# PATHWORKS

# Version 5 Migration Guide

AA-Q2FYA-TE

**March 1994**

| | |
|---|---|
| **Revision/Update Information:** | This is a new document |
| **Software Version** | PATHWORKS Version 5.0 for DOS and Windows<br>PATHWORKS Version 5.0 for OpenVMS |

**Digital Equipment Corporation**
**Maynard, Massachusetts**

**First Published, March 1994**

The information in this document is subject to change without notice and should not be construed as a commitment by Digital Equipment Corporation. Digital Equipment Corporation assumes no responsibility for any errors that may appear in this document.

The software described in this document is furnished under a license and may be used or copied only in accordance with the terms of such license.

Restricted Rights: Use, duplication, or disclosure by the U.S. Government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013.

© Digital Equipment Corporation 1994.

All Rights Reserved.
Printed in U.S.A.

The following are trademarks of Digital Equipment Corporation:
Alpha AXP, DEC, DECdirect, DECnet, DECNIS, DECprint, DECtransporter, DECwindows, InfoServer, LASTport, LAT, ManageWORKS, OpenVMS, PATHWORKS, ULTRIX, VAX, VMS, VT, and the Digital logo.

The following are third-party trademarks:
3Com is a registered trademark of 3Com Corporation. PostScript is a registered trademark of Adobe Systems, Inc. CompuServe is a registered trademark of CompuServe, Inc. Kermit is used by permission of Henson Associates, Inc. OS/2 is a registered trademark of International Business Machines Corporation. Intel is a trademark of Intel Corporation. Windows and Windows-NT are trademarks of Microsoft Corporation. NetWare and Novell are registered trademarks of Novell Inc. Motif is a registered trademark of Open Software Foundation, Inc. SCO is a trademark of Santa Cruz Operations, Inc. OpenLook and UNIX are registered trademarks of UNIX System Laboratories.

All other trademarks and registered trademarks are the property of their respective owners.

# Contents


## 1 Preface 1-1

Purpose ... 1-1
Who Should Read This Guide ... 1-1
What To Do First ... 1-2
Conventions ... 1-3
PATHWORKS V5 Upgrade Services ... 1-3

## 2 Sample Migration Process 2-1

Overview ... 2-1
What Are the Basic Steps? ... 2-1
Step 1: Install the V5 Client Software to the Server ... 2-3
- What to do ... 2-3
- Planning for this step ... 2-3
- Install PNS (optional) ... 2-4
- Impact on users ... 2-4

Step 2: Upgrade V4.x Clients to V5 ... 2-4
- What to do ... 2-4
- What you can't do ... 2-4
- Planning for this step ... 2-5
- Impact on users ... 2-6

Step 3: Plan Your V5 Client Environment ... 2-7
- What to do ... 2-7
- Unsupported connection formats ... 2-8
- V4.x STARTNET.BAT modification ... 2-9
- Migrating AUTOUSER.BAT files ... 2-9
- Modifying the sample templates ... 2-9
- Using the LAN Manager messenger server ... 2-10

Step 4: Install the V5 Server Software ... 2-10
- What to do ... 2-10
- Planning for this step ... 2-10
- Impact on users ... 2-11

Step 5: Plan for LAN Manager on the Server ... 2-11
- What to do ... 2-11
- Impact on users ... 2-12

Step 6: Configure the Server ... 2-12
- What to do ... 2-12
- Planning considerations ... 2-12

Impact on users....2-13
Step 7: Run the Server Upgrade Utility....2-13
What to do....2-14
Planning considerations....2-14
Upgrading V4.x file and print services....2-14
Impact on users....2-15
Step 8: Configure the Server to Run in Backward Compatibility Mode....2-16
What to do....2-16
Planning considerations....2-17
Impact on users....2-17
Step 9: Connect the V5 Clients to the V5 Server....2-18
What to do....2-18
Impact on users....2-18
Step 10: Reconfigure the Clients for the Enhanced Redirector....2-19
What to do....2-19
Using Workstation Manager....2-19
Planning considerations....2-19
Impact on users....2-19
Step 11: Join the Servers to the Domain....2-20
What to do....2-20
Planning considerations....2-21
Impact on users....2-21
Step 12: Stop Disk Services on the V5 Server....2-21

**3 Client Migration 3-1**

Before You Begin....3-1
What Are the Basic Steps?....3-2
Installing the client software....3-2
Upgrading your V4.x clients....3-3
Before You Upgrade....3-4
What clients are supported?....3-4
What servers are supported?....3-4
Client Installation media....3-5
Client utilities....3-6
Client configuration....3-7
Planning disk space for V5 client software installation....3-7
PC hardware and software requirements....3-8
Client memory....3-9
Client management....3-9
Upgrading your V4.x Clients....3-10
When to use the Upgrade utility....3-10
When not to use the Upgrade utility....3-10
How the V5 client starts the network....3-12
Loading device drivers....3-12
What Files Are Installed or Changed?....3-13
Startup files....3-13
DECnet management databases....3-14

TCP/IP files ..... 3-15
Microsoft Windows files ..... 3-15
Planning for the Upgrade ..... 3-16
Memory ..... 3-16
Which Redirector should you use? ..... 3-18
Template memory ..... 3-18
Configuring the client ..... 3-20
The configuration utility ..... 3-20
Customizing the client configuration ..... 3-21
INS files ..... 3-22
Setting up multiple configurations ..... 3-22
How Are Client Connections Different? ..... 3-23
Novell NetWare Support ..... 3-23
TCP/IP Support ..... 3-24
Differences between V4.x and V5 TCP/IP support ..... 3-24
New PWTCP.INI file ..... 3-25
Other new features ..... 3-25
Changes in TCP/IP administration ..... 3-26
The AUTOUSER.BAT File ..... 3-27
Differences between V4.x and V5 automatic connections ..... 3-27
Upgrading AUTOUSER.BAT files ..... 3-27
Modifying the PATHWORKS Program Group ..... 3-29
Changing Passwords ..... 3-29

**4 Client Components and Applications 4-1**

Overview ..... 4-1
VT320 Terminal Emulator ..... 4-1
Differences between V4.x and V5 VT320 ..... 4-1
Removing old fonts ..... 4-2
API support ..... 4-2
SETHOST Terminal Emulator ..... 4-2
Differences between V4.x and V5 SETHOST ..... 4-2
Mail ..... 4-3
Network Driver ..... 4-3
Differences between V4.x and V5 Windows drivers ..... 4-4
Broadcast Receiver (RCV.EXE) ..... 4-5
CTERM.EXE ..... 4-6
Data Links ..... 4-6
Network File Transfer for DOS (NFT) ..... 4-7
Network File Transfer for Windows (NFTW) ..... 4-7
USE ..... 4-7
MEMMAN and SAVE ..... 4-8
SHOW ..... 4-8
Asynchronous Communication ..... 4-9
Differences between V4.x and V5 ..... 4-9
Modem operation ..... 4-10
Using asynchronous communication ..... 4-10

Disk Services....4-10
Local area disk (LAD)....4-10
LAD driver (LADDRV.SYS)....4-11
LAD CD-ROM driver (LADCDDRV.SYS)....4-11
LAT....4-11
LAT.EXE....4-11
LATASYNC....4-12
LATCOM.SYS....4-12
LAT Control Program (LATCP)....4-13
LAT Services Manager (LATSM)....4-14
MOP Load/Dump Server....4-14
Network Control Program for DOS....4-14
Schedular (SCH)....4-15
EMSLOAD....4-15
PC DECwindows Motif....4-16
DNP....4-17
Remote File Access (RFA)....4-17
SPAWNER.EXE....4-17
Retired Components....4-17
MSNET.INI....4-18
Unsupported disk....4-18

**5 X.25 Migration 5-1**

Overview....5-1
Migration....5-1

**6 Client Programming Changes 6-1**

Overview....6-1
Winsock library support....6-2
Terminal Access Library changes....6-2

**7 Server Migration 7-1**

Overview....7-1
Before You Upgrade....7-2
Software requirements....7-2
What clients are supported by a V5 server?....7-2
Disk space requirements....7-3
Optional software requirements....7-3
Planning disk space for V5 client software....7-4
Planning the LAN Manager Network....7-4
Organizing your network....7-4
Choosing the server's role in a domain....7-5
Planning the domain....7-7
Planning for LAN Manager Security....7-7
Differences between V4.x and V5 security....7-8
How to decide between security models....7-8

Client access with user-level security ..... 7-11
VMScluster Planning and Support ..... 7-12
Differences between V4.x and V5 ..... 7-12
LAN Manager support ..... 7-12
What Are the Basic Steps? ..... 7-13
Security Migration ..... 7-15
How permissions map ..... 7-16
File Service Migration ..... 7-17
Differences between V4.x file services and V5 shared directories ..... 7-17
PATHWORKS File System (PFS) ..... 7-18
File system support ..... 7-19
Upgrading OpenVMS directories ..... 7-20
Print Service Migration ..... 7-21
Differences between V4.x and V5 ..... 7-21
Setting-up PostScript printers ..... 7-22
PATHWORKS User and Group Migration ..... 7-23
Differences between V4.x and V5 users ..... 7-23
User and Group name conflicts ..... 7-23
User access with /SETDIR ..... 7-24
LAN Manager 256 group restriction ..... 7-25
User and group access restrictions to shares ..... 7-27
Disk Service Support and Migration ..... 7-29
Disk services and V5 ..... 7-29
Managing disk services on a V5 server ..... 7-30
Administration and Management ..... 7-30
Differences between V4.x and V5 network management ..... 7-30
Server management interfaces ..... 7-31
Client management ..... 7-32
Displaying shares limit ..... 7-32
Command Line Migration ..... 7-33
Command Line Net interface ..... 7-33
The PCSA Manager ..... 7-33

**8 Remote Boot Migration 8-1**

Before You Begin ..... 8-1
How is V5 Remote Boot Different? ..... 8-2
What servers are supported? ..... 8-3
V5 restrictions ..... 8-3
Setting up the V5 Remote Boot Environment ..... 8-4
Preparing for migration ..... 8-4
Planning remote boot profiles ..... 8-4
Upgrading Your V4.x Remote Boot Clients ..... 8-5
Step 1: Set up the Remote Boot service on the server ..... 8-5
Step 2: Upgrade the remote boot database ..... 8-6
Step 3: Set up the V5 client ..... 8-6
Step 4: Update the server from the client ..... 8-7
Step 5: Install DOS on the server ..... 8-7

Step 6: Enable clients to use the Remote Boot service....8-8
Step 7: Create the client profiles....8-8
Step 8: Create Workstation Records....8-9
Step 9: Make sure all services are available....8-9
Step 10: Boot your remote boot clients....8-9
Step 11: Copy V4.x data....8-10
Step 12: Delete the V4.x LAD Remote Boot disks....8-11

**9 License Migration 9-1**

Customers With "Right-to-New-Version" Service....9-1
Customers Without "Right-to-New-Version" Service....9-1
CCS License....9-1
Access to Existing PATHWORKS Servers....9-2

**10 Interoperability Matrix 10-1**

**Index**

# 1 Preface

## Purpose

This guide describes how to plan the migration of an existing PATHWORKS V4.*x* network to a PATHWORKS V5 (LAN Manager) network.

You can reduce or eliminate any interruption in services to your users by carefully planning your migration and by implementing your migration in phases. In this way, you can introduce new functionality without impacting existing functionality.

This guide cannot address all the needs of existing V4.*x* customers. Use the methods described here as a starting point for your migration planning and implementation.

## Who Should Read This Guide

This guide is intended for administrators responsible for planning the migration of an existing PATHWORKS V4.*x* network to a PATHWORKS V5 network.

If you are installing PATHWORKS on your network for the first time, you do not need to read this guide.

## What To Do First

▶ Read the documentation included with your PATHWORKS V5 distribution kits.

With V5, the network is based on Microsoft LAN Manager V2.2 for a greater degree of interoperability. The move from a proprietary Digital network to LAN Manager V2.2 makes setting up and managing the network very different from V4.*x*.

By reading all the documentation before reading this guide, you can familiarize yourself with the new features and procedures and LAN Manager concepts.

The following manuals contain the most important information for migration:

| Manual | Description |
|---|---|
| **Server documentation set** | |
| *Server Installation and Upgrade Guide* | Describes how to install and set up PATHWORKS V5 for OpenVMS (LAN Manager) server software, and how to upgrade the product from a previous version of the server software. |
| *Server Administrator's Guide* | Describes how to use PATHWORKS V5 for OpenVMS, such as creating shared directories; describes LAN Manager network concepts, such as domain controllers and member servers; describes how to run the V5 server in VMSclusters; and describes FAT container files and the FAT file system. |
| *LAN Manager Remote Boot Guide* | Describes the LAN Manager Remote Boot service, and includes a complete diagram of the RPL on-disk substructure. |
| *Guide to Managing PATHWORKS Licenses* | Describes the license server software and how to manage PATHWORKS licenses |
| **Client documentation set** | |
| *Client Installation and Configuration Guide* | Describes how to install client software on your server or hard disk and how to configure PCs as PATHWORKS clients. It also provides supplemental configuration information including descriptions of the Workstation Manager and Update utilities. |

## Conventions

This guide uses the following conventions:

| Convention | Meaning |
|---|---|
| UPPERCASE | Uppercase indicates commands. |
| lowercase | Lowercase indicates user supplied information. |
| ▶ | Indicates the beginning of a procedure. |
| | Indicates more information is available |

## PATHWORKS V5 Upgrade Services

Four types of upgrade services are available for all customers with an existing V4.*x* environment. You can purchase these services from your Digital representative.

Services include Upgrade Planning, Upgrade Installation, Additional Client Installation, and Optimization Design.

- **Upgrade Planning**

  The service team assesses the 4.*x* environment and produces a plan for the best way to upgrade. This service is recommended as a prerequisite for Upgrade Installation and Optimization Design.

  The team delivers an Upgrade Planning Report that describes and analyzes the environment, recommends the appropriate implementation, and estimates resource time and customer actions.

- **Upgrade Installation**

  The service team installs or upgrades one PATHWORKS server and one client in an existing network. This service includes the basic configuration of one LAN Manager domain on the installed server.

  If needed, configuration of multiple domains is included with the Optimization Design Service.

  *Required prerequisites:*

  1. Operating system is installed and operational.
  2. Configuration is planned and domain names, system names, and network addresses are assigned.
  3. Disk locations of PATHWORKS components are defined.
  4. Hardware is installed and configured.
  5. Adapter types and parameters are supplied.
  6. All hardware is powered on and self-tests on server, client, printer, communication devices, and storage devices are successfully completed.
  7. Media, documentation, and license are supplied.

  *Deliverables:*

  - Upgrade or configure server, create sample share, create user accounts, create upgrade template
  - Upgrade or configure client and create upgrade template.
  - Configure one printer
  - Provide orientation training for the system manager

- **Additional Client Installation**

  This service supplements the Upgrade Installation. The service team installs an additional client to an installed PATHWORKS V5 server.

- **Optimization Design Service (1 Day)**

  The service team analyzes the V4.*x* environment and designs the changes that need to be made to use the PATHWORKS V5 features. The team produces a working plan and an action plan for implementation.

  Prerequisite: Upgrade Planning Report or written requirements for each change.

# 2 Sample Migration Process

## Overview

This section presents an example of one possible way of migrating your PATHWORKS V4.*x* client/server environment to the PATHWORKS V5 environment.

It is impossible to anticipate every PATHWORKS environment or local customization. Use this section as a guide to understanding the issues, techniques, and tools involved in migration.

**What about remote boot clients?**

This section does not include examples of upgrading V4.*x* remote boot clients.

For more information and examples, see the "Remote Boot Migration" section in this guide.

## What Are the Basic Steps?

Your first step is to carefully plan how each step will impact the clients and servers in your network. You must analyze your V4.*x* environment and plan the design of your V5 network before starting the migration.

The following table briefly outlines one set of steps you could use to migrate to V5. It is not intended as a definitive set of steps. Depending on how your network is set up, you may decide to reorder or omit steps, or introduce additional steps.

| Step | | Description |
|---|---|---|
| **1.** | Install the V5 client software to the servers in your network. | This step installs the V5 client software, but keeps the V4.*x* client software operational. |
| **2.** | Upgrade the V4.*x* clients to V5. | The V5 client upgrade utility allows you to upgrade a V4.*x* client to use V5 client software and the V5 system service. |
| **3.** | Plan your V5 client environment. | At this point, your newly upgraded V5 clients act just like V4.*x* clients. The following steps, particularly upgrading the V4.*x* server software to V5, will change what your V5 clients can do in the PATHWORKS network. Plan for these changes now. |
| **4.** | Install the V5 server kit to the servers in your network. | You install the V5 server software but don't start it. You keep the V4.*x* server software running to service your clients during this phase of migration. |
| **5.** | Plan for LAN Manager on the server. | V5 changes how the server operates in the network as well as how clients access and share resources on the server. You must plan for these changes. |
| **6.** | Configure the server. | After you install the server, you must run the server Configuration Utility before you can start the server. The Configuration Utility lets you modify aspects of the server's configuration. |
| **7.** | Run the server Upgrade utility on the server and create upgrade reports. | After running the Configuration Utility and before starting the server, use the server Upgrade utility to upgrade the V4.*x* databases to V5 LAN Manager databases. |
| **8.** | Configure the server to run in backward compatibility mode. | Backward Compatibility mode lets you easily migrate the PATHWORKS UAF to the LAN Manager domain-wide UAS by capturing your user's OpenVMS passwords in a secure way |
| **9.** | Connect the V5 clients to the V5 server. | In order to update the UAS database with the OpenVMS password, you must now connect your clients to a V5 server using an OpenVMS user name and password. |
| **10.** | Reconfigure the clients to use Enhanced Redirector. | Use the client Configuration utility to reconfigure clients now using the Basic Redirector to use the Enhanced Redirector. This step is optional. |
| **11.** | Take the server out of backward compatibility mode and configure as a full member of a LAN Manager network using Upgrade to merge the domain database. | After all your V4.*x* clients are upgraded to V5 and those clients are reconfigured to use the Enhanced Redirector, you join the V5 servers in Backward Compatibility mode to the domain. |
| **12.** | Stop disk services on the server. | If your V4.*x* servers used disk devices, then you must edit the SYSTARTUP_V5.COM command procedure to stop the V4.*x* disk server. |

# Step 1: Install the V5 Client Software to the Server

Before you can upgrade your V4.*x* clients, you must install the V5 client software on the V4.*x* servers in your network.

## What to do

▶ Install the V5 client software on at least one server in your network by following the installation procedure described in the *Client Installation and Configuration Guide.*

Also see "Installing the client software" in the Client Migration section of this guide for an overview of migration issues for the installation.

## Planning for this step

Before installing V5 client software, consider the following:

- You install the V5 client software in a new file service, leaving your V4.*x* client software intact and running. In order to accommodate both V4.*x* and V5 software, make sure your server has enough disk space before starting the installation.

  See "Planning disk space for V5 client software installation" in the Client Migration section of this guide for more information.

- You need to install the V5 client software on at least one server in your network to upgrade your V4.*x* clients in later steps.

  After installing the software on the first server, you can install (or clone) the V5 client software on as many V4.*x* servers as you want, whenever you want, without impacting the migration process.

- V5 introduces Workstation Manager to remotely manage your clients. Part of the V5 client installation requires optional preparations for later use of Workstation Manager (WSM).

  You should plan which servers in your V5 network will contain the Workstation Manager databases. The servers containing the WSM databases should be accessible to all clients in your network, meaning the servers should be running all the transports that the clients will be using (DECnet or TCP/IP, for example).

For more information, see the *Client Installation and Upgrade Guide*.

### Install PNS (optional)

After you upgrade the V4.*x* server software to V5 (Step 7), V5 clients can automatically view all V5 servers in the Network Connect program that comes with the V5 client software.

In the meantime, if you want to view and browse the V4.*x* servers in your network using Network Connect, you must install the PATHWORKS Name Service (PNS) on the V4.*x* server.

For more information, see the *Client Installation and Configuration Guide*.

### Impact on users

During this phase all your clients will continue to use the V4.*x* system service. There is no impact on users.

## Step 2: Upgrade V4.*x* Clients to V5

Now that V5 client software has been installed on at least one server in your network, you can upgrade your V4.*x* clients to use the V5 system file services.

### What to do

▶ Upgrade your V4.*x* clients to V5 by following the Upgrade procedure described in the *Client Installation and Configuration Guide.*

When upgrading your V4.*x* clients, use the new V5 Client Upgrade utility. The client Upgrade utility creates a V5 configuration based on what you had in V4.*x.* By using a similar configuration, you minimize the impact on users and prepare them to move to full V5 LAN Manager functionality.

### What you can't do

You cannot use the client Upgrade utility if your V4.*x* client is configured in any of the following ways:

| Client configuration | What to do |
|---|---|
| Remote Boot | With V5, remote boot is based on the Microsoft LAN Manager Remote Boot service. Upgrading your V4.*x* Remote Boot clients requires that you :<br>• Install and configure PATHWORKS V5 for OpenVMS (LAN Manager) on the server. Make sure to enable the Remote Boot service.<br>• Update the V5 remote boot database.<br>• Use the Remote Boot Manager to upgrade the remote boot clients.<br>• Manually copy the contents of the V4.*x* LAD remote boot disks to the V5 remote boot directory.<br>For more information, see:<br>• The Remote Boot Migration section in this guide<br>• *Server Installation and Upgrade Guide*<br>• *LAN Manager Remote Boot Guide* |
| Nonstandard configuration. This includes:<br>• Clients using Windows for Workgroups<br>• Clients having more than one network batch file<br>• Clients whose STARTNET.BAT or .WIK files have been significantly modified<br>• Configurations where the default location or the name of components has been changed | For each nonstandard configuration, you must manually edit and copy PATHWORKS files and run the client Configuration utility.<br>For more information, see:<br>• "When not to use the Upgrade utility" in the Client Migration in this guide<br>• *Client Installation and Configuration Guide* |

## Planning for this step

Before running the client Upgrade utility on your V4.*x* clients, note the following:

- Upgrade automatically creates a new directory for the V5 client software and leaves the V4.*x* software intact. This configuration gives you the ability to return to your V4.*x* configuration, but it also takes up more disk space.

  In order to accommodate both V4.*x* and V5 configurations, make sure your clients have enough disk space before starting the upgrade.

- The V5 client software uses more memory than the V4.*x* software. Upgrade creates a V5 configuration that duplicates your V4.*x* configuration. Because you are now loading V5 components, the amount of client memory available after starting your V5 network will be different.

## Impact on users

This step upgrades the PATHWORKS software needed for the client to connect to the network. It does not change the logon process or what services the client connects to. However, the user will see some differences:

- **Licensing**: Because you are now using V5 client software, when the client boots it expects to find a V5 license server to verify the client license. But because you haven't installed the V5 server software, the client displays an error when it tries to verify the client license.

  You can ignore this error for now. It does not affect how the V5 client accesses services on V4.*x* servers.
- **Network startup messages**: The informational messages displayed on the client when it runs STARTNET are different in V5.
- **Windows components:** If the V4.*x* client included Microsoft Windows support, the upgrade creates a new PATHWORKS program group in Windows. The PATHWORKS program group contains all the new PATHWORKS Windows applications and management tools. See the online help for each application for more information.
- **Remote Management:** At this point, you cannot manage any PATHWORKS V4.*x* servers from the client using ManageWORKS. You can manage servers remotely from the client after upgrading the V4.*x* server software to V5 and reconfiguring the clients to use the Enhanced Redirector.
- **STARTNET.BAT switches:** The Upgrade utility does not copy switches added to network startup commands in V4.*x* STARTNET.BAT to the V5 STARTNET.BAT file. To add those switches again after the upgrade, run the V5 Configuration utility, choose the Customize option, and select Network startup commands.
- **NETTIME:** NETTIME is not placed in the V5 STARTNET.BAT file. If you want to continue to use this feature, add the following as additional startup commands:
  - NETTIME if you are using the Basic Redirector
  - NET TIME if you are using the Enhanced Redirector

- **Retired functionality:** After you upgrade the client to V5, the following PATHWORKS are no longer supported and are not included on the V5 client kit:
  - DLL802 driver
  - LOGON.BAT
  - DNPDCPPC.EXE
  - LAD.EXE (replaced with LAD.SYS)
  - DOS extensions
- **Unsupported disk:** The following PATHWORKS components are no longer supported, but are included on the Unsupported disk:
  - DTR.EXE
  - DTS.EXE
  - NDU.EXE
  - NPDRV.SYS
  - NDDRV.SYS
  - TFA.EXE
  - TNT.EXE
  - TTT.EXE

  The Unsupported disk is available from CompuServe, DSNlink (for Digital's service customers), your Digital representative, or DECdirect.

Also see Appendix A in this guide for what features are not supported when using V5 clients and V4.*x* servers.

## Step 3: Plan Your V5 Client Environment

At this point, your newly upgraded V5 clients act just like V4.*x* clients. The following steps, particularly upgrading the V4.*x* server software to V5, will change what your V5 clients can do in the PATHWORKS network.

Careful planning now will make your migration to V5 easier.

### What to do

▶ Start preparing your users to use:

- New client applications. The V5 client software includes PATHWORKS Windows applications and management tools that replace the V4.*x* command-line interfaces.
- V5 terminology. The V4.*x* file and print services are referred to by their NOS-specific terms. For example, file services are called shared directories and print services are called shared printers under LAN Manager.

For more information, see:

- Online help for the PATHWORKS Windows applications

- *Server Administrator's Guide*

## Unsupported connection formats

When you upgrade your V4.*x* servers to V5, several client connection formats are no longer supported. The following table describes these unsupported connection formats:

| Format | Description |
|---|---|
| • Accessing OpenVMS directories with USE /SETDIR. For example, after making a connection, the user types:<br>`USE G: DUA1:[REVIEWS.V30] /SETDIR` | The USE qualifier /SETDIR is not supported on the V5 server. Clients (both V4.*x* and V5) connecting to shares on a V5 server will not be able to access OpenVMS directories with /SETDIR. |
| • Connecting with multiple user contexts in the same session. For example, the user types:<br>USE ?: \\SERVER\SERVICE%username password<br>USE ?: \\SERVER\SERVICE%2ndname 2ndpassword | Only one user context can be used for connections from a single client session. |
| • Connecting OpenVMS directory specification with the following format:<br>`sys$system%username password`<br>For example, the user types:<br>USE ?: \\MERZ\DISK$DEVICE:[000000]%username * | This is not supported on the V5 server. |

You can eliminate any interruption to your users by:

1. Checking if your users currently use the formats not supported in V5. The server Upgrade utility has no way of knowing if the client uses these formats. You could either ask your users if they use these formats, or scan the client AUTOUSER.BAT files and logon scripts.
2. Create new file services for those directories V4.*x* users currently access with the connection formats not supported by V5.

   Keep the names 8.3 characters or less; service names longer than 8.3 characters will not be accessible from V5 clients using the Enhanced Redirector.
3. Remove all commands using these formats from your client batch files and replace them with connections to the newly created file services.

By creating a new file service, the server Upgrade utility will automatically create LAN Manager shared directories and protection for those services.

For more information, see

- *Server Installation and Upgrade* manual for information on upgrading OpenVMS security.
- V5 *Server Administration Guide* for information on creating a LAN Manager share.
- V4.*x Server Administration Guide* for information on creating a V4.*x* file service.

## V4.*x* STARTNET.BAT modification

You may have modified your STARTNET.BAT file to support failover connections to other servers. For example, your V4.*x* STARTNET.BAT file may contains lines similar to:

```
USE ?: \\VAX1\PCSAV41
IF NOT ERRORLEVEL 1 GOTO LABEL
USE ?: \\VAX2\PCSAV41
```

The client Upgrade Utility does not maintain this type of connection failover. You can use the client Configuration utility in a later step to keep this type of connection failover by putting multiple server names in the LAN Manager SERVER field.

For more information, see:

- Online help for the client Configuration utility
- *Client Installation and Configuration Guide*

## Migrating AUTOUSER.BAT files

When you upgrade a V4.*x* user account to V5, the client Upgrade utility does not copy AUTOUSER.BAT files to V5 logon scripts. The AUTOUSER.BAT file stays with the account but is not run when the user logs into the domain.

See "AUTOUSER.BAT Files" in the Client Migration section of this guide for information on migrating your AUTOUSER.BAT files to a V5 environment.

## Modifying the sample templates

In later steps, you will use the V5 client Configuration utility to change the "V4.*x*-like" configurations to take full advantage of the V5 network.

The client Configuration utility uses templates to configure the client. The V5 kit contains a number of sample configuration templates, including some resembling standard V4.*x* configurations.

You should compare your V4.*x* configurations to the V5 sample templates to see how closely the V5 samples match your client configurations. By using the Admin Option in the Configuration utility, you can modify the existing templates or create new ones to suit your needs. For example, you may have one group of clients that are all configured alike and connect to a set of file and print services after starting the network. You can create or modify a template to load the required PATHWORKS software and to automatically connect to those file and print services.

By creating and modifying the templates now, you can avoid making the same modifications to individual local client templates when you reconfigure them.

See Create Templates with the Admin Option in the *Client Installation and Configuration Guide* for information on creating or modifying remote configuration templates.

### Using the LAN Manager messenger server

When modifying your templates, consider including the LAN Manager messenger service on the client. By running the messenger service, the client will receive all alert messages sent from the server.

▶ To use the LAN Manager messenger service, select Messenger service in the LAN Manager Information dialog box in the Configuration utility.

## Step 4: Install the V5 Server Software

You can install the V5 server software without interrupting your V4.*x* services. During this phase of migration, you keep the V4.*x* server software running to service your clients.

### What to do

▶ Install the V5 server software on at least one server in your network by following the installation procedure described in the *Server Installation and Upgrade Guide*.

### Planning for this step

Before installing V5 server software, consider the following:

- You install the V5 server software to a newly created directory, leaving your V4.*x* server software intact and running. In order to accommodate both V4.*x* and V5 software, make sure your server has enough disk space before starting this step.
- You should first install the V5 server software on the server that you later plan to make the primary domain controller.

See Before You Upgrade in the Server Migration section of this guide for an overview of migration issues for the installation.

### Impact on users

Because you are not starting the V5 server software at this time, there is no impact on your users.

## Step 5: Plan for LAN Manager on the Server

The V5 server integrates Microsoft LAN Manager V2.2 with OpenVMS. This integration changes how the server operates in the network as well as how clients access and share resources on the server.

### What to do

▶ Plan for the integration of LAN Manager. The next steps are critical; they involve configuring the server and client for a full LAN Manager environment. At this point, your network environment is virtually the same as it was in V4.*x*. Before you continue, you must fully understand and plan for the changes LAN Manager brings to your PATHWORKS network. During this phase, you should:

- Plan the organization of your network into domains and the role each server will play in the domain
- Determine the impact of LAN Manager security and which security model you use
- Plan the merge of the OpenVMS UAF with the LAN Manager UAS using backward compatibility
- Understand the effect of migration to V5 on:
  - users
  - groups
  - file and print services
- Plan the migration of V4.*x* LAD disks to FAT container files.

  See the *Server Installation and Upgrade Guide* for more information.
- Understand the impact of the new features when installing V5 on a VMScluster
- Understand how licensing will be implemented
- Understand how to use and interpret the Upgrade reports generated by the server Upgrade utility

- Consider the impact of upgrading your V4.*x* remote boot clients
- If you use AUTOGEN feedback on the server, you may want to run AUTOGEN and reboot before running the server Configuration procedure.

For more information on planning for a LAN Manager environment, see:

- *Server Installation and Upgrade Guide*
- *Server Administrator's Guide*
- *Guide to Managing PATHWORKS Licenses*

### Impact on users

This is only a planning phase; there is no impact on users.

## Step 6: Configure the Server

After you install the server, you must run the server Configuration procedure before you can start the server. The Configuration procedure lets you modify aspects of the server's configuration, such as which services you want to enable and which domains are visible to the server.

### What to do

▶ Before running server Configuration procedure, make a copy of the PCFS$STARTUP_PARAMS.DAT file to use as a reference during the V5 configuration.

▶ Run the server Configuration procedure on each server where you have installed V5 by following the instructions in the *Server Installation and Upgrade Guide*.

### Planning considerations

The server Configuration utility prompts you for information on how your server is set up. Be prepared to provide the following information:

- Do you plan to run the license server?
- Do you want to run the LAN Manager Remote Boot service? If you currently have V4.*x* Remote Boot clients on this server, the answer is probably yes.

  See the Remote Boot Migration section in this guide for more information.
- What is the LAN Manager domain name?
- What LAN Manager security mode do you plan to use?

- Do you want to run the server in backward compatibility mode? Backward compatibility mode lets you migrate the PATHWORKS UAF to the LAN Manager domain-wide UAS.

  Make sure the servers are kept in Backward compatibility mode until you are sure all your PATHWORKS user passwords are upgraded to V5.

- Do you want to run the server Upgrade utility as part of the Configuration procedure?

  The Configuration procedure asks "Do you wish to upgrade PATHWORKS V4.*x* databases to V5.0 now?" If you understand the implications of running Upgrade, answer **YES**. If you answer **NO**, you can run the Upgrade procedure at anytime.

- Do you want to start the server?

  The Configuration procedure asks, "Do you wish to start PATHWORKS V5.0 for OpenVMS now?" Answer **NO**. Do not start the server until after you have created Upgrade reports and run the Upgrade utility.

See the *Server Installation and Upgrade Guide* for more information.

### Impact on users

Since you are not starting the V5 server software at this time, there is no impact on your users.

## Step 7: Run the Server Upgrade Utility

After running the server Configuration procedure and before starting the server, use the server Upgrade utility to:

- Create Upgrade reports. Upgrade reports:
  - List existing V4.*x* users, groups, services, and access rights
  - List what the Upgrade procedure will and will not upgrade
  - Act as input files to the Upgrade procedure that change information and correct conflicts
- Upgrade the V4.*x* databases to LAN Manager databases.
- Upgrade UAF access to LAN Manager.
- Upgrade share access to LAN Manager.

## What to do

▶ Run the server Upgrade utility on each server where you have installed and configured V5 by following the instructions in the *Server Installation and Upgrade Guide*.

During Upgrade, you have the following options:

- Run Upgrade without generating Upgrade reports. Because Upgrade reports give you a complete description of your V4.*x* environment and tell you exactly what upgrade will and will not do, you should ALWAYS generate Upgrade reports.
- Choose between Complete and Custom Upgrade. You must complete the Complete Upgrade once you start it. You can complete the Custom Upgrade in phases, implementing what you want, when you want it. Because it offers the most control, Digital recommends using Custom Upgrade.

## Planning considerations

Before generating the reports and starting the upgrade, you should fully understand how your users, groups, services, and access rights will act under PATHWORKS V5.

Study the Upgrade reports carefully. They describe your current environment and show you what your new environment will be like.

Use this time to delete V4.*x* users, groups, and services that you no longer use.

If you use the Upgrade reports to change the names of any users, groups, and services, make sure that you tell the users in your network about the new names, perhaps by mailing them the Upgrade reports.

Changing the names of any users, groups, or services may require some modification to existing DOS batch files you may have.

See the *Server Installation and Upgrade Guide* for more information.

## Upgrading V4.*x* file and print services

Make sure that all your V4.*x* file and print services are accessible as V5 LAN Manager shares for clients running either the Basic or Enhanced Redirector.

In V4.*x*, you could create file and print services with names up to 32 characters in length. V4.*x* clients using the Basic Redirector could use these file and printer services without a problem.

When you upgrade your V4.*x* clients to V5, you will eventually want to use the Enhanced Redirector to take full advantage of V5's features. But clients using the Enhanced Redirector are limited to using share names 8.3 characters in length.

Before you start upgrading your V4.*x* file and print services to LAN Manager shares, use the Upgrade reports to survey your existing V4.*x* services.

By using the Upgrade reports, you can resolve any naming conflicts and supply new, shorter names for the corresponding LAN Manager share.

The following table describes how Upgrade handles V4.*x* service names of different lengths.

| If the V4.*x* file or print service name... | Then Upgrade... | The V5 print queue can be used... |
|---|---|---|
| Is 12 (8.3 format) characters or less | Creates a corresponding LAN Manager share using the same name. | From all V5 and V4.*x* clients, using either the Basic or the Enhanced Redirector. |
| Is longer than 12 (8.3 format) characters and you change the name using the File and Print Report | Creates a corresponding LAN Manager share for the V4.*x* service using the name you supplied in the `=new name` line | From all V5 and V4.*x* clients, using either the Basic or the Enhanced Redirector. |
| Is longer than 12 (8.3 format) characters and you do not change the name | Creates a LAN Manager share not visible from management applications | From clients using the Digital Basic Redirector |

If you use the Upgrade reports to change the names of V4.*x* file and print services (for example, from LPS20$LANDSCAPE to LPS$LAND for a print queue), use the report to distribute the list of new, shorter share names when you start upgrading your clients to the Enhanced Redirector.

**What about disk devices?**

The Upgrade utility neither lists V4.*x* disk services nor converts the disk services to a V5 share. You must manually convert the V4.*x* disk service to a V5 share.

For more information, see

- Disk Service Support and Migration in the Server Migration section of this guide
- *Server Installation and Upgrade*

## Impact on users

Since you are not starting the V5 server software at this time, there is no impact on your users.

# Step 8: Configure the Server to Run in Backward Compatibility Mode

Running a V5 server in backward compatibility mode lets you upgrade your V4.*x* clients to V5 clients over a period of time instead of all at once.

In backward compatibility mode, both V4.*x* and V5 clients running either the Basic or Enhanced Redirector can connect to and use services on a V5 server as if it were a V4.*x* server.

Backward compatibility mode lets you easily migrate the PATHWORKS UAF to the LAN Manager domain-wide UAS by capturing your users' OpenVMS passwords in a secure way.

**When not to use backward compatibility mode**

If you have an existing primary domain controller in your V4.*x* network (for example, using an OS/2 or NTAS server), and you already have synchronized your client OpenVMS passwords with the LAN Manager passwords, then you can skip backward compatibility mode and add the server directly to the domain as a backup domain controller or Member server.

**If backward compatibility is not enabled**

If you do not enable backward compatibility mode on the V5 server, when the V4.*x* client tries to connect to it using an OpenVMS user name and password, the connection will fail with the following error message: `Invalid service or password.`

If you do not enable backward compatibility mode, you will not be able to synchronize your users' OpenVMS passwords with the new LAN Manager passwords.

## What to do

▶ If a primary domain controller does not already exist (for example, you have an existing OS/2 or NTAS network), then the first server to start in backward compatibility mode is the one you plan to use as your primary domain controller.

The primary domain controller contains the domain-wide UAS. As you upgrade other servers in your network, PATHWORKS builds a local UAS based on the local UAF. The local UAS is then merged with the UAS on the primary domain controller.

For more information, see *Server Installation and Upgrade Guide* for instructions on starting the server in backward compatibility mode.

## Planning considerations

When setting a server to backward compatibility mode, note the following:

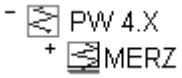
- As noted in earlier steps, after you enable backward compatibility mode, there are several user connection formats that are no longer supported. If you have not already resolved those conflicts, users will no longer be able to access those services (shares).
- Backward compatibility is intended to support the gradual transition of V4.*x* clients to V5, not as an alternative to migration. Backward compatibility mode will be phased out in the future.

## Impact on users

Assuming you have accounted for the differences in user connection formats in the previous steps (for example, SETDIR is not supported), there should be little impact on your users. However the user will see some differences:

- When using the PATHWORKS Network Connect application, backward-compatible servers now appear in the "LAN Manager" section of the Network Connect window. Prior to this step, these servers appeared in the "PATHWORKS V4.*x*" section.

  For example, a server displayed as:

  is now displayed as part of a domain:

- Licensing verification process is now active. Users will see licensing messages when they start the network.
- The NET PRINT (or NETD PRINT) command only supports the following syntaxes to a V5 server:
  - NETD PRINT [/BINARY] filename LPTx:
  - NETD PRINT LPTx:

  No other qualifiers are not supported to permitted to any LAN Manager 2.*x* servers, including the PATHWORKS V5 servers.

  For more information on NETD PRINT, see the *Client Commands Reference*.

# Step 9: Connect the V5 Clients to the V5 Server

When you upgrade your servers to V5, the Upgrade utility creates a LAN Manager account database (UAS) based on the OpenVMS UAF database. But when the server creates a database, it can only extract the OpenVMS username from the UAF. OpenVMS passwords are encrypted and cannot be copied to the new LAN Manager UAS.

## What to do

▶ Connect your clients to the backward-compatible V5 server using an OpenVMS user name and password.

The backward-compatible server captures the OpenVMS password and copies it to the LAN Manager UAS and sets the LAN Manager password. For example:

```
USE ?: \\MERZ\MENNETI%MENNETI merzpassword
```

The backward compatible server captures the OpenVMS password and copies it to the LAN Manager UAS, setting the LAN Manager password. After the user sets the LAN Manager password, the client is ready to be upgraded to V5 using the Enhanced Redirector.

For more information, see

- *Server Installation and Upgrade Guide*
- *Server Administrator's Guide*

## Impact on users

Assuming you have accounted for the differences in user connection formats in the previous steps, there should be no user impact.

**If backward compatibility is not enabled**

If you do not enable backward compatibility mode on the V5 server, when the V4.*x* client tries to connect to it using an OpenVMS username and password, the connection will fail with the following error message:

```
Invalid service or password.
```

# Step 10: Reconfigure the Clients for the Enhanced Redirector

This step is optional. For your clients to take full advantage of the PATHWORKS V5 network, your clients must use the Enhanced Redirector. With the Enhanced Redirector, your clients will be able to use the LAN Manager Logon Validation process (NETLOGON). Logon Validation lets clients log on once to the domain, giving them access to all resources in that domain.

**Note:** If your V4.*x* clients use the Enhanced Redirector, they will automatically be reconfigured in V5 to use the Enhanced Redirector by the client Upgrade utility.

Skip this step for V5 clients already configured for the Enhanced Redirector.

## What to do

▶ Use the client Configuration utility to reconfigure your clients to use the Enhanced Redirector and NETLOGON.

For more information, see the *Client Installation and Configuration Guide.*

## Using Workstation Manager

If you have planned the configuration templates to handle all your client configurations, you can now use Workstation Manager and the client UPDATE program to automatically reconfigure your clients to use the Enhanced Redirector.

See the *Client Installation and Configuration Guide* and Workstation Manager online help for more information.

## Planning considerations

Before starting this step, make sure you have:

- Modified your configuration templates to reflect the needs of the clients in your network.
- Created LAN Manager shares for all valid V4.*x* file and print services.

## Impact on users

After a client is configured for the Enhanced Redirector, the is restricted to connecting to shares following the 8.3 character naming convention.

For a full description of what a V5 client with the Enhanced Redirector can and cannot do, see Appendix A in this guide.

## Step 11: Join the Servers to the Domain

After your V4.*x* clients are upgraded to V5 and those clients are reconfigured to use the Enhanced Redirector, you should join the V5 servers in backward compatibility mode to the domain. Joining a server to a domain allows both the V5 client and server to take full advantage of V5's capabilities.

After you join a server to a domain, you will have to manage only the UAS on the primary domain controller instead of the individual UASs on your standalone servers.

### What to do

▶ To join a backwardly compatible server to the domain:

1. Decide the domain role for each server you upgrade. Upgrade the server you plan to use as the primary domain controller first. Upgrade other servers one at a time, not all at once. This action allows automatic UAS merging to function properly. This is not necessary if you already have a primary domain controller in your network, for example a pre-existing NTAS or OS/2 server.
2. Run SYS$STARTUP:PWRK$SETINI.COM and turn off backward compatibility. This command procedure allow you to alter basic parameters in the V5 environment without editing the LANMAN.INI file. PWRK$CONFIG executes this command procedure as part of initial configuration.
3. Stop the file server with SYS$STARTUP:PWRK$SHUTDOWN
4. Set the server's role in the domain:
   a. Using the Server Admin interface, select the Security settings option from the Accounts menu.
   b. Use the NET ACCOUNTS/ROLS command to change the server's role.

   See Changing a Server's Role in a Domain in the *Server Administrator's Guide* for more information.
5. Start the file server with SYS$STARTUP:PWRK$STARTUP.
6. Perform a UAS merge procedure on the servers you plan to use as backup domain controllers and member servers. The UAS merge procedure also changes the server's role in the domain.

   Any changes made to that local UAS will now be merged to the domain-wide UAS on the primary domain controller.

   See also the *Server Installation and Upgrade Guide* for instructions for the UAS merge.

### Planning considerations

Note the following:

- Upgrade the server you plan to us as the primary domain controller first. Upgrade other servers one at a time, not all at once. This action allows automatic UAS merging to function properly. This is not necessary if you already have a primary domain controller in your network, for example a pre-existing NTAS or OS/2 server.
- As you upgrade the other servers in your network, make sure to designate at least one as a backup domain controller. Adding backup domain controllers to your domain spreads the client logon validation across the domain.

### Impact on users

After the servers are joined to the domain, logon validation will now work on the client.

## Step 12: Stop Disk Services on the V5 Server

If your V4.*x* servers used disk devices, then the SYSTARTUP_V5.COM command procedure for your upgraded servers will contain the following line to start the V4.*x* Disk server:

```
$@SYS$STARTUP:LAD_STARTUP
```

Keep this line in SYSTARTUP_V5.COM until you have migrated all your disk services to FAT container files, or stopped using disk services.

Your Remote Boot clients will continue to work using their V4.*x* files. You can gradually upgrade to V5 Remote Boot Services.

For more information, see Remote Boot Migration in this guide.

# 3 Client Migration

## Before You Begin

In V5, the server integrates the Microsoft LAN Manager Version 2.2 network operating system with the OpenVMS operating system. This integration changes both how the server operates in the network and how clients access resources on the server.

This section describes:

- The differences between the V4.*x* and V5 PATHWORKS client software
- How those differences will impact the planning and setup of your PATHWORKS V5 network
- Information you need to plan your migration to V5 without interrupting service to your users.

The following table lists the information you should review and understand before reading this section:

| See... | For... |
|---|---|
| Sample Migration Process in this guide | A step-by-step example of migrating a sample V4.*x* network to V5 |
| *Client Installation and Configuration Guide* | Instructions on how to:<br>• Install PATHWORKS for DOS and Windows<br>• Upgrade existing V4.*x* clients<br>• Configure clients<br>• Use Workstation Manager |
| Online help | Information on how to use the new PATHWORKS Windows applications |

**What about remote boot clients?**

This section does not include examples of upgrading V4.*x* remote boot clients.

For more information and examples, see the Remote Boot Migration section in this guide.

# What Are the Basic Steps?

## Installing the client software

Before you can upgrade V4.*x* clients, you must install the V5 client software on the server.

▶ To install the V5 client software:

| Step | Description |
|---|---|
| **Preparation:** | |
| **1.** Create an area for installation. | Before installing on a supported server, you must create the system service on the server and name it (for example, PWV50). |
| **2.** Create an area for the Workstation Manager Database (WMD). | If you plan to use Workstation Manager to remotely manage V5 clients, you must create a separate service for it on the server. |
| **Making the network connection:** | |
| **3.** Connect your V4.*x* client to the new V5 system service using an account with write access. | If the PC you are using cannot make a network connection, use the LAN Manager SETUP disk provided with the kit to connect to the PWV50 service. |
| **4.** Supply all required information. | This information includes the client and server information needed to make the connection. |
| **Installing the software:** | |
| **5.** Start the installation utility, PWINSTAL. | PWINSTAL replaces the V4.*x* INSTALL utility. PWINSTAL has both a DOS and Windows version. |
| **6.** Verify where to install. | After you install the client software in an initial location, you can clone it to other servers in the network. |
| **7.** Select the software NOT to install. | By default, all PATHWORKS services are selected for installation. |
| **8.** Start the installation | You will be prompted for the appropriate disks from your kit. |
| **9.** Create the WMD database. | If you plan to use Workstation Manager, you must now create the WMD database in the WMD service you created. The WMD database stores information about client configurations. |
| **10.** Complete the installation. | After completing the installation, you are ready to upgrade and configure your V4.*x* clients. |

**Hard disk installation**

If you are installing the V5 client software to your PC's hard disk, you must first:

- Create a subdirectory to hold the files
- Use the SUBST commands and an unused drive letter to make the new subdirectory a simulated root location.

  **Caution**: If you don't use the SUBST command, the installation could delete all the files on your hard drive.

After installing the software, you must run the Configuration Utility in order to use the software.

For more information, see:

- *Client Installation and Configuration Guide* for complete installation instructions
- Sample Migration Process in this guide

## Upgrading your V4.*x* clients

▶ To upgrade V4.*x* clients to V5, run the client Upgrade procedure. Upgrade takes the following steps:

| Step | Description |
|---|---|
| **1.** Scans your PC | Upgrade scans the network startup file (STARTNET.BAT, for example) for specific components. The components located are then translated into V5 tasks, groups and files. The list of tasks read from PATHWRKS.INI is searched for the tasks and groups required, which are then selected as if PWSETUP was run, and a template file (UPGRADE.TXT) is generated. |
| **2.** Converts PATHWORKS batch files | Upgrade saves the startup files from the previous version with the extension .UPG, and also creates a PWUNDO.BAT in the root directory of the target drive for reverting back to the previous configuration. |
| **3.** Converts or copies your PATHWORKS databases | Several V4.*x* DECnet data files are changed and renamed during the Upgrade procedure. DEC*.DAT files are converted to PW*.DAT if the V4.*x* client was configured for DECnet. |
| **4.** Removes obsolete PATHWORKS components from your CONFIG.SYS and AUTOEXEC.BAT files | Upgrade reads the existing CONFIG.SYS, and removes all PATHWORKS device drivers. If the current configuration is using NDIS (determined by the presence of NETBIND in the network startup file), then the appropriate NDIS driver is removed from CONFIG.SYS as well. If the NDIS driver is not known to Upgrade, it scans the PROTOCOL.INI file to determine the driver name. If Upgrade is unable to determine what the NDIS driver is, you may have to manually remove the NDIS driver from the CONFIG.SYS file. |
| **5.** Starts the Configuration utility | The Configuration utility uses the Express option to automatically configure the V4.*x* clients as V5 clients using the same services you had in V4.*x*. |

You can upgrade your V4.*x* clients with V5 software, but configure them to act as they did under V4.*x*. By doing this, you can continue to use the familiar V4.*x* functionality while planning your migration to a full V5 client.

For more information, see:

- *Client Installation and Configuration Guide* for complete upgrade instructions
- Sample Migration Process in this guide

## Before You Upgrade

The following sections describe the differences between the V4.*x* and the V5 client. The information in these sections will help you plan the upgrade to V5.

### What clients are supported?

With the V5 client, you install one kit for DECnet, NetBEUI, TCP/IP and Novell NetWare support.

PATHWORKS V5 for DOS and Windows replaces several existing PATHWORKS client products. You can upgrade clients running the following software to PATHWORKS V5 for DOS and Windows :

- PATHWORKS V4.*x* for DOS
- PATHWORKS V2.*x* for DOS (TCP/IP)
- PATHWORKS V1.*x* for DOS (NetWare Coexistence)

### What servers are supported?

You do not need to upgrade your V4.*x* servers to V5 before upgrading your V4.*x* clients. The V5 client supports file and print connections to both existing PATHWORKS and retail LAN Manager and NetWare servers.

The following table describes which servers the V4.*x* and V5 client software can be installed on:

| V4.*x* can be installed on... | V5 can be installed on... |
|---|---|
| • PATHWORKS V4.*x* for VMS on VAX or Alpha AXP systems<br>• PATHWORKS V1.*x* or V2.*x* for OS/2<br>• PATHWORKS V1.0 or 1.1 for ULTRIX<br>• PATHWORKS V1.*x* for SCO UNIX on Intel systems | • PATHWORKS V4.*x* for VMS on VAX or Alpha AXP systems<br>• PATHWORKS V5 for OpenVMS (LAN Manager) on VAX or Alpha AXP systems<br>• PATHWORKS V1.0 for OpenVMS (NetWare)<br>• PATHWORKS V1.*x* for ULTRIX VAX or RISC systems<br>• PATHWORKS V5 for Digital OSF/1 AXP (LAN Manager) on AXP systems<br>• PATHWORKS V1.1, V2.0, V2.0B for OS/2 server software on Intel systems<br>• PATHWORKS V1.*x* for SCO UNIX on Intel systems<br>• Microsoft LAN Manager V2.2 and compatible servers<br>• Microsoft Windows NT Advanced Server on Intel servers<br>• Novell NetWare V2.15, V2.2, V3.*x*, V4.*x* and compatible servers on Intel systems |
| Both V4.*x* and V5 allow for installation of the client software to a client's hard disk. | |

## Client Installation media

The V4.*x* client offers several types of installation media, depending what kind of server you install the kit on. With the V5 client, you use one type of media for all supported servers. The following table describes the differences between versions.

| V4.*x* installation media | | V5 installation media |
|---|---|---|
| Server-specific media | | High-density diskettes or CD-ROM for any supported server to which a PC can connect. |
| **Server:** | **Media:** | |
| OpenVMS | TK50 or magnetic tape | |
| ULTRIX | TK50 or magnetic tape | |
| OS/2 | Diskettes | |

## Client utilities

The following table shows the differences between the V4.*x* and V5 installation and configuration utilities:

| V5 Utility | Description | V4.*x* Utility |
|---|---|---|
| SETUP | Establishes a network connection and calls the installation and configuration utilities.<br>Use the SETUP diskette for all supported transports. The V5 kit contains two SETUP diskettes one for each of the following network operating system on your server:<br>• LAN Manager<br>• NetWare | • Client setup diskettes<br>• Separate network diskettes for DECnet and TCP/IP.<br>• Netsetup |
| Installation (PWINSTAL) | Installs the client software from the source diskettes to a file service. It lets you select what client software to put in the file service in broad groups called tasks, smaller groups called groups, or individual files. | Server-specific utilities:<br>• VMS: VMSINSTAL<br>• ULTRIX: SETLD<br>• OS/2: INSTALL<br>• Hard disk: INSTALL |
| Upgrade | Scans the configuration of a V4.*x* client and upgrades the software and configuration to V5.<br>You must use the Upgrade utility for the initial configuration of an existing V4.*x* client. | Netsetup (no separate utility) |
| Configuration (PWSETUP) | Configures the client. PWSETUP lets you select what PATHWORKS software to copy to the client, what startup commands to execute, and other details about your configuration. | Netsetup |
| Workstation Manager | A Windows utility, run from ManageWORKS, that lets you change the PATHWORKS configurations of remote PCs.<br>Workstation Manager duplicates the functions of the Configuration utility, but adds remote management and the ability to replicate configuration information across a group of PCs at the same time. | Not available |

## Client configuration

The following table describes the differences between V4.*x* and V5 configuration:

| Task... | In V4.*x*... | In V5... |
|---|---|---|
| First client connection | Use the following:<br>• Client setup diskettes<br>• Separate Network diskettes for both DECnet and TCP/IP. | There are two SETUP diskettes, one each for connections to the following types of servers:<br>• LAN Manager<br>• NetWare |
| Upgrading from previous version | Run Netsetup on existing client configuration. | Uses a separate Upgrade utility |
| Configuration utility | Use Netsetup. | Upgrade utility calls the new Configuration utility |
| Remote boot | Use:<br>• Netsetup to configure<br>• FRBCON to create a floppy remote boot diskette | Use a separate utility, the PATHWORKS Remote Boot Manager utility |
| Customizing configurations | Used .WIK files to modify Netsetup actions. | Use template files. Use Configuration utility to create and modify the template files |
| Network startup files | CONFIG.SYS<br>AUTOEXEC.BAT<br>DECPARM.DAT<br>STARTNET.BAT<br>STOPNET.BAT | AUTOEXEC.BAT<br>CFGxxxx.TPL<br>PWENT.DAT<br>STARTNET.BAT<br>STOPNET.BAT |
| Release notes | Release notes are included on a disk labeled *PATHWORKS for DOS Release Notes*. | Release notes are located on Disk 1 of your kit. |
| Troubleshooting | Included on a separate diskette. | Included on a separate diskette. |

## Planning disk space for V5 client software installation

The disk space requirements for client software installation are described in the following table:

| Platform | V4.*x* | V5 |
|---|---|---|
| OpenVMS | 35,000 blocks on the system disk | 102,000 blocks on the system disk if full kit is installed |

| | | |
|---|---|---|
| Other systems (including client hard disk) | 18 MB | 52 MB if full kit is installed |

## PC hardware and software requirements

The following table describes the hardware and software requirements of V4.*x* and V5 clients:

| Component | V4.*x* | V5 |
|---|---|---|
| CPU | 8086, 8088, 80286, 80386, and 80486-class PCs | 80286 PC or higher<br>XT's are no longer supported |
| DOS version | DOS V3.3 or higher | DOS V3.3 or higher (depending on what version your DOS vendor currently supports) |
| Windows | V3.*x* | V3.1<br>Windows V3.0 is no longer supported |
| Network adapter | • Digital EtherWORKS using native and NDIS drivers<br>• Ethernet or Token Ring adapters using NDIS drivers | • Digital EtherWORKS using native, NDIS, and ODI drivers<br>• FDDI using NDIS and ODI drivers<br>• Token Ring using NDIS, ODI, and DLC drivers<br>• using NABIOS drivers<br>• ISDN using native drivers network adapter cards.<br>• Various third-party Ethernet, FDDI, Token Ring, X.25, and ISDN network adapter cards if accompanied by an appropriate driver from the vendor. |

**Note:** To run the client-based management utility, ManageWORKS, with adequate performance, Digital suggests using a 16 MHz 80386 PC or higher.

For more information, see the System Support Information section of the *Client Installation and Configuration Guide*.

### Unsupported hardware

The following hardware is no longer supported for the V5 client:

- DEPCA mouse
- LK250 keyboards

## Client memory

The V4.*x* client needed approximately 360 KB to run Netsetup and Install. The V5 client requires the following amount of DOS memory to run the installation and upgrade utilities:

| Utility | Conventional Memory | Extended Memory |
|---|---|---|
| SETUP.EXE for initial client connect | 500 KB | 1 MB |
| PWINSTAL.EXE to install client software | 200 KB | 750 KB |
| UPGRADE.EXE to upgrade V4.*x* clients to V5 | 410 KB | 550 KB |
| PWSETUP.EXE to configure the V5 client | 200 KB | 550 KB |
| UPDATE.EXE to remotely update client configuration | 415 KB | 550 KB |

The following table contains the minimum memory requirements for V5 client configurations:

| Memory Type | DOS Client | Windows Client |
|---|---|---|
| Conventional | 640 KB | 640 KB |
| EMS | Up to 640 KB | Up to 640 KB |
| XMS (HMA) | 64 KB | 64 KB |
| Additional extended | 1 MB | 3 MB |

## Client management

In V4.*x*, you had to manually run Netsetup on each client to configure or reconfigure that client.

In V5, you can remotely configure your clients using Workstation Manager. Workstation Manager duplicates most of the functions of the V5 client Configuration utility from a remote location and lets you simultaneously replicate configuration information across a group of clients.

Using Workstation Manager, you can:

- Create new network configurations using a template
- Change templates for existing network configurations
- Reconfigure multiple workstations at the same time
- Group workstations together to manage multiple workstations more easily

For more information, see:

- *Client Installation and Configuration Guide*
- Workstation Manager online help.

# Upgrading your V4.*x* Clients

## When to use the Upgrade utility

The V5 Upgrade utility scans the V4.*x* client and upgrades the software and configuration information to V5. You must use the Upgrade utility for the initial configuration of an existing V4.*x* client. If you want to reconfigure after an upgrade, you then use the Configuration utility.

If the client has a standard V4.*x* PATHWORKS configuration, you should run the Upgrade utility before making any changes to the client with the Configuration utility.

You can upgrade the following clients to V5:

- PATHWORKS V4.*x* for DOS
- PATHWORKS V2.*x* for DOS (TCP/IP)
- PATHWORKS for DOS V1.*x* (NetWare Coexistence)

## When not to use the Upgrade utility

Do not use the Upgrade utility if your V4.*x* client is configured for any of the following:

### Remote Boot

With V5, Remote Boot is based on the Microsoft LAN Manager Remote Boot service. Upgrading your V4.*x* remote boot clients requires:

- PATHWORKS V5 for OpenVMS (LAN Manager) installed and configured on the server before upgrading the remote boot client
- Using the PATHWORKS Remote Boot Manager utility to upgrade the remote boot clients

For more information see

- Remote Boot Migration section in this guide
- *Server Installation and Upgrade Guide*
- *LAN Manager Remote Boot Guide*

### Nonstandard configurations

Nonstandard V4.*x* configurations include clients:

- Using Windows for Workgroups
- Having more than one network batch file
- Whose STARTNET.BAT or WIK files have been significantly modified
- Whose default location or name of components has been changed

▶ If you have a nonstandard configuration, do the following:

1. Back up your CONFIG.SYS and AUTOEXEC.BAT files and manually edit them to remove your network components.
2. Run the Configuration utility.
3. Copy the network transport database files to the location of your V5 software. These include:
   - DECPARM.DAT
   - DECNODE.DAT
   - DECALIAS.DAT
   - DECACC.DAT
   - DECOBJ.DAT

If the new parameter database is not found, DNP automatically attempt to read the old parameter database

## How the V5 client starts the network

With V5, the way the client starts the network is different. The following table describes the differences in network startup:

| V4.*x* Client Startup | V5 Client Startup |
|---|---|
| **1.** PATHWORKS device drivers are loaded from CONFIG.SYS (for example, LADDRV.SYS). | **1.** AUTOEXEC.BAT runs STARTNET.BAT. |
| **2.** AUTOEXEC.BAT runs STARTNET.BAT. | **2.** STARTNET.BAT runs SELECT.EXE, which prompts the user for which configuration to load. |
| **3.** STARTNET.BAT loads the PATHWORKS network and connects to the V4.*x* system file service. | **3.** After choosing the configuration, PCSA.EXE reads the configuration parameters from the CFGxxxx.TPL file and then rewrites the various *.INI files used by the different networking components. |
| | **4.** The CFGxxxx.TPL file loads device drivers and network components to start the network and connect to the V5 system file service. |
| | **5.** STARTNET.BAT runs the Update utility, which updates your local template by comparing it with the template for the client in the Workstation Manager database. |

## Loading device drivers

V4.*x* loads some PATHWORKS components and NDIS drivers from the CONFIG.SYS file. Upgrade removes the PATHWORKS components and NDIS drivers from the V4.*x* CONFIG.SYS file.

V5 uses LD.COM to dynamically load these drivers after the client has been booted. LD.COM is run from the CFGxxx.TPL file during network startup.

For more information, see the *Client Commands Reference*.

## What Files Are Installed or Changed?

The Upgrade utility transfers some files from the V4.*x* configuration to the V5 configuration.

### Startup files

Several V4.*x* network startup files are changed by the Upgrade and several new ones are created:

| File | Function in V4.*x* | Function in V5 |
|---|---|---|
| CONFIG.SYS | Loads PATHWORKS device drivers | None. Upgrade removes PATHWORKS drivers and places them in the CFGxxx.TPL file. |
| AUTOEXEC.BAT | Calls STARTNET.BAT and includes post-network startup commands | Calls STARTNET.BAT. Upgrade copies any post-network startup commands and puts them in the CFGxxx.TPL file. |
| EXECINFO.BAT | Called by STARTNET to set node name, address, and environment variables | Upgrade does not use EXECINFO.BAT; support dropped. Upgrade reads configuration information and writes it in the CFG*xxx*.TPL file. |
| STARTNET.BAT | Loads the PATHWORKS software | Calls SELECT to load the PATHWORKS software defined in the CFG*xxx*.TPL file. |
| STOPNET.BAT | Unloads the network | Unloads the network. In V5, you can restart the network after it has been unloaded without rebooting. |
| CFGWS.DAT | Contains configuration information used by Netsetup | Support dropped. |
| CFGxxx.TPL | Not in V4.*x* | The CFGxxx.TPL files on your workstation contain the names of services, groups, and files that you configured for your client, as well as other client-specific information (for example, user commands). |
| PWENT.DAT | Not in V4.*x* | Contains the node name and address of the client and the maximum number of links allowed the client. |
| PWLIC*xx*T.EXE | Not in V4.*x* | The PWLICLMT.EXE (LAN Manager) or PWLICNWT.EXE (NetWare) file is a terminate-and-stay-resident (TSR) program loaded by the network startup procedure that responds with the workstation's license status to the PATHWORKS license server and the file server. The license status is stored in a file named PWLICxx.DAT on the client. |

| | | |
|---|---|---|
| PWLIC*xx*.EXE | Not in V4.*x* | The PWLICLM.EXE (LAN Manager) or PWLICNW.EXE (NetWare) file is a program loaded by the network startup procedure that requests licenses from the PATHWORKS license server. |
| PWLIC*xx*.DAT | Not in V4.*x* | PWLIC*xx*.EXE calls PWLIC*xx*.DAT to verify licensing information at network startup. |
| UPDATE.DAT | Not in V4.*x* | Contains the WMD name for the client and placeholders containing the WMD service and WMD location for use by future PATHWORKS products. The UPDATE.DAT file is created and used by the Update utility. |

## DECnet management databases

Several V4.*x* DECnet data files are changed and renamed during the Upgrade procedure.

| V4.*x* File | Description | V5 File |
|---|---|---|
| DECPARM.DAT | V5 attribute file. Read by DECnet network process at network startup. | PWENT.DAT |
| DECNODE.DAT<br>DECALIAS.DAT | Contains node names, related addresses, and outgoing access information for remote nodes. Read by utilities during outgoing connections. Read by DECnet network process at startup. V5 combines DECNODE.DAT and DECALIAS.DAT into PWNODE.DAT.<br><br>The node database is now sorted by Node Name instead of Node Address. This affects the display NCP LIST KNOWN NODES. | PWNODE.DAT |
| DECACC.DAT | Incoming access on a per user basis. Used by applications such as FAL (File Access Listener) to check incoming access. | PWINACC.DAT |
| DECREM.DAT | Mapping of node name and object number to remote service name. | PWREM.DAT |
| DECOBJ.DAT | DECnet object accessed by incoming connections, read by SPAWNER.EXE. | PWOBJ.DAT |
| -- | Data used to perform MOP down-line load from remote systems such as terminal servers and DECnet routers. | PWLOAD.DAT |

If the new parameter database is not found, DNP will automatically attempt to read the old parameter database.

**Note:** In V5, the format of the local parameter and node databases have been changed to binary format to accommodate future network information. DECnet (DNP) was modified to read the new parameter databases.

## TCP/IP files

When you upgrade a V4.*x* TCP/IP client, several V4.*x* TCP/IP files are changed during the Upgrade procedure:

| File | Function in V5 |
|---|---|
| PROTOCOL.INI | In V5, TCP/IP now has its own .INI file, PWTCP.INI. Upgrade copies the TCP/IP parameters into PWTCP.INI, and the other PROTOCOL.INI parameters into a copy of PROTOCOL.INI in the new V5 directory. |
| PWTCP.INI | New in V5, contains all PATHWORKS TCP/IP parameters. |

## Microsoft Windows files

The following table describes the Windows files created or modified by the Upgrade procedure.

| File | Function in V5 |
|---|---|
| DECPW.386 | V5 PATHWORKS driver. DECPW.386 supersedes the DECnet/DECNB Virtual Device Drivers (VxD) found on the Microsoft Windows V3.1 product.<br>**Note:**<br>The V4.*x* network drivers, DECNET.386 and DECNB.386, are no longer supported.<br>A new parameter, DNETCriticalSection, has been added to SYSTEM.INI for DECPW.386.<br>For more information, see the *Client Commands Reference*. |
| PATHWRKS.INI | Lists the drivers used by the PATHWORKS Windows Connect utility. It configures Windows so that you can use PATHWORKS network functions. For more information, see the Network Connect online help. |
| PWGROUP.INS | Controls what icons are placed in the Windows program groups. The master copy is on the system service. PWGROUP.INI is copied and tailored to each client. |
| PWMGMT.INI | Lists the drivers used by ManageWORKS, and all user preferences set and customizations made to the application by the user. For more information, see the ManageWORKS online help. |
| PWUSER.INI | Stores information about three types of network connections under Windows: previous, preferred, and automatic. Automatic network connections are read from PWUSER.INI and set up each time you start Windows. |

## Memory

The client Upgrade utility creates a V5 configuration that duplicates your V4.*x* configuration. But because you are now loading V5 components, the amount of client memory available after starting your V5 network will be different.

Because memory consumption depends on which components are loaded, there is no way of predicting how much memory your V5 configuration will take. The following table shows an approximate comparison of the memory used by V5 components, and where applicable, the memory used by the same component in V4.*x*.

In this table, CM stands for Conventional Memory.

| Component | In V4.*x* | | In V5 | |
|---|---|---|---|---|
| | CM | CM with EMS or XMS/HMA | CM | CM with EMS or XMS/HMA |
| **LAN Manager** | | | | |
| Microsoft Basic Redirector | N/A | N/A | 38K | 1K (XMS) |
| Digital Basic Redirector | 34K | 1K (XMS) | 35K | IK (XMS) |
| Enhanced Redirector | 93K | 49K | 99K | 50K |
| DNP.EXE | 32K | 8K | 37K | 2K |
| NETBEUI.EXE | 36K | -- | 36K | -- |
| **Digital components** | | | | |
| SAVE.EXE | 2k | -- | 2K | -- |
| SCH.EXE | 7K | -- | 9K | -- |
| SCHK.EXE | 3K | -- | 4K | -- |
| RCV.EXE | 6K | 8K (1) | 7K | 2K |
| PWCICLMT.EXE | N/A | N/A | 2K | - |
| **Terminal emulation** | | | | |
| CTERM | 37K | N/A | 54K | 13K |
| LAT | 10K | 8K (1) | 18K | 1K |
| **Virtual Disk and InfoServer support** | | | | |
| LASTport | 8K | 8K (1) | 11K | 2K |
| LAD | 5K | 8K (1) | 5K | N/A |
| MSCDEX | N/A | N/A | 48K | 16K |

| | | | | |
|---|---|---|---|---|
| **Data Links** | | | | |
| DLLASYNC | N/A | N/A | 10K | |
| DLLDEPCA | 7.6K | -- | 11K | |
| DLLNDIS and DLLNDIST | 32K | -- | 32K | |
| DLLODI | N/A | N/A | 39K | |
| **NetWare (in V4.*x* with Coexistence add-on kit)** | | | | |
| NETX.EXE | 43K | | 43K | -- |
| XMSNETX.EXE | -- | 6K (XMS) | -- | 6K (XMS) |
| EMSNETX.EXE | -- | 10K | -- | 10K |
| IPX.COM | 17K | -- | 17K | -- |
| IPXODI.COM | 15K | -- | 15K | -- |
| IPXNDIS.DOS | 1K | -- | 1K | -- |
| LSL.COM | 10K | -- | 10K | -- |
| **TCP/IP (in V4.*x* with TCP/IP add-on kit)** | | | | |
| BAPI.EXE | 16K | -- | 15K | 2.4K |
| DNR.EXE | 15K | 2K | 22K | 8K |
| TCPIP.EXE (V5) | -- | -- | 41K | 2K |
| TCPTSR.EXE (V4.*x*) | 109K | 70K | -- | -- |
| TN.EXE | 10K | 2K | 32K | 4K |
| SNMP.EXE | | | 43K | 4K |
| **Drivers** | | | | |
| LADCDDRV.SYS | 6K | -- | 5.6K | -- |
| LADDRV.SYS | 2.5K | -- | 3.5K | |
| MINSES.EXE | 1K | -- | 1.5K | -- |
| NDIS driver | 2-9K | -- | 7-13K | -- |
| PROTMAN.DOS<br>PROTMAN.EXE | 96 bytes | -- | 192 bytes | -- |
| ODI driver | N/A | N/A | 2-9K | |

❶ With V4.*x*, when DNP, LAST, LAD, LAT, or RCV are loaded into EMS as a group or loaded individually, they leave behind an 8K stub in conventional memory.

For complete information on the size and description of PATHWORKS components, see:

- The V5 *Client Installation and Configuration Guide*
- The V4.*x Memory Solutions for Client Administrators*

## Which Redirector should you use?

Most V4.*x* clients use the Basic Redirector. To take full advantage of V5, you should reconfigure your clients as soon as possible to use the Enhanced Redirector. The following table describes the differences in redirectors used in V5:

| Function | Microsoft Basic Redirector | Digital Basic Redirector | Enhanced Redirector |
|---|---|---|---|
| Memory required | 38K | 35K | 99K |
| Multiple protocol stacks for file and print (for example, TCP/IP and DECnet) | Not supported | Not supported | Supported |
| Service browsing | Not supported | Not supported | Supported |
| LAN Manager APIs | Not supported | Not supported | Supported for both DOS and Windows |
| Integrated broadcast and receive | Not supported | Not supported | Supported |
| Share names | Up to 12 characters (8.3 format) | Up to 32 characters | Up to 12 characters (8.3 format) |

For complete information on the V5 redirectors, see the *Client Installation and Configuration Guide*.

## Template memory

The client Upgrade utility creates a V5 configuration that duplicates your V4.*x* configuration. After becoming familiar with V5, you may want to change your configuration. You can base your new configuration on one of ten sample configuration templates included in the V5 client. Use the following table as a guideline for the approximate amount of client memory required by each configuration template.

| Template | Approximate size in memory in bytes | |
|---|---|---|
| | without EMS | with EMS |
| Asynch #1 | 161K | 90K |
| Asynch #2 | 121K | 46K |
| ManageWORKS ❶ | 270K | 185K |
| NetWare #1 ❶ | 169K | 84K |
| NetWare #2 ❶ | 173K | 84K |
| LAN Manager #1 ❶ | 128K | 71K |
| LAN Manager #2 ❶ | 111K | 61K |
| LAN Manager #3 ❶ | 213K | 127K |
| LAN Manager and NetWare | 187K | 119K |
| TCP/IP | 129K | 57K |

Use the following guidelines when referring to this table:

- Configurations marked with ❶ use the Digital-supplied native data link driver (DEPCA).
  - For NDIS configurations, add 30K
  - For ODI configurations, add 47K
- None of the configurations uses LOADHI. You could save additional memory using LOADHI.
- The amount of available client memory after starting the network depends on the PC configuration.
- These memory guidelines reflect the templates shipped with V5. Since you have the ability to modify existing templates or create new ones, memory used may change depending on which components you load.
- Since memory consumption depends on which components are loaded, there is no way of predicting how much memory your V5 configuration will take.

See the *Client Installation and Configuration Guide* for more information on the sample templates and the memory requirements of individual components.

# Configuring the client

## The configuration utility

The Upgrade utility automatically configures the V4.*x* client as a V5 client using the same services the client had in V4.*x*. Use the new Configuration utility (PWSETUP) to reconfigure your client (for example, to use the Enhanced Redirector).

The following table describes the differences in configuring a V4.*x* and V5 client:

| Function | V4.*x* | V5 |
|---|---|---|
| Utility | Netsetup | Configuration utility (PWSETUP.EXE) |
| Interface | DOS only | Separate DOS and Windows interfaces |
| Installing and configuring PATHWORKS components | You use Netsetup to choose specific PATHWORKS components.<br>For example, to use SETHOST, you have to pick CTERM or LAT. | You use the Configuration utility to select specific task-based templates.<br>For example, to use SETHOST, you pick PATHWORKS Terminal Emulator and the client automatically is configured for LAT or CTERM, depending on the template used. |
| Installing applications on the client | Not supported.<br>For example, to run VT320 from the client's hard disk, you have to use INSTALL or manually copy the VT320 files from the system file service. | Configuration utility lets you choose to run some PATHWORKS components and applications from the server or from the client's hard disk.<br>For example, to install VT320 on a client's hard disk, add PATHWORKS Terminal Emulation during the configuration. |
| Customizing client configuration | You have to customize the Write Key Disk (WIK) file stored on the V4.*x* system service. | V5 uses template files to store multiple client configurations. |
| Multiple client configurations | Not supported.<br>To change your configuration, you have to run Netsetup and reboot your machine. | Created and managed by the Configuration utility. The client can have multiple network configurations for different circumstances. |
| Multiple transport configurations | Not supported. | You use the Configuration utility to run IPX, LAT, LASTport, NetBUEI, DECnet, and TCP/IP simultaneously. |

| | | |
|---|---|---|
| Configuration options | Three operator modes:<br>• Basic<br>• Intermediate<br>• Advanced | Three configuration options:<br>• Express<br>• Customize<br>• Admin |
| Redirector support | Supports the following:<br>• Basic Redirector<br>• Enhanced Redirector<br>• Enhanced Redirector with LAN Manager V2.0 support | Supports the following<br>• Microsoft Basic Redirector<br>• Digital's Basic Redirector<br>• Microsoft Enhanced Redirector |

For information on all the topics in this section, see the *Client Installation and Configuration Guide*.

## Customizing the client configuration

The following table compares how you customize the client configuration in V4.*x* and V5:

| In V4.*x*... | In V5... |
|---|---|
| To change how Netsetup configures your clients (for example, to load a specific device driver from CONFIG.SYS), you have to customize the Write Key Disk (WIK) file stored on the V4.*x* system service.<br>Since all clients use a single WIK file, you are limited in the types of changes you can make. | Template files (CFG*xxx*.TPL) are used to store multiple client configurations.<br>Using the Admin Option in the Configuration Utility, you can:<br>• Create a remote configuration template by specifying software preferences, startup commands, and license group information<br>• Create one or more templates using the Admin option, and then use the templates to configure multiple PCs with the Express option<br>• Customize command line switches for the network components<br>• Add additional network startup commands that run each time STARTNET.BAT is run |

There is no migration utility to move .WIK file customizations to the V5 template files. Any changes you made to V4.*x* .WIK files must be made manually to the V5 template files.

For more information on modifying template files, see the *Client Installation and Configuration Guide*.

## INS files

The following table describes the files used and created by the Installation utility (PWINSTAL):

| File | Description |
|---|---|
| KITDATA.INS | KITDATA.INS is the installation script. The Installation utility reads KITDATA.INS and displays installation options.<br>This files replaces the V4.*x* installation script, INSTALL.INS. |
| PATHWORKS.INS | After the Installation utility has copied the client software to the server, it creates PATHWORKS.INS.<br>PATHWORKS.INS summarizes the files copied, with the directory structure and other information needed by the Configuration utility. PATHWORKS.INS merges the additional files on the system service for the V4.*x* NetWare and TCP/IP add-on kits.<br>PATHWORKS.INS replaces the V4.*x* PCSAINFO.DAT file. |

**Note:** Editing KITDATA.INS or PATHWRKS.INS is not supported.

## Setting up multiple configurations

The following table compares setting up multiple configurations in V4.*x* and V5:

| In V4.*x*... | In V5... |
|---|---|
| You can have only one network configuration.<br>To change your configuration, you have to run Netsetup and reboot your machine. | Network startup information is stored in numbered template files (CFGxxx.TPL), so you can set up multiple network configurations for different circumstances.<br>For example, you can configure a laptop to use TCP/IP over Ethernet when at the office. When away from the office, you can select another configuration to run asynchronous TCP/IP.<br>When you start the network, STARTNET.BAT prompts the user to select the desired CFGxxxx.TPL. Once selected, STARTNET reads the configuration parameters from the CFGxxxx.TPL file and then rewrites the various *.INI files used by the different networking components. |

For information on setting up multiple configurations, see the *Client Installation and Configuration Guide*.

## How Are Client Connections Different?

Several changes to the V5 client affect how your clients connect to file and print services. The following table lists the basic differences between V4.*x* and V5 clients:

| Function | In V4.*x*... | In V5... | Comment... |
|---|---|---|---|
| User changing host directories | Supported | Not supported | SETDIR is not supported in V5. |
| Connecting to a service with another OpenVMS user name and password | Supported | Not supported | With V5, if you connect to an OpenVMS system using one user name/password pair, you cannot connect to the server with a different user name/password pair in the same session. |
| Displaying file and print services (shares) on a server | Supported | Replaced | V5 includes the Browser, a Windows application that lets you view and connect to services on V4.*x* and V5 servers. |
| Connecting to file and print services with names longer than 12 characters (8.3 format) | Supported | With Basic Redirector only | To take advantage of the V5 client features, the client must use the Enhanced Redirector. The Enhanced Redirector supports service names up to 12 characters (8.3 format) long. |

See Appendix A in this guide for a complete comparison of V4.*x* and V5 client functionality.

## Novell NetWare Support

The following table outlines the differences in Novell NetWare support between V4.*x* and V5 clients:

| Feature | In V4.*x*... | In V5... |
|---|---|---|
| Installation | Must separately buy, install, and configure PATHWORKS for DOS (NetWare Coexistence). | Provided as part of the V5 installation and configuration. |
| Supported drivers | NDIS | NDIS and the NetWare Open Dataline Interface (ODI). ODI supports:<br>• Multiple protocol stacks<br>• Multiple logical boards to be configured for one or more physical boards |
| Server management | Native NetWare tools on a per server basis. | ManageWORKS to manage multiple NetWare servers from the client. |

# TCP/IP Support

## Differences between V4.*x* and V5 TCP/IP support

PATHWORKS V5 provides new TCP/IP components. The following table outlines the differences in TCP/IP support between V4.*x* and V5 clients:

| Feature | In V4.*x*... | In V5... |
|---|---|---|
| Installation | Must separately buy, install, and configure PATHWORKS for DOS (TCP/IP) | Provided as part of the V5 installation and configuration |
| Installation directory/system service | \PCSAV41 for PATHWORKS for DOS software<br>\TCPIP for PATHWORKS for DOS (TCP/IP) | \PWV50 or user selectable |
| Management | DOS-based utilities | DOS and Windows based utilities |
| Asynchronous communications | Not supported | Supported via Serial Line Interface Protocol (SLIP) |
| Memory | • Size: about 120 KB<br>• Cannot co-exist with DNP in EMS | • Size: about 56 KB<br>• Loadable in EMS with DNP |
| Simple Network Protocol (SNMP) | Not supported | Supported |
| NETBIOS support, socket management, and network management | Requires three separate programs:<br>• TINYRFC.EXE for NetBios<br>• SOCKTSR.EXE for socket management<br>• NMTSR.EXE for network management | Requires one program, TCPIP.EXE |
| EMS support | Available with NEMM.SYS | Can be loaded into EMS simultaneously with other PATHWORKS components, such as IPX, NetBEUI, LAT, and DECnet |
| Networks | Ethernet and Token-Ring only | Support for:<br>• Ethernet<br>• Token ring<br>• SLIP<br>• X.25<br>• FDDI<br>• SNMP<br>• ISDN |

| | | |
|---|---|---|
| Simultaneous TCP connects | 32 (V1.*x*)<br>96 (V2.0) | 128 |
| Wireless support | Not available | Supported for wireless networks like Mobitex and ARDIS using Digital RoamAbout Transport software. RoamAbout Transport is installed and configured separately. |
| NetWare ODI support | Not available | Supported |
| Routers | Must be identified in Netsetup | Supported with Router Discovery (RFC 1256) |

## New PWTCP.INI file

In V5 TCP/IP has its own .INI file, called PWTCP.INI. V4.*x* TCP/IP uses PROTOCOL.INI.

When you start the network, STARTNET.BAT first rewrites parts of the PWTCP.INI file, using parameters from the CFGxxxx.TPL file the user selects. STARTNET then loads the TCP/IP components, which use the values set in PWTCP.INI. The TCP/IP parameters affected in this way include:

- Computer's name
- Computer's IP address
- Computer's subnetwork mask
- Computer's domain
- Default gateway address (the first default router)
- Default name server address
- Default LAN Manager server name
- Default LAN Manager server address

## Other new features

PATHWORKS V5 TCP/IP includes the following new features:

- BSD-style socket support in static link library, Windows' DLL, or Winsock.
- Telnet, Domain Name Resolver, and SNMP are separate TSRs.
- Support for Winsock. This includes:
  - Letting users run public domain Winsock applications such as WMOSAIC, CELLO, and TRUMPET.
  - Displaying the output from X-windows applications on their PCs by using Digital's eXcursion or PC DECwindows Motif products over Winsock.

- New IP routing features. These include automatic router discover and multiple static routers. The user can enable these items by editing the PWTCP.INI file.
- Three new DOS utilities: LPR, LPQ, and LPRM. These utilities provide printer support over TCP/IP.
- New Windows TCP/IP utilities: FTP, PING, and NETSTAT.
- Telnet support for the VT320, SETHOST and other standard third-party terminal emulators.

For complete information on TCP/IP features, see

- *TCP/IP User's Guide*
- Online help for TCP/IP Windows utilities

## Changes in TCP/IP administration

Three PATHWORKS V5 TCP/IP features affect administrators.

1. NMTSR is no longer supported.

   Users and administrators may execute ARP, PING, and NETSTAT at any time after STARNET loads TCP/IP.

2. PATHWORKS V5 provides an SNMP agent.

   This agent supports the system interfaces ICMP, TCP, UDP, and SNMP groups from MIB II (RFC 1213). It also supports the counters from MIB II IP group, but does not support the IP group Address Table, Routing Table, or Net to Media Table. The agent supports one "get" community and another for "set." The default get community is "public," while there is no default community for set.

3. PATHWORKS V5 TCP/IP supports remote client management using Workstation Manager and the UPDATE utility.

For more information, see:

- *Client Installation and Configuration Guide*.
- *TCP/IP User's Guide*

# The AUTOUSER.BAT File

## Differences between V4.*x* and V5 automatic connections

Both V5 and V4.*x* provide clients with the ability to automatically connect to network resources and run applications when they log in. The following table describes the differences between V4.*x* and V5:

| Feature | In V4.*x*... | In V5... |
|---|---|---|
| Method | Runs AUTOUSER.BAT when the user connects to an account using LOGON | Runs a logon script when the user logs into the domain |
| Location of scripts | On the server where the user has an account | On the primary and backup domain controller |
| Sharing scripts | None | Users may have individual logon scripts or can share a single script. |
| Managing scripts | PCSA-MANAGER used to edit AUTOUSER.BAT | any text editor can be used |

## Upgrading AUTOUSER.BAT files

When you upgrade a V4.*x* user account to V5, the client Upgrade procedure does not copy AUTOUSER.BAT files to V5 logon scripts. The AUTOUSER.BAT stays with the account but is not run when the user logs on to the domain.

By default, V5 supplies a simple common logon script that users see when they log on to the domain:

```
Welcome to PATHWORKS V5 for OpenVMS (LAN Manager V2.2)
```

If you want to save any customizations in your V4.*x* AUTOUSER.BAT files, complete the procedure in one of the following sections.

### Specify additional startup commands on the client

When you upgrade a V4.*x* client, you can specify commands to be run when the client starts the network.

▶ To specify additional startup commands

1. Start the client Configuration utility:
2. Select Customize as the Configuration Option.
3. On the Modify Workstation Configuration screen, select Additional Startup Commands.
4. In the Additional Startup commands screen, use the AUTOUSER.BAT file as a guide to add startup commands to be run when the client starts the network.

### Modify the logon script on the server

Logon scripts are executed from the primary domain controller. Logon scripts must be placed in a command directory on the primary domain controller and manually copied to a specific directory on all the Backup controllers.

▶ To create a new logon script for a user:

1. Locate the directory on the primary domain controller that contains logon scripts.

   This directory is defined by `scripts=` line in the `[NETLOGON]` section of the server's LANMAN.INI file. By default, this is PWRK$LMROOT:[LANMAN.REPL.EXPORT.SCRIPTS].

2. Create the new logon script using the AUTOUSER.BAT file as a guide.

3. Save the new logon script to the default scripts directory, or in a subdirectory you created.

   Two copies of the logon script should be placed in the scripts directory if the domain serves both DOS and OS/2 clients. Use the following guidelines when naming the files:

| Client | File Extensions for Script File |
|---|---|
| DOS | .BAT |
| OS/2 | .CMD |

4. Manually copy the client's logon scripts to all backup domain controllers. The default script location on backup controllers is: PWRK$LMROOT:[LANMAN.REPL.IMPORT.SCRIPTS]

5. Specify the file on the primary domain controller used as the client's logon script by one of the following methods:

   - From ManageWORKS on a V5 client, choose the Users icon and then choose the Zoom option from the Actions menu.
   - From the Server Admin Menu on a V5 server, choose the Users option from the Accounts menu.
   - From the command line, enter the NET USER command with the `/scriptpath: [pathname]` parameter.

   The path of the script is relative to the directory defined in the LANMAN.INI file. For example, if you created AUTOUSER.BAT in the USER1 subdirectory off the scripts directory, you would specify \USER1\AUTOUSER.BAT as the script location.

### Call AUTOUSER.BAT from STARTNET

The Upgrade procedure does not delete the AUTOUSER.BAT file in the OpenVMS account.

▶ To call AUTOUSER.BAT from your local STARTNET.BAT:

1. Make a backup copy of STARTNET.BAT.
2. At the end of STARTNET.BAT, add that connects to the service that contains your AUTOUSER.BAT file.
3. After the call to the service, add a line that runs AUTOUSER.BAT.

## Modifying the PATHWORKS Program Group

When you run the Configuration utility, it calls PWICON.EXE to create the PATHWORKS program group in Windows. PWICON.EXE uses a script file, PWGROUP.INS, to create PATHWORKS groups and icons.

PWGROUP.INS is copied, with some modification, to the client by the Configuration utility. When you configure your client for the PATHWORKS Windows network, PWICON.EXE is run automatically.

PWICON.EXE can be manually run from Windows. See PWGROUP.INS for instructions on how to modify it to add or remove groups and icons from the PATHWORKS program groups. The master copy of the file is kept on the V5 system service in the \TEMPLATE directory.

For more information, see the PWGROUP.INS file.

## Changing Passwords

The following table describes the three methods of changing passwords in V5:

| Command | Description |
|---|---|
| NETD PASSWORD | Change the password for an account on a server running:<br>• PATHWORKS V5 for OpenVMS (LAN Manager)<br>• PATHWORKS for VMS V4.*x*<br>• PATHWORKS for ULTRIX V1.*x* |
| NET PASSWORD | Changes the LAN Manager domain password |

| | |
|---|---|
| NETPASS | Changes both the LAN Manager domain password and OpenVMS password on PATHWORKS V5 for OpenVMS (LAN Manager) servers |

# 4 Client Components and Applications

## Overview

This section contains information about the differences between V4.*x* and V5 for specific client components, applications, and utilities.

## VT320 Terminal Emulator

### Differences between V4.*x* and V5 VT320

The following table describes the differences between the V4.*x* and V5 VT320 terminal emulators:

| Feature | In V4.*x*... | In V5... |
|---|---|---|
| Supported transports | LAT, CTERM, TELNET | LAT, CTERM, TELNET |
| Keyboard mapping | Not supported | Supported. The keyboard map file extension is .kmf. |
| Configuration file | DEFAULT.320 | VT320.INI |
| Fonts | VGA resolution up to 640x480 | 7 dynamically changeable fonts<br>Screen resolution from 640x480 to 1280x1024 |
| List services | LAT only | LAT, CTERM, and TELNET |
| Maximum sessions | 16 | Limited only by available memory |
| File transfer | Not supported | Kermit |
| API support | Not included | RFA API for Kermit. |

For more information, see:

- VT320 online help
- *Terminal Emulation Guide*

### Removing old fonts

Upgrading does not remove the V4.*x* VT320 fonts and configuration files.

▶ To remove any references to V4.*x* VT320:

1. Remove the following line from the [fonts] section of your WIN.INI file:
2. `DEC Terminal Emulation Fonts=DECTERM.FON`
3. Delete all DECTERM*.FON files.
4. Delete any old configuration files, usually ending with .320.

### API support

The RFA (Remote File Access) components provide a protocol and transport independent API for file transfers under Windows, when a file server can not be used.

For more information, see the PATHWORKS *Network Programming Reference*.

## SETHOST Terminal Emulator

### Differences between V4.*x* and V5 SETHOST

The following table describes the differences between the V4.*x* and V5 SETHOST terminal emulators:

| Feature | In V4.*x*... | In V5... |
|---|---|---|
| NetWare access | Not supported | Supplied using NetWare Virtual Terminal facility (NVT) |
| Multiple transports | Simultaneous sessions using LAT and CTERM | Simultaneous sessions using LAT, CTERM, TELNET, and NVT |
| Baud rate | 50 to 19,200 | 75 to 38400 bps<br>Support for 50 bps dropped |
| International character sets | Uses a separate file for each language (*.CHR) | Uses CHARSETS.DAT as a reference file for international character sets. CHARSETS.DAT is a single binary replacement in PATHWORKS V5 for all of the *.CHR ASCII files. |

For more information, see the *Terminal Emulation Guide*

## Mail

Only minor changes were made to Mail for V5. These include:

- Mail no longer supports PATHWORKS for DOS (TCP/IP) V1.*x* or V2.*x*. TCP/IP is now included with V5.
- Mail now supports concurrent access to protocol stacks. This enables you to communicate with remote servers using DECnet or TCP/IP in the same mail session.
- Mail uses CHARSETS.DAT as a reference file for international character sets. Support for the V4.*x* *.CHR files has been dropped.
- Supports a maximum of 1024 remote mail folders. V4.*x* supported 300 remote mail folders.

Also note the following:

- Mail is not supported with:
  - PATHWORKS V1.*x* for SCO UNIX server
  - PATHWORKS V2.0B for OS/2 server over TCP/IP
  - PATHWORKS for OpenVMS (LAN Manager) server over TCP/IP
  - Native transports such as NetBEUI and IPX
- Although MAIL takes less than 300K of conventional memory to run, it allocates memory dynamically during normal mail processing. Because of this, you should have approximately 410K of free conventional memory before running MAIL.

For more information, see the *Mail User's Reference*.

## Network Driver

The PATHWORKS V5 WinNet driver is a set of files that allows Windows applications such as the File Manager and Print Manager to perform generic network functions, such as connecting to a network resource, or obtaining print job information.

In addition, V5 contains the Network Connect application, which allows users to bypass the File Manager, and directly access the driver's connection dialog. This functionality is provided by the file PW.EXE

For more information, see:

- *User's Handbook*
- Online help for Network Connect

## Differences between V4.*x* and V5 Windows drivers

### Installation

The following table describes the differences between the installation of the PATHWORKS V4.*x* and V5 Windows drivers:

| Version | V4.*x* | V5 |
|---|---|---|
| Windows V3.0 | Uses WIN3SETU. This utility also installed other drivers such as the DEPCA mouse driver. | Windows V3.0 is not supported in PATHWORKS V5 |
| Windows V3.1 | The drivers were shipped with the Windows V3.1 kit and installed by Windows SETUP | Uses the PATHWORKS Configuration utility |

### Files

In V4.*x*, the WinNet driver functionality was provided by a single file PCSA.DRV. In V5.0, the WinNet driver functionality is provided by the following files:

| Network | Files |
|---|---|
| PATHWORKS | PATHWRKS.DRV, PATHWRKS.HLP, PATHWRKS.INI |
| LAN Manager | LANMAN21.DRV*, BROWSELM.DLL*, BROWSELM.HLP |
| NetWare | NETWARE.DRV, BROWSENW.DLL*, BROWSENW.HLP |
| PATHWORKS V4.*x* | PCSA50.DRV, BROWSE41.DLL |
| Virtual disk services | LAD.DRV, BROWSELA.DLL |
| InfoServer CD-ROM services | LADCD.DRV, BROWSECD.DLL |

### Network support

The following table shows the differences in functionality between the PATHWORKS 4.*x* WinNet driver and the 5.0 WinNet driver. Browsing support has been added for the different types of networks. Also added is connection support for CDROM services.

| | V4.*x* | | V5 | |
|---|---|---|---|---|
| **Network** | **Connections** | **Browsing** | **Connections** | **Browsing** |
| LAN Manager | X | Not supported | X | X |
| NetWare | X | Not supported | X | X |
| PATHWORKS V4.*x* | X | Not supported | X | X |
| Virtual Disk Services | X | Not supported | X | X |
| InfoServer CD-ROM services | Not supported | Not supported | X | X |

### Initialization (.INI) files

The following table describes the differences between the initialization files for the V4.*x* and V5 PATHWORKS Windows drivers:

| In V4.*x*... | In V5... |
|---|---|
| The File Manager keeps information about network settings and previous connections in the following INI files:<br>• WIN.INI: The [Network] section containes entries for File and Printer connections that Windows and the WinNet driver restores at Windows startup<br>• WINFILE.INI: The File Manager saves the names of network file services in the [Previous] section. These values are listed when you push the Previous button in the Connections dialog. | There are 2 INI files related to the WinNet Driver:<br>• PATHWRKS.INI: This file identifies which NOS specific drivers and DLLs are used by the PATHWORKS WinNet driver. This file is shipped pre-configured with the PATHWORKS client kit.<br>• PWUSER.INI: This file is maintained by PATHWRKS.DRV. It contains information about Preferred connections, Previous connections, Auto-Restore connections, along with other user settings. |

## Broadcast Receiver (RCV.EXE)

In V5, RCV.EXE

- Supports three LANAs instead of two as in 4.*x*.
- Works on any of following network protocols:
  - DECnet
  - TCP/IP
  - NetBEUI
- Is not compatible with V4.*x* EMSLOAD

For more information, see the *Client Commands Reference*.

## CTERM.EXE

In V5, CTERM.EXE:

- Is loadable in EMS.
- Includes a block mode interface which increases the data-transfer speed.
- Users can tell CTERM to allocate its own SCBs (Session Control Blocks) for every session opened on CTERM. This option is valid only when CTERM is loaded in EMS. CTERM uses XMS to allocate its own SCBs, saving conventional memory.

For more information, see

- *Client Commands Reference*
- *Client Installation and Configuration Guide*
- *Terminal Emulation Guide*

## Data Links

The following table describes the V5 data links:

| Data link | Description |
|---|---|
| DLLDEPCA | For V5, DLLPECA:<br>• Has a new qualifier, \IPALONE. It is used if you are using TCP/IP and do not want to enable MOP.<br>• Supports multiple stacks.<br>• Gets its DECnet information from PWENT.DAT not DECPARM.DAT. |
| DLLNDIS(T) | For V5, DLLNDIS(T):<br>• Has a new parameter in PROTOCOL.INI, IP_ALONE. It is used if you are using TCP/IP and do not want to enable MOP.<br>• The maximum size of LG_BUFSIZ in PROTOCOL.INI changed to 4485 bytes for FDDI support.<br>• Supports multiple stacks.<br>• Gets its DECnet information from PWENT.DAT, not DECPARM.DAT. |
| DLLODI | Data link driver for NetWare ODI support. This is a new component. |
| DLLDLC | Data link driver for DLC Token Ring. This is a new component. |
| DLL802 | This driver is no longer supported in V5. It was removed because all data links now support 802.2. |

**Note:** All data links include 802.2 support, which lets data links transmit and receive 802.2 format packets.

By default, the Responder is enabled. With the exception of DLLNDIS(T), there is a /noresponder switch. For DLLNDIS(T), you can turn the responder off from the PROTOCOL.INI with the following line: `responder=0`.

For more information, see:

- *Client Commands Reference*
- *Network Programming Reference* for information on the 802.2 APIs

## Network File Transfer for DOS (NFT)

In V5, NFT for DOS uses CHARSETS.DAT as a reference file for international character sets. CHARSETS.DAT is a replacement for all of the V4.*x* *.CHR ASCII files.

For more information, see the *DECnet User's Guide*.

## Network File Transfer for Windows (NFTW)

Note the following for V5 Network File Transfer for Windows:

- V4.*x* NFT functionality is supported with the following exceptions:
  - there is no APPEND feature
  - the trace (or log file) cannot be viewed from inside NFTW
  - the View File Text is not available
- NFTW uses the Remote File Access (RFA) mechanism for file transfers.

For more information, see the NFTW online help.

## USE

Note the following for USE.EXE:

- NetWare file service connections are supported.
- Service names are restricted to 8 characters when using the Microsoft Basic and Enhanced Redirector.
- Connections to V4.*x* servers using the %username syntax are not supported.

For more information, see the *Client Commands Reference*.

## MEMMAN and SAVE

MEMMAN and SAVE now support:

- EMS, XMS, VCPI and DPMI detail and summary information
- Conventional and system memory maps
- Unloading LAN Manager and NetWare drivers
- Unloading device drivers

MEMMAN supports unloading components from upper memory blocks on DOS 5.*x* and 6.*x* configurations when used with DOS=UMB. The memory mark may be loaded low or high and components do not have to occupy contiguous UMBs.

For more information, see the *Client Commands Reference*.

## SHOW

SHOW is a troubleshooting and debugging tool available on the system service in the \DEBUG directory.

SHOW V5 includes:

- Support for PATHWORKS 5.0 components
- Remote diagnostic capabilities. The remote diagnostic support requires that SHOWSERV.EXE be loaded after they have started the network. See the ADVISE, SOLICIT and SHOWSERV help topics for more information on remote debugging
- Online help

# Asynchronous Communication

## Differences between V4.*x* and V5

The following table describes the differences between V4.*x* and V5 asynchronous communication:

| Feature | In V4.*x*... | In V5... |
|---|---|---|
| DECnet support | DNPDCPPC.EXE. | DLLASYNC.EXE with DNP.EXE. |
| EMS support | Not supported | DLLASYNC.EXE uses DNP.EXE for DECnet support and TCPIP.EXE for TCP/IP support.<br>Both TCPIP.EXE and DNP.EXE can be loaded into EMS. |
| Transfer rate under Windows | Limited | No restrictions. DOS and Windows performance are equivalent. |
| Configuration | Netsetup | The Configuration Utility |
| Memory | DNPDCPPC use 59K conventional | Loading DLLASYNC and DNP uses about 65K conventional. By loading DNP into EMS, the pair uses about 37K of conventional memory. |
| SLIP (asynchronous TCP/IP) support | Not supported | SLIP uses DLLASYNC.EXE as the data link and TCPIP.EXE as the transport. |

For more information, see:

- *Client Installation and Configuration Guide*
- *Terminal Emulation Guide*
- *TCP/IP User's Guide*
- *DECnet Network Management Guide*

### Modem operation

In V5, modem operation is set from the Configuration utility by modifying the /M command line switch on DLLASYNC. There are three modes of operation:

- M:0

  This is the default, using Request To Send/Clear To Send (RTS/CTS) flow control. The default satisfies almost all modem users, including the data-leads only configuration.

- MF:1

  Implements full modem control like V4.*x*.

- M:1

  Ignores all modem control signals. Using this setting, the interrupt for modem status register changes is disabled and no modem signals will be performed

### Using asynchronous communication

When using asynchronous communication in V5, note the following:

- With asynchronous DECnet, , you should define the DECnet parameters for a slow medium. For example:

  NCP DEF EXEC CHAR DELAY FACTOR 96

  NCP DEF EXEC CHAR DELAY WEIGHT 2

  In asynchronous communication, 96 is a minimum value for DELAY FACTOR and 2 is a maximum for DELAY WEIGHT.

- If you are using the Enhanced Redirector, there is a `sesstimeout=` line in LANMAN.INI. For slow baud rates, you may need to make this large relative to the baud rate. For example, you made need as much three minutes: `sesstimeout=180`.

## Disk Services

Disk services are supported only if you are upgrading from V4.*x* and used disk services in your V4.*x* environment.

### Local area disk (LAD)

In V5, local area disk (LAD):

- Is implemented as a device driver (LAD.SYS) instead of a TSR (LAD.EXE). LAD.SYS is loaded using the PATHWORKS Driver Loader, LD.EXE.
- No longer provides int 13h interface.

- Now supports a total of 16 devices, which can be used together with LADDRV or LADCDDRV. The user no longer has to make sure that the sum of drives allocated by LADDRV and LADCDDRV is less than that supported by LAD.

For more information on using disk services, see:

- *Client Commands Reference*
- *Client Installation and Configuration Guide*

### LAD driver (LADDRV.SYS)

In V5, the LAD driver (LADDRV.SYS):

- Has a new switch /RECONNECT. With this switch, LADDRV will try to reconnect to the same service in case of a failure in a running service.
- Supports 16 drives.
- Does not run with V4.*x* LAD.EXE.

For more information on using LADDRV.SYS, see:

- *Client Commands Reference*
- *Client Installation and Configuration Guide*

### LAD CD-ROM driver (LADCDDRV.SYS)

In V5, the LAD CD-ROM driver (LADCDDRV.SYS) is unchanged, except that it will not work with V4.*x* LAD.EXE.

For more information on using LADCDDRV.SYS, see:

- *Client Commands Reference*
- *Client Installation and Configuration Guide*

## LAT

### LAT.EXE

In V5, LAT.EXE:

- No longer supports LPT4.
- Has a new switch, /IGNORE. IGNORE allows a parallel printer port to be initialized even if the printer is turned off.
- Defaults to offering one internal SCB. In V4.*x* the default was 0. If the new default causes problems with memory, use the LATCP DEF SCB 0 command to set the default number of SCBs to 0.
- Now defaults to SEARCH "ON" for unknown service solicitation.

- Now accepts incoming connections. This means that a client may connect directly to an LPT or COM port. This is done by using the LATCP DEF COM*n* SLAVE ON command.
- APIs have been expanded so applications may be written to offer LAT services over the network.

For more information on using LAT, see the *Client Commands Reference.*

## LATASYNC

LATASYNC is new for V5. LATASYNC helps serve asynchronous serial devices to the network, for example serial printers. Note the following when using LATASYNC:

- Use the LATCP ADD COMn command to configure LATASYNC. LATASYNC gets its configuration information from DECLAT.DAT.
- You must load LATASYNC after LAT. If you unload LAT, LATASYNC is also unloaded.
- Using LATASYNC with Windows is supported, but if you start Windows while LATASYNC is actively moving data, LATASYNC will probably stop working.
- SETHOST, VT320, and other Windows terminal emulators do not support LATASYNC.
- Kermit, DynaComm, and WinCim support LATASYNC.

For more information on using LAT, see the *Client Commands Reference.*

## LATCOM.SYS

LATCOM.SYS is new to V5. LATCOM.SYS is a device driver that lets you connect to LAT services with a terminal emulator that does not understand the LAT protocol by using the INT14 or COM interface.

With LATCOM, you can connect a logical COM device to a LAT service with the USE COM*n*: servicename command.

▶ To load LATCOM, enter a line similar to the following in the client's CONFIG.SYS:

```
device=c:\pw\latcom.sys
```

For more information on using LAT, see the *Client Commands Reference.*

## LAT Control Program (LATCP)

In V5, LATCP:

- DEFINE commands are supported for wireless networks like Mobitex and ARDIS using DECtransporter. DECtransporter is installed and configured separately by SET commands.
- SET commands take effect immediately. Changes made with SET commands are lost when you restart your network. DEFINE commands make permanent changes that do not take effect until you restart LAT.
- When specifying group codes, use a hyphen (-) to specify a range. For example: `LATCP> SET GROUP CODE 0,2,4-243,255`
- DEFINE/SET SERVER NAME changes the LAT name from LAT_AA00041234 to a character string of 1 to 16 characters.
- New ADD COM and DEFINE COM commands allow addition and control of LAT-served serial printers:
  - DEFINE LPT/COM SLAVE ON causes the port to be offered to other PCs.
  - DEFINE LPT/COM ADVERTISE ON causes port availability to be multicast.
  - DEFINE COM SPEED sets a default baud rate for a serial port.
  - DEFINE COM DATA SIZE sets a default character size for a serial port.
  - DEFINE COM PARITY sets a default parity for a serial port.
  - DEFINE COM XON/XOFF sets this type of flow control for a serial port.
  - DEFINE COM RTS/CTS sets this type of flow control for this serial port.
- REDIRECT COM/LPT sends all data that would have gone to the port to the screen. This is used for troubleshooting.
- ADD SERVICE adds a preferred service to the permanent LAT database by soliciting the service information over the network.
- FLUSH SERVICE TABLE removes all nonpreferred services from the LAT service table.

For more information on using LAT, see the *Client Commands Reference.*

### LAT Services Manager (LATSM)

LATSM is new to V5. You run LATSM using ManageWORKS to manage your local LAT service table and select LAT preferred services.

LATSM lets you:

- Change the LAT service table size
- Add and delete preferred services
- Display the service table
- Listen for new services

For more information on using LAT, see the *Client Commands Reference.*

## MOP Load/Dump Server

In V5, MOP:

- Supports the loading of management files for devices such as a DECNIS or Wanrouter 250.
- You no longer use MOPCONF.EXE to specify the MOP load and dump file names and other information stored in ROUCONFG.DAT. In V5, you use NCP to modify and store that information.
- Includes MOP_CVT.EXE to convert the V4.*x* ROUCONFG.DAT database to a batch file, MOP_CVT.BAT, that contains the equivalent V5 NCP commands. The MOP_CVT.BAT file can be used as an input file when running NCP to define the load/dump information for V5.

## Network Control Program for DOS

V5 includes both DOS and Windows versions of NCP. In V5, NCP:

- Uses the following new database files:
  - PWOBJ.DAT for DECnet network objects
  - PWINACC.DAT for incoming DECnet access data
  - PWENT.DAT for transport stack initialization data
  - PWNODE.DAT and PWLOAD.DAT for node name, address, outgoing access, and load data
  - PWREM.DAT for Remote Adapter Name data

- Supports only the list and define commands for NCP V4.*x* with V5
- Includes X.25 entities for both DECnet and TCP/IP in PWENT.DAT for use with PATHWORKS X.25 for DOS and Windows V5.

For more information, see:

- DECnet management databases in this guide
- NCPW online help
- *DECnet Network Management Guide*

## Schedular (SCH)

In V5 SCH.EXE and SCHK.EXE, you can no longer modify the clock selection with the /H or /S switch.

## EMSLOAD

In V5, EMSLOAD:

- Is not backward compatible; it works only with V5 components.
- Separates the stubs (the portions that remain in conventional memory) for each component. This eliminates the conventional memory overhead for components that are not loaded into EMS. In V4.*x*, EMSLOAD had a single stub for all loadable components. The V4.*x* stub was always loaded into DOS conventional memory.

  The new EMS stub automatically loads into UMB if it is available. Do not LOADHIGH EMSLOAD.EXE, since this will defeat the automatic UMB feature.

## PC DECwindows Motif

The following table describes the differences between V4.*x* and V5 PC DECwindows Motif:

| Feature: | In V4.*x*: | In V5 |
|---|---|---|
| Configuration | DWCONFIG and DWDOS | DWDOS only |
| Configuration file | DWDOS.INI | DWDOS.CFG.<br>You cannot use V4.*x* DWOS.INI files with V5. |
| Start PC DECwindows Motif | Either DWDOS286 or DWDOS386 | DWDOS automatically selects the correct executable for your machine. |

Also note the following for V5 PC DECwindows Motif:

- MIT and OpenLook fonts are included in the FONTS100 and FONTS75 font directories. You no longer have to manually add the font path.
- Remote starting over TCP/IP to OpenVMS hosts requires the REXEC service and no longer uses the Telnet service.
- The X Image Extension is supported on 80386 and 80486SX PCs which have an 80387 math processor (or equivalent) and 80486DX PCs.
- Support for several new video modes has been added.

For more information , see the *PC DECwindows Motif Guide*.

## DNP

The following table describes the changes and enhancements to the DECnet Phase IV implementation in V5:

| Feature | In V4.*x*... | In V5... |
|---|---|---|
| Files | Several different programs, depending on client configuration (for example DNNETH.EXE, DNNDCPLD.EXE, DNNDCPPC.EXE). | A single program, DNP.EXE.<br>DNP.EXE includes support for Token Ring and asynchronous DECnet. |
| Loadable into EMS | Supported. | Supported. |
| Token Ring support | Included in DNNETH.EXE. | Included in DNP.EXE. |
| Asynchronous support | Uses a separate version of DNP. | DNP.EXE includes support for the new "point-to-point" data link interface, which allows special data link drivers, such as DLLASYNC.EXE, to provide data link services over point-to-point links such as async lines, X.25, or ISDN. |
| Databases | See "DECnet management databases" in the Client Migration section of this guide for a description of the differences betweeb the V4.*x* and V5 databases. | |

## Remote File Access (RFA)

RFA (Remote File Access) was added in V5 to provide a protocol and transport independent API for file transfers under Microsoft Windows. The following components use RFA:

- Network File Transfer for Windows (NFTW)
- VT320

For more information, see the *Network Programming Reference*.

## SPAWNER.EXE

In V5, SPAWNER.EXE creates the DECnet object database, PWOBJ.DAT, if it does not exist. In V4.*x*, the object database was created during installation and configuration.

For more information, see the *DECnet User's Guide.*

## Retired Components

The following PATHWORKS components are no longer supported and are not included on the V5 client kit:

- DLL802 driver
- DTR.EXE (Included on the Unsupported disk)

- DTS.EXE (Included on the Unsupported disk)
- LOGON.BAT
- DNPDCPPC.EXE
- LAD.EXE (replaced by LAD.SYS)
- DOS extensions

## MSNET.INI

The following table lists the command no longer supported from MSNET.INI and the replacement function, if provided:

| Command: | Replacement: |
|---|---|
| NET ERROR | NCP SHOW LINE/CIRC COUNTERS |
| NET DEFINE | No replacement |
| NET CLEAR | NCP PURGE NODE nodename. |
| NET INSTALL | No replacement |
| NET START | No replacement |
| NET TEST | NCP LOOP NODE nodename COUNT number LENGTH 512 or PING. |
| NET LOOPBACK. | NCP LOOP LINE CONTROLLER or PING |
| NET LIST | NCP LIST KNOWN NODES or type out your HOSTS file |

## Unsupported disk

The following PATHWORKS components are no longer supported, but are included on the Unsupported disk:

- NDU.EXE
- NPDRV.SYS
- NDDRV.SYS
- TFA.EXE
- TNT.EXE
- TTT.EXE

The Unsupported disk is available from CompuServe, DSNlink (for Digital's service customers), your Digital representative, or DECdirect.

# 5 X.25 Migration

## Overview

PATHWORKS X.25 V5 for DOS and Windows provides enhancements to PATHWORKS V5 for DOS and Windows, including optimized and reduced memory utilization and support of the simultaneous use of both the DECnet and TCP/IP. PATHWORKS X.25 V1 (DOS) works only with the PATHWORKS for DOS software versions V4.1 and V4.1a and only supports DECnet as the transport protocol.

**Note:** You can provide PATHWORKS X.25 V5 capability to four additional PC clients in your Ethernet or Token Ring LAN using the new add-on software, PATHWORKS WAN ACCESS (DOS and Windows) V1.0. PATHWORKS WAN ACCESS lets you connect the four additional clients to PATHWORKS servers and still maintain the X.25 functionality on your PATHWORKS X.25 V5 PCs.

For more information on PATHWORKS WAN ACCESS (DOS and Windows) V1.0 contact your local Digital office.

## Migration

The V5 client Upgrade utility does not support PATHWORKS X.25 (DOS) to PATHWORKS X.25 V5 for DOS and Windows migration.

▶ To upgrade your PATHWORKS X.25 V1 (DOS) clients:

1. Using a networked client, connect to the V5 file service \\server\PWV50.
2. Run PWINSTAL from the client using the PATHWORKS X.25 for DOS and Windows diskettes.

   PWINSTAL merges the PATHWORKS X.25 for V5 DOS and Windows kit on to the V5 file service. You can also install the software locally to your PC's hard disk drive.

3. Configure the client:

   a. Check that PATHWORKS V5 for DOS and Windows V5 and PATHWORKS X.25 V5 for DOS and Windows are installed on the server, or locally on your PC's hard disk drive.

   b. Use the V5 client Configuration utility to configure your client. The Configuration utility copies the PATHWORKS files to your client. You should use a different target directory than the one you used for PATHWORKS X.25 V1.0 (DOS) (DNETX25).

   c. Verify that your configuration is working correctly: If the network connection to your PC is active, stop PATHWORKS V4.*x* with the \DNETX25\STOPNET command. You can then start the network connection using PATHWORKS X.25 for V5 DOS and Windows by using \PW\STARTNET.

   d. If PATHWORKS X25 V1.0 (DOS) was configured to start automatically at PC boot time, remove the command \DNETX25\STARTNET from your AUTOEXEC.BAT file.

   e. Delete the old product version from the \DNETX25 directory.

# 6 Client Programming Changes

## Overview

PATHWORKS V5 introduces a number of changes requiring the programmer's attention. For V5, note the following:

- Programming support is now included in a separately orderable kit, the PATHWORKS V5 Programmer's Kit.
- The PATHWORKS *Network Programming Reference* has been significantly revised. The manual now includes parallel emphasis of both the DECnet and TCP/IP transports, coverage of NT socket usage, and documentation of USELIB. Documentation of task-to-task programming is no longer included in the manual.
- Replacement DOS examples have been made for the socket library. Most of the previous V4.*x* samples were ported to V5 with the exception of the socket Windows-based samples.
- For TCP/IP applications, the V5 socket library is not source-compatible with the previous socket library.

  A planned future release will improve the TCP/IP source compatibility with the previous socket library. The future release of the socket library will have more details on how to acheive limited source compatibility.
- DECnet applications should be able to be recompiled and relinked without problems, although the library names have been changed. Also, DECnet applications will continue to work even if they are not recompiled. Applications will not be able to access PW*.DAT unless they are recompiled and relinked.
- The decnet() function is missing from the V5 socket library. This function will be added in the next release. If your DECnet applications use this function, add the following line your application and recompile:

  ```
  #define        decnet(iocb) SktSubmitIOCB(0,iocb)
  ```

## Winsock library support

PATHWORKS V5 provides a Winsock library. This library conforms to version 1.1 of the Winsock specification, and permits programmers to write Windows applications over TCP/IP. Digital has tested it with most of the existing public domain Winsock applications, like MOSAIC, CELLO, TRUMPET, QUTNET, WORMHOLE, FINGER, WS_PING, and WS_FTP.

## Terminal Access Library changes

In V5, the Terminal Access Library (TRMNLAXS.DLL):

- Includes the following new calls:
  - GetService( LPSTR lpServiceName, BYTE bType ). GetService supersedes GetLATService.
  - InquireServices( BYTE bType ). GetService supersedes InquireLATServices.
- TRMNLAXS now dynamically allocates SCBs. In V4.*x*, for each LAT session you wanted to access from Windows, you had to add an SCB for that session using LATCP.

  TRMNLAXS will continue to use those pre-allocated SCBs, but TRMNLAXS will dynamically allocate enough conventional memory for any new SCBs it needs.
- ReadData and WriteData will use the new CTERM 5.0's block mode read and write if the character count is greater than 1 byte.
- V5 TRMNLAXS will not work with V4.*x* LAT, CTERM, and TELNET.
- TRMNLAXS and the virtual terminal transports now support block sizes larger than 255, but because of limits in the protocols used and because these are blocking calls (no callbacks), a block size of 255 is recommended.

# 7 Server Migration

## Overview

In V5, the server integrates the Microsoft LAN Manager Version 2.2 network operating system with the OpenVMS operating system. This integration changes both how the server operates in the network and how clients access resources on the server. LAN Manager also changes how remote boot clients work.

This section describes:

- The differences between the V4.*x* and V5 PATHWORKS server software
- How those differences will impact how you plan for and set up your PATHWORKS V5 network
- Information you will need to plan your migration to V5 without interrupting service to your users

The following table lists the information you should review and understand before reading this section:

| See... | For... |
|---|---|
| Sample Migration Process in this guide | A step-by-step example of migrating a sample V4.*x* network to V5 |
| *Server Installation and Upgrade Guide* | Instructions on how to:<br>• Install PATHWORKS for OpenVMS (LAN Manager)<br>• Upgrade existing databases of users, groups, services, and access rights to work with V5 |
| *Server Administrators Guide* | Information on LAN Manager network management and security features used in PATHWORKS V5. |

**What about Remote Boot Services?**

This section does not include examples of upgrading V4.*x* Remote Boot services.

For more information and examples, see Remote Boot Migration in this guide.

# Before You Upgrade

The following sections describe the differences between the V4.*x* and the V5 server. The information in these sections will help you plan the upgrade to V5.

## Software requirements

The following table describes supported VAX and AXP software for V4.*x* and V5:

| V4.*x* | V5 |
|---|---|
| OpenVMS V5.3 or higher | OpenVMS VAX V5.5-2 or V6.0 |
| OpenVMS Alpha AXP, V1.5 | OpenVMS Alpha AXP, V1.5 |

## What clients are supported by a V5 server?

The following tables describes the differences in client support between V4.*x* and V5 servers:

| V4.*x* Server | V5 Server |
|---|---|

| | |
|---|---|
| • PATHWORKS for DOS V4.*x*<br>• PATHWORKS for OS/2 V2.*x* or higher | • PATHWORKS for DOS and Windows V5 or higher<br>• PATHWORKS for DOS V4.*x*<br>• PATHWORKS for OS/2 V2.*x* or higher<br>• Windows NT workstations V3.1<br> See the *Server Release Notes* for more information.<br>• Workgroups for Windows V3.1 or V3.11 clients<br> See the *Server Release Notes* for more information.<br>• Native LAN Manager V2.2 client for DOS, Windows, and OS/2 |

## Disk space requirements

The following table lists the disk space requirements for V4.*x* and V5:

| | V5: | |
|---|---|---|
| **V4.*x*** | **OpenVMS VAX** | **OpenVMS AXP** |
| 6000 blocks | 42,000 blocks | 58,000 blocks |

You can run the V4.*x* server while you install, configure, and upgrade to V5.

**Note:**

You cannot run the V4.*x* and V5 server at the same time. Starting the V5 server automatically stops the V4.*x* server.

Do not delete V4.*x* until you are satisfied with the implementation of your V5 network.

## Optional software requirements

V5 offers optional software not available with V4.*x*. The following table lists the disk space requirements for each option:

| | Disk space required on system disk | |
|---|---|---|
| **Option** | **OpenVMS VAX** | **OpenVMS Alpha AXP** |
| eXtended Qio Processor Plus (XQP+) | 1000 blocks | N/A |
| DECprint Supervisor | 4500 blocks | 5000 blocks |

### Planning disk space for V5 client software

If you plan to install the V5 client software on your V5 server, you must plan for the disk space used by the client software. The following table describes the differences in disk space need for installation:

| V4.*x* | V5 |
|---|---|
| 35,000 blocks | 102,000 blocks for a complete installation. The disk space requirements may be less if you tailor the V5 client installation.<br> For more information, see the *Client Installation and Configuration Guide*. |

You will be using the V4.*x* client file service while you install and configure your V5 clients. Do not delete the V4.*x* file service until you are satisfied with the implementation of your V5 network.

## Planning the LAN Manager Network

This section describes how the integration of LAN Manager affects:

- The organization of your network
- What role each server will play in your network.
- Security

### Organizing your network

The following table describes how V4.*x* and V5 servers participate in a PATHWORKS network:

| Differences | In V4.*x*... | In V5... |
|---|---|---|
| How the server functions in the network | Each server participates in the network as an independent (standalone) provider of services. Each V4.*x* server maintains its own database of users, based on the OpenVMS UAF. | You organize related users, computers, and resources into domains. Within a domain, a server can act as a:<br>• primary domain controller, storing the master copy of a distributed user database<br>• a backup domain controller, which keeps a copy of the distributed user database<br>• member server<br>• standalone server, having a unique database of LAN Manager users and groups |
| How clients access network services | Clients connect to services on a server-by-server basis. | Clients log on to the domain rather than a single server, simplifying client access to network services. Clients still access services on individual servers. |

## Choosing the server's role in a domain

For each server you plan to upgrade to V5, you must decide what role that server will play in your network. The following table describes those roles:

| Domain role | Description | Guidelines |
|---|---|---|
| Primary domain controller(PDC) | Each domain running logon validation must have one server that functions as the primary domain controller. This server has the domain's master copy of the user accounts (UAS) database. The PDC can validate any logon request in the domain.<br>Any changes to the domain's logical UAS must be made here. When, a change is made to the domain-wide UAS, the PDC notifies the other servers in the domain that a change has been made and they retrieve copies of the UAS from the PDC(except standalone servers). | There can be only one primary domain controller in a domain. You may already have an existing primary domain controller in your V4.*x* network (for example, using an OS/2 or NTAS server) If a primary domain controller does not exist, upgrade the V4.*x* server you plan to use as the PDC first. |

| | | |
|---|---|---|
| Backup domain controller (BDC) | A backup domain controller retrieves copies of the domain UAS from the PDC. A BDC uses its copy of the UAS to do logon validation and share connects. | There can be many BDCs in a domain. Like the primary domain controller, a backup controller can validate logon requests. Making servers backup domain controllers:<br>• Improves performance and reliability of your domain because the load of logon validation can be spread among several servers.<br>• Logon validation in the domain can continue even if the primary controller is unavailable.<br>• Lets you "promote" them to primary domain controllers when the need arises |
| Domain member (DM) | A domain member receives a copy of the domain UAS from the PDC. A DM uses its copy of the domain UAS to do share connects only. It does not validate logon requests. | There can be many DMs in a domain. Since a member server does not spend time processing logon requests, this role can be a good choice for servers that have heavy work loads. |
| Standalone Server (SS) | A standalone server belongs to the domain but does not participate in the UAS replication process. It maintains its own UAS and uses it for share connects only. An SS does not do logon validation. | There can be many standalone servers in a domain. Standalone servers can run in backward compatibility mode. |

For more information , see the *Server Administrators Guide*.

**Interoperating in an NTAS network:**

If your domain contains a Windows NT Advanced Server (NTAS), it must be the primary domain controller.

For more information, see the Interoperating in an NTAS Network section of the *Server Release Note*s.

### Planning the domain

Use the following guidelines when planning your domains:

- If a primary domain controller does not already exist (for example, you have an existing OS/2 or NTAS domain controller), then the first server you upgrade from V4.*x* to V5 in each domain must be the server you plan to be the primary domain controller for that domain.
- When creating groups to manage users, you are limited to 256 groups per domain, including the special groups (ADMINS, USERS, GUESTS, SERVERS) reserved on the LAN Manager servers.
- Every backup and member server uses a link to the primary domain controller. This counts against the number of clients that the primary domain controller can support.
- Standalone servers have no impact on the domain because they do not participate in UAS replication.
- There is no optimum ratio of servers to clients; the best ratio depends on the demands the users make on the network. Be sure to allow for future growth of the network.
- When setting up shared resources, estimate the demand for these resources, and then think about how to spread them around the network to distribute the work load among servers.

## Planning for LAN Manager Security

In previous releases of PATHWORKS server software, security was based on the OpenVMS operating system. In V5, security is based on the LAN Manager V2.2 security scheme. However, PATHWORKS V5 server software enhances LAN Manager security by letting you incorporate OpenVMS security features. See How to decide between security models later in this section.

When planning to upgrade to V5, you must consider the changes in PATHWORKS security and decide how to enforce network security. LAN Manager security provides two security models, share-level security and user-level security, that let you control access to shared resources.

For each V5 server, you must decide on which LAN Manager security model to implement. When you install and configure V5 on a server, the default setting is user-level security. You must explicitly choose share-level security during the configuration for it to take effect.

A server (including VMScluster members) must run one type of security. It cannot run both at the same time. However, both user-level and share-level security can coexist on the same LAN.

For more information, see the *Server Administrators Guide*.

## Differences between V4.*x* and V5 security

The following table describes the main differences between V4.*x* and V5 security:

| Feature | In V4.*x*... | In V5.. |
|---|---|---|
| Security model | Determining who had access to shared resources and the type of access allowed is controlled by user context, OpenVMS UIC-based protection, and Access Control Lists (ACLs) on that resource. | There are three security models:<br>• User-level security: security is based on a password associated with a LAN Manager user account.<br>• Share-level security: security is based on a password associated with each shared resource.<br>• PATHWORKS security: provides user-level security mapped to OpenVMS security. |
| User authentication | Validation is based on the OpenVMS User Authorization File (UAF). | Validation is based on the Unified Account Subsystem (UAS).<br>The UAS can be distributed among servers in a domain with LAN Manager Domain services. |
| User accounts | Stored in OpenVMS user accounts | Stored in LAN Manager User Accounts database. Each LAN Manager account is mapped to an OpenVMS account. |

## How to decide between security models

There are two types of LAN Manager security:

- Share-level
- User-level

  With User-level security you can optionally choose additional PATHWORKS security.

  PATHWORKS security maps user-level security to OpenVMS security using the following options:

  — LAN Manager-only

  — LAN Manager and OpenVMS

  — LAN Manager and Creator

You must decide which security model to use on each V4.*x* server you upgrade to V5. The following tables describes when to use each security model:

| Description | When to use |
|---|---|
| **Share-level security** | |
| Share-level security bases its control on a password assigned to each resource | • You need to manage resources on a single server, and you can set the same permissions to these resources for all users.<br>• User-specific logon validation is not important.<br>• Sharing password information is not a concern |
| **User-level security** | |
| User-level security bases its control on a password associated with each user | • You need to manage multiple resources in a multiserver network, and you need to tailor access to these resources for individual users.<br>• You want LAN Manager to validate each user's attempt to log on to the network.<br>• You want to customize security to be similar to V4.*x* security.<br>• You have multiple resources in a multi-NOS environment including:<br>— OpenVMS interactive users<br>— PATHWORKS for OpenVMS (Macintosh)<br>— PATHWORKS for OpenVMS (NetWare) |
| **LAN Manager-Only Security (User-level)** | |
| Only LAN Manager security is enforced, the server acts as a native LAN Manager server. OpenVMS checks are bypassed. No OpenVMS account is required, only a PATHWORKS account. | When there is little or no file sharing between LAN Manager and OpenVMS users, for example on server with no interactive users. LAN Manager-Only Security is the recommended PATHWORKS security model.<br>LAN Manager-only mode uses a "many-to-one" mapping by associating the default OpenVMS accounts created by the V5 installation:<br>• PWRK$DEFAULT — The default account used if no OpenVMS account has been specifically associated with the client's server-based LAN Manager account.<br>• PWRK$GUEST — The account used if the client requesting access to a server resource does not have a UAS account on that server.<br>If you are planning for a server dedicated to LAN Manager clients and no other platforms (such as NetWare, AppleShare, and interactive OpenVMS users), use this mode. |

| LAN Manager and OpenVMS Security (User-level) | |
|---|---|
| Both LAN Manager security and OpenVMS security are enforced. This provides the highest level of security but requires additional management. | On a server that supports both LAN Manager and OpenVMS users.<br>This mode offers the greatest security when sharing resources with other platforms, such as NetWare, AppleShare, and interactive OpenVMS users. |
| **LAN Manager and Creator Security (User-level)** | |
| OpenVMS security is enforced only for files not created by the V5 server. Files created by a PATHWORKS user are subject to LAN Manager security only, files created with OpenVMS or PATHWORKS V4.*x* are subject to both LAN Manager and OpenVMS security. This mode requires additional OpenVMS management. | On servers where there is only limited sharing between LAN Manager and OpenVMS users.<br>This mode enables faster access to files created by PATHWORKS while ensuring checks on files created by OpenVMS user accounts. |

Note the following when choosing the security mode:

- Servers can run either user-level or share-level security, but not both. Both types of security can exist on the same network, but all servers participating in a VMScluster environment must run the same type of security.
- The level of LAN Manager and OpenVMS security integration that you select can affect how resources are shared among PATHWORKS users. If you select LAN Manager and OpenVMS security, a resource created by one PATHWORKS user may not necessarily be accessible to other PATHWORKS users.

  For example, if LAN Manager-only security checks allow access but the user's LAN Manager account maps to an OpenVMS account that does not share OpenVMS access with the resource creator, the LAN Manager and OpenVMS security check will fail and resource access will be denied.
- LAN Manager and OpenVMS security complies with both LAN Manager and OpenVMS file access security mechanisms. If you do not need this level of file access checking, you can use the LAN Manager-only or LAN Manager and Creator security mode.

For more information, see the PATHWORKS Security section of Chapter 3 in the *Server Administrator's Guide*.

## Client access with user-level security

With user-level security, access to a resource in a domain is a two-step process:

| Step | | Action |
|---|---|---|
| **1**. | Domain logon | • The user logs on to a domain by providing the domain name, user name, and password.<br>• A primary domain controller or a backup domain controller running Netlogon looks up the client information in the UAS.<br>**Username and password match:**<br>If there is a direct match, the server returns a message saying that the user has been "successfully validated." No resource connections have been granted at this time.<br>**Correct username, incorrect password:**<br>If the user name exists and password lookup failed, the logon fails and any attempt to connect to a LAN Manager server is rejected with an "access denied"<br>**Username does not exist:**<br>If the username does not exist in the UAS, then the connection is logged on as STANDALONE. Any connections made to LAN Manager services will be made through GUEST access, if enabled on that server. |
| **2.** | Resource connection | When a client tries to make a connection to a share:<br>• The redirector passes the domain user name and password from the client to the server.<br>• The server verifies the information in the UAS.<br>• The server provides a connection with the proper access rights. |

The LAN Manager user name/password credentials presented to the server are either:

- Valid: the user name exists in the server's database with that password
- Invalid: the user name exists in the server's database but the password does not match and the connection is rejected
- Unknown: the user name does not exist in the server's database but the connection is allowed as GUEST.

# VMScluster Planning and Support

## Differences between V4.*x* and V5

The following table describes the differences in VMScluster support for V4.*x* and V5:

| In V4.*x*... | In V5... |
|---|---|
| • File sharing between VMScluster members is permitted, which can result in decreased performance.<br>• Each VMScluster member can run the PATHWORKS server software.<br>• Using the VMScluster alias from the client is not recommended.<br>• No load balancing algorithms are provided.<br>• VMScluster alias is supported only on DECnet.<br>• Multiple UAFs in a VMScluster are supported.<br>• Node-specific file server service databases are supported. | • Performance of each VMScluster member approaches that of a single, nonclustered node.<br>• The number of nodes in a VMScluster adds to the capacity of your PATHWORKS environment without degrading performance.<br>• The PATHWORKS VMScluster alias allows clients to connect to the VMScluster as if it were a single server.<br>• VMScluster members share LAN Manager domain responsibilities.<br>• When using a PATHWORKS alias, new load balancing algorithms balance client connections across VMScluster members.<br>• PATHWORKS cluster alias is transport-independent.<br>• Maximum cluster members running PATHWORKS is thirty-one.<br>• Single UAF configuration only. |

For more information, see:

- Chapter 8, PATHWORKS in a VMScluster environment, in the *Server Administrator's Guide*
- *Server Installation and Upgrade Guide*

## LAN Manager support

PATHWORKS VMScluster support in a LAN Manager environment.

| LAN Manager feature | PATHWORKS VMScluster support |
|---|---|

| | |
|---|---|
| Domain roles and failover | • All PATHWORKS servers participating in a VMScluster system must be members of a single domain.<br>• Within the domain, all servers running in a VMScluster must be defined as either a primary domain controller, a backup domain controller, member server, or standalone server. |

| | |
|---|---|
| Domain failover | • Since all VMScluster nodes assume the same role in the domain, if one member of the VMScluster fails, one of the other nodes assumes the domain role.<br>• Server authentication is done using the PATHWORKS cluster alias. |
| UAS replication | VMScluster members share one UAS file. |
| Security | The security level must be the same for all nodes in the VMScluster. |
| Share database | VMScluster members share one share database |
| Connection support | VMScluster members respond to the PATHWORKS VMScluster alias as a server name, as well as individual nodes. |

## What Are the Basic Steps?

The following table describes the basic steps in upgrading a V4.*x* server to V5.

| Step | Action |
|---|---|
| **1.** Prepare for installation. | Make sure:<br>• You have the required hardware and software<br>• You back up the OpenVMS system<br>• You have enough disk space to install V5 |
| **2.** Install the V5 server software. | Start the installation procedure and respond to installation prompts.<br>**VMScluster planning**<br>• For heterogeneous VMScluster systems, you must install and PATHWORKS V5 on the system disk of each server node that will participate in the VMScluster environment.<br>• For homogeneous VMScluster systems, you install PATHWORKS V5 once. |
| **3.** Install optional software | Install the eXtended Qio Processor Plus (optional).<br>Install the DECprint Supervisor (optional). |

| | |
|---|---|
| **4.** Configure the V5 software | After you install the server, you must run PWRK$CONFIG before you can start the server. PWRK$CONFIG:<br>• Is installed by the installation procedure<br>• Creates the LAN Manager user accounts and share database<br>• Gives you the option to enter the Upgrade utility to perform the upgrade procedure if a previous version of the server is installed<br>• Gives you the option to start the server |
| | **VMScluster planning**<br>On each VMScluster member that you want to be a PATHWORKS server, run PWRK$CONFIG. When running PWRK$CONFIG in a VMScluster, you are prompted for the PATHWORKS VMScluster alias |
| **5.** Create upgrade reports (optional) | An upgrade report is a file that you create with the Upgrade procedure. An upgrade report:<br>• Lists elements of the current server database (users, groups, services) that the upgrade procedure will and will not upgrade automatically<br>• Points out aspects of the current server database that do not comply with LAN Manager standards (for example, file service names that exceed LAN Manager limits)<br>You can edit an upgrade report to change information and correct conflicts. You can then use the report as an input data file during the upgrade procedure to ensure a smooth and complete upgrade. Digital recommends always creating upgrade reports. |
| **6.** Upgrade | During upgrade, you:<br>• Create upgrade reports<br>• Upgrade users and groups<br>• Upgrade file and print services<br>• Upgrade security for file shares<br>• Delete temporary files<br>• Upgrade security on OpenVMS directories, subdirectories, and files (optional).<br>• Change the server's role in the domain and merge the local server's users and groups databases with those of the primary domain controller. |

| | |
|---|---|
| **7.** Start the server | You can start the V5 server:<br>• During the installation procedure<br>• Manually from the command line<br>• Automatically each time you boot<br><br>**VMScluster planning**<br>When installing V5 on multiple members of the same VMScluster, use the SYSMAN utility to start the server manually on all VMScluster members |

Depending on how you plan your upgrade, you can complete the steps in phases. For example, you can install the V5 software but not start it. By doing this, you can continue to run the V4.*x* server while creating the upgrade reports needed to carefully plan the upgrade to V5.

For a more information, see

- *Server Installation and Upgrade Guide*
- Sample Migration Process in this guide for a migration example, and how each step below might fit into your overall migration plans

## Security Migration

The server Upgrade utility provides two security upgrade procedures:

| Procedure | Run from... | Description |
|---|---|---|
| File and print services security upgrade | The Upgrade utility, as part of a complete upgrade or custom upgrade option | Upgrades the following:<br>• RMS protection and OpenVMS ACLs applied only to V4.*x* common and personal services<br>• V4.*x* access records associated with any file or file service type |
| Additional security upgrade | The Additional Options menu | Upgrades RMS protection, applied to OpenVMS directories not offered as V4.*x* file services |

The following table describes the effect of the upgrade on security:

| For the V4.*x* security feature... | The V5 Upgrade procedure... |
|---|---|
| RMS protection | • Determines the most common protection for Owner, Group, and World categories associated with files and directories<br>• Adds a LAN Manager ACL to the directory as similar as possible to V4.*x* RMS protection<br>• Adds a separate LAN Manager ACL for all files in the directory that do not share the common protections, or that have a different owner than the parent directory |
| OpenVMS ACLs | Adds LAN Manager ACLs are added to the beginning of existing OpenVMS ACLs already applied to file services. |

## How permissions map

When you upgrade V4.*x* file and print services to V5 LAN Manager shares, the OpenVMS ACL or RMS protections map to LAN Manager permissions. The following table shows that mapping:

| Permission | Description | Equivalent OpenVMS file attribute |
|---|---|---|
| **File shares** | | |
| R (Read) | Users can read and copy files, run programs, and change directories. | READ |
| W(Write) | Users can write the contents and change file attributes. | WRITE |
| C (Create) | Users can create files and subdirectories within a shared directory. | WRITE |
| D (Delete) | Users can delete files and subdirectories within the shared directory. | DELETE |
| X (Execute) | Users can run the file but not read or copy it.<br>OS/2 and MS-DOS version 5 or later recognize X permission. | EXECUTE |
| A (Attribute) | Users can change file attributes. | WRITE |
| P (Permission) | Users can change file permissions. | WRITE |

| Printer shares | | |
|---|---|---|
| Y (Yes) | All permissions. | READ, WRITE, DELETE, EXECUTE |
| N (No) | Users have no access. | -- |

# File Service Migration

In V5, the process of making server resources, such as disk drives and directories, available to users is called sharing. The server Upgrade procedure makes V4.*x* file services into LAN Manager shares by assigning each file service a share name.

## Differences between V4.*x* file services and V5 shared directories

The following table describes the differences between V4.*x* file services and V5 shared directories:

| Feature | In V4.*x*... | In V5... |
|---|---|---|
| Creating and managing file services/shares | You use PCSA Manager. | Creating and managing shared directories can be done through the following:<br>• On a V5 client running the Enhanced Redirector using ManageWORKS<br>• ADMIN/PATHWORKS<br>• Command Line Net interface |
| Creating "personal" services/shares | A normal OpenVMS user account was automatically available as a "personal" file service. | When you upgrade, V4.*x* OpenVMS PATHWORKS accounts are automatically given LAN Manager accounts. For new OpenVMS accounts, you:<br>**1.** manually create a corresponding LAN Manager account, add a share, and grant access to the user.<br>**2.** Use ADMIN/PATHWORKS to create the LAN Manager user and mapped OpenVMS account. |

| | | |
|---|---|---|
| Enforcing security | You use OpenVMS UIC-based protection and ACLs. | Sharing is controlled by the LAN Manager security model used. |
| Sharing resources | Files services are listed in the PCFS database. | File services are called shares and are stored in the sharefile. |
| | File service names can be up to 32 characters. | File share names are limited to 8.3 characters for clients using the Enhanced Redirector. |
| | | Clients using the Digital Basic Redirector can still use names up to 32 characters in length. |

## PATHWORKS File System (PFS)

In V5, the PATHWORKS File System (PFS) provides file access on the V5 server. PFS provides familiar open, read, write, and close operations, as well as file attributes, directory and file functions (copy, rename, etc.), and file protection.

PFS supports two alternate file systems:

- ODS-2 (OpenVMS file-11 on-disk structure) for storage and access of files from both OpenVMS and PATHWORKS clients. For example, all V4.*x* file services upgraded to V5 shares are available through ODS-2.
- FAT (DOS file allocation table structure) to store DOS files not needing access by OpenVMS users. The FAT file system is also used to migrate V4.*x* disk services to V5 file shares.

The following table describes the difference between ODS-2 and FAT:

| Feature | ODS-2 | FAT |
|---|---|---|
| Security | Based on LAN Manager security. | Based on LAN Manager security file permission. |
| Management | Managed as LAN Manager shares. | To manager FAT files:<br>• Use ADMIN/PATHWORKS on the local node to create and mount FAT files<br>• Once a FAT file is mounted, you manage it as any other LAN Manager share.<br>• Use PCDISK to access and maintain the contents of the file system only when FAT file is dismounted. |
| Backup | Incremental backup with OpenVMS. | FAT files backed up as single file. |

| | | |
|---|---|---|
| Advantages | • Supports all RMS file formats for read access<br>• Accessible to both PATHWORKS and OpenVMS interactive users.<br><br>**XQP+**<br>An eXtended QIO Processor (XQP+) is supplied with V5 to enhance ODS-2 file performance.<br> For more information, see the *Server Installation and Upgrade Guide*. | FAT files offer:<br>• High performance for directory and file operations<br>• A solution for V4.*x* environments that used disk services that includes<br>— WAN access<br>— simultaneous reads and writes by multiple users<br>— multiple transports<br>• improved performance |
| Disadvantages | Included overhead in the DOS-OpenVMS file mapping. ODS-2 performance can be increased by installing the XQP+ processor. | FAT files:<br>• Do not provide the same degree of interoperability as ODS-2 files. For example, FAT container files are not accessible from Macintosh servers or clients.<br>• Are not accessible by OpenVMS users |

## File system support

The following table indicates the level of file system support according to Client/Server configuration for:

- ODS-2 files
- LAD and LASTport remote boot disk dervices
- FAT container files

| When the server is ▶ | V4.*x* | V4.*x* | V5 | V5 |
|---|---|---|---|---|
| and the client is ▶ | V4.*x* | V5 | V5 | V4.*x* |
| And the file system is ▼ | | | | |
| ODS-2 | Supported | Supported | Supported | Supported |
| FAT container files | Not supported | Not supported | Supported | Supported |
| V4.*x* disk services | Supported | Supported | Supported only if the OpenVMS server was upgraded from V4.*x* | Supported only if the OpenVMS server was upgraded from V4.*x* |
| LAD Remote Boot | Supported | Not supported | Not supported | Supported only if the OpenVMS server was upgraded from V4.*x* |

## Upgrading OpenVMS directories

In V4.*x*, clients could connect to some OpenVMS that were not file services by:

- Using the /SETDIR qualifier with the USE command
- Connecting directly to OpenVMS directories
- Connecting to an OpenVMS UAF logon directory

These types of connections are not supported by the V5 server, but your clients may still need access to those directories. Because these directories are not V4.*x* file services, the server Upgrade will not automatically create LAN Manager shares for them.

▶ To provide access to these directories:

1. Create a LAN Manager shared directory associated with that directory.
2. Set LAN Manager permissions for those directories.

**Creating new V4.*x* file services**

If you create a V4.*x* file service for the OpenVMS directory and properly set up access permission before running the server upgrade utility, the upgrade will automatically creates LAN Manager shared directories and protection for those services.

3. Remove all commands using these formats from your client batch files and replace them with connections to the newly created share.

For more information, see:

- *Server Installation and Upgrade Guide* for information on upgrading OpenVMS security.
- *Server Administration Guide* for information on creating a LAN Manager share.

### SETDIR Example

In V4.*x*, clients could connect to a V4.*x* server using an OpenVMS user name and password and then change to another directory not offered as a V4.*x* file service with /SETDIR. For example,

1. A V4.*x* user (USER1) connects to the V4.*x* server MERZ using:

   ```
   USE ?: \\MERZ\USER1%USER1 *
   ```

2. Once the connection is made, USER1 changes the default directory to the OpenVMS directory DUA1:[REVIEWS.V30] using /SETDIR:

   ```
   USE G: DUA1:[REVIEWS.V30] /SETDIR
   ```

In order for clients (either V4.*x* and V5) to connect to MERZ::DUA1:[REVIEWS.V30], you must:

1. Create a share called REVIEWV3.
2. Make sure a share is created for USER1.
3. Grant USER1 LAN Manager account the appropriate access.

After perfoming a net logon as USER1, the client can now connect to the new service using:

```
USE ?: \\MERZ\REVIEWV3
```

## Print Service Migration

In V5, the process of making server resources, such as printers and print queues, available to users is called sharing. The server Upgrade procedure makes V4.*x* print services into LAN Manager shares by assigning each print service a share name.

### Differences between V4.*x* and V5

The following table describes the differences between V4.*x* print services and V5 shared printers:

| Feature | In V4.*x*... | In V5... |
|---|---|---|
| Creating and managing server-based queues | You use PCSA Manager | You create and manage print queues with the following:<br>• On a V5 client running the Enhanced Redirector using ManageWORKS.<br>• ADMIN/PATHWORKS<br>• Command Line Net interface |
| Enforcing security | You use OpenVMS UIC-based protection and ACLs. | Sharing is controlled by the LAN Manager security model used. |
| Managing special formatting | You control formatting from OpenVMS by modules in the printer's device control library using PCSA Manager | You control formatting from OpenVMS by modules in the printer's device control library using PCSA Manager.<br>You use DECprint Supervisor for OpenVMS (DCPS) to set up and manage third-party PostScript printers. |
| Using service names | Service names can be up to 32 characters. | Printer share names are limited to 12 characters (8.3 format) for clients using the Enhanced Redirector.<br>Clients using the Digital Basic Redirector can still use names up to 32 characters. |

**Note:** In V4.*x*, OpenVMS print queues were automatically available as print services. With V5, users cannot access an OpenVMS print queue that is not defined as a LAN Manager print share.

The server Upgrade procedure converts OpenVMS print queues to LAN Manager shares. For queues not upgraded, or for new queues, you must manually create a LAN Manager share for that queue.

## Setting-up PostScript printers

With V5, you use DECprint Supervisor for OpenVMS (DCPS) software to create the OpenVMS PostScript queues. Once the queue is created, you then can use PATHWORKS to create the LAN Manager print share for that queue.

For more information, see:

- *DECprint Supervisor for OpenVMS Software Installation Guide*
- *DECprint Supervisor for OpenVMS System Manager's Guide*

# PATHWORKS User and Group Migration

## Differences between V4.*x* and V5 users

### Users

The following tables describes the differences between V4.*x* and V5 PATHWORKS users:

| In V4.*x*... | In V5... |
|---|---|
| • Users are listed in the OpenVMS UAF database on each V4.*x* server where the accounts exist.<br>• User names can be up to 32 characters.<br>• PCFS$USER is associated with the account created by PATHWORKS. | • Users are listed in the LAN Manager UAS on the primary domain controller or the UAS of a standalone server.<br>• User names are limited to 20 characters |

The server Upgrade utility automatically creates a LAN Manager account for the OpenVMS accounts on the V4.*x* server:

- If the account has the PCFS$USER identifier
- If the account belongs to a PATHWORKS group
- If the the user's default directory contains one or more files with a DOS ACE (a file created by a DOS application)

### Groups

The following tables describes the differences between V4.*x* and V5 groups:

| In V4.*x*... | In V5... |
|---|---|
| • OpenVMS UIC identifiers and resources identifiers are listed on each V4.*x* server where the group and V4.*x* server database exist<br>• Group names can be up to 32 characters | • Users are listed in the LAN Manager UAS on the primary domain controller<br>• Group names are limited to 20 characters. |

## User and Group name conflicts

During the upgrade of each V4.*x* server in your network, a local UAS is created. The upgrade procedure then creates LAN Manager users and groups based on V4.*x* user and groups.

When you are upgrading, you can choose to cross-reference an existing primary domain controller to identify user and group name conflicts.

When you are ready to join that server to the domain, you can use the UAS merge procedure to merge the standalone UAS with the domain-wide UAS.

During this merge, local users and groups will be merged with the UAS on the primary domain controller when the user or group names do not exist on the primary domain controller

---

**Note:** Since V4.*x* users and groups were specific to an individual server, the same user name or group name could exist on multiple servers in your V4.*x* network. In V5, the user now logs on to the entire domain. This means that those identical names on separate servers may pose a potential conflict and access problem.

---

**Example:**

Under V4.*x*, you have user JOEBOB on server MERZ and user JOEBOB on server DADA. By upgrading the two servers to V5 and not changing the user names, you would merge the two user into one user on the primary domain controller.

If the duplicate user name on the separate servers is the same user, then no conflict exists. If the user names represent two unique users, you can use the Users reports on each server to assign different user names to those users, say JOEBOB1 and JOEBOB2.

## User access with /SETDIR

Any users who connect to services not created by V4.*x* and do not use V4.*x* logon may not meet the criteria set by the Upgrade utility for PATHWORKS users and may be commented out on the Users report.

▶ To make sure all valid V4.*x* users are upgraded to V5 LAN Manager users:

1. Create the Users report.
2. Review how each user access services in your V4.*x* network.
3. For valid V4.*x* users not automatically upgraded, remove the comment character (!) from in front of the user name.
4. Use the Upgrade Users report as input to the server Upgrade utility.

For more information, see:

- SETDIR example in this guide for more information on /SETDIR
- *Server Installation and Upgrade Guide*

## LAN Manager 256 group restriction

You are limited to 256 groups per domain (including the four groups reserved by LAN Manager: ADMINS, USERS, GUESTS, SERVERS).

You should run the Upgrade Groups report to list all the groups on the V4.*x* server for which the server Upgrade utility will automatically create LAN Manager groups. The server Upgrade utility automatically creates LAN Manager groups for:

- PATHWORKS V4.*x* groups
- Any OpenVMS UIC group and OpenVMS resource identifier that includes at least one PATHWORKS user.

If you exceed the 256 group limit, consider the following strategies:

- Merge existing groups
- Review the use of OpenVMS identifiers
- Create a new domain

These strategies are explained in the following sections.

### Merge existing groups

You may find you have the same users in multiple groups, or that some of the proposed LAN Manager groups are based on PATHWORKS groups that you no longer need.

By using the Upgrade Groups report as input for the Upgrade utility, you can:

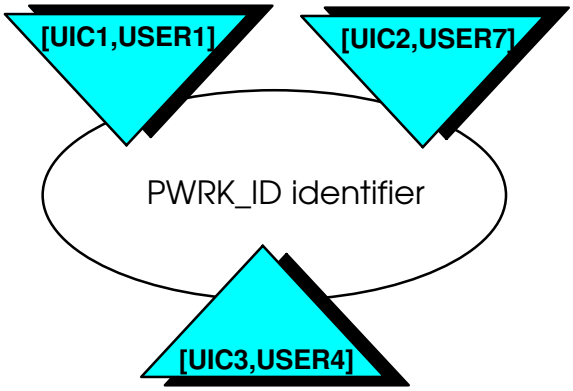
- Rename a group on the local server to merge members of a local group with members of a group listed on the primary domain controller.

  For example, if you have an existing SALES group on the local server and a SALESFORCE group on the primary domain controller, you can edit the report to rename SALES to SALESFORCE. When you upgrade the local server, no new LAN Manager groups are created in the domain, and the local users are placed in the exiting SALESFORCE group.
- Prevent the upgrade of existing groups or resource identifiers.

### Review the use of OpenVMS identifiers

Upgrade creates a LAN Manager group for every OpenVMS resource identifier that includes at least one PATHWORKS user. Depending on how you implement UIC groups and identifiers, the server Upgrade utility may create redundant LAN Manager groups.

OpenVMS identifiers can be used to create a "virtual" group, linking together several different UIC groups. For example, you could give the PWRK_ID identifier to members of different UIC groups:




In the example above, the server Upgrade would create 4 LAN Manager groups; UIC1, UIC2, UIC3, and PWRK_ID.

If you had a number of PATHWORKS users in UIC1, each with the PWRK_ID identifier; those users would now be in both the UIC1 and PWRK_ID LAN Manager groups. From a LAN Manager perspective, there may be no reason to have both groups.

By using the Upgrade Groups report, you can:

- Review the PATHWORKS users in your current OpenVMS UIC groups and identifiers
- Spot redundant users and groups
- Evaluate how you use OpenVMS UIC groups and identifiers from a V4.*x* perspective
- Reorganize your PATHWORKS users into a more manageable number of LAN Manager groups
- Eliminate unnecessary creation of LAN Manager groups

For example, by reviewing the Groups report, you may find PATHWORKS users that belong to the same UIC group and have the same identifiers. You can choose not to add the identifier as a LAN Manager group by commenting out the identifier in the Groups reports.

For more information:

- *Server Installation and Upgrade Guide* for information on the Groups report
- *Server Administrator's Guide* for information on PATHWORKS security.
- OpenVMS documentation for information in UIC groups and identifiers

### Create a new domain

Depending on how your V4.*x* network was set up, you run the risk of adding more groups to the domain with each server you upgrade.

By running Upgrade Groups reports on each server you plan to join to the domain, you can:

- Determine the total number of possible LAN Manager groups
- Review each group currently in your domain and the users in each of those groups

If you are approaching the 256 group domain limit, consider creating a new domain to split your groups.

Do not simply create a new domain to handle the excess groups. When creating a new domain, you should carefully evaluate your current groups and users to create a meaningful division in your PATHWORKS network. To do this, you may have to reorganize your users and groups by moving those users and groups to the appropriate servers in their respective domains.

For more information, see:

- *Server Installation and Upgrade Guide* for information on the Groups report
- *Server Administrator's Guide* for information on creating a domain

## User and group access restrictions to shares

LAN Manager grants access to shares to both individual LAN Manager users and groups. With LAN Manager, you can grant access to a maximum of 64 users and groups per share. For example, you can grant access to a share to 20 groups and 44 individual users.

In V4.*x*, you could grant group and user access to individual file and print services. When you upgrade your V4.*x* services to V5 LAN Manager shares, the server Upgrade utility sets the V5 permissions for each share as closely as possible to those used in V4.*x*.

Depending on how you granted access to V4.*x* services, you may exceed the 64 user and group access limit per share when you upgrade. If you exceed the 64 user and group limit on a share, some users may not be able to access the share.

If you exceed the 64 group and user access limit, consider the following strategies:

- Check V4.*x* access to services
- Change group and user access to shares
- Collapse users into a new group

## Check V4.x access to services

To make sure access to V5 shares is as close as possible to the access you granted to V4.*x* file and print services, do the following:

▶ Review how you set up user and group access to V4.*x* file and print services. To check user and group access to V4.*x* services:

1. Start the PCSA Manager Utility
2. Select Service options from the PCSA Manager menu
3. Select List Services option from the Service Options menu
4. Select List Authorized File and Printer Services from the List Services menu.

   All file and print services are listed along with the group and user access to each service.

▶ Review any changes you plan to make to user names and group names during your upgrade to V5.

For more information, see:

- Managing File Services in the V4.*x Server Administrator's Guide*
- Upgrading PATHWORKS V5 for OpenVMS (LAN Manager) in the *Server Installation and Upgrade Guide*

## Changing group and user access to shares

If any of your V4.*x* file and print services grant access to more than a total of 64 users and groups, only the first 64 users and groups will be granted access to the upgraded V5 shares.

By changing how you grant access to the V4.*x* file and print services, you can use the server Upgrade procedure to automatically apply those changes to the V5 shares. Consider the following:

**Review and reorganize V4.*x* access:**

By reviewing how you granted access under V4.*x*, you may be able to:

- eliminate some V4.*x* users and group that are no longer valid
- reorganize existing users and groups into smaller number of groups
- group individual users together to reduce the number of users you grant access to

By eliminating and reorganizing users and groups , you may be able reduce the number to 64 or less.

For more information, see:

- LAN Manager group restrictions earlier in this section
- *Server Installation and Upgrade Guide* for information on Upgrade Group reports
- V4.*x Server Administrator's Guide*

**Grant public or guest access:**

Depending on your security needs, consider granting public access to the services.

In V4.*x*, you can use the PCSA Manager menu to grant public access. If you change the group and user access in V4.*x*, the server Upgrade utility automatically applies those changes to the V5 shares.

In V5, you can use one of the management interfaces to grant USERS or GUESTS access (similar to V4.*x* public access) to the shares.

For more information, see:

- V4.*x Server Administrator's Guide* for information on granting public access to V4.*x* services
- V5 *Server Administrator's Guide* for information on granting public access to V5 shares

# Disk Service Support and Migration

## Disk services and V5

Disk services are being retired beginning with V5. With V5, you can upgrade existing V4.*x* local area disk (LAD) container files to allocation table (FAT) container files

Existing V4.*x* disk services will continue to function under V5. When you upgrade the server to V5, you should migrate your V4.*x* Disk Services to V5 container files when you are ready.

Note the following:

- **CD-ROM support** — The LAD/LASTport protocol will continue to ship indefinitely with the V5 client to provide access to CD-ROMs offered by Digital InfoServers.
- **NDU support** — The Network Device Utility (NDU) used by V4.*x* clients to create LAD disk services is not supported in V5.

For more information on upgrading disk services, see the Upgrading Disk Services section, Chapter 4, in the *Server Installation and Upgrade Guide.*

### Managing disk services on a V5 server

Two disk service management utilities are supplied for V5 servers upgraded from V4.*x*:

| Utility: | Function: |
|---|---|
| PCDISK | • Provides access to LAD disks from OpenVMS<br>• Identical to V4.*x* PCDISK<br> For more information, see your V4.*x Administrator's Command Reference*. |
| PCSA Manager emulator | • Intended to support existing command procedures that call the PCSA Manager utility<br>• Provided only on V5 servers upgraded from V4.*x*<br> For more information, see V5 *Server Release Notes*. |

**Note:** You cannot manage disk services or FAT files system using ManageWORKS.

## Administration and Management

### Differences between V4.*x* and V5 network management

The following table describes the differences between V4.*x* and V5 network management:

| For: | In V4.*x*... | In V5... |
|---|---|---|
| Server management | You are restricted to management of the local server using PCSA Manager.<br>PCSA Manager provides a menu and command line interface for the creation and management of local PATHWORKS users, groups, and shared resources. | You can remotely manage all V5 servers in your network, from either client-based or server-based interfaces. |
| Client management | Client management was not available. | You can remotely manage and configure clients using Workstation Manager. |

For more information, see:

- *Server Administrator's Guide*
- *Client Installation and Configuration Guide*.

## Server management interfaces

With V5, you can manage all your LAN Manager file and print shares from both the V5 server and the V5 client. The following table describes the V5 management options:

| Interface | Run from... | Description |
|---|---|---|
| ManageWORKS | V5 client | Lets you remotely manage V5 servers in your network from the client. ManageWORKS also lets you manage Novell NetWare servers in your network and all client workstations.<br> For more information, see ManageWORKS online help. |
| ADMIN/PATHWORKS | V5 server | Lets you manage:<br>• The local server and remotely manage any LAN Manager server in your network without having to memorize commands or command line syntax.<br>• PATHWORKS enhancements on the local server.<br> For more information , see the *Server Administrator's Guide* and the Server Admin online help. |
| Command Line Net interface | V5 server<br>V5 client<br>V2.*x* OS/2 client<br>LAN Manager client | The Command Line Net interface is the standard management interface available with LAN Manager software. It consists of Net commands that you can enter from the system prompt.<br>You can use Net commands in batch files to automate administrative tasks.<br> For more information , see the *Server Administrator's Command Reference.* |

| | | |
|---|---|---|
| PCSA Manager | V5 server | Digital supplies the PCSA Manager utility for backward compatibility with previous versions of PATHWORKS server software. It is available for supporting DCL command procedures and is not recommended as a primary management interface.<br>The PCSA Manager utility is not supported in V5. |
| LAN Manager Net Admin interface | V5 client<br>V2.*x* OS/2 client<br>LAN Manager client | This is the LAN Manager V2.2 character cell interface.<br> For more information, see your LAN Manager documentation. |

Selecting an interface usually depends on personal preferences. In most cases, regardless of which interface you use, you will be able to use any of the interfaces for server management.

## Client management

Workstation Manager is a new PATHWORKS utility, used through ManageWORKS, that duplicates most of the functions of the V5 client Configuration utility from a remote location and lets you simultaneously replicate configuration information across a group of clients.

For more information, see *Client Installation and Configuration Guide* and Workstation Manager online help.

## Displaying shares limit

When displaying shares on a particular server with one of the server management interfaces, LAN Manager can display only the first 64 Kbytes of the share database.

On servers with a very large share database (a VMScluster, for example), you may not be able to see all the shares on that server.

▶ To view all the shares on a server, use the @SYS$MANAGER:PWRK$LMSHARE command on that server.

For more information, enter:

```
@SYS$MANAGER:PWRK$LMSHARE HELP
```

# Command Line Migration

## Command Line Net interface

The V5 server replaces the PCSA Manager command line interface with the Command Line Net interface. The Command Line Net interface is the standard management interface available with LAN Manager software. You must have LAN Manager ADMIN privileges to execute many of the management commands available with this interface.

When you begin managing LAN Manager servers, you may be most comfortable using one of the menu-based interfaces. Once you become familiar with server management tasks however, you may want to use Net commands in batch files to automate administrative tasks.

For more information, see the *Server Administrator's Command Reference*.

## The PCSA Manager

The V5 server includes a PCSA Manager utility that maps a subset of the existing PCSA Manager command line functions to return information from the V5 server in LAN Manager terminology. This utility provides backward compatibility for existing site-specific command procedures.

You can use the PCSA Manager command line interface to perform the following tasks:

- Support DCL command procedures for server management by mapping PCSA commands to LAN Manager commands. Batch files containing PCSA Manager commands that you have created with earlier versions of PATHWORKS will continue to execute properly with V5.

  See the *Server Release Notes* for a list of PCSA commands mapped to LAN Manager commands.

- Support existing LAD services and LAD/LAST remote boot clients. You can use PCSA Manager commands to manage LAD services or LAD/LAST remote boot clients that you have not to upgraded to V5.

▶ To run the PCSA Manager, enter the following command at the server system prompt:

```
ADMINISTRATE/PCSA
```

For more information, see

- *Server Release Notes*
- HELP at the PCSA_MANAGER> prompt for a list of the commands and their syntax

# 8 Remote Boot Migration

## Before You Begin

The PATHWORKS V5 Remote Boot service is based on Microsoft's LAN Manager Remote Boot service, which uses the Remote Program Load (RPL) and the NetBEUI transport protocol.

The integration of Microsoft's LAN Manager Remote Boot service changes how remote boot clients work. To understand the migration issues described here, read the *LAN Manager Remote Boot Guide.*

Using a V5 client, see the online help for the PATHWORKS Remote Boot Manager for information on managing the V5 Remote Boot services.

This section describes:

- The differences between V4.*x* and V5 remote boot
- How to set up your V5 remote boot environment
- How to upgrade your V4.*x* remote boot clients to V5

## How is V5 Remote Boot Different?

The following table describes the differences between V4.*x* and V5 Remote Boot services:

| Feature | In V4.*x*... | In V5... |
|---|---|---|
| Supported servers | OpenVMS | Any server supporting the LAN Manager Remote Boot service. |
| Diskless boot | Supported on EtherWORKS adapters only. | Supported on an adapter with RPL or MOP ROMS. |
| Floppy remote boot | Supported on EtherWORKS, 3Com 3C503 and 3C523 adapters | |
| Task image | Represented by a static MOP image. | Based on the contents of the boot block configuration file (DOSBB.CNF).<br>Each type of network adapter has a separate DOSBB.CNF file. |
| Boot environment | Uses the Digital native data link and LAD LASTport disk services. | Uses the industry standard NDIS drivers and LAN Manager shares. |
| Redirector | used either the Basic or Enhanced Redirector. | Enhanced Redirector only |
| Transports | DECnet only | NetBEUI<br>DECnet and TCP/IP can be used in conjunction with NetBEUI. |
| Startup file sharing | Not provided, since there is a single disk image per client. | May be enabled with profiles. |
| Client configuration | Netsetup | Remote Boot Manager |
| Remote boot management | Remote Boot services configured for individual clients using Netsetup. | Remote boot profiles configured for individual clients or groups of similar clients using the client-based Remote Boot Manager Windows application. |
| Boot image memory size | 32-64K | 90-120K |

## What servers are supported?

In V4.*x,* remote boot clients are supported only when using a V4.*x* OpenVMS server. In V5, remote boot clients can use any server supporting LAN Manager Remote Boot. They include:

- PATHWORKS V5 for OpenVMS (LAN Manager) on VAX or Alpha AXP systems
- PATHWORKS V5 for DEC OSF/1 AXP (LAN Manager) on AXP systems
- PATHWORKS for OS/2 V1.1, V2.0, V2.0B server software on Intel systems
- PATHWORKS for SCO UNIX V1.*x* on Intel systems
- Microsoft LAN Manager-based OS/2 V2.2 compatible servers

## V5 restrictions

The PATHWORKS V5 Remote Boot service has the following restrictions:

- The Remote Boot service requires the LAN Manager Enhanced Redirector. The Basic Redirector and NetWare are not supported.
- The Remote Boot service requires NetBEUI, which cannot be unloaded. Optionally, TCP/IP or DECnet (or both) can be loaded, but only as additional transports.
- You must use the Remote Boot service on a server running LAN Manager user-level security, not share-level security.
- The file STOPNET.BAT is not created on remote boot workstations because remote boot configurations cannot be unloaded. The network cannot be unloaded.
- Because the Enhanced Redirector, NetBEUI, and DLLNDIS are always loaded, remote boot workstations have less conventional memory available to DOS applications than local boot configurations.
- To use the PATHWORKS Remote Boot Manager from a V5 client, that client must be configured for the Enhanced Redirector and have LAN Manager ADMIN privileges. If you have multiple domains, you must have ADMIN privileges in all domains.

# Setting up the V5 Remote Boot Environment

Setting up your V5 Remote Boot service includes installation and configuration pieces on both the V5 client and V5 server.

## Preparing for migration

Before upgrading your V4.*x* remote boot clients to V5, you must install and configure both the V5 server and V5 client software. The V5 server software will continue to support the V4.*x* Remote Boot service.

## Planning remote boot profiles

V5 remote boot clients use profiles to tell the Remote Boot service how and what to boot on the client.

In V5, a remote boot client can use either a personal or shared profile. Carefully plan your profiles to share as many as possible between your clients. To do this, you must evaluate your V4.*x* remote boot clients configurations and application requirements.

Clients that share a profile must share the following characteristics:

- Type of network adapter
- Network settings
- DOS version
- Type of additional memory

Clients that share a profile will share the following configuration and startup files:

- CONFIG.SYS
- AUTOEXEC.BAT
- LANMAN.INI
- .FIT file. The .FIT file maps server-based files, directories, and programs to logical directories on each client's virtual C drive.

The following table describes the differences between personal profiles and shared profile:

| Feature | In personal profiles... | In shared profiles... |
|---|---|---|
| Number of profiles | A separate profile is used for each client. | Single profiles are used for groups of similar clients. |
| Disk space | The more personal profiles you use, the more disk space you use. | Because the profiles are shared, you use less disk space per client. |
| Client access | Clients have RW access for personal-profile directories and have control over the operating environment | Clients have read-only access to shared-profile directories. |
| Profile management | Management can be difficult, because clients can modify their startup files. | Only someone with LAN Manager ADMIN privileges can modify the profile. |
| Update propagation | Propagation is not possible: each client must be updated independently. | Only the shared profile directory needs to be updated. |

# Upgrading Your V4.*x* Remote Boot Clients

## Step 1: Set up the Remote Boot service on the server

Before upgrading your remote boot clients, you must install and start the Remote Boot service on the V5 server. Although the PATHWORKS Remote Boot service is based on LAN Manager, there is some additional setup required.

▶ To set up the server for the V5 Remote Boot service:

| Step | Explanation |
|---|---|
| **1.** Install the V5 server software. | The Remote Boot service is bundled with PATHWORKS server software. When you install PATHWORKS, the Remote Boot service software is automatically installed. |
| **2.** Run PWRK$CONFIG to enable the Remote Boot service. | Answer YES to the Enable Remote Boot services prompt. By default, the Remote Boot service is not started.<br>This action creates the RPL directory tree, including empty directories where you will install DOS.<br>The PWRK$CONFIG procedure does not copy the DOS versions you install in V4.*x*. |

By following this procedure, you make sure that:

- The Remote Boot service is started automatically each time you start the server.
- SYSGEN parameters are modified to reflect the number of remote boot clients.

For more information, see the *Server Installation and Upgrade Guide*.

## Step 2: Upgrade the remote boot database

V4.*x* clients use the LAD LASTport protocol to remote boot. However, after a 4.*x* client is upgraded to V5, it must use the V5 Remote Program Load (RPL) protocol to remote boot.

Before you upgrade your clients to use the RPL protocol, you must upgrade the entries in the 4.*x* Remote Boot database (PCSA$BOOT_DATABASE.DAT) and include them in the V5 Remote Boot database (RPL.MAP).

▶ To upgrade V4.*x* remote boot profiles on the V5 server:

1. Log into the V5 server using the system account.
2. Run one of the following commands:

| Command | Result |
|---|---|
| `ADMIN/UPGRADE/REMOTEBOOT clientname` | Upgrades the entry of a single V4.*x* remote boot client |
| `ADMIN/UPGRADE/REMOTEBOOT *` | Upgrades the entries of all V4.*x* remote boot clients |

Existing V4.*x* Remote Boot services are not changed by this procedure and can still be used by your V4.*x* remote boot clients.

## Step 3: Set up the V5 client

After installing the Remote Boot service on the server, you use the Remote Boot Manager from a V5 client to complete the remote boot configuration on the server. You must have at least one non-remote boot client in your network to run the Remote Boot Manager.

▶ To use the Remote Boot Manager:

1. Install the V5 client software on a server in your network.
2. Use the client Configuration utility to configure a client for:
   - Microsoft Windows support
   - Enhanced Redirector (full LAN Manager support)
   - ManageWORKS

**Note:** The Configuration utility creates a PATHWORKS Windows Applications group, which includes the Remote Boot Manager.

For more information, see:

- *Client Installation and Configuration Guide*
- Online help for installation and configuration

## Step 4: Update the server from the client

From the V5 client, use the Remote Boot Manager to update the V5 servers that are running the LAN Manager Remote Boot service.

▶ To update the remote boot servers:

1. From the PATHWORKS for Windows program group, choose the Remote Boot Manager icon.

   The Remote Boot Manager displays a list of servers offering Remote Boot services.

2. Select the server you want to administer. You must have LAN Manager ADMIN privileges on that server or in the domain.
3. From the Actions menu, choose Update Server.
4. Continue running the Update Server command on each remote boot server in your network. A server cannot boot a client workstation until you run this command.

The Update Server command:

- Creates the Remote Boot LAN Manager groups (RPLADMIN and RPLUSER) on the server
- Sets permissions on the RPL directory tree
- Copies client files from the V5 client system service to the Remote Boot (RPL) share on the server

For more information, see:

- *LAN Manager Remote Boot Guide*
- Remote Boot Manager online help

## Step 5: Install DOS on the server

When you upgrade V4.*x* servers offering Remote Boot services, the upgrade procedure does not automatically copy the versions of DOS that you installed on V4.*x* server. The V5 Remote Boot server must have a copy of each version of DOS that you want to make available to the client.

When you ran the Configuration procedure (PWRK$CONFIG) on the server, it created empty DOS directories in the RPLFILES share.

▶ To install each version of DOS that you want to be available from the server:

1. Make sure each version of DOS you want is installed on a connected client.
2. Copy DOS from the connected client to the V5 server.

See the *LAN Manager Remote Boot Guide* for complete instructions on copying DOS from the client to the server.

## Step 6: Enable clients to use the Remote Boot service

▶ To configure a remote boot client for the V5 Remote Boot service:

1. Follow the instructions listed in the Enabling Workstations to Use the Remote Boot Service section of the *LAN Manager Remote Boot Guide*.
2. Repeat the procedure for each V4.*x* remote boot client you plan to upgrade to V5.

## Step 7: Create the client profiles

Profiles define the working environment for one or more remote boot client workstations.

▶ To create profiles for your upgraded clients:

| Step | Description |
|---|---|
| **1.** From the V5 client, start the Remote Boot Manager. | The Remote Boot Manager displays a list of servers in the selected domain.<br>The client must have ADMIN privileges. |
| **2.** Select a server and choose the Profiles icon. | Select the server where you upgraded the V4.*x* LAD Remote Boot disk services in Step 2: Upgrade the remote boot database. |
| **3.** From the Actions menu, choose the Create Option. | Enter the name of the profile. Choose one of the configurations listed.<br>The base configuration includes the network adapter type and the version of DOS to associated with the specified profile. |
| **4.** Complete the Configuration utility dialog boxes. | The Remote Boot Manager automatically starts the client Configuration utility. You specify additional startup commands, shared resources, and hardware parameters for the profile. |
| **5.** Repeat steps 1 to 4 for each remote boot client on that server that you want to upgrade. | If your remote boot clients have the same hardware and network configuration, they can share the same profile. Using the same profile saves disk space and makes upgrading additional clients easier. |

For more information, see the Remote Boot Manager online help.

## Step 8: Create Workstation Records

For each V4.*x* remote boot client that you upgraded in Step 2, you must create a Workstation record where you specify a personal or shared profile to define the working environment of the V5 remote boot client.

▶ To create Workstation records for your upgraded clients:

| Step | Description |
|---|---|
| **1.** From the V5 client, run the Remote Boot Manager | The Remote Boot Manager displays a list of servers in the selected domain. |
| **2.** Select a server and click on the Workstations icon | Select the server where you upgraded the V4.*x* LAD Remote Boot disk services in Step 2: Upgrade the remote boot database. |
| **3.** Select the name of the client that you want to create a workstation record for. | You see a list of remote boot clients on the selected server. The V4.*x* remote boot clients you upgraded are displayed and flagged as "NEW." |
| **4.** From the Actions menu, select Zoom and verify the information that displays | The information provided includes<br>• Adapter address<br>• Computer name<br>• Task image<br>• Profile type (personal or shared)<br>• Profile name<br>• DECnet or TCP/IP information |
| **5.** Repeat steps 3 and 4 for each client that you want to upgrade to V5. | |

**Note:** Keep a list of all the remote boot clients on your servers, you will need the names of these clients in Step 11: Copy V4.*x* data.

For more information, see the Remote Boot Manager online help.

## Step 9: Make sure all services are available

If your V4.*x* remote boot clients used any V4.*x* file or print services, make sure those services were upgraded to V5 shares. See the *Server Installation and Upgrade Guide* for more information.

You can also make Microsoft Windows available to your V5 remote boot clients. See the *LAN Manager Remote Boot Guide* for more information.

## Step 10: Boot your remote boot clients

Your clients are now ready to boot using the V5 LAN Manager Remote Boot service.

## Step 11: Copy V4.*x* data

As the administrator, you can connect to both the V4.*x* LAD disk and the V5 RPL share and manually copy the data stored on the client's V4.*x* LAD disk to the new V5 Remote Boot service.

▶ To copy information from V4.*x* LAD disks to V5 RPL shares:

1. Get a list of workstations using V4.*x* LAD disks on your V5 server, use the following command from the server:
   `PCSA SHOW WORKSTATIONS`

   You will see a display similar to the following:

```
Registered Remote Boot Workstations:
Name      Hardware Address  Address  Load File  Size   Comment
----      ----------------  -------  ---------  ----   -------
CLIENT1   AA-00-04-27-BA-A9 3.854    DEPCA.TSK  1.2MB  Test disk
```

   Note the hardware address of the listed workstations

2. Get the list of V5 remote boot clients on the server you made in Step 8: Create Workstation Records
3. Make sure you have a client configured for:
   - Basic Redirector.
     You need the Basic Redirector to connect to the V4.*x* LAD disk service.
   - Virtual Disk Services
   - LAN Manager ADMIN privileges
4. Using the client you configured in the above step, connect to the workstation's V4.*x* LAD disk using the hardware address you got in step 1. For example:

```
USE ?: \\MERZ\AA-00-04-27-BA-A9 /v
Device G: connected to \\MERZ\AA-00-04-27-BA-A9
```

5. Connect to the V5 RPLFILES share on the server where the V5 remote boot client is located. For example:

```
USE ?: \\MERZ\RPLFILES
Device M: connected to \\MERZ\RPLFILES
```

6. In the RPLFILES share, set your default directory to \TMPFILES\client_name using the name of the V5 remote boot client. For example:
   M:\CD TMPFILES\CLIENT1
7. Copy the files you want from of the V4.*x* LAD disk to the RPL share of the V5 remote boot client
8. Repeat steps 4 through 7 for each remote boot client you upgraded to V5 on that server

## Step 12: Delete the V4.*x* LAD Remote Boot disks

After all your V4.*x* remote boot clients are upgraded, you can delete the V4.*x* remote boot disks to save space.

▶ To delete the V4.*x* LAD drives:

1. Start the PCSA_MANAGER emulator on the V5 server with the following command:

   ```
   ADMINISTRATE/PCSA
   ```

2. List all available LAD remote boot container files.
3. Dismount the LAD container file using the DISMOUNT command.
4. Delete the LAD container files.

# 9 License Migration

## Customers With "Right-to-New-Version" Service

All current PATHWORKS for DOS V4.*x* customers with RTNV service contracts are entitled to PATHWORKS V5 for DOS and Windows (LAN Manager) CCS licenses at no charge. Since the CCS license grants the same rights as the V4.*x* license, customers can expect to receive CCS licenses equal to the number of PATHWORKS for DOS licenses covered by their service contract.

These customers should have been contacted by their SPS territory representative to determine PAK denominations and to be sure that PAKs are sent to the right locations.

## Customers Without "Right-to-New-Version" Service

All current customers who do not have RTNV service can purchase migration CCS licenses at reduced prices through their Digital sales representative, DECdirect, or through Digital resellers. Proof of license purchase is required such as:

- Original PATHWORKS license certificates
- Invoices
- Other customer-specific proof (this is non-standard; check with your local software license administrator)

## CCS License

The CCS license is functionally identical to the previously sold PATHWORKS license. When workstations need access to PATHWORKS file and print services as well as PATHWORKS client software, then the CCS license is the right solution.

The CCS (Combination Client Server) license:

- Allows access to file and print services on an unlimited number of PATHWORKS servers.
- Pertains to a particular NOS, such as LAN Manager or NetWare.

- Allows use of the PATHWORKS client software including ManageWORKS; TCP/IP and DECnet transports and utilities; and applications such as terminal emulation, Mail, and X Windows.
- Is assigned to a single workstation.
- Remains with the workstation unless the system administrator revokes it using the license management software.

Some examples of situations where the CCS license is appropriate are:

- A customer wants to use file and print services using DECnet as the transport.
- A customer wants access to file and print services on three PATHWORKS servers and also wants to use ManageWORKS.
- A customer currently needs access to only one PATHWORKS server but knows that an expansion is planned. This customer also needs to use DECnet with terminal emulation and Mail.

## Access to Existing PATHWORKS Servers

Clients that are using PATHWORKS V5 CCS (LAN Manager) licenses can connect to pre-V5.0 and current versions of PATHWORKS servers. Clients can connect to file and print services on the following pre-V5.0 servers:

- PATHWORKS V4.*x* for OpenVMS (LAN Manager)
- PATHWORKS V1.*x* for ULTRIX (LAN Manager)
- PATHWORKS V1.*x* for SCO UNIX (LAN Manager )

# 10 Interoperability Matrix

The following tables describe the interoperability between different versions of PATHWORKS client and server products. They describe :

- The functionality supported in the V4.*x* products
- The functionality supported in the V5 products
- The V4.*x* functionality replaced in V5
- The V4.*x* functionality that is no longer supported in V5

To use the table, look up the function and then look across the column to the client/server version combination of interest.

| Code | Description |
|---|---|
| Y | The function is supported. |
| N | The function is not supported. |
| U | The function is supported on V5 servers upgraded from V4.*x*. |
| R | The function is supported but is replaced by an alternate fuction. |
| D | The function is supported if the client is configured with the Digital Basic Redirector. |
| B | The function is supported if the V5 server is in backward compatibility mode. |
| LM | LAN Manager |
| PW | PATHWORKS |
| NA | The function is not applicable. |

In the following tables:

- The V5 client is configured with the Enhanced Redirector. Some V4.x features are still supported for a V5 client using the Digital Basic Redirector and connected to a V5 server in backward compatibility mode. For clients using the Enhanced Redirector, use the NETD commands instead of NET.
- The V4.x client is configured with the Digital Basic Redirector

| PATHWORKS V4.*x*/V5 Interoperability Matrix | | | | |
|---|---|---|---|---|
| **When the client is ▶** | **V4.*x*** | **V5** | **V4.*x*** | **V5** |
| **and the server is ▶** | **V4.*x*** | **V5** | **V5** | **V4.*x*** |
| **And the function is ▼** | | | | |
| **NET ATTRIB** to set and display host protection on files and directories | Y | N | N | Y |
| **NET CLEAR** to clear a node from the client's DECnet network database | Y | N | Y | N |
| **NET CONTINUE** to restart file or printer services that have been temporarily suspended | Y | Y | Y | Y |
| **NET CREATE** to create and format a virtual disk | Y | U | U | Y |
| **NET DEFINE** to register a node with the client's DECnet network database | Y | N | Y | N |
| **NET DELETE** to delete a virtual disk | Y | U | U | Y |
| **NET DISK SERVICES** to display the virtual disk services available on a server | Y | U | U | Y |
| **NET DISMOUNT** to make a virtual disk unavailable on the network | Y | U | U | Y |
| **NET ERROR** to display DECnet and LAD/LAST error statistics | Y | N | Y | N |
| **NET FILE SERVICES** to display the file and printer services available on a server | Y | R | U | N |
| **NET HELP** to show the function and syntax of client commands | Y | Y | Y | Y |
| **NET LIST** to list nodes in the client's DECnet network database | Y | N | Y | N |
| **NET LOAD** to restore network connections that have been saved | Y | Y | Y | Y |
| **NET MODIFY** to change the characteristics of a virtual disk service | Y | U | U | Y |
| **NET MOUNT** to make a virtual disk ready for connections | Y | U | U | Y |

| PATHWORKS V4.*x*/V5 Interoperability Matrix | | | | |
|---|---|---|---|---|
| **When the client is ▶** | **V4.*x*** | **V5** | **V4.*x*** | **V5** |
| **and the server is ▶** | **V4.*x*** | **V5** | **V5** | **V4.*x*** |
| **And the function is ▼** | | | | |
| **NETPASS** to change your NOS and host password on a server | NA | Y | NA | N |
| **NET PASSWORD** (LM) to change your host password on a domain | N | Y | Y | N |
| **NET PASSWORD** (PW) to change your host password on a server | Y | Y | Y | Y |
| **NET PAUSE** to temporarily suspend logical connections to file and printer services | Y | Y | Y | Y |
| **NET PRINT** (LM) to display or control print jobs and queues | N | Y | Y | N |
| **NET PRINT** (PW) to print a file, show host queue entries, and specify host print qualifiers | Y | N | N | Y |
| **NET SAVE** to save current network connections | Y | Y | Y | Y |
| **NET TEST** to start a DECnet loop test | Y | N | Y | N |
| **NET TIME** (LM) to display the time for a server or a domain | N | Y | Y | Y |
| **NETTIME** (PW) to set the date and time at the client (from the server) | Y | N | N | N |
| **NET VIEW** to display the file and printer services available on a server | N | Y | N | N |
| **NET ZERO LAD** to clear error counters for the virtual disk drivers | Y | Y | Y | Y |
| **SETNAME** to set your client's NetBIOS name | Y | Y | Y | Y |

| PATHWORKS V4.*x*/V5 Interoperability Matrix | | | | |
|---|---|---|---|---|
| **When the client is ▶** | **V4.*x*** | **V5** | **V4.*x*** | **V5** |
| **When the server is ▶** | **V4.v** | **V5** | **V5** | **V4.*x*** |
| **And the function is ▼** | | | | |
| **USE** to connect to and disconnect from file, printer, and disk services | Y | Y | Y | Y |
| **USE /SETDIR** to change host directories | Y | N | B | D |
| **USE \\servername\\share%username password** to connect to a service with another person's user name and password | Y | N | N | D |
| **USE/SHOW/VIRTUAL** to display disk services on a server | Y | U | U | Y |
| **USE/SHOW/NET** to display file and printer services on a server | Y | UR | U | Y |
| **USE** to any host print queue that is not a share (Dynamic print shares) | Y | N | N | Y |
| **USE \\servername**\share maximum length | 12 | 12 | 12 | 12 |
| **USE** \\servername**share** maximum length (Digital Basic Redir) | 32 | 32 | 32 | 32 |
| **USE** \\servername**share** maximum length (Enhanced Redir) | 12 | 12 | 12 | 12 |
| **USE** \\servername\share%**username** maximum length | 12 | NA | 12 | NA |
| **USE** \\servername\share%username **password** maximum length | 31 | NA | NA | 14 |
| (LM) NET LOGON **username** password maximum length | NA | 20 | NA | NA |
| (LM) NET LOGON username **password** maximum length | NA | 14 | NA | 14 |
| **Long Share Names** - The ability to use share names longer than 12 (requires PW basic redirector) | Y | B | U | Y |
| **NETSETUP Support** - Support NETSETUP through PCSA$RMI for managing LAD remote boot disks<br>NETSETUP can be run from a V5 client if connected to a V4.1 system service | Y | UR | UR | Y |
| **DOSLOAD Support** - Support for the current DOSLOAD utility through PCSA$RMI<br>DOSLOAD can be run from a V5 client if connected to a V4.1 system service | Y | U | U | Y |
| **LOGON.BAT** to connect client to personal directory on a VMS or ULTRIX server | Y | R | Y | N |

| PATHWORKS V4.*x*/V5 Interoperability Matrix | | | | |
|---|---|---|---|---|
| **When the client is ▶** | **V4.*x*** | **V5** | **V4.*x*** | **V5** |
| **When the server is ▶** | **V4.*x*** | **V5** | **V5** | **V4.*x*** |
| **And the function is ▼** | | | | |
| **PCSA Manager Menu** The menu interface to manage the file server | Y | R | R | Y |
| **PCSA Manager Command Line** The command line interface to manage the file server (batch files) | Y | R | R | Y |
| **Server Backup/Restore** to backup and restore services and user on the server | Y | N | N | Y |
| **Collect Server Data** to collect server statistics for tuning | Y | R | R | Y |
| **Configure Server Parameters** to tune the server | Y | R | R | Y |
| **Autogen Server** to run the VMS AUTOGEN facility | Y | R | R | Y |
| **File Server Options** to add, delete, modify, and list file services; to start, stop, and set the file server | Y | R | R | Y |
| **Disk Server Options** to add, delete, modify, and list disk services; to start, stop, and set the disk server | Y | UR | UR | Y |
| **Remote Boot Database Options** to restore, delete, list remote boot database; to list the client OS; to add and delete templates | Y | UR | U | Y |
| **Register DECnet Nodes** to register and delete DECnet nodes for remote boot | Y | R | U | N |
| **Group Options** to add, delete, and list groups; to grant and deny access | Y | R | R | Y |
| **User Options** to add, delete, modify, move, and list users; to grant and deny access | Y | R | R | Y |
| **Printer Options** to add, delete, and list print queues; to create start-up file | Y | R | R | Y |
| **Close File_Server File** to close a file on the file server | Y | R | R | Y |
| **Log File Options** to manipulate the file server log file | Y | R | R | Y |
| **SYSUAF Security Features** to allow VMS password, user authentication, and account control | Y | R | R | Y |
| **VMS Password History** to support VMS password history list | Y | R | R | N |

| PATHWORKS V4.*x*/V5 Interoperability Matrix | | | | |
|---|---|---|---|---|
| **When the client is ▶** | **V4.*x*** | **V5** | **V4.*x*** | **V5** |
| **and the server is ▶** | **V4.*x*** | **V5** | **V5** | **V4.*x*** |
| **And the function is ▼** | | | | |
| **VMS Password Expiration** to support VMS password expiration and notification | Y | R | N | Y |
| **VMS Password Dictionary** to support VMS password dictionary | Y | Y | Y | N |
| **VMS Breakin Detection** to support VMS break-in detection through LGI_BRK parameters (Lockout) | Y | R | R | Y |
| **VMS Intrusion Database Support** to record intrusion attempts in the VMS Intrusion Database | Y | R | R | Y |
| **Disk Quotas** to enforce host disk quotas on the file server | Y | R | R | Y |
| **NetBIOS Mail Notification Service** (DECnet only) | Y | Y | Y | Y |
| **PATHWORKS for VMS Mail Server** (DECnet only) | Y | Y | Y | Y |
| **V2.2 Mail Server** The old PATHWORKS Mail Server based on extended SMBs | Y | N | N | N |
| **Local Area Disk Services** (VAX only and V4.*x* server was previously installed) | Y | U | U | Y |
| **LAD Remote Boot** to remote boot through LAD/LAST (VAX only and V4.*x* server was previously installed) | Y | R | Y | N |
| **PCDISK utility** VMS access to LAD disks | Y | B | Y | Y |
| **LAST Transport (LANSESS)** file server support for LAST | Y | N | N | N |
| **DECnet Transport** File server support for DECnet | Y | Y | Y | Y |
| **TCP/IP Transport** File serve support for TCP/IP (3rd-party TCP/IP vendors many include PATHWORKS support) | Y | Y | Y | Y |
| **NetBEUI Transport** File server support for NetBEUI | N | Y | Y | N |
| **OSI Co-existence** File server support for OSI co-existence (server only) | Y | Y | Y | Y |

# Index


### A

ADMIN/PATHWORKS 7-31
Asynchronous communication 4-9
AUTOEXEC.BAT 3-13
Automatic connections, client 3-27
AUTOUSER.BAT, upgrading 2-9, 3-27

### B

Backup domain controller 7-6
Backward compatibility 2-16
Basic Redirector 3-18

### C

CCS license 9-1
CD-ROM support 7-29
CFGWS.DAT 3-13
Client configuration 3-6, 3-7, 3-20, 3-21
Client installation 2-3, 3-2, 3-8
Client management 3-9
Client memory 3-9, 3-16
Client startup files, network 3-13
Client upgrade 2-4
Client, upgrade 3-10
Clients, automatic connections 3-27
Clients, network startup 3-12
Clients, supported 7-2
Clients, upgrading 3-3
Command line migration 7-33
Command Line Net interface 7-31
CONFIG.SYS 3-13
Configuration files, client 3-13
Configuration utility, server 7-14
Configuration, client 3-7, 3-20, 3-21
CTERM.EXE 4-6

### D

Data links 4-6
DECACC.DAT 3-14
DECALIAS.DAT 3-14
DECnet databases 3-14
DECNODE.DAT 3-14
DECOBJ.DAT 3-14
DECPARM.DAT 3-14
DECprint Supervisor for OpenVMS 7-22
DECPW.386, Windows file 3-15
DECREM.DAT 3-14
Device drivers, loading 3-12
Disk services 4-10, 4-11, 7-29
Disk services, managing 7-30
Disk services, migration 7-29
Disk space, client installation 3-7
Disk space, server 7-3
DLL802 4-6
DLLASYNC.EXE 4-9
DLLDEPCA 4-6
DLLDLC 4-6
DLLNDIS(T) 4-6
DLLODI 4-6
DNP (DECnet Network Process) 4-17
documentation, what to read first 1-2
Domain members 7-6
Domains, creating 7-27
Domains, in VMScluster systems 7-12
Domains, planning 7-7

### E

EMSLOAD 4-15
Enhanced Redirector 3-18
EXECINFO.BAT 3-13

### F

FAT container files 7-29
FAT container files support 7-19
FAT file structure 7-18
File services, LAN Manager shares and 7-17
File services, migration 7-17
File system support 7-19
Floppy remote boot 8-2

## G

Group access to shares 7-28
Groups 7-7
Groups, differences with V4.x 7-23
Groups, merging 7-25
Groups, restrictions on 7-7, 7-25, 7-27
Groups, upgrading 7-23

## I

Installation, client 2-3, 3-2, 3-5
Installation, server 2-10
Interoperability, client 10-1

## K

KITDATA.INS 3-22

## L

LADCDDRV.SYS 4-11
LADDRV.SYS 4-11
LAN Manager and Creator security, when to use 7-8
LAN Manager and OpenVMS security, when to use 7-8
LAN Manager Net Admin interface 7-32
LAN Manager security, comparison with V4.x 7-8, 7-16
LAN Manager security, planning 7-7, 7-8, 7-16
LAN Manager security, share-level 7-8
LAN Manager security, user-level 7-8
LAN Manager, choosing server role 7-5
LAN Manager, planning for 7-4
LAN Manager-only security, when to use 7-8
LAT Control Program (LATCP) 4-13
LAT Services Manager, LATSM 4-14
LAT.EXE 4-11
LATASYNC 4-12
LATCOM.SYS 4-12
LATCP 4-13
LATSM 4-14
Licensing 9-1
Logon scripts 3-28

## M

Mail 4-3
Management, client 3-9
Management, server 7-30
ManageWORKS 7-31
ManageWORKS PWMGMT.INI file 3-15
Memory, client 3-16
Memory, client requirements 3-9
Memory, template 3-18
Migration, sample process 2-1
MOP 4-14
MOP and PWLOAD.DAT 3-14
MSNET.INI 4-18

## N

NCP 4-14
NCPW 4-14
NDU support 7-29
NET PASSWORD command 3-29
NETD PASSWORD command 3-29
NETPASS command 3-29
Network Connect utility 4-3
Network connections, client 3-23
Network connections, unsupported 2-8
Network Control Program for DOS (NCP) 4-14
Network Control Program for Windows (NCPW) 4-14
Network drivers 4-3
Network File Transfer for DOS (NFT) 4-7
Network File Transfer for Windows (NFTW) 4-7
Network management 7-30
Network startup files 3-7
Network startup, client 3-12
NFT 4-7
NFTW 4-7
Novell NetWare support 3-23
NTAS server, as primary domain controller 7-6, 7-7
NTAS server, pre-existing 7-5

## O

ODS-2 file structure 7-18
ODS-2 support 7-19

OpenVMS directories, upgrading 7-20
OpenVMS resource identifier 7-25
OS/2 server, pre-existing 7-5

## P

Passwords 2-18, 3-29
PATHWORKS File System (PFS) 7-18
PATHWORKS Name Service (PNS) 2-4
PATHWORKS.INS 3-22
PATHWRKS.INI 3-15, 4-5
PC DECwindows Motif 4-16
PCSA Manager 7-32, 7-33
PostScript printers, setting up 7-22
Primary domain controller 7-5
Print service migration 7-21
Printing, differences 7-21
Programming changes, client 6-1
PROTOCOL.INI 3-15
PWENT.DAT 3-13, 3-14
PWGROUP.INS 3-15
PWICON.EXE 3-29
PWINACC.DAT 3-14
PWINSTAL, client installation utility 3-6
PWLICxx.DAT 3-14
PWLICxx.EXE 3-14
PWLICxxT.EXE 3-13
PWLOAD.DAT 3-14
PWMGMT.INI 3-15
PWNODE.DAT 3-14
PWOBJ.DAT 3-14
PWREM.DAT 3-14
PWRK$CONFIG 7-14
PWSETUP, client configuration utility 3-6, 3-20
PWTCP.INI 3-15, 3-25
PWUSER.INI 3-15, 4-5

## R

RCV.EXE 4-5
Redirectors 3-18
Remote Boot 3-7, 8-1
Remote boot 3-10
Remote Boot Manager 8-9
Remote Boot support 7-19
Remote Boot, differences between versions 8-2
Remote Boot, profiles 8-4
Remote Boot, restrictions 8-3
Remote client configuration 7-32
Resource identifier 7-25
RFA (Remote File Access) 4-17
right-to-new-version service 9-1
RMS protection, mapping to LAN Manager 7-16

## S

Schedular 4-15
Security, comparison 7-8, 7-16
Security, migration 7-15
Security, planning 7-7, 7-8, 7-16
Server administration, available interfaces 7-31
Server installation 2-10
Server requirements 7-2
Server requirements, disk space 7-3, 7-4
Server requirements, optional software 7-3
Server requirements, software 7-2
Server requirements, supported clients 7-2
Server upgrade, basic steps 7-13
Server upgrade, Configuration 7-14
Server, choosing the server's role 7-5
Server, steps to upgrade 7-13
SETDIR 3-23, 7-21, 7-24
SETDIR, user access 7-24
SETHOST terminal emulator 4-2
SETUP, client utility 3-6
Share-level security 7-8
Share-level security, when to use 7-8
Shares 7-17
SHOW 4-8
Socket library changes 6-1
SPAWNER.EXE 4-17
Standalone server 7-6
STARTNET.BAT 2-9, 3-13
STARTNET.BAT switches 2-6
STOPNET.BAT 3-13

## T

TCP/IP files 3-15
TCP/IP support 3-24
TCP/IP, administration 3-26
TCP/IP, new features 3-25
Template files, client 3-12, 3-13
Template memory 3-18

Terminal emulators 4-1, 4-2

## U

UAS merge, name conflicts 7-23
Unsupported components, client 2-7, 4-17, 4-18
UPDATE.DAT 3-14
Upgrade reports 2-13, 7-14
Upgrade services 1-3
Upgrade, client utility 3-6, 3-10
Upgrade, server utility 7-13, 7-15
Upgrading licensing 9-1
Upgrading OpenVMS directories 7-20
USE.EXE 4-7
User, access to shares 7-28
User-level security 7-8
User-level security, client access 7-11
User-level security, LAN Manager and Creator 7-8
User-level security, LAN Manager and OpenVMS 7-8
User-level security, LAN Manager-only 7-8
User-level security, when to use 7-8
Users, differences with V4.x 7-23
Users, restrictions on 7-27
Users, upgrading 7-23

## V

VMSclusters, differences from V4.x 7-12
VMSclusters, domains 7-12
VMSclusters, planning 7-12
VMSclusters, upgrading 7-13
VT320 terminal emulator 4-1

## W

WIN.INI: 4-5
Windows files 3-15
Windows for Workgroups 3-11
WINFILE.INI 4-5
Workstation Manager 3-2, 3-6, 3-10, 7-32

## X

X.25 migration 5-1