP Server as part of the general CNFNET configuration or specifically as **@TCPWARE:CNFNET IMAP** (see Example 4-14):

- 1 Enter **Y** or **Return** at the prompt asking if you want to enable the TCPware IMAP Server.
If you do not want IMAP, enter **N**.
- 2 If you entered **Y**, enter the user (account) the IMAPD (daemon) process should execute as. The default is SYSTEM. Whatever user you choose must have SYSNAM, TMPMBX, NETMBX, and SYSPRV or BYPASS privileges.
- 3 Determine if you want to enable message caching.
By default, the IMAP Server caches only the text of the last accessed message and the attributes of all messages in the currently selected folder. Enabling message caching causes the server to cache the text of all messages once seen and until the folder is closed. Message caching can increase server performance, but requires considerably more memory.
- 4 Determine the debug logging level for the connection. Select:
 - NONE if you do not want debug logging (default)
 - ERROR if you want to log errors only
 - INFO if you want to log informational messages and errors
 - DEBUG if you want complete debug logging

You can enter just the first letter of your choice at the prompt.

- 5 CNFNET displays the IMAP configuration parameters you set. Respond whether this is correct by pressing **Return** for YES, or entering **N** for NO. If NO, return to step 2 to reenter the parameters.
- 6 If you previously configured the IMAP server, a prompt comes up asking if you want to restart it based on the changes you made.

For more information on IMAP, see the *Management Guide*, Chapter 17, *Managing Mail Services*, in the *IMAP Server* section.

Example 4-14 Configuring IMAP

Configuring the Internet Message Access Protocol V4 (IMAP) Server:

For detailed information on the following parameters, refer to the TCPware for OpenVMS Management Guide.

Do you want to enable the IMAP server [YES]: **Return** [1]

Specify the username the IMAPD process should execute as. The account requires SYSNAM, TMPMBX, NETMBX, and SYSPRV or BYPASS privileges.

Enter the username [SYSTEM]: **Return** [2]

The server can be configured to cache all messages in a folder while it is in use. This may increase performance in some cases, but requires substantially more memory per process. By default, only the most recently accessed message is cached.

Do you want to enable full message caching [NO]: **Y Return** [3]

Determine the logging level, Options are:

NONE	- No logging
ERROR	- Errors only
INFO	- Information messages and Errors
DEBUG	- Complete Debug logging

You may enter the first character of your choice.

Enter your choice (None, Error, Info, Debug) [INFO]: **NONE Return** [4]

The IMAP server is configured as follows:

Username	: SYSTEM
Message caching enabled	: YES
log level	: NONE

Is this correct [YES]: **Return** [5]


```
Do you want to restart the Internet Message Access Protocol Server [NO]:  
y Return [6]  
  
Shutting down the Internet Message Access Protocol Server ...  
Starting the Internet Message Access Protocol Server ...
```

Configure the Kerberos Server

If you are configuring Kerberos for TCPware, you can configure your machine as a Primary Kerberos Server and have Kerberos applications, or have just Kerberos applications, such as RCP, RSH, RLOGIN, and TELNET.

CNFNET Steps

You can configure the Kerberos Server as part of the general CNFNET configuration or specifically as **@TCPWARE:CNFNET KERBEROS** (see Example 4-15).

- 1 Enter **y** at the prompt `Do you want the Kerberos Services [NO]:`.
- 2 Press **Return** at the prompt `Do you want to configure Kerberos Services [YES]:`.
- 3 Indicate the type of Kerberos service you want. You can set up your host as a Primary Kerberos Server with Kerberos applications, or can choose not to set it up as a server but have Kerberos applications. Enter **PRIMARY** for a Primary Server with Kerberos applications, or **APPLICATIONS** for Kerberos applications only.
- 4 Enter the name of the default Kerberos realm in which your host resides. The default Kerberos realm name is the DNS domain name. This information is in the `TCPWARE:KRB.CONF` file. Enter your realm name or accept the given default at the prompt `Name of the default Kerberos realm [your-realm]:`.

If the `KRB.CONF` file already exists from a previous configuration, the contents of the file appear. If you want to change this file, enter **y** at the prompt `Do you want to change TCPWARE:KRB.CONF [NO]:`.
- 5 Enter the name of the Primary Kerberos Server at the prompt `Name of the Primary Kerberos server []:`. This name is required.
- 6 Enter the names of any secondary Kerberos server at the prompt `Name of a Secondary Kerberos server []:`. These names are optional.

The prompt reappears, allowing you to specify more secondary servers.

To delete an existing Kerberos secondary server name, enter an asterisk (*).

To stop entering names of secondary Kerberos servers, press **Return**.

To register other Kerberos servers after configuration, edit the `TCPWARE:KRB.CONF` file and add these servers to the end of the file.
- 7 If you entered **PRIMARY** in step 3, enter the maximum age of the Kerberos database. Kerberos servers use the maximum age setting at startup to determine if their databases are too old. Enter the value or accept the default of **NONE** at the prompt `Maximum age of the Kerberos database (in seconds) [NONE]:`.

The range is between one hour (3600 seconds) and three days (259200 seconds). If you enter NONE, TCPware does not check the maximum age of the database.

Example 4-15 Configuring the Kerberos Server

Configuring Kerberos (Version 4) Services:

Kerberos allows you to control user access to network services.

Do you want the Kerberos Services [NO]: **Y Return** [1]

Do you want to configure Kerberos Services [NO]: **Y Return** [2]

There are two Kerberos service types available:

PRIMARY	=	Primary server & Kerberos applications.
APPLICATIONS	=	Kerberos applications only.

Please choose one of (PRIMARY or APPLICATIONS).

What type of Kerberos service do you want [PRIMARY]: **Return** [3]

Enter the name of the default Kerberos realm that this machine resides in. The default for the Kerberos realm name is the DNS Domain Name. This information is stored in TCPWARE:KRB.CONF

Name of the default Kerberos realm [nene.com]: **Return** [4]

Enter the names of the primary and secondary Kerberos servers.

NOTE: The name of the primary server is REQUIRED.

To delete an existing Kerberos secondary server name, type "*" at the prompt.

To stop entering names of secondary Kerberos servers, hit **Return** when there is no default secondary server name present.

If you want to register other Kerberos servers after configuration, edit the TCPWARE:KRB.CONF file and add them to the end of the file.

Name of the Primary Kerberos server []: **PHI Return** [5]

Name of a Secondary Kerberos server []: **BART Return** [6]

Name of a Secondary Kerberos server []: **MARGE Return**

Name of a Secondary Kerberos server []: **Return**

Enter the maximum age of the Kerberos database. Kerberos servers use this at startup to determine if their databases are too old.

The range of this value is between one hour (3600 seconds) and three days (259200).

If you enter "NONE", then the maximum age of the database is not checked.

Maximum age of the Kerberos database (in seconds) [NONE]: **Return** [7]

Configure the Kerberos Applications

You can configure Kerberos for incoming RCP, RLOGIN, RSH, and TELNET services.

CNFNET Steps

Additional Kerberos configuration prompts ask whether you want to allow Kerberos authentication for incoming RCP, RLOGIN, RSH, and TELNET requests (see Example 4-16):

- 1 Determine if you want each application server to:
 - REQUIRE that only Kerberos requests be handled.
 - ALLOW both Kerberos and non-Kerberos requests to be handled.
 - DISABLE Kerberos requests from being handled.
- 2 Respond to whether you want to require, allow, or disable handling of Kerberos authentication requests to the RLOGIN, RSH, and TELNET servers.
- 3 Determine the location of the user's Kerberos ticket file and enter it at the prompt.
- 4 The configuration values appear. Determine if this configuration is correct and press **Return** or enter **N** at the prompt

Is this configuration correct [YES]:.

Note! Once completing the CNFNET procedure, you need to create the Kerberos database and stash the Kerberos master password, otherwise the Kerberos Server will not start. Use the NETCU commands described in Chapter 23 of the *Management Guide, Managing Kerberos*. Then restart Kerberos by entering **@TCPWARE: STARTNET KERBEROS**.

Example 4-16 Figuring Kerberos Applications

Kerberos authentication can be enabled for incoming requests to the RLOGIN, RSH (RCP), and TELNET servers. Available options are:

REQUIRED = Only Kerberos requests are handled.
ALLOWED = Both Kerberos and non-Kerberos requests are handled.
DISABLED = Only non-Kerberos requests are handled.

Please select one of (REQUIRED, ALLOWED, or DISABLED): [1]

Do you want RLOGIN Kerberos authentication requests to be [ALLOWED]:
Return [2]

Do you want RSH (RCP) Kerberos authentication requests to be [ALLOWED]:

Return

Do you want TELNET Kerberos authentication requests to be [ALLOWED]:

Return

Enter the location of the user's ticket file [SYS\$LOGIN:KERBV4.TICKET]:

Return **[3]**

These are the values you have chosen:

Kerberos service type:	PRIMARY
Kerberos database age limit:	NONE
RLOGIN server Kerberos authentication is:	ALLOWED
RSH (RCP) server Kerberos authentication is:	ALLOWED
TELNET server Kerberos authentication is:	ALLOWED
User's ticket file location:	SYS\$LOGIN:KERBV4.TICKET
Local Realm:	nene.com
Primary Server:	phi

Is this configuration correct [YES]: **Return** **[4]**

The Kerberos Primary Server database TCPWARE:PRINCIPAL.OK does not exist on this machine. The Kerberos server will not work properly unless this file exists.

After completing the TCPware configuration, create the Kerberos Database, and stash the Kerberos master password. Once this has been done, shutdown and restart the Kerberos Services.

Consult the TCPware documentation for more details.

Configure the Line Printer Services

The Line Printer Services (LPS) include some of TCPware's remote printing features. LPS supports an LPS client and an Line Printer Daemon (LPD) server. LPS lets you use the LPR, LPQ, and LPRM commands to print local files on remote hosts, display status information for remote print queues, and remove jobs from remote print queues. LPS also lets you use the OpenVMS PRINT command to print files remotely. For LPS, you need to configure:

- The default remote printer for the LPS commands (LPR, LPQ, and LPRM)
- The OpenVMS print queue for the PRINT command
- Possible batch startup
- The LPD server

CNFNET Steps

You can configure the Line Printer Services (LPS) as part of the general CNFNET configuration or specifically as

@TCPWARE:CNFNET LPS

Begin with the following steps (see Example 4-17):

- 1 Enter **Y** at the prompt asking if you want to enable the Line Printer Services.
- 2 Enter **Y** at the prompt asking if you want to configure LPS now.
- 3 Configure the spool directory for LPS. LPS uses a spool directory to temporarily store the files to be printed. You can use the default location or specify a different location as an OpenVMS directory specification. The default is TCPWARE_SPECIFIC:[TCPWARE.LPS_SPOOL].

Note! It might be necessary to configure the remote LPD server to accept print jobs from the client host. See your UNIX system administrator or documentation for information.

Example 4-17 Starting the Line Printer Services Configuration

Configuring the Line Printer Services (LPS):

Line Printer Services consists of the client and the server. The client lets users on this OpenVMS host print files on printers attached to remote hosts. The server accepts files from remote hosts to be printed on printers attached to this OpenVMS host. LPS configuration consists of configuring:

- Default remote printer for LPS Client commands (LPR,LPQ,LPRM)
- OpenVMS Print Queue
- LPD Server

Do you want to enable the Line Printer Services (LPS) [NO]: **Y Return [1]**

Do you want to configure LPS now [YES]: **Return [2]**

Configuring the spool directory for Line Printer Services.

LPS uses a spool directory to temporarily store the files to be printed. You may use the default location or specify a different location as an OpenVMS directory specification.

Enter the spool directory specification

[TCPWARE_SPECIFIC:[TCPWARE.LPS_SPOOL]]: **Return [3]**

Configure the Default Remote Printer for LPS

You can configure the default remote printer to be able to use the UNIX-style LPR, LPQ, and LPRM commands in the Line Printer Services (LPS).

Prepare

To configure LPS on the client so that users can use the UNIX-style LPR, LPRM, and LPQ commands, you need the name of the:

- Local spool directory (TCPWARE_SPECIFIC:[TCPWARE.LPS_SPOOL] by default)
- Remote host serving the print queue
- Print queue on the remote print server

Table 4-3 shows how to locate a print queue name and hostname by viewing the `/etc/printcap` file or printer status on different types of UNIX systems. If the print queue or hostname information needs editing, get your UNIX system manager to make changes.

Table 4-3 Examples of Locating Remote Print Queue and Host Names

On SunOS V4 (BSD UNIX)	On HP-UX (UNIX System V)
<div>Locating the queue name</div> <pre>% more /etc/printcap marketing\$printer :lp=\ :sd=/usr/spool/lpd:\ . . . or % lpc lpc> status marketing\$printer queueing is enabled printing is enabled . . .</pre>	<pre>% lpstat -p</pre>
<div>Locating the hostname</div> <pre>% hostname alpha.daisy.com</pre>	<pre>% hostname alpha.daisy.com</pre>

CNFNET Steps

To configure the default remote printer (see Example 4-18):

- 1 Decide if you want to define the default remote printer at this time.
- 2 Enter the hostname for the remote printer. If you are not planning to use the LPR, LPRM, and LPQ commands, enter an asterisk (*).
- 3 Enter the default remote printer on the remote host; for example
`ALPHA: SYS$PRINT.`
- 4 If the default remote printer configuration is correct, enter END at the prompt
`What would you like to do (CHANGE, DELETE, or END):.`

Example 4-18 Configuring the Default Remote Printer for LPS Commands

Configuring the default remote printer for LPS client commands.

If you plan to use the LPR, LPQ and LPRM commands, you may define a default remote printer. LPS uses this printer if users do not specify a remote printer in the LPR, LPQ, or LPRM command.

Currently there is no default remote printer defined.

Do you want to define the default remote printer [YES]: **Return** [1]

Enter the host name for the remote printer []: **ALPHA Return** [2]

Enter the remote printer on alpha []: **SYS\$PRINT Return** [3]

The current configuration for default remote printer is:

What would you like to do (CHANGE, DELETE, or END): **END Return** [4]

Configure the LPS Client OpenVMS Print Queues

LPS lets you use the OpenVMS PRINT command to print on a remote printer. You can configure local LPS OpenVMS queues to send print jobs to remote printers attached to a remote host running LPD.

CNFNET Steps

To configure LPS client print queues (see Example 4-19):

- 1 For a first time configuration, the message

Currently there is no print queue configured appears.

However, if CNFNET recognizes a PRINTCAP. file on the system, the message A printcap file has been found on this system appears. You have the option to use information in this file at the prompt

Do you want to base the symbiont configuration on printcap [YES]:.

See Chapter 15 in the *Management Guide, Managing Print Services*, for details on the PRINTCAP database.

- 2 If you are not using the PRINTCAP database, enter **Y** at the prompt asking if you want to configure print queues.
- 3 Enter the local LPS OpenVMS queue name; for example: DOC\$PRINT.
- 4 Enter the remote hostname you want associated with the queue; for example: SIGMA.
- 5 Enter the remote printer name associated with the remote host; for example: DOC_PRINTER.
- 6 Enter **Y** or **N** at the prompt asking if users can override the remote printer specification.
- 7 Respond to the prompt asking you to select the formatting options; for example:

Select formatting options (VMS/LPD) [LPD]: **VMS**

- Enter **LPD** (the default) to enable the LPS OpenVMS print queue to send files to the remote LPD server for formatting.
- Enter **VMS** to enable the LPS OpenVMS queue to support the /FORM qualifier and formatting on the local print queue.

8 Responding to the additional qualifiers prompt is optional. Additional qualifiers refer only to qualifiers available with the OpenVMS INITIALIZE/QUEUE command.

For example, to implement OpenVMS device control, enter:

```
/LIBRARY=LN03DEVCTL
```

This qualifier specifies the device control modules within the device control library. Depending on your formatting configuration, this means the LPS OpenVMS queue either applies the device control information to the local device or to the remote device.

9 Enter **Y** or **N** at the prompt asking if you want to configure another print queue.

10 Respond to the prompt asking if you would like to ADD, CHANGE, DELETE, or START a queue, or END configuring the print queues; for example: **END**.

Use the **START** option only if LPS is already running. This is useful for restarting a single queue when changing its configuration or starting the newly created queue without stopping any existing ones.

Example 4-19 Configuring the LPS OpenVMS Print Queues

Configuring LPS OpenVMS Print Queue

You can configure an LPS OpenVMS print queue to print files on a printer attached to a remote host running LPD. Use the OpenVMS PRINT command to send print jobs to this queue.

You must name one or more local OpenVMS print queues for LPS to use. For each local OpenVMS print queue, you must also specify the:

- Associated remote host name
- Name of the printer attached to the remote host

You can also specify additional qualifiers used when LPS initializes the print queue. Please refer to the OpenVMS documentation on the INITIALIZE/QUEUE command for the qualifiers you can use.

Currently there is no print queue configured. [1]

Would you like to configure print queues [NO]: **Y Return** [2]

Specify the OpenVMS print queue name for LPS: **DOC\$PRINT Return** [3]

Specify the remote host name: **SIGMA Return** [4]

Specify the remote printer on sigma: **DOC_PRINTER Return** [5]

May users override the remote printer specification [NO]: **Return** [6]

Select formatting option (VMS/LPD) [LPD]: **Return** [7]

Specify additional qualifier [:] **Return** [8]

Do you want to configure another queue [NO]: **Return** [9]

The currently configured queues are:

OpenVMS Print Queue	Remote Host	Remote Printer	OvR	Fmt
-----	-----	-----	---	---
DOC\$PRINT	sigma	doc_printer	NO	LPD

You may enter:

ADD	To add a new print queue(s)
CHANGE	To change an existing print queue(s)
DELETE	To delete an existing print queue(s)
START	To (re)start print queue(s)
END	To end configuring the print queue(s)

[10]

What would you like to do (ADD, CHANGE, DELETE, START or END): **END Return**

Configure LPS for Batch Startup

You can select to start LPS on a batch queue, which greatly reduces the time of TCPware startup if there are many LPS print queues defined.

To start LPS as a batch job (see Example 4-20):

- 1 Enter **Y** at the prompt asking if you want to start LPS on a batch queue. The default is NO.
- 2 Enter the batch queue name. The default is SYS\$BATCH.

STARTNET now submits the LPS portion of TCPware startup to the specified batch queue. The LPS startup log file, TCPWARE:LPSSTART.LOG, retains the LPS batch startup information.

Go to the next section to configure the LPD Server.

Example 4-20 Configuring LPS for Batch Startup

Do you want to start LPS on a batch queue [NO]: **Y Return**
 Enter the batch queue name for the LPS startup [SYS\$BATCH]: **Return**

When this selection is made, STARTNET will submit LPS portion of startup to the specified batch queue. Log of the startup will remain in TCPWARE:LPSSTART.LOG.

Configure the LPD Server

If you configure the Line Printer Services (LPS), you may also want to configure the LPS server (LPD). LPD allows remote users to send files to print queues on your OpenVMS host. To configure the LPD server (see Example 4-21):

- 1 Enter **Y** at the prompt asking if you want this host to support the LPD server.
If you accept the default NO, go to the next section.
- 2 Enter **Return** or **N** at the prompt if you do not want the LPD server to use batch queues. If you want to use batch queues, enter **Y**.

Note that:

- LPD places the jobs it receives into ordinary OpenVMS print queues. You must define these queues on your local host before anyone can use LPD. TCPware does not set up these queues and you cannot define them in CNFNET. Instead, see your OpenVMS documentation for instructions.
- The local LPD works properly only if the system manager on the remote client with which it communicates properly configured it to send print jobs.

Users at remote clients need to specify names of OpenVMS print queues as printers. On many UNIX systems, the `/etc/printcap` file defines this information. See your client documentation for details.

Note! STARTNET does not define the `TCPWARE_LPD_qname_PARAMETER`, `TCPWARE_LPD_qname_FORM`, and `TCPWARE_LPD_qname_QUEUE` logicals. You should define these system logicals in the system startup file.

Example 4-21 Configuring the LPD Server

Configuring the LPD Server

Do you want this host to support the LPD server [NO]: **Y Return** [1]

Do you want the LPD server to allow batch queues to be used [NO]: **Return** [2]

Build the LPD Server Access File

The LPD Access File determines which remote hosts can use the LPD server and maps remote users to OpenVMS usernames.

Prepare

To build the LPD access file, you need the name of the:

- Remote host allowed access to the print server.
- Remote user on the remote host that you want to be allowed access.
- Local user for the remote user on the print server.
- Default local user for the remote users whose hosts are defined in the LPD Access File but whose remote usernames are not mapped to a specific OpenVMS username.

CNFNET Steps

The LPD server requires an LPD Access File. You can build this file now or later (see Example 4-22):

- 1 Enter **Y** at the prompt asking you if you want to build the LPD Access File now.
If you enter **N** or press **Return**, continue with the next section.
- 2 Enter the name of the remote host allowed access; for example: ALPHA.
- 3 Enter the remote user on the remote host allowed access. For example, the remote user on ALPHA: KOENIG
Use upper- or lowercase letters according to how the remote host defines the name.
- 4 Enter the local username for the remote user at the remote host. For example, KOENIG at ALPHA: LUNA.
The system converts this username to uppercase, regardless of how you enter it.
- 5 Repeat steps 3 and 4 for each remote user permitted to print files on printers attached to your OpenVMS host. After you enter all usernames for a remote host, press **Return**.
- 6 Press **Return** at the remote host prompt to stop entering information.
- 7 Enter a default OpenVMS username; for example, LPD_USER.
Remote users whose hosts are defined in the LPD Access File but whose remote usernames are not mapped to a specific OpenVMS username use this default.

Example 4-22 Building the LPD Access File

The LPD Server requires an LPD Access File, specifying:

- Which remote hosts are permitted to print files on this system.
- Remote-to-local OpenVMS username mappings.

Do you want to build the LPD Access File now [YES]: **Return** [1]

Press return at the remote host prompt to stop entering information.

Enter the name of the remote host allowed access: **alpha Return** [2]

When you have entered all users from alpha to be allowed local access, press return to specify the next remote host.

NOTE: Enter * to map all remote users to a local username.

Enter the remote user on alpha allowed access: **koenig Return** [3]

Enter the local username for koenig at alpha: **luna Return** [4]

Enter the remote user on alpha allowed access: **Return** [5]

Enter the name of the remote host allowed access: **Return** [6]

You need to define a default OpenVMS username for remote users whose hosts are defined in the LPD Access File, but whose remote usernames are not mapped to a local OpenVMS username.

Enter the default OpenVMS username: **lpd_user Return** [7]

Note! Be careful when defining the default OpenVMS username. Remote users can submit batch jobs to your local OpenVMS host by printing to a batch queue (if enabled). To prevent unauthorized users from submitting batch jobs, avoid defining a username belonging to a privileged account (such as SYSTEM). Instead, create a special user account and use the AUTHORIZE utility to restrict access.

Configure the Miscellaneous Services

The miscellaneous services include the following:

TFTPD	Trivial File Transfer Protocol Server
CHARGEND	Character Generator Protocol Server
DAYTIMED	Daytime Protocol Server
DISCARDD	Discard Protocol Server
ECHOD	Echo Protocol Server
QUOTED	Quote-of-the-Day Server
IDENT	Identification Server (formerly Authentication Server)
TIME	Time Protocol

All these services can be enabled or disabled. They also have some options that can be configured.

CNFNET Steps

You can configure the Miscellaneous Services as part of the general CNFNET configuration or specifically as **@TCPWARE:CNFNET MISC** (see Example 4-23):

- 1 At the prompt, enter **Y** if you want TFTP, or press **Return** or enter **N** if you do not want TFTP.
- 2 If you entered **Y** in step 1, you must also enter the TFTP root working directory. Enter a directory name or press **Return** to accept the default (TCPWARE_ROOT:[TCPWARE.TFTP_WORK]). (See the following subsection.)
- 3 For all other services, at the prompt, enter **Y** if you want to enable, or press **Return** or enter **N** if you want to disable service. (See Example 4-23).

See the *Management Guide* for more information on the TFTP and other miscellaneous servers.

TFTP File Access

The TFTP protocol does not provide user authentication. Therefore, TFTP allows access only to files in the TCPWARE_TFTP_ROOT directory and its subdirectories. You usually define this system logical as TCPWARE_ROOT:[TCPWARE.TFTP_WORK], but you can define it

otherwise.

TFTPD allows you to read, create, and write files in this directory. It creates files transferred in "netascii" mode as STREAM_LF formatted files, and files transferred in "binary" mode as fixed-length 512-byte record files.

Example 4-23 Configuring the Miscellaneous Services

Configuring the Miscellaneous Services:

Do you want the Trivial File Transfer Server (TFTPD) [NO]: **Y Return [1]**

You must specify the root working directory for TFTPD.

Remote TFTP users have access only to the files within this directory (and its subdirectories).

NOTE: The TFTP protocol does not provide user authorization. Any remote users can access the files in this directory and its subdirectories. You may want to write protect this directory, if remote users will not need to create new files.

Enter the root working directory for
TFTPD [TCPWARE_ROOT:[TCPWARE.TFTP-WORK]]: **Return [2]**

Do you want the CHARGEN Server (CHARGEND) [NO]:

Do you want the DAYTIME Server (DAYTIMED) [NO]:

Do you want the DISCARD Server (DISCARD) [NO]:

Do you want the ECHO Server (ECHOD) [NO]:

Do you want the QUOTE Server (QUOTED) [NO]:

Do you want the AUTH Server (Identification) [NO]:

Do you want the TIME Service [NO]:

Do you want to restart the miscellaneous servers [NO]:

Configure the NFS-OpenVMS Server

Because you need to install, configure, and start TCPware for OpenVMS before you can set up the NFS-OpenVMS Server, you might want to enter **N** at the Do you want the NFS Server [YES] prompt. This lets you continue with CNFNET. You can always go back later to invoke the NFS-OpenVMS Server component configuration using

```
@TCPWARE:CNFNET NFS
```

Prepare to Set Up the Server

Before you set up the Server:

- 1 Identify the NFS users on the network that should have access to the OpenVMS server.

Obtain the User ID (UID) and Group ID (GID) numbers for each NFS user. For UNIX system users, obtain the UIDs and GIDs from the `/etc/passwd` file (see Example 4-24). For PC users, assign any UIDs and GIDs that do not conflict with existing users.

For an OpenVMS user, assign a UID and GID that does not conflict with UNIX users. You can take the UIDs and GIDs from the user UIC [*gid, uic*]. Any method is acceptable as long as it generates unique UID/GID pairs for each user.

- 2 Identify which OpenVMS directories and files the NFS users need to access. You should export only the necessary directories and files.
- 3 Match the NFS users with the valid usernames of OpenVMS accounts that can use the required directories and files.

In some cases, you need to create new OpenVMS accounts to accommodate the NFS users. You must update your `SYSUAF.DAT` file. (See your OpenVMS documentation.)

Set Up the Server

Setting up the NFS Server consists of the following:

- 1 Add users to the PROXY database.
- 2 Add directories to the EXPORT database.
- 3 If necessary, create a spool directory.
- 4 Restart and test the Server.

Add Users to the Server PROXY Database

To add users to the server PROXY database (see Example 4-25):

- 1 Be sure the network is running.
- 2 Start TCPware.
- 3 Invoke NETCU by entering at the DCL prompt:

```
$ NETCU
```

Enter an ADD PROXY command for each NFS user and superuser. Use the format:

```
ADD PROXY vms-username /UID=uid /GID=gid [/HOST=host]
```

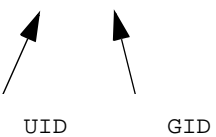
The *vms-username* is the OpenVMS account to which you want to register an NFS user. Enter this name exactly as it is entered in the OpenVMS user authorization file (UAF).

If the username is not in the UAF, use the AUTHORIZE utility and add the user to the UAF. Do this before you add the username to the PROXY database.

Example 4-24 Locating UIDs and GIDs

```
> cat /etc/passwd

gimli:fmE3CZNyjkZt2:1000:15:Frodo Gimli:/usr/users/user:/bin/csh
pippin:TZ7u8CuAJRs5g:1134:15:Merry Pippin:/usr/users/pippin:/bin/csh
```



UID GID

Obtain the *uid* and *gid* values from client's `etc/passwd` file (see Example 4-24). Enter `UID=0` AND `GID=1` for a superuser.

For PC users, assign any UIDs and give the same GIDs to users that need to have group access to files. Do not use wildcards.

Using the added `/HOST` qualifier with a host name value means that only the specified user on the specified host can use the server account.

- 4 Enter the `SHOW PROXY` command to confirm that you entered the information correctly.
- 5 Enter the `RELOAD PROXY` command if you added users to an existing `PROXY` database. This command ensures that new entries take effect by reloading the database on the server.

Example 4-25 Adding Users to the Server PROXY Database

```
(Iota) $ RUN TCPWARE:STARTNET [1]
(Iota) $ NETCU [2]
NETCU> ADD PROXY SYSTEM /UID=0 /GID=1/HOST=SIGMA
NETCU> ADD PROXY GIMLI/UID=1000 /GID=15
NETCU> ADD PROXY PIPPIN /UID=1134 /GID=15
NETCU> SHOW PROXY [3]
NFS PROXY Database V5.6 Copyright (c) 2002 Process Software
```

Username	UID	GID	Host(s)
SYSTEM	0	1	SIGMA
GIMLI	1000	15	
PIPPIN	1134	15	

```
NETCU> RELOAD PROXY [4]
NETCU> EXIT
```

Add Directories to the Server EXPORT Database

To add an entry to the NFS EXPORT database (see Example 4-26):

- 1 Be sure the network is up and running.

- 2 Enter an ADD EXPORT command at the NETCU prompt for each OpenVMS directory you want exported. Use the format:

```
ADD EXPORT "pathname" vms-directory
```

The *pathname* is the name the NFS client uses for the exported directory. Enclose the pathname in quotation marks (" "). The pathname is generally a UNIX-style name similar to an OpenVMS directory name.

Note! The case of the pathname is preserved so you must use the same case when using the NFS MOUNT command.

The *vms-directory* is the device and directory on the local OpenVMS system that you want to export.

When adding an EXPORT entry for the TCPware NFS-OpenVMS Client, export that entry using the /NOCONVERT qualifier to the NFSMOUNT command.

- 3 Enter an ADD EXPORT command for the spool directory if you use PCNFSD for printing.
If the spool directory is a subdirectory of a directory already listed in the EXPORT database, you do not need to create a separate entry.
Do not append the PC client host name to the end of the directory specification.
It is recommended that you enter the PC spool directory entry in the EXPORT database as follows:

```
ADD EXPORT "/spool" device:[directory] /NOCONVERT /RFM=UNDEFINED
```

- 4 Enter the SHOW EXPORT command to confirm your entries.

Note! You can also set additional export parameters, including specifying particular hosts, using ADD EXPORT qualifiers. See the ADD EXPORT command description in Chapter 2 of the NETCU Command Reference, NETCU Commands, for details on these parameters.

Create a Spool Directory

Complete this step only if you have PCs and plan to use the PC NFS protocol (PCNFS) for printing. Otherwise, proceed to the next section.

To create a spool directory (see Example 4-27):

- 1 Enter the CREATE/DIRECTORY command and create a spool directory on the server that the PCNFS server program (PCNFSD) can use for printing.
- 2 Create a subdirectory within the spool directory for each client allowed to use PCNFS for printing. The subdirectory name is the client's host name. You can skip this step if you choose to create subdirectories automatically (see *CNFNET Steps, Part 2*).

Note! You need to export the spool directory only. When you create the EXPORT database, be sure to include the spool directory. Do not include any subdirectories within the spool directory.

Example 4-26 Adding an Entry to the Server EXPORT Database

```

NETCU> ADD EXPORT "/mnt/iota" DUA0:[000000]      [1]

%TCPWARE_NETCU-I-ADDPATH, added path /mnt/iota

NETCU> ADD EXPORT "/pcreports/spool" DUA0:[PCREPORTS.SPOOL] -
_NETCU> /NOCONVERT /RFM=UNDEFINED                [2]

%TCPWARE_NETCU-I-ADDPATH, added path /pcreports/spool

NETCU> SHOW EXPORT                               [3]
NFS EXPORT Database V5.6 Copyright (c) 2002 Process Software

Path                Directory                Host(s)
----                -
/mnt/iota            DUA0:[000000]
/pcreports/spool     DUA0:[PCREPORTS.SPOOL]

NETCU> EXIT

```

Example 4-27 Creating a Spool Directory and Spool Subdirectories

```

$ CREATE/DIRECTORY DUA0:[PCREPORTS.SPOOL]          [1]
$
$ CREATE/DIRECTORY DUA0:[PCREPORTS.SPOOL.DAISY]     [2]
$
$ CREATE/DIRECTORY DUA0:[PCREPORTS.SPOOL.ROSE]
$

```

CNFNET Steps, Part 1

To configure the NFS Server in CNFNET (see Example 4-28):

- 1** Enter **Y** or **Return** at the prompt asking if you would like the NFS v3 Server on this machine. To use the v2 server, enter **N** to get to the NFS v2 prompt.
- 2** Press **Return** to accept the default access identifier.
Accepting the default of [] (null) means that you do not want to add any further access restrictions to the server than already exist. Entering a value further restricts access to the server.
- 3** Press **Return** to accept the default security mask value, or enter a new value.
Accepting the default of [] means that you do not want to add any security mask values. You should normally specify these options on a filesystem basis using appropriate NETCU ADD EXPORT command qualifiers. However, if you want these options on a system-wide basis, add their individual bit mask values and enter the result at the prompt. The options and their matching ADD EXPORT qualifiers are:

- Superuser mount — Only the superuser can mount filesystems (/SUPERUSER_MOUNT)
- Explicit — Only filesystems explicitly exported can be mounted (/EXPLICIT_MOUNT)
- Mount proxy check — The UID/GID used in mount requests must exist in the PROXY database (/PROXY_CHECK)
- Privileged port checks — All incoming NFS requests must originate from privileged ports (/PRIVILEGED_PORT).

Report all access allowed for files to the client (the server does all access checks) (/SERVER_ACCESS)

Allow PCNFS batch queue printing (no corresponding qualifier)

Disable PCNFSD use of the intrusion database (no corresponding qualifier)

Disable PCNFSD deletion of printed files (no corresponding qualifier)

Example 4-28 Configuring the NFS-OpenVMS Server

Configuring NFS-OpenVMS Server:

Do you want the NFS v3 Server (NFSDV3)[YES]: **Return** [1]

For detailed information on NFS-OpenVMS Server parameters, refer to the TCPware for OpenVMS(R) Installation & Configuration Guide.

The access identifier parameter, NFS_ACCESS_IDENTIFIER, specifies the name of the rights identifier to be granted to all NFS users. This parameter is optional.

To remove a previously entered identifier, enter *.

Enter the access identifier []: **Return** [2]

The security mask parameter, NFS_SECURITY, controls access to the OpenVMS system. Note that these options should normally be specified on a file system basis (rather than a global basis) using the appropriate NETCU ADD EXPORT command qualifiers (as indicated below) if applicable.

Bit Mask	Meaning when set
-----	-----
1	Superuser mount. Only the superuser is allowed to mount file systems (/SUPERUSER_MOUNT).
2	Explicit mount. Only file systems explicitly exported can be mounted (/EXPLICIT_MOUNT).
4	Mount proxy check. The UID/GID used in mount requests must exist in the PROXY database (/PROXY_CHECK).
8	Privileged port check. All incoming NFS requests must originate from privileged ports (/PRIVILEGED_PORT).
16	Report all access allowed for files to client (server does all access checks) (/SERVER_ACCESS).
32	Allow PCNFS batch queue printing.
64	Disable PCNFSD use of the intrusion database.

To specify the security mask, add up all the bit mask values for the types of security you want provided.

Enter the security mask []: **68 Return** [3]

CNFNET Steps, Part 2

During the second part of this NFS-OpenVMS Server configuration, you need to respond to the logging class, PCNFSD spool directory, and configuration prompts (see Example 4-29).

If you are configuring the NFS Server for the first time, use the default values to get the Server up and running quickly. You can change the parameter values later.

- 1 Enter **Y** or **Return** to accept the default logging class mask value or enter a new value.
- 2 Enter **Y** or **Return** when asked if you want to enable PCNFSD if you have PCs and plan to use the PC-NFS protocol (PCNFS) for printing.

You can also specify `PRINTING-ONLY` if you want to enable print spooling of files on the server without enabling PCNFSD authentication.

See the *Management Guide*, Chapter 14, *NFS-OpenVMS Server Management*, the *PCNFSD Services* section, for details on PCNFSD authentication.

- 3 If you enable PCNFSD, the Server prompts you to enter the spool directory. Enter the pathname already assigned to the spool directory in the EXPORT database. Do not use quotation marks around the spool directory name. Enter the PC-NFS Client spool directory; for example:

```
/pcreports/spool
```

- 4 You can automatically create subdirectories in the spool directory specified in step 3 for each PCNFSD client. This option simplifies the subdirectory creation process for when many clients are involved. If you decide to enable autocreation, enter **Y** at the prompt. When the configuration parameters appear, the words (autocreate subdirectories) appear after the Spool directory: specification.

The default is **N** since, in many cases, the subdirectories have already been created so that only the specific client has access to the spool directory. With the option set to **YES**, the automatically created subdirectories inherit the permissions from the directory created in step 3, which might not be desired.

- 5 After CNFNET displays the current value of each parameter, enter **Y** or **Return** if the configuration is correct.

If you enter **N**, CNFNET repeats the prompts for each parameter.

Example 4-29 Setting NFS Server Parameters

The logging class mask parameter, `NFS_LOG_CLASS`, controls the types of information written to the log file.

Bit Mask	Meaning when set	Comments
-----	-----	-----
1	Warnings	Error recovery messages
2	Mount Requests	Mount call messages
4	General	General operation messages
8	Security	Security violation messages
16	NFS Errors	NFSERR_IO messages

To specify the logging class mask, add up all the bit mask values for the types of information you want logged. The value -1 logs all classes.

Enter the logging class mask [-1]: **Return** [1]

The PCNFSD enable parameter, NFS_PCNFSD_ENABLE, enables or disables the PCNFSD protocol.

You may enter YES (to enable PCNFSD), NO (to disable PCNFSD), or PRINTING-ONLY (to enable PCNFSD for printing only - authentication requests are ignored).

Do you want PCNFSD enabled [YES]: **Return** [2]

The spool directory parameter, NFS_PCNFSD_SPOOL, defines the spool directory used for printing files with PCNFSD. If this parameter is undefined, the printing capability of PCNFSD is disabled. The spool directory name is case sensitive.

To remove a previously entered spool directory, enter *

Enter the PC-NFS Client spool directory []: **/pcreports/spool Return** [3]

Automatically create subdirectories for each client [NO]: **Y Return** [4]

These are the NFS-OpenVMS Server configuration parameters you selected:

```
NFS Server: Type:           Network File System Server

Access Identifier:         (none)
Security Mask:             68 = Proxy, Disable Intrusion
Logging Class Mask:       -1 = Warnings, Mounts, General, Security,
Errors
PCNFSD enable:             1 (YES)
Spool directory:           /pcreports/spool(autocreate subdirectories)
```

Is this configuration correct [YES]: **Return** [5]

Start and Restart the NFS Server

To start the NFS server (see Example 4-30):

- 1 Enter @TCPWARE:STARTNET NFS at the DCL prompt.
- 2 Enter @TCPWARE:SHUTNET NFS at the DCL prompt, if the server is running.

- 3 Enter `@TCPWARE:STARTNET NFS` at the DCL prompt.

Test the NFS Server

To test the server (see Example 4-31):

- 1 Access an NFS client authorized to use this server.
- 2 On the NFS client, enter a mount command for one of the exported directories. Refer to the directory by the pathname assigned in the EXPORT database.
- 3 For a UNIX client, enter the `cd` command and change the directory to the one you specified in the mount command, for example: `cd /iota`.
- 4 For a UNIX client, issue the `ls` command to show the contents of this directory. The NFS-Server is installed and configured properly if this command does not cause the system to display an error message.

See the text below and Example 12-3 in the *Management Guide* for sample output of the `ls` command.

- 5 Check the log file to make sure the NFS server is running and that status messages do not indicate problems. See Example 4-32.

If problems arise, see the *Troubleshooting* section in Chapter 14, *Managing NFS-OpenVMS Server*, of the *Management Guide* for possible solutions.

If you need to modify the PROXY or EXPORT database, use the commands available through NETCU.

Note! The Server updates the PROXY database dynamically only if you use the /SERVER qualifier with the ADD PROXY command or use the RELOAD PROXY command in NETCU. Also use the RELOAD PROXY command in to reload the database every time you modify the system authorization file (SYSUAF).

Example 4-30 Starting the Server

```
$ @TCPWARE:STARTNET NFS

Starting NFS -OpenVMS Server...
%RUN-S-PROC_ID, identification of created process is 00000060
%RUN-S-PROC_ID, identification of created process is 00000061
.
.
.
$
```

Example 4-31 Testing the NFS Server

```
$ TELNET SIGMA [1]
```

```
.
.
.

sigma.daisy.com# mount iota:/mnt/iota /iota          [2]
sigma.daisy.com# cd /iota                          [3]
sigma.daisy.com# ls                                [4]
backup.sys      contin.sys      lpsCLIENT      sqlsrvSERVER    syslost
badblk.sys      corimg.sys      notesSERVER     sys0             sysmaint
badlog.sys      engineering    nsc             sys293           user
bitmap.sys      indexf.sys     rdmRUJ          syscommon        vmsCOMMON
clipart         lci            root            sysexec          volset.sys
sigma.daisy.com#
```

Example 4-32 Checking the NFS Server Log File

```
$ TYPE TCPWARE:NFSERVER.LOG                      [5]
```

Note! NFS V3 Server - Testing the asynchronous write functionality has revealed a problem with some v3 clients not recognizing failed asynchronous write requests. The writes may fail due to a full UDP buffer on the server. Process Software recommends increasing the UDP buffer size on the server if you are using a v3 client. We have tested successfully with a buffer size of 25:

```
NETCU> START/UDP/UNSOLICITED_RECEIVE_LIMIT=25
```

Configure the Network Time Protocol

The Network Time Protocol (NTP) synchronizes timekeeping among a set of distributed time servers and clients.

CNFNET Steps

You can configure NTP as part of the general CNFNET configuration or specifically as **@TCPWARE:CNFNET NTP** (see Example 4-33):

Enter **Y** or **Return** at the prompt asking you if you want to use the TCPware NTP daemon. This creates the NTP server. (If you do not want NTP, enter **N**.)

Note! If you installed Kerberos on your system, a message appears that you should use NTP. NTP synchronizes your clock with that of other Kerberos users so that authentication will work correctly.

Configuration File

To use NTP, you must create the NTP configuration file, TCPWARE:NTP.CONF. To create the most basic version of this file:

- 1 Determine one, or preferably two, NTP time servers on your network.
- 2 Identify NTP-supporting hosts with which you regularly exchange data where accurate time coordination is an issue.
- 3 Configure each NTP time server as a server and each participating client host as a peer in the NTP.CONF file.

If your time servers were 192.168.67.1, 192.168.67.2, and 192.168.67.3, you could include the entries shown in Example 4-35 in host 192.168.67.100's NTP.CONF file.

You can also designate master clocks and local masters for more advanced configuration.

Note! The WAYTOOBIG parameter takes effect only if the SLEWALWAYS command is utilized in the TCPWARE:NTP.CONF file.

For details, see the *Management Guide*, Chapter 10, *Network Time Protocol (NTP)*.

Example 4-33 Enabling NTP

Configuring the Network Time Protocol (NTP) Daemon:

Kerberos is installed on this system. For Kerberos to work correctly, use the Network Time Protocol (NTP) Daemon to synchronize the clock on this system with the other systems that are also using Kerberos.

Do you want to use the TCPware for OpenVMS NTP Daemon [YES]: **Return**

You may set the parameter WAYTOOBIG, which defines the number of seconds difference between the system clock and the reference clock past which no clock adjustment will be performed by the NTP daemon.

While you may set this to any numeric value you wish, you should realize that setting it to lower than 4000 may interfere with NTP attempting to automatically adjust your system clock for Daylight Savings Time (if your timezone rule calls for that).

Enter value for WAYTOOBIG [289985]: **4000**

Do you want to restart the Network Time Protocol Daemon [NO]: **Y Return**

Example 4-34 Configuring the NTP.CONF File on Host 192.168.67.100

```
server 192.168.67.1
server 192.168.67.2
server 192.168.67.3
peer   192.168.67.101
peer   192.168.67.102 ...
```

Configure the Post Office Protocol Version 3

The Post Office Protocol Version 3 (POP3) Server lets remote PC systems retrieve mail in your system's inbound mailbox.

CNFNET Steps

You can configure the POP3 Server as part of the general CNFNET configuration or specifically as **@TCPWARE:CNFNET POP3** (see Example 4-35):

- 1 Enter **Y** or **Return** at the prompt asking if you want to enable the TCPware POP3 Server.
If you do not want POP3, enter **N**.
- 2 If you enter **Y**, enter the maximum number of new mail messages to return per connection to the remote PC. The default is 32. Either accept the default by pressing **Return** or enter another number.
- 3 Determine the debug logging level for the connection:
 - Select **ERROR** if you want to log errors only
 - Select **INFO** if you want to log informational messages and errors
 - Select **THREAD** if you want detailed thread logging, informational messages, and errors
 - Select **DEBUG** if you want complete debug logging

You can enter just the first letter of your choice at the prompt. The default is **I**.

- 4 If you want to execute a **MAIL PURGE /RECLAIM** operation, enter **Y**.
- 5 CNFNET displays the POP3 configuration parameters you set. Respond whether this is correct by pressing **Return** for YES, or entering **N** for NO. If NO, return to step 2 to reenter the parameters.

For more information on POP3, see the *Management Guide*, Chapter 17, *Managing Mail Services*, the *POP3 Server* section.

Example 4-35 Configuring POP3

Configuring The Post Office Protocol V3 (POP3) Server:

For detailed information on the following parameters, refer to the TCPware for OpenVMS Management Guide.

Do you want to enable the POP3 server [YES]: **Return** [1]

Enter Maximum number of new mail messages to return per connect [32]:
Return [2]

Determine the logging level, Options are:

```
ERROR   - Errors only
INFO    - Information messages and Errors
THREAD  - Detailed Thread logging, information messages and Errors
DEBUG   - Complete Debug logging
```


You may enter the first character of your choice.

Enter your choice (Error, Info, Thread, Debug) [INFO]: **Return** [3]

Do you want to execute a MAIL PURGE/RECLAIM operation after use [YES]:
Return [4]

The POP3 server is configured as follows:

Maximum number of new mail messages to return : 32
Logging Level : INFO
Do a MAIL PURGE/RECLAIM : YES
Is this correct [YES]: **Return** [5]

Configure the PWIPDRIVER

CNFNET Steps

You can enable the PWIPDRIVER for PATHWORKS and DECnet/OSI as part of the general CNFNET configuration or specifically as **@TCPWARE:CNFNET PWIP** (see Example 4-36):

Press **Return** or enter **N** at the prompt asking if you want to enable the PWIPDRIVER. The default is YES.

If you do not want the PWIPDRIVER, enter **N**.

Example 4-36 Configuring the PWIPDRIVER

Configuring the PWIPDRIVER:

The PWIPDRIVER is **required** by Pathworks and DECnet/OSI over TCP/IP.

Do you want to enable the PWIPDRIVER [YES]: **Return**

Configure the Berkeley R Commands

The Berkeley R Commands consist of:

- Three R Services (login, shell, and exec)
- Three clients (RLOGIN, RSH, and RMT)

CAUTION! Make sure that you are familiar with the R Commands and authorization methods before starting the R Services. Failure to do so may inadvertently expose you to a security risk. (See the *Management Guide*, Chapter 16, *Managing R Commands*.)

Configure the R Services

You can enable the Berkeley R Commands as part of the general CNFNET configuration or

specifically as

@TCPWARE:CNFNET RCMD.

First, determine the type of R Service you want to enable:

login, shell, or exec

Read the explanations for each on the CNFNET screen (see Example 4-37).

Proceed directly to the next section to configure the R Commands clients.

Example 4-37 Configuring the R Services

Configuring the Berkeley R Commands:

The Berkeley R Commands have 2 parts: services and clients.

login service allows remote users to log in to this system using the BSD RLOGIN protocol. Authorization is done using equivalence files alone, or with both equivalence files and the user having to enter a password.

shell and exec services both allow remote users to execute a single command on this system. The difference is in the authorization method used. shell uses equivalence files while exec uses explicit username/password strings.

All services can, optionally, use Service Access Lists to further restrict remote access.

There are 3 clients: RLOGIN, RSH, and RMT.

You have the option of making the services available. You should be familiar with the R Commands and the authorization methods before starting the services to insure that you do not inadvertently expose your system to a security risk.

Configure RLOGIN, RSH, and RMT

The R Commands include an RLOGIN Client, RSH Client, and RMT Client. To continue configuring the R Commands (see Example 4-38):

- 1 Press **Return** if you want to activate the login service, or enter **N** if you do not.
- 2 Specify the type of login authorization you want. The selections are NORMAL or SECURE. Press **Return** if you want to accept NORMAL, the default value. Enter SECURE if you want SECURE login authorization. SECURE login authorization requires an RHOSTS file entry on the system.

See the *Host Equivalence Files* section of Chapter 16, *Managing R Commands*, in the *Management Guide* for details.

The login service allows remote users to log in using the BSD RLOGIN protocol.

- 3 Press **Return** if you want to activate the shell service, or enter **N** if you do not. (The Remote Copy Program (RCP) requires this service.)

- 4 Press **Return** if you want to activate the `exec` service, or enter **N** if you do not. (The `RCP` command also requires this service.)
- 5 Press **Return** if you want to install the `RLOGIN` image, or enter **N** if you do not.
- 6 Press **Return** if you want to install the `RSH` image, or enter if you do not.
- 7 Press **Return** if you want to install the `RMTSETUP` image for `RMT`, or enter **N** if you do not.

Note! The `klogin` service starts only if you start the `login` service and allow Kerberos authentication requests for the `RLOGIN` server. The `kshell` service starts only if you start the `shell` service and allow Kerberos authentication requests for the `RSH` server. See the *Configure the Kerberos Server* section for details.

Host Equivalence File

Determine the method you want to use for host equivalence. Once you start TCPware, remote users cannot access the R Services until you set up the "host equivalence" data in the `HOSTS.EQUIV` or `.RHOSTS` file:

- The `HOSTS.EQUIV` file defines which remote hosts or users can access the server host. The `HOSTS.EQUIV` file is in the `TCPWARE` directory and is analogous to the `/etc/hosts.equiv` file in UNIX.

Place the `HOSTS.EQUIV` file in either the `TCPWARE_COMMON:[TCPWARE]` or `TCPWARE_SPECIFIC:[TCPWARE]` directory, depending on your needs.

- The `.RHOSTS` file lets users have remote access to accounts beyond what the `HOSTS.EQUIV` file specifies. The `.RHOSTS` file is in the user's login directory and is analogous to the UNIX `~/.rhosts` file.

To create a `.RHOSTS` file, use a text editor on the TCPware host to create a `SYSS$LOGIN:.RHOSTS` file in your login directory.

Example 4-38 Configuring RLOGIN, RSH, and RMTSETUP

```
Do you want to activate login service [YES]: Return [1]
```

```
There are 2 methods of authorization available for login service.
```

```
NORMAL: Uses equivalence files to authorize remote users, and allows
remote user to try a username/password if there isn't an
equivalence file match.
```

```
SECURE: Uses equivalence files, and if there is a match, requires the
remote user to enter the account's password correctly. If there
is
no equivalence file match, access is denied.
```

```
Which type of login authorization (NORMAL, SECURE) [NORMAL]: Return [2]
```

```
Do you want to activate shell service [YES]: Return [3]
```

```
Do you want to activate exec service [YES]: Return [4]
```

The RLOGIN, RSH, and RMTSETUP (without the /PASSWORD qualifier) commands require SYSPRV privilege to bind to reserved TCP ports which are needed for them to work correctly. In a BASIC configuration, the executable images are INSTALLED with SYSPRV privilege to allow all users on your system to make use of them. In this FULL configuration, you have the option of restricting the use of these 3 commands.

Answering "NO" to the following questions restricts use of the indicated command to users with either SYSPRV or BYPASS privilege only.

Answering "YES" allows general use of the command.

Do you want to INSTALL the RLOGIN image [YES]: **Return** [5]

Do you want to INSTALL the RSH image [YES]: **Return** [6]

Do you want to INSTALL the RMTSETUP image [YES]: **Return** [7]

Note! It is advisable, if you want automatic startup of this component, to include the \$ **SET NOON** line in your SYLOGIN.COM file to prevent the component from failing should there be an error in the file.

Configure SMTP-OpenVMS

Follow these steps to configure SMTP-OpenVMS. Refer to the *TCPware Management Guide*, Chapter 17, and the *TCPware Network Control Utility (NETCU) Command Reference*, Chapter 1, for information on the TCPWARE CONFIGURE /MAIL command.

CNFNET Steps

You can configure SMTP-OpenVMS as part of the general CNFNET configuration or specifically as

@TCPWARE:CNFNET SMTP

- 1 Enter whether you want to use the SMTP Mail Transfer Agent. The default is NO.
- 2 Enter the username of the local postmaster. Press **Return** to accept the default ([SYSTEM]).

One user on this system must act as the local postmaster. This person receives mail sent to the postmaster. The person's username must always be valid while SMTP-OpenVMS operates.

Example 4-39 Configuring SMTP-OpenVMS

Configuring SMTP-OpenVMS:

For detailed information on the following parameters, refer to the TCPware for OpenVMS Management Guide.

Do you want to use the SMTP Mail Transfer Agent? [YES]: **Return**

One user on this system must act as the local postmaster. This person will receive mail sent to the postmaster. The person's username must always be valid while SMTP-OpenVMS is operating.

Enter the username of the local postmaster [SYSTEM]:

Do you want to enable the SMTP RFC2789 MIB [Yes]? **Return**

Do you want to enable SMTP accounting [Yes]? **Return**

Name of the host that will run the accounting collection program
[localhost]:

Port number that accounting collection program listens on []:

For further configuration options, please see the procedure described in the TCPware for OpenVMS Installation & Configuration Guide to configure SMTP-OpenVMS

Configure SNMP Services

SNMP is the Simple Network Management Protocol. Activate the SNMP agent only if your network has an SNMP client (network management station).

CNFNET Steps

You can configure the SNMP Services as part of the general CNFNET configuration or specifically as **@TCPWARE:CNFNET SNMP** (see Example 4-40):

- 1 Enter **Y** if you want to activate the SNMP agent on your host.
- 2 You might want to configure the SNMP Multiplexing (SMUX) Service. If so, activate it on the host by typing **Y** at the prompt. Also, include the relevant peer names in the SNMPD.CONF file (see *Configuration File*) using the given syntax.

Note! Enabling SMUX when there are no SMUX subagents to use it can interfere with walking of the SNMP management base due to the SMUX MIB returning NoSuchName when no subagents exist. SMUX is an historical protocol, and should not be enabled unless there are subagents that will be using it. Specific items in the SNMP management base that appear after the SMUX MIB can still be queried when they are accessed from the start of their management base.

- 3 You might want to configure the SNMP Agent X Service. If so, activate it on the host by typing **Y** at the prompt. Also, include the relevant peer names in the SNMPD.CONF file (see *Configuration File*) using the given syntax. You need Agent X for SMTP and FTP Statistics as well as for using Compaq's Insight Manager's subagents.
- 4 You might want to configure an SNMP subagent on your host. A subagent serves private Management Information Bases (MIBs) available through an application programming interface (API).

External users wanting to have their private MIBs served by TCPware's SNMP agent should develop a shareable image that exports the APIs in the private MIBs in addition to the routines needed to access the MIB variables.

Enter **Y** if you want to configure SNMP subagents on your host.

The subagent must be an installed shareable image and export the routines `SnmpExtensionInit`, `SnmpExtensionQuery`, and `SnmpExtensionTrap` as universal symbols. If you have more than one subagent, enter each name when prompted.

While entering the name, do not enter the `.EXE` extension. For example, if you built and installed a shareable image called `PRIVATE_MIB.EXE` for a subagent, enter `PRIVATE_MIB` as the name of the shareable image when prompted.

Enter **Return** by itself to end the subagent configuration.

See the *Programmer's Guide*, Chapter 10, *SNMP Extendible Agent API Routines*.

Configuration File

TCPware normally uses default values for SNMP Services. To customize the configuration (such as by adding SMUX or AgentX peers), edit the `TCPWARE_COMMON:SNMPD.CONF` configuration file.

See the *Management Guide*, Chapter 7, *Managing SNMP Services*, for information on the `SNMPD.CONF` file.

After editing the SNMP configuration file, you need to stop and restart the agent so the changes can take effect. Follow these steps:

- 1 Log in as the system manager.
- 2 Stop the SNMP agent process by entering:

```
@TCPWARE:SHUTNET SNMP
```

- 3 Start the SNMP agent process by entering:

```
@TCPWARE:STARTNET SNMP
```

Example 4-40 Configuring an SNMP Agent

Configuring the SNMP Agent:

```
SNMP is the Simple Network Management Protocol. If you activate the SNMP
agent on this host, the agent will start up when you start up the
network and will respond to queries. Answer YES to the next prompt only
if your network has an SNMP client (network management station).
```

```
Do you want to activate the SNMP agent on this host [NO]: Y Return
```

Configuring the SNMP SMUX Service:

```
You have the option of enabling the SNMP server's SMUX Service. SMUX
(RFC 1227) is an SNMP subagent protocol.
```

Warning: If you enable SMUX support, the SNMP server will only accept SMUX connections from hosts explicitly listed in the SNMPD.CONF file. Make sure to configure this file appropriately. Refer to the TCPware Management Guide, the Managing SNMP Services chapter.

Do you want to activate the SNMP SMUX service on this host [NO]: **Return**

Configuring the SNMP AgentX Service:

You have the option of enabling the SNMP server's AgentX Service. AgentX (RFC 2741) is an SNMP subagent protocol.

Warning: If you enable AgentX support, the SNMP server will only accept AgentX connections from hosts explicitly listed in the SNMPD.CONF file. Make sure to configure this file appropriately. Refer to the TCPware Management Guide, the Managing SNMP Services chapter.

Do you want to activate the SNMP AgentX service on this host [NO]: **Return**

Configuring an SNMP subagent(s):

An SNMP subagent is a shareable image that serves a private MIB. If the master SNMP agent receives a query for a variable in the private MIB, it will hand that query to the subagent for resolution.

Each subagent must be a shareable image, and conform to the SNMP Extendible Agent API Routines interface defined in the TCPware Programmer's Guide.

Answer YES to the next prompt only if this installation has SNMP subagents.

Do you want to configure subagent(s) on this host [NO]: **Y Return**

Please enter the name of one subagent per prompt, until finished. When finished press <Return> at the prompt to signify the end. Please do not enter the ".EXE" extension.

Enter the name of the shareable image without .EXE: **SNMP_AGENT1_SHR Return**

Enter the name of the shareable image without .EXE: **SNMP_AGENT2_SHR Return**

Enter the name of the shareable image without .EXE: **Return**

Configure the SSH Utility

SSH is the Secure Shell protocol. TCPware provides support for both SSH Version 1 protocol and SSH Version 2 protocol.

Please note that in addition to the configuration performed via CNFNET as described below, there are configuration files for both the SSH1/SSH2 servers and SSH client which must be modified as

appropriate to meet the security requirements of your organization. Refer to chapters 25 and 26 of the *TCPware TCP/IP for OpenVMS Management Guide* for details on the configuration files.

CNFNET Steps

You can enable TCPware's SSH utility as shown in Example 4-41.\$

Example 4-41 Configuring the SSH Utility

```
$ @TCPWARE:CNFNET SSH
```

```
TCPware(R) for OpenVMS Version 5.6-1 Network Configuration procedure
for:
```

```
TCP/IP Services:
```

```
FTP-OpenVMS
```

```
NFS-OpenVMS Client
```

```
SMTP-OpenVMS
```

```
TELNET-OpenVMS
```

```
Kerberos Services
```

```
SSH-OpenVMS Server
```

```
This procedure helps you define the parameters needed to get TCPware(R)
for OpenVMS running on this system.
```

```
THIS procedure creates the configuration data file,
TCPWARE_SPECIFIC:[TCPWARE]TCPWARE_CONFIGURE.COM, to reflect your
system's configuration.
```

```
Type <return> to continue...
```

```
Configuring SSH-OpenVMS
```

```
For detailed information on the following parameters, refer to the
TCPware for OpenVMS Management Guide.
```

```
TCPware supports both SSH1 and SSH2 servers. You may configure TCPware
to support either SSH1 servers or SSH2 servers, or both. Note that the
choice of TCPware servers has no impact on the TCPware SSH client, which
supports both SSH1 and SSH2 remote servers.
```

```
Do you want to enable the SSH1 server[NO]? YES
```

```
Do you want to enable the SSH2 server[NO]? YES
```

```
For SSH1, you must specify the number of bits in the RSA key. The range
is 512 to 32768 bits, but keys longer than 1024 are generally not much
safer, and they significantly increase the amount of CPU time consumed
by key generation when the SSHD_MASTER process is starting.
```


Enter the number of bits in the RSA key[768]:

You may specify an alternate configuration file for the SSH1 server. If you have already specified an alternate config file, enter a single space and hit RETURN at the prompt to reset it to the default file name.

Enter an alternate SSH1 configuration filename[:]:

You may specify an alternate configuration file for the SSH2 server. If you have already specified an alternate config file, enter a single space and hit RETURN at the prompt to reset it to the default file name.

Enter an alternate SSH2 configuration filename[:]:

Specify the level of debug for the SSH1 and SSH2 servers.

For SSH1, any non-zero value will turn on debug, but there is no "degree of debug."

For SSH2, this is a value from 0 to 50, where zero is no debug and 50 is the maximum level of debug. Note that at levels exceeding debug level 8, there may be a substantial impact on SSH2 server (and possibly, the system, too) performance due to the amount of information logged.

Enter the debug level[0 50, 0]:4

For SSH1, you may enter the name of an alternate RSA host key file. If you have already specified an alternate host key file, enter a single space and hit RETURN at the prompt to reset it to the default file name.

Enter an alternate SSH1 public server host key file [:]:

Specify the time in seconds after which the server private key is generated. This is only done for SSH1 sessions.

Enter the key regeneration time [3600]:

You may specify the number of seconds a user has to enter a password during user authentication (default = "dval"). In addition, you may allow this to default to the value used by OpenVMS when a user is logging into a non-SSH session. To specify an infinite wait time, enter 0 for the timeout value.

Do you want to change the default login grace time [NO]?

Specify the port for the SSH server to listen on, if you wish to use a port other than the default port of 22.

Enter port to use[22]:

Do you want any messages logged by the SSH server at all [YES]?

Do you want verbose logging by the SSH server [NO]?

You may specify the maximum number of concurrent SSH sessions to be allowed on the server. This is the total of both SSH1 and SSH2 sessions. The default is 1000 sessions.

Enter maximum number of concurrent SSH sessions [1-1000, 100]:

In OpenVMS, users with passwords that have expired because the SYSUAF PWDLIFETIME value has been exceeded are allowed to log into the system, and are then forced to change their password. The SSH1 protocol does not allow for that condition. Answer "YES" to the following question if you wish to allow users with expired passwords to still log into the system. They WILL NOT be forced to change their password.

Note that the SSH2 protocol is not restricted as the SSH1 protocol is; changing of expired passwords, save for pre-generated passwords, is performed by many SSH2 clients (including the TCPware client).

Do you want to allow users with preexpired passwords to log in [YES]?

The SSH1 protocol does not permit the display of the contents of SYS\$ANNOUNCE logical or file prior to a user logging in. Answering "Y" to the next question will cause the TCPware SSH1 client to display the contents of SYS\$ANNOUNCE after user authentication is completed but before the contents of SYS\$WELCOME are displayed.

Do you want to display SYS\$ANNOUNCE [YES]?

When generating user keys, a passphrase may be used to further protect the key. No limit is normally enforced for the length of the passphrase. However, you may specify a minimum length the passphrase may be.

What you want the minimum passphrase length to be for SS1 [0-1024, 0]?
10

What you want the minimum passphrase length to be for SSH2 [0-1024, 0]?
10

Do you want to restart the SSH-OpenVMS Server [NO]: **YES**

Shutting down the SSH-OpenVMS Server ...

Starting the SSH-OpenVMS Server ...

%RUN-S-PROC_ID, identification of created process is 20800104

\$

Configure the TALK Utility

The TALK utility allows you to exchange messages you type at your terminal window with another local or remote user.

CNFNET Steps

You can enable TCPware's TALK as part of the general CNFNET configuration or specifically as **@TCPWARE:CNFNET TALK** (see Example 4-42):

Determine if you want to enable the TALK server to use TALK at the following prompt (the default

is YES):

Do you want to enable the TALKD server [Y]:

Example 4-42 Configuring the TALK Utility

Configuring TALK Utility:

The TALK client/server operates with other "NTALK" clients and servers. The "NTALK" protocol was introduced in BSD V4.3; the version of TALK shipped with TCPware is not compatible with TALK utilities based on earlier versions of BSD.

In order for users to use TALK, the TALKD server must also be enabled.

Do you want to enable the TALKD server [Y]: **Return**

Configure TELNET-OpenVMS

CNFNET Steps

You can configure TELNET-OpenVMS as part of the general CNFNET configuration or specifically as **@TCPWARE:CNFNET TELNET** (see Example 4-43):

Specify at the prompt how many Server-TELNET listeners you want on this system. Set this number to **1** unless you expect a lot of incoming TELNET activity. This number does not limit the number of incoming TELNET sessions. The number of sessions is limited only by the available system resources (such as the maximum number of processes).

Example 4-43 Configuring TELNET-OpenVMS

Configuring TELNET-OpenVMS:

Determine how many Server-TELNET listeners you want on this system. Set this number to 1 unless you expect a lot of incoming TELNET activity.

This number does not limit the number of incoming TELNET sessions. The number of sessions is limited only by the available system resources (such as the maximum number of processes).

Enter the number of Server-TELNET listeners [1]: **Return**

Note! It is advisable, if you want automatic startup of this component, to include the **\$ SET NOON** line in your SYLOGIN.COM file to prevent the component from failing should there be an error in the file.

Configure TIMED

The Time Synchronization Protocol (TIMED) synchronizes the clocks of the various hosts in a LAN.

CNFNET Steps

You can configure TCPware's TIMED as part of the general CNFNET configuration or specifically as **@TCPWARE:CNFNET TIMED** (see Example 4-44):

1 Specify if you want to use the TIMED daemon at the prompt

Do you want to use the TCPware TIMED Daemon [YES]:.

2 TIMED operates in one of three modes:

SLAVE — The secondary daemon adjusts time in response to a master daemon. A slave daemon can never become a master.

MASTER — The master candidate daemon operates as a master if there are no other masters already running in the network, runs as a secondary if there is already a master, and may be promoted to a master in case the master terminates (there can be multiple masters).

FIXED_MASTER — Operates as a master in fixed mode and adjusts the secondary daemon to its own node instead of calculating the network average time, and adjusts the clocks on all the nodes, including its own (only one fixed master can be in the network and there should be no other master or secondary candidate in the network).

If you do not want to accept the default (MASTER), reply with **Y** at the prompt:

Do you want to change the TIMED mode [NO]:

and indicate a different mode at the Select TIMED mode (SLAVE/MASTER/FIXED_MASTER) [MASTER]: prompt.

3 Decide which networks you want included or excluded in TIMED synchronization. By default, TIMED tries to communicate to other servers through all the available networks on each host:

- **INCLUDE** specifies the list of networks to include in the time synchronization
- **EXCLUDE** specifies the list of networks to exclude from the time synchronization

Your current configuration (DEFAULT) appears. You are then prompted whether you want to change it at the prompt

Do you want to change the TIMED network configuration.

NO is the default response.

To change the configuration, enter **Y** and then enter **INCLUDE** or **EXCLUDE** at the prompt

Select TIMED network configuration (DEFAULT/INCLUDE/EXCLUDE)
[DEFAULT]:.

Then, at the next prompt, enter the network or list of networks (separated by commas) to include or exclude.

Your current configuration appears.

Decide if you want to restart TIMED. The default is NO.

Example 4-44 Configuring TIMED

Configuring the TIMED Daemon:

Do you want to use the TCPware for OpenVMS TIMED Daemon [YES]: **Return [1]**

Each TIMED daemon in this network can operate in the following 3 different modes:

SLAVE	Slave daemon which adjust time in response to a master daemon. Never promoted to a master.
MASTER	Master candidate daemon which operates as a master if there are no other masters already running in the network. It will run as slave if there is already a master, and may promote to master in case the master terminates. There can be multiple daemons run in this mode.
FIXED_MASTER	This daemon will operate as a master in fixed mode. In fixed mode, the master adjusts the slave daemon to its own node instead of calculating the network average time, and adjusts the clocks on all the nodes, including its own. Only one fixed master is allowed in the network and there should be no other master or master candidate in the network.

Current configuration is: MASTER

Do you want to change the TIMED mode [NO]: **Return [2]**

By default, TIMED will try to communicate to other daemons through all the available networks on this host. If the host is connected to more than one network, you can optionally limit the networks to which TIMED will synchronize the time. You can either:

- INCLUDE to specify the list of networks to include in the time synchronization

or

- EXCLUDE to specify the list of networks to exclude from time synchronization

Current configuration is:

DEFAULT

Do you want to change the TIMED network configuration [NO]: **Return [3]**

Configure X Display Manager

CNFNET Steps

You can configure the X Display Manager as part of the general CNFNET configuration or specifically as **@TCPWARE:CNFNET XDM** (see Example 4-45).

Determine if you want to use the XDM Server. The default is NO.

If you enable XDM, you can manage remote X displays (X terminals). When started, remote X displays communicate with XDM through the UDP-based X Display Manager Control Protocol (XDMCP). The XDM Server creates a DECwindows login process that prompts users on the remote X display to log in and create a DECwindows session.

Example 4-45 Configuring the XDM Server

Configuring the X Display Manager (XDM) Server:

Do you want to use the TCPware for OpenVMS XDM Server [NO]: **Return**

Chapter 5

Configuring the NetWare Services

Introduction

Note! Process Software does not support NetWare in TCPware.

This chapter describes how to configure the NetWare Services. It is for the OpenVMS system manager, administrator, or operator responsible for product configuration.

Proceed with this chapter after you install TCPware (see Chapter 2, *Installing TCPware*). This chapter also covers configuring the NetWare Services core environment (IPX/SPX).

TCPware provides three configuration options (accessed either through the menu-driven system or directly) for the NetWare Services:

Options	Lets you configure...
Core environment	the basic IPX/SPX parameters before proceeding with the component configuration
Full	all the NetWare Services components at one time
Component	a particular NetWare Services component

This chapter focuses on the menu-driven options and the text and prompts that appear for a full TCPware NetWare Services configuration. Your configuration may not be as complex, especially if you are configuring TCPware for the first time. You can perform the basic configuration by accepting the defaults presented at each prompt. Simply press **Return** so that you can progress through the configuration more quickly.

Each component configuration appears in its own section, and in the order presented during the full configuration. You can always return to a specific component configuration after you have ended the full configuration procedure. The instructions on how to access the particular component configuration are given in each section.

A complete configuration example appears in Appendix B, *Sample Configuration*.

Note! Appendix C, *Installed Files*, includes information on the files installed with a TCPware configuration and includes a section on defining the TCPware logicals. You must define these logicals before you configure TCPware.

Invoke CNFNET

CNFNET.COM is the procedure you use to configure the NetWare Services core environment as well as its application products. This procedure creates the configuration data file, TCPWARE_SPECIFIC:[TCPWARE]TCPWARE_CONFIGURE.COM.

You can invoke CNFNET using either or both of two methods:

Menu-driven	Command-driven
-------------	----------------

Menu-Driven Configuration

The menu-driven system provides configuration options as convenient menu selections. You can select between configuring the TCP/IP Services or NetWare Services, starting up (or restarting) or shutting down TCPware, and displaying software licensing information. The menu hierarchy allows you to move from one function to the next and to back up and make corrections along the way. You can use the menus to configure specifically TCP-OpenVMS.

To invoke the menu-driven system, enter at the DCL prompt:

```
$ @TCPWARE:CNFNET MENU
```

Press **Return** at the Type <return> to continue... prompt. A menu appears:

```
TCPware(R) for OpenVMS Configuration Menu
```

```
Configuration Options:
```

- 1 - Configure TCPware Services
- 2 - Configure NetWare Services

- 3 - Startup/Restart all TCPware Services
- 4 - Shutdown all TCPware Services

- L - Display the software licensing information (PASSWORD)
- E - Exit the configuration procedure (changes will be saved)

```
Enter configuration option: 2 Return
```

Enter 2 (Configure NetWare Services) at the Enter configuration option: prompt.

Command-Driven Configuration

You can also use a command-driven interface for the configuration. To configure the NetWare Services as part of the entire TCPware configuration, enter at the DCL prompt:

```
$ @TCPWARE:CNFNET
```

To configure just the NetWare Services core environment (IPX/SPX), enter at the DCL prompt:

```
$ @TCPWARE:CNFNET IPX
```

NetWare Services Configuration Menu

If you selected option 2 at the TCPware(R) for OpenVMS Configuration Menu, the following menu appears:

NetWare Services Configuration Menu

Configuration Options:

- 1 - Core environment for NetWare services
- 2 - Configure all NetWare components
- 3 - Configure a specific NetWare component

- 4 - Startup/Restart NetWare services
- 5 - Shutdown NetWare services
- 6 - Startup/Restart a specific NetWare component
- 7 - Shutdown a specific NetWare component

- E - Exit to previous menu

Enter configuration option:

You should first configure the NetWare Services core environment (IPX/SPX). Enter **1** at the Enter configuration option: prompt.

When you complete the core environment configuration (described in the following sections), you return to the NetWare Services Configuration Menu so that you can either configure all the NetWare Services components (**2**) or particular component (**3**). Option 3 displays the following menu so that you can select a NetWare Service to configure:

Configuring a Specific NetWare Component

Configuration options:

- 1 - FSS Configure the File Sharing Services
- 2 - NPS Configure the Network Print Services
- 3 - TES Configure the Terminal Emulation Services

E - Exit to previous menu

Enter menu option:

Note! If you omit configuring the core environment for any of the services, the following message appears: Please configure the core environment before configuring a specific component.

Note! You do not need to reboot your system after the configuration.

Locate the IPX Network Number

To configure the NetWare Services, you must enter the IPX network number. The IPX network number is the NetWare address of the NetWare network connected to your OpenVMS system:

- 1 Go to the NetWare file server located on the network.
- 2 Enter the **CONFIG** command at the colon (:) prompt. The following example shows a display produced by the CONFIG command.

```
File server name: VILLAGE  
IPX internal network number: 8C1BC3F7
```

```
3Com EtherLink II 3C503 v3.11 (910121)  
Hardware setting: I/O Port 300h to 30Fh and 700h to 70Fh, Memory C8000h  
to CBFFFh, Interrupt 3h  
Node address: 02608C1BC3F7  
Frame type: ETHERNET II  
No board name defined  
LAN protocol: IPX network 00000002
```

```
3Com EtherLink II 3C503 v3.11 (910121)  
Hardware setting: I/O Port 300h to 30Fh and 700h to 70Fh, Memory C8000h  
to CBFFFh, Interrupt 3h  
Node address: 02608C1BC3F7  
Frame type: ETHERNET_802.3  
Board name: 802  
LAN protocol: IPX network 00000006
```

The command output in the above example and Figure 5-1 show two networks:

00000002, which corresponds to the Ethernet II frame type

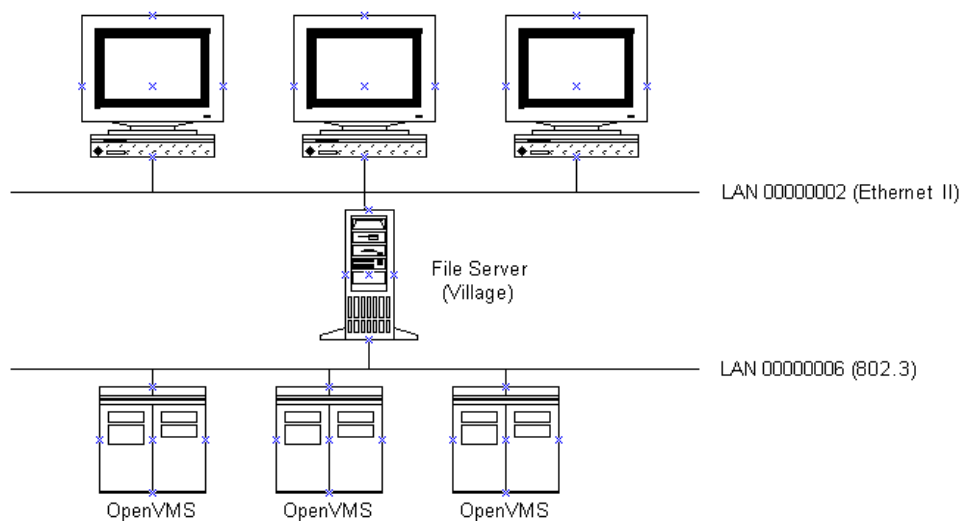
00000006, which corresponds to the 802.3 frame type connected to the OpenVMS system.

Keep a copy of the IPX network number as an eight-character hexadecimal number, including leading zeros; in the above example, this is 00000006.

- 3 Determine whether to use Ethernet II or 802.3 packets. If you use a NetWare 386 Server to locate the network address, be sure to use the physical address of the cable, not the logical address of the server.

CAUTION! CNFNET purges up to the last five versions of the TCPWARE_CONFIGURE.COM file. You are strongly advised not to edit this file directly.

Figure 5-1 IPX Network Figure



Select the Frame Type

You must enter the frame type the IPX/SPX protocol uses to send packets. Here are some guidelines for what frame type to enter:

802.2	The default frame type standard for NetWare versions shipped after April 15 1993 (NetWare 3.x and later), which is a change from the previous 802.3 default. The 802.2 standard accommodates packet checksumming, advanced security features, protocol independence, and other emerging technologies. The 802.2 standard is also the default standard for Fiber Distributed Data Interface (FDDI) and Token-Ring networks.
802.2 SNAP	SNAP stands for Subnet Access Protocol and is an alternative standard for Ethernet, Token-Ring, and Appletalk Phase II networks. Many implement 802.2 SNAP to prepare for an increased number of network protocols.
Ethernet II	An early standard originally used to communicate with Compaq minis and also used on TCP/IP and AppleTalk Phase I networks.
802.3	The previous standard frame type for NetWare 2.x and 3.11, which is not recommended for new networks or Compaq hosts. Do not use this with DECnet/OSI.

You can configure the IPX network in a number of ways. Decide if you want to configure each workstation and server on the network for a single frame type, or set up a router to bridge between

two frame types. If you decide to use a router, decide if you want to use one or two Ethernet segments.

Start with the easiest configuration for your site. If you have a large network (20 servers and 500 workstations), the simplest solution may be to install a bridge or router and let it bridge packets between the two frame types. If you have one server and five workstations, it may be easier to migrate each workstation and server to a single frame type.

If you want to focus on a single frame type, you should migrate from the Ethernet II or 802.3 frame type to the 802.2 or 802.2 SNAP frame type.

See the *NetWare Services Administrator's Guide*, Appendix A, *Configuring Frame Types*, for details on configuring frame types for servers, routers, and workstations for various NetWare versions.

Configure the Device Type and Network Number

Configuring the NetWare Service device type and network number is the first step in CNFNET. Specifically, these are the Ethernet device type that TCPware NetWare Services use and the IPX network number for the segment connected to the OpenVMS system (see Example 5-1):

- 1 Enter **Y** or press **Return** to configure the TCPware NetWare Services.
- 2 Enter the Ethernet device type. For example, press **Return** to accept the default device [ESA]: .
- 3 Enter the IPX network number in hexadecimal format; for example: **0000AFAF**.

The IPX network number is bound to the particular frame type you want to use. If you are unsure about the network number, use the CONFIG command at the NetWare server console and note the value next to the LAN protocol: IPX network parameter for the frame type.

Example 5-1 Configuring the Device Type and Network Number

The Netware Services portion is next to be configured. NetWare Services consists of File Sharing Service (FSS), Network Print Service (NPS) and Terminal Emulation Service (TES). These services provide connectivity to NetWare LANs. The IPX/SPX protocol is used to communicate in the NetWare environment.

Do you want to configure the TCPWare NetWare Services now [YES] **Return** [1]

The following are examples of Ethernet controllers and their corresponding device types:

```
DEBNTs use device type  ETA, ETB ...
DEBNAs use device type  ETA, ETB ...
DEUNAs use device type  XEA, XEB ...
DELUAs use device type  XEA, XEB ...
DEQNAs use device type  XQA, XQB ...
DELQAs use device type  XQA, XQB ...
```

```
DESQAs use device type  XQA, XQB ...
DESVAs use device type  ESA, ESB ...
DEMNAs use device type  EXA, EXB ...
DE425s use device type  ERA, ERB ...
DE422s use device type  ERA, ERB ...
TULIPs use device type  EWA, EWB ...
```

Please enter the device type for the Ethernet controller you want Netware Services to use, or press <Enter> to accept the default.

Enter Ethernet device type [ESA]: **Return** [2]

Please enter the IPX network number of the NetWare network to which this system is connected. The network number is an eight digit hexadecimal number. For example: 000003DE, 00000CDC and 0000AF AF are valid numbers. Note that the IPX network number is bound to the particular frame type you want to use. If you are unsure about the IPX network number, use the CONFIG command at the NetWare server console and note the value next to the "LAN protocol: IPX network" parameter for the frame type.

Enter IPX network number [0000AF AF]: **Return** [3]

Configure the Frame Type and IPX Node Name

To complete the IPX/SPX core environment portion of the NetWare Services you need to enter the frame type NetWare Services uses to communicate on the network and the IPX node name for the OpenVMS system (see Example 5-2):

1 Enter the frame type:

To select IEEE 802.3 with 802.2 enter **Ethernet_802.2** or **802.2**

To select IEEE 802.3 with 802.2 SNAP enter **Ethernet_SNAP** or **SNAP**

To select Ethernet II enter **Ethernet_II** or **ETHER**

To select "raw" IEEE 802.3 enter **Ethernet_802.3** or **802.3**

CAUTION! Do not use 802.3 frame types when using NetWare together with DECnet/OSI. The NetWare and DECnet/OSI 802.3 frame type are incompatible.

See the *NetWare Services Administrator's Guide*, Appendix A, *Configuring Frame Types*, for details on migrating existing frame types.

2 Enter the IPX node name using the naming guidelines indicated in the procedure.

The default IPX node name is defined by DECnet as SYS\$NODE. If the symbol SYS\$NODE is not defined, the default is **VMS**.

3 Press **Return** to accept the values listed in the network configuration summary. If they are incorrect, enter **N** and start the configuration over again.

Example 5-2 Configuring the Frame Type and IPX Node Name

There are four different frame types used on NetWare Ethernet networks. They are:

IEEE 802.3 with 802.2 - Default NetWare 3.x and 4.x frame type for all drivers shipped after Apr. 15, 1993. IEEE standard.

IEEE 802.2 with SNAP - IEEE standard. Widely implemented frame type used by TCP/IP, Appletalk and Token-Ring protocols.

Ethernet II - Early Compaq, Intel and Xerox networking standard. Alternative to 802.3 "raw" for older NetWare networks.

IEEE 802.3 "raw" - Old default NetWare frame type for 2.x and 3.11 networks. Not recommended for new networks or Compaq hosts. NOTE: The NetWare 802.3 frame type conflicts with the DECnet/OSI 802.3 frame type. Therefore, do not use 802.3 when using NetWare together with DECnet/OSI.

Please choose the frame type that fits your LAN environment. To see what your NetWare Server(s) is currently using, issue the CONFIG command at the server's console prompt.

```
TO CHOOSE                PLEASE ENTER

IEEE 802.3 with 802.2    Ethernet_802.2  or  802.2
IEEE 802.2 with SNAP     Ethernet_SNAP   or  SNAP
Ethernet II              Ethernet_II    or  ETHER
IEEE 802.3 "raw"         Ethernet_802.3  or  802.3

Ethernet frame type [Ethernet_802.2]: Return           [1]
```

Please enter the IPX node name of this NetWare Services system or press <Enter> to accept the default. The IPX node name is the name that workstations will use to connect to services on this system.

The IPX server name must be between 2 and 45 characters long. The first character in the name cannot be a period. The server name cannot include these characters:

space	()	colon	(:)	semicolon	(;)
plus sign	(+)	asterisk	(*)	equals sign	(=)
double quotes	(")	comma	(,)	question mark	(?)
slash	(/)	backslash	(\)	less than sign	(<)
open bracket	([)	close bracket	(])	greater than sign	(>)

Enter IPX node name [LILAC]:**Return** [2]

IPX Network Configuration Summary

```
-----
Ethernet Device      : ESA
Network Address      : 0000BFBF
Ethernet Protocol    : Ethernet_802.2
Server Node Name     : LILAC
```

Are these values correct [YES]: **Return** [3]

Collect FSS-OpenVMS Information

To prepare for the FSS-OpenVMS configuration, determine:

- The name of the FSS system volume on the OpenVMS system, if you do not accept the default of `SYSS$SYSDEVICE:[FSS_SYS_VOLUME]`.
- The file server Guest account name if you do not accept the IGUEST default.
- The password of the Guest account.
- The unique User Identification Code (UIC) of the Guest account.
- The system privileges you want to assign the Console Program. The defaults are `PRMMBX`, `READALL`, `SETPRV`, and `SYSLCK`, although you may want others.

Configure the FSS System Volume and Guest Account

Configure FSS-OpenVMS as part of the general CNFNET configuration or specifically as `@TCPWARE:CNFNET FSS`. To configure the FSS-OpenVMS system volume and Guest account (see Example 5-3):

- 1 Enter **Y** or press **Return** if you want to use FSS-OpenVMS. Enter **N** if you do not want to use it.
- 2 Enter the system volume name or press **Return** to accept the default:
 - The default is `SYSS$SPECIFIC:[FSS_SYS_VOLUME]` if a first time configuration, if the `SYSS$SYSDEVICE:[FSS_SYS_VOLUME]` directory does not exist from a previous TCPware version, or if it exists together with the latter.
 - The default is `SYSS$SYSDEVICE:[FSS_SYS_VOLUME]` if it already exists from a previous TCPware version and the `SYSS$SPECIFIC:[FSS_SYS_VOLUME]` directory does not also exist.

If you specify a directory that does not exist, the configuration procedure creates the directory with the OpenVMS Guest account as the owner.

Note! The owner of the system volume directory must be the FSS-OpenVMS Guest account. If you want to use a directory that already exists, make sure the Guest account owns it.

- 3 Press **Return** to accept the default file server Guest account name [`IGUEST`] or enter the name of the account you want to use.

If the guest account already exists, you are prompted whether you want to use another name for the Guest account. Steps 4 and 5 would not be relevant in this case.
- 4 Enter the file server Guest account password; for example, `SECRET`.
- 5 Enter a unique UIC for the Guest account; for example, [`123,123`] .

Example 5-3 Configuring the FSS System Volume and Guest Account

Configuring File Sharing Services (FSS):

FSS-OpenVMS provides NetWare users with access to OpenVMS directories, files and printers.

Do you want to use the FSS Product [YES]: **Return** [1]

The system volume is the directory that acts as the NetWare SYS volume for this file server. The SYSTEM, MAIL, PUBLIC, and LOGIN subdirectories are created here.

You can place NetWare utilities such as SYSCON and FILER here.

At initial configuration, the Guest account is the owner of all of these directories.

Press <Return> to accept the default location for the directory.

Note: "SYS\$SPECIFIC:[FSS_SYS_VOLUME]" or
"SYS\$SYSDEVICE:[FSS_SYS_VOLUME]" may be the default.

The default System volume = SYS\$SPECIFIC:[FSS_SYS_VOLUME]
press <Return> to accept it or specify a new one: **Return** [2]

This procedure creates the FSS Guest account with minimal privileges and a password (supplied at configuration). NetWare workstation users That do not have an OpenVMS account use this account when they have access to the file server.

NOTE : No default directory or device is set up for the Guest account.

File server Guest account name [IGUEST]: **Return** [3]

The FSS Guest account password follows the standard OpenVMS password specification. This password is important if the account is to be given additional privileges.

Enter the FSS Guest account password: **SECRET Return** [4]

The Guest account is created with the UIC value specified here. This UIC (User Identification Code) should be unique.

UICs must have an octal group number and user number, not exceeding four digits each, separated by a comma and enclosed in brackets.
Example: [120,45]

Please enter a unique UIC for the guest account: **[123,123] Return** [5]

Configure FSS Console Program Privileges

To configure the FSS console privileges (see Example 5-4):

- 1 Enter the Console program privileges you want, separating each entry with a comma. You can use any standard OpenVMS privileges.
The minimum OpenVMS user privileges required to run the console are PRMMBX, READALL, SETPREV, SYSNAM, and SYSLCK.
- 2 Enter **N** or press **Return** to accept the values listed in the FSS-OpenVMS configuration summary. This procedure displays the summary when you complete entering the NetWare Services configuration information.
- 3 If needed, use the DISKQUOTA utility and enter a record for the FSS Guest account.

Note! If your site uses VMS disk quotas, you may need to use the DISKQUOTA utility and enter a record for the FSS Guest account.

The first time you start FSS-OpenVMS, the system uses the following default configuration:

- The NetWare SUPERVISOR account does not have a password
- Users share the SYS\$SYSDEVICE:[FSS_SYS_VOLUME] directory as a NetWare volume called SYS
- Users cannot share printers

To modify the default configuration, reconfigure the server, or create user accounts, see the *NetWare Services Administrator's Guide*, Chapter 2, *Configuration and Printer Sharing*.

Example 5-4 Configuring Console Program Privileges

The Console program issues commands to the File Server. You can protect the server by specifying privileges needed to run the Console program. Only users who have these privileges can run the Console.

You can specify one or more of the following privileges separated by commas:

[1]

ACNT, ALL, ALLSPOOL, ALTPRI, BUGCHK, BYPASS, CMEXEC, CMKRN, DETACH, DIAGNOSE, DOWNGRADE, EXQUOTA, GROUP, GRPNAM, GRPPRV, LOG_IO, MOUNT, NETMBX, OPER, PFNMAP, PHY_IO, PRMCEB, PRMGBL, PRMMBX, PSWAPM, READALL, SECURITY, SETPRV, SHARE, SHMEM, SYSGBL, SYSLCK, SYSNAM, SYSPRV, TMPMBX, UPGRADE, VOLPRO, WORLD

Console program privileges [PRMMBX,READALL,SETPREV,SYSNAM,SYSLCK]: **Return**

FSS-OpenVMS Configuration Summary

```
SYS Volume           : SYS$SPECIFIC:[FSS_SYS_VOLUME]
Guest Account        : IGUEST
Guest UIC             : [300,300]
Console Privilege     : PRMMBX,READALL,SETPREV,SYSNAM,SYSLCK
```

Are these values correct [YES]: Y **Return** [2]

IMPORTANT: Some sites use disk quotas. If your site does this, [3]
then you may need to use the DISKQUOTA utility and enter a record

Configure NPS-OpenVMS

Configure NPS-OpenVMS as part of the general CNFNET configuration or specifically as **@TCPWARE:CNFNET NPS** (see Example 5-5):

- 1 Enter **Y** or press **Return** if you want to use NPS-OpenVMS. Enter **N** if you do not want to use it
- 2 Enter the maximum number of Network Print Services connections; for example: **12**.

The maximum number of NPS connections (queues) authorized by your software license is 5, 20, 60, or 255. You can specify fewer queues than your license authorizes.

See the *NetWare Services Administrator's Guide*, Chapter 21, *NPSCP Reference*, the SET MAX command, for details on changing the number of queues.

Note! To reconfigure NPS-OpenVMS after the basic configuration, use NPSCP. See the *NetWare Services Administrator's Guide*, Chapter 19, *Preparing to Use NPS-OpenVMS*, the *Preparing to Use the Control Program (NPSCP)* section.

Example 5-5 Configuring NPS-OpenVMS

Configuring Network Print Services (NPS):

NPS-OpenVMS allows VAX/VMS users to print to NetWare print queues.
NPS-OpenVMS redirects VAX/VMS print queues to NetWare print queues.
To the user, the print queues appear as standard VAX/VMS queues.
NPS-OpenVMS handles the redirection transparently.

Do you want to use the NPS Product [YES]: **Y Return** [1]

The maximum number of connections is used to allocate VAX system resources to NPS processes. The default is to allocate resources to support up to the maximum number of connections authorized by the license. You may input any value in the range [1-255].

Maximum Number of NPS Connections [255]: **12 Return** [2]

Configure TES-OpenVMS

Configure TES-OpenVMS as part of the general CNFNET configuration or specifically as **@TCPWARE:CNFNET TES**. To configure the TES-OpenVMS (see Example 5-6):

Enter **Y** or press **Return** if you want to use TES-OpenVMS. Enter **N** if you do not want to use it.

See the *NetWare Services Administrator's Guide*, Chapter 12, *Windows 3.x TES Client*, or Chapter 13, *Windows 95 TES32 Client*, for instructions on configuring the client-side of TES.

Example 5-6 Configuring TES-OpenVMS

Configuring Terminal Emulation Services (TES) :

TES provides NetWare network workstations with an asynchronous connection to a VAX. TES consists of a server software component and a client software component. The server component is configured here.

Do you want to use the TES Product [YES]: **Return**

Configure Process Quotas

After configuring NetWare Services, if any of the OpenVMS system parameters are outside the desired range, the system displays the current value of all parameters followed by recommended changes. If the SYS parameters are within the required range, the system does not display a list of their current values.

Example 5-7 shows a sample listing of OpenVMS SYS parameters with recommendations.

The configuration procedures set the SYS parameters to provide the resources necessary to run the TCPware NetWare Services products.

If you need to modify a SYS parameter, see your OpenVMS documentation for the procedure. The system might display the value of the following SYS parameters:

CHANNELCNT	<p>This parameter sets the number of permanent I/O channels available to the system. NetWare requires about 50 channels. Plan to add 8 to 10 additional channels per workstation to allow for multiple open files on each workstation. Since TCPware provides you with a license that supports up to 255 NetWare Services product users, this parameter assumes a maximum value of 2047.</p> <p>If you support fewer than the maximum number of users allowed by your product user license (255), or you already set your CHANNELCNT to a value close to the recommended setting, you might not need to adjust it.</p>
VIRTUALPAGECNT	<p>This parameter sets the upper boundary for the maximum number of virtual pages you can map to any one process. The recommended setting is 40,000 pages.</p>
WSMAX	<p>This parameter controls the maximum working set size for a process. If free pages are available on the system and the server page-faults, you can improve performance by increasing this value. The recommended setting is 8192. If you already set your WSMAX to a value close to the recommended setting, you might not need to adjust it.</p>

GBLPAGES and GBLPAGFIL	The GBLPAGES parameter refers to the global page table entries. The GBLPAGFIL parameter is a subset of GBLPAGES and refers to global page file sections. FSS-OpenVMS requires 1500 GBLPAGFIL pages to operate. If you install FSS-OpenVMS for the first time, add 1500 to both GBLPAGES and GBLPAGFIL.
MAXBUF	MAXBUF parameter calculates other parameters.
NPAGEVIR	<p>$NPAGEVIR \text{ parameter} = 40000 + (max\text{-}NPS\text{-}queues * MAXBUF) + (max\text{-}NPS\text{-}servers * 27000);$</p> <p>max-NPS-queues is the number the manager enters during NPS configuration</p> <p>max-NPS-servers is (max-NPS-queues / 5) or 10, whichever is greater</p>
NPAGEDYN	NPAGEDYN parameter is $NPAGEVIR / 3$.

Note! The SYSGEN parameter settings are extremely important and you must have the proper "mix" for your system. The recommended settings can only provide general guidelines only.

Example 5-7 Configuring Process Quotas

Current SYSGEN Parameter settings are:

```
CHANNELCNT      = 255
VIRTUALPAGECNT  = 75000
WSMAX           = 8200
GBLPAGES        = 30000
GBLPAGFIL       = 6024
MAXBUF          = 2064
NPAGEVIR        = 2124800
NPAGEDYN        = 530944
```

It is recommended that the following system generation (SYSGEN) parameters be changed for correct operation of products:

```
CHANNELCNT should be at least 305 or
Add 50 to CHANNELCNT, plus 10 per workstation using FSS
Set NPAGEDYN to at least 647773
GBLPAGES should be increased by 1500
GBLPAGFIL should be increased by 1500
```

Chapter 6

Starting and Testing TCPware

Introduction

This chapter describes how to start and stop TCPware, and remove TCPware files. It is for the OpenVMS system manager, administrator, or operator responsible for system startup.

Prepare for Startup

Verify the Installation, Configuration, and Registration

Before you start TCPware for the first time, be sure you have:

- Installed your TCPware components.
- Correctly configured your TCPware components.
- Registered TCPware through your Product Authorization Key (PAK).

Running Other Products

If you run IP-over-X.25, DECnet, DECwindows, HYPERchannel, or another vendor's TCP/IP product, there are a few things you need to keep in mind:

If you...	Then you must...
Installed and configured IP-over-X.25 support	Install, configure, and run VAX P.S.I. See Chapter 1.
Run DECnet	Start Decnet before starting TCPware. If DECnet and TCPware use the same Ethernet controller, DECnet cannot start if TCPware is already running. (You do not have to run DECnet to use TCPware).

If you...	Then you must...
Run DECwindows	Set up the Compaq windows transport interface. You can use the TCPware DECwindows transport interface only if your system runs VMS Version 5.5-2 or later, or OpenVMS, and if you enabled this feature during network configuration. To set up and use the TCPware DECwindows transport interface, see Chapter 28 in the <i>Management Guide</i> .
Use HYPERchannel support	Start and load the Network Systems Corporation H269 driver (as described in the H269 documentation) before starting TCPware.

System Parameters

You can use the SYSGEN utility in OpenVMS to examine the system parameters described in this section. Edit the SYSSYSTEM:MODPARAMS.DAT file and use AUTOGEN to change the system parameters. System parameter settings need to be as follows:

- The TCPware shareable Socket Library, SMTP-OpenVMS ONC RPC Run-Time Library and the TCPware DECwindows transport interface require a modest number of global pages and sections for the shareable images they install.

GBLPAGES refers to the global page table entries. GBLSECTIONS refers to the number of global section descriptors. If an insufficient number of GBLPAGES or GBLSECTIONS are free, the shareable images might fail to install. If this happens, increase the number of each.

Table 6-1 lists the minimum free requirements for global pages and sections required after installation but before starting TCPware.
- If you plan to use Serial Line IP (SLIP) lines, make sure you set the maximum buffer size (MAXBUF) and alternate type-ahead (TTY_ALTYPAHD) system parameters properly. Change the following parameters:
 - MAXBUF should be at least twice the maximum transmission unit (MTU) of the SLIP line plus 144. The default MTU for SLIP lines is 1006 bytes; therefore, MAXBUF must be at least 2156. Increase MAXBUF if necessary.

MAXBUF is dynamic. If you use SYSGEN to change it, you do not need to reboot the system for the change in value to take effect.
 - TTY_ALTYPAHD should be larger than its default value. This prevents characters from being lost. The greater the line speed, the higher you should set this parameter. For most applications, 1024 is appropriate.

TTY_ALTYPAHD is not dynamic. If you use SYSGEN to change this parameter, you must reboot the system for the change to take effect.
- Make any recommended system parameter changes for the NetWare services.

Account Privileges

Make sure each TCPware user account has TMPMBX and NETMBX privileges. These are the normal default privileges required to use TCPware. Use the OpenVMS AUTHORIZE utility to

grant these privileges to the appropriate users.

Table 6-1 Global Pages and Section: Minimum Requirements

Shareable Image	GBLPAGES	GBLSECTIONS
DECW_TRANSPORT_TCPWARE*	8	2
SMTP_MAILSHR	20	2
SMTP_MAILSHRP*	10	2
TCPWARE_RPCLIB_SHR	5	1
TCPWARE SOCKLIB_SHR	10	2
**VMS Version 5.5-2 and greater		

Automatic Startup Process

To automatically start TCPware each time you boot your system:

Step	Task	Action
1	Add TCPware to your system startup file	<p>The name of the startup file for your system is in Table 6-2. Edit the file and add these lines after the ones that start DECnet (note that they are valid only for the default TCPware installation common files location):</p> <pre>\$ @SYS\$SYSROOT:[TCPWARE]TCPWARE_LOGICALS \$ @TCPWARE:STARTNET</pre>

Configuring the TCPware Commands

To configure the TCPware commands:

Step	Task	Action
1	Edit your SYLOGIN.COM file to define all the TCPware commands	<p>Add the following line to the "all accounts" definition section of the system-wide login file, SYS\$MANAGER:SYLOGIN.COM:</p> <pre>\$ @TCPWARE:TCPWARE_COMMANDS</pre> <p>To prevent any errors in the SYLOGIN.COM file from causing a TCPware module to fail, you might want to include the \$ SET NOON line at the beginning of the file to disable error checking.</p>

Note! If you chose to install TCPware common files in a location other than the default, you must redefine SYSSYSROOT to point to that location.

Table 6-2 System Startup File Name and Location

If your VMS version is...	Your startup file is...
OpenVMS VAX V6.x	SYSS\$MANAGER:SYSTARTUP_VMS.COM
OpenVMS Alpha	SYSS\$MANAGER:SYSTARTUP_VMS.COM
VMS V5.x	SYSS\$MANAGER:SYSTARTUP_V5.COM

Configuration Menu Startup or Shutdown Process

You can start all components or selected components from the configuration menu system. Enter at the DCL prompt:

@TCPWARE:CNFNET MENU

At the menu shown in Example 6-1, enter the number of the service you want to start up: TCP/IP Services (1), NetWare Services (2), or both (3).

Figure 6-1 First Menu in the Startup or Shutdown Procedure

TCPware(R) for OpenVMS Configuration Menu

Configuration Options:

- 1 - Configure TCPware Services
- 2 - Configure NetWare Services
- 3 - Startup/Restart all TCPware Services
- 4 - Shutdown all TCPware Services
- L - Display the software licensing information (PASSWORD)
- E - Exit the configuration procedure (changes will be saved)

Enter configuration option: **1 Return**

If you enter 1 or 2, another menu appears from which you can select to start or restart the entire service (4), or start or restart a particular component (6). In the latter case, a menu such as in Figure 6-2 appears. The shutdown menus available if you enter 4 at the menu in Example 6-1 are similar except that they are for shutdown purposes. The shutdown menu for the NetWare Services, for example, appears in Example 6-3.

CAUTION! Do not use the STOP PROCESS/ID command to stop TCPware or any of its components. Use the SHUTNET command as described on the following page.

Figure 6-2 Component Configuration Menu for the TCPware Services

Configuring a Specific TCP/IP Component

Configuration options:

- 1 - ACECLIENT Configure the ACE/Client Service
- 2 - CNFS Configure the NFS-OpenVMS Client
- 3 - DNIP Configure DECnet over IP tunnels
- 4 - DNS Configure the Domain Name Server
- 5 - FTP Configure the FTP-OpenVMS Server
- 6 - GATED Configure the Gate Daemon
- 7 - IMAP Configure the Internet Message Access Protocol Server
- 8 - KERBEROS Configure the Kerberos Services
- 9 - LPS Configure the Line Printer Services
- 10 - MISC Configure the Miscellaneous Services
- 11 - NFS Configure the NFS-OpenVMS Server
- 12 - NTP Configure the Network Time Protocol Daemon
- 13 - POP3 Configure the Post Office Protocol V3 Server
- 14 - PWIP Configure the PWIPDRIVER
- 15 - RCMD Configure the Berkeley R Commands
- 16 - SMTP Configure the Simple Mail Transfer Protocol Services
- 17 - SNMP Configure the Simple Network Management Protocol Agents
- 18 - TALK Configure the TALK utility
- 19 - TELNET Configure the TELNET-OpenVMS Server
- 20 - TIMED Configure the TIMED Server
- 21 - XDM Configure the X Display Manager

E - Exit to previous menu

Enter menu option:

Figure 6-3 Component Startup Menu for the TCPware Services

Starting a Specific TCP/IP Component

Startup options:

- 1 - ACCOUNTING Startup the TCP/IP Services accounting facility
- 2 - ACECLIENT Startup the ACE/Client Service
- 3 - CNFS Startup the NFS-OpenVMS Client
- 4 - DHCP Startup the Dynamic Host Configuration Protocol Server
- 5 - DNIP Startup DECnet over IP tunnels
- 6 - DNS Startup the Domain Name Server
- 7 - FTP Startup the FTP-OpenVMS Server
- 8 - GATED Startup the Gate Daemon
- 9 - IMAP Startup the Internet Message Access Protocol Server
- 10 - KERBEROS Startup the Kerberos Services
- 11 - LPS Startup the Line Printer Services

- 12 - MISC Startup the Miscellaneous Services
- 13 - NFS Startup the NFS-OpenVMS Server
- 14 - NTP Startup the Network Time Protocol Daemon
- 15 - POP3 Startup the Post Office Protocol V3 Server
- 16 - PWIP Startup the PWIPDRIVER
- 17 - RCMD Startup the Berkeley R Commands
- 18 - SMTP Startup the Simple Mail Transfer Protocol Services
- 19 - SNMP Startup the Simple Network Management Protocol Agents
- 20 - SSH Startup the SSH-OpenVMS Server
- 21 - TALK Startup the TALK server
- 22 - TELNET Startup the TELNET-OpenVMS Server
- 23 - TIMED Startup the TIMED Server
- 24 - XDM Startup the XDM Server

Enter menu option (E to exit):

Command Startup or Shutdown Process

You can also use the DCL command method to start TCPware or one of its components:

@TCPWARE:STARTNET [<i>component</i>]	<p>STARTNET by itself starts all TCPware. If you specify a component with the command, you start that component only (see Example 6-2 for the TCP/IP Services; note that your list of available components may be different). Start the TCP/IP Services components using @TCPWARE:STARTNET TCPWARE and the NetWare components using @TCPWARE:STARTNET NETWARE.</p> <p>Upon startup, TCPware checks for the logicals TCP, UDP, IP, INET, RMT, RCD, BG, and QX. If any of these logicals have been previously defined on your system, the following warning is generated:</p> <p>%TCPWARE-W-BADLOGICAL</p> <p>Redefine the conflicting logicals and restart TCPware.</p> <p>If you need to shut down TCPware or any of its components, use the DCL command:</p>
--	---

@TCPWARE:SHUTNET [<i>component</i>]	SHUTNET by itself shuts down all TCPware. If you specify a component with the command, you shut down that component only (use one of the component names listed in Example 6-2). Shut down the TCP/IP Services components using @TCPWARE:SHUTNET TCPWARE and the NetWare components using @TCPWARE:SHUTNET NETWORKE .
---------------------------------------	---

Customizing Your Startup

If your network configuration has special requirements, you might need to create the file TCPWARE:TCPWARE_STARTUP.COM and call it from the OpenVMS system startup file. (See comments in the STARTNET.COM file for more details about special requirements.)

To configure special requirements:

- 1 Copy the TCPWARE:TCPWARE_STARTUP.TEMPLATE template file to the TCPWARE:TCPWARE_STARTUP.COM file.

```
$ COPY TCPWARE_COMMON:[TCPWARE]TCPWARE_STARTUP.TEMPLATE-
_$ TCPWARE_COMMON:[TCPWARE]TCPWARE_STARTUP.COM
```

- 2 Edit the VMS system startup file.

- a Delete the following line or pair of lines, whichever the file contains:

```
$ @SYS$SYSROOT:[TCPIP]STARTNET
$ @SYS$SYSROOT:[TCPWARE]TCPWARE_LOGICALS
$ @TCPWARE:STARTNET
```

- b Add the following line to the VMS system startup file:

```
$ @TCPWARE_COMMON:[TCPWARE]TCPWARE_STARTUP.COM
```

- 3 Edit the TCPWARE_STARTUP.COM file as needed and as described in the rest of this section.

Note! Changes you make to network parameters using Network Control Utility (NETCU) commands are active until TCPware shuts down. Update the TCPWARE_STARTUP.COM file with these commands to make them permanent.

For example, you might want to do the following (see Example 6-4):

Step	Task	Action
1	Override the default TCP maximum segment size or window size	See the description of the START/TCP command /MSS and /MWS qualifiers in the <i>NETCU Command Reference</i> , Chapter 2, <i>NETCU Commands</i> . If you use TCP over a satellite link with a line speed greater than 384 Kbits, configure TCPware on both sides with a window size greater than 63448 bytes. See the description of the START TCP command for details on using satellite links.
2	Override the default UDP maximum datagram size	See the description of the START/UDP command /MDS qualifier.
3	Enable FORWARDING capability	See the description of the ENABLE FORWARDING command /MDS qualifier. You can also add the ENABLE FORWARDING command to the TCPWARE_STARTUP.COM file.
4	Join multicasting host group addresses	You may have applications that rely on multicasting yet do not want to change the application code to join the specific groups so that they can receive the multicast datagrams. Therefore, you can include ADD MULTICAST_GROUP commands to the TCPWARE_STARTUP.COM file to add the multicast IP addresses.

Example 6-1 Customizing Startup

```
START/TCP/MWS= value/MSS= value /NOKEEPLIVE      [1]
START/UDP/MDS= value                               [2]
ENABLE FORWARDING                                  [3]
ADD MULTICAST_GROUP 224.0.0.2 /LINE=ISA-0          [4]
```

Starting User-Written Servers

If you want any user-written servers to start automatically when you start TCPware, edit the SERVERS.COM file. CNFNET creates a template of this file if none existed previously.

To start a user-written server automatically, see Example 6-5 and do the following:

- 1 Edit the TCPWARE:SERVERS.COM file.

- 2 Enter the ADD SERVICE command in the file for each server you add.

For example, if you built FINGERD from the sources TCPware provides, you might add the command in Example 6-2 to the end of the SERVERS.COM file.

The various quotas and parameters might be different for your system, or you might chose to take the defaults for most values.

See the description for the ADD SERVICE command in the *NETCU Command Reference*, Chapter 2, *NETCU Commands*.

Example 6-2 Configuring User-Written Servers

```
ADD SERVICE FINGER TCP TCPWARE:FINGERD -                               [2]
    /PROCESS_NAME = FINGERD -
    /NOACCOUNTING -
    /NOAUTHORIZE -
    /INPUT = NLA0: -
    /OUTPUT = NLA0: -|
    /ERROR = NLA0: -
    /UIC = [SYSTEM] -
    /AST_LIMIT = 10 -
    /BUFFER_LIMIT = 10240 -
    /ENQUEUE_LIMIT = 100 -
    /EXTENT = 500 -
    /FILE_LIMIT = 20 -
    /IO_BUFFERED = 6 -
    /IO_DIRECT = 6 -
    /MAXIMUM_WORKING_SET = 300 -
    /PAGE_FILE = 10000 -
    /PRIORITY = 4 -
    /PRIVILEGES = (NOSAME, SYSPRV, NETMBX, TMPMBX, WORLD) -
    /QUEUE_LIMIT = 8 -
    /WORKING_SET = 200 -
    /SUBPROCESS_LIMIT = 0
```

Installing and Configuring INGRES/Net

This section describes how to install and configure Ingres Corporation's INGRES/Net product to use TCPware as the TCP/IP network protocol. For INGRES/NET Version 6.4, use TCPware's UCX Compatibility mode, which is the TCP_Compaaq protocol at INGRES/Net startup. For earlier versions, follow these steps:

- 1 Define the TWG\$ETC logical name.
- 2 Define the ETC logical name to be TWG\$ETC:[000000], as described in the INGRES/Net installation procedures.

- 3 Be sure that the `HOSTS .` file in the directory referenced by the ETC logical name defined in step 2 (`ETC:HOSTS .`) defines *localhost* and all the hostnames you need for INGRES/Net access. You can define *localhost* as the 127.0.0.1 loopback address.
- 4 If you plan to use the default symbolic form of the Wollongong TCP/IP listen address (IIO), define that logical name. Use the format described in the INGRES/Net installation instructions for specifying the value of a Wollongong TCP/IP listen address.

For example, if your local host's internet address is 128.100.200.50, and you use the default port number for a production installation (21064), define IIO as shown in Example 6-6. Make sure to replace the dots in the internet address with underscores.
- 5 Install INGRES/Net following the instructions described in the *INGRES/Net User's and Administrator's Guide*. Follow the directions specified for using Wollongong TCP/IP as a network protocol.
- 6 For an easier INGRES/Net startup, add the definitions of the TWG\$ETC, ETC, and IIO logical names to your system startup file before the INGRES startup commands.

Install and start TCPware for OpenVMS before you install INGRES/Net.

Example 6-3 Installing and Configuring INGRES/Net

```
$ DEFINE/SYSTEM/EXECUTIVE/TRANSLATION=CONCEALED TWG$ETC-      [1]
_$ SYS$SYSDEVICE:[SYS0.SYSCOMMON.TCPWARE]
```

Use this command line for INGRES/Net Version 6.4

```
$ DEFINE/SYSTEM/EXECUTIVE ETC TWG$ETC:[000000]                [2]
```

Use this command line for INGRES/Net Version 6.2 or 6.3

```
$ DEFINE/SYSTEM ETC TWG$ETC:[000000]
```

```
$ DEFINE/SYSTEM IIO 128_100_200_50:21064                      [4]
```

Installing and Configuring Oracle's SQL*Net

This section describes how to install and configure Oracle's SQL*Net product to support TCPware as the TCP/IP network protocol. You need ORACLE for OpenVMS for VAX Version 6.1.

Note! Install and operate TCPware for OpenVMS before installing SQL*Net.
For Oracle's SQL*Net Version 7.1.5 and later (with Protocol Adapter 2.1.5), just install the product. It is fully compatible with TCPware's TCP/IP driver. You can ignore the configuration steps that follow.

To install and configure SQL*Net versions before 7.1.5 to use TCPware (see Example 6-7):

- 1 Install the SQL*Net product as described in the Oracle SQL*Net documentation. Make sure you configure it to make use of the Wollongong TCP/IP driver.

- 2 Load and build SQL*Net. Do not edit the HOSTS. and SERVICES. files as described in the Oracle documentation. Instead:
 - a Create a [NETDIST.ETC] directory on the system disk, as shown.
 - b Define the TWG\$TCP system logical to be the name of the device on which you create the [NETDIST.ETC] directory.
 - c Edit the TCPWARE:SERVICES. file to add the definition for the orasrv service. For example:

```
orasrv 1525/tcp
```

See your Oracle documentation for the exact entry information.
 - d Make sure the TCPWARE:HOSTS. file defines *localhost* and all of the hostnames you need for ORACLE access. You can define *localhost* as the 127.0.0.1 loopback address. SQL*Net does not use the Domain Name Services.
 - e Copy the SERVICES. and HOSTS. files from the TCPWARE: directory to the TWG\$TCP:[NETDIST.ETC] directory. Remember to copy these files each time you update them.
- 3 Start the SQL*Net TCP server process. See your Oracle documentation.
- 4 Add the TWG\$TCP logical name to either the system or ORACLE startup command procedure to make the changes permanent. Note that device is the name of the device on which you create the [NETDIST.ETC] directory.

To undo SQL*Net support of TCPware:

- 1 Delete the TWG\$TCP:[NETDIST.ETC] files and directory.
- 2 Remove the TWG\$TCP system logical definition from the running system. Enter:

```
$ DEASSIGN/SYSTEM TWG$TCP
```
- 3 Remove the TWG\$TCP system logical definition from any startup command procedures to which you added it.

Example 6-4 Installing and Configuring Oracle's SQL*Net

```
$ CREATE/DIRECTORY SYS$SYSDEVICE:[NETDIST.ETC]/PROT=(WO:RE) [2a]
$ DEFINE/SYSTEM/NOLOG TWG$TCP SYS$SYSDEVICE: [2b]
$ EDIT TCPWARE:SERVICES.orasrv 1525/tcp Ctrl/Z [2c]
$ COPY TCPWARE:SERVICES.,HOSTS.TWG$TCP:[NETDIST.ETC]/PROT=(WO:RE) [2e]
$ DEFINE/SYSTEM/NOLOG TWG$TCP device [4]
```

Configuring Compaq's TEAMLINKS and AIDA Products

TCPware also supports Compaq's TEAMLINKS and AIDA products. To configure the

TEAMLINKS and AIDA products for use with TCPware:

- 1 For TEAMLINKS, use the NETCU ADD SERVICE command to add two services to the TCPWARE:SERVICES. file, for the Teamlinks Connection and the Mailworks process, assigning ports as in Example 6-7.
- 2 For AIDA, use the NETCU ADD SERVICE command to add two services to the TCPWARE:SERVICES. file for the File Cabinet Server and the AIDA Server, assigning ports as in Example 6-7.

Port numbers must be in the range 1024 to 65535. This is valid for ALL-IN-1 IOS Teamlinks Connection Version 2.1 for OpenVMS VAX (it may not apply to earlier or future versions).

For more information, see the *ALL-IN-1 IOS Teamlinks Connection Installation and Management Guide*, Section 6.2.

Example 6-5 Installing and Configuring TEAMLINKS

<code>tlinks</code>	<code>6161/tcp</code>	<code># teamlinks connect</code>	<code>[1]</code>
<code>muas</code>	<code>8484/tcp</code>	<code># mailworks process</code>	

Example 6-6 Installing and Configuring AIDA

<code>oa\$fcs</code>	<code>7373/tcp</code>	<code># teamlinks connect</code>	<code>[2]</code>
<code>oa\$aída</code>	<code>7300/tcp</code>	<code># mailworks process</code>	

Removing TCPware Components

You can remove any or all TCPware components using the DCL command:

- To remove a single component:
`@TCPWARE:TCPWARE_REMOVE component`
- To remove all the TCPware components:
`@TCPWARE:TCPWARE_REMOVE TCPware`

CAUTION! This command deletes all relevant files in all TCPware-specific directories and the TCPWARE directory.

Register Your Product Authorization Key (PAK)

Registering this PAK allows you to start and run TCPware for all the products you install.

To register your PAK, do the following (see Example 6-7):

- 1 Copy down the string of digits representing your Hardware ID. This is your Ethernet controller's hardware ID.
- 2 With your Hardware ID number and product names and version information available, contact Process Software's Licensing Desk.
- 3 The Licensing Desk will ask you for the required information and provide you with the various values you have to enter during the LMF procedure. Be sure to enter these values exactly as you see them, especially the Authorization Number.
- 4 Use the OpenVMS License Management Facility (LMF) in one of the two following ways, depending on your preference (Figure 5-9 shows a sample menu and PAK information display):

- `SY$UPDATE:VMSLICENSE` command — The menu- and prompt-driven method that takes you through each licensing step in detail. Enter:

```
@SY$UPDATE:VMSLICENSE
```

- `LICENSE REGISTER` command — The single command method where you can specify licensing information through qualifiers. Enter:

```
LICENSE REGISTER TCPWARE /qualifier /qualifier ....
```

See Compaq Computer's *OpenVMS License Management Utility Manual (or A Practical Guide to OpenVMS Software License Management and Tools)* for details on the `VMSLICENSE` or `LICENSE REGISTER` procedures.

Example 6-7 Registering Your PAK

Sample Hardware ID Information (*EXAMPLE ONLY: Do Not Use*)

Provide your distributor or Process Software with the following information to obtain Product Authorization Key(s) for this system:

- o Hardware ID: "12-34-56". [1]
- o The product name and version number for the product(s) you are installing on this system.

Refer to your product documentation for more information on obtaining Product Authorization Key(s).

Sample VMSLICENSE Command Procedure Menu

VMS License Management Utility Options:

[4]

1. REGISTER a Product Authorization Key
2. AMEND an existing Product Authorization Key
3. CANCEL an existing Product Authorization Key
4. LIST the Product Authorization Keys
5. MODIFY an existing Product Authorization Key
6. DISABLE an existing Product Authorization Key
7. DELETE an existing Product Authorization Key
8. COPY an existing Product Authorization Key

9. MOVE an existing Product Authorization Key
10. ENABLE an existing Product Authorization Key
11. SHOW the licenses loaded on this node
12. SHOW the unit requirements for this node

99. EXIT this procedure

Type '?' at any prompt for a description of the information requested.
Press Ctrl/Z at any prompt to exit this procedure.

Enter one of the above choices [1]

Sample VMS PAK Information

ISSUER:	PSC
AUTHORIZATION NUMBER:	9145685760
PRODUCT NAME:	TCPWARE-TCP
PRODUCER:	PSC
NUMBER OF UNITS:	200
VERSION:	
PRODUCT RELEASE DATE:	
KEY TERMINATION DATE:	
AVAILABILITY TABLE CODE:	F
ACTIVITY TABLE CODE:	
KEY OPTIONS:	NO_SHARE
PRODUCT TOKEN:	
HARDWARE I.D.:	
CHECKSUM:	4-ABCD-EFGH-IJKL-MNOP

Test TCPware

Use the following steps to test your TCPware connections after a startup:

- 1 Verify that the databases you need are properly updated by the startup. Among these are:
 - TCPWARE:HOSTS.
 - TCPWARE:HOSTS.EQUIV
 - .RHOSTS
 - ROUTING.COM
- 2 Log out of the system account — TCPware for OpenVMS is ready for general use.
- 3 Test TCPware — Perform connectivity tests for each TCPware component you installed and configured. For example, use FTP to transfer some files.

If you uncover problems during testing, review the network configuration. If you need to reconfigure a component, stop TCPware first.

Appendix A

Sample Installation

This appendix provides a sample TCPware update installation.

The system manager's responses are in **bold type**. Note that your responses might not necessarily be the same as those given in the example.

Example A-1 Sample Installation

```
$ @SYS$UPDATE:VMSINSTAL Return
```

```
OpenVMS AXP Software Product Installation Procedure V7.1  
It is 3-NOV-2002 at 11:51.
```

```
Enter a question mark (?) at any time for help.
```

```
* Are you satisfied with the backup of your system disk [YES]? Return
```

```
* Where will the distribution volumes be mounted: SYS$MANAGER Return
```

```
Enter the products to be processed from the first distribution volume set.
```

```
* Products: TCPWARE056 Return
```

```
* Enter installation options you wish to use (none): Return
```

```
The following products will be processed:
```

```
TCPWARE V5.6
```

```
Beginning installation of TCPWARE V5.6 at 11:52
```

```
%VMSINSTAL-I-RESTORE, Restoring product save set A ...
```

```
%VMSINSTAL-I-REMOVED, Product's release notes have been moved to SYS$HELP.
```

```
TCPware(R) for OpenVMS Version 5.6
```

```
Copyright (c) 2002, by Process Software
```

Refer to the "Installing TCPware" chapter of the TCPware for OpenVMS(R)
Installation & Configuration Guide.

Sample Installation

You can specify the directory where you want the TCPware common files installed. The default location for the TCPware common files is SYS\$COMMON. A [.TCPWARE] subdirectory will be created in the directory you specify.

* Where do you want to install the TCPware common files SYS\$COMMON]:**Return**

You can specify the directory where you want node specific files installed. This directory must not be used by any other nodes in a cluster. The default location is SYS\$SPECIFIC:[TCPWARE]. A [.TCPWARE] subdirectory will be created in the directory you specify.

* Where do you want to install the TCPware node specific files
[SYS\$SPECIFIC]:**Return**

TCP-OpenVMS will be installed.

TCPware for OpenVMS includes online HELP. You may add this HELP to the DCL HELP library (SYS\$HELP:HELPLIB.HLB). The HELP text will display under the heading "TCPware".

*Do you want to add online HELP to the DCL HELP library [YES]? **Return**

Select the products to install by answering YES or NO to the following prompts. Install only those products for which you have a Product Authorization Key. Installing products for which you do not have a Product Authorization Key does you no good (a Product Authorization Key is required which only allows you to use licensed products).

```
* Do you want to reinstall FTP-OpenVMS           (TCP/IP  Services) [YES]?
* Do you want to reinstall Service Accounting    (TCP/IP  Services) [YES]?
* Do you want to reinstall NFS-OpenVMS Client    (TCP/IP  Services) [YES]?
* Do you want to reinstall NFS-OpenVMS Server    (TCP/IP  Services) [YES]?
* Do you want to reinstall SMTP-OpenVMS          (TCP/IP  Services) [YES]?
* Do you want to reinstall TELNET-OpenVMS        (TCP/IP  Services) [YES]?
* Do you want to reinstall SSH-OpenVMS           (TCP/IP  Services) [YES]?
* Do you want to reinstall Kerberos Services     (TCP/IP  Services) [YES]?
* Do you want to reinstall ONC RPC Services      (TCP/IP  Services) [YES]?
* Do you want to install   FSS-OpenVMS           (NetWare Services) [NO]?
* Do you want to install   NPS-OpenVMS           (NetWare Services) [NO]?
* Do you want to install   TES-OpenVMS           (NetWare Services) [NO]?
```

The following products will be installed:

TCP-OpenVMS

```
FTP-OpenVMS           (TCP/IP  Services)
Service Accounting    (TCP/IP  Services)
NFS-OpenVMS Client    (TCP/IP  Services)
NFS-OpenVMS Server    (TCP/IP  Services)
SMTP-OpenVMS          (TCP/IP  Services)
TELNET-OpenVMS        (TCP/IP  Services)
```

```

SSH-OpenVMS          (TCP/IP Services)
Kerberos Services    (TCP/IP Services)
ONC RPC Services      (TCP/IP Services)

```

* Is this correct [YES]? **Return**

This concludes the question and answer portion of the installation.

Your system will now be updated to include TCPware for OpenVMS. This will take a short while.

```

%VMSINSTAL-I-RESTORE, Restoring product save set B ...
%VMSINSTAL-I-RESTORE, Restoring product save set C ...
%VMSINSTAL-I-RESTORE, Restoring product save set D ...
%VMSINSTAL-I-RESTORE, Restoring product save set E ...
%VMSINSTAL-I-RESTORE, Restoring product save set F ...
%VMSINSTAL-I-RESTORE, Restoring product save set G ...
%VMSINSTAL-I-RESTORE, Restoring product save set H ...
%VMSINSTAL-I-RESTORE, Restoring product save set I ...
%VMSINSTAL-I-RESTORE, Restoring product save set J ...
%VMSINSTAL-I-RESTORE, Restoring product save set K ...
%VMSINSTAL-I-RESTORE, Restoring product save set L ...

```

```

-----
|           Installing TCP-OpenVMS           |
-----

```

```

%VMSINSTAL-I-SYSDIR, This product creates system disk directory
TCPWARE_COMMON:[TCPWARE].

```

If you intend to use TCPware on other nodes in this VMScluster, and you have the appropriate Product Authorization Key(s), you must run the network configuration procedure on each node.

```

%VMSINSTAL-I-SYSDIR, This product creates system disk directory
TCPWARE_COMMON:[TCPWARE.EXAMPLES].
%VMSINSTAL-I-SYSDIR, This product creates system disk directory
TCPWARE_COMMON:[TCPWARE.INCLUDE].
%VMSINSTAL-I-SYSDIR, This product creates system disk directory
TCPWARE_COMMON:[TCPWARE.NAMED].

```

```

-----
|           Installing ONC RPC Services       |
-----

```

```

%VMSINSTAL-I-SYSDIR, This product creates system disk directory
TCPWARE_COMMON:[TCPWARE.EXAMPLES.RPC].

```

```

-----
|           Installing FTP-OpenVMS           |
-----

```

```

-----
|           Installing NFS-OpenVMS Client    |
-----

```

```
-----
|      Installing NFS-OpenVMS Server      |
|-----|
```

```
-----
|      Installing SMTP-OpenVMS      |
+-----|
```

```
-----
|      Installing POP3 Server      |
|-----|
```

```
-----
|      Installing IMAP Server      |
|-----|
```

```
-----
|      Installing TELNET-OpenVMS      |
|-----|
```

```
-----
|      Installing Kerberos V4 Services      |
|-----|
```

```
-----
|      Installing FSS-OpenVMS      |
|-----|
```

```
%VMSINSTAL-I-SYSDIR, This product creates system disk directory
TCPWARE_COMMON:[TCPWARE.IPX].
```

```
-----
|      Installing NPS-OpenVMS      |
|-----|
```

```
-----
|      Installing TES-OpenVMS      |
|-----|
```

```
%VMSINSTAL-I-SYSDIR, This product creates system disk directory
TCPWARE_COMMON:[TCPWARE.IPX.TES_UNSUPRTD].
```

To complete the installation, follow the steps described in the
"Configuring TCPware" and "Starting Up TCPware" chapters of the TCPware for
OpenVMS Installation & Configuration Guide.

```
%VMSINSTAL-I-MOVEFILES, Files will now be moved to their target
directories...
```

```
      Installation of TCPWARE V5.6 completed at 12:11
Enter the products to be processed from the next distribution volume set.
```

```
* Products: exit Return
      VMSINSTAL procedure done at 12:19
```

Appendix B

Sample Configuration

This appendix provides a sample full TCPware configuration.

The system manager's responses are in **bold type**. Note that your responses might not necessarily be the same as those given in the example.

Example B-1 Sample Configuration

\$ **@TCPWARE:CNFNET MENU Return**

TCPware(R) for OpenVMS Version 5.6-0 Network Configuration procedure for:

```
TCP/IP Services:
  FTP-OpenVMS
  NFS-OpenVMS Client
  NFS-OpenVMS Server
  SMTP-OpenVMS
  TELNET-OpenVMS
  Kerberos Services
  SSH-OpenVMS Server
```

This procedure helps you define the parameters needed to get TCPware(R) for OpenVMS running on this system.

This procedure creates the configuration data file, TCPWARE_SPECIFIC:[TCPWARE]TCPWARE_CONFIGURE.COM, to reflect your system's configuration.

Type <return> to continue...**Return**

TCPware(R) for OpenVMS Configuration Menu

Configuration Options:

Sample Configuration

- 1 - Configure TCPware Services
- 2 - Configure NetWare Services
- 3 - Startup/Restart all TCPware Services
- 4 - Shutdown all TCPware Services
- L - Display the software licensing information (PASSWORD)
- E - Exit the configuration procedure (changes will be saved)

Enter configuration option: **1 Return**

TCPware Services Configuration Menu

Configuration Options:

- 1 - Core environment for TCP/IP services
- 2 - Configure all TCP/IP components
- 3 - Configure a specific TCP/IP component
- 4 - Startup/Restart TCP/IP services
- 5 - Shutdown TCP/IP services
- 6 - Startup/Restart a specific TCP/IP component
- 7 - Shutdown a specific TCP/IP component
- E - Exit to previous menu

Enter configuration option: **1 Return**

Please enter your Process Software Maintenance Agreement (MAS) number if you have one and have it available. This number can be found on the top of your Software Maintenance and Support Acknowledgment form.

If you do not have this number, press <RETURN> at the prompt. If you would like to enter this information later, you can set it using the command:

\$ @TCPWARE:CNFNET MAS Return

Enter your Maintenance Agreement (MAS) number []: **12345 Return**

You need to enter the line identifications for the available network devices. The following is a partial list of the network devices that are supported:

Line Id	Network Device
-----	-----
QNA-n	for DEC's DELQA, DESQA, or DEQNA (XQDRIVER)
UNA-n	for DEC's DELUA or DEUNA (XEDRIVER)
BNA-n	for DEC's DEBNI, DEBNA, or DEBNT (ETDRIVER)
SVA-n	for DEC's DESVA (ESDRIVER)
MNA-n	for DEC's DEMNA (EXDRIVER)
ISA-n	for DEC's VAX 4000 (EZDRIVER)

MFA-n	for DEC's DEMFA FDDIcontroller 400 (FXDRIVER)
FZA-n	for DEC's DEFZA FDDIcontroller 700 (FCDRIVER)
PRO-n	for Proteon's proNET (PNDRIVER)
HYP-n	for NSC's HYPERchannel (NxDRIVER)
SLIP-n	for (static) Serial Line IP (any terminal device)
DECNET-n	for IP over DECnet (requires DECnet)
DSB-n	for DEC's DSB32 (SLDRIVER)
DST-n	for DEC's DST32 (ZSDRIVER)
DSV-n	for DEC's DSV11 (SJDRIVER)
X25-n	for VAX P.S.I. (IP over X.25)
LPB-0	for local loopback (no device driver)

Unless your system has more than one controller, n is 0.

Enter the line identifications [LPB-0,EWA-0]: **Return**

You need to supply the following information for each line:

- The internet address for the line
- The name for the line (same as the host name if single line host, fully qualified domain name if using DNS)
- The subnet mask for the line
- The line specific information (depends on line)

If there is a DHCP server running on the network and this is a single line host, you may get the information from DHCP server automatically. To do so, please select 2.

1. Configure Internet address and related items manually.
2. Configure Internet address and related items automatically

Continue with selection [1]: **Return**

If a network is not subnetted, press return at the subnet mask prompt. Otherwise, enter the subnet mask for the network as an internet address. These are the default subnet masks for each network class:

Network Class	Default Subnet Mask
-----	-----
A	255.0.0.0
B	255.255.0.0
C	255.255.255.0

Using LOOPBACK (127.0.0.1) as name for line LPB-0.

What is the local host's INTERNET ADDRESS for line EWA-0 [198.115.140.19]:

192.168.2.56 Return

What is the NAME for line EWA-0 [mine.yours.com]: **LILAC.NENE.COM Return**

What is the SUBNET MASK for line EWA-0 [255.255.255.0]: **Return**

Sample Configuration

Do you want to enable TRAILER packet support for line EWA-0 [NO]: **Return**
Do you want to enable RARP (Reverse ARP) support for line EWA-0 [YES]: **Return**

The network devices are configured as follows:

Line	Address	Name	Options
----	-----	----	-----
LPB-0	127.0.0.1	LOOPBACK	
EWA-0	192.168.2.56	LILAC.NENE.COM	/MASK=255.255.255.0 /FLAGS=(NOTRAILERS)

Is this configuration correct [YES]: **Return**

If your network is connected to other networks, you may want to enter the internet address of a default gateway. If your network has more than one gateway, enter the gateway "closest" to the networks that you will be connecting to most frequently. The (sub)network portion of the internet address for the gateway MUST match that of a locally connected (sub)network.

Enter 0.0.0.0 if you need to remove a previously defined default gateway or your network does not have any gateways.

Your routing requirements might be more complex if your network has several gateways. Handle this by adding the appropriate NETCU commands (such as ADD ROUTE) to the TCPWARE_COMMON:[TCPWARE]ROUTING.COM command procedure.

For more information on routing, refer to the TCPware for OpenVMS(R) documentation.

Enter the internet address of the default gateway [0.0.0.0]: **Return**

You need to specify local time zone information. Time zone maybe specified as fixed value which must be manually set for the daylight savings time change, or you can use NTP (Network Time Protocol) Daemon to change the system clock and time offset automatically.

Do you want to have NTP set the time and time offset automatically [NO]?
Return

You need to provide the offset from universal time (UT) or local time zone name. It is recommended that you specify an offset from UT instead of entering a time zone name.

Offset from universal time	
in hours and minutes:	+HHMM (east) or -HHMM (west)
Universal time zone:	UT, UTC, GMT
North American time zone:	EST, EDT, CST, CDT, MST, MDT, PST, PDT
Military time zone:	Any single letter A through Z except J

You may enter a non-standard time zone name, although the Internet discourages their use. If you use a non-standard name, you will be prompted to enter the offset from universal time as well.

Enter the offset from UT or the local time zone name [EST]: **Return**

You need to enter the official name of this host as it is known locally and by other hosts on the network. Default is the name you specified for the first network device.

If your system will use Domain Name Services, you must enter the full domain name of the host.

Enter the official host-domain name for this host [mine.yours.com]: **Return**

Enter the time zone name and time zone rules (if different from default rules). TCPWARE:TIMEZONES.DAT contains a list of available time zone rules, or local definitions maybe defined in TCPWARE:TIMEZONES.LOCAL.

Enter the time zone name [EST]: **Return**

Enter the time zone rule(s): Canadian, U.S. Federal **Return**

You need to enter the official name of this host as it is known locally and by other hosts on the network. Default is the name you specified for the first network device.

If your system will use Domain Name Services, you must enter the full domain name of the host.

A host definition file already exists. You have the option of using the existing file or creating a new one.

Create a new host definition file? [NO] **Return**

If you changed the host name or internet address of the local host, edit the host definition file (TCPWARE_COMMON:[TCPWARE]HOSTS.) to reflect the changes.

If you chose option 2 under DHCP server: **Return**

Set DHCP client Host Name for line EWA-0: **Return**

You can press Enter to let the system choose a host name. Or you can specify a name you would like to use for the host. However, the final name for the host will be up to the DHCP server to decide. It may not be the name you specify.

Host Name for the line EWA-0 (<return> to end) [mine]: **Return**

You need to specify local time zone information. Time zone maybe specified as fixed value which must be manually set for the daylight savings time change,

Sample Configuration

or you can use NTP (Network Time Protocol) Daemon to change the system clock and time offset automatically.

Do you want to have NTP set the time and time offset automatically [NO]?

Type <return> to continue...**Return**

TCPware Services Configuration Menu You need to provide the offset from universal time (UT) or local time zone name. It is recommended that you specify an offset from UT instead of entering a time zone name.

Offset from universal time
 in hours and minutes: +HHMM (east) or -HHMM (west)
Universal time zone: UT, UTC, GMT
North American time zone: EST, EDT, CST, CDT, MST, MDT, PST, PDT
Military time zone: Any single letter A through Z except J

You may enter a non-standard time zone name, although the Internet discourages their use. If you use a non-standard name, you will be prompted to enter the offset from universal time as well.

Enter the offset from UT or the local time zone name [EST]:

TCPware Services Configuration Menu

- 1 - Core environment for TCP/IP services
- 2 - Configure all TCP/IP components
- 3 - Configure a specific TCP/IP component

- 4 - Startup/Restart TCP/IP services
- 5 - Shutdown TCP/IP services
- 6 - Startup/Restart a specific TCP/IP component
- 7 - Shutdown a specific TCP/IP component

- E - Exit to previous menu

Enter configuration option: **2 Return**

Configuring all of the TCP/IP components...
Type <return> to continue...**Return**

Configuring the Accounting listener:

TCPware accounting consists of two components: The accounting record logger, which this procedure configures and controls, and the services that can use the accounting process.

This procedure controls the startup of the accounting record logger. The details such as the name of the accounting file, the port that the accounting

record logger listens on, and the list of IP addresses that can use the accounting logger are controlled by TCPWARE:ACCOUNTING.CONF

Do you want to activate the Accounting listener on this host [NO]:

Configuring TCPware ACE/Client:

ACE/Client allows you to authenticate user logins.

Do you want the TCPware ACE/Client [NO]: **Return**

Configuring NFS-OpenVMS Client:

Do you want the NFS Client [YES]: **Return**

Configuring the Dynamic Host Configuration Protocol (DHCP) Server:

Do you want to enable the Dynamic Host Configuration/Bootstrap Protocol Server (DHCPD) [NO]: **Return**

Configuring DECnet over IP tunnels:

DECnet over IP tunneling allows you to establish DECnet lines and circuits over a TCP/IP network.

Do you want to configure DECnet over IP tunnels [NO]: **Return**

Configuring the Domain Name Services (DNS):

The Domain Name Services (DNS) for this host were previously configured to operate as a client only.

Do you want to change the current configuration [YES]: **Return**

Do you want to enable the DNS Server [NO]: **Return**

Do you want to enable DNS client support [YES]: **Return**

The client needs to obtain information from a DNS server.

Provide the internet address(es) of up to three DNS servers. Use spaces to separate multiple addresses.

Note: If the local host is configured as a server, you can enter the loopback internet address or the local host's internet address to make use of that server.

Enter the internet address of the server(s) [192.42.95.1]: **Return**

By default, the client appends the local domain name to local queries, and queries that fail resolving as fully qualified names. If you would like other domains appended, provide the name(s) of up to six domains to append. If you

Sample Configuration

do not want to append a domain other than your default domain, answer no to skip to the next section. Use spaces to separate multiple domains.

Do you want to configure a list of domains [NO]: **Return**

By default, the client resolves host names with 1 or more dots absolutely before appending your domain name. If you would like host names with 1 or more dots to be resolved with your domain name first, or you would like host names with no dots to be resolved absolutely, you want to change the number of dots.

Do you want to configure number of dots [NO]: **Return**

This is how your DNS client is configured:

```
Domain Name:           yours.com
Name Server(s):        192.47.95.1
```

Is this configuration correct [YES]: **Return**

Configuring FTP-OpenVMS:

Do you want to enable the FTP server [YES]: **Return**

Do you want to enable FTP accounting [NO]: **Y Return**

Name of host that will run accounting collection program [localhost]: **Return**

Port number that accounting collection program listens on []: **Return**

Configuring GateDaemon (GateD):

GateD is a routing process that automatically exchanges routing information with other hosts using a variety of protocols. The supported protocols are: RIP Version 1, RIP Version 2, DCN HELLO, OSPF Version 2, EGP Version 2, BGP Versions 2 through 4, and Router Discovery.

Please follow the procedure described in the TCPware for OpenVMS Installation and Configuration Guide to configure GateD.

Do you want to use the TCPware for OpenVMS GateDaemon [NO]: **Return**

Configuring The Internet Message Access Protocol V4 (IMAP) Server:

For detailed information on the following parameters, refer to the TCPware for OpenVMS Management Guide.

Do you want to enable the IMAP server [YES]: **Return**

Specify the username the IMAPD process should execute as. The account requires SYSNAM, TMPMBX, NETMBX, and SYSPRV or BYPASS privileges.

Enter the username [SYSTEM]: **Return**

The server can be configured to cache all messages in a folder while it is in use. This may increase performance in some cases, but requires substantially more memory per process. By default, only the most recently accessed message is cached.

Do you want to enable full message caching [NO]: **Return**

Specify the username the IMAPD process should execute as. The account requires SYSNAM, TMPMBX, NETMBX, and SYSPRV or BYPASS privileges.

Enter the username [SYSTEM]: **Return**

The server can be configured to cache all messages in a folder while it is in use. This may increase performance in some cases, but requires substantially more memory per process. By default, only the most recently accessed message is cached.

Do you want to enable full message caching [NO]: **Return**

Determine the logging level, Options are:

NONE	- No logging
ERROR	- Errors only
INFO	- Information messages and Errors
DEBUG	- Complete Debug logging

You may enter the first character of your choice.

Enter your choice (None, Error, Info, Debug) [DEBUG]: **Return**

The IMAP server is configured as follows:

Username	: SYSTEM
Message caching enabled	: NO
log level	: DEBUG

Is this correct [YES]: **Return**

Configuring Kerberos (Version 4) Services:

Kerberos allows you to control user access to network services.

Do you want the Kerberos Services [NO]: **Return**

Configuring the Line Printer Services (LPS):

Line Printer Services consists of the client and the server. The client lets users on this OpenVMS host print files on printers attached to remote hosts. The server accepts files from remote hosts to be printed on printers attached to this OpenVMS host. LPS configuration consists of configuring:

Sample Configuration

- Default remote printer for LPS Client commands (LPR,LPQ,LPRM)
- OpenVMS Print Queue
- LPD Server

Do you want to enable the Line Printer Services (LPS) [NO]: **Return**

Configuring the Miscellaneous Services:

Do you want the Trivial File Transfer Server (TFTPD) [NO]: **Return**

Configuring NFS-OpenVMS Server:

Do you want the NFS Server (NFSD) [YES]: **Return**

For detailed information on NFS-OpenVMS Server parameters, refer to the TCPware(R) for OpenVMS Installation & Configuration Guide.

Type <return> to continue...**Return**

The access identifier parameter, `NFS_ACCESS_IDENTIFIER`, specifies the name of the rights identifier to be granted to all NFS users. This parameter is optional.

To remove a previously entered identifier, enter *.

Enter the access identifier []: **MARKETING Return**

The security mask parameter, `NFS_SECURITY`, controls access to the OpenVMS system. Note that these options should normally be specified on a file system basis (rather than a global basis) using the appropriate `NETCU ADD EXPORT` command qualifiers (as indicated below), if applicable.

Bit Mask	Meaning when set
-----	-----
1	Superuser mount. Only the superuser is allowed to mount file systems (/SUPERUSER_MOUNT).
2	Explicit mount. Only file systems explicitly exported can be mounted (/EXPLICIT_MOUNT).
4	Mount proxy check. The UID/GID used in mount requests must exist in the PROXY database (/PROXY_CHECK).
8	Privileged port check. All incoming NFS requests must originate from privileged ports (/PRIVILEGED_PORT).
16	Report all access allowed for files to client (server does all access checks) (/SERVER_ACCESS).
32	Allow PCNFSD batch queue printing.
64	Disable PCNFSD use of the intrusion database.
128	Disable PCNFSD deletion of printed files.

To specify the security mask, add up all the bit mask values for the types of security you want provided.

Enter the security mask [0]: **16 Return**

The logging class mask parameter, `NFS_LOG_CLASS`, controls the types of information written to the log file.

Bit Mask	Meaning when set	Comments
-----	-----	-----
1	Warnings	Error recovery messages
2	Mount Requests	Mount call messages
4	General	General operation messages
8	Security	Security violation messages
16	NFS Errors	NFSERR_IO messages

To specify the logging class mask, add up all the bit mask values for the types of information you want logged. The value -1 logs all classes.

Enter the logging class mask [-1]: **Return**

The PCNFSD enable parameter, `NFS_PCNFSD_ENABLE`, enables or disables the PCNFSD protocol.

You may enter YES (to enable PCNFSD), NO (to disable PCNFSD), or PRINTING-ONLY (to enable PCNFSD for printing only - authentication requests are ignored).

Do you want PCNFSD enabled [YES]: **Return**

The spool directory parameter, `NFS_PCNFSD_SPOOL`, defines the spool directory used for printing files with PCNFSD. If this parameter is undefined, the printing capability of PCNFSD is disabled. The spool directory name is case sensitive.

To remove a previously entered spool directory, enter *.

Enter the PC-NFS Client spool directory []: **/NFS/EXPORTED/SPOOL Return**

Automatically create subdirectories for each client [NO]: **Return**

These are the NFS-OpenVMS Server configuration parameters you selected:

```

Access Identifier:      (none)
Security Mask:         16 = All Access
Logging Class Mask:    -1 = Warnings, Mounts, General, Security, Errors
PCNFSD enable:         1 (YES)
Spool directory:       /NFS/EXPORTED/SPOOL

```

Is this configuration correct [YES]: **Return**

Configuring the Network Time Protocol (NTP) Daemon:

Sample Configuration

Kerberos is installed on this system. For Kerberos to work correctly, use the Network Time Protocol (NTP) Daemon to synchronize the clock on this system with the other systems that are also using Kerberos.

Do you want to use the TCPware for OpenVMS NTP Daemon [YES]: **Return**

Configuring The Post Office Protocol V3 (POP3) Server:

For detailed information on the following parameters, refer to the TCPware for OpenVMS Management Guide.

Do you want to enable the POP3 server [NO]: **Return**

Configuring the PWIPDRIVER:

The PWIPDRIVER is **required** by Pathworks and DECnet/OSI over TCP/IP.

Do you want to enable the PWIPDRIVER [YES]: **Return**

Configuring the Berkeley R Commands:

The Berkeley R Commands have 2 parts: services and clients.

There are 3 R services: login, shell, and exec.

login service allows remote users to log in to this system using the BSD RLOGIN protocol. Authorization is done using equivalence files alone, or with both equivalence files and the user having to enter a password.

shell and exec services both allow remote users to execute a single command on this system. The difference is in the authorization method used. shell uses equivalence files while exec uses explicit username/password strings.

All services can, optionally, use Service Access Lists to further restrict remote access.

There are 3 clients: RLOGIN, RSH, and RMT.

You have the option of making the services available. You should be familiar with the R Commands and the authorization methods before starting the services to insure that you do not inadvertently expose your system to a security risk.

Do you want to activate login service [YES]: **Return**

There are 2 methods of authorization available for login service.

NORMAL: Uses equivalence files to authorize remote users, and allows remote user to try a username/password if there isn't an equivalence file match.

SECURE: Uses equivalence files, and if there is a match, requires the remote user to enter the account's password correctly. If there is no equivalence file match, access is denied.

Which type of login authorization (NORMAL, SECURE) [NORMAL]: **Return**

Do you want to activate shell service [YES]: **Return**

Do you want to activate exec service [YES]: **Return**

The RLOGIN, RSH, and RMTSETUP (without the /PASSWORD qualifier) commands require SYSPRV privilege to bind to reserved TCP ports which are needed for them to work correctly. In a BASIC configuration, the executable images are INSTALLED with SYSPRV privilege to allow all users on your system to make use of them. In this FULL configuration, you have the option of restricting the use of these 3 commands.

Answering "NO" to the following questions restricts use of the indicated command to users with either SYSPRV or BYPASS privilege only.

Answering "YES" allows general use of the command.

Do you want to INSTALL the RLOGIN image [YES]: **Return**

Do you want to INSTALL the RSH image [YES]: **Return**

Do you want to INSTALL the RMTSETUP image [NO]: **Return**

Configuring SMTP-OpenVMS:

For detailed information on the following parameters, refer to the TCPware for OpenVMS Management Guide.

Do you want to use the SMTP Mail Transfer Agent? [YES]: **Return**

One user on this system must act as the local postmaster. This person will receive mail sent to the postmaster. The person's username must always be valid while SMTP-OpenVMS is operating.

Enter the username of the local postmaster [SYSTEM]: **Return**

Do you want to enable the SMTP RFC2789 MIB [NO]? **Return**

Do you want to enable SMTP accounting [YES]? **Return**

Name of the host that will run the accounting collection program
[mine.yours.com]: **Return**

Port number that accounting collection program listens on [45000]: **Return**

For further configuration options, please see the procedure described in the TCPware for OpenVMS Installation & Configuration Guide to configure SMTP-OpenVMS

Configuring the SNMP Agent:

Sample Configuration

SNMP is the Simple Network Management Protocol. If you activate the SNMP agent on this host, the agent will start up when you start up the network and will respond to queries. Answer YES to the next prompt only if your network has an SNMP client (network management station).

Do you want to activate the SNMP agent on this host [NO]: **Return**

Configuring SSH-OpenVMS:

For detailed information on the following parameters, refer to the TCPware for OpenVMS Management Guide.

Do you want to enable the SSH server [NO]? **Return**

Configuring TALK Utility

The TALK client/server operates with other "NTALK" clients and servers. The "NTALK" protocol was introduced in BSD V4.3; the version of TALK shipped with TCPware is not compatible with TALK utilities based on earlier versions of BSD.

In order for users to use TALK, the TALKD server must also be enabled.

Do you want to enable the TALKD server [NO]: **Return**

Configuring TELNET-OpenVMS:

Determine how many Server-TELNET listeners you want on this system. Set this number to 1 unless you expect a lot of incoming TELNET activity.

This number does not limit the number of incoming TELNET sessions. The number of sessions is limited only by the available system resources (such as the maximum number of processes).

Enter the number of Server-TELNET listeners [1]:

Configuring the TIMED Daemon:

Do you want Configuring the X Display Manager (XDM) Server: **Return**

Do you want to use the TCPware for OpenVMS XDM Server [NO]:to use the TCPware for OpenVMS TIMED Daemon [NO]: **Return**

Configuring the SNMP SMUX Service:

You have the option of enabling the SNMP server's SMUX Service. SMUX (RFC 1227) is an SNMP subagent protocol.

Warning: If you enable SMUX support, the SNMP server will only accept SMUX connections from hosts explicitly listed in the SNMPD.CONF file. Make sure to

configure this file appropriately. Refer to the TCPware Management Guide, the Managing SNMP Services chapter.

Do you want to activate the SNMP SMUX service on this host [NO]: **Return**

Configuring the SNMP AgentX Service:

You have the option of enabling the SNMP server's AgentX Service. AgentX (RFC 2741) is an SNMP subagent protocol.

Warning: If you enable AgentX support, the SNMP server will only accept AgentX connections from hosts explicitly listed in the SNMPD.CONF file. Make sure to configure this file appropriately. Refer to the TCPware Management Guide, the Managing SNMP Services chapter.

Do you want to activate the SNMP AgentX service on this host [NO]: **Return**

Configuring the Accounting listener:

TCPware accounting consists of two components: The accounting record logger, which this procedure configures and controls, and the services that can use the accounting process.

This procedure controls the startup of the accounting record logger. The details such as the name of the accounting file, the port that the accounting record logger listens on, and the list of IP addresses that can use the accounting logger are controlled by TCPWARE:ACCOUNTING.CONF

Do you want to activate the Accounting listener on this host [NO]: **Return**

Configuring an SNMP subagent(s):

An SNMP subagent is a shareable image that serves a private MIB. If the master SNMP agent receives a query for a variable in the private MIB, it will hand that query to the subagent for resolution.

Each subagent must be a shareable image, and conform to the SNMP Extendible Agent API Routines interface defined in the TCPware Programmer's Guide.

Answer YES to the next prompt only if this installation has SNMP subagents.

Do you want to configure subagent(s) on this host [NO]: **Return**

Configuring SSH-OpenVMS:

For detailed information on the following parameters, refer to the TCPware for OpenVMS Management Guide.

Do you want to enable the SSH server [NO]? YES **Return**

Sample Configuration

For SSH1, you must specify the number of bits in the RSA key. The range is 512 to 32768 bits, but keys longer than 1024 are generally not much safer, and they significantly increase the amount of CPU time consumed by key generation.

Enter the number of bits in the RSA key [768]: **Return**

You may specify an alternate configuration file for the SSH1 server.

Enter an alternate SSH1 configuration filename: DKA300:[SSHFILE]MYCONFIG.TXT
Return

Specify the level of debug, as a value from 0 to 50. For SSH1, any non-zero value will turn on debug, but there is no "degree of debug".

Enter the debug level [0 - 50, 0]: 15 **Return**

Enter an alternate SSH1 public server host key file:
DKA300:[SSHKEYS]MYHOST.KEY **Return**

Specify the time in seconds after which the server private key is generated. This is only done for SSH1 sessions.

Enter the key regeneration time [3600]: **Return**

You may specify the number of seconds a user has to enter a password during user authentication (default = 600). In addition, you may allow this to default to the value used by OpenVMS when a user is logging into a non-SSH session. To specify an infinite wait time, enter 0 for the timeout value.

Do you want to change the default login grace time [NO]? **YES Return**

Do you want use the default OpenVMS login grace time [NO]? **N Return**

Enter the login grace time to use [0]: **120 Return**

Specify the port for the SSH server to listen on, if you want to use a port other than the default port of 22.

Enter port to use [22]: **Return**

Do you want any messages logged by the SSH server at all [NO]? **Y Return**

Do you want verbose logging by the SSH server [NO]? **Y Return**

Enter maximum number of concurrent SSH sessions [1-1000, 1000]: **200 Return**

In OpenVMS, users with passwords that have expired because the SYSUAF PWDLIFETIME value has been exceeded are allowed to log into the system, and are then forced to change their password. The SSH protocol does not allow for

that condition. Answer "YES" to the following question if you want to allow users with expired passwords to still log into the system. They WILL NOT be forced to change their password.

Do you want to allow users with expired passwords to log in [NO]? **Y Return**

In OpenVMS, users with passwords that have been pre-expired by the system manager are allowed to log into the system, and are then forced to change their password. The SSH protocol does not allow for that condition. Answer "YES" to the following question if you want to allow users with pre-expired passwords to still log into the system. They WILL NOT be forced to change their password.

Do you want to allow users with preexpired passwords to log in [NO]? **Y Return**

When generating user keys, a passphrase may be used to further protect the key. No limit is normally enforced for the length of the passphrase. However, you may specify a minimum length for the passphrase to be.

What you want the minimum passphrase length to be [0-1024, 0]? **10 Return**

Do you want to restart the SSH-OpenVMS Server [NO]: **YES Return**

Shutting down the SSH-OpenVMS Server ...

Starting the SSH-OpenVMS Server ...

%RUN-S-PROC_ID, identification of created process is 20800104

\$

Configuring the WEBCNF Server:

For detailed information on the following parameters, refer to the TCPware for OpenVMS Installation & Configuration Guide.

You can now configure parts of TCPware and show various network parameters using a web browser.

Do you want to enable the WEBCNF server [NO]: **Return**

TCPware Services Configuration Menu

Configuration Options:

- 1 - Core environment for TCP/IP services
- 2 - Configure all TCP/IP components
- 3 - Configure a specific TCP/IP component

- 4 - Startup/Restart TCP/IP services
- 5 - Shutdown TCP/IP services
- 6 - Startup/Restart a specific TCP/IP component
- 7 - Shutdown a specific TCP/IP component

Sample Configuration

E - Exit to previous menu

Enter configuration option: **E Return**

Appendix C

Installed Files

Introduction

This appendix describes:

- Defining the TCPware logicals
- How directories are set up
- Component keys to the file listing
- TCPware files and their descriptions

TCPware does not create the same files for all installations. The files it creates depend on which products are installed and which features you enable during network configuration.

Defining the TCPware Logicals

TCPware file definitions include a number of logicals. You can define these logicals in the SYS\$SYSROOT:[TCPWARE]TCPWARE_LOGICALS.COM procedure. Make sure to execute this procedure before performing any other TCPware procedure.

The logicals and how they relate to OpenVMS system logicals are shown in Table C-1. (Note that they are valid only for the default TCPware installation common files location.

Table C-1 TCPware Default Directory Location Logicals

TCPware Logical Name	System Logical Equivalent
TCPWARE_ROOT	SYS\$SYSROOT:
TCPWARE	TCPWARE_ROOT:[TCPWARE]
TCPWARE_INCLUDE	TCPWARE:[INCLUDE]
TCPWARE_SPECIFIC	SYS\$SPECIFIC

Table C-1 TCPware Default Directory Location Logicals (Continued)

TCPware Logical Name	System Logical Equivalent
TCPWARE_COMMON	SYS\$COMMON

How Directories Are Set Up

The TCPWARE_SPECIFIC:[TCPWARE] directory and its subdirectories contain files that are specific to your local OpenVMS node. The TCPWARE_COMMON:[TCPWARE] directory and its subdirectories contain files shared by all nodes on the VMScluster. These files are generally executable images, command procedures, and source code.

Other files are in the SYS\$COMMON:[SYSEXEC], SYS\$COMMON:[SYSLIB], SYS\$COMMON:[SYSHLP], and SYS\$COMMON:[SYSMSG] directories.

TCPware organizes files in this manner for both standalone systems and VAX clusters. This means that if your installation changes from using a standalone system to using a cluster, you do not have to reorganize the TCPware files.

TCPware Components

TCPware for OpenVMS comprises the components listed in Table C-2. Each TCPware file is associated with one of these components.

Table C-2 Component Key

Component	Meaning
ACECLIENT	Access Control Encryption Client (ACE/Client)
CNFS	Network File System Client
DHCP	Dynamic Host Configuration Protocol
DNIP	DECnet over IP Tunneling
DNS	Domain Name Services
FTP	File Transfer Protocol
GATED	Gateway Routing Daemon Protocol
IMAP	Internet Message Access Protocol Server
KERBEROS	Kerberos Servers and Applications
LPS	Line Printer Services

Table C-2 Component Key (Continued)

Component	Meaning
MISC	Miscellaneous
NFS	Network File System Server
NTP	Network Time Protocol Daemon
POP3	Post Office Protocol V3 Server
PWIP	PATHWORKS over IP
RCMD	Berkeley R Commands
Session Accounting	TCPware can record accounting information from services that have been enabled. Currently FTP and SMTP.
SMTP	Simple Mail Transfer Protocol Client and Server
SNMP	Simple Network Management Protocol Agent
SSH	Secure Shell (security)
TALK	TALK Utility
TELNET	TELNET Client and Server
TIMED	Time Synchronization Protocol
XDM	X Display Manager
IPX	NetWare Services
FSS	FSS-OpenVMS
NPS	NPS-OpenVMS
TES	TES-OpenVMS

NetWare Services Directories and Files

Although NetWare is no longer supported as part of TCPware, the TCPware installation procedure installs the NetWare Services directory structure.

The installation procedure creates the following directories:

- TCPWARE_SPECIFIC:[TCPWARE.IPX]
- TCPWARE_COMMON:[TCPWARE.IPX]
- SYS\$SYSDEVICE:[FSS_SYS_VOLUME] — This directory contains the subdirectories and

files required by FSS-OpenVMS that allow it to look and act like a NetWare file server when using NetWare utilities.

CAUTION! Although OpenVMS command and executable files have .COM and .EXE extensions, FSS-OpenVMS users cannot run OpenVMS program files from DOS.

TCPWARE_SPECIFIC:[TCPWARE]

TCPWARE_SPECIFIC File	Code	Description
ADMIN_ACL.ADD	KERBEROS	Kerberos Administration server access control list (ACL) providing add privileges
ADMIN_ACL.GET	KERBEROS	Kerberos Admin server ACL for get privileges
ADMIN_ACL.MOD	KERBEROS	Kerberos Admin ACL for modification privileges
BOOTPTAB.	MISC	BOOTPD configuration file (obsolete)
DNS_CLIENT.LOG	DNS	DNS Client log file
FTP_LISTENER.LOG	GATED	GateD log file
GATED.LOG	GATED	GateD log file
HOSTS.	TCP	Host definition file (not required if using DNS client)
IMAPSERVER.LOG	IMAP	IMAP log file
IPSO_AUTHORITIES.	TCP	IP Security Option (IPSO) list of authorities
IPT.LOG	TCP/IPX	Logs IPX over IP tunneling process
KADMIN.LOG	KERBEROS	Kerberos administration server log file
KERBEROS.LOG	KERBEROS	Kerberos database log file
KRB.CONF	KERBEROS	Kerberos configuration file
LOCKSERVER.LOG	NFS	Log file created by TCPware_LOCKD
LPD_USERS.DAT	LPS	LPD Access file
LPDSERVER.LOG	LPS	Log file for the LPD server
LPS_SPOOL.DIR	LPS	Spool directory used by LPS and LPD server
NAMED_DUMP.LOG	DNS	Cache log file created by TCPware_NAMED

TCPWARE_SPECIFIC File	Code	Description
NAMESERVER.LOG	DNS	Statistics log file created by TCPware_NAMED
NETCP.LOG	TCP	Master server log file created by TCPware_NETCP
NETWORKS.	TCP	Text file that defines mapping between network names and numbers
NFSSERVER.LOG	NFS	Log file created by TCPware_NFSD
NFS_MNTLST.DAT	NFS	List of clients with active mounts
NLMSERVER.LOG	NFS	Network Lock Manager server log file
NTPSERVER.LOG	NTP	Log file for Network Time Protocol (NTP)
POP3SERVER.LOG	POP3	POP3 Server log file
PROTOCOLS.	TCP	Text file that defines mapping between protocol names and numbers
PSW_*.DAT	TCP	Contains software password for a hardware ID
RAP.LOG	TCP	Log file for RAP
ROUTING.COM	TCP	Contains commands defining routes; used by STARTNET
RPC.	RPC	Text file that defines mapping between RPC program numbers and names; used by RPCINFO
SERVERS.COM	TCP	Miscellaneous servers executed by STARTNET
SERVICES.	TCP	Text file defining mapping between service names and numbers
SLIP_SETUP.COM	TCP	Commands needed to configure terminal devices for SLIP
SM.DAT	NFS	Contains hosts being monitored by the Network Status Monitor; created during configuration

TCPWARE_SPECIFIC File	Code	Description
SM_BAK.DAT	NFS	Files used to track outstanding network locks
SM_STATE.	NFS	Files used to track outstanding network locks
SMTPCLIENT.LOG	SMTP	Log file created by the SMTP client (obsolete)
SMTP_ALIASES.	SMTP	SMTP alias file
SMTP_HOST_ALIASES.	SMTP	SMTP host aliases file
SMTP_SERVER_REJECT.	SMTP	SMTP rejection file
SNMPSERVER.LOG	SNMP	Log file created by TCPware_SNMPD
SPOOL.DIR	SMTP	Spool directory containing SMTP mail messages
SRVTAB.	KERBEROS	Kerberos service table file
START_SMTP.COM	SMTP	SMTP startup file
START_SMTP_LOCAL.COM	SMTP	SMTP local startup file
STATSERVER.LOG	NFS	Log file created by TCPware_STATD
TCPWARE_CONFIGURE.COM	TCP	TCPware configuration file created by CNFNET
TFTP_WORK.DIR	MISC	Default TFTP working directory; created only if TFTP is enabled.
TIMED.LOG	TIMED	Log file created by TCPware_TIMED
X25.LOG	X.25	Log file for X.25 mapping activities
XDMSERVER.LOG	TCP	Log file for XDM server

TCPWARE_SPECIFIC:[TCPWARE.IPX]

SPECIFIC IPX File	Code	Description
FSS.CMD	FSS	Contains initialization commands for FSS-OpenVMS server
FSS.LOG	FSS	Log file that contains all FSS-OpenVMS run-time events and error messages
FSS_IN.COM	FSS	Startup environment for FSS server
FSS_OPTIONS.DAT	FSS	Supplemental file to FSS.CMD that you can use to place site-specific commands for starting FSS-OpenVMS
GATEWAY.INI	NPS	Initialization file for Q service gateway process (TCPWARE_QSG)
OBJECTS.BND	FSS	One of file comprising FSS-OpenVMS server bindery
PROPERTIES.BND	FSS	One of file comprising FSS-OpenVMS server bindery
PROP_VALUES.BND	FSS	One of file comprising FSS-OpenVMS server bindery
QSG.LOG	NPS	Log file created when QSG.EXE is executed; contains events logged by TCPware_QSG process
QSG_IN.COM	NPS	Startup environment for the QSG process
RPR.LOG	FSS	RPR log file
SAP_SVR.LOG	FSS	SAP server log file
TMP_FILES.DIR	FSS	FSS temporary files directory
SPL.LOG	NPS	Log file created when SPL.EXE is executed; contains events logged by SPL process
SPL_IN.COM	NPS	Startup environment for SPL process
SPOOL.INI	NPS	Initialization file for Spool Client SPL process (TCPWARE_SPL)
TRUSTEE.DB	FSS	FSS-OpenVMS trustee database

TCPWARE_SPECIFIC:[TCPWARE.NAMED]

NAMED File	Code	Description
NAMED.BOOT	DNS	Contains name and location of each DNS database file
NAMED.CA	DNS	Contains internet addresses for name server with authority for the domain, and for root servers; after DNS runs for a while, may also contain copies of cached data
NAMED.HOSTS	DNS	Contains host and address information for entire name space for which name server has authority
NAMED.LOCAL	DNS	Contains local loopback address
NAMED.REV	DNS	Contains reverse mapping information that returns host domain name when given internet address

TCPWARE_COMMON:[TCPWARE]

TCPWARE_COMMON FILE	Code	Description
ACECLIENT_CL.EXE	ACECLIENT	ACE/Client executable file
ACECLIENT_CONTROL.COM	ACECLIENT	ACE/Client control file
ACECLIENT_USER.DAT	ACECLIENT	ACE/Client user database file
ACEMAIN_CL.EXE	KERBEROS	ACE/Client server configuration display file
ADMIN_ACL.ADD	KERBEROS	Kerberos Administration server access control list (ACL) providing add privileges
ADMIN_ACL.GET	KERBEROS	Kerberos Admin server ACL for get privileges
ADMIN_ACL.MOD	KERBEROS	Kerberos Admin ACL for modification privileges
BGDRIVER.EXE	TCP	BG device driver
BGDRIVER.STB	TCP	Driver symbols
BOOTPD.EXE	MISC	BOOTP executable file (obsolete)

TCPWARE_COMMON FILE	Code	Description
BOOTPTAB.TEMPLATE	MISC	BOOTP template file (obsolete)
CHARGEND.EXE	MISC	CHARGEN server executable
CHARSETS.DAT	TELNET	TELNET International Character Sets file
CNFNET.COM	TCP	Command procedure for TCPware configuration
CNFS_CONTROL.COM	CNFS	CNFS control module used to configure, start up, and shut down NFS-OpenVMS Client
CONFIG_SMTP_HEADERS.COM	SMTP	SMTP user-defined headers configuration file
CONTROLLER_AXPEXE	WEBCNF	WebCNF controller executable for AXP
CONTROLLER_VAX.EXE	WEBCNF	WebCNF controller executable for VAX
CUSTOM_LOGICALS.TEMPLATE	NFS	Template file for the NFS database file locations
CVTHOSTS.COM	TCP	HOSTS.COM to HOSTS.conversion procedure
DAYTIMED.EXE	MISC	DAYTIME server executable, invoked by NETCP
DCF.OBJ	SMTP (VAX only)	Object file for DCF program
DCF_BUILD.COM	SMTP (VAX only)	Procedure to build Message Router DCF program
DECW_CONTROL.COM	DECW	DECwindows control module; <i>not provided for Alpha or OpenVMS V6.0 and later systems</i>
DECW_FTP.EXE	FTP	FTP graphical user interface executable
DECW_FTP.UID	FTP	FTP graphical user interface definition

TCPWARE_COMMON FILE	Code	Description
DHCPD.EXE	DHCP	DHCP/BOOTP server executable
DHCPD_CONF.TEMPLATE	DHCP	DHCP configuration file template
DHCP_LEASE.DAT	DHCP	DHCP lease database (may be in _SPECIFIC)
DHCPD_LEASES.TEMPLATE	DHCP	DHCP lease file template
DHCPTAB.TEMPLATE	DHCP	DHCP template file (obsolete)
DHCPD.CONF	DHCP	DHCP configuration file
DHCPD.LEASES	DHCP	DHCP lease file
DHCPD.LEASES_OLD	DHCP	DHCP saved lease file
DHCPDEBUG.LOG	DHCP	DHCP debug log file
DHCP_CONTROL.COM	DHCP	DHCP control file
DHCP_CONVERSION_TOOL.EXE	DHCP	DHCP conversion tool
DHCP_LEASE.DAT	DHCP	DHCP lease database (obsolete)
DHCP_SERVER.COM	DHCP	DHCP server process command procedure
DISCARDD.EXE	MISC	DISCARD server executable, invoked by NETCP
DNIPDRIVER.EXE	TCP	DECnet-over-IP device driver
DNIPDRIVER.STB	TCP	Driver symbols
DNIP_CONTROL.COM	TCP	DECnet-over-IP control module used by STARTNET, SHUTNET, and CNFNET
DNS_CONTROL.COM	DNS	DNS control module used by STARTNET, SHUTNET, and DNFNET
DNS_CONVERSION_TOOL.EXE	DNS	DNS conversion tool
ECHOD.EXE	MISC	ECHO server executable, invoked by NETCP

TCPWARE_COMMON FILE	Code	Description
EXE.ADF	CNFS	Default .EXE ADF file used by Client-NFS
EXPORTDHCP.EXE	EXPORTS	DHCP export executable
EXPORTDNS.EXE	EXPORTS	DNS export executable
FTP.EXE	FTP	Client-FTP utility executable
FTPHELP.HLB	FTP	Client[FTP utility help library
FTPSERVER_DTP.COM	FTP	Server-FTP data transfer process command procedure, invoked by FTPD_PIP
FTP_CONTROL.COM	FTP	FTP control module used by STARTNET, SHUTNET, and CNFNET
FTP_LISTENER.COM	FTP	FTP_LISTENER command file invoked by @TCPWARE:STARTNET FTP
FTP_LISTENER.EXE	FTP	Server-FTP incoming connection listener program
FTP_SERVER.EXE	FTP	Server-FTP request processing program
GATED.CONF	GATED	GateD configuration file
GATED_CONTROL.COM	GATED	GateD control file
HLB.ADF	CNFS	Default .HLB ADF file used by Client-NFS
HOSTS.	TCP	Hosts definition file (not required if using DNS)
IMAPD.EXE	IMAP	IMAP server executable
IMAP_CONTROL.COM	IMAP	IMAP control file
IMAP_STARTUP.COM	IMAP	IMAP startup file
INETDRIVER.EXE	TCP	SRI QIO emulation device driver
IPDRIVER.EXE	TCP	IP device driver

TCPWARE_COMMON FILE	Code	Description
IPDRIVER.STB	TCP	Driver symbols
IPSO_AUTHORITIES.	TCP	IP Security Option (IPSO) list of authorities
IPT_PROCESS.EXE	IPX	Executable for IPX over IP tunneling process
IPT_IN.COM	IPX	Input file for IPX over IP tunneling process
KADMIN.EXE	KERBEROS	Kerberos Administration server
KERBEROS.EXE	KERBEROS	Kerberos server
KERBEROS_CONTROL.COM	KERBEROS	Kerberos control file
KSTASH.KEY	KERBEROS	Protected file with Kerberos master password
LOAD_NTDRIVER.COM	TCP	Loads the NTDRIVER; called by TELNET, RCMD, and Kerberos control procedures
LPD.EXE	LPS	LPD server executable image
LPD_SERVER.COM	LPS	LPD server configuration file
LPD_USERS.DAT	LPS	LPD Access File
LPQ.EXE	LPS	LPQ command
LPR.EXE	LPS	LPR command
LPR_JOB.DAT	LPS	LPR job number file; created only if you use LPR
LPRM.EXE	LPS	LPRM command
LPS_CONTROL.COM	LPS	Used by CNFNET, STARTNET, and SHUTNET to configure, start, and stop LPS
MAILING_LIST.DIR	SMTP	SMTP mailing list directory
MAP3270.DAT	TELNET	Key mappings for IBM 3270 terminal emulation

TCPWARE_COMMON FILE	Code	Description
MAP3270_DECSNA.DAT	TELNET	Key mappings closely resembling those of DECnet/SNA 3270 Terminal Emulator
MISC_CONTROL.COM	MISC	Configures, starts, and stops miscellaneous services
MLB.ADF	CNFS	Default .MLB ADF file used by Client-NFS
MR_CONFIGURE.COM	SMTP (VAX only)	SMTP/Message Router configuration procedure
MR_TO_TCPWARE.COM	SMTP (VAX only)	Message Router to TCPware SMTP interface
MR_TO_TCPWARE.EXE	SMTP (VAX only)	Message Router to TCPware SMTP interface
MULTINET_MR_LIBRARY.EXE	SMTP (VAX only)	Message Router support routines images
MULTINET_SOCKET_LIBRARY.EXE	SMTP	Socket library executable
MULTINET_TOPS_LIBRARY.EXE	SMTP	Tops library executable
NAMED-XFER.EXE	DNS	Used for zone transfers; <i>do not execute directly</i>
NAMED.EXE	DNS	Nameserver executable
NAME_SERVER.COM	DNS	A command procedure that runs NAMED_ZXFR.EXE; <i>do not execute directly</i>
NETCP.EXE	TCP	NETCP process; <i>do not execute this file directly</i>
NETCU.EXE	NETCU	NETCU executable image
NETCUHELP.HLB	NETCU	NETCU online HELP library
NETCU_SPAWN.COM	NETCU	NETCU SPAWN file
NETSTAT.COM	NETCU	Translates common <i>netstat</i> commands to NETCU commands and executes the latter

TCPWARE_COMMON FILE	Code	Description
NETWORKS.	TCP	Text file that defines mapping between network names and numbers
NFSACP.EXE	CNFS	NFS Client ACP; maps OpenVMS file system I/Os to NFS requests and performs operations
NFSACP.STB	CNFS	NFS ACP symbols file
NFSD.EXE	NFS	NFS server executable image
NFSDISMOUNT.EXE	CNFS	NFSDISMOUNT command program
NFSDRIVER.EXE	CNFS	NFS-OpenVMS Client device drive
NFSMOUNT.EXE	CNFS	NFSMOUNT command program
NFS_CONTROL.COM	NFS	Used by CNFNET, STARTNET, and SHUTNET to configure, start, and stop NFS
NFS_EXPORT.DAT	NFS	NFS EXPORT database
NFS_GROUP.DAT	CNFS	NFS-OpenVMS Client GROUP database file
NFS_PROXY.DAT	NFS/CNFS	NFS PROXY database
NFS_SHUTDOWN.COM	NFS	Shuts down NFS server
NFS_STARTUP.COM	NFS	Starts up the NFS server; <i>do not execute directly</i>
NLM.EXE	RPC	Network Lock Manager executable image used by NFS-OpenVMS Client and Server
NLM_STARTUP.COM	NFS	Network Lock Manager startup file
NSLOOKUP.EXE	DNS	NSLOOKUP executable image
NSLOOKUP_HELP.TXT	DNS	NSLOOKUP online help

TCPWARE_COMMON FILE	Code	Description
NSLOOKUP_VIEW.COM	DNS	VIEW command for NSLOOKUP
NSTEST.EXE	DNS	DNS test program
NTDRIVER.EXE	TCP	TELNET/RLOGIN server device driver
NTDRIVER.STB	TCP	Driver symbols
NTP.CONF	NTP	Network Time Protocol (NTP) configuration file
NTPD.EXE	NTP	Network Time Protocol (NTP) Daemon
NTPDATE.EXE	NTP	NTPDATE executable
NTPDC.EXE	NTP	NTPDC executable
NTPQ.EXE	NTP	NTPQ executable
NTPTRACE.EXE	NTP	NTPTRACE executable
NTP_CONTROL.COM	NTP	NTP control file used by CNFNET, STARTNET, and SHUTNET
OBJ.ADF	CNFS	Default.OBJ ADF file used by Client-NFS
OLB.ADF	CNFS	Default.OLB ADF file used by Client-NFS
OSPF_DESTS.DAT	GATED	List of OSPF destination records
PING.EXE	MISC	PING command
PING_V2.EXE	MISC	Older version of PING for TCPware Version 2
POP3D.EXE	POP3	POP3 Daemon executable
POP3_CONTROL.COM	POP3	POP3 control file
POP3_STARTUP.COM	POP3	POP3 startup file
PPPD.EXE	TCP	PPP executables

TCPWARE_COMMON FILE	Code	Description
PROTOCOLS.	TCP	Text file that defines mapping between protocol names and numbers
PURVEYOR_RTL.EXE	WEBCNF	WebCNF run-time library
PWIPDRIVER.EXE	TCP	PATHWORKS-over-IP device driver (used by PATHWORKS Version 5)
PWIPDRIVER.STB	TCP	Driver symbols
PWIP_CONTROL.COM	TCP	PATHWORKS-over-IP control module (used by PATHWORKS Version 5)
QUOTED.EXE	MISC	QUOTE server executable
QXCP.EXE	TCP	Control program used to manage QXDRIVER
QXCP.HLB	TCP	Help file for QXCP
QXDRIVER.EXE, QXDRIVER.STB	TCP	IPX/SPZ device driver
RAP.CONF	TCP	Route Access Protocol configuration file
RAP_CONTROL	TCP	Configures, starts, and stops RAP
RAPD.EXE	TCP	Executable for TCPware_RAPD process
RCDDRIVER.EXE	RCMD	RCD driver executable
RCDDRIVER.STB	RCMD	Driver symbols
RCMD_CONTROL.COM	TCP	Berkeley R Commands control file
RCPEXE	FTP	Remote Copy Program
RESTART.COM	TCP	Restarts TCPware
RLOGIN.EXE	TCP	RLOGIN executable
RMTDRIVER.EXE	RCMD	RMT driver executable
RMTDRIVER.STB	RCMD	Driver symbols

TCPWARE_COMMON FILE	Code	Description
RMTSETUP.EXE	RCMD	RMTSETUP executable
ROUTING.COM	TCP	Contains commands defining routes
RPC.	RPC	Text file defining mapping between RPC program numbers and names; used by RPCINFO
RPCGEN.EXE	RPC	RCPGEN compiler produces DEC-C code for use with the PRCXDR header files and library
RPCGEN.OLD_EXE	RPC	Old RPCGEN compiler. Produces VAX-C code for use with the old ONC-RPC header files and libraries.
RPCINFO.EXE	RPC	RPCINFO command
RSH.EXE	TCP	Berkeley R Commands shell client
SERVERS.COM	TCP	Miscellaneous commands executed by STARTNET
SERVICES.	TCP	Text file that defines mapping between service names and numbers
SETUP_TWG.COM	TCP	Sets up WIN/TCP emulation to allow for most WIN/TCP applications to run over TCPware
SHUTNET.COM	TCP	Shuts down one or all TCPware components
SLIPLOGIN.COM	TCP	Template login file for dial-up SLIP connections
SM_CONTROL.COM	SM	Server Manager control file
SM_CONTROL.EXE	SM	Server Manager control program
SM.EXE	SM	Server Manager executable

TCPWARE_COMMON FILE	Code	Description
SMTP_CL.EXE	SMTP	SMTP client executable image (obsolete)
SMTP_CLIENT.COM	SMTP	Runs SMTP client; <i>do not invoke directly</i> (obsolete)
SMTP_CONFIG_CVT.COM	SMTP	SMTP configuration conversion tool
SMTP_CONTROL.COM	SMTP	Configures, starts, and stops SMTP-OpenVMS
SMTP_MAILSHR.EXE	SMTP	OpenVMS MAIL interface module for SMTP-OpenVMS; used by VMS MAIL
SMTP_MAILSHRP.EXE	SMTP	OpenVMS MAIL interface module for SMTP-OpenVMS; used by VMS MAIL
SMTP_QONLY.COM	SMTP	Used by nodes on cluster not running SMTP-OpenVMS so that they can send mail (obsolete)
SMTP_RETURN_MSG.TXT	SMTP	Contains text for SMTP (obsolete)
SMTP_SERVER.COM	SMTP	Command procedure that runs SMTP server; <i>do not invoke this procedure directly</i> (obsolete)
SMTP_SERVER.EXE	SMTP	SMTP server executable, invoked by NETCP
SMTP_SERVER_REJECT.TEMPLATE	SMTP	SMTP rejection file template
SMTP_SVR.EXE	SMTP	(obsolete)
SM_CONTROL.EXE	SM	Server Manager control executable
SM_SERVER.COM	SM	Server Manager server executable
SNMPD.EXE	SNMP	SNMP executable

TCPWARE_COMMON FILE	Code	Description
SNMP_CONTROL.COM	SNMP	Configures, starts, and stops SNMP
SOCKLIB.OLB	TCP	TCPware socket library
SOCKLIBD.OLB	TCP	D float socket library (Alpha only)
SOCKLIBG.OLB	TCP	G float socket library (VAX only)
SOCKLIBT.OLB	TCP	IEEE float socket library (Alpha only)
SPOOL.DIR	SMTP	SMTP-OpenVMS spool directory
STARTNET.COM	TCP	Starts TCPware
STARTUP_RESOLVER.COM	TCP	Starts TCPware-DNS
STB.ADF	CNFS	Default .STB ADF file used by Client-NFS
STREAMCRLF.FDL	NFS	Used to convert files to STREAM files terminated with CRLF; format used for MS-DOS text files
STREAMLF.FDL	NFS	Used to convert files to STREAM-LF (UNIX) format
SYSUAF_AUTH.DLL	WEBCNF	WebCNF user authentication module (reads SYSUAF.DAT)
TALK.EXE	TALK	TALK utility executable
TALKD.EXE	TALK	TALK daemon executable
TALK_CONTROL.COM	TALK	Configures, starts, and stops TALK
TCPDRIVER.EXE	TCP	TCP device driver
TCPDRIVER.STB	TCP	Driver symbols
TCPDUMP.EXE	TCP	TCPDUMP utility
TCPWAREIDENT.COM	TCP	Identifies the TCPware version

TCPWARE_COMMON FILE	Code	Description
TCPWARE_COMMANDS.COM	TCP	Contains TCPware foreign command definitions
TCPWARE_CONFIGURE_MAIL.CLD	SMTP	MAIL-CONFIG command definition file
TCPWARE_CONFIGURE_MAIL.EXE	SMTP	MAIL-CONFIG executable
TCPWARE_CONFIGURE_MAIL.HLB	SMTP	MAIL-CONFIG help library
TCPWARE_DECODE.EXE	SMTP	DECODE executable
TCPWARE_DNS_MAIN.EXE	TCP	Provides a mechanism for TCPware components to do asynchronous DNS requests
TCPWARE_LOGICALS.COM	TCP	Defines the TCPware logicals
TCPWARE_REMOVE.COM	TCP	Procedure used to delete TCPware files
TCPWARE_RMT_SERVER.EXE	TCP	Remote magnetic tape server
TCPWARE_RSERVICE.COM	TCP	R Services shell and exec support procedure
TCPWARE_SEND.EXE	SMTP	SEND executable
TCPWARE_SMTP_REQUEUE_OLD_MAIL.EXE	SMTP	Moves SMTP mail from old SMTP queues to new
TCPWARE_STARTUP.TEMPLATE	TCP	Template startup file
TCPWARE_WEBCNF_CONTROLLER.COM	WEBCNF	Startup for WebCNF controller process
TCPWARE_WEBCNF_WORKER.COM	WEBCNF	Startup for WebCNF worker process
TELLIB.OLB	TELNET	TELNET programming library
TELNET.EXE	TELNET	Client-TELNET executable image
TELNETHELP.HLB	TELNET	TELNET online HELP library
TELNET_CONTROL.COM	TELNET	Configures, starts, and stops TELNET-OpenVMS

TCPWARE_COMMON FILE	Code	Description
TEMPLATE_SNMPD.CONF	SNMP	SNMP configuration file template
TFTP.EXE	MISC	TFTP client test
TFTPD.EXE	MISC	TFTP server executable, invoked by NETCP
TIMED.EXE	TIMED	TIMED daemon executable
TIMEDC.EXE	TIMED	TIMEDC command executable
TIMED_CONTROL.COM	TIMED	Configures, starts, and stops TIMED
TIMEZONES.DAT	NTP	Timezone definition file for NTP
TLB.ADF	CNFS	Default .TLB ADF file used by Client-NFS
TRACEROUTE.EXE	TCP	TRACEROUTE client test
UCX\$IPC.OLB	TCP	Library file for UCX compatibility
UCX\$IPC_SHR.EXE	TCP	UCX run-time library used by VAXCRTL to support VAX C Socket Routines
UCX\$RPCXDR.OLB	TCP	RPC-XDR object library
UCX\$RPCXDR_SHR.EXE	TCP	RPC-XDR sharable image for use with DEC-C RPC applications
UDPDRIIVER.EXE	TCP	UDP device driver
UDPDRIIVER.STB	TCP	Driver symbols
VERIFY_LOGICAL.COM	TCP	Checks for conflicting logical names
VMSTEXT.FDL	NFS	Converts file to standard VMS text format
WEBCNF_CONTROL.COM	WEBCNF	WebCNF control module used by STARTNET, SHUTNET, and CNFNET

TCPWARE_COMMON FILE	Code	Description
WHOIS.EXE	MISC	WHOIS client executable, invoked by NETCP
WORKER_AXP.EXE	WEBCNF	WebCNF Worker executable for AXP
WORKER_VAX.EXE	WEBCNF	WebCNF Worker executable for VAX
XDM.EXE	XDM	X Display Manager (XDM) executable
XDM_ACCESS.TEMPLATE	XDM	Template XDM access control file
XDM_CONFIG.TEMPLATE	XDM	Template XDM configuration file
XDM_CONTROL.COM	XDM	Configures, starts, and stops XDM
XDM_KEYS.TEMPLATE	XDM	Template file for providing XDMCP authentication between XDM and an X-terminal
XDM_SERVER.COM	XDM	Control file for the XDM server
XDM_SESSION.EXE	XDM	Session controller for XDM sessions
XNTPDC.EXE	XDM	NTP control program

TCPWARE_COMMON:[TCPWARE.EXAMPLES]

Examples File	Code	Description
BGDRIVER_TCP_CLIENT.C	TCP	Sample TCP-Client source code
BGDRIVER_TCP_SERVER.C	TCP	Sample TCP-Server source code
BGDRIVER_UDP_CLIENT.C	TCP	Sample UDP-Client source code
BGDRIVER_UDP_SERVER.C	TCP	Sample UDP-Server source code
DAYTIMED.C	MISC	Sample DAYTIME server source code
DISCARD.C	TCP	Sample code for DISCARD; uses INETDRIVER QIO interface
DISCARDD.C	MISC	Sample DISCARD server source code
FINGER.C	TCP	Sample code for FINGER client, using TCPDRIVER QIO interface
FINGERD.C	TCP	Sample code for FINGER server, using TCPDRIVER QIO interface
FTPSAMPLE.C	FTP	Sample code for FTP API
INETDRIVER_CLIENT.C	TCP	Sample INETDRIVER-Client source code
INETDRIVER_SERVER.C	TCP	Sample INETDRIVER-Server source code
RPC.DIR	RPC	Old VAX-C RPC example programs
SNMP_SUBAGENT.C	SNMP	Sample program for SNMP subagent
SNMP_SUBAGENT.H	SNMP	Sample program include file for SNMP subagent
TCPDRIVER_CLIENT.C	TCP	Sample TCPDRIVER-Client source code
TCPDRIVER_SERVER.C	TCP	Sample TCPDRIVER-Server source code
TCPSAMPLE.FOR	TCP	Sample program using TCPDRIVER QIO interface
TCP_SOCKET_CLIENT.C	TCP	Sample TCP socket client source coded
TCP_SOCKET_SERVER.C	TCP	Sample TCP socket server source code
TELNET_SAMPLE.C	TELNET	TELNET sample source code
UDPDRIVER_CLIENT.C	TCP	Sample UDPDRIVER-Client source code

Examples File	Code	Description
UDPDRIIVER_SERVER.C	TCP	Sample UDPDRIIVER-Server source codd
UDPSAMPLE.FOR	TCP	Sample program using UDPDRIIVER QIO interface
UDP_SOCKET_CLIENT.C	TCP	Sample UDP socket client source code
UDP_SOCKET_SERVER.C	TCP	Sample UDP socket server source code
UDP_SMTP_DISPATCH.C	TCP	Sample UDP SMTP dispatch source code
USER_SMTP_DISPATCH.C	SMTP	Sample USER SMTP dispatch source code
WHOIS.C	MISC	Source code for WHOIS client

TCPWARE_COMMON:[TCPWARE.EXAMPLES.RPC]

EXAMPLES.RPC File	Code	Description
GETSYI.COM	RPC	Command procedure that compiles and links related RPC sample programs
GETSYI.H	RPC	Header file used by sample RPC GETSYI programs
GETSYI.X	RPC	Sample RPCGEN input file for TCP and UDP transports
GETSYI_CLNT.C	RPC	Sample client code generated by RPCGEN compiler
GETSYI_CLNT_CALL.C	RPC	Sample RPC client program using <code>client_call</code> routine
GETSYI_CLNT_CALLRPC.C	RPC	Sample RPC client program using <code>callrpc</code> routine
GETSYI_CLNT_RMTCALL.C	RPC	Sample RPC client program using <code>pmap_rmtcall</code> routine
GETSYI_CLNT_SUBS.C	RPC	Miscellaneous client support routines
GETSYI_DEF.H	RPC	Various structure definitions used by RPC sample programs
GETSYI_PROC_A.C	RPC	Sample RPC program and procedure for asynchronous server
GETSYI_PROC_S.C	RPC	Sample RPC procedure for synchronous server
GETSYI_SVC.C	RPC	Sample RPC program for synchronous server, generated by RPCGEN
GETSYI_SVC_REG.C	RPC	Sample RPC program and procedure using <code>registerrpc</code> routine
GETSYI_SVC_SUBS.C	RPC	Miscellaneous server support routines for sample GETSYI programs
GETSYI_XDR.C	RPC	XDR routines generated by RPCGEN, used by sample RPC clients and servers
GETSYI_XDR_2.C	RPC	Alternative XDR routines using <code>xdr_union</code> , used by sample RPC clients and servers
PRINT.C	RPC	Sample RPC batch client program

EXAMPLES.RPC File	Code	Description
PRINT.COM	RPC	Command procedure that compiles and links related RPC sample programs
PRINT.H	RPC	Header file for the sample RPC batch programs; generated by RPCGEN
PRINT.X	RPC	RPCGEN input file used by sample RPC batch programs
PRINT_DEF.H	RPC	Various structure definitions used by RPC sample batch programs
PRINT_SVC.C	RPC	Sample RPC batch server program
PRINT_XDR.C	RPC	XDR routines used by sample RPC batch programs; generated by RPCGEN compiler
SYSINFO.C	RPC	Sample RPC client program using broadcast RPC
SYSINFO.COM	RPC	Command procedure that compiles and links related RPC sample programs
SYSINFO.H	RPC	Header file used by sample RPC broadcast programs; generated by RPCGEN
SYSINFO.X	RPC	RPCGEN input file used by sample RPC broadcast programs
SYSINFO_DEF.H	RPC	Various structure definitions used by sample RPC broadcast programs
SYSINFO_SVC.C	RPC	Sample RPC server program using broadcast RPC
SYSINFO_XDR.C	RPC	XDR routines used by sample RPC broadcast programs

TCPWARE_COMMON:[TCPWARE.INCLUDE]

INCLUDE File	Code	Description
FTPDEF.H	FTP	Include file for compiling FTP Library
IF.H	TCP	Defines interface data structures used with <code>socket_ioctl</code> routine to obtain information about network interfaces
IF_ARP.H	TCP	Defines the Address Resolution Protocol (ARP) data structures used with <code>socket_ioctl</code> routine to set and get ARP entries
IN.H	TCP	Socket library include file; defines internet and socket address structures
INET.H	TCP	Socket library include file; defines <code>inet</code> subroutines
INETIODEF.H	TCP	Include file used by INETDRIVER QIO function codes
IOCTL.H	TCP	Socket Library IOCTL request codes header file
IPSO.H	TCP	Include file that contains IPSO Socket Library routines
NAMESER.H	DNS	Include file used by DNS
NETDB.H	TCP	Socket library include file; defines network database structures
PORTABILITY.H	DNS	Resolver functions; defines some things not defined on every system
RESOLV.H	DNS	Include file used to call DNS client routines directly
ROUTE.H	TCP	Defines routing data structures used with <code>socket_ioctl</code> routine to set and get routing table entries
RPCOLD.DIR	RPC	Old RPC header files for use with the TCPware socket library and VAX-C. (obsolete)
RPCXDR.DIR	RPC	New RPC header files for use with DEC-C.
SNMP_COMMON.H	SNMP	Defines the data structure the SNMP API routines use
SOCKERR.H	TCP	Socket library include file; defines socket error codes
SOCKET.H	TCP	Socket library include file; defines <code>sockaddr</code> structure <code>SOCK_STREAM</code> , <code>SOCK_DGRAM</code> , <code>AF_INET</code> , and other symbols used when calling socket library routines

INCLUDE File	Code	Description
SOCKETVAR.H	TCP	Socket library include file; defines socket structure used by socket subroutines
TYPES.H	TCP	Socket library include file; defines many UNIX C data type names
UCX\$INETDEF.H	TCP	Include file for compiling UCX Compatibility Services
_CCBFLD.H	TELNET	TELNET-OpenVMS include file for CCB definitions

TCPWARE_COMMON:[TCPWARE.IPX]

COMMON IPX File	Code	Description
CONSOLE.HLB	FSS	FSS console help library
FSS.EXE	FSS	FSS main executable image
FSS_CONSOLE.EXE	FSS	FSS console program
FSS_CONTROL.COM	FSS	FSS control module used by STARTNET, SHUTNET, and CNFNET
FSS_DBS.COM	FSS	Command procedure to back up FSS databases
FSS_DOWN.EXE	FSS	Image used to shut down FSS
FSS_IN.COM	FSS	Used by FSS
FSS_OPTIONS.DAT	FSS	Contains optional FSS startup commands
GET_USER_INFO.EXE	FSS	Gets account configuration information
NPSCP.EXE	NPS	NPS control program
NPSCP.HLB	NPS	NPS control program help library
NPSINSTAL.EXE	NPS	Generates NPS configuration files
NPS_CONTROL.COM	NPS	NPS control module used by STARTNET, SHUTNET, and CNFNET
NPS_QUEUES.EXE	NPS	NPS queues executable
NPS_STOP.EXE	NPS	Called by NPS_CONTROL.COM
OBJECTS.BND	FSS	Empty bindery database
PROPERTIES.BND	FSS	Empty bindery database
PROP_VALUES.BND	FSS	Empty bindery database
QBDRIVER.EXE	FSS	Driver used by FSS
QSG.EXE	NPS	Driver used by NPS
QSG_IN.COM	NPS	Used by QSG
QTCP.EXE	TES	QTDRIVER control program
QTDRIVER.EXE	TES	TES terminal driver
QZCREATE.EXE	NPS	Used to create directory or file

COMMON IPX File	Code	Description
QZDEACCESS.EXE	NPS	Used to deaccess file
QZDELETE.EXE	NPS	Used to delete file
QZDRIVER.EXE	NPS	Driver used by NPS
QZSTART.EXE	NPS	Called by NPS_CONTROL.COM
QZSTOP.EXE	NPS	Called by NPS_CONTROL.COM
RPR.EXE	FSS	RPR executable
RPR.HLB	FSS	RPR help file
RPR_CONSOLE.EXE	FSS	RPR_CONSOLE executable
RPR_IN.COM	FSS	Input file for RPR.EXE
SAP_SERVER.EXE	FSS	SAP server executable
SAP_SVR_IN.COM	FSS	Input file for SAP_SERVER.EXE
SPL.EXE	NPS	NPS print spooler
SPL_IN.COM	NPS	Used by SPL
TESCP.HLB	TES	QTCP help library
TES_CONTROL.COM	TES	TES control module used by STARTNET, SHUTNET, and CNFNET
TES_UNSUPRTD.DIR	TES	TES control module used by STARTNET, SHUTNET, and CNFNET
TRUSTEE.DB	TES	Empty trustee database

TCPWARE_COMMON:[TCPWARE.IPX.TES_UNSUPRTD]

IPX.TES_UNSUPRTD File	Code	Description
COPYRIGHT.DOC	TES	All these files contain Kermit distribution that might be used by TES; other terminal emulators may also be used
KERMIT.EXE	TES	
KERMIT302.DOS	TES	
KINSTALL.COM	TES	
NWWIN.TXT	TES	
OBJSCAN.DOC	TES	
OBJSCAN.EXE	TES	
READ.ME	TES	
VMSDEH.MAR	TES	
VMSHEX.MAR	TES	
VMSMIT.RNH	TES	
VMS_KERMIT.DOC	TES	

TCPWARE_COMMON:[TCPWARE.NAMED]

NAMED File	Code	Template File for
TEMPLATE_NAMED.CA	DNS	Default root cache file
TEMPLATE_NAMED.CONF	DNS	Default caching server configuration
TEMPLATE_NAMED.HOSTS	DNS	Example zone file
TEMPLATE_NAMED.LOCAL	DNS	Default 127.0.0.1 reverse zone
TEMPLATE_NAMED.LOCALHOST	DNS	Default localhost zone file
TEMPLATE_NAMED.REV	DNS	Example reverse zone file

SYS\$COMMON:[SYSEXEXE]

SYS\$COMMON:[SYSEXEXE]File	Description
TCPWARE_LPR SMB.EXE	LPS print symbiont (LPD formatting)
TCPWARE_SMTP_SYMBIONT.EXE	SMTP queue symbiont
TCPWARE_TSSYM.EXE	Terminal Server print symbiont
TCPWARE_VMSLPR SMB.EXE	LPS print symbiont (VMS formatting)

SYS\$COMMON:[SYSHLP]

SYS\$COMMON:[SYSHLP]File	Description
TCPWARE054.RELEASE_NOTES	TCPware <i>Release Notes</i> file

SYS\$COMMON:[SYSLIB]

SYS\$COMMON:[SYSLIB]File	Description
PSC_SNMPC_TCPWARE.EXE	SNMP subagent sharable image
TCPWARE_FTPLIB_SHR.EXE	FTP Library shareable image file
TCPWARE_PORTMAPPER_SHR.EXE	Port Mapper shareable image, used by NETCP
TCPWARE_RPCLIB_SHR.EXE	RPC D_float library routines
TCPWARE SOCKLIB_SHR.EXE	TCPware shareable image D_float library (socket library)

VAX The following files may additionally be installed.

SYS\$COMMON:[SYSLIB]File	Description
DECW_TRANSPORT_TCPWARE.EXE	DECwindows transport interface; <i>exists only if your TCPware system runs VMS Version 5.3 or later, or OpenVMS</i>
TCPWARE_RPCLIBG_SHR.EXE	RPC G_float library routines

SY\$COMMON:[SYSLIB]File	Description
TCPWARE SOCKLIBG_SHR.EXE	TCPware shareable image G_float library (socket library)

Alpha The following files may additionally be installed.

SY\$COMMON:[SYSLIB]File	Description
TCPWARE_RPCLIBD_SHR.EXE	RPC shareable image D_float library routines
TCPWARE_RPCLIBT_SHR.EXE	RPC shareable image IEEE_float library routines
TCPWARE SOCKLIBD_SHR.EXE	TCPware shareable image D_float library (socket library)
TCPWARE SOCKLIBT_SHR.EXE	TCPware shareable image IEEE_float library (socket library)

SY\$COMMON:[SYSMSG]

SY\$COMMON:[SYSMSG] File	Description
TCPWARE_MSG.EXE	TCPware for OpenVMS message file

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