

HP OpenVMS Version 8.4 Upgrade and Installation Manual

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Table of Contents

Preface.....	15
About this document.....	15
Intended Audience.....	15
When to Use This Manual.....	15
New and Changed Information in this Edition.....	15
Document Organization.....	16
Typographical Conventions.....	17
Related Information.....	17
Publishing History.....	19
HP Encourages Your Comments.....	20
How to Order Additional Documentation.....	20
1 Getting Started.....	21
1.1 Key Terms.....	21
1.2 Getting to Know Your Integrity servers.....	22
1.2.1 Entering Commands at Integrity servers Console Interfaces.....	22
1.2.2 Integrity server Tools.....	22
1.2.3 Virtual Connect (VC) on HP BladeSystem c-Class Enclosures.....	23
1.2.4 Cell-Based Server Terminology.....	23
1.2.5 Getting Started: Main Steps After You Unpack Your Integrity servers.....	24
1.3 Examining Software and Hardware Components	25
1.3.1 Hardware Components.....	25
1.3.2 Software Components.....	25
1.3.3 OpenVMS Alpha Operating System CD.....	25
1.3.4 OpenVMS for Integrity servers Operating Environment DVD.....	25
1.3.5 Firmware on Alpha Systems.....	26
1.3.6 Firmware on Integrity server Systems.....	26
1.3.6.1 Checking Firmware Version	27
1.3.6.2 Creating a Firmware Update CD.....	27
1.3.6.3 Updating Your Firmware from the Firmware Update CD.....	28
1.3.7 Device-Naming Conventions.....	28
1.4 Using the Operating System Menu.....	29
1.4.1 Using the Install, Upgrade, or Reconfigure OpenVMS Option (1).....	30
1.4.1.1 INITIALIZE Option.....	31
1.4.1.2 PRESERVE Option.....	31
1.4.2 Using the Display Layered Products Option (2).....	32
1.4.3 Using the Install or Upgrade Layered Products Option (3).....	33
1.4.4 Using the Show Installed Products Option (4).....	35
1.4.5 Using the Reconfigure Installed Products Option (5).....	36
1.4.6 Using the Remove Installed Products Option (6).....	38
1.4.7 Using the Patches and Recovery Data Option (7).....	39
1.4.8 Using the Execute DCL Option (8).....	40
1.4.9 Using the Shutdown Option (9).....	40
1.5 Making the Install/Upgrade/Backup Selection	40
2 Preparing to Install in an OpenVMS Cluster Environment.....	41
2.1 Preinstallation Tasks for OpenVMS Cluster Environments.....	41
2.2 Documentation to Review.....	41
2.3 Mixed-Version Support in OpenVMS Cluster Systems.....	41

2.4	OpenVMS Cluster Information You Need.....	43
2.5	Dismounting the Target System Disk Elsewhere in the Cluster.....	43
2.6	Beginning the Installation.....	44
3	Installing the OpenVMS Operating System.....	45
3.1	Installation Tasks.....	45
3.2	Booting the OpenVMS Operating System Media.....	45
3.2.1	Booting the OpenVMS Alpha CD.....	46
3.2.1.1	Determining the Boot Device.....	46
3.2.1.2	Booting from the Local Drive.....	46
3.2.1.3	Booting from the InfoServer.....	46
3.2.2	Booting the OpenVMS Integrity servers OE DVD.....	48
3.2.2.1	Booting from the Local Drive.....	49
3.2.2.2	Booting Over the Network Using the InfoServer utility.....	50
3.2.2.3	Booting Using HP SIM Provisioning.....	50
3.2.2.4	Booting Using vMedia.....	51
3.3	Installing the OpenVMS Guest Operating System.....	51
3.3.1	Preparing to Install the Guest Operating System.....	51
3.3.2	Installing the Guest Operating System.....	53
3.4	Installing the OpenVMS Operating System onto a System Disk.....	54
3.4.1	Differences Between OpenVMS Integrity servers and Alpha Installations.....	54
3.4.2	Responding to Prompts During the Installation.....	55
3.4.3	Installing OpenVMS Using Option 1 of the Operating System Menu.....	56
3.5	Booting the New OpenVMS System Disk.....	77
3.5.1	Booting the OpenVMS Alpha System Disk.....	77
3.5.1.1	Specifying the Default Boot Device on Alpha Systems.....	77
3.5.1.2	How to Boot the New System Disk.....	77
3.5.2	Booting the OpenVMS Integrity servers System Disk.....	78
3.5.3	Next Steps.....	79
3.6	Joining an OpenVMS Cluster.....	79
3.7	Running AUTOGEN.....	81
3.8	Rebooting After AUTOGEN.....	81
3.9	Logging In to the SYSTEM Account.....	82
3.9.1	Logging In from a Character-Cell Terminal.....	82
3.9.2	Logging In from a Workstation.....	82
3.10	Postinstallation Tasks.....	83
4	Before Upgrading the OpenVMS Operating System.....	85
4.1	Preupgrade Tasks.....	85
4.2	Documentation to Review.....	85
4.3	Notes, Cautions, and Restrictions.....	86
4.3.1	Upgrade Paths.....	86
4.3.1.1	Direct Upgrade Paths	86
4.3.1.2	Indirect Upgrade Paths.....	86
4.3.2	Update License Requirements.....	86
4.3.3	Components You Choose Not to Install.....	87
4.3.4	Licenses and Layered Products.....	87
4.4	Software That Must Be Manually Removed.....	87
4.4.1	Remove Older Versions of DECram for OpenVMS (Alpha Only).....	87
4.4.2	Remove TDC Version 2.0 (Alpha Only).....	88
4.5	Software That Must be Deconfigured (Integrity servers Only).....	89
4.6	Saving Archived Files from Being Deleted by the Upgrade.....	89
4.7	Preparing the System Disk.....	89

4.7.1	Checking the Directory Structure and Preserving Your Security Protections.....	89
4.7.2	Checking the SYSCOMMON Directories.....	89
4.7.3	Purging Duplicate Files from the System Disk.....	90
4.7.4	Examining the System Disk.....	90
4.7.5	Checking the Size of the System Disk.....	90
4.7.6	Returning Authorization and AGEN\$INCLUDE Files to the System Disk.....	91
4.7.6.1	Authorization Files.....	91
4.7.6.2	AGEN\$INCLUDE Files.....	92
4.7.7	Verifying System Parameters.....	92
4.8	Ensuring You Have a Recent FEEDBACK.DAT File.....	93
4.9	Shadowing Environment.....	94
4.9.1	Setting the Boot Device.....	95
4.9.2	Creating a Nonshadowed Target Disk.....	95
4.10	Backing Up the System Disk.....	95
4.11	Finishing Preupgrade Tasks.....	96
5	Preparing to Upgrade in an OpenVMS Cluster Environment.....	97
5.1	Preupgrade Tasks for OpenVMS Cluster Environments.....	97
5.2	Documentation to Review.....	97
5.3	Mixed-Version Support in an OpenVMS Cluster Environment.....	97
5.4	Adding a New System to an OpenVMS Cluster.....	99
5.5	Types of Upgrades.....	99
5.5.1	Concurrent Upgrade.....	99
5.5.1.1	How a Concurrent Upgrade Works.....	99
5.5.1.2	Preparing Your System for a Concurrent Upgrade.....	99
5.5.2	Rolling Upgrade.....	100
5.5.2.1	How a Rolling Upgrade Works.....	100
5.5.2.2	Notes and Restrictions.....	100
5.5.2.3	Preparing Your System for a Rolling Upgrade.....	101
6	Upgrading the OpenVMS Operating System.....	105
6.1	Upgrade Tasks.....	105
6.2	Booting the OpenVMS Operating System Media.....	105
6.2.1	Booting the OpenVMS Alpha Operating System CD.....	105
6.2.1.1	Determining the Boot Device.....	105
6.2.1.2	Booting from the Local Drive.....	106
6.2.1.3	Booting from the InfoServer.....	106
6.2.2	Booting the OpenVMS Integrity servers OE DVD.....	107
6.2.2.1	Booting from the Local Drive.....	108
6.2.2.2	Booting Over the Network Using the InfoServer Utility.....	109
6.2.2.3	Booting Using HP SIM Provisioning.....	109
6.2.2.4	Booting Using vMedia.....	109
6.3	Performing the Upgrade.....	109
6.3.1	Upgrading the System Using Option 1 of the Operating System Menu.....	109
6.3.2	Choosing INITIALIZE or PRESERVE.....	110
6.3.3	Specifying the Target Disk.....	110
6.3.4	Selecting Reinstallation and Reconfiguration Options.....	111
6.3.5	Checking for Recovery Data.....	112
6.3.6	Specifying the Volume Label.....	113
6.3.7	Specifying the On-Disk Structure Level.....	113
6.3.8	Choosing Whether to Allow the Procedure to Create and Validate Boot Options (Integrity servers only).....	115
6.3.9	Warning About Removal of the DECRAM Command.....	116

6.3.10	Setting OpenVMS Cluster Membership Information.....	116
6.3.11	Setting OpenVMS Galaxy Information (Alpha Only).....	117
6.3.12	Updating Time Zone Information.....	117
6.3.13	Upgrading Windowing, Networking, and Related Products.....	117
6.4	Completing the Upgrade.....	118
6.4.1	Choosing Descriptive Help Text.....	119
6.4.2	Removing Older Versions of ENCRYPT.....	119
6.4.3	Secure Delivery Validation.....	119
6.4.4	Saving Archived Files.....	120
6.4.5	Selecting Product Component Options.....	120
6.4.6	Component and Product Installation Confirmation Messages.....	122
6.4.7	Upgrade Creates and Validates Boot Options (Integrity servers only).....	123
6.4.8	Upgrade Completes and Returns to OpenVMS Operating System Menu.....	124
6.4.9	Shutting Down the System.....	125
6.5	What to Do After Shutdown.....	125

7 After Installing or Upgrading the OpenVMS Operating System..... 127

7.1	Postinstallation and Postupgrade Tasks.....	127
7.2	Backing Up Your System Disk.....	129
7.3	Registering Your Licenses.....	130
7.4	Set System Parameters for Volume Shadowing (Optional).....	131
7.5	Tuning BAP System Parameters (Alpha Upgrade Only).....	132
7.6	Running AUTOGEN to Set System Parameter Changes.....	133
7.7	Forming the Shadow Set.....	133
7.8	Customizing the System (New Installations, Some Upgrades).....	134
7.8.1	Creating Network Proxy Authorization Files.....	135
7.8.2	Setting Up the Queue Manager and Default Queues	135
7.8.3	Configuring a Multihead System (Optional).....	136
7.8.4	Configuring DECnet	137
7.8.5	Configuring HP TCP/IP Services for OpenVMS.....	137
7.8.6	Installing and Configuring Third-Party Networking Software.....	138
7.9	Initializing or Configuring Other Installed Components.....	138
7.9.1	Initializing CDSA (Optional).....	138
7.9.2	Configuring the Availability Manager Base Software (Optional).....	139
7.9.3	Configuring Kerberos (Optional).....	140
7.9.4	Configuring SSL for OpenVMS (Optional).....	141
7.9.5	Configure WBEM Services for OpenVMS (Optional; Integrity servers only).....	142
7.9.5.1	Configuring WBEM Services for OpenVMS (Where Not Configured Previously).....	143
7.9.5.2	Configuring WBEM Services for OpenVMS (Where Configured Previously).....	144
7.9.6	Configure WBEM Providers for OpenVMS (Optional; Integrity servers only).....	146
7.9.7	Configure the Instant Capacity Software (Optional; Integrity servers only).....	148
7.9.8	Configure HP SIM (Optional; Integrity servers only).....	149
7.9.9	Initializing and Running the Performance Data Collector Base Software (Optional).....	149
7.9.9.1	User Privileges and Quotas.....	150
7.9.9.2	Startup File.....	150
7.9.9.3	Compatibility with Prior Releases.....	150
7.9.9.4	Running TDC_RT.....	151
7.9.9.5	Installation in OpenVMS Clusters.....	151
7.9.10	Preparing to Use OpenVMS Management Station (Optional).....	152
7.9.11	Installing OpenVMS Debugger Clients on a PC (Optional)	152
7.10	Creating a System-Specific Login Welcome Message (Optional).....	152
7.11	Examining Your Command Procedures (Upgrades Only).....	153
7.12	Adding and Removing Operating System Files (Optional).....	153

7.13 Expanding the System Libraries (Optional; OpenVMS Alpha Only) Compressing the System Libraries (Optional, OpenVMS Integrity servers: Not Recommended).....	155
7.14 Installing Patches (Optional but Recommended).....	159
7.15 Installing and Configuring Layered Products (New Installations, Some Upgrades).....	161
7.15.1 Alternative Procedure.....	162
7.16 Reinstall DECEvent Software (Alpha Upgrades only; optional).....	163
7.17 Creating Print Queues (New Installations, Some Upgrades).....	163
7.18 Updating SYSTARTUP_VMS.COM to Start Layered Products and Print Queues.....	163
7.19 Creating Accounts (New Installations, Some Upgrades).....	163
7.20 Testing the System with UETP (Optional).....	163
7.21 Backing Up the Customized System Disk and Initiating Systematic Backups.....	164
7.22 Reforming the Shadow Set as Final Postupgrade Backup.....	164
7.23 Rebooting Cluster Members (Upgrades Only).....	164
7.24 Running AUTOGEN to Tune the System.....	164
7.25 Modifying System Parameters.....	166
7.25.1 General Notes About Modifying System Parameters.....	166
7.25.2 Modifying System Parameters After an Upgrade.....	166
7.25.2.1 System File Sizes.....	167
7.25.2.2 OpenVMS Cluster Parameters.....	167

A Booting and Shutting Down Your OpenVMS Alpha System.....	169
A.1 Booting Operations.....	169
A.1.1 Booting the OpenVMS Alpha Operating System CD.....	169
A.1.1.1 Booting from the Local Drive.....	169
A.1.1.2 Booting from the InfoServer	170
A.1.2 Booting with a PMAZB or PMAZC TURBOchannel Adapter.....	173
A.1.3 Booting Manually from the System Disk.....	174
A.1.4 Performing a Conversational (Interactive) Boot.....	174
A.1.5 Booting with Minimum Startup.....	176
A.1.6 Booting with the XDelta Utility (XDELTA).....	176
A.1.7 Booting from a Different Root Directory.....	176
A.1.8 Booting over the Network with an Alternate TURBOchannel Adapter.....	177
A.1.9 Booting in an Emergency.....	177
A.1.9.1 Booting with Default System Parameters.....	177
A.1.9.2 Booting Without Startup and Login Procedures.....	179
A.1.9.3 Booting Without the User Authorization File.....	179
A.2 Configuring Boot Behavior for Alpha Systems.....	181
A.2.1 Setting the System for Automatic Booting.....	181
A.2.2 Setting and Showing Boot Devices.....	182
A.2.3 Setting Boot Flag Parameters.....	182
A.2.4 Writing a New Boot Block.....	183
A.3 Halt and Shutdown Operations.....	184
A.3.1 Halting the System.....	184
A.3.2 Shutting Down the System.....	185
A.3.2.1 Orderly Shutdown.....	185
A.3.2.2 Emergency Shutdown with OPCCRASH.EXE.....	185
A.3.2.3 Emergency Shutdown with Crash Commands.....	185
A.4 Troubleshooting Procedures.....	186
A.4.1 If the System Does Not Boot.....	186
A.4.1.1 For Hardware Problems.....	186
A.4.1.2 For Software Problems.....	186
A.4.2 Detecting and Responding to System Problems.....	186

B Configuring OpenVMS Integrity servers Hardware Operation and Boot Operations, and Booting and Shutting Down Your System.....	189
B.1 Configuration and Management Utilities for HP Integrity servers	189
B.1.1 Overview of Utilities and Console Options.....	190
B.1.2 Configuration and Management Utilities on Cell-Based Servers.....	192
B.1.3 Using the Delete or Backspace Key with Integrity server Utilities.....	192
B.2 Selecting Your OpenVMS Console for the Integrity servers System.....	193
B.2.1 Selecting Your OpenVMS Console (Not Applicable to rx2600 Integrity servers).....	195
B.2.1.1 Using the EFI Boot Manager to Select the OpenVMS Console.....	195
B.2.1.2 Using the EFI Shell to Select the OpenVMS Console.....	197
B.2.2 Selecting Your OpenVMS Console on rx2600 Integrity servers.....	198
B.3 Overview of Using EFI.....	202
B.3.1 General Notes About Using EFI.....	203
B.4 Enabling or Disabling Hyper-Threading on Dual-Core Processors.....	205
B.5 Configuring and Managing OpenVMS Booting on Integrity servers	205
B.5.1 Checking the ACPI Configuration for Booting OpenVMS in an nPartition.....	206
B.5.2 Setting Boot Options for Your System Disk.....	207
B.5.2.1 Adding a Boot Option and Setting Boot Flags	207
B.5.2.1.1 Using EFI to Set Automatic Booting of Your System Disk.....	209
B.5.2.2 Displaying EFI Boot Entries and Mapped OpenVMS Devices.....	210
B.5.2.3 Setting EFI Boot Option Countdown Timer (Timeout).....	210
B.5.2.4 Saving and Restoring EFI Settings.....	210
B.5.3 Writing a New Boot Block.....	211
B.5.4 Alpha and Equivalent Integrity servers System Boot Commands.....	213
B.6 Booting Operations.....	213
B.6.1 Overview of Booting on a Cell-Based Server	214
B.6.1.1 Booting the nPartition Hardware.....	214
B.6.1.2 Booting OpenVMS Integrity servers on an nPartition.....	215
B.6.2 Booting the OpenVMS Integrity servers OE DVD from the Local Drive.....	215
B.6.2.1 Alternate Method of Using EFI to Boot the DVD.....	216
B.6.3 Booting the OpenVMS Integrity servers OE DVD from the InfoServer.....	219
B.6.4 Booting an Image of the OpenVMS Integrity servers OE DVD Using HP SIM Provisioning.....	219
B.6.5 Booting an Image of the OpenVMS Integrity servers OE DVD Using vMedia.....	219
B.6.6 Booting from a Fibre Channel Device.....	219
B.6.7 Booting Manually from the Local System Disk.....	219
B.6.8 Performing a Conversational (Interactive) Boot.....	220
B.6.9 Booting with Minimum Startup.....	221
B.6.10 Booting with the XDelta Utility (XDELTA).....	221
B.6.11 Booting from a Different Root Directory.....	222
B.6.12 Emergency Booting.....	222
B.6.12.1 Booting with Default System Parameters.....	222
B.6.12.2 Booting Without Startup and Login Procedures.....	223
B.6.12.3 Booting Without a User Authorization File.....	224
B.7 Halt and Shutdown Procedures.....	225
B.7.1 Halting the Integrity servers to Recover from Hangs and Crashes.....	225
B.7.2 Shutting Down the System.....	226
B.7.2.1 Orderly Shutdown.....	226
B.7.2.2 Emergency Shutdown with OPCCRASH.EXE.....	227
B.8 Troubleshooting Procedures.....	227
B.8.1 If the System Does Not Boot.....	227
B.8.1.1 For Hardware Problems.....	227
B.8.1.2 For Software Problems.....	227
B.8.2 Detecting and Responding to System Problems.....	227

C	Setting Up and Performing Network Booting.....	229
C.1	About the OpenVMS InfoServer Utility.....	229
C.2	Setting Up Your System as an InfoServer Client.....	231
C.2.1	Determining the Local Network I/O Card to Be Used	231
C.2.2	Adding the Network Boot Option to the EFI Boot Manager.....	232
C.2.3	Verifying the Network I/O Device Is Bootable by EFI.....	233
C.3	Setting Up the InfoServer Server.....	234
C.4	Setting Up the BOOTP Boot Server and TFTP Server (OpenVMS Integrity servers Only).....	237
C.5	Booting OpenVMS Integrity servers from the InfoServer.....	240
C.6	Troubleshooting InfoServer Boot Problems.....	245
D	Using HP SIM and vMedia for Provisioning OpenVMS.....	247
D.1	HP SIM Provisioning of OpenVMS.....	247
D.1.1	About HP SIM and Provisioning.....	247
D.1.2	Prerequisites for HP SIM Provisioning.....	248
D.1.3	Setting Up InfoServer Support.....	249
D.1.4	Setting Up vMedia.....	252
D.1.5	Setting Up HP SIM and the Windows Server to Provision OpenVMS.....	259
D.1.5.1	Installing or Upgrading the OpenVMS Provisioning Plug-in for HP SIM.....	259
D.1.5.2	Discovering and Identifying Your New Provisioning Client Management Processors	259
D.1.5.2.1	Manually Discovering an MP with HP SIM.....	260
D.1.6	Provisioning OpenVMS.....	262
D.1.6.1	Provisioning OpenVMS Through the InfoServer.....	264
D.1.6.2	Provisioning OpenVMS Through vMedia.....	271
D.1.6.3	Installing Licenses on OpenVMS Servers Through Provisioning.....	275
D.1.6.4	Configuring OpenVMS TCP/IP Through Provisioning.....	278
D.1.6.4.1	Prerequisites for Configuring TCP/IP.....	279
D.1.6.4.2	Configuring TCP/IP.....	279
D.2	Using vMedia Independently of HP SIM.....	284
D.2.1	Prerequisites for Using vMedia to Install or Upgrade OpenVMS.....	284
D.2.2	Using vMedia to Install or Upgrade OpenVMS.....	285
E	Setting Up and Booting Fibre Channel Storage Devices.....	293
E.1	Booting on a Fibre Channel Storage Device on OpenVMS Alpha Systems.....	293
E.1.1	Using the AlphaServer Console for Configuring Fibre Channel (Alpha Only).....	293
E.1.1.1	Viewing the FC Configuration from the Console.....	293
E.1.1.2	Setting Up FC Disks for Booting and Dumping.....	296
E.2	Booting on a Fibre Channel Storage Device on OpenVMS Integrity server Systems.....	299
E.2.1	Checking the Firmware Version.....	299
E.2.2	Obtaining the IPF Offline Diagnostics and Utilities.....	300
E.2.3	Configuring and Booting FC Boot Device.....	301
E.2.4	Configuring Additional Nodes to Boot into a Cluster Using a Shared Disk.....	304
F	Backing Up and Restoring the System Disk.....	305
F.1	Reasons for Backing Up the System Disk.....	305
F.2	Suggested Procedures.....	305
F.3	OpenVMS Cluster Caution.....	305
F.4	Backing Up the System Disk.....	306
F.4.1	Getting Started.....	306
F.4.2	Mounting Devices.....	306
F.4.3	Performing the System Disk Backup.....	306

F.4.4	Changing the Disk Volume Cluster Size.....	307
F.4.5	Logging Out, Shutting Down, and Rebooting.....	307
F.5	Restoring the System Disk.....	307
F.5.1	Getting Started.....	307
F.5.2	Mounting Devices.....	308
F.5.3	Performing the System Disk Restore.....	308
F.5.4	Logging Out, Shutting Down, and Rebooting.....	308
F.6	Alternative Backup and Restore Procedure (Minimum OpenVMS Environment).....	309
F.6.1	Preparing an Alternate System Disk.....	309
F.6.2	Using the Alternate System Disk.....	310
G	Installing the OpenVMS Internationalization Data Kit.....	313
H	Preparing to Use OpenVMS Management Station.....	315
H.1	Preparing Your OpenVMS System.....	315
H.1.1	Setting Up in a Mixed-Architecture Cluster Environment.....	315
H.1.2	Starting the Server on Other Nodes.....	317
H.1.3	Error Log Information.....	317
H.1.4	Updating the Printer and Storage Database.....	317
H.1.5	Editing the System Files.....	317
H.1.6	Controlling the Printer and Storage Environment.....	318
H.1.7	Keeping Your Printer Environment Up to Date.....	318
H.1.7.1	When Is the Database Updated?.....	319
H.1.7.2	Do You Need to Run TNT\$UTILITY.COM Manually?.....	319
H.1.7.3	What Are the Requirements for Running TNT\$UTILITY.COM?.....	319
H.1.8	Keeping Your Storage Environment Up to Date.....	320
H.1.9	Enabling Disk Quotas.....	320
H.1.10	Caching Storage Configuration Data.....	320
H.1.11	Running Third-Party TCP/IP Stacks.....	320
H.1.12	Determining and Reporting Problems.....	321
H.1.13	Removing the OpenVMS Management Station Server.....	321
H.2	Preparing Your PC.....	321
H.2.1	Required Memory and Disk Space.....	321
H.2.2	Distribution Files.....	321
H.2.3	Required Software.....	321
H.2.4	Time Required for Installation.....	321
H.2.5	Copying the Client File to the PC.....	321
H.2.6	Installation Directory.....	322
H.2.7	Installation Procedure.....	322
H.2.8	Recovering from Errors.....	322
H.3	After Installing the Client Software on Your PC.....	322
H.4	Defining TCP/IP Nodes.....	322
H.5	Removing Version 2.1 of the OpenVMS Management Station Client.....	322
H.6	Removing OpenVMS Management Station.....	322
H.7	Getting Started with OpenVMS Management Station.....	323
I	Removing the OpenVMS Operating System.....	325
J	Alternative Ways to Initialize the System Disk.....	327
J.1	Alternative Method of Initialization.....	327
J.2	Removing the Diagnostic Partition File (Integrity servers only).....	328

Glossary.....	329
Index.....	339

List of Figures

E-1	Fibre Channel Host and SAN Storage Controller Configuration.....	303
-----	------------------------------------------------------------------	-----

List of Tables

1-1	Definitions of Terms.....	21
1-2	Getting OpenVMS Started on Integrity servers.....	24
2-1	Preinstallation Checklist.....	41
2-2	Warranted Cluster Support with OpenVMS Version 8.4.....	42
2-3	Supported Migration Pairing with Version 8.4 OpenVMS Alpha or Integrity servers.....	42
3-1	Installation Checklist.....	45
3-2	Prompts for OpenVMS Cluster Configurations.....	80
4-1	Preupgrade Checklist.....	85
4-2	Logical Names for Relocated Authorization Files.....	91
5-1	Preupgrade Checklist for OpenVMS Cluster Environments.....	97
5-2	Warranted Cluster Support with OpenVMS Version 8.4.....	98
5-3	Supported Migration Pairing with Version 8.4 OpenVMS Alpha or Integrity servers.....	98
6-1	Upgrade Checklist.....	105
7-1	Postinstallation and Postupgrade Checklist.....	128
7-2	Reduced and Expanded Sizes of Libraries	156
A-1	Supported LAN Devices.....	170
A-2	SYSGEN Commands Used in the SYSBOOT Procedure.....	175
A-3	Emergency Boot Procedures.....	177
B-1	Alpha and Integrity servers EFI Command Equivalents.....	213
B-2	SYSGEN Commands Used in the SYSBOOT Procedure.....	220
B-3	Emergency Boot Procedures.....	222
C-1	InfoServer Booting: Differences Between Alpha and Integrity server Systems.....	229
C-2	Procedure for Enabling InfoServer Network Booting.....	230

List of Examples

3-1	Component Options and Suboptions.....	72
C-1	Setting Up the Boot Server and Client (for Version 8.3-1H1 and Lower).....	240
C-2	Setting Up the Boot Server and Client (for Version 8.4).....	240
C-3	DHCP Message.....	243
C-4	Loading of Memory Disk Message.....	244
E-1	Using wwidmgr -show wwid.....	294
E-2	Using wwidmgr -show wwid -full.....	295
E-3	Using wwidmgr -quickset.....	298
E-4	Boot Sequence from an FC System Disk.....	299

Preface

About this document

This document explains how to install, or upgrade to, Version 8.4 of the HP OpenVMS OpenVMS Alpha or OpenVMS for Integrity servers operating system. Also included are the prerequisites for installing and upgrading your software and the required and optional tasks you can perform after you complete the software installation or upgrade.



NOTE: This document is a work in progress. Not all the information in this manual has been updated for the current release; more information will be added. Throughout the remainder of this document, the version number of OpenVMS is referred to as 8.4 instead of E8.4.

Intended Audience

This manual is intended for anyone responsible for installing or upgrading the OpenVMS Alpha or OpenVMS Integrity servers operating system, and for the startup, shutdown, and backup operations required on Alpha or Integrity servers running this software.

When to Use This Manual

Use this manual if you need to install or upgrade the OpenVMS operating system software yourself or if you need to perform certain startup, shutdown, or backup operations. If you received factory-installed software (FIS) with your Alpha system or Integrity servers, see the release notes provided with the software, and use this manual for any information not covered in those release notes.

New and Changed Information in this Edition

The following information is new or revised for OpenVMS Version 8.4:

- With this release, the operating environments (OEs) providing OpenVMS Integrity server elements have been changed:
 - Beginning with OpenVMS Version 8.4, the Base Operating Environment (BOE) replaces the Foundation Operating Environment (FOE) as the tier of the Operating Environment for OpenVMS for Integrity servers. The BOE offers the base operating system and networking transport products and more.
 - The High Availability Operating Environment (HA-OE) includes some of the OpenVMS products that were formerly included with the Mission Critical Operating Environment (MCCOE) and Enterprise Operating Environment (EOE). The HA-OE additionally offers the products included with the BOE like the following (they were formerly part of the EOE and are now part of the BOE):
 - DECram

For more information, see the *HP Operating Environments for OpenVMS for Integrity servers Software Product Description (SPD 82.34.xx)*.

- OpenVMS Integrity servers now support a power management interface from the Integrity Lights Out (iLO) console and from the Insight Power Manager (IPM) software. The power management interface is available only on systems that support the iLO power management interface. For more information about iLO power management interface available for your Integrity servers, see the *iLO MP Operations Guide*. IPM provides centralized monitoring and control of server power consumption and thermal output. (Although OpenVMS still supports the SYSGEN parameter CPU_POWER_MGMT, the iLO interface takes precedence over this parameter.) Before installing OpenVMS Integrity servers, check that power

management is set in the state that you prefer. For more information, see the *HP OpenVMS System Management Utilities Reference Manual*.

- OpenVMS Integrity servers support virtual keyboard, video, and mouse (vKVM) with Integrity servers (rx2660, rx3600, and rx6600 Integrity servers and the BL860c and BL870c Server Blade products). HP iLO management processors make it simpler, faster and less costly to manage your Integrity servers remotely. The iLO Advanced KVM Card on the Integrity servers combines a physical graphics/USB card with additional logic to permit the Lights Out Advanced features of Virtual Media and Integrated Remote Console. Licenses to use iLO/vKVM are provided with the Server Blade products. For other server products, licenses might have to be purchased separately.

Document Organization

This manual is organized as follows:

- Chapter 1 (page 21) defines key terms and provides information about hardware and software components. Review this chapter before performing any installation or upgrade.
- Chapter 2 (page 41) provides preliminary information.
- Chapter 3 (page 45) explains how to install the OpenVMS Alpha or OpenVMS Integrity servers operating system. It also includes instructions for installing the OpenVMS Guest operating system.
- Chapter 4 (page 85) describes how to prepare your system for an upgrade.
- Chapter 5 (page 97) supplements Chapter 4 (page 85) with additional tasks you must perform before upgrading an OpenVMS Cluster system.
- Chapter 6 (page 105) describes how to upgrade the operating system.
- Chapter 7 (page 127) describes the tasks you must perform after installing or upgrading the operating system.
- Appendix A (page 169) contains instructions on booting, halting, and shutting down OpenVMS Alpha systems. It also includes instructions on configuring boot options.
- Appendix B (page 189) provides an overview of the utilities available with HP Integrity servers, and explains how to configure the system console, how to configure boot options, and how to boot the OpenVMS operating system.
- Appendix C (page 229) explains how to set up and perform network booting for installations and upgrades using the InfoServer utility, a software application available on certain OpenVMS Alpha and OpenVMS Integrity server systems.
- Appendix D (page 247) explains how to set up and perform provisioning (installations and upgrades) of OpenVMS on one or more Integrity servers in a network using HP SIM. In addition, this appendix explains how to use vMedia to install or upgrade OpenVMS on Integrity servers in the network.
- Appendix E (page 293) explains how to boot the Fibre Channel storage device.
- Appendix F (page 305) explains how to back up and restore the system disk.
- Appendix G (page 313) discusses the OpenVMS internationalization data kit (VMSI18N) and how to install it.
- Appendix H (page 315) explains how to prepare your OpenVMS system and your PC to run the OpenVMS Management Station server and client software.
- Appendix I (page 325) explains how to remove the OpenVMS operating system from your disk.
- Appendix J (page 327) explains alternate methods of initializing an OpenVMS Alpha or OpenVMS Integrity servers system disk and includes information about diagnostic partitions on OpenVMS Integrity servers system disks.
- The Glossary (page 329) defines key terms used in this manual.

Typographical Conventions

The following conventions are used in this manual:

Convention	Meaning
Ctrl/x	A sequence such as Ctrl/x indicates that you must hold down the key labeled Ctrl while you press another key or a pointing device button.
PF1x	A sequence such as PF1x indicates that you must first press and release the key labeled PF1 and then press and release another key (x) or a pointing device button.
Enter	In examples, a key name in bold indicates that you press that key.
...	A horizontal ellipsis in examples indicates one of the following possibilities:– Additional optional arguments in a statement have been omitted.– The preceding item or items can be repeated one or more times.– Additional parameters, values, or other information can be entered.
.	A vertical ellipsis indicates the omission of items from a code example or command format; the items are omitted because they are not important to the topic being discussed.
()	In command format descriptions, parentheses indicate that you must enclose choices in parentheses if you specify more than one. In installation or upgrade examples, parentheses indicate the possible answers to a prompt, such as: <code>Is this correct? (Y/N) [Y]</code>
[]	In command format descriptions, brackets indicate optional choices. You can choose one or more items or no items. Do not type the brackets on the command line. However, you must include the brackets in the syntax for OpenVMS directory specifications and for a substring specification in an assignment statement. In installation or upgrade examples, brackets indicate the default answer to a prompt if you press Enter without entering a value, as in: <code>Is this correct? (Y/N) [Y]</code>
	In command format descriptions, vertical bars separate choices within brackets or braces. Within brackets, the choices are optional; within braces, at least one choice is required. Do not type the vertical bars on the command line.
{ }	In command format descriptions, braces indicate required choices; you must choose at least one of the items listed. Do not type the braces on the command line.
bold type	Bold type represents the name of an argument, an attribute, or a reason. In command and script examples, bold indicates user input. Bold type also represents the introduction of a new term.
<i>italic type</i>	Italic type indicates important information, complete titles of manuals, or variables. Variables include information that varies in system output (<code>Internal error number</code>), in command lines (<code>/PRODUCER=name</code>), and in command parameters in text (where <code>dd</code> represents the predefined code for the device type).
UPPERCASE TYPE	Uppercase type indicates a command, the name of a routine, the name of a file, or the abbreviation for a system privilege.
Example	This typeface indicates code examples, command examples, and interactive screen displays. In text, this type also identifies website addresses, UNIX command and pathnames, PC-based commands and folders, and certain elements of the C programming language.
–	A hyphen at the end of a command format description, command line, or code line indicates that the command or statement continues on the following line.
numbers	All numbers in text are assumed to be decimal unless otherwise noted. Nondecimal radixes—binary, octal, or hexadecimal—are explicitly indicated.

Related Information

Before installing, upgrading, or using the OpenVMS operating system on your computer, be sure you have access to the following documents. Some of the documents listed here are from

an earlier OpenVMS version documentation set. They have not been revised, they remain valid for OpenVMS Version 8.4.

- *Cover Letter for HP OpenVMS Version 8.4* and any other cover letters included with your kit.
- *HP OpenVMS Version 8.4 New Features and Documentation Overview*, which describes enhancements and new features included in this release of the OpenVMS Integrity servers operating system and provides an overview of the documentation that supports OpenVMS.
- *HP OpenVMS License Management Utility Manual*, which explains how to use the License Management Facility (LMF), the license management tool for the OpenVMS operating system. The manual describes licensing requirements and the tasks required to manage licenses.
- *HP OpenVMS Version 8.4 Release Notes*, which provides important supplementary information about the OpenVMS 8.4 release.
- *HP OpenVMS Cluster Systems and Guidelines for OpenVMS Cluster Configurations*, if you plan to install your system in an OpenVMS Cluster environment.
- The most recent version of the *DECwindows Motif for OpenVMS Installation Guide* and *Managing DECwindows Motif for OpenVMS Systems* (if you plan to install and customize DECwindows Motif for OpenVMS software).
- *HP Open Source Security for OpenVMS, Volume 1: Common Data Security Architecture*, which provides information about CDSA software.
- *HP Open Source Security for OpenVMS, Volume 2: HP SSL for OpenVMS*, which provides information about HP SSL software.
- *HP Open Source Security for OpenVMS, Volume 3: Kerberos*, which provides information about Kerberos software.
- *HP Availability Manager Installation Instructions*, which provides information about Availability Manager software and is available at the following website:
<http://www.hp.com/products/openvms/availabilitymanager>
- For documentation related to the Performance Data Collector (TDC), see the following website:
<http://www.hp.com/products/openvms/tdc/>
- The following networking software documents (if you plan to install and configure DECnet-Plus for OpenVMS, DECnet Phase IV for OpenVMS, or TCP/IP Services for OpenVMS software):
 - *HP TCP/IP Services for OpenVMS Installation and Configuration*
 - *DECnet-Plus for OpenVMS Installation and Configuration*

Documentation for these networking products is included on the OpenVMS Version 8.4 Online Documentation CD. Hardcopy documentation must be purchased separately.

- For documentation related to Instant Capacity (iCAP), Temporary Instant Capacity (TiCAP), see the *HP Instant Capacity User's Guide* on the following website:
<http://docs.hp.com/en/hplex.html#Utility%20Pricing>
- HP SIM documentation is available in the Information Library on the following website:
<http://www.hp.com/go/hpsim>
- HP gWLM documentation is available in the Information Library on the following website (select the Information Library link and then the Manuals, Release Notes, Manpages link and see the Version A.40 manuals):
<http://www.docs.hp.com/en/vse.html>

Information about gWLM and documentation for installing the gWLM agent on OpenVMS Integrity server systems, including release notes, is available at the following website:

http://h71000.www7.hp.com/openvms/integrity/integrity_gwm.html

- The hardware manuals that are supplied with your Alpha or Integrity servers computer. These manuals provide detailed information about your system hardware, including the operation of the system unit, the drives, and the monitor.

During the course of installing, upgrading, or using the OpenVMS operating system on your computer, you could refer to the following documents as well:

- *HP OpenVMS License Management Utility Manual*, which contains detailed information about registering your software licenses.
- *HP OpenVMS System Manager's Manual* and the *HP OpenVMS System Management Utilities Reference Manual*, which contain information about system management operations and utilities that you might need to use when you install, upgrade, customize, and maintain your OpenVMS system. The *HP OpenVMS System Management Utilities Reference Manual: M-Z* provides complete information about using the PCSI utility PRODUCT command to add or remove files, install other software, and related operations.
- *HP Volume Shadowing for OpenVMS*, which you might need if you are installing or upgrading the OpenVMS operating system on a shadowed system disk.
- *HP OpenVMS Management Station Installation Guide*, which provides information about getting started, setting up, and using OpenVMS Management Station.

For additional information about HP OpenVMS products and services, see the following website:

<http://www.hp.com/go/openvms>

For information about managing nPartitions on midrange or Superdome servers, see the *nPartition Administrator's Guide* (previously titled *HP System Partitions Guide: Administration for nPartitions*).

For the latest hardware documentation for HP Integrity servers, see the following website:

<http://docs.hp.com/en/hw.html>

For the latest hardware documentation for Alpha computers, see the following website:

<http://www.hp.com/go/alphadocs>

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[OpenVMS Systems Documentation website.](#)

Manufacturing Part Number	Supported Operating Systems	Supported Versions	Edition Number	Publication Date
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BA322-90087	OpenVMS Integrity servers; OpenVMS Alpha	Version 8.4	1.0	October, 2009
BA322-90077	OpenVMS Integrity servers	Version 8.3-1H1	1.0	October, 2007

HP Encourages Your Comments

HP welcomes your comments on this manual.

Please send comments to the following email address:

openvmsdoc@hp.com

How to Order Additional Documentation

For more information about how to order additional documentation, see the OpenVMS documentation website:

<http://www.hp.com/go/openvms/doc/order>

1 Getting Started

This chapter defines key terms and describes preliminary procedures you must perform before installing or upgrading your OpenVMS system.



NOTE: Throughout this book, examples are taken from OpenVMS Integrity servers' installations or upgrades except where stated otherwise. OpenVMS DCL commands are in uppercase, while HP Integrity servers console commands are in lowercase.

1.1 Key Terms

Table 1-1 lists a few key terms you need to know before you install or upgrade the system.

Table 1-1 Definitions of Terms

Term	Definition
HP Integrity Virtual Machines (Integrity VM)	Integrity VM is a soft partitioning and virtualization technology that provides operating system isolation, with sub-CPU allocation granularity and shared I/O. Integrity VM can be installed on an Integrity server or a hardware partition (nPartition) running HP-UX. OpenVMS can be one of the guest operating systems supported.
HSx device	A self-contained, intelligent, mass storage subsystem that lets computers in an OpenVMS Cluster system environment share disks. The disk on which you install or upgrade the operating system can be connected to one of these systems (for example, an HSV or HSG).
InfoServer	<p>A general-purpose disk storage server. For OpenVMS Alpha systems, the InfoServer may be an independent hardware device or, beginning with OpenVMS Version 8.3, it may be a utility (software application) on an OpenVMS system. On OpenVMS Integrity server systems, the InfoServer is only available as a software application on an OpenVMS system.</p> <p>The InfoServer hardware can serve CDs only (it does not support DVDs); thus, this hardware device cannot serve the OpenVMS Integrity servers operating environment (OE) DVD. The InfoServer utility can serve both DVDs and CDs (for OpenVMS Integrity servers and OpenVMS Alpha systems, respectively). The systems connected to the same LAN can use the InfoServer utility to boot the OpenVMS operating system from a virtual drive (instead of the local drive). For more information about the InfoServer utility, see the <i>HP OpenVMS Version 8.4 New Features and Documentation Overview</i>.</p>
local drive	A drive on your computer system, such as a CD, DVD, or disk drive (hard drive), that is connected directly to the computer. If you have a standalone computer, it is likely that all drives connected to the computer system are local drives.
operating system media	The OpenVMS Alpha operating system CD or the OpenVMS for Integrity servers Operating Environment DVD (OE DVD) included with an OpenVMS distribution kit, which contains the OpenVMS operating system and the installation and other procedures described in this manual.
provisioning	Using HP Systems Insight Manager (HP SIM), the process of installing or upgrading OpenVMS on one or more Integrity servers automatically. HP SIM initiates the process and the installation or upgrade automatically continues in the background.
source drive	The drive that holds the operating system media during an upgrade or installation. This can be a local drive or an InfoServer virtual drive. The drive contains the OpenVMS Alpha operating system CD or the OpenVMS for Integrity servers Operating Environment DVD, or a copy of it.
system disk	The disk from which OpenVMS is typically booted. During an installation or upgrade, this is the target disk because it receives files from the source drive. After installation or upgrade, the target drive is booted and becomes the system disk.
target drive	The drive that holds the target system disk during the upgrade or installation. Note: the target drive must be a hard drive, not a CD or DVD.

Table 1-1 Definitions of Terms *(continued)*

Term	Definition
Virtual KVM (vKVM)	Virtual keyboard, video, and mouse feature included with Integrated Lights Out (iLO) 2 Management Processor (MP) on Integrity servers (rx2660, rx3600, and rx6600 Integrity servers and the BL860c and BL870c Server Blade products). The feature allows you to connect a virtual serial line from your PC to Integrity servers, enabling your PC, keyboard, and mouse to function as if directly connected to the server. Your window displays the contents of the Integrity server's VGA.
virtual media (vMedia)	A virtual-disk capability included with Integrated Lights Out (iLO) 2 Management Processor (MP) on Integrity servers. vMedia provides virtual devices that mimic physical hardware devices. For example, it can provide a virtual CD/DVD drive that emulates the DVD drive on a PC and connects over the network to your Integrity servers as if it were physically connected. You can use vMedia to install OpenVMS on Integrity servers that do not include a built-in DVD drive or that are physically located elsewhere. vMedia can provide the network service for HP SIM provisioning, or it can be used independently of HP SIM.

1.2 Getting to Know Your Integrity servers

The OpenVMS operating system is now supported on a wide variety of HP Integrity servers, including the following:

- Entry-class servers, which include members of the rx16nn, rx26nn, rx36nn, rx46nn, and rx66nn series and the **BladeSystems** Integrity BL860c and BL870c Server Blade products
- Midrange servers, which include members of the rx76nn and rx86nn series
- High-end servers (Superdome)

For an up-to-date list of servers supported by the current release of OpenVMS, see the *HP OpenVMS Version 8.4 Software Product Description (SPD 82.35.xx)*.

The hardware, firmware, and software supported might vary significantly from system to system. Integrity servers are available in many different configurations. The hardware, utilities, and hardware configuration procedures might differ significantly across models, and even across versions of the same model. This manual provides basic information about the firmware, hardware, and utilities offered on Integrity servers. This information is not meant to replace the hardware documentation. For the most up-to-date and relevant information for your particular model, see the hardware documentation for your Integrity servers. The hardware documentation includes model-specific illustrations to guide you. The latest version of documentation for your server can be found online at:

<http://docs.hp.com/en/hw.html>

<http://www.hp.com/support/itaniumservers>

For the latest information about firmware, software requirements, and special considerations for your Integrity servers, see the *HP OpenVMS Version 8.4 Release Notes*.

1.2.1 Entering Commands at Integrity servers Console Interfaces

When entering commands for the Integrity servers, if you press **Delete** on a VTxxx terminal (or press the key you have mapped to send the DEL/RUBOUT character code in your terminal emulator), the last character typed might not be deleted, as would be expected on an OpenVMS Alpha system. The firmware on Integrity servers where that unexpected behavior occurs uses **Ctrl/H** to delete the last character typed. On such Integrity servers, you can remap your terminal to use **Ctrl/H** instead of DEL/RUBOUT, as described in Section B.1.3 (page 192).

1.2.2 Integrity server Tools

Integrity servers include multiple interfaces for working with various aspects of the server or **server complex**. The Management Processor (MP) is available on most Integrity servers. Many entry-class Integrity servers now come with the Integrated Lights Out (iLO) MP (Integrity iLO 2 MP), which provides a complete remote console experience, including a web-based graphical

user interface and the functionality provided by vKVM and vMedia. MP and Integrity iLO provide a service interface that allows access to all hardware and, in a complex, all **nPartitions**. The MP is always available, even when the main power source is turned off (MP can operate on standby power). On **cell-based servers** (such as rx7620, rx8620, and Superdome), MP is available whether or not nPartitions are configured or booted in the server complex. You can navigate from MP to and from the operating system (if it is booted).

The Extensible Firmware Interface (**EFI**) provides support for operating system loaders and allows you to configure the firmware and control the booting environment. EFI is accessible only when the operating system is not booted. On cell-based servers, each nPartition has a separate EFI console interface. EFI provides support for managing nPartitions. The EFI interface is available from an nPartition console only when the nPartition is in an active state but has not booted an operating system.

You can move from the EFI interface to MP and back again. Similarly, you can move from MP to the operating system and back.

OpenVMS Integrity servers now support a power management interface from the Integrity Lights Out (iLO) console and from the Insight Power Manager (**IPM**) software. The power management interface is available only on systems that support the iLO power management interface. For more information about iLO power management interface available for your Integrity servers, see the *iLO MP Operations Guide*. IPM provides centralized monitoring and control of server power consumption and thermal output. (Although OpenVMS still supports the SYSGEN parameter CPU_POWER_MGMT, the iLO interface takes precedence over this parameter.) Before installing OpenVMS Integrity servers, check that power management is set in the state that you prefer. For more information, see the *HP OpenVMS System Management Utilities Reference Manual*.

1.2.3 Virtual Connect (VC) on HP BladeSystem c-Class Enclosures

HP Virtual Connect (**VC**) is a set of interconnect modules and embedded software available for HP **BladeSystem** c-Class enclosures. VC simplifies the setup and administration of server connections. Where most server interconnect choices come with compromises such as too many cables or too much to manage, VC reduces the number of network cables and simplifies management while adding the unique ability to wire everything once, then add, replace or recover servers in minutes instead of hours or days.

VC is enabled with a choice of Ethernet and Fibre Channel modules designed for the HP BladeSystem. The built-in HP Virtual Connect manager defines a server connection profile for each server bay—even before a server is installed. This profile establishes the Media Access Control (MAC) addresses for all Network Interface Controllers (NICs), the World Wide Names (WWNs) for all Host Bus Adapters (HBAs), and the SAN boot parameters. The profile then holds them constant so that even if the server is changed, the configuration and connection profile stay constant. When a new server takes its place, the same profile is assigned.

For more information about VC, select the Virtual Connect networking link at the following website:

<http://www.hp.com/go/bladesystem/virtualconnect>

In addition, see the *HP Virtual Connect for c-Class BladeSystem User's Guide*, available at the following location:

<http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00865618/c00865618.pdf>

1.2.4 Cell-Based Server Terminology

A cell-based server—such as the HP rx7620, rx8720, or Superdome server—is a hardware complex that can run one or more operating systems and that supports dividing hardware resources into nPartitions. Thus, it enables you to configure a complex into one large system or into several smaller systems.

All processors (**cores**) and memory are contained in **cells**, each of which can be assigned for exclusive use by an nPartition. An nPartition defines a subset of the server hardware resources that is used as an independent system environment. An nPartition has its own EFI system boot interface and each nPartition boots and reboots independently. Each nPartition provides both hardware and software isolation so that hardware or software faults in one nPartition do not affect other nPartitions within the same server **complex**.

By using HP software-based nPartition management tools, you can configure nPartition definitions for a server without physically modifying the server hardware configuration. The main administration tools for nPartitions are the Partition Manager, which provides a graphical interface, and the nPartition Commands, which provides a command-line interface. Versions of these interfaces are provided on HP-UX, Linux, and Microsoft Windows systems. The nPartition Commands tool is also available on Linux systems. MP and EFI can also perform nPartition administrative tasks. Slightly different tool sets and capabilities are available on different server models. For more information, see your hardware documentation. In addition, see the *nPartition Administrator's Guide* (previously titled *HP System Partitions Guide: Administration for nPartitions*).

1.2.5 Getting Started: Main Steps After You Unpack Your Integrity servers

When you unpack your Integrity servers, the main steps for getting OpenVMS up and running are those listed in Table 1-2. As indicated in the third column, some of the instructions are provided in this manual. However, for the most up-to-date information specific to your Integrity servers model and version, always refer to the hardware documentation provided for your Integrity servers.

Table 1-2 Getting OpenVMS Started on Integrity servers

Step	Action	Documentation
1	Connect your console cable to the serial port; if MP is present on your server, connect to the MP serial port.	Section B.2 (page 193)
2	Optionally, configure MP to accept connections over TCP/IP Services for OpenVMS.	Hardware manual
3	From the EFI Shell interface or EFI Boot Manager menu, select the device for the OpenVMS console.	Section B.2 (page 193); if you ordered your server preinstalled, console selections are already made but you might need to change them
4	For systems with iLO console and Insight Power Manager, check that power management is set to the state that you prefer.	<i>HP OpenVMS System Management Utilities Reference Manual</i>
5	Power on your Integrity servers, insert the OpenVMS Integrity servers distribution media (DVD) into the drive, cycle power, and then use the EFI boot menu to boot from the DVD. Support for the latest HP Integrity servers supporting Intel and Itanium. For Integrity servers that do not include a built-in CD/DVD drive, you can use an external USB CD/DVD drive (you must supply this drive and the required cable; they are not included with the Integrity servers). OpenVMS supports the InfoServer utility, provisioning, and virtual media (vMedia) devices to allow you to boot, install, or upgrade OpenVMS over the network.	For how to power on and recycle power, see the hardware documentation; for instructions on booting the DVD, see Section 3.2.2 (page 48) For information on the Infoserver utility, see Appendix C (page 229) For information on provisioning and vMedia, see Appendix D (page 247)

After the initial boot, you need not use EFI to configure boot options. You can configure EFI boot options while OpenVMS is running by using the OpenVMS Integrity servers Boot Manager (SYS\$MANAGER:BOOT_OPTIONS.COM), as explained in Section B.5.2 (page 207). This utility is easier to use than EFI and allows you to configure the most pertinent options for your system. In addition, the OpenVMS installation (and upgrade) procedure can assist you in establishing and validating boot options for your system disk.

1.3 Examining Software and Hardware Components

Before you begin an installation or upgrade, be sure you have all the required hardware and software components, as described in the following sections.

1.3.1 Hardware Components

For hardware components, verify the following::

- Be sure the hardware is installed and verified for proper operation. For detailed information, see the hardware manuals you received with your computer.

For initial installations on Integrity servers, your console terminal requires a standard PC-to-PC file transfer cable (also known as a null modem cable; 9-pin female connectors at each end) to connect a PC, laptop, or similar device that includes terminal emulation software; alternatively, on most systems you can use a VGA monitor and USB keyboard (and USB mouse). For information about setting up your system console, see [Section B.2 \(page 193\)](#).

- Be sure you know how to turn on and operate the components of your system, including the system unit, console, monitor, drives, terminals, and printers. If necessary, read the hardware manuals that came with these components.
- Make sure you record the installation procedure. You need a transcript if a problem occurs during installation. If you are using terminal emulation software, set the software to log the session. Otherwise, set up your system to record the installation procedure on either a hardcopy terminal or a printer attached to the console terminal. (See your hardware manuals for more details about connecting those components to your system.)

1.3.2 Software Components

For software components, verify the following:

- Be sure you have all the items listed on the bill of materials contained in the distribution kit. If your distribution kit is incomplete, notify HP Customer Support and request priority shipment of any missing items.
- Before installing the OpenVMS operating system software, review all cover letters and release notes.

1.3.3 OpenVMS Alpha Operating System CD

Included in your OpenVMS Alpha kit is the OpenVMS Alpha operating system CD, which you use to install or upgrade the operating system, or to perform operations such as backing up the system disk. The CD is labeled similar to the following:

CD label	HP OpenVMS Alpha Version 8.4 Operating System
Volume label	ALPHA084

The CD label is the printed label on the CD. The volume label is the machine-readable name that the OpenVMS Alpha operating system and InfoServer systems (or utilities) use to access the CD.

1.3.4 OpenVMS for Integrity servers Operating Environment DVD

Included in your OpenVMS Integrity servers kit is the OpenVMS for Integrity servers OE DVD, which you use to install the operating system or to perform operations such as backing up the system disk. The DVD is labeled similar to the following:

DVD label	HP OpenVMS Version 8.4 for Integrity servers Operating Environment
Volume label	I64084

The DVD label is the printed label on the OE DVD. The volume label is the machine-readable name that the OpenVMS Integrity servers operating system uses to access and identify the DVD.

1.3.5 Firmware on Alpha Systems

OpenVMS Alpha performs a firmware check each time the system is booted. When you boot the OpenVMS Alpha operating system CD, the system automatically checks the version of console firmware that is running on your computer. The system also provides information about how to update the firmware.

If you do not have the *required* version of console firmware, the system displays a message similar to the following:

```
%SYSBOOT-F-FIRMREV, Firmware rev.nnn is below the absolute minimum ofnnn.  
Please update your firmware to the recommended revision nnn,  
Alpha Systems Firmware Update Vn.n.
```

If you do not have the *recommended* version of console firmware, the system displays a message similar to the following:

```
%SYSBOOT-W-FIRMREV, Firmware rev.nnn is below the recommended minimum ofnn.  
Please update your firmware to the recommended revision,  
which can be found on the firmware CD labeled:  
Alpha Systems Firmware Update Vn.n.
```

The latest firmware CD is included with your OpenVMS Alpha media kit. It includes system firmware for current and recent Alpha systems and some I/O adapters. Firmware for older hardware might not be included on the current CD but can be found on previous CDs or online at:

<http://h18002.www1.hp.com/alphaserver/firmware/>

HP recommends updating to the latest released firmware for all systems and I/O adapters. Firmware is released more often than the OpenVMS Alpha operating system. The firmware version recommendations included in OpenVMS Alpha Version 8.4 might be superseded before the next version of the OpenVMS Alpha operating system is released.

1.3.6 Firmware on Integrity server Systems

HP Integrity servers include several firmware components (varying with system type), any of which might need updating. For the minimum versions recommended, see the *HP OpenVMS Version 8.4 Release Notes*. HP recommends that you sign up for Subscriber's Choice so that you can automatically receive email notices regarding the latest firmware updates. Make sure you register all your products to receive the appropriate firmware update notices. You can sign up for Subscriber's Choice at the following website:

<http://itrc.hp.com>

To update entry-class Integrity servers firmware, follow the instructions provided in this section; for cell-based servers (midrange and high-end), contact HP Customer Support.

To update your firmware, perform the following steps:

1. Determine the current firmware versions on your Integrity servers (see Section 1.3.6.1 (page 27)).



NOTE: To receive notification of new firmware releases for the Integrity servers you own, you can subscribe (free of charge) for drivers and software alerts, as instructed in Section 1.3.6.1 (page 27).

2. Create a firmware update CD on any system equipped with a CD or CD/DVD-recordable drive (see Section 1.3.6.2 (page 27)).
3. Update the firmware on your Integrity servers (see Section 1.3.6.3 (page 28)).

1.3.6.1 Checking Firmware Version

To determine the firmware version in place on your Integrity servers, you can use the Extensible Firmware Interface (EFI) `info fw` command at the EFI Shell prompt, as in the following example. (For cell-based servers, check the firmware at the nPartition console.)

```
Shell> info fw
```

You can also use the EFI Boot Manager to obtain firmware information. With MP, you can use the MP `sysrev` command.



NOTE: The `info fw` command at the EFI> Shell prompt cannot be used while OpenVMS is running. You can use the MP interface to check firmware on your system while OpenVMS is running.

NOTE: EFI Shell commands are not case sensitive. However, in this manual, EFI and other Integrity servers interface commands are displayed in lowercase to help distinguish them from OpenVMS DCL commands.

For more information about the latest firmware for your Integrity servers, check the *HP OpenVMS Version 8.4 Release Notes*. In addition, see the information and resources provided on the HP Support website by following these steps:

1. Go to the following website:

<http://www.hp.com/support/itaniumservers>

2. Select the appropriate server in the provided list.

The HP Support page that appears provides a list of tasks and services to choose. To automatically receive drivers and support alerts from HP (free of charge), select “Signup: drivers and support alerts” from the list of services (you might need to select “See more...” to access the signup link), and fill out the forms as instructed.

For more information about firmware for your Integrity servers, select “Download drivers and software” from the list of tasks, and continue with the next step.

3. On the “Download drivers and software” page, select “Cross operating system (BIOS, Firmware, Diagnostics, etc.)”.
4. On the resulting page, locate the appropriate firmware (look for the latest update; previous versions might also be listed), and select the link for the firmware in the “Description” column.
5. Select the “Release Notes” tab and read the information about the latest version of firmware available and the instructions on determining the version of firmware in place on your Integrity servers. Compare your installed version with firmware versions listed in the release notes.

1.3.6.2 Creating a Firmware Update CD

To create a firmware update CD for your entry-class Integrity servers, you need a CD-recordable drive and software, plus a blank CD-R or CD-RW disk. (For updating firmware on a cell-based server, you must contact HP Customer Support.)



NOTE: The following instructions are for recording a DVD on an OpenVMS system. You can record the DVD on any system or PC, such as a Microsoft Windows computer, a Linux system, or an HP-UX system.

1. Follow [steps 1 through 3](#) from the preceding section.
2. Locate the appropriate ISO-image firmware file. (Look for the latest update; previous versions might also be listed along with the latest.) Select the link for that file and read the instructions for the file included in the release notes, and then download the ISO-image firmware

(zip-compressed) file to your system. (To access the release notes, see [step 5](#) in the preceding section.)

3. Unzip the firmware file into the corresponding .ISO file. The .ISO file is a block copy of the firmware disk for the Integrity servers system. On OpenVMS systems, you can obtain the INFO-ZIP utility from an OpenVMS Freeware CD and use the UnZip utility provided with INFO-ZIP. OpenVMS Freeware CDs are packaged with the OpenVMS for Integrity servers OE DVD, and the files on the Freeware CDs are available online at the following website:

www.hp.com/go/openvms/freeware

The following example shows the command for unzipping an .ISO image of the latest firmware for an rx2600 system (the file name changes with each update of the firmware available on the website):

```
$ UNZIP PF_CPEAKSYS0nnn.ZIP
Archive:  SYS$SYSROOT:[SYSMGR] PF_CPEAKSYS0nnn.ZIP
  inflating: PF_CPEAKSYS0nnn.ISO
```

4. Record the data on the CD, specifying the .ISO file as the source for the CD. For instructions on doing this, enter the following command:

```
$ @SYS$MANAGER:CDRECORD HELP
```



NOTE: OpenVMS software includes the CD recording tool CDRECORD. For online help, enter the @SYS\$MANAGER:CDRECORD HELP command at the OpenVMS DCL prompt as shown previously. For CDRECORD source files, check the OpenVMS Open Source Tools CD supplied with your OpenVMS Integrity servers OE DVD. For more information about the software, see the following website:

<http://h71000.www7.hp.com/opensource/opensource.html>

1.3.6.3 Updating Your Firmware from the Firmware Update CD

You update the firmware of an entry-class Integrity servers from the firmware update CD created in the preceding section. For instructions, see the release notes provided for the firmware you downloaded.



IMPORTANT: To update Integrity servers firmware on cell-based servers, contact HP Customer Support.

1.3.7 Device-Naming Conventions

When you perform specific operations, you are asked to specify a **device name** for the source drive and one for the target drive. When specifying those device names, note the following naming conventions:

- When the source drive is a local CD or DVD drive, the device name is similar to the following:
DQA0 (IDE drive) or DNA0 (USB drive)

For a device name, such as DQA0:, note the following conventions:

- DQ is the device code.
- A is the device controller designation.
- 0 is the unit number of the device.

- When the target drive is a local disk, the device name is similar to the following:
DKA0:

- When the source drive is a virtual DVD drive served by the InfoServer, the device name is typically the following:
DAD1:
- On OpenVMS systems configured in certain OpenVMS Cluster or HSx environments, the device naming convention is similar to the following:
DUA20.14.0.2.0
The values you specify identify components such as the boot device, controller, unit number of the boot device, HSx controller node number, and channel numbers. Because these values vary depending on your specific hardware configuration, see the owner, operator, and technical service manuals that came with your computer for detailed information.

1.4 Using the Operating System Menu

The following sections describe how to use the operating system menu to install, upgrade, and modify your system disk, and perform other related tasks.



NOTE: The OpenVMS Alpha CD and OpenVMS Integrity servers DVD menu options are very similar. This section provides examples from the OpenVMS Integrity servers menu system.

The OpenVMS operating system main menu displays automatically when you boot the OpenVMS operating system from the operating system **media** (for instructions on how to boot from the operating system media, see [Section 3.2 \(page 45\)](#)). From the menu, you can choose options to perform any of the following tasks:

- Install or upgrade the operating system from the operating system media.
- Display a list of products that can be installed from the operating system media.
- Install or upgrade **layered products** from the operating system media.
- Show which products are installed on your system.
- Reconfigure layered products installed on your system.
- Remove products.
- Find, install, and remove patches, and display and remove recovery data.
- Enter the DCL environment from which you can perform preinstallation or maintenance tasks, such as mounting or showing devices and backing up or restoring files on the system disk.
- Shut down the system.

The following is a sample display of the OpenVMS main menu:

```
.
.
.
*****
You can install or upgrade the OpenVMS I64 operating system
or you can install or upgrade layered products that are included
on the OpenVMS I64 distribution media (CD/DVD).
```

You can also execute DCL commands and procedures to perform "standalone" tasks, such as backing up the system disk.

Please choose one of the following:

- 1) Upgrade, install or reconfigure OpenVMS I64 Version 8.4
- 2) Display layered products that this procedure can install
- 3) Install or upgrade layered products
- 4) Show installed products
- 5) Reconfigure installed products
- 6) Remove installed products
- 7) Find, Install or Undo patches; Show or Delete recovery data

- 8) Execute DCL commands and procedures
- 9) Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?)

Review the following sections to understand how the menu works. Then you can choose appropriate menu options when you are asked to do so before, during, and after an installation or upgrade.

1.4.1 Using the Install, Upgrade, or Reconfigure OpenVMS Option (1)

Select option 1 on the operating system main menu to install, upgrade, or reconfigure your OpenVMS software. Selecting option 1 implements a PCSI utility concept called a **platform**. The OpenVMS platform contains:

- The OpenVMS operating system
- **Kerberos**, Common Data Security Architecture (**CDSA**), HPBinarychecker, Secure Sockets Layer (**SSL**), Performance Data Collector (**TDC**) (base), and **Availability Manager** (base), all of which are installed automatically with OpenVMS
- The optional **DECwindows Motif for OpenVMS**, **DECnet-Plus**, **DECnet Phase IV**, and **TCP/IP Services for OpenVMS** products, and for OpenVMS Integrity servers only, **WBEM Services for OpenVMS**, and **WBEM Providers for OpenVMS**



NOTE: For use of Instant Capacity (**iCAP**), Temporary Instant Capacity (**TiCAP**), (supported on cell-based Integrity servers), and for support of such products as gWLM and HP Systems Insight Manager (HP SIM), you must install TCP/IP Services for OpenVMS. SSL for OpenVMS is required and is installed automatically.

Including the optional products in the OpenVMS platform allows you to install or upgrade these products along with the OpenVMS operating system.

When you choose to upgrade the system disk, and the OpenVMS software on the disk is the same version, you are given options to reinstall or to reconfigure the OpenVMS system or reconfigure the OpenVMS platform.

Before installing or upgrading OpenVMS, see the information in the following chapters, as appropriate:

- Chapter 2: “Preparing to Install in an OpenVMS Cluster Environment” (page 41)
- Chapter 3: “Installing the OpenVMS Operating System” (page 45)
- Chapter 4: “Before Upgrading the OpenVMS Operating System” (page 85)
- Chapter 5: “Preparing to Upgrade in an OpenVMS Cluster Environment” (page 97)
- Chapter 6: “Upgrading the OpenVMS Operating System” (page 105)



NOTE: Before installing or upgrading OpenVMS on a target drive in an OpenVMS Cluster, make sure the target system disk is not mounted elsewhere in the cluster. The target system disk must be dismounted clusterwide (except on the system from which the installation or upgrade is being performed) and must remain so during the installation or upgrade.

When you select option 1 on the operating system main menu, the system asks whether you want to preserve or initialize the system disk. The display is similar to the following:

There are two choices for Installation/Upgrade:

INITIALIZE - Removes all software and data files that were previously on the target disk and installs OpenVMS I64.

PRESERVE -- Installs or upgrades OpenVMS I64 on the target disk and retains all other contents of the target disk.

* Note: You cannot use PRESERVE to install OpenVMS I64 on a disk on

which any other operating system is installed. This includes implementations of OpenVMS for other architectures.

Do you want to INITIALIZE or to PRESERVE? [PRESERVE]

1.4.1.1 INITIALIZE Option

When you specify the INITIALIZE option, the following operations take place:

- All software and data files that already exist on the target disk are removed. The software can only be recovered from a backup of the disk, so make sure that you either have a backup or will not need the data again.
- The operating system is installed.

Specify the INITIALIZE option and perform a full installation under any of the following conditions:

- If your computer is new (it has never had any version of any operating system running on it, including factory-installed software).
- If your computer is already running a version of the OpenVMS operating system and you want to overwrite the entire contents of the system disk (the operating system, application software, and user files).
- If you want to keep an existing system disk and install OpenVMS on a different disk.
- If you are running the OpenVMS operating system but cannot upgrade. For example, if you changed the names of system directories on the system disk, the upgrade procedure will not work correctly. Therefore, unless you restore the system disk to its original directory structure, you must reinstall the operating system using the INITIALIZE option.



NOTE: During initialization of an OpenVMS Integrity servers target system disk, the installation process creates a **diagnostic partition**, visible only at the console prompt. For more information about this partition and options you can take, see [Appendix J \(page 327\)](#).

For systems that support the Instant Capacity (iCAP) feature, CPU status (how many cores are available and how much time they have remaining) is not affected by initialization of the system disk. Such information is stored in NVRAM on the Integrity servers.

1.4.1.2 PRESERVE Option

When you specify the PRESERVE option, the following operations take place:

IF ...	THEN ...
The OpenVMS operating system <i>is not</i> already installed on the target disk and no other operating system is installed on the disk	<ul style="list-style-type: none">• The operating system is <i>installed</i>.• All other contents of the target disk are retained.
The OpenVMS operating system <i>is</i> installed on the target disk	The operating system is <i>upgraded</i> , as follows: <ul style="list-style-type: none">• Old operating system files and new files are merged or replaced.• All other contents of the target disk are retained.



NOTE: You cannot install OpenVMS on a disk where another operating system is installed. For example, you cannot take a UNIX disk, select the PRESERVE option, and then install OpenVMS on the disk. The UNIX disk is not structured in the format that OpenVMS requires. If you intend to choose the PRESERVE option (because there are certain files on the disk that you want to retain), HP recommends that you first make a backup copy of your system disk. If there is any problem during the installation or upgrade that might affect the integrity of the disk, you will have the backup copy as a safeguard.

If you choose the PRESERVE option and choose a target disk that already contains the OpenVMS Version 8.4 software, you are provided with the option to either reconfigure or reinstall the OpenVMS operating system:

- Reconfigure the operating system if you want to change the options you chose to include when the operating system was installed.
- Reinstall the operating system if you think that your system files might have become corrupted.

For additional configuration information, see [Section 7.12 \(page 153\)](#).

1.4.2 Using the Display Layered Products Option (2)

Use option 2 to display layered products that can be installed.



NOTE: Although option 2 displays any patch kits available from the OpenVMS distribution media, HP recommends using option 7 to display patch kits; option 7 enables you to specify locations to search in addition to the standard location.

When you select option 2 on the operating system main menu, the following information is displayed:

- The version of OpenVMS and versions of the required components and optional products that can be installed or upgraded when you select option 1 on the main menu.
- The layered product kits that are available for installation when you select option 3 on the operating system main menu. The DECwindows graphical user interface and HP networking products are shown again, along with other layered products.



NOTE: The two lists of products (the products that can be installed or upgraded and the layered product kits available for installation) might be the same or very similar. Generally, products that can be installed or upgraded along with the OpenVMS operating system should be installed or upgraded with the OpenVMS operating system.

The following is an example of a display. WBEMCIM is the file name used in the PCSI kit for the WBEM Services for OpenVMS product, which is available on OpenVMS Integrity server systems only. CIM stands for the Common Information Model, which differentiates the current OpenVMS WBEM product from the original one that is based on the Simple Network Maintenance Protocol (SNMP). The version numbers in this example do not necessarily reflect the version numbers of the products actually shipped with OpenVMS Version 8.4.

```
The following versions of the OpenVMS operating system,  
required components and optional other products  
are available on the OpenVMS distribution media (CD/DVD).  
They can be installed by selecting option 1:
```

```
HP I64VMS VMS version V8.4  
HP I64VMS AVAIL_MAN_BASE V8.4  
HP I64VMS CDSA version V2.3-306  
HP I64VMS KERBEROS version V3.1-152  
HP I64VMS SSL V1.4-284  
HP I64VMS TDC_RT version V2.3-1
```

```

HP I64VMS HPBINARYCHECKER version V1.0
HP I64VMS WBEMCIM version V2.91-A070728
HP I64VMS WBEMPROVIDERS version V2.0-31
HP I64VMS DWMOTIF version V1.7
HP I64VMS DECNET_PLUS version V8.4
HP I64VMS DECNET_PHASE_IV version V8.4
HP I64VMS TCPIP version V5.7

```

The following Layered Product kits are available on the OpenVMS Distribution media (CD/DVD). They can be installed by selecting option 3. If they are already installed, they can be reconfigured by selecting option 5, or removed by selecting option 6.

PRODUCT	KIT TYPE	KIT FORMAT
HP I64VMS AVAIL_MAN_BASE V8.4	Full LP	Compressed
HP I64VMS CDSA V2.3-306	Full LP	Compressed
HP I64VMS DECNET_PHASE_IV V8.4	Full LP	Compressed
HP I64VMS DECNET_PLUS V8.4	Full LP	Compressed
HP I64VMS DWMOTIF V1.7	Full LP	Compressed
HP I64VMS HPBINARYCHECKER V1.0	Full LP	Compressed
HP I64VMS DWMOTIF_SUPPORT V8.4	Full LP	Compressed
HP I64VMS KERBEROS V3.1-152	Full LP	Compressed
HP I64VMS SSL V1.4-284	Full LP	Compressed
HP I64VMS TCPIP V5.7	Full LP	Compressed
HP I64VMS TDC_RT V2.3-1	Full LP	Compressed
HP I64VMS WBEMCIM V2.91-A070728	Full LP	Compressed
HP I64VMS WBEMPROVIDERS V2.0-31	Full LP	Compressed

13 items found

Press Return to continue...

1.4.3 Using the Install or Upgrade Layered Products Option (3)

Use option 3 on the operating system main menu for normal installations or upgrades of the layered products.



NOTE: Although option 3 installs any patch kits available from the OpenVMS distribution media, HP recommends using option 7 to install patch kits; option 7 enables you to install patch kits that are not located in the standard location. In addition, option 7 saves recovery data; when you use option 7 to remove patch kits, only kits with recovery data are removed.

You can use option 1 to install or upgrade the DECwindows graphical user interface and HP networking products along with the OpenVMS operating system.

When you select option 3, the PCSI utility allows you to choose whether to install layered products or to register layered products that are on the target disk but are not in the Product Database. If you attempt to reinstall the same version of a product that is already installed, the product is reinstalled. Any patches that were applied to the product are removed. If you want to reconfigure, select the reconfigure option (5) on the main menu.

As of Version 8.3, most of the software kits included on the OpenVMS distribution media are signed using Secure Delivery. When you use option 3 of the OpenVMS Integrity servers operating system menu, these kits are validated by the PCSI utility. When you use option 3 from the OpenVMS Alpha operating system menu, these kits are not validated; this restriction is due to the CD's space limitations. You can install kits created before the secure delivery process was enabled in OpenVMS Version 8.3. (However, after you install or upgrade to OpenVMS Version

8.3 or later, signed kits that you install subsequently are validated, including any signed kits included on the distribution media.) The DCL command PRODUCT SHOW HISTORY displays the validation status of these kits as unsigned rather than as a validated kit.

As shown in the following example, you are also prompted for a target disk and asked whether you want brief or detailed descriptions. The procedure presents a list of products and allows you to select any or all of these products. Alternatively, you can exit without installing or upgrading any products.



NOTE: The layered products listed include the required CDSA, HPBinarychecker, Kerberos, SSL, **TDC**, and Availability Manager. Also included are the optional DECwindows, DECnet Phase IV, DECnet-Plus, and TCP/IP Services for OpenVMS products, and for OpenVMS Integrity servers only, WBEM Services for OpenVMS, and WBEM Providers for OpenVMS. Support of such features as Instant Capacity (iCAP), Temporary Instant Capacity (TiCAP), and for products such as gWLM and HP SIM, requires TCP/IP Services for OpenVMS. When you use HP SIM to provision OpenVMS on Integrity servers, TCP/IP Services for OpenVMS is installed automatically. You can install (or upgrade to) the new implementation of TCP/IP Services for OpenVMS (Version 5.7) as part of the OpenVMS upgrade. If you want to install Version 5.7 separately, choose the following product, selecting the appropriate option as in the example that follows.

HP I64VMS TCPIP V5.7

The procedure will ask a series of questions.

() - encloses acceptable answers
[] - encloses default answers

Type your response and press the <Return> key. Type:

? - to repeat an explanation
^ - to change prior input (not always possible)
Ctrl/Y - to exit the installation procedure

Do you want to INSTALL or REGISTER? (INSTALL/REGISTER/?) [INSTALL] **INSTALL**

If you choose to install or upgrade DECwindows Motif,
please note the following:

- o If you did not select the OpenVMS DECwindows server support and workstation files options, DECwindows Motif will not run. You must add these options to use DECwindows Motif.

If you choose to install or upgrade DECnet-Plus or DECnet Phase IV,
please note the following:

- o If you did not select the OpenVMS DECnet option, neither version of DECnet will run. You must add this option to use DECnet.

If you want to install a patch kit, please use main menu option 7.

Press Return to continue...

You must enter the device name for the target disk on which
the layered product(s) installation will be performed.

Enter device name for target disk: [DKB300] (? for choices) **DKB300**

DKB300: is labeled V84SYS.

The install operation can provide brief or detailed descriptions.
In either case, you can request the detailed descriptions by typing "?".

Do you always want detailed descriptions? (Yes/No) [No] **NO**

```
1 - HP I64VMS AVAIL_MAN_BASE V8.4           Layered Product
2 - HP I64VMS CDSA V2.3-306                 Layered Product
3 - HP I64VMS DECNET_PHASE_IV V8.4         Layered Product
4 - HP I64VMS DECNET_PLUS V8.4             Layered Product
5 - HP I64VMS DWMOTIF V1.7                 Layered Product
6 - HP I64VMS DWMOTIF_SUPPORT V8.4         Layered Product
7 - HP I64VMS HPBINARYCHECKER V1.0        Layered Product
8 - HP I64VMS KERBEROS V3.1-152            Layered Product
9 - HP I64VMS SSL V1.4-284                 Layered Product
10 - HP I64VMS TCPIP V5.7                  Layered Product
11 - HP I64VMS TDC_RT V2.3-1              Layered Product
12 - HP I64VMS WBEMCIM V2.91-A070728      Layered Product
13 - HP I64VMS WBEMPROVIDERS V2.0-31      Layered Product
14 - All products listed above
? - Help
E - Exit
```

Choose one or more items from the menu separated by commas: **9**



NOTE: When you boot the OpenVMS operating system media and select the option to install layered products, the installation procedure for the selected layered product(s) does not run the Installation Verification Procedure (IVP) for layered products. Because the operating system is booted from the media and the layered products are installed on a different device (the target drive), the IVPs cannot execute correctly. However, you can run the IVP for each layered product after you boot the target system (see the layered product installation documents for information about running the IVP).

1.4.4 Using the Show Installed Products Option (4)

Use option 4 on the operating system main menu to display a list of products that have been installed on a selected target disk by the PCSI utility. Products that were installed by VMSINSTAL or other installation methods do not appear in this display unless they have been registered in the PCSI utility's product database.

The following is a sample display of the prompts and information that appear when you select option 4. WBEM Services for OpenVMS and WBEM Providers for OpenVMS are available on OpenVMS Integrity server systems only. The version numbers in this example do not necessarily reflect the version numbers of the products actually shipped with OpenVMS Version 8.4.

You must enter the device name for the system disk for which you want to display installed products.

If you enter an invalid device or one which is not a system disk an error will occur.

(Enter "^" and press Return to return to main menu.)

```
Enter device name for system disk: [DKB300] (? for choices) DKB300
%MOUNT-I-MOUNTED, V84SYS mounted on _DKB300:
```

The default is an 80-column display that does not include Maintenance (patches) or Referenced by information.

Do you want the full, 132-column display? (Yes/No) [No] **NO**

```
-----
PRODUCT                                KIT TYPE      STATE
-----
HP I64VMS AVAIL_MAN_BASE V8.4          Full LP       Installed
```

```

HP I64VMS CDSA V2.3-306           Full LP      Installed
HP I64VMS DECNET_PLUS V8.4       Full LP      Installed
HP I64VMS DWMOTIF V1.7           Full LP      Installed
HP I64VMS DWMOTIF_SUPPORT V8.4   Full LP      Installed
HP I64VMS HPBINARYCHECKER V1.0   Full LP      Installed
HP I64VMS KERBEROS V3.1-152      Full LP      Installed
HP I64VMS OPENVMS V8.4           Platform     Installed
HP I64VMS TCPIP V5.7             Full LP      Installed
HP I64VMS VMS V8.4               Oper System  Installed
HP I64VMS SSL V1.4-284           Full LP      Installed
HP I64VMS TDC_RT V2.3-1         Full LP      Installed
HP I64VMS WBEMCIM V2.91-A070728  Full LP      Installed
HP I64VMS WBEMPROVIDERS V2.0-31  Full LP      Installed

```

12 items found

Do you wish to display product history? (Yes/No) [No] **YES**

```

-----
PRODUCT                                KIT TYPE      OPERATION     DATE AND TIME
-----
HP I64VMS AVAIL_MAN_BASE V8.4         Full LP      Install      25-SEP-2009 18:04:23
HP I64VMS CDSA V2.3-306              Full LP      Install      25-SEP-2009 18:04:23
HP I64VMS DECNET_PLUS V8.4           Full LP      Install      25-SEP-2009 18:04:23
HP I64VMS DWMOTIF V1.7               Full LP      Install      25-SEP-2009 18:04:23
HP I64VMS KERBEROS V3.1-152          Full LP      Install      25-SEP-2009 18:04:23
HP I64VMS OPENVMS V8.4               Platform     Install      25-SEP-2009 18:04:23
HP I64VMS TCPIP V5.7                 Full LP      Install      25-SEP-2009 18:04:23
HP I64VMS VMS V8.4                   Oper System  Install      25-SEP-2009 18:04:23
HP I64VMS SSL V1.4-284               Full LP      Install      25-SEP-2009 18:04:23
HP I64VMS WBEMCIM V2.91-A070728      Full LP      Install      25-SEP-2009 18:04:23
HP I64VMS WBEMPROVIDERS V2.0-31      Full LP      Install      25-SEP-2009 18:04:23
HP I64VMS TDC_RT V2.3-1              Full LP      Install      25-SEP-2009 18:04:23
HP I64VMS AVAIL_MAN_BASE V8.3        Full LP      Remove       25-SEP-2009 18:04:23
HP I64VMS CDSA V2.2                   Full LP      Remove       25-SEP-2009 18:04:23
HP I64VMS DECNET_PHASE_IV V8.3       Full LP      Remove       25-SEP-2009 18:04:23
HP I64VMS DWMOTIF V1.6               Full LP      Remove       25-SEP-2009 18:04:23
HP I64VMS OPENVMS V8.3               Platform     Remove       25-SEP-2009 18:04:23
HP I64VMS VMS V8.3                   Oper System  Remove       25-SEP-2009 18:04:23
HP I64VMS KERBEROS V3                 Transition  Remove       25-SEP-2009 18:04:23
HP I64VMS KERBEROS V3                 Transition  Reg Product  25-SEP-2008 17:20:44
HP I64VMS CDSA V2.1                   Full LP      Install      27-AUG-2004 21:07:15
HP I64VMS DECNET_PHASE_IV V8.2       Full LP      Install      27-AUG-2004 21:07:15
HP I64VMS DWMOTIF V1.5               Full LP      Install      27-AUG-2004 21:07:15
HP I64VMS OPENVMS V8.3               Platform     Install      27-AUG-2004 21:07:15
HP I64VMS TCPIP V5.4-18               Full LP      Install      27-AUG-2004 21:07:15
HP I64VMS VMS V8.3                   Oper System  Install      27-AUG-2004 21:07:15
-----

```

26 items found

Press Return to continue...



NOTE: The products listed in the product history vary from system to system, depending on the actual history of the system. For definitions of the kit types, see the *HP POLYCENTER Software Installation Utility Developer's Guide*.

1.4.5 Using the Reconfigure Installed Products Option (5)

Use option 5 to reconfigure layered products, including the DECwindows graphical user interface and HP networking products. This allows you to change the product choices you made during a previous installation or upgrade.

You can reconfigure a product only if all of the following conditions are true:

- The product is available for installation while your system is booted from the operating system media. For information about displaying products that are available for installation, see Section 1.4.2 (page 32) (option 2 on the main menu).
- The product is installed. For information about displaying installed products, see Section 1.4.4 (page 35) (option 4 on the main menu).
- The version of the product that is available for installation is the same as the version of the product that is installed.

When you select option 5 on the operating system main menu, the procedure prompts you for a target disk name and asks whether you want brief or detailed descriptions about the reconfiguration options. The procedure then lists the products you can configure. You can select any or all of these products, or you can exit without reconfiguring products.

The following is a sample display of the prompts and information that might appear when you select option 5. The version numbers in this example do not necessarily reflect the version numbers of the products actually shipped with OpenVMS Version 8.4.

This procedure will ask a series of questions.

- () - encloses acceptable answers
- [] - encloses default answers

Type your response and press the <Return> key. Type:

- ? - to repeat an explanation
- ^ - to change prior input (not always possible)
- Ctrl/Y - to exit the installation procedure

You must enter the device name for the target disk on which the layered product(s) reconfiguration will be performed.

Enter device name for target disk: [DKB300] (? for choices) **DKB300**

DKB300: is labeled V84SYS.

The reconfigure operation can provide brief or detailed descriptions. In either case, you can request the detailed descriptions by typing "?".

Do you always want detailed descriptions? (Yes/No) [No] **NO**

- 1 - HP I64VMS AVAIL_MAN_BASE V8.4 Layered Product
- 2 - HP I64VMS CDSA V2.3-306 Layered Product
- 3 - HP I64VMS DECNET_PHASE_IV V8.4 Layered Product
- 4 - HP I64VMS DECNET_PLUS V8.4 Layered Product
- 5 - HP I64VMS DWMOTIF V1.7 Layered Product
- 6 - HP I64VMS DWMOTIF_SUPPORT V8.4 Layered Product
- 7 - HP I64VMS HPBINARYCHECKER V1.0 Layered Product
- 8 - HP I64VMS KERBEROS V3.1-152 Layered Product
- 9 - HP I64VMS SSL V1.4-284 Layered Product
- 10 - HP I64VMS TCPIP V5.7 Layered Product
- 11 - HP I64VMS TDC_RT V2.3-1 Layered Product
- 12 - HP I64VMS WBEMCIM V2.91-A070728 Layered Product
- 13 - HP I64VMS WBEMPROVIDERS V2.0-31 Layered Product
- 14 - All products listed above
- ? - Help
- E - Exit

Choose one or more items from the menu separated by commas:

1.4.6 Using the Remove Installed Products Option (6)

Option 6 allows you to remove products that were installed or registered with the PCSI utility. (This option removes complete products. To remove patches, use option 7, as described in Section 1.4.7 (page 39).)



IMPORTANT: Do not remove the following system-integrated products (**SIPs**): Availability Manager, CDSA, HPBinarychecker, Kerberos, SSL, TDC_RT, WBEM Services for OpenVMS (WBEMCIM), and WBEM Providers for OpenVMS. These products are tightly bound with the operating system. Attempts to remove any of these products might not work as expected and can create undesirable side effects.

When you select option 6, you are prompted for a target disk name and whether you want brief or detailed descriptions about the remove options. The procedure then lists the products you can remove. You can select any or all of these products, or you can exit without removing any products.

The following is a sample display of the prompts and information that appear when you select option 6. The version numbers in this example do not necessarily reflect the version numbers of the products actually shipped with OpenVMS Version 8.4.

This procedure will ask a series of questions.

() - encloses acceptable answers
[] - encloses default answers

Type your response and press the <Return> key. Type:

? - to repeat an explanation
^ - to change prior input (not always possible)
Ctrl/Y - to exit the installation procedure

You must enter the device name for the target disk on which the layered product(s) removal will be performed.

Enter device name for target disk: [DKB300:] (? for choices) **DKB300**

DKB300: is labeled V84SYS.

The remove operation can provide brief or detailed descriptions. In either case, you can request the detailed descriptions by typing "?".

Do you always want detailed descriptions? (Yes/No) [No] **NO**

1 - HP I64VMS AVAIL_MAN_BASE V8.3	Layered Product
2 - HP I64VMS CDSA V2.3-306	Layered Product
3 - HP I64VMS DECNET_PHASE_IV V8.3	Layered Product
4 - HP I64VMS DECNET_PLUS V8.3	Layered Product
5 - HP I64VMS DWMOTIF V1.6	Layered Product
6 - HP I64VMS DWMOTIF_SUPPORT V8.3	Layered Product
7 - HP I64VMS HPBINARYCHECKER V1.0	Layered Product
8 - HP I64VMS KERBEROS V3.1-152	Layered Product
9 - HP I64VMS SSL V1.4-284	Layered Product
10 - HP I64VMS TCPIP V5.7	Layered Product
11 - HP I64VMS TDC_RT V2.3-1	Layered Product
12 - HP I64VMS WBEMCIM V2.91-A070728	Layered Product
13 - HP I64VMS WBEMPROVIDERS V2.0-31	Layered Product
13 - All products listed above	
? - Help	
E - Exit	

Choose one or more items from the menu separated by commas:

1.4.7 Using the Patches and Recovery Data Option (7)

Select option 7 to install or undo patches and to perform related operations. When you select option 7, the following options submenu appears:

This procedure can perform one of the following operations:

- 1) Install one or more patches
- 2) Undo recent patches for which there is recovery data
- 3) Show recovery data
- 4) Delete recovery data
- 5) Find patch kits

Enter CHOICE or X to return to main menu: (1/2/3/4/5/X)

Note the following about these options:

- When you choose submenu option 1, the following information is displayed:

NOTE: Some patch kits cannot be correctly installed by this procedure; this includes patch kits for versions of OpenVMS prior to V8.3. Patches for OpenVMS V8.3 and later install correctly. For patches to other products, check with the patch kit provider, or install the patch from the running system.

Options 2 through 5 (undo, show, delete, and find) will work correctly for all patch kits.

- When you choose submenu option 1, 2, 3, or 4, you are prompted for the target device on which to perform the operation:

You must enter the device name for the target disk on which the operation will be performed.

Enter device name for target disk: (? for choices) [DKB300]

- When you choose submenu option 1, you are prompted to choose detailed or brief descriptions, as follows:

The patch operation can provide brief or detailed descriptions. In either case, you can request the detailed descriptions by typing ?.

Do you always want detailed descriptions? (Yes/No) [No]

- For each of the submenu options (1 through 5), you are prompted for the patch kit source. You can specify alternate locations. You can use wildcards when you specify the location. The prompt and introductory information are displayed as follows:

This procedure will look for patch kits in

```
SYS$SYSDEVICE:[KITS.*]
```

If you want to add an additional location, enter the device and directory specification and press return. Wildcards are allowed. For example:

```
dka100:[dir1]
dkb0:[dir1,dir2]
dka200:[dir1,*]
dkb300:[dir1...]
```

Enter the single letter "D" to reset the default location.

If you do not want to add an additional location, just press return without entering anything.

Enter additional location, D, or just press Return:

After you provide the necessary information, a PCSI /PRODUCT command automatically performs the operation you requested. If you chose options 1, 2, or 4 from the submenu, the PCSI utility prompts you for additional input and displays additional information.

1.4.8 Using the Execute DCL Option (8)

When you select option 8, you get access to a subset of DCL commands (such as SHOW DEVICE, MOUNT, and BACKUP) to perform specific preinstallation and maintenance operations. Note, however, that this is a restricted DCL environment in that certain DCL commands (such as PRODUCT) and certain utilities (such as VMSINSTAL) do not function as expected because you are booting from read-only or write-locked media, and because a full system startup has not been performed.

A triple dollar sign prompt (\$\$\$) indicates that you are in this restricted DCL environment, as in the following example:

```
$$$ SHOW DEVICE
```

To exit the DCL environment and return to the main menu, enter the LOGOUT command.

1.4.9 Using the Shutdown Option (9)

When you select option 9 on the operating system main menu, your system shuts down and you are returned to the console prompt (>>> on Alpha systems; P00>>> on Integrity servers). The system displays a message similar to the following (this example shows the message from an OpenVMS Integrity server system):

```
Shutting down the system

SYSTEM SHUTDOWN COMPLETE

**** Primary HALTED with code HWRPB_HALT$K_REMAIN_HALTED

**** Hit any key to cold reboot ****
P00>>>
```

1.5 Making the Install/Upgrade/Backup Selection

Now that you have reviewed key terms, examined hardware and software requirements, and learned how to use the menu system included on the OpenVMS operating system media, you can do the following:

IF ...	THEN GO TO...
You want to install the operating system in an OpenVMS Cluster environment	Chapter 2 (page 41), and then Chapter 3 (page 45). Perform postinstallation tasks described in Chapter 7 (page 127).
You want to install the operating system in a nonclustered environment	Chapter 3 (page 45). Perform postinstallation tasks described in Chapter 7 (page 127).
You want to upgrade the operating system in an OpenVMS Cluster environment	Chapter 4 (page 85), Chapter 5 (page 97), and then Chapter 6 (page 105). Perform postupgrade tasks described in Chapter 7 (page 127).
You want to upgrade the operating system in a standalone environment	Chapter 4 (page 85), and then Chapter 6 (page 105). Perform postupgrade tasks described in Chapter 7 (page 127).
You want only to back up or restore your system disk	Appendix F (page 305).

2 Preparing to Install in an OpenVMS Cluster Environment

This chapter contains information to review and steps to perform before installing OpenVMS in an OpenVMS Cluster environment. If you are not installing your operating system in an OpenVMS Cluster environment, go to [Chapter 3 \(page 45\)](#) for information about installing your system.

2.1 Preinstallation Tasks for OpenVMS Cluster Environments

Use the checklist in [Table 2-1](#) to ensure that you perform all necessary tasks prior to installing your system in an OpenVMS Cluster environment.

Table 2-1 Preinstallation Checklist

Task	Section
<input type="checkbox"/> Review relevant OpenVMS operating system and OpenVMS Cluster documentation.	Section 2.2 (page 41)
<input type="checkbox"/> Familiarize yourself with mixed-version, mixed-architecture, and migration support in OpenVMS Cluster systems.	Section 2.3 (page 41)
<input type="checkbox"/> Have information ready to provide at the system prompt during an installation.	Section 2.4 (page 43)
<input type="checkbox"/> Make sure the target system disk is not mounted elsewhere in the cluster.	Section 2.5 (page 43)
<input type="checkbox"/> Begin the installation.	Chapter 3 (page 45)

2.2 Documentation to Review

Before you install the operating system in an OpenVMS Cluster environment, review any relevant OpenVMS Cluster information contained in the following documents.

- *Cover Letter for HP OpenVMS Version 8.4*
- Software Product Descriptions included with your distribution kit
- *HP OpenVMS Version 8.4 Release Notes*
- *HP OpenVMS Version 8.4 New Features and Documentation Overview*
- *HP OpenVMS Cluster Systems*
- *Guidelines for OpenVMS Cluster Configurations*

Be sure to consult your network or system manager as well.

2.3 Mixed-Version Support in OpenVMS Cluster Systems

HP provides two levels of support for mixed-version and mixed-architecture OpenVMS Cluster systems: **warranted support** and **migration support**.

Warranted support means that HP has fully qualified the two specified versions coexisting in an OpenVMS Cluster and will address all problems identified by customers using this configuration.

Migration support means that HP has qualified the versions for use together in configurations that are migrating in a staged fashion to a newer version of OpenVMS VAX, OpenVMS Alpha, or OpenVMS Integrity servers. Problem reports submitted against these configurations will be answered by HP. However, in exceptional cases, HP may request that you move to a warranted configuration as part of the solution. Migration support helps customers move to warranted OpenVMS Cluster pairs. For the minimum version supported for an upgrade to OpenVMS Version 8.4, see [Section 4.3.1 \(page 86\)](#).

Warranted support combinations with OpenVMS Integrity servers Version 8.4 and OpenVMS Alpha Version 8.4 are shown in Table 2-2.

Table 2-2 Warranted Cluster Support with OpenVMS Version 8.4

Operating system	Warranted in combination with
OpenVMS Alpha Version 8.4	OpenVMS Integrity servers Version 8.4
OpenVMS Integrity servers Version 8.4	OpenVMS Integrity servers Version 8.4 OpenVMS Alpha Version 8.4

Additional warranted combinations are included in the following list. This list does not show same platform and version combinations. OpenVMS systems of the same platform and version are always warranted.

- OpenVMS Alpha V8.3 and OpenVMS Integrity servers V8.3 or V8.3-1H1
 - OpenVMS Alpha V8.2 and OpenVMS Integrity servers V8.2-1
 - OpenVMS Alpha V7.3-2 and OpenVMS Integrity servers V8.2-1
 - OpenVMS Alpha V8.2 and OpenVMS Alpha V7.3-2
 - OpenVMS VAX V7.3 and any version of OpenVMS Alpha, V7.3-2 and later
- OpenVMS VAX systems are not supported with OpenVMS Integrity server systems in the same cluster.



NOTE: Only two architectures are supported in the same OpenVMS Cluster.

System disks are architecture specific and can be shared only by systems of the same architecture. An Alpha and Integrity servers system, or an Alpha and VAX system, cannot boot from the same system disk. However, cross-architecture satellite booting is supported between an Alpha and VAX system. When you configure an OpenVMS Cluster to take advantage of cross-architecture booting, make sure that at least one system from each architecture is configured with a disk that can be used for installations and upgrades. For more information, see the *Guidelines for OpenVMS Cluster Configurations* and *HP OpenVMS Cluster Systems*.

Table 2-3 shows the supported migration pairs.

Table 2-3 Supported Migration Pairing with Version 8.4 OpenVMS Alpha or Integrity servers

Supported with either of these migrating to OpenVMS Integrity servers Version 8.4	Supported with either of these migrating to OpenVMS Alpha Version 8.4
OpenVMS Integrity servers Version 8.3-1H1	OpenVMS Alpha Version 8.3
OpenVMS Integrity servers Version 8.3	OpenVMS Alpha Version 8.2
OpenVMS Integrity servers Version 8.2-1	OpenVMS Alpha Version 7.3-2

For more information, see the OpenVMS Technical Software Support Service website at:

<http://www.hp.com/go/openvms/support>

In addition, see the OpenVMS Operating System Support Chart at:

<http://www.hp.com/go/openvms/supportchart>

Before introducing an OpenVMS Version 8.4 system into an existing OpenVMS Cluster, you might need to install certain patch kits (also known as remedial kits) on cluster members running earlier versions of OpenVMS. For a complete list of required patch kits, see the *HP OpenVMS Version 8.4 Release Notes*.

For information about supporting the TDC_RT software in OpenVMS Clusters, see Section 7.9.9.5 (page 151).

2.4 OpenVMS Cluster Information You Need

If during the installation you answer YES to the system prompt asking whether your system will be a member of an OpenVMS Cluster, you need to provide the following information after you boot the system disk:

Required Information	Explanation
Type of configuration	Configuration types (CI, DSSI, SCSI, local area, or mixed-interconnect) are distinguished by the interconnect device that the VAX, Alpha, or Integrity server computers in the OpenVMS Cluster use to communicate with one another. HP Integrity servers do not support CI, DSSI, or MEMORY CHANNEL devices.
DECnet node name and node address	To obtain the DECnet node name and node address for the computer on which you are installing the OpenVMS operating system, consult the network or system manager. If you install DECnet-Plus for OpenVMS (Phase V) software and do not plan to use DECnet Phase IV for OpenVMS addresses, then you do not need to provide this information.
Allocation class value	<p>During the installation procedure, you might be asked for the allocation class value (ALLOCLASS) of the computer on which you are installing the OpenVMS operating system. For example:</p> <p>Enter a value for <i>this_node</i> ALLOCLASS parameter:</p> <p>In an OpenVMS Cluster environment, the allocation class value cannot be zero if the node serves DSSI or CI disks to other cluster members, or if volume shadowing will be used on this system or in the cluster. In either case, the ALLOCLASS value must be a number from 1 to 255 and cannot be a number in use by another system in the cluster.</p> <p>After you enter the allocation class value, the installation procedure uses it to automatically set the value of the ALLOCLASS system parameter.</p> <p>HP recommends that you thoroughly review the chapter on cluster storage devices in the <i>HP OpenVMS Cluster Systems</i> manual. This manual also includes the rules for specifying allocation class values.</p>
Whether you want a quorum disk	To help you determine whether you need a quorum disk in the cluster, see the <i>HP OpenVMS Cluster Systems</i> manual.
Location of the page and swap files	On a nonclustered system, the page and swap files are on one or more local disks, but on a clustered system, the files might be on one or more local or clustered disks. See the <i>HP OpenVMS Cluster Systems</i> manual to help you determine where the page and swap files will be located for the system on which you are installing the OpenVMS operating system software.
Systems that will be a MOP server ¹ , disk server , or tape server	If you are going to set up either a local area or a mixed-interconnect cluster, you need to make these determinations.
Cluster group number and cluster password ²	<p>If you are going to set up a local area or mixed-interconnect cluster that is LAN-based (Gigabit Ethernet), use the following rules to determine the cluster group number and password:</p> <ul style="list-style-type: none">• Cluster group number—A number in the range from 1 to 4095 or 61440 to 65535.• Cluster password—Must be from 1 to 31 alphanumeric characters in length and can include dollar signs (\$) and underscores(_).

¹ Servers that use the Maintenance Operations Protocol (**MOP**).

² Cluster group number and password are required by any cluster nodes that use the local area network for cluster communications. In a cluster that uses mixed interconnects, if any of the interconnects require the cluster number and password, then you must set the cluster number and password for all nodes.

2.5 Dismounting the Target System Disk Elsewhere in the Cluster

Before installing OpenVMS on a target drive in an OpenVMS Cluster, make sure the target system disk is not mounted elsewhere in the cluster. The target system disk must be dismounted clusterwide (except on the system from which the installation is being performed) and must

remain so during the installation. For instructions on dismounting cluster disks, see [Section 5.5.2.3 \(page 101\)](#).

2.6 Beginning the Installation

After you have completed all the tasks in this chapter, go to [Chapter 3 \(page 45\)](#) to begin the installation.

3 Installing the OpenVMS Operating System

This chapter explains how to install the OpenVMS Alpha and Integrity servers operating systems. It includes sample output similar to what you might see during an installation and explains how to respond to the prompts.

If you purchased a system with the operating system preinstalled, then most of the information in this chapter does not apply. The first time you power up your preinstalled system, you are prompted to enter only the information necessary to customize your installation. See the documentation provided with your system.

This chapter includes the procedures for booting the OpenVMS operating system CD/DVD. The boot procedures differ significantly between Alpha and Itanium-based systems. For additional information about booting Alpha systems, see [Appendix A \(page 169\)](#). Information about setting up and booting Itanium-based systems is located in [Appendix B \(page 189\)](#). If you are installing OpenVMS for the first time, see the appropriate appendix.

Once the system CD/DVD is booted, the procedures for installing OpenVMS Alpha and OpenVMS Integrity servers are very similar.



NOTE: Before you install the OpenVMS operating system, ensure that the correct version of firmware is running in your computer. For information about Alpha system firmware, see [Section 1.3.5 \(page 26\)](#). For Integrity servers system firmware, see [Section 1.3.6 \(page 26\)](#).

This chapter is organized into sections and steps that describe the major tasks for installing OpenVMS, in the order in which these tasks must be performed. [Section 3.1 \(page 45\)](#) includes a checklist that you can use to make sure you perform all the installation tasks described in this chapter.

3.1 Installation Tasks

Use the checklist in [Table 3-1](#) to ensure that you perform all necessary installation tasks.

Table 3-1 Installation Checklist

Task	Section
<input type="checkbox"/> Boot the OpenVMS operating system media.	Section 3.2 (page 45)
<input type="checkbox"/> Install the OpenVMS operating system onto a system disk.	Section 3.4 (page 54)
<input type="checkbox"/> Boot the OpenVMS system disk.	Section 3.5 (page 77)
<input type="checkbox"/> Join the OpenVMS Cluster (optional).	Section 3.6 (page 79)
<input type="checkbox"/> Run AUTOGEN.	Section 3.7 (page 81)
<input type="checkbox"/> Reboot the operating system after AUTOGEN completes (this should occur automatically).	Section 3.8 (page 81)
<input type="checkbox"/> Log in to the SYSTEM account.	Section 3.9 (page 82)
<input type="checkbox"/> Perform postinstallation tasks, as necessary.	Chapter 7 (page 127)

3.2 Booting the OpenVMS Operating System Media

The OpenVMS Version 8.4 operating system includes procedures and tools (such as the PCSI utility) that enable you to install the operating system easily. These tools are available once you boot the system properly. First, you must boot the OpenVMS Alpha CD or the OpenVMS Integrity servers OE DVD. To boot the OpenVMS Alpha system CD, see [Section 3.2.1 \(page 46\)](#). To boot the OpenVMS Integrity servers OE DVD, see [Section 3.2.2 \(page 48\)](#).

3.2.1 Booting the OpenVMS Alpha CD

This section explains how to boot the OpenVMS Alpha operating system CD, either from your local CD drive, as described in Section 3.2.1.2 (page 46), or from a CD drive served by the InfoServer, as described in Section 3.2.1.3 (page 46). First, you need to identify the name of the CD drive, as explained in Section 3.2.1.1 (page 46). For more information about booting operations, see Section A.1 (page 169).

3.2.1.1 Determining the Boot Device

To boot the operating system CD, you need to determine the identity of the CD drive. Follow these steps:

1. Insert the operating system CD into the local CD drive.
2. Enter the SHOW DEVICE command at the console prompt (>>>) and look for the correct drive listed in the output (for example, DKA400). If you are booting from the InfoServer, look for a device listed with its hardware address, as in the last line of the following example (EWA0):

```
>>> SHOW DEVICE
dva0.0.0.1000.0   DVA0                RX23
dka200.2.0.5.0   DKA200             RZ28M   1004
dka300.3.0.5.0   DKA300             RZ29B   0016
dka400.4.0.5.0   DKA400             RRD42   442E
ewa0.0.0.3.0     EWA0                00-00-F8-1F-70-3D
```

For additional information, see the *HP OpenVMS Version 8.4 for Alpha and Integrity Servers Software Product Description (SPD 82.35.xx)* and the hardware manuals that you received with your Alpha computer.

3.2.1.2 Booting from the Local Drive

To boot the operating system CD from the local CD drive, enter the boot command in the following format:

```
BOOT -FLAGS 0,0 source-drive
```

Substitute the device name of the CD drive for *source-drive*, such as DKA400, as listed in the SHOW DEVICE display example in Section 3.2.1.1 (page 46). In this case, you would enter the following command and press **Enter**:

```
>>> BOOT -FLAGS 0,0 DKA400
```

3.2.1.3 Booting from the InfoServer

To boot the operating system CD using either the InfoServer hardware or the InfoServer utility, follow these steps. To use the InfoServer utility, certain configuration steps are required initially (one time only), as described in Appendix C (page 229). The operating system CD must be mounted systemwide.

1. Make sure that your operating system CD is being served from either the InfoServer hardware or the InfoServer utility. If you are using the InfoServer utility, certain configuration steps are required (one time only); see Appendix C (page 229).
2. At the console prompt, enter the boot command in the following format:

```
>>> BOOT -FLAGS 0,0 -FILE APB_084 lan-device-name
```

Substitute the name of the local area network device for *lan-device-name*, such as EWA0, as listed in the SHOW DEVICE display example in Section 3.2.1.1 (page 46).

The APB file name is the unique file name that was assigned to the APB.EXE file when it was copied from the operating system CD to the InfoServer. This file is the name of the APB program used for the initial system load (ISL) boot program.



NOTE: If you are using a DEC 3000 or 4000 series system, note the following:

- On DEC 3000 series systems, you can boot through the InfoServer using an alternate TURBOchannel device, such as a PMAD (Ethernet) or DEFTA (FDDI), by specifying the device name as “n/ESA0”. The value for *n* is the TURBOchannel slot number, which you can obtain by entering the SHOW CONFIGURATION command at the console prompt (>>>) and examining the display. For more information, see Section A.1.8 (page 177).
- On DEC 4000 series systems, you *must* specify the ISL file name in uppercase (APB_084).

3. The InfoServer ISL program then displays the following menu:

```
Network Initial System Load Function
Version 1.2
```

FUNCTION ID		FUNCTION
1	-	Display Menu
2	-	Help
3	-	Choose Service
4	-	Select Options
5	-	Stop

Enter a function ID value:

4. Respond to the prompts as follows, pressing **Enter** after each entry:
- a. Enter 3 for the function ID.
 - b. Enter 2 for the option ID.
 - c. Enter the service name (ALPHA084 is the default service name for the InfoServer hardware; for the InfoServer utility, ask your system or network manager for the service name).

A sample display follows:

```
Enter a function ID value: 3
OPTION          OPTION
ID
1      -      Find Services
2      -      Enter known Service Name
```

```
Enter an Option ID value: 2
Enter a Known Service Name: ALPHA084
```



NOTE: If you boot the OpenVMS Alpha operating system CD from an InfoServer but lose your connection during the installation procedure (the system is unresponsive and pressing **Ctrl/Y** does not return you to the menu), do the following:

IF ...	THEN ...
You previously chose the INITIALIZE option	<ol style="list-style-type: none"> 1. Boot the OpenVMS Alpha operating system CD again from the network. 2. Choose the install option (1) on the menu and perform the installation again, as described in this chapter.
You previously chose the PRESERVE option	<ol style="list-style-type: none"> 1. Boot the OpenVMS Alpha operating system CD again from the network. 2. Enter the DCL environment by choosing option 8 on the menu. 3. Mount the device containing your backup copy of the target disk and the device that is your target disk. 4. Restore the backup copy of your target disk by entering the appropriate BACKUP commands. (See Appendix F (page 305) for complete information about using MOUNT and BACKUP commands to restore a system disk.) 5. Log out from the DCL environment. 6. Choose the install option (1) on the menu and perform the installation again, as described in this chapter.

3.2.2 Booting the OpenVMS Integrity servers OE DVD

You can boot the OpenVMS Integrity servers OE DVD in any of the following ways. This section gives detailed instructions on booting from the local DVD drive. Detailed instructions on the other methods are available in the appendixes, as noted in the corresponding sections to follow.

- From your local DVD drive (Section 3.2.2.1 (page 49))
- From a virtual DVD drive served over the network by the InfoServer utility (Section 3.2.2.2 (page 50))
- From an image on a PC or Windows server in the network accessed through the HP SIM interface (Section 3.2.2.3 (page 50))
- From an image on a PC or Windows server in the network using virtual media (vMedia) through a browser connected to your Integrity servers iLO 2 MP port (Section D.2 (page 284))

The latter two options can be used for entry-class Integrity servers that support such means (you can use these options when a local DVD drive is not available on your Integrity servers). For more information about booting operations, see Section B.6 (page 213).

Before you can boot your OpenVMS DVD, make sure your console is configured correctly. You can use a VGA graphics device (except on an rx2600 Integrity servers or other servers that lack the firmware capabilities), serial device, or network interface for the console. For information about configuring your system console, see Section B.2 (page 193).



NOTE: When using a VGA console and installing from vMedia or a USB DVD drive with the keyboard plugged into a USB hub, the keyboard might not be operational. If so, simply unplug the hub and plug it back in.

HP recommends that you load and use the most current system firmware. For more information about system firmware, see Section 1.3.6 (page 26) and the *HP OpenVMS Version 8.4 Release Notes*.

For information about other required and optional tasks to be performed before or after booting the system, see Appendix B (page 189).



CAUTION: To boot your OpenVMS Integrity servers operating system on a cell-based server (Superdome servers, or midrange servers such as rx8620 and rx7620), note the following:

- The ACPI configuration must be set correctly. For more information, see Section B.5.1 (page 206).
- The nPartition on which OpenVMS Integrity servers is booted must have all memory configured as interleaved memory (memory that can be mapped across more than one cell). For more information about cell memory and general notes on nPartition booting, see Section B.6.1 (page 214) and see your hardware documentation.

3.2.2.1 Booting from the Local Drive

Boot the OpenVMS Integrity servers OE DVD from a local DVD drive by performing the steps included in this section. To boot the DVD on a cell-based server, a DVD device must be accessible by the nPartition on which OpenVMS is being installed.

1. Make sure your Integrity servers is powered on. If your system has an attached external device, make sure it is turned on and operational.
2. Insert the DVD into the drive.
3. Cycle power.

4. From the main EFI boot menu (for cell-based servers, this must be the EFI boot menu for the nPartition on which OpenVMS is to be booted), select the appropriate item from the boot options list. The EFI boot menu is timed; press any key to stop the countdown timer.

For some systems, the boot option to select is the Internal Bootable DVD option. If that option is not listed in your EFI boot menu, move to the Boot From a File menu and select the Removable Media Boot option, if present.

Alternatively (and this method is recommended for cell-based servers), boot the DVD drive from the EFI Shell prompt by entering the command shown in the following example, where *fsn*: corresponds to the Integrity servers DVD drive (such as fs0:). If you have navigated to a particular file system, the EFI Shell prompt reflects that file system; for example, if the current file system is fs0:, the EFI Shell prompt is fs0:>.

```
Shell> fsn:\efi\boot\bootia64.efi
```

To determine which device is the bootable DVD drive, examine the list of mapped devices and look for an fs device listing that includes the letters "CDROM", as in the following line. In this line, *fsn* is the file system associated with the drive, which is usually fs0: (instead of "fsn", you might see something similar to "V8.4"; instead of Ata, you might see Scsi, depending on the server model):

```
fsn : Acpi (HWP0002,400) /Pci (4|1) /Ata (Primary,Master) /CDROM (Entry0)
```

You can use the following command to display the mapping of various EFI device names to OpenVMS device names, where *fsn* is the device you want to check (such as fs0:):

```
Shell> fsn:\efi\vms\vms_show dev -fs
```

On most Integrity servers, the DVD drive is DQA0: (IDE) or DNA0: (USB). On systems that include a SCSI bus, such as the Superdome server, the DVD drive is DKA0:. For more information about the `vms_show` command, see the *HP OpenVMS System Management Utilities Reference Manual*.



NOTE: By default, certain versions of EFI might interpret the **Delete** (or **Backspace**) key differently than do OpenVMS Alpha systems or Microsoft Windows computers. In such cases, press **Ctrl/H** to delete the last character entered. For more information, see Section B.1.3 (page 192).

When the DVD boots properly, the OpenVMS operating system banner is displayed, followed by the operating system menu. You can now install your OpenVMS Integrity servers operating system onto the target disk; see Section 3.4 (page 54). If the methods documented in this section do not succeed in booting the DVD, see Section B.6.2.1 (page 216).



NOTE: When booting OpenVMS from the installation DVD for the first time on any OpenVMS Integrity servers system with a SAN storage device, you might experience a delay in EFI initialization because the entire SAN is scanned. Depending on the size of the SAN, this delay might range from several seconds to several minutes.

3.2.2.2 Booting Over the Network Using the InfoServer utility

To use the InfoServer utility to boot from the network, certain configuration steps are required initially (one time only); see Appendix C (page 229). The instructions on booting over the network from a virtual DVD are also included in Appendix C (page 229).

3.2.2.3 Booting Using HP SIM Provisioning

To use HP SIM **provisioning** to boot an image of the OpenVMS OE DVD, certain configuration steps are required initially (one time only). For these steps and the booting instructions, see Appendix D (page 247).

3.2.2.4 Booting Using vMedia

To use vMedia to boot an image of the OpenVMS OE DVD, certain configuration steps are required initially (one time only); see Section D.1.4 (page 252). For instructions on booting with vMedia, see Section D.2 (page 284).

3.3 Installing the OpenVMS Guest Operating System

HP Integrity VM is a soft partitioning and virtualization technology that provides operating system isolation, with sub-CPU allocation granularity and shared I/O. Integrity VM can be installed on an Integrity server or a hardware partition (nPartition) running HP-UX. You can install OpenVMS as a “guest” operating system, which is an Integrity VM environment running on Integrity servers. An Integrity VM Host administrator or an OpenVMS system administrator can manage a guest operating system like a discreet Integrity server or nPartition.

For more information about OpenVMS installation, see Chapter 1 “Getting Started”.

For more information about Integrity VM installation, see the *HP Integrity Virtual Machines Installation, Configuration, and Administration* manual.



NOTE: OpenVMS guest on Integrity VM is supported on VT-i (Intel Virtualization Technology for the Intel Itanium architecture) enabled Intel Itanium2 processors. Currently Intel Itanium2 9000 and 9100 series supports VT-i.

3.3.1 Preparing to Install the Guest Operating System

This section describes the important steps you need to take before installing the guest operating system.

The Integrity VM kit is installed on the VM Host. Integrity VM is not supported with hyperthreads. The following command checks if hyperthreading is enabled:

```
# getconf SC_HT_ENABLED
1
```



NOTE: In the output 1 indicates hyperthreading is enabled and 0 indicates hyperthreading is disabled.

If hyperthreading is enabled, disable it by executing the following command and reboot the VM:

```
# /usr/sbin/setboot -m off
# reboot
```

The following are the pre-installation steps:

1. Obtain installation materials and necessary site-specific information
2. Guest operating system's networking information, such as:
 - Host name for each guest
 - IP Address for each guest (if fixed)
 - Subnet Mask
 - IP address of one or more DNS servers and the gateway machine
 - DECnet address for each guest
3. Guest operating system's time-zone
4. Guest operating system's “system” password
5. Identify the installation DVD drive location by executing this command on the VM Host:

```
# ioscan -Nfunc disk
...
```

```
disk      7  64000/0xfa00/0x4  esdisk  CLAIMED  DEVICE      Optiarc DVD RW AD-5590A
          /dev/disk/disk7    /dev/rdisk/disk7
```

Additionally, you can use the DVD to create an ISO file by copying the disk to the file system using an utility such as dd. Mount the disk onto the VM Host file system and execute the dd command to create an ISO file:

```
# mount /dev/disk/disk237 /fdev/frackA/
# dd if=/dev/rdisk/disk7 of=/fdev/frackA/OpenVMS.iso bs=64k
```

- To create and start the virtual switch (vswitch), use the hpvmnet command. A physical LAN device has to be selected that acts as a virtual switch. To view all running LAN interfaces, use the nwmgr command:

```
# nwmgr
Name/          Interface Station          Sub-   Interface      Related
ClassInstance State   Address         system  Type           Interface
=====
lan0           UP     0x0017A4771010 igelan  1000Base-SX
lan1           DOWN  0x0017A4771012 igelan  1000Base-SX
lan900        DOWN  0x000000000000 hp_apa  hp_apa
lan901        DOWN  0x000000000000 hp_apa  hp_apa
lan902        DOWN  0x000000000000 hp_apa  hp_apa
lan903        DOWN  0x000000000000 hp_apa  hp_apa
lan904        DOWN  0x000000000000 hp_apa  hp_apa
```

In this example lan0 interface “UP” status indicates the LAN interface is running.

To create the virtual switch, use the following command:

```
# hpvmnet -c -S myswitch -n 0
```

In this example the virtual switch name is myswitch and it uses the lan0 interface.

To start the virtual switch, use the following command:

```
# hpvmnet -b -S myswitch
```

- To create a file to act as OpenVMS system disk, use the hpvmdevmgmt command:

```
# hpvmdevmgmt -S 4G /fdev/frackA/disk1
```

- To create a virtual machine on the VM Host, use the following commands:

```
# hpvmcreate -P vmsg1 -O OpenVMS -c 2 -r 2g
# hpvmmodify -P vmsg1 -a network:avio_lan::vswitch:myswitch
# hpvmmodify -P vmsg1 -a disk:avio_stor::file:/fdev/frackA/disk1
```

For DVD, run this command:

```
# hpvmmodify -P vmsg1 -a dvd:avio_stor::disk:/dev/rdisk/disk7
```

For ISO file, run this command:

```
# hpvmmodify -P vmsg1 -a dvd:avio_stor::file:/fdev/frackA/OpenVMS.iso
```

In this example, the virtual machine name (guest name) is vmsg1 of operating system type *OpenVMS* comprising of the following:

- 2 CPUs
- 2 GB memory
- AVIO LAN virtual switch with the name myswitch
- AVIO disk with backing store as /fdev/frackA/disk1
- AVIO DVD with backing store as /dev/rdisk/disk7 (for DVD) or AVIO disk with backing store as /fdev/frackA/OpenVMS.iso (for ISO file)



NOTE: Specify the operating system type as OpenVMS.

If a physical disk is used as a backing store, the disk can be defined to assume disk4 as the path to the physical disk. You can replace the command # hpvmmodify -P vmsg1 -a disk:avio_stor::file:/fdev/frackA/disk1 with the command # hpvmmodify -P vmsg1 -a disk:avio_stor::file:/fdev/frackA/disk1 with the command # hpvmmodify -P vmsg1 -a disk:avio_stor::disk:/dev/rdisk/disk4.

If a logical volume is used as a backing store, the logical volume can be defined to assume rlv012 as the path to the logical volume. You can replace the command # hpvmmodify -P vmsg1 -a disk:avio_stor::file:/fdev/frackA/disk1 with the command # hpvmmodify -P vmsg1 -a disk:avio_stor::lv:/dev/vg01/rlv012

9. To display the status information about one or more Integrity VMs, use the following command:

```
# hpvmstatus
[Virtual Machines]
Virtual Machine Name VM # OS Type State #VCPUs #Devs #Nets Memory Rmt Host
=====
vmsg1 1 OpenVMS Off 2 2 1 2 GB -
```

Now the VM Host is prepared for installing the guest operating system.

3.3.2 Installing the Guest Operating System

You can install the guest operating system by following the below procedure:

1. To start the virtual machine on the VM Host, use the following command:

```
# hpvmstart -P vmsg1
(C) Copyright 2000 - 2008 Hewlett-Packard Development Company, L.P.
.
Opening minor device and creating guest machine container
Creation of VM, minor device 1
.
.
.
hpvmstart: Successful start initiation of guest 'vmsg1'
```

You can use the hpvmconsole command to connect to the guest.

2. To connect to the virtual console of the guest operating system, use the following command:

For example:

```
# hpvmconsole -P vmsg1
[vmsg1] vMP> CO
Loading device drivers
EFI Boot Manager ver 1.10 [14.62] [Build:Mon Nov 3 14:18:56 2008]
Please select a boot option
EFI Shell [Built-in]
Boot option maintenance menu
Use ^ and v to change option
```

where CO is the command for console output, use **Ctrl/B** to return to the vMP main menu.

- a. Typically, the EFI shell is selected automatically upon startup. If not, select EFI Shell [Built-in] from the menu.

```
Loading.: EFI Shell [Built-in]
EFI Shell version 1.10 [14.62]
Device mapping table
fs0 : Acpi (PNP0A03, 0) / Pci (0 | 0) / Scsi (Pun1, Lun0) / CDROM (Entry0)
blk0 : Acpi (PNP0A03, 0) / Pci (0 | 0) / Scsi (Pun0, Lun0)
blk1 : Acpi (PNP0A03, 0) / Pci (0 | 0) / Scsi (Pun1, Lun0)
```

```
blk2 : Acpi (PNP0A03,0) /Pci (0|0) /Scsi (Pun1,Lun0) /CDROM (Entry0)
Shell>
```

The following example shows the file systems fs0, fs1, and fs2 present on the disk:

```
fs0 : Acpi (PNP0A03,0) /Pci (0|0) /Scsi (Pun0,Lun0) /HD (Part1,Sig5D1D1134
-C809-11DB-9AEB-000000000000)
fs1 : Acpi (PNP0A03,0) /Pci (0|0) /Scsi (Pun0,Lun0) /HD (Part2,Sig5DB58D88
-C809-11DB-9AEB-000000000000)
fs2 : Acpi (PNP0A03,0) /Pci (0|0) /Scsi (Pun1,Lun0) /CDROM (Entry0)
.
.
.
Shell>
```

EFI lists devices with file systems detected as fs(n). In this example, fs0 and fs1 are older file systems that are present on the disk. File system fs2 corresponds to the bootable OpenVMS Virtual DVD, as can be recognized by the CD against it.

- b. Boot the installation DVD, which is indicated in the device-mapping table as /CDROM, by entering the commands given in the example below. Choose the virtual DVD drive by using the fs command. In the following example the virtual DVD is shown as fs2:

For example:

```
fs2:\> cd efi\boot
fs2:\efi\boot>bootia64.efi
```

Boot the OpenVMS installation virtual DVD and perform a normal OpenVMS installation.



NOTE: To return from the vMP press **Ctrl/B** (when logged in from the VM Host console, use **Ctrl/X**).

After executing the `bootia64` command, the standard OpenVMS installation menu is displayed. From this menu onwards, the OpenVMS guest operating system installation is similar to the installation of OpenVMS on a physical system.



NOTE: To return from the virtual console, press **Ctrl/B**. Enter RS to restart the virtual machine and then resume the OpenVMS installation procedure.

3.4 Installing the OpenVMS Operating System onto a System Disk

After booting the operating system media, you can create an operating system disk by using option 1 of the menu provided by the operating system media. The procedure for installing an OpenVMS Integrity servers system is similar to that for installing OpenVMS Alpha operating systems. Exceptions are summarized in Section 3.4.1 (page 54) and are noted in the installation instructions in Section 3.4.3 (page 56).

3.4.1 Differences Between OpenVMS Integrity servers and Alpha Installations

If you are unfamiliar with OpenVMS Alpha installations, skip to the next section.

If you have not installed an OpenVMS Integrity servers system before and are familiar with OpenVMS Alpha installations, the main differences between installations of these two systems onto a system disk include the following:

- Output from the installation procedure is nearly identical for both Alpha and Integrity servers except, of course, the operating system names as well as names of products included with the installation. For example, the OpenVMS Integrity servers windowing and networking product names are all displayed as HP I64VMS *product-name*, such as HP I64VMS

KERBEROS, while OpenVMS Alpha product names are displayed in any of three different ways, depending on the product and version:

- HP *product-name*, such as HP AXPVMS KERBEROS
 - DEC *product-name*, such as DEC AXPVMS DWMOTIF
 - CPQ *product-name*, such as CPQ AXPVMS CDSA
- The default target system disk and volume labels are unique for each system.
 - The OpenVMS Integrity servers procedure does not ask whether your system will be an instance in an OpenVMS Galaxy; OpenVMS Integrity servers does not support OpenVMS Galaxy.
 - The OpenVMS Alpha operating system includes several components that are not included with the OpenVMS Integrity servers, such as C Object Libraries and software support for translating images.
 - When installing OpenVMS Integrity servers onto the system disk the first time, you are advised to set up the system with a boot option for the system disk (and to set it as the default boot device); you can allow the installation procedure to assist you in setting up and validating a boot entry. Whereas on Alpha systems you can configure boot devices only by shutting down the system and entering commands at the console, on Integrity server systems you can configure boot devices either before you shut down the system (using the installation procedure or, once OpenVMS is running, using the OpenVMS Integrity servers Boot Manager utility) or after you shut down the system (using EFI Utilities for OpenVMS or EFI itself).
 - For OpenVMS Integrity servers, when you install the operating system by booting from the distribution media, the PCSI utility uses the following to validate the kits that were signed:
 - Prior to Version 8.4 - Secure Delivery component of CDSA
 - From Version 8.4 onwards -HPBinarychecker

For OpenVMS Alpha, such validation is not performed when installing the operating system from the distribution media (CD). (Because of limitations of the OpenVMS Alpha CD boot environment, CDSA is not present on the distribution CD in usable form.) On both OpenVMS Alpha and Integrity server systems, signed PCSI kits that you install subsequently (including signed kits on the distribution media) are validated. In addition, on both OpenVMS Alpha and OpenVMS Integrity server systems, the DCL command `PRODUCT SHOW HISTORY` displays the validation status of installed products and identifies those that were installed from unsigned kits or were installed prior to the availability of the Secure Delivery functionality.

3.4.2 Responding to Prompts During the Installation

At different points during the installation, you must respond to prompts that ask you to supply specific information. This manual and the help text available during the installation procedure tell you how to obtain most of this information and how to make decisions when responding to specific prompts.

To repeat an explanation provided by the installation procedure, type a question mark (?) at the prompt. To change or correct a response made to an earlier question, enter the caret (^) character as many times as needed. Entering this character might take you back more than one question. To return to the main menu, press **Ctrl/Y**, which aborts the installation.

HP recommends that you review the following summary before you begin the installation so that you understand beforehand the types of information you need to provide.

During the installation, the procedure prompts you for the following information:

- The name of the target drive, and the LAN device (if booting is served by an InfoServer).
- Whether you want to select the INITIALIZE or PRESERVE option (as described in Section 1.4.1 (page 30)).
- A volume label for the target disk (if you choose not to use the default volume label).
- A password for the SYSTEM account.

- Whether you want to form or join an OpenVMS Cluster system and, if so, what kind (as described in Section 2.4 (page 43)).
- DECnet node name and address (or values for the system parameters, SCSNODE and SCSSYSTEMID).



NOTE: If you install the DECnet-Plus for OpenVMS software, but you want to use addresses compatible with DECnet Phase IV software, you still need to provide this information. These settings identify your system by name and number in a DECnet or cluster environment. If you supply a DECnet Phase IV address, the procedure automatically calculates the SCSSYSTEMID value. If necessary, consult the network or system manager to obtain this information.

- Information listed on Product Authorization Keys (PAKs) for your OpenVMS licenses. To register your licenses, you must enter the information listed on the PAK for each license. You may register your licenses after installing OpenVMS.
- Optional operating system components that you want to install. You can install all components (by default), or you can select specific components from this list:
 - DECwindows Motif for OpenVMS (a graphical user interface)

If you install this product, you must also include the DECwindows Server Support component. If you are not installing DECwindows as part of the OpenVMS installation now, but you plan to install it later, install the DECwindows Server Support component now.
 - OpenVMS Management Station

If you need to create a kit to install the PC component of the **OpenVMS Management Station** software, then you must include the OpenVMS Management Station Software PC files component.
 - TCP/IP Services for OpenVMS
 - Either DECnet-Plus for OpenVMS or DECnet Phase IV for OpenVMS (but not both)

If you install either DECnet implementation, you must also include the Support for DECnet component. If you are not installing DECnet-Plus or DECnet Phase IV now, but you plan to install one of them later, you should install the Support for the DECnet-Plus or DECnet Phase IV component now. (The same support component applies to both implementations of DECnet.)

For a list of component options included with the OpenVMS operating system, see Example 3-1 (page 72).

3.4.3 Installing OpenVMS Using Option 1 of the Operating System Menu

A few seconds after you boot the operating system CD (OpenVMS Alpha) or DVD (OpenVMS Integrity servers OE DVD), several informational messages followed by the OpenVMS banner appear. After that, other informational messages appear, followed eventually by the operating system main menu, as shown in the following example. The duration of messages depend on the system type and attached hardware.

```

.
.
.
*****

You can install or upgrade the OpenVMS I64 operating system
or you can install or upgrade layered products that are included
on the OpenVMS I64 distribution media (CD/DVD).

```

You can also execute DCL commands and procedures to perform "standalone" tasks, such as backing up the system disk.

Please choose one of the following:

- 1) Upgrade, install or reconfigure OpenVMS I64 Version 8.4
- 2) Display layered products that this procedure can install
- 3) Install or upgrade layered products
- 4) Show installed products
- 5) Reconfigure installed products
- 6) Remove installed products
- 7) Find, Install or Undo patches; Show or Delete recovery data
- 8) Execute DCL commands and procedures
- 9) Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?)

To install the OpenVMS operating system, follow these steps:

1. Select Option 1 on the Menu : Respond to the menu prompt by entering 1, as in the following example.

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?)1

The OpenVMS operating system kit might contain patch kits. If it does, information similar to the following is displayed:

The following PATCH kits are present on the OpenVMS I64 distribution media.

PRODUCT	KIT TYPE	KIT FORMAT
DEC I64VMS TCPIP_ECO V5.n-nnn	Patch	Compressed

1 item found

Please consult the OpenVMS I64 Upgrade and Installation Manual, the Release Notes, and the Cover Letter to determine if any or all of these patches may be required for your system.

If you have not already done so, determine whether you need to install any patches.

The initial display from the procedure also includes information about how to respond to prompts (as described in Section 3.4.2 (page 55)):

This procedure will ask a series of questions.

() - encloses acceptable answers

[] - encloses default answers

Type your response and press the <Return>key. Type:

? - to repeat an explanation

^ - to change prior input (not always possible)

Ctrl/Y - to exit the installation procedure

2. **Create the System Disk:** The procedure allows you to begin creating the system disk. First it displays the following information, followed by the prompt asking whether you want to initialize or preserve the disk:

There are two choices for Installation/Upgrade:

INITIALIZE - Removes all software and data files that were previously on the target disk and installs OpenVMS I64.

PRESERVE -- Installs or upgrades OpenVMS I64 on the target disk and retains all other contents of the target disk.

* NOTE: You cannot use preserve to install OpenVMS I64 on a disk on which any other operating system is installed. This includes implementations of OpenVMS for other architectures.

Do you want to INITIALIZE or to PRESERVE? [PRESERVE] **INITIALIZE**

Respond to the INITIALIZE or PRESERVE prompt as follows:

IF ...	THEN ...
Your disk is new	Type INITIALIZE and press Enter .
You want to remove all files from an existing system disk	Type INITIALIZE and press Enter .
You want to retain OpenVMS files on an existing disk	Press Enter to accept the default (PRESERVE); go to Chapter 6 (page 105).



NOTE: You cannot install OpenVMS on a disk where another operating system is installed. For example, you cannot take a UNIX disk, select the PRESERVE option, and then install OpenVMS on the disk. The UNIX disk is not structured in the format that OpenVMS requires. During initialization of an OpenVMS Integrity servers target system disk, the installation process creates a diagnostic partition, visible only at the console prompt. For more information about this partition and the options you can take, see Appendix J (page 327).

3. **Specify the System Disk (Target Disk):** The procedure next asks you for the name of the target disk. If you do not know the name of the disk, enter a question mark (?). The procedure displays a list of devices on your system. Select the appropriate disk and respond to the prompt. For example:

You must enter the device name for the target disk on which OpenVMS I64 will be installed.

Enter device name for target disk: (? for choices) **DKB400**

If this is the first installation on this system, no default device is indicated, as in this example. A default device name is listed if this is not the first installation (for example, [DKB400] or, for a Fibre Channel disk device, [\$1\$DGA567]).

If you select a device that is not available or that cannot be used for some other reason, the procedure displays information indicating why the device cannot be used. For example, if you enter MKA500, a tape device, a message similar to the following is displayed:

MKA500 is not a disk device

4. **Specify the Volume Label:** If you select a device that can be used, the procedure then informs you of the volume label currently assigned to this device and asks whether you want to keep that label. If you choose not to keep that label, you are prompted for a new label, as shown in the following example. The OpenVMS operating system uses the volume label to identify and reference the disk. Make sure the label you use is unique; problems occur if the same label is used by different disk volumes.

```
DKB400: is now labeled V84SYS.
```

```
Do you want to keep this label? (Yes/No) [Yes] NO
```

```
Enter volume label for target system disk: [I64SYS] I64084
```

You can keep the label already assigned to the disk, accept the default label assigned by the system (for Integrity server systems, I64SYS), or specify a different volume label (with a limit of 12 characters that can include A to Z, 0 through 9, the dollar sign (\$), hyphen (-), and underscore (_) characters).



NOTE: OpenVMS requires that the volume labels for all disks on your system or OpenVMS Cluster have unique labels. If a disk having the same label as the system disk is mounted, various OpenVMS components do not function as intended or a node might crash during boot.

5. **Specify On-Disk Structure Level:** After you enter the volume label for the target system disk, when you selected INITIALIZE, you are asked whether you want to initialize the target system disk with On-Disk Structure Level 2 (ODS-2) or Level 5 (ODS-5). The second paragraph in the following example appears during installations of OpenVMS Integrity servers only.

```
The target system disk can be initialized with On-Disk Structure  
Level 2 (ODS-2) or Level 5 (ODS-5). (? for more information)
```

```
OpenVMS I64 systems include WBEM Services for OpenVMS; the WBEM data  
repository requires an ODS-5 disk. If you choose to initialize the  
target system disk with ODS-5 the repository can be on the system  
disk; otherwise you will need to provide an additional ODS-5 disk.  
(? for more information).
```

```
Do you want to initialize with ODS-2 or ODS-5? (2/5/?)
```

For details about ODS-2 and ODS-5 file systems, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*. A brief summary follows.



NOTE: HP recommends that your system disk be initialized in ODS-5 format, unless you plan to use software that requires ODS-2.

Although WBEM Services for OpenVMS can be installed on an ODS-2 disk, the WBEM Services for OpenVMS data repository requires an ODS-5 disk. A system disk in ODS-5 format can store everything; if you choose to have your disk in ODS-2 format, the procedure asks you to provide an ODS-5 disk for the data repository.

- ODS-2
ODS-2 allows for compatibility with OpenVMS VAX and Alpha systems that use ODS-2 disks (as well as OpenVMS Integrity server systems using ODS-2 disks). Choose ODS-2

if you do not need the new features of ODS-5 disks, including the support of applications ported from other operating systems (such as UNIX, Linux, and MS Windows).

- ODS-5
 - ODS-5 supports file names that are longer, have a wider range of legal characters, and allow for mixed-case file names. This feature permits use of file names similar to those in a Microsoft Windows or UNIX environment.
 - ODS-5 supports hard links to files, access dates, and files whose names differ only by case.
 - ODS-5 volumes cannot be mounted on any version of OpenVMS prior to Version 7.2.
 - Systems running OpenVMS VAX Version 7.2 and higher can mount ODS-5 volumes, but cannot create or access files having extended names. (Lowercase file names are seen in uppercase on OpenVMS VAX systems.)

Select ODS-2 or ODS-5 by entering 2 or 5 at the prompt.

6. **Enable Hard Links (ODS-5 Only):** If you select ODS-5, the procedure asks whether you want to enable hard links (if you selected ODS-2, skip to the next step). When you install OpenVMS Integrity servers, the procedure advises you that WBEM Services for OpenVMS does not require hard links, as shown in the following example. Enter YES or NO to indicate your choice.

```
Hard links can be enabled on ODS-5 disks. WBEM Services for OpenVMS
does not require hard links. (? for more information)
```

```
Do you want to enable hard links? (Yes/No/?) YES
```

Both ODS-2 and ODS-5 support aliases, which are additional names for a file or directory. Only ODS-5 supports hard links. One of the main differences with hard links enabled is the way the DCL DELETE command works. With hard links enabled, if you enter the DELETE command to delete a file that has one or more aliases associated with it, the command only deletes the alias by which the file is being accessed. The actual file continues to exist and is accessible by any remaining alias. The file is deleted only when the last remaining alias is deleted. Without hard links enabled, the DELETE command deletes both the alias by which the file is being accessed and the file itself. Any other aliases remain but the file is no longer accessible because it is no longer present. Thus, the remaining aliases are unusable. If enabling hard links has any drawbacks, they are minor and probably of concern only in rare circumstances. For example, if disk quotas are in effect, though owners of a file can delete any links to a file in a directory they can access, hard links in other users' directories might cause a file to be retained, and the file size continues to be charged against that owner's disk quota.

In general, be aware that enabling hard links does change the file system's behavior and that applications and management practices should respond accordingly (instead of being alias-specific, for example).

For more information about hard links, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

7. **Confirm Target System Disk Choices:** The procedure displays your target system disk choices and asks you to confirm that they are correct. In the following example, the choices made were to initialize the disk with ODS-5 and with hard links. The volume label is I64084.

```
You have chosen to install OpenVMS I64 on a new disk.
```

```
The target system disk, DKB400:, will be initialized
with structure level 5 (ODS-5).
Hard links WILL be enabled.
It will be labeled I64084.
Any data currently on the target system disk will be lost.
```

Is this OK? (Yes/No) **YES**

```
Initializing and mounting target....
%EFI-I-VOLINIT, FAT volume DIAGNOSTICS has been initialized
```

```
Creating page and swap files....
```

8. **Configure and Validate Boot Options (Integrity servers only):** On OpenVMS Integrity servers installations, the procedure next asks whether you want to create or validate boot options.

Boot options in the EFI Boot Manager boot option menu can provide a convenient way to boot your system. The installation procedure can automatically create a new boot option (if none exists) or validate existing boot options.

Do you want to create or validate boot options? (Yes/No) [Yes] **YES**

If your newly installed system disk will normally be booted on this system and this device, and if you want the installation procedure to assist you in setting up or validating boot options on the EFI console in the EFI Boot Manager menu, answer YES. The installation procedure creates and validates a new boot option if one does not exist, or validates existing boot options, just before the installation completes (see step 22).

When you answer YES and no boot option exists, the procedure allows you to set OpenVMS boot flags (VMS_FLAGS), as shown in the following example. Enter the OpenVMS flags (for example, 0,1), or press **Enter** to set no flags (the default). If a boot option exists, you can change boot flags after the installation completes (for information about changing boot flags, see Section B.5.2 (page 207)).

You can set VMS_FLAGS or accept the default, 0,0.

Enter the value for VMS_FLAGS: (n,n) [0,0]

If you do not want the installation procedure to assist you in setting up or validating boot options on the EFI console, answer NO.

HP recommends that you allow the installation procedure to assist you in setting up and validating boot options.



NOTE: If your newly installed system disk is a Fibre Channel device, HP recommends that you add it as a boot option in the EFI boot menu. If you do not allow the installation procedure to add the device to the boot menu, you can add it by using the OpenVMS Integrity servers Boot Manager utility (SYS\$MANAGER:BOOT_OPTIONS.COM) after the installation completes. (To add Fibre Channel devices to the EFI boot menu, use the OpenVMS Integrity servers Boot Manager utility instead of EFI.)

HP recommends using the OpenVMS Integrity servers Boot Manager utility to add shadowed system disks in a multiple-member shadow set to the EFI boot device list and dump device list. Be sure to add all members to both lists.

For information about the OpenVMS Integrity servers Boot Manager utility, see Section B.5.2 (page 207). For more information about configuring and booting Fibre Channel devices, see Appendix E (page 293).

9. **Specify SYSTEM Account Information (Initialized Disks Only):** If you are initializing the target disk, you are prompted for SYSTEM account information. Before you respond to the prompt asking you to enter a password for the SYSTEM account, note the following:
- Passwords must be at least 8 characters in length (but must not exceed 31 characters). Valid characters for the password include A through Z, 0 through 9, the dollar sign (\$), and underscore (_). Passwords must contain at least one alphabetic character (A through

Z). The system converts all characters to uppercase, so the case of characters you enter does not matter.

- Press **Enter** after you enter the password. (The password does not display as you type it.)
- After you enter the password, the procedure checks to make sure it meets the requirements for a valid password.
- Reenter the password for verification.

The following is a sample display:

```
You must enter a password for the SYSTEM account.
```

```
The password must be a minimum of 8 characters in length, and  
may not exceed 31 characters. It will be checked and verified.  
The system will not accept passwords that can be guessed easily.
```

```
The password will not be displayed as you enter it.
```

```
Password for SYSTEM account:
```

```
Re-enter SYSTEM password for verification:
```

If you reenter the password incorrectly or if the procedure determines that the password is too easy for another user to guess, the procedure displays an error message and allows you to specify a valid password.

10. **Declare OpenVMS Cluster Membership:** The procedure now asks whether your system will be part of an OpenVMS Cluster. The display is similar to the following:

```
Will this system be a member of an OpenVMS Cluster? (Yes/No)
```

You should answer YES if the system will be a member of an OpenVMS Cluster. Answering YES to this question causes SYS\$MANAGER:CLUSTER_CONFIG.COM to run automatically when your newly installed system is first booted. The CLUSTER_CONFIG procedure asks a series of questions about the cluster. Your response to this question determines how the VAXCLUSTER system parameter is set. (The VAXCLUSTER system parameter is set for OpenVMS Integrity server systems as well as Alpha and VAX systems; it is not specific to OpenVMS VAX systems.) For more information, see the *Guidelines for OpenVMS Cluster Configurations* manual.

If you answer YES to the cluster question, the display is similar to the following:

```
When your new system is first booted you will be required to answer  
additional questions in order to configure the OpenVMS Cluster.
```

If you answer NO to the cluster question, the system can still be a member of an OpenVMS Cluster. However, in this case you must explicitly configure the node into the cluster after the installation is completed. For more information, see [Section 3.6 \(page 79\)](#).

For more information about cluster configuration, see the *HP OpenVMS Cluster Systems* manual.

11. **Declaring System as OpenVMS Galaxy Instance (Alpha only):** The procedure next asks whether your system will be an instance in an OpenVMS Galaxy. (This question is asked in OpenVMS Alpha installations only. OpenVMS Integrity servers does not support OpenVMS Galaxy.) The display is similar to the following:

```
Will this system be an instance in an OpenVMS Galaxy? (Yes/No)
```

Your answer to this question determines how the GALAXY system parameter is set.

12. **Set SCSNODE System Parameter:** The procedure now asks you to specify a value for the first of two system parameters, the SCSNODE parameter. (Step 13 describes the output and prompts for the second system parameter, SCSSYSTEMID.) SCSNODE is a name that can be from one to six letters or numbers; it must include at least one letter. If this system is part of an OpenVMS Cluster, SCSNODE must be unique within the cluster. If you are using

DECnet Phase IV for OpenVMS or DECnet-Plus for OpenVMS with DECnet Phase IV addresses, then SCSNODE must be the same as your DECnet node name.

The following is an example of the display and a valid response:

For your system to operate properly, you must set two parameters:
SCSNODE and SCSSYSTEMID.

SCSNODE can be from 1 to 6 letters or numbers. It must contain at least one letter.

If you plan to use DECnet, SCSNODE must be the DECnet Phase IV node name, or the DECnet-Plus (Phase V) node synonym.

If you have multiple OpenVMS systems, the SCSNODE on each system must be unique.

Enter SCSNODE: **I64CSI**

- 13. Declare Use of DECnet; Setting SCSSYSTEMID System Parameter:** The next prompt asks whether you plan to use DECnet. It also informs you that the SCSSYSTEMID system parameter is based on the DECnet Phase IV address. SCSSYSTEMID must also be unique within an OpenVMS Cluster.

If you plan to use DECnet, SCSSYSTEMID must be set based on the DECnet Phase IV address.

Do you plan to use DECnet (Yes/No) [YES]: **YES**

If you answer YES, the information about the DECnet Phase IV addresses is displayed along with a prompt for a DECnet Phase IV address. Enter a valid DECnet Phase IV address, as in the following example:

DECnet Phase IV addresses are in the format

DECnet_area_number.DECnet_node_number

DECnet_area_number is a number between 1 and 63.

DECnet_node_number is a number between 1 and 1023.

If you plan to use DECnet WITHOUT Phase IV compatible addresses, enter 0.0.

Enter DECnet (Phase IV) Address [1.1]: **63.180**

A display such as the following informs you of the value assigned to SCSSYSTEMID:

SCSSYSTEMID will be set to 64692.

This was calculated as follows:

$(\text{DECnet_area_number} * 1024) + \text{DECnet_node_number}$

If you are not using DECnet, or if you enter 0.0 as the DECnet Phase IV address, you are prompted to enter a SCSSYSTEMID in the range of 1 to 65535. If this is a **standalone system**, the default of 65534 is acceptable. However, if this system is part of an OpenVMS Cluster, you must enter a SCSSYSTEMID that is unique within the cluster. The following is a sample display:

The system cannot calculate SCSSYSTEMID from an address that is not compatible with DECnet Phase-IV.

You will have to choose a value for SCSSYSTEMID.

If you plan to use LAT software, you may have to add /NODECNET to any CREATE LINK commands in SYS\$MANAGER:LATSYSTARTUP.COM.

Please choose a SCSSYSTEMID between 1 and 65535. If you have multiple

OpenVMS systems, the SCSSYSTEMID on each system must be unique.

Enter SCSSYSTEMID [65535]: **12345**

14. **Set Local Time Zone:** Now the procedure asks you to configure the local time zone. For local time zone support to work correctly, the installation procedure must set the time zone that accurately describes the location you want to be your default time zone. Usually, this is the time zone in which your system is running. In addition, the procedure asks you to set the OpenVMS time differential factor (TDF).

The procedure displays the main time zone menu. You can select the time zone in either of two ways:

- Select the number in the main time zone menu that best represents the time zone desired. (If multiple time zones exist for the selection you make, you must select the exact time zone from another menu.)
- Use a search option that allows you to bypass the time zone menu and search by name (partial or full).

If you select one of the numbers in the time zone menu, the corresponding time zone is selected. At any prompt, you can enter a question mark (?) for help information.



NOTE: An asterisk (*) next to a number indicates that more than one time zone exists for that selection. If you select such a number, an additional menu displays choices that allow you to select the appropriate time zone. For example, if you choose the United States (US) time zone from the main time zone menu, a second menu displays the specific time zones within the United States.

The following example shows how you would select the Eastern time zone for the United States by using the menu number:

Configuring the Local Time Zone

```
TIME ZONE SPECIFICATION -- MAIN Time Zone Menu      "*" indicates a menu

0* GMT
1* AFRICA          17) EST          33) IRAN          49) PORTUGAL
2* AMERICA        18) EST5EDT       34) ISRAEL        50) PRC
3* ANTARCTICA     19* ETC           35) JAMAICA       51) PST8PDT
4* ARCTIC         20* EUROPE        36) JAPAN         52) ROC
5* ASIA           21) FACTORY       37) KWAJALEIN    53) ROK
6* ATLANTIC       22) GB-EIRE       38) LIBYA        54) SINGAPORE
7* AUSTRALIA      23) GB            39) MET          55) TURKEY
8* BRAZIL         24) GMT-0         40* MEXICO        56) UCT
9* CANADA         25) GMT           41* MIDEAST       57) UNIVERSAL
10) CET           26) GMT0          42) MST           58* US
11* CHILE         27) GMTPLUS0     43) MST7MDT      59) UTC
12) CST6CDT       28) GREENWICH    44) NAVAJO        60) W-SU
13) CUBA          29) HONGKONG     45) NZ-CHAT      61) WET
14) EET           30) HST           46) NZ            62) ZULU
15) EGYPT         31) ICELAND      47* PACIFIC
16) EIRE          32* INDIAN       48) POLAND
```

Press "Return" to redisplay, enter "=" to search or "?" for help, or Select the number above that best represents the desired time zone: 58

```
US Time Zone Menu      "*" indicates a menu

0* RETURN TO MAIN TIME ZONE MENU
1) ALASKA              5) EAST-INDIANA      9) MICHIGAN       13) SAMOA
2) ALEUTIAN           6) EASTERN           10) MOUNTAIN
3) ARIZONA            7) HAWAII           11) PACIFIC-NEW
4) CENTRAL            8) INDIANA-STARKE  12) PACIFIC
```

Press "Return" to redisplay, enter "=" to search or "?" for help, or Select the number above that best represents the desired time zone: 6

You selected US /EASTERN as your time zone.
Is this correct? (Yes/No) [YES]:

To use the search option instead of menu numbers to select the time zone, enter an equals sign (=) at the menu prompt instead of a number. You can enter one or more words or partial

words immediately after the equals string, or you can enter the equals sign alone, in which case the procedure prompts you for the words or partial words of the time zone you want to select. After you enter that information, the procedure displays all matching time zones, and you can then select the appropriate one.

The following example shows how you would select the Eastern time zone for the United States by using the search option:

Configuring the Local Time Zone

```
TIME ZONE SPECIFICATION -- MAIN Time Zone Menu          "*" indicates a menu

0* GMT
1* AFRICA              17) EST                33) IRAN                49) PORTUGAL
2* AMERICA             18) EST5EDT            34) ISRAEL              50) PRC
3* ANTARCTICA         19* ETC                35) JAMAICA             51) PST8PDT
4* ARCTIC              20* EUROPE            36) JAPAN               52) ROC
5* ASIA                21) FACTORY           37) KWAJALEIN          53) ROK
6* ATLANTIC           22) GB-EIRE           38) LIBYA               54) SINGAPORE
7* AUSTRALIA          23) GB                39) MET                 55) TURKEY
8* BRAZIL              24) GMT-0             40* MEXICO              56) UCT
9* CANADA              25) GMT               41* MIDEAST             57) UNIVERSAL
10) CET                26) GMT0              42) MST                 58* US
11* CHILE              27) GMTPLUS0          43) MST7MDT            59) UTC
12) CST6CDT           28) GREENWICH         44) NAVAJO              60) W-SU
13) CUBA               29) HONGKONG          45) NZ-CHAT            61) WET
14) EET                30) HST               46) NZ                  62) ZULU
15) EGYPT              31) ICELAND           47* PACIFIC
16) EIRE               32* INDIAN            48) POLAND
```

Press "Return" to redisplay, enter "=" to search or "?" for help, or
Select the number above that best represents the desired time zone: =EAST

Search for Time Zone by Full or Partial Name

"*" indicates a menu

```
1) BRAZIL / EAST
2) CANADA / EAST-SASKATCHEWAN
3) CANADA / EASTERN
4) CHILE / EASTERISLAND
5) MIDEAST / RIYADH87
6) MIDEAST / RIYADH88
7) MIDEAST / RIYADH89
8) PACIFIC / EASTER
9) US / EAST-INDIANA
10) US / EASTERN
```

Press "Return" to redisplay this menu,
enter "=" to search for a new zone,
enter "0" to return to the Main Time Zone Menu, enter "?" for help, or
Select the number above that best represents the desired time zone: 10

You selected US / EASTERN as your time zone.

Is this correct? (Yes/No) [YES]:

The procedure then prompts you for the TDF.

For more information about local time zone support, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

15. **Set Time Differential Factor (TDF):** The procedure now provides information about and prompts you to enter the time differential factor (TDF). The TDF is the difference between your system time and Coordinated Universal Time (UTC), which is an international standard (similar to Greenwich Mean Time) for measuring time of day. The procedure supplies a default for TDF, which is generally the correct response. If the time zone you selected supports daylight saving time, the procedure asks you whether daylight saving time is currently in effect. The following example shows TDF information and prompts displayed by the

procedure:

Configuring the Time Differential Factor (TDF)

Default Time Differential Factor for standard time is -5:00.
Default Time Differential Factor for daylight saving time is -4:00.

The Time Differential Factor (TDF) is the difference between your system time and Coordinated Universal Time (UTC). UTC is similar in most respects to Greenwich Mean Time (GMT).

The TDF is expressed as hours and minutes, and should be entered in the hh:mm format. TDFs for the Americas will be negative (-3:00, -4:00, etc.); TDFs for Europe, Africa, Asia and Australia will be positive (1:00, 2:00, etc.).

This time zone supports daylight saving time.
Is this time zone currently on daylight saving time? (Yes/No): **YES**

Enter the Time Differential Factor [-4:00]:

NEW SYSTEM TIME DIFFERENTIAL FACTOR = -4:00

Is this correct? [Y]:

For more information about TDF support, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*. Once OpenVMS has been installed and booted from the system disk, you can determine whether your system is set for daylight saving time by using the following DCL command to display the translation for the daylight saving time logical:

```
$ SHOW LOGICAL *TIMEZONE*
"SYS$TIMEZONE_DAYLIGHT_SAVING"="1"
.
.
.
```

16. **Register Licenses (Optional at this time):** After setting the TDF, the procedure asks whether you want to register any Product Authorization Keys (PAKs), as in the following display:

If you have Product Authorization Keys (PAKs) to register,
you can register them now.

Do you want to register any Product Authorization Keys? (Yes/No) [Yes]

You can register the PAKs now by responding YES to the prompt, or later by responding NO. You register licenses later by following the directions in Section 7.3 (page 130).

To register your licenses now, be sure you have the following before proceeding:

- A copy of the Product Authorization Key (PAK) for each license that you are registering.
- The *HP OpenVMS License Management Utility Manual*, which contains complete, detailed information about the licensing procedure.

For the OpenVMS Integrity servers operating system, a single Operating Environment (OE) license grants the right to use all the components bundled in the purchased OE. Sufficient PCL (Per Core License) units are required to license all processor cores in a socket.

The OE license must contain PCL units sufficient to activate all licensed sockets in the system or hard partition. (If additional cores are added later to the system or hard partition, each requires additional PCL units.) The License Management utility supports these OpenVMS Integrity servers licensing practices. The OpenVMS Unlimited User License is included with the Base Operating Environment (BOE) and, therefore, is included with the other OEs available. For more information, see the *HP Operating Environments for OpenVMS for Integrity Servers Software Product Description (SPD 82.34.xx)*.

The OpenVMS Alpha operating system uses one or more of several types of licenses, as described in the *HP OpenVMS Version 8.4 for Alpha and Integrity Servers Software Product Description (SPD 82.35.xx)*.

For more information about licensing terms and policies, contact your local HP sales office, or see the HP software licensing information at the following location:

http://h18000.www1.hp.com/products/software/info/terms/swl_sld.html

When you answer YES to the prompt to register your licenses now, the installation procedure launches the SYS\$UPDATE:VMSLICENSE.COM procedure, which displays the following options menu:

VMS License Management Utility Options:

1. REGISTER a Product Authorization Key
2. AMEND an existing Product Authorization Key
3. CANCEL an existing Product Authorization Key
4. LIST Product Authorization Keys
5. MODIFY an existing Product Authorization Key
6. DISABLE an existing Product Authorization Key
7. DELETE an existing Product Authorization Key
8. COPY an existing Product Authorization Key
9. MOVE an existing Product Authorization Key
10. ENABLE an existing Product Authorization Key
11. SHOW the licenses loaded on this node
12. SHOW the unit requirements for this node

99. Exit this procedure

Type '?' at any prompt for a description of the information requested. Press Ctrl/Z at any prompt to return to this menu.

Enter one of the above choices [1]

Select the REGISTER option and enter each license key until you have successfully registered all required PAKs. After you register all your licenses, exit the License Management procedure by entering 99 at the prompt.

17. **Install Windowing, Networking, and Related Products:** The procedure now asks whether you want to install the optional DECwindows GUI (DECwindows Motif for OpenVMS) and networking software (DECnet and TCP/IP) included with OpenVMS. The software that you choose to install (including the required software) is installed along with the OpenVMS operating system. You can change the default values for these products later in the installation procedure.



NOTE: The following display shows what you might see during an OpenVMS Integrity servers installation. Some of the products listed are supported on OpenVMS Integrity server systems only.

The following products are part of the OpenVMS installation; they will be installed along with the OpenVMS operating system:

- o Availability Manager (base) for OpenVMS I64
- o CDSA for OpenVMS I64
- o KERBEROS for OpenVMS I64
- o SSL for OpenVMS I64
- o Performance Data Collector (base) for OpenVMS I64
- o HP Binary Checker for OpenVMS I64
- o WBEM Services for OpenVMS (WBEMCIM)
- o WBEM Providers for OpenVMS (WBEMPROVIDERS)

You can also install the following optional products along with the OpenVMS operating system:

- o DECwindows Motif for OpenVMS I64
- o DECnet-Plus for OpenVMS I64
- o DECnet Phase IV for OpenVMS I64

- o HP TCP/IP Services for OpenVMS

If you want to change your selections, you can do so later in the installation by answering "NO" to the following question:

"Do you want the defaults for all options?"

Do you want to install DECwindows Motif for OpenVMS I64 V1.7? (Yes/No) [Yes] **Y**

If you want to install the OpenVMS graphical user interface and you have the hardware that supports it and the license to use it, answer YES; otherwise, answer NO.

You may install any of the optional software products separately after the OpenVMS installation completes.



NOTE: Beginning with OpenVMS Version 8.3, DECwindows client files are made available through the DWMOTIF_SUPPORT kit. (Prior to Version 8.3, the client files were included directly with the OpenVMS operating system kit.) The OpenVMS installation procedure installs this kit automatically. The DWMOTIF_SUPPORT kit name is listed during the installation.

The OpenVMS installation menu offers the choice to install DECnet-Plus for OpenVMS or DECnet Phase IV for OpenVMS networking software. You cannot have both installed on your system at the same time. You can also choose to install neither DECnet product; however, certain products that depend on DECnet might be adversely affected.

If you have installed DECnet-Plus and TCP/IP on your system, you can run DECnet applications over your TCP/IP network. For more information about DECnet over TCP/IP, see the *DECnet-Plus for OpenVMS Network Management* manual.

The software products display is similar to the following:

Beginning with OpenVMS V7.1, the DECnet-Plus kit is provided with the OpenVMS operating system kit. HP strongly recommends that DECnet users install DECnet-Plus. DECnet Phase IV applications are supported by DECnet-Plus.

DECnet Phase IV is also provided as an option.

If you install DECnet-Plus and TCP/IP you can run DECnet applications over a TCP/IP network. Please see the OpenVMS Management Guide for information on running DECnet over TCP/IP.

Do you want to install DECnet-Plus for OpenVMS I64 V8.4? (Yes/No) [YES]

If you answer NO to the DECnet-Plus prompt, you are prompted to install DECnet Phase IV:

Do you want to install DECnet Phase IV for OpenVMS I64 V8.4? (Yes/No) [Yes]

Finally, you are asked whether you want to install TCP/IP Services for OpenVMS:

Do you want to install HP TCP/IP Services for OpenVMS V5.7? (Yes/No) [Yes] **Y**



NOTE: For support of Instant Capacity (iCAP) (supported on cell-based Integrity servers), and for support of such products as gWLM and HP SIM, you must install TCP/IP Services for OpenVMS. When you use HP SIM to provision OpenVMS on Integrity servers, TCP/IP Services for OpenVMS is installed automatically.

18. **Choose Descriptive Help Text (Optional):** After you respond to the prompt for TCP/IP Services for OpenVMS, the final stages of the installation proceed. First, the procedure asks whether you want detailed descriptions:

```
The installation can provide brief or detailed descriptions.
In either case, you can request the detailed descriptions by typing ?.
```

```
Do you always want detailed descriptions? (Yes/No) [No]
```

If you answer YES, the procedure displays additional explanatory text with each prompt.

As of Version 8.3, most PCSI kits included on the OpenVMS distribution media are signed using Secure Delivery. Each target file includes an associated digital signature file that is used for Secure Delivery validation. This validation involves authenticating the originator (HP, in this case) and verifying the contents of the target file. (The digital signature file is also referred to as a manifest; it has the same file name as the target file plus `_ESW` appended to the file extension, as in `filename.PCSI$COMPRESSED_ESW`.) When you install OpenVMS Integrity servers Version 8.4 from the distribution media, the procedure validates any signed PCSI kits that are being installed. For each kit successfully validated, you see a message similar to the following:

Prior to Version 8.4:

```
Performing product kit validation ...
%PCSI-I-HPCVALPASSED, validation of
DKB400: [KITS.CDSA] HP-I64VMS-CDSA-Vnnnn-nnn-n.PCSI$COMPRESSED;1 succeeded
.
.
.
```

Version 8.4 onwards:

```
Performing product kit validation ...
%PCSI-I-HPCVALPASSED, validation of
DKB400: [KITS.HPBINARYCHECKER] HP-I64VMS-HPBINARYCHECKER-Vnnnn-nnn-n.PCSI$COMPRESSED;1 succeeded
.
.
.
```



NOTE: Because of limitations in the OpenVMS Alpha CD boot environment, OpenVMS Alpha kits are not validated when installed from the distribution CD. On both OpenVMS Alpha and Integrity server systems, signed PCSI kits that you install subsequently (including any signed kits on the distribution media) are validated. In addition, on both OpenVMS Alpha and OpenVMS Integrity server systems, the DCL command `PRODUCT SHOW HISTORY` displays the validation status of installed products.

19. **Select Product Component Options (Accept All Defaults or Select Individually):** The procedure displays a message such as the following, indicating that it is ready to install the operating system:

```
The following product has been selected:
    HP I64VMS OPENVMS V8.4                Platform (product suite)
```

```
Configuration phase starting ...
```

```
You will be asked to choose options, if any, for each selected product and
for any products that need to be installed to satisfy software dependency
requirements.
```

```
HP I64VMS OPENVMS V8.4: OPENVMS and related products Platform
```

COPYRIGHT ...

Hewlett-Packard Development Company, L.P.

Do you want the defaults for all options? [YES]

When selecting options, note the following:

- If you want all the default values, press **Enter**.
If you want to select options individually, answer NO. The procedure then prompts you for each option and suboption shown in Example 3-1 (page 72).
- Review the list of options and compare them with the requirements for your system. If you are selecting components individually, be sure that you include all components necessary to support the needs of your users. Note also that certain components depend on the installation of other components.
- If you are not sure whether you want certain options, request help by entering a question mark (?) at the prompt for that option.
- After you select all the options you want, you can view your selections and make changes (if necessary).
- OpenVMS Management Station software is automatically installed on your OpenVMS system disk when you accept all the default values. If you do not accept the default values, you must select the OpenVMS Management Station component (server and client files) if you plan to use this product. After the installation is complete, you can prepare your OpenVMS system and your PC to run OpenVMS Management Station by following the procedures described in Appendix H (page 315).
- If you decide after the installation to change which OpenVMS operating system options you want installed on your system, you must reconfigure the installation as described in Section 1.4.1.2 (page 31) and Section 7.12 (page 153).
- After you boot the new system disk and log in, you can obtain information about individual system files by entering HELP SYS_FILES at the dollar sign prompt (\$).



NOTE: Unless you have specific reasons to do otherwise, HP recommends that you accept the defaults and install all OpenVMS options. OpenVMS and layered products have various dependencies on many of these options. Even if you think you do not need certain options, some OpenVMS or layered product operations might not work correctly if other OpenVMS options are not installed.

Note also that, for OpenVMS Integrity server installations, the availability of certain options depends on the OE you have purchased. For more information, see the *HP Operating Environments for OpenVMS for Integrity Servers Software Product Description* (SPD 82.34.xx).

If you answer YES to accept the defaults for all options, the procedure displays a message similar to the following, the contents of which depend on the products you chose to install. If you answer NO, the procedure prompts you for each option and suboption.

Availability Manager (base) for OpenVMS I64

CDSA for OpenVMS I64

KERBEROS for OpenVMS I64

SSL for OpenVMS I64

Performance Data Collector for OpenVMS

HP Binary Checker for OpenVMS I64

WBEM Services for OpenVMS (WBEMCIM)

HP I64VMS WBEMCIM V2.91-A070728: HP WBEM Services for OpenVMS
Copying WBEM Services for OpenVMS Release Notes to SYS\$HELP

....There are post-installation tasks you must complete.

WBEM Providers for OpenVMS (WBEMPROVIDERS)

HP I64VMS DWMOTIF V1.7: DECwindows Motif

If a Language Variant is installed, refer to the Installation Guide.

20. **Finish Installation onto System Disk – Review and Confirm Options:** When you have answered all the prompts and selected the options you want installed, the procedure displays information about the products you have selected. The procedure allows you to review your selections and make changes if necessary, then installs the product, provides informational messages, and returns you to the original menu.

First, you are asked whether you want to review the options:

Do you want to review the options? [NO]

If you answer YES, the procedure displays all the selected options and suboptions, similar to [Example 3-1](#). If you answer NO, the installation continues as described with the sample script (beginning with "Execution phase starting ...") that follows.

Example 3-1 Component Options and Suboptions

```
DECdtm Distributed Transaction Manager
Support for DECnet-Plus or DECnet for OpenVMS
Programming Support
  Debugger Utility
  Image Dump Utility
  Macro libraries
  Macro-32 Migration Compiler
  TLB intermediary form of STARLET
  C Object Libraries 1
  C Header Files
  VMS text libraries of Ada declarations
RMS Journaling Recovery Utility
System Programming Support
  Delta Debugger
  System Dump Analyzer Utility
  Miscellaneous Symbol Table Files
OpenVMS Management Station Software -- PC files
Utilities
  Phone Utility
  Error Log Generator Utility 1
  XPG4 Internationalization Utilities
  World Wide PostScript Printing Subsystem
Bliss Require Files
Example Files
Message Facility Files (HELP/MESSAGE)
Translated Image Support
UETP Files
DECwindows Server Support
Delete any obsolete OpenVMS files
Delete files archived by OpenVMS remedial kits
```

11 Alpha only

The component options listed in [Example 3-1](#) are included within the OpenVMS Version 8.4 operating system. Except as noted, these options apply to both OpenVMS Alpha and Integrity server systems. Depending on the products you chose to install with the operating system, additional components are included as well. After the procedure displays all selected options and suboptions, you are prompted as follows:

Are you satisfied with these options? [YES]

If you answer NO to this question, you are allowed to selectively configure options and suboptions, even if you did not do so previously. When you finish, you are asked again whether you are satisfied with the options you selected. When you answer YES to indicate you are satisfied with the selections, the installation begins installing OpenVMS onto the target disk. The following is a sample display:



NOTE: **Alpha systems only:** If you perform two installations at the same time to systems connected by MEMORY CHANNEL, you might see a message similar to the following every 5 seconds:

```
%PMA0 CPU00: 25-SEP-2009 14:58:40 Remote System Conflicts with
Known System - REMOTE NODE
%PMA0 CPU00: 25-SEP-2009 14:58:45 Remote System Conflicts with
Known System - REMOTE NODE
```

Disregard the message. The installation or upgrade will proceed normally and the message is not present when the system reboots with its actual node name.

NOTE: Names of products installed with OpenVMS differ between OpenVMS Alpha and Integrity server installations. For example, the OpenVMS Integrity servers windowing and networking product names are all displayed as HP I64VMS *product-name*, such as HP I64VMS KERBEROS, while OpenVMS Alpha product names are displayed in any of three different ways, depending on the product and version:

- HP *product-name*, such as HP AXPVMS KERBEROS V3.1
- DEC *product-name*, such as DEC AXPVMS DWMOTIF V1.7
- CPQ *product-name*, such as CPQ AXPVMS CDSA V2.3

Execution phase starting ...

The following products will be installed to destinations:

```
HP I64VMS AVAIL_MAN_BASE V8.4          DISK$I64SYS: [VMS$COMMON.]
HP I64VMS CDSA V2.3-306                DISK$I64SYS: [VMS$COMMON.]
HP I64VMS DECNET_PLUS V8.4             DISK$I64SYS: [VMS$COMMON.]
HP I64VMS DWMOTIF V1.7                 DISK$I64SYS: [VMS$COMMON.]
HP I64VMS DWMOTIF_SUPPORT V8.4        DISK$I64SYS: [VMS$COMMON.]
HP I64VMS HPBINARYCHECKER V1.0        DISK$I64SYS: [VMS$COMMON.]
HP I64VMS KERBEROS V3.1-152           DISK$I64SYS: [VMS$COMMON.]
HP I64VMS OPENVMS V8.4                 DISK$I64SYS: [VMS$COMMON.]
HP I64VMS SSL V1.4-284                 DISK$I64SYS: [VMS$COMMON.]
HP I64VMS TCPIP V5.7                   DISK$I64SYS: [VMS$COMMON.]
HP I64VMS TDC_RT V2.3-1                DISK$I64SYS: [VMS$COMMON.]
HP I64VMS VMS V8.4                     DISK$I64SYS: [VMS$COMMON.]
HP I64VMS WBEMCIM V2.91-A070728       DISK$I64SYS: [VMS$COMMON.]
HP I64VMS WBEMPROVIDERS V2.0-31       DISK$I64SYS: [VMS$COMMON.]
```

Portion done: 0%..10%..20%..30%..40%..50%..60%..70%..80%..90%

%PCSI-I-PRCOUTPUT, output from subprocess follows ...

```
% - Execute SYS$MANAGER:TCPIP$CONFIG.COM to proceed with configuration of
%   HP TCP/IP Services for OpenVMS.
%
```

Portion done: 100%

Depending on the options you selected, certain messages such as the preceding TCP/IP message might be displayed at this point.

21. **Final Installation Confirmation and Information Messages:** The installation continues, displaying the products that have been installed and post-installation tasks that might need

to be performed. The version numbers in this example do not necessarily reflect the version numbers of the products actually shipped with OpenVMS Version 8.4.

The following products have been installed:

HP I64VMS AVAIL_MAN_BASE V8.4	Layered Product
HP I64VMS CDSA V2.3-306	Layered Product
HP I64VMS DECNET_PLUS V8.4	Layered Product
HP I64VMS DWMOTIF V1.7	Layered Product
HP I64VMS DWMOTIF_SUPPORT V8.4	Layered Product
HP I64VMS HPBINARYCHECKER V1.0	Layered Product
HP I64VMS KERBEROS V3.1-152	Layered Product
HP I64VMS OPENVMS V8.4	Platform (product suite)
HP I64VMS SSL V1.4-284	Layered Product
HP I64VMS TCPIP V5.7	Layered Product
HP I64VMS TDC_RT V2.3-1	Layered Product
HP I64VMS VMS V8.4	Operating System
HP I64VMS WBEMCIM V2.91-A070728	Layered Product
HP I64VMS WBEMPROVIDERS V2.0-31	Layered Product

HP I64VMS OPENVMS V8.4: OPENVMS and related products Platform

HP I64VMS KERBEROS V3.1-152

Configure and set up Kerberos

If Kerberos will be run on this system, but has not been used previously, you need to perform the following steps.

- o Run the Kerberos configuration procedure:

```
@SYS$STARTUP:KRB$CONFIGURE.COM
```

- o Add the following line to SYS\$MANAGER:SYSTARTUP_VMS.COM:

```
$ @SYS$STARTUP:KRB$STARTUP
```

- o Add the following line to SYS\$MANAGER:SYLOGIN.COM:

```
$ @SYS$MANAGER:KRB$SYMBOLS
```

Press RETURN to continue:

HP I64VMS SSL V1.4-284: SSL for OpenVMS I64 V1.4 (Based on OpenSSL 0.9.8h)

There are post-installation tasks that you must complete after upgrading from previous SSL versions

including verifying startup command procedures and logical names.

Refer to SYS\$HELP:SSL014.RELEASE_NOTES for more information.

HP I64VMS TDC_RT V2.3-1: The Performance Data Collector (base) for OpenVMS

Users of this product require the following privileges:
(CMKRNL, LOG_IO, WORLD, PHY_IO, SYSPRV, SYSLCK)

Users of this product require the following process resource limits:
WSQUO minimum 7000

A read-me file is available in SYS\$COMMON:[TDC]TDC_README.TXT

Release notes are available in SYS\$COMMON:[TDC]TDC_RELEASE_NOTES.TXT

HP I64VMS TCPIP V5.7 : HP TCP/IP Services for OpenVMS.

Check the release notes for current status of the product.

22. **Installation Creates and Validates Boot Options (Integrity servers only):** At this point in an OpenVMS Integrity servers installation, the procedure creates and validates boot options if you chose to have the procedure do so (see step 8).

- **If you answered NO** in step 8, the following message is displayed:

If there is an existing boot option that was used to boot this system disk, you may be able to use it. Otherwise, you will have to use the EFI Shell the first time that you boot the newly installed system. After booting, use the OpenVMS I64 Boot Manager to create a Boot Option. To do this log in to a privileged account and execute this command:

```
$ @SYS$MANAGER:BOOT_OPTIONS
```

The procedure then informs you that the installation is complete and prompts you to press **Return (Enter)** to continue, at which point it returns you to the OpenVMS main menu. You can select option 8 (“Execute DCL commands and procedures”) on the OpenVMS main menu and enter the command at the DCL triple dollar sign prompt (\$\$\$) to start the OpenVMS Integrity servers Boot Manager utility.

- **If you answered YES** in step 8, the installation procedure determines whether a boot entry already exists for the system disk (in this example, DKB400:):

- **If an entry is found**, a message similar to the following is displayed:

```
The EFI Boot Manager menu includes the following boot option(s)
for DKB400:
```

```
EFI Boot Options list:      Timeout = 0 secs.
-----
01. DKB400 PCI(0|20|1|0) Scsi(Pun1,Lun0) "OpenVMS on DKB400: PKA0.1"
-----
1 entries found.
```

In this example, one boot option is found. If multiple entries are found and if they are all SCSI devices, the procedure displays the following message and then notifies you that the installation is complete:

```
Please use the OpenVMS I64 Boot Manager to ensure that you
have a valid boot option for the system you have just installed.
```

When one entry is found, or when multiple Fibre Channel entries are found, the procedure validates the boot options, as in the following example, in which the found entry fails to boot and is then fixed and validated:

```

Validate EFI Boot Options list:      Timeout = 0 secs.
-----
 1 OpenVMS on DKB400: PKA0.1
   DKB400 PCI(0|20|1|0) Scsi(Pun1,Lun0)
   efi$bcfg: Option Failed. Fixing Boot Entry automatically.

efi$bcfg: Entry 1 Boot0001 removed.
efi$bcfg: DKB400 PCI(0|20|1|0) Scsi(Pun1,Lun0) (Boot0001) Option
successfully added
-----
1 entries validated.

```

- **If no existing entry is found**, a boot option is created and the procedure displays the validation text, as in the following example:

```
efi$bcfg: DKB400: (Boot0003) Option successfully added
```

```

The Boot Option is called OpenVMS on DKB400;;
it is the first entry in the Boot Options menu, and is
configured (by default) to boot from SYS0.

```

```
VMS_FLAGS are set to -fl 0,30000
```

23. **Installation Completes and Returns to OpenVMS Menu:** The installation procedure is now complete. The procedure displays information about the special startup procedure that runs when the newly installed system is first booted. It then prompts you to press **Return (Enter)** to continue. After you do so, you are returned to the OpenVMS operating system menu. The following is a sample display:

The installation is now complete.

When the newly installed system is first booted, a special startup procedure will be run. This procedure will:

- o Configure the system for standalone or OpenVMS Cluster operation.
- o Run AUTOGEN to set system parameters.
- o Reboot the system with the newly set parameters.

You may shut down now or continue with other operations.

```
Process I64VMS_INSTALL logged out at 25-SEP-2009 14:45:49.54
```

```
Press Return to continue...
```

```
*****
```

```

You can install or upgrade the OpenVMS I64 operating system
or you can install or upgrade layered products that are included
on the OpenVMS I64 distribution media (CD/DVD).

```

```

You can also execute DCL commands and procedures to perform
"standalone" tasks, such as backing up the system disk.

```

```
Please choose one of the following:
```

- 1) Upgrade, install or reconfigure OpenVMS I64 Version 8.4
- 2) Display layered products that this procedure can install
- 3) Install or upgrade layered products
- 4) Show installed products
- 5) Reconfigure installed products
- 6) Remove installed products
- 7) Find, Install or Undo patches; Show or Delete recovery data
- 8) Execute DCL commands and procedures
- 9) Shut down this system

```
Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?)
```

24. **Shut Down the System:** Unless you want to perform other operations prior to booting the new system disk, choose the shutdown option (9) on the OpenVMS main menu to shut down the operating system, as shown in the following example. If you want to install layered products that have not been installed yet, HP recommends doing so during the postinstallation phase, as described in Section 7.15 (page 161).

```
Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?) 9
  Shutting down the system
```

```
SYSTEM SHUTDOWN COMPLETE
```

After you complete the installation and shut down the system, you can boot your new operating system disk, as explained in Section 3.5.2 (page 78). If you are installing OpenVMS Integrity servers, make sure you remove the DVD from the drive before booting the system disk.

3.5 Booting the New OpenVMS System Disk

After you have successfully installed the OpenVMS operating system, the next step is to set up the new system disk as the default boot device. For OpenVMS Integrity server systems, this step may already have been done (see step 22 of the installation procedure in Section 3.4.3 (page 56)), in which case you can boot the OpenVMS Integrity servers system disk by performing the steps in Section 3.5.2 (page 78). To set up the OpenVMS system disk as the default boot device and then boot it, see Section 3.5.1 (page 77).

3.5.1 Booting the OpenVMS Alpha System Disk

For booting the OpenVMS Alpha system disk, first designate the new system disk as the default boot device by performing the steps in Section 3.5.1.1 (page 77). Then, to boot the disk, perform the steps in Section 3.5.1.2 (page 77).

3.5.1.1 Specifying the Default Boot Device on Alpha Systems

Before you boot the new system disk, perform the following steps:

1. Halt the system by pressing either **Ctrl/P** or **Halt**. For more information about halting your Alpha computer, see Appendix A (page 169).
2. At the console prompt (>>>), enter the SET BOOTDEF_DEV command in the following format:

```
SET BOOTDEF_DEV target-drive
```

Substitute the device name of the system disk for *target-drive*. The SET BOOTDEF_DEV command tells the system which disk to boot from. For example, if the system disk has the device name DKA400, enter the following command and press **Enter**:

```
>>> SET BOOTDEF_DEV DKA400
```

If the system disk is connected to a hierarchical storage device (HSx), the format for specifying that drive is different. For example, on a DEC 7000 series system connected to an HSC device, the command is similar to the following:

```
>>> SET BOOTDEF_DEV DUA20.14.0.2.0
```

For more information about setting and showing the default boot device, see Appendix A (page 169).

3.5.1.2 How to Boot the New System Disk

To boot the system disk, enter the following command and press **Enter**:

```
>>> BOOT -FLAGS 0,0
```

When the system starts booting, the initial informational messages displayed are similar to the following:

```
OpenVMS (TM) Alpha Operating System, Version 8.4
```

```
Installing required known files...
```

```
Configuring devices...
```

```
(c) Copyright 1976-2006 Hewlett-Packard Development Company, L.P.
```

3.5.2 Booting the OpenVMS Integrity servers System Disk

The following steps explain how to boot your new OpenVMS Integrity servers system disk. For more information about this and special booting operations, see Section B.6 (page 213). You can also use vMedia to boot an OpenVMS system disk; see Section D.2 (page 284).



NOTE: Make sure you remove the DVD from the DVD/CD drive before booting the system disk.

The actions you take to boot the system disk depend on whether you have configured your system with a boot option for your system disk:

- **If you have configured your system with a boot option for your system disk**, your system disk is displayed as a boot option in the EFI Boot Manager menu. Select your system disk and press **Enter**. If your system disk is the first option in the EFI Boot Manager menu, it might boot automatically after the 10-second countdown.
- **If you have not configured your system with a boot option for your disk**, follow these steps:
 1. Press **Enter** or any other key. (You might see text that instructs you to "hit any key to cold reboot.") The machine displays several boot-related messages and then displays the EFI Boot Manager menu.
 2. Go to the EFI Shell prompt by selecting the EFI Shell [Built-in] option from the EFI Boot Manager menu. (This might be selected automatically if you do not make a selection before the EFI countdown completes.) A display similar to the following appears. An explanation of the two types of devices shown (**blk** and **fs**) follows the example.

```
Loading.: EFI Shell [Built-in]
EFI Shell version 1.10 [14.61]
Device mapping table
fs { fs0 : Acpi (HWP0002,100) /Pci (1|0) /Scsi (Pun0,Lun0) /HD (Part1,Sig8FCF6F11-...
    { fs1 : Acpi (HWP0002,100) /Pci (1|0) /Scsi (Pun0,Lun0) /HD (Part4,Sig8FCF6F10-...
blk { blk0 : Acpi (HWP0002,0) /Pci (2|0) /Ata (Primary,Master)
    { blk1 : Acpi (HWP0002,100) /Pci (1|0) /Scsi (Pun0,Lun0)
    { blk2 : Acpi (HWP0002,100) /Pci (1|0) /Scsi (Pun0,Lun0) /HD (Part1,Sig8FCF6F11-...
    { blk3 : Acpi (HWP0002,100) /Pci (1|0) /Scsi (Pun0,Lun0) /HD (Part2,Sig8FCF6F10-...
    { blk4 : Acpi (HWP0002,100) /Pci (1|0) /Scsi (Pun0,Lun0) /HD (Part3,Sig8FCF6F11-...
    { blk5 : Acpi (HWP0002,100) /Pci (1|0) /Scsi (Pun0,Lun0) /HD (Part4,Sig8FCF6F10-...
    { blk6 : Acpi (HWP0002,100) /Pci (1|0) /Scsi (Pun0,Lun0) /HD (Part5,Sig8FCF6F10-...
Shell>
```

fs The fs devices are file-structured logical partitions on physical disks that are included with your Integrity servers system. One or more fs device exists for each volume with a bootable **partition** or diagnostic partition. Generally, fs0: corresponds to the target disk on which you installed OpenVMS Integrity servers (unless the DVD was not removed, in which case fs1: corresponds to the target disk). For example, if the target disk is DKA0, then fs0: most likely corresponds to the target disk. On the other hand, if the target disk is a DKA100 or DKB200 or similar, the

corresponding EFI device depends on what partitions are configured on the target disk.

blk The blk devices are block devices. Multiple blk devices exist for each volume that has a bootable partition or diagnostic partition. These devices may include the DVD device as well as the diagnostic partitions on OpenVMS system disks. Diagnostic partitions are intended and reserved for use by HP Services. (For more information about this partition, see Appendix J (page 327).)

3. To boot the OpenVMS Integrity servers system disk, enter the following command at the EFI Shell prompt, where *fsn:* is the device associated with the system disk (probably fs0:):

```
Shell> fsn:\efi\vms\vms_loader.efi
```

The OpenVMS Integrity servers operating system now starts booting. A display similar to the following appears, followed by the prompt for user name and password:

```
HP OpenVMS Industry Standard 64 Operating System, Version 8.4  
(c) Copyright ... Hewlett-Packard Development Company, L.P.
```

HP Integrity servers maintain a system event log (SEL) within system console storage, and OpenVMS Integrity servers automatically transfers the contents of the SEL into the OpenVMS error log. On certain machines, during a successful boot operation while using a console, you might see a message indicating that the Baseboard Management Controller (**BMC**) SEL is full. You can safely continue when the BMC SEL is full by following the prompts; OpenVMS processes the contents of the SEL.

3.5.3 Next Steps

When you boot OpenVMS from a new system disk, a special startup procedure runs that does the following:

- Gives you the opportunity to configure the system for standalone or OpenVMS Cluster operation (see Section 3.6 (page 79)).
- Runs AUTOGEN to evaluate your hardware configuration, estimate typical workloads, and set system parameters (see Section 3.7 (page 81)).
- Reboots your system with the new parameters (see Section 3.8 (page 81)).

After the system is rebooted with the new parameters, you can log into your SYSTEM account, as explained in Section 3.9 (page 82). On Integrity servers, if you did not allow the OpenVMS installation procedure to create a boot option for your system disk, you can set up such an option now, as explained in Section B.5 (page 205). Appendix B (page 189) includes additional information regarding setting up and booting HP Integrity servers.

3.6 Joining an OpenVMS Cluster

At installation, you are prompted to determine if the node will join an OpenVMS cluster. If you answered as No, and if the node will not be a cluster member, you can skip to “Running AUTOGEN” (page 81).

If you answered NO to the question about joining an OpenVMS Cluster, but you do intend to add this node to a new or existing OpenVMS Cluster, you can do so only after the system has rebooted (at the end of this phase of the installation). You must manually run the cluster configuration utility. On an OpenVMS Alpha system, you can manually add your node to an OpenVMS Cluster by entering the following command:

```
$ @SYS$MANAGER:CLUSTER_CONFIG
```

On an OpenVMS Integrity servers system, you can do this by entering the following command:

```
$ @SYS$MANAGER:CLUSTER_CONFIG_LAN
```

For more information about cluster configuration, see the *HP OpenVMS Cluster Systems* manual or the *Guidelines for OpenVMS Cluster Configurations* manual.

If you answered YES to the question about joining an OpenVMS Cluster, the system now prompts you for information about your configuration. Table 3-2 lists the OpenVMS Cluster prompts and suggested responses. These prompts appear if you answered YES to the question about joining an OpenVMS Cluster or if you manually run SYS\$MANAGER:CLUSTER_CONFIG.COM or SYS\$MANAGER:CLUSTER_CONFIG_LAN.COM. Note that, depending on your responses and the particular cluster configuration, some prompts are not displayed.

Table 3-2 Prompts for OpenVMS Cluster Configurations

Question	How to Respond
Will this node be a cluster member (Y/N)?	Enter Y.
What is the node's DECnet node name?	Enter the DECnet node name (for example, MYNODE). The DECnet node name can be from one to six alphanumeric characters in length and cannot include dollar signs (\$) or underscores (_). This is the name you specified in step 12 of the installation procedure.
What is the node's DECnet node address?	Enter the DECnet node address; for example, 2.2. This is the address you specified in step 13 of the installation procedure.
Will the Ethernet be used for cluster communications (Y/N)? (Alpha only)	Enter N for an OpenVMS CI-only cluster or DSSI-only cluster . Otherwise, enter Y. ¹
Enter this cluster's group number: ²	Enter a number in the range of 1 to 4095 or 61440 to 65535.
Enter this cluster's password: ²	Enter the cluster password. The password must be from 1 to 31 alphanumeric characters in length and can include dollar signs (\$) and underscores (_).
Reenter this cluster's password for verification:	Reenter the password.
Will MYNODE be a disk server (Y/N)?	Enter Y if you want local disks to be served to the cluster (mandatory for local area and mixed-interconnect configurations). See the <i>HP OpenVMS Cluster Systems</i> manual for information about served cluster disks.
Will MYNODE serve RFXx disks (Y)? (Alpha only)	Enter a response appropriate for your DSSI configuration, if such disks are available.
Enter a value for MYNODE's ALLOCLASS parameter.	In an OpenVMS Cluster environment, the allocation class value cannot be zero if the node serves DSSI or CI disks to other cluster members, or if volume shadowing will be used on this system. In either case, the ALLOCLASS value must be a number from 1 to 255. HP recommends that you thoroughly review the chapter on cluster storage devices in the <i>HP OpenVMS Cluster Systems</i> manual. This manual also includes the rules for specifying allocation class values.
Does this cluster contain a quorum disk (Y/N)?	For CI-only, SCSI, local area, and mixed-interconnect configurations, enter Y or N, depending on your configuration. For most DSSI systems, enter Y. However, if you are adding a two-system DSSI configuration to an existing cluster (in which case you might not need a quorum disk), you can answer N. If you enter Y, the system asks for the name of the quorum disk. Enter the device name of the quorum disk. For information about quorum disks, see the <i>HP OpenVMS Cluster Systems</i> manual.

- 1 The Ethernet might not be required for communication within a **local area OpenVMS Cluster system** configured with FDDI devices. Within certain Digital Storage Systems Interconnect (DSSI) or computer interconnect (CI) mixed-interconnect configurations, neither the Ethernet nor FDDI are required for communication. If your configuration fits either scenario, you can answer NO (N) to this question.
- 2 Cluster group number and password are required by any cluster nodes that use the local area network. In a cluster that uses mixed interconnects, if any of the interconnects require the cluster number and password, then you must set the cluster number and password for all nodes.

3.7 Running AUTOGEN

At this point, the system automatically runs AUTOGEN to evaluate your hardware configuration and estimate typical workloads. AUTOGEN then sets system parameters, the sizes of page, swap, and dump files, and the contents of VMSIMAGES.DAT. When AUTOGEN finishes and your system reboots, the installation procedure is complete.

The installation procedure displays messages similar to the following:

```
AUTOGEN will now be run to compute the new system parameters. The system
will then shut down and reboot, and the installation or upgrade will be
complete.
```

After rebooting you can continue with such system management tasks as:

```
Decompressing the System Libraries (not necessary on OpenVMS I64)
Configuring networking software (TCP/IP Services, DECnet, other)
Using SYS$MANAGER:CLUSTER_CONFIG.COM to create an OpenVMS Cluster
Creating FIELD, SYSTEST, and SYSTEST_CLIG accounts if needed
```

```
%AUTOGEN-I-BEGIN, GETDATA phase is beginning.
%AUTOGEN-I-NEWFILE, A new version of SYS$SYSTEM:PARAMS.DAT has been created.
    You may wish to purge this file.
%AUTOGEN-I-END, GETDATA phase has successfully completed.
%AUTOGEN-I-BEGIN, GENPARAMS phase is beginning.
%AUTOGEN-I-NEWFILE, A new version of SYS$MANAGER:VMSIMAGES.DAT has been created.
    You may wish to purge this file.
%AUTOGEN-I-NEWFILE, A new version of SYS$SYSTEM:SETPARAMS.DAT has been created.
    You may wish to purge this file.
%AUTOGEN-I-END, GENPARAMS phase has successfully completed.
%AUTOGEN-I-BEGIN, GENFILES phase is beginning.
%SYSGEN-I-EXTENDED, SYS$SYSROOT:[SYSEXE]PAGEFILE.SYS;1 extended
%SYSGEN-I-EXTENDED, SYS$SYSROOT:[SYSEXE]SWAPFILE.SYS;1 extended
%SYSGEN-I-CREATED, SYS$SYSROOT:[SYSEXE]SYSDUMP.DMP;1 created

%AUTOGEN-I-REPORT, AUTOGEN has produced some informational messages that
    have been stored in the file SYS$SYSTEM:AGEN$PARAMS.REPORT. You may
    wish to review the information in that file.

%AUTOGEN-I-END, GENFILES phase has successfully completed.
%AUTOGEN-I-BEGIN, SETPARAMS phase is beginning.
%AUTOGEN-I-SYSGEN, parameters modified
%AUTOGEN-I-END, SETPARAMS phase has successfully completed.
%AUTOGEN-I-BEGIN, REBOOT phase is beginning.
```

The system is shutting down to allow the system to boot with the generated site-specific parameters and installed images.



NOTE: After booting and running AUTOGEN, several messages are displayed at DECwindows startup. For information about these messages and how to avoid them, see the *HP DECwindows Motif for OpenVMS Release Notes*.

3.8 Rebooting After AUTOGEN

After AUTOGEN finishes, the system automatically shuts down and displays messages similar to the following:

The system will automatically reboot after the shutdown and the installation will be complete.

```
SHUTDOWN -- Perform an Orderly System Shutdown
           on node I64CSI
```

```
%SHUTDOWN-I-BOOTCHECK, performing reboot consistency check...
%SHUTDOWN-I-CHECKOK, basic reboot consistency check completed
```

```
.
.
.
```

After installation, the OpenVMS Alpha system is automatically restarted. If the Alpha system does not reboot automatically, you must manually do so. For example, if the system disk is DKA400, enter the following command and press **Enter**:

```
>>> BOOT DKA400
```

After shutdown of an OpenVMS Integrity servers system, it reboots automatically only if you have set the system disk boot option accordingly; otherwise, you must boot the system manually, as described in Section 3.5.2 (page 78).

When the system reboots, it displays informational messages and accounting information indicating that your OpenVMS operating system has finished booting and is now ready for use. For example:

```
%SET-I-INTSET, login interactive limit = 64, current interactive value = 0
SYSTEM      job terminated at 25-SEP-2009 14:51:23.47
Accounting information:
Buffered I/O count:          2177      Peak working set size:    6848
Direct I/O count:           1358      Peak page file size:     179552
Page faults:                 1805      Mounted volumes:         0
Charged CPU time:           0 00:00:13.37  Elapsed time:           0 00:01:06.20
```

3.9 Logging In to the SYSTEM Account

The following two sections explain how to log in to the SYSTEM account from a character-cell terminal and from a workstation.

3.9.1 Logging In from a Character-Cell Terminal

Log in from a character-cell terminal by entering the user name SYSTEM followed by the password. The display is similar to the following:

```
OpenVMS I64 Operating System, Version 8.4
```

```
Username: SYSTEM
```

```
Password:
```

```
.
.
.
```

```
OpenVMS I64 Operating System, Version 8.4
```

If you forget your password for an OpenVMS Integrity servers SYSTEM account, follow the instructions in Section B.6.12 (page 222) to perform an emergency startup. If you forget your password for an OpenVMS Alpha SYSTEM account, see Section A.1.9 (page 177).

3.9.2 Logging In from a Workstation

If you installed the DECwindows Motif for OpenVMS software on your workstation, do the following after the login window is displayed on your screen:

1. Enter the user name SYSTEM, press **Tab**, and then enter the password.
2. Press **Enter** or click **OK** with your mouse.

3. At this point, you can create a DECterm session or initiate other management functions. For information about creating a DECterm session, see the *DECwindows Motif for OpenVMS Applications Guide*.

3.10 Postinstallation Tasks

After you have successfully installed the OpenVMS operating system and logged in to the SYSTEM account, you must perform certain postinstallation tasks before you can use the system. For complete information, see Chapter 7 (page 127).

4 Before Upgrading the OpenVMS Operating System

This chapter describes which tasks you should perform prior to beginning an upgrade. Section 4.1 (page 85) includes a checklist that you can use to make sure you perform all the tasks described in this chapter.

4.1 Preupgrade Tasks

Use the checklist in Table 4-1 to ensure that you perform all necessary tasks prior to upgrading your system.

Table 4-1 Preupgrade Checklist

Task	Section
<input type="checkbox"/> Review relevant documentation.	Section 4.2 (page 85)
<input type="checkbox"/> Review notes, cautions, and restrictions about the following: <ul style="list-style-type: none">• Upgrade paths to Version 8.4• Update license requirements• Components you choose not to install• Upgrade issues after the system disk directory structure has been changed• Licenses and possible reinstallation requirements for layered products	Section 4.3 (page 86)
<input type="checkbox"/> Check for software that must be manually removed.	Section 4.4 (page 87)
<input type="checkbox"/> Save files that you do not want deleted by the upgrade procedure.	Section 4.5 (page 89)
<input type="checkbox"/> Prepare the system disk.	Section 4.7 (page 89)
<input type="checkbox"/> Ensure that you have a recent FEEDBACK.DAT file.	Section 4.8 (page 93)
<input type="checkbox"/> Perform required actions before upgrading in a volume shadowing environment.	Section 4.9 (page 94)
<input type="checkbox"/> Back up the current system disk.	Section 4.10 (page 95)
<input type="checkbox"/> Shut down the system.	Section 4.11 (page 96)

4.2 Documentation to Review

In addition to reviewing the information in this chapter, you might need to refer to the following sources of information as well.

- *Cover Letter for HP OpenVMS Version 8.4*
- Software Product Descriptions included with your distribution kit
- *HP OpenVMS Version 8.4 Release Notes*
- *HP OpenVMS Version 8.4 New Features and Documentation Overview*
- *HP OpenVMS Cluster Systems*
- *Guidelines for OpenVMS Cluster Configurations*
- *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems* (specifically, the chapter entitled "Managing System Parameters"), for information about using AUTOGEN, modifying the system parameters file (MODPARAMS.DAT), and related operations

- *HP OpenVMS System Management Utilities Reference Manual*, for information about using system management utilities such as SYSMAN and ANALYZE/DISK_STRUCTURE
- *HP OpenVMS Guide to System Security*, for information about reestablishing your security environment after the upgrade

4.3 Notes, Cautions, and Restrictions

This section provides important information that can affect the success of your upgrade. Review the cautions, restrictions, and notes carefully before you begin the upgrade.

4.3.1 Upgrade Paths

The following subsections describe the various types of upgrades to OpenVMS Version 8.4.

4.3.1.1 Direct Upgrade Paths

You can upgrade directly to OpenVMS Integrity servers Version 8.4 from only the following versions of OpenVMS Integrity servers:

- Version 8.3-1H1
- Version 8.3
- Version 8.2-1

You can upgrade directly to OpenVMS Alpha Version 8.4 from only the following versions of OpenVMS Alpha:

- Version 8.3
- Version 8.2
- Version 7.3-2

4.3.1.2 Indirect Upgrade Paths

If you are running a version of OpenVMS Alpha earlier than Version 7.3-2, you cannot upgrade directly to Version 8.4. You need to perform intermediate version upgrades before upgrading to Version 8.4. HP recommends performing the various upgrades over a several-day period, allowing for system disk backups between upgrades. This allows to look for, and recover from, problems that might arise because of a specific upgrade. This also allows you to identify the exact point in the upgrade stream where the problem arises.

For example, if you are running OpenVMS Alpha Version 7.1, you need to perform an intermediate upgrade to either Version 7.2, 7.2-1, or 7.2-2, and then upgrade to Version 7.3-2. After this, you can upgrade to Version 8.4.



NOTE: When performing an intermediate upgrade, review each OpenVMS installation manual available for the version of OpenVMS that you are upgrading to, checking for any special requirements such as patches that might have to be applied before upgrading.

4.3.2 Update License Requirements



IMPORTANT: Before upgrading to OpenVMS Integrity servers Version 8.4, you must have the appropriate OE license loaded on your system. Similarly, before upgrading your OpenVMS Alpha system, you must have the appropriate Alpha licenses loaded on your system.

HP software licenses grant the right to use the current version of a product or any previous version of the product at the time of purchase.



NOTE: When you initially purchase the OpenVMS software and license, HP provides a Product Authorization Key (PAK) that is required to enable the License Management Facility (LMF) to register the license and to validate and authorize subsequent use of the product. A PAK does not provide license or new version rights. For more information about licensing and the License Management Facility, see the *HP OpenVMS License Management Utility Manual*.

If you need an Update License, please contact your HP Sales representative.

4.3.3 Components You Choose Not to Install

If you choose not to install optional OpenVMS networking software (DECnet or TCP/IP) or the DECwindows/Motif GUI during the upgrade, the upgrade procedure removes these products from the system disk. Note that TCP/IP Services for OpenVMS is installed automatically when OpenVMS is installed by HP SIM provisioning. For information about checking for appropriate versions of software on your system and for certain products requiring that you manually remove older versions, see Section 4.4 (page 87).



NOTE: Unless you have specific reasons to do otherwise, HP recommends that you accept the defaults and install all OpenVMS options. OpenVMS and layered products have various dependencies on many of these options. Even if you think you do not need certain options, some OpenVMS or layered product operations might not work correctly if other OpenVMS options are not installed.

Note also that, for OpenVMS Integrity server installations, the availability of certain options depends on the OE you have purchased. For more information, see the *HP Operating Environments for OpenVMS for Integrity Servers Software Product Description (SPD 82.34.xx)*.

4.3.4 Licenses and Layered Products

The upgrade procedure is designed so that you do not need to reinstall most layered products after the upgrade. However, you might need to reinstall certain layered products because of product-specific installation procedures.

The upgrade procedure leaves your OpenVMS license and layered product licenses intact. You do not need to reinstall these licenses after you upgrade.

4.4 Software That Must Be Manually Removed

Before upgrading, if you are currently using DECram or TDC V2.0, these products must be removed manually; otherwise, the upgrade might fail. For other information about software that might need to be removed manually, see the *HP OpenVMS Version 8.4 Release Notes*.



NOTE: The OpenVMS Alpha upgrade procedure checks for older versions of SSL and removes them if found.

4.4.1 Remove Older Versions of DECram for OpenVMS (Alpha Only)

Beginning with OpenVMS Version 8.2, DECram for OpenVMS becomes an integral part of the OpenVMS operating system. Before upgrading to OpenVMS Alpha Version 8.4, you must manually remove earlier versions of DECram for OpenVMS that were customer installed. The upgrade procedure cannot remove DECram for OpenVMS automatically. If an old version of DECram for OpenVMS is installed, the upgrade procedure might abort; if the upgrade does complete, DECram for OpenVMS might cause errors or work improperly. This section explains how to remove an older version of DECram for OpenVMS from your operating system.

Before you shut down the operating system that you plan to upgrade, follow these steps to remove DECram for OpenVMS (if you have already shut down your operating system, you must reboot before continuing).



IMPORTANT: Perform these steps *only* on versions of OpenVMS Alpha prior to 8.2.

1. Check for a POLYCENTER software installation (PCSI) utility DECram for OpenVMS installation by logging on to a privileged account and entering the following command:

```
$ PRODUCT SHOW PRODUCT DECRAM
```

If the resulting display shows that DECram is not found on the system, skip to step 3; otherwise, proceed to step 2.

2. If the SHOW PRODUCT display shows that DECram for OpenVMS is installed, enter the following command to remove the product:

```
$ PRODUCT REMOVE DECRAM
```

Once this command has completed successfully, you are finished; you do not need to perform the next steps. If the product removal fails, go on to step 3.

3. Check for files on your system from a VMSINSTAL utility DECram for OpenVMS installation by entering the following commands:

```
$ DIRECTORY SYS$$SYSDEVICE: [SYS*.SYS$LDR] SYS$MDDRIVER.EXE
$ DIRECTORY SYS$$SYSDEVICE: [SYS*.SYSEXE] MDMANAGER.EXE
$ DIRECTORY SYS$$SYSDEVICE: [SYS*.SYSMGR] MDRECOVER.EXE
$ DIRECTORY SYS$$SYSDEVICE: [SYS*.SYSHLP] DECRAM$HELP.HLB
$ DIRECTORY SYS$$SYSDEVICE: [SYS*.SYSTEST] DECRAM$IVP.COM
```

If files are found, use the commands in step 4 to remove them. If no files are found, skip to step 5.

4. Remove the files found in step 3 by entering the appropriate DELETE commands (the /NOCONFIRM/NOLOG qualifiers are optional):

```
$ DELETE/NOCONFIRM/NOLOG SYS$$SYSDEVICE: [SYS*.SYS$LDR] SYS$MDDRIVER.EXE;*
$ DELETE/NOCONFIRM/NOLOG SYS$$SYSDEVICE: [SYS*.SYSEXE] MDMANAGER.EXE;*
$ DELETE/NOCONFIRM/NOLOG SYS$$SYSDEVICE: [SYS*.SYSMGR] MDRECOVER.EXE;*
$ DELETE/NOCONFIRM/NOLOG SYS$$SYSDEVICE: [SYS*.SYSHLP] DECRAM$HELP.HLB;*
$ DELETE/NOCONFIRM/NOLOG SYS$$SYSDEVICE: [SYS*.SYSTEST] DECRAM$IVP.COM;*
```

5. In addition, remove the DECram for OpenVMS startup file from the startup database by entering the following commands:

```
$ RUN SYS$SYSTEM:SYSMAN
SYSMAN> STARTUP SET DATABASE STARTUP$STARTUP_LAYERED
SYSMAN> STARTUP REMOVE FILE MDRECOVER.EXE
```

Ignore any “-STARTUP-E-FILNOTFND, STARTUP file MDRECOVER.EXE not found” errors. To exit from SYSMAN, press **Ctrl/Z** or enter EXIT.

4.4.2 Remove TDC Version 2.0 (Alpha Only)

TDC Version 2.0 was released for use on OpenVMS Alpha Version 7.3-2 systems. Prior to installing the current release of OpenVMS Alpha, remove TDC Version 2.0 from your system.

Before you shut down the operating system that you plan to upgrade, follow these steps to remove TDC V2.0 (if you have already shut down your operating system, you must reboot before continuing):

1. Check for a POLYCENTER software installation (PCSI) utility TDC V2.0 installation by logging on to a privileged account and entering the following command:

```
$ PRODUCT SHOW PRODUCT TDC
```

 If the resulting display shows that TDC is not found on the system, no action is required; if TDC is found, proceed to step 2.
2. If the SHOW PRODUCT display shows that TDC V2.0 is installed, enter the following command to remove the product:

```
$ PRODUCT REMOVE TDC
```

4.5 Software That Must be Deconfigured (Integrity servers Only)

Before upgrading, if you are using or have configured WBEM Providers for OpenVMS, you must manually deconfigure WBEM Providers by entering the following command:

```
$ @SYS$COMMON: [WBEMPROVIDERS] WBEMPROVIDERS$DECONFIGURE.COM
```

4.6 Saving Archived Files from Being Deleted by the Upgrade

By default, the upgrade procedure deletes files that were archived as *filename.type_OLD* by OpenVMS remedial kits. If you do not want these files deleted, you can rename them before you perform the upgrade. Alternatively, you can have the upgrade procedure save them by responding to the prompts, as described in Section 6.4.4 (page 120).

4.7 Preparing the System Disk

The following sections describe how to prepare the system disk for the upgrade. Operations include the following:

- Checking for appropriate directory structure and preserving your security protections
- Checking the SYSCOMMON directories
- Purging duplicate files from the system disk
- Examining the system disk
- Checking the size of the system disk
- Returning authorization and AGEN\$INCLUDE files to the system disk
- Verifying system parameters

4.7.1 Checking the Directory Structure and Preserving Your Security Protections

If you changed the directory structure on your system disk, the upgrade procedure does not work correctly. Restore your system disk to a standard directory structure before you attempt an upgrade.

The OpenVMS upgrade procedure provides new files and directories in the directory [VMS\$COMMON...]. If you have any special protections and access control lists (ACLs), you need to reapply them to reestablish the security environment you currently have. For more information about creating and maintaining a secure environment, see the *HP OpenVMS Guide to System Security* manual.

4.7.2 Checking the SYSCOMMON Directories

For the upgrade to be successful, the SYSCOMMON directories in all system roots must be aliases (or hard links) for the VMS\$COMMON directory. To check whether this is the case, enter the following commands if you are booted from the system disk that you are upgrading, and compare the displayed file identifiers to ensure that they are all the same:

```
$ DIRECTORY/FILE_ID/NOHEADING/NOTRAILING SYS$SYSDEVICE: [000000] VMS$COMMON.DIR
$ DIRECTORY/FILE_ID/NOHEADING/NOTRAILING SYS$SYSDEVICE: [SYS*] SYSCOMMON.DIR
```

If you did not boot from the system disk that you are upgrading, mount the disk to be upgraded and specify the actual device name in the command. For example, if the system disk to be upgraded is mounted on DKA100, you would use commands similar to the following:

```
$ DIRECTORY/FILE_ID/NOHEADING/NOTRAILING DKA100:[000000]VMS$COMMON.DIR
$ DIRECTORY/FILE_ID/NOHEADING/NOTRAILING DKA100:[SYS*]SYSCOMMON.DIR
```

Output from the first command should list a single file. Output from the second command should list one file for each system root on the disk. Check whether the file ID is the same for all of the listed files and take action as follows:

- If all the file IDs are the same, continue with the procedure described in the next section.
- If all the file IDs are not the same, this system disk does not have the directory structure that OpenVMS requires, and the upgrade will not succeed. For assistance on resolving this, contact your software support representative.

4.7.3 Purging Duplicate Files from the System Disk

To free up disk space and file headers, purge the system disk of duplicate files. HP recommends that you enter the following commands, as shown:

```
$ PURGE/LOG/BEFORE=TODAY SYS$SYSDEVICE:[000000...]*.LOG
$ PURGE/LOG SYS$SYSTEM:PAGEFILE*.SYS
$ PURGE/LOG SYS$SYSTEM:SWAPFILE*.SYS
$ PURGE/LOG SYS$SYSTEM:DUMPFIL*.SYS
```

Check the system disk for application and system dump files by entering the following command:

```
$DIRECTORY/SIZE/DATE SYS$SYSDEVICE:[000000...]*.DMP
```

If any .DMP files are found, use your discretion and delete them. All the files being purged by the preceding commands will survive an upgrade but might no longer be needed and might take up a significant amount of disk space.

4.7.4 Examining the System Disk

Examine and repair (if necessary) the system disk using the ANALYZE/DISK_STRUCTURE command. (See the *HP OpenVMS System Management Utilities Reference Manual: A-L* for more information about this command.) Use the following procedure:

1. Analyze the system disk for inconsistencies and errors in the file structure by entering the following command:

```
$ ANALYZE/DISK_STRUCTURE SYS$SYSDEVICE
```

Ignore the following message:

```
%ANALDISK-I-OPENQUOTA, error opening QUOTA.SYS
```

2. If you find any other errors on the system disk, repair the errors by entering the following command:

```
$ ANALYZE/DISK_STRUCTURE/REPAIR SYS$SYSDEVICE
```

Repeat steps 1 and 2 until no errors (other than the one shown in step 1) are returned.

4.7.5 Checking the Size of the System Disk

It is difficult to determine in advance how many blocks of disk space you need for the upgrade. It depends on how many files you have on the target disk already and on how many components you select during the upgrade procedure. However, the following information will help:

- The *maximum* amount of disk space you need is approximately 675,000 blocks, but your system might use substantially less.
- After you select the components you want installed on the system for the upgrade, the upgrade procedure calculates whether you have enough disk space, displaying the number of available blocks and the number required for the upgrade. If the procedure determines that your disk does not have enough space to perform the upgrade, it displays a message

to alert you and allows you to terminate the upgrade so you can create more disk space and try the upgrade again.



NOTE: If the files on your system disk are badly fragmented, you might not be able to complete an upgrade, even when the amount of disk space appears to be sufficient. HP recommends that you back up and restore the system disk prior to upgrading. Restoring the system disk from an image backup defragments the disk. For information about backing up and restoring your system disk, see [Appendix F \(page 305\)](#).

To see how much space you have on the system disk, enter the following command:

```
$ SHOW DEVICE SYS$SYSDEVICE
```

4.7.6 Returning Authorization and AGEN\$INCLUDE Files to the System Disk

If you place authorization and AGEN\$INCLUDE files on disks other than the system disk, the upgrade procedure will not find these files. This is because the other disks are not mounted during the upgrade. In addition, the logical names you set up to point to these files are not defined during the upgrade. The following sections explain how to make these files available to the upgrade procedure.

4.7.6.1 Authorization Files

OpenVMS allows you to relocate certain system files (mostly authorization files) off the system disk. You do this by copying the files to another location and then defining logical names as documented in the file SYS\$MANAGER:SYLOGICALS.TEMPLATE. The logical names are defined in SYS\$STARTUP:SYLOGICALS.COM.

When you boot your system from the OpenVMS operating system media, the logical names pointing to these files are not defined, and the disks where they are located are not mounted. Because of this, the upgrade cannot access the relocated files, possibly resulting in an incorrect or incomplete upgrade. The upgrade might finish without error, but the files might not be in place as expected.

Before upgrading your system, check the definitions of these logical names on your system. (If a file has not been relocated, the corresponding logical name might not be defined. This is acceptable.) If any logical name points to a location or file name other than the location and file name listed in [Table 4-2](#), return the file to the default location and file name. To prevent the system from referencing the files located off the system disk, either delete the associated logical name (using the DCL command DEASSIGN/SYSTEM/EXEC), or shut down the operating system and reboot from the operating system media. After the upgrade and before booting the operating system, you can move these files back to their original locations off the system disk, using the DCL option (8) from the OpenVMS operating system menu.



NOTE: Some files listed in [Table 4-2](#), such as SYS\$SYSTEM:VMS\$PASSWORD_HISTORY.DATA and SYS\$LIBRARY:VMS\$PASSWORD_POLICY.EXE, might not exist on your system, depending on certain configuration settings. For information about these files, see the *HP OpenVMS Guide to System Security* manual.

Table 4-2 Logical Names for Relocated Authorization Files

Logical Name	Location and File Name
LAN\$NODE_DATABASE	SYS\$SYSTEM:LAN\$NODE_DATABASE.DAT
LMF\$LICENSE	SYS\$SYSTEM:LMF\$LICENSE.LDB
NETNODE_REMOTE	SYS\$SYSTEM:NETNODE_REMOTE.DAT
NETNODE_UPDATE	SYS\$MANAGER:NETNODE_UPDATE.COM

Table 4-2 Logical Names for Relocated Authorization Files *(continued)*

Logical Name	Location and File Name
NETOBJECT	SYS\$SYSTEM:NETOBJECT.DAT
NETPROXY	SYS\$SYSTEM:NETPROXY.DAT
NET\$PROXY	SYS\$SYSTEM:NET\$PROXY.DAT
RIGHTSLIST	SYS\$SYSTEM:RIGHTSLIST.DAT
SYSUAF	SYS\$SYSTEM:SYSUAF.DAT
SYSUAFALT	SYS\$SYSTEM:SYSUAFALT.DAT
SYSALF	SYS\$SYSTEM:SYSALF.DAT
VMSMAIL_PROFILE	SYS\$SYSTEM:VMSMAIL_PROFILE.DATA
VMS\$AUDIT_SERVER	SYS\$MANAGER:VMS\$AUDIT_SERVER.DAT
VMS\$OBJECTS	SYS\$SYSTEM:VMS\$OBJECTS.DAT
VMS\$PASSWORD_DICTIONARY	SYS\$LIBRARY:VMS\$PASSWORD_DICTIONARY.DATA
VMS\$PASSWORD_HISTORY	SYS\$SYSTEM:VMS\$PASSWORD_HISTORY.DATA
VMS\$PASSWORD_POLICY	SYS\$LIBRARY:VMS\$PASSWORD_POLICY.EXE

4.7.6.2 AGEN\$INCLUDE Files

If you use the AGEN\$INCLUDE feature in SYS\$SYSTEM:MODPARAMS.DAT to include files containing additional parameter settings, and the files that are being included are not on the system disk, then do the following before upgrading:

1. Move the files to the system disk.
2. Update the AGEN\$INCLUDE entries to reflect the new locations of these files. For these entries, do not use logical names that you defined in SYS\$STARTUP:SYLOGICALS.COM or elsewhere for your normal startup procedure. When you boot the system from the OpenVMS operating system media for an upgrade, your normal startup procedure is not run, and so these logical names are not defined for the upgrade. In addition, when you first boot the upgraded system, a special startup procedure is used.

After the upgrade is complete, you can move these included files back to their original locations. If you do so, remember to re-set the AGEN\$INCLUDE entries in SYS\$SYSTEM:MODPARAMS.DAT.

4.7.7 Verifying System Parameters

Verify (and modify if necessary) system parameters. (For information about verifying and modifying system parameters, see the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.) During an upgrade, AUTOGEN initially generates parameter values based on parameter defaults. However, during the GETDATA phase, AUTOGEN modifies parameter values based on entries stored in SYS\$SYSTEM:MODPARAMS.DAT. In addition, AUTOGEN analyzes feedback information stored in the AGEN\$FEEDBACK.DAT file and, if the data is valid, adjusts any related parameter values accordingly. (AUTOGEN considers data as valid if the system has been up at least for 24 hours and the feedback is no more than 30 days old.) To ensure that your feedback data is up to date, follow the instructions in Section 4.8 (page 93).



IMPORTANT: Any system parameters that you modified and *did not* enter in the SYS\$SYSTEM:MODPARAMS.DAT file are lost during the upgrade. To retain these parameters, enter their names and the values that you have in use for them in SYS\$SYSTEM:MODPARAMS.DAT. When AUTOGEN runs after the upgrade, it uses the values in SYS\$SYSTEM:MODPARAMS.DAT.

For example, if the current value of GBLPAGES is 30000, and you modified GBLPAGES by 128 pages above the default, add the following line to SYS\$SYSTEM:MODPARAMS.DAT:

```
MIN_GBLPAGES=30128 !Increased by 128 by PLM for product z 12/12/04
```

AUTOGEN compares the computed value of GBLPAGES with this MIN_ value (30128). If the computed value is less than the specified MIN_ value, AUTOGEN increases the value of GBLPAGES to the MIN_ value. Each time AUTOGEN runs, it makes the same comparison and adjusts the value of GBLPAGES, but never below the minimum indicated by MIN_GBLPAGES.



IMPORTANT: If you modify system parameters, note the following:

- In general, you should allow AUTOGEN to calculate system parameters. You can hardcode values (such as GBLPAGES=*value*), but doing so overrides AUTOGEN and might not allow it to set an optimal value based on observed usage.
- Whenever possible, use MIN_*parameter* values (such as MIN_GBLPAGES) to set the minimum value that can be set for a parameter by AUTOGEN. AUTOGEN increases the value if necessary. It also adjusts related parameters, unless they are hardcoded, in which case information is provided in the AGEN\$PARAMS.REPORT file. Use MAX_*parameter* values to set a maximum value when you need to limit a parameter to a known maximum value.
- Enter numeric values as integers, without commas (for example, 10000). Enter alphabetic characters in lowercase or uppercase.
- HP recommends that you include comments in the MODPARAMS.DAT file indicating who changed the value, when it was done, and why it was done. An exclamation point serves as a comment starter and can appear anywhere on a line. The following is an example illustrating the modifications recommended in the preceding bulleted items:

```
! the following changes made by K.Newcomb on 9/20/03
!
SWAPFILE=0                ! don't re-size the SWAPFILE on AUTOGEN runs
MIN_gblsections=750      ! required for DECwindows MOTIF
MIN_NPAGEDYN=2750000     ! set npagedyn to a min of 2.75 million
```

For more information about using AUTOGEN as recommended, see Section 7.24 (page 164).

If your system was upgraded previously, a new SYS\$SYSTEM:MODPARAMS.DAT file was created then. This file has comments and possibly duplicated entries that were created during that upgrade. If you upgrade again, SYS\$SYSTEM:MODPARAMS.DAT can become unnecessarily large and potentially confusing. HP recommends that you edit and reorganize SYS\$SYSTEM:MODPARAMS.DAT before you upgrade again.



NOTE: On a cluster system disk, the MODPARAMS.DAT file should exist in SYS\$SYSROOT:[SYSEXE] for each root. You must edit MODPARAMS.DAT as necessary for each root.

4.8 Ensuring You Have a Recent FEEDBACK.DAT File

Before upgrading your system, HP recommends that you have a recent AGEN\$FEEDBACK.DAT file. This file is in SYS\$SPECIFIC:[SYSEXE] (that is, in [SYSx.SYSEXE], where *x* is the root; for example, SYS0 or SYS1). In OpenVMS Cluster systems, this file should exist in each node's

SYS\$SPECIFIC directory. When the system (or each system in a cluster) is rebooted after the upgrade, AUTOGEN runs. If a recent AGEN\$FEEDBACK.DAT file is available, it is used. The data in this file helps AUTOGEN set system parameters for your specific applications and workload.



NOTE: If you do not have a current AGEN\$FEEDBACK.DAT file, AUTOGEN might calculate system parameters that do not reflect your system's requirements. In that case, multiple cycles of running AUTOGEN and rebooting might be necessary before all layered products can be started. In some cases, successful startup can require additional entries in MODPARAMS.DAT. This should not be necessary if a current AGEN\$FEEDBACK.DAT file is available.

If you do not have the AGEN\$FEEDBACK.DAT file on your system, HP recommends that you create a current AGEN\$FEEDBACK.DAT file during a time when your system is running under a typical workload. To ensure the greatest data reliability, the system should be running for more than 24 hours but less than 30 days. Enter the following command:

```
$ RUN SYS$SYSTEM:AGEN$FEEDBACK.EXE
```

This runs very quickly and should not affect the performance of your system while it executes.

You can also specify the SAVE_FEEDBACK option when you execute the SYS\$SYSTEM:SHUTDOWN.COM procedure; however, the data captured might not fully reflect the typical workload on your system.



IMPORTANT: If you start AUTOGEN without specifying the execution-mode parameter (FEEDBACK, NOFEEDBACK, or CHECK_FEEDBACK), AUTOGEN uses the feedback information in its calculations. However, if the feedback information reflects system up time of less than 24 hours, or if the feedback information is more than 30 days old, AUTOGEN includes warnings in the AGEN\$PARAMS.REPORT file to alert you to potential problems with the feedback data. If you wrongly assume the feedback is valid, the parameter settings might vary significantly from your expectations.

If you specify FEEDBACK (or NOFEEDBACK), AUTOGEN uses (or does not use) the feedback regardless of the data's reliability. AUTOGEN proceeds through the SETPARAMS phase (if you specified SETPARAMS, SHUTDOWN, or REBOOT as the end phase) and sets system parameters to the values it computed.

If you specify CHECK_FEEDBACK, AUTOGEN checks the validity of the feedback data. If AUTOGEN determines the feedback is suspect, then AUTOGEN ignores the feedback when computing parameter values. It stops at the TESTFILES phase and issues a warning in the report that parameters have not been changed. You must read the report and decide whether the calculated values are acceptable. You can either use them (by running the AUTOGEN SETPARAMS phase) or rerun AUTOGEN with valid feedback data.

4.9 Shadowing Environment

Because you cannot upgrade the operating system on a shadowed system disk (the upgrade will fail), you need to disable shadowing of the system disk and perform other operations before you can upgrade the operating system.

There are several methods for creating a nonshadowed target disk. This section describes how to change one of your *existing* shadowed system disks in a multiple-member shadow set to a nonshadowed disk that you can use as your target disk for the upgrade.

If you have a larger configuration with disks that you can access physically, you might want to use a copy of the system disk as your target disk. *HP Volume Shadowing for OpenVMS* describes two methods you can use to create this copy (using volume shadowing commands or BACKUP commands) and how to disable volume shadowing.

4.9.1 Setting the Boot Device

Be sure your system is set to boot by default from the disk you intend to upgrade. For OpenVMS Alpha systems, use the `SHOW BOOTDEF_DEV` and `SET BOOTDEF_DEV` console commands to accomplish this task. (For more information, see [Appendix A \(page 169\)](#).)

For OpenVMS Integrity server systems, HP recommends using the OpenVMS Integrity servers Boot Manager utility (`SYS$MANAGER:BOOT_OPTIONS.COM`) to add shadowed system disks in a multiple-member shadow set to the EFI boot device list and dump device list. Be sure to add all members to both lists. For more information about setting boot options and using this utility, see [Section B.5.2 \(page 207\)](#).

4.9.2 Creating a Nonshadowed Target Disk

Perform the steps described in this section to change one of your existing shadowed system disks to a nonshadowed disk.



IMPORTANT: If you simply use a `MOUNT/OVERRIDE=SHADOW_MEMBERSHIP` command to mount the volume to be upgraded, volume shadowing can overwrite the newly upgraded disk with information from a prior volume that has not been upgraded.

1. Shut down all systems booted from the shadowed system disk.
2. Perform a conversational (interactive) boot (for OpenVMS Alpha systems, see [Section A.1.4 \(page 174\)](#); for OpenVMS Integrity server systems, see [Section B.6.8 \(page 220\)](#)) on the system disk you have chosen for your target disk. For OpenVMS Alpha systems, for example, enter the following command:

```
>>> BOOT -FLAGS 0,1 DKA100
```

For OpenVMS Integrity server systems, enter the following command at the EFI Shell prompt, where `fsn:` is the device associated with the system disk (such as `fs1:`):

```
Shell> fsn:\efi\vms\vms_loader.efi -flags 0,1
```

3. At the `SYSBOOT>` prompt, enter the following command to disable volume shadowing of the system disk:

```
SYSBOOT> SET SHADOW_SYS_DISK 0
```
4. Enter the `CONTINUE` command to resume the boot procedure. For example:

```
SYSBOOT> CONTINUE
```
5. After the boot completes, go to [Section 4.11 \(page 96\)](#).

You now have a nonshadowed system disk that you can use for the upgrade.

4.10 Backing Up the System Disk

HP strongly recommends that you make a backup copy of the system disk and, if your configuration allows it, upgrade the backup copy. Then, if there are problems, you still have a working system disk.



NOTE: OpenVMS Engineering has encountered cases where recovery from a failed upgrade has been difficult, expensive, or impossible because no backup of the preupgrade system disk was available. Various hardware or software failures or a power failure can make a partially upgraded system disk unusable. A backup copy might be the only route to recovery. The minimal time required to make a backup is a very wise investment.

To back up the system disk, follow these steps:

1. Shut down the system (for OpenVMS Alpha systems, see [Section A.3.2 \(page 185\)](#); for OpenVMS Integrity server systems, see [Section B.7.2 \(page 226\)](#)).

2. Boot the operating system media, following the instructions for OpenVMS Integrity servers in Section B.6 (page 213), and for OpenVMS Alpha in Section A.1 (page 169).
3. Use the menu system to enter the DCL environment (option 8).
4. Mount the system device and the target device on which you will make the backup copy. (If you are backing up to tape, skip to the next step.) For example, if your system disk is on DKA0: and the target device is on DKA100:, you might use the following commands. The /OVERRIDE qualifier used in this example allows you to mount the system disk without entering its volume label. The /FOREIGN qualifier is required for the target disk when you use the BACKUP /IMAGE command.

```
$$$ MOUNT /OVERRIDE=IDENTIFICATION DKA0:
$$$ MOUNT /FOREIGN DKA100:
```

5. To back up the system disk to a magnetic tape, enter the following commands, where MTA0: is the magnetic tape drive and *label* is the volume label. Note that the BACKUP command automatically mounts the tape and begins the backup to it.

```
$$$ INITIALIZE MTA0: label
$$$ MOUNT /OVERRIDE=IDENTIFICATION DKA0:
$$$ BACKUP /IMAGE /LOG DKA0: MTA0:label.BCK
```

6. To back up to a device other than a magnetic tape drive, enter the BACKUP command. For example, if your system disk is on DKA0: and your target disk is on DKA100:, use the following command (the colons are required):

```
$$$ BACKUP /IMAGE /LOG DKA0: DKA100:
```

The /IMAGE qualifier causes the Backup utility to produce a functionally equivalent copy of the system disk, which is also bootable. The /LOG qualifier causes the procedure to display the specification of each save set file being processed. To compare the backed up files to the source files, use the /VERIFY qualifier. If any discrepancies are detected, the Backup utility displays an error message indicating the discrepancies.

7. Log out from the DCL environment.
8. Shut down the system by selecting option 9 on the menu.

For more complete information about backup operations, including a description of an alternative method that does not require booting from the operating system media, see [Appendix F \(page 305\)](#). For more information about the Backup utility, see the *HP OpenVMS System Management Utilities Reference Manual: A-L*.

4.11 Finishing Preupgrade Tasks

Continue the preupgrade tasks as follows, depending on whether you are upgrading in a standalone or OpenVMS Cluster environment:

IF ...	THEN ...
You are upgrading a standalone system	<ol style="list-style-type: none"> 1. Review the checklist at the beginning of this chapter to verify that you have performed the necessary tasks. 2. Log in to the SYSTEM account. 3. Enter the following command: \$ @SYS\$SYSTEM: SHUTDOWN 4. When the procedure asks whether an automatic system reboot should be performed, enter N (NO). 5. Go to Chapter 6 (page 105) to begin the upgrade procedure.
You are upgrading an OpenVMS Cluster system	<ol style="list-style-type: none"> 1. Review the checklist at the beginning of this chapter to verify that you have performed the necessary tasks. 2. Go to Chapter 5 (page 97).

5 Preparing to Upgrade in an OpenVMS Cluster Environment

This chapter describes how to prepare to upgrade in an OpenVMS Cluster environment. If you are not upgrading in an OpenVMS Cluster environment, go to Chapter 6 (page 105).

5.1 Preupgrade Tasks for OpenVMS Cluster Environments



NOTE: Be sure you have performed the preupgrade tasks described in Chapter 4 (page 85) before you upgrade your OpenVMS Cluster system.

Use the checklist in Table 5-1 to ensure that you perform all necessary tasks prior to upgrading your system in an OpenVMS Cluster environment.

Table 5-1 Preupgrade Checklist for OpenVMS Cluster Environments

Task	Section
<input type="checkbox"/> Review relevant OpenVMS operating system and OpenVMS Cluster documentation.	Section 5.2 (page 97)
<input type="checkbox"/> Familiarize yourself with mixed-version, mixed-architecture, and migration support in OpenVMS Cluster systems.	Section 5.3 (page 97)
<input type="checkbox"/> If you are adding a new OpenVMS computer system to an existing OpenVMS Cluster, choose one of two options for upgrading.	Section 5.4 (page 99)
<input type="checkbox"/> Perform the preliminary tasks required for the type of upgrade: <ul style="list-style-type: none">◦ Concurrent upgrade◦ Rolling upgrade	Section 5.5 (page 99): <ul style="list-style-type: none">◦ Section 5.5.1 (page 99)◦ Section 5.5.2 (page 100)
<input type="checkbox"/> Begin the upgrade.	Chapter 6 (page 105)

5.2 Documentation to Review

When you upgrade the operating system in an OpenVMS Cluster environment, be sure you review any relevant OpenVMS Cluster information contained in the following documents.

- *Cover Letter for HP OpenVMS Version 8.4*
- Software Product Descriptions included with your distribution kit
- *HP OpenVMS Version 8.4 Release Notes*
- *HP OpenVMS Version 8.4 New Features and Documentation Overview*
- *HP OpenVMS Cluster Systems*
- *Guidelines for OpenVMS Cluster Configurations*

Be sure to consult your network or system manager as well.

5.3 Mixed-Version Support in an OpenVMS Cluster Environment

HP provides two levels of support for mixed-version and mixed-architecture OpenVMS Cluster systems: warranted support and migration support.

Warranted support means that HP has fully qualified two specified versions coexisting in an OpenVMS Cluster and will address all problems identified by customers using these configurations.

Migration support means that HP has qualified the versions for use together in configurations that are migrating in a staged fashion to a newer version of OpenVMS. Problem reports submitted against these configurations will be answered by HP. However, in exceptional cases, HP may

request that you move to a warranted configuration as part of the solution. Migration support helps customers move to warranted OpenVMS Cluster pairs.

Warranted support combinations with OpenVMS Integrity servers Version 8.4 and OpenVMS Alpha Version 8.4 are shown in Table 5-2.

Table 5-2 Warranted Cluster Support with OpenVMS Version 8.4

Operating system	Warranted in combination with
OpenVMS Alpha Version 8.4	OpenVMS Integrity servers Version 8.4
OpenVMS Integrity servers Version 8.4	OpenVMS Integrity servers Version 8.4 OpenVMS Alpha Version 8.4

Additional warranted combinations are included in the following list. This list does not show same platform and version combinations. OpenVMS systems of the same platform and version are always warranted.

- OpenVMS Alpha V8.3 and OpenVMS Integrity servers V8.3 or V8.3-1H1
 - OpenVMS Alpha V8.2 and OpenVMS Integrity servers V8.2-1
 - OpenVMS Alpha V7.3-2 and OpenVMS Integrity servers V8.2-1
 - OpenVMS Alpha V8.2 and OpenVMS Alpha V7.3-2
 - OpenVMS VAX V7.3 and any version of OpenVMS Alpha, V7.3-2 and later
- OpenVMS VAX systems are not supported with OpenVMS Integrity server systems in the same cluster.



NOTE: Only two architectures are supported in the same OpenVMS Cluster: OpenVMS Integrity servers and OpenVMS Alpha, or OpenVMS Alpha and OpenVMS VAX, but not OpenVMS Integrity servers and OpenVMS VAX.

System disks are architecture specific and can be shared only by systems of the same architecture. An Alpha and Integrity servers system, or an Alpha and VAX system, cannot boot from the same system disk. However, cross-architecture satellite booting is supported between an Alpha and VAX system. When you configure an OpenVMS Cluster to take advantage of cross-architecture booting, make sure that at least one system from each architecture is configured with a disk that can be used for installations and upgrades. For more information, see the *Guidelines for OpenVMS Cluster Configurations* and *HP OpenVMS Cluster Systems* manuals.

Table 5-3 shows the supported migration pairings.

Table 5-3 Supported Migration Pairing with Version 8.4 OpenVMS Alpha or Integrity servers

Supported with either of these migrating to OpenVMS Integrity servers Version 8.4	Supported with either of these migrating to OpenVMS Alpha Version 8.4
OpenVMS Integrity servers Version 8.3-1H1	OpenVMS Alpha Version 8.3
OpenVMS Integrity servers Version 8.3	OpenVMS Alpha Version 8.2
OpenVMS Integrity servers Version 8.2-1	OpenVMS Alpha Version 7.3-2

For information about valid upgrade paths, see Section 4.3.1 (page 86).

For more information, see the OpenVMS Technical Software Support Service website at:

<http://www.hp.com/go/openvms/support>

In addition, see the following website for the OpenVMS Operating System Support Chart at:

<http://www.hp.com/go/openvms/supportchart>

Before introducing an OpenVMS Version 8.4 system into an existing OpenVMS Cluster, you might need to install certain patch kits (also known as remedial kits) on cluster members running

earlier versions of OpenVMS. In a mixed-architecture cluster, you need to install an LMF patch on any OpenVMS Version 7.3-2 Alpha members. For a complete list of required patch kits, see the *HP OpenVMS Version 8.4 Release Notes*.

For information about supporting the Performance Data Collector base software (TDC_RT) in OpenVMS Clusters, see Section 7.9.9.5 (page 151).

5.4 Adding a New System to an OpenVMS Cluster

To add a new OpenVMS Version 8.4 Alpha or Integrity servers system to an existing OpenVMS Cluster configuration, all existing Alpha nodes in the cluster must be running OpenVMS Alpha Version 7.3-2 or later, and all existing OpenVMS Integrity server nodes must be running OpenVMS Integrity servers Version 8.2-1 or later. Any node in the cluster that is running an older version of OpenVMS must be upgraded appropriately before you can add a Version 8.4 node. If you have a VAXcluster, any node running an older version of OpenVMS VAX must be upgraded to Version 7.3 of OpenVMS VAX before you can add an Alpha Version 8.4 node.

Alternatively, any OpenVMS Alpha or Integrity servers node that needs to be upgraded can be removed temporarily from the cluster and added back after it has been upgraded. This allows you to form a supported cluster immediately, adding nodes back into the cluster as they are upgraded. Note that, depending on the number of nodes being added, you might need to adjust the EXPECTED_VOTES system parameter to reflect the number of voting nodes and any quorum disk votes (if a quorum disk is being used). In addition, for any node being removed from the cluster, you should specify the REMOVE_NODE option during system shutdown so that the quorum for the remaining nodes is correctly adjusted.

5.5 Types of Upgrades

Two types of cluster upgrades are available: a **concurrent upgrade** and a **rolling upgrade**. The type of upgrade you use depends on whether you want to maintain the availability of the cluster during the upgrade and whether you have more than one system disk. Review this chapter and then perform the preliminary tasks for the upgrade procedure (concurrent or rolling) that best suit your configuration.

5.5.1 Concurrent Upgrade

This section describes the following:

- How a concurrent upgrade works
- Preparing your system for a concurrent upgrade

5.5.1.1 How a Concurrent Upgrade Works

During a concurrent upgrade, you must shut down the entire cluster and upgrade each system disk. No one can use the cluster until you upgrade each system disk and reboot each computer. When the cluster reboots, each computer will run the upgraded version of the OpenVMS operating system.

If all systems in the OpenVMS Cluster environment are booted from one system disk, you must perform a concurrent upgrade.

5.5.1.2 Preparing Your System for a Concurrent Upgrade

To prepare for a concurrent upgrade, follow these steps:

1. Log in locally to the SYSTEM account.
If you have more than one system disk, make sure that you have performed the preupgrade tasks on each system disk that you are upgrading. Make sure the target system disk is not mounted on any other node in the cluster and remains dismounted during the upgrade. It should be mounted only on the system that is performing the upgrade. (For information about dismounting disks, see Section 5.5.2.3 (page 101).) Then go to Chapter 6 (page 105) and perform an upgrade on each system disk. You do not have to reboot the operating system media for each upgrade. You only need to choose option 1 on the menu for each upgrade.
2. Shut down all systems by entering the following command on each system (**satellite nodes** first, then the boot nodes):

```
$ @SYS$SYSTEM:SHUTDOWN
```
3. When the procedure asks whether an automatic system reboot should be performed, enter N (NO).
4. After all satellite nodes have shut down, select the CLUSTER_SHUTDOWN option.
5. When the shutdown procedure is finished on all nodes, halt each system by either pressing **Ctrl/P** or **Halt**. For more information about halting your Integrity servers, see Section B.7.1 (page 225). For information about halting your Alpha computer, see Section A.3.1 (page 184).
6. If you have only one system disk for your cluster, go to Chapter 6 (page 105) to begin the upgrade procedure.
After the upgrade is complete, you are instructed to reboot each computer in the OpenVMS Cluster environment before beginning other postupgrade procedures.

5.5.2 Rolling Upgrade

This section describes the following:

- How a rolling upgrade works
- Notes and restrictions
- Preparing your system for a rolling upgrade

5.5.2.1 How a Rolling Upgrade Works

A rolling upgrade allows you to have a mixed-version cluster. During a rolling upgrade, you keep some of the computers in the cluster running and available while you upgrade others. You must have more than one system disk. You upgrade each system disk individually, allowing old and new versions of the operating system to run together in the same cluster.

5.5.2.2 Notes and Restrictions

The following restrictions apply to rolling upgrades. For additional compatibility issues and restrictions information, see the *HP OpenVMS Version 8.4 Release Notes*.

- The system being upgraded must not attempt to access any disk that is being accessed by one or more of the remaining OpenVMS Cluster systems.
- The remaining OpenVMS Cluster systems must not attempt to access the target disk of the system being upgraded.

If the target disk being upgraded is locally attached to the system performing the upgrade, then it is not accessible to the remaining OpenVMS Cluster systems. (The OpenVMS system booted from the operating system media does not MSCP serve local disks.) HP recommends that, whenever possible, you perform the upgrade on a local disk or that you perform a concurrent upgrade.

During the upgrade, be sure that the target disk you select, as well as any disk you access from the DCL menu option, is either a local disk or one that is not being accessed by any of the remaining OpenVMS Cluster members. Make sure the target system disk is not mounted

on any other node in the cluster and remains dismounted during the upgrade. It should be mounted only on the system that is performing the upgrade. (For information about dismounting disks, see Section 5.5.2.3 (page 101).)



NOTE: Any attempt to access the target system disk from the remaining OpenVMS Cluster members will corrupt the target disk. Even if the target system disk is mounted only by a remaining cluster member and no file access is performed, the target disk will probably be corrupted. If a disk is corrupted in this way, the only supported recovery is to restore the backup copy of the corrupted disk.

- HP recommends that all Alpha computers in a cluster run the same (preferably the latest) version of the OpenVMS Alpha operating system, and that all Integrity servers run the same version of the OpenVMS Integrity servers operating system.
- You cannot perform a rolling upgrade if all systems boot from a single system disk. Perform a concurrent upgrade instead.
- The upgrade procedure affects the queuing system as follows:
 - The queuing system is not active on the system you are upgrading; do not attempt to execute a START/QUEUE/MANAGER command.
 - You cannot create a queue database on the operating system CD/DVD (because it is not writable).
 - The queue manager process on other nodes in the cluster can continue to run during the upgrade if the queue database is not on the disk being upgraded.

5.5.2.3 Preparing Your System for a Rolling Upgrade

To prepare for a rolling upgrade, follow these steps:

1. Log in to any node where the target disk is mounted as a data disk rather than as the system disk. (That disk must be the one on which you already performed the preupgrade tasks described in Chapter 4 (page 85).)
2. Check the votes and make adjustments to maintain the proper quorum so the cluster can continue to operate throughout the upgrade. (*HP OpenVMS Cluster Systems* describes this procedure in detail.)
3. Use the DCL command DISMOUNT/CLUSTER to dismount the data disk. (You can also perform this operation using the SYSMAN utility.)

Note that you can ignore messages from nodes where the specified data disk is being used as the system disk.

4. Verify that the data disk has been dismounted successfully by entering the following commands:

```
$ MCR SYSMAN
SYSMAN> SET ENVIRONMENT/CLUSTER
SYSMAN> DO SHOW DEVICE disk-name
```

Examine the display to be sure the disk is not mounted on any nodes as a data disk. Noting the value listed in the Trans Count field can help you make that determination: A value of less than 50 indicates that the disk is mounted as a data disk rather than as the system disk; a much larger value (for example, 300) indicates that the disk most likely is the system disk.

5. If the disk is still mounted on any nodes as a data disk, use the SYSMAN utility to dismount the disk; otherwise, exit the SYSMAN utility.

6. Use the following command to shut down any nodes that boot from the system disk you are upgrading (shut down satellite nodes first):

```
$ @SYS$SYSTEM:SHUTDOWN
```

- a. When the procedure asks whether an automatic system reboot should be performed, enter N (NO).
- b. After all satellite nodes have shut down, select the REMOVE_NODE option.

If a proper quorum is not maintained at any time during the upgrade procedure, the shutdown procedure hangs the cluster. If the cluster hangs during a shutdown, you can use the Interrupt Priority C (IPC) facility to adjust quorum from the system console of a system that is still a cluster member.

From an OpenVMS Alpha cluster member, press **Ctrl/P**. The IPC facility displays help information about IPC commands. Enter the commands at the console:

```
$ Ctrl/P
>>> D SIRR C
>>> C
Interrupt Priority C
```

Commands:

C device	Cancel Mount Verification
Q	Adjust Quorum
CTRL-Z	Exit IPC
CTRL-P	Prompt for Crash

```
IPC> Q
IPC> Ctrl/Z
```

From an OpenVMS Integrity servers cluster member, pressing **Ctrl/P** puts the system directly into the IPC facility, which displays help information about IPC commands. To adjust quorum, enter the commands shown in the following example. Note that if systems are booted with XDELTA, pressing **Ctrl/P** brings the OpenVMS Integrity servers system into XDELTA. The IPC facility is not available in this case.

```
$ Ctrl/P
Interrupt Priority C
```

Commands:

C device	Cancel Mount Verification
Q	Adjust Quorum
CTRL-Z	Exit IPC
CTRL-P	Prompt for Crash

```
IPC> Q
IPC> Ctrl/Z
```

You can also adjust quorum using Availability Manager or DECams. The method is equivalent to that used by IPC except you do not have to use the console (this assumes the Data Analyzer is running on a system outside the OpenVMS Cluster, which is recommended). For more information, see the "Adjust Quorum" section in the *Availability Manager User's Guide* or the *DECams User's Guide*. The *Availability Manager User's Guide* is available at:

<http://www.hp.com/products/openvms/availabilitymanager>

After the shutdown procedure is finished on all nodes, go to [Chapter 6 \(page 105\)](#) to begin the upgrade procedure.



CAUTION: During the upgrade it is very important that the system disk being upgraded is accessed *only* by the node on which the upgrade is being performed. If the disk can be accessed from other nodes in the cluster, for example, through an HSC or HSJ device, you *must* ensure that this does not happen. Even if the disk is only mounted and no file access is performed, the disk can still become corrupted.

Ensure that any users who might mount disks know that they must not access the system disk being upgraded. Also make sure that any procedures that might mount the disk do not run during the upgrade. If you have automatic procedures that periodically check and remount disks, it would be wise to disable them during the upgrade.

6 Upgrading the OpenVMS Operating System

This chapter explains how to upgrade the OpenVMS operating system from a local CD or DVD drive and includes information about reinstalling or reconfiguring your system.

This chapter is organized into sections that describe the major tasks for upgrading OpenVMS, in the order in which these tasks must be performed. Section 6.1 (page 105) includes a checklist that you can use to make sure you perform all the upgrade tasks described in this chapter.

6.1 Upgrade Tasks

Use the checklist in Table 6-1 to ensure that you perform all necessary upgrade tasks.

Table 6-1 Upgrade Checklist

Task	Section
<input type="checkbox"/> Boot the OpenVMS operating system media.	Section 6.2.2 (page 107)
<input type="checkbox"/> Use option 1 of the operating system menu to upgrade your OpenVMS operating system, respond to the prompts, and shut down the system when the upgrade completes.	Section 6.3 (page 109), Section 6.4 (page 118)
<input type="checkbox"/> If you did not allow the upgrade procedure to create a boot option for your upgraded system disk, add a boot option now, if desired. (OpenVMS Integrity servers only)	Section B.5.2 (page 207)
<input type="checkbox"/> Reboot your system. (The steps vary according to the type of upgrade you are performing.)	Section 6.5 (page 125)
<input type="checkbox"/> Perform postupgrade tasks, as necessary.	Chapter 7 (page 127)

6.2 Booting the OpenVMS Operating System Media

The OpenVMS operating system includes procedures that allow you to easily upgrade the operating system using the PCSI utility. These tools are available once you boot the system properly. To boot the OpenVMS Alpha system CD, see Section 6.2.1 (page 105). To boot the OpenVMS Integrity servers OE DVD, see Section 6.2.2 (page 107).

You can use a VGA graphics device (except on an rx2600 Integrity servers or other servers that lack the firmware capabilities), serial device, or network interface for the console. For information about configuring your system console, see Section B.2 (page 193).



NOTE: When using a VGA console and upgrading from vMedia or a USB DVD drive with the keyboard plugged into a USB hub, if the keyboard is not responding, simply unplug the hub and plug it back in.

6.2.1 Booting the OpenVMS Alpha Operating System CD

To get started, boot the OpenVMS Alpha operating system CD either from your local CD drive or from a CD drive served by the InfoServer, as described in Section 6.2.1.2 (page 106) and Section 6.2.1.3 (page 106). First, you need to identify the name of the CD drive, as explained in Section 6.2.1.1 (page 105). For more information about booting operations, see Section A.1 (page 169).

6.2.1.1 Determining the Boot Device

To boot the operating system CD, you need to determine the identity of the CD drive. Follow these steps:

1. Insert the operating system CD into the local CD drive.

2. Enter the SHOW DEVICE command at the console prompt (>>>) and look for the correct drive listed in the output (for example, DKA400). If you are booting from the InfoServer, look for a device listed with its hardware address, as in the last line of the following example (EWA0):

```
>>> SHOW DEVICE
dva0.0.0.1000.0      DVA0                RX23
dka200.2.0.5.0      DKA200              RZ28M   1004
dka300.3.0.5.0      DKA300              RZ29B   0016
dka400.4.0.5.0      DKA400              RRD42   442E
ewa0.0.0.3.0        EWA0                00-00-F8-1F-70-3D
```

For additional information, see the *HP OpenVMS Version 8.4 for Alpha and Integrity Servers Software Product Description* (SPD 82.35.xx) and the hardware manuals that you received with your Alpha computer.

6.2.1.2 Booting from the Local Drive

To boot the operating system CD from the local CD drive, enter the boot command in the following format:

```
BOOT -FLAGS 0,0 source-drive
```

Substitute the device name of the CD drive for *source-drive*, such as DKA400, as listed in the SHOW DEVICE display example in Section 6.2.1.1 (page 105). In this case, you would enter the following command and press **Enter**:

```
>>> BOOT -FLAGS 0,0 DKA400
```

6.2.1.3 Booting from the InfoServer

To boot the operating system CD using either the InfoServer hardware or the InfoServer utility, follow these steps. To use the InfoServer utility, certain configuration steps are required initially (one time only), as described in Appendix C (page 229); note that the operating system CD must be mounted systemwide.

1. At the console prompt, enter the boot command in the following format:

```
>>> BOOT -FLAGS 0,0 -FILE APB_084 lan-device-name
```

Substitute the name of the local area network device for *lan-device-name*, such as EWA0, as listed in the SHOW DEVICE display example in Section 6.2.1.1 (page 105).

The APB file name is the unique file name that was assigned to the APB.EXE file when it was copied from the operating system CD to the InfoServer. This file is the name of the APB program used for the initial system load (ISL) boot program.



NOTE: If you are using a DEC 3000 or 4000 series system, note the following:

- On DEC 3000 series systems, you can boot through the InfoServer using an alternate TURBOchannel device, such as a PMAD (Ethernet) or DEFTA (FDDI), by specifying the device name as *n/ESA0*. The value for *n* is the TURBOchannel slot number, which you can obtain by entering the SHOW CONFIGURATION command at the console prompt (>>>) and examining the display. For more information, see Section A.1.8 (page 177) in Appendix A (page 169).
 - On DEC 4000 series systems, you must specify the ISL file name in uppercase (APB_084).
-

2. The InfoServer ISL program then displays the following menu:

```
Network Initial System Load Function
Version 1.2
```

FUNCTION ID		FUNCTION
1	-	Display Menu
2	-	Help
3	-	Choose Service
4	-	Select Options
5	-	Stop

Enter a function ID value:

3. Respond to the prompts as follows, pressing **Enter** after each entry:
 - a. Enter 3 for the function ID.
 - b. Enter 2 for the option ID.
 - c. Enter the service name (ALPHA084 is the default service name for the InfoServer hardware; for the InfoServer utility, ask your system or network manager for the service name).

A sample display follows:

```
Enter a function ID value: 3
OPTION                OPTION
ID
1      -              Find Services
2      -              Enter known Service Name
```

```
Enter an Option ID value: 2
Enter a Known Service Name: ALPHA084
```



NOTE: If you boot the OpenVMS Alpha operating system CD from an InfoServer system but lose your connection during the upgrade procedure (the system is unresponsive and pressing **Ctrl/Y** does not return you to the menu), do the following:

1. Boot the OpenVMS Alpha operating system CD again from the network.
2. Enter the DCL environment by choosing option 8 on the menu.
3. Mount the device containing your backup copy of the target disk and the device that is your target disk.
4. Restore the backup copy of your target disk by entering the appropriate BACKUP commands. (See Appendix F (page 305) for complete information about using MOUNT and BACKUP commands to restore a system disk.)
5. Log out from the DCL environment.
6. Perform the upgrade again by choosing the upgrade option (1) on the menu and following the procedures described in this chapter.

6.2.2 Booting the OpenVMS Integrity servers OE DVD

You can boot the OpenVMS Integrity servers OE DVD in any of the following ways. This section gives detailed instructions on booting from the local DVD drive. Detailed instructions on the other methods are available in the appendixes, as noted in the corresponding sections that follow.

- From your local DVD drive (Section 6.2.2.1 (page 108))
- From a virtual DVD drive served over the network by the InfoServer utility (Section 6.2.2.2 (page 109))
- From an image on a PC or Windows server in the network accessed through the HP SIM interface (Section 6.2.2.3 (page 109))
- From an image on a PC or Windows server in the network using vMedia through a browser connected to your Integrity servers iLO 2 MP port (Section 6.2.2.4 (page 109))

The latter two options can be used for entry-class Integrity servers that support such means; they can be used when a local DVD drive is not available. For more information about booting operations, see Section B.6 (page 213).

6.2.2.1 Booting from the Local Drive

To boot a local OpenVMS Integrity servers OE DVD, follow these steps. To boot the DVD on a cell-based server, a DVD device must be accessible by the nPartition that OpenVMS is being installed on.

1. Make sure your Integrity servers is powered on. If your system has an attached external device, make sure it is turned on and operational.
2. Insert the DVD into the drive you want to use.
3. Cycle power.
4. From the main EFI boot menu (for cell-based servers, this must be the EFI boot menu for the nPartition on which OpenVMS is to be booted), select the appropriate item from the boot options list. Note that the EFI boot menu is timed; press any key to stop the countdown timer.

For some systems, the boot option to select is the Internal Bootable DVD option. If that option is not listed in your EFI boot menu, move to the Boot From a File menu and select the Removable Media Boot option, if present.

Alternatively (and this method is recommended for cell-based servers), boot the DVD drive from the EFI Shell prompt by entering the command shown in the following example, where *fsn*: corresponds to the Integrity servers DVD drive (such as fs0:). Note that if you have navigated to a particular file system, the EFI Shell prompt would reflect that file system; for example, if the current file system is fs0:, the EFI Shell prompt would be fs0:>.

```
Shell> fsn:\efi\boot\bootia64.efi
```

To determine which device is the bootable DVD drive, examine the list of mapped devices and look for an fs device listing that includes the letters "CDROM", as in the following line, where *fsn* is the file system associated with the drive, which is usually fs0: (instead of "*fsn*", you might see something similar to "V8.4"; instead of Ata, you might see Scsi, depending on the server model):

```
fsn : Acpi (HWP0002,400) /Pci (4|1) /Ata (Primary,Master) /CDROM (Entry0)
```

You can use the following command to display the mapping of various EFI device names to OpenVMS device names, where *fsn* is the device you want to check (such as fs0:):

```
Shell> fsn:\efi\vms\ms_show dev -fs
```

On most Integrity servers, the DVD drive is DQA0: (IDE) or DNA0: (USB). On systems that include a SCSI bus, such as the Superdome server, the DVD drive is DKA0:. For more information about the `ms_show` command, see the *HP OpenVMS System Management Utilities Reference Manual*.



NOTE: By default, certain versions of EFI might interpret the **Delete** (or **Backspace**) key differently than do OpenVMS Alpha systems or Microsoft Windows computers. In such cases, press **Ctrl/H** to delete the last character entered. For more information, see [Section B.1.3 \(page 192\)](#).

When the DVD boots properly, the OpenVMS operating system banner appears, followed by the operating system menu. You can now upgrade your OpenVMS Integrity servers operating system on the target disk (see [Section 6.3 \(page 109\)](#)). If the methods documented in this section do not succeed in booting the DVD, see [Section B.6.2.1 \(page 216\)](#).



NOTE: When booting OpenVMS from the installation DVD for the first time on any OpenVMS Integrity servers system with a SAN storage device, you might experience a delay in EFI initialization because the entire SAN is scanned. Depending on the size of the SAN, this delay might range from several seconds to several minutes.

6.2.2.2 Booting Over the Network Using the InfoServer Utility

To use the InfoServer utility to boot from the network, certain configuration steps are required initially (one time only); see [Appendix C \(page 229\)](#). The instructions on booting over the network from a virtual DVD drive are also included in [Appendix C \(page 229\)](#).

6.2.2.3 Booting Using HP SIM Provisioning

To use HP SIM provisioning to boot an image of the OpenVMS OE DVD, certain configuration steps are required initially (one time only). For these steps and the booting instructions, see [Appendix D \(page 247\)](#). For upgrades, your OpenVMS boot flags must be set to (0,0).

6.2.2.4 Booting Using vMedia

To use vMedia to boot an image of the OpenVMS OE DVD, certain configuration steps are required initially (one time only); see [Section D.1.4 \(page 252\)](#). For instructions on booting with vMedia, see [Section D.2 \(page 284\)](#).

6.3 Performing the Upgrade

The following sections describe how to upgrade from the operating system media.

6.3.1 Upgrading the System Using Option 1 of the Operating System Menu

A few seconds after you boot the operating system CD (OpenVMS Alpha) or DVD (OpenVMS Integrity servers OE DVD), several informational messages followed by the OpenVMS banner appear. After that, other informational messages appear, followed eventually by the operating system main menu. The duration of messages depend on the system type and attached hardware. To upgrade the OpenVMS operating system, choose option (1) on the menu, as in the following example:

```
.
.
.
*****
You can install or upgrade the OpenVMS I64 operating system
or you can install or upgrade layered products that are included
on the OpenVMS I64 distribution media (CD/DVD) .

You can also execute DCL commands and procedures to perform
"standalone" tasks, such as backing up the system disk.

Please choose one of the following:

1) Upgrade, install or reconfigure OpenVMS I64 Version 8.4
2) Display layered products that this procedure can install
3) Install or upgrade layered products
4) Show installed products
5) Reconfigure installed products
6) Remove installed products
7) Find, Install or Undo patches; Show or Delete recovery data
8) Execute DCL commands and procedures
9) Shut down this system
```

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?) 1

6.3.2 Choosing INITIALIZE or PRESERVE

The procedure displays the following information and prompts:

This procedure will ask a series of questions.

() - encloses acceptable answers
[] - encloses default answers

Type your response and press the <Return>key. Type:

? - to repeat an explanation
^ - to change prior input (not always possible)
Ctrl/Y - to exit the installation procedure

There are two choices for installation/upgrade:

Initialize - removes all software and data files that were previously on the target disk and installs OpenVMS I64.

Preserve -- installs or upgrades OpenVMS I64 on the target disk and retains all other contents of the target disk.

* NOTE: You cannot use preserve to install OpenVMS I64 on a disk on which any other operating system is installed. This includes implementations of OpenVMS for other architectures.

Do you want to INITIALIZE or to PRESERVE? [PRESERVE])

For an upgrade, press **Enter** (or **Return**) to accept the default (PRESERVE).

6.3.3 Specifying the Target Disk

Next the procedure asks for the name of the target disk. If you enter a question mark (?), the system displays a list of devices on your system. Select the appropriate disk and respond to the prompt. For example:

You must enter the device name for the target disk on which OpenVMS I64 will be installed.

Enter device name for target disk: [DKB300] (? for choices) **DKB400**

If you select a device that is not available or that cannot be used for some other reason, the system displays information indicating why the device cannot be used. For example, if you enter MKA500, a tape device, a message similar to the following is displayed:



CAUTION: If the selected target disk includes .EXE or .COM files installed by a previous upgrade or installation in one or more system-specific root directories in SYS\$COMMON, the upgrade procedure tells you that when you boot from a root that contains any of these files, they are used instead of the files provided by the newer version of OpenVMS. This can make the upgraded system unbootable or cause errors after booting. Unless an HP representative has advised you to keep one or more of these files where they are, you must delete, rename, or move these files from the system-specific root directory. The procedure lists the names and locations of these files. Record these if you are not using a hardcopy terminal. The procedure gives you the option of terminating the upgrade so that you can do what is necessary for these files: select option 8 ("Execute DCL commands and procedures") on the OpenVMS main menu and enter the appropriate DCL commands.

6.3.4 Selecting Reinstallation and Reconfiguration Options

If you are using the OpenVMS Version 8.4 operating system media and you selected a target disk that already has Version 8.4 installed, you are presented with several configuration options. A sample display follows. See also the example in Section 7.12 (page 153).

```
Version 8.4 of the OpenVMS operating system is already installed
on DKB400:.
```

```
Please choose one of the following:
```

- 1) Reconfigure the OpenVMS platform.
- 2) Reconfigure the OpenVMS operating system.
- 3) Reinstall the OpenVMS operating system.
- 4) Return to the Main Menu (abort the upgrade/installation).

```
Enter a "?" for more information.
```

If you enter a question mark (?), the following information is displayed:

- o Reconfigure the OpenVMS platform.

```
This action will allow you to change your selections of which
products you installed along with the OpenVMS operating system
installation.
```

```
This will NOT change any options in the OpenVMS operating system,
nor will it reinstall any operating system files.
```

- o Reconfigure the OpenVMS operating system.

```
This action will allow you to change your choices about which
options you included for the OpenVMS operating system.
```

```
This will NOT change any options for the products you installed
along with the OpenVMS operating system installation, nor will
it reinstall or upgrade any of them.
```

- o Reinstall the OpenVMS operating system.

```
This action will cause ALL operating system files to be replaced.
You can also change your choices about which options you included
for the OpenVMS operating system.
```

```
This will NOT change any options for the products you installed
along with the OpenVMS operating system installation, nor will
it reinstall or upgrade any of them.
```

```
Reinstall will take longer than Reconfigure. Reinstall may be
```

appropriate if you suspect that files in the operating system, or in the windowing and network products have become corrupted.

If you want to reinstall or upgrade any of the products you installed along with the OpenVMS operating system installation, choose "Install or upgrade layered products" (option 3) from the main menu.

If you want to change your choices about which options you included for any of the products you installed along with the OpenVMS operating system installation, choose "Reconfigure installed products" (option 5) from the main menu.

Next the menu is redisplayed:

Please choose one of the following:

- 1) Reconfigure the OpenVMS platform.
- 2) Reconfigure the OpenVMS operating system.
- 3) Reinstall the OpenVMS operating system.
- 4) Return to the Main Menu (abort the upgrade/installation).

Enter choice or ? for help: (1/2/3/4/?)

For additional configuration information, see Section 7.12 (page 153).

6.3.5 Checking for Recovery Data

When you specify the `/SAVE_RECOVERY_DATA` qualifier with the `PRODUCT INSTALL` command, the `PCSI` utility saves information that can be used for removing patches and mandatory update kits at a later time. The `PRODUCT UNDO PATCH` command removes the patches and kits. (The `/SAVE_RECOVERY_DATA` qualifier and `PRODUCT UNDO PATCH` command were first added to OpenVMS Alpha in Version 7.3-2; they were backported to OpenVMS Alpha Version 7.2-2, 7.3, and 7.3-1.)

The upgrade procedure, after entering the `PRODUCT INSTALL` command, checks the target disk for recovery data that was saved by the `PCSI` utility during patch installations. If no recovery data is present, the upgrade continues. If recovery data is present and all the data found applies only to the OpenVMS operating system, the upgrade procedure deletes the data and continues. The data is deleted because it becomes invalid after the upgrade and the disk space freed up might be needed during the upgrade. (The procedure does not display the deletion of the files because earlier patches to OpenVMS are always removed as part of the upgrade.) If any of the recovery data applies to products other than the OpenVMS operating system, then the upgrade procedure displays a message similar to the following:

```
The target system has recovery data from PRODUCT operations which
used the /SAVE_RECOVERY_DATA qualifier. This data must be deleted
to continue the OpenVMS upgrade.
```

Please examine the following display.

If you wish to delete this data and continue the OpenVMS upgrade, answer YES to the question "Do you want to continue?"

If you do not wish to delete this data, answer NO. A NO answer will preserve the recovery data and abort the OpenVMS upgrade.

The following patch recovery data has been selected:

```
RECOVERY DATA SET 001 created 25-JUL-2009 15:23:39.69
```

```
-----
PATCH
```

```
APPLIED TO
-----
```

```
JAK VMS RM1 V1.0
```

```
JAK VMS RMTEST V1.0
-----
```

- * If you continue, recovery data for the patches listed above will be deleted.
- * The deletion of recovery data does not affect the installation status of
- * patches applied to products that are not participating in this operation.
- * However, continuing with this operation prevents you from uninstalling
- * these patches at a future time by use of the PRODUCT UNDO PATCH command.

Do you want to continue? [YES]

If you answer YES (the default), the recovery data sets are deleted and the OpenVMS upgrade continues.

Deleting RECOVERY DATA SET 001 ...

If you answer NO, the recovery data sets are not deleted and the OpenVMS upgrade aborts.

Do you want to continue? [YES] NO

%PCSIUI-I-USERABORT, operation terminated by user request

You chose to retain recovery data on the target system disk.
The OpenVMS upgrade cannot continue.

Please correct the situation that prevents you from deleting the
recovery data and then retry the upgrade.

6.3.6 Specifying the Volume Label

After you specify the target disk and, if applicable, check for recovery data, the procedure informs you of the volume label currently assigned to the target disk you specified and asks whether you want to keep that label. As shown in the following example, if you choose not to keep the label, you are prompted for a new label. The OpenVMS operating system uses the volume label to identify and reference the disk. Make sure the label you use is unique; problems occur if the same label is used by different disk volumes.

```
DKB400: is now labeled I64SYS.
Do you want to keep this label? (Yes/No) [Yes] NO
```

```
Enter volume label for target system disk: [I64SYS] I64084
```

You can accept the default label assigned by the system or specify a different volume label. (The label name has a limit of 12 characters that can include A to Z, 0 to 9, the dollar sign (\$), hyphen (-), and underscore(_) characters).



NOTE: OpenVMS requires that the volume labels for all disks on your system or OpenVMS Cluster have unique labels. If a disk that has the same label as the system disk is mounted, various OpenVMS components will not function as intended or a node might crash during boot.

If you change the volume label for a disk in an OpenVMS Cluster, be sure to change the command that mounts the disk on other nodes in the cluster; otherwise, the disk will not mount on those nodes once they are rebooted.

6.3.7 Specifying the On-Disk Structure Level

If the target disk is currently initialized with On-Disk Structure Level 2 (ODS-2), the procedure informs you and gives you the option to convert the disk to On-Disk Structure Level 5 (ODS-5), as in the following example. The information pertaining to WBEM Services for OpenVMS appears only if you are upgrading an OpenVMS Integrity servers system. If the target disk is currently initialized with ODS-5, the upgrade continues without displaying information about the disk structure. You are not asked whether to convert the system disk's structure or whether to enable hard links.



NOTE: If your disk is initialized with ODS-5 with hard links not enabled. You can enable them after the upgrade by executing the following commands:

```
$ SET VOLUME/VOLUME_CHARACTERISTICS=HARDLINKS SYS$SYSDEVICE
$ ANALYZE DISK_STRUCTURE/REPAIR SYS$SYSDEVICE
```

The target system disk is currently at On-Disk Structure Level 2 (ODS-2). It can be converted to On-Disk Structure Level 5 (ODS-5).

OpenVMS I64 systems include WBEM Services for OpenVMS; the WBEM data repository requires an ODS-5 disk. If you choose to convert the target system disk to ODS-5, the repository can be on the system disk; otherwise you will need to provide an additional ODS-5 disk. (? for more information.)

Do you want to convert the target system disk to ODS-5? (Yes/No/?)

If you answer YES, the disk will be converted to ODS-5. The procedure informs you that you can use the BACKUP/CONVERT command to convert ODS-5 disks back to ODS-2 format; for more information, see the *HP OpenVMS System Management Utilities Reference Manual: A-L*.



NOTE: HP recommends that your system disk be structured in ODS-5 format unless you use software that requires ODS-2. A brief comparison of ODS-2 and ODS-5, including advantages and disadvantages, follows this note.

Note also that although WBEM Services for OpenVMS can be installed on an ODS-2 disk, the WBEM Services for OpenVMS data repository requires an ODS-5 disk. A system disk in ODS-5 format can store everything; if you choose to have your disk in ODS-2 format, the procedure asks you to provide an ODS-5 disk for the data repository.

A brief summary of ODS-2 and ODS-5 file systems follows; for more information, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

- ODS-2
 - ODS-2 allows for compatibility with OpenVMS VAX and Alpha systems that use ODS-2 disks (as well as OpenVMS Integrity servers systems using ODS-2 disks). Choose ODS-2 if you do not need the new features of ODS-5 disks, including the support of applications ported from other operating systems (such as UNIX, Linux, and MS Windows) available with ODS-5 disks.
- ODS-5
 - ODS-5 supports file names that are longer and have a wider range of legal characters. This feature permits use of file names similar to those in a Windows or UNIX environment.
 - ODS-5 supports hard links to files, access dates, and files whose names differ only by case.
 - ODS-5 volumes cannot be mounted on any version of OpenVMS prior to Version 7.2.
 - Systems running OpenVMS VAX Version 7.2 and higher can mount ODS-5 volumes but cannot create or access files that have extended names. (On OpenVMS VAX systems, lowercase file name characters are seen in uppercase.)

If you choose not to change to ODS-5, the upgrade continues and the target disk is mounted. For example:

```
Do you want to convert the target system disk to ODS-5? (Yes/No/?) NO
```

```
...OpenVMS I64 will be upgraded on DKB400:.
```

If you choose to change to ODS-5, you are given the option to enable hard links. (For more information about hard links, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.) The upgrade then continues.

Do you want to convert the target system disk to ODS-5? (Yes/No/?) **YES**

DKB400: has been converted to ODS-5.

You can use the BACKUP/CONVERT command to convert ODS-5 disks back to ODS-2 format. For more information, refer to the OpenVMS System Management Utilities Reference Manual.

Hard links can be enabled on ODS-5 disks. WBEM Services for OpenVMS does not require hard links. (? for more information)
(***Enabling hard links can take from 5-10 minutes to an hour or more.***)

Do you want to enable hard links? (Yes/No/?) **YES**

If you choose to enable hard links, the procedure automatically executes an ANALYZE/DISK_STRUCTURE/REPAIR operation to correctly set the reference (link) counts. ANALYZE/DISK_STRUCTURE/REPAIR counts the number of directory entries that reference each file, and sets the link count if it is incorrect. This operation can take from 5 to 10 minutes to an hour or more, depending on the complexity of the system disk configuration, the number of layered products installed, and the number of user files. During the process, messages similar to the following are displayed:

Hard links have been enabled on DKB400:.

The newly enabled hard links are not correct and need to be updated. The Analyze/Disk_Structure utility will now be run to do this.

This can take from 5 - 10 minutes to an hour or more. It is a normal requirement when hard links are enabled on an existing disk.

```
%ANALDISK-I-COUNT, 1000 hard link updates completed
%ANALDISK-I-COUNT, 2000 hard link updates completed
%ANALDISK-I-COUNT, 3000 hard link updates completed
%ANALDISK-I-COUNT, 4000 hard link updates completed
%ANALDISK-I-COUNT, 5000 hard link updates completed
%ANALDISK-I-COUNT, 6000 hard link updates completed
```

OpenVMS I64 will be upgraded on DKB400:.

6.3.8 Choosing Whether to Allow the Procedure to Create and Validate Boot Options (Integrity servers only)

On OpenVMS Integrity servers upgrades, the procedure next asks whether you want to create or validate boot options.

Boot options in the EFI Boot Manager boot option menu can provide a convenient way to boot your system. The installation procedure can automatically create a new boot option (if none exists) or validate existing boot options.

Do you want to create or validate boot options? (Yes/No) [Yes] **YES**

If your system disk will normally be booted on this system and this device, and if you want the upgrade procedure to assist you in setting up or validating boot options on the EFI console in the EFI Boot Manager menu, answer YES. The procedure creates and validates a new boot option if one does not exist, or it validates existing boot options, just before the upgrade completes. (See Section 6.4.7 (page 123).)

If you answer YES and no boot option exists, the procedure allows you to set OpenVMS boot flags (VMS_FLAGS), as shown in the following example. Enter the OpenVMS flags (for example, 0,1), or press **Enter** to set no flags (the default). If a boot option exists, you can change boot flags

after the upgrade completes (for information about changing boot flags, see [Section B.5.2 \(page 207\)](#)).

You can set `VMS_FLAGS` or accept the default, `0,0`.

Enter the value for `VMS_FLAGS`: (n,n) [0,0]

If you do not want the procedure to assist you in setting up or validating boot options on the EFI console, answer `NO`.

HP recommends that you allow the procedure to assist you in setting up and validating boot options.



NOTE: If your newly upgraded system disk is a Fibre Channel device, HP recommends that you add it as a boot option in the EFI boot menu. If you do not allow the upgrade procedure to add the device to the boot menu, you can add it by using the OpenVMS Integrity servers Boot Manager utility (`SYS$MANAGER:BOOT_OPTIONS.COM`) after the upgrade completes. (To add Fibre Channel devices to the EFI boot menu, you must use this utility instead of EFI.)

HP recommends using the OpenVMS Integrity servers Boot Manager utility to add shadowed system disks in a multiple-member shadow set to the EFI boot device list and dump device list. Be sure to add all members to both lists.

For information about the OpenVMS Integrity servers Boot Manager utility, see [Section B.5.2 \(page 207\)](#). For more information about configuring and booting Fibre Channel devices, see [Appendix E \(page 293\)](#).

6.3.9 Warning About Removal of the DECRAM Command

When upgrading from versions of OpenVMS prior to 8.3, the procedure displays a message similar to the following that warns you that the DCL command `DECRAM` is being removed to prevent conflict with the `DECRYPT` command:

Beginning with OpenVMS V8.3, the DCL commands `ENCRYPT` and `DECRYPT` are provided as part of OpenVMS.

Because "`DECRYPT`" conflicts with the existing command "`DECRAM`", this upgrade will remove the `DECRAM` command.

If you use the command `DECRAM` interactively or in command procedures, please see the release notes for more information.

The `DECRYPT` command (introduced with OpenVMS Version 8.3) overwrites the default definition of `DECR`, which you might have been using to run `DECRam`. You should update any command procedures that use the `DECRAM` command so that they use the foreign command style of DCL to run `DECRam`:

```
$ DECRAM == "$MDMANAGER"
```

This change affects only the use of the DCL command; all other aspects of the `DECRam` product remain the same.

6.3.10 Setting OpenVMS Cluster Membership Information

The procedure now asks whether your system will be part of an OpenVMS Cluster. For example:

```
Will this system be a member of an OpenVMS Cluster? (Yes/No)
```

If you answer `YES` to this question, the procedure will ask whether your system will use IP for Cluster Communications.

```
Will this system use IP for Cluster Communications ? (Yes/No)
```

If the system being upgraded is member of an existing cluster, answering `YES` to this question causes the `SYS$MANAGER:CLUSTER_CONFIG.COM` procedure to run automatically when your upgraded system is first booted. However, correct cluster membership information is required

by the upgrade procedure. Note that you can run this procedure manually to configure or reconfigure your system as a member of an OpenVMS Cluster. For more information about configuring a member of an OpenVMS Cluster, see the *Guidelines for OpenVMS Cluster Configurations* manual.

6.3.11 Setting OpenVMS Galaxy Information (Alpha Only)

The procedure next asks whether your system is an instance in an OpenVMS Galaxy. The display is similar to the following:

```
Will this system be an instance in an OpenVMS Galaxy? (Yes/No)
```

If you answer YES to this question, and you also answered YES to the OpenVMS Cluster question, then information about required remedial kits is displayed. Your answer to this question determines how the system parameter GALAXY is set.

6.3.12 Updating Time Zone Information

For local time zone support to work correctly, the time zone that accurately describes the location you want to be considered as your default time zone must be set. In addition, your system must be configured correctly to use a valid OpenVMS time differential factor (TDF).

If the installation procedure determines that time zone information is incomplete, it prompts you to set the correct default time zone and TDF for your system. For information about setting the time zone information, see Section 3.4.3 (page 56).

For more information about TDF and local time zone support, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

6.3.13 Upgrading Windowing, Networking, and Related Products

The procedure now presents information about the optional DECwindows GUI (DECwindows Motif for OpenVMS), WBEM products (WBEM Services for OpenVMS and WBEM Providers), and networking (DECnet and TCP/IP) products that will be upgraded along with the OpenVMS operating system. As noted by the procedure, you can change the default values for these products later in the installation procedure.



NOTE: The following display shows what you might see during an OpenVMS Integrity servers installation. Some of the products listed are supported on OpenVMS Integrity server systems only.

```
The following products are part of the OpenVMS installation;  
if necessary they will be installed or upgraded along with the OpenVMS operating system:
```

- o Availability Manager (base) for OpenVMS I64
- o CDSA for OpenVMS I64
- o KERBEROS for OpenVMS I64
- o SSL for OpenVMS I64
- o Performance Data Collector (base) for OpenVMS I64
- o HP Binary Checker for OpenVMS I64

```
If necessary, the following optional products will also be upgraded  
along with the OpenVMS operating system:
```

- o DECwindows Motif for OpenVMS I64
- o DECnet-Plus for OpenVMS I64
- o DECnet Phase IV for OpenVMS I64
- o HP TCP/IP Services for OpenVMS
- o WBEM Services for OpenVMS (WBEMCIM)
- o WBEM Providers for OpenVMS (WBEMPROVIDERS)

```
If you want to add or delete optional products, you can do so later  
in the upgrade by answering NO to the following question:
```

```
"Do you want the defaults for all product options?"
```

```
Availability Manager (base) for OpenVMS I64  
is already installed on your system. An upgrade is not required.
```

CDSA for OpenVMS I64 ...
is installed on your system. It will be upgraded.

KERBEROS for OpenVMS I64...
is installed on your system. It will be upgraded.

SSL for OpenVMS I64...
is installed on your system. An upgrade is not required.

Performance Data Collector (base) for OpenVMS I64...
is installed on your system. It will be upgraded.

HP Binary Checker for OpenVMS I64

DECwindows Motif for OpenVMS I64 V1.7
is installed on your system. An upgrade is not required.

Beginning with OpenVMS V7.1, the DECnet-Plus kit is provided with the OpenVMS operating system kit. HP strongly recommends that DECnet users install DECnet-Plus. DECnet Phase IV applications are supported by DECnet-Plus.

DECnet Phase IV is also provided as an option.

If you install DECnet-Plus and TCP/IP you can run DECnet applications over a TCP/IP network. Please see OpenVMS Management Guide for information on running DECnet over TCP/IP.

Do you want to install DECnet-Plus for OpenVMS I64 V8.4? (Yes/No) [Yes]

HP TCP/IP Services for OpenVMS
is already installed on your system. An upgrade is not required.

WBEM Services for OpenVMS (WBEMCIM)
is installed on your system. It will be upgraded.

WBEM Providers for OpenVMS (WBEMPROVIDERS)
is installed on your system. It will be upgraded.



NOTE: Beginning with OpenVMS Version 8.3, DECwindows client files are made available through the DWMOTIF_SUPPORT kit. (Prior to Version 8.3, the client files were included directly with the OpenVMS operating system kit.) The OpenVMS installation procedure installs this kit automatically. The DWMOTIF_SUPPORT kit name is listed during the installation.

Required versions of some of the windowing and networking products might already be installed on the system. If so, you will see a message to this effect, as seen for most of the products in the previous example. For some of the windowing and networking products, earlier versions might be installed that still work on OpenVMS Version 8.4. In this case, you will see a message indicating the software is already installed and asking whether you want to install the newer version. You can keep the currently installed version or upgrade to the newer version supplied with OpenVMS Version 8.4. If you choose to keep the currently installed version, you should verify what level of support for this version is available from HP.

Some windowing and networking products might have versions installed that do not work on OpenVMS Version 8.4. In this case, you are not given a choice to upgrade—the software is upgraded automatically. (On OpenVMS Alpha upgrades, if older versions of SSL for OpenVMS are found, the procedure removes them.)



NOTE: For support of Instant Capacity (iCAP) (supported on cell-based Integrity servers), and for support of such products as gWLM and HP SIM, install TCP/IP Services for OpenVMS. When you provision OpenVMS on Integrity servers, TCP/IP Services for OpenVMS is installed automatically.

6.4 Completing the Upgrade

The following sections describe the remaining steps that you need to perform to complete the upgrade.

6.4.1 Choosing Descriptive Help Text

The procedure next prompts you as follows:

```
The installation operation can provide brief or detailed descriptions.  
In either case, you can request the detailed descriptions by typing ?.
```

Do you always want detailed descriptions? (Yes/No) [No]

If you answer YES, the procedure displays additional explanatory text with each prompt.

6.4.2 Removing Older Versions of ENCRYPT

Beginning with OpenVMS Version 8.3, Encryption for OpenVMS is included with the operating system. If an older version of ENCRYPT (HP I64VMS ENCRYPT or HP AXPVMS ENCRYPT) is found on your system, the upgrade procedure removes the product. Confirmation of the removal of the ENCRYPT product is displayed, as in the following example:

```
HP I64VMS ENCRYPT will now be removed.  
This is required because OpenVMS now includes ENCRYPT.
```

```
The following product has been selected:  
HP I64VMS ENCRYPT V1.6                Layered Product
```

```
The following product will be removed from destination:  
HP I64VMS ENCRYPT V1.6                DISK$I64084: [VMS$COMMON.]
```

```
Portion done: 0%...20%...30%...40%...50%...60%...70%...80%...90%...100%
```

```
The following product has been removed:  
HP I64VMS ENCRYPT V1.6                Layered Product
```

6.4.3 Secure Delivery Validation

As of Version 8.3, most PCSI kits included on the OpenVMS distribution media are signed using Secure Delivery. Each target file includes an associated digital signature file (also referred to as a manifest) that is used for Secure Delivery validation. This validation involves authenticating the originator (HP, in this case) and verifying the contents of the target file. (The digital signature file has the same file name as the target file plus `_ESW` appended to the file extension, as in `filename.PCSI$COMPRESSED_ESW`.) When you upgrade OpenVMS Integrity servers from the distribution media, the procedure validates any PCSI kits that are being installed. For each kit successfully validated, you see a message similar to the following:

Prior to Version 8.4:

```
Performing product kit validation of signed kits...  
%PCSI-I-HPCVALPASSED, validation of  
DKB400: [KITS.CDSA] HP-I64VMS-CDSA-Vnnnn-nnn-n.PCSI$COMPRESSED;1 succeeded  
.  
.  
.
```

From Version 8.4 onwards:

```
Performing product kit validation ...  
%PCSI-I-HPCVALPASSED, validation of  
DKB400: [KITS.HPBINARYCHECKER] HP-I64VMS-HPBINARYCHECKER-Vnnnn-nnn-n.PCSI$COMPRESSED;1 succeeded  
.  
.  
.
```

Note that because of limitations in the OpenVMS Alpha CD boot environment, OpenVMS Alpha kits are not validated when booted from it. On both OpenVMS Alpha and Integrity server systems, signed PCSI kits that are installed subsequent to the initial boot of the OpenVMS CD/DVD (including signed kits on the distribution media) are validated. In addition, on both OpenVMS Alpha and OpenVMS Integrity server systems, the DCL command `PRODUCT SHOW HISTORY` displays the validation status of installed products.

6.4.4 Saving Archived Files

By default, the OpenVMS upgrade deletes files that were archived as *filename.type_OLD* by OpenVMS remedial kits. If you do not want to delete these files, you can save them by performing one of the following actions:

- When the script asks whether you want the defaults for all options, answer NO. (This script is shown in the example in Section 6.4.5 (page 120).) Step through the options and answer NO to the option for deleting files archived by remedial kits. This action saves all such files.
- Before beginning the upgrade, rename any *_OLD* files that you want to save. Files that you do not rename are deleted.

Note that the upgrade does not delete all files with a file extension ending in *_OLD*. Rather, it deletes only those *_OLD* files that were archived by OpenVMS remedial kits.



NOTE: OpenVMS patches save these *_OLD* files in *VMS\$REMEDIAL_OLD_FILES.TXT* in the *SY\$UPDATE* directory. All files listed in this file are supposed to have *_OLD* appended to their names; however, some patch kits add the files without this extension. If the upgrade procedure detects files without *_OLD* appended, it displays a message similar to the following:

```
%UPGRADE-I-FIXUP, appending _OLD to file names in
  PCSI$DESTINATION: [SYSUPD] VMS$REMEDIAL_OLD_FILES.TXT
    [SYSUPD] VMSKITBLD.DAT
    [SYSHLP] XFC$SDA.HLP
    [SYS$LDR] SYSTEM_SYNCHRONIZATION.EXE-OLD
    [SYS$LDR] SYS$XFCACHE.DSF
    [SYS$LDR] SHELL9K.EXE_STB
    [000000] HP-I64VMS-VMS-V0820-1-2.PCSI$DESCRIPTION
```

6.4.5 Selecting Product Component Options

As you begin the upgrade procedure, the procedure asks whether you want all the default values (meaning all the files and subgroups of files for each component included in the operating system). The display is similar to the following:

```
The following product has been selected:
  HP I64VMS OPENVMS V8.4                Platform (product suite)
```

```
Configuration phase starting ...
```

You will be asked to choose options, if any, for each selected product and for any products that may be installed to satisfy software dependency requirements.

```
HP I64VMS OPENVMS V8.4: OPENVMS and related products Platform
```

```
COPYRIGHT 1976 ...
```

```
Hewlett-Packard Development Company, L.P.
```

```
Do you want the defaults for all options? [YES]
```

During an upgrade, the PCSI utility defines default values as the values that you selected when you last installed or upgraded the OpenVMS operating system on your system. Therefore, before you respond to the prompt, note the following:

- If you accept the default values, you receive the same components that you selected when you last installed or upgraded the system (instead of *all* the components currently available)

plus any new components that were not in the previous version of the OpenVMS operating system.

- If you want to include or exclude any components differently than you did in the last installation or upgrade, you must answer NO and then respond to the prompts for *each* option, even those that you are not changing.
- If you want to review the current defaults first, answer NO. Then answer YES when the procedure asks whether you want to view the values.

If you review the defaults and are satisfied, answer YES to the prompt asking whether you are satisfied with the values. If you want to make changes, answer NO to that question and then answer YES when the procedure asks whether you want to reenter the values.

When you select component options, also note the following:

- Whether you choose all the default values or select individual files, the procedure allows you to view your selections and make changes.
- If you are not sure whether you want certain component options, you can request help by entering a question mark (?) at the prompt for that component (or group of components).
- You should review the list of options and compare them with the requirements for your procedure. If you are selecting components individually, be sure that you include all components necessary to support the needs of your users. Note also that certain components depend upon the installation of other components.
- OpenVMS Management Station software is installed automatically on your OpenVMS system disk when you accept all the default values. If you do not accept the default values, you must select the OpenVMS Management Station component (server and client files) if you plan to use that product. After the upgrade is complete, you can then prepare your OpenVMS system and your PC to run OpenVMS Management Station by following the procedures described in Appendix H (page 315).
- If you decide after the upgrade to change which OpenVMS operating system components you want installed on your system, you must reconfigure the installation as described in Section 7.12 (page 153).
- After you boot the upgraded system disk and log in, you can obtain information about individual system files by entering HELP SYS_FILES at the dollar sign prompt (\$).



NOTE: Unless you have specific reasons to do otherwise, HP recommends that you accept the defaults and install all OpenVMS options. OpenVMS and layered products have various dependencies on many of these options. Even if you think you do not need certain options, some OpenVMS or layered product operations might not work correctly if other OpenVMS options are not installed.

If you answer YES to accept the defaults for all options, the procedure displays a message similar to the following, the contents of which depend on the products you chose to install. If you answer NO, the procedure prompts you for each option and suboption.

```
Availability Manager (base) for OpenVMS I64

CDSA for OpenVMS I64

KERBEROS for OpenVMS I64

SSL for OpenVMS I64

Performance Data Collector (base) for OpenVMS I64

HP Binary Checker for OpenVMS I64

WBEM Services for OpenVMS (WBEMCIM)

WBEM Providers for OpenVMS (WBEMPROVIDERS)
```

For a list of component options included with the OpenVMS Version 8.4 operating system, see Example 3-1 (page 72).

6.4.6 Component and Product Installation Confirmation Messages

When you have answered all the prompts and selected the components you want installed, the procedure allows you to review your selections and make changes, and then displays information about the various components and products that were installed, as shown in the following sample display in which the review is not chosen. You might see an %UPGRADE-I-FIXUP message, which indicates that obsolete files on the system were incorrectly saved by remedial kits. The "fixup" allows them to be correctly removed.



NOTE: If you perform two installations at the same time to OpenVMS Alpha systems connected via MEMORY CHANNEL, you might see a message similar to the following every 5 seconds:

```
%PMA0 CPU00: 30-AUG-2004 14:58:40 Remote System Conflicts with
Known System - REMOTE NODE
%PMA0 CPU00: 30-AUG-2004 14:58:45 Remote System Conflicts with
Known System - REMOTE NODE
```

Disregard the message. The installation or upgrade will proceed normally and the messages will not be present when the system reboots with its real node name. The version numbers in this example do not necessarily reflect the version numbers of the products actually shipped with OpenVMS Version 8.4.

```
Do you want to review the options? [NO] NO
```

```
Execution phase starting ...
```

```
The following products will be installed to destinations:
```

```
HP I64VMS CDSA V2.3-306           DISK$I64084:[VMS$COMMON.]
HP I64VMS DECNET_PLUS V8.4        DISK$I64084:[VMS$COMMON.]
HP I64VMS HPBINARYCHECKER V1.0    DISK$I64084:[VMS$COMMON.]
HP I64VMS KERBEROS V3.1-152       DISK$I64084:[VMS$COMMON.]
HP I64VMS OPENVMS V8.4            DISK$I64084:[VMS$COMMON.]
HP I64VMS VMS V8.4                DISK$I64084:[VMS$COMMON.]
HP I64VMS WBEMCIM V2.91-A070728    DISK$I64084:[VMS$COMMON.]
HP I64VMS WBEMPROVIDERS V2.0-31    DISK$I64084:[VMS$COMMON.]
```

```
The following products will be removed from destinations:
```

```
HP I64VMS CDSA V2.2           DISK$I64084:[VMS$COMMON.]
HP I64VMS DECNET_PLUS V8.3     DISK$I64084:[VMS$COMMON.]
HP I64VMS KERBEROS V3.0        DISK$I64084:[VMS$COMMON.]
HP I64VMS OPENVMS V8.3        DISK$I64084:[VMS$COMMON.]
HP I64VMS VMS V8.3            DISK$I64084:[VMS$COMMON.]
```

```
Portion done: 0%..10%..20%..30%..40%..50%..60%..70%..80%..90%..100%
```

```
The following products have been installed:
```

```
HP I64VMS CDSA V2.3-306           Layered Product
HP I64VMS DECNET_PLUS V8.4        Layered Product
HP I64VMS HPBINARYCHECKER V1.0    Layered Product
HP I64VMS KERBEROS V3.1-152       Layered Product
HP I64VMS OPENVMS V8.4            Platform (product suite)
HP I64VMS VMS V8.4                Operating System
HP I64VMS WBEMCIM V2.91-A070728.....Layered Product
HP I64VMS WBEMPROVIDERS V2.0-31.....Layered Product
```

```
The following products have been removed:
```

```
HP I64VMS CDSA V2.2           Layered Product
HP I64VMS DECNET_PLUS V8.2     Layered Product
HP I64VMS KERBEROS V3.0        Layered Product
```

```
HP I64VMS OPENVMS V8.3           Platform (product suite)
HP I64VMS VMS V8.3              Operating System
```

HP I64VMS OPENVMS V8.4: OPENVMS and related products Platform

HP I64VMS KERBEROS V3.1-152

Configure and set up Kerberos

If Kerberos will be run on this system, but has not been used previously, you need to perform the following steps.

- o Run the Kerberos configuration procedure:

```
@SYS$STARTUP:KRB$CONFIGURE.COM
```

- o Add the following line to SYS\$MANAGER:SYSTARTUP_VMS.COM:

```
$ @SYS$STARTUP:KRB$STARTUP
```

- o Add the following line to SYS\$MANAGER:SYLOGIN.COM:

```
$ @SYS$MANAGER:KRB$SYMBOLS
```

Press RETURN to continue:

6.4.7 Upgrade Creates and Validates Boot Options (Integrity servers only)

At this point in an OpenVMS Integrity servers upgrade, the procedure creates and validates boot options if you chose to have the procedure do so (see [Section 6.3.8 \(page 115\)](#)).

- **If you answered NO**, the following message is displayed

If there is an existing boot option that was used to boot this system disk, you may be able to use it. Otherwise, you will have to use the EFI Shell the first time that you boot the newly installed system. After booting, use the OpenVMS I64 Boot Manager to create a Boot Option. To do this log in to a privileged account and execute this command:

```
$ @SYS$MANAGER:BOOT_OPTIONS
```

The procedure then informs you that the upgrade is complete and prompts you to press **Return (Enter)** to continue, at which point it returns you to the OpenVMS main menu. You can select option 8 (“Execute DCL commands and procedures”) on the OpenVMS main menu and enter the command at the DCL triple dollar sign prompt (\$\$\$) to start the OpenVMS Integrity servers Boot Manager utility.

- **If you answered YES**, the procedure determines whether a boot entry already exists for the system disk (in this example, DKB400):

- **If an entry is found**, a message similar to the following is displayed:

```
The EFI Boot Manager menu includes the following boot option(s)
for DKB400:
```

```
Validate EFI Boot Options list:      Timeout = 0 secs.
```

```
-----
1 DKB400 PCI(0|20|1|0) Scsi(Pun1,Lun0) "OpenVMS on DKB400: PKA0.1"
-----
```

```
1 entries found.
```

In this example, one boot option is found. If multiple entries are found and if they are all SCSI devices, the procedure displays the following message and then notifies you that the upgrade is complete:

The EFI Boot Manager menu includes multiple Boot Options for \$1SDGA1200: Boot Options cannot be created or validated automatically.

Please use the OpenVMS I64 Boot Manager to ensure that you have a valid boot option for the system you have just installed.

When one entry is found, or when multiple Fibre Channel entries are found, the procedure validates the boot options, as in the following example, in which the found entry fails to boot and is then fixed and validated:

```
Validate EFI Boot Options list:      Timeout = 0 secs.
-----
1 DKB400: PKA0.1
   DKB400 PCI(0|20|1|0) Scsi(Pun1,Lun0)
   efi$bcfg: Option Failed. Fixing Boot Entry automatically.

efi$bcfg: Entry 1 Boot0001 removed.
efi$bcfg: DKB400 PCI(0|20|1|0) Scsi(Pun1,Lun0) (Boot0001) Option
successfully added
-----
1 entries validated.
```

- **If no existing entry is found**, a boot option is created and the procedure displays validation text as in the following example:

```
efi$bcfg: DKB400: (Boot0003) Option successfully added
```

```
The Boot Option is called OpenVMS on DKB400;
it is the first entry in the Boot Options menu, and is
configured (by default) to boot from SYS0.
```

```
VMS_FLAGS are set to -fl 0,0
```

6.4.8 Upgrade Completes and Returns to OpenVMS Operating System Menu

The upgrade procedure is now complete. The procedure displays information about the special startup procedure that runs when the newly installed system is first booted. It then prompts you to press **Return (Enter)** to continue. After you do so, you are returned to the OpenVMS operating system menu. The following is a sample display:

```
The upgrade is now complete.
```

```
When the newly upgraded system is first booted, a special
startup procedure will be run. This procedure will:
```

- o Run AUTOGEN to set system parameters.
- o Reboot the system with the newly set parameters.

```
You may shut down now or continue with other operations.
```

```
Process I64VMS_INSTALL logged out at 25-JUL-2009 14:45:49.54
```

```
Press Return to continue...
```

```
*****
```

```
You can install or upgrade the OpenVMS I64 operating system
or you can install or upgrade layered products that are included
on the OpenVMS I64 distribution media (CD/DVD).
```

```
You can also execute DCL commands and procedures to perform
"standalone" tasks, such as backing up the system disk.
```

```
Please choose one of the following:
```

- 1) Upgrade, install or reconfigure OpenVMS I64 Version 8.4
- 2) Display layered products that this procedure can install
- 3) Install or upgrade layered products
- 4) Show installed products
- 5) Reconfigure installed products
- 6) Remove installed products
- 7) Find, Install or Undo patches; Show or Delete recovery data
- 8) Execute DCL commands and procedures
- 9) Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?)

6.4.9 Shutting Down the System

Unless you want to perform any other operations prior to booting the upgraded disk, shut the system down by choosing the shutdown option (9) on the menu:

```
Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?)  9
  Shutting down the system
```

```
  .
  .
  .
```

```
          SYSTEM SHUTDOWN COMPLETE
```

6.5 What to Do After Shutdown

After an OpenVMS Alpha system shuts down, you can make the newly upgraded system disk the default boot device, if necessary, and then boot the system disk. After an OpenVMS Integrity servers system shuts down, you can use the OpenVMS Integrity servers Boot Manager utility to add and validate a boot option for the newly upgraded system disk, and then boot the newly upgraded system disk. For either operating system, AUTOGEN runs automatically, after which the system shuts down again and automatically reboots. If you are doing a concurrent or rolling upgrade in an OpenVMS Cluster environment, do not boot any other cluster members now.

Now go to [Chapter 7 \(page 127\)](#) and check for any postupgrade tasks that need to be performed before the system and cluster can be used. Once you have completed all required postupgrade tasks, you can reboot and then use other cluster members.

7 After Installing or Upgrading the OpenVMS Operating System

After you have installed or upgraded the OpenVMS operating system, you must perform several important tasks to prepare the system for operation. Section 7.1 (page 127) includes a checklist that you can use to make sure you perform all the postinstallation or postupgrade tasks necessary for your system.

7.1 Postinstallation and Postupgrade Tasks

Use the checklist in Table 7-1 to ensure that you perform all necessary postinstallation or postupgrade tasks. Unless indicated otherwise, these tasks are applicable as both postinstallation and postupgrade tasks.

Table 7-1 Postinstallation and Postupgrade Checklist

Task	Section
<ul style="list-style-type: none"> □ For a newly installed system disk, you can back up the disk. (At this point, you could reinstall OpenVMS onto the disk instead.) For a newly upgraded system disk, if it is <i>not</i> going to be a shadow set member, back up the system disk as a safeguard before proceeding with the next steps. If your newly upgraded system disk is going to be a shadow set member, you can re-form it in a later step. As an optional precaution, you can back up the system disk as well. 	Section 7.2 (page 129)
<ul style="list-style-type: none"> □ Register any licenses that were not registered during the installation; for an upgrade, register any new licenses. 	Section 7.3 (page 130)
<ul style="list-style-type: none"> □ <i>New installations only (optional)</i>: Set system parameters to enable volume shadowing. 	Section 7.4 (page 131)
<ul style="list-style-type: none"> □ <i>Alpha upgrades only</i>: Tune BAP system parameters. 	Section 7.5 (page 132)
<ul style="list-style-type: none"> □ If you set system parameters to enable volume shadowing or removed hardcoded BAP system parameters, run AUTOGEN and reboot. 	Section 7.6 (page 133)
<ul style="list-style-type: none"> □ If you want to form a shadow set for a system disk, you can do this now or later. If you upgrade a disk in a volume shadowing environment, re-form the shadow set. 	Section 7.7 (page 133)
<ul style="list-style-type: none"> □ <i>New installations, some upgrades</i>: Perform the following tasks that generally apply to new installations only but could also apply after an upgrade: <ul style="list-style-type: none"> □ Create proxy files, if required. □ Set up the queue manager and start the default batch and print queues. □ Configure a multihead system, if applicable. □ Configure DECnet if it was installed. After an upgrade, perform only if DECnet was added during the upgrade. □ Configure TCP/IP Services for OpenVMS if it was installed. After an upgrade, configure TCP/IP Services only if it was added during the upgrade. □ If you are using neither DECnet nor TCP/IP Services, install and configure third-party networking software, if necessary. Networking software is required to download patches and for certain layered products. 	Section 7.8.1 (page 135)
	Section 7.8.2 (page 135)
	Section 7.8.3 (page 136)
	Section 7.8.4 (page 137)
	Section 7.8.5 (page 137)
	Section 7.8.6 (page 138)
<ul style="list-style-type: none"> □ Initialize or configure the following products, as needed: <ul style="list-style-type: none"> □ Initialize CDSA. □ Configure Availability Manager. □ Configure Kerberos. □ Configure SSL for OpenVMS. □ On Integrity servers using services that depend on WBEM Services for OpenVMS, configure WBEM Services for OpenVMS. □ On Integrity servers using services that depend on WBEM Providers, configure WBEM Providers for OpenVMS. □ On Integrity servers that use Instant Capacity (iCAP) or Temporary Instant Capacity (TiCAP), configure the iCAP software. □ On Integrity servers that use HP SIM services, configure HP SIM. 	Section 7.9.1 (page 138)
	Section 7.9.2 (page 139)
	Section 7.9.3 (page 140)
	Section 7.9.4 (page 141)
	Section 7.9.5 (page 142)
	Section 7.9.6 (page 146)
	Section 7.9.7 (page 148)
	Section 7.9.8 (page 149)

Table 7-1 Postinstallation and Postupgrade Checklist (continued)

Task	Section
□ Initialize and run the Performance Data Collector base software (TDC_RT).	Section 7.9.9 (page 149)
□ Prepare your OpenVMS system and your PC to run OpenVMS Management Station, and follow procedures in Appendix H (page 315).	Section 7.9.10 (page 152)
□ Install OpenVMS Debugger clients on a PC.	Section 7.9.11 (page 152)
□ Create or edit a system-specific or clusterwide login welcome message SYS\$MANAGER:WELCOME.TXT (optional).	Section 7.10 (page 152)
□ <i>Upgrades only:</i> Examine command procedures for which the upgrade may have provided new template files.	Section 7.11 (page 153)
□ Add and remove operating system files (optional).	Section 7.12 (page 153)
□ <i>Alpha only:</i> Expand the system libraries using LIBDECOMP.COM (optional). <i>Integrity servers only:</i> If necessary, compress the system libraries using LIBDECOMP.COM (optional, HP recommends keeping libraries in expanded format).	Section 7.13 (page 155)
□ Download and apply any relevant OpenVMS or networking patches that are available (optional but recommended).	Section 7.14 (page 159)
□ <i>New installations, some upgrades:</i> Install and configure layered products.	Section 7.15 (page 161)
□ <i>Alpha upgrades only (optional):</i> Reinstall DECEvent software (which is automatically removed during an upgrade)	Section 7.16 (page 163)
□ <i>New installations, some upgrades:</i> Create print queues.	Section 7.17 (page 163)
□ Update SYSTARTUP_VMS.COM to have layered products, print queues, and other products or devices start at boot.	Section 7.18 (page 163)
□ <i>Installations and possibly upgrades:</i> Create user accounts.	Section 7.19 (page 163)
□ Run the User Environment Test Package (UETP) to test the system (optional).	Section 7.20 (page 163)
□ Back up the system disk and start a systematic routine for backing up the application, data, and user disks.	Section 7.21 (page 164)
□ If the system disk was pulled out of the shadow set and all the appropriate postupgrade steps recommended in this chapter thus far were performed on that disk, then re-form the shadow set once again.	Section 7.22 (page 164)
□ <i>Upgrades only:</i> Reboot cluster members, if applicable.	Section 7.23 (page 164)
□ Tune your operating system: After the system has run for at least 24 hours with users or a typical application workload on the system, run AUTOGEN to collect feedback. If necessary, modify the MODPARAMS.DAT file.	Section 7.24 (page 164) Section 7.25 (page 166)

7.2 Backing Up Your System Disk

Unless your newly installed or upgraded system disk will be part of a shadow set, HP recommends that you back up the system disk before performing the tasks described in this chapter. If you encounter problems while performing any of these tasks, having a backup copy of the system disk ensures that you can restore it to a known condition without having to repeat the installation or upgrade.

If your system disk will be part of a multiple-member shadow set, then a backup is not necessary. Either form or re-form the shadow set, as described in Section 7.7 (page 133); this creates a backup copy of the newly installed or upgraded system disk through the shadow copy operation. Remember to dismount any added shadow set members after the shadow copy has completed, complete any steps described in this chapter that you need to perform and, when you are finished, re-form the shadow set.

If your newly installed or upgraded system disk will not be in a shadow set, back up the system disk by performing the following steps. (For a newly installed system disk, it might be just as easy to reinstall the operating system.)

1. Shut down the system (for OpenVMS Alpha systems, as described in Section A.3.2 (page 185); for OpenVMS Integrity server systems, as described in Section B.7.2 (page 226)).
2. Boot the operating system media, as described in Section 3.2 (page 45).
3. Use the OpenVMS operating system menu to enter the DCL environment (option 8).
4. Mount the system device and the target device on which you are making the backup copy. (If you are backing up to tape, skip to the next step.) For example, if your system disk is on DKA0: and the target device is on DKA100:, you might use the following commands (colons are required). The /OVERRIDE qualifier used in this example enables you to mount the system disk without entering its volume label. The /FOREIGN qualifier is required for the target disk when you use the BACKUP /IMAGE command.

```
$$$ MOUNT /OVERRIDE=IDENTIFICATION DKA0:
$$$ MOUNT /FOREIGN DKA100:
$$$ BACKUP /IMAGE /LOG DKA0: DKA100:
```

The /IMAGE qualifier causes the Backup utility to produce a functionally equivalent copy of the system disk, which is also bootable. The /LOG qualifier causes the procedure to display the specification of each save set file being processed. To compare the backed up files to the source files, use the /VERIFY qualifier. If any discrepancies are detected, the Backup utility displays an error message.

5. To back up the system disk to a magnetic tape, enter the following commands, where MTA0: is the magnetic tape drive and *label* is the volume label. Note that the BACKUP command automatically mounts the tape and begins the backup to it.

```
$$$ INITIALIZE MTA0: label
$$$ MOUNT /OVERRIDE=IDENTIFICATION DKA0:
$$$ BACKUP /IMAGE /LOG DKA0: MTA0:label.BCK
```

6. Log out from the DCL environment.
7. Shut down the system by selecting option 9 on the menu.
8. Boot from the disk on which you either upgraded or installed OpenVMS.

In addition to backing up the system disk now before you customize it, you should back up your system disk again after you successfully complete your customization tasks and install layered products.

For more complete information about backup operations, including a description of an alternative method that does not require booting from the operating system media and that enables you to back up a shadowed disk without disabling the shadow set, see Appendix F (page 305). For more information about the Backup utility, see the *HP OpenVMS System Management Utilities Reference Manual: A-L*.

7.3 Registering Your Licenses

If you did not register your OpenVMS licenses during the installation, you must do so before you can use the OpenVMS operating system. You must also register the licenses for OpenVMS layered products. If your operating system came preinstalled, you must register licenses. The licenses are not preinstalled. If you plan to form a volume shadow set for your newly installed system disk, you must enter and load the VOLSHAD license.

If you have upgraded your operating system, register any new OpenVMS or layered product licenses. Note that licensing schemes differ between OpenVMS Alpha and Integrity server systems. For OpenVMS Integrity server systems, a single OE license grants the right to use all the components bundled in the purchased OE. Each OE is offered with Per Core Licenses (PCLs).

For information about registering licenses, see the following documents:

- *HP OpenVMS License Management Utility Manual*
- *HP OpenVMS Version 8.4 Release Notes*
- For OpenVMS Integrity server systems, the *HP Operating Environments for OpenVMS for Integrity Servers Software Product Description (SPD 82.34.xx)*.

To register licenses, use the OpenVMS License utility as follows:

1. Start the OpenVMS License utility by entering the following command at the OpenVMS system prompt. (You can also use the LICENSE REGISTER command.)

```
$ @SYS$UPDATE:VMSLICENSE
```

2. The utility displays a menu screen similar to the following. Select the REGISTER option (press **Enter** or enter 1 at the prompt), and enter each license key until you have successfully registered all required PAKs.

```
VMS License Management Utility Options:
```

1. REGISTER a Product Authorization Key
2. AMEND an existing Product Authorization Key
3. CANCEL an existing Product Authorization Key
4. LIST Product Authorization Keys
5. MODIFY an existing Product Authorization Key
6. DISABLE an existing Product Authorization Key
7. DELETE an existing Product Authorization Key
8. COPY an existing Product Authorization Key
9. MOVE an existing Product Authorization Key
10. ENABLE an existing Product Authorization Key
11. SHOW the licenses loaded on this node
12. SHOW the unit requirements for this node

```
99. Exit this procedure
```

```
Type '?' at any prompt for a description of the information requested. Press Ctrl/Z at any prompt to return to this menu.
```

```
Enter one of the above choices [1]
```

3. After each license is successfully registered, the procedure asks whether the license should be loaded. Answer YES.
4. After you have registered and loaded all your licenses, exit the License Management procedure by entering option 99.

7.4 Set System Parameters for Volume Shadowing (Optional)

If you plan to form a shadowed system disk, you must add system parameters to the SYS\$SYSTEM:MODPARAMS.DAT file. Add the following lines to the bottom of the MODPARAMS.DAT file:

```
SHADOWING=2           !Enable volume shadowing
SHADOW_SYS_DISK=1     !Enable shadowing of the system disk
SHADOW_SYS_UNIT=n     !Optional: default is 0, which creates DSA0
SHADOW_MAX_COPY=4    !Allow up to 4 shadow copies or merges going on at the same time
ALLOCLASS=x          !This number must be non-zero;
                    !it must be used if local non-FC devices are going to be
                    !shadow set members
```

If a nonzero ALLOCLASS value is already in use for your system, do not change the ALLOCLASS value. For more information about these and other system parameters you can set for volume

shadowing, see the *HP Volume Shadowing for OpenVMS* manual. For more information about setting ALLOCLASS for clusters, see the *HP OpenVMS Cluster Systems* manual.

7.5 Tuning BAP System Parameters (Alpha Upgrade Only)

OpenVMS Alpha Version 7.1 and later contains system parameters that control the operation of bus-addressable pool (BAP).

The CIPCA, CIXCD, KFMSB, and Qlogic ISP 1020 (KZPSM-AA) adapters are some of the adapters that use bus-addressable pool to improve performance. BAP is a non-paged dynamic, physical-address-filtered memory pool used to overcome I/O bus and 32-bit adapter physical addressing limits.

The following table lists the BAP system parameters and their default values:

System Parameter	Default Value
NPAG_BAP_MIN	0
NPAG_BAP_MAX	0
NPAG_BAP_MIN_PA	0
NPAG_BAP_MAX_PA	-1

The default values of these parameters enable the system to boot with any configuration. When AUTOGEN is run on a configured system, it resets these parameters to values that should enhance performance for the current system configuration.

If this is an upgrade of OpenVMS, or if the system fails to boot after a hardware change and displays a message that refers to incorrect BAP parameters, HP recommends that you perform the following steps:

1. To begin the conversational boot, use the BOOT command in the following format:

```
BOOT -FLAGS 0,1 [device-name]
```

For *device-name*, substitute the device name of your system disk drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press the **Enter** key:

```
>>> BOOT -FLAGS 0,1 DKA400
```

2. At the SYSBOOT> prompt, enter the following:

```
NPAG_BAP_MIN 0
NPAG_BAP_MAX 0
NPAG_BAP_MIN_PA 0
NPAG_BAP_MAX_PA -1
```

3. This should enable the system to boot. Once completed, enter the following command:

```
$ RUN SYS$SYSTEM:AGEN$FEEDBACK.EXE
```

4. The command entered in the preceding step creates a file that will contain the BAP values for the system in its current configuration. To see what they are, enter the following command (the BAP parameters in AGEN\$FEEDBACK.DAT do not include the NPAG_ prefix):

```
$ SEARCH SYS$SYSTEM:AGEN$FEEDBACK.DAT BAP
```

5. Check MODPARAMS.DAT for any hardcoded BAP values by entering the following command:

```
$ SEARCH SYS$SYSTEM:MODPARAMS.DAT BAP
```



IMPORTANT: If any BAP parameters are defined in MODPARAMS.DAT, HP strongly recommends removing them. Their presence in MODPARAMS.DAT could be the source of the current boot problem or might be a source of one in the future if a change is made to the adapter card configuration in the system.

If you make changes to adapters in the future and the system boots successfully, immediately run AUTOGEN, by entering the following command:

```
$ @SYS$UPDATE:AUTOGEN GETDATA SETPARAMS NOFEEDBACK
```

7.6 Running AUTOGEN to Set System Parameter Changes

If you modified MODPARAMS.DAT to enable or modify shadowing parameters (see Section 7.4 (page 131)), or if you removed hardcoded BAP system parameters (see Section 7.5 (page 132)), then run AUTOGEN and reboot the system by performing the following steps. This makes the changes take effect.

1. Run AUTOGEN by entering the following command:

```
$ @SYS$UPDATE:AUTOGEN GETDATA TESTFILES NOFEEDBACK
```

2. After AUTOGEN completes, display or print the SYS\$SYSTEM:AGEN\$PARAMS.REPORT file and review it. This file lists changes being made to SYSGEN parameters or changes that AUTOGEN wanted to make but could not because of a hardcoded or maximum value that was specified in MODPARAMS.DAT.

3. If other changes need to be made to MODPARAMS.DAT based on a review of the AGEN\$PARAMS.REPORT file, make them now and then resume at step 1.

4. Once you are satisfied with the parameter settings, enter the following AUTOGEN command:

```
$ @SYS$UPDATE:AUTOGEN GENPARAMS SETPARAMS NOFEEDBACK
```

This command makes the parameter changes permanent so that they are used on subsequent reboots.

5. Reboot the system by entering the following command:

```
$ @SYS$SYSTEM: SHUTDOWN
```

For more information about AUTOGEN, see *HP OpenVMS System Management Utilities Reference Manual: A-L*.

7.7 Forming the Shadow Set

If you have upgraded a disk in a volume shadowing environment, you must now re-form the shadow set. If you want to form a shadow set for a newly installed system disk, you can do this now or later. To do so requires that the VOLSHAD license has been entered and loaded. In addition, you must set several system parameters, as explained in Section 7.4 (page 131), and then you must run AUTOGEN and reboot the system, as explained in Section 7.6 (page 133).

Forming the shadow set with the newly installed or upgraded disk as the master causes the other disks in the shadow set to be updated with a copy of the disk. (In a single-member shadow set, although no other disks exist to be updated, the shadow set can be used to facilitate replacement of a failed drive.)

After forming the shadow set, dismount one of the shadow set members and keep it as a backup. After you perform the steps recommended in this chapter, you can place another volume into the shadow set instead of doing the final backup, or re-add the volume that was dismounted.

Form the shadow set as follows:

1. Enter the SHOW DEVICE D command to display a list of disks available on your system. For example:

```
$ SHOW DEVICE D
Device                               Device      Error      Volume      Free  Trans  Mnt
Name                                 Status      Count      Label       Blocks Count  Cnt
$11$DKB100: (NODE1) Online         0
$11$DKB200: (NODE1) Mounted        0          I64084     918150     1   31
```

2. Enter a command in the following format:

```
MOUNT/CONFIRM/SYSTEM DSAn: /SHADOW=(upgraded-disk:,new-member:) volume-label
where:
```

- *DSAn*: is the virtual unit name of the shadow set, where *n* is a unique number from 0 to 999.
- *upgraded-disk*: is the name of the shadowed system disk on which you just upgraded or installed OpenVMS.
- *new-member*: is the name of the disk you want to add as a member of the shadow set.
- *volume-label* is the volume label of the shadow set you just upgraded or the disk you are creating.



NOTE: When you form the shadow set, the contents of the new member are replaced by the contents of the disk you upgraded. Specifying the /CONFIRM qualifier reminds you of this fact, confirming that you are specifying the correct name of a disk that either is blank or contains files you no longer need.

Example

```
$ MOUNT/CONFIRM/SYSTEM DSA54: /SHADOW=($11$DKB200:,$11$DKB100:) I64084

%MOUNT-F-SHDWCOPYREQ, shadow copy required
Virtual Unit - DSA54 Volume label I64A084
  Member                               Volume label Owner UIC
  $11$DKB100: (NODE1) SCRATCH          [100,100]
Allow FULL shadow copy on the above member(s)? [N]: YES
```



NOTE: Before continuing with the next step in this chapter, after the shadow copy completes, dismount one of the shadow set members to use as a backup. Normally, this should be the unit you just added to the upgraded volume when you formed the shadow set (in the preceding example, \$11\$DKB100:).

For OpenVMS Integrity servers, to add a shadowed system disk in a multiple-member shadow set to the EFI boot device list and dump device list, HP recommends using the OpenVMS Integrity servers Boot Manager utility (SYS\$MANAGER:BOOT_OPTIONS.COM). Be sure to add all members to both lists.

7.8 Customizing the System (New Installations, Some Upgrades)

You can customize the system to meet your site-specific needs. In addition, if your Integrity servers is part of an OpenVMS Cluster environment, you must prepare the cluster environment and configure the cluster. The following subsections describe the customization tasks you can perform at this time. In general, these tasks apply to new installations only; however, in some cases, they apply to upgrades. The tasks are as follows:

1. Create network proxy authorization files (Section 7.8.1 (page 135)).
2. Set up the queue manager, configure shared files (when multiple system disks are present), and start the default batch and print queues (Section 7.8.2 (page 135)).
3. Configure your multihead system, if applicable (Section 7.8.3 (page 136)).

4. Configure DECnet if it was installed or added during an upgrade (Section 7.8.4 (page 137)).
5. Configure TCP/IP Services for OpenVMS if it was installed or added during an upgrade (Section 7.8.5 (page 137)).
6. If neither DECnet nor TCP/IP Services for OpenVMS is being used, install and configure third-party networking software, if necessary (Section 7.8.6 (page 138)).
7. Update SYSTARTUP_VMS.COM to have networking software (and, optionally, any other additional products you have installed) start at boot (Section 7.18 (page 163)).

For instructions on customizing the system, review the following documentation:

- The release notes, for notes and restrictions that might be relevant to your customization plans
- The *HP OpenVMS System Manager's Manual*, for instructions on customizing and using your system

Note that other customization tasks are described later in this chapter.

7.8.1 Creating Network Proxy Authorization Files

After a new installation of OpenVMS that includes DECnet, or after an upgrade in which you have added DECnet, create your network proxy authorization files. These files include security authorization information for users using network proxy accounts. If you do not create these network authorization files before starting up your system, you might see messages such as the following during startup:

```
Message from user SYSTEM on HOMER
%SECSRV-E-NOPROXYDB, cannot find proxy database file NET$PROXY.DAT
%RMS-E-FNF, file not found
```

The NET\$PROXY.DAT file is the primary network proxy authorization file. The other network authorization file to be created is NETPROXY.DAT. To create the network proxy authorization files, enter the following commands:

```
$ SET DEFAULT SYS$COMMON: [SYSEXE]
$ MC AUTHORIZE CREATE/PROXY
$ SET DEFAULT SYS$LOGIN
```



NOTE: Be sure you create the network proxy authorization files before starting the queue manager (as described in Section 7.8.2 (page 135)).

If you see messages similar to the following when you create the proxy files, you can ignore them:

```
%UAF-W-NETCHANERR, error assigning a channel to NET:
-SYSTEM-W-NOSUCHDEV, no such device available
```

For more information about network proxy accounts and files, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*. For more information about the Authorize utility, see the *HP OpenVMS System Management Utilities Reference Manual: A-L*.

7.8.2 Setting Up the Queue Manager and Default Queues

The initial installation of OpenVMS does not create the queue manager or any queues. HP recommends that you create the queue manager and your default batch and print queues now. When you install layered products (as described in Section 7.15 (page 161)), some of these products expect such queues to be present or try to create queues themselves.



NOTE: Normally, you create a queue manager only once. The system stores the START QUEUE command in the queue database to enable the queue manager to start automatically whenever the system reboots. If the queue manager has been started before on your system, do not specify this START QUEUE command again; the /NEW_VERSION qualifier causes your system to overwrite your current queue database files.

To configure shared files on multiple system disks or off the system disk, edit the SYS\$MANAGER:SYLOGICALS.COM file as described in *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

To set up the queue manager and a batch queue for new installations, enter the following commands at the DCL prompt.

```
$ START QUEUE /MANAGER /NEW_VERSION
$ INITIALIZE /QUEUE /START /BATCH SYS$BATCH
```



NOTE: If you did an upgrade of the operating system, do not specify the START QUEUE command with the /NEW_VERSION qualifier.)

As noted, the queue manager starts automatically the next time you boot your OpenVMS system. To have the SYS\$BATCH queue start automatically, edit the line in the SYS\$STARTUP:SYSTARTUP_VMS.COM file that starts the SYS\$BATCH queue by removing the exclamation mark (!) and, if present, the extra dollar sign (\$). The following example shows the line before and after editing. In that section, you can also define a default system print queue (SYS\$PRINT).

```
Before:      $!$ START /QUEUE SYS$BATCH
After:       $ START /QUEUE SYS$BATCH
```

For more information about starting and creating queues, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

7.8.3 Configuring a Multihead System (Optional)

A multihead configuration consists of a single system (such as an HP AlphaServer ES40) that supports multiple graphics options. A graphics option consists of a graphics controller (card) and a graphics display interface (monitor).

Your system can be configured automatically for multihead use if you copy the private server setup template file to a command procedure file type (.COM). The DECwindows Motif server loads this command procedure on startup or restart.

To set up your system for multihead support, perform these steps:



NOTE: The DECwindows Motif software must already be installed on the system prior to completing this procedure. If DECwindows is not installed, you must install the software, load the license and reboot the system prior to completing this procedure.

1. Copy the private server setup template file to a new .COM file by entering the following command:

```
$ COPY SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.TEMPLATE
   _To: SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.COM
```

2. Restart the DECwindows server by entering the following command:

```
$ @SYS$STARTUP:DECW$STARTUP RESTART
```

For more information about customizing your DECwindows environment using the SYS\$MANAGER:DECW\$PRIVATE_SERVER_SETUP.COM file, see the most recent version of

7.8.4 Configuring DECnet

If you installed DECnet, or if you added DECnet during an upgrade, you must now configure DECnet. Follow the instructions provided for the version of DECnet you installed. Licensing requirements for OpenVMS Alpha and OpenVMS Integrity servers, respectively, are as follows:

- OpenVMS Alpha systems: to receive either basic DECnet functionality or extended DECnet functionality, the appropriate license must be registered and loaded (the DECnet End System License or the DECnet Extended Function License, respectively).
- OpenVMS Integrity server systems: the DECnet End System License is included with the Base Operating Environment (BOE). If you want your system to take advantage of the advanced features of DECnet (such as routing, DTSS server, DNS server), you must register and load the DECnet-Plus Extended Function License.

To load and register licenses, perform the steps described in [Section 7.3 \(page 130\)](#).

If you installed DECnet-Plus for OpenVMS software, see the *DECnet-Plus for OpenVMS Release Notes* and the *HP DECnet-Plus for OpenVMS Installation and Configuration* manual for information about how to configure this software using the NET\$CONFIGURE procedure.

If you installed DECnet Phase IV, see the *DECnet for OpenVMS Guide to Networking* manual for information about configuring this software using the NETCONFIG command procedure.

Once you have configured DECnet Phase IV, edit SYS\$COMMON:[SYSMGR]SYSTARTUP_VMS.COM so that the software starts when the system reboots. (This step is not required if you are running DECnet-Plus.) You can have the software start interactively or in batch mode by making one of the following changes:

Interactive mode:

Before:

```
$!$ START/NETWORK DECNET
```

After:

```
$ START/NETWORK DECNET
```

Batch mode:

Before:

```
$!$ SUBMIT SYS$MANAGER:STARTNET.COM
```

After:

```
$ SUBMIT SYS$MANAGER:STARTNET.COM
```



IMPORTANT: If you intend to run both DECnet Phase IV and a TCP product, DECnet must start first. In this case, HP recommends starting DECnet using interactive mode.

For information about editing STARTUP-VMS.COM, see [Section 7.18 \(page 163\)](#).

7.8.5 Configuring HP TCP/IP Services for OpenVMS

If you plan to run TCP/IP Services for OpenVMS software, note the following:

- Configure your system for networking by executing the interactive command procedure SYS\$MANAGER:TCPIP\$CONFIG.COM. Be sure to consult the *HP TCP/IP Services for OpenVMS Installation and Configuration* manual for specifics about configuring TCP/IP Services for OpenVMS and for configuring IPv6 support.
- After completing the configuration, edit the command pertaining to TCP/IP Services for OpenVMS in SYS\$COMMON:[SYSMGR]SYSTARTUP_VMS.COM (as instructed in

Section 7.18 (page 163)) so that the TCP/IP Services software starts automatically when your system is rebooted.



IMPORTANT: Do not configure TCP/IP Services for OpenVMS without first starting the queue manager.

7.8.6 Installing and Configuring Third-Party Networking Software

You need networking software to download patches and as a requirement for certain layered products. If you are using neither DECnet nor TCP/IP Services for OpenVMS, you should install and configure third-party networking software now. See the appropriate vendor's product documentation.

7.9 Initializing or Configuring Other Installed Components

Initialize or configure any of the following products as necessary, following the instructions in the sections indicated:

- CDSA (Section 7.9.1 (page 138))
- Availability Manager (Section 7.9.2 (page 139))
- Kerberos (Section 7.9.3 (page 140))
- SSL for OpenVMS (Section 7.9.4 (page 141))
- WBEM Services for OpenVMS (Section 7.9.5 (page 142))
- WBEM Providers for OpenVMS (Section 7.9.6 (page 146))
- Instant Capacity (iCAP) software (Section 7.9.7 (page 148))
- HP SIM software (Section 7.9.8 (page 149))
- Performance Data Collector base software, TDC_RT (Section 7.9.9 (page 149))

7.9.1 Initializing CDSA (Optional)

The Common Data Security Architecture (CDSA) software is installed, configured, and initialized automatically with the operating system installation or upgrade. CDSA is required for Secure Delivery purposes and other security features; otherwise, use of CDSA is not required.

Note that if you installed a new CDSA kit without upgrading the base operating system, you must enter the following command to initialize CDSA prior to its first use. Enter the command from an account that has both SYSPRV and CMKRNL privileges (for example, the SYSTEM account).

```
$ @SYS$STARTUP:CDSA$UPGRADE
```

The following is an example of the output you might see:

```
Module uninstalled successfully.
.
.
.
CDSA-I-Init, CDSA has previously been initialized on this system.
CDSA-I-Init, Re-initializing CDSA.

CDSA-I-Init, Initializing CDSA
MDS installed successfully.
.
.
.
CDSA-I-Init, CDSA Initialization complete
CDSA-I-Init, Initializing Secure Delivery
Install completed successfully.
Install completed successfully.
Module installed successfully.
```

Module installed successfully.
CDSA-I-Init, Secure Delivery Initialization complete



NOTE: Do not attempt to explicitly remove CDSA from your system. The PRODUCT REMOVE command is not supported for CDSA although there appears to be an option to remove CDSA. CDSA is installed with the operating system and is tightly bound with it. Attempts to remove it might not work as expected and can create undesirable side effects. An attempt to remove it results in a message similar to the following:

```
%PCSI-E-HRDREF, product HP I64VMS CDSA V2.3 is referenced by HP I64VMS OPENVMS V8.4
```

```
The two products listed above are tightly bound by a software dependency.  
If you override the recommendation to terminate the operation, the  
referenced product will be removed, but the referencing product will have  
an unsatisfied software dependency and may no longer function correctly.  
Please review the referencing product's documentation on requirements.
```

```
Answer YES to the following question to terminate the PRODUCT command.  
However, if you are sure you want to remove the referenced product then  
answer NO to continue the operation.
```

```
Terminating is strongly recommended. Do you want to terminate? [YES]
```

For more information about CDSA, see *HP Open Source Security for OpenVMS, Volume 1: Common Data Security Architecture*.

7.9.2 Configuring the Availability Manager Base Software (Optional)

The Availability Manager base kit is installed automatically with the operating system; however, use of Availability Manager is not required. If you do not plan to use Availability Manager or any products that depend on it, skip to the next section.

The files in the Availability Manager base kit make up what is called the Data Collector. The Data Collector is used to collect data for the Availability Manager and DECamds products. To display the data, you need to install an Availability Manager Data Analyzer kit on an OpenVMS or Windows-based node in the local LAN. The kit is included in the OpenVMS upgrade media, or you can obtain it from the following website:

<http://www.hp.com/products/openvms/availabilitymanager>

The base kit files are the same files that have been provided with the OpenVMS installation kit since Version 7.2. The only change for OpenVMS Version 8.2 and higher is that these files are now installed as a required product rather than being an optional software product in the operating system kit. Procedures for configuring and using these files remain unchanged.

For more information about how to configure and use the files in the Availability Manager base kit, see the section "Performing Postinstallation Tasks" in the Availability Manager installation instructions for OpenVMS (*HP Availability Manager Installation Instructions*). This and other Availability Manager documents are available at the website mentioned previously.



NOTE: Do not attempt to explicitly remove the Availability Manager from your system. The PRODUCT REMOVE command is not supported for Availability Manager although there appears to be an option to remove Availability Manager. The Availability Manager base software is installed with the operating system and is tightly bound with it. Attempts to remove it might not work as expected and can create undesirable side effects. An attempt to remove it results in a message similar to the following:

```
%PCSI-E-HRDREF, product HP I64VMS Availability Manager V8.4 is referenced by HP I64VMS OPENVMS V8.4
```

```
The two products listed above are tightly bound by a software dependency.
If you override the recommendation to terminate the operation, the
referenced product will be removed, but the referencing product will have
an unsatisfied software dependency and may no longer function correctly.
Please review the referencing product's documentation on requirements.
```

```
Answer YES to the following question to terminate the PRODUCT command.
However, if you are sure you want to remove the referenced product then
answer NO to continue the operation.
```

```
Terminating is strongly recommended. Do you want to terminate? [YES]
```

7.9.3 Configuring Kerberos (Optional)

The Kerberos for OpenVMS software, which is based on MIT Kerberos, is installed automatically with the operating system; however, use of Kerberos is not required. If you do not plan to use Kerberos or any products that depend on Kerberos, skip to the next section.

To configure Kerberos, perform the following steps from a privileged OpenVMS user account (for example, SYSTEM).

1. Run the following command procedure to configure the Kerberos clients and servers:

```
$ @SYS$STARTUP:KRB$CONFIGURE.COM
```

2. Add the following line to your SYLOGIN command procedure or to the LOGIN.COM of each user who will use Kerberos:

```
$ @SYS$MANAGER:KRB$SYMBOLS
```

3. Edit SYS\$MANAGER:SYSTARTUP_VMS.COM to remove the exclamation point from the KRB\$STARTUP.COM line so that it appears as shown in the following example. (Note that SYSTARTUP_VMS.COM has HP TCP/IP Services for OpenVMS starting before Kerberos. This is required.)

```
$ @SYS$STARTUP:KRB$STARTUP.COM
```

For additional setup and configuration information, see the *HP Open Source Security for OpenVMS, Volume 3: Kerberos* manual. This document contains links to the MIT Kerberos documentation and is available from the OpenVMS Version 8.4 kit.



NOTE: Do not attempt to explicitly remove Kerberos from your system. The PRODUCT REMOVE command is not supported for Kerberos although there appears to be an option to remove Kerberos. Kerberos is installed with the operating system and is tightly bound with it. Attempts to remove it might not work as expected and can create undesirable side effects. An attempt to remove it results in a message similar to the following:

```
%PCSI-E-HRDREF, product HP I64VMS Kerberos V3.1 is referenced by HP I64VMS
OPENVMS V8.4
```

The two products listed above are tightly bound by a software dependency. If you override the recommendation to terminate the operation, the referenced product will be removed, but the referencing product will have an unsatisfied software dependency and may no longer function correctly. Please review the referencing product's documentation on requirements.

Answer YES to the following question to terminate the PRODUCT command. However, if you are sure you want to remove the referenced product then answer NO to continue the operation.

```
Terminating is strongly recommended. Do you want to terminate? [YES]
```

7.9.4 Configuring SSL for OpenVMS (Optional)

The HP SSL for OpenVMS software is installed automatically with the operating system; however, use of SSL is not required. If you do not plan to use SSL or any products that depend on it, skip to the next section.

The SSL\$STARTUP.COM command procedure has been added to VMS\$LPBEGIN-050 to enable SSL to start automatically.

Add the following line to SYS\$MANAGER:SYSHUTDOWN.COM:

```
$ @SYS$STARTUP:SSL$SHUTDOWN.COM
```

If you are upgrading and have an earlier version of SSL installed, copy your SSL\$STARTUP.TEMPLATE file (located in SYS\$STARTUP) to SSL\$STARTUP.COM in the SYS\$STARTUP directory.

Several other post-installation and post-upgrade tasks are required, as described in the SSL release notes, available in SYS\$HELP:SSL nnn .RELEASE_NOTES, where nnn is the version of the SSL software, such as 013.

For more information about SSL, see *HP Open Source Security for OpenVMS, Volume 2: HP SSL for OpenVMS*.



NOTE: Do not attempt to explicitly remove SSL from your system. The PRODUCT REMOVE command is not supported for SSL although there appears to be an option to remove SSL. SSL is installed with the operating system and is tightly bound with it. Attempts to remove it might not work as expected and can create undesirable side effects. An attempt to remove it results in a message similar to the following:

```
%PCSI-E-HRDREF, product HP I64VMS SSL V1.4 is referenced by HP I64VMS OPENVMS V8.4
```

```
The two products listed above are tightly bound by a software dependency.
If you override the recommendation to terminate the operation, the
referenced product will be removed, but the referencing product will have
an unsatisfied software dependency and may no longer function correctly.
Please review the referencing product's documentation on requirements.
```

```
Answer YES to the following question to terminate the PRODUCT command.
However, if you are sure you want to remove the referenced product then
answer NO to continue the operation.
```

```
Terminating is strongly recommended. Do you want to terminate? [YES]
```

7.9.5 Configure WBEM Services for OpenVMS (Optional; Integrity servers only)

WBEM Services for OpenVMS is installed automatically with OpenVMS installation. As with other similar products, an OpenVMS upgrade does not automatically include WBEM Services for OpenVMS if it is not already installed on the target system disk. In this case, you must install the product separately using the PCSI PRODUCT INSTALL command. If you do not plan to use WBEM Services for OpenVMS or any products that depend on it, simply do not configure the software; if you have already configured the software, you can choose not to start it.

You must configure WBEM Services for OpenVMS to obtain the services provided by HP SIM (Version 5.2 or later) and products such as Instant Capacity and gWLM. To provide services over the network, both TCP/IP Services for OpenVMS and SSL (for security purposes) are required and must be configured and running. (For information about configuring TCP/IP Services for OpenVMS, see Section 7.8.5 (page 137).

To configure WBEM Services for OpenVMS on a system on which WBEM Services for OpenVMS has never been installed and configured, follow the steps described in “Section 7.9.5.1.” If you are configuring the product on a system on which it has been configured previously, see Section 7.9.5.2 (page 144).

For more information about HP WBEM products, see the following website:

<http://www.hp.com/go/wbem>



NOTE: HP recommends that you do not remove the WBEM Services for OpenVMS product even if you do not have a need for it. If you attempt to use the PRODUCT REMOVE command to remove this product, you might see a message similar to the following. This message is automatically displayed for any product that is required with OpenVMS. The consequences of removing WBEM Services for OpenVMS might not be as severe as implied by the message unless other software is using the product on your server.

```
%PCSI-E-HRDREF, product HP I64VMS WBEMCIM V2.91 is referenced by HP I64VMS OPENVMS V8.4
```

```
The two products listed above are tightly bound by a software dependency.
If you override the recommendation to terminate the operation, the
referenced product will be removed, but the referencing product will have
an unsatisfied software dependency and may no longer function correctly.
Please review the referencing product's documentation on requirements.
```

```
Answer YES to the following question to terminate the PRODUCT command.
However, if you are sure you want to remove the referenced product then
answer NO to continue the operation.
```

```
Terminating is strongly recommended. Do you want to terminate? [YES]
```

7.9.5.1 Configuring WBEM Services for OpenVMS (Where Not Configured Previously)

To configure WBEM Services for OpenVMS on a system for the first time, follow these steps:

1. Enter the following command

```
$ RUN SYS$SYSROOT:[WBEM_SERVICES]WBEM_SERVICES$CONFIG
```

This command invokes the utility that configures and initializes the environment for WBEM Services for OpenVMS.

2. After displaying the initial configuration utility banner, the utility informs you where it will store the configuration files and repository and asks if you want to change the location.

```
The configuration files and repository will be placed in the following location:
SYS$SPECIFIC:[WBEM_Services].
```

```
Do you want to change this location (Yes/No) [No]?:
```



NOTE: The repository, a compiled version of the Common Information Model (CIM) class schema, requires an ODS-5 formatted disk (the repository uses UNIX-style file names, which are not supported on ODS-2 formatted disks). If the default location is on an ODS-2 formatted disk, you must change the location to an ODS-5 disk.

When you accept the default location, the utility informs you that all configuration questions have been answered and asks whether you want to continue, as shown in the following example. If you choose to continue, the utility creates the CIMServer repository tree in the location indicated earlier. The CIMServer is the WBEM Services for OpenVMS process that runs on the system to support certain applications. It also creates the following command files:

```
SYS$STARTUP:WBEM_Services$Startup.com
```

```
SYS$STARTUP:WBEM_Services$Shutdown.com
```

```
SYS$SYSROOT:[WBEM_SERVICES]WBEM_Services$Define_Commands.com
```

The SYS\$STARTUP:WBEM_Services\$Startup.com file defines system logicals for the WBEM Services for OpenVMS environment.

All configuration questions have been answered.

Do you want to continue (Yes/No) [YES]?:

```
%WBEMCONFIG-I-CREREPBEGIN, Create Repository Begins...
%WBEMCONFIG-I-CREREPCOMPLETE, Create Repository Complete.
This utility creates:
  SYS$STARTUP:WBEM_Services$Startup.com
which should be added to SYS$STARTUP:SYSTARTUP_VMS.COM.
```

```
This utility creates:
  SYS$STARTUP:WBEM_Services$Shutdown.com
which should be added to SYS$STARTUP:SYSHUTDOWN.COM.
```

```
This utility creates:
  SYS$SYSROOT:[wbem_services]WBEM_Services$Define_Commands.com
which users who use this product can add to their login.com.
```

3. The utility asks whether to start the CIMServer:

Do you want to start the CIMServer now (Yes/No) [Yes]?:

CIMServer must be running so that your system can use such applications as Instant Capacity and gWLM. You can start CIMServer now, or you can perform other postinstallation or postupgrade tasks first and then start CIMServer. If you choose to start CIMServer now, the utility displays the progress and operating system information, as in the following example:

```
%RUN-S-PROC_ID, identification of created process is 21A00599
%WBEMCIM-I-STARTUPWAIT, Waiting for CIMServer to start... 120 seconds remaining.
%WBEMCIM-S-CSSTARTED, CIMServer successfully started.
OperatingSystem Information
  Host: boston.hp.com
  Name: OpenVMS
  Version: V8.4
  UserLicense: Unlimited user license
  Number of Users: 1 users
  Number of Processes: 29 processes
  OSCapability: 64 bit
  LastBootTime: Jul 31, 2009 10:52:55 (-0400)
  LocalDateTime: Aug 3, 2009 10:14:58 (-0400)
  SystemUpTime: 256923 seconds = 2 days, 23 hrs, 22 mins, 3 secs
%RUN-S-PROC_ID, identification of created process is 21A00599
```

4. To ensure that CIMServer starts automatically at each reboot, add the following line to SYS\$MANAGER:SYSTARTUP_VMS.COM after the line that starts TCP/IP:

```
$ @SYS$STARTUP:WBEM_Services$Startup.com
```

To have CIMServer shut down automatically with the operating system, add the following line to the SYS\$MANAGER:SYSTARTUP:SYSHUTDOWN.COM file:

```
$ @SYS$STARTUP:WBEM_Services$Shutdown.com
```

All users who use this product should also add the following line to their LOGIN.COM file:

```
$ @SYS$STARTUP:WBEM_Services$Define_Commands.com
```

5. In an OpenVMS Cluster, each member that runs WBEM Services for OpenVMS needs its own repository. Therefore, you must perform the WBEM Services for OpenVMS configuration procedure on each of those cluster members.

7.9.5.2 Configuring WBEM Services for OpenVMS (Where Configured Previously)

To configure WBEM Services for OpenVMS on a system where it has been configured previously, follow these steps:

1. Enter the following command

```
$ RUN SYS$SYSROOT:[WBEM_SERVICES]WBEM_SERVICES$CONFIG
```

This command starts the utility that configures and initializes the environment for WBEM Services for OpenVMS.

If the WBEM Services for OpenVMS product (Version 2.0) available with OpenVMS Integrity servers Version 8.3 is already configured on your system, the following error message and the recommended remedial actions appear:

```
%WBEMCONFIG-E-SYSCOMMONLOGICAL, WBEM_VAR can no longer be defined to point to a location in SYS$COMMON. The repository files in WBEM_VAR should not be shared with other cluster members.
```

Follow these manual steps to move the repository out of the SYS\$COMMON area and complete the post installation configuration tasks:

- o Delete the sys\$common:[WBEM_Services.var...] directory tree.
- o Deassign the WBEM_VAR system logical.
- o Run this procedure again.

Perform the recommended steps, as in the following example:

```
$ DELETE SYS$COMMON:[WBEM_SERVICES.VAR...] *.*;*
$ DELETE SYS$COMMON:[WBEM_SERVICES]VAR.DIR;*
$ DEASSIGN/SYS WBEM_VAR
$ RUN SYS$SYSROOT:[WBEM_SERVICES]WBEM_SERVICES$CONFIG
```

After you start the configuration procedure, go to Section 7.9.5.1 (page 143) and follow the steps described there, starting with step 2.

2. After displaying the initial configuration utility banner, the utility informs you where it will store the configuration files and repository and asks if you want to change the location.

The configuration files and repository will be placed in the following location:
SYS\$SPECIFIC:[WBEM_Services].

Do you want to change this location (Yes/No) [No]?:

The repository is a compiled version of the CIM class schema. This example assumes you accept the current location.

3. As shown in the following example, the utility informs you that all configuration questions have been answered and asks whether you want to continue.

If the utility determines that the repository schema has not changed, the utility informs you and continues. The utility does not need to upgrade the repository.

If the utility determines that the current repository needs upgrading, or if the utility does not find a repository (perhaps WBEM Services for OpenVMS had been installed but not configured), the utility displays a message informing you that the repository will be upgraded or created and that this will take 10 to 15 minutes depending on your processor and disk I/O speed. In the following example, the utility needs to create the repository tree.

The utility also creates the SYS\$STARTUP:WBEM_Services\$Startup.com, SYS\$STARTUP:WBEM_Services\$Shutdown.com, and SYS\$SYSROOT:[WBEM_SERVICES]WBEM_Services\$Define_Commands.com command files. The SYS\$STARTUP:WBEM_Services\$Startup.com file defines system logicals for the WBEM Services for OpenVMS environment.

All configuration questions have been answered.

Do you want to continue (Yes/No) [Yes]?:

```
%WBEMCONFIG-I-CREREPBEGIN, Create Repository Begins...
%WBEMCONFIG-I-CREREPCOMPLETE, Create Repository Complete.
This utility creates:
    SYS$STARTUP:WBEM_Services$Startup.com
which should be added to SYS$STARTUP:SYSTARTUP_VMS.COM.
```

This utility creates:
SYS\$STARTUP:WBEM_Services\$Shutdown.com
which should be added to SYS\$STARTUP:SYSHUTDOWN.COM.

This utility creates:
SYS\$SYSROOT:[wbem_services]WBEM_Services\$Define_Commands.com
which users who use this product can add to their login.com.

4. The utility now asks you whether to start the CIMServer:

Do you want to start the CIMServer now (Y/N) {Y}?:

CIMServer must be running so that your system can use such applications as Instant Capacity and gWLM. You can start CIMServer now, or you can perform other postinstallation or postupgrade tasks first and then start CIMServer. If you choose to start CIMServer now, the utility displays the progress and operating system information, as in the following example:

```
%RUN-S-PROC_ID, identification of created process is 21A00599
%WBEMCIM-I-STARTUPWAIT, Waiting for CIMServer to start... 120 seconds remaining.
%WBEMCIM-S-CSSTARTED, CIMServer successfully started.
OperatingSystem Information
Host: boston.hp.com
Name: OpenVMS
Version: V8.4
UserLicense: Unlimited user license
Number of Users: 1 users
Number of Processes: 29 processes
OSCapability: 64 bit
LastBootTime: Jul 31, 2009 10:52:55 (-0400)
LocalDateTime: Aug 3, 2009 10:14:58 (-0400)
SystemUptime: 256923 seconds = 2 days, 23 hrs, 22 mins, 3 secs
%RUN-S-PROC_ID, identification of created process is 21A00599
```

5. To ensure that CIMServer starts automatically at each reboot, add the following line to the SYS\$MANAGER:SYSTARTUP_VMS.COM file:

```
$ @SYS$STARTUP:WBEM_Services$Startup.com
```

To have CIMServer shut down automatically with the operating system, add the following line to the SYS\$MANAGER:SYSSTARTUP:SYSHUTDOWN.COM file:

```
$ @SYS$STARTUP:WBEM_Services$Shutdown.com
```

All users who use this product should also add the following line to their LOGIN.COM file:

```
$ @SYS$STARTUP:WBEM_Services$Define_Commands.com
```

6. In an OpenVMS Cluster, each member that will run WBEM Services for OpenVMS needs its own repository. Therefore, you must perform the WBEM Services for OpenVMS configuration procedure on each of those cluster members.

7.9.6 Configure WBEM Providers for OpenVMS (Optional; Integrity servers only)

WBEM Providers for OpenVMS is installed automatically with OpenVMS installation. As with other similar products, an OpenVMS upgrade does not include WBEM Providers for OpenVMS if it is not currently installed on the target system disk. In this case, you must install the product separately using the PCSI PRODUCT INSTALL command.

You must configure WBEM Providers for OpenVMS to obtain the services provided by HP SIM . WBEM Providers for OpenVMS requires WBEM Services for OpenVMS.



NOTE: If you are using WBEM Providers for OpenVMS, and have performed an OpenVMS upgrade, you must re-configure WBEM Providers by following the steps below.

To configure WBEM Providers for OpenVMS, follow these steps:

1. If not done so already, define the WBEM Services logicals by entering the following command:

```
$ @SYS$COMMON:[WBEM_SERVICES]WBEM_Services$Define_Commands.com
```

2. Ensure that the CIM Server is running and verify the list of providers installed by entering the following command:

```
$ CIMPROVIDER -L -S
```

This displays output similar to the following:

MODULE	STATUS
OperatingSystemModule	OK
ComputerSystemModule	OK
ProcessModule	OK
IPProviderModule	OK

3. To configure the Wbem Providers for OpenVMS software, enter the following command:

```
$ @SYS$COMMON:[WBEMPROVIDERS]WBEMPROVIDERS$CONFIGURE.COM
```

You are prompted to enter the primary owner name and contact information.

```
%WBEMPROVIDERS-I-STARTING, Info:Starting WBEMPROVIDERS Configuration.
Enter Primary Owner name of the system: system
Enter Primary owner contact information: 25166235
%WBEMPROVIDERS-I-CONTINUECONFIG, Info:configuration of EventIndicationConsumerModule...
%WBEMPROVIDERS-I-CONTINUECONFIG, Info:configuration of EMSWrapperProviderModule...
%WBEMPROVIDERS-I-CONTINUECONFIG, Info:configuration of HPVMSLANIndicationProviderModule...
%WBEMPROVIDERS-I-CONTINUECONFIG, Info:configuration of StateChangeIndicationProviderModule...
%WBEMPROVIDERS-I-CONTINUECONFIG, Info:configuration of ChassisProviderModule...
%WBEMPROVIDERS-I-CONTINUECONFIG, Info:configuration of cpuprovidermodule...
%WBEMPROVIDERS-I-CONTINUECONFIG, Info:configuration of MemoryModule...
%WBEMPROVIDERS-I-CONTINUECONFIG, Info:configuration of FirmwareRevisionProviderModule...
%WBEMPROVIDERS-I-CONTINUECONFIG, Info:configuration of MPPProviderModule...
%WBEMPROVIDERS-I-CONTINUECONFIG, Info:configuration of EnclosureProviderModule...
%WBEMPROVIDERS-I-CONTINUECONFIG, Info:configuration of HPHealthStateProviderModule...
%WBEMPROVIDERS-I-CONTINUECONFIG, Info:configuration of HPVMSLANProviderModule...
%WBEMPROVIDERS-I-CONTINUECONFIG, Info:configuration of HPVMSLANCSProviderModule...
%WBEMPROVIDERS-I-CONTINUECONFIG, Info:configuration of CSChassisProviderModule...
%WBEMPROVIDERS-I-CONTINUECONFIG, Info:configuration of HPVMPProviderModule...
%WBEMPROVIDERS-I-CONTINUECONFIG, Info:configuration of HP_UtilizationProviderModule...
%RUN-S-PROC_ID, identification of created process is 00006939
%WBEMPROVIDERS-I-WAIT, Info:Waiting for 1 Minute for the Inventory to Initialize
%RUN-S-PROC_ID, identification of created process is 0000693F
%RUN-S-PROC_ID, identification of created process is 00006940
%WBEMPROVIDERS-I-PROVCONFIG, Info:Completed configuration of WBEMPROVIDERS.
```

The configuration process takes a few minutes to complete and displays output similar to the following:

```
Starting WBEMPROVIDERS Configuration. This would take around
5 minutes
Starting WBEMPROVIDERS. This would take around 2 minutes
Inventory is not ready! Waiting for 2 Minutes
%RUN-S-PROC_ID, identification of created process is
23800EC2
WBEMPROVIDERS configuration is completed.
```

This command procedure registers the Wbem Providers software with the CIM Server and copies the node specific files to SYS\$SPECIFIC:[WBEMPROVIDERS].

4. Verify the list of providers installed and their status by entering the following command:

```
$ CIMPROVIDER -L -S
```

This displays output similar to the following:

MODULE	STATUS
OperatingSystemModule	OK
ComputerSystemModule	OK
ProcessModule	OK
IPProviderModule	OK
EventIndicationConsumerModule	OK
EMSWrapperProviderModule	OK
HPVMSLANIndicationProviderModule	OK
StateChangeIndicationProviderModule	OK
ChassisProviderModule	OK
cpuprovidermodule	OK
MemoryModule	OK
FirmwareRevisionProviderModule	OK
MPPProviderModule	OK
EnclosureProviderModule	OK
HPHealthStateProviderModule	OK
HPVMSLANProviderModule	OK
HPVMSLANCSPProviderModule	OK
CSChassisProviderModule	OK
HPVMProviderModule	OK
HP_UtilizationProviderModule	OK

To configure WBEM Providers for OpenVMS, follow the directions provided in the *HP WBEM Providers Installation and Administrator's Guide*, available in the `SY$COMMON:[WBEMPROVIDERS.DOCUMENTATION]` directory on your OpenVMS system disk. For the latest information, see the following website and select the appropriate link:

http://h71000.www7.hp.com/openvms/system_management.html



NOTE: HP recommends that you do not remove the WBEM Providers for OpenVMS product even if you do not have a need for it. If you attempt to use the `PRODUCT REMOVE` command to remove this product, you might see a message similar to the following. This message is automatically displayed for any product that is required with OpenVMS; the consequences of removing WBEM Providers for OpenVMS might not be as severe as implied by the message unless other software (such as HP SIM) is using the product on your Integrity servers.

```
%PCSI-E-HRDREF, product HP I64VMS WBEMPROVIDERS V2.0 is referenced by HP I64VMS OPENVMS V8.4
```

```
The two products listed above are tightly bound by a software dependency.
If you override the recommendation to terminate the operation, the
referenced product will be removed, but the referencing product will have
an unsatisfied software dependency and may no longer function correctly.
Please review the referencing product's documentation on requirements.
```

```
Answer YES to the following question to terminate the PRODUCT command.
However, if you are sure you want to remove the referenced product then
answer NO to continue the operation.
```

```
Terminating is strongly recommended. Do you want to terminate? [YES]
```

7.9.7 Configure the Instant Capacity Software (Optional; Integrity servers only)

Instant Capacity (iCAP) software is supported on cell-based Integrity servers. For support of this software, as well as Temporary Instant Capacity (TiCAP), you must configure WBEM Services for OpenVMS.

If you choose to use Instant Capacity, Temporary Instant Capacity, or Global Instant Capacity, configure the software by entering the following command:

```
$ @SYS$MANAGER:ICAP$CONFIG.COM
```

For more information about configuring and using Instant Capacity, see the *HP Instant Capacity User's Guide* on the following website:

<http://docs.hp.com/en/netsys.html#Utility%20Pricing%20Solutions>

7.9.8 Configure HP SIM (Optional; Integrity servers only)

To enable HP SIM support of OpenVMS on your system, follow the directions provided in the *HP WBEM Providers Installation and Administrator's Guide*, available in the `SYS$COMMON:[WBEMPROVIDERS.DOCUMENTATION]` directory on your OpenVMS system disk. For the latest information, see the documentation provided at the following website:

<http://h18002.www1.hp.com/products/servers/management/hpsim/download.html>

7.9.9 Initializing and Running the Performance Data Collector Base Software (Optional)

The Performance Data Collector for HP OpenVMS (TDC) collects and manages configuration and performance data for analysis by other applications. TDC_RT Version 2.3-20 is a run-time only (base) variant of the TDC software that is installed automatically with the OpenVMS operating system for use on specific operating system platforms.

Use of the TDC_RT software is not required. If you do not plan to use TDC_RT or any products that depend on it, you can skip to the next section.

TDC_RT does not run automatically when the system starts, but any suitably privileged user can start the software manually. This section includes information about system parameters, privileges and quotas, startup, and installation in OpenVMS Clusters.



NOTE: Do not attempt to explicitly remove TDC_RT from your system. The PRODUCT REMOVE command is not supported for TDC_RT although there appears to be an option to remove it. TDC_RT is installed with the operating system and is tightly bound with it. HP or third-party applications might require TDC_RT. Attempts to remove it might not work as expected and can create undesirable side effects. An attempt to remove it results in a message similar to the following:

```
%PCSI-E-HRDREF, product HP TDC_RT V2.3 is referenced by HP I64VMS OPENVMS
V8.4
```

The two products listed above are tightly bound by a software dependency. If you override the recommendation to terminate the operation, the referenced product will be removed, but the referencing product will have an unsatisfied software dependency and may no longer function correctly. Please review the referencing product's documentation on requirements.

Answer YES to the following question to terminate the PRODUCT command. However, if you are sure you want to remove the referenced product then answer NO to continue the operation.

```
Terminating is strongly recommended. Do you want to terminate? [YES]
```

7.9.9.1 User Privileges and Quotas

Users of TDC_RT require various privileges, depending on the types of data to be collected. Online help is available when running the collector application and specifies the privileges required to collect each type of data. Enabling the following set of privileges enables collection of all data items: CMKRNL, LOG_IO, NETMBX, PHY_IO, SYSLCK, SYSPRV, WORLD.

Users of the product also require working set quotas (WSQUO) greater than the following:

```
6000 pagelets on Alpha systems
7000 pagelets on Integrity server systems
```

7.9.9.2 Startup File

TDC_RT provides a startup file that should be launched during system startup. The startup file defines several logical names required for use of the product, but the startup file does not actually start the data collector.

Add the following line to SYS\$MANAGER:SYSTARTUP_VMS.COM:

```
$ @SYS$STARTUP:TDC$STARTUP
```

To directly run TDC\$STARTUP.COM, SYSNAM privilege is required.

7.9.9.3 Compatibility with Prior Releases

Note the following about prior releases of TDC software.

- TDC Version 1.n

For users of some third-party system-management applications, TDC Version 1.n was distributed by web download. Applications developed using TDC Version 1.n will not work with TDC Version 2.2 software until they are rebuilt using the TDC Version 2.2 Software Developer's Kit (SDK). You can obtain this SDK kit from the following website:

<http://www.hp.com/products/openvms/tdc/>

Data files created using TDC Version 1.n cannot be read by TDC_RT Version 2.2. Data files created using TDC_RT Version 2.2 cannot be read using TDC Version 1.n.

When TDC_RT Version 2.1 or any newer version of TDC is installed, files associated with TDC Version 1.*n* are not removed. In any case, TDC_RT Version 2.1 (or later) and TDC Version 1.*n* can safely coexist on a system. You can remove the older TDC files by uninstalling TDC (use the DCL command `PRODUCT REMOVE`).

- TDC Version 2.2 on an earlier version of OpenVMS

If you upgrade to OpenVMS Version 8.4 from an earlier version of OpenVMS on which TDC Version 2.2 was installed, files shared by TDC_RT Version 2.2 and TDC Version 2.2 are updated; these files are the documentation and support files listed in `SYS$COMMON:[TDC]README.TXT` as common to all kit variants. Unless the TDC and TDC_RT kits share the same baselevel number (for example, 102), image files installed with TDC Version 2.2 are retained in their installed locations. Most likely, the downloaded TDC Version 2.2 software will be more recent (higher baselevel number) than the TDC_RT Version 2.2 software installed with OpenVMS Version 8.4. The TDC Version 2.2 SDK (if installed) and any additional documentation files installed with TDC Version 2.2 are retained.

Running `SYS$STARTUP:TDC$STARTUP.COM` causes the most recent TDC/TDC_RT Version 2.2 images to be used at runtime, regardless of whether they were installed with TDC Version 2.2 or with TDC_RT Version 2.2.

You can remove TDC Version 2.2 without affecting the integrity of the TDC_RT Version 2.2 installation if their baselevel numbers differ.

As of OpenVMS Version 8.2, TDC and TDC_RT use the same naming scheme for image files. A build number is tagged to the image file names. For example, if the version of TDC_RT that ships with your operating system is Version 2.2-60 (where 60 is the build number), then the files that are installed will have names such as `TDC$APISHR$I_V840-0060.EXE`, where `I` denotes Integrity servers (or `TDC$APISHR$A_V840-0060.EXE`, where `A` denotes Alpha), `V840` denotes the version of OpenVMS (8.4), and `0060` is the build number. The `SYS$STARTUP:TDC$STARTUP.COM` startup file, which is also identical for both TDC and TDC_RT, uses this build number to determine which image files to use. When a subsequent installation is performed with software that has higher build numbers, the `TDC$STARTUP.COM` startup file uses the image files with the highest build number appropriate for the current platform.

7.9.9.4 Running TDC_RT

To run the collector application, users can enter the TDC command at the DCL prompt. But first, because the TDC command is not included in the system command table `SYS$LIBRARY:DCLTABLES.EXE`, each user must add the command to their table by entering the following command at the DCL prompt:

```
$ SET COMMAND SYS$COMMON: [TDC] TDC$DCL
```

Each user can add this SET command to their `LOGIN.COM` file. However, because elevated privileges are required for most data collection operations, it might not be appropriate to add this command to `SYS$MANAGER:SYLOGIN.COM`.

To start the collector application, enter the TDC command:

```
$ TDC
```

For more information about running the application, see the file `SYS$COMMON:[TDC]TDC_README.TXT`. Release notes are located in the file `SYS$COMMON:[TDC]TDC_RELEASE_NOTES.TXT`. See both of these files before running the collector application.

7.9.9.5 Installation in OpenVMS Clusters

TDC_RT is installed in `SYS$COMMON:[TDC]` by default. Included are only those files required to run the data collector with the particular operating system version it was distributed with. Once TDC_RT is installed and `SYS$STARTUP:TDC$STARTUP.COM` has been run on each cluster

member, then all cluster members in a single-version, single-architecture OpenVMS Cluster should be able to run the software.

For mixed-version and mixed-architecture clusters, you should obtain and install a complete Performance Data Collector kit (TDC Version 2.2) from the following website:

<http://www.hp.com/products/openvms/tdc>

The complete kit provides an SDK and run-time environments for all supported OpenVMS configurations. It supports installation on a clusterwide basis in mixed-version and mixed-architecture OpenVMS Clusters.

7.9.10 Preparing to Use OpenVMS Management Station (Optional)

If you installed the OpenVMS Management Station software on your system (either by accepting all default values or by selecting the component manually during the installation or upgrade procedure), you must perform several tasks on your OpenVMS system and your PC before you can use OpenVMS Management Station. These tasks include the following:

- Editing system files
- Starting OpenVMS Management Station on other nodes
- Verifying that you have the proper memory, disk space, media, and the required software to install and run OpenVMS Management Station on your PC
- Installing the client software on your PC
- Defining DECnet nodes (after a new installation only)

For complete information about preparing your OpenVMS system and your PC to run the OpenVMS Management Station server and client software, see [Appendix H \(page 315\)](#).

7.9.11 Installing OpenVMS Debugger Clients on a PC (Optional)

The latest version of the OpenVMS Debugger runs on OpenVMS Alpha and Integrity server systems. The debug server runs on OpenVMS, while a debug client, which is the user interface to the server, runs on OpenVMS and on Microsoft Windows 95, Windows 98, Windows NT, Windows 2000, Windows XP, and Windows Vista. There is no special installation procedure for the components that run on OpenVMS. The installation guide and kit for the OpenVMS debugger client is located on the Layered Products CD that comes with the OpenVMS binary CD set. The directory on the CD is `DEBUG_CLIENTS011`. The `KIT.DIR` subdirectory contains the following files:

- 40COMUPD.EXE
- DEBUGX86011.EXE

For installation instructions, see the `INSTALLATION_INFO.PS` or `INSTALLATION_INFO.TXT` file in the `DOCUMENTATION` subdirectory.

7.10 Creating a System-Specific Login Welcome Message (Optional)

You can use `SYS$WELCOME` to display a system-specific welcome message at login. The message could inform users of scheduled down time, recent updates to the system, whom to contact about system problems, and so forth. A template file is provided by the operating system. To create your own `SYS$WELCOME` file, do the following:

1. Copy the template file using the following command:

```
$ COPY SYS$MANAGER:WELCOME.TXT SYS$SPECIFIC:[SYSMGR]WELCOME.TXT
```

For a clusterwide welcome message, you can copy the file to `SYS$COMMON:[SYSMGR]`.
2. Replace the text in `SYS$SPECIFIC:[SYSMGR]WELCOME.TXT` with text specific to your system.
3. Edit `SYS$MANAGER:SYSTARTUP_VMS.COM` to remove the exclamation point (!) from the line that defines `SYS$WELCOME`.

If you do not want to use a node-specific welcome file, you can optionally define the logical in SYS\$MANAGER:SYSTARTUP_VMS.COM to display a message, such as in the following example:

```
$ DEFINE SYS$WELCOME "Welcome to node HOMER"
```

For more information about creating login welcome messages, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

7.11 Examining Your Command Procedures (Upgrades Only)

The upgrade procedure retains the site-specific versions of the following files located in the [VMS\$COMMON] directory:

- [SYSMGR]LAT\$SYSTARTUP.COM
- [SYSMGR]LOGIN.COM
- [SYSMGR]SYCONFIG.COM
- [SYSMGR]SYLOGICALS.COM
- [SYSMGR]SYLOGIN.COM
- [SYSMGR]SYPAGSWPFILES.COM
- [SYSMGR]SYSECURITY.COM
- [SYSMGR]SYSHUTDOWN.COM
- [SYSMGR]SYSTARTUP_VMS.COM
- [SYSMGR]TFF\$SYSTARTUP.COM
- [SYSMGR]WELCOME.TXT
- [SYS\$STARTUP]ESS\$LAST_STARTUP.DAT

The upgrade procedure might provide new templates for some of these files with the .TEMPLATE file extension. The new templates might include features that are not in your site-specific files. Check the templates against your site-specific files and edit your files as necessary.



NOTE: As of Version 8.3 of OpenVMS, the DCL command DECRAM has been removed because it conflicts with the new DECRYPT command (DECRYPT overwrites the default definition of DECR, which you might have been using to run DECram). You should update any command procedures that use the DECRAM command so that they use the foreign command style of DCL to run DECRAM:

```
$ DECRAM == "$MDMANAGER"
```

This change affects only the use of the DCL command; all other aspects of the DECram product remain the same.

7.12 Adding and Removing Operating System Files (Optional)

If you decide after the installation or upgrade to change which OpenVMS operating system files you want installed on your system, you can use the menu system contained on the OpenVMS operating system media to add or remove files.



NOTE: You can obtain information about individual system files by entering the HELP SYS_FILES command at the dollar sign prompt (\$).



IMPORTANT: Unless you have a specific need to exclude operating system files from your system disk, HP strongly recommends that you accept the defaults and install all files that are part of OpenVMS. In general, limited disk space is not a good reason to exclude files; problems encountered when needed files are missing can cost much more than the cost of a larger disk.

To add or remove operating system files:

1. Mount and boot the OpenVMS operating system media.

2. Choose option 1 on the menu.
3. Choose the PRESERVE option.
4. Enter the name of the device that contains the system disk and answer the questions.
5. After you answer the question "Do you want detailed descriptions?," information regarding reconfiguring or reinstalling is displayed. Read the instructions, then choose the desired entry on the menu of options.

The following is a sample display:

Please choose one of the following:

- 1) Upgrade, install or reconfigure OpenVMS I64 Version 8.4
- 2) Display layered products that this procedure can install
- 3) Install or upgrade layered products
- 4) Show installed products
- 5) Reconfigure installed products
- 6) Remove installed products
- 7) Find, Install or Undo patches; Show or Delete recovery data
- 8) Execute DCL commands and procedures
- 9) Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?) 1

.
.
.

Do you want to INITIALIZE or to PRESERVE? [PRESERVE] **PRESERVE**

.
.
.

Version 8.4 of the OpenVMS operating system is already installed on the target disk. You may choose one of the following actions:

- o Reconfigure the OpenVMS platform.

This action will allow you to change your selections of which of the windowing and network products you included with your OpenVMS operating system installation.

- o Reconfigure the OpenVMS operating system.

This action will allow you to change your choices about which options you included for the OpenVMS operating system.

- o Reinstall the OpenVMS operating system.

This action will cause ALL operating system files to be replaced. You can also change your choices about which options you included for the OpenVMS operating system.

Reinstall will take longer than Reconfigure. Reinstall may be appropriate if you suspect that files in the operating system, or in the windowing and network products have become corrupted.

If you want to reinstall any of the windowing and network products, choose "Install or upgrade layered products" from the main menu.

If you want to change your choices about which options you included for any of the windowing and network products, choose "Reconfigure installed products" (option 5) from the main menu.

Please choose one of the following:

- 1) Reconfigure the OpenVMS platform.
- 2) Reconfigure the OpenVMS operating system.
- 3) Reinstall the OpenVMS operating system.
- 4) Return to the Main Menu (abort the upgrade/installation).

Enter choice or ? for help: (1/2/3/4/?) **2**

The following product has been selected:

HP I64VMS VMS V8.4 Operating System

Configuration phase starting ...

You will be asked to choose options, if any, for each selected product and for any products that may be installed to satisfy software dependency requirements.

HP I64VMS OPENVMS V8.4: OpenVMS and related products Platform

COPYRIGHT 1976, ...
Hewlett-Packard Development Company, L.P.

Do you want the defaults for all options? [YES] **NO**

Answer NO to this question as shown, and select the options you want, as described in step 19 of the installation procedure in Section 3.4.3 (page 56). (Example 3-1 (page 72) shows a list of the component options.) After you respond to the prompts, the display continues and the installation procedure completes. The following is a continuation of the sample display:

Do you want to review the options? [NO]

Execution phase starting ...

The following product will be reconfigured:

HP I64VMS VMS V8.4

Portion done: 0%...10%...20%...30%...40%...50%...60%...80%...90%...100%

The following product has been reconfigured:

HP I64VMS VMS V8.4

.
.
.

For detailed instructions on how to remove the OpenVMS operating system from your disk, see Appendix I (page 325).

7.13 Expanding the System Libraries (Optional; OpenVMS Alpha Only) Compressing the System Libraries (Optional, OpenVMS Integrity servers: Not Recommended)

Libraries included with the OpenVMS Alpha operating system kit are installed in data-reduced (compressed) format. Unless disk space is limited, HP recommends expanding (decompressing) these libraries to give the system faster access to them.

The libraries included with the OpenVMS Integrity servers operating system kit are installed in expanded (uncompressed) format. HP recommends keeping the libraries in expanded format. Compressing them can hinder system performance. You can use the command procedure SYS\$UPDATE:LIBDECOMP.COM to decompress, compress, or list the sizes of the system libraries.

To expand libraries that are in data-reduced format or compress libraries that are in expanded format, use the OpenVMS Library Decompression utility (LIBDECOMP.COM). The utility runs on both OpenVMS Alpha and Integrity server systems. To run the utility, enter the following command:

\$ @SYS\$UPDATE:LIBDECOMP

For more information about the utility, you can request help by entering the following command:

\$ @SYS\$UPDATE:LIBDECOMP HELP

You can list the sizes and format (reduced or expanded) of the libraries by using the following command:

\$ @SYS\$UPDATE:LIBDECOMP LIST

For complete information about expanding and reducing system library files and using LIBDECOMP.COM, see the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

Table 7-2 (page 156) lists the libraries that ship on OpenVMS Version 8.4 and shows the approximate sizes of the libraries in both data-reduced (compressed) and expanded format. Note that library sizes differ for Alpha and Integrity server systems.



NOTE: File sizes are subject to change. In addition, layered products and user applications might add entries to the HELPLIB.HLB and STARLET.OLB libraries. The sizes listed in Table 7-1 do not reflect such entries. For the most accurate information, run the Library Decompression utility on your own system and review the output from the list function.

The LIBDECOMP.COM utility lists the following libraries as “Library not present”:

- [SYSLIB]SYBLDMLB.MLB
- [SYSLIB]DECCRTL.OLB
- [SYSLIB]SYBLDLIB.OLB

These libraries are not used with OpenVMS Alpha or OpenVMS Integrity servers; they are used with OpenVMS VAX only. These libraries are omitted from Table 7-2.

Table 7-2 Reduced and Expanded Sizes of Libraries

Library Name/Description	OpenVMS Alpha		OpenVMS Integrity servers	
	Reduced Size (as shipped)	Expanded Size	Reduced Size	Expanded Size (as shipped)
[SYSHLP] directory; Help library files (.HLB)				
ACLEDT.HLB Access Control List Editor help	70	102	70	103
BKM\$HELP.HLB Backup Manager help	156	248	156	251
DBG\$HELP.HLB OpenVMS Debugger help	1237	2144	1237	2164
DBG\$UIHELP.HLB OpenVMS Debugger help	271	441	271	465
EDTHELP.HLB EDT Editor help	154	229	154	233
EVE\$HELP.HLB EVE Editor help	676	1197	676	1177
EVE\$KEYHELP.HLB EVE Keypad help	99	145	99	148
EXCHNGHLP.HLB Exchange Utility help	83	118	83	118

Table 7-2 Reduced and Expanded Sizes of Libraries *(continued)*

Library Name/Description	OpenVMS Alpha		OpenVMS Integrity servers	
	Reduced Size (as shipped)	Expanded Size	Reduced Size	Expanded Size (as shipped)
HELPLIB.HLB ¹ DCL help	10055	18701	10830	21426
LANCP\$HELP.HLB LAN Control Program help	116	169	113	163
LATCP\$HELP.HLB LAT Control Program help	157	243	157	243
MAILHELP.HLB Mail Utility help	211	316	211	316
NCPHELP.HLB Network Control Program help	262	412	262	412
SDA.HLB System Dump Analyzer help	384	581	384	587
SHWCLHELP.HLB Show Cluster Utility help	88	127	88	127
SYSGEN.HLB System Generation Utility help	369	582	366	578
SYSMANHELP.HLB System Management Utility help	539	871	559	907
TPUHELP.HLB Text Processing Utility help	575	1036	575	1015
UAFHELP.HLB Authorize Utility help	253	391	249	384
[SYSLIB] directory; Macro library files (.MLB)				
LANIDEF.MLB LAN internal driver macros	196	261	196	275
LIB.MLB Operating system macros	3039	5254	3226	5515
STARLET.MLB Operating system macros	2558	3827	2595	3576
[SYSLIB] directory; Object library files (.OLB)				
STARLET.OLB ¹ System object library and run-time library	30664	49858	69916	116397
VAXCTRL.OLB HP C RTL routine name entry points; VAX G_floating double-precision, floating-point entry points	1271	1689	Not included	
VAXCRTLD.OLB Limited support of VAX D_floating double-precision, floating-point entry points	1732	2802	Not included	

Table 7-2 Reduced and Expanded Sizes of Libraries (continued)

Library Name/Description	OpenVMS Alpha		OpenVMS Integrity servers	
	Reduced Size (as shipped)	Expanded Size	Reduced Size	Expanded Size (as shipped)
VAXCRTLDX.OLB VAX D_floating support; support for /L_DOUBLE_SIZE=128 compiler qualifier	1663	2648	Not included	
VAXCRTLT.OLB IEEE T_floating double-precision, floating-point entry points	1578	2491	Not included	
VAXCRTLT.X.OLB IEEE T_floating support; support for /L_DOUBLE_SIZE=128 compiler qualifier	1596	2493	Not included	
VAXCRTLX.OLB G_floating support; support for /L_DOUBLE_SIZE=128 compiler qualifier	1422	2003	Not included	
VMS\$VOLATILE_PRIVATE_INTERFACES.OLB OpenVMS bugcheck processing codes	601	873	1519	2121
[SYSLIB] directory; Text library files (.TLB)				
BASIC\$STARLET.TLB BASIC language variant of the STARLET library, containing version-independent declarations for system services	3896	8129	3865	8197
ERFLIB.TLB ANALYZE ERROR device descriptions	64	85	Not included	
LIB_ADA_SUBSET.TLB Ada programmers toolkit of operating system definitions	1915	3535	1914	3615
NTA.TLB Windows NT definition files	34	42	34	52
STARLETPAS.TLB Pascal language variant of the STARLET library, containing version-independent declarations for system services	3817	8959	3802	8967
STARLET_RECENT_ADA_SUBSET.TLB Ada programmers toolkit of operating system definitions	1144	2030	1144	2058
STARLETSD.TLB Language-independent STARLET definitions used during layered product installations	4328	7758	4297	7936
SYS\$LIB_C.TLB C language variant of the LIB library, containing internal and version-dependent declarations for system services	10544	22218	17356	35869
SYS\$STARLET_C.TLB C language variant of the STARLET library, containing version-independent declarations for system services	6324	13694	6559	14130
TOTALS:	94141	168857	132963	239525

1 Layered products and user applications might add entries to the HELPLIB.HLB and STARLET.OLB libraries. The sizes listed in this table do not reflect such additional entries.

7.14 Installing Patches (Optional but Recommended)

HP recommends installing any relevant OpenVMS and networking patches that are available. Most patches are optional, but some layered products might require one or more patches on the system before their software is installed. For more information about patches that might be required on your system, see the *HP OpenVMS Version 8.4 Release Notes*, and the documentation provided for the relevant layered products.

As of Version 8.3 of OpenVMS, patch files are validated using the Secure Delivery feature. Each patch file includes an associated digital signature file (also referred to as a manifest) that is used to validate the patch file. This validation involves authenticating the originator (HP, in this case) and verifying the contents of the file.



NOTE: HP strongly recommends backing up your system disk before installing patches.

To download and install OpenVMS patches, do the following:

1. Create a directory on a nonsystem disk called [PATCHES] and set default to that directory.
2. For OpenVMS Alpha systems, go to the following location (entering the letters in the case indicated) and download the appropriate patches to the [PATCHES] directory:

ftp://ftp.itrc.hp.com/openvms_patches/alpha/V8.4

For OpenVMS Integrity server systems, go to the following location (entering the letters in the case indicated) and download the appropriate patches to the [PATCHES] directory:

ftp://ftp.itrc.hp.com/openvms_patches/i64/V8.4

Alternatively, you can access patches at the following location:

<http://www.itrc.hp.com>

3. The patches are downloaded as compressed files. To decompress them, use the RUN command, as in the following example:

```
$ RUN VMS84I_MX2-V0100.ZIPEXE
```

This decompresses the patch into an installable file.

4. Install the decompressed patches as described in the patch release notes.

Alternatively, you can access the ITRC site from your OpenVMS system and download the patches as described in the following steps:

1. Create a directory on a nonsystem disk called [PATCHES] and set default to that directory.
2. Enter the following command at the system prompt:

```
$ FTP FTP.ITRC.HP.COM
```

3. Log in as an anonymous user (user name: anonymous). The password is your email address.
4. Once you are logged in, enter the bin command at the FTP> prompt to get into binary mode, as in the following example. Binary mode is necessary for downloading patches correctly. Enter commands in this and the following steps in the exact case shown (lowercase or uppercase).

```
FTP> bin
200 Type is set to I.
```

5. Enter the command PASSIVE ON, as in the following example:

```
FTP> passive on
Passive is on.
```

6. On OpenVMS Alpha systems, to access the directory containing the Version 8.4 operating system patches, enter the following command, using the exact case indicated for each letter:

```
FTP> cd openvms_patches/alpha/V8.4
250 CWD command successful.
```

On OpenVMS Integrity server systems, to access the directory containing the V8.4 operating system patches, enter the following command, using the exact case indicated for each letter:

```
FTP> cd openvms_patches/i64/V8.4
250 CWD command successful.
```

To access the directory containing patches for layered products such as TCP/IP Services or DECnet, enter the following command (for Alpha systems, specify alpha in place of Integrity servers)::

```
FTP> cd openvms_patches/layered_products/i64
250 CWD command successful.
```

7. Search for the patch you want by using the `ls` command, specifying a few unique letters of the patch name in uppercase (all patch names are in uppercase) surrounded by asterisks. For example, to look for a patch named VMS83I_MX2-V0100, enter the following command:

```
FTP> ls *MX2*
227 Entering Passive Mode (192,151,52,14,235,168)
150 Opening ASCII mode data connection for file list.
VMS83I_MX2-V0100.ZIPEXE
VMS83I_MX2-V0100.txt

226 Transfer complete.
47 bytes received in 00:00:00.00 seconds (45.90 Kbytes/s)
```

The `.ZIPEXE` file is the patch installation file; the `.TXT` file is the patch release notes (also included in the `.ZIPEXE` file). Alpha patches have a `.PCSI-DCX_AXPEXE` file extension.

8. If the patch is an UPDATE patch or a TCP/IP patch, which can be very large files, you might want to enter the hash command as shown in the following example so that in the next step you can verify that the download is happening as expected (hash displays # symbols on the screen as the file is being downloaded).

```
FTP> hash
Hash mark printing on (1024/hash mark).
```

9. When you find the patch file, use the `get` command to download the file, as in the following example. Remember that case is significant and all patch file names are in uppercase.

```
FTP> get VMS83I_MX2-V0100.ZIPEXE
227 Entering Passive Mode (192,6,165,75,248,228)
150 Opening BINARY mode data connection for VMS83I_MX2-V0100.ZIPEXE
(36218732 bytes).
#####
:
:
:
#####
#####
226 Transfer complete.
local: USER5:[PATCHES]VMS83I_MX2-V0100.ZIPEXE;1
remote: VMS83I_MX2-V0100.ZIPEXE
2238464 bytes received in 00:00:01.29 seconds (1.65 Mbytes/s)
```

10. Repeat steps 8 through 10 until you have downloaded all the patches you need.
11. When you are finished, press **Ctrl/Z** to exit FTP and return to the DCL prompt.
12. The patches are downloaded as compressed files. To decompress them, use the `RUN` command, as in the following example:

```
$ RUN VMS83I_MX2-V0100.ZIPEXE
```

This decompresses the patch into an installable file.

13. Install the decompressed patches as described in the patch release notes.

7.15 Installing and Configuring Layered Products (New Installations, Some Upgrades)

The OpenVMS operating system kit includes several layered products. These include the System Integrated Product (SIP) kits for the following products that are installed automatically:

- Availability Manager (base) for OpenVMS (required)
- CDSA for OpenVMS (required)
- Kerberos for OpenVMS (required)
- SSL for OpenVMS (required)
- Performance Data Collector base software, TDC_RT (required)
- HP Binary Checker for OpenVMS
- WBEM Services for OpenVMS (OpenVMS Integrity servers only; required)
- WBEM Providers for OpenVMS (OpenVMS Integrity servers only; required)

These layered products also include the SIP kits for the following products that you can install optionally as part of the OpenVMS operating system installation:

- DECwindows Motif for OpenVMS
- DECnet-Plus for OpenVMS
- DECnet Phase IV for OpenVMS
- TCP/IP Services for OpenVMS

These layered products are included in the operating system media and can be installed using either the steps shown in this section or the alternative procedure described in Section 7.15.1 (page 162). Other layered products—whether provided by HP on other CDs in the operating system distribution, in the Software Product Library CD set, or on a CD provided by a third-party company—should be installed using the steps shown in Section 7.15.1 (page 162).

In addition to the SIPs, the OpenVMS Integrity servers OE DVD includes kits for various products that are part of the OpenVMS OEs. HP does not support installing these OE product kits while booted from the OE DVD. To install these OE products, you must use the procedure described in Section 7.15.1 (page 162).

As of Version 8.3, most PCSI kits included on the OpenVMS distribution media are signed using Secure Delivery. Signed PCSI kits that are installed from the OpenVMS Integrity servers operating system distribution media are validated. (Kits installed from the OpenVMS Alpha operating system distribution CD are not validated; this restriction is due to space limitations of the distribution CD.) On both OpenVMS Alpha and Integrity server systems, signed PCSI kits that you install subsequently are validated (including signed kits on the distribution media).



NOTE: To use menu option 3, the target system must have the identical version of the OpenVMS operating system as the operating system media. If you need to install layered products on a target system that has a different version of the operating system, use the alternative procedure.

To use option 3 of the operating system menu, follow these steps:

1. Before you install any layered products, be sure you back up the system disk.
2. If you are not already booted from the operating system media, shut down the system and boot the operating system media. For instructions on how to shut down the OpenVMS Integrity servers system, see Section B.7 (page 225); for instructions on how to shut down the OpenVMS Alpha system, see Section B.7.2 (page 226).
3. To view a list of products that can be installed, choose option 2 on the menu. If the layered product that you want to install is not listed in the display, install the product by using the alternative procedure described in Section 7.15.1 (page 162), or see the documentation you received with the layered product. Note that HP does not support VMSINSTALL, PRODUCT INSTALL, or other PRODUCT commands from the DCL option on the operating system menu.

4. To install layered products, choose option 3 on the menu. For more instructions, see Section 1.4.3 (page 33).
5. After the installation completes, shut down the system by selecting option 9 on the menu. When you boot the target system, the layered products you installed will be present.

For additional information about installing layered products, see the *HP OpenVMS System Manager's Manual*.

7.15.1 Alternative Procedure

Use this alternative procedure to install the following products:

- Layered products on a target system that has a different operating system version than that of the operating system media (CD/DVD)
- Layered products that require VMSINSTAL (indicated in the directories by save-set file names with file types of .A, .B, and so on)
- OpenVMS Integrity servers OE products
- SIP kits (as an alternative to using menu option 3 of the operating system menu on the media)
- Products on the Layered Products, Freeware, System Tools, and e-Business Integration and Infrastructure CDs
- Third-party software products (such as database products, accounting software, and so forth)

For a list of layered products you can install, see the Software Product Descriptions included with your operating system kit. Note that some products require a license key (PAK) from HP.

Follow these steps:

1. Before you install all your layered products, be sure you back up the system disk. In addition, ensure that a license has been loaded for the software. Note also that most layered products require changes to SYSGEN parameters or AUTHORIZE values, and to system files such as SYLOGICALS.COM, SYLOGIN.COM, and SYSTARTUP_VMS.COM. For more information, see the following:
 - Installation guides for these layered products
 - *HP OpenVMS System Manager's Manual, Volume 1: Essentials*
 - Section 7.25 (page 166) in this manual
 - Section 7.18 (page 163) in this manual
2. After your target system disk runs AUTOGEN and boots (if necessary), mount the OpenVMS operating system media. For example, if the device with the operating system media is DKA400:, use the following command:

```
$ MOUNT/OVERRIDE=IDENTIFICATION DKA400
```

3. Locate the directories and files containing the available layered products. For example, if the device name is DKA400:, enter the following command:

```
$ DIRECTORY /NOHEAD/NOTRAIL DKA400:[*.KIT]
```

You can use the PRODUCT FIND command to locate kits by using the PCSI utility. For example:

```
$ PRODUCT FIND * /SOURCE=DKA400:[*.KIT]
```

4. To install layered products that require VMSINSTALL (indicated in the directories by save-set file names with file types of .A, .B, and so on), enter the @SYS\$UPDATE:VMSINSTALL command and then specify the device name and directory at the prompt. For example:

```
$ @SYS$UPDATE:VMSINSTALL
```

```
* Where will the distribution volumes be mounted: DKA400:[DIAA032.KIT]
```

To install layered products that require the PCSI utility (indicated in the directories by file names with file types of .PCSI or .PCSI\$COMPRESSED), use the PRODUCT INSTALL command to specify the device name and directory. Following is an example of the PRODUCT INSTALL command on an Integrity servers system:

```
$ PRODUCT INSTALL FORTRAN /SOURCE=DKB400:[I64_FORT075.KIT]
```

7.16 Reinstall DECEvent Software (Alpha Upgrades only; optional)

The optional DECEvent software is automatically removed during an OpenVMS upgrade. If you want to continue using the DECEvent product, you must manually install this software after the upgrade has completed.



NOTE: On OpenVMS Integrity server systems and recent versions of OpenVMS Alpha, DECEvent functionality and more is provided by Web-Based Enterprises Services (**WEBES**). More information about this tool is available at the following website:

<http://h18000.www1.hp.com/support/svctools/>

7.17 Creating Print Queues (New Installations, Some Upgrades)

If you have a large number of print queues to add and you need to get the system in use quickly, you can set up one print queue per area or work group and then add the other print queues later, after the user accounts are added (Section 7.19 (page 163)). For more information about adding print queues, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

7.18 Updating SYSTARTUP_VMS.COM to Start Layered Products and Print Queues

After installing and configuring any layered products and adding new print queues, you should update the SYSTARTUP_VMS.COM file to start these products and print queues. For more about updating the SYSTARTUP_VMS.COM file, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

7.19 Creating Accounts (New Installations, Some Upgrades)

During installation, DEFAULT and SYSTEM accounts are created automatically. You should create additional user accounts now. If you plan to have HP service representatives test your system or if you plan to run testing software such as UETP, you must create accounts for each representative and a SYSTEST (standalone system) or SYSTEST_CLIG (OpenVMS Cluster system) account to run UETP.

For complete information about creating and managing user accounts and about creating accounts for HP service representatives and UETP, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

7.20 Testing the System with UETP (Optional)

The User Environment Test Package (UETP) is a software package that tests whether the OpenVMS operating system is installed correctly. It tests the hardware, including disk drives, tape drives, CD drives, line printers (if any), network cards, and so forth. Running UETP is optional; HP

recommends that you run UETP after an installation or if new hardware was added as part of an upgrade.

Before using UETP, you must create a SYSTEST (standalone system) or SYSTEST_CLIG (OpenVMS Cluster system) account. You should also create an account for HP service representatives to use. You can use the CREATE_SPECIAL_ACCOUNTS.COM file to create these accounts, as explained in *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

For complete information about using UETP, see the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

7.21 Backing Up the Customized System Disk and Initiating Systematic Backups

After you customize the OpenVMS operating system to your satisfaction and perform the other steps recommended thus far in this chapter that are relevant to your system, protect your work by making a standalone backup copy of the system disk to tape. To do so, follow the instructions in Section 7.2 (page 129). If you are going to be saving to disk, specify a disk that will not be (or is not) part of a shadow set.

For complete information about backup operations, including a description of an alternative method that does not require booting from the operating system media, see Appendix F (page 305).

HP also recommends creating a systematic routine for backing up the application, data, and user disks. For more information, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

7.22 Reforming the Shadow Set as Final Postupgrade Backup

If your system disk participates in a volume shadowing environment, re-form the shadow set again to generate another shadow copy onto the other disks in the set. To do so, follow the instructions in Section 7.7 (page 133).

7.23 Rebooting Cluster Members (Upgrades Only)

If you are performing a rolling upgrade in an OpenVMS Cluster environment and have completed all the postupgrade tasks required thus far for your upgraded system disk, reboot each system that boots from that system disk.

For more information about booting your system, see Appendix A (page 169) for OpenVMS Alpha systems and Appendix B (page 189).

At this point, your system is ready for general use.

7.24 Running AUTOGEN to Tune the System

When you install or upgrade the OpenVMS operating system, the system executes the AUTOGEN.COM procedure to set the values of system parameters and the sizes of the page, swap, and dump files according to the system configuration.

After running your system for at least 24 hours with users or a typical application workload on the system, run the AUTOGEN.COM procedure again to tune the system properly. Run AUTOGEN as follows. (In an OpenVMS Cluster, you must follow these steps to run AUTOGEN on each cluster node.)

1. Run AUTOGEN in feedback mode, examine AGEN\$PARAMS.REPORT, and reboot the system. To run AUTOGEN in feedback mode, use the following command:

```
$ @SYS$UPDATE:AUTOGEN SAVPARAMS SETPARAMS FEEDBACK
```

To view AGEN\$PARAMS.REPORT on your screen, enter the following command:

```
$ TYPE SYS$SYSTEM:AGEN$PARAMS.REPORT
```

You can print this file or examine it using the EDIT/READ_ONLY command.

If the report includes a message similar to the following, you might need to modify the size of the page, swap, or dump file:

```
%AUTOGEN-W-DSKSPC, The disk on which DKA0:[SYS0.SYSEXE]PAGEFILE.SYS  
  resides would be over 95% full if it were modified to hold 20000 blocks.
```

For more information about AGEN\$PARAMS.REPORT, see the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

2. Run AUTOGEN again in feedback mode two work days later and examine AGEN\$PARAMS.REPORT, and then reboot the system. (For information about the importance of having a current AGEN\$FEEDBACK.DAT file, see Section 4.8 (page 93).)
3. HP recommends that you run AUTOGEN from the SAVPARAMS phase through the TESTFILES phase weekly thereafter until the system stabilizes (that is, until AUTOGEN finds nothing that needs to be adjusted). Make sure you run AUTOGEN when your system is running under a typical workload. Examine AGEN\$PARAMS.REPORT to determine the need for additional changes.



IMPORTANT: If you start AUTOGEN without specifying the execution-mode parameter (FEEDBACK, NOFEEDBACK, or CHECK_FEEDBACK), AUTOGEN uses the feedback information in its calculations. However, if the feedback information reflects system up time of less than 24 hours, or if the feedback information is more than 30 days old, AUTOGEN includes warnings in the AGEN\$PARAMS.REPORT file to alert you to potential problems with the feedback data. If you wrongly assume the feedback is valid, the parameter settings might vary significantly from your expectations.

If you specify FEEDBACK (or NOFEEDBACK), AUTOGEN uses (or does not use) the feedback regardless of the data's reliability. AUTOGEN proceeds through the SETPARAMS phase (if you specified SETPARAMS, SHUTDOWN, or REBOOT as the end phase) and sets system parameters to the values it computed.

If you specify CHECK_FEEDBACK, AUTOGEN checks the validity of the feedback data. If AUTOGEN determines the feedback is suspect, then AUTOGEN ignores the feedback when computing parameter values. It stops at the TESTFILES phase and issues a warning in the report that parameters have not been changed. You must read the report and decide whether the calculated values are acceptable. You can either use them (by running the AUTOGEN SETPARAMS phase) or rerun AUTOGEN with valid feedback data.

-
4. After the system has stabilized, HP recommends that you run AUTOGEN at least monthly to save feedback information for future use. Use the following command:

```
$ @SYS$UPDATE:AUTOGEN SAVPARAMS
```

If you do not maintain current feedback information for AUTOGEN, you will not have the needed information the next time you upgrade your system. As a result, you may have to reboot and rerun AUTOGEN several times to make your upgraded system operational.

For more information about running AUTOGEN, see the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

7.25 Modifying System Parameters

Based on your examination of `AGEN$PARAMS.REPORT`, you might need to modify parameter values in `MODPARAMS.DAT`. Read the notes in Section 7.25.1 (page 166). These notes apply to modifications being made after a new installation and after an upgrade. If you are modifying system parameters after an upgrade, also see Section 7.25.2 (page 166).

7.25.1 General Notes About Modifying System Parameters

When modifying system parameters, note the following:

- In general, let AUTOGEN calculate system parameters. You can hardcode values (such as `GBLPAGES=value`), but doing so overrides AUTOGEN and might not allow it to set an optimal value based on observed usage.
- Whenever possible, use `MIN_parameter` values (such as `MIN_GBLPAGES`) to set the minimum value that can be set for a parameter by AUTOGEN. AUTOGEN increases the value if necessary. It also adjusts related parameters unless they are hardcoded, in which case information is provided in the `AGEN$PARAMS.REPORT` file. Use `MAX_parameter` values to set a maximum value when it is necessary to limit a parameter to a known maximum value (this is rarely necessary).
- Enter numeric values as integers without commas (for example, 10000). Enter alphabetic characters in lower or uppercase.
- HP recommends that you include comments in the `MODPARAMS.DAT` file indicating who changed the value, when it was done, and why it was done. An exclamation point (!) serves as a comment starter and can appear anywhere on a line. The following example illustrates the modifications recommended in the preceding bulleted items:

```
! the following changes made by K.Newcomb on 9/20/03
!  
SWAPFILE=0                ! don't re-size the SWAPFILE on AUTOGEN runs  
MIN_gblsections=750      ! required for DECwindows MOTIF  
MIN_NPAGEDYN=2750000     ! set npagedyn to a min of 2.75 million
```

For more information about the `MODPARAMS.DAT` file and about using AUTOGEN in general, see the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

7.25.2 Modifying System Parameters After an Upgrade

Review the file `SYS$SYSTEM:MODPARAMS.DAT`. The upgrade procedure created a new version of this file. The old version is named `SYS$SYSTEM:MODPARAMS.DAT_OLD`. The new `MODPARAMS.DAT` file contains all the parameters in the old file, plus various parameters that the upgrade procedure added to ensure that all necessary system parameters are properly propagated from the earlier version of OpenVMS. The upgrade procedure also adds comment lines to explain the source of the parameters in each section of the new `MODPARAMS.DAT` file.

Note that the old `MODPARAMS.DAT` is included in the new `MODPARAMS.DAT` each time an upgrade is performed. Because of this, if `MODPARAMS.DAT` is not reviewed and cleaned up after each upgrade, it might eventually contain many levels of duplicated parameters. For this reason, you should review `MODPARAMS.DAT` after each upgrade. This enables you to eliminate any duplication. You can also take this opportunity to modify any parameters, if necessary.

Based on your examination of `AGEN$PARAMS.REPORT`, you might need to modify parameter values in `MODPARAMS.DAT`.

The following subsections are examples of instances where you need to modify parameters in `MODPARAMS.DAT`.

7.25.2.1 System File Sizes

AUTOGEN sets the following files at sizes appropriate for your system:

- [SYSEXE]SYSDUMP.DMP
- [SYSEXE]PAGEFILE.SYS
- [SYSEXE]SWAPFILE.SYS

If you have special workloads or configurations, you can specify different sizes for these files by performing the following steps:

1. Log in to the SYSTEM account.
2. Enter the following command:

```
$ @SYS$UPDATE:AUTOGEN SAVPARAMS TESTFILES
```
3. If the file sizes displayed need to be adjusted, add symbols to the MODPARAMS.DAT file (described in detail in the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*), and repeat step 2 until you are satisfied with the file sizes.
4. When you are satisfied with the file sizes, enter the following command to ensure that the modified system files are installed when the system is rebooted:

```
$ @SYS$UPDATE:AUTOGEN GENPARAMS SETPARAMS
```

7.25.2.2 OpenVMS Cluster Parameters

If you are upgrading an OpenVMS Cluster system, note the following:

- The upgrade procedure creates a new MODPARAMS.DAT for each system root on your system disk. Normally, there is one root for each computer that boots from the system disk. You must review and adjust each of these MODPARAMS.DAT files individually.
The MODPARAMS.DAT file for the system on which you are running is located in the SYS\$SYSROOT:[SYSEXE]MODPARAMS.DAT file. The MODPARAMS.DAT files for other roots on the same system disk can be found in SYS\$SYSDEVICE:[SYSx.SYSEXE]MODPARAMS.DAT, where *x* represents the root number; for example, SYS0, SYS1, SYS2, and so forth. (Valid root numbers might include hexadecimal digits—SYSA, SYSB, and so forth.)
- Be sure the EXPECTED_VOTES value is correct. This value is the sum of all votes in the cluster. For example, if there are five computers in the cluster and each has one vote, the value is 5.

A Booting and Shutting Down Your OpenVMS Alpha System

This appendix applies to Alpha systems only and explains how to halt, boot, and shut down the operating system. It also includes related information, such as setting the system for automatic booting and using the Writeboot utility. This appendix also includes brief troubleshooting procedures.

This appendix contains the following information:

- Booting operations, including the following:
 - Booting the operating system CD locally and from an InfoServer system
 - Booting manually from the system disk
 - Performing a conversational (interactive) boot
 - Booting with minimum startup
 - Booting with the XDelta utility (XDELTA)
 - Booting from a different directory
 - Booting with a PMAZB or PMAZC TURBOchannel adapter
 - Booting over the network with an alternate TURBOchannel adapter
 - Booting in an emergency
- Set, Show, and WRITEBOOT operations, including the following:
 - Setting the system for automatic booting
 - Setting and showing boot devices
 - Setting boot parameters
 - Writing a new boot block
- Halt and shutdown operations
- Troubleshooting procedures

For the latest hardware documentation for Alpha computers, see the documents at:

<http://www.hp.com/go/alphadocs>

A.1 Booting Operations

The following sections describe different methods of booting your OpenVMS Alpha system.

A.1.1 Booting the OpenVMS Alpha Operating System CD

If you need to boot the OpenVMS Alpha operating system CD, either to perform an installation or upgrade or to perform related operations such as mounting or backing up the system disk, perform the steps in the following sections, depending on whether you are booting locally or from the InfoServer.

A.1.1.1 Booting from the Local Drive

Boot from the local drive as follows:

1. Insert the operating system CD into the local CD drive.
2. At the console prompt (>>>), enter the SHOW DEVICE command so you can identify the name of the CD drive (for example, DKA400:)
3. Enter the boot command in the following format:

```
BOOT -FLAGS 0,0 source-drive
```

Substitute the device name of the CD drive (as listed in the SHOW DEVICE display) for *source-drive*.

For example, if the SHOW DEVICE display lists the device name of your CD drive as DKA400, enter the following command and press **Enter**:

```
>>> BOOT -FLAGS 0,0 DKA400
```

After you boot, the system displays a menu from which you can choose options to perform the following tasks:

- Install or upgrade the operating system using the PCSI utility.
- Enter a DCL environment from which you can perform preinstallation or maintenance tasks such as mounting or showing devices and backing up or restoring files on the system disk.
- Shut down the system.

A.1.1.2 Booting from the InfoServer

To boot the operating system CD using either the InfoServer hardware or the InfoServer utility, follow these steps. To use the InfoServer utility, certain configuration steps are required initially (one time only), as described in Appendix C (page 229); note that the operating system CD must be mounted systemwide.

1. At the console prompt (>>>), enter the SHOW DEVICE command and scan the devices listed in the output to determine the name of the CD drive. Look for a device listed with its hardware address, as in the last line of the following example; compare this information with that provided by the table in step 2.

```
>>> SHOW DEVICE
```

```
dva0.0.0.1000.0      DVA0                      RX23
dka200.2.0.5.0      DKA200                    RZ28M  1004
dka300.3.0.5.0      DKA300                    RZ29B  0016
dka400.4.0.5.0      DKA400                    RZ26L  442E
ewa0.0.0.3.0        EWA0                      00-00-F8-1F-70-3D
```

For additional information, see the *HP OpenVMS Version 8.4 for Alpha and Integrity Servers Software Product Description* (SPD 82.35.xx) and the hardware manuals that you received with your Alpha computer.

2. At the console prompt, enter the following command, where *lan-device-name* is the LAN device (for example, EWA0) identified with your computer:

```
>>> B -FLAGS 0,0 -FILE APB_084 lan-device-name
```

For information about the LAN devices your system supports, see Table A-1. Ethernet device EWA0 refers to the first EW device. Subsequent devices are named EWB0, EWC0, and so on. For most systems, you can use the SHOW CONFIGURATION console command to list LAN devices available for boot. For additional information, see the hardware manuals that you received with your Alpha computer and the OpenVMS software product description (SPD). The APB file name in the previous command is the unique file name that was assigned to the APB.EXE file when it was copied from the operating system CD to the InfoServer. This file is the name of the APB program used for the initial system load (ISL) boot program.

Table A-1 Supported LAN Devices

Alpha Computer	Ethernet Device	FDDI Device
ALPHAbook 1	EOA0	-
AlphaServer 400 series	EWA0	FWA0
AlphaServer 1000 series	ERA0, EWA0	FRA0
AlphaServer 1000A series	EWA0	FWA0
AlphaServer 1200 series	EWA0	FWA0
AlphaServer 2000 series	ERA0, EWA0	FRA0
AlphaServer 2100, 2100A series	ERA0, EWA0	FRA0
AlphaServer 4100 series	EWA0	FWA0
AlphaServer 8200 series	EXA0, EWA0	FXA0
AlphaServer 8400 series	EXA0, EWA0	FXA0

Table A-1 Supported LAN Devices (continued)

Alpha Computer	Ethernet Device	FDDI Device
AlphaStation 200 series	EWA0	FWA0
AlphaStation 400 series	EWA0	FWA0
AlphaStation 500 series	EWA0	FWA0
AlphaStation 600 series	ERA0, EWA0	FWA0
DEC 2000 series	ERA0	—
DEC 3000 series	ESA0	"n/ESA0"
DEC 4000 series	EZA0	—
DEC 7000 series	EXA0	FXA0
DEC 10000 series	EXA0	FXA0
DIGITAL Personal Workstation (DPWS) series	EWA0	FWA0
AlphaServer DS15	EWA0, EIA0, EGA0	FWA0
AlphaServer DS20	EWA0, EIA0, EGA0	FWA0
AlphaServer DS20e	EWA0, EIA0, EGA0	FWA0
AlphaServer DS25	EWA0, EIA0, EGA0	FWA0
AlphaServer ES40	EWA0, EIA0, EGA0	FWA0
AlphaServer ES45	EWA0, EIA0, EGA0	FWA0
AlphaServer ES47	EWA0, EIA0, EGA0	FWA0
AlphaServer ES80	EWA0, EIA0, EGA0	FWA0
AlphaServer GS60	EWA0, EGA0	FWA0
AlphaServer GS80	EWA0, EIA0, EGA0	FWA0
AlphaServer GS140	EWA0, EGA0	FWA0
AlphaServer GS160	EWA0, EIA0, EGA0	FWA0
AlphaServer GS320	EWA0, EIA0, EGA0	FWA0
AlphaServer GS1280	EWA0, EIA0, EGA0	FWA0



NOTE: Note the following about devices and computers listed in Table A-1:

- The console LAN device EGA0 is the Gigabit Ethernet device DEGXA. OpenVMS refers to this device as an EW device rather than an EG device. To correlate the console device names for EG and EW devices, compare the MAC address listed for each device by the console and by the LANCP SHOW CONFIGURATION commands.
- If you are using a DEC 3000 or 4000 series system, note the following:
 - On DEC 3000 series systems, you can boot through the InfoServer with an Ethernet PMAD device or FDDI DEFTA device by specifying the device name as "*n*/ESA0". The value for *n* is the TURBOchannel slot number, which you can obtain by entering the SHOW CONFIGURATION command at the console prompt (>>>) and examining the display. For more information, see Section A.1.2 (page 173).
 - On DEC 4000 series systems, you *must* specify the ISL file name in uppercase (for example, APB_084).
- The InfoServer ISL program then displays the following menu:

Network Initial System Load Function
Version 1.2

FUNCTION ID		FUNCTION
1	-	Display Menu
2	-	Help
3	-	Choose Service
4	-	Select Options
5	-	Stop

Enter a function ID value:

4. Respond to the prompts as follows, and press **Enter** after each entry:
 - a. Enter 3 for the function ID.
 - b. Enter 2 for the option ID.
 - c. Enter the service name (ALPHA084 is the default service name for the InfoServer hardware; for the InfoServer utility, ask your system or network manager for the service name).

A sample display follows:

```
Enter a function ID value: 3
OPTION                   OPTION
  ID
  1      -      Find Services
  2      -      Enter known Service Name
```

```
Enter an Option ID value: 2
Enter a Known Service Name: ALPHA084
```

After you boot, the system displays a menu from which you can choose options to perform the such tasks as the following:

- Install or upgrade the operating system using the PCSI utility.
- Enter a DCL environment from which you can perform preinstallation or maintenance tasks such as mounting or showing devices and backing up or restoring files on the system disk.
- Shut down the system.



NOTE: If you boot the OpenVMS Alpha operating system CD from an InfoServer but lose your connection during the installation or upgrade procedure (the system is unresponsive and pressing **Ctrl/Y** does not return you to the menu), do the following:

IF ...	THEN ...
You previously chose the INITIALIZE option	<ol style="list-style-type: none"> 1. Reboot the OpenVMS Alpha operating system CD. 2. Choose the install/upgrade option (1) on the menu and perform the installation or upgrade procedure again.
You previously chose the PRESERVE option	<ol style="list-style-type: none"> 1. Reboot the OpenVMS Alpha operating system CD. 2. Enter the DCL environment by choosing option 8 on the menu. 3. Mount the device containing your backup copy of the target disk and the device that is your target disk. 4. Restore the backup copy of your target disk by entering the appropriate BACKUP commands. (See Appendix F (page 305) for complete information about using MOUNT and BACKUP commands to restore a system disk.) 5. Log out from the DCL environment. 6. Choose the install/upgrade option (1) on the menu and perform the installation or upgrade procedure again.

A.1.2 Booting with a PMAZB or PMAZC TURBOchannel Adapter

PMAZB and PMAZC TURBOchannel adapters are adapters that are software-compatible with the integrated SCSI ports on DEC 3000 Alpha series systems. If your system is not a DEC 3000 Alpha series system, skip to the next section.

The DEC 3000 Alpha series system consoles implement the SHOW CONFIGURATION console command, which displays information about the TURBOchannel options and the built-in adapters in the system. When a PMAZB or PMAZC adapter is installed in the TURBOchannel, the SHOW CONFIGURATION command displays the "PMAZB-AA" or "PMAZC-AA" string, the TURBOchannel slot number, and the device status.

The DEC 3000 Alpha series consoles also implement the SHOW DEVICE command, which displays information about the devices in the system. Because the integrated SCSI adapter is built into every DEC 3000 Alpha series system, the SHOW DEVICE console command can display the SCSI devices connected to the integrated SCSI ports. However, the SHOW DEVICE console command cannot display the SCSI devices connected to the PMAZB or PMAZC SCSI ports.

To make the console display the devices connected to the PMAZB or PMAZC SCSI ports, enter the following command at the console prompt, where *x* is the TURBOchannel slot number in which the PMAZB or PMAZC adapter is installed:

```
>>> TEST TCx CNFG
```

This command displays the devices that are connected to each SCSI port of the PMAZB or PMAZC adapter. The device controller letters are either A or B, based upon the PMAZB or PMAZC ports to which the devices are connected. Do not confuse these devices with any DK*Axxx* or DK*Bxxx* devices displayed by the SHOW DEVICE command, which shows SCSI devices on the integrated SCSI ports only.

To boot from a device connected to a PMAZB or PMAZC adapter, enter the boot command as follows:

```
>>> BOOT "x/dkyzzz"
```

The following conventions are used:

- *x* is the TURBOchannel slot number in which the PMAZB or PMAZC adapter is installed.
- *dk* is the device code of the boot device.

- *y* is either A or B, depending on the SCSI port of the PMAZB or PMAZC adapter that contains the boot device.
- *zzz* is the SCSI unit number of the boot device.

The OpenVMS Alpha operating system does not distinguish between the PMAZB or PMAZC adapter and the integrated SCSI adapter. The operating system views them as identical adapters. Because the operating system searches for I/O adapters in backplane slot number order, device controller letters are assigned that correspond to the backplane order of the TURBOchannel options, followed by the integrated adapters. This is different from console SCSI device naming, which always designates SCSI devices on the integrated SCSI ports as either A or B port devices.

On a DEC 3000 Model 500 Alpha system with no TURBOchannel options installed, the OpenVMS Alpha operating system names the integrated SCSI ports PKA0 and PKB0, and the devices connected to the ports inherit the controller letter from the port controller letter (A or B). However, if a PMAZB or PMAZC adapter is installed in the TURBOchannel, the operating system names the PMAZB or PMAZC SCSI ports PKA0 and PKB0 and names the integrated SCSI ports PKC0 and PKD0. The devices connected to the ports inherit the controller letter from the port controller letter (A, B, C, or D).

A.1.3 Booting Manually from the System Disk

Boot the system disk manually as follows:

IF ...	THEN GO TO...
The OpenVMS Alpha operating system is running	Step 1
The OpenVMS Alpha operating system is <i>not</i> running	Step 4

1. Log in to the SYSTEM account.
2. Enter the following command and press **Enter**:

```
$ @SYS$SYSTEM:SHUTDOWN
```
3. Answer the questions displayed by the system. When the procedure asks whether an automatic reboot should be performed, press **Enter** for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE
```

4. Halt the system by pressing either **Ctrl/P** or **Halt**. (See Section A.3.1 (page 184) for more information about how to halt your Alpha computer.)
5. Enter the BOOT command in the following format:

```
BOOT device-name
```

Substitute the device name of the system disk for *device-name*. For example, to boot from a drive with a device name of DKA400, enter the following command and press **Enter**:

```
>>> BOOT DKA400
```

To boot from the network, enter the following command and press **Enter**:

```
>>> BOOT ESA0
```

A.1.4 Performing a Conversational (Interactive) Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot to stop the boot process before it completes. The boot process stops after it loads SYS\$SYSTEM:SYSBOOT.EXE and displays the SYSBOOT> prompt. At the SYSBOOT> prompt, you can enter specific OpenVMS System Generation utility (SYSGEN) commands to do the following:

- Examine system parameter values
- Change system parameter values
- Specify another parameter file

- Specify another system startup command procedure
- Select the default system parameter file (ALPHAVMSSYS.PAR) if you modified system parameters to values that render the system unbootable
- Specify a minimum startup

There are several ways to perform a conversational boot. The following procedure is the most direct:

IF ...	THEN GO TO...
The OpenVMS Alpha operating system is running	Step 1
The OpenVMS Alpha operating system is <i>not</i> running	Step 4

1. Log in to the SYSTEM account.
2. Enter the following command and press **Enter**:

```
$ @SYS$SYSTEM:SHUTDOWN
```
3. Answer the questions displayed by the system. When the procedure asks whether an automatic reboot should be performed, press **Enter** for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE
```
4. Halt the system by pressing either **Ctrl/P** or **Halt**. (For more information about how to halt your Alpha computer, see Section A.3.1 (page 184).)
5. To begin the conversational boot, enter the BOOT command in the following format:

```
BOOT -FLAGS 0,1 [device-name]
```

for *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press **Enter**:

```
>>> BOOT -FLAGS 0,1 DKA400
```

If you do not specify a device name, the system boots from the boot device assigned when you entered the SET BOOTDEF_DEV command.
6. At the SYSBOOT> prompt, you can enter any of the SYSGEN commands listed in Table A-2. For more information about these SYSGEN commands, see the *HP OpenVMS System Management Utilities Reference Manual: M-Z*.
7. When you finish using the SYSGEN commands, enter the CONTINUE command to complete the boot process.

Table A-2 SYSGEN Commands Used in the SYSBOOT Procedure

Command	Description
CONTINUE	Resumes the boot procedure.
DISABLE CHECKS	Inhibits checking of parameter values specified with the SET command.
ENABLE CHECKS	Permits checking of parameter values specified with the SET command.
HELP	Displays a summary of the SYSBOOT commands on the terminal screen.
SET <i>parameter-name</i>	Establishes the value of a system parameter.
SET/STARTUP	Sets the name of the system startup command procedure.
SHOW [<i>parameter</i>]	Displays active, current, default, maximum, and minimum values for specific parameters. (Use qualifiers to display characteristics of parameters grouped by categories.)
USE [<i>file-spec</i>]	Specifies a parameter file to be used as a source of values. You must enter the entire file specification, including device and directory; you cannot specify a logical name.

For examples of using conversational booting, see Section A.1.5 (page 176) and Section A.1.9 (page 177).

A.1.5 Booting with Minimum Startup

In certain cases, you might want to boot your system without performing the full sequence of startup events. For example, if a startup event prevents you from logging in, you might want to boot the system without executing the startup so that you can log in and fix the problem. You can use the conversational boot to specify a minimum startup.



NOTE: Because this procedure bypasses specific startup operations, it does not autoconfigure the system's peripheral devices.

Boot the system with minimum startup as follows:

1. Begin the conversational boot by entering the **BOOT** command in the following format:

```
BOOT -FLAGS 0,1 [device-name]
```

For *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press **Enter**:

```
>>> BOOT -FLAGS 0,1 DKA400
```

2. Enter the following command and press **Enter**:

```
SYSBOOT> SET STARTUP_P1 "MIN"
```

3. Enter the following command to ensure that the operating system does not record for subsequent system reboots the **STARTUP_P1** parameter change you made in step 2:

```
SYSBOOT> SET WRITESYSPARAMS 0
```

4. Enter the following command to continue booting:

```
SYSBOOT> CONTINUE
```

A.1.6 Booting with the XDelta Utility (XDELTA)

The XDelta utility (XDELTA) is a debugging tool that system programmers use. The procedure for booting all Alpha computers with XDELTA is the same.

The following table describes the valid values you can specify when booting with XDELTA:

Value	System Response
0	Normal, nonstop boot (default).
1	Begins a conversational boot and then displays the SYSBOOT prompt.
2	Includes XDELTA but does not take the initial breakpoint.
3	Displays the SYSBOOT prompt and includes XDELTA but does not take the initial breakpoint.
6	Includes XDELTA and takes the initial breakpoint.
7	Includes XDELTA, displays the SYSBOOT prompt, and takes the initial breakpoint at system initialization.

The following is an example of booting with XDELTA from the console prompt:

```
>>> BOOT -FLAGS 0,7
```

For more information about using XDELTA, see the *HP OpenVMS Delta/XDelta Debugger Manual*.

A.1.7 Booting from a Different Root Directory

By default, the OpenVMS Alpha operating system is installed in the system root directory [SYS0]. However, if you have created a cluster system disk, you can use the

SYSS\$MANAGER:CLUSTER_CONFIG.COM procedure to add a copy of the operating system to a different root directory. (See the *HP OpenVMS System Manager's Manual* for more information about using the SYSS\$MANAGER:CLUSTER_CONFIG.COM procedure.)

To boot from a different directory (for example, [SYS3]), enter the BOOT command as follows:

```
>>> BOOT -FLAGS 3,0 DKA200
```

A.1.8 Booting over the Network with an Alternate TURBOchannel Adapter

You can use an alternate TURBOchannel adapter to boot a DEC 3000 series Alpha computer (with the TURBOchannel option) over the network in an InfoServer or OpenVMS Cluster environment. Examples of alternate TURBOchannel adapters are the PMAD (which connects to the Ethernet) and the DEFTA (which connects to the FDDI).

To boot from a TURBOchannel device connected to one of these alternate adapters, enter the boot command as follows:

```
>>> BOOT "n/ESAO"
```

The value for *n* is the TURBOchannel slot number for the device, which you can obtain by entering the SHOW CONFIGURATION command at the console prompt (>>>) and examining the display. In the following example, the TURBOchannel slot number (listed under the "TCINFO" column) is 0:

```
>>> SHOW CONFIGURATION
DEC 3000 - M300
Digital Equipment Corporation
VPP PAL X5.56-80800101/OSF PAL X1.34-80800201 - Built on 18-DEC-1996 11:376
```

	TCINFO	DEVNAM	DEVSTAT
	-----	-----	-----
	CPU	OK KN16-AA	-V3.2-S6CD-I151-sV2.0-DECchip 21064 P3.0-150
	ASIC	OK	
	MEM	OK	
	MEM	OK	
6			
	CXT	OK	
5			
	NVR	OK	
	SCC	OK	
	NI	OK	
	ISDN	OK	
4			
	SCSI	OK	
0-PMAD-AA	TC0		

A.1.9 Booting in an Emergency

If a system problem prevents your system from booting, you might need to perform an emergency boot operation. Table A-3 summarizes these emergency boot operations, and the sections that follow describe each boot operation in more detail.

Table A-3 Emergency Boot Procedures

Operation	When to Use
Booting with default system parameters	When parameter values in the parameter file have been modified so that the system is unbootable
Booting without startup and login procedures	If an error in the startup or login procedure prevents you from logging in
Booting without the user authorization file	If you have forgotten the password and cannot log in to a privileged account

A.1.9.1 Booting with Default System Parameters

If the current values stored in the parameter file have been incorrectly modified, these incorrect values might cause the system to become unbootable. With a conversational boot operation, you

can reset the active values for all system parameters to the default value. (In most cases, HP recommends that you use AUTOGEN to modify system parameters. In certain cases, however, you can use a conversational boot to modify a parameter value *temporarily*. To change a parameter value *permanently*, you must edit MODPARAMS.DAT and run AUTOGEN. For instructions, see the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.) The default values allow you to boot the system temporarily so you can correct the problem.

How to Perform This Task

1. Begin the conversational boot by entering the BOOT command in the following format:

```
BOOT -FLAGS 0,1 [device-name]
```

For device-name, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press **Enter**:

```
>>> BOOT -FLAGS 0,1 DKA400
```

2. At the SYSBOOT> prompt, enter the following command:

```
SYSBOOT> USE DEFAULT
```

The USE DEFAULT command specifies that default values should be used for all parameters.

3. To avoid starting all layered products on a system that is not tuned for them, possibly causing the system to hang, set the STARTUP_P1 system parameter as follows:

```
SYSBOOT> SET STARTUP_P1 "MIN"
```

4. Enter the following command to ensure that the operating system does not record for subsequent system reboots the STARTUP_P1 parameter change you made in step 3:

```
SYSBOOT> SET WRITESYSPARAMS 0
```

5. Enter the following command to continue booting:

```
SYSBOOT> CONTINUE
```

6. When the system finishes booting, determine which changed parameter caused the problem and reset the parameter value. If you specified the value for the parameter in the AUTOGEN parameter file MODPARAMS.DAT, fix the value in that file and run AUTOGEN. For more information, see the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

7. After your system runs for at least 24 hours, run AUTOGEN in feedback mode, following the steps described in Section 7.24 (page 164). Be sure to examine the AGEN\$PARAMS.REPORT, as recommended. If necessary, modify system parameters as instructed in Section 7.25 (page 166). If you need assistance, contact your software support representative. Once you feel confident that the problem is corrected, and AUTOGEN has been run through the SETPARAMS phase, reboot the system.

Example

```
SYSBOOT> USE DEFAULT
```

```
SYSBOOT> SET STARTUP_P1 "MIN"
```

```
SYSBOOT> SET WRITESYSPARAMS 0
```

```
SYSBOOT> CONTINUE
```

```
Username: SYSTEM
```

```
Password:
```

```
$ EDIT SYS$SYSTEM:MODPARAMS.DAT
```

```
.
```

```
.
```

```
.
```

```
[Insert line(s) to reset parameter value(s)]
```

```
.
```

```
.
```

```
.
```

A.1.9.2 Booting Without Startup and Login Procedures

If the system does not complete the startup procedures or does not allow you to log in, you might need to bypass the startup and login procedures. The startup and login procedures provided by HP should always work. However, if you introduce an error when modifying the startup or login procedure, it is possible to accidentally lock yourself out of the system.

How to Perform This Task

1. Begin the conversational boot by entering the **BOOT** command in the following format:
`BOOT -FLAGS 0,1 [device-name]`
For *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press **Enter**:
`>>> BOOT -FLAGS 0,1 DKA400`
2. Enter the following command at the **SYSBOOT>** prompt:
`SYSBOOT> SET/STARTUP OPA0:`
3. Enter the following command to ensure that the operating system does not record for subsequent system reboots the **STARTUP_P1** parameter change you made in step 2:
`SYSBOOT> SET WRITESYSPARAMS 0`
4. Enter the following command to continue booting:
`SYSBOOT> CONTINUE`
5. When the system is booted, the operator console displays the DCL command prompt (**\$**). You are logged in.
6. Enter the following DCL command:
`$ SET NOON`
This command directs the operating system to ignore any errors that might occur. If you do not enter this command and you invoke an error, the system logs you out.
7. Correct the error condition that caused the login failure. (That is, make the necessary repairs to the startup or login procedure, or to the **SYSUAF.DAT** file.)
Use a text editor to correct the startup or login file. Note that some system consoles might not supply a screen-mode editor. You can also copy a corrected file and delete the incorrect version by using the **RENAME** and **DELETE** commands.
8. Perform a normal startup by entering the following command:
`$ @SYS$SYSTEM:STARTUP`

Example

```
SYSBOOT> SET/STARTUP OPA0:
SYSBOOT> SET WRITESYSPARAMS 0
SYSBOOT> CONTINUE
$ SET NOON
$ SET DEFAULT SYS$SYSROOT:[SYSEXE]
$ @SYS$SYSTEM:STARTUP
```

A.1.9.3 Booting Without the User Authorization File

Ordinarily, the startup and login procedures provided by HP always work; however, certain conditions can cause them to fail. A simple way to lock yourself out of the system is to set passwords to login accounts and forget them. Another way to be locked out is if one or more core system Product Authorization Key (PAK) software licenses are unavailable or expired. In such emergencies, perform a conversational emergency boot by performing the steps given in this section.

How to Perform This Task

1. Halt the system by pressing **Ctrl/P** or whatever method is used for your computer. (See Section A.3 (page 184) for more information about how to halt Alpha computer systems.)
2. Begin the conversational boot by entering the **BOOT** command in the following format:

```
BOOT -FLAGS 0,1 [device-name]
```

For *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press **Enter**:

```
>>> BOOT -FLAGS 0,1 DKA400
```

If your system has a hardware password (various systems support a password that prevents unauthorized access to the console), you need this password for logging in to the console. If you do not have this password, contact HP customer support to reset the hardware console password.

3. Enter the following commands at the **SYSBOOT>** prompt:

```
SYSBOOT> SET/STARTUP OPA0:  
SYSBOOT> SET WINDOW_SYSTEM 0  
SYSBOOT> SET WRITESYSPARAMS 0  
SYSBOOT> CONTINUE
```

The first three commands request that:

- OpenVMS read the system startup commands directly from the system console
- The Windows system (if any) not start
- OpenVMS not record the parameter changes for subsequent system reboots

The last command causes the booting to continue.

4. At the **DCL** prompt, the system now accepts startup commands directly from the console. Enter the following two commands as shown. These commands allow a normal system startup while you are left logged in on the console. Without the **SPAWN** command, you would be logged out when the startup completes.

```
$ SPAWN  
$ @SYS$SYSTEM:STARTUP
```

5. Once you log out of this session, the system completes the startup and can be used normally. Optionally, you can choose to reboot the system.



NOTE: Instead of using the **SET/STARTUP OPA0:** command, an alternative method of booting under these emergency conditions is to set the **UAFALTERNATE** system parameter to use the alternate authorization file rather than the standard user authorization file. Setting the system parameter **UAFALTERNATE** defines the logical name **SYSUAF** to refer to the file **SYS\$SYSTEM:SYSUAFALT.DAT**. If this file is found during a normal login, the system uses it to validate the account and prompts you for the user name and password.

HP does not recommend this method. If an alternate **SYSUAFALT.DAT** file has been configured on your system, the **UAFALTERNATE** method will likely fail (assuming you do not know the password for the privileged account stored within the **SYSUAFALT.DAT** file). In addition, the **OPA0:** system console is critical to system operations and system security and allows access when the **SYSUAF** system authorization database is unavailable or corrupted; when core product license **PAKs** are not registered, are expired, or are disabled; and in various system failures.

Example

```
SYSBOOT> SET/STARTUP OPA0:  
SYSBOOT> SET WINDOW_SYSTEM 0  
SYSBOOT> SET WRITESYSPARAMS 0  
SYSBOOT> CONTINUE  
$ SPAWN  
$ @SYS$SYSTEM:STARTUP  
$
```

A.2 Configuring Boot Behavior for Alpha Systems

The following sections describe how to set up automatic booting, set and show the default boot device, modify boot parameters, and create a bootable OpenVMS Alpha system disk using the Writeboot utility.

A.2.1 Setting the System for Automatic Booting

Alpha computers can boot automatically from a designated boot device. When you installed the OpenVMS Alpha operating system, you designated the system disk as the default boot device. Section A.2.2 (page 182) describes how to change the default boot device.

Alpha computers can boot automatically from the default boot device under the following conditions:

- When you first turn on system power
- When system power comes on after a power failure
- After you shut down the system (if you enter Y when the shutdown procedure asks whether an automatic reboot should be performed)
- After a bugcheck or system crash
- If the system halts under program control

Set the system to boot automatically by performing one of the following steps:

IF ...	THEN GO TO...
The OpenVMS Alpha operating system is running	Step 1
The OpenVMS Alpha operating system is <i>not</i> running	Step 4

1. Log in to the SYSTEM account.
2. Enter the following command and press **Enter**:

```
$ @SYS$SYSTEM:SHUTDOWN
```
3. Answer the questions displayed by the system. When the procedure asks whether an automatic reboot should be performed, press **Enter** for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE
```
4. Halt the system by pressing either **Ctrl/P** or **Halt**. (See Section A.3.1 (page 184) for more information about how to halt your Alpha computer.)
5. If you have an SMP system with multiple CPUs, enter the following command at the console prompt (>>>) to stop the other CPUs:

```
>>> INITIALIZE
```
6. Enter the following command to show whether the system has been set to boot automatically:

```
>>> SHOW AUTO_ACTION
```

The system displays one of the following:

 - Restart
 - Boot
 - Halt
7. Enter the SET AUTO_ACTION command if you want to change the automatic booting behavior. HP recommends that AUTO_ACTION be set to RESTART. This forces the system to attempt to write a crash dump to the dump file, and after the dump write completes, the system tries to reboot itself automatically. For example, the following command sets the system to reboot automatically:

```
>>> SET AUTO_ACTION RESTART
```

- After you set this variable, HP recommends that you set the boot device and operating system flags as well, using the SET BOOTDEF_DEV and SET BOOT_OSFLAGS commands described in the following sections.

A.2.2 Setting and Showing Boot Devices

Use the SET BOOTDEF_DEV command to tell the system which drive you want to boot from (that drive becomes the default boot device). Use the SHOW BOOTDEF_DEV command to display the current default boot device.

Note that when you set this variable, HP recommends that you set the operating system boot parameters as well, using the SET BOOT_OSFLAGS command.

At the console prompt (>>>), enter the SET BOOTDEF_DEV command in the following format:

```
SET BOOTDEF_DEV device-name
```

Substitute the device name of the system disk for *device-name*. For example, to boot from a drive with a device name of DKA400 on a DEC 3000 Alpha series computer, enter the following command and press **Enter**:

```
>>> SET BOOTDEF_DEV DKA400
```

The next time you boot the system, you can enter the BOOT command without specifying a device name (because DKA400 is now the default boot device). For example:

```
>>> BOOT
```



NOTE: If you have not used the SET BOOTDEF_DEV command to set the drive to boot from and you enter the BOOT command without specifying a device name, the system displays an error message.

Use the SHOW BOOTDEF_DEV command to find out what drive was specified in the last SET BOOT command. For example:

```
>>> SHOW BOOTDEF_DEV
```

To cancel the drive specified in a previous SET BOOTDEF_DEV command, enter the following command and press **Enter**:

```
>>> SET BOOTDEF_DEV
```



NOTE: This command is not valid on DEC 3000 Alpha series systems.

A.2.3 Setting Boot Flag Parameters

By default, when you boot the operating system, the flags parameter is set to 0. If you want to define parameters to enable specific functions during the booting process, use the SET BOOT_OSFLAGS console command.

The following is a list of values you can specify with the SET BOOT_OSFLAGS command.



NOTE: HP recommends that you keep the BOOT_OSFLAGS parameter at the default value 0 unless you have a specific need to change it (for example, to troubleshoot a system boot problem).

Hexadecimal Value	System Response
1	Allows a conversational boot (the system displays the SYSBOOT> prompt).
2	Maps XDELTA to a running system.
4	Stops the boot procedure at the initial system breakpoint.
8	Performs a diagnostic bootstrap .
10	Stops the boot procedure at the bootstrap breakpoints.
20	Omits header from secondary bootstrap image.

Hexadecimal Value	System Response
80	Prompts for the name of the secondary bootstrap file.
100	Halts the system before the secondary bootstrap.
2000	Marks corrected read data error pages as bad.
10000	Displays extensive, detailed debug messages during the boot process.
20000	Displays selected user-oriented messages during the boot process.

The following examples show how to use the SET BOOT_OSFLAGS command:

- The following command specifies the root directory as 0 and the parameter as 1, which sets the system to perform a conversational boot from the [SYS0] directory when you enter the BOOT command:

```
>>> SET BOOT_OSFLAGS 0,1
```

- The following command specifies the root directory as 1 and the parameter as 0, which sets the system (for example, the second host in a two-system DSSI OpenVMS Cluster configuration) to boot from the [SYS1] directory (instead of [SYS0]) when you enter the BOOT command:

```
>>> SET BOOT_OSFLAGS 1,0
```

- The following example specifies the root directory as 0 and the parameters as 1, 2, 4, and 20000 (for a total hexadecimal value of 20007). As a result, when you enter the BOOT command, the system performs a conversational boot from the [SYS0] directory with XDELTA, stops at the initial system breakpoint, and displays relevant user messages.

```
>>> SET BOOT_OSFLAGS 0,20007
```

To display the parameters you have just set, use the SHOW BOOT_OSFLAGS command. For example:

```
>>> SHOW BOOT_OSFLAGS
BOOT_OSFLAGS = 0,20007
```

Now that the boot parameters have been set, to boot the system using the parameters you have specified, simply type BOOT or B at the prompt (>>>).

A.2.4 Writing a New Boot Block

The boot block is block 0 of the system disk. It contains the size and location of the primary bootstrap image (APB.EXE) used to boot the system. If you suspect that the boot block on your system disk is invalid, you can use the Writeboot utility (WRITEBOOT.EXE) to write a new boot block.

The Writeboot utility is copied to your system disk during the installation procedure. It enables you to create a bootable OpenVMS Alpha system disk from one that was originally created by one of the following methods:

- A nonimage backup of an Alpha system disk (possibly corrupting the boot block)
- A nonimage restore of an Alpha system disk from an image save set

The Writeboot utility also enables you to rewrite the boot block of an OpenVMS Alpha system disk to point to a new version of the OpenVMS Alpha primary bootstrap file (APB.EXE) that you have previously copied to the disk. (Note that the file must be contiguous.)



NOTE: The file must be contiguous and movefile operations on the file must be disabled. If the file is not contiguous, use the DCL command COPY/CONTIGUOUS (or similar) to re-create a contiguous version of the file. To disable movefile operations, use the DCL command SET FILE/NOMOVE. This prevents bootstrap failures that could result from the normal and expected operations of disk defragmentation tools.

To start the Writeboot utility, enter the following command:

```
$ RUN SYS$SYSTEM:WRITEBOOT
```

The utility prompts you as follows:

Update VAX portion of boot block (default is Y):

Update Alpha portion of boot block (default is Y):

Answer N (NO) to the VAX prompt. If you answer Y (YES) to update the Alpha boot block, the utility prompts you for the Alpha boot file:

Enter Alpha boot file:

Specify *device-name*: [VMS\$COMMON.SYSEXE]APB.EXE in response to this prompt, where *device-name* indicates the device on which the system disk is mounted. The utility writes the specified information to the boot block on the system disk. For more information, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

A.3 Halt and Shutdown Operations

The following sections describe halt and shutdown operations for Alpha computers.

A.3.1 Halting the System

During installation, upgrade, and related system operations, you might need to halt your system. The methods for halting Alpha computers differ slightly with certain models, as described in the next section.

The following table summarizes the ways you can halt specific Alpha computers:

Alpha Computer	How to Halt
AlphaServer 300, 800, 1000, 1200, 2000, 2100 series	Do one of the following: <ul style="list-style-type: none"> • Press Halt. • Press Ctrl/P.
AlphaServer 8200, 8400 series	Press Ctrl/P .
AlphaStation 200, 400, 500, 600 series	Do one of the following: <ul style="list-style-type: none"> • Press Halt (if the graphics monitor is serving as the console). • Press Ctrl/P (if you are using the alternate console and port).
DEC 2000, 3000 series	Do one of the following: <ul style="list-style-type: none"> • Press Halt (if the graphics monitor is serving as the console). • Press Ctrl/P (if you are using the alternate console and port).
DEC 4000 series	Do one of the following: <ul style="list-style-type: none"> • Press the Halt. • Press Break on the console (the default setting). • Press Ctrl/P, but only after using the console command SET TTA0_HALTSn to enable this key combination, where <i>n</i> can be 6 (enables the Break key and Ctrl/P) or 2 (enables Ctrl/P but disables the Break key).
DEC 7000, 10000 series	Press Ctrl/P .

A.3.2 Shutting Down the System

Before you shut down the operating system, decide if you want it to reboot automatically or if you want to enter console-mode commands after the shutdown completes.

You can perform the following three types of shutdown operations:

- An orderly shutdown with `SYS$SYSTEM:SHUTDOWN.COM` (see Section A.3.2.1 (page 185))
- An emergency shutdown with `OPCCRASH.EXE` (see Section A.3.2.2 (page 185))
- An emergency shutdown with crash commands (see Section A.3.2.3 (page 185))

If you want the system to reboot automatically after the shutdown, see Section A.2.1 (page 181).

A.3.2.1 Orderly Shutdown

The `SHUTDOWN.COM` procedure shuts down the system while performing maintenance functions such as disabling future logins, stopping the batch and printer queues, dismounting volumes, and stopping user processes. To use the `SHUTDOWN.COM` command procedure, log in to the `SYSTEM` account, enter the following command, and press **Enter**:

```
$ @SYS$SYSTEM:SHUTDOWN
```

For more information about the `SHUTDOWN.COM` command procedure, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

A.3.2.2 Emergency Shutdown with `OPCCRASH.EXE`

If you cannot perform an orderly shutdown with the `SHUTDOWN.COM` procedure, run the `OPCCRASH.EXE` emergency shutdown program. To run the `OPCCRASH.EXE` program, log in to the `SYSTEM` account, enter the following command, and press **Enter**:

```
$ RUN SYS$SYSTEM:OPCCRASH
```

For more information about the `OPCCRASH` program, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

A.3.2.3 Emergency Shutdown with Crash Commands

Use crash commands only if the system “hangs” (stops responding to any commands) and you cannot log in to the `SYSTEM` account to use the `SHUTDOWN.COM` procedure or the `OPCCRASH.EXE` program.



NOTE: The method described here works on all Alpha computers. However, on certain systems, you can force your processor to fail (crash) by entering a specific console command. See the hardware manuals that came with your computer for that information.

To force your processor to fail, do the following:

1. Halt the system by pressing either **Ctrl/P** or **Halt**. (See Section A.3.1 (page 184) for more information about how to halt your Alpha computer.)
2. To examine processor registers, enter the following commands and press **Enter**:

```
>>> E -N F R0
>>> E PS
```

The system displays the contents of the registers. Write down these values if you want to save information about the state of the system.

3. Enter the following commands and press **Enter**:

```
>>> D PC FFFFFFFF00000000
>>> D PS 1F00
```

By depositing these values, you cause the system to write a memory dump to the system dump file on the disk.

4. Enter the following command and press **Enter**:

```
>>> CONTINUE
```

This causes the system to perform a bugcheck.

5. After the system reboots, log in to the SYSTEM account.
6. To examine the dump file, enter the following commands and press **Enter** after each one:

```
$ ANALYZE/CRASH SYS$SYSTEM:SYSDUMP.DMP  
SDA> SHOW CRASH
```

For more information about the System Dump Analyzer (SDA) utility, see the *HP OpenVMS System Analysis Tools Manual*.

A.4 Troubleshooting Procedures

The following sections describe procedures that you can follow if you encounter problems with your system.

A.4.1 If the System Does Not Boot

If the system does not boot because a hardware problem occurs, a question mark(?) usually precedes the error message displayed on the console terminal. An example of a hardware problem is a read error on a disk.

A.4.1.1 For Hardware Problems

If you suspect a hardware problem, do the following:

1. Consult the hardware manual for your Alpha computer.
2. Contact an HP support representative.

A.4.1.2 For Software Problems

When the operating system is loaded into memory, a message similar to the following is displayed on the terminal screen:

```
SYSTEM job terminated at 27-AUG-2004 15:05:03.17
```

If the system does not display this message, a software problem has probably occurred. Do the following:

1. Turn off the system. Turn it back on and try to reboot.
2. Perform a conversational boot using the default system parameters or try one of the emergency boot procedures described in Section A.1.9 (page 177).
3. If the system boots, run the AUTOGEN procedure. For more information about the AUTOGEN procedure, see the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

A.4.2 Detecting and Responding to System Problems

If your system exhibits unexpected behavior, note the following:

- If the system displays a bugcheck message on the console terminal and shuts itself down, it means the system encountered a problem that made further operation impossible or dangerous. If the system does not reboot automatically, set up your system to boot automatically as explained in Section A.2.1 (page 181), or reboot the system manually as explained in Section A.1.3 (page 174).
- If the system stops responding to your commands (that is, the system “hangs”), there is a possible failure in a system software or hardware component or a possible power failure.
- If the system exhibits erratic behavior (it does not respond according to specifications), it indicates a possible failure in a system software or hardware component.

To determine whether the failure is a system problem:

- Be sure that you did not press **F1** (the **Hold Screen** key). The Hold Screen light goes on when you press either **F1** or press **Ctrl/S**.
- Press **Ctrl/T** to check the status of your process. A status line should appear, indicating the name of the program that is executing and other information. If the status line does not

appear, the program you are executing might be stalled or “hanging.” (If you have disabled **Ctrl/T** by entering the command `SET NOCONTROL=T` or have set the terminal to `NOBROADCAST` mode by entering the command `SET TERMINAL/NOBROADCAST`, this procedure does not work.)

- Make sure the cable connecting the terminal or monitor to the system is secure.

If you determine that you have a system problem:

1. Force an exit from a stalled or hanging program by pressing **Ctrl/Y**. Note that when you press **Ctrl/Y**, any work performed by the program and not saved on disk is lost.
2. If the system is still unresponsive, halt it by pressing either **Ctrl/P** or **Halt**. (See Section A.3.1 (page 184) for more information about how to halt your Alpha computer.)
3. Note in detail the sequence of events that caused the problem and notify an HP support representative.

B Configuring OpenVMS Integrity servers Hardware Operation and Boot Operations, and Booting and Shutting Down Your System

This appendix briefly describes the configuration and management tools that might be available on HP Integrity servers, and explains how to set up the system console, configure boot options, boot the OpenVMS Integrity servers operating system, and shut down the operating system. The appendix also includes brief troubleshooting procedures.

Specifically, this appendix contains the following information:

- Hardware/firmware configuration and management interfaces and their features
- Setting up your system console
- Overview of using the Extensible Firmware Interface (EFI)
- Enabling or disabling **Hyper-Threading** on nPartitions that have dual-core processors that support it
- Configuring and managing boot operations such as the following:
 - Setting the system for automatic booting
 - Setting and showing boot devices
 - Setting boot parameters
 - Writing a new boot block
- Booting operations, including the following:
 - Booting the OE DVD
 - Booting the system disk
 - Performing a conversational (interactive) boot
 - Booting with minimum startup
 - Booting with the XDelta utility (XDELTA)
 - Booting from a different root directory
 - Booting in an emergency
- Halting and shutting down operations
- Troubleshooting procedures



NOTE: Any information about Integrity servers hardware and utilities is provided in this manual for your convenience and is not intended to replace the hardware documentation included with your Integrity servers system or the latest documentation available on the Web. HP Integrity servers are available in many different configurations. Hardware, utilities, and certain hardware configuration procedures might differ significantly across models, and even across versions of the same model. Please see your hardware documentation for the most up-to-date information specific to your particular model and version. Note that the hardware documentation includes model-specific illustrations to guide you. The latest version of documentation for your server can be found online at:

<http://docs.hp.com/en/hw.html>

<http://docs.hp.com>

<http://www.hp.com/support/itaniumservers>

B.1 Configuration and Management Utilities for HP Integrity servers

This section provides a brief overview of the configuration and management utilities that are typically available for your Integrity servers system. For more information, see the appropriate hardware documentation.

B.1.1 Overview of Utilities and Console Options

The main interfaces that are typically available for configuring and managing your HP Integrity servers environment are the Extensible Firmware Interface (EFI) and the Management Processor (MP). On entry-class Integrity servers, MP has been replaced by the Integrated Lights Out (iLO) Management Processor, which includes all the functionality of MP plus additional features. On some models, the Baseboard Management Control (BMC) utility is provided. Cell-based servers include additional management tools. On servers supporting iLO and Insight Power Management (IPM), a power management interface is available for OpenVMS Integrity servers. For more information, see the *HP OpenVMS Utility Routines Manual*. IPM provides centralized monitoring and control of server power consumption and thermal output. (Although OpenVMS still supports the SYSGEN parameter CPU_POWER_MGMT, the iLO interface takes precedence over this parameter.) Before installing OpenVMS Integrity servers, check that power management is set in the state that you prefer. For more information, see the *HP OpenVMS Utility Routines Manual*.

EFI is the main boot and preboot interface; it is the core interface to the system firmware and console commands on all models. BMC is provided on entry-class HP Integrity servers (although on a few systems the interface itself is hidden). BMC provides basic management capabilities and access to EFI. MP (or iLO) is available on most systems; on some systems it is available only if the necessary console hardware has been installed and configured. In addition to providing access to EFI, MP provides advanced management functionality (beyond that which is available through BMC), including remote management, network console and Web-based access, and enhanced diagnostic capabilities. Both BMC and MP (iLO) can operate on standby power—even when the Integrity server's main power switch is turned to the off position.

EFI is the base console environment. You can either use MP (iLO) or BMC to interact with the capabilities of the console interface.

The OpenVMS Integrity servers installation and upgrade procedures assist you in adding a boot option for your newly installed or upgraded system disk. Before you can boot your OpenVMS system, your console must be configured correctly, as explained in Section B.2 (page 193).

The following briefly describes some of the main features of EFI, MP, and BMC.

- Extensible Firmware Interface (EFI)

EFI is a menu and command-line interface between the operating system and the system firmware. The EFI interface is available only when the operating system is not booted; on cell-based servers, the interface is available from an nPartition console when the nPartition is in an active state but has not booted an operating system. To configure EFI boot options while the operating system is running, OpenVMS provides the OpenVMS Integrity servers Boot Manager utility (SYS\$MANAGER:BOOT_OPTIONS.COM). Changes made by this utility do not take effect until the system is rebooted.

The EFI Boot Manager, like the OpenVMS Integrity servers Boot Manager, provides support for operating system loaders and enables you to configure the firmware and control the booting environment for your OpenVMS operating system. A FAT partition on the boot disk stores the system loader. The Boot Configuration menu (or in some versions of EFI, the Boot Option Maintenance Menu) enables you to add or delete a boot option, change the boot order, select the active console, and more. After you power up the server, the EFI boot manager presents different ways to bring up the system, depending on how you have set up the boot options. For example, you can boot to the EFI Shell. When you select the EFI Shell command-line interface option, you can enter commands at the EFI Shell prompt. For more information about EFI options and commands, see Section B.3 (page 202) and the appropriate hardware documentation.



NOTE: In some HP documents, you might see the acronym **POSSE** used in place of or in combination with EFI. EFI is an Intel specification of an interface between firmware and the operating system. POSSE (Pre-OS System Environment) is the HP implementation of EFI that extends the EFI Shell and EFI Boot Manager to include additional features for managing hardware and system boot options.

- Management Processor (MP)

Management Processor (or, on entry-class Integrity servers, iLO) provides both local and remote access for controlling the system console, reset/power management, and transfer of control (TOC) capabilities. It also enables you to monitor tasks and display detailed information about various internal subsystems. On cell-based servers, MP is a complex-wide tool and is always available, even if nPartitions are not configured or booted in the server complex. In contrast, EFI does not operate as a complex-wide tool and is only available when the nPartition is in an active state but has not booted an operating system; each nPartition has its own EFI interface. Using MP, you can select the partition for which you want EFI access. You can access all hardware and nPartitions in the complex. The following is a brief summary of MP's main features:

- Console connectivity

As a console interface, MP enables you to interact with EFI and to power the server on or off; ultimately, it can function as the OPA0: terminal port on OpenVMS.

- Virtual Front Panel (VFP)

MP provides a virtual front panel that you can use to monitor the front panel LEDs from a remote location.

- Command interface

MP provides an extensive menu system and a command-line interface.

- Multiple, simultaneous viewers

Multiple users can access the MP console or a particular nPartition console. Only one user at a time is allowed interactive access. All other users have read-only access. (Output from the interactive user is reflected to the read-only users currently accessing the console.) Access to MP can be restricted by password-protected user accounts.

- Availability/standby power

MP is available whenever the system is connected to a power source, even if the server's main power switch is in the off position.

- Accessibility

MP is accessible in several ways, including by direct monitor connection using a terminal, PC, laptop or desktop computer connected to the MP serial port (with certain Integrity servers, you can also use a VGA monitor and USB keyboard and mouse); by modem through an EIA-232 port; or by Telnet or Web browser on the LAN. MP is accessible through Secure Shell (SSH), which is provided by TCP/IP Services for OpenVMS. This method of access is more secure than any of the other methods.

- Console log

MP records recent output from the system console. The `c1` command enables you to view the recorded information.

- Event logs

MP includes event logs that include information about system events and booting. The `s1` command displays the contents of system status logs.

On some systems, such as the rx1600, MP is optional. For more information about MP options and commands, see the appropriate hardware documentation.



NOTE: MP provides much more functionality than BMC and might be more appropriate for your needs. On some systems, MP is an optional component and on others it is built into the system.

- Baseboard Management Controller (BMC)
BMC is more limited in functionality than MP. BMC enables you to control some management features built into the system board, such as diagnostics, configuration, and hardware management. BMC provides a console connection on some systems. As with MP, BMC enables you to interact with EFI; it can function as the OPA0: terminal port on OpenVMS. BMC also operates on standby power. However, BMC is accessible only through the serial port on the back of the system. BMC commands enable you to control the BMC interface, view logs, get help, display firmware revisions, reset the system, turn the system locator LED on or off, and change the BMC password. BMC is not provided on cell-based Integrity servers. On some systems, such as the rx4640, the BMC user interface is hidden but is still present and functional. For more information about BMC commands, see the appropriate hardware documentation.

B.1.2 Configuration and Management Utilities on Cell-Based Servers

For the more complex environments provided by cell-based Integrity servers, a wider variety of tools is provided. Systems with multiple nPartitions provide a separate EFI interface for each nPartition. MP provides access to, and allows management across, the complex and each nPartition EFI interface.

In addition to MP and EFI (cell-based servers do not provide BMC), these systems offer Partition Manager and other tools that vary from system to system and operating system to operating system. The Partition Manager (parmgr) utility provides a graphical interface for managing nPartitions and complex hardware. It centralizes all nPartition management functions in one place, providing the system manager with the tools to dynamically reconfigure, power on, power off, create, delete, and modify nPartitions to ensure smooth and well-controlled operation. Partition Manager can be run on HP-UX or Microsoft Windows systems. You can use either version of Partition Manager to manage nPartitions for OpenVMS Version 8.4. Partition Manager is a free product that you can download from the following website (PARMGR must be uppercase as shown):

<http://www.docs.hp.com/en/PARMGR2/download.html>

For more information about Partition Manager, see the *nPartition Administrator's Guide* (previously titled *HP System Partitions Guide: Administration for nPartitions*).

For more information about these and other tools available for configuring or managing Integrity servers, see the appropriate hardware documentation.

B.1.3 Using the Delete or Backspace Key with Integrity server Utilities

Some versions of the EFI environment and the MP and BMC console interfaces on Integrity server systems still interpret the **Delete** (or **Backspace**) key as do UNIX systems, which is different from the way OpenVMS Alpha systems or Microsoft Windows systems interpret it. Whereas the OpenVMS operating system uses the ASCII DEL/RUBOUT character (7F hexadecimal) to delete the last character typed in a command line, these Integrity server facilities use **Ctrl/H**. When you enter commands for these Integrity servers, if you press **Delete** at a VTxxx terminal (or press the key you have mapped to send the DEL/RUBOUT character code in your terminal emulator), the last character typed is not deleted.

You can remap a terminal so that the **Delete** key removes the last character typed by adding the following command to your login command procedure (generally, LOGIN.COM):

```
$ SET TERMINAL/BACKSPACE=DELETE
```

This command remaps **Ctrl/H** to DEL. The driver does not remap these keys if the terminal is in one of the following states:

- Terminal attribute is set to PASSALL
- Terminal attribute is set to PASTHRU
- IO\$_READALL
- IO\$_READPBLK
- **Ctrl/V** is entered, which tells the driver to pass the next character and skip the remap check.

Alternatively, you can set up your terminal emulator so that the **Backspace** key deletes the last character typed. However, for the key to work properly on OpenVMS, you must still enter the SET TERMINAL command described earlier.

B.2 Selecting Your OpenVMS Console for the Integrity servers System

You must set up the firmware console as described in the hardware or firmware documentation provided with your Integrity servers. When first powered on, Integrity servers interact with the firmware interface and accept input from one or more console devices. These devices include the Integrity iLO MP (or simply MP on some servers; for simplicity, this section refers to MP for both firmware interfaces), serial ports, and if present, local graphics monitor and keyboard. The default console devices enabled for use by the firmware depend on the Integrity server hardware model and associated firmware (see your hardware documentation). The MP port is typically used by the OpenVMS operating system on Integrity servers (recommended by HP). This port provides serial access as well as networked access to the firmware console. If using the serial port, use a VT100-capable terminal or emulator device. On Integrity servers that do not have an MP port, the console serial port (generally on the back of the server) is enabled.

With the exception of some older Integrity server models, such as the HP Integrity rx2600 server, the current firmware available for Integrity servers provides a text menu-based interface by default. The current firmware also includes the concept of console interfaces that are “Primary,” “Secondary,” and “Not Configured.” The Primary console is the console enabled for interacting with the operating system as well as with the firmware. Although the firmware can interact with multiple console devices, OpenVMS uses only one of these devices as its console and requires that one device be selected. You select one device to serve as the Primary console, as explained in Section B.2.1 (page 195) where more details are also given about the Primary, Secondary, and Not Configured console selections.

When an Integrity server is powered up, the firmware displays information to the Primary and Secondary console devices. If you do not see output within a few seconds of powering up, your console device is probably not selected as a Primary or Secondary device; you will need to connect your console terminal cable to the appropriate device. When connected to the correct device, the firmware displays the EFI Boot Manager screen, from where you can begin to navigate to select the Primary console for use by OpenVMS, as explained later in this section. When using the firmware to boot OpenVMS, if you do not see OpenVMS console output and the system appears hung, your console terminal device might be connected to a Secondary console device instead of the Primary console device.

If you are already using the system console, you can disregard the remainder of this section. If you have ordered a machine with OpenVMS preinstalled, your console selections have been chosen for you, but you might want to change these default console selections. If you have changed your system configuration, or if you are installing OpenVMS on new (uninstalled) Integrity servers, or if you are reinstalling OpenVMS using the INITIALIZE option (removing all the software and data files that were previously installed on the target system disk), you might need to select the correct console. If the correct console is not selected, OpenVMS might use an unexpected device as the console, causing your system to appear to be hanging; or OpenVMS either will fail to boot or will boot with output sent to the wrong location.

You can use MP to establish remote console access, such as through the TELNET utility provided with HP TCP/IP Services for OpenVMS. Alternatively, you can access the MP console interface through the Internet using an Internet browser. If you intend to set up LAN or remote access for an MP console interface, you must initially use the serial port for console operations when you set up the Integrity servers for the first time. (See your hardware documentation for instructions on setting LAN or remote access for the MP console interface.)

Your first step is to decide what console to use. Depending on your hardware/firmware configuration, OpenVMS can use one of the following types of consoles:

- System serial port
- MP (or iLO MP) serial port

The MP interface is not visible to OpenVMS unless the MP serial port is selected as the Primary console.

- Graphics (VGA) device

Graphics console support allows you to use a monitor and a USB keyboard and mouse connected directly to the Integrity server ports available for such purposes. Certain older (legacy) Integrity servers, such as the rx2600, do not support a graphics console because they lack the required firmware capabilities. On some Integrity servers, a VGA device might not be built into the system, in which case a graphics option card is required for VGA console support.

Most Integrity servers support multiple graphics options; the exceptions are the rx1600 and rx1620 servers. A graphics option consists of a graphics card and a graphics display interface (monitor). When multiple graphics devices are present, you can select only one device for use by the firmware as a console device. The other graphics devices must be set to Not Configured (NC). When DECwindows is used on a system booted using the VGA as the OpenVMS console, DECwindows selects the VGA console as the default screen. When enabling multihead DECwindows graphics operation, the VGA console defaults to screen 0. If no VGA device is configured as a console, DECwindows selects a default screen based on the Integrity server model and device bus ordering. For details about enabling multihead DECwindows graphics operation, see Section 7.8.3 (page 136).

Note the following restrictions:

- OpenVMS supports up to four add-on graphics devices plus any built-in graphics, depending on the Integrity servers and available slots. The firmware available on some Integrity servers might limit which devices can be used as a VGA console device. For information about your specific configuration's platform and graphics configuration rules, see your hardware documentation .
- For correct operation of the VGA console, OpenVMS requires that at least one other non-VGA device be configured as the Secondary console.
- XDELTA is not available when using the VGA console; it is disabled when requested.
- Conversational (interactive) boot (SYSBOOT>) is not supported with the VGA console. To change SYSGEN parameters, use SYSGEN from OpenVMS, or boot OpenVMS from a non-VGA console for conversational boot.
- When using a VGA console and installing from vMedia or a USB DVD drive with the keyboard plugged into a USB hub, the keyboard might not be operational initially. To enable keyboard operation, simply unplug the hub and plug it back in.

For more information, platform-specific details, and the firmware required for VGA support, see the *HP OpenVMS Version 8.4 Release Notes* and the hardware documentation for your Integrity servers.

The procedure for selecting the correct console varies according to the Integrity server model and firmware. For Integrity servers other than the rx2600, follow the steps in Section B.2.1 (page 195). For rx2600 Integrity servers and servers for which you cannot obtain the required firmware, follow the steps in Section B.2.2.

On systems which support iLO firmware, OpenVMS Version 8.4 enables the Integrated Console which provides a virtual keyboard, video and mouse (vKVM) to operate from the remote iLO browser window. The Integrated Console functionality allows both pre-boot (EFI), OpenVMS boot, and runtime (both text console and DECwindows) to be displayed and interacted with from the iLO browser window. By default, the maximum resolution of the graphics display in DECwindows is 1024x768 and is a restriction of the iLO firmware. To use the Integrated Console, the system must be set up with VGA as the primary console. Both the local keyboard, video and mouse can be used in addition to (or at the same time) with the remote iLO Integrated Console. Performance of DECwindows graphics using the iLO Integrated Console will vary depending

on the speed of the LAN, and in general is only recommended for doing occasional system management functions that do not require performance sensitive graphics.



NOTE: Make sure your Integrity servers has the latest firmware updates installed.

B.2.1 Selecting Your OpenVMS Console (Not Applicable to rx2600 Integrity servers)

On Integrity servers other than the rx2600 (or on servers with outdated firmware), console devices can be configured as one of the following three types:

- Primary console—The device enabled as a console for the firmware interface and used as the OpenVMS console (OPA0). If a VGA device (device path) is selected as the Primary console, at least one serial device path must be set as a Secondary console in order to use the VGA device to boot OpenVMS.
- Secondary console—A device enabled as a console for the firmware but not used as the OpenVMS console during or after booting. The device is configured as a normal serial port device. If you specify an MP port as the Secondary console, it will not be visible to OpenVMS. The MP port is visible to OpenVMS only when selected as a Primary console. If multiple serial ports are available as a console on your Integrity servers and you select one for a Secondary console, do not use that console for transmission of binary data.
- Not Configured—A device that is not enabled as a console for the firmware or operating system.

Your system can be booted from any Primary or Secondary console but OpenVMS output displays only on the primary console. For information about serial devices that can be selected as the console and the serial device port enumeration, see the *HP OpenVMS Version 8.4 Release Notes*.

You can select a console in one of two ways:

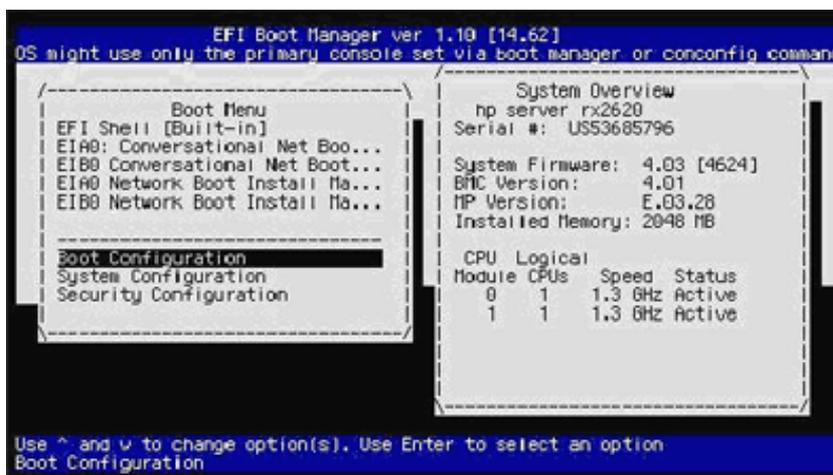
- Using the EFI Boot Manager, as described in Section B.2.1.1 (page 195)
- Using the EFI shell, as described in Section B.2.1.2

The examples in the following two subsections show how to select a VGA device for the OpenVMS console.

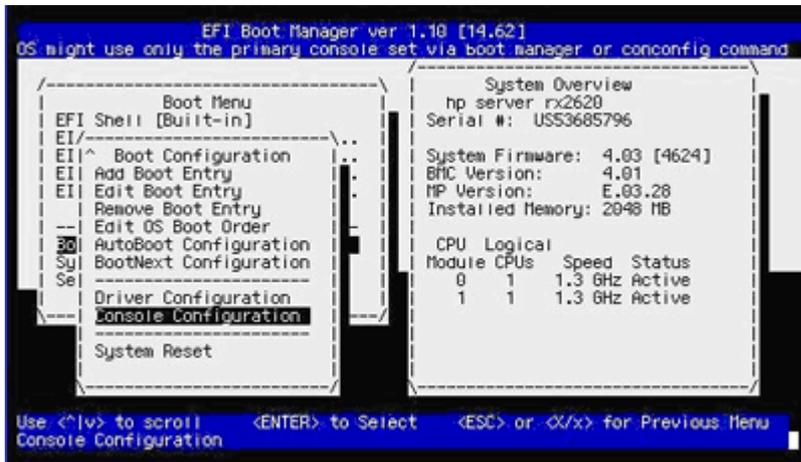
B.2.1.1 Using the EFI Boot Manager to Select the OpenVMS Console

To select the device for your OpenVMS console using the EFI Boot Manager, follow these steps. Depending on the firmware version and configuration, menu selections displayed on your screen might differ from those seen in the examples. With this EFI firmware, you no longer have to select a console input device, console output device, and console error device. The firmware automatically sets the Primary console device to be the console input, console output, and console error device.

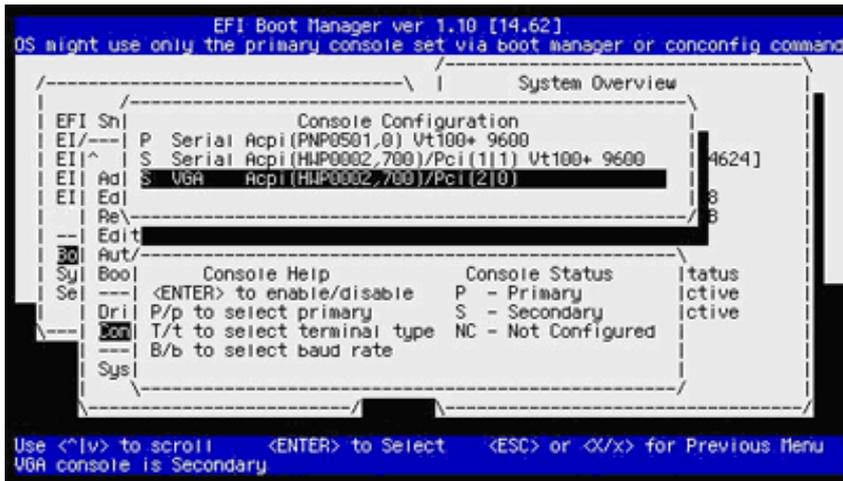
1. From the EFI Boot Manager screen, use the up or down arrow key to select the Boot Configuration menu and press **Enter**:



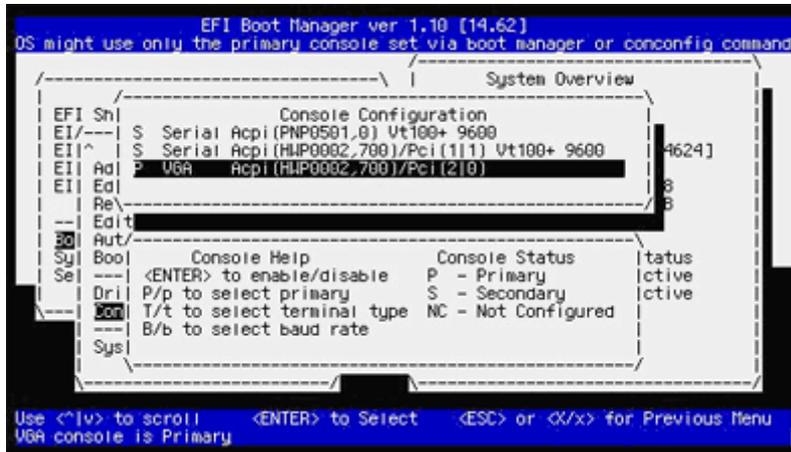
- From the Boot Configuration menu, select the Console Configuration menu and press **Enter**:



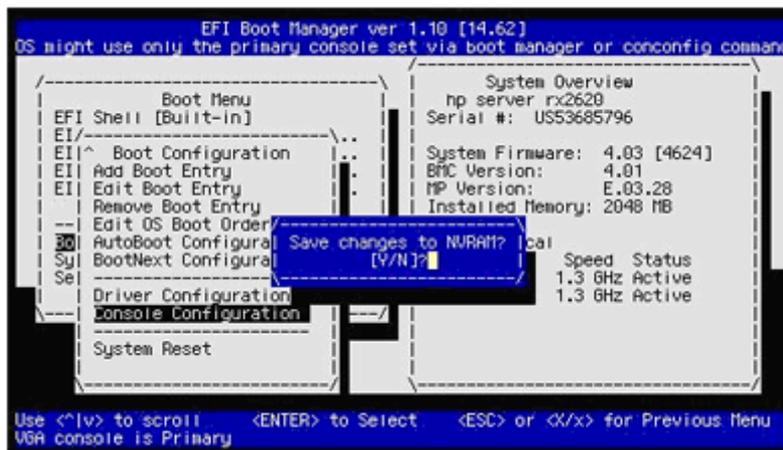
- If the Console Configuration menu shows that your preferred device is already configured as the Primary console, you need not continue; otherwise, select the device that you want as the OpenVMS Primary console. In the following screen, the VGA device is selected:



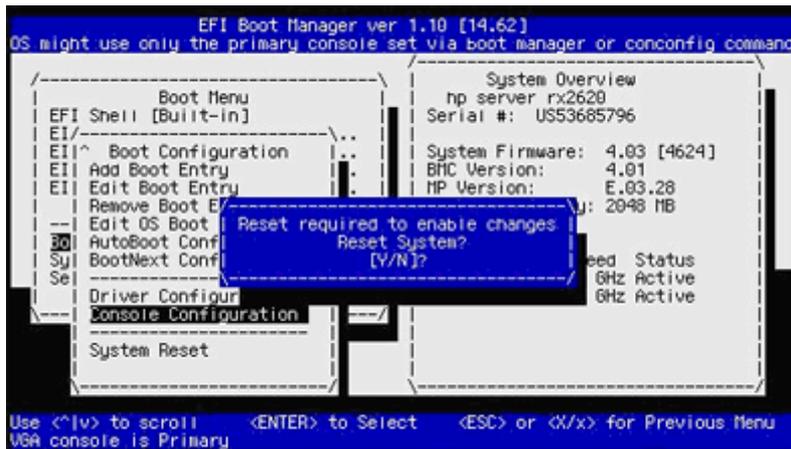
- Enter P to configure the selected device as the Primary console. You then see the selected device as the Primary console:



- Press the **Esc** key to return to the previous menu. When prompted whether to save changes to NVRAM, enter Y:



- When prompted whether to reset the system, enter Y to make the changes take effect:



B.2.1.2 Using the EFI Shell to Select the OpenVMS Console

To select the device for your OpenVMS console using the EFI shell, follow these steps:

1. At the EFI Shell prompt, enter the `conconfig` command to view the index number for the available console devices, as in the following example (the column titled “Primary” displays how the device is configured (P for Primary, S for Secondary, NC for Not Configured)):

```
Shell>conconfig
CONSOLE CONFIGURATION
```

Index	Primary	Type	Device Path
1	P	Serial	Acpi (PNP0501,0)
2	S	Serial	Acpi (HWP0002,700)/Pci (1 1)
3	S	VGA	Acpi (HWP0002,700)/Pci (2 0)

2. If your preferred device is already configured as the Primary console, you need not continue. If your preferred device is not currently configured as the Primary console, enter the `conconfig` command in the following format:

```
conconfig index primary
```

where *index* is the index number of the device preferred for the OpenVMS console. In the following example, the VGA device is selected as the Primary console, and the resulting display reflects the configuration change:

```
Shell>conconfig 3 primary
CONSOLE CONFIGURATION
```

Index	Primary	Type	Device Path
1	S	Serial	Acpi (PNP0501,0)
2	S	Serial	Acpi (HWP0002,700)/Pci (1 1)
3	P	VGA	Acpi (HWP0002,700)/Pci (2 0)

3. Enter the `reset` command to make the changes active, as in the following example:

```
Shell>reset
```

B.2.2 Selecting Your OpenVMS Console on rx2600 Integrity servers

This section describes how to select a console on rx2600 Integrity servers or other servers with outdated firmware. On such servers, you must configure a Console Input, Console Output, and Console Error Device for your OpenVMS console. There is no concept of the Primary console that automatically configures these devices for the OpenVMS console. In addition, on such servers OpenVMS does not support graphics consoles.



NOTE: The following instructions assume that OpenVMS is not installed on your Integrity servers and that boot options are not defined.

1. **Decide what console you want to use.**
2. **Power on the system. If using an MP serial port, log in to MP and access EFI.** If you are setting the system serial port as your system console, go to the next step now. If you are setting the MP serial port as your system console and you have just powered on your Integrity servers, the MP console interface prompts you to log in. (By default, both user name and password are set to Admin. For security purposes, change the password immediately. See your hardware documentation for more information.)



NOTE: To see the MP login user name and password prompts, you might need to press **Enter** one or more times on your console keyboard. If this does not work, try pressing **Ctrl/B**.

If you see only the MP password prompt, press **Enter** to get to the MP login prompt.

If the login prompt still fails to appear, the system might be powered off. (When you powered on the system, you might have pressed the power button twice, which turns it on and then off.)

If you see a message similar to the following, another user has the console (only one user can write to the console, although multiple users can view it).

```
[Read only - use Ctrl-Ecf for console write access]
```

To gain control of the console from the other user, press **Ctrl/E**, release the key combination, and then immediately type the letters `cf`. Alternatively, you can have the other user log off.

The system does not work if it is running MP firmware older than version E02.22. For information about updating the MP firmware, see [Section 1.3.6 \(page 26\)](#).

When the `MP>` prompt is displayed, move to the EFI interface by entering the `co` (console mode) command. If the power or initialization sequence has not completed, you will see that and must wait until the menu reappears, at which point reenter the `co` command to get to the EFI Boot Manager menu. At the EFI Boot Manager menu, select the EFI Shell interface.

On Integrity servers without `nPartitions`, the `co` command brings you directly to the EFI Boot Manager screen. If you do not enter a command before the EFI countdown timer expires, the EFI Shell prompt is displayed. (On some servers, the countdown timer is 10 seconds by default; on others, such as Server Blade products, it might be even less.) When the operating system is running, the `co` command brings you to the console port of the operating system.

On cell-based servers, unless you are using a single-partition user account, the `co` command first brings you to a console menu that lists the available `nPartitions`. Select the appropriate `nPartition` to access the EFI Boot Manager console for that `nPartition`. The following example shows a console menu (menus and displays such as this might vary from system to system):

```
Partitions available:
```

```
  #   Name
  ---  ----
  1)   MIA1
  2)   MIA2
  3)   TESTING
  4)   LAN
  5)   AMYS
  6)   ACCNTS
  Q)   Quit
```

```
Please select partition number:
```

If the `co` command results in a screen that is unexpected or difficult to interpret, pressing **Enter** might help. If you are at an EFI submenu instead of the main menu, navigate to the main menu by exiting from the submenu and any subsequent submenus until you return to the EFI main menu.

For more information about determining which `nPartition` to access, see the *nPartition Administrator's Guide* (previously titled *HP System Partitions Guide: Administration for nPartitions*) or the appropriate hardware documentation.

3. **Access the EFI Boot Configuration menu.** The EFI Boot Manager screen includes a boot menu. The default menu option is highlighted, as shown in the following example:



NOTE: The appearance of EFI Boot Manager screens and menus differs from version to version of the firmware.

Boot Menu

```
EFI Shell [Built-in]
Internal Bootable DVD
-----
Boot Configuration
System Configuration
Security Configuration
```

From the EFI boot menu, select the Boot Configuration option (or, in some versions of EFI, the Boot Option Maintenance Menu). To move to an option, use the up or down arrow key. (With some terminal emulators, you might have to use the letter `v` to scroll down or the caret (`^`) to scroll up.) Press **Enter** to toggle the selection. If you do not select an option within the countdown period, EFI moves to the default option—the EFI Shell in the boot menu example, in which case the EFI Shell prompt is displayed. Exit the EFI Shell to return to the Boot Configuration menu. If lines from the preceding screen linger and obscure the EFI Shell prompt, press **Enter** to bring the EFI Shell prompt into view.

4. **Configure the Console Input, Console Output, and Console Error Devices.** If you have the latest EFI firmware, select the Console Configuration option from the Boot Configuration menu to list the console input, console output, and console error device options. Some versions of EFI list the three console device options directly in the Boot Option Maintenance Menu. Configure each console option one at a time, as follows:



NOTE: With OpenVMS systems, the input, output, and error console all must point to the same serial-line console device. New systems might be shipped with multiple devices selected for each of the console types, so make sure only one device is selected for each. If you see an error message that mentions multiple device-path instances for the console input or output device, perform the following steps to select a single console only.

On rx2600 Integrity servers and certain other servers with firmware that is not up to date, OpenVMS might not boot using a USB keyboard or a VGA graphics display device. The system might boot with these devices but does not display any indication that the system is booting. You might receive a warning when the system begins to boot. You might also see other errors in later stages of the boot. Additionally, you might lose output that you normally see during booting.

- a. **Select the console input device.** EFI displays a list of devices (device paths) available for console input. Select only one device from this list, and deselect any unused devices. The following is a sample list of devices, annotated with explanatory text below the list. This example shows the devices for an entry-class Integrity servers; the procedure and display differ on cell-based servers. For more information about the EFI paths used for console selection, see the Intel Extensible Firmware Interface (EFI) documents available from the Intel website.

```

System      { Acpi (PNP0501,0) /Uart (9600 N81) /VenMsg (PcAnsi)
Serial Port { Acpi (PNP0501,0) /Uart (9600 N81) /VenMsg (Vt100)
              Acpi (PNP0501,0) /Uart (9600 N81) /VenMsg (Vt100+)
              Acpi (PNP0501,0) /Uart (9600 N81) /VenMsg (VtUtf8)
MP Console  { Acpi (HWP0002,700) /Pci (1|1) /Uart (9600 N81) /VenMsg (PcAnsi)
              Acpi (HWP0002,700) /Pci (1|1) /Uart (9600 N81) /VenMsg (Vt100)
              Acpi (HWP0002,700) /Pci (1|1) /Uart (9600 N81) /VenMsg (Vt100+)
              Acpi (HWP0002,700) /Pci (1|1) /Uart (9600 N81) /VenMsg (VtUtf8)
VGA Device -> Acpi (HWP0002,700) /Pci (2|0)

```

System Serial Port

These four lines indicate any of the valid devices that you can define for the console using the system serial port. Any line that has the notation Uart but not the notation Pci is one of the system serial ports. Notice that the lines are almost identical except for the text following the VenMsg portion indicating the terminal emulation protocol such as VT100. Thus, each of the four entries is the same device with different emulation protocols.

MP Console

These four lines appear only on systems that have an MP port. Any lines that include both Uart and Pci are MP serial port devices. As with the serial port devices, these four lines refer to the same device with different emulation protocols.

VGA Device

This is the graphic console device. Do not select this. OpenVMS does not support VGA graphics as a console output device for booting on rx2600 Integrity servers.

Select a device using the protocol appropriate for your terminal emulator (in most cases, VT100+ is the best choice). Select only one device line. OpenVMS does not operate if more than one device is selected.

- b. **Save your settings to NVRAM.**
- c. **Select the console output device.** Repeat steps a and b to configure the console output device. Select the same device you selected for the console input device.
- d. **Select the console error device.** Repeat steps a and b to configure the console error device (also referred to as the standard error device). Select the same device you selected for the console input and output devices.

5. **Perform a cold reset if required.** Your system might require a cold reset. Newer versions of EFI do not require a cold reset. For more information, see your hardware documentation.

At this point, you can boot the OpenVMS Integrity servers DVD to install the operating system onto a system disk. Follow the instructions in Chapter 3 (page 45) (specifics for booting are provided in this appendix).



NOTE: Any time new potential console devices are added to a system, or anytime NVRAM on a system is cleared, review your console selections. When you change serial devices, you must also make changes to the input, output, and error console device options to ensure proper operation.

B.3 Overview of Using EFI

EFI is the basic interface between the operating system and firmware on all Integrity server systems; it is similar to SRM on Alpha systems. EFI provides a boot option menu and the ability to configure boot options. EFI is accessible when the operating system is not booted. On cell-based servers, EFI is available when the nPartition is in an active state but has not booted an operating system. Each nPartition has its own EFI interface and system boot environment that enables you to interact with the nPartition before an operating system has booted on it.

When you first power on a new Integrity servers system, you see a series of diagnostic messages followed by the EFI Boot Manager screen (unless MP is available, in which case you see the MP login screen). However, if your Integrity servers came with the OpenVMS Integrity servers operating system installed, then the OpenVMS Integrity servers operating system is the first option and it boots automatically.



NOTE: On some systems that include MP, you might first see the MP login screen. In addition, on cell-based servers, you initially must select the console for the nPartition you want to access. As noted previously, the behavior of Integrity server systems can vary significantly from model to model as well as from version to version of the firmware.

To select an option from the EFI Boot Manager menu, use the up or down arrow key to highlight an item (or for some (with some terminal emulators, you might have to use the letter v to scroll down and the caret (^) to scroll up), and then press **Enter** to activate the selection. You can use EFI to configure numerous options for your Integrity servers and OpenVMS operating system.

For the first boot of a system on which OpenVMS is not preinstalled, you probably need to use EFI to get started. When you select the EFI Shell, the console displays much activity before the EFI Shell prompt is displayed. If you do not see the EFI Shell prompt, press **Enter**. (Note also that the EFI Shell prompt might change, as explained in Section B.3.1 (page 203).)

The EFI boot menu lists boot options. Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments to be used when booting the device. You can add boot options to the boot menu. The OpenVMS installation procedure (as well as the upgrade procedure) can assist you in adding and validating a boot option for your newly installed system disk. The procedure uses the OpenVMS Integrity servers Boot Manager utility (SYS\$MANAGER:BOOT_OPTIONS.COM) to add and validate boot options. You can use this utility directly at the OpenVMS DCL prompt. HP recommends using either of these methods for configuring boot options rather than using EFI. The OpenVMS Integrity servers Boot Manager utility is easier to use than EFI and enables you to configure the most pertinent options for your system (while OpenVMS is running), including the following:

- Display boot options known to the EFI Boot Manager.
- Add a boot option to the EFI Boot Manager so that your system disk boots automatically when the system is powered on or rebooted.
- Remove or change the position of a boot option in the EFI Boot Manager list.
- Validate and fix the boot option list.
- Change how long EFI pauses before booting or rebooting.

Use of this utility is optional for most devices but is required for configuring boot options on Fibre Channel devices. HP recommends using this utility to add members of a multiple-member

shadow set to the boot list and dump device list. (Be sure to add all members to both lists.) For instructions on how to use the utility, see Section B.5 (page 205). For more information about configuring Fibre Channel devices with this utility, see Appendix E (page 293). For information about using the OpenVMS Integrity servers Boot Manager utility to display boot options, see Section B.5.2.2 (page 210). For information about setting the pause length, see Section B.5.2.3 (page 210). The OpenVMS Integrity servers Boot Manager utility also enables you to configure dump off the system disk (DOSD) devices and debug devices; for more information about this, see the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

B.3.1 General Notes About Using EFI

Note the following:

- **Using EFI on cell-based servers:** On Integrity servers with nPartition support, a separate EFI interface exists for each nPartition. Be sure to access the appropriate nPartition console. To determine which nPartition EFI interface you are using, use the `info sys` command at the EFI Shell prompt. This lists the local nPartition number and details about active cells. For processor details, use the `info cpu` command. (You can also use MP to provide information about the nPartition you are using, as described in the *nPartition Administrator's Guide* (previously titled *HP System Partitions Guide: Administration for nPartitions*.) You can use the MP console interface to access any nPartition's EFI console. Press **Ctrl/B** to move from EFI (or from your OpenVMS session) to the MP interface. Log in to MP if you are prompted. A menu then displays the names of all available nPartitions. Select from this list the nPartition that you want to access. To gain console write access for an nPartition console, press **Ctrl/E** and enter the letters `cf`. You can use the MP `pd` command to set a default nPartition for MP login; this helps to ensure you are brought to the intended nPartition (for example, to help prevent you from accidentally reconfiguring an nPartition you do not own). To return to the EFI console (when OpenVMS is not booted), enter the `co` command at the MP> prompt.
- **Navigating EFI file system directories:** To switch to a different file system, enter the file system name. The following example shows how to switch to fs3: from the current location (top level of the EFI Shell):

```
Shell> fs3:
fs3:\>
```

Note that the prompt is now `fs3:\`. The EFI Shell prompt changes to reflect the file system currently accessed. The Shell prompt is displayed again if you reset the system. Also note that the file system number might change when remapped after hardware changes are made to the server (for example, after an I/O drive is added to the server and the nPartition boots or the `map -r` command is issued).
- **File structure of EFI file systems:** The file structure of an fs disk is identical to MS-DOS and the commands to move around the structure are similar to MS-DOS commands. For example, to move to directory `efi` on disk `fs0`, enter the `cd` command:

```
fs0:\> cd efi
fs0:\efi>
```

To display the contents of the `efi` directory, use the `dir` command.
- **EFI commands for OpenVMS:** Most commands that you issue for OpenVMS purposes at the EFI Shell prompt are issued from `\efi\vms` on the file system associated with the system disk. You can enter such commands directly from the top level by specifying `\efi\vms` in the path for subsequent commands, or by first moving to `\efi\vms` and entering the commands without the path specification. The first example that follows shows how to enter commands from the top level. The second example shows how to move to `\efi\vms` before entering the commands. The `vms_show` command displays the equivalent OpenVMS device name for devices mapped by EFI, and the `vms_set` command can be used to set a debug or dump device. These EFI commands for OpenVMS, known as EFI Utilities for OpenVMS, are usable only when the operating system is not running. To display and set EFI-mapped

devices while the operating system is running, use the OpenVMS Integrity servers Boot Manager utility (SYSS\$MANAGER:BOOT_OPTIONS.COM), as described in Section B.5 (page 205). The EFI Utilities for OpenVMS are described in the *HP OpenVMS System Management Utilities Reference Manual*.

Example 1 — From Top Level

```
fs0:\> \efi\vms\vms_show device
.
.
.
fs0:\> \efi\vms\vms_set dump_dev dga3730
```

Example 2 — First Moving to \efi\vms

```
fs0:\> cd \efi\vms
fs0:\efi\vms> vms_show device
.
.
.
fs0:\efi\vms> vms_set dump_dev dga3730
```



NOTE: The directory structure and contents of the OpenVMS system disk differs from those of the OpenVMS Integrity servers OE DVD. Note also that the bootstrap on the system disk is located at `\efi\vms\vms_loader.efi`, while on the DVD it is at `\efi\boot\bootia64.efi`. (These two files are identical in content.)

- **EFI aliases:** You can define aliases for EFI commands that are easier to remember. For example, to define the alias `dir` for the `ls` command, use the `alias` command as follows:

```
fs0:\> alias dir "ls"
```

To define an alias for the command that boots OpenVMS from `fs0:`, enter the following command:

```
fs0:\> alias bvms "fs0:\efi\vms\vms_loader.efi"
```



NOTE: Setting an alias to point to a specific device can lead to unexpected results. For example, if you insert a DVD in the DVD/CD drive, `fs0:` now points to the DVD/CD drive. HP recommends using the OpenVMS Integrity servers Boot Manager utility to set your system disk as a boot device for EFI, as explained in Section B.5 (page 205).

To list the aliases currently defined, enter the `alias` command:

```
fs0:\> alias
dir    : ls
bvms   : fs0:\efi\vms\vms_loader.efi
```

- **Boot device list:** Any changes in storage configuration after the system is booted to EFI (such as inserting a DVD into a DVD removable drive or adding SCSI drives on storage enclosures) is not automatically detected by the EFI Shell environment. To have the EFI Shell recognize the device, you must reconnect the device driver (on cell-based servers, use the EFI `search` command; on other servers, use the EFI `reconnect` command).

The EFI shell environment creates default mappings for all the device handles that support a recognized file system. After you change the system configuration or add a new device, you must regenerate these mappings. For information about reconnecting devices and regenerating mappings, see Section B.6.2.1 (page 216) and your hardware documentation or the website listed at the end of this section.

- **Moving between EFI and MP:** To move from MP interface to EFI, type `co` (for Console) at the `MP>` prompt. If you are in command mode (at the `MP:CM>` prompt), first press **Ctrl/B** to return to the `MP>` prompt.

When you move to EFI from MP, confirm that you are at the main EFI main menu. If you are at a submenu, to access the main menu exit from the submenu and any subsequent submenus until you return to the main menu.

To move from the EFI to MP, press **Ctrl/B** (this assumes MP is present and configured).

For more information about using EFI, see the documentation provided for your Integrity servers.

B.4 Enabling or Disabling Hyper-Threading on Dual-Core Processors

Systems that have Intel Itanium Dual-Core processors can support Hyper-Threading. Hyper-Threading provides the ability for processors to create an additional **logical CPU** that might allow additional efficiencies of processing. For example, a dual-core processor with Hyper-Threading active provides four logical CPUs, two on each core. The effect that Hyper-Threading has on performance depends heavily on the applications running on your system. HP recommends that you start with Hyper-Threading disabled and experiment later, if you wish.

You can enable or disable Hyper-Threading for a system whose processors support it. To display the Hyper-Threading state for a system, use the EFI `info cpu` or `cpuconfig` command. (The display indicates that “CPU threads” are turned on or off.) For example:

```
Shell> cpuconfig
PROCESSOR MODULE INFORMATION

CPU      # of      L3      L4      Family/
Module   Logical   Speed   Cache   Cache   Model   Rev   Processor
-----  -
0        4        1.4 GHz 6 MB    None    20/00   CO    Active
```

CPU threads are turned on.

To enable or disable Hyper-Threading, use the EFI `cpuconfig threads on` or `cpuconfig threads off` command. For more information, enter `help cpuconfig` at the EFI Shell prompt or see the appropriate hardware documentation. The recent release of the Partition Manager also supports Hyper-Threading.

After enabling or disabling Hyper-Threading, the system must be reset for the change to take effect. Use the EFI Shell `reset` command. When Hyper-Threading is enabled, it remains active on the next reboot of the system.

B.5 Configuring and Managing OpenVMS Booting on Integrity servers

This section explains how to configure and manage the booting behavior of your Integrity servers. You can use the EFI Boot Manager (while the operating system is not running) or the OpenVMS Integrity servers Boot Manager (while the operating system is running) to configure boot options. HP recommends using the latter.

You can configure multiple boot entries for a single operating system. On cell-based Integrity servers running multiple operating systems, you can configure boot options for all currently installed operating systems. On cell-based servers, each nPartition has a local instance of EFI that is specific to that partition. Each partition can be booted and stopped independently of other nPartitions in the system, and each partition executes its own operating system image.

On cell-based servers, to successfully boot an operating system you must first ensure that the ACPI configuration is correct for the operating system being booted, as explained in Section B.5.1 (page 206). Each nPartition has its own ACPI configuration value.



IMPORTANT: To configure booting on a Fibre Channel storage device, you must use the OpenVMS Integrity servers Boot Manager utility. (For information about configuring Fibre Channel devices, see [Appendix E \(page 293\)](#).) HP also recommends using this utility to add members of a multiple-member shadow set to the boot device list and dump device list. Be sure to add all members to both lists.

If you have just completed the initial setup of your Integrity servers, perform the following steps before continuing:

1. Power up your server system, as explained in the hardware documentation for your server. If you use the power button on the front panel, press it only once.



NOTE: If you see a warning that the BMC system event log (SEL) is full, you can safely continue by following the prompts; OpenVMS processes the contents of the SEL. If you want to clear the SEL manually, see the instructions in the first note of Section B.6 (page 213).

HP recommends that you load and use the most current system firmware. For more information about updating the system firmware, see Section 1.3.6 (page 26).

2. If you have a cell-based server, check that the ACPI configuration is correct for the OpenVMS operating system. For more information, see Section B.5.1 (page 206).
3. At the EFI Boot Manager menu, select the EFI Shell [Built-in] option. You can now boot your OpenVMS Integrity servers system manually, or you can add a new entry to the EFI Boot Manager menu to have your system booted automatically whenever you power on your Integrity servers or reboot.

This section discusses the following topics:

- Checking the ACPI configuration for nPartition booting (Section B.5.1 (page 206))
- Setting automatic booting and boot flags for your system disk (Section B.5.2 (page 207)) (also includes how to set automatic booting using EFI commands)
- Displaying EFI boot entries and mapped OpenVMS devices, using the OpenVMS Integrity servers Boot Manager utility (Section B.5.2.2 (page 210)) (also includes how to display boot entries using EFI commands)
- Setting the EFI boot option timeout value, using the OpenVMS Integrity servers Boot Manager utility (Section B.5.2.3 (page 210))
- Writing a new boot block, using the OpenVMS Integrity servers SET BOOTBLOCK command (Section B.5.3 (page 211))
- Comparing Alpha and Integrity servers system boot commands (Section B.5.4 (page 213))

B.5.1 Checking the ACPI Configuration for Booting OpenVMS in an nPartition

To boot your OpenVMS Integrity servers operating system on a cell-based server, the ACPI configuration must be set correctly. The ACPI configuration value determines, among other things, the EFI Path format used when referencing devices. If your Integrity servers was factory installed, the ACPI configuration is set correctly. If the nPartition on which you want to boot your OpenVMS system had previously been running a Windows or Linux system, then enter the following command at the EFI Shell prompt to set the partition to boot correctly with OpenVMS:

```
EFI> acpiconfig default
```

To make this new value take effect, you must reset the nPartition by using the EFI Shell `reset` command:

```
EFI> reset
```

If the ACPI configuration value is not set properly, when the operating system boots, it fails with bugcheck code INCONSTATE.

You cannot modify the ACPI configuration value for Integrity servers that do not support nPartitions (for example, the rx2600 server).

To display the current configuration value, enter the `acpiconfig` command with no arguments:

```
EFI> acpiconfig  
Acpiconfig settings: default
```



NOTE: The `acpicfg` command does not necessarily report the setting that was used on the current nPartition boot stage. It reports only the current setting, which is used for the next boot of the nPartition.

B.5.2 Setting Boot Options for Your System Disk

You can establish and manage boot options for your system disk in any of three ways:

- During installation or upgrade, allowing the OpenVMS Integrity servers installation/upgrade procedure to automatically establish an EFI boot option for your system disk
- Using the OpenVMS Integrity servers Boot Manager utility (`SY$MANAGER:BOOT_OPTIONS.COM`) while the operating system is running
- Using EFI (after the system disk has been created or updated and only while the operating system is not running)

HP recommends that you allow the OpenVMS Integrity servers installation or upgrade procedure to establish a boot option for your system disk. However, you still have the option of modifying the boot option or adding other boot options for your system disk by using the OpenVMS Integrity servers Boot Manager utility from the OpenVMS DCL prompt (or by using EFI itself).

The OpenVMS Integrity servers Boot Manager utility is a menu-based utility that enables you to configure EFI boot options for your Integrity servers. It is easier to use than EFI. With this OpenVMS utility, you can perform actions such as the following:

- Add your system disk as an EFI boot option (you can optionally configure it to boot automatically on hardware startup and reboot).
- Manage multiple system disks.
- Set boot flags.
- Display the EFI boot options.
- Add, move, and remove boot options in the EFI Boot Manager menu.
- Enable or disable the EFI boot countdown timer (timeout) and set the countdown value.

This section explains how to perform most of these operations (except moving and removing boot options). For more information about the OpenVMS Boot Manager utility, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*. This section also explains how to use EFI to add a boot option for automatic booting.

HP recommends that you configure your system with a boot option for your system disk. You can enable automatic reboot of the system disk by specifying your system disk as the first boot option in the EFI Boot Manager menu. When the EFI timeout (countdown) occurs, your system disk boots automatically.



NOTE: To configure booting on Fibre Channel devices, you must use the OpenVMS Integrity servers Boot Manager utility. (Use of this utility is optional for other devices but mandatory for Fibre Channel devices.) HP also recommends using this utility to add members of a multiple-member shadow set to the boot device list and dump device list. Be sure to add all members to both lists. For more information about the utility, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*. For more information about configuring and booting Fibre Channel devices, see [Appendix E \(page 293\)](#).

B.5.2.1 Adding a Boot Option and Setting Boot Flags

To add a boot option and set boot flags using the OpenVMS Integrity servers Boot Manager utility, follow these steps:

1. At the DCL prompt, enter the following command to start the OpenVMS Integrity servers Boot Manager utility:

```
$ @SY$MANAGER:BOOT_OPTIONS.COM
```
2. When the utility starts, the main menu is displayed. To add your system disk as a boot option, enter 1 at the prompt, as in the following example:

OpenVMS I64 Boot Manager Boot Options List Management Utility

- (1) ADD an entry to the Boot Options list
- (2) DISPLAY the Boot Options list
- (3) REMOVE an entry from the Boot Options list
- (4) MOVE the position of an entry in the Boot Options list
- (5) VALIDATE boot options and fix them as necessary
- (6) Modify Boot Options TIMEOUT setting

- (B) Set to operate on the Boot Device Options list
- (D) Set to operate on the Dump Device Options list
- (G) Set to operate on the Debug Device Options list

- (E) EXIT from the Boot Manager utility

You can also enter Ctrl-Y at any time to abort this utility

Enter your choice: 1



NOTE: While using this utility, you can change a response made to an earlier prompt by entering the caret (^) character as many times as needed. To end and return to the DCL prompt, press **Ctrl/Y**.

3. The utility prompts you for the device name. Enter the system disk device you are using for this installation. In the following example, the device name is DKA0:

Enter the device name (enter "?" for a list of devices): **DKA0:**

4. The utility prompts you for the position you want your entry to take in the EFI boot option list. To see a list of the current boot options, enter a question mark (?):

Enter the desired position number (1,2,3,...) of the entry.
To display the Boot Options list, enter "?" and press Return.
Position [1]: ?

5. The list in the following example includes only one boot option. To add your boot option entry to the top of the list (the default) so that your system disk boots automatically when the server starts or the EFI countdown timer expires, enter 1:

```
EFI Boot Options list:      Timeout = 0 secs.
-----
01. VenHw(d65a6b8c-71e5-4df0-d2f009a9) "EFI Shell [Built-in]"
-----
1 entries found.
```

Enter the desired position number (1,2,3,...) of the entry.
To display the Boot Options list, enter "?" and press Return.
Position [1]: 1

6. The utility prompts you for OpenVMS boot flags. By default, no flags are set. Enter the OpenVMS flags (for example, 0,1), or press **Enter** to set no flags, as in the following example:

Enter the value for VMS_FLAGS in the form n,n.
VMS_FLAGS [NONE]:

Optionally, you can use any of the standard OpenVMS boot flags such as the following:

Flags	Description
0,1	Enable SYSBOOT to change system parameters; enable conversational booting for debugging purposes.
0,2	Load XDELTA.
0,4	Take the initial EXEC_INIT breakpoint.

Flags	Description
0,20000	Print debug messages on boot.
0,30000	Print more debug messages on boot.

7. The utility prompts you for a description to include with your boot option entry. By default, the device name is used as the description. You can enter more descriptive information as in the following example. This example shows a sample confirmation message (for devices with multiple paths, such as Fibre Channel devices, a separate confirmation message is displayed for each path). EFI\$BCFG is the name of the executor file for the OpenVMS Integrity servers Boot Manager utility.

```
Enter a short description (do not include quotation marks).
Description ["DKA0"]: DKA0: OpenVMS V8.4 for PLMs System
```

```
efi$bcfg: DKA0: (BOOT003) Option successfully added
```

8. When you have successfully added your boot option, exit the utility by entering E at the prompt:

```
Enter your choice: E
$
```

B.5.2.1.1 Using EFI to Set Automatic Booting of Your System Disk

HP recommends allowing the OpenVMS installation or upgrade procedure to set your system disk to boot automatically. Or, use the OpenVMS Integrity servers Boot Manager utility (SYS\$MANAGER:BOOT_OPTIONS.COM). However, you can use EFI. This section explains how to use EFI to set up your Integrity servers firmware to automatically boot your OpenVMS Integrity servers system from your system disk. (HP also recommends using the OpenVMS Integrity servers Boot Manager utility to set boot flags. Optionally, you can use the `vms_loader.efi -flags n,n` command at the EFI prompt to set any of the standard OpenVMS boot flags, as documented earlier in this appendix.)

Access the EFI Shell and enter the following line at the prompt, where `fsn:` (such as `fs0:` or `fs1:`) is the device associated with the system disk:

```
Shell> bcfg boot add 1 fsn:\efi\vms\vms_loader.efi "HP OpenVMS I64"
```

This command adds the OpenVMS Integrity servers operating system to position 1 in the EFI Boot Manager menu. The quoted text in the command line (“HP OpenVMS Integrity servers”) is displayed at position 1 in the EFI boot menu. You can enter any text that helps you identify the operating system disk. During system power up, the position 1 item is automatically executed after the countdown.

Alternatively, you can add an EFI boot menu option by using the EFI menu interface:

1. Select the Boot Configuration option (or in some versions of EFI, the Boot Option Maintenance Menu).
2. Select Add a Boot Option.
3. Select the boot device and boot file.



NOTE: All EFI boot options embed the disk Globally Unique ID (GUID). Therefore, if you reinstall OpenVMS or restore a system disk from an image backup, you must first delete the old boot options and then add a new boot option. To delete a boot option, use the Delete Boot Option(s) option in the Boot Configuration menu (or Boot Option Maintenance Menu).

Still another method to add a boot entry to the EFI Boot Manager menu is to use the EFI Utilities for OpenVMS (Integrity servers only) `vms_bcfg` command, which accepts OpenVMS device names and also enables you to set flags. However, this command has limited capabilities; for example, it cannot handle Fibre Channel paths as can the OpenVMS Integrity servers Boot Manager utility. In the following example, DKA0: is the OpenVMS system disk being added as the first boot option:

```
Shell> \efi\vms\vms_bcfg boot add 1 dka0: -fl 0,2 "HP OpenVMS I64"
```

For more information about EFI utilities for OpenVMS, see the *HP OpenVMS System Management Utilities Reference Manual*.

B.5.2.2 Displaying EFI Boot Entries and Mapped OpenVMS Devices

The Integrity servers EFI Boot Manager shows the various paths to the boot device. You can use the OpenVMS Integrity servers Boot Manager utility to display the OpenVMS boot device options known to EFI.

Start the utility at the DCL prompt (@SYS\$MANAGER:BOOT_OPTIONS.COM) and select option 2 on the main menu (the main menu is shown in [Section B.5.2 \(page 207\)](#)). The utility displays the following prompt. In this example, the listings for the DQA0: device are requested and displayed.

```
To display all entries in the Boot Options list, press Return.
To display specific entries, enter the entry number or device name.
(Enter "?" for a list of devices): DQA0
```

```
EFI Boot Options list:   Timeout = 20 secs.
```

```
-----
04. DQA0 PCI(0|0|2|0) ATA(Primary,Master) "DVD-ROM "
```

```
-----
1 entries found.
```

You can also display all bootable devices mapped by the EFI console and their equivalent OpenVMS device names by using the EFI Utilities for OpenVMS `vms_show` command at the EFI Shell prompt (from `\efi\vms`). For more information about EFI utilities for OpenVMS, see the *HP OpenVMS System Management Utilities Reference Manual*.

B.5.2.3 Setting EFI Boot Option Countdown Timer (Timeout)

Whenever the EFI Boot Manager menu displays, it waits for you to select an option. The wait depends on the current setting of the EFI countdown timer. On some servers, the countdown timer is 10 seconds by default; on others, such as Server Blade products, it might be even less. After the timer expires, EFI boots the first boot option. If the first option is not available or does not boot, EFI waits the same duration before booting the next option in the list. The OpenVMS Integrity servers Boot Manager utility (SYS\$MANAGER:BOOT_OPTIONS.COM) allows you to change this timeout value and also to disable the countdown (so that there is no wait) and enable it.

Select option 6 on the OpenVMS Integrity servers Boot Options main menu (the main menu is shown in [Section B.5.2 \(page 207\)](#)). The utility displays the following prompt. To change the value, enter YES and then enter the new value. In this example, the timeout value is changed to 20 seconds.

```
efi$bcfg: Boot Timeout period is 10 secs
```

```
Would you like to modify the Timeout value? (Yes/No) [NO] YES
```

```
Please enter the Timeout value in seconds: 20
```

```
efi$bcfg: Boot Timeout period is 20 secs
```

To disable the timer so that automatic booting occurs instantaneously, enter 0 as the value, as in the following example:

```
Please enter the Timeout value in seconds: 0
```

```
efi$bcfg: Boot Timeout is Disabled
```

B.5.2.4 Saving and Restoring EFI Settings

Certain EFI settings, such as the Hyper-Threading setting supported on Intel Itanium Dual-Core processors, cannot be restored if lost. HP recommends that you write down your customized EFI settings in case they are lost in a system hardware or firmware failure. You can use the EFI

`info cpu` command or the EFI `cpuconfig` command to display current settings, such as the setting of the Hyper-Threading feature.

You might need to restore boot options, such as if they get lost during a firmware upgrade. You can save and restore your EFI boot path settings on Integrity servers by using the OpenVMS Integrity servers Boot Manager (`SYS$MANAGER:BOOT_OPTIONS.COM`) utility. You can also use the EFI `variable -s` command to save boot option variables and the `variable -r` command to restore them. After using the `variable` command to restore boot options, a reset might be required. Use the EFI Shell `reset` command.

You can use the OpenVMS-specific EFI utility `vms_bcfg` (`\efi\vms\vms_bcfg`) to set boot options, and the `vms_showutility` (`\efi\vms\vms_show`) to display them; however, these utilities are more limited in scope than the OpenVMS Integrity servers Boot Manager utility. For example, they cannot work with Fibre Channel boot paths as can the OpenVMS Integrity servers Boot Manager utility. You can use the EFI `variable` command to restore the boot options list from a previously saved file.

You could also use the EFI Shell `variable` command to restore variables such as boot path options; you must have first saved them in a known location by using the `variable -save` command. For more information, see the service manual provided for your Integrity servers.

B.5.3 Writing a New Boot Block

The boot block structures on the system disk contain the size and location of the boot partition and other details relevant to the bootstrap of OpenVMS Integrity servers. The size and location of the boot partition stored within the boot block structures must be maintained and must reference the current location of the OpenVMS file `SYS$EFI.SYS`.

Current versions of BACKUP maintain the boot block structures as well as the size and location of the boot partition during image operations (analogous to the similar BACKUP/IMAGE operations that maintain the boot block on OpenVMS Alpha disks). Older versions of BACKUP do not maintain these structures and do not correctly locate core OpenVMS Integrity servers bootstrap files.

If the boot partition file `SYS$EFI.SYS` is manually replaced or relocated, you must use the DCL command `SET BOOTBLOCK` or the `SYS$SETBOOT` image to rewrite the boot block structures. The `SET BOOTBLOCK` command and `SYS$SETBOOT` are analogous to the OpenVMS Alpha Writeboot utility; they provide OpenVMS Integrity servers with the equivalent of what the Writeboot utility provides on OpenVMS Alpha.



NOTE: Do not use the OpenVMS Alpha Writeboot utility to rewrite boot block structures on an OpenVMS Integrity servers system disk.

The `SET BOOTBLOCK` command enables you to establish the boot block pointers necessary for the EFI console to find and bootstrap an OpenVMS Integrity servers system disk. You must use this command if the target OpenVMS Integrity servers system disk was originally created by one of the following methods:

- A version of BACKUP that does not support the OpenVMS Integrity servers system disk structure. HP recommends that you do *not* use these versions of BACKUP for archiving or restoring an OpenVMS Integrity servers system disk.
- A nonimage backup of an OpenVMS Integrity servers system disk (possibly corrupting the boot block and various directory backlinks that must be manually reset). HP recommends that you do *not* use nonimage backups.
- A nonimage restore of an OpenVMS Integrity servers system disk from an image save set. HP recommends that you do *not* use a nonimage restoration.



NOTE: If the target OpenVMS Integrity servers system disk has an incorrectly-placed [000000]GPT.SYS file, the disk cannot be used reliably as an OpenVMS Integrity servers system disk. Typically, the file gets incorrectly placed due to the use of an older version of BACKUP/IMAGE, a file-based BACKUP disk restoration, or an errant disk defragmentation tool (the file is set with /NOMOVE to disable move operations; defragmentation tools that do not honor this setting will corrupt the file). A correctly-located GPT.SYS file will have at least two file extents, the first beginning at LBN 0 and the last at the disk capacity minus the size of the last extent (an extent is one or more adjacent clusters allocated to a file). The size of each of the two extents varies according to the disk cluster factor on the target disk. The first extent size is currently 34 or more blocks, and the last extent 33 or more blocks. For example:

```
$ DUMP/HEADER/BLOCK=END=0 SYS$SYSDEVICE:[000000]GPT.SYS ...
```

Map area

Retrieval pointers:

```
Count:          36      LBN:          0
Count:          36      LBN:      71132925
```

This example is from a disk with 71132960 blocks. The placement of the final extent is 71132924, which is calculated by subtracting 36 (the size of the last extent) from the disk capacity (71132960).

You may be able to temporarily recover from this condition and attempt to bootstrap the target OpenVMS Integrity servers system disk by renaming GPT.SYS to GPT.BAD, and then entering the SET BOOTBLOCK command. To correctly recover from this condition, you must INITIALIZE the target disk and then reload the disk contents using a file-based BACKUP restoration or a file-based COPY operation. No supported means exists for adding a GPT.SYS file onto an existing disk nor for adding the file during a BACKUP/IMAGE restoration operation.

To write the boot block structures onto an OpenVMS Integrity servers system disk, enter the SET BOOTBLOCK command using the following format:

```
$ SET BOOTBLOCK [/PRESERVE=SIGNATURES] [/I64] [boot-partition-name]
```

You can specify the file name for the boot partition (*boot-partition-name*). If you do not specify a file or device name, the command defaults to the following file for the boot partition:

```
SYS$SYSDEVICE:[VMS$COMMON.SYS$LDR]SYS$EFI.SYS
```

The command also assumes the current architecture. To specify OpenVMS Integrity servers, include /Integrity servers in the command line.

Use the /PRESERVE=SIGNATURES qualifier to preserve the existing GUID disk signature value and the associated root aliases. Using the OpenVMS Backup utility creates a new disk signature when restoring a bootable disk image.

If you reset the boot block structures, you might need to remove any EFI boot aliases that reference the disk, and then add them back again. You can use the EFI alias command to remove and add aliases; HP recommends using the OpenVMS Integrity servers Boot Manager utility (SYS\$MANAGER:BOOT_OPTIONS.COM) to maintain EFI console boot aliases.



NOTE: The boot partition file must be contiguous and movefile operations on the file must be disabled. If the file is not contiguous, use the DCL command COPY/CONTIGUOUS (or equivalent) to re-create a contiguous version of the file. To disable movefile operations, use the DCL command SET FILE/NOMOVE. This prevents bootstrap failures that could result from the normal and expected operations of disk defragmentation tools.

Alternatively, you can write a boot block by entering the following command:

```
$ RUN SYS$SYSTEM:SYS$SETBOOT
```

The utility prompts you for the required input (in a way similar to the operation of the OpenVMS Alpha Writeboot utility).

B.5.4 Alpha and Equivalent Integrity servers System Boot Commands

The Extensible Firmware Interface (EFI) on Integrity servers performs most of the same functions that the SRM console does on Alpha processors. If you are familiar with the Alpha tool, use the following table to find EFI commands equivalent to the Alpha commands you commonly use on Alpha systems. Some of the commands listed might not be available on certain hardware systems.

Table B-1 Alpha and Integrity servers EFI Command Equivalents

Task	Alpha SRM command at P00> prompt	Integrity servers EFI command at Shell prompt
Display help information	HELP	help
Display list and version of devices found on the most recently initialized system	SHOW CONFIGURATION or SHOW VERSION	info fw
Display devices and controllers in the system, including bootable devices and mappings	SHOW DEVICE	map vms_show devices(from \efi\vms) ¹
Display all system information	SHOW FRU	info all pci info io
Display memory information	SHOW MEMORY	info mem
Display volume information of the file system	SHOW DEV DKA0	vol fs0
Display hardware information about CPU resources	SHOW CONFIGURATION	info cpu
Display power status	SHOW POWER	info all ²
Set system dump disk	SET DUMP_DEV <i>disk1</i> , <i>disk2</i> ...	vms_set_dump_dev <i>disk1</i> , <i>disk2</i> , ... (from \efi\vms) ¹
Set boot flags	SET BOOT_OSFLAGS 0,0	set vms_flags "0,0" ¹
Set boot behavior to automatic boot	SET AUTO_ACTION BOOT	bcfg boot add 1 fsx:\efi\vms\vms_loader.efi "I64" ¹
Change the current boot option	SET AUTO_ACTION HALT	bcfg boot mv 1 2 ¹

¹ Similar functionality is provided by the OpenVMS Integrity servers Boot Manager utility (SYS\$MANAGER:BOOT_OPTIONS.COM), launched at the OpenVMS DCL prompt. Regarding the display of devices, BOOT_OPTIONS.COM displays only the boot entries and also a selected dump device for DOSD and a debug device; vms_show can display all devices mapped by the EFI console and their equivalent OpenVMS device names. The map command shows all devices currently mapped on the EFI Shell.

² Best source of information about power status is the MP PS command.

B.6 Booting Operations

This section describes various methods for booting your OpenVMS Integrity servers operating system.



NOTE: To boot your OpenVMS Integrity servers operating system, you can use a VGA graphics device (except on rx2600 Integrity servers or other servers that lack the firmware capabilities), a serial device, or a network interface for the console. For information about setting up the console on your Integrity servers, see [Section B.2 \(page 193\)](#).

When using a VGA console and installing from vMedia or a USB DVD drive with the keyboard plugged into a USB hub, if the keyboard does not respond, simply unplug the hub and plug it back in.



NOTE: HP Integrity servers maintain a system event log (SEL) within system console storage, and OpenVMS Integrity servers automatically transfers the contents of the SEL into the OpenVMS error log. During a successful boot operation while using a console, you might see a message indicating that the BMC SEL is full. You can safely continue when the BMC SEL is full by following the prompts; OpenVMS processes the contents of the SEL.

HP recommends that the latest system firmware be loaded and used. For more information about updating the system firmware, see [Section 1.3.6 \(page 26\)](#). For midrange and high-end Integrity servers, contact HP Customer Support to update your firmware.

B.6.1 Overview of Booting on a Cell-Based Server

This section gives an overview of booting the nPartition hardware and booting OpenVMS on an nPartition.

B.6.1.1 Booting the nPartition Hardware

Each nPartition runs its own firmware and has its own system boot environment. You can boot an nPartition independently of any other nPartitions in the same server complex.

The nPartition boot process includes two phases: the cell boot phase and the nPartition boot phase. These phases occur only as part of the hardware boot process, not as part of the operating system boot.

- **Cell boot phase**—This phase occurs when cells are powered on or reset. The main activities during this phase are the power-on-self-test activities. During this phase, cells operate independently of other cells in the complex. Cells do not necessarily proceed through this phase at the same pace, because each cell may have a different amount of hardware to discover and test, or cells might be reset or powered on at different times.
- **nPartition boot phase**—This phase occurs when an nPartition has been booted, after its cells have completed their self tests. During this phase, “nPartition rendezvous” occurs, in which each cell contacts the other active cells in the nPartition and selects a core cell that is responsible for managing the rest of the nPartition boot process. A processor on the core cell runs the nPartition EFI system boot environment. When the operating system boot process is initiated, the core cell passes control to the operating system loader.

You can view progress of these phases by using the Virtual Front Panel (VFP) to check the nPartition boot state. Access VFP from the MP main menu.

For information about how to boot the nPartition hardware, see your hardware documentation.

B.6.1.2 Booting OpenVMS Integrity servers on an nPartition



CAUTION: To prevent loss of data when booting your OpenVMS Integrity servers operating system, note the following:

- You must first ensure that the nPartition has its ACPI configuration set to the default (see Section B.5.1 (page 206)).
- OpenVMS Integrity servers does not support using cell local memory (CLM). The nPartition on which OpenVMS Integrity servers is booted must have all memory configured as interleaved memory (memory that can be mapped across more than one cell). Although you might be able to run OpenVMS Integrity servers on an nPartition that has cell local memory configured, such a configuration is untested and is not supported. To check cell local memory configuration details, use the Partition Manager or the `parstatus` command. For more information, see the *nPartition Administrator's Guide* (previously titled *HP System Partitions Guide: Administration for nPartitions*) or the following website:

<http://docs.hp.com/en/PARMGR2/>

You can also use the EFI Shell `info mem` command. If the reported “NonInterleaved Memory” is less than 512 MB, the cell is configured completely as interleaved memory (the indicated amount of noninterleaved memory is used by the firmware). If the command reports more than 512 MB of noninterleaved memory, use Partition Manager or the `parstatus` command to confirm the CLM configuration details.

As with all Integrity servers that run OpenVMS, you can boot OpenVMS Integrity servers either by selecting a boot entry from the EFI Boot Manager or by starting the system loader (VMS_LOADER.EFI) from the EFI Shell. To boot OpenVMS Integrity servers, access the nPartition console and use either of these two methods:

- From the EFI Boot Manager, select the OpenVMS Integrity servers boot entry from the boot options list and press **Enter**.
- From the EFI Shell, start the OpenVMS system loader by entering the following command at the EFI Shell prompt, where `fsn:` (such as `fs1:`) is the device associated with the OpenVMS Integrity servers system disk:

```
Shell> fsn:\efi\vms\vms_loader.efi
```

When starting the VMS_LOADER.EFI system loader, you must either specify its full path (as shown in this example) or start it from the `\efi\vms` directory. For more information, see Section B.3.1 (page 203).

For booting the OpenVMS Integrity servers OE DVD, the path is different. Enter the following command instead:

```
Shell> fsn:efi\boot\bootia64.efi
```



NOTE: The nPartition must be at EFI before beginning the OpenVMS Integrity servers boot process. If the nPartition is not at EFI, you can use VFP to check the nPartition boot state. An nPartition might be inactive or cells might be powered off. If VFP indicates that all cells in the nPartition are in the boot-is-blocked (**BIB**) state, the nPartition is inactive and you must use the MP `bo` command to boot the nPartition past BIB and make it active. For more information, see your hardware documentation.

B.6.2 Booting the OpenVMS Integrity servers OE DVD from the Local Drive

To boot the OpenVMS Integrity servers OE DVD, follow these steps. To boot the DVD on a cell-based server, a DVD device must be accessible for the nPartition that OpenVMS is being installed on.

1. Make sure your Integrity servers is powered on. If your system has an attached external device, make sure it is turned on and operational.
2. Insert the DVD into the drive.
3. Cycle power.

4. From the main EFI boot menu (for cell-based servers, this must be the EFI boot menu for the nPartition on which OpenVMS is to be booted), select the appropriate item from the boot options list. The EFI boot menu is timed; press any key to stop the countdown timer. For some systems, the boot option to select is the Internal Bootable DVD option. If that option is not listed in your EFI boot menu, move to the Boot From a File menu and select the Removable Media Boot option, if present.

Alternatively (and this method is recommended for cell-based servers), boot the DVD drive from the EFI Shell prompt by entering the command shown in the following example, where *fsn*: corresponds to the Integrity servers DVD drive (such as fs0:). If you have navigated to a particular file system, the EFI Shell prompt would reflect that file system; for example, if the current file system is fs0:, the EFI Shell prompt would be fs0:>.

```
Shell> fsn:\efi\boot\bootia64.efi
```

To determine which device is the bootable DVD drive, examine the list of mapped devices and look for an fs device listing that includes the text CDROM, as in the following example, where *fsn* is the file system associated with the drive, which is usually fs0: (instead of *fsn*, you might see something like V8.4; instead of Ata, you might see Scsi, depending on the server model):

```
fsn : Acpi (HWP0002,400) /Pci (4 | 1) /Ata (Primary,Master) /CDROM (Entry0)
```

Use the `vms_show dev` command to display the mapping of various EFI device names to OpenVMS device names, as in the following example where *fsn* is the device you want to check (such as fs0:):

```
Shell> fsn:\efi\vms\vms_show dev -fs
```

For more information about the `vms_show` command, see the *HP OpenVMS System Management Utilities Reference Manual*.



NOTE: By default, certain versions of EFI might interpret the **Delete** (or **Backspace**) key differently than do OpenVMS Alpha systems or Microsoft Windows computers. In such cases, press **Ctrl/H** to delete the last character entered. For more information, see Section B.1.3 (page 192).

When the DVD boots properly, the OpenVMS operating system banner is displayed, followed by the operating system menu. You can now install your OpenVMS Integrity servers operating system onto the target disk; see Section 3.4 (page 54). If the DVD fails to boot properly use the alternate method of booting described in Section B.6.2.1 (page 216).



NOTE: When booting OpenVMS from the installation DVD for the first time on any OpenVMS Integrity servers system with a SAN storage device, you might experience a delay in EFI initialization because the entire SAN is scanned. Depending on the size of the SAN, this delay might range from several seconds to several minutes.

B.6.2.1 Alternate Method of Using EFI to Boot the DVD

If the DVD does not boot using the methods described above, follow these steps:

1. To ensure that EFI can access the DVD, enter the following commands at the EFI Shell prompt of entry-class or single-cell Integrity servers. Enter the commands in the order shown. (The EFI Shell prompt may not necessarily be Shell> as in this example; it could be a prompt that reflects the current file system, such as fs0:>.)

```
Shell> reconnect -r  
Shell> map -r
```

For a multiple-cell nPartition on a cell-based server, use the `search all` command instead of the `reconnect -r` command, followed by the `map -r` command. See your hardware documentation for more information about EFI commands.

The `reconnect -r` command discovers any devices added after booting the server. The `search all` command discovers all devices including any that were not in the boot options list or connected to the core cell's I/O chassis. (On large server systems, the `search all` command could take significant time to complete. You can reduce the search time by specifying a more directed search, such as for a specific I/O chassis connected to a cell or a specific PCI card in a chassis. For more information, see the help information provided for the `search` command.)

The `map -r` command remaps and rebuilds the list of known devices that have a bootable EFI system partition. For a multiple-cell nPartition on a cell-based server, if you insert the DVD after EFI is loaded, you must use the `search` command to allow EFI to detect the inserted DVD; otherwise, EFI would not recognize the DVD in the DVD drive. When EFI detects a valid, bootable DVD in the DVD drive, it maps an fs device to it and lists that device in the mapping table displayed by the `map -r` command.

2. To boot the DVD, enter the following command at the EFI Shell prompt, where *fsn:* is the Integrity servers DVD drive (such as *fs0:*).

```
Shell> fsn:\efi\boot\bootia64.efi
```

If this command does not work, or if you have doubts about which device maps to the DVD drive, you can use the EFI Boot Manager menu system to boot the OE DVD, as described in the following steps:

- a. From the main EFI boot menu, select the Boot Configuration option (or in some versions of EFI, the Boot Option Maintenance Menu).
- b. From the Boot Configuration menu, select the Boot From a File option.
- c. From the Boot From a File menu, select the menu item that includes the text CDROM, as in the following example, and press **Enter**.



NOTE: The contents of the screens shown in the following examples vary according to the firmware and devices installed on your Integrity servers.

```
Boot From a File. Select a Volume
```

```
V8.3 [Acpi (HWP0002,400)/Pci (2|0)/Ata (Primary,Master)/CDROM (Entry0)
Load File [EFI Shell [Built-in]]
Load File [Acpi (HWP0002,0)/Pci (3|0)/Mac (00306EF3A2B6)]
Load File [Acpi (HWP0002,100)/Pci (2|0)/Mac (00306EF312E4)]
Exit
```

- d. A screen is displayed that shows the top-level directory structure of the DVD, similar to the screen in the following example. Select the *efi* directory.

```
EFI Boot Maintenance Manager ver n.nn[nn.nn]
```

```
Select file or change to new directory:
```

```
n/nn/nn 06:21a<DIR> 2,048 efi
[Treat like Removable Media Boot]
Exit
```

- e. The next screen to appear shows the first level of subdirectories below the top level, similar to the following example. Select the *boot* directory (it contains the boot file).

```
EFI Boot Maintenance Manager ver n.nn[nn.nn]
```

```
Select file or change to new directory:
```

```
n/nn/nn 06:21a<DIR> 2,048 .
n/nn/nn 06:21a<DIR> 0 ..
n/nn/nn 06:21a<DIR> 2,048 boot
n/nn/nn 06:21a<DIR> 2,048 vms
Exit
```

- f. The next screen displays the files within the *boot* directory. Select the file named *bootia64.efi*.

```
EFI Boot Maintenance Manager ver n.nn[nn.nn]
```

```
Select file or change to new directory:
```

```
n/nn/nn 06:21a<DIR>      2,048 .  
n/nn/nn 06:21a<DIR>      2,048 ..  
.  
.  
.  
n/nn/nn 06:21a          334,848 BOOTIA64.EFI  
.  
.  
.
```

```
Exit
```

B.6.3 Booting the OpenVMS Integrity servers OE DVD from the InfoServer

To boot from a virtual DVD drive on the LAN using OpenVMS Integrity servers InfoServer software, you must initially perform certain configuration steps (one time only). These steps and the instructions on performing the network boot are described in Appendix C (page 229).

B.6.4 Booting an Image of the OpenVMS Integrity servers OE DVD Using HP SIM Provisioning

To use HP SIM provisioning to boot an image of the OpenVMS OE DVD, certain configuration steps are required initially (one time only). For these steps and the booting instructions, see Appendix D (page 247). For upgrades, your OpenVMS boot flags must be set to (0,0).

B.6.5 Booting an Image of the OpenVMS Integrity servers OE DVD Using vMedia

To use vMedia to boot an image of the OpenVMS OE DVD, certain configuration steps are required initially (one time only); see Section D.1.4 (page 252). For instructions on booting with vMedia, see Section D.2 (page 284).

B.6.6 Booting from a Fibre Channel Device

For instructions on booting from a Fibre Channel (FC) storage device, see Appendix E (page 293).

B.6.7 Booting Manually from the Local System Disk

HP recommends setting up your Integrity servers EFI console with a boot option for your OpenVMS Integrity servers operating system disk. In this way, booting the system disk simply requires selecting the boot option from the EFI Boot Manager boot options list. You can set the EFI boot option to boot automatically on powering on or rebooting. The OpenVMS installation and upgrade procedures can assist you in adding and validating a boot option for your system disk; you can also use the OpenVMS Integrity servers Boot Manager utility (SYS\$MANAGER:BOOT_OPTIONS.COM), as explained in Section B.5.2 (page 207).

The steps that follow explain how to boot the OpenVMS Integrity servers operating system disk manually. You can also use vMedia to boot an OpenVMS system disk; see Section D.2 (page 284).



NOTE: If you have recently booted the OpenVMS Integrity servers OE DVD, make sure you remove this DVD before booting the system disk.

On Integrity server systems, the system disk must be mounted locally (on the system you are booting) or on a SAN storage device.

1. If OpenVMS is not running, skip to the next step. If OpenVMS is running, access the EFI console by shutting down the operating system (see the instructions in Section B.7 (page 225)).

2. Boot the system disk manually by entering the following command at the EFI Shell prompt, where *fsn:* (such as *fs1:*) is the device associated with the system disk:

```
Shell> fsn:\efi\vms\vms_loader.efi
```

You must either specify the full path (as shown in this example) or start the system loader from the `\efi\vms` directory. For more information, see Section B.3.1 (page 203).

B.6.8 Performing a Conversational (Interactive) Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot to stop the boot process before it completes. The boot process stops after it loads `SYS$SYSTEM:SYSBOOT.EXE` and displays the `SYSBOOT>` prompt. At the `SYSBOOT>` prompt, you can enter specific OpenVMS System Generation utility (SYSGEN) commands to do the following:

- Examine system parameter values
- Change system parameter values
- Specify another parameter file
- Specify another system startup command procedure
- Select the default system parameter file (`IA64VMSSYS.PAR`) if you modified system parameters to values that render the system unbootable
- Specify a minimum startup

There are several ways to perform a conversational boot. The following procedure is the most direct:

IF ...	THEN GO TO...
The OpenVMS Integrity servers operating system is running.	Step 1
The OpenVMS Integrity servers operating system is <i>not</i> running.	Step 4

1. Log in to the SYSTEM account.
2. Enter the following command:

```
$ @SYS$SYSTEM:SHUTDOWN
```
3. Answer the questions displayed by the system. When the procedure asks whether an automatic reboot should be performed, press **Enter** for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE
```
4. Halt the system or nPartition. (See Section B.7 (page 225) for more information about how to halt your Integrity servers).
5. Begin the conversational boot by entering the following command at the EFI Shell prompt, where *fsn:* is the device (such as *fs1:*) associated with the system disk:

```
Shell> fsn:\efi\vms\vms_loader.efi -flags 0,1
```
6. At the `SYSBOOT>` prompt, you can enter any of the SYSGEN commands listed in Table B-2. For more information about these SYSGEN commands, see the *HP OpenVMS System Management Utilities Reference Manual: M-Z*.
7. When you finish using the SYSGEN commands, enter the `CONTINUE` command to complete the boot process.

Table B-2 SYSGEN Commands Used in the SYSBOOT Procedure

Command	Description
CONTINUE	Resumes the boot procedure.
DISABLE CHECKS	Inhibits checking of parameter values specified with the SET command.

Table B-2 SYSGEN Commands Used in the SYSBOOT Procedure *(continued)*

Command	Description
ENABLE CHECKS	Permits checking of parameter values specified with the SET command.
HELP	Displays a summary of the SYSBOOT commands on the terminal screen.
SET <i>parameter-name</i>	Establishes the value of a system parameter.
SET/STARTUP	Sets the name of the system startup command procedure.
SHOW [<i>parameter</i>]	Displays active, current, default, maximum, and minimum values for specific parameters. (Use qualifiers to display characteristics of parameters grouped by categories.)
USE [<i>file-spec</i>]	Specifies a parameter file to be used as a source of values. You must enter the entire file specification, including device and directory; you cannot specify a logical name.
USE DEFAULT	Specifies that default values be used for all parameters.

For examples of conversational booting, see Section B.6.9 (page 221) and Section B.6.12 (page 222).

B.6.9 Booting with Minimum Startup

In certain cases, you might want to boot your system without performing the full sequence of startup events. For example, if a startup event prevents you from logging in, you might want to boot the system without executing the startup so that you can log in and fix the problem. You can use the conversational boot to specify a minimum startup.



NOTE: Because this procedure bypasses specific startup operations, it does not autoconfigure the system's peripheral devices.

Boot the system with minimum startup as follows:

1. Begin the conversational boot by entering the following command at the EFI Shell prompt, where *fsn:* is the device (such as *fs1:*) associated with the system disk and the system root is [SYS0...]:

```
Shell> fsn:\efi\vms\vms_loader.efi -flags 0,1
```
2. Enter the following command:

```
SYSBOOT> SET STARTUP_P1 "MIN"
```
3. Enter the following command to ensure that the operating system does not record for subsequent system reboots the STARTUP_P1 parameter change you made in step 2:

```
SYSBOOT> SET WRITESYSPARAMS 0
```
4. Enter the following command to continue booting:

```
SYSBOOT> CONTINUE
```

B.6.10 Booting with the XDelta Utility (XDELTA)

The XDelta utility (XDELTA) is a debugging tool that system programmers use. The procedure for booting all Integrity servers with XDELTA is the same.

The following table describes the valid values you can specify when booting with XDELTA:

Value	System Response
0	Normal, nonstop boot (default).
1	Begins a conversational boot and then displays the SYSBOOT prompt.
2	Includes XDELTA but does not take the initial breakpoint.

Value	System Response
3	Displays the SYSBOOT prompt and includes XDELTA but does not take the initial breakpoint.
6	Includes XDELTA and takes the initial breakpoint.
7	Includes XDELTA, displays the SYSBOOT prompt, and takes the initial breakpoint at system initialization.

The following is an example of booting with XDELTA from fs1: at the EFI> prompt:

```
EFI> fs1:\efi\vms\vms_loader.efi -flags 0,7
```

For more information about using XDELTA, see the *HP OpenVMS Delta/XDelta Debugger Manual*.

B.6.11 Booting from a Different Root Directory

By default, the OpenVMS Integrity servers operating system is installed in the system root directory [SYS0]. However, if you have created a cluster system disk, you can use the SYS\$MANAGER:CLUSTER_CONFIG_LAN.COM procedure to add a copy of the operating system to a different root directory. (For more information about using the SYS\$MANAGER:CLUSTER_CONFIG_LAN.COM procedure, see the *HP OpenVMS System Manager's Manual*.)

To boot from a different root (for example, [SYS3]), enter the following command at the EFI Shell prompt, where *fsn:* (such as fs1:) is the device associated with the system disk:

```
Shell> fsn:\efi\vms\vms_loader.efi -flags 3,0
```

B.6.12 Emergency Booting

If a system problem prevents your system from booting, you might need to perform an emergency boot operation. Table B-3 summarizes these emergency boot operations, and the sections that follow describe each boot operation in more detail.

Table B-3 Emergency Boot Procedures

Operation	When to Use
Booting with default system parameters	When parameter values in the parameter file have been modified so that the system is unbootable
Booting without startup and login procedures	If an error in the startup or login procedure prevents you from logging in
Booting without the user authorization file	If you have forgotten the password and cannot log in to a privileged account

B.6.12.1 Booting with Default System Parameters

If the current values stored in the parameter file have been incorrectly modified, these incorrect values might cause the system to become unbootable. With a conversational boot operation, you can reset the active values for all system parameters to the default value. (In most cases, HP recommends that you use AUTOGEN to modify system parameters. In certain cases, however, you can use a conversational boot to modify a parameter value *temporarily*. To change a parameter value *permanently*, you must edit MODPARAMS.DAT and run AUTOGEN. For instructions, see the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.) The default values allow you to boot the system temporarily so you can correct the problem.

How to Perform This Task

1. Begin the conversational boot by entering the following command at the EFI Shell prompt, where *fsn:* (such as fs1:) is the device associated with the system disk:

```
Shell> fsn:\efi\vms\vms_loader.efi -flags 0,1
```
2. At the SYSBOOT> prompt, enter the following command:

```
SYSBOOT> USE DEFAULT
```

The USE DEFAULT command specifies that default values should be used for all parameters.

3. To avoid starting all layered products on a system that is not tuned for them, possibly causing the system to hang, set the STARTUP_P1 system parameter as follows:

```
SYSBOOT> SET STARTUP_P1 "MIN"
```

4. Enter the following command to ensure that the operating system does not record for subsequent system reboots the STARTUP_P1 parameter change you made in step 3:

```
SYSBOOT> SET WRITESYSPARAMS 0
```

5. Enter the following command to continue booting:

```
SYSBOOT> CONTINUE
```

6. When the system finishes booting, determine which changed parameter caused the problem and reset the parameter value. If you specified the value for the parameter in the AUTOGEN parameter file MODPARAMS.DAT, fix the value in that file and run AUTOGEN. For more information, see the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

7. After your system runs for at least 24 hours, run AUTOGEN in feedback mode, following the steps described in Section 7.24 (page 164). Be sure to examine the AGEN\$PARAMS.REPORT, as recommended. If necessary, modify system parameters as instructed in Section 7.25 (page 166). If you need assistance, contact your software support representative. Once you feel confident that the problem is corrected, and AUTOGEN has been run through the SETPARAMS phase, reboot the system.

Example

```
SYSBOOT> USE DEFAULT
SYSBOOT> SET STARTUP_P1 "MIN"
SYSBOOT> SET WRITESYSPARAMS 0
SYSBOOT> CONTINUE
Username: SYSTEM
Password:
$ EDIT SYS$SYSTEM:MODPARAMS.DAT
.
.
.
[Insert line(s) to reset parameter value(s)]
.
.
.
```

B.6.12.2 Booting Without Startup and Login Procedures

If the system does not complete the startup procedures or does not allow you to log in, you might need to bypass the startup and login procedures. The startup and login procedures provided by HP should always work. However, if you introduce an error when you modify the startup or login procedure, you could accidentally lock yourself out of the system.

How to Perform This Task

1. Begin the conversational boot by entering the following command at the EFI Shell prompt, where *fsn:* (such as *fs1:*) is the device associated with the system disk:

```
Shell> fsn:\efi\vms\vms_loader.efi -flags 0,1
```

2. Enter the following command at the SYSBOOT> prompt:

```
SYSBOOT> SET/STARTUP OPA0:
```

3. Enter the following command to ensure that the operating system does not record for subsequent system reboots the STARTUP_P1 parameter change you made in step 2:

```
SYSBOOT> SET WRITESYSPARAMS 0
```

4. Enter the following command to continue booting:

```
SYSBOOT> CONTINUE
```

5. When the system is booted, the operator console displays the DCL command prompt (\$). You are now logged in.
6. Enter the following two DCL commands:

```
$ SPAWN  
$ SET NOON
```

The SPAWN command enables you to stay connected to the console, and the second command instructs the operating system to ignore any errors that might occur. If you do not enter these commands and you invoke an error, the system logs you out. Without the SPAWN command, you are logged out when the startup procedure completes in step 8.

7. Correct the error condition that caused the login failure. (That is, make the necessary repairs to the startup or login procedure, or to the SYSUAF.DAT file.)

Use a text editor to correct the startup or login file. Some system displays might not support a screen-mode editor. You can also copy a corrected file and delete the incorrect version by using the RENAME and DELETE commands.

8. Perform a normal startup by entering the following command:

```
$ @SYS$SYSTEM:STARTUP
```

Example

```
SYSBOOT> SET/STARTUP OPA0:  
SYSBOOT> SET WRITESYSPARAMS 0  
SYSBOOT> CONTINUE  
$ SPAWN  
$ SET NOON  
$ SET DEFAULT SYS$SYSROOT:[SYSEXE]  
$ @SYS$SYSTEM:STARTUP
```

B.6.12.3 Booting Without a User Authorization File

Ordinarily, the startup and login procedures provided by HP work; however, certain conditions can cause them to fail. A simple way to lock yourself out of the system is to set passwords to login accounts and forget them. Another way to be locked out is if one or more core system Product Authorization Key (PAK) software licenses are unavailable or expired. In such emergencies, perform a conversational emergency boot by performing the steps given in this section.

How to Perform This Task

1. Halt the system or nPartition. (See Section B.7 (page 225) for more information about how to halt your Integrity servers.)
2. Begin the conversational boot by entering the following command at the EFI Shell prompt, where *fsn:* (such as *fs1:*) is the device associated with the system disk:

```
Shell> fsn:\efi\vms\vms_loader.efi -flags 0,1
```

You need your hardware system's password for logging in to the console. By default, both the user name and password are set to Admin. If you do not have this password, contact HP Customer Support to reset the hardware console password.

3. Enter the following commands at the SYSBOOT> prompt:

```
SYSBOOT> SET/STARTUP OPA0:  
SYSBOOT> SET WINDOW_SYSTEM 0  
SYSBOOT> SET WRITESYSPARAMS 0  
SYSBOOT> CONTINUE
```

The first three commands request the following:

- OpenVMS read the system startup commands directly from the system console.
- The windowing system (if any) not start.
- OpenVMS not record the parameter changes for subsequent system reboots.

The last command causes the booting to continue.

4. At the DCL prompt, the system now accepts startup commands directly from the console. Enter the following two commands. These commands allow a normal system startup while you are left logged in on the console. Without the SPAWN command, you are logged out when the startup completes.

```
$ SPAWN
$ @SYS$SYSTEM:STARTUP
```

5. Once you log out of this session, the system completes the startup and can be used normally. Optionally, you can choose to reboot the system.

Example

```
SYSBOOT> SET/STARTUP OPA0:
SYSBOOT> SET WINDOW_SYSTEM 0
SYSBOOT> SET WRITESYSPARAMS 0
SYSBOOT> CONTINUE
$ SPAWN
$ @SYS$SYSTEM:STARTUP
$
```



NOTE: Instead of using the SET/STARTUP OPA0: command in emergency conditions, you can set the UAFALTERNATE system parameter to use the alternate authorization file rather than the standard user authorization file. Setting the system parameter UAFALTERNATE defines the logical name SYSUAF to refer to the file SYS\$SYSTEM:SYSUAFALT.DAT. If this file is found during a normal login, the system uses it to validate the account and prompts you for the user name and password.

HP does not recommend this method. If an alternate SYSUAFALT.DAT file has been configured on your system, the UAFALTERNATE method will likely fail (assuming you do not know the password for the privileged account stored within the SYSUAFALT.DAT file). In addition, the OPA0: system console is critical to system operations and system security and allows access when the SYSUAF system authorization database is unavailable or corrupted; when core product license PAKs are not registered, are expired, or are disabled; and in various system failures.

B.7 Halt and Shutdown Procedures

The following sections describe halt and shutdown procedures for Integrity servers and OpenVMS Integrity servers.

B.7.1 Halting the Integrity servers to Recover from Hangs and Crashes

If your system hangs and you want to force a crash, you can use MP, if available. Use the `tc` command. Confirm your intention when prompted. The `tc` command forces a crash dump. You can reset the machine (without forcing a crash) by using the MP `rs` command.

For cell-based servers, when you enter the `tc` or `rs` command, you are first prompted to select the partition for which you want the operating system shut down.

Alternatively, when the operating system controls the console, press **Ctrl/P**. The next step taken by the system depends on whether XDELTA is loaded:

- If XDELTA is loaded, the system enters XDELTA after you press **Ctrl/P**. The system displays the instruction pointer and current instructions. You can force a crash from XDELTA by entering `;C`, as in the following example:

```
$
Console Brk at 8068AD40
8068AD40!          add    r16 = r24, r16 ;; (New IPL = 3)
;C
```

- If XDELTA is not loaded, pressing **Ctrl/P** causes the system to enter the IPC facility. Pressing **Ctrl/P** within the utility brings the “Crash? (Y/N)” prompt. Enter Y to cause the system to

crash and to bring you eventually to EFI. If you enter any other character, the system returns back to the IPC facility.

B.7.2 Shutting Down the System

Before you shut down the operating system, decide if you want it to reboot automatically or if you want to enter console-mode commands after the shutdown completes. If you want the system to reboot automatically after the shutdown, first set up automatic booting, as described in Section B.5.2 (page 207).

You can perform the following two types of shutdown operations, as discussed in the indicated sections:

- An orderly shutdown with `SYS$SYSTEM:SHUTDOWN.COM` (see Section B.7.2.1 (page 226))
- An emergency shutdown with `OPCCRASH.EXE` (see Section B.7.2.2 (page 227))

B.7.2.1 Orderly Shutdown

The `SHUTDOWN.COM` procedure shuts down the operating system while performing maintenance functions such as disabling future logins, stopping the batch and printer queues, dismounting volumes, and stopping user processes. To use the `SHUTDOWN.COM` command procedure, log in to the `SYSTEM` account, enter the following command:

```
$ @SYS$SYSTEM:SHUTDOWN
```

For more information about the `SHUTDOWN.COM` command procedure, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

On cell-based Integrity servers, two special types of nPartition reboot are supported: reboot for reconfiguration, which reboots an nPartition and enables cell configuration changes to occur, and shutdown for reconfiguration, which puts an nPartition into an inactive state.

- To perform a reboot for reconfiguration from OpenVMS Integrity servers running on an nPartition, enter the OpenVMS `@SYS$SYSTEM:SHUTDOWN` command, and then answer YES to the prompt that asks whether to perform an automatic system reboot.

On cell-based Integrity servers, an operating system reboot is equivalent to a reboot for reconfiguration. Performing a reboot for reconfiguration enables any cell assignment changes for the nPartition (for example, removing an active cell or activating a newly added cell).

The reboot for reconfiguration takes all cells assigned to the nPartition through a cell boot phase. The cells with a Yes use-on-next-boot attribute proceed through the nPartition boot phase to become active cells whose resources are available to software running on the nPartition.

- To perform a shutdown for reconfiguration of an nPartition running OpenVMS Integrity servers, first enter the OpenVMS `@SYS$SYSTEM:SHUTDOWN` command and then answer NO to the prompt asking whether to perform an automatic system reboot. Next, access MP and use the `rr` command (specify the OpenVMS nPartition to shut down for reconfiguration).

A shutdown for reconfiguration takes all cells assigned to the nPartition through a cell boot phase and then stops their boot progress at the boot-is-blocked (BIB) state. When all cells assigned to the nPartition are at the BIB state, the nPartition is inactive and no software can run on the nPartition until it is manually booted past BIB.

To boot an inactive nPartition past BIB, use the `MP bo` command and specify which nPartition to make active. Booting past the BIB state involves all cells that are assigned to the nPartition and that have a Yes use-on-next-boot attribute. The cells are taken through the nPartition boot phase to become active cells whose resources are available to software running on the nPartition.

For more information about shutting down Integrity servers or an nPartition, see the appropriate hardware documentation.

B.7.2.2 Emergency Shutdown with OPCCRASH.EXE

If you cannot perform an orderly shutdown with the SHUTDOWN.COM procedure, run the OPCCRASH.EXE emergency shutdown program. To run the OPCCRASH.EXE program, log in to the SYSTEM account and enter the following command:

```
$ RUN SYS$SYSTEM:OPCCRASH
```

For more information about the OPCCRASH program, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

On cell-based Integrity servers, entering the OpenVMS RUN SYS\$SYSTEM:OPCCRASH command results in the system dumping memory and then halting at the P00>>> prompt. To reset the nPartition following OPCRASH, access the nPartition console and press any key to reboot.

Using the MP tc command to reset an nPartition results in the system dumping memory and then automatically resetting the nPartition.

B.8 Troubleshooting Procedures

The following sections describe procedures that you can follow if you encounter problems with your system.

B.8.1 If the System Does Not Boot

If the system does not boot because a hardware problem occurs, a question mark (?) usually precedes the error message displayed on the console terminal. An example of a hardware problem is a read error on a disk. Another is a BIB condition in an nPartition on a cell-based server. You can use VFP to check the nPartition boot state. If VFP indicates that all cells in the nPartition are at BIB, the nPartition is inactive and you must use the MP bo command to boot the nPartition past BIB and make it active.

One way to get to the EFI Boot Manager to attempt to reboot is to use the MP rs command.

For more information about using VFP and MP, see your hardware documentation.

B.8.1.1 For Hardware Problems

If you suspect a hardware problem, do the following:

1. Consult the hardware manual for your Integrity servers.
2. Contact HP Customer Support.

B.8.1.2 For Software Problems

When the operating system is loaded into memory, a message similar to the following is displayed on the terminal screen:

```
SYSTEM job terminated at 27-JUL-2009 15:05:03.17
```

If the system does not display this message, a software problem has probably occurred. Do the following:

1. Turn off the system. Turn it back on and try to reboot.
2. Perform a conversational boot using the default system parameters or try one of the emergency boot procedures described in Section B.6.12 (page 222).
3. If the system boots, run the AUTOGEN procedure. For more information about the AUTOGEN procedure, see the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

B.8.2 Detecting and Responding to System Problems

If your system exhibits unexpected behavior, note the following:

- If the system displays a bugcheck message on the console terminal and shuts itself down, it means the system encountered a problem that made further operation impossible or

dangerous. If the system does not reboot automatically, reboot the system manually as described in Section B.6.7 (page 219).

- If the system stops responding to your commands (that is, if the system hangs), there is a possible failure in a system software or hardware component or a possible power failure.
- If the system exhibits erratic behavior (it does not respond according to specifications), it indicates a possible failure in a system software or hardware component.

To determine whether the failure is a system problem:

- Be sure that you did not press **F1 (Hold Screen)**. The Hold Screen light turns on when you press either **F1** or **Ctrl/S**.
- Press **Ctrl/T** to check the status of your process. A status line should appear indicating the name of the program that is executing and other information. If the status line does not appear, the program you are executing might be stalled or hanging. (If you have disabled **Ctrl/T** by entering the command SET NOCONTROL=T, or if you have set the terminal to NOBROADCAST mode by entering the command SET TERMINAL/NOBROADCAST, this procedure does not work.)
- Make sure the cable connecting the terminal or monitor to the system is secure.

If you determine that you have a system problem, take the following steps:

1. Force an exit from a stalled or hanging program by pressing **Ctrl/Y**. Pressing **Ctrl/Y** causes any work performed by the program and not saved on disk to be lost.
2. If the system is still unresponsive, halt it (see Section B.7.1 (page 225) for more information.)
3. Note in detail the sequence of events that caused the problem and notify HP Customer Support.

C Setting Up and Performing Network Booting

This appendix explains the steps required to enable your system to boot over the LAN using the OpenVMS InfoServer utility, a software application available on OpenVMS Alpha (Version 8.3 or later) and OpenVMS Integrity servers (Version 8.2-1 or later) systems. It also describes how to boot the virtual DVD/CD drive from the network.

C.1 About the OpenVMS InfoServer Utility

InfoServer network booting is supported for OpenVMS installations and upgrades on any OpenVMS Alpha system and on any Integrity servers that support OpenVMS. For OpenVMS Integrity server systems, InfoServer network booting is supported on all LAN cards (also referred to as LAN devices or adapters) that are supported by EFI.

For both OpenVMS Alpha and Integrity servers Version 8.4 installations and upgrades, you can boot from a virtual DVD/CD drive on the LAN using the OpenVMS InfoServer utility. You can use the OpenVMS InfoServer software application on all Version 8.2-1 or later OpenVMS Integrity server systems as well as on any OpenVMS Alpha Version 8.3 or later systems that support a DVD drive. This support provides the additional advantage of allowing a network administrator to upgrade multiple OpenVMS systems on the network from a single copy of the OpenVMS distribution CD or DVD.

Using the InfoServer utility on Integrity servers for network booting requires several one-time-only configuration steps unique to OpenVMS Integrity servers. Likewise, using the InfoServer utility on OpenVMS Alpha servers requires an additional, one-time-only software configuration step. Any configuration procedures that might have been performed for network booting using an InfoServer hardware system (traditionally used by Alpha systems) are not valid for the OpenVMS Integrity servers or OpenVMS Alpha InfoServer application.

Booting from the InfoServer utility for OpenVMS Integrity servers differs significantly from booting from the InfoServer hardware system traditionally used by OpenVMS Alpha systems or from the InfoServer utility on OpenVMS Alpha systems. For example, while Alpha systems use the Maintenance Operations Protocol (MOP) to request the primary bootstrap file (APB.EXE) to start the boot, the Integrity servers console uses the Intel Preboot Execution Environment (PXE) bootstrap protocol in conjunction with the TCP/IP Services for OpenVMS BOOTP server and TFTP. The Integrity servers EFI console first loads the primary bootstrap file VMS_LOADER.EFI, which is formatted for EFI compatibility. VMS_LOADER.EFI then uses TFTP to request the primary bootstrap IPB.EXE from the **boot server**. IPB.EXE is formatted in OpenVMS ODS file structure and is needed for booting the OpenVMS Integrity servers operating system.

To install or upgrade the operating system over the network, OpenVMS Integrity server systems must use the InfoServer utility that is integrated with the OpenVMS operating system. The InfoServer hardware traditionally used by OpenVMS Alpha systems is not equipped to handle DVD drives required for the OpenVMS Integrity servers distribution media. OpenVMS Alpha systems can use the OpenVMS InfoServer utility or the traditional InfoServer hardware system that is independent of OpenVMS. OpenVMS Alpha systems can boot from the distribution CD on DVD drives (DVD drives support both DVDs and CDs). Table C-1 summarizes the major differences between Alpha and Integrity servers InfoServer booting.

Table C-1 InfoServer Booting: Differences Between Alpha and Integrity server Systems

Component	Alpha	Integrity servers
Downline load protocol	MOP	PXE (DHCP/BOOTP/TFTP)
Boot file	APB_ <i>version</i> (for example, APB_084)	VMS_LOADER.EFI and IPB.EXE (both files are version specific)

Table C-1 InfoServer Booting: Differences Between Alpha and Integrity server Systems (continued)

Component	Alpha	Integrity servers
Boot server	Any MOP-enabled system with the specified file	Only those BOOTP servers having the network device MAC address defined in the BOOTP database
LAN server	InfoServer hardware, or InfoServer utility running on OpenVMS Alpha Version 8.3 or later, or on OpenVMS Integrity servers Version 8.2-1 or later	InfoServer application running on OpenVMS Alpha Version 8.3 or OpenVMS Integrity servers Version 8.2-1 or later.

Because of these differences, any procedures used for Alpha systems to set up booting from the InfoServer hardware are not valid for setting up booting from the OpenVMS InfoServer utility. In addition, actions for setting up booting from the OpenVMS Integrity servers InfoServer utility differ from those required for setting up booting from an OpenVMS Alpha InfoServer utility. Table C-2 lists the various actions that need to be performed to enable network booting using the OpenVMS InfoServer utility on OpenVMS Integrity servers or OpenVMS Alpha systems. These actions need to be performed only once except where noted.

Table C-2 Procedure for Enabling InfoServer Network Booting

InfoServer Client Setup		
Architecture	Actions Required	Section
Integrity servers clients only	<ol style="list-style-type: none"> Determine the LAN I/O card to be used on your local Integrity servers for the network boot and report the associated OpenVMS device name, its IP address, and its MAC address to the network administrator responsible for setting up the BOOTP server. Optionally (and recommended), add this network device as an EFI boot option—this procedure can be repeated on any other system in the LAN that will use the InfoServer server for network booting. Verify that the network device is supported by EFI as a bootable device. 	Section C.2 (page 231)
InfoServer Utility Setup		
Architecture	Actions Required (You or Network Administrator)	Section
Integrity servers or Alpha	Designate at least one OpenVMS system in the LAN as the InfoServer server. Upgrade the system if necessary (OpenVMS Integrity servers must be Version 8.2-1 or later; OpenVMS Alpha must be Version 8.3 or later).	Upgrade instructions in Chapter 6 (page 105). Prior to upgrading, review Chapter 4 (page 85), and Chapter 5 (page 97).
Integrity servers or Alpha	<ol style="list-style-type: none"> Copy SYS\$STARTUP:ESS\$LAD_STARTUP.TEMPLATE to SYS\$STARTUP:ESS\$LAD_STARTUP.DAT and then modify parameters in SYS\$STARTUP:ESS\$LAD_STARTUP.DAT. Determine which network device will be used for InfoServer LAD operations. Copy SYS\$STARTUP:ESS\$LAST_STARTUP.TEMPLATE to SYS\$STARTUP:ESS\$LAST_STARTUP.DAT and then modify parameters in SYS\$STARTUP:ESS\$LAST_STARTUP.DAT. Add a line to SYS\$MANAGER:SYSTARTUP_VMS.COM to start the SYS\$STARTUP:ESS\$LAD_STARTUP.COM file at startup. If you changed any SYSGEN parameters, run AUTOGEN and reboot; if you did not change SYSGEN parameters, skip the reboot and execute the SYS\$STARTUP:ESS\$LAD_STARTUP.COM file manually. Use the InfoServer control program to create a service for the DVD drive. 	Section C.3 (page 234).

Table C-2 Procedure for Enabling InfoServer Network Booting (continued)

Alpha only	Enable MOP on the boot server and then copy APB_084.SYS from the OpenVMS Version 8.4 distribution media to the MOP download database (LAN\$DLL, which defaults to MOM\$SYSTEM).	See the LANCP chapter in <i>HP OpenVMS System Management Utilities Reference Manual: A-L</i> .
Integrity servers only	Set up the TCP/IP Services for OpenVMS BOOTP server and TFTP server. (For each new release of OpenVMS Integrity servers, update the client entries in the BOOTP database to point to the new version-specific boot file.) The person responsible for setting up the boot server needs information about your InfoServer client. OpenVMS Integrity servers boot files are unique for each version of OpenVMS Integrity servers. Latest boot files must be available and referenced in the BOOTP server database.	Section C.4 (page 237).



NOTE: The discussion of InfoServer booting in this manual pertains to environments where the boot clients and servers are located in the same LAN. For more complex circumstances, consult HP Customer Support.

C.2 Setting Up Your System as an InfoServer Client

To set up your local OpenVMS Integrity servers system as an InfoServer client for network booting, you must perform the following steps. Detailed instructions are provided in the subsections that follow. For OpenVMS Alpha systems, no extra steps are required for setting up an InfoServer client. You can boot the OpenVMS Alpha InfoServer client from the >>> prompt.

1. Determine the LAN I/O card to be used on your local Integrity servers for the network boot. Report the associated OpenVMS device name and its IP address and MAC address to the network administrator responsible for setting up the BOOTP server.
2. Optionally (and recommended), add the network device as a boot option in the EFI Boot Manager menu.
3. Verify that the network device is supported by EFI as a bootable device.



NOTE: The ability to boot over the network requires that the nearest switch or router be configured to autonegotiate.

C.2.1 Determining the Local Network I/O Card to Be Used

Select a LAN I/O card (also referred to as a LAN I/O device or adapter) on your Integrity servers. This device must be supported by your Integrity server's EFI firmware. At minimum, EFI supports the **core I/O** LAN cards installed in the Integrity servers. On all Integrity servers, devices supported by OpenVMS are either EI or EW devices (for example, EIA0 or EWA0). The EFI firmware might also support variants of the core I/O cards, such as additional network interface cards (NICs) of the same type. It might also support other NICs that are installed in the system but not classified as core I/O cards. In any case, you can verify that the device you select is supported by EFI.

If multiple I/O cards are available on your system, you can choose more than one to serve for network booting.

To list the installed LAN I/O devices known to your OpenVMS Integrity servers system, follow these steps:

1. If your operating system is not running, access the OpenVMS DCL triple dollar sign prompt (\$\$\$) from your OpenVMS Integrity servers OE DVD by selecting option 8 (Execute DCL commands and procedures) on the OpenVMS operating system main menu. Otherwise, skip to the next step.
2. At the DCL prompt, enter the following command to start the OpenVMS Integrity servers Boot Manager utility.

```
@SYS$MANAGER:BOOT_OPTIONS
```

3. Start the LANCP utility and enter the LANCP command `SHOW CONFIGURATION` at the LANCP prompt, as in the following example. The resulting display lists four LAN devices, two of which are available (connected), as indicated by the Link column (Up means the device is available; Down means it is not). You can use a device that is in use by other protocols. Decide which available devices you want to use for network booting and record the device's name, MAC address, and IP address. (The MAC address should be labeled on the physical device.) Once the LAN device is verified as bootable by EFI, you provide this information to the person responsible for maintaining the BOOTP server database (see Section C.4 (page 237)).

```

$$$ RUN SYS$SYSTEM:LANCP
LANCP> SHOW CONFIGURATION
LAN Configuration:
      Parent or
Device PrefCPU Medium/User Version Link Speed Duplex Auto BufSize MAC Address Type ...
-----
EIA0    0      Ethernet   X-21   Up    1000  Full   Yes   1500 AA-00-04-00-A5-38  UTP i82546 ...
      00-13-21-5B-85-E4 (default) ...
EIB0    1      Ethernet   X-21   Up    1000  Full   Yes   1500 AA-00-04-00-A5-38  UTP i82546 ...
      00-13-21-5B-85-E5 (default) ...
EWA0    0      Ethernet   X-59   Down  -      -      Yes   1500 00-11-0A-43-23-D8  UTP AB465A ...
EWB0    1      Ethernet   X-59   Down  -      -      Yes   1500 00-11-0A-43-23-D9  UTP AB465A ...

```

C.2.2 Adding the Network Boot Option to the EFI Boot Manager

To add the LAN device (virtual DVD drive) as a network boot option, use the OpenVMS Integrity servers Boot Manager utility, as follows:

1. At the DCL prompt, enter the following command to start the OpenVMS Integrity servers Boot Manager utility:

```
$ @SYS$MANAGER:BOOT_OPTIONS
```



NOTE: When booting OpenVMS Integrity servers Version 8.4 or later, you need to specify a special boot flag and the name of InfoServer service name. The `BOOT_OPTIONS.COM` procedure now accepts InfoServer service name in addition to the boot flags.

2. The OpenVMS Integrity servers Boot Manager Boot Options main menu is displayed. To add a network boot option, enter 1 at the prompt:

```
OpenVMS I64 Boot Manager Boot Options List Management Utility
```

- ```

(1) ADD an entry to the Boot Options list
(2) DISPLAY the Boot Options list
(3) REMOVE an entry from the Boot Options list
(4) MOVE the position of an entry in the Boot Options list
(5) VALIDATE boot options and fix them as necessary
(6) Modify Boot Options TIMEOUT setting

```

- ```

(B) Set to operate on the Boot Device Options list
(D) Set to operate on the Dump Device Options list
(G) Set to operate on the Debug Device Options list

```

```
(E) EXIT from the Boot Manager utility
```

```
You can also enter Ctrl-Y at any time to abort this utility
```

```
Enter your choice: 1
```



NOTE: While using this utility, you can change a response made to an earlier prompt by entering the caret (^) character as many times as needed. To end and return to the DCL prompt, press **Ctrl/Y**.

3. The utility prompts you for the device name. Enter the device name. In the following example, the device name is EIA0:.

```
Enter the device name (enter "?" for a list of devices): EIA0:
```

- The utility prompts you for the position you want your entry to take in the EFI boot option list. Enter any position number other than 1. (The number 1 position sets the device for automatic rebooting, which is not desirable for upgrades.)

```
Enter the desired position number (1,2,3,,,) of the entry.
To display the Boot Options list, enter "?" and press Return.
Position [1]: 4
```

- The utility prompts you for OpenVMS boot flags. By default, no flags are set. Enter the OpenVMS flags (for example, 0,1), or accept the default (NONE) to set no flags as in the following example:

```
Enter the value for VMS_FLAGS in the form n,n.
VMS_FLAGS [NONE]:
```

If you are booting OpenVMS Integrity Version 8.4 onwards, HP recommends the value of VMS_FLAGS be set to 0,200400.

- The utility prompts you for the service name from OpenVMS Integrity servers Version 8.4 onwards if you have entered 0,200400 as the boot flags. The service name is mandatory.

```
INFOSERVER_SERVICE:
```



NOTE: The service name entered must be in uppercase.

- The utility asks whether the device will be used for cluster satellite booting. Answer NO as in the following example:

```
Will EIA0 be used for cluster satellite boot? (Yes/No): NO
```

(For information about establishing a device for cluster satellite booting, see the *HP OpenVMS Cluster Systems* manuals.)

- The utility prompts you for a description to include with your boot option entry. By default, the device name and MAC address is used as the description. You can enter more descriptive information, as in the following example. As shown in the display of boot entries that follows, the device name and MAC address (without dashes) are included anyway in the boot entry line.

```
Enter a short description (do not include quotation marks).
Description ["EIA0"]: I64 UPGRADE VIA NET
```

```
efi$bcfg: eia0 (Boot0002) Option successfully added
```

Using the utility to display the devices at this point (selecting 2 on the main menu), you see your device listed, as in the following example:

```
Enter your choice: 2
```

```
To display all entries in the Boot Options list, press Return.
To display specific entries, enter the entry number or device name.
(Enter "?" for a list of devices):
```

```
EFI Boot Options list: Timeout = 10 secs.
```

```
-----
01. DKB0 PCI(0|20|1|1) Scsi(Pun0,Lun0) "Boot VMS from DKB0" OPT
02. DKB200 PCI(0|20|1|1) Scsi(Pun2,Lun0) "Boot VMS from DKB200" OPT
03. VenHw(d65a6b8c-71e5-4df0-d2f009a9) "EFI Shell [Built-in]"
04. EIA0 PCI(0|0|2|0) Mac(0013215b85e4) "I64 Upgrade VIA NET"
-----
```

```
4 entries found.
```

- Exit the utility by entering E at the prompt:

```
Enter your choice: E
```

C.2.3 Verifying the Network I/O Device Is Bootable by EFI

Finally, verify that the LAN device you selected for your system's InfoServer client is bootable by EFI. Verification is recommended if the selected device is not one of the core I/O LAN devices

installed on your Integrity servers. To verify that the selected LAN device is bootable by EFI, follow these steps:

1. Access the EFI console for your Integrity servers. If your operating system is running, you must shut down your system to access EFI. (For details about accessing and using EFI, see your hardware documentation.)
2. From the EFI main menu, select the Boot Configuration option (or in some versions of EFI, the Boot Option Maintenance Menu). Make a selection before the EFI timeout expires; otherwise, the first entry of the EFI Boot Manager is selected automatically. If you are brought to the EFI Shell prompt, enter the `exit` command at the prompt to move back to the EFI main menu. If an autoboot begins, you can perform a cold reset of the Integrity servers to get back to the EFI console. (For more information, see your hardware documentation.) Otherwise, you must wait for your system to boot and shut it down again.
3. At the EFI Boot Configuration menu, select the Boot From a File option. In the Boot From a File list, look for the load file that corresponds to the LAN device you selected for network booting. This is the load file with a matching MAC address, as in the following example:

```
Load File [Acpi(HWP0002,0)/Pci(2|0)/Mac(0013215b85e4)]
```

The MAC address of the EIA0 network device selected earlier was 00-13-21-5B-85-E4, which matches the MAC address shown (without dashes). This verifies that the selected device is visible to the EFI console. If none of the Boot From a File options listed matches your selected device, then try another available device (as listed with the LANCP command `SHOW CONFIGURATION` in Section C.2.1 (page 231)).

4. Provide the device name and its IP address and MAC address to the person responsible for setting up the BOOTP server.

C.3 Setting Up the InfoServer Server

At least one system in the LAN must be designated as the InfoServer server. For OpenVMS Integrity servers Version 8.4 and later, if you select to boot via memory disk by specifying the appropriate boot flag and service name, make sure that the LAN server and the Boot server are the same system. This is the system that hosts the physical DVD drive from which network booting is performed. This system must be running OpenVMS Integrity servers Version 8.2-1 or later or OpenVMS Alpha Version 8.3 or later. The InfoServer software comes as part of the base operating system on these systems.

The following steps are necessary to set up the InfoServer software on the designated system:

1. Copy `SYS$STARTUP:ESS$LAD_STARTUP.TEMPLATE` to `ESS$LAD_STARTUP.DAT` (save the `ESS$LAD_STARTUP.TEMPLATE` file as a backup).
2. Edit `SYS$STARTUP:ESS$LAD_STARTUP.DAT` to modify parameters as needed. This file configures InfoServer parameters affecting the OpenVMS LASTport/Disk (LAD) server, which allows access to the DVD drive. The following is an example of the configuration file (with default settings):

```
!++
! ESS$LAD_STARTUP.TEMPLATE
!
! Copy this file to SYS$STARTUP:ESS$LAD_STARTUP.DAT and edit it
! to suit your local situation.
!
! This file is used by SYS$STARTUP:ESS$LAD_STARTUP.COM to set up
! the parameters for the InfoServer Application on OpenVMS
! LASTport/Disk (LAD) server.
!
! Note:
! The LAD disk block cache is structured as a number of fixed-size
! buckets. You must specify both the bucket size and the number of
! buckets for the cache.
!
! The LAD cache is allocated from non-paged pool and is in no way
! associated with the XFC cache. The total LAD cache size in bytes
! may be determined by the formula:
!
! cache-bytes = bucket-size-in-blocks * number-of-buckets * 512
```

```

!
! Be sure the SYSGEN parameters NPAGDYN/NPAGEVIR are sized appropriately.
!
! The following keywords with values are accepted by this procedure:
!
!     BUFFER_SIZE -   A number between 3 and 8 denoting the
!                     bucket size in blocks as follows:
!                     3 -   8 blocks
!                     4 -  16 blocks
!                     5 -  32 blocks
!                     6 -  64 blocks
!                     7 - 128 blocks
!                     8 - 256 blocks
!
!     CACHE_BUCKETS - Number of buckets
!
!     MAXIMUM_SERVICES - Maximum number of services (max=1024)
!
!     WRITE_LIMIT -   Server wide count of asynchronous writes
!
!--

```

```

BUFFER_SIZE = 3           ! default (8 block buckets)
CACHE_BUCKETS = 512      ! Default setting
WRITE_LIMIT = 0          ! No async writes
MAXIMUM_SERVICES = 256  ! default (typically more than enough)

```

The following table provides a short description of each of the parameters:

Parameter	Description												
BUFFER_SIZE	<p>The InfoServer block cache is structured as an array of fixed-size buffers (also called buckets). The BUFFER_SIZE parameter determines the size of each buffer or bucket. The numeric value of this parameter is an integer in the range 3 through 8, representing the bucket size in 512-byte blocks as follows. Bucket sizes larger than 32 blocks might not be appropriate for most users. The OpenVMS client segments I/O requests larger than 31 blocks into 31-block chunks, which could result in excessive I/O activity to the disk. The cache is allocated from nonpaged pool and is dedicated solely to the LAD driver.</p> <table> <tr> <td>3</td> <td>8 blocks (default)</td> </tr> <tr> <td>4</td> <td>16 blocks</td> </tr> <tr> <td>5</td> <td>32 blocks</td> </tr> <tr> <td>6</td> <td>64 blocks</td> </tr> <tr> <td>7</td> <td>128 blocks</td> </tr> <tr> <td>8</td> <td>256 blocks</td> </tr> </table>	3	8 blocks (default)	4	16 blocks	5	32 blocks	6	64 blocks	7	128 blocks	8	256 blocks
3	8 blocks (default)												
4	16 blocks												
5	32 blocks												
6	64 blocks												
7	128 blocks												
8	256 blocks												
CACHE_BUCKETS	Determines the number of buckets in the cache. The default is 512. Numbers larger than 16384 might adversely affect performance. To reach a desirable cache size, consider increasing the BUFFER_SIZE parameter.												
MAXIMUM_SERVICES	Sets the maximum number of services that can be defined at one time for the server. The value of this parameter must be a power of 2. The default and minimum value is 256 (adequate for most circumstances); the maximum value is 1024. Each service descriptor consumes nonpaged pool; however, unused services consume 4 bytes each.												
WRITE_LIMIT	The number of asynchronous write operations that can be outstanding for the server at any time. The default is 0 (no outstanding asynchronous write operations).												



NOTE: As indicated in the file comments, the LAD cache comes out of nonpaged pool. If you increase the cache significantly, you might need to increase the nonpaged pool SYSGEN parameters (NPAGEDYN and NPAGEVIR).

3. Determine which network device will be used for InfoServer LAD operations. You can use any network device that is visible to OpenVMS. Typically, any network device that works with DECnet or TCP/IP Services for OpenVMS should work. Use the LANCP command SHOW CONFIGURATION to determine which device to use, as described in Section C.2.1 (page 231).

For this release of OpenVMS, the LASTport protocol runs on only a single network device. To enable this device, copy the SYS\$STARTUP:ESS\$LAST_STARTUP.TEMPLATE file to the SYS\$STARTUP:ESS\$LAST_STARTUP.DAT file, and then open the SYS\$STARTUP:ESS\$LAST_STARTUP.DAT file and make the following changes:

- a. Remove the comment character (!) from the line that has the following text: DEVICE = (). Within the parentheses, specify the device name. For example: DEVICE = (EIA).
- b. Comment out the line that specifies ALL_CONTROLLERS = ON (comment out a line by inserting an exclamation point (!) at the beginning of the line).

The following example shows the SYS\$STARTUP:ESS\$LAST_STARTUP.DAT file with the suggested changes made (shown in **bold**):

```
!++
! This file will be used to set the appropriate LASTTCP qualifiers. The following
! LASTTCP qualifiers: ALL_CONTROLLERS, CHECKSUM, TRANSMIT_QUOTA, or SLOW_MODE
! can be set by using the following statement format:
! LASTTCP qualifier = 1 to enable e.g. SLOW_MODE = 1 enables SLOW_MODE
! LASTTCP qualifier = 0 to disable e.g. SLOW_MODE = 0 disables SLOW_MODE
! The remaining LASTTCP qualifiers will require the appropriate value settings.
DEVICE = (EIA) ! Uncommented; device name specified
! TIMEOUT = n minimum interval in seconds
! CIRCUIT_MAXIMUM = n maximum number of nodes
! GROUP = n Group number
! NODE_NAME = name Node name
! CONTROLLERS = ({{controller letter,}}...) Controller list
! TRANSMIT_QUOTA = n Number of transmit buffers
!--
!ALL_CONTROLLERS = ON ! Commented out
```

4. Add the following line to the system startup file SYS\$MANAGER:SYSTARTUP_VMS.COM:
@SYS\$STARTUP:ESS\$LAD_STARTUP.COM
5. If you changed any SYSGEN parameters, run AUTOGEN and reboot (for information about running AUTOGEN, see Section 7.24 (page 164)). If no SYSGEN parameters were changed, you can skip the reboot and execute the SYS\$STARTUP:ESS\$LAD_STARTUP.COM file manually.

After you complete these steps, the InfoServer server software is running and available to serve boot requests. The network devices are LAD0 (the LAD Server Virtual Device) and LAST0 (the LAST Transport Layer Virtual Device).

6. The InfoServer server can run on the same system as the InfoServer client. You might want to start the InfoServer client on this system, allowing the system to mount InfoServer devices. To start the InfoServer on this system, enter the following command at the DCL prompt:

```
@SYS$STARTUP:ESS$STARTUP DISK
```

To have the InfoServer client start at system boot, include the command in SYS\$MANAGER:SYSTARTUP_VMS.COM.

7. Now that you have set up and enabled the InfoServer server, you must use the InfoServer control program to create a service for the DVD drive. Follow these steps:
 - a. Mount the OpenVMS distribution media systemwide. In the following example, DQA0 is the DVD drive name (typically, DQA0 or DNA0 is the drive name) and I64084 is the volume label (for OpenVMS Integrity servers):

```
$ MOUNT/SYSTEM DQA0 I64084
```

- b. Enter the following command at the DCL prompt to define the InfoServer control program as a foreign command, or enter the line in a startup or login command file:

```
$ INFOSERVER ::= $ESS$INFOSERVER
```

Alternatively, you can enter the following command to start the program:

```
$ RUN SYS$SYSTEM:ESS$INFOSERVER
```

- c. Start the InfoServer control program and create the service, as in the following example (the colon after the device name DQA0 is required):

```
$ INFOSERVER
```

```
INFOSERVER> CREATE SERVICE I64084 DQA0:
```

```
INFOSERVER> EXIT
```

The created service should now be available for any InfoServer clients in the same LAN (these clients broadcast service solicitations over the LAN).

Started as in this example, the InfoServer control program accepts multiple commands until you exit by entering the EXIT command (or pressing **Ctrl/Z**). You can also enter a single command at the DCL prompt, returning you immediately to the DCL prompt again:

```
$ INFOSERVER CREATE SERVICE I64084 DQA0:
```

```
$
```

The InfoServer control program commands are similar, though not identical, to those supported by the hardware InfoServer used traditionally by OpenVMS Alpha systems. For more information, see the InfoServer help (at the InfoServer prompt, enter HELP) or the *HP OpenVMS System Management Utilities Reference Manual* manual.

8. On OpenVMS Alpha systems only, you must perform the following steps:
 - a. Enable MOP to use LANACP or DECnet on the system on which the OpenVMS InfoServer utility is being used. For information about enabling MOP, see the LANCP chapter in the *HP OpenVMS System Management Utilities Reference Manual: A-L*.
 - b. Copy the APB_084.SYS file from the OpenVMS Alpha distribution media to the MOP download directory (LAN\$DLL, which defaults to MOM\$SYSTEM).

C.4 Setting Up the BOOTP Boot Server and TFTP Server (OpenVMS Integrity servers Only)

The BOOTP boot server for the OpenVMS Integrity servers InfoServer utility can be on the same system or on any system in the same LAN as the InfoServer application for OpenVMS Integrity servers Version 8.3-1H1 and lower. For OpenVMS Version 8.4 onwards, when booting via memory disk, make sure that the BOOTP server and LAN server is the same system. TFTP is required on the boot server for supplying the boot files to the client systems.

The steps necessary to set up the boot server and boot files are as follows:



NOTE: All instructions and examples assume the use of TCP/IP Services for OpenVMS. Other IP products might work but have not been tested and are not supported at this time.



IMPORTANT: You do not have to perform steps 2 and 3 when booting an OpenVMS Integrity servers Version 8.4 or later if boot flags are set to 0,200400.

1. Make sure TCP/IP Services for OpenVMS is installed and that:
 - At least one IP interface is defined.
 - The BOOTP server and TFTP server are configured and started.
 - Optionally, make sure TELNET and FTP are configured and started.

To display IP interface information, use the TCPIP SHOW INTERFACE command.

To verify that the BOOTP and TFTP servers are configured and started, use the HP TCP/IP Services for OpenVMS SYS\$MANAGER:TCPIP\$CONFIG.COM configuration procedure. From the Main Configuration menu, select option 3 (Server components). If a BOOTP or TFTP service is not enabled and started, select the appropriate server option, and then enable and start the service accordingly. For more information about configuring and starting TCP/IP Services for OpenVMS components, see the *HP TCP/IP Services for OpenVMS Installation and Configuration* and *HP TCP/IP Services for OpenVMS Management* manuals.



NOTE: If you are currently using the DHCP service, you must disable it. The BOOTP service must be enabled instead. For information about disabling or enabling services, see the *HP TCP/IP Services for OpenVMS Management* manual.

2. Set up a location for the OpenVMS Integrity servers Version 8.4 boot files by creating the directory accessible by TFTP, as in the following example. (HP recommends that you create a separate boot file directory for each version of the operating system.)

```
$ CREATE/DIRECTORY TCPIP$TFTP_ROOT: [V831H1]
```



IMPORTANT: For each subsequent upgrade of OpenVMS, you must create a separate directory for the boot files specific to the OpenVMS version and, where appropriate, modify the path specified for each client's boot files (as in [step 6](#)). To make subsequent upgrades easier, you can use systemwide or clusterwide logical names.

3. Copy the following two files from the DVD to the TCPIP\$TFTP_ROOT: [V831H1] directory:
 - [SYS0.SYSCOMMON.SYSEXE] VMS_LOADER.EFI
 - [SYS0.SYSCOMMON.SYSEXE] IPB.EXE
4. Gather data for each boot client (that is, each node that is going to boot the DVD over the network), including the following information for the client's network device (the client Integrity servers core I/O card):
 - IP address
 - MAC address
5. Define each boot client's host name in the TCP/IP Services for OpenVMS local host database using the TCPIP SET HOST command. In the following example, *hostname* is the host name of the boot client and *ipaddress* is its IP address.

```
$ TCPIP SET HOST hostname/ADDRESS=ipaddress
```

The IP address does not have to be the actual address you plan to use for the boot client host; it must be in the same LAN as the BOOTP server and must not be currently in use. However, if you use statically assigned IP addresses, HP recommends (for simplicity) using the assigned address of the boot client's network device. To display and verify the assigned IP address, use the TCPIP SHOW HOST command.

- For each boot client, add an entry in the BOOTP database to associate the MAC address of the client's LAN device with the boot file to be loaded from the boot server, as in the following example. In this example, *hostname* is the host name of the boot client, and *MACAddress* is the client's MAC address in the format *xx-xx-xx-xx-xx*. The boot file specification need not include "TCPIP\$TFTP_ROOT:", if steps 2 and 3 were performed and VMS_LOADER.EFI and IPB.EXE are copied to the newly created directory. Otherwise, the boot file specification is the complete path for VMS_LOADER.EFI and in the below example, it is in the DVD identified by device DQA0:

```
$ TCPIP SET BOOTP hostname /HARDWARE=ADDRESS=MACAddress-
_$ /FILE=[V831H1]VMS_LOADER.EFI (For Version 8.3-1H1 and lower)
$ TCPIP SET BOOTP hostname /HARDWARE=ADDRESS=MACAddress-
_$ /FILE=DQA0:[SYS0.SYSCOMMON.SYSEXE]VMS_LOADER.EFI (For Version 8.4 and higher)
```

You might need to specify a gateway (/GATEWAYS) and network mask (/NETWORK_MASK). To determine the names of the gateways and the subnet information, consult your network administrator. For more information about this command, see the TCP/IP Services for OpenVMS documentation. To display and verify your BOOTP server configuration, use the TCPIP SHOW BOOTP/FULL command.



IMPORTANT: For each new version of OpenVMS Integrity servers, you must modify the client entry in the BOOTP database to point to the new, version-specific boot file.

Example C-1 shows the commands for setting up a boot server for a client named MOZART. An explanation of each command follows the example.

Example C-1 Setting Up the Boot Server and Client (for Version 8.3-1H1 and Lower)

```
$ CREATE/DIRECTORY TCPIP$TFTP_ROOT:[V831H1] 1
$ COPY DQA0:[SYS0.SYSCOMMON.SYSEXE]VMS_LOADER.EFI TCPIP$TFTP_ROOT:[V831H1]VMS_LOADER.EFI 2
$ COPY DQA0:[SYS0.SYSCOMMON.SYSEXE]IPB.EXE TCPIP$TFTP_ROOT:[V831H1]IPB.EXE 3
$ TCPIP SET HOST MOZART/ADDRESS=1.1.110.117 4
$ TCPIP SET BOOTP MOZART/HARDWARE=ADDRESS=00-13-21-5B-85-E4 -
_TCPIP> /FILE=[V831H1]VMS_LOADER.EFI 5
$ TCPIP SHOW HOST MOZART 6
```

```
      BIND Database
Server:  1.1.128.41

Host address      Host name
16.32.110.117    MOZART...
$TCPIP SHOW BOOTP MOZART/FULL 7

Host:             1.1.110.117    mozart

                                 Hardware Address: 00-13-21-5B-85-E4
Network mask:    255.0.0.0          Type:      Ethernet
File:           [V831H1]VMS_LOADER.EFI

Time offset:           0
Vendor: ACME, Inc.

Gateways:          not defined

Servers:
.
.
.
```

- Creates the directory TCPIP\$TFTP_ROOT:[V831H1] on the system to be the TFTP and BOOTP server.
- Copies [SYS0.SYSCOMMON.SYSEXE]VMS_LOADER.EFI from the DVD to TCPIP\$TFTP_ROOT:[V831H1].
- Copies [SYS0.SYSCOMMON.SYSEXE]IPB.EXE from the DVD to TCPIP\$TFTP_ROOT:[V831H1].
- Adds the boot client host MOZART to the TCP/IP hosts database, specifying MOZART's IP address as 1.1.110.117.

- 5 Adds host MOZART as a client entry in the BOOTP database, where the MAC address of the client's LAN device is 00-13-21-5B-85-E4 (as was determined in the example for the client in Section C.2.1 (page 231)) and the boot file for the client is [V831H1]VMS_LOADER.EFI.
- 6 Displays information about the boot client MOZART as stored in the local host database (use this command to verify that the client has been configured appropriately).
- 7 Displays information about the boot client MOZART as stored in the BOOTP database (use this command to verify that the client has been configured appropriately).

Example C-2 Setting Up the Boot Server and Client (for Version 8.4)

```

$ TCPIP SET HOST MOZART/ADDRESS=1.1.110.117 1
$ TCPIP SET BOOTP MOZART/HARDWARE=ADDRESS=00-13-21-5B-85-E4 -
$ _TCPIP> /FILE=DQA0:[SYS0.SYSCOMMON.SYSEXE ]VMS_LOADER.EFI 2
$ $ TCPIP SHOW HOST MOZART 3

      BIND Database
Server:  1.1.128.41

Host address      Host name
16.32.110.117    MOZART...
$TCPIP SHOW BOOTP MOZART/FULL 4

Host:            1.1.110.117    mozart

                                 Hardware Address: 00-13-21-5B-85-E4
Network mask: 255.0.0.0          Type:      Ethernet
File:           [DQA0:[SYS0.SYSCOMMON.SYSEXE ]VMS_LOADER.EFI

Time offset:           0
Vendor: ACME, Inc.

Gateways:           not defined

Servers:
.
.
.

```

- 1 Adds the boot client host MOZART to the TCP/IP hosts database, specifying MOZART's IP address as 1.1.110.117.
- 2 Adds host MOZART as a client entry in the BOOTP database, where the MAC address of the client's LAN device is 00-13-21-5B-85-E4 (as was determined in the example for the client in Section B.2.1 (page 191)) and the boot file for the client is DQA0:[SYS0.SYSCOMMON.SYSEXE]VMS_LOADER.EFI.
- 3 Displays information about the boot client MOZART as stored in the local host database (use this command to verify that the client has been configured appropriately).
- 4 Displays information about the boot client MOZART as stored in the BOOTP database (use this command to verify that the client has been configured appropriately).

After you complete these steps, in addition to the required steps in the preceding sections, you can boot a client over the network using the InfoServer application. Instructions on performing the InfoServer boot are in Section C.5 (page 240). A troubleshooting section is included in Section C.6 (page 245).

C.5 Booting OpenVMS Integrity servers from the InfoServer

After you set up the InfoServer software and the boot server properly and ensure that the InfoServer service is available, you can boot the remote DVD served by the InfoServer by following these steps:

to the appropriate network and are bootable using the InfoServer, in which case it does not matter which one you select. Note also that once you have OpenVMS running, you can display the devices and their corresponding MAC addresses by using the LANCP command `SHOW CONFIG` at the DCL prompt. The command lists the OpenVMS device names along with the MAC address and other characteristics. Likewise, with OpenVMS running, the EFI Utilities for OpenVMS `vms_show` command might provide additional information about any devices on the local system.

Booting with EFI `lanboot select` command

For OpenVMS Version 8.3-1H1 and lower:

- a. From the EFI Boot Manager screen, select the EFI Shell [Built-in] option.
- b. At the Shell prompt, enter the `lanboot select` command.
- c. When prompted, enter the number for the LAN device that has the MAC address.

For OpenVMS Version 8.4 and later:

- a. From the EFI Boot Manager screen, select the EFI Shell [Built-in] option.
- b. At the Shell prompt, enter the following commands to setup appropriate boot flags and service name:

```
Shell> SET VMS_FLAGS 0,200400
Shell> SET INFOSERVER_SERVICE I64084
```

(where I64084 is the InfoServer service name to be used for booting/installation. The service name entered must be in uppercase.)

- c. Now enter `lanboot select` at the shell prompt. When prompted, enter the number for the LAN devices that have the MAC address specified when you configured BOOTP in Section C.4 (page 237).
3. When you select the appropriate entry, you see several lines of messages and then the InfoServer boot menu (the same boot menu you would see on an Alpha system), as in the following examples. The DHCP (Dynamic Host Communication Protocol) message indicates the loading of the loader image (`VMS_LOADER.EFI`) that uses the EFI console to load and start the OpenVMS bootstrap (`IPB.EXE`). The Trivial File Transfer Protocol (TFTP) loads the bootstrap. In the first example, "Integrity servers Upgrade VIA NET" is the boot option for the InfoServer service. It was selected from the EFI Boot Manager options list (not shown). In the second example, you notice the loading of memory disk message prior to IPB load. Since the service name is pre-decided by setting the environment variable or have specified it through `BOOT_OPTIONS.COM`, the InfoServer service menu is not displayed in the second example.

Example C-3 DHCP Message

```
Loading.: Network Boot, 10/100
Running LoadFile()

CLIENT MAC ADDR: 00 13 21 5H 85 E4
DHCP./
CLIENT IP: 1.1.24.219   MASK: 255.0.0.0   DHCP IP: 0.240.0.0
Running LoadFile()

Starting: I64 Upgrade VIA NET
%EIA-I-BOOTDRIVER, Starting auto-negotiation
%EIA-I-BOOTDRIVER, Auto-negotiation selected 100BaseTX FDX

Network Initial System Load Function
Version 1.2
```

FUNCTION ID		FUNCTION
1	-	Display Menu
2	-	Help
3	-	Choose Service
4	-	Select Options
5	-	Stop

Enter a function ID value:

4. Respond to the prompts by pressing **Enter** after each entry; use the default service name indicated or one suggested by the system manager:
 - a. Enter 3 for the function ID.
 - b. Enter 2 for the option ID.
 - c. Enter the service name (ALPHA084 is the default service name for the InfoServer hardware; I64084 is the default service name for the OpenVMS Integrity servers OE DVD; when using the InfoServer utility, check with your system or network manager for the service name to specify).

A sample display follows:

```
Enter a function ID value: 3
OPTION                     OPTION
ID
1       -       Find Services
2       -       Enter known Service Name
```

```
Enter an Option ID value: 2
Enter a Known Service Name: I64084
```

After you boot, the system displays the OpenVMS menu. To install your OpenVMS operating system, follow the instructions in Section 3.4 (page 54). To upgrade your system, follow the instructions in Section 6.3 (page 109).

Example C-4 Loading of Memory Disk Message

Loading.: Network Boot Mac(00-15-60-04-f4-1e)

Client MAC Address: 00 15 60 04 F4 1E .- Client IP Address: 1.1.238.63 Subnet Mask: 255.255.240.0 BOOTP Server IP Address: 1.1.238.239 DHCP Server IP Address: 0.240.0.0 Boot file name: LDA3:[VMS\$COMMON.SYSEXEXE]VMS_LOADER.EFI

Retrieving File Size.|

Retrieving File (TFTP).Loading memory disk from IP 1.1.238.239

.....
Loading file: LDA3:[VMS\$COMMON.SYSEXEXE]IPB.EXE from IP 1.1.238.239 %IPB-I-SUCCESS, HP OpenVMS IPB version E8.4 successfully loaded.

HP OpenVMS Industry Standard 64 Operating System, Version E8.4
© Copyright 1976-2009 Hewlett-Packard Development Company, L.P.

%SMP-I-CPUTRN, CPU #1 has joined the active set.

%SMP-I-CPUTRN, CPU #2 has joined the active set.

%SMP-I-CPUTRN, CPU #3 has joined the active set.

%EIA0, Link up: 100 mbit, full duplex, flow control (receive only)

Installing required known files...

Configuring devices...

%PKA0, Copyright (c) 1998 LSI Logic PKW V3.2.20 ROM 4.19 %PKA0, SCSI Chip is SYM53C1010/66, Operating mode is LVD Ultra3 SCSI %PKB0, Copyright (c) 1998 LSI Logic PKW V3.2.20 ROM 4.19 %PKB0, SCSI Chip is SYM53C1010/66, Operating mode is LVD Ultra3 SCSI %EIB0, Link up: 100 mbit, full duplex, flow control (receive only)

You can install or upgrade the OpenVMS I64 operating system
or you can install or upgrade layered products that are included
on the OpenVMS I64 distribution media (CD/DVD).

You can also execute DCL commands and procedures to perform
"standalone" tasks, such as backing up the system disk.

Please choose one of the following:

- 1) Upgrade, install or reconfigure OpenVMS I64 Version E8.4
- 2) Display layered products that this procedure can install
- 3) Install or upgrade layered products
- 4) Show installed products
- 5) Reconfigure installed products
- 6) Remove installed products
- 7) Find, Install or Undo patches; Show or Delete Recovery Data
- 8) Execute DCL commands and procedures
- 9) Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?)



NOTE: If you boot the OpenVMS Alpha operating system CD or OpenVMS Integrity servers OE DVD from an InfoServer but lose your connection during the installation or upgrade procedure (the system is unresponsive and pressing **Ctrl/Y** does not return you to the menu), do the following:

IF ...	THEN ...
You previously chose the INITIALIZE option	<ol style="list-style-type: none">1. Reboot the OpenVMS CD DVD.2. Choose the install/upgrade option (1) on the menu and perform the installation or upgrade procedure again.
You previously chose the PRESERVE option	<ol style="list-style-type: none">1. Reboot the OpenVMS CD or DVD.2. Enter the DCL environment by choosing option 8 on the menu.3. Mount the device containing your backup copy of the target disk and the device that is your target disk.4. Restore the backup copy of your target disk by entering the appropriate BACKUP commands. (See Appendix F (page 305) for complete information about using MOUNT and BACKUP commands to restore a system disk.)5. Log out from the DCL environment.6. Choose the install/upgrade option (1) on the menu and perform the installation or upgrade procedure again.

C.6 Troubleshooting InfoServer Boot Problems

For problems using the OpenVMS Integrity servers InfoServer software for network booting, consider the following:

1. When you attempt to boot over the network, check your console display for the following:
 - The IP address of the boot server that sends your EFI console the OpenVMS Integrity servers loader file (VMS_LOADER.EFI). If this IP address is not as expected, your client host might be in the database of the wrong boot server. Enter your client host IP address in the database of the correct boot server (see step 5 of Section C.4 (page 237)), and remove your client from the database of any other boot servers.
 - The version number of the IPB.EXE bootstrap file that is loaded (for this release, the version should be 8.4). If this version number is not the correct version of OpenVMS Integrity servers, a message indicates there is a mismatch. The boot server might be the source of the problem. Make sure that it is configured correctly. Make sure the client entry in the boot server's database has been updated to point to the current version of the loader file (see step 3 and step 6 of Section C.4 (page 237)).
 - Evidence that DHCP is not responding. If you do not see a message indicating autonegotiation has been started, make sure the closest network device or switch is set for autonegotiation.
2. If the network boot succeeds but your attempt to choose a service or to display services at the InfoServer menu fails, a device might be filtering the LASTport/Disk (LAD) protocol. This protocol does not provide routing functions and only works within a LAN. If filtering devices are used in an extended LAN, the devices must allow this protocol (protocol type is 80-41) to pass through unfiltered so that clients can access the InfoServer across the filtering device.

For LANCP and LANACP problems, see the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems* for more information.

D Using HP SIM and vMedia for Provisioning OpenVMS

HP Systems Insight Manager (HP SIM) allows you to provision OpenVMS to one or more Integrity servers in the network. This means that, from a single location in the network (a Microsoft Windows ProLiant server designated as the management workstation), you can use HP SIM to install, upgrade or configure OpenVMS on several servers simultaneously.

For installing or upgrading OpenVMS, HP SIM uses either InfoServer utility or virtual media (vMedia) to provide the booting service over the network. Using the HP SIM interface, you can initiate the installation or upgrade process, and OpenVMS is then booted from the InfoServer or vMedia. While the installation or upgrade continues in the background, you can monitor the process from your console or attend to other tasks. Using InfoServer, you can provision up to eight servers simultaneously. Using vMedia, you can provision one server at a time. HP SIM provisioning facilitates installing or upgrading OpenVMS on Integrity servers that do not include a CD/DVD drive.

You can also use HP SIM provisioning to configure OpenVMS servers. HP SIM provisioning supports applying OpenVMS licenses and configuring TCP/IP (for HP TCP/IP Services for OpenVMS) on up to eight servers simultaneously.

You can also use vMedia independently of HP SIM to install or upgrade OpenVMS on a server. When using vMedia, the bootable image can be stored on a network drive, or on the system from where you browse to access the server. Unlike HP SIM provisioning, using vMedia independently of HP SIM to install or upgrade OpenVMS, you interactively perform the procedure, specifying answers to prompts (as documented in Chapter 3 (page 45) and Chapter 6 (page 105)).

This appendix explains how to do the following:

- Enable and use HP SIM provisioning to install, upgrade or configure OpenVMS on one or more servers (HP SIM Provisioning of OpenVMS).
- Enable and use vMedia to install or upgrade OpenVMS (Using vMedia Independently of HP SIM).

D.1 HP SIM Provisioning of OpenVMS

D.1.1 About HP SIM and Provisioning

HP Systems Insight Manager (HP SIM) is the foundation for HP's unified server-storage management strategy. It provides simplified, centralized management of multiple servers and platforms through a web-based, unified ("single-pane-of-glass") interface. HP SIM provides the basic tools needed to identify, discover, monitor, and deploy systems and other assets on the network. The core HP SIM software uses WBEM to deliver essential capabilities required to manage HP server platforms.

HP SIM running on a Microsoft Windows ProLiant server supports provisioning of OpenVMS on selected HP Integrity rack and blade servers. For information on prerequisites for HP SIM, see "Prerequisites for HP SIM Provisioning" (page 248). An OpenVMS provisioning plug-in for HP SIM must be installed on the ProLiant server. You can access HP SIM from a browser on your PC. With provisioning support, HP SIM installs or upgrades OpenVMS quickly and easily on one or more servers in the network, in much the same way as HP-UX supports provisioning. You can also use provisioning support to apply OpenVMS licenses (Product Authorization Keys) and to configure OpenVMS TCP/IP on one or more servers in the network simultaneously.

You use HP SIM to initiate the provisioning, after which the installation, upgrade or configuration process occurs automatically in the background. To install or upgrade OpenVMS over the network with HP SIM provisioning, you can use network services provided by the InfoServer utility and TCP/IP services for OpenVMS, or you can use the vMedia feature provided with your Integrity server firmware. Currently, HP SIM provisioning does not support booting from a shadowed system disk.

To use the InfoServer software utility, you must create a service for a bootable image of OpenVMS (a container file) stored at a location on the network that is accessible to the InfoServer. The OpenVMS InfoServer utility serves for provisioning in much the same way as does the HP

Ignite-UX server for provisioning HP-UX on Integrity servers. Using HP SIM with InfoServer, you can provision up to eight servers simultaneously.

To use vMedia, which is provided with Integrity servers that include iLO 2 MP, you must create an ISO image of the OpenVMS OE DVD, store the image on an accessible PC or Windows server in the network, and use HP SIM to connect your Integrity servers vMedia to that image. Using vMedia, you can provision one server at a time. You can also use vMedia independently of HP SIM to install or upgrade a server over the network. For more information about vMedia, see Section D.2 (page 284).



NOTE: DVDs are accessible by vMedia as read-only.

D.1.2 Prerequisites for HP SIM Provisioning

Support of HP SIM provisioning requires the following:

- HP SIM Version 6.0, running on a Microsoft Windows ProLiant server (32-bit), designated as the management workstation.

The ProLiant server must be on the same LAN as any Integrity servers that you plan to provision. To provision OpenVMS, HP SIM requires that the OpenVMS Provisioning Plug-in for HP SIM be installed. This plug-in enables HP SIM to manage and provision OpenVMS. For information on acquiring and installing the plug-in, see “Setting Up HP SIM and the Windows Server to Provision OpenVMS” (page 259). For information on installing, configuring, and using HP SIM, see the documentation located at the following website:

<http://www.hp.com/go/hpsim>



NOTE: When OpenVMS is installed by means of HP SIM provisioning, the WBEM Services for OpenVMS, and WBEM Providers for OpenVMS are installed automatically. These products along with TCP/IP Services for OpenVMS are required for HP SIM management support.

- A LAN connection to the iLO 2 MP port of each Integrity server that you plan to provision.
- You can use HP SIM provisioning for the following Integrity servers: rx3600, rx6600, and the HP Integrity BL860c and BL870c Blade servers.



IMPORTANT: Provisioning currently does not support installing, upgrading or configuring OpenVMS as a guest operating system on HP Integrity VM.

- Verify that the version of OpenVMS being provisioned is supported on the target Integrity server. For more information on supported Integrity servers, see the following documents:
 - *OpenVMS Hardware Support Chart* available at the following location:
http://h71000.www7.hp.com/openvms/hw_supportchart.html
 - *OpenVMS OE Support Chart* available at the following location:
http://h71000.www7.hp.com/openvms/openvms_supportchart.html
- If you plan to use the InfoServer utility to provide HP SIM provisioning, the InfoServer utility must be running on an OpenVMS Version 8.4 system connected to the same LAN as your Integrity server. You must provide the IP address of your InfoServer to HP SIM provisioning for installing or upgrading OpenVMS. For information on setting up the InfoServer for HP SIM provisioning, see “Setting Up InfoServer Support” (page 249).
- If you plan to use vMedia, the following are required:

On the Integrity server:

- vMedia licensing through the Advanced Server Management option (iLO 2 Advanced Pack) and the user virtual media access right. vMedia is part of the iLO Advanced Pack feature set. This license is provided and pre-enabled on the Integrity BL860c and BL870c Server Blade products.

On the management workstation (or a Windows-based PC/server on the same LAN as the Integrity server):

- Microsoft Internet Explorer Version 6 or later.
- Java Plug-in 1.5.0_08 or later. (The vMedia Java applet has only been tested on x86 PCs and Windows servers.)
- An ISO image of the OpenVMS Integrity servers OE DVD stored on a local disk or a network drive accessible through a high-speed link. To create the ISO image, you can use ILO 2 MP through your browser, as described in “Setting Up vMedia” (page 252). HP recommends that you do not use vMedia to install or upgrade directly from a DVD on the management workstation.



NOTE: When using vMedia to install or upgrade OpenVMS, HP recommends that you use an image of the OpenVMS Integrity servers OE DVD located on your Windows-based management station. This has two advantages:

- If the DVD is defective or corrupted, when you attempt to create an image of it, the imaging software will fail, thereby indicating the DVD's condition.
- Installing or upgrading OpenVMS from the image file is much faster than installing from a DVD. This advantage outweighs any extra cost or time of copying the DVD to the ISO image file.

NOTE: If your Integrity server has a local DVD drive, install or upgrade from the OpenVMS for Integrity servers OE DVD inserted in the DVD drive on your Integrity server instead of using vMedia from your Windows-based management workstation. In short, for best performance with installations or upgrades, choose from the following, listed according to the potential speed (from fastest to slowest):

- Use local DVD drive — If your Integrity server has a local DVD drive, install or upgrade using the OpenVMS for Integrity servers OE DVD from that DVD drive.
- Use vMedia with OpenVMS OE DVD ISO image — To install or upgrade using an ISO image of the OpenVMS for Integrity servers OE DVD, where the image is stored on your Windows-based management workstation.
- vMedia with OpenVMS OE DVD — It is a slow process, and is not recommended unless you have no other recourse. Install or upgrade from a DVD drive on your Windows-based management workstation.

To set up your environment for vMedia support, see Section D.1.4 (page 252).

- Up-to-date firmware for the Integrity server (on server blades, this includes the firmware for the Onboard Administrator).
- Optionally, HP iLO or other means for monitoring the console.

D.1.3 Setting Up InfoServer Support

If you want to use the InfoServer utility to provide a network service for provisioning, follow the steps described in this section. To use the InfoServer utility to enable provisioning over the network, the utility must be running on an OpenVMS Alpha or OpenVMS Integrity server system in the same LAN as the target Integrity server that is to be provisioned. The InfoServer utility uses the TCP/IP Services for OpenVMS (BOOTP server and TFTP servers) to help boot the OpenVMS operating system. The InfoServer accesses a bootable image of OpenVMS that you store on a system in the same LAN. Follow these steps to enable the required InfoServer support for HP SIM provisioning. For more information, see [Appendix C \(page 229\)](#).

1. At least one system in the LAN must be designated as the InfoServer server. This is the system that hosts the DVD drive from which network booting is performed. It must be running OpenVMS Alpha Version 8.3 or later, or OpenVMS Integrity servers Version 8.2–1 or later. Perform these basic steps to set up InfoServer:
 - a. Copy the SYS\$STARTUP:ESS\$LAD_STARTUP.TEMPLATE file to the SYS\$STARTUP:ESS\$LAD_STARTUP.DAT file. If any changes are necessary for your environment (typically none are required), modify the SYS\$STARTUP:ESS\$LAD_STARTUP.DAT file.
 - b. Copy the SYS\$STARTUP:ESS\$LAST_STARTUP.TEMPLATE file to the SYS\$STARTUP:ESS\$LAST_STARTUP.DAT file. Modify the SYS\$STARTUP:ESS\$LAST_STARTUP.DAT file as follows, along with any other changes necessary for your environment:
 1. Remove the comment (!) character from the line that has the following text: DEVICE = (). Within the parentheses, specify the device name. For example: DEVICE = (EIA).
 2. Comment out the line that specifies ALL_CONTROLLERS = ON (comment out a line by inserting an exclamation point (!) at the beginning of the line).
 - c. Optionally, add the following two lines to the SYS\$MANAGER:SYSTARTUP_VMS.COM system startup file:

```
@SYS$STARTUP:ESS$LAD_STARTUP.COM
@SYS$STARTUP:LD$STARTUP
```



NOTE: Invoke these commands manually to start these services immediately rather than initiating a reboot.

2. Set up the BOOTP server and TFTP server on the InfoServer server:



IMPORTANT: For HP SIM provisioning, the BOOTP and TFTP server must be set up on the same system as the InfoServer. TFTP is required on the boot server for supplying the boot files to the client systems.

- a. Make sure TCP/IP Services for OpenVMS is installed and that:
 - At least one IP interface is defined.
 - The BOOTP server and TFTP server are configured and started.
 - Optionally, make sure TELNET and FTP are configured and started.

To display IP interface information, use the TCPIP SHOW INTERFACE command.



NOTE: If you are currently using the DHCP service, you must disable it. The BOOTP service must be enabled instead. For information about disabling or enabling services, see the *HP TCP/IP Services for OpenVMS Management* manual.



IMPORTANT: When you install or upgrade to OpenVMS Integrity servers Version 8.4 or later from an InfoServer through Provisioning, OpenVMS is booted on the target server through a memory disk. So, you need not complete steps b and c for OpenVMS Integrity servers Version 8.4 systems. Complete steps b and c only for OpenVMS systems of version 8.3-1H1 and lower.

- b. Set up a location for the OpenVMS Integrity servers boot files by creating the directory accessible by TFTP, as in the following example. HP recommends that you create a separate boot file directory for each version of the operating system.

```
$ CREATE/DIRECTORY TCPIP$TFTP_ROOT:[V831H1]
```



IMPORTANT: For each subsequent upgrade of OpenVMS, you must create a separate directory for the boot files specific to the OpenVMS version and, where appropriate, modify the path specified for each client's boot files. To make subsequent upgrades easier, you can use systemwide or clusterwide logical names.

- c. Copy the following two files from the DVD to the TCPIP\$TFTP_ROOT:[V831H1] directory:
 - [SYS0.SYSCOMMON.SYSEXE]VMS_LOADER.EFI
 - [SYS0.SYSCOMMON.SYSEXE]IPB.EXE
- d. Gather data for each boot client (each node that is going to be provisioned, hereafter referred to as a provisioning/boot client), including the IP address of the network device (the Integrity server core I/O card).
- e. Define each provisioning/boot client's host name in the TCP/IP Services for OpenVMS local host database using the TCPIP SET HOST command.

In the following example, *hostname* is the host name of the provisioning/boot client and *ipaddress* is its IP address:

\$ TCPIP SET HOST hostname /ADDRESS=ipaddress

- f. For each provisioning/boot client, you might need to add an entry in the BOOTP database to specify a gateway and network mask.

To do so, use the SET BOOTP command in the following format, where *hostname* specified the host name of the boot client, *MACAddress* specifies the MAC address of the network port of the boot client used for LAN booting, *gateways-ip* specifies the gateways used for routing, *ip-network-mask* specifies the subnet mask, and *diskname* specifies either the DVD or LD device containing the OpenVMS OS image

To determine the names of the gateways and the subnet information, consult your network administrator. For more information on this command, see the TCP/IP Services for OpenVMS documentation.

For V8.3-1H1 or lower:

```
$ TCPIP SET BOOTP hostname /HARDWARE=ADDRESS=MACAddress -
/GATEWAYS=gateways-ip -
/NETWORK_MASK=ip-network-mask -
/FILE=TCPIP$TFTP_ROOT:[V831H1]VMS_LOADER.EFI
```

For Version 8.4 or later:

```
$ TCPIP SET BOOTP hostname /HARDWARE=ADDRESS=MACAddress -
/GATEWAYS=gateways-ip -
/NETWORK_MASK=ip-network-mask -
/FILE = <disk_name>[SYS0.SYSCOMMON.SYSEXE]VMS_LOADER.EFI
```

To display and verify your BOOTP server configuration, use the TCPIP SHOW BOOTP/FULL command.



IMPORTANT: For each new version of OpenVMS Integrity server, you must modify the client entry in the BOOTP database to point to the new, version-specific boot file. As shown in the previous examples, the boot file for OpenVMS Version 8.3-1H1 is [V831H1]VMS_LOADER.EFI and for Version 8.4 and later it is the actual path to VMS_LOADER which is either in the DVD or the LD device created.

- 3. Create a copy of the OpenVMS OE DVD on an LD device (logical disk or virtual drive) that is accessible to the InfoServer utility. The following example shows how to establish an LD device and copy the OpenVMS DVD (DNA0:) to the device on an OpenVMS system that is the InfoServer server:

```
$ @SYS$STARTUP:LD$STARTUP
$ LD CREATE I64084.DSK/SIZE=6005000
$ LD CONNECT I64084.DSK
$ MOUNT/FOREIGN/NOASSIST LDA1:
```

```
$ MOUNT/OVERRIDE=IDENTIFICATION DNA0:  
$ BACKUP/IMAGE/VERIFY DNA0: LDA1:  
$ DISMOUNT DNA0:  
$ DISMOUNT LDA1:
```

For more information about InfoServer commands, including how to work with LD devices, see the InfoServer help (at the InfoServer prompt, type HELP) or the *HP OpenVMS System Management Utilities Reference Manual* manual.

4. Start the InfoServer client on your Integrity servers, and on any other systems that are to be provisioned, by entering the following command:

```
$ @SYS$STARTUP:ESS$STARTUP DISK
```

To have the InfoServer start at system boot, include the preceding command in the SYS\$MANAGER:SYSTARTUP_VMS.COM file.

5. Enable the LD device as the InfoServer service, as in the following example:

```
$ MOUNT/SYSTEM/NOWRITE LDA1: I64084  
$ INFOSERVER ::= $ESS$INFOSERVER  
$ INFOSERVER  
INFOSERVER> CREATE SERVICE I64084 LDA1:  
INFOSERVER> EXIT
```

D.1.4 Setting Up vMedia

If you want to use vMedia to provide a virtual CD/DVD drive or image file over the network from which you can install or upgrade OpenVMS on your Integrity servers, follow the steps described in this section. These steps show you how to use iLO 2 MP through your browser to create an ISO image of your OpenVMS OE DVD.

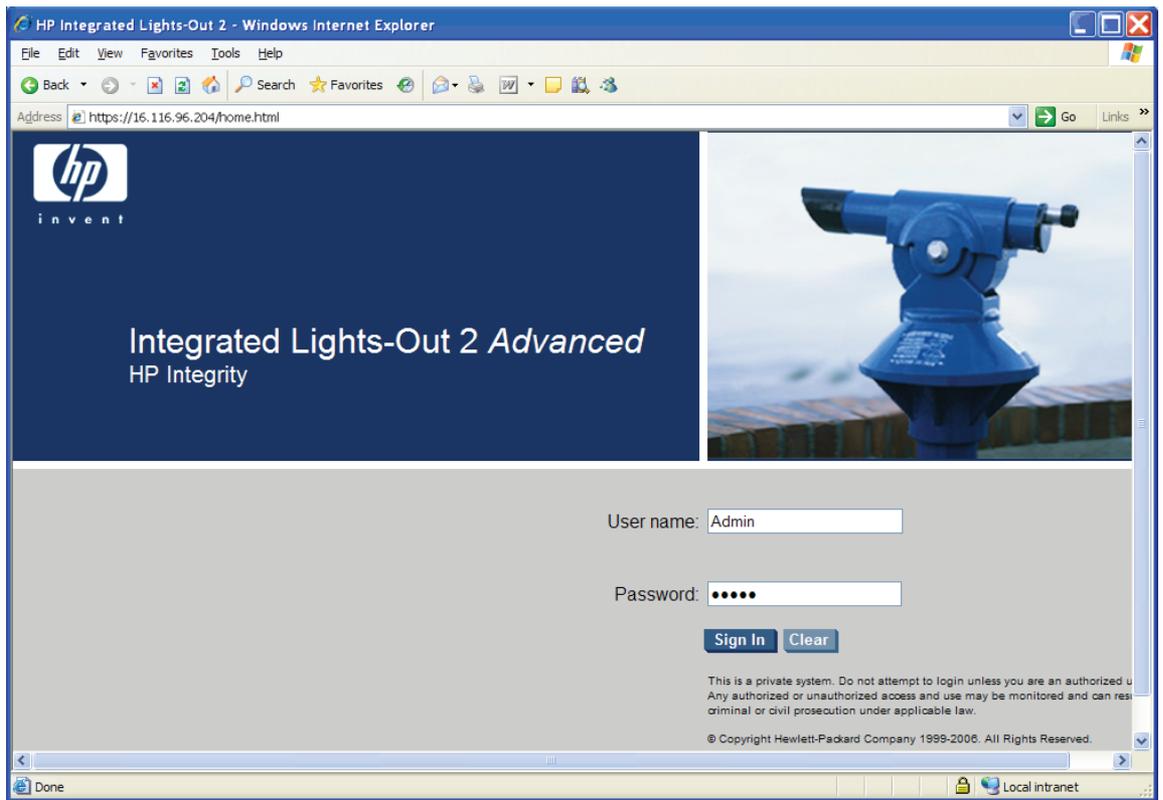


NOTE: Contents of screens shown in this section may vary according to the type of browser software being used.

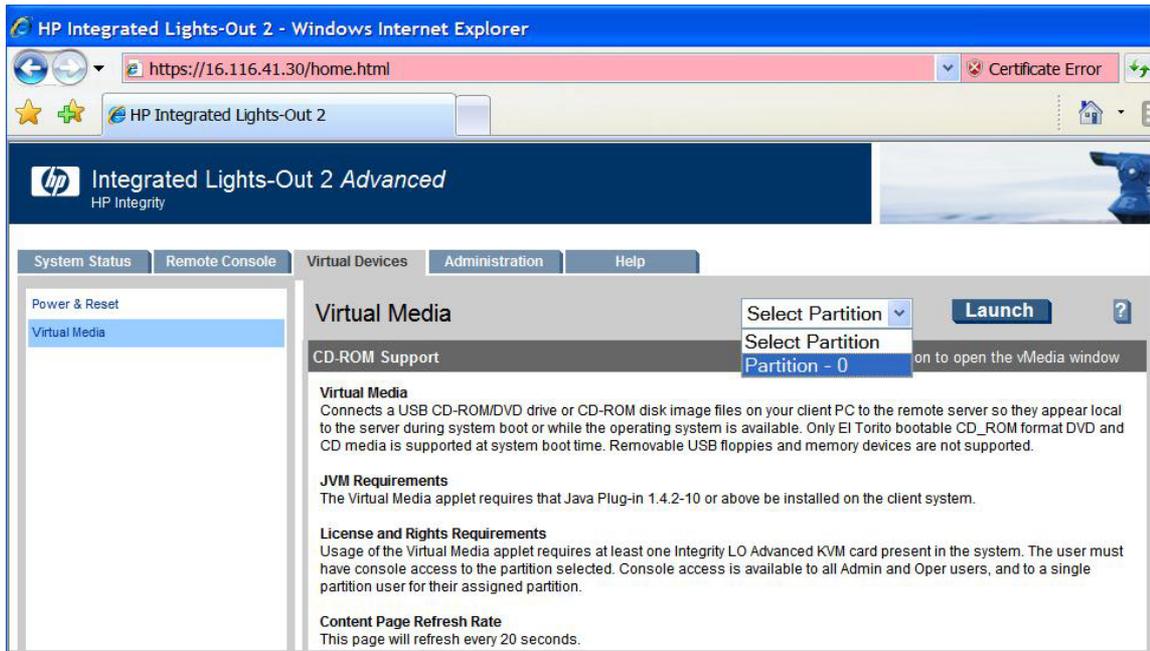
1. Insert the OpenVMS OE DVD into the DVD drive on your PC or Windows server.
2. Make sure your Integrity servers iLO 2 MP and vMedia are set up as documented in your Integrity server hardware documentation (for example, see the *HP Integrity iLO 2 MP Operations Guide*). Enable the right to use the vMedia applet.

Make sure your Integrity server is powered on. Once you connect to your server's iLO 2 MP and log in, you can check the status and power on your Integrity servers from your browser. Select the Virtual Devices tab and access the Power & Reset screen by selecting Power Management (on the left of the screen).

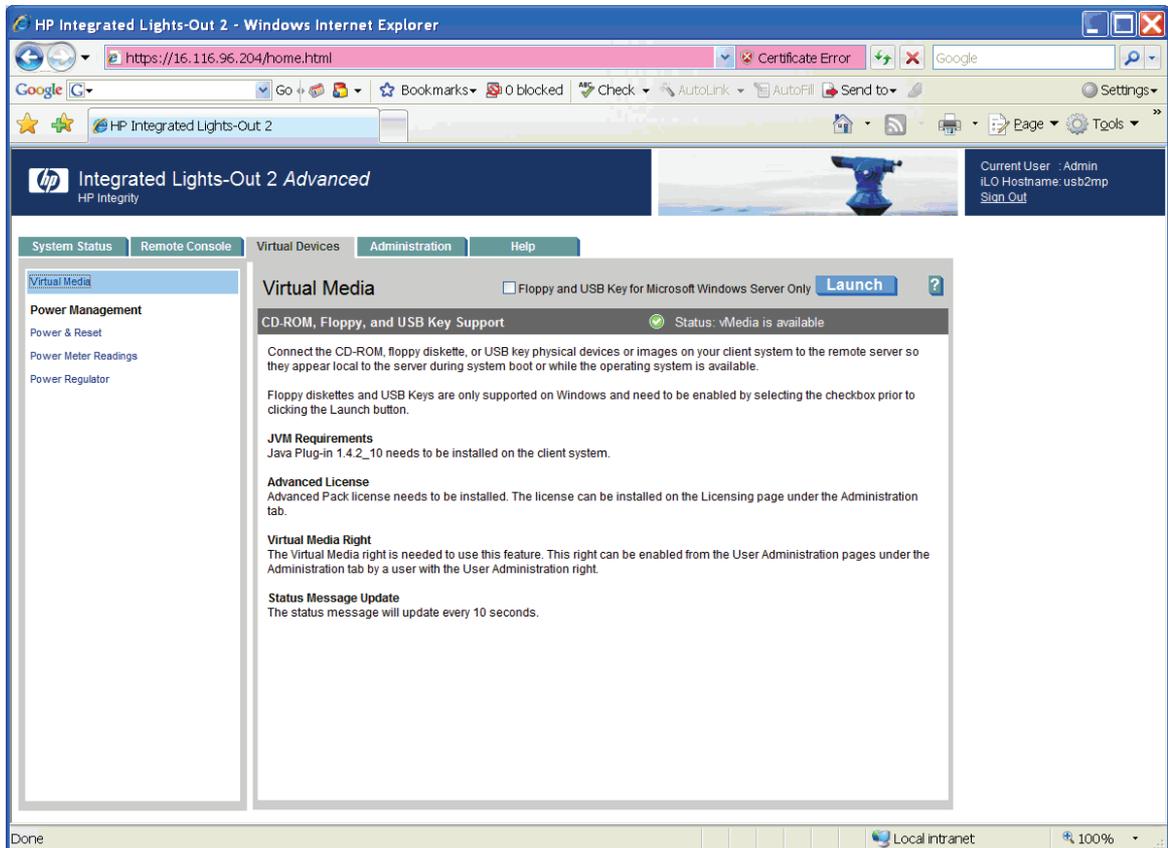
3. From a browser on a Windows-based PC or server in the same network as your Integrity servers, access your Integrity server's iLO 2 MP by specifying the DNS name or IP address. Then log in as shown in the following example (in this example, the IP address is entered):



4. Select the Virtual Devices tab and then select Virtual Media from the list on the left. If your Integrity server is not a cell-based system, skip to the next step. If your server is a cell-based system, you must select the partition before launching the vMedia application, as in the following example:



5. Click **Launch** in the upper right corner of the Virtual Media screen, as shown in the following example:



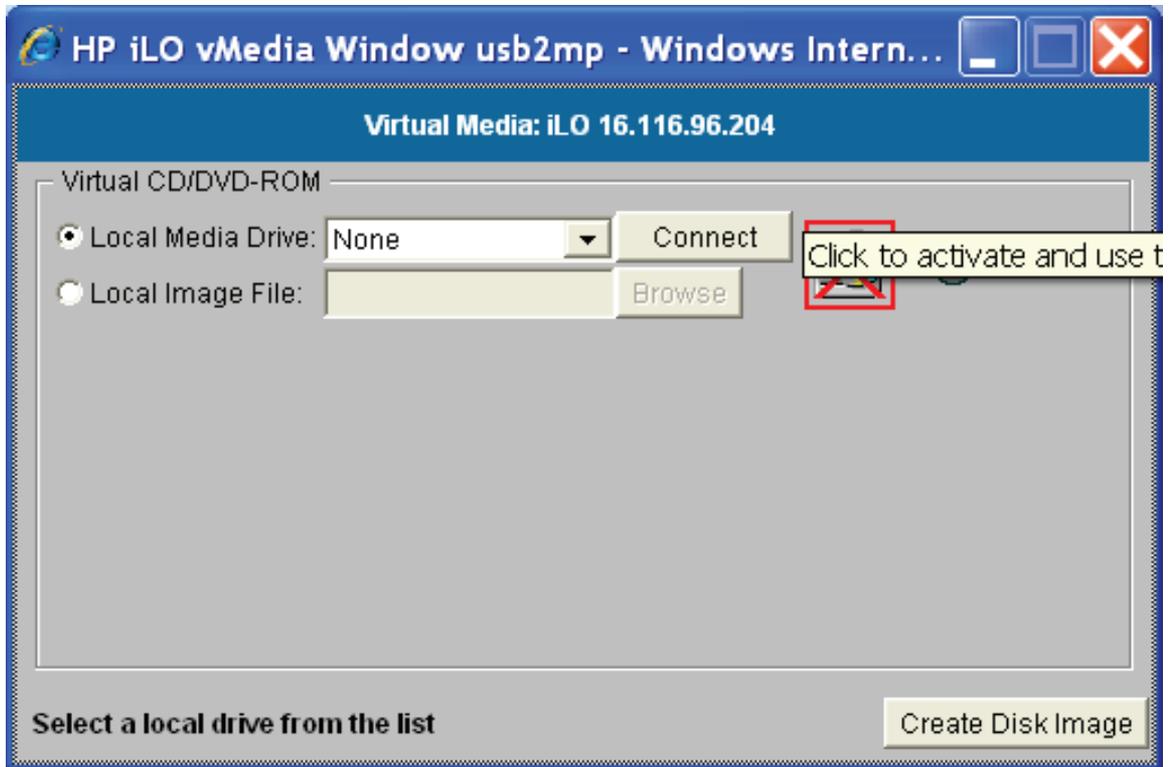
6. You might see the following warning or similar warnings or informational messages regarding security. In the security warning shown here, you can check the box to always trust content, and then click **Yes**. (To avoid certification warnings, install valid certificates for the iLO 2 MP. For more information, see the *HP Integrity iLO 2 MP Operations Guide*. In addition, see the online help provided by your browser.)



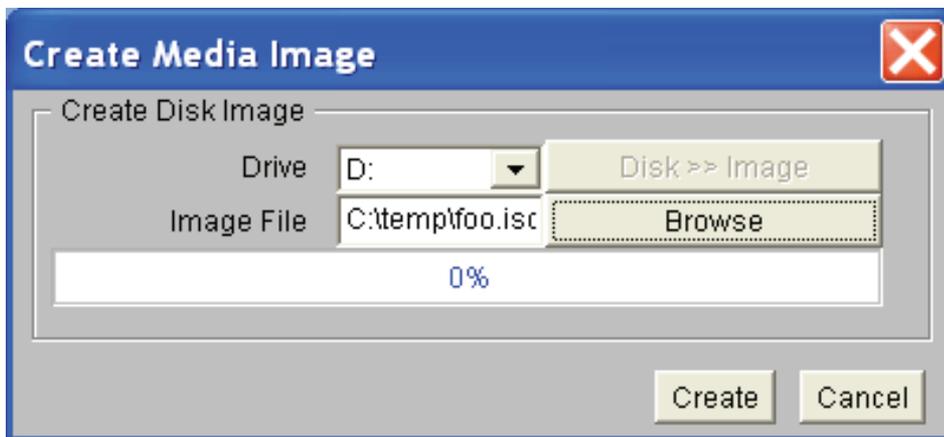
A screen similar to the following might appear next. Check the box to always trust content, and then click **Run**.



- From the Virtual CD/DVD-ROM dialog box that appears next, make sure the Local Media Drive option is selected, and then click **Create Disk Image**, as in the following example:



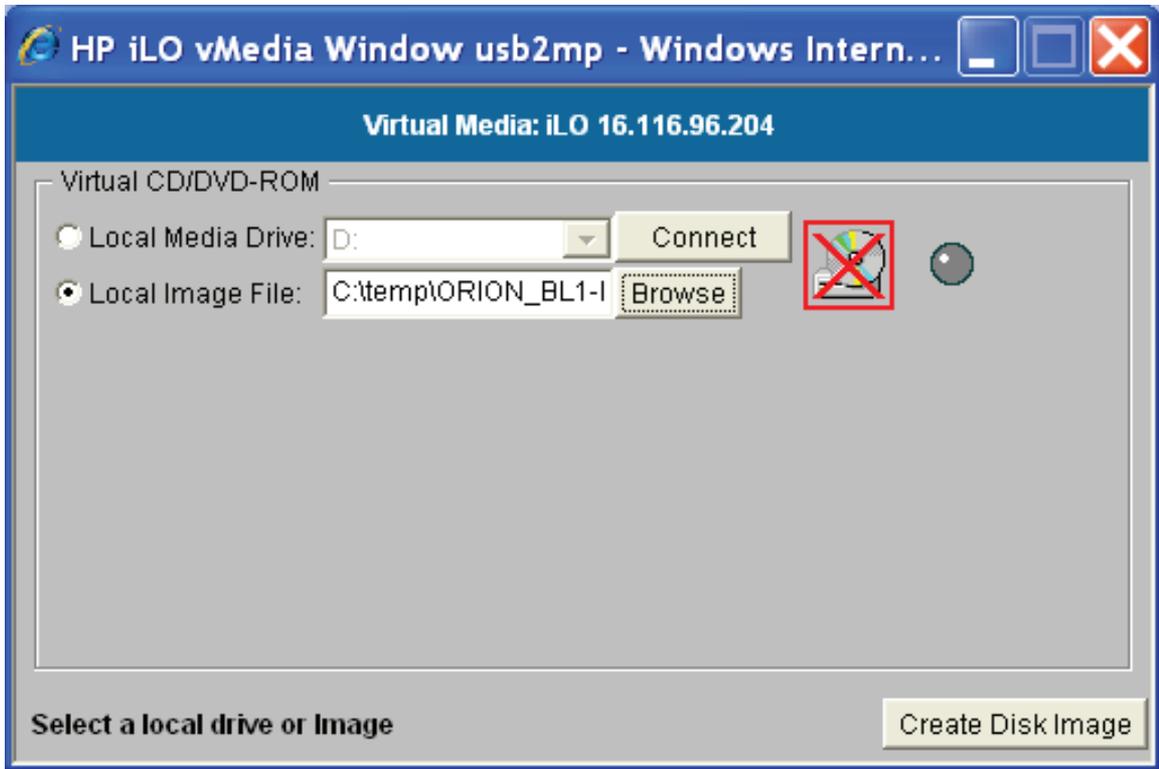
- The Create Disk Image dialog box appears, as in the following example. Specify a path or file name for the image to be created, and then click **Create**.



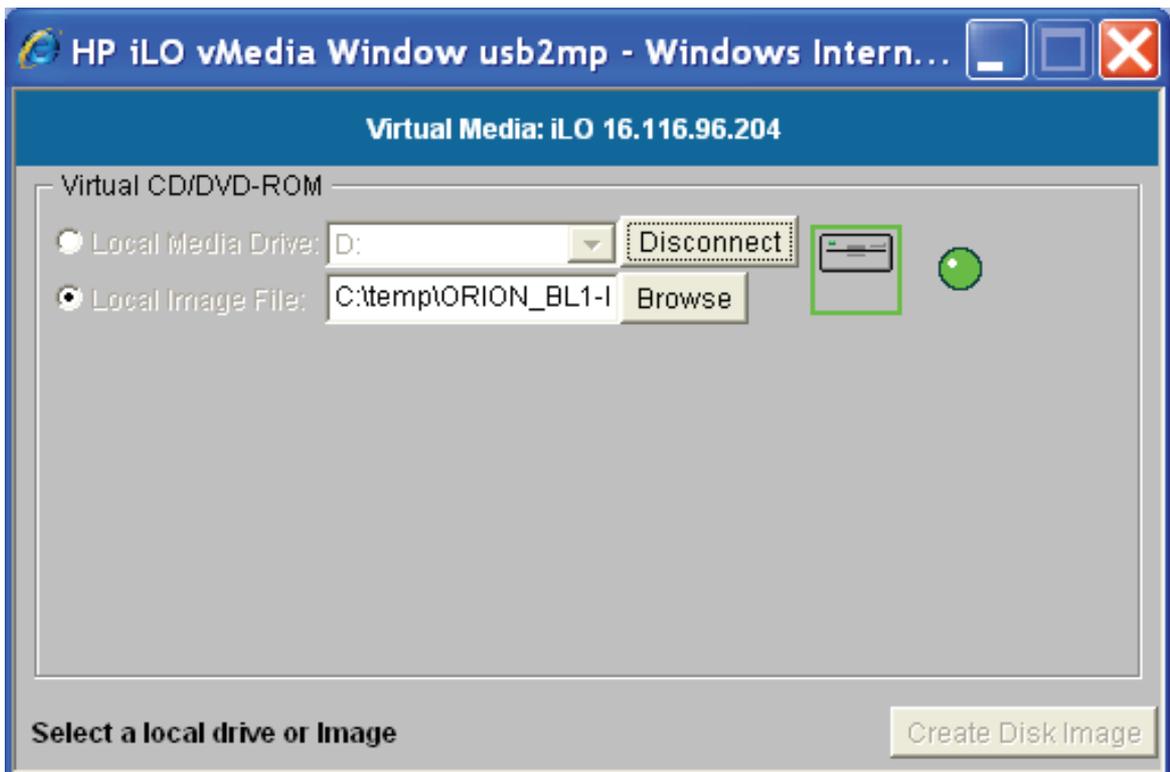


NOTE: As noted previously, HP recommends that you do not install or upgrade directly from a DVD (on your local Windows-based management workstation) with vMedia. Creating a disk image on the local drive (or a network drive) will make the installation or upgrade much faster. This assumes the local or network drive is accessible to your Integrity servers over a high-speed network link.

9. This brings up the Virtual CD/DVD-ROM dialog box, as in the following example. Select the Local Image File option, browse for the created ISO image file that you want vMedia to access, and then click **Connect**.



The screen should then indicate the image is connected to vMedia, as in the following example. Now the targeted Integrity server is ready to be booted using the ISO image file.



You can now provision OpenVMS through HP SIM (see Section D.1.6.2 (page 271)) or use vMedia independently of HP SIM (see Section D.2 (page 284)).

D.1.5 Setting Up HP SIM and the Windows Server to Provision OpenVMS

Install and configure HP SIM on a Microsoft Windows ProLiant server in the LAN according to the instructions in the *HP SIM Windows Installation and Configuration Guide* and the *HP SIM Release Notes* available in the Information Library on the following website:

<http://www.hp.com/go/hpsim>

Once HP SIM is installed and configured, do the following:

- Acquire and install the OpenVMS Provisioning Plug-in for HP SIM, as described in Section D.1.5.1 (page 259).
- Enable HP SIM to discover and identify the MPs of the Integrity servers on which you want OpenVMS provisioned, as described in Section D.1.5.2 (page 259).

D.1.5.1 Installing or Upgrading the OpenVMS Provisioning Plug-in for HP SIM

The OpenVMS Provisioning Plug-in for HP SIM enables HP SIM to support provisioning of OpenVMS. Follow these steps to acquire and install the plug-in or upgrade an existing version of the plug-in:

1. Download the HP OpenVMS Provisioning kit (ZIP file) from the following website:
<http://www.hp.com/go/openvms/provisioning>
2. Extract the ZIP file to a folder on your Windows server. Navigate to this folder, and double-click the `InstallOpenVMSProvisioning.jar` file and click the **Install** button on the resulting installer wizard window. The OpenVMS Provisioning for HP SIM installation wizard indicates the completion of the installation or upgrade of the provisioning components and the update of HP SIM deployment tools.



NOTE: If you double-click on the `.jar` file and a Windows popup message indicates that Windows cannot open the file, enter the following command at the MS-DOS prompt after changing the current directory to the folder where the provisioning kit ZIP file was extracted:

```
java -jar InstallOpenVMSProvisioning.jar
```

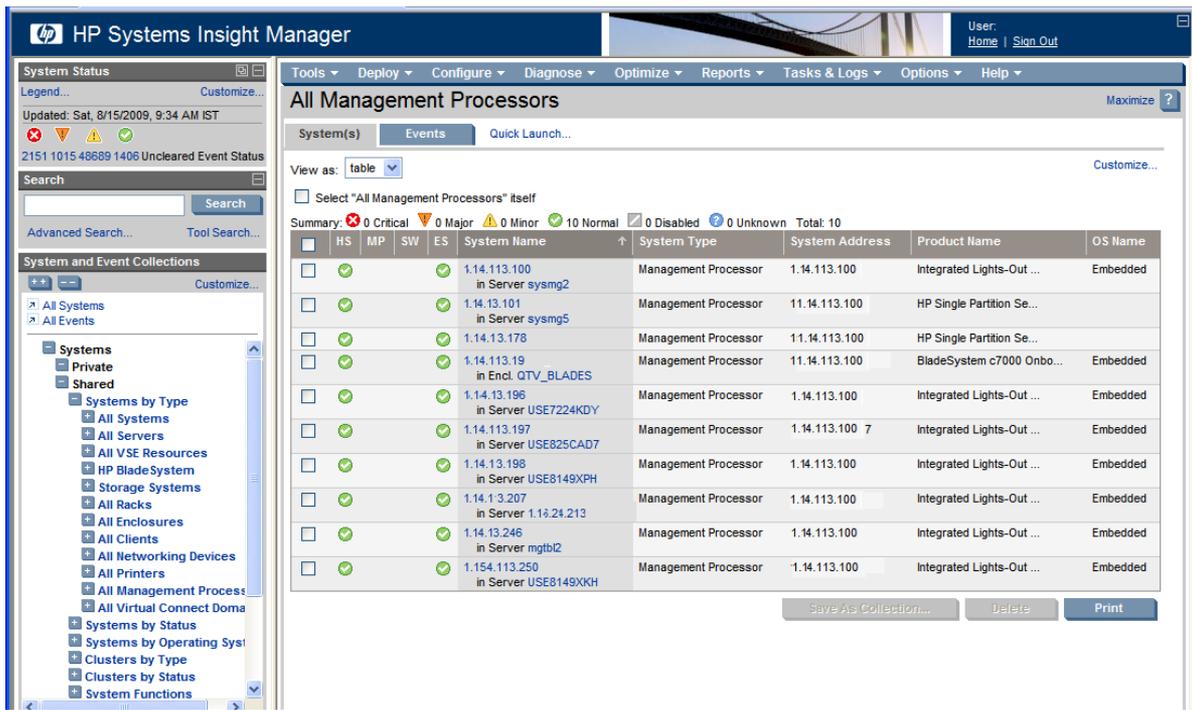
3. If your OpenVMS InfoServer or vMedia is configured properly, you can use HP SIM to provision (deploy) OpenVMS. However, first make sure HP SIM can discover and identify the MPs of the Integrity servers that are to be provisioned.

D.1.5.2 Discovering and Identifying Your New Provisioning Client Management Processors

On any Integrity server that is to be provisioned by HP SIM, the iLO 2 MP must be connected to the network, and HP SIM must be able to discover and identify the Management Processors (MP). For information about connecting your iLO 2 MP, see the appropriate documentation for Integrity servers.

You can configure HP SIM to automatically discover iLO 2 MP ports in the network. But in some cases you might need to manually discover a port that you have recently turned on. The procedure in this section describes how to use HP SIM to discover a newly introduced iLO 2 MP port. This is a one-time procedure. For more information on using HP SIM, see the *HP SIM User Guide*.

To determine whether your system iLO 2 MP has already been discovered, access the HP SIM home page and select **System and Event Collections** -> **All Management Processors** in the left-hand panel. The following is an example of an HP SIM **All Management Processors** listing.



If your system is listed with the proper port IP address and identification, you are ready to provision. (HP SIM identifies such properties as the type of system, which in this case is MP, the operating system and version, and the product name.) If your MP is not listed, perform a manual discovery as described in the subsequent sections.

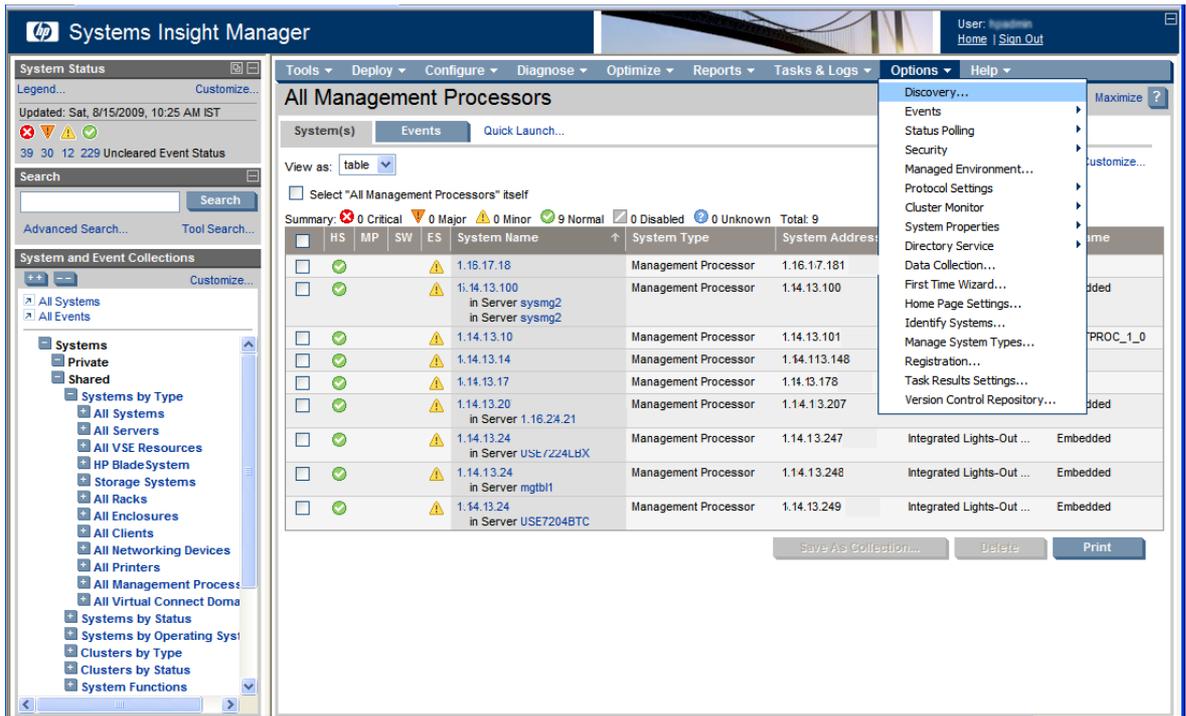


NOTE: If your iLO 2 MP is connected properly and turned on, HP SIM must discover it. If your port is not discovered, check the LAN cable connections and proper port configuration. For more information on these tasks, see the *HP BladeSystem Onboard Administrator User Guide* or the *HP Integrity iLO 2 MP Operations Guide*. For information on discovery problems related to HP SIM, see the HP SIM documentation.

D.1.5.2.1 Manually Discovering an MP with HP SIM

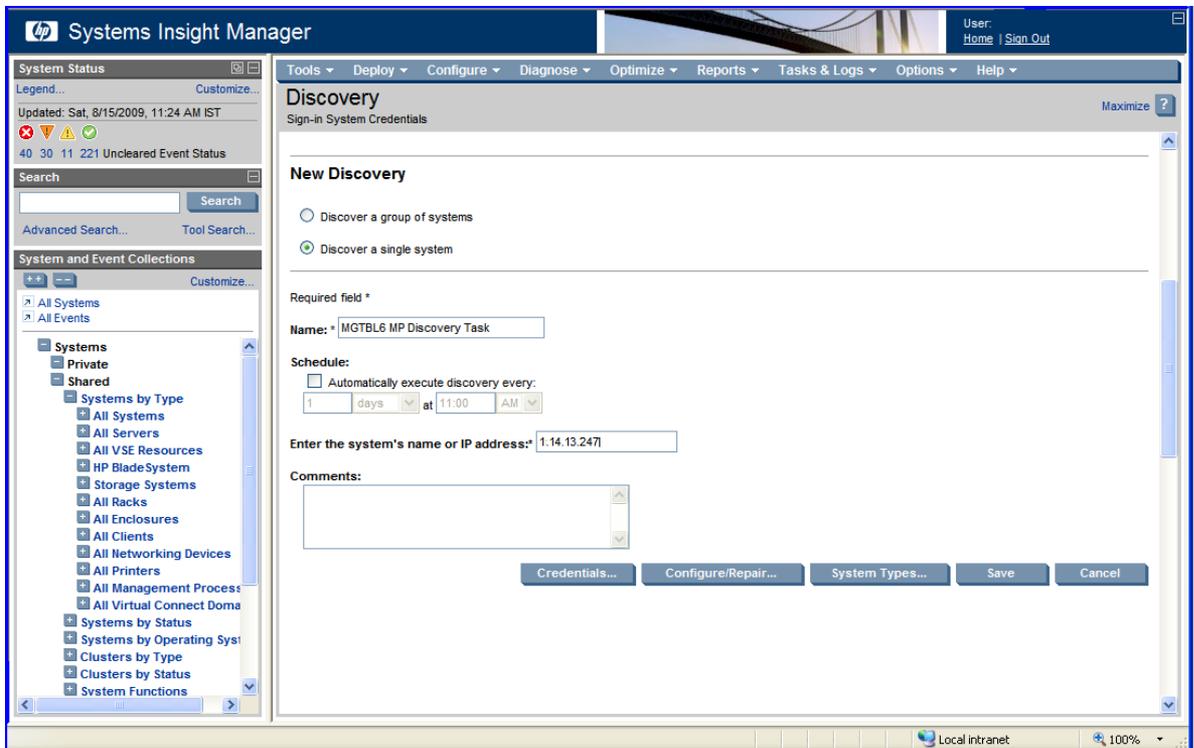
To enable HP SIM to manually discover the Integrity servers iLO 2 MP in HP SIM, use the following procedure:

1. Select **Options** → **Discovery**, as shown in the following example:

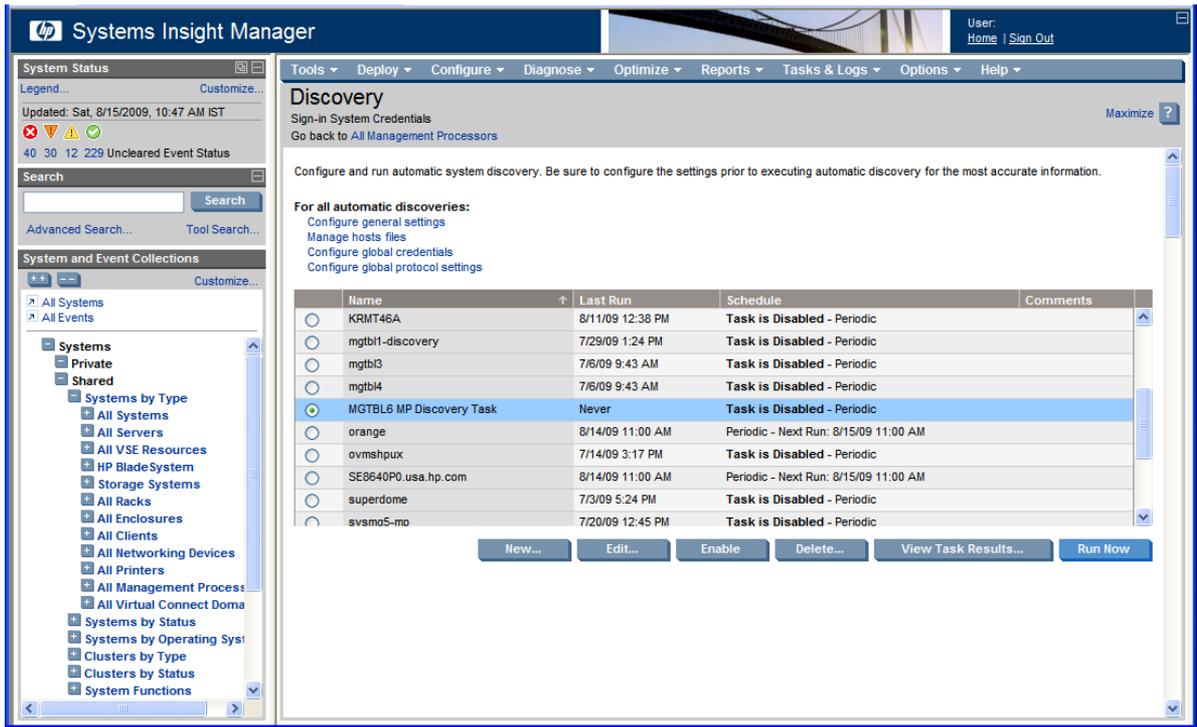


2. Click **New**.

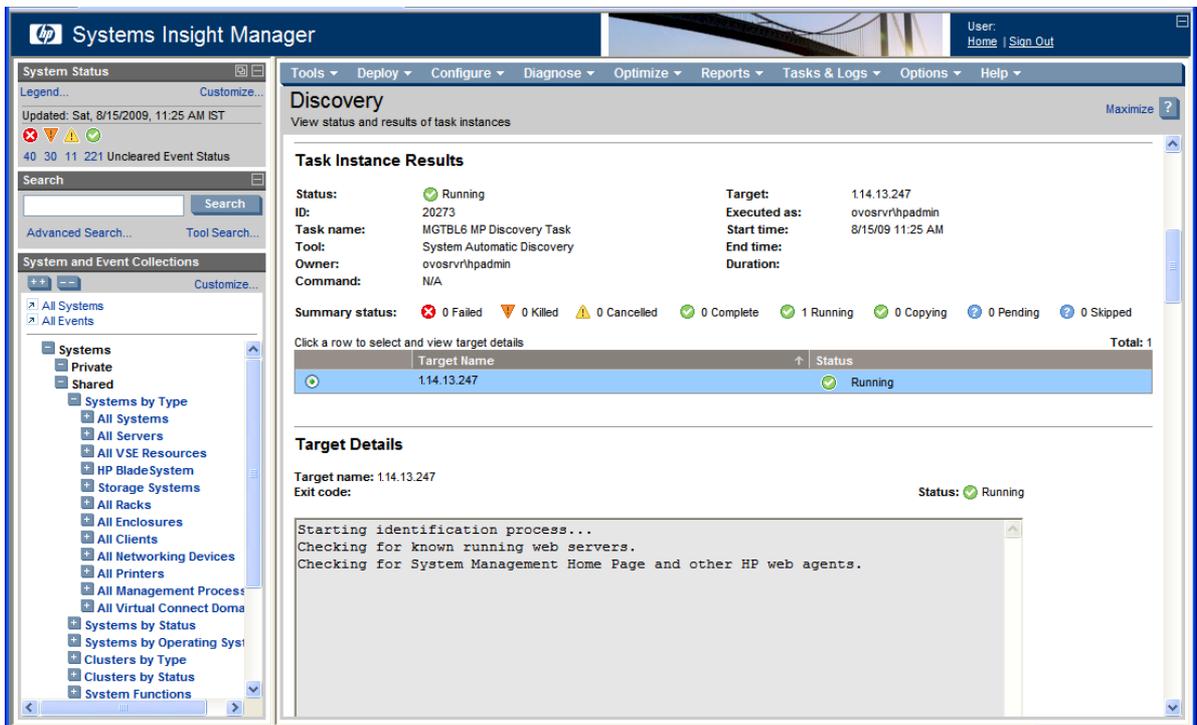
Under the resulting **New Discovery** heading, select **Discover a single system**. Enter the name of the discovery task in the **Name:** text box. Under Schedule, clear the **Automatically execute discovery every** check box. Enter the IP address of the Integrity servers iLO 2 MP port to be discovered, and click **Save**.



3. After the discovery task is saved, select the newly created discovery task on the Discovery page and click **Run Now**. HP SIM will now attempt to discover the MP with the given IP address.



4. Click **View Task Results** to view the progress of the discovery.



D.1.6 Provisioning OpenVMS

Once the iLO 2 MP of your Integrity servers (and any other servers you want to provision) has been discovered and identified, you can provision OpenVMS (deploy or configure the operating system on the target Integrity servers).

To provision OpenVMS using the InfoServer, see “Provisioning OpenVMS Through the InfoServer” (page 264).”

To provision OpenVMS using the vMedia device, see “Provisioning OpenVMS Through vMedia” (page 271).

To apply OpenVMS licenses on your Integrity servers running OpenVMS, see “Installing Licenses on OpenVMS Servers Through Provisioning” (page 275).

To configure OpenVMS TCP/IP on your Integrity servers through Provisioning, see “Configuring OpenVMS TCP/IP Through Provisioning” (page 278).

D.1.6.1 Provisioning OpenVMS Through the InfoServer

To provision OpenVMS using HP SIM with the InfoServer, follow these steps.

1. Complete the procedure described in “Setting Up InfoServer Support” (page 249) to setup InfoServer for use with Provisioning.
2. Ensure that each server to be provisioned is not booted into an operating system. The servers can be in a powered-OFF state, in a halted state, or booted into the EFI shell. If a server is powered-OFF, Provisioning will power ON the system before deploying OpenVMS.



IMPORTANT: Provisioning performs a system reset through the MP before deploying OpenVMS on a server. If the server is booted into an OS, ensure that the OS is gracefully shutdown before proceeding further with Provisioning to avoid losing any unsaved data.

3. From the HP SIM home page, select **System and Event Collections** -> **All Management Processors**.
4. Select the MPs of the Integrity servers to be provisioned. Then, select **Deploy** -> **OpenVMS**, and select one of the following options from the OpenVMS menu:
 - **Install OpenVMS from InfoServer**
 - **Upgrade OpenVMS from InfoServer**

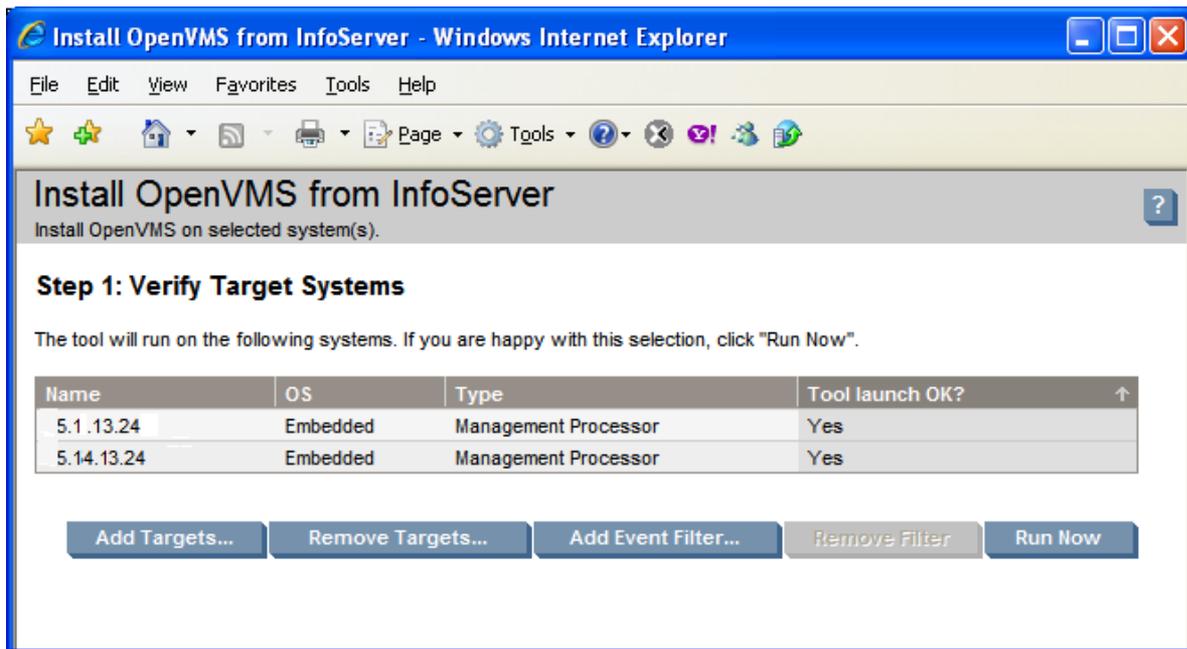
HS	MP	SW	ES	System Name	system type	system address	Product Name	OS
				1.14.13.148	Management Processor	1.14.13.148		
				1.14.13.178	Management Processor	1.14.13.178		
				1.14.13.207	Management Processor	1.14.13.207	Integrated Lights-Out ...	
				1.14.13.247 in Server USE7224LBX	Management Processor	1.14.13.247	Integrated Lights-Out ...	
				1.14.13.248 in Server 1.13.25.115	Management Processor	1.14.13.248	Integrated Lights-Out ...	
				1.14.13.249 in Server USE7204BTC	Management Processor	1.14.13.249	Integrated Lights-Out ...	

In this example, the option **Install OpenVMS from InfoServer** is selected.



NOTE: OpenVMS from InfoServer can be provisioned on up to eight servers at a time.

5. On the resulting page, HP SIM displays the Integrity servers to be provisioned. Verify the target servers that you have selected, and click **Run Now**.



6. Provide the following information for each Integrity server being provisioned:
 - **MP Login Credentials:** This information is used to login to the MP console of the target server to provision OpenVMS. The default for the user name and password is Admin.
 - **Timeout (in minutes):** This value determines the maximum duration of inactivity allowed on the system console during OpenVMS installation or upgrade, after which HP SIM provisioning reports that the system is not responding. The default value of this parameter is set to five minutes. You can modify this default value, but HP does not recommend decreasing the value.
 - **LAN Boot Settings:**
 - **Use DHCP:** Select this option if the target server must receive its TCP/IP settings from a DHCP server for the LAN boot.
 - **InfoServer IP and Service Name:** InfoServer/BOOTP server IP address and InfoServer service name that must be used for provisioning OpenVMS.
 - **Client Static IP, Subnet Mask, and Gateway IP:** Specify these settings for the target server if DHCP is not being used.
 - **VMS_LOADER.EFI Location:** Location of the VMS loader that must be used to network boot the target server. For example, LDA3 : [VMS\$COMMON . SYSEXE]
 - **OpenVMS version:** Version of OpenVMS being provisioned from InfoServer.



NOTE: If you have selected more than one target server for provisioning, you can install or upgrade a different version of OpenVMS on each target server. For example, you can provision OpenVMS Version 8.4 on the first target server, OpenVMS Version 8.3-1H1 on the second target server, and so on.

- **OpenVMS Installation Options:**
 - **Installation Disk:** Device name of the system disk on which OpenVMS is installed. For example, DKA200.
 - **Volume Label:** Volume label assigned to the system disk. Ensure that the label name you provide is unique. Problems could arise if the same label is used for different disks. The volume label has a limit of 12 characters, and can be a combination of letters (A to Z) and numbers (0 to 9), and can include special characters such as the dollar sign (\$), hyphen (-), and underscore (_).
 - **Initialize Disk:** Indicates whether or not the system disk will be initialized. Disk structure to use if it is being initialized (ODS-2/ODS-5), and use of hard links if the disk structure selected is ODS-5.

- **Installation of optional products:** You can choose to install the following optional products with the OpenVMS installation:
 - DECwindows Motif for OpenVMS
 - HP TCP/IP Services for OpenVMS
 - DECnet Phase IV or DECnet-Plus for OpenVMSIf you select DECnet Phase IV or DECnet-Plus for installation, you must specify the DECnet address to be used. Enter the DECnet address as 0.0 if you plan to use DECnet without Phase IV compatible addresses.



NOTE: WBEM Services for OpenVMS and WBEM Providers for OpenVMS are automatically installed as part of the OpenVMS OS installation.

- **SCSNODE:** Value of the SCSNODE system parameter for OpenVMS on the target server. The value must be a combination of at least one letter and numbers ranging from 1 to 6.
- **SCSSYSTEMID:** Value of the SCSSYSTEMID system parameter for OpenVMS on the target server. If you have selected DECnet for installation and provided a valid DECnet address, the SCSSYSTEMID parameter is automatically computed by provisioning based on the DECnet address.
- **Create/Validate Boot Options:** Select this option if you want OpenVMS to create a new boot option when none exist for the selected system disk, or to validate an existing boot option in the EFI Boot Manager boot options menu.



NOTE: If this option is enabled, and no boot option exists for the selected system disk, Provisioning sets the VMS boot flags for the new boot option as 0,0.

- **Time Zone Settings:** Time zone in which the target server resides. Depending on the time zone selected, you need to indicate whether daylight saving is currently being observed and the time differential factor with respect to the Coordinated Universal Time (UTC).

Verify the information provided for each target server and click **Next**.

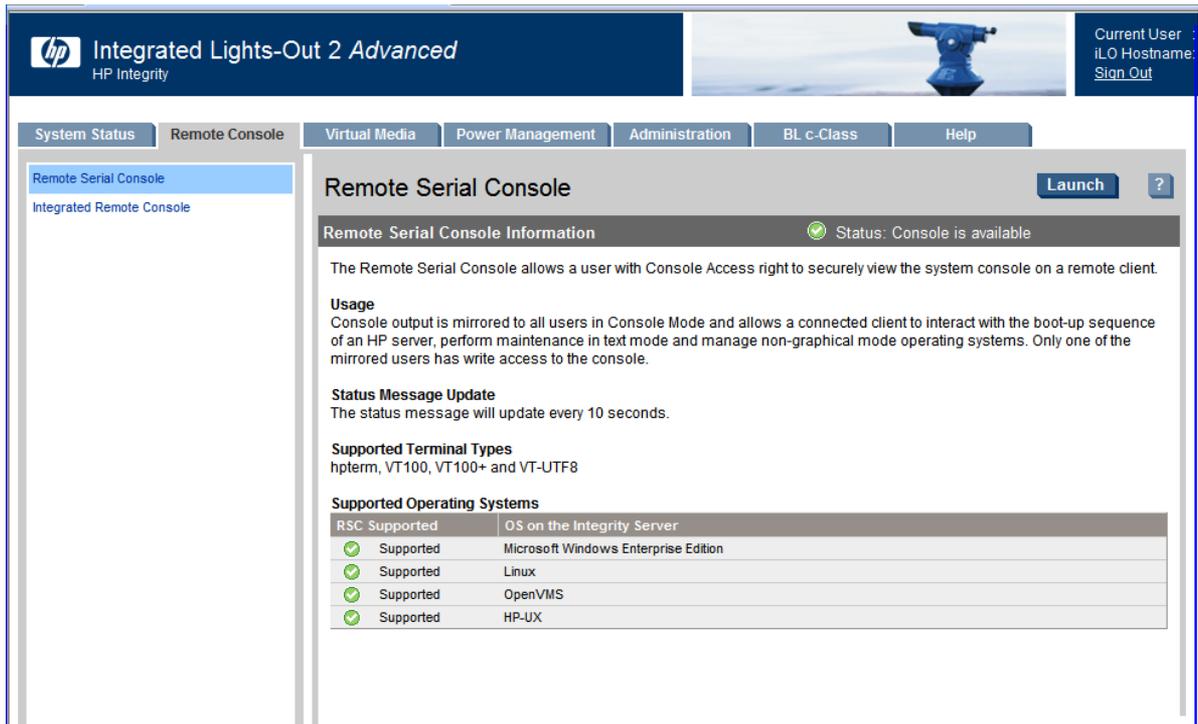
This image illustrates the progress of provisioning OpenVMS from InfoServer.

8. To view what is going on in the background for an Integrity server that is being provisioned, access the server iLO 2 MP website address from any browser, as shown in the image below. Click **Launch** to access the server serial console.

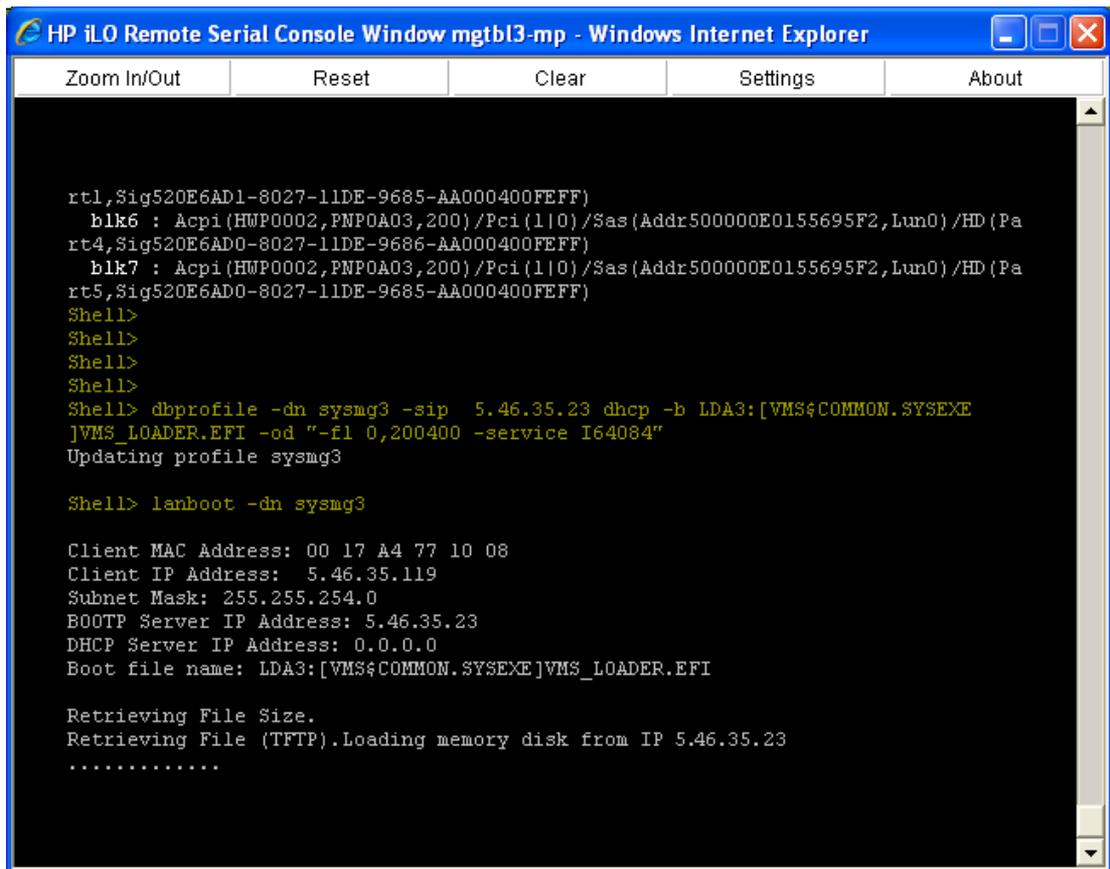


IMPORTANT:

- Do not interrupt the installation process.
- Do not allow Write access to the server console while the installation or upgrade process is in progress.



This example shows the provisioning feature providing the InfoServer information and retrieving the system loader `VMS_LOADER.EFI` and other files needed to install OpenVMS.



```
HP iLO Remote Serial Console Window mgtbl3-mp - Windows Internet Explorer
Zoom In/Out Reset Clear Settings About

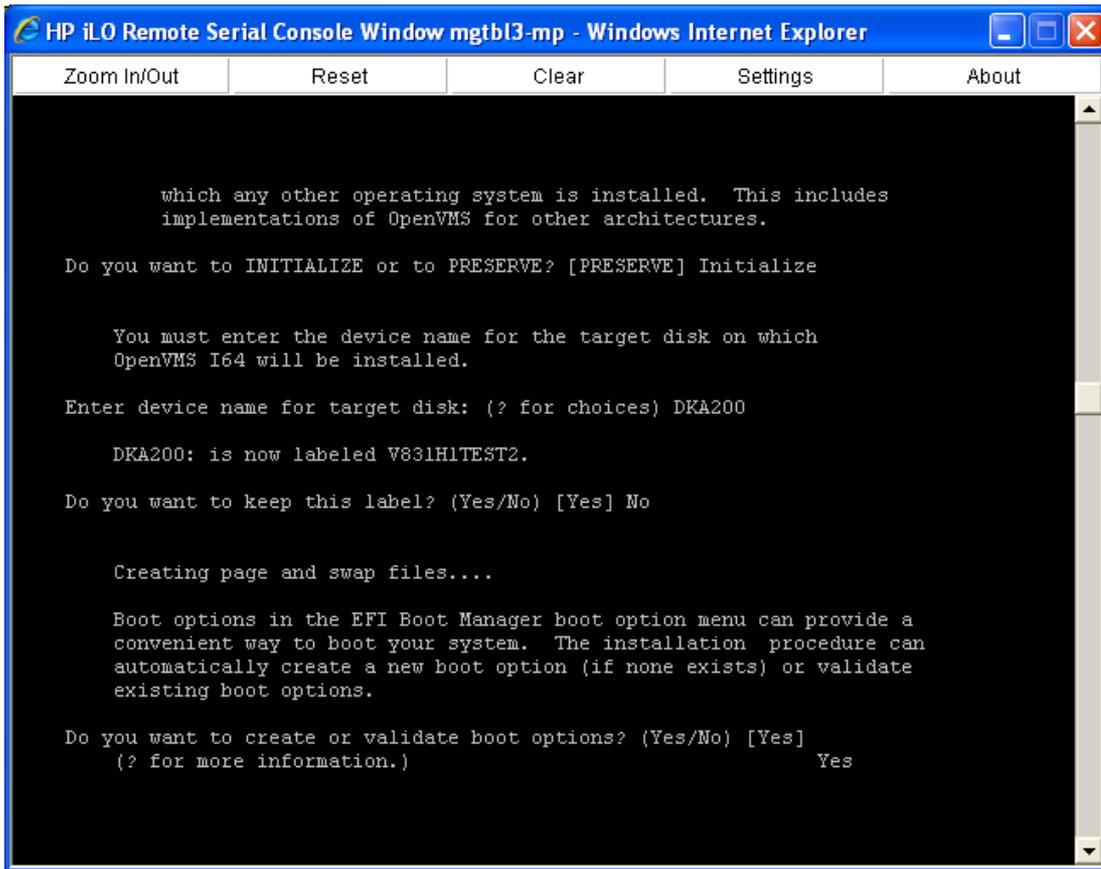
rtl,Sig520E6AD1-8027-11DE-9685-AA000400FEFF)
  blk6 : Acpi(HWP0002,PNP0A03,200)/Pci(110)/Sas(Addr500000E0155695F2,Lun0)/HD (Pa
rt4,Sig520E6AD0-8027-11DE-9686-AA000400FEFF)
  blk7 : Acpi(HWP0002,PNP0A03,200)/Pci(110)/Sas(Addr500000E0155695F2,Lun0)/HD (Pa
rt5,Sig520E6AD0-8027-11DE-9685-AA000400FEFF)
Shell>
Shell>
Shell>
Shell>
Shell> dbprofile -dn sysmg3 -sip 5.46.35.23 dhcp -b LDA3:[VMS$COMMON.SYSEXE
]VMS_LOADER.EFI -od "-fl 0,200400 -service I64084"
Updating profile sysmg3

Shell> lanboot -dn sysmg3

Client MAC Address: 00 17 A4 77 10 08
Client IP Address: 5.46.35.119
Subnet Mask: 255.255.254.0
BOOTP Server IP Address: 5.46.35.23
DHCP Server IP Address: 0.0.0.0
Boot file name: LDA3:[VMS$COMMON.SYSEXE]VMS_LOADER.EFI

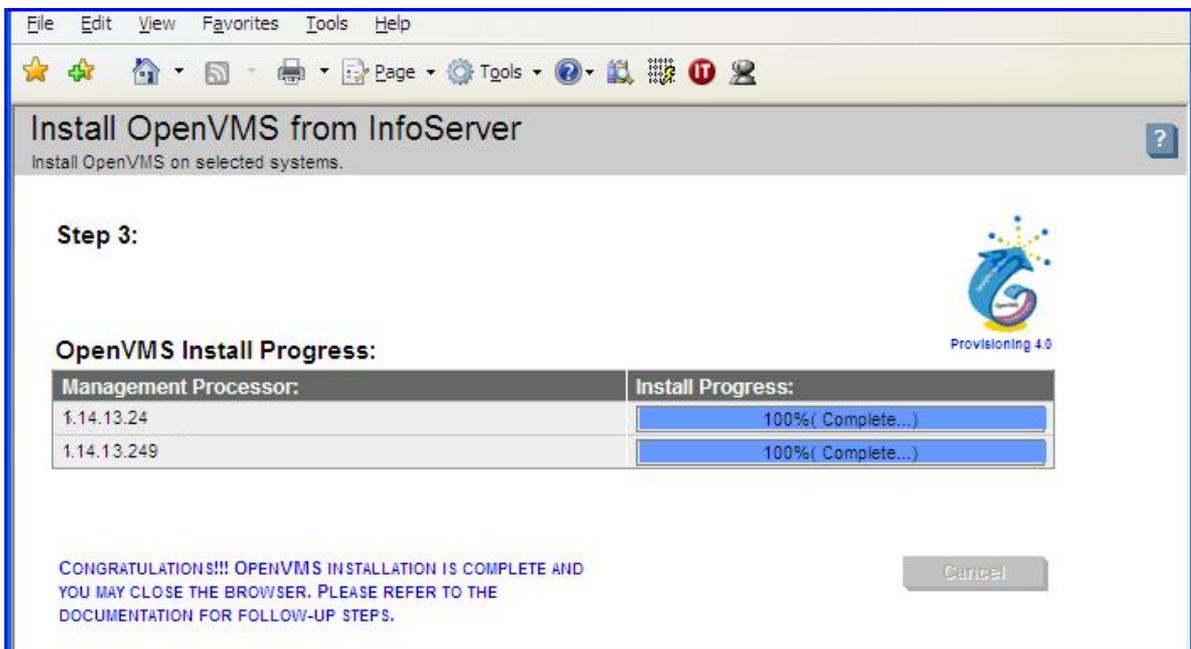
Retrieving File Size.
Retrieving File (TFTP).Loading memory disk from IP 5.46.35.23
.....
```

The provisioning install script runs in the background and provides responses to install OpenVMS on the target servers. The following example shows some of the automatic responses from the install script.



IMPORTANT: Do not interrupt the process. Do not allow Write access to your server console while the installation or upgrade process is in progress.

After approximately 60 minutes, depending on the network bandwidth and configuration, the installation completes.



If the procedure does not complete successfully, provisioning terminates. The reason for failure is displayed in the progress column and on the console screen, as well as in the log file <HP SIM

Installation Directory>\logs\OPENVMS\



NOTE: After completing the installation, you must register all licenses for use of the operating system and any installed layered products. For information about registering licenses, see “Registering Your Licenses” (page 130). For information on using HP SIM provisioning to register your licenses, see “Installing Licenses on OpenVMS Servers Through Provisioning” (page 275).

D.1.6.2 Provisioning OpenVMS Through vMedia

To provision OpenVMS using HP SIM with the vMedia, follow these steps:

1. Complete the procedure described in “Setting Up vMedia” (page 252) to use vMedia to present the OpenVMS OE DVD or DVD image to the Integrity servers to be provisioned.
2. Ensure that each server to be provisioned is not booted into an operating system. The servers can be in a powered-OFF state, in a halted state, or booted into the EFI shell. If a server is powered-OFF, Provisioning will power ON the system before deploying OpenVMS.



IMPORTANT: Provisioning performs a system reset through the MP before deploying OpenVMS on a server. If the server is booted into an OS, ensure that the OS is gracefully shutdown before proceeding further with Provisioning to avoid losing any unsaved data.

3. From the HP SIM home page, select **System and Event Collections** → **All Management Processors**.
4. Select the MP of the Integrity server to be provisioned. Select **Deploy** → **OpenVMS**, and choose one of the following options from the OpenVMS menu:
 - **Install OpenVMS from vMedia**
 - **Upgrade OpenVMS from vMedia**

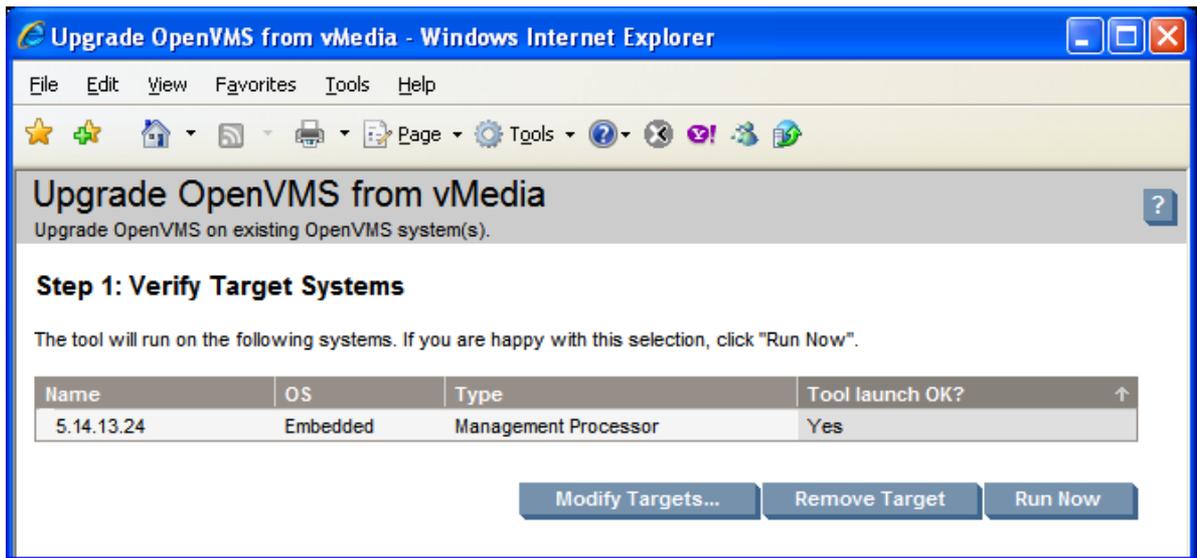
	HS	MP	SW	ES	System Name	Address	Product Name	OS Name
<input type="checkbox"/>	✓			⚠	1.16.17.181	Management Processor	1.16.17.181	HP Single Partition Se...
<input type="checkbox"/>	✓			⚠	1.14.13.100 in Server sysmg2 in Server sysmg2	Management Processor	1.14.13.100	Integrated Lights-Out ... Embedded
<input type="checkbox"/>	✓			⚠	1.14.13.101	Management Processor	1.14.13.101	HP Single Partition Se... MGMTPROC_1_0
<input type="checkbox"/>	✓			⚠	1.14.13.148	Management Processor	1.14.13.148	
<input type="checkbox"/>	✓			⚠	1.14.13.178	Management Processor	1.14.13.178	
<input type="checkbox"/>	✓			⚠	1.14.13.207 in Server 1.16.24.21	Management Processor	1.14.13.207	Integrated Lights-Out ... Embedded
<input checked="" type="checkbox"/>	✓	✓	✓	✓	1.14.13.247 in Server USE7224LBX	Management Processor	1.14.13.247	Integrated Lights-Out ... Embedded
<input type="checkbox"/>	✓			⚠	1.14.13.248 in Server mgth1	Management Processor	1.14.13.248	Integrated Lights-Out ... Embedded
<input checked="" type="checkbox"/>	✓	✓		⚠	1.14.13.249 in Server USE7204BTC	Management Processor	1.14.13.249	Integrated Lights-Out ... Embedded

In this example, the option **Upgrade OpenVMS from vMedia** is selected.



NOTE: OpenVMS from vMedia can be provisioned on one server at a time.

5. HP SIM displays the Integrity server to be provisioned. Verify the target server that you have selected, and click **Run Now**.



6. Provide the following information for the Integrity server being provisioned:
 - **MP Login Credentials:** This information is used to login to the MP console of the target server to provision OpenVMS. The default for the user name and password is Admin.
 - **Timeout (in minutes):** This value determines the maximum duration of inactivity allowed on the system console during OpenVMS installation or upgrade, after which HP SIM provisioning reports that the system is not responding. The default value for vMedia provisioning is set to ten minutes. You can modify this default value, but HP does not recommend decreasing the value.
 - **OpenVMS Upgrade Options:**
 - **Upgrade Disk:** Device name of the system disk containing a previous version of OpenVMS that has to be upgraded. For example — DKA200.
 - **Create/Validate Boot Options:** Select this if you want OpenVMS to create a new boot option if none exists for the selected system disk, or to validate an existing boot option in the EFI Boot Manager boot options menu.



NOTE: If this option is enabled, and no boot option exists for the selected system disk, Provisioning sets the VMS boot flags for the new boot option as 0,0.

Upgrade OpenVMS from vMedia - Windows Internet Explorer

File Edit View Favorites Tools Help

Upgrade OpenVMS from vMedia
Upgrade OpenVMS on existing OpenVMS system(s).

Step 2:

HP OpenVMS Upgrade Using vMedia

Management Processor:
5.14.13.24

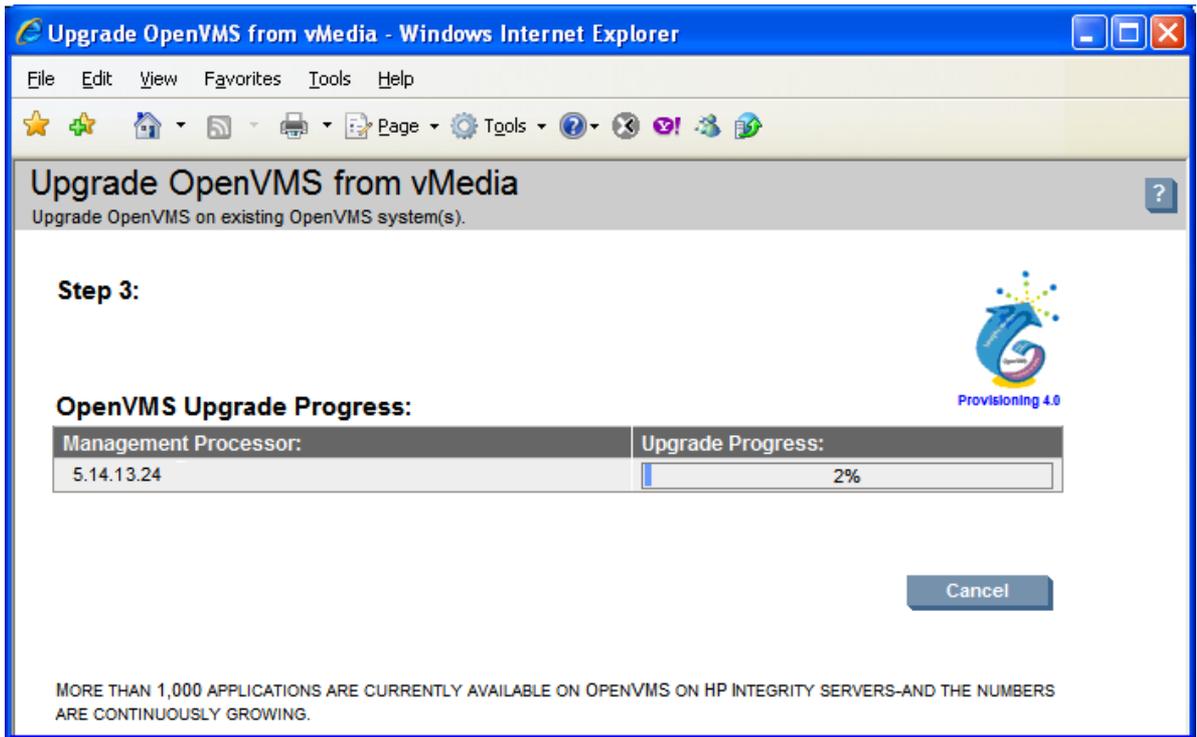
MP Login: Username: Admin Password: Timeout(minutes): 15

OpenVMS Upgrade Options:

Upgrade Disk: DKA200 Create/Validate Boot Options

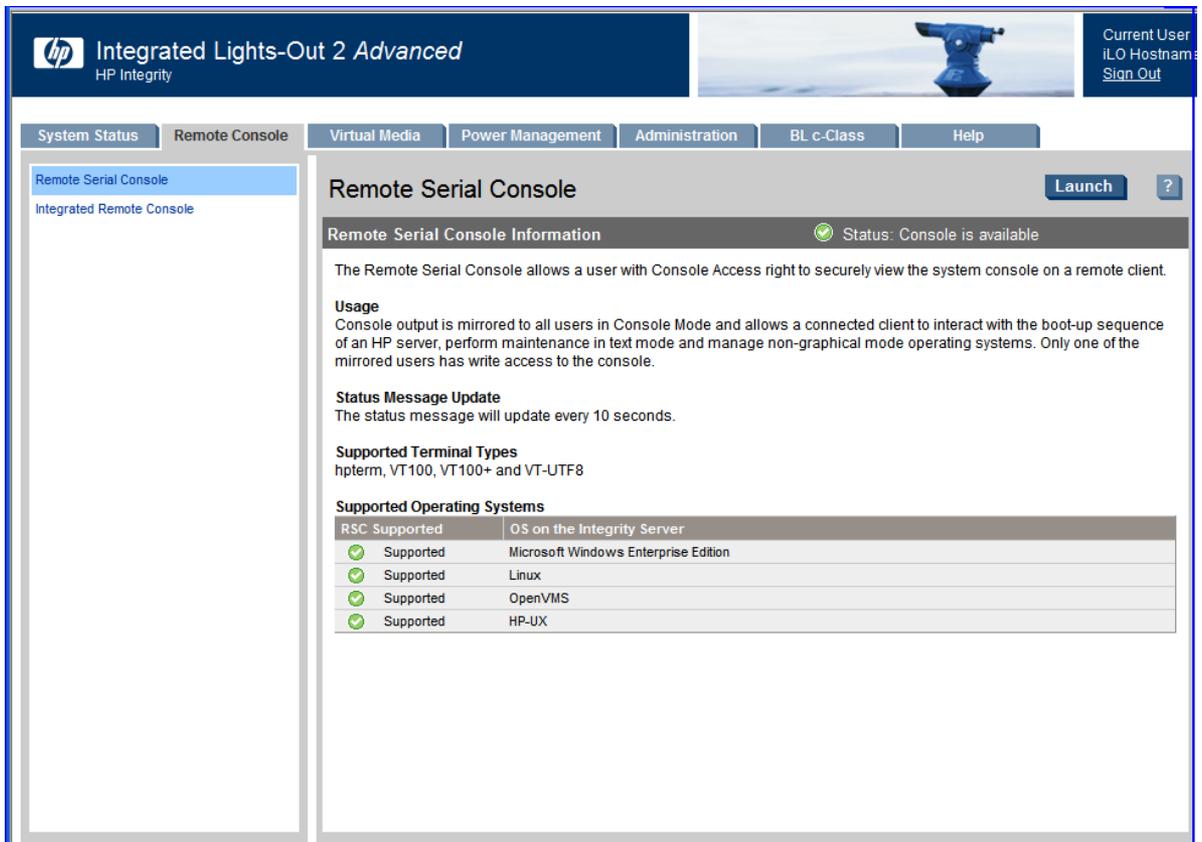
Cancel Next

7. Verify that the information for the target server is accurate, and click **Next**.
HP-SIM boots OpenVMS from vMedia and provisions OpenVMS on the selected target server. The upgrade progress is indicated, as shown in the example below:



This image illustrates the progress of provisioning OpenVms from vMedia.

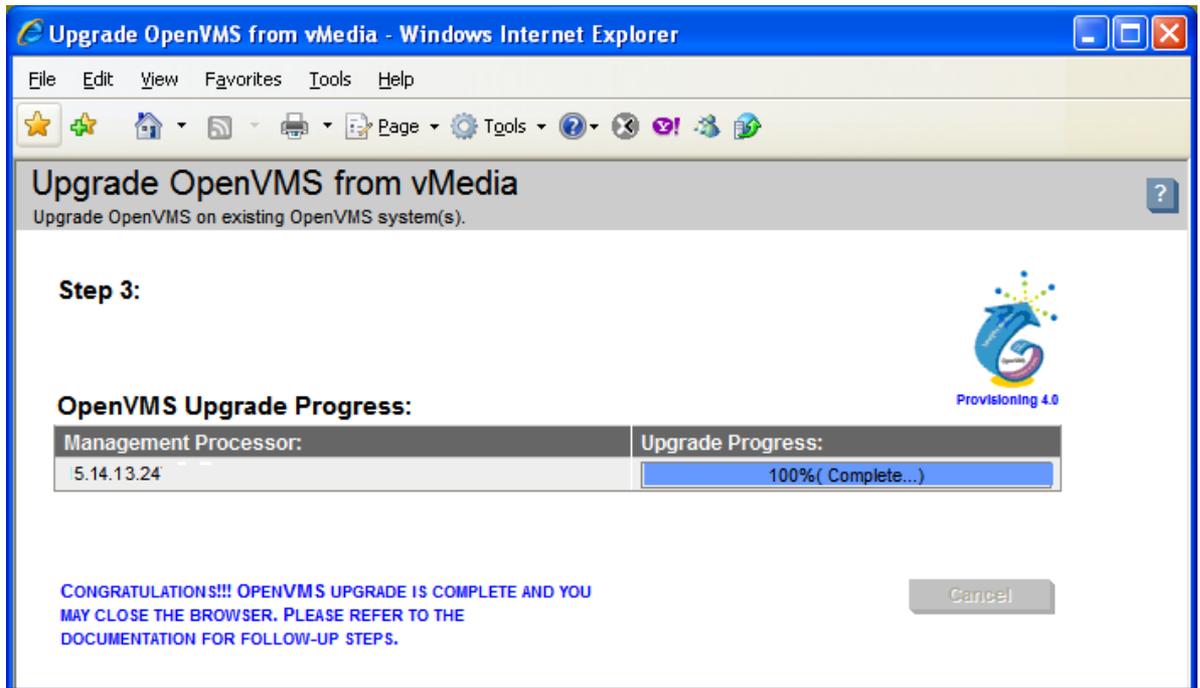
8. Meanwhile, to view what is going on in the background on the Integrity server that is being provisioned, access the server iLO 2 MP website address from any browser. Click **Launch** to access the server serial console.





IMPORTANT: Do not interrupt the provisioning process. Do not allow Write access to your server console while the installation or upgrade process is in progress.

9. After approximately 90 minutes, depending on the network bandwidth and configuration, the upgrade procedure is completed.



If the procedure does not complete successfully, provisioning terminates. The reason for failure is displayed in the progress column and on the console screen, as well as in the log file `<HP SIM Installation Directory>\logs\OPENVMS\<mp-ipaddress>_<date>.log` on the ProLiant Server that is running HP SIM.

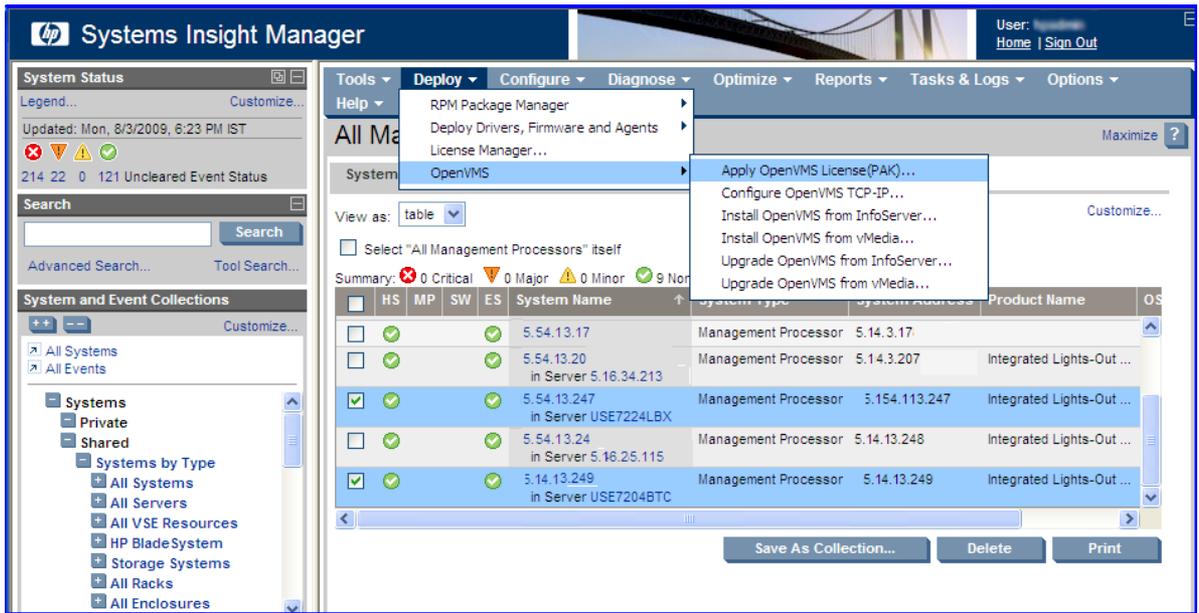


NOTE: After completing the installation, you must register all licenses for use of the operating system and any installed layered products. For information about registering licenses, see “Registering Your Licenses” (page 130). For information on using HP SIM provisioning to register your licenses, see “Installing Licenses on OpenVMS Servers Through Provisioning” (page 275).

D.1.6.3 Installing Licenses on OpenVMS Servers Through Provisioning

You can use Provisioning to install licenses on Integrity servers that are running OpenVMS. You will need the OpenVMS license PAK command procedure for this purpose. Follow the steps below to install licenses:

1. From the HP SIM home page, select **System and Event Collections -> All Management Processors**.
2. Select the MPs of the Integrity servers on which you want to install the licenses. Select **Deploy -> OpenVMS -> Apply OpenVMS License (PAK)**.



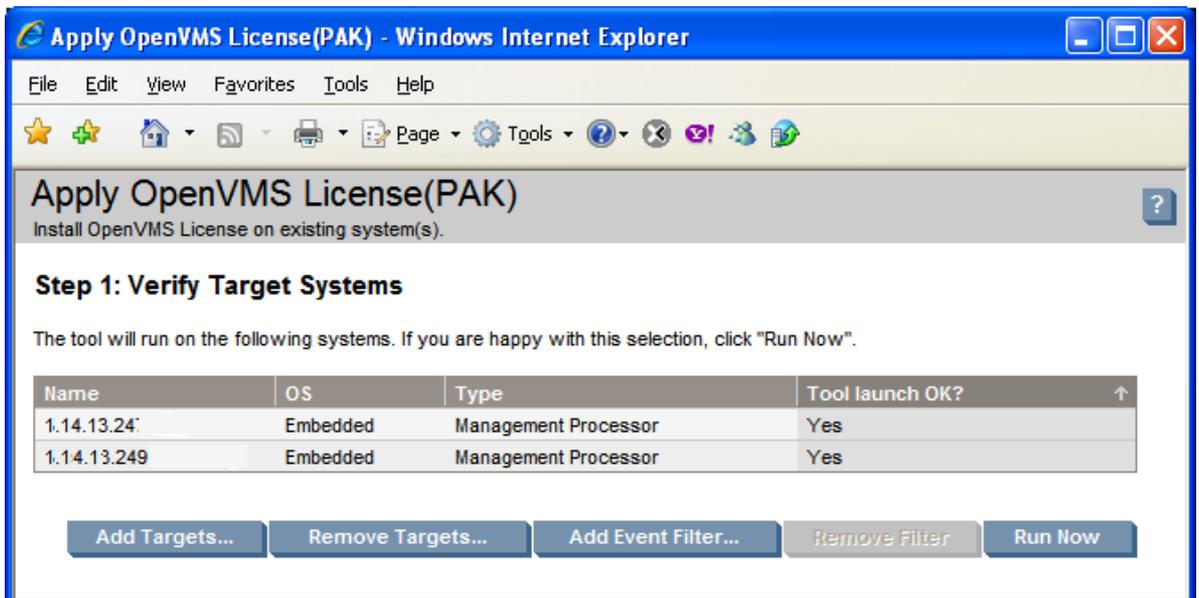
You can install licenses on up to eight Integrity servers at a time.



NOTE: To install the license, ensure that OpenVMS is up and running. Before proceeding, verify that the correct installation of OpenVMS is running on all the selected servers.

HP SIM displays the Integrity servers to be provisioned.

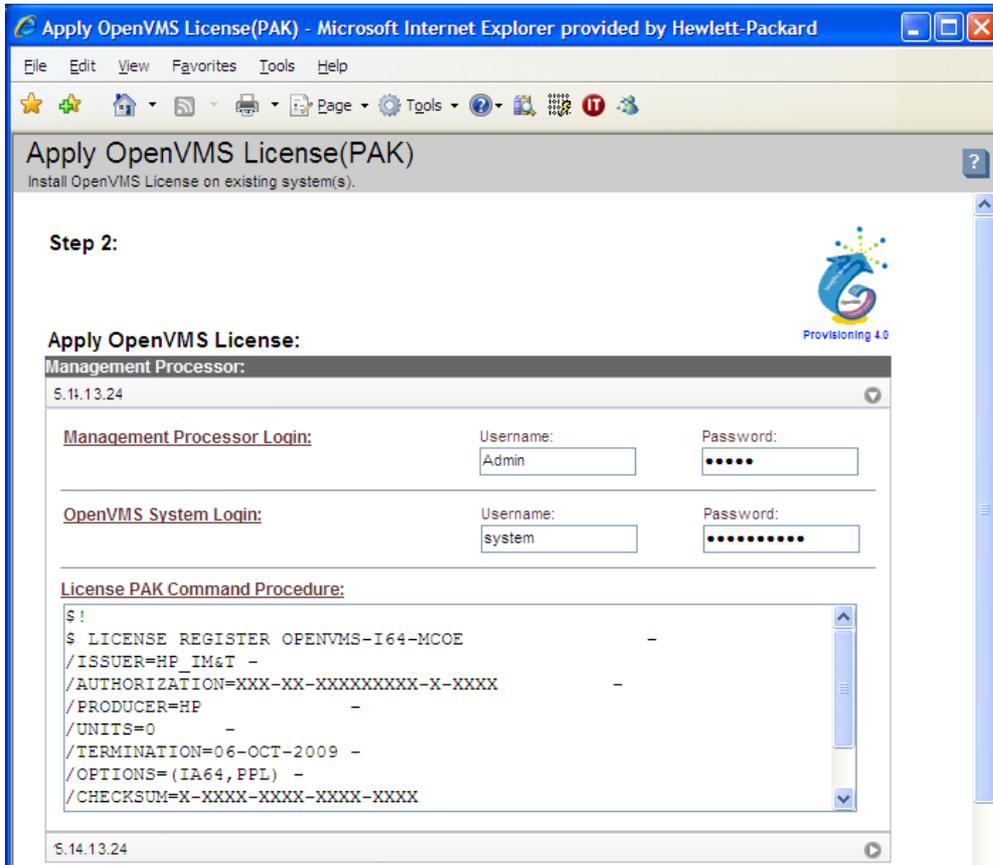
3. Verify the target servers that you have selected, and click **Run Now**.



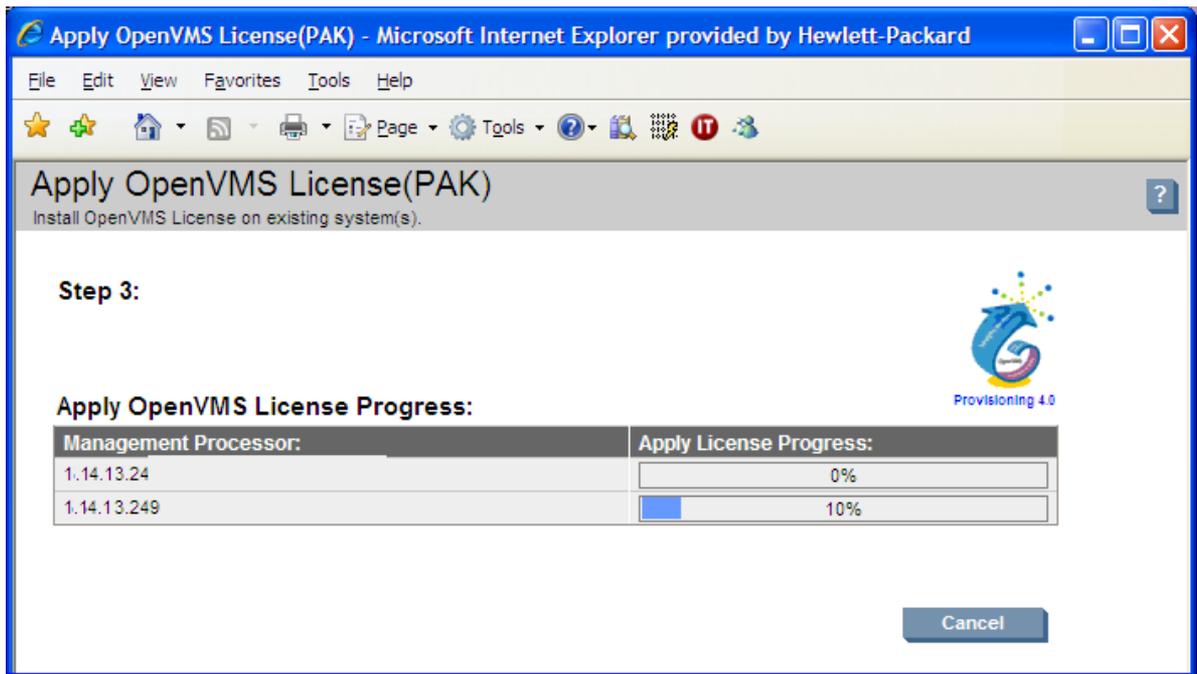
4. On the subsequent page, provide the following information for each Integrity server that must be provisioned:

- **MP Login Credentials:** This information is used to login to the MP console of the target server to install licenses. The default for the user name and password is Admin.
- **OpenVMS System Login Credentials:** This information is used to login to OpenVMS that is running on the target server to install licenses.
- **License PAK Command Procedure:** Copy and paste the OpenVMS license PAK command procedure into this text box.

Following is an example of all these values. Verify the information provided for the target server and click **Apply PAK**.



5. HP-SIM logs in to the MP console and OpenVMS on each target server, and installs the provided licenses in the background. The license installation progress is indicated, as shown in the example.



IMPORTANT: Do not interrupt the license installation process. Do not allow Write access to your server console while the license installation is in progress.

The license installation process completes within a few minutes.

If the procedure does not complete successfully, provisioning terminates. The reason for failure is displayed in the progress column and on the console screen, as well as in the log file, <HP SIM Installation Directory>\logs\OPENVMS\
<mp-ipaddress>_<date>_License.log on the ProLiant server that is running HP SIM.

D.1.6.4 Configuring OpenVMS TCP/IP Through Provisioning

HP SIM Provisioning can be used to configure OpenVMS TCP/IP on Integrity servers. Through provisioning, you can configure or re-configure the TCP/IP core environment, client components and server components. With provisioning, you can configure TCP/IP on up to eight Integrity servers simultaneously and on each server, one network interface can be configured.



NOTE:

- Provisioning supports configuring TCP/IP with IPv4 addresses only; IPv6 addresses are currently not supported.
- Provisioning does not support configuring an alias or secondary IP address.
- Provisioning does not support configuring the DHCP server component on a target server.
- Provisioning allows you to configure up to one network interface on each target server.
- Provisioning does not support configuring optional components in HP TCP/IP Services for OpenVMS.
- Provisioning does not support setting up logical LAN devices and LAN failover configurations.

The subsequent sections describe the prerequisites and procedures for configuring HP TCP/IP Services for OpenVMS with Provisioning.

D.1.6.4.1 Prerequisites for Configuring TCP/IP

Following are the prerequisites for configuring TCP/IP through HP SIM provisioning:

- The target server must have the correct installation of OpenVMS up and running.
- The HP TCP/IP Services for OpenVMS Version 5.6 or higher must be installed on the target server. HP SIM provisioning supports configuring HP TCP/IP Services for OpenVMS only. Configuration of non-HP TCP/IP implementations is not supported.
- The target server must have a valid license to use HP TCP/IP Services for OpenVMS.
- The target server must have at least one network interface in the link-up state. Configuration of a TCP/IP interface that is in a link-down state is not allowed. On each server, up to one network interface can be configured.
- To configure a target server as a DHCP client, the DHCP server (serving client IP addresses) must be setup and running on another system in the same network.

D.1.6.4.2 Configuring TCP/IP

Prior to configuring TCP/IP on the target Integrity servers, ensure that the prerequisites are met.



IMPORTANT: Using Provisioning to re-configure TCP/IP on a target server will delete any existing TCP/IP configuration on the server.

Complete the following procedure to configure TCP/IP:

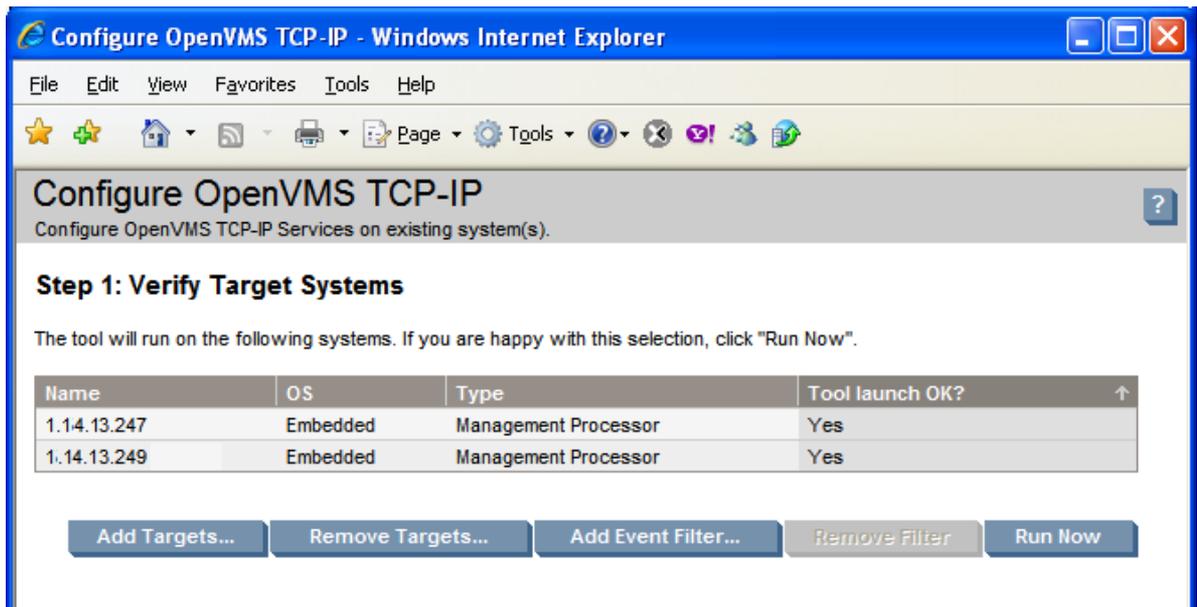
1. From the HP SIM home page, select **System and Event Collections -> All Management Processors**.
2. Select the MPs of the Integrity servers on which you need to configure TCP/IP. Select **Deploy -> OpenVMS -> Configure OpenVMS TCP-IP**.

HS	MP	SW	ES	System Name	Address	Product Name	OS Name
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1.14.13.100 in Server sysmg2	1.14.13.100	Integrated Lights-Out ...	Embedded
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1.14.13.101	1.14.13.101	HP Single Partition Se...	MGMTPROC_1_0
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1.14.13.148	1.14.13.148	Management Processor	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1.14.13.178	1.14.13.178	Management Processor	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1.14.13.207 in Server 1.13.24.213	1.14.13.207	Integrated Lights-Out ...	Embedded
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1.14.13.247 in Server USE7224L BX	1.14.13.247	Integrated Lights-Out ...	Embedded
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1.14.13.248 in Server mg1b1	1.14.13.248	Integrated Lights-Out ...	Embedded
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1.14.13.249 in Server USE7204BTC	1.14.13.249	Integrated Lights-Out ...	Embedded

HP SIM displays the Integrity servers to be provisioned.

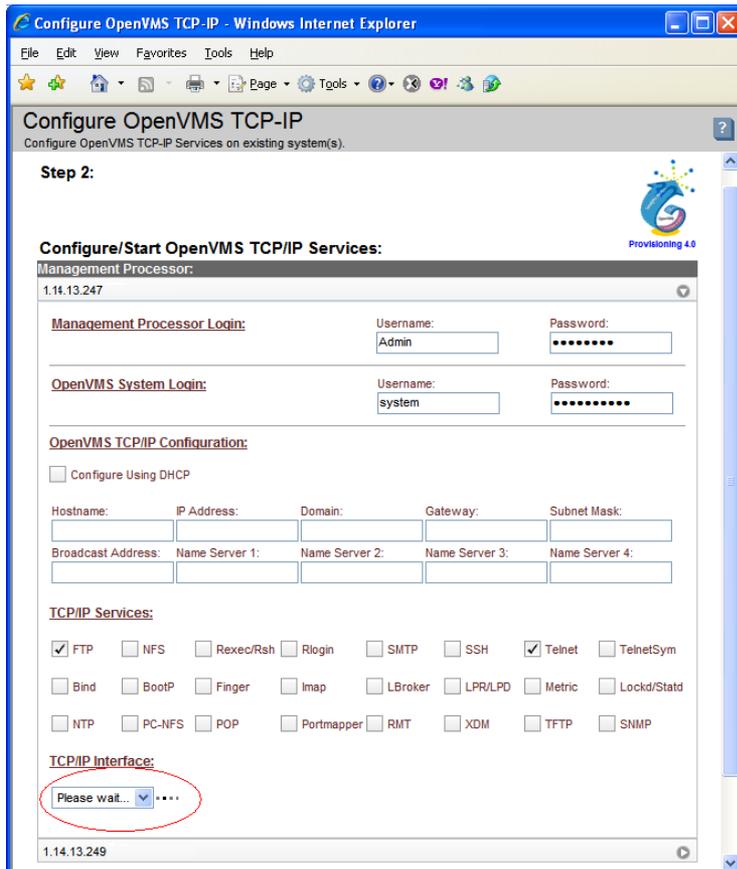
You can configure TCP/IP on up to eight Integrity servers at a time.

3. Verify the target servers that you have selected, and click **Run Now**.



4. On the subsequent page, provide the following information for each Integrity server being provisioned:
 - **MP Login Credentials:** This information is used to login to the MP console of the target server to configure TCP/IP. The default values for the user name and password is Admin.
 - **OpenVMS System Login Credentials:** This information is used to login to OpenVMS running on the target server to configure TCP/IP.

After you have provided the MP login and OpenVMS system login credentials for a server, and move the cursor focus away from the credentials, provisioning automatically accesses the server and fetches the TCP/IP network interfaces in the link-up state. During this process, a message as shown in the figure below is displayed.



IMPORTANT: Do not interrupt the provisioning process. Do not allow write access to your server console while this procedure is in progress.

You can continue to fill out rest of the details for OpenVMS TCP/IP Configuration and TCP/IP Services while provisioning fetches the network interfaces in the background. After completion, provisioning populates the TCP/IP Interfaces field in the GUI with the interfaces found in the link-up state. You can select the TCP/IP interface later, if required.



NOTE: If you accidentally specified incorrect credentials for MP login and OpenVMS system login, and provisioning has started accessing the target server, you can correct the credentials. Provisioning will use the corrected credentials to access the target server.

If the TCP/IP interface fetch procedure does not complete successfully, the reason for failure is displayed against the corresponding target server (next to the TCP/IP Interface combo box) and in the log file <HP SIM Installation Directory>\logs\OPENVMS\
<mp-ipaddress>_<date>_GetInterface.log on the ProLiant server that is running HP SIM.

5. Specify the OpenVMS TCP/IP configuration and TCP/IP Services details for each target server.
 - **OpenVMS TCP/IP Configuration:** Specify the following TCP/IP configuration details for the selected interface:
 - Hostname — TCP/IP host name for the target server. When configuring the target server as a DHCP client, the host name (if specified) is suggested to the DHCP server when acquiring the DHCP address settings.
 - Configure using DHCP — Select this option if the address configuration for the interface will be managed by DHCP client. If not, the following information needs to be provided for a static IP address configuration:
 - Interface IP address
 - Subnet mask

- Gateway IP address
 - Domain suffix for the connection
 - Broadcast address: This address is automatically computed from the interface IP address.
 - At least one and up to four name server IP addresses.
- **TCP/IP Services:** Select the client and server components to be enabled on the target server. You must select at least one TCP/IP service for each target server. If the FTP, NFS, RLOGIN, SSH or TELNET services are selected to be enabled, provisioning enables its client and server components on the target server.



NOTE: If a target server is being configured as a DHCP client, the services BIND, BOOTP, TFTP and XDM cannot be configured on the target server. These services are disabled from the selection.

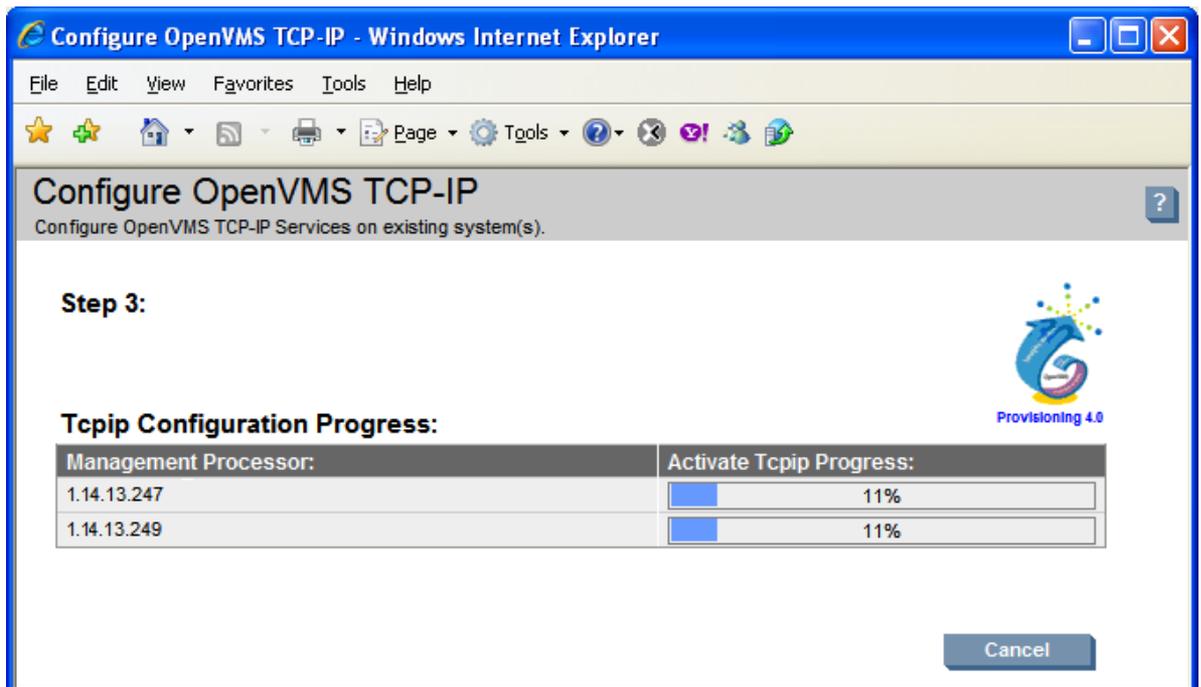
6. After provisioning has populated the TCP/IP Interface details for each target server, select the network interface to which the OpenVMS TCP/IP configuration that was specified in point 5 will be applied.

7. Verify the information provided for each target server and click **Start Tcpip**.



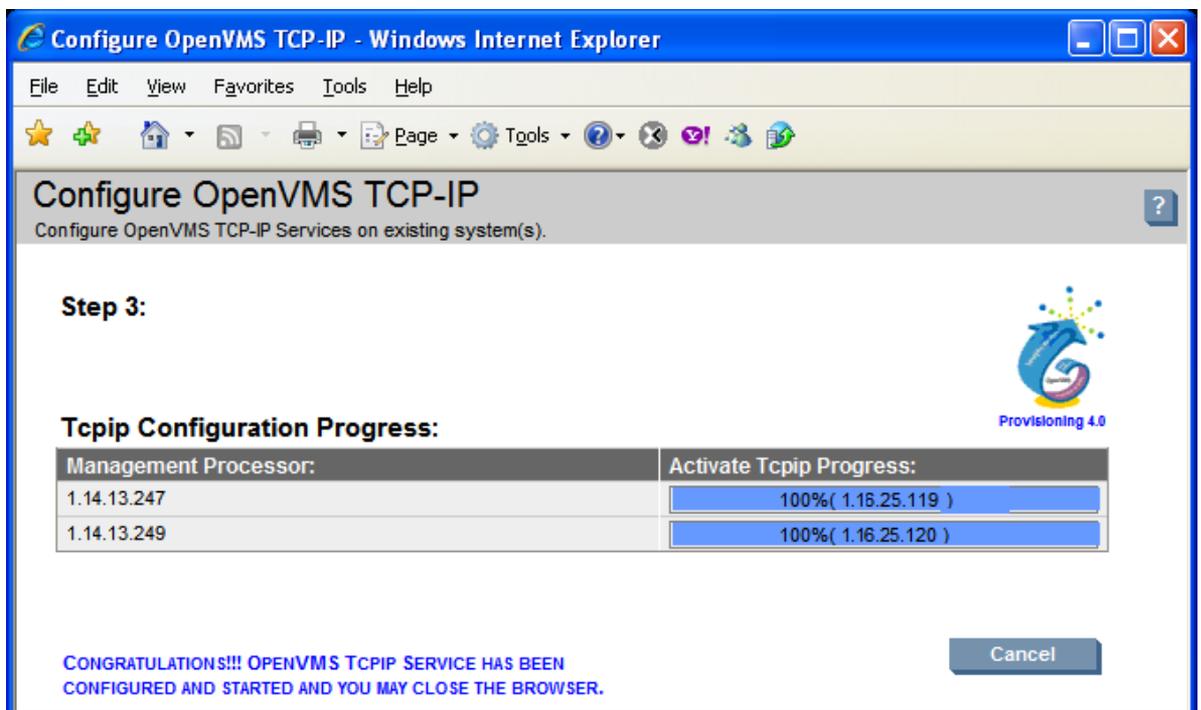
NOTE: The **Start Tcpip** button remains disabled if the TCP/IP interface list cannot be successfully populated for one or more target servers. For example, this button remains disabled if incorrect MP or OpenVMS login credentials have been specified for a target server.

HP SIM logs in to each target server, and configures TCP/IP in the background.



IMPORTANT: Do not interrupt the configuration process. Do not allow write access to your server console while the TCP/IP configuration is in progress.

After configuring TCP/IP, provisioning starts the TCP/IP services on each target server. The TCP/IP configuration provisioning completes within a few minutes.



If the procedure does not complete successfully, provisioning terminates. The reason for failure is displayed in the progress column and on the console screen, as well as in the log file `<HPSIM-Installation-Directory>\logs\OPENVMS\
<mp-ipaddress>_<date>_ConfigTcpip.log` on the ProLiant server that is running HP SIM.



NOTE: To start TCP/IP services automatically after a system is restarted, uncomment the following line in the COM procedure `SYS$COMMON: [SYSMGR] SYSTARTUP_VMS.COM`:

```
$!$ @SYS$STARTUP:TCPIP$STARTUP.COM
```

D.2 Using vMedia Independently of HP SIM

If you do not have access to HP SIM, you can use vMedia independently, as described in this section. If you have several Integrity servers connected by a high-speed network, you can use vMedia from a central location to perform the installation or upgrades on the servers (one at a time). You can use vMedia on a wider variety of Integrity servers. For a list of the supported servers, see Section D.2.1 (page 284).

The vMedia functionality provides virtual devices that mimic physical hardware devices. For example, it can provide you with a virtual CD/DVD drive that connects over the network to your Integrity servers just as if being physically connected. For maximum performance, HP recommends using image files stored on a hard drive of your management station PC or Windows server or on a network drive accessible through a high-speed network link. You can use vMedia for initial system installation on a system without a built-in DVD or for remote installation on a system physically located elsewhere. Unlike HP SIM provisioning, which automatically installs OpenVMS and provides defaults for the various installation options, with vMedia installations independent of HP SIM, you perform installations interactively, determining the values of choice for each option or prompt.

vMedia also allows the installation of layered products, either remotely or on systems without a built-in DVD drive. The connected virtual device is not limited to installation or upgrade purposes. You can access the virtual device while OpenVMS is running. For example, you can use vMedia to install and enable layered products.



NOTE: DVDs are accessible by vMedia as read only.

The vMedia device is the first in a series of virtual-disk capabilities included in the current generation of MP hardware. vMedia consists of two primary components:

- On the Integrity servers where OpenVMS is to be installed or upgraded: iLO 2 MP firmware that emulates a USB DVD and streams the vMedia data across a live network connection between the remote management console and the Integrity server.
- On the management workstation (the remote x86 PC or Windows server from where you will browse to connect to the Integrity servers iLO 2 MP): Java code that provides data to the iLO 2 MP firmware as requested.

D.2.1 Prerequisites for Using vMedia to Install or Upgrade OpenVMS

The vMedia functionality is included with the iLO 2 MP. OpenVMS supports the use of vMedia with the HP Integrity rx2660, rx3600, rx6600, rx7620, rx7640, rx8620, and rx8640 servers and with the Integrity BL860c and BL870c Server Blade products. Using vMedia requires the following:

On Integrity servers:

- On Integrity rx2660, rx3600, and rx6600 servers, vMedia licensing through the Advanced Server Management option (iLO 2 Advanced Pack) and the user virtual media access right. vMedia is part of the iLO Advanced Pack feature set. This license is provided and pre-enabled on the Integrity BL860c and BL870c Server Blade products and on the supported cell-based servers (rx7640, rx8640, and Superdomes with the sx2000 chipset).
- On the supported cell-based servers, HP Lights Out Advanced/KVM card (AD370A).

On Windows-based PC or server from which you browse to the iLO 2 MP:

- Microsoft Internet Explorer Version 6 or later
- Java Plug-in 1.4.2_10 or later.

- The vMedia Java applet has only been tested on x86 PCs and Windows servers.
- An ISO image of the OpenVMS Integrity servers OE DVD stored on a local disk or a network drive accessible through a high-speed link. To create the ISO image, you can use ILO 2 MP through your browser, as described in Section D.1.4 (page 252). HP recommends that you do not use vMedia to install or upgrade directly from a DVD on the management workstation.



NOTE: When using vMedia to install or upgrade OpenVMS, HP recommends using an image of the OpenVMS Integrity servers OE DVD located on your Windows-based PC or server. This has two advantages:

- If the DVD is defective or corrupted, the imaging software will fail when you attempt to create an image of it, thereby indicating the DVD's condition.
- Installing or upgrading OpenVMS from the image file is much faster than installing from a DVD. This advantage outweighs any extra cost or time of copying the DVD to the ISO image file.

NOTE: If your Integrity servers has a local DVD drive, install or upgrade from the OpenVMS for Integrity servers OE DVD inserted in the DVD drive on your Integrity servers instead of using vMedia from your Windows-based management workstation. In short, for best performance with installations or upgrades, choose from the following, listed according to the potential speed (from fastest to slowest):

- If your Integrity server has a local DVD drive, install or upgrade using the OpenVMS for Integrity servers OE DVD from that DVD drive instead of using vMedia from your Windows-based system.
- Install or upgrade using an ISO image of the OpenVMS for Integrity servers OE DVD, where the image is stored on your Windows-based management workstation.
- Slowest, and not recommended unless you have no other recourse, install or upgrade from a DVD drive on your Windows-based management workstation.

D.2.2 Using vMedia to Install or Upgrade OpenVMS

To use vMedia to install or upgrade OpenVMS on Integrity servers, perform these steps.

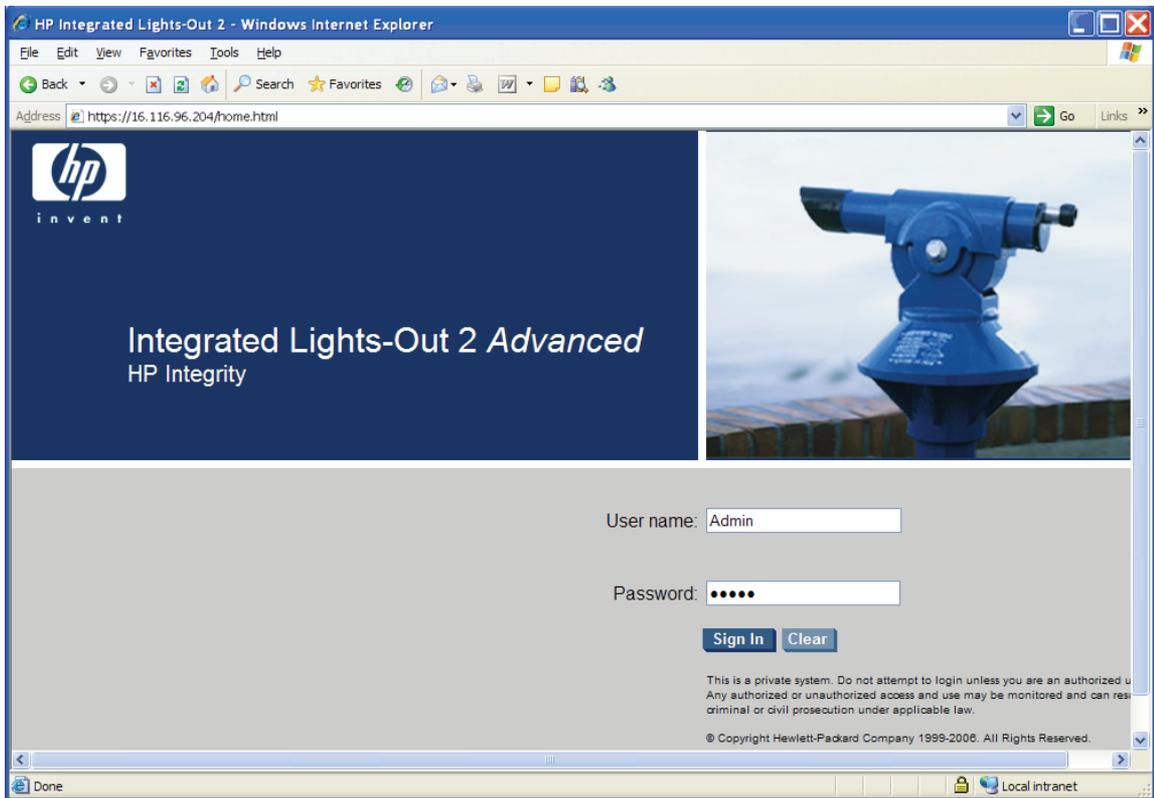


NOTE: Contents of screens shown in this section may vary according to the type of browser software being used.

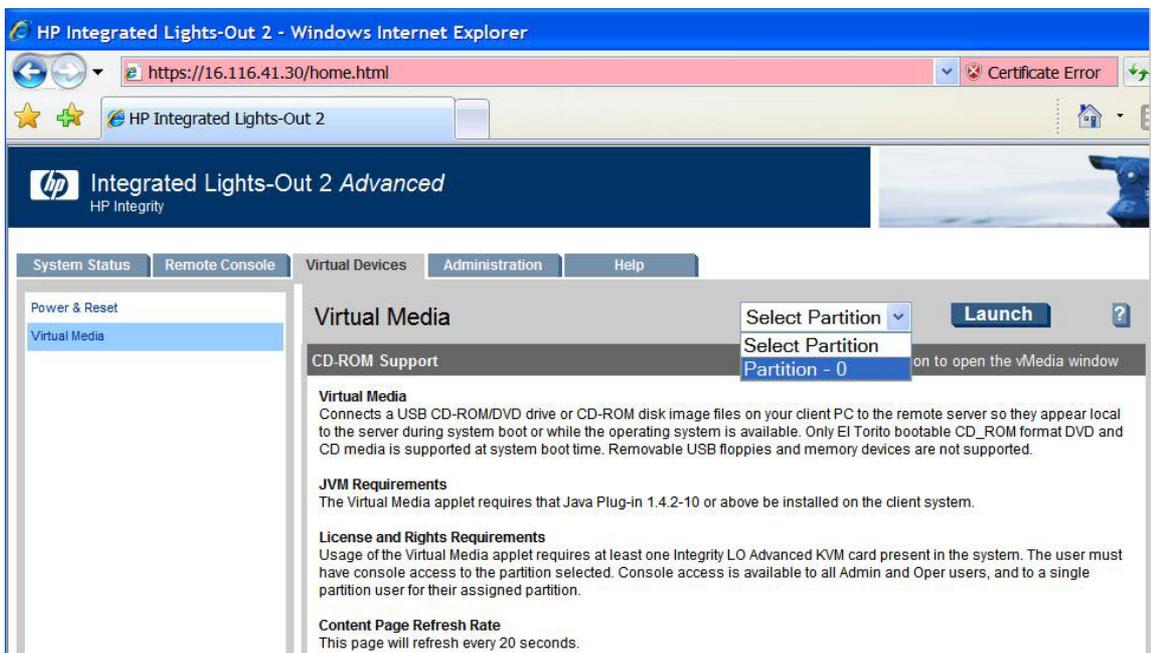
1. Insert the OpenVMS OE DVD into the DVD drive of your PC or Windows server.
2. Make sure your Integrity servers iLO 2 MP and vMedia are set up as documented in your Integrity servers hardware documentation (for example, see the *HP Integrity iLO 2 MP Operations Guide*). Enable the right to use the vMedia applet.

Make sure your Integrity server is powered on. Once you connect to your server's iLO 2 MP and log in, you can check the status and power on your Integrity server from your browser. Select the Virtual Devices tab and access the Power & Reset screen by selecting Power Management (on the left of the screen).

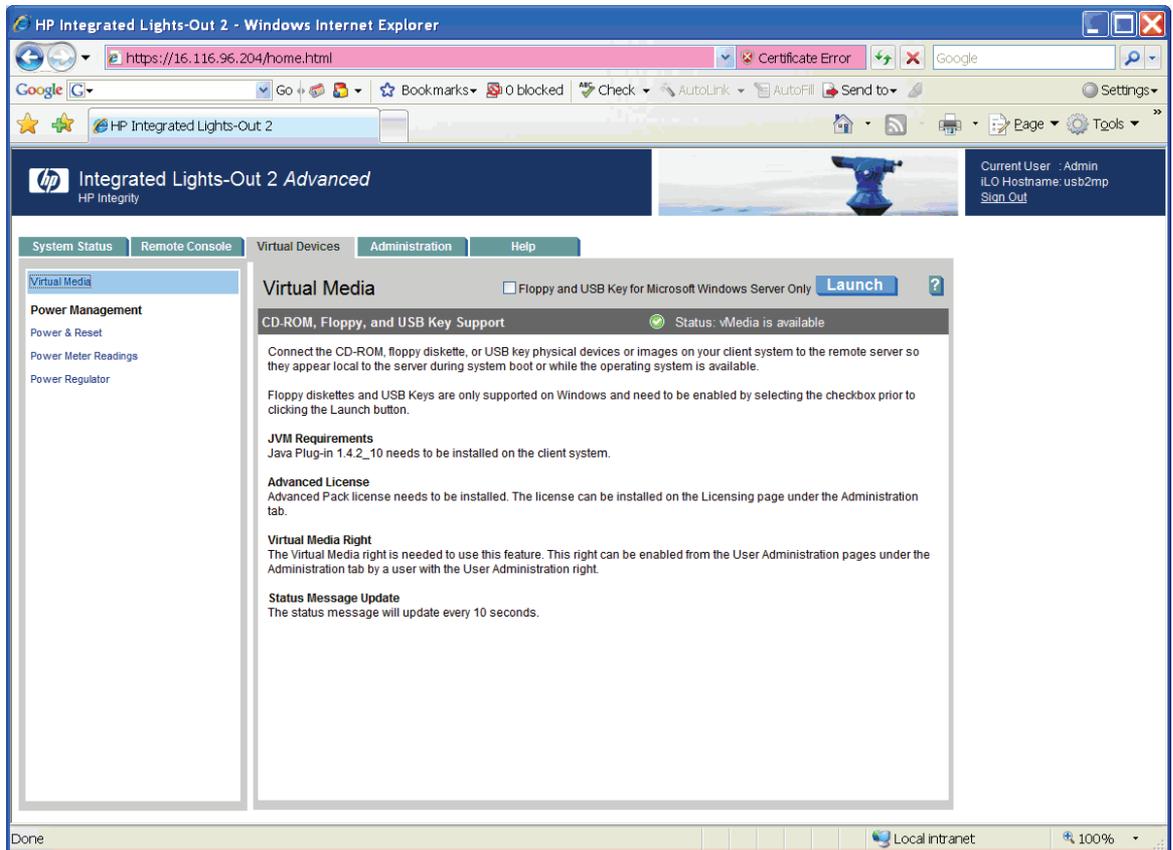
- From a browser on a Windows-based PC or server in the same network as your Integrity servers, access your Integrity server's iLO 2 MP by specifying the DNS name or IP address. Then log in as shown in the following example:



- Select the Virtual Devices tab, then select Virtual Media from the list on the left. If your Integrity server is not a cell-based system, skip to the next step. If your server is a cell-based system, select the partition before launching the vMedia application, as shown:

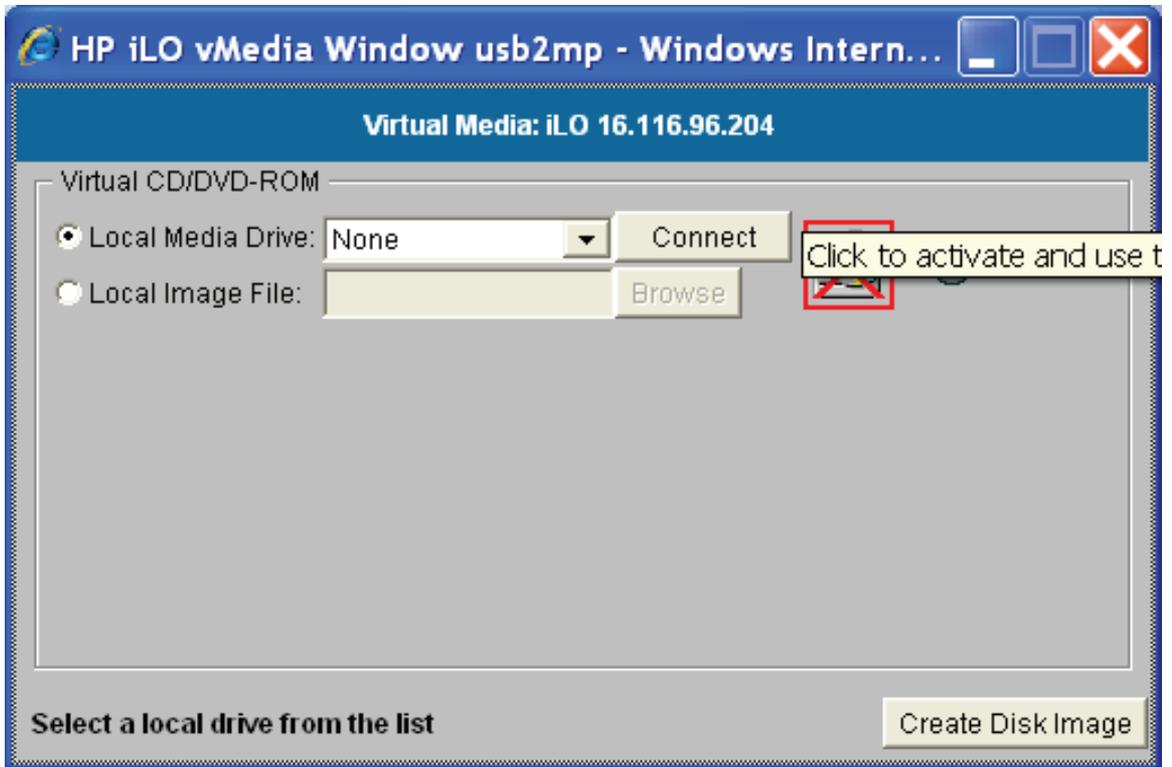


5. Now launch the vMedia application by clicking **Launch**, as shown in the following example:

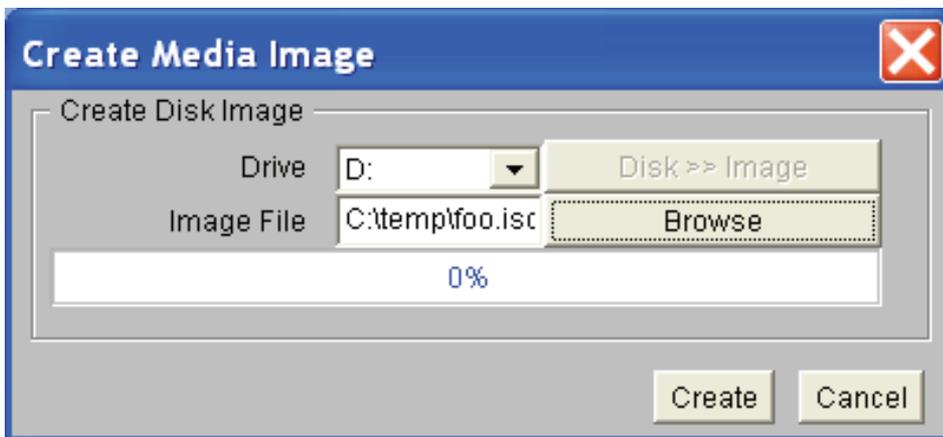


6. At this point, you might see popup security warnings, such as the one shown in Section D.1.4 (page 252). In this case, you can check the box to always trust content, and then click **Yes**. (To avoid certification warnings, install valid certificates for the iLO 2 MP hardware. For more information, see the *HP Integrity iLO 2 MP Operations Guide*. In addition, see the online help provided by your browser.)

- From the Virtual CD/DVD-ROM dialog box shown in the following example, make sure the Local Media Drive option is selected, and then click **Create Disk Image**:

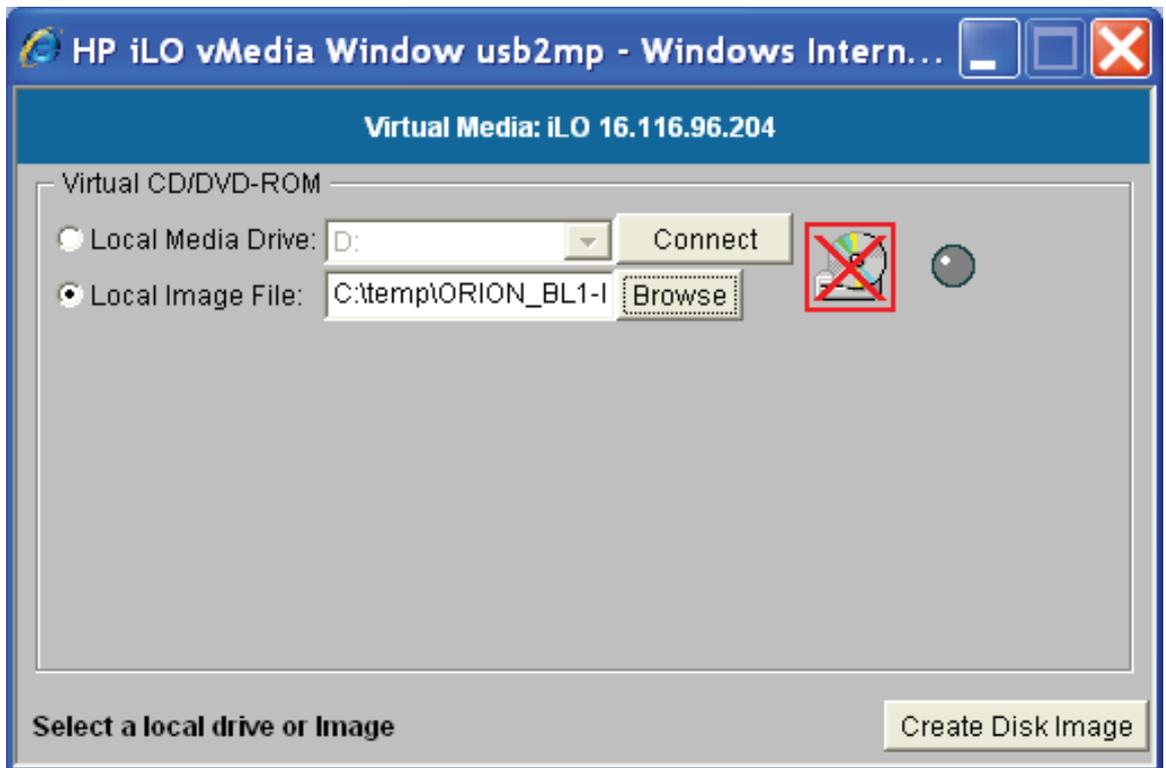


- The Create Disk Image dialog box appears, as in the following example. Specify a path or file name for the image to be created, and then click **Create**.

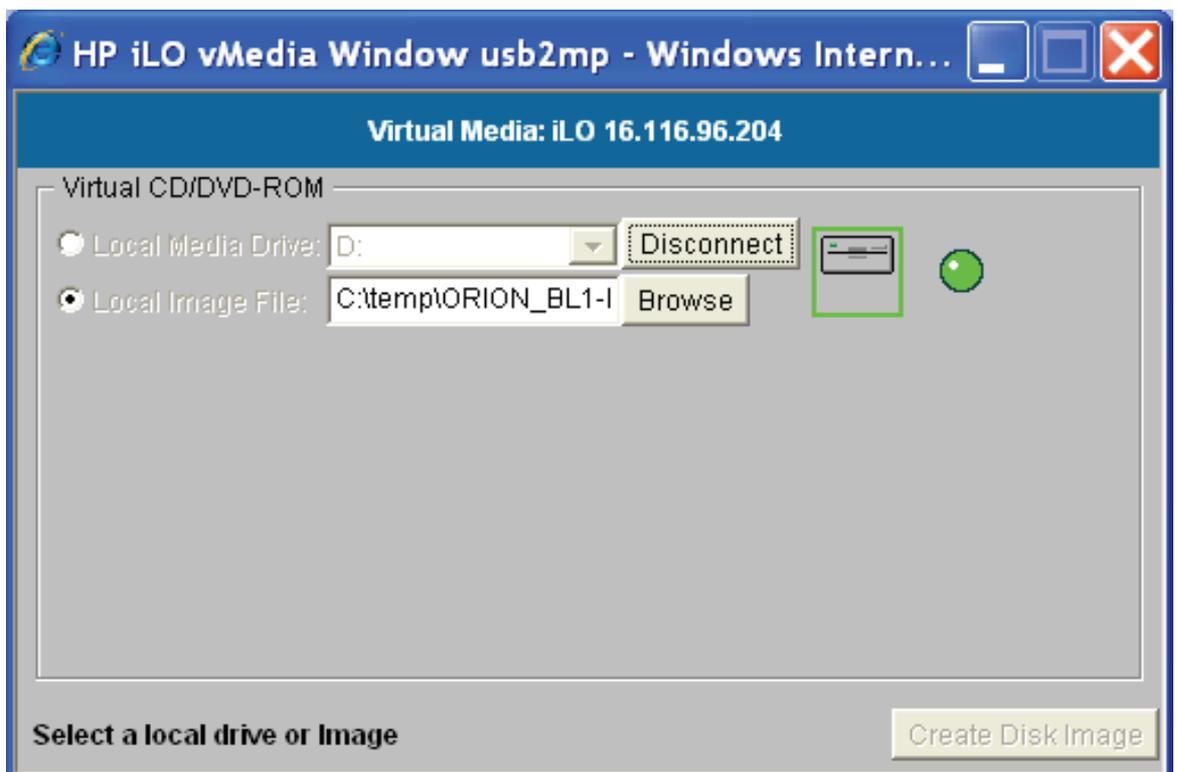


NOTE: As noted previously, HP recommends that you do not install or upgrade directly from a DVD (on your local Windows-based management workstation) with vMedia. Creating a disk image on the local drive (or a network drive) will make the installation or upgrade much faster. This assumes the local or network drive is accessible to your Integrity servers over a high-speed network link.

9. The Virtual CD/DVD-ROM dialog box appears, as in the following example. Select the Local Image File option, and then browse for the created ISO image file that you want vMedia to access. Then click **Connect**.



The following screen indicates that the image is connected to vMedia. Now the targeted Integrity server is ready to be booted using the ISO image file.



- At this point, access the Integrity server's console from a browser or terminal emulator, log in to the MP, and enter the `co` command at the MP main menu:

MP MAIN MENU:

```
CO: Console
VFP: Virtual Front Panel
CM: Command Menu
SMCLP: Server Management Command Line Protocol
CL: Console Log
SL: Show Event Logs
HE: Main Help Menu
X: Exit Connection
```

```
[usb2mp] MP> co
```

- At the EFI Shell prompt, enter the `reconnect -r` command to make sure all devices are discovered:

```
Shell> reconnect -r
```

- When the EFI Shell prompt next appears, enter the `map -r` command to remap and rebuild the list of known devices that have a bootable EFI system partition:

```
Shell> map -r
```

The following example shows the boot mapping table displayed by the `map -r` command. The significant lines in the table are those that include both USB and CDRUM information. Thus, in this example, `fs0` is the file-structured logical partition on the physical disk to be booted from; it includes the bootable partition, and `blk2` is the block device that has the bootable partition.

```
Device mapping table
fs0 : Acpi (HWP0002, PNP0A03, 0) / Pci (2|0) / Usb (0, 2) / CDRUM (Entry0)
fs1 : Acpi (HWP0002, PNP0A03, 200) / Pci (1|0) / Sas (Addr500000E014887A22, Lun0) / HD (Part1, ...FF)
fs2 : Acpi (HWP0002, PNP0A03, 200) / Pci (1|0) / Sas (Addr500000E014887A22, Lun0) / HD (Part4, ...FF)
blk0 : Acpi (HWP0002, PNP0A03, 0) / Pci (2|1) / Usb (0, 0)
blk1 : Acpi (HWP0002, PNP0A03, 0) / Pci (2|0) / Usb (0, 2)
blk2 : Acpi (HWP0002, PNP0A03, 0) / Pci (2|0) / Usb (0, 2) / CDRUM (Entry0)
blk3 : Acpi (HWP0002, PNP0A03, 200) / Pci (1|0) / Sas (Addr5000C50000A7B30D, Lun0)
blk4 : Acpi (HWP0002, PNP0A03, 200) / Pci (1|0) / Sas (Addr500000E014887A22, Lun0)
blk5 : Acpi (HWP0002, PNP0A03, 200) / Pci (1|0) / Sas (Addr500000E014887A22, Lun0) / HD (Part1, ...FF)
blk6 : Acpi (HWP0002, PNP0A03, 200) / Pci (1|0) / Sas (Addr500000E014887A22, Lun0) / HD (Part2, ...FF)
blk7 : Acpi (HWP0002, PNP0A03, 200) / Pci (1|0) / Sas (Addr500000E014887A22, Lun0) / HD (Part3, ...FF)
blk8 : Acpi (HWP0002, PNP0A03, 200) / Pci (1|0) / Sas (Addr500000E014887A22, Lun0) / HD (Part4, ...FF)
blk9 : Acpi (HWP0002, PNP0A03, 200) / Pci (1|0) / Sas (Addr500000E014887A22, Lun0) / HD (Part5, ...FF)
```

13. Now you can boot the OpenVMS Integrity servers image, either using the EFI boot menu or the following command at the EFI Shell prompt:

```
Shell> fs0:\efi\boot\bootia64.efi
```

As shown in the following example, the OpenVMS displays several messages followed by the operating system menu. You can now begin the installation or upgrade of OpenVMS on the Integrity servers.



NOTE: The %SYSTEM-I-MOUNTVER messages and the Universal Serial Bus Configuration Manager message are new to OpenVMS Version 8.4 and are seen only when using USB or vMedia devices for booting the Integrity rx2660, rx3600, and rx6600 servers.

```
.
.
.
.
Installing required known files...
%RUN-S-PROC_ID, identification of created process is 00000024
%SYSTEM-I-MOUNTVER, DNA0: is offline. Mount verification in progress.

%SYSTEM-I-MOUNTVER, DNA0: has completed mount verification.

Universal Serial Bus Configuration Manager, Version V2.1 Reset Unconfigured devices

Configuring devices...

%PKA0, Copyright (c) 2001 LSI Logic, PKM V1.1.01 Chip LSISAS1068
%PKA0, LSISAS1068 firmware version is 1.16.0.0
%EWA0, Auto-negotiation mode assumed set by console
%EWA0, Mer15704 located in 64-bit, 66-mhz PCI-X slot
%EWA0, Device type is BCM5704C (UTP) Rev B0 (21000000)
%EWB0, Auto-negotiation mode assumed set by console
%EWB0, Mer15704 located in 64-bit, 66-mhz PCI-X slot
%EWB0, Device type is BCM5704C (UTP) Rev B0 (21000000)
%EWA0, Link up: 100 mbit, full duplex, flow control (txrx)
%EWB0, Link up: 100 mbit, full duplex, flow control (txrx)

*****

You can install or upgrade the OpenVMS I64 operating system
or you can install or upgrade layered products that are included
on the OpenVMS I64 distribution media (CD/DVD).

You can also execute DCL commands and procedures to perform
"standalone" tasks, such as backing up the system disk.

Please choose one of the following:

    1) Upgrade, install or reconfigure OpenVMS I64 Version X8.4
    2) Display layered products that this procedure can install
    3) Install or upgrade layered products
    4) Show installed products
    5) Reconfigure installed products
    6) Remove installed products
    7) Find, Install or Undo patches; Show or Delete Recovery Data
    8) Execute DCL commands and procedures
    9) Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?)
```

Perform the installation or upgrade. Follow the installation instructions in “Installing OpenVMS Using Option 1 of the Operating System Menu” (page 56), or the upgrade instructions in “Performing the Upgrade” (page 109).



NOTE: After an installation finishes, you must register all licenses for use of the operating system and any installed layered products. For information about registering licenses, see Section 7.3 (page 130).

After the installation or upgrade finishes, you can change responses that you made to the installation or upgrade script and perform any other postinstallation or postupgrade tasks. HP recommends that you specify a new SYSTEM password rather than using the default.

E Setting Up and Booting Fibre Channel Storage Devices

This appendix describes how to set up and boot from a Fibre Channel (FC) Storage Area Network (SAN) storage device on OpenVMS Alpha and Integrity server systems. You may prefer booting from an FC storage device because of its speed and because it can serve as a common cluster system disk in a SAN. FC storage is supported on all storage arrays that are supported on OpenVMS systems. For a list of supported devices, see the *HP OpenVMS Version 8.4 for Alpha and Integrity Servers Software Product Description* (SPD 82.35.xx).

The HBA requires the latest RISC firmware and EFI firmware and driver.

Fibre Channel device booting supports point-to-point topology. There is no plan to support FC arbitrated loop topology.

E.1 Booting on a Fibre Channel Storage Device on OpenVMS Alpha Systems

This section describes how to use the AlphaServer console for configuring Fibre Channel, how to view the Fibre Channel configuration from the console, and how to set up disks for Fibre Channel booting and dumping on OpenVMS Alpha systems.

E.1.1 Using the AlphaServer Console for Configuring Fibre Channel (Alpha Only)

The AlphaServer console can be used to view the status of an FC interconnect. This allows you to confirm that the interconnect is set up properly before booting. If you plan to use an FC disk device for booting or dumping, you must perform some additional steps to set up those FC disk devices at the console. These topics are discussed in the following subsections.

E.1.1.1 Viewing the FC Configuration from the Console

Console SHOW commands can be used to display information about the devices that the console detected when it last probed the system's I/O adapters. Unlike other interconnects, however, FC disk devices are not automatically included in the SHOW DEVICE output. This is because FC devices are identified by their WWIDs, and WWIDs are too large to be included in the SHOW DEVICE output. Instead, the console provides a command for managing WWIDs, named the `wwidmgr` command. This command enables you to display information about FC devices and to define appropriate device names for the FC devices that will be used for booting and dumping.

Note the following points about using the `wwidmgr` command:

- To use the `wwidmgr` command, if your system is an Alpha Server model 8 x00, 4x00, or 1200, you must first enter diagnostic mode. On all other platforms, you can enter the `wwidmgr` command at any time.
- The changes made by the `wwidmgr` command do not take effect until after the next system initialization. After using the `wwidmgr` command, you must enter the `initialize` command.

For a complete description of the `wwidmgr` command, see the *Wwidmgr User's Manual*. This manual is available in the [.DOC] directory of the Alpha Systems Firmware Update CD.

The following examples, produced on an AlphaServer 4100 system, show some typical uses of the `wwidmgr` command. Other environments might require additional steps, and the output on other systems might vary slightly.

Note the following about [Example E-1](#):

- The `wwidmgr -show wwid` command displays a summary of the FC devices on the system. This command does not display information about device connectivity.
- There are two FC adapters and five disks. (All the disks are listed at the end, independent of the adapters to which they are connected.) In this example, each of the disks was assigned a device identifier at the HSG80 console. The console refers to this identifier as a user-assigned device identifier (UDID).

Example E-1 Using `wwidmgr -show wwid`

```
P00>>> set mode diag
Console is in diagnostic mode
P00>>> wwidmgr -show wwid

polling kgpsa0 (KGPSA-B) slot 2, bus 0 PCI, hose 1
kgpsaa0.0.0.2.1          PGA0          WWN 1000-0000-c920-a7db
polling kgpsa1 (KGPSA-B) slot 3, bus 0 PCI, hose 1
kgpsab0.0.0.3.1          PGB0          WWN 1000-0000-c920-a694
[0] UDID:10 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0016 (ev:none)
[1] UDID:50 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0026 (ev:none)
[2] UDID:51 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0027 (ev:none)
[3] UDID:60 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0021 (ev:none)
[4] UDID:61 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0022 (ev:none)
```

Example E-2 shows how the `wwidmgr show wwid -full` command displays information about FC devices and how they are connected. The display has two parts:

- The first part lists each path from an adapter to an FC port. Adapters are identified by console device names, such as KGPSAA. FC ports are identified by their WWID, such as 5000-1FE1-0000-0D14. If any FC disks are found on a path, they are listed after that path. FC disks are identified by their current console device name, followed by their WWID.
- The second part of the display lists all the FC disks and the paths through which they are reachable. In this part, which begins with `[0] UDID:10 . . .`, you see four paths to each disk with two paths through each adapter, KGPSAA and KGPSAB. Each path through an adapter goes to a different port on the HSG or HSV. The column titled Con indicates whether the FC disk unit is currently online to the HSG or HSV controller that this path uses.

Example E-2 Using `wwidmgr -show wwid -full`

```
P00>>> wwidmgr -show wwid -full
```

```
kgpsaa0.0.0.2.1
```

```
- Port: 1000-0000-c920-a7db
```

```
kgpsaa0.0.0.2.1
```

```
- Port: 2007-0060-6900-075b
```

```
kgpsaa0.0.0.2.1
```

```
- Port: 20fc-0060-6900-075b
```

```
kgpsaa0.0.0.2.1
```

```
- Port: 5000-1fe1-0000-0d14
```

```
- dga12274.13.0.2.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0016
```

```
- dga15346.13.0.2.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0026
```

```
- dga31539.13.0.2.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0027
```

```
- dga31155.13.0.2.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0021
```

```
- dga30963.13.0.2.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0022
```

```
kgpsaa0.0.0.2.1
```

```
- Port: 5000-1fe1-0000-0d11
```

```
- dga12274.14.0.2.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0016
```

```
- dga15346.14.0.2.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0026
```

```
- dga31539.14.0.2.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0027
```

```
- dga31155.14.0.2.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0021
```

```
- dga30963.14.0.2.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0022
```

```
kgpsab0.0.0.3.1
```

```
- Port: 1000-0000-c920-a694
```

```
kgpsab0.0.0.3.1
```

```
- Port: 2007-0060-6900-09b8
```

```
kgpsab0.0.0.3.1
```

```
- Port: 20fc-0060-6900-09b8
```

```
kgpsab0.0.0.3.1
```

```
- Port: 5000-1fe1-0000-0d13
```

```
- dgb12274.13.0.3.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0016
```

```
- dgb15346.13.0.3.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0026
```

```
- dgb31539.13.0.3.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0027
```

```
- dgb31155.13.0.3.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0021
```

```
- dgb30963.13.0.3.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0022
```

```
kgpsab0.0.0.3.1
```

```
- Port: 5000-1fe1-0000-0d12
```

```
- dgb12274.14.0.3.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0016
```

```
- dgb15346.14.0.3.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0026
```

```
- dgb31539.14.0.3.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0027
```

```
- dgb31155.14.0.3.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0021
```

```
- dgb30963.14.0.3.1 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0022
```

```
[0] UDID:10 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0016 (ev:none)
```

```
- current_unit:12274 current_col: 0 default_unit:12274
```

```
via adapter via fc_nport Con DID Lun
```

```
- kgpsaa0.0.0.2.1 5000-1fe1-0000-0d14 Yes 210013 10
```

```
- kgpsaa0.0.0.2.1 5000-1fe1-0000-0d11 No 210213 10
```

```
- kgpsab0.0.0.3.1 5000-1fe1-0000-0d13 Yes 210013 10
```

```
- kgpsab0.0.0.3.1 5000-1fe1-0000-0d12 No 210213 10
```

```
[1] UDID:50 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0026 (ev:none)
```

```
- current_unit:15346 current_col: 0 default_unit:15346
```

```

        via adapter      via fc_nport      Con      DID      Lun
-   kgpsaa0.0.0.2.1  5000-1fe1-0000-0d14  Yes      210013   50
-   kgpsaa0.0.0.2.1  5000-1fe1-0000-0d11  No       210213   50
-   kgpsab0.0.0.3.1  5000-1fe1-0000-0d13  Yes      210013   50
-   kgpsab0.0.0.3.1  5000-1fe1-0000-0d12  No       210213   50

[2] UDID:51 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0027 (ev:none)
- current_unit:31539 current_col: 0 default_unit:31539
    via adapter      via fc_nport      Con      DID      Lun
-   kgpsaa0.0.0.2.1  5000-1fe1-0000-0d14  Yes      210013   51
-   kgpsaa0.0.0.2.1  5000-1fe1-0000-0d11  No       210213   51
-   kgpsab0.0.0.3.1  5000-1fe1-0000-0d13  Yes      210013   51
-   kgpsab0.0.0.3.1  5000-1fe1-0000-0d12  No       210213   51

[3] UDID:60 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0021 (ev:none)
- current_unit:31155 current_col: 0 default_unit:31155
    via adapter      via fc_nport      Con      DID      Lun
-   kgpsaa0.0.0.2.1  5000-1fe1-0000-0d14  Yes      210013   60
-   kgpsaa0.0.0.2.1  5000-1fe1-0000-0d11  No       210213   60
-   kgpsab0.0.0.3.1  5000-1fe1-0000-0d13  Yes      210013   60
-   kgpsab0.0.0.3.1  5000-1fe1-0000-0d12  No       210213   60

[4] UDID:61 WWID:01000010:6000-1fe1-0000-0d10-0009-8090-0677-0022 (ev:none)
- current_unit:30963 current_col: 0 default_unit:30963
    via adapter      via fc_nport      Con      DID      Lun
-   kgpsaa0.0.0.2.1  5000-1fe1-0000-0d14  Yes      210013   61
-   kgpsaa0.0.0.2.1  5000-1fe1-0000-0d11  No       210213   61
-   kgpsab0.0.0.3.1  5000-1fe1-0000-0d13  Yes      210013   61
-   kgpsab0.0.0.3.1  5000-1fe1-0000-0d12  No       210213   61

```

E.1.1.2 Setting Up FC Disks for Booting and Dumping

You must use the `wwidmgr` command to set up each device that you will use for booting or dumping. Once a device is set up, the console retains the information it requires to access the device in nonvolatile memory. You only have to rerun the `wwidmgr` command if the system configuration changes and the nonvolatile information is no longer valid.

The console provides a simplified setup command, called `wwidmgr -quickset`. This command can be used in either of the following cases:

- You are setting up just one device.
- All the devices you are setting up are accessed through the same ports on the HSG or HSV.

If neither description applies to your configuration, see the *Wwidmgr Users' Manual* for additional instructions.

Example E-3 illustrates the `wwidmgr -quickset` command. Note the following:

- The command `wwidmgr -quickset -udid 10` sets up the FC disk whose HSG or HSV device identifier is equal to 10.
- The console device names are path dependent. Each path used to access an FC disk has a different name. In this example, the `wwidmgr -quickset` command establishes four console device names corresponding to the four paths from the host to the FC disk:
 - `dga10.1001.0.2.1`
 - `dga10.1002.0.2.1`
 - `dgb10.1003.0.3.1`
 - `dgb10.1004.0.3.1`
- The second command, `wwidmgr -quickset -udid 50`, sets up the FC disk whose HSG or HSV identifier is equal to 50.

- The changes made by the `wwidmgr` command do not take effect until after the next system initialization, so the next step is to use the `initialize` command.
- After initialization, the console `show device` command displays each FC adapter, followed by the paths through that adapter to each of the defined FC disks. The path-independent OpenVMS device name for each FC disk is displayed in the second column.

Example E-3 Using wwidmgr -quickset

```
P00>>> wwidmgr -quickset -udid 10
```

Disk assignment and reachability after next initialization:

```
6000-1fe1-0000-0d10-0009-8090-0677-0016
      via adapter:          via fc nport:          connected:
dga10.1001.0.2.1          kgpsaa0.0.0.2.1      5000-1fe1-0000-0d14    Yes
dga10.1002.0.2.1          kgpsaa0.0.0.2.1      5000-1fe1-0000-0d11    No
dgb10.1003.0.3.1          kgpsab0.0.0.3.1      5000-1fe1-0000-0d13    Yes
dgb10.1004.0.3.1          kgpsab0.0.0.3.1      5000-1fe1-0000-0d12    No
P00>>> wwidmgr -quickset -udid 50
```

Disk assignment and reachability after next initialization:

```
6000-1fe1-0000-0d10-0009-8090-0677-0016
      via adapter:          via fc nport:          connected:
dga10.1001.0.2.1          kgpsaa0.0.0.2.1      5000-1fe1-0000-0d14    Yes
dga10.1002.0.2.1          kgpsaa0.0.0.2.1      5000-1fe1-0000-0d11    No
dgb10.1003.0.3.1          kgpsab0.0.0.3.1      5000-1fe1-0000-0d13    Yes
dgb10.1004.0.3.1          kgpsab0.0.0.3.1      5000-1fe1-0000-0d12    No
```

```
6000-1fe1-0000-0d10-0009-8090-0677-0026
      via adapter:          via fc nport:          connected:
dga50.1001.0.2.1          kgpsaa0.0.0.2.1      5000-1fe1-0000-0d14    Yes
dga50.1002.0.2.1          kgpsaa0.0.0.2.1      5000-1fe1-0000-0d11    No
dgb50.1003.0.3.1          kgpsab0.0.0.3.1      5000-1fe1-0000-0d13    Yes
dgb50.1004.0.3.1          kgpsab0.0.0.3.1      5000-1fe1-0000-0d12    No
```

```
P00>>> initialize
```

```
Initializing...
```

```
P00>>> show device
```

```
polling ncr0 (NCR 53C810) slot 1, bus 0 PCI, hose 1   SCSI Bus ID 7
dka500.5.0.1.1          DKA500                RRD45  1645
polling kgpsaa0 (KGPSA-B) slot 2, bus 0 PCI, hose 1
kgpsaa0.0.0.2.1          PGA0                  WWN 1000-0000-c920-a7db
dga10.1001.0.2.1          $1$DGA10             HSG80  R024
dga50.1001.0.2.1          $1$DGA50             HSG80  R024
dga10.1002.0.2.1          $1$DGA10             HSG80  R024
dga50.1002.0.2.1          $1$DGA50             HSG80  R024
polling kgpsaa1 (KGPSA-B) slot 3, bus 0 PCI, hose 1
kgpsaa1.0.0.3.1          PGB0                  WWN 1000-0000-c920-a694
dgb10.1003.0.3.1          $1$DGA10             HSG80  R024
dgb50.1003.0.3.1          $1$DGA50             HSG80  R024
dgb10.1004.0.3.1          $1$DGA10             HSG80  R024
dgb50.1004.0.3.1          $1$DGA50             HSG80  R024
polling isp0 (QLogic ISP1020) slot 4, bus 0 PCI, hose 1   SCSI Bus ID 15
dkb0.0.0.4.1          DKB0                  RZ1CB-CS 0844
dkb100.1.0.4.1          DKB100                RZ1CB-CS 0844
polling floppy0 (FLOPPY) PCEB - XBUS hose 0
dva0.0.0.1000.0          DVA0                  RX23
polling ncr1 (NCR 53C810) slot 4, bus 0 PCI, hose 0   SCSI Bus ID 7
dkc0.0.0.4.0          DKC0                  RZ29B  0007
polling tulip0 (DECchip 21040-AA) slot 3, bus 0 PCI, hose 0
ewa0.0.0.3.0          00-00-F8-21-09-74 Auto-Sensing
```

Example E-4 shows a boot sequence from an FC system disk. Note the following:

- The boot device is \$1\$DGA50. The user has elected to enter all four paths to the device in the bootdef_dev string. This ensures that the system will be able to boot even if a path has failed.
- The first path on the boot command string, dga50.1002.0.2.1, is not currently connected (that is, the disk is not on line to the HSG80 on that path). The console indicates this fact, retries a few times, then moves on to the next path in the bootdef_dev string. This path is currently connected, and the boot succeeds.
- After booting, the OpenVMS SHOW DEVICE command confirms that OpenVMS has configured all five of the FC devices that were displayed by the wwidmgr -show wwid

command, not only the two FC disks that were set up using the console `wwidmgr -quickset` command. The OpenVMS `SHOW DEV/MULTIPATH` command confirms that OpenVMS has configured all four paths to each disk.

Example E-4 Boot Sequence from an FC System Disk

```
P00>>> set bootdef_dev dga50.1002.0.2.1,dga50.1001.0.2.1,dgb50.1003.0.3.1,dgb50.1004.0.3.1
P00>>> b
(boot dga50.1002.0.2.1 -flags 0,0)
dga50.1002.0.2.1 is not connected
dga50.1002.0.2.1 is not connected
dga50.1002.0.2.1 is not connected
dga50.1002.0.2.1 is not connected
failed to open dga50.1002.0.2.1
(boot dga50.1001.0.2.1 -flags 0,0)
block 0 of dga50.1001.0.2.1 is a valid boot block
reading 919 blocks from dga50.1001.0.2.1
bootstrap code read in
Building FRU table
base = 200000, image_start = 0, image_bytes = 72e00
initializing HWRPB at 2000
initializing page table at 1f2000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

      OpenVMS (TM) Alpha Operating System, Version V7.2
      .
      .
      .
$ SHOW DEVICE
Device          Device      Error   Volume      Free  Trans  Mnt
Name            Status      Count   Label        Blocks Count  Cnt
$1$DGA10:      (FCNOD1)  Online    0
$1$DGA50:      (FCNOD1)  Mounted   0   V72_SSB    4734189   303   1
$1$DGA51:      (FCNOD1)  Online    0
$1$DGA60:      (FCNOD1)  Online    0
$1$DGA61:      (FCNOD1)  Online    0
$ SHOW LOGICAL SYS$SYSDEVICE
"SYS$SYSDEVICE" = "$1$DGA50:" (LNM$SYSTEM_TABLE)
$ SHO DEV/MULTI
Device          Device      Error   Paths      Current
Name            Status      Count   Paths      path
$1$DGA10:      (FCNOD1)  Online    0   4/ 4   PGB0.5000-1FE1-0000-0D11
$1$DGA50:      (FCNOD1)  Mounted   0   4/ 4   PGA0.5000-1FE1-0000-0D12
$1$DGA51:      (FCNOD1)  Online    0   4/ 4   PGA0.5000-1FE1-0000-0D13
$1$DGA60:      (FCNOD1)  Online    0   4/ 4   PGB0.5000-1FE1-0000-0D14
$1$DGA61:      (FCNOD1)  Online    0   4/ 4   PGB0.5000-1FE1-0000-0D11
Device          Device      Error   Paths      Current
Name            Status      Count   Paths      path
$1$GGA42:      Online     0       4/ 4   PGB0.5000-1FE1-0000-0D11
```

E.2 Booting on a Fibre Channel Storage Device on OpenVMS Integrity server Systems

This section describes how to check the firmware version of the flash memory of the FC storage device, how to obtain the latest copy of the IPF Offline Diagnostics and Utilities CD, and how to configure the boot device paths for the storage device.

E.2.1 Checking the Firmware Version

Before you can boot on a FC device on OpenVMS Integrity server systems, the EFI bootable firmware of the flash memory of the FC HBA must be the latest supported revision.



IMPORTANT: If you have an entry-class Integrity servers, you can update the firmware yourself. If you have a cell-based Integrity servers, you must contact HP Customer Support to update the firmware for you.

To flash the memory of the FC HBA on an entry-class server, update the EFI driver and RISC firmware to the latest versions available. In addition, to enable the HBA factory default settings, update the NVRAM resident in the FLASH ROM on the HBA, if necessary.

To determine the most current supported versions of the RISC firmware and EFI driver, see the appropriate README text file provided on the latest, supported HP IPF Offline Diagnostics and Utilities CD. For a 2 GB FC device, locate this file by navigating to the `\efi\hp\tools\io_cards\fc2` directory. To update the driver and firmware, you can use a script on the CD that updates the driver and firmware automatically. Use the following command in the directory previously mentioned:

```
fcd_update2.nsh
```

For a 4 GB FC device, navigate to the `fc4` directory (`\efi\hp\tools\io_cards\fc4`) to locate the README text file. To update the driver and firmware, use the following command (located in the `fc4` directory):

```
fcd_update4.nsh
```

You can also use the `efiutil.efi` utility located in either directory.

For instructions on obtaining the Offline Diagnostics and Utilities CD, see [Section E.2.2 \(page 300\)](#). For additional information about updating the bootable firmware of the FC device, see the *Guidelines for OpenVMS Cluster Configurations*.

You can determine the versions of the driver and RISC firmware currently in place on your Integrity servers in two ways: from the console during system initialization or by using the `efiutil` utility.

- The driver and RISC firmware versions are shown in the booting console message that is displayed during system initialization, as in the following example. The RISC firmware version is indicated in the format `n.nn.nnn`.

```
HP 2 Port 2Gb Fibre Channel Adapter (driver n.nn, firmware n.nn.nnn)
```

- The driver and RISC firmware versions are also shown in the display of the `efiutil info` command:

```
fs0:\efi\hp\tools\io_cards\fc2\efiutil> info

Fibre Channel Card Efi Utility  n.nn  (11/1/2004)
```

```
2 Fibre Channel Adapters found:
```

Adapter	Path	WWN	Driver (Firmware)
A0	Acpi(000222F0,200)/Pci(1 0)	50060B00001CF2DC	n.nn (n.nn.nnn)
A1	Acpi(000222F0,200)/Pci(1 1)	50060B00001CF2DE	n.nn (n.nn.nnn)

E.2.2 Obtaining the IPF Offline Diagnostics and Utilities

Obtain the latest copy of the IPF Offline Diagnostics and Utilities CD by either of the following methods:

- Order the CD free of charge from the HP Software Depot site main page at:

<http://www.hp.com/go/softwaredepot>

Type `ipf offline` in the Search bar and select the latest version listed (dates are indicated in the listed product names).

- Burn your own CD locally after downloading a master ISO image of the IPF Offline Diagnostics and Utilities CD from the following website:

<http://www.hp.com/support/itaniumservers>

1. Select your server product from the list provided.
2. From the HP Support page, select “Download drivers and software”.

3. From the “Download drivers and software page”, select “Cross operating system (BIOS, Firmware, Diagnostics, etc)”.
4. Download the Offline Diagnostics and Utilities software. Previous versions of the software might be listed along with the current (latest) version. Be sure to select the latest version.

Alternatively, you can select the appropriate Offline Diagnostics and Utilities link under the Description heading on this web page. Then you can access the installation instructions and release notes as well as download the software. The README text file on the CD also includes information about how to install the software and update the firmware.

5. Burn the full ISO image onto a blank CD, using a CD burner and any major CD burning software. To complete the recording process, see the operating instructions provided by your CD burner software. The downloaded CD data is a single ISO image file. This image file must be burned directly to a CD exactly as is. This creates a dual-partition, bootable CD.

E.2.3 Configuring and Booting FC Boot Device

For OpenVMS Integrity servers Version 8.2, the process of setting up an FC boot device required using the OpenVMS Integrity servers Boot Manager utility (SYS\$MANAGER:BOOT_OPTIONS.COM) to specify values to the EFI Boot Manager. Starting with OpenVMS Integrity servers Version 8.2-1, this process is automated by the OpenVMS Integrity servers installation and upgrade procedures.

The OpenVMS Integrity servers installation/upgrade procedure displays the name of an FC disk as a boot device and prompts you to add the Boot Option. HP recommends that you accept this default. Alternatively, after the installation or upgrade completes, you can run the OpenVMS Integrity servers Boot Manager to set up or modify an FC boot device, as described in the following steps. Always use the OpenVMS Integrity servers installation/upgrade procedure or the OpenVMS Integrity servers Boot Manager to set up or modify an FC boot device; do not use EFI for this purpose.



NOTE: On certain entry-level servers, if no FC boot device is listed in the EFI boot menu, you might experience a delay in EFI initialization because the entire SAN is scanned. Depending on the size of the SAN, this delay might range from several seconds to several minutes. Cell-based systems (such as rx7620, rx8620, and the Superdome) are not affected by this delay.

When booting OpenVMS from the installation DVD for the first time on any OpenVMS Integrity servers system, you might also experience a similar delay in EFI initialization.

If you did not allow the OpenVMS Integrity servers installation or upgrade procedure to automatically set up your FC boot device, or if you want to modify the boot option that was set up for that device, use the OpenVMS Integrity servers Boot Manager utility, by following these steps:

1. If your operating system is not running, access the OpenVMS DCL triple dollar sign prompt (\$\$\$) from the OpenVMS operating system main menu by choosing option 8 (Execute DCL commands and procedures). Otherwise, skip to the next step.
2. At the DCL prompt, enter the following command to start the OpenVMS Integrity servers Boot Manager utility:
`$$$ @SYS$MANAGER:BOOT_OPTIONS`
3. When the utility is launched, the main menu is displayed. To add your FC system disk as a boot option, enter 1 at the prompt, as in the following example:

```
OpenVMS I64 Boot Manager Boot Options List Management Utility
```

- ```
(1) ADD an entry to the Boot Options list
(2) DISPLAY the Boot Options list
(3) REMOVE an entry from the Boot Options list
```

- (4) MOVE the position of an entry in the Boot Options list
- (5) VALIDATE boot options and fix them as necessary
- (6) Modify Boot Options TIMEOUT setting
  
- (B) Set to operate on the Boot Device Options list
- (D) Set to operate on the Dump Device Options list
- (G) Set to operate on the Debug Device Options list

(E) EXIT from the Boot Manager utility

You can also enter Ctrl-Y at any time to abort this utility

Enter your choice: **1**




---

**NOTE:** While using this utility, you can change a response made to an earlier prompt by entering the caret (^) character as many times as needed. To end and return to the DCL prompt, press **Ctrl/Y**.

---

4. The utility prompts you for the device name. Enter the FC system disk device you are using for this installation. In the following example, the device is a multipath FC device named \$1\$DGA1:. This ensures that the system will be able to boot even if a path has failed.

Enter the device name (enter "?" for a list of devices): **\$1\$DGA1:**

5. The utility prompts you for the position you want your entry to take in the EFI boot option list. Enter 1 to enable automatic reboot, as in the following example:

Enter the desired position number (1,2,3,...) of the entry.  
 To display the Boot Options list, enter "?" and press Return.  
 Position [1]: **1**

6. The utility prompts you for OpenVMS boot flags. By default, no flags are set. Enter the OpenVMS flags (for example, 0,1), or accept the default (NONE) to set no flags, as in the following example:

Enter the value for VMS\_FLAGS in the form n,n.  
 VMS\_FLAGS [NONE]:

7. The utility prompts you for a description to include with your boot option entry. By default, the device name is used as the description. You can enter more descriptive information. In the following example, the default is taken:

Enter a short description (do not include quotation marks).  
 Description ["\$1\$DGA1"]:

```
efi$bcfg: 1dga1 (Boot0001) Option successfully added
efi$bcfg: 1dga1 (Boot0002) Option successfully added
efi$bcfg: 1dga1 (Boot0003) Option successfully added
efi$bcfg: 1dga1 (Boot0004) Option successfully added
```

This display example shows four different FC boot paths were configured for your FC system disk.

8. After you successfully add your boot option, exit the utility by entering E at the prompt.

Enter your choice: **E**

9. Log out from the DCL level and shut down the Integrity servers system.

10. When you next see the boot option list displayed at your console by EFI, it should look similar to the following (assuming you took the default in step 7). In this example, the device is \$1\$dga1 for two dual-ported EVA5000 storage arrays (the four separate boot paths are identified in the display). Figure E-1 (page 303) illustrates the host FC ports (FGA0 and FGB0) on the Integrity servers and the corresponding FC SAN/EVA5000 storage controller configuration.

Please select a boot option

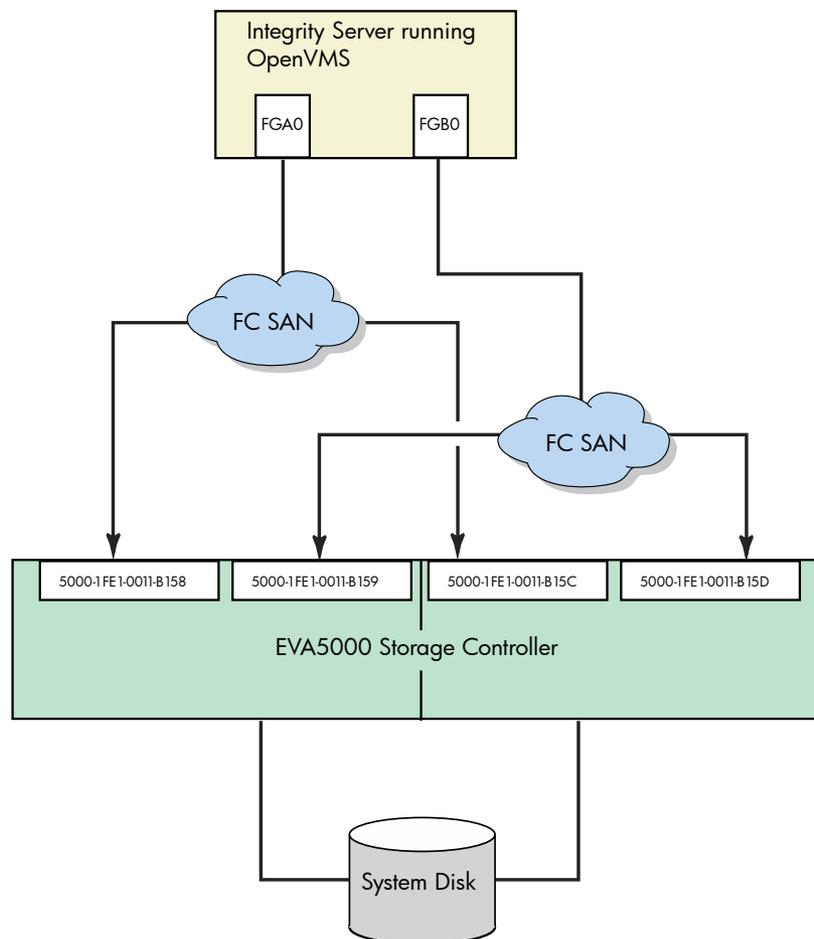
```
1dga1 FGA0.5000-1FE1-0011-B15C
1dga1 FGA0.5000-1FE1-0011-B158
1dga1 FGB0.5000-1FE1-0011-B15D
1dga1 FGB0.5000-1FE1-0011-B159
EFI Shell [Built-in]
```

The text to the right of \$1\$dga1 identifies the boot path from the host adapter to the storage controller, where:

- FGA0 or FGB0 are the FC ports (also known as host adapters).
- Each 5000-1FE1-0011-B15 *n* number (where *n* is C, 8, D, or 9, respectively) is the factory-assigned FC storage port 64-bit worldwide identifier (WWID), otherwise known as the FC port name.

If you get confused, simply boot the OpenVMS Integrity servers OE DVD and use the OpenVMS Integrity servers Boot Manager utility to remove the current boot options (option 3) and then to add your boot options again.

**Figure E-1 Fibre Channel Host and SAN Storage Controller Configuration**



For more information about this utility, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

Boot the FC system disk by selecting the appropriate boot option from the EFI Boot Manager menu and pressing **Enter**. If your FC boot path is the first option in the menu, it might boot automatically after the countdown timer expires.

## E.2.4 Configuring Additional Nodes to Boot into a Cluster Using a Shared Disk

If you have booted the OpenVMS Integrity servers OE DVD and installed the operating system onto an FC (SAN) disk and configured the system to operate in an OpenVMS Cluster environment, you can configure additional Integrity server systems to boot into the OpenVMS Cluster by following these steps:

1. Run the cluster configuration utility on the initial cluster system to add the new node to the cluster. On an OpenVMS Alpha system, run the utility by entering the following command:

```
$ @SYS$MANAGER:CLUSTER_CONFIG_LAN
```

On an OpenVMS Integrity servers system, run the utility by entering the following command:

```
$ @SYS$MANAGER:CLUSTER_CONFIG_LAN
```

2. Boot the HP OpenVMS Integrity servers OE DVD on the target node (the new node).
3. Select option 8 from the operating system menu to access OpenVMS DCL.
4. Start the OpenVMS Integrity servers Boot Manager utility by entering the following command at the DCL prompt:



**NOTE:** The OpenVMS Integrity servers Boot Manager utility requires the shared FC disk be mounted. If the shared FC disk is not mounted clusterwide, the utility tries to mount the disk with a /NOWRITE option. If the shared FC disk is already mounted clusterwide, user intervention is required.

---

```
$$$ @SYS$MANAGER:BOOT_OPTIONS
```

5. Use the utility to add a new entry for the shared cluster system disk. Follow the instructions provided in Section E.2.3 (page 301).
6. Boot the new system into the cluster.

---

# F Backing Up and Restoring the System Disk

This appendix describes how to perform backup and restore operations on the system disk. You perform these tasks by entering commands from a specialized backup environment. You access this environment through the menu that is displayed when you boot the OpenVMS Alpha CD or the OpenVMS Integrity servers OE DVD, or through an alternative method that does not require the CD or DVD.

This specialized backup environment is required because it allows you to create an exact copy of the system disk. You cannot create an exact copy in a standard operating system environment because the OpenVMS Backup utility saves only what is on the disk at the moment the BACKUP command is executing, excluding portions of open files contained in memory or data about files not yet written back to the disk (cache).

For more information about backup operations, including procedures for backing up and restoring files and directories, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

## F.1 Reasons for Backing Up the System Disk

The primary reason for having a backup copy of the system disk is so you can fully restore your system in case any hardware or software problem affects the integrity of your original system disk or your ability to access it. For example, use the backup copy to restore your system under the following conditions:

- When a problem occurs during an OpenVMS upgrade or update, or during the installation of other software products. If you back up the system disk before you attempt any of those procedures, you can restore the system disk and attempt the procedure again.
- When a system file that is accidentally deleted renders the system disk nonoperational. If you back up the system disk after you installed or upgraded the OpenVMS operating system and any other software products, you can restore the system disk.
- When the drive that holds the system disk malfunctions. If you have a backup copy of the system disk, you can restore it to a functioning disk and continue to use the system.

Another reason for backing up the system disk is to eliminate disk fragmentation, which occurs when files are stored noncontiguously on the disk. The BACKUP/IMAGE command creates a copy on which files are stored contiguously.

## F.2 Suggested Procedures

HP recommends the following:

- The preferred method for performing system disk backup and restore operations is to boot the operating system media, choose the DCL option from menu, and then enter the appropriate backup commands. The detailed procedures are described in Section F.4 (page 306) and Section F.5 (page 307).

However, if you do not have access to the CD or if you want to back up a shadowed system disk without disabling the shadow set, you can use a different procedure, which is described in Section F.6 (page 309).

- Store the backup media in a safe place.
- If you have an OpenVMS Cluster environment with more than one system disk, be sure the volume labels on each system disk and on backup copies of system disks are unique. Use the SET VOLUME/LABEL command to change a volume label, if necessary.

## F.3 OpenVMS Cluster Caution

If any nodes except the node used to run BACKUP are booted during the backup operations described in this appendix, your cluster will become partitioned, where nodes in the existing cluster divide into two or more independent clusters. This condition can cause data file corruption.

In addition, these backup environments do not restrict your use of DCL commands to the BACKUP command only, which further increases your risk of accidentally destroying or corrupting data

on a disk. Therefore, to avoid jeopardizing the integrity of your data in any way, HP recommends that you shut down the entire OpenVMS Cluster system before you back up your system disk.

## F.4 Backing Up the System Disk

The following sections describe how to back up the system disk.

### F.4.1 Getting Started

Before you back up the system disk, do the following:

1. In an OpenVMS Cluster environment, dismount the system disk from all systems in the cluster that have the disk mounted as a data disk (rather than as the system disk).
2. Shut down all systems booted from that disk.
3. Boot the operating system media. (For booting the OpenVMS Integrity servers OE DVD, see Section B.6 (page 213). For booting the OpenVMS Alpha CD, see Section A.1 (page 169).)
4. Choose the DCL option (8) on the menu. For example:

```

```

```
You can install or upgrade the OpenVMS I64 operating system
or you can install or upgrade layered products that are included
on the OpenVMS I64 distribution media (CD/DVD).
```

```
You can also execute DCL commands and procedures to perform
"standalone" tasks, such as backing up the system disk.
```

```
Please choose one of the following:
```

- 1) Upgrade, install or reconfigure OpenVMS I64 Version 8.4
- 2) Display layered products that this procedure can install
- 3) Install or upgrade layered products
- 4) Show installed products
- 5) Reconfigure installed products
- 6) Remove installed products
- 7) Find, Install, or Undo patches; Show or Delete recovery data
- 8) Execute DCL commands and procedures
- 9) Shut down this system

```
Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?) 8
```

5. At the triple dollar sign prompt (\$\$\$), enter the SHOW DEVICES command.
6. Examine the list of devices to determine which device is the source drive (the system disk you want to back up) and which device is the target drive (the supported disk or tape device that will hold the backed up files).

### F.4.2 Mounting Devices

After you determine the source drive and target drive, mount those devices (and any other output devices you plan to use) before you perform any backup operations. Enter the MOUNT commands in the following format:

```
$$$ MOUNT/OVERRIDE=IDENTIFICATION source-drive
```

```
$$$ MOUNT/FOREIGN target-drive
```

In these commands:

- *source-drive* is the name of the drive holding the system disk.
- *target-drive* is the name of the drive that will hold the backup files.

### F.4.3 Performing the System Disk Backup

When the system disk and output devices are mounted, back up the system disk by entering the BACKUP command in the following format:

```
$$$ BACKUP/IMAGE/VERIFY source-drive: target-drive:
```

### Example 1

In this example, the system disk and a target disk are mounted so the BACKUP command can create a backup disk. (You can use a backup disk as a system disk.)

```
$$$ MOUNT/OVERRIDE=IDENTIFICATION DKA200
$$$ MOUNT/FOREIGN DKA300
$$$ BACKUP/IMAGE/VERIFY DKA200: DKA300:
```

### Example 2

In this example, the system disk and a target tape device are mounted so the BACKUP command can create a backup tape.

```
$$$ INITIALIZE MKA300: label
$$$ MOUNT/OVERRIDE=IDENTIFICATION DKA200
$$$ MOUNT/FOREIGN MKA300
$$$ BACKUP/IMAGE/VERIFY DKA200: MKA300:SEP_08_BACKUP.BCK/SAVE_SET/REWIND
```

## F.4.4 Changing the Disk Volume Cluster Size

The BACKUP/IMAGE command maintains a set of disk volume parameters from the input volume, altering attributes such as the disk volume cluster size as appropriate for the target device. (Cluster size refers to the basic unit of space allocation on the disk, *not* to OpenVMS Cluster environments.)

To change the disk volume cluster size, you must restore the disk contents to a disk that has been previously initialized with the desired cluster size (using BACKUP/IMAGE/NOINITIALIZE). For more information about initializing a disk and using the BACKUP command, see the *HP OpenVMS System Manager's Manual, Volume 1: Essentials* and the *HP OpenVMS System Management Utilities Reference Manual: A-L*, and see the description of the INITIALIZE and BACKUP commands in the *HP OpenVMS DCL Dictionary*.

## F.4.5 Logging Out, Shutting Down, and Rebooting

After you complete the backup operation:

1. Enter the LOGOUT command to exit the DCL environment and return to the menu.
2. Choose the shutdown option (9).
3. After the shutdown completes, boot from the system disk.

## F.5 Restoring the System Disk

The following sections describe how to restore the system disk. Note that restoring a system disk also serves to defragment the disk. In addition, it validates the backup, ensuring that the backed up system disk is usable.

### F.5.1 Getting Started

Before you can restore the system disk, follow these steps:

1. Shut down the system.
2. Boot the operating system media. (For booting the OpenVMS Integrity servers OE DVD, see Section B.6 (page 213). For booting the OpenVMS Alpha CD, see Section A.1 (page 169).)
3. Choose the DCL option (8) on the menu. For example:

```
You can install or upgrade the OpenVMS I64 operating system
or you can install or upgrade layered products that are included
on the OpenVMS I64 distribution (CD/DVD).
```

```
You can also execute DCL commands and procedures to perform
"standalone" tasks, such as backing up the system disk.
```

Please choose one of the following:

- 1) Upgrade, install or reconfigure OpenVMS I64 Version 8.4
- 2) Display layered products that this procedure can install
- 3) Install or upgrade layered products
- 4) Show installed products
- 5) Reconfigure installed products
- 6) Remove installed products
- 7) Find, Install, or Undo patches; Show or Delete recovery data
- 8) Execute DCL commands and procedures
- 9) Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?) **8**

4. At the triple dollar sign prompt (\$\$\$), enter the SHOW DEVICES command.
5. Examine the list of devices to determine which device is the source drive (the drive holding the backed up files you want to restore) and which device is the target drive (the disk on which you want the files restored).

## F.5.2 Mounting Devices

After you determine the source drive and target drive, mount those devices (and any other output devices you plan to use) before you perform any restore operations. Enter the MOUNT commands in the following format:

```
$$$ MOUNT/OVERRIDE=IDENTIFICATION source-drive
$$$ MOUNT/FOREIGN target-drive
```

In these commands:

- *source-drive* is the device holding the files you want to restore  
(Note, however, that you must use the MOUNT/FOREIGN command if the source drive is a tape device.)
- *target-drive* is the destination

## F.5.3 Performing the System Disk Restore

Enter the BACKUP command in the following format to restore the system disk:

```
$$$ BACKUP/IMAGE/VERIFY source-drive: target-drive:
```

### Example 1

In this example, a backup disk and a target disk are mounted so the BACKUP command can restore the system disk from the backup disk:

```
$$$ MOUNT/OVERRIDE=IDENTIFICATION DKA300
$$$ MOUNT/FOREIGN DKA200
$$$ BACKUP/IMAGE/VERIFY DKA300: DKA200:
```

### Example 2

In this example, a backup tape and a target disk are mounted so the BACKUP command can restore the system disk from the backup tape:

```
$$$ MOUNT/FOREIGN MKA300
$$$ MOUNT/FOREIGN DKA200
$$$ BACKUP/IMAGE/VERIFY MKA300:SEP_08_BACKUP.BCK/SAVE_SET DKA200:
```

## F.5.4 Logging Out, Shutting Down, and Rebooting

After you complete the restore operation, follow these steps:

1. Enter the LOGOUT command to exit the DCL environment and return to the menu.
2. Choose the shutdown option (9).
3. After the shutdown completes, boot from the system disk.

## F.6 Alternative Backup and Restore Procedure (Minimum OpenVMS Environment)

This section describes an alternative method of performing backup and restore operations. This method is similar to creating a Standalone Backup directory on a disk, as supported by OpenVMS VAX systems and certain earlier versions of OpenVMS Alpha (using `SY$UPDATE.STABACKIT.COM`). Supported by both OpenVMS Alpha and Integrity server systems, this method installs a Minimum OpenVMS Environment (install with no options) on another disk from which you can perform your backup and restore operations on the system disk. The Minimum OpenVMS Environment is created in the SYSE root ([SYSE]) on the disk, which runs a subset of OpenVMS and is indicated by the triple dollar sign (\$\$\$) system prompt. Use this method under the following conditions:

- If you do not have access to the operating system media and its menu system
- If you want to back up a shadowed system disk without disabling the shadow set



**NOTE:** You can back up your running system disk by using the `/IGNORE=INTERLOCK` qualifier with the `BACKUP` command and ignoring warning messages. However, that method requires that all other use of the system be suspended, including disabling logins, stopping print and batch queues, and turning off networking software. In addition, you cannot use this method to restore files to the running system disk. Because of these limitations, HP recommends that, if you must use an alternative backup or restore method, you use the method described in this section.

### F.6.1 Preparing an Alternate System Disk

Prepare an alternate system disk as follows:

1. Log in to a privileged account on your running OpenVMS system.
2. Using the `SHOW DEVICE` command, identify a data disk on which you can install the operating system, with no options. This is your target disk during that installation. To install the operating system with no options on your target disk, you need the following amount of free disk space:
  - OpenVMS Alpha: approximately 5,21,552 blocks (267 MB)
  - OpenVMS Integrity servers: approximately 10,09,762 blocks (517 MB)

Existing data remains on the disk.

3. The target disk must be mounted privately to your process. (This prevents other users from accessing this disk during the installation and backup procedures.) Therefore, if the target disk was mounted with the `/SYSTEM`, `/CLUSTER`, `/GROUP`, or `/SHARE` qualifier, dismount that disk and mount it without those qualifiers or the `/FOREIGN` qualifier. For example:

```
$ MOUNT/OVERRIDE=IDENTIFICATION DKA200
```

4. For OpenVMS Integrity servers, enter the following command:

```
$ @SYS$SYSTEM:I64VMS$PCSI_INSTALL_MIN.COM [target-disk]
```

For OpenVMS Alpha, enter the following command:

```
$ @SYS$SYSTEM:AXPVMS$PCSI_INSTALL_MIN.COM [target-disk]
```

(The procedure prompts you for a device name if you do not specify it on the command line.)

5. As the procedure completes the installation, the display is similar to the following:

```
HP I64VMS OPENVMS V8.4: OpenVMS and related products platform

COPYRIGHT (c) ...
Hewlett-Packard Development Company, L.P.

Execution phase starting ...

The following product will be installed:
HP I64VMS VMS V8.4

Portion Done: 0%..10%..20%..30%..40%..50%..60%..70%..80%..90%..100%

The following product has been installed:
HP I64VMS VMS V8.4
.
.
.
The installation of minimum OpenVMS I64 is now complete.

Use EFI or the boot option you just created or validated (if any)
to boot minimum OpenVMS. If you use EFI remember to set VMS_FLAGS
to E,0 before booting, and to reset VMS_FLAGS to 0,0 (or as
required by your system).

BOOT -FLAGS E,0 device-name

(Some configurations may require a boot option to boot.)
```



---

**CAUTION:** If your system is a cluster member, HP recommends that you shut down the entire OpenVMS Cluster system before you back up your system disk. This will prevent you from creating a partitioned cluster and from jeopardizing the integrity of your data in any other way.

---

## F.6.2 Using the Alternate System Disk

Use the alternate system disk (on which you installed the operating system with no options) to perform backup and restore operations as follows:

1. Shut down your system.
2. Boot the alternate system disk from the SYSE root. For example, from an OpenVMS Alpha system, enter the following command:

```
>>> BOOT -FLAGS E,0 DKA 200
```

For OpenVMS Integrity server systems, you can add the alternate system disk as a boot option in the EFI Boot Manager menu by using the OpenVMS Integrity servers Boot Manager utility (SYS\$MANAGER:BOOT\_OPTIONS.COM), as described in [Section B.5.2 \(page 207\)](#). When prompted, set the flags as e,0. Alternatively, boot the alternate system disk manually by entering the following command at the EFI Shell prompt, where *fsn:* (such as *fs1:*) is the device associated with the system disk:

```
Shell> fsn:\efi\vms\vms_loader.efi -flags e,0
```

The system automatically logs you in to the SYSTEM account and then displays a triple dollar sign prompt (\$\$\$).



**NOTE:** During the boot and login operations on this minimum version of the operating system, you can ignore license messages that are similar to the following:

```
%LICENSE-I-NOLICENSE, no license is active for this software product
```

---

3. If your system disk is shadowed, install and load a Volume Shadowing for OpenVMS license on this data disk. Then you can back up the shadowed system disk from this data disk without disabling the shadow set.
- 



**NOTE:** HP recommends that you do *not* install any other licenses, including OpenVMS licenses, on this alternate system. You can use the system only from the console.

---

4. Mount the system disk and any output devices you plan to use during the backup or restore operations. See Section F.5.2 (page 308) for more information.
5. Perform the necessary backup or restore operations by entering the appropriate BACKUP commands. For examples of using the BACKUP command to back up the system disk, see Section F.4.3 (page 306); for examples of using the BACKUP command to restore the system disk, see Section F.5.3 (page 308).
6. Shut down the system.
7. Boot from your original system disk.



# G Installing the OpenVMS Internationalization Data Kit

The OpenVMS internationalization data kit (VMSI18N kit) provides locale data and iconv code converters for international software, utilities, and HP C international run-time routines.

The HP C RTL provides capabilities to allow application developers to create international software. The HP C RTL obtains information about a language and a culture by reading this information from locale files. This kit contains all of the supported locale files.

The kit also contains a set of Unicode codeset converters that allows conversion between any supported codeset (including DEC Multinational Character Set and Microsoft Code Page 437) to any Unicode encoding (UCS-2, UCS-4, or UTF-8).

If you are using these C RTL capabilities, you must install the VMSI18N kit on your system. This kit is provided on the OpenVMS media set as your OpenVMS kit. For the location of this kit, see the *HP OpenVMS Version 8.4 Release Notes*.

Prior to installation, review the release notes for the VMSI18N kit.

To install this save set, follow the standard OpenVMS installation procedures. Use VMSI18N as the name of the kit. In the following example, *dev* is the device name and *dir* is the directory location of the kit.

```
$ PRODUCT INSTALL VMSI18N /SOURCE=dev:[dir]
```

You can install any of the following categories of locales:

- European and U.S.
- Japanese
- Korean
- Thai
- Chinese
- Unicode

In the following installation example, the European and U.S., Japanese, and Unicode support options are selected.

```
$ PRODUCT INSTALL VMSI18N /SOURCE=DKB200:[VMSI18N_I64084.KIT]
```

```
The following product has been selected:
HP I64VMS VMSI18N V8.4 Layered Product
```

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

```
Configuration phase starting ...
```

```
You will be asked to choose options, if any, for each selected product and for
any products that may be installed to satisfy software dependency requirements.
```

```
HP I64VMS VMSI18N V8.4
```

```
Do you want the defaults for all options? [YES] NO
European and U.S. support [YES] YES
Japanese support [YES] YES
Korean support [YES] NO
Thai support [YES] NO
Chinese support [YES] NO
Unicode support [YES] YES
```

```
Do you want to review the options? [NO] NO
```

```
Execution phase starting ...
```

```
The following product will be installed to destination:
HP I64VMS VMSI18N V8.4 DISK$I64SYS:[VMS$COMMON.]
```

```
Portion done: 0%...10%...20%...30%...40%...50%...60%...70%...80%...90%...100%
```

```
The following product has been installed:
HP I64VMS VMSI18N V8.4 Layered Product
```



---

# H Preparing to Use OpenVMS Management Station

This appendix explains how to prepare your OpenVMS system to run the OpenVMS Management Station server software and how to prepare your PC to run the OpenVMS Management Station client software. This appendix also includes other related information.

OpenVMS Management Station is a powerful Microsoft Windows based management tool for system managers and others who perform management tasks on OpenVMS systems. It allows system managers to organize the systems they need to manage in ways that are meaningful to them and their environment. OpenVMS Management Station provides a comprehensive user interface that allows system managers to manage OpenVMS user accounts, printers, and storage on those systems and across multiple systems. For example, if you have an account on three different OpenVMS Cluster systems, OpenVMS Management Station allows you to easily update a process quota, add a privilege, and so forth, for each instance of the account.



**NOTE:** If you have HP SIM, use HP SIM for installing and upgrading OpenVMS on one or more Integrity servers. Use OpenVMS Management Station for the purposes described in this appendix.

---

OpenVMS Management Station consists of the client software, which is installed on a PC from which all management operations are performed, and the server software, which is installed on any OpenVMS system that is to be managed.

During the OpenVMS installation or upgrade procedure, the OpenVMS Management Station server software is automatically installed on your OpenVMS system disk.

You can download the PC client file from the following website:

<http://www.hp.com/go/openvms/argus>

If the TNT\$\* server files have been deleted from SYS\$SYSTEM, you can recover the server files by reinstalling the OpenVMS operating system or by downloading and installing the appropriate kit from this website.

After you ensure that OpenVMS Management Station software is installed on your system, perform the procedures described in this appendix.

## H.1 Preparing Your OpenVMS System

You must prepare your OpenVMS system to run the server software so that your system can properly interact with the PC running the client software. The procedures include the following:

- Set up in a mixed-architecture cluster environment (if applicable).
- Start the server on other nodes.
- Update the printer and storage database.
- Edit the system files.
- Allow OpenVMS Management Station to control the printer and storage environment.
- Keep your printer environment up to date.
- Check if running third-party TCP/IP stacks.
- Determine and report problems.

### H.1.1 Setting Up in a Mixed-Architecture Cluster Environment

The OpenVMS Management Station server creates several configuration files:

- TNT\$UADB.DAT
- TNT\$ACS.DAT
- TNT\$JOURNAL.TNT\$TRANSACTION\_JOURNAL
- TNT\$MONITOR.DAT
- TNT\$MONITOR.TNT\$MONITOR\_JOURNAL
- TNT\$EMERGENCY\_MOUNT.COM

In a common-environment cluster with one common system disk, you use a common copy of each of these files located in the SYS\$COMMON:[SYSEXE] directory on the common system disk, or on a disk that is mounted by all cluster nodes. No further action is required.

However, to prepare a common user environment for an OpenVMS Cluster system that includes more than one common system disk, you must coordinate the files on those disks.

The following rules apply:

- Disks holding common resources must be mounted early in the system startup procedure, such as in the SYLOGICALS.COM procedure.
- You must ensure that the disks are mounted with each cluster reboot.

Follow these steps to coordinate files:

1. Decide where to locate the files. In a cluster with multiple system disks, system management is much easier if the common system files are located on a single disk that is not a system disk.
2. Copy the following files from SYS\$COMMON:[SYSEXE] to a directory on a disk other than the system disk:
  - TNT\$UADB.DAT
  - TNT\$ACS.DAT
  - TNT\$MONITOR.DAT
  - TNT\$MONITOR.TNT\$MONITOR\_JOURNAL
  - TNT\$EMERGENCY\_MOUNT.COM
  - TNT\$JOURNAL.TNT\$TRANSACTION\_JOURNAL
3. Edit the file SYS\$COMMON:[SYSMGR]SYLOGICALS.COM *on each system disk* and define logical names that specify the location of the cluster common files.

### Example

To place the files on \$1\$DJA15, define logical names as follows:

```
$ DEFINE/SYSTEM/EXEC TNT$ACS -
_ $ 1DJA15: [VMS$COMMON.SYSEXE] TNT$ACS.DAT
```

TNT\$EMERGENCY\_MOUNT.COM is created in SYS\$SYSTEM or in the directory pointed to by the TNT\$ACS logical, if the logical exists.

```
$ DEFINE/SYSTEM/EXEC TNT$UADB -
_ $ 1DJA15: [VMS$COMMON.SYSEXE] TNT$UADB.DAT
```

```
$ DEFINE/SYSTEM/EXEC TNT$JOURNAL -
_ $ 1DJA15: [VMS$COMMON.SYSEXE] TNT$JOURNAL.TNT$TRANSACTION_JOURNAL
```

```
$ DEFINE/SYSTEM/EXEC TNT$MONITOR -
_ $ 1DJA15: [VMS$COMMON.SYSEXE] TNT$MONITOR.DAT
```

```
$ DEFINE/SYSTEM/EXEC TNT$MONITORJOURNAL -
_ $ 1DJA15: [VMS$COMMON.SYSEXE] TNT$MONITOR.TNT$MONITOR_JOURNAL
```

4. To ensure that the system disks are mounted correctly with each reboot, follow these steps:
  - a. Copy the SYS\$EXAMPLES:CLU\_MOUNT\_DISK.COM file to the [VMS\$COMMON.SYSMGR] directory, and edit the file for your configuration.
  - b. Edit SYLOGICALS.COM and include commands to mount, with the appropriate volume label, the system disk containing the shared files.

### Example

If the system disk is \$1\$DJA16, include the following command:

```
$ @SYS$SYSDEVICE: [VMS$COMMON.SYSMGR] CLU_MOUNT_DISK.COM -
_ $ 1DJA16: volume-label
```

## H.1.2 Starting the Server on Other Nodes

If you plan to run OpenVMS Management Station on more than one node in an OpenVMS Cluster without rebooting, you need to start the software on those nodes.

Use SYSMAN to start the server as follows:

```
$ @SYS$STARTUP:TNT$STARTUP.COM
```

Or you can log in to each node that shares the SYS\$COMMON: directory and enter the following command:

```
$ @SYS$STARTUP:TNT$STARTUP.COM
```

If you are performing an upgrade or a reinstallation and OpenVMS Management Station is already running on the node, add the RESTART parameter to the startup command, as follows:

```
$ @SYS$STARTUP:TNT$STARTUP.COM RESTART
```

## H.1.3 Error Log Information

OpenVMS Management Station writes error log information to the file TNT\$SERVER\_ERROR.LOG. This error log is created in the SYS\$SPECIFIC:[SYSEXE] directory. If you start the OpenVMS Management Station server on multiple nodes in a cluster, which is recommended, multiple server error logs are generated.

## H.1.4 Updating the Printer and Storage Database

When you install OpenVMS Management Station, the installation starts the OpenVMS Management Station server on the installation node. If this installation is an upgrade, the server converts the existing OpenVMS Management Station database to the latest V3.\* format. If this is a new installation, the server creates an initial version of the database file TNT\$ACS.DAT and starts the update functions automatically.

To complete the database, start the OpenVMS Management Station server on each node in your cluster. The instances of the server communicate with each other to determine device, queue, and volume information, and the server must be running on each node for this communication to take place.

## H.1.5 Editing the System Files

To start the OpenVMS Management Station server from your system startup files, insert one of the following commands into your system startup procedures (probably SYS\$MANAGER:SYSTARTUP\_VMS.COM) after both the Queue Manager and network are started but immediately before the ENABLE AUTOSTART/QUEUES command.



**NOTE:** Remove any other invocations of TNT\$STARTUP you might have added in previous releases of the OpenVMS Management Station.

OpenVMS Management Station cannot start until the network has started. If you start your network using a batch process, OpenVMS Management Station might start before the batch process completes and the network is started.

| Command       | Parameter 1 | Parameter 2 | Description                                                                                                                                                                        |
|---------------|-------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| @TNT\$STARTUP | blank       | n/a         | Starts the server. Does not start printer queues or mount volumes.                                                                                                                 |
| @TNT\$STARTUP | RESTART     | n/a         | Shuts down a running server, then starts the server. Does not start printer queues or mount volumes.                                                                               |
| @TNT\$STARTUP | BOOT        | blank       | Starts the server. Starts any printer queues that are not yet started and are managed by OpenVMS Management Station. Does not mount volumes managed by OpenVMS Management Station. |

| Command       | Parameter 1 | Parameter 2 | Description                                                                                                                                                                                                     |
|---------------|-------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| @TNT\$STARTUP | BOOT        | ALL         | Starts the server. Starts any printer queues that are not yet started and are managed by OpenVMS Management Station. Mounts any volumes that are not yet mounted and are managed by OpenVMS Management Station. |
| @TNT\$STARTUP | BOOT        | PRINTERS    | Starts the server. Starts any printer queues that are not yet started and are managed by OpenVMS Management Station. Does not mount volumes managed by OpenVMS Management Station.                              |
| @TNT\$STARTUP | BOOT        | STORAGE     | Starts the server. Mounts any volumes that are not yet mounted and are managed by OpenVMS Management Station. Does not start any printer queues.                                                                |

The effect of TNT\$STARTUP BOOT, with no second parameter, has not changed from earlier releases. This command starts any printer queues that are not yet started and are managed by OpenVMS Management Station, but it does not mount any volumes.

Add the following command line to the system shutdown file,  
SYS\$MANAGER:SYSHUTDOWN.COM:

```
$ @SYS$STARTUP:TNT$SHUTDOWN.COM
```

## H.1.6 Controlling the Printer and Storage Environment

It is not necessary to remove your existing queue startup and volume mount DCL procedures immediately. The OpenVMS Management Station server recognizes that you started a queue or mounted a volume with your command procedures and assumes that you want it that way.

As you become familiar with the server's management ability, you can remove or comment out the DCL commands and procedures that perform these tasks and allow OpenVMS Management Station to control your printer and storage environment.

In addition, the OpenVMS Management Station server periodically (every 24 hours) generates a DCL command procedure that includes the commands to mount all of the volumes managed by OpenVMS Management Station. If you are familiar with DCL, you can look at this command procedure to see what actions OpenVMS Management Station performs for you. In the event of an unforeseen system problem or a corrupt server database (SYS\$SYSTEM:TNT\$ACS.DAT), you can use this command procedure to mount the volumes.

The name of the generated file is TNT\$EMERGENCY\_MOUNT.COM.

TNT\$EMERGENCY\_MOUNT.COM is created in SYS\$SYSTEM or in the directory pointed to by the TNT\$ACS logical, if that logical name exists.

The OpenVMS Management Station server limits TNT\$EMERGENCY\_MOUNT.COM to seven versions.

## H.1.7 Keeping Your Printer Environment Up to Date

The OpenVMS Management Station server installation creates a file named SYS\$STARTUP:TNT\$UTILITY.COM. This command procedure scans the OpenVMS system and updates the database of known printers, queues, and related devices.

### H.1.7.1 When Is the Database Updated?

The database is updated:

- As part of the OpenVMS Management Station installation.
- When you specifically start TNT\$UTILITY.COM.
- At periodic intervals as a server background thread. Two logical names control how often this server thread runs:

| Logical Name                    | Description                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TNT\$PRINTER_RECON_INTERVAL     | How often the thread should run, in minutes, from when the server was last started on this node. If you do not define this logical, the default value is 1440 minutes (24 hours).                                 |
| TNT\$PRINTER_RECON_INTERVAL_MIN | The minimum number of minutes that must elapse before the thread should run again, starting from when the database was last updated. If you do not define this logical, the default value is 60 minutes (1 hour). |

You can think of these logicals as meaning “run the thread this often (TNT\$PRINTER\_RECON\_INTERVAL), but make sure this much time has elapsed since the database was last updated (TNT\$PRINTER\_RECON\_INTERVAL\_MIN).”

Because you can run TNT\$UTILITY.COM yourself, and because the OpenVMS Management Station server also updates the database, the TNT\$PRINTER\_RECON\_INTERVAL\_MIN logical prevents the database from being updated more frequently than is actually needed.

If you want to change the defaults for one of these logicals, define the logical on all nodes on which the OpenVMS Management Station server is running.

### H.1.7.2 Do You Need to Run TNT\$UTILITY.COM Manually?

If you use OpenVMS Management Station to make all of the changes to your printer configuration, the configuration files are immediately modified to reflect the changes and you probably do not need to specifically run the TNT\$UTILITY.COM procedure.

However, if you or someone else uses DCL to make a change—for example, if you use the DELETE /QUEUE command to delete a queue—the configuration files are not synchronized. In this case, the OpenVMS Management Station client tells you to run the TNT\$UTILITY.COM procedure to resynchronize the database.

Run the following procedure on one node in the cluster to make the database match your system:

```
$ @SYS$STARTUP:TNT$UTILITY.COM UPDATE PRINTERS
```

For example, if you or someone else uses DCL to delete a queue, you need to delete that queue from the database. The TNT\$UTILITY.COM procedure assumes that your system is set up and running the way that you want it to, so you should fix any problems before you run TNT\$UTILITY.COM.

### H.1.7.3 What Are the Requirements for Running TNT\$UTILITY.COM?

You need the SYSNAM privilege to run TNT\$UTILITY.COM.

The TNT\$UTILITY.COM procedure connects to the OpenVMS Management Station server on the current OpenVMS system to determine device and queue information. Therefore, the OpenVMS Management Station server must be running on the node where you run TNT\$UTILITY.COM.

The OpenVMS Management Station server then connects to the other OpenVMS Management Station servers in the OpenVMS Cluster to determine device and queue information. It is generally a good idea to keep the OpenVMS Management Station server running on the other nodes in an OpenVMS Cluster to keep the database up to the minute.

However, if the OpenVMS Management Server is not able to connect to the OpenVMS Management Station server on a given node, it uses the known information about that OpenVMS

node from the database. That is, in the absence of a valid connection to that OpenVMS node, the information in the database is assumed to be correct.

## H.1.8 Keeping Your Storage Environment Up to Date

The TNT\$UTILITY.COM utility accepts parameters (UPDATE STORAGE) to update the storage database. However, the storage database is updated dynamically every time you use the OpenVMS Management Station client to perform a storage management operation. Therefore, you do not need to run TNT\$UTILITY.COM to update the storage database.

## H.1.9 Enabling Disk Quotas

Before installing OpenVMS Management Station, you might have disabled disk quotas on the SYSTEM disk. If so, reenable the quotas and then rebuild to update quota information by entering the following commands:

```
$ RUN SYS$SYSTEM:DISKQUOTA
DISKQUOTA> ENABLE
DISKQUOTA> REBUILD
DISKQUOTA> EXIT
```

## H.1.10 Caching Storage Configuration Data

OpenVMS Management Station uses two logical names to determine how often to refresh cached (in-memory) storage configuration data.

- TNT\$PURGE\_CYCLE\_LATENCY—Determines how often (in seconds) to wait after purging stale device reports before purging again. This value affects how frequently the clusterwide data (maintained by a master server) is updated in memory.

```
min = 180
default = 1800 (30 minutes)
max = 18000 (5 hours)
```

- TNT\$LOCAL\_SURVEY\_LATENCY—Determines the delay (in seconds) from one node-specific device survey to the next. This value is independent of clusterwide surveys requested by the master server when performing a purge.

```
min = 6
default = 60 (1 minute)
max = 600 (10 minutes)
```

For both logical names, smaller values result in the OpenVMS Management Station server consuming more CPU cycles in periodic purges or surveys.

If you do not accept the defaults, you might find that larger OpenVMS Cluster systems perform better with values on the high end of the allowed range.

If you do not define these logicals, the OpenVMS Management Station server uses the default values. If you do define these logical names, the values are used only if they are within the accepted range.

## H.1.11 Running Third-Party TCP/IP Stacks

TCP/IP Services for OpenVMS Version 5.7 is the only supported TCP/IP stack. Additional stacks have not been tested. However, TCP/IP stacks that are 100 percent compliant with the QIO interface for TCP/IP Services for OpenVMS should also work. (Contact your TCP/IP vendor for additional information and support issues.)

For the best chance of success, check the following:

- Make sure that the QIO service (for example, UCXQIO) is enabled.
- For TCPware (from Process Software Corporation), also make sure that the TCPware UCX\$IPC\_SHR.EXE is an installed image.
- Also for TCPware, make sure you are running a version of TCPware that correctly implements a DEC C-compatible socket interface.

## H.1.12 Determining and Reporting Problems

If you encounter a problem while using OpenVMS Management Station, please report it to HP. Depending on the nature of the problem and the type of support contract you have, you can take one of the following actions:

- If your software contract or warranty agreement entitles you to telephone support, call HP.
- If the problem is related to OpenVMS Management Station documentation, use the Internet address listed in the preface of this manual to send us your comments.

## H.1.13 Removing the OpenVMS Management Station Server

When you execute the OpenVMS installation or upgrade procedure, the OpenVMS Management Station server software is automatically installed on your OpenVMS system disk. If this server software is later reinstalled using another kit (for example, a kit downloaded from the web or a patch kit), you have the option to remove OpenVMS Management Station. If you use the PCSI utility to remove OpenVMS Management Station from the OpenVMS system, the following files are not removed:

- TNT\$ACS.DAT
- TNT\$JOURNAL.TNT\$TRANSACTION\_JOURNAL
- TNT\$SERVER\_ERROR.LOG
- TNT\$UADB.DAT
- TNT\$EMERGENCY\_MOUNT.COM

Do not delete these files unless you have already removed OpenVMS Management Station.

## H.2 Preparing Your PC

During the OpenVMS installation or upgrade procedure, you selected the OpenVMS Management Station client software files to be installed on your OpenVMS system disk (or you added them later using the DCL command `PRODUCT INSTALL TNT`). After you prepare your OpenVMS system to run the server software, you must prepare your PC to run the client software.

### H.2.1 Required Memory and Disk Space

Your PC requires 20 MB of free disk space to install the OpenVMS Management Station client software.

### H.2.2 Distribution Files

The OpenVMS Management Station client kit, TNT032-D.EXE for Intel systems (Microsoft Windows 2000 and Windows XP), can be downloaded from the following website:

<http://www.hp.com/go/openvms/argus>

### H.2.3 Required Software

Microsoft Windows 2000 or Windows XP must be installed on each PC on which you want to install the OpenVMS Management Station client.

The version of the Microsoft Management Console (MMC) included in this baselevel requires files provided by Microsoft Internet Explorer, Version 3.02 or later, which must be present on the system.

### H.2.4 Time Required for Installation

The time required to install the OpenVMS Management Station client software is approximately 5 minutes.

### H.2.5 Copying the Client File to the PC

The client file TNT032-D.EXE can be downloaded from the following website:

<http://www.hp.com/go/openvms/argus>

Copy the client file to a temporary directory on the PC using either of the following procedures:

- Create a file share to the OpenVMS system and copy the file.
- Use FTP on the PC to copy the file from the OpenVMS system.

## H.2.6 Installation Directory

The installation procedure allows you to select the installation directory and suggests `\Program Files\OpenVMS Mgmt Station\` as the default.

## H.2.7 Installation Procedure

Run the `TNT032-D.EXE` file from a temporary directory. This is a self-extracting executable file that automates the OpenVMS Management Station installation.

## H.2.8 Recovering from Errors

If an error occurs during installation, you will receive an error message describing the problem. This information can help you determine the cause of the problem. An error can occur during the installation if one or more of the following conditions exist:

- The operating system version is incorrect.
- Disk space and memory necessary for successful installation are inadequate.

## H.3 After Installing the Client Software on Your PC

When you create an OpenVMS Cluster or OpenVMS Node object in an OpenVMS Management Domain, you select the transport you want to use for all connections to that system. You can choose DECnet Phase IV for OpenVMS or TCP/IP.

OpenVMS Management Station uses this transport for all communications between the PC and this system, or between any other OpenVMS system that is running the OpenVMS Management Station server and this system.



**NOTE:** For primary servers, the OpenVMS Management Station client supports only TCP/IP connections. That is, the connection between the PC and the OpenVMS system uses only TCP/IP. Therefore, at least one OpenVMS system *must* be running TCP/IP.

---

You do need to make sure that your PC can connect to the primary-server systems, as described in the following sections. OpenVMS Management Station connects your PC to the primary-server system and then routes management operations to the target systems.

## H.4 Defining TCP/IP Nodes

Your hosts file or name server must be able to resolve the IP name or address of all primary-server systems. If you can successfully ping the primary-server systems from your PC, then this condition is met.

## H.5 Removing Version 2.1 of the OpenVMS Management Station Client

Version 3.2 (or later) of the OpenVMS Management Station client is not dependent on Version 2.1 and does not share any files with this earlier version. After installing the Version 3.2 (or later) client, you can remove the Version 2.1 client software.

## H.6 Removing OpenVMS Management Station

If you need to remove the OpenVMS Management Station client software, make sure you first exit OpenVMS Management Station. The removal process fails if OpenVMS Management Station is running.

If you run the OpenVMS Management Station Help, the following files might be created:

- `VMSMGMT.FTS`
- `VMSMGMT.GID`

- VMSPRINT.FTS
- VMSPRINT.GID
- VMSSCOPE.FTS
- VMSSCOPE.GID
- VMSSTORE.FTS
- VMSSTORE.GID
- VMSACNT.FTS
- VMSACNT.GID

The OpenVMS Management Station Uninstall program does not delete these files. To complete the removal:

1. Delete these files.
2. Delete the OpenVMS Management Station directory.

The OpenVMS Management Station Uninstall program does not remove the MMC support files.

## H.7 Getting Started with OpenVMS Management Station

All information about getting started, setting up, and using OpenVMS Management Station is contained in online help and the *HP OpenVMS Management Station Overview and Release Notes*.



---

# I Removing the OpenVMS Operating System

This appendix explains how to remove the OpenVMS operating system from your disk.

You can remove the OpenVMS operating system from your disk in the following ways:

- If the disk contains a small number of user files, copy those user files elsewhere and then reinitialize the disk.
- If the disk contains many user files, use the `PRODUCT REMOVE` command to remove an obsolete or extra copy of the OpenVMS operating system without removing any of the user files. You must also delete or archive certain operating system files that the `PRODUCT REMOVE` command cannot delete.



**NOTE:** For systems supporting the Instant Capacity feature, CPU status (how many cores are available and how much time they have remaining) is not affected by removal of the operating system from your disk. Such information is stored in NVRAM on the Integrity servers.

---

Follow these steps to remove OpenVMS operating system files:

1. If your system disk has multiple system-specific roots, boot the system and execute `SYS$MANAGER:CLUSTER_CONFIG.COM` (on OpenVMS Alpha systems) or `SYS$MANAGER:CLUSTER_CONFIG_LAN.COM` (on OpenVMS Integrity server systems) to remove all roots except the one from which you are booted.
2. Shut down and boot from the distribution media or from a system disk other than the one from which OpenVMS is being removed. Then do one of the following:
  - If OpenVMS is not running from the distribution media, log in to a privileged account.
  - If OpenVMS is running from the distribution media, choose the option to execute DCL commands.

3. Enter the following DCL commands:

```
$ DEFINE/NOLOG PCSI$SYSDEVICE target-disk
$ DEFINE/NOLOG PCSI$SPECIFIC target-disk: [SYSx.]
$ DEFINE/NOLOG PCSI$DESTINATION target-disk: [VMS$COMMON]
```

where:

- *target-disk* is the device name of the disk from which OpenVMS is being removed.
  - *SYSx* is the root number that you did not remove in step 1.
4. If the disk also contains layered products that were installed using the PCSI utility, HP recommends that you remove them as well. Remove any layered products *before* using the `PRODUCT REMOVE VMS` command.

Use the following command to remove all the products at once. Select the layered products you want to remove from the menu.

```
$ PRODUCT REMOVE * /REMOTE
```

Use the following commands to remove individual products:

```
$ PRODUCT SHOW PRODUCT/REMOTE
$ PRODUCT REMOVE product-name /REMOTE
```

5. Enter the following DCL command:

```
$ PRODUCT REMOVE VMS /REMOTE
```

6. Because the PRODUCT REMOVE command does not delete certain files, review the target disk to determine whether you want to delete, move, or archive the operating system files that still remain on the disk.

Following are lists of the files that the PRODUCT REMOVE command does not delete:

- In *target-disk*:`[SYS*.SYSEXE]`, where \* is the hexadecimal number of any additional OpenVMS Cluster root on the target disk:
  - IA64VMSSYS.PAR (OpenVMS Integrity server systems)
  - ALPHAVMSSYS.PAR (OpenVMS Alpha systems)
  - MODPARAMS.DAT
  - PAGEFILE.SYS
  - SWAPFILE.SYS
- In *target-disk*:`[VMS$COMMON.SYSEXE]`:
  - LMF\$LICENSE.LDB
  - PCSI\$FILE\_SYSTEM.PCSI\$DATABASE
  - PCSI\$PROCESSOR.PCSI\$DATABASE
  - PCSI\$ROOT.PCSI\$DATABASE
  - RIGHTSLIST.DAT
  - SYSUAF.DAT

As you examine the preceding lists of files, you might want to archive, rather than delete, the following files:

- IA64VMSSYS.PAR (OpenVMS Integrity server systems)
- ALPHAVMSSYS.PAR (OpenVMS Alpha systems)
- MODPARAMS.DAT
- LMF\$LICENSE.LDB
- RIGHTSLIST.DAT
- SYSUAF.DAT

Also, if you previously removed layered products, those products might have created additional files that you might want to delete, move, or archive.

7. Review the target disk for the directory structures `[VMS$COMMON...]` and `[SYSx...]` that remain after you remove the OpenVMS operating system. You might want to delete these directories.

The directories `[SYSx]SYSCOMMON.DIR` (in all `[SYSx]`) are aliases for the file `[000000]VMS$COMMON.DIR`. Do not delete these `SYSCOMMON.DIR` files. Instead, use the SET FILE /REMOVE command as follows:

```
$ SET FILE /REMOVE [SYS*]SYSCOMMON.DIR
```

After you execute this command and delete, move or archive all the files in `[VMS$COMMON...]`, you can delete `[000000]VMS$COMMON.DIR`. Then you can delete, move, or archive the files in each `[SYSx]` directory.

---

# J Alternative Ways to Initialize the System Disk

The usual way to create a new OpenVMS system disk is to install OpenVMS with the INITIALIZE option. When you do this, the installation process responds as follows:

- On OpenVMS Integrity server systems only, a diagnostic partition is created.  
The diagnostic partition is visible only from the console; it corresponds to the contents of `SYSS$MAINTENANCE:SYS$DIAGNOSTICS.SYS` on the system disk. The partition is intended and reserved for use by HP Services (it is used with the HP IPF Offline Diagnostics and Utilities CD provided with the purchase of your Integrity servers). For more information about offline diagnostics, see your hardware documentation and the following website:  
<http://docs.hp.com/hpux/diag>  
HP recommends creating the system disk with this partition and not removing it. However, it is not required for operation of OpenVMS.  
If you do not want the diagnostic partition, you can prevent its creation by initializing the disk before installing OpenVMS, performing the steps in Section J.1 (page 327). Alternatively, if you have already created the system disk and the partition, you can remove it by performing the steps in Section J.2 (page 328).
- The disk is initialized with volume expansion (INITIALIZE/LIMIT).  
This method of initialization (using the /LIMIT qualifier) might make your target system disk incompatible with versions of OpenVMS prior to 7.2. HP recommends that you create your system disk in the default manner unless you need to mount the disk on a version of OpenVMS prior to 7.2.  
You can avoid use of the /LIMIT qualifier by initializing your target system disk before you install OpenVMS, performing the steps in Section J.1 (page 327). As a result of this alternate method, your new system disk might include a relatively large minimum allocation size (as defined by /CLUSTER\_SIZE). Small files will use more space than would be used otherwise. Therefore, perform these steps *only* for system disks that must be mounted on versions of OpenVMS prior to Version 7.2.

## J.1 Alternative Method of Initialization

Use the following initialization method to avoid use of the /LIMIT qualifier or, for OpenVMS Integrity servers, to prevent creation of the diagnostic partition.



**NOTE:** When you initialize your target disk using the following method, you must use the PRESERVE option during the installation of OpenVMS on the disk. If you use the INITIALIZE option, the disk is reinitialized using the defaults.

---

1. After booting the operating system media, and before installing the operating system, select option 8 (“Execute DCL commands and procedures”) on the main menu.
2. Initialize the intended target disk with the following command:

```
$ INITIALIZE /SYSTEM /HEADERS=150000 /STRUCTURE=ods-level target-disk target-label
```

where:

- *ods-level* is 2 (for ODS-2) or 5 (for ODS-5).
- *target-disk* is the device for the target disk (such as DKA100:).
- *target-label* is the label for the target disk (you can change the label later).

If you specified ODS-5 and you want support for hard links, include the /VOLUME\_CHARACTERISTICS=HARDLINKS qualifier with the INITIALIZE command.

If you are using this method of initialization to prevent creation of a diagnostic partition, and you do not intend to mount the disk on an OpenVMS system prior to version 7.2, include the /LIMIT qualifier with the INITIALIZE command. If you do not use the /LIMIT qualifier, your new system disk might be initialized with a relatively large minimum allocation size. This can cause small files to use more space than necessary.

3. Exit DCL (log off), and then select option 1 (“Upgrade, install or reconfigure OpenVMS”) on the main menu.
4. When you are asked whether to initialize or preserve the target disk, choose PRESERVE (the default).
5. Continue with the installation.

## J.2 Removing the Diagnostic Partition File (Integrity servers only)

To remove the diagnostic partition on an OpenVMS Integrity servers system disk and to recover the disk space occupied, delete the file `SY$MAINTENANCE:SY$DIAGNOSTICS.SYS` and then reset the boot block. This file can contain hardware diagnostics but is not essential for operations. To delete the file, enter the following command:

```
$ DELETE SY$MAINTENANCE:SY$DIAGNOSTICS.SYS;*/LOG
```

Reset the boot block by entering the `SET BOOTBLOCK` command at the DCL prompt, as in the following example, where *target-disk* is the device on which your target system disk is mounted:

```
$ SET BOOTBLOCK /PRESERVE=SIGNATURE target-disk: [VMS$COMMON.SY$LDR] SY$EFI.SYS
```

---

# Glossary

This glossary defines key terms in the context of an OpenVMS computing environment.

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Advanced Server for OpenVMS</b>     | Supported on OpenVMS Alpha systems only, an OpenVMS-based network operating system compatible with Microsoft networking technology. Allows OpenVMS systems to be file and print servers for Windows desktop users. These users can use Microsoft products and utilities such as Windows Explorer to access file and print resources. Also provides a flexible system for network administration and security. This product supports OpenVMS ODS-5 disk volumes and Extended File Specifications.<br><i>See also</i> PATHWORKS for Advanced Server (OpenVMS).                             |
| <b>Availability Manager</b>            | A system management tool that enables the system manager to monitor one or more OpenVMS nodes on an extended LAN from an OpenVMS, Windows 2000, or Windows XP system. Availability Manager helps system managers and analysts target a specific node for analysis. The tool collects system and process data from multiple nodes simultaneously; it analyzes the data and displays the output. The Availability Manager (base) software installed with OpenVMS provides the data collection components that allow the system to be monitored by the Availability Manager and by DECamsd. |
| <b>AVIO</b>                            | Accelerated Virtual Input/Output. An I/O protocol that improves virtual I/O performance for network and storage devices used within the Integrity VM environment. The protocol also enables support for a greater number of virtual I/O devices per guest. Special drivers are required on both the VM Host and guests. Participating guests must include a virtual I/O device configured to use the AVIO protocol.                                                                                                                                                                      |
| <b>backing store</b>                   | The physical device on the VM Host that is allocated to guests, such as a network adapter, disk, or file.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Base Operating Environment</b>      | <i>See</i> BOE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Baseboard Management Controller</b> | <i>See</i> BMC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>BIB</b>                             | Boot-is-blocked. The state of a cell (on cell-based Integrity servers) that is powered on but not allowed to boot. When all cells assigned to an nPartition are at the BIB state, the nPartition is inactive and no software can run on the nPartition until it is manually booted past BIB.<br><i>See also</i> cell, nPartition.                                                                                                                                                                                                                                                        |
| <b>BladeSystem</b>                     | HP BladeSystem is comprised of blade compute nodes, integrated connectivity to data and storage networks, and shared power subsystems.<br><i>See also</i> BladeSystem enclosure, server blades.                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>BladeSystem enclosure</b>           | Hardware solution for consolidating server blades and all supporting infrastructure elements (such as storage, network, and power) into a single unit.<br><i>See also</i> BladeSystem, server blades.                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>BMC</b>                             | Baseboard Management Controller. A utility provided with HP Integrity servers that allows you to control some management features built into the system board, such as diagnostics, configuration, and hardware management. It enables you to interact with the Extensible Firmware Interface (EFI) and to boot the OpenVMS operating system.<br><i>See also</i> EFI, MP.                                                                                                                                                                                                                |
| <b>BOE</b>                             | Base Operating Environment. The tier of the Operating Environment for OpenVMS for Integrity servers that offers the base operating system and networking transport products. The contents of this tier are contained in each of the other, higher-level tiers.<br><i>See also</i> DCOE, OE.                                                                                                                                                                                                                                                                                              |
| <b>boot</b>                            | The process of loading system software into a processor's main memory. This guide uses the term <i>boot</i> to refer to this process.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>boot server</b>                     | A boot server downloads the system software required by a client system. A TCP boot server (TCP/IP Services for OpenVMS BOOTP server) is the host that centralizes configuration and management of an IP address database, such as is used for OpenVMS InfoServer client booting                                                                                                                                                                                                                                                                                                         |

and satellite booting. For satellite booting, the boot server is part of an OpenVMS Cluster; it includes either a MOP server (for OpenVMS Alpha systems) or a BOOTP/TFTP server (for OpenVMS Integrity server systems), and a disk server for the satellite system disk.  
*See also* InfoServer, satellite node.

- bootstrap** *See* boot.
- CDSA** Common Data Security Architecture. A multiplatform, Open Source security infrastructure. CDSA provides a stable, standards-based programming interface that enables applications to access operating system security services. With CDSA, you can create cross-platform, security-enabled applications. Beginning with Version 2.2, CDSA includes support of Secure Delivery and HRS (Human Recognition Service Standard). CDSA is automatically installed with the operating system. For more information about CDSA, see the *HP Open Source Security for OpenVMS, Volume 1: Common Data Security Architecture* manual.  
*See also* Secure Delivery, HRS.
- cell** Also known as a cell board: a circuit board that is the basic building block of an nPartition in a server complex (such as any HP midrange and high-end Integrity servers). A cell consists of a symmetric multiprocessor and memory.  
*See also* cell-based server, nPartition, server complex, virtual partition.
- cell-based server** A server in which all cores and memory are contained in cells, each of which can be assigned for exclusive use by an nPartition. Each nPartition runs its own instance of an operating system.  
*See also* cell, nPartition, server complex, virtual partition.
- CI** Computer interconnect. A type of I/O subsystem. It links computers to each other and to HSx devices (for example, an HSJ or HSG).  
*See also* CI-only cluster, DSSI.
- CI-only cluster** A computer system consisting of several computers attached to a computer interconnect (CI) through which it communicates with other computers in the cluster. These computers share a single file system. CI provides redundant paths.  
*See also* computer interconnect (CI), DSSI-only cluster.
- Common Data Security Architecture** *See* CDSA.
- complex** *See* server complex.
- computer interconnect** *See* CI.
- concurrent upgrade** The entire OpenVMS Cluster is shut down and unusable while upgrading each system disk. When the cluster reboots, all cluster members start up the upgraded version of the OpenVMS operating system.
- core** The actual data processing engine within a processor. A single processor might have multiple cores, and a core might support multiple execution threads. Also referred to as a logical CPU.
- core I/O** Provides the base set of I/O functions required by every nPartition on cell-based Integrity servers. Includes the partition console interface and the network interface.  
*See also* cell, cell-based server, nPartition.
- Data Center Operating Environment** *See* DCOE.
- DCOE** Data Center Operating Environment. The tier of the Operating Environment for OpenVMS for Integrity servers that offers everything offered by the Base Operating Environment (BOE) plus other capabilities such as system management capabilities, OpenVMS Cluster software, and volume shadowing.  
*See also* BOE, OE.
- DECnet Phase IV** Networking software that allows OpenVMS systems to participate in network task-to-task communications to transfer and copy files, print files, and run applications. DECnet Phase IV networking capabilities are defined in the DIGITAL Network Architecture (DNA) Phase IV. A system-integrated product, DECnet for OpenVMS Integrity servers is a component of the Base Operating Environment (BOE) on the Integrity servers license bundle.

*See also* DECnet-Plus, TCP/IP Services for OpenVMS.

|                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DECnet-Plus</b>                         | Formerly known as DECnet/OSI, DECnet-Plus is the networking software that offers the capabilities defined in the DIGITAL Network Architecture (DNA) Phase V protocols. DECnet-Plus provides the newest DECnet features such as extended addressing and downline-load performance enhancements. DECnet-Plus integrates DECnet and OSI protocols and provides a linkage to TCP/IP. DECnet-Plus for OpenVMS Integrity servers is a component of the Base Operating Environment (BOE) on the Integrity servers license bundle.<br><i>See also</i> DECnet Phase IV, TCP/IP Services for OpenVMS.                                                                        |
| <b>DECwindows Motif for OpenVMS</b>        | A layered product that provides support for both OSF/Motif, a standards-based graphical user interface, and the X user interface (XUI) in a single, run-time and development environment. DECwindows Motif displays the OSF/Motif user interface, but applications written on either toolkit will run regardless of the environment selected by the user.                                                                                                                                                                                                                                                                                                          |
| <b>device name</b>                         | The name used to identify a device on the system. A device name indicates the device code, controller designation, and unit number, such as DKA0, where DK is the device code, A is the boot device controller designation, and 0 is the unit number on the boot device.                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>diagnostic partition</b>                | When present on an OpenVMS Integrity servers system disk, this partition corresponds to the contents of SYS\$MAINTENANCE:SYS\$DIAGNOSTICS.SYS on the disk. The diagnostic partition and its contents are intended and reserved for use by HP Services. Customer access and use is not supported.                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Digital Storage System Interconnect</b> | <i>See</i> DSSI.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>disk server</b>                         | A computer within a local area cluster that provides an access path to CI, DSSI, and locally connected disks for other computers that do not have a direct connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>DSSI</b>                                | Digital Storage Systems Interconnect. A medium-bandwidth interconnect. Typically, OpenVMS Alpha nodes use DSSI to access peripherals (such as disks and tapes).<br><i>See also</i> computer interconnect (CI), DSSI-only cluster.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>DSSI-only cluster</b>                   | A computer system consisting of several computers attached to a Digital Storage System Interconnect (DSSI) through which it communicates with other computers in the cluster. These computers share a single file system.<br><i>See also</i> DSSI, CI-only cluster.                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>EFI</b>                                 | Extensible Firmware Interface. The interface between HP Integrity servers operating system and system firmware enabling you to perform such tasks as configuring the firmware and controlling the booting environment. EFI is the Intel specification of an interface between firmware and hardware.<br><i>See also</i> BMC, MP, POSSE.                                                                                                                                                                                                                                                                                                                            |
| <b>encryption</b>                          | A process implemented for data confidentiality that converts sensitive or otherwise private data to an unintelligible form called cipher-text. Decryption reverses the process, taking the unintelligible cipher-text and converting the data back into its original form, called plaintext. Encryption and decryption are also known as encipher and decipher. Encryption for OpenVMS software is based on the Advanced Encryption Standard (AES) algorithm and is integrated with the operating system. This allows OpenVMS users, system managers, security managers, or programmers to secure their files, save sets, or application data with AES Encryption. |
| <b>Enterprise Operating Environment</b>    | <i>See</i> EOE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>EOE</b>                                 | Enterprise Operating Environment. Discontinued operating environment for OpenVMS for Integrity servers available prior to OpenVMS Version 8.4 and since replaced by the Data Center Operating Environment (DCOE).<br><i>See also</i> BOE, DCOE.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Extensible Firmware Interface</b>       | <i>See</i> EFI.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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| <b>FOE</b>                                | Foundation Operating Environment. Discontinued operating environment for OpenVMS for Integrity servers available prior to OpenVMS Version 8.4 and since replaced by the Base Operating Environment (BOE).<br><i>See also</i> BOE, DCOE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Foundation Operating Environment</b>   | <i>See</i> FOE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Global Workload Manager</b>            | <i>See</i> gWLM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>gWLM</b>                               | HP Integrity Essentials Global Workload Manager. The VSE Management Software application that provides centralized, intelligent, policy-based resource management across multiple HP servers. The resource-sharing policies increase system utilization and facilitate controlled sharing of system resources. gWLM's monitoring abilities provide both real-time and historical monitoring of resource allocation.<br><i>See also</i> HP SIM, VSE, WBEM (Web-Based Enterprise Management Services for OpenVMS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>HP Binary Checker</b>                  | HP Binary Checker validates the kits signed using HP Code Signing Service (HPCSS). This validator is available with the OpenVMS operating system from OpenVMS Version 8.4 onwards. Changes have been made to VMSINSTAL and PCSI to use the validator. Some of the layered products that use VMSINSTAL will be signed the way in which the PCSI kits were signed. CDSA signing will be discontinued after the OpenVMS Version 8.4 Release.<br><i>See also</i> CDSA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>HP SIM</b>                             | HP Systems Insight Manager. The unified infrastructure management strategy foundation which provides the platform and framework on which the VSE Management Software products are deployed. HP SIM (an HP implementation of WBEM) provides simplified, centralized management of multiple servers and platforms through a web-based, unified interface.<br><i>See also</i> gWLM, provisioning, VSE, WBEM (Web-Based Enterprise Management Services for OpenVMS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>HP Systems Insight Manager</b>         | <i>See</i> HP SIM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>HRS</b>                                | Human Recognition Service Standard. HRS provides generic authentication service suitable for use with any form of human authentication (biometrics) for operation with CDSA.<br><i>See also</i> CDSA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>HSx device</b>                         | A self-contained, intelligent, mass storage subsystem (for example, an HSJ or HSG) that lets computers in a cluster environment share disks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>HSx drive</b>                          | Any disk or tape drive connected to an HSx device (for example, an HSJ or HSG). A system disk on an HSx drive can be shared by several computers in an OpenVMS Cluster environment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Human Recognition Service Standard</b> | <i>See</i> HRS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hyper-Threading</b>                    | Supported on systems that have dual-core processors, this feature provides the ability for processors to create a second virtual core that allows additional efficiencies of processing. For example, a dual-core processor with Hyper-Threading active can run four threads.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>iCAP</b>                               | Instant Capacity. Supported on cell-based Integrity servers, the HP Utility Pricing Solutions product that allows you to purchase and install additional processing power through the use of a two-step purchase model. Initially, you purchase system components (cores, cell boards, memory) at a fraction of the regular price because the usage rights are not included. These Instant Capacity components are inactive but installed and ready for use. When extra capacity is needed, you pay the remainder of the regular price for the usage rights to activate the components. If the regular price for the component is reduced by the time the usage rights are purchased, the remainder price is proportionally reduced, providing additional savings. After obtaining usage rights, Instant Capacity cores can be turned on by the Instant Capacity software or during installation.<br><br>Earlier versions of iCAP were referred to as Instant Capacity on Demand, or iCOD.<br><i>See also</i> TiCAP. |

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| <b>iLO</b>                                    | <i>See MP.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>InfoServer</b>                             | A general-purpose disk storage server (virtual device server). It can make devices available to client systems on the LAN. Client systems can connect to the virtual devices and use them as though they are locally attached devices. OpenVMS systems connected to the same LAN can boot from a virtual drive available from the InfoServer instead of from a local CD or DVD.                                                                                                                                                                   |
| <b>Insight Power Manager</b>                  | <i>See IPM.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>instance</b>                               | <i>See OpenVMS instance.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Instant Capacity</b>                       | <i>See iCAP.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Integrated Lights Out (iLO)</b>            | <i>See MP.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Integrity VM</b>                           | The HP Integrity VM product allows you to install and run multiple systems (virtual machines) on the same physical host system.                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>IPM</b>                                    | Insight Power Manager. An integrated power monitoring and management application that provides centralized control of server power consumption and thermal output at the datacenter level. It extends the capacity of datacenters by enabling the user to control the amount of power and cooling required for servers.                                                                                                                                                                                                                           |
| <b>Kerberos</b>                               | A network authentication protocol that provides authentication for applications using secret-key cryptography. Kerberos is automatically installed with the OpenVMS operating system.                                                                                                                                                                                                                                                                                                                                                             |
| <b>layered products</b>                       | Products, including SIPs, provided by HP and third parties that can be installed on an OpenVMS system.<br><i>See also SIP.</i>                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>local area OpenVMS Cluster system</b>      | A configuration consisting of one or more computers that act as a MOP server and disk server, and a number of low-end computers that act as satellite nodes. The LAN connects all of the computers. These computers share a single file system.                                                                                                                                                                                                                                                                                                   |
| <b>local drive</b>                            | A drive, such as a CD, DVD, or disk drive, that is connected directly to a computer. If you have a standalone computer, it is likely that all drives connected to the system are local drives.                                                                                                                                                                                                                                                                                                                                                    |
| <b>logical CPU</b>                            | An execution thread contained within a core on Integrity servers with Intel Itanium Dual-Core processors. With Hyper-Threading enabled, each core can contain multiple logical CPUs.<br><i>See also core, Hyper-Threading.</i>                                                                                                                                                                                                                                                                                                                    |
| <b>Maintenance Operations Protocol</b>        | <i>See MOP.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Management Processor</b>                   | <i>See MP.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>MCOE</b>                                   | Mission Critical Operating Environment. Discontinued operating environment for OpenVMS for Integrity servers available prior to OpenVMS Version 8.4 and since replaced by the Data Center Operating Environment (DCOE).<br><i>See also BOE, DCOE.</i>                                                                                                                                                                                                                                                                                             |
| <b>media</b>                                  | Any packaging agents capable of storing computer software (for example, compact discs, magnetic tapes, floppy disks, disk packs, and tape cartridges).                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>migration support</b>                      | In OpenVMS Clusters, migration support means that HP has qualified the versions for use together in configurations that are migrating in a staged fashion to a newer version of OpenVMS VAX, OpenVMS Alpha, or OpenVMS Integrity servers. Problem reports submitted against these configurations are answered by HP. However, in exceptional cases HP might request moving to a warranted configuration as part of the solution. Migration support helps customers move to warranted OpenVMS Cluster pairs.<br><i>See also warranted support.</i> |
| <b>Mission Critical Operating Environment</b> | <i>See MCOE.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>MOP</b>                                    | Maintenance Operations Protocol. A protocol used for operations such as downline loading and upline dumping.                                                                                                                                                                                                                                                                                                                                                                                                                                      |

*See also* MOP server.

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| <b>MOP server</b>                 | <p>A computer system using either the LAN Auxiliary Control Process (LANACP) or DECnet software to downline-load systems using the Maintenance Operations Protocol (MOP). Systems loaded include OpenVMS systems, print servers, and LAT servers.</p> <p><i>See also</i> MOP.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>MP</b>                         | <p>Management Processor. A utility on HP Integrity servers that provides both local and remote access for controlling the system console, reset/power management, and transfer of control (TOC) capabilities. It also allows you interact with the Extensible Firmware Interface (EFI) and to monitor tasks and display detailed information about various internal subsystems. MP is available even when the server main power switch is in the off position. Most entry-class Integrity servers include the Integrated Lights Out (iLO) Management Processor, which provides a complete remote console experience with a web-based GUI and the functionality provided by virtual media (vMedia).</p> <p><i>See also</i> BMC, EFI.</p> |
| <b>nPartition</b>                 | <p>Node partition. A hard partition within a cell-based server that provides both hardware and software isolation among different instances of the operating system running on a single server. Cell-based servers can be configured either as a single, large, symmetric multiprocessor or as several independent systems. An nPartition has exclusive use of the memory, processor (core), and I/O resources belonging to the cells that are assigned to that partition, and can execute its own operating system image.</p> <p><i>See also</i> cell, partition, server complex, virtual partition).</p>                                                                                                                              |
| <b>OE</b>                         | <p>The Operating Environment for OpenVMS for Integrity servers is the model for delivering the OpenVMS Integrity servers operating system, layered products, and documentation. Each operating environment bundles a group of products offered together at a single price based on the number of active cores in the system.</p> <p><i>See also</i> BOE, DCOE.</p>                                                                                                                                                                                                                                                                                                                                                                      |
| <b>OE DVD</b>                     | <p>The Operating Environment DVD containing the OpenVMS for Integrity servers Operating Environment and operating system, and the installation and other procedures described in this manual.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>OpenVMS Cluster system</b>     | <p>A computer system consisting of two or more Alpha, VAX, or Integrity servers computers running HP OpenVMS Cluster software. Many types of cluster interconnect devices can be used to create a cluster environment; for example, CI, DSSI, and LAN devices in a local area network, and Shared Memory CI (SMCI) for OpenVMS Galaxy instances. An OpenVMS Cluster can consist of a single interconnect or a mixed-interconnect cluster with any combination of cluster interconnects.</p>                                                                                                                                                                                                                                             |
| <b>OpenVMS instance</b>           | <p>The OpenVMS operating system running in either a soft or hard partition of a hardware platform. To share memory in a hard partition, the GALAXY system parameter must be set.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>OpenVMS Management Station</b> | <p>A powerful Microsoft Windows based management tool for system managers and others who perform system management tasks on OpenVMS systems. Allows system managers to manage user accounts, printers, and storage across multiple systems, using an intuitive interface that eliminates the need to remember complex OpenVMS DCL syntax, command procedures, and device names. A server component is installed on OpenVMS (automatically if you select all the default values during the installation); a client component is installed on a PC.</p>                                                                                                                                                                                   |
| <b>Operating Environment</b>      | <p><i>See</i> OE.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Operating Environment DVD</b>  | <p><i>See</i> OE DVD.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>operating system CD</b>        | <p>The CD containing the OpenVMS Alpha operating system and the installation and other procedures.</p> <p><i>See also</i> operating system media, Operating Environment DVD.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>operating system media</b>     | <p>The operating system CD or the OE DVD included with your OpenVMS distribution kit.</p> <p><i>See also</i> operating system CD, OE DVD.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

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| <b>partition</b>                               | A subset of the server hardware that includes processor, memory, and I/O resources on which an operating system can run. This type of partitioning allows a single server to run an operating system independently in each partition with isolation from other partitions.<br><i>See also</i> cell, nPartition, server complex, virtual partition.                                                                                                                                                                                                                                                              |
| <b>PATHWORKS for OpenVMS (Advanced Server)</b> | Supported on OpenVMS Alpha and VAX systems only, an OpenVMS network operating system compatible with Microsoft networking technology. Allows OpenVMS systems to be file and print servers for Windows desktop users. Such users can use Microsoft products and utilities such as Windows Explorer to access file and print resources. Also provides a flexible system for network administration and security.<br><i>See also</i> Advanced Server for OpenVMS.                                                                                                                                                  |
| <b>Performance Data Collector</b>              | <i>See</i> TDC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>platform</b>                                | A PCSI utility concept in which the OpenVMS operating system is kitted with options for selected other products (for example, DECwindows Motif and networking products) so that the user can opt to install all at once. Generically, a platform is the combination of physical hardware and operating system on which a piece of management or application software runs.                                                                                                                                                                                                                                      |
| <b>POSSE</b>                                   | Pre-OS System Environment. The HP implementation of EFI that extends the EFI Shell and EFI Boot Manager to include additional features for managing hardware and system boot options.<br><i>See also</i> EFI.                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Providers</b>                               | <i>See</i> WBEM Providers for OpenVMS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>provisioning</b>                            | An HP SIM feature that allows you to install or upgrade OpenVMS on one or more servers in the network simultaneously. HP SIM initiates the process and the installation or upgrade automatically continues in the background.<br><i>See also</i> HP SIM, VSE, WBEM (Web-Based Enterprise Management Services for OpenVMS).                                                                                                                                                                                                                                                                                      |
| <b>rolling upgrade</b>                         | Each system disk in an OpenVMS Cluster is upgraded individually, allowing old and new versions of the operating system to run together. Certain members of the cluster are available for use while others are being upgraded.<br><i>See also</i> concurrent upgrade.                                                                                                                                                                                                                                                                                                                                            |
| <b>satellite node</b>                          | A computer that is part of a local area cluster. A satellite node is downline loaded from a boot server and then boots remotely from the system disk served by a disk server in the local area cluster.<br><i>See also</i> disk server, boot server.                                                                                                                                                                                                                                                                                                                                                            |
| <b>scratch disk</b>                            | A blank disk or a disk with files you no longer need.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Secure Delivery</b>                         | Supported by CDSA, Secure Delivery uses public key and digital signature technology to implement a system that provides OpenVMS users the ability to validate files from OpenVMS and third-party OpenVMS vendors. The validation process involves authenticating the originator and verifying the contents of a file. Secure Delivery is integrated into PCSI to automatically ensure that software installed on OpenVMS was not tampered with prior to installation. Most kits included on the OpenVMS distribution media (as of Version 8.3) have been signed using Secure Delivery.<br><i>See also</i> CDSA. |
| <b>Secure Sockets Layer</b>                    | <i>See</i> SSL.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>server blades</b>                           | Thin, modular, self-contained computer servers containing one or more microprocessors and memory. Server blades are designed for high density and eliminate the need for many components such as power cords and network cables that are present in traditional rack-mount systems. HP server blades support technologies such as hot-plug hard-drives, multiple I/O cards, multi-function network interconnects and Integrated Lights Out.<br><i>See also</i> BladeSystem, BladeSystem enclosure.                                                                                                              |
| <b>server complex</b>                          | The hardware of a cell-based server that includes all cells, I/O expansion cabinets, cables, cabinet hardware, fans, and power and utilities components. The complex can support multiple instances of an operating system by means of nPartitions.<br><i>See also</i> cell, nPartition, server complex.                                                                                                                                                                                                                                                                                                        |
| <b>SIM</b>                                     | <i>See</i> HP SIM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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| <b>SIP</b>                           | System Integrated Product. A product provided by HP that can be installed or upgraded as part of the OpenVMS installation or upgrade. SIPs include required products, such as CDSA, Kerberos, and the base kit for Availability Manager; and optional products such as DECwindows Motif, DECnet-Plus, DECnet Phase IV, TCP/IP Services for OpenVMS, and on OpenVMS Integrity server systems only, WBEM Services for OpenVMS and WBEM Providers for OpenVMS. <i>See also</i> layered products.                                                                                                                |
| <b>source drive</b>                  | The drive that holds the operating system distribution media during an upgrade or installation. This can be a local drive or an InfoServer. The drive contains either the operating system CD or DVD, or a copy of it.                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>SSL</b>                           | Secure Sockets Layer. The open-standard security protocol for secure transfer of sensitive information over the Internet. HP SSL offers a high degree of confidentiality by allowing server authentication, client authentication, and an encrypted connection that requires all information sent between client and server to be encrypted by the sending software and decrypted by the receiving software. HP SSL for OpenVMS is automatically installed with the OpenVMS operating system. For more information, see the <i>HP Open Source Security for OpenVMS, Volume 2: HP SSL for OpenVMS</i> manual. |
| <b>standalone system</b>             | A computer system consisting of a single computer that is not part of a network or OpenVMS Cluster.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>system disk</b>                   | The disk from which OpenVMS is typically booted. During an installation or upgrade, this disk is the target disk because it receives files from the source drive. After installation or upgrade, the target drive is booted and becomes the system disk. <i>See also</i> target drive.                                                                                                                                                                                                                                                                                                                       |
| <b>System Integrated Product</b>     | <i>See</i> SIP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Systems Insight Manager</b>       | <i>See</i> HP SIM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>target drive</b>                  | The drive that holds the system disk during an upgrade or installation, or the drive you designate when backing up the system disk.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>TCP/IP Services for OpenVMS</b>   | HP standard implementation of the TCP/IP and NFS networking protocols, integrated with the OpenVMS operating system installation. Provides interoperability and resource sharing among systems running OpenVMS, UNIX, Windows, and other operating systems that support TCP/IP. TCP/IP provides a comprehensive suite of functions and applications that support industry-standard protocols for heterogeneous network communications and resource sharing. <i>See also</i> DECnet Phase IV, DECnet-Plus.                                                                                                    |
| <b>TDC</b>                           | The Performance Data Collector for HP OpenVMS (TDC) collects and manages configuration and performance data for analysis by other applications. TDC_RT Version 2.2 or later is a run-time only (base) variant of the TDC software that is installed automatically with the OpenVMS operating system for use on specific operating system platforms. By default, data is collected in a file. Subsequently, user applications can retrieve the data from the file.                                                                                                                                            |
| <b>Temporary Instant Capacity</b>    | <i>See</i> TiCAP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>TiCAP</b>                         | Temporary Instant Capacity. Supported on cell-based Integrity servers, an HP product option included with Instant Capacity (iCAP) that enables you to purchase prepaid core activation rights for a specified (temporary) period of time. Temporary capacity is sold in 30 processing-day increments (or 720 core-hours), which can be spread across all Instant Capacity cores as required. TiCAP was formerly referred to as TiCOD. <i>See also</i> iCAP.                                                                                                                                                  |
| <b>UETP</b>                          | User Environment Test Package. A software package that tests all the standard peripheral devices on your system, various commands and operating system functions, the system's multiple-user capability, DECnet software, and the cluster environment.                                                                                                                                                                                                                                                                                                                                                       |
| <b>User Environment Test Package</b> | <i>See</i> UETP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>VC</b>                            | Virtual Connect. A set of interconnect modules and embedded software for HP BladeSystem c-Class enclosures; it simplifies the setup and administration of server connections. Where most                                                                                                                                                                                                                                                                                                                                                                                                                     |

server interconnect choices come with compromises such as too many cables or too much to manage, VC reduces the number of network cables and simplifies management while adding the unique ability to wire everything once, then add, replace or recover servers in minutes instead of hours or days. HP Virtual Connect includes the HP 1/10Gb Virtual Connect Ethernet Module and HP 4 Gb Virtual Connect Fibre Channel Module for c-Class BladeSystem, and the HP Virtual Connect Manager.

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| <b>Virtual Connect</b>            | <i>See VC.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>virtual console</b>            | The virtualized console of a virtual machine that emulates the functionality of the Management Processor interface for Integrity servers. Each virtual machine has its own virtual console from which the virtual machine can be powered on or off and booted or shut down, and from which the guest operating system can be selected.                                                                                                                                                                                                                                                                                   |
| <b>virtual device</b>             | An emulation of a physical device. This emulation, used as a device by a virtual machine, effectively maps a virtual device to an entity (for example, s a DVD) on the VM Host.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>virtual machine</b>            | Virtual hardware system. Also called VM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>virtual media</b>              | <i>See vMedia.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>virtual partition</b>          | A soft partition within a cell-based server that can provide software isolation among different instances of the operating system running on a single server or nPartition. Cell-based servers can be configured either as a single large symmetric multiprocessor or as several independent systems. A virtual partition uses a subset of the system processor, memory, and I/O resources, and includes operating system and application-related software. The HP-UX operating system is the only operating system that can run in a virtual partition.<br><i>See also cell, partition, nPartition, server complex.</i> |
| <b>Virtual Server Environment</b> | <i>See VSE.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>vKVM</b>                       | OpenVMS Version 8.4 adds support for the iLO Integrated Console capability provided by Integrity Servers and blades systems supporting iLO. The enabling functionality that provides this support is referred to as “virtual Keyboard, Video, and Mouse” or vKVM. The feature allows you to connect a virtual serial line from your PC to Integrity servers, enabling your PC, keyboard, and mouse to function as if directly connected to the server. Your window displays the contents of the Integrity server's VGA.                                                                                                  |
| <b>vMedia</b>                     | Virtual Media. A virtual-disk capability included with iLO MP 2 on Integrity servers. vMedia provides virtual devices that mimic physical hardware devices. For example, it can provide a virtual CD/DVD drive that connects over the network to your Integrity servers as if it were physically connected. You can use vMedia to install OpenVMS on Integrity servers that do not include a built-in DVD drive. vMedia can provide the network service for HP SIM provisioning, or it can be used independently of HP SIM.<br><i>See also HP SIM, provisioning.</i>                                                     |
| <b>volume shadowing</b>           | The software that performs disk mirroring operations using a redundant array of independent disks (RAID) 1 storage strategy. Provides high data availability for disk devices by ensuring against data loss that results from media deterioration or controller or device failure. This prevents storage subsystem component failures from interrupting system or application tasks. Volume Shadowing for OpenVMS is available as both a separately licensed product on Integrity server systems and a component of the Data Center Operating Environment (DCOE) on Integrity servers.                                   |
| <b>VSE</b>                        | HP Virtual Server Environment. An integrated virtualization offering for HP-UX servers (including Integrity servers). VSE provides a flexible computing environment that maximizes utilization of server resources. VSE consists of a pool of dynamically sizable virtual servers, each of which can grow and shrink based on service-level objectives and business priorities.<br><i>See also gWLM, iCAP, TiCAP.</i>                                                                                                                                                                                                    |
| <b>warranted support</b>          | In OpenVMS Clusters, warranted support means that HP has fully qualified the specified versions of OpenVMS coexisting in the cluster and addresses all problems identified by customers using the cluster configuration.<br><i>See also migration support.</i>                                                                                                                                                                                                                                                                                                                                                           |
| <b>WBEM</b>                       | Web-Based Enterprise Management. A collection of management and Internet standard technologies that aid and unify management of large-scale distributed computing environments.                                                                                                                                                                                                                                                                                                                                                                                                                                          |

WBEM provides the ability for the industry to deliver a well-integrated set of standard-based management tools, facilitating the exchange of data across otherwise disparate technologies and platforms.

*See also* WBEM Providers for OpenVMS, WBEM Services for OpenVMS.

**WBEM Providers for OpenVMS**

Available on OpenVMS Integrity server systems, a product that enables (along with WBEM Services for OpenVMS) HP Systems Insight Manager (HP SIM) management of the operating system. HP SIM uses WBEM providers to perform such functions as identifying the operating system on the managed system, associating the virtual or physical instances to their respective containers, providing inventory and reports on hardware and software configurations, and monitoring the system remotely for hardware faults.

*See also* provisioning, WBEM Services for OpenVMS, HP SIM.

**WBEM Services for OpenVMS**

A product available on OpenVMS Integrity server systems that provides an industry-standard enterprise management framework and resource description. WBEM's structured framework is capable of being extended and uses management and Internet standards. Developers of management applications can take advantage of previously done work that exposes resource information and operations; for example, developers can take code that was developed for a specific platform or application and use it with WBEM for the same purposes—WBEM is platform-neutral, enabling reuse of infrastructure, tools, and applications. WBEMCIM is the WBEM Services for OpenVMS file name used in the PCSI kit. CIM stands for the Common Information Model, which differentiates the current OpenVMS WBEM product from the original one that is based on the Simple Network Maintenance Protocol (SNMP).

*See also* WBEM Providers for OpenVMS.

**Web-Based Enterprises Services**

*See* WEBES.

**WEBES**

Web-Based Enterprises Services. Tool used for hardware fault detection, analysis, and notification on Integrity, ProLiant, and Alpha based servers along with EVA storage systems. WEBES also performs crash analysis on OpenVMS.

# Index

## A

Accounts  
  creating after installation or upgrade, 163  
ACPI configuration, 206  
Advanced Encryption Standard (AES), 331  
Advanced Server for OpenVMS  
  defined, 329  
AGEN\$INCLUDE files  
  returning to system disk, 92  
AGEN\$PARAMS.REPORT file  
  examining, 165  
Aliases  
  with hard links enabled, 60  
Allocation class (ALLOCLASS parameter)  
  for shadow sets, 131  
  setting during installation, 43, 79  
  supplying during OpenVMS Cluster installation, 80  
Alpha commands  
  compared with Integrity server commands, 213  
Alpha computers  
  boot behavior  
    configuring, 181–184  
  boot device  
    setting, 182  
    showing, 182  
  boot flag parameters  
    setting, 182  
  booting  
    automatic, 181  
    canceling boot device, 182  
    conversational, 174  
    emergency, 177  
    failure, 186  
    from a different root, 176  
    manually, 174  
    with minimum startup, 176  
    with PMAD TURBOchannel adapter, 177  
    with PMAZB TURBOchannel adapter, 173  
    with PMAZC TURBOchannel adapter, 173  
    with XDELTA, 176  
  firmware, 26  
  halting, 184  
  shutting down, 185  
  troubleshooting procedures, 186  
ANALYZE/CRASH command, 186  
ANALYZE/DISK\_STRUCTURE command  
  error message, 90  
  using before an upgrade, 90  
APB.EXE  
  and Writeboot utility, 183  
Architectures  
  in OpenVMS Cluster, 41, 97  
Archived files  
  deleting, 120  
  saving, 120

## Authorization

  files, 91  
  network proxy, 135  
  returning to system disk, 91  
AUTOGEN, 165  
  reboot after, 81  
  running after an installation or upgrade, 164  
  running at end of installation, 81  
  running at end of upgrade, 125  
  tuning operating system, 164  
Availability Manager  
  configuring, 139  
  defined, 329  
  installing, 68  
  installing or upgrading, 30  
  upgrading, 117  
AVIO  
  defined, 329

## B

backing store  
  defined, 329  
Backing up the system disk, 305–311  
  after customizing, 164  
  after installation or upgrade, 129  
  before upgrade, 95  
  from OpenVMS main menu, 29  
  in a shadow set, 309  
  without booting the OpenVMS CD or DVD, 309  
Backspace key, 192  
BACKUP command, 305  
  caution, 305  
BAP system parameters  
  tuning, 132  
Base Operating Environment  
  (*see* BOE)  
Baseboard Management Controller  
  (*see* BMC (Baseboard Management Controller))  
Batch queue  
  creating, 135  
BIB (boot-is-blocked state), 215, 226, 227  
  defined, 329  
BMC (Baseboard Management Controller)  
  defined, 329  
  description, 189  
  system event log (SEL), 213  
BOE  
  defined, 329  
  licensing, 68  
Boot  
  defined, 329  
Boot block, writing, 183, 211  
Boot command  
  Alpha and Integrity server equivalents, 213  
  qualifiers for XDELTA, 176, 221  
Boot device list, 204

- Boot device paths
  - configuring on FC, 301
- Boot flags, 182, 207
- Boot options
  - boot devices, 182, 207
  - changing EFI boot timeout, 210
  - displaying, 181, 210
  - during upgrade, 123
  - setting, 181–184, 207
  - setting during installation, 61, 75
  - setting during upgrade, 115
- Boot server
  - configuration for InfoServer, 237
  - defined, 329
- Booting
  - automatic, 181, 207, 209
  - canceling boot device, 182
  - cell-based servers, 214
  - conversational, 174, 220
  - emergency, 177, 222
    - with default system parameters, 177, 222
    - without startup and login procedures, 179, 223
    - without the user authorization file, 179, 224
  - failure, 186, 227
  - from a different root, 176, 222
  - from Fibre Channel storage devices, 293–304
  - from HP SIM, 50, 109, 219
  - from InfoServer, 46, 50, 106, 109, 170, 219, 240
  - from local drive, 46, 49, 106, 108, 169, 215
  - from vMedia, 51, 109, 219
  - manually, 174, 219
  - OpenVMS Alpha operating system CD, 169
  - OpenVMS Integrity servers OE DVD, 215
  - operating system CD/DVD, 46, 48
    - for upgrade, 107
  - problems, 177, 222
  - satellite, 233
  - setting boot device, 182
  - setting boot flag parameters, 182, 207
  - showing boot device, 182
  - with alternate TURBOchannel adapter, 177
  - with minimum startup, 176, 221
  - with PMAD TURBOchannel, 177
  - with PMAZB TURBOchannel, 173
  - with PMAZC TURBOchannel, 173
  - with XDELTA, 176, 221
- Bootstrap
  - defined, 329
- Bugcheck, 186, 227
- C**
- CDSA
  - defined, 330
  - initializing, 138
  - installing, 68
  - installing or upgrading, 30
  - upgrading, 117
- Cell
  - defined, 330
- Cell boot phase, 214
- Cell-based servers, 192
  - (*see also* nPartition)
  - booting, 214
  - defined, 330
  - EFI, 203
  - terminology, 23
  - utilities, 192
- Checklist
  - installation, 45
  - postinstallation and postupgrade, 127
  - preinstallation for OpenVMS Cluster, 41
  - preupgrade, 85
  - preupgrade for OpenVMS Cluster, 97
  - upgrade, 105
- CI-only OpenVMS Cluster
  - defined, 330
- Cluster
  - (*see* OpenVMS Cluster)
- Cluster size (disk volume), 307
- Command procedures
  - checking after upgrade, 153
  - site-specific, 153
- Computer interconnect (CI)
  - defined, 330
- Concurrent upgrades
  - defined, 330
  - description, 99
  - preparing system for, 99
  - tasks after shutdown, 125
- Configuration options
  - during upgrade, 111
- Console (Integrity servers)
  - configuring, 193
  - delete or backspace key, 192
  - interface, 189
    - MP, 193
  - MP interface, 193
  - options, 190
  - system serial port, 193
- Console firmware, 26
- CONTINUE command, 175, 220
- Core
  - defined, 330
- Core I/O
  - defined, 330
- Crash commands, 185
- Customizing the system, 134–138
- D**
- Data Center Operating Environment
  - (*see* DCOE)
- DCL option (from OpenVMS main menu), 40
- DCOE (Data Center Operating Environment)
  - defined, 330
- Debug devices
  - configuring, 203
- DEC 3000 Alpha computers
  - booting

- over the network, 177
- with alternate TURBOchannel adapter, 177
- with PMAZB TURBOchannel adapter, 173
- with PMAZC TURBOchannel adapter, 173
- DECamds
  - check for valid versions for system upgrade, 87
- DECEvent
  - reinstall after upgrade, 163
- Decipher, 331
- DECnet
  - declaring during installation, 63
  - installing or upgrading, 30
  - node address, 43
    - providing during installation, 80
  - node name, 43
    - possible values, 80
    - providing during installation, 80
- DECnet Phase IV
  - configuring, 137
  - defined, 330
  - ignoring during startup, 137
  - installing, 68
  - registering license after installation, 130
  - running with DECwindows, 137
  - upgrading, 117
- DECnet-Plus
  - configuring, 137
  - defined, 331
  - installing, 68
  - upgrading, 117
- DECnet/OSI
  - (*see* DECnet-Plus)
- DECram
  - checking for valid versions for system upgrade, 87
  - DCL command DECRAM, 116, 153
  - in system upgrade, 87
- DECRYPT command, 116, 153
- Decryption
  - defined, 331
- DECwindows Motif
  - client files, 118
  - defined, 331
  - installing, 68
  - installing or upgrading, 30
  - upgrading, 117
- Delete key (Integrity server utilities), 192
- Device name
  - conventions, 28
  - defined, 331
- Diagnostic partition, 327
  - defined, 331
  - removing, 328
- Disk server
  - defined, 331
- Disk space
  - amount needed for upgrade, 91
  - amount needed to decompress system libraries, 155
- DSSI (Distributed Storage Systems Interconnect)
  - defined, 331
- DSSI-only OpenVMS Cluster
  - defined, 331
- Dump file
  - checking size, 167
  - modifying size, 165
- Dump Off the System Disk (DOSD)
  - configuring, 203
- DWMOTIF\_SUPPORT, 118
- E
- EFI (Extensible Firmware Interface), 22
  - adding boot options, 207
  - boot path settings
    - storing and restoring, 210
  - changing boot option timeout, 210
  - defined, 331
  - description, 189
  - displaying boot options, 210
  - on nPartition, 203
  - using, 202–205
- EFI Boot Manager, 190
  - (*see also* OpenVMS Integrity servers Boot Manager (BOOT\_OPTIONS.COM) utility)
  - adding boot options to
    - manually, 209
    - using OpenVMS Integrity servers Boot Manager utility, 207
  - setting boot behavior, 206
  - setting timeout, 210
- EFI Utilities for OpenVMS (Integrity servers)
  - documentation, 210
  - entering commands, 55, 204
  - vms\_bcfg, 209
  - vms\_set command, 213
  - vms\_show command, 210, 213
- EFI\$BCFG (*see* OpenVMS Integrity servers Boot Manager (BOOT\_OPTIONS.COM) utility)
- Emergency system startup, 177, 222
  - with default system parameters, 177, 222
  - without startup and login procedures, 179, 223
  - without the UAF, 179, 224
- Encipher, 331
- ENCRYPT command, 116, 153
- Encryption
  - defined, 331
- Encryption for OpenVMS, 331
- Enterprise Operating Environment
  - (*see* EOE)
- EOE
  - defined, 331
- Errors
  - cluster hang during preupgrade shutdown, 102
  - running ANALYZE/DISK\_STRUCTURE, 90
  - troubleshooting system problems, 186, 227
- Extensible Firmware Interface (*see* EFI (Extensible Firmware Interface))
- F
- FEEDBACK.DAT file, 93

- Fibre Channel
  - configuring and booting, 293–304
  - configuring for booting, 202, 207, 296, 301
    - in cluster, 304
  - configuring for dumping, 296, 301
  - displaying device information, 293, 298, 300
  - firmware, 293, 299, 300
  - newly installed disk, 61
  - newly upgraded system disk, 116
  - SAN storage array graphic, 303
  - system disk booting, 296, 304
  - system disk identification, 58
- FIELD account
  - creating after installation or upgrade, 163
- Files
  - restoring on the system disk, 29
- Firmware
  - revision checking, 26, 27
  - updating, 26
- FOE
  - defined, 332
- Foundation Operating Environment
  - (*see* FOE)
- G**
- Gigabit Ethernet
  - cluster, 43
  - LAN devices, 170
- Global Workload Manager (*see* gWLM (Global Workload Manager))
- Graphics
  - console device, 193, 201
  - interface, DECwindows, 32, 56
  - option
    - multihead configuration, 136, 194
- gWLM (Global Workload Manager)
  - defined, 332
  - requirements, 30, 70, 118
- H**
- Halting the system, 184, 225
- Hard links
  - specifying, 60
- Hardware
  - components
    - preinstallation, 25
  - documentation
    - Integrity servers, 22, 189
  - problems, diagnosing, 186
    - Integrity servers, 227
- HP Binary Checker
  - defined, 332
  - installing, 68
  - installing or upgrading, 30
  - upgrading, 117
- HP SIM (Systems Insight Manager)
  - defined, 332
  - provisioning, 247
  - requirements, 70, 118
    - setting up for provisioning, 259
- HP SIM provisioning
  - (*see* Provisioning)
- HRS (Human Recognition Service Standard)
  - defined, 332
- HSxdevice
  - defined, 21, 332
  - specifying, 77
- HSxdrive
  - defined, 332
- Hyper-Threading
  - defined, 332
  - enabling and disabling, 205
  - saving or restoring state of, 210
- I**
- iCAP (Instant Capacity)
  - and removal of the operating system from system disk, 325
  - and system disk initialization, 31
  - configuring, 148
  - defined, 332
  - requirements, 30, 70, 118
- iLO (Integrated Lights Out), 22, 189
- InfoServer
  - booting, 46, 106, 170, 240
  - client configuration, 231
  - defined, 21, 333
  - for provisioning
    - setting up, 249
  - LAN devices supported, 170, 231
  - losing connection, 173, 245
    - during installation, 48
    - during upgrade, 107
  - software application
    - boot server configuration, 237
    - booting OpenVMS, 240
    - configuration, 229–245
    - server configuration, 234
    - troubleshooting, 245
- INITIALIZE
  - command, 181
  - option
    - alternative use of, 327
    - on OpenVMS main menu, 31, 57
- Insight Power Management (*see* IPM (Insight Power Management))
- Installable products
  - displaying, 32
- Installation, 45–83
  - and AUTOGEN, 81
  - booting
    - new system disk, 75, 77
    - operating system CD/DVD, 45–51
  - checklist, 45
  - completing the procedure, 72
  - component options, list of, 72
  - differences between OpenVMS Alpha and Integrity servers, 54

- help text, 70
- HP SIM provisioning, 262
- information needed for OpenVMS Cluster, 41–44
- Integrity VM guest operating system, 53
- layered products, 68, 72
  - after installation or upgrade, 161
- license registration, 67
- on target disk, 73
- OpenVMS Debugger clients, 152
- PCSI, 30
- procedure, 56–77
- prompts, 55
- rebooting system, 82
- recording, 25
- selecting component options, 70
- setting passwords, 61
- specifying OpenVMS Cluster configuration, 79
- stages of, 45
- system information, providing, 61
- third-party networking software, 138
- windowing and networking products, 68
- Installed products
  - displaying, 35
  - removing, 38
- Instant Capacity (*see* iCAP (Instant Capacity))
- Integrated Lights Out
  - (*see* iLO (Integrated Lights Out))
- Integrity servers
  - boot behavior
    - configuring, 205–213
  - boot device
    - setting, 205–213
    - showing, 205, 207, 210
  - boot flag parameters
    - setting, 207
  - boot options, 61
    - during upgrade, 115, 123
    - EFI boot menu, 202
    - managing, 205–213
    - OpenVMS Integrity servers installation, 75
  - booting
    - automatic, 207, 209
    - conversational, 220
    - emergency, 222
    - failure, 227
    - from a different root, 222
    - manually, 219
    - with minimum startup, 221
    - with XDELTA, 221
  - commands
    - and equivalent Alpha commands, 213
  - console configuration, 193
  - documentation, 22, 189
  - firmware, 26–28
  - getting started, 24
  - halting, 225
  - hangs or crashes, 225
  - OE DVD, 25
    - booting, 215
  - overview, 22–24
  - setting up and booting, 24, 189–225
  - shutting down, 226
  - system event log (SEL), 213
  - troubleshooting procedures, 227
  - utilities and console options, 189–193
- Integrity VM guest operating system
  - Installation, 53
- Internationalization (VMSI18N) data kit
  - installation, 313
- IPC (Interrupt Priority C), 102
- IPF Offline Diagnostics and Utilities CD, 300
- IPM (Insight Power Manager), 23
  - defined, 333

## K

- Kerberos
  - configuring, 140
  - defined, 333
  - installing, 68
  - installing or upgrading, 30
  - upgrading, 117

## L

- LAN devices
  - InfoServer support, 170, 231
- Layered products
  - defined, 333
  - installing
    - after OpenVMS installation or upgrade, 161
    - alternative procedure, 162
    - during OpenVMS installation, 68, 72
    - during OpenVMS upgrade, 125
  - installing or upgrading independently of system, 33, 161
  - reconfiguring, 36
  - registering, 33
  - Secure Delivery, 33, 55, 70, 119, 161
  - system upgrade effect on, 87
- LIBDECOMP.COM, 155
- Libraries
  - compressing and decompressing, 81
  - expanding or compressing, 155
- License Management utility
  - using, 131
- Licenses, 68
  - registering
    - after installation or upgrade, 130
    - during installation, 67
  - update requirements for system upgrade, 86
  - upgrade effect on layered products, 87
- Local area OpenVMS Cluster
  - defined, 333
- Local drive
  - defined, 21, 333
- Log
  - for installation, 25
- Logging in
  - problems due to forgotten password, 179, 224

- problems due to login procedure, 179, 223
- problems due to startup procedure, 179, 223

- Logical CPU
  - defined, 333

- Logical names
  - UAFALTERNATE, 180, 225

- Login command procedures
  - booting without, 179, 223
  - errors preventing login, 179, 223

- Login welcome message
  - defining, 152

## M

- Magnetic media
  - defined, 21

- Maintenance Operations Protocol (MOP)
  - defined, 333

- Management Processor (*see* MP (Management Processor))

- MCOE
  - defined, 333

- Media
  - defined, 333

- Migration support, 41, 97
  - defined, 333

- Minimum startup, 176, 221

- Mission Critical Operating Environment
  - (*see* MCOE)

- Mixed-architecture OpenVMS Cluster systems, 41, 97, 100

- OpenVMS Management Station, 315

- Mixed-version OpenVMS Cluster systems, 41, 97, 101

- MODPARAMS.DAT parameter file
  - modifying after installation or upgrade, 166
  - modifying after upgrade, 166
  - modifying before upgrade, 93
  - modifying for cluster, 167

- MOP server
  - defined, 334

- MP (Management Processor)
  - co command, 199
  - defined, 334
  - description, 189
  - setting as console interface, 193

- Multihead system
  - configuring, 136, 194

## N

- NETCONFIG.COM procedure
  - running, 137

- Network booting
  - InfoServer, 229–245

- Network proxy authorization files
  - creating, 135

- Networking products, 138
  - (*see also* TCP/IP Services for OpenVMS, DECnet, DECnet Phase IV, DECnet-Plus)
  - configuring, 137
  - installing, 68
  - reconfiguring, 36

- third-party
  - installing, 138
- upgrading, 117
- nPartition, 192
  - (*see also* Cell-based servers)
  - ACPI configuration, 206
  - BIB (boot-is-blocked state), 215, 226, 227
  - boot phase, 214
  - defined, 334
  - hardware booting, 214
  - reboot for reconfiguration, 226
  - shutdown for reconfiguration, 226
  - software booting, 215

## O

- ODS-2
  - selecting on installation, 59
  - selecting on upgrade, 113

- ODS-5
  - selecting on installation, 59
  - selecting on upgrade, 113

- OE (Operating Environment)

- DVD
    - defined, 334

- for OpenVMS
    - defined, 334

- licensing, 68
    - options, 71, 87

- On-Disk Structure Level
  - specifying, 59

- OPCCRASH.EXE, 185, 227

- OpenVMS Alpha
  - boot behavior
    - configuring, 182
  - boot flags, 182
  - booting
    - automatic, 181
    - conversational, 174
    - from a different root, 176
    - manually, 174
    - with minimum startup, 176
    - with XDELTA, 176
  - component options, 72
  - firmware, 26
  - layered products
    - installing, 162
  - operating system CD, 25
    - booting, 169
    - shutting down, 185

- OpenVMS Cluster
  - and OpenVMS Management Station, 315
  - BACKUP caution, 305
  - becoming a member
    - during installation, 62
    - during upgrade, 116
    - preupgrade requirements, 99
  - configuring
    - after installation, 62, 79
    - during installation, 79

- defined, 334
- EXPECTED\_VOTES parameter, 167
- group number
  - rules for creating, 43
- information required for OpenVMS installation, 41–44
- installation
  - prompts, 79, 80
  - supplying ALLOCLASS parameter, 80
- installing, 79
- installing TDC\_RT, 151
- label for system disk, 305
- local area, 333
- migration support, 41, 97
  - defined, 333
- mixed-version support, 97
- parameters
  - after upgrade, 167
- password
  - rules for creating, 43
- quorum
  - adjusting using Availability Manager or DECamds, 102
  - adjusting using IPC, 102
  - maintaining during rolling upgrades, 102
- rebooting members, 164
- upgrade
  - concurrent, 99
  - preparing for, 97–103
  - rolling, 100
  - setting membership information, 116
  - tasks after shutdown, 125
  - types of, 99–103
- warranted support, 41, 97
  - defined, 337
- OpenVMS Debugger
  - installing clients on a PC, 152
- OpenVMS Galaxy
  - creating an instance, 62, 117
- OpenVMS instance
  - defined, 334
- OpenVMS Integrity servers
  - boot behavior
    - configuring, 207
  - boot flags, 207
  - booting
    - automatic, 207, 209
    - conversational, 220
    - from a different root, 222
    - manually, 219
    - with minimum startup, 221
    - with XDELTA, 221
  - component options, 72
  - firmware, 26
  - layered products
    - installing, 162
  - OE DVD, 25
    - booting, 215
  - shutting down, 226
- OpenVMS Integrity servers Boot Manager (BOOT\_OPTIONS.COM) utility, 190, 205
  - (*see also* EFI Boot Manager)
  - adding boot entry for system disk, 61, 116, 207
  - changing EFI boot timeout value, 210
  - displaying boot options, 210
  - overview, 202
- OpenVMS internationalization (VMSI18N) data kit
  - installation, 313
- OpenVMS Management Station
  - defined, 334
  - defining TCP/IP nodes, 322
  - disk quotas, 320
  - error log, 317
  - getting started, 323
  - preparing the PC, 321
  - preparing to use, 152, 315–323
  - problem reporting, 321
  - removing, 322
  - server
    - removing, 321
  - system files, 317
  - uninstalling V2.1 client, 322
- Operating Environment
  - (*see* OE (Operating Environment))
- Operating system
  - CD
    - defined, 334
  - files
    - removing, 325
  - media
    - defined, 21, 334
- Operating system CD/DVD
  - booting for installation, 45–51
  - booting for upgrade, 105–109
- Operating system menu
  - accessing DCL, 40
  - displaying installed products, 35–36
  - displaying layered products, 32–33
  - installing OpenVMS, 30–32, 56–77
  - installing or upgrading layered products, 33–35
  - patches and recovery data operations, 39–40
  - reconfiguring installed products, 36–37
  - removing installed products, 38–39
  - shutting down the system, 40
  - upgrading OpenVMS, 30–32, 109–125
  - using, 29–40
- Output
  - saving from installation, 25
- P
- Page file
  - checking size, 167
  - modifying size, 165
- PAK (Product Authorization Key)
  - registering after an installation or upgrade, 130
  - registering during installation, 67
- Partition
  - defined, 335

- Partition Manager, 24, 192
- Password
  - forgotten, 82, 179, 224
  - minimum length, 61
  - setting during installation, 61
- Patches
  - finding, installing, removing
    - using distribution media menu option, 39
  - installing from download, 159
  - required for existing OpenVMS Cluster members, 42, 99
  - Secure Delivery, 159
- PATHWORKS for OpenVMS (Advanced Server)
  - defined, 335
- PCSI
  - and recovery data, 112
  - installing layered products independently, 163
  - installing patches
    - using FTP, 159
  - installing the operating system, 30
  - upgrading the operating system, 30
- Performance Data Collector (TDC)
  - defined, 336
- Performance Data Collector base software (TDC\_RT)
  - compatibility with prior releases, 150
  - defined, 336
  - initializing and running, 149
  - installing, 68
    - in OpenVMS Clusters, 151
  - installing or upgrading, 30
  - running the software, 151
  - startup file, 150
  - upgrading, 117
  - user privileges and quotas, 150
- Platform
  - defined, 335
- PMAD TURBOchannel adapter
  - booting system, 177
- PMAZB TURBOchannel adapter
  - booting system, 173
- PMAZC TURBOchannel adapter
  - booting system, 173
- POLYCENTER Software Installation utility
  - (*see* PCSI)
- POSSE (Pre-OS System Environment)
  - defined, 335
  - HP implementation of EFI, 190
- Postinstallation tasks
  - accounts, 163
  - AUTOGEN
    - to set system parameter changes, 133
    - tuning the system, 164
  - Availability Manager configuration, 139
  - backing up the system disk, 129, 164
  - BAP system parameters, 132
  - CDSA initialization, 138
  - checklist, 127
  - customizing the system, 134–138
  - DECnet configuration, 137
  - iCAP configuration, 148
  - Kerberos configuration, 140
  - layered products, 161
  - license registration, 130
  - login welcome message, 152
  - MODPARAMS.DAT file, 166
  - multihead system configuration, 136, 194
  - network proxy authorization files, 135
  - OpenVMS Debugger clients installation, 152
  - OpenVMS Management Station, 152
  - page file size, 165
  - patches, 159
  - print queues, 163
  - queue manager and default queues, 135
  - shadow sets
    - license required, 130
  - shadow sets reformation, 164
  - SSL configuration, 141
  - SYSTARTUP\_VMS.COM procedure, 137, 163
  - system files, 153
  - system libraries, 155
  - TCP/IP Services for OpenVMS configuration, 137
  - TDC\_RT initialization, 149
  - testing the system, 163
  - third-party networking software configuration, 138
  - tuning the system, 164
  - WBEM Providers for OpenVMS, 146
  - WBEM Services for OpenVMS configuration, 142
- Postupgrade tasks
  - accounts, 163
  - AUTOGEN
    - to set system parameter changes, 133
    - turning the system, 164
  - Availability Manager configuration, 139
  - backing up the system disk, 129, 164
  - BAP system parameters, 132
  - CDSA initialization, 138
  - checklist, 127
  - cluster members, 164
  - command procedure templates, 153
  - customizing the system, 134–138
  - DECnet configuration, 137
  - dump file size, 165
  - iCAP configuration, 148
  - Kerberos configuration, 140
  - layered products, 161
  - license registration, 130
  - login welcome message, 152
  - MODPARAMS.DAT file, 166
  - multihead system configuration, 136, 194
  - network proxy authorization files, 135
  - OpenVMS Debugger clients installation, 152
  - OpenVMS Management Station, 152
  - page file size, 165
  - patches, 159
  - print queues, 163
  - queue manager and default queues, 135
  - shadow sets
    - license required, 130
  - shadow sets reformation, 164
  - SSL configuration, 141
  - SYSTARTUP\_VMS.COM procedure, 137, 163
  - system files, 153
  - system libraries, 155
  - TCP/IP Services for OpenVMS configuration, 137
  - TDC\_RT initialization, 149
  - testing the system, 163
  - third-party networking software configuration, 138
  - tuning the system, 164
  - WBEM Providers for OpenVMS, 146
  - WBEM Services for OpenVMS configuration, 142

- shadow sets, forming, 133
- SSL configuration, 141
- swap file size, 165
- SYSTARTUP\_VMS.COM procedure, 137, 163
- system files
  - adding or removing, 153
  - sizes, 167
- system libraries, 155
- TCP/IP Services for OpenVMS configuration, 137
- TDC\_RT initialization, 149
- testing the system, 163
- third-party networking software configuration, 138
- tuning the operating system, 164
- WBEM Providers for OpenVMS configuration, 146
- WBEM Services for OpenVMS configuration, 142
- Pre-OS System Environment
  - (see POSSE (Pre-OS System Environment))
- Preinstallation tasks
  - collecting information for, 55
  - firmware revision checking, 26, 27
  - OpenVMS Cluster environment, 41–44
  - software and hardware components, 25
- PRESERVE option, 31
- Preupgrade tasks
  - backing up system disk, 95
  - checklist, 85
    - OpenVMS Cluster, 97
  - DECamds and DECram, 87
  - FEEDBACK.DAT file, 93
  - shutting down system, 96
  - system disk, 89, 90
  - volume shadowing, 94
- Print queue
  - creating after installation or upgrade, 163
  - default
    - creating, 135
- Printer
  - recording installation on, 25
- Problems
  - booting, 177, 222
    - troubleshooting, 186, 227
  - locked out of system, 179, 224
  - logging in, 179, 223, 224
- Product Authorization Key
  - (see PAK (Product Authorization Key))
- PRODUCT INSTALL command, 161
- PRODUCT REMOVE command
  - files not removed with, 325
  - removing operating system files, 325
- Provisioning, 247
  - defined, 335
  - HP SIM and Windows server setup, 259
  - plug-in, 259
  - procedure, 262
  - requirements, 248
  - with InfoServer
    - setting up, 249
  - with vMedia
    - setting up, 252
- Proxy files
  - (see Network proxy authorization files)
- Q
- Queue database
  - creating, 135
- Queue manager
  - starting, 135
- Quorum
  - adjusting, 102
  - maintaining during rolling upgrades, 102
- R
- Reboot, 81
  - (see also Boot, Booting)
  - after AUTOGEN, 81
  - after installation, 82
  - automatic after AUTOGEN, 81
  - example, 178, 223
  - OpenVMS Cluster members, 164
- Recovery data
  - checking for during upgrade, 112
  - displaying and installing
    - using distribution media menu option, 39
- Release notes
  - after installation or upgrade, 135
  - before installation, 25
- Remedial kits
  - deleting archived files, 120
  - required for existing OpenVMS Cluster members, 42, 99
  - saving archived files, 120
- Removing operating system files, 325
- Restoring system disk, 307
  - without booting the OpenVMS CD or DVD, 309
- Restrictions
  - for OpenVMS upgrade, 86
- Rolling upgrades
  - caution, 103
  - defined, 335
  - description, 100
  - maintaining cluster quorum, 102
  - operating system version required, 100
  - preparing system for, 101
  - restrictions, 100
  - tasks after shutdown, 125
- S
- SAN disk, 304
- SAN storage device
  - delay in EFI initialization, 50, 108, 216, 301
  - graphic, 303
- Satellite booting, 233
- Satellite node
  - defined, 335
- Save sets
  - transferring to system disk, 57
- Scratch disk
  - defined, 335

- SCSSYSTEMID system parameter
  - specifying, 63
- SDA (System Dump Analyzer), 186
- Secure Delivery
  - and distribution kits, 33, 55, 70, 119, 161
  - and installing patches, 159
  - defined, 335
- Selecting active console devices, 201
- Server complex
  - defined, 335
- SET AUTO\_ACTION command, 181
- SET BOOT command, 211
- SET BOOT\_OSFLAGS command, 182
- SET BOOTDEF\_DEV command, 182
- SETBOOTBLOCK command, 211
- Shadow sets, 94
  - (*see also* Volume shadowing)
  - adding to boot and dump device lists, 61, 116
  - backing up system disk, 309
  - forming, 133
    - license required, 130
    - system parameters, 131
  - reforming, 164
  - system disk
    - upgrading, 94
- SHOW BOOTDEF\_DEV command, 182
- SHOW CRASH command, 186
- Shutdown
  - after installation, 81
  - before an upgrade, 96, 100, 102
  - procedures, 185, 226
- Shutdown option, 40
- SHUTDOWN.COM, 185, 226
- SIM (*see* HP SIM (Systems Insight Manager))
- SIPs (System Integrated Products)
  - defined, 336
  - installing after installation or upgrade, 161
- Secure Delivery, 33, 161
  - differences between OpenVMS Alpha and OpenVMS Integrity servers, 55
  - during installation, 70
  - during upgrade, 119
- Site-specific command procedures
  - restored during upgrade, 153
- Source drive, 21, 306
  - defined, 21
- SSL for OpenVMS
  - configuring, 141
  - defined, 336
  - installing, 68
  - installing or upgrading, 30
  - upgrading, 117
- Standalone Backup, 309
- Startup command procedure
  - booting without, 179
  - errors preventing login, 179, 223
- Swap file
  - checking size, 167
  - modifying size, 165
- SWAPFILES.COM procedure
  - executing to change system file sizes, 167
- SYS\$BATCH queue
  - creating, 135
- SYS\$EFI.SYS file
  - and writing a boot block, 211
- SYS\$PRINT queue
  - creating, 135
- SYS\$UPDATE.STABACKIT.COM procedure, 309
- SYS\$WELCOME
  - defining, 152
- SYSBOOT.EXE, 174, 220
  - commands, 175, 220
- SYSGEN
  - ALLOCLASS parameter
    - for shadow sets, 131
    - setting during installation, 43, 79
  - commands for conversational boot, 175, 220
- SYSTARTUP\_VMS.COM procedure
  - editing to control DECnet Phase IV, 137
  - for starting network software at boot, 137
  - updating to start layered products and print queues, 163
- System
  - customizing, 134–138
  - files
    - adding, 153
    - removing, 153
  - hang, 186, 228
  - libraries
    - compressing and decompressing, 81
    - expanding or compressing, 155
  - parameters
    - booting with default, 177, 222
    - for volume shadowing, 131
    - incorrect values prevent boot, 177, 222
    - modifying after installation or upgrade, 166
    - modifying after upgrade, 166
    - modifying before upgrade, 93
    - verifying, 92
  - problems
    - troubleshooting, 186, 227
  - shutting down before upgrade, 96
  - startup in an emergency, 177, 222
    - with default system parameters, 177, 222
    - without startup and login procedures, 179, 223
    - without the UAF, 179, 224
- SYSTEM account
  - forgotten password, 82
  - logging in, 82
  - setting password, 61
- System disk
  - adding boot entry to EFI Boot Manager menu, 61, 75, 115, 123, 207
  - adding system files, 153
  - analyzing and repairing, 90
  - backing up, 305–311
    - after an installation, 164
    - after installation or upgrade, 129

- alternate disk for, 309
- before an upgrade, 95
- from OpenVMS main menu, 29
- boot options, 207
- booting, 77, 174, 219
  - after installation, 82
  - after transferring required save set, 77
- checking amount of free space on, 155
- creating, 57
- defined, 21, 336
- initializing, 57, 110
  - alternative methods, 31, 327
- preparing an alternate for backup, 309
- preparing for upgrade, 89
- preserving, 31, 57, 110
- removing system files, 153
- restoring, 307
- restoring files on, 29
- space needed
  - for upgrade, 91
  - to decompress libraries, 155
- specifying
  - during installation, 58
  - during upgrade, 110
- unique volume label requirement, 305
- upgrading, 94
- System Dump Analyzer
  - (*see* SDA)
- System event log (SEL), 213
- System Generation utility
  - (*see* SYSGEN)
- System Integrated Products
  - (*see* SIPs (System Integrated Products), Layered products)
- SYSTEST account
  - creating after installation or upgrade, 163
- SYSUAFALT.DAT file, 180, 225

**T**

- Target disk
  - using backup copy for, 95
- Target drive, 306
  - defined, 21
- TCP/IP
  - third-party
    - installing, 138
    - OpenVMS Management Station, 320
- TCP/IP Services for OpenVMS
  - configuring, 137
  - defined, 336
  - installing, 68
  - installing or upgrading, 30
  - upgrade
    - remove older versions prior to, 87
  - upgrading, 117
- TDC
  - (*see* Performance Data Collector base software (TDC\_RT), Performance Data Collector (TDC))
- TDC\_RT

- (*see* Performance Data Collector base software (TDC\_RT))
- TDF
  - setting during an installation, 66
- Temporary Instant Capacity (*see* TiCAP (Temporary Instant Capacity))
- TiCAP (Temporary Instant Capacity)
  - defined, 336
  - requirements, 30, 70, 118
- Time differential factor
  - (*see* TDF)
- Time zones
  - setting during an installation, 65
  - updating during an upgrade, 117
- Timeout
  - EFI boot option, 210
- Troubleshooting
  - InfoServer boot problems, 245
  - system problems, 186, 227
- Tuning operating system, 164
- TURBOchannel
  - booting
    - with alternate adapter, 177
    - with PMAD adapter, 177
    - with PMAZB adapter, 173
    - with PMAZC adapter, 173

**U**

- UAFALTERNATE logical name, 180, 225
- UETP (User Environment Test Package), 163
  - defined, 336
- Uninstall
  - OpenVMS operating system, 325
  - recovery data for, 112
- Upgrade, 105–125
  - booting
    - operating system CD/DVD, 105–109
  - cautions and restrictions, 86
  - checklist, 105
  - concurrent (OpenVMS Cluster), 99
  - DECram, 87
  - disk space requirement, 91
  - effect
    - on command procedures, 153
    - on layered products, 87
    - on MODPARAMS.DAT file, 166
  - OpenVMS Cluster
    - adding a new CPU, 99
    - preliminary tasks, 97–103
    - preparing for, 97–103
    - required operating system version, 100
  - paths, 86
  - PCSI, 30
  - preparation checklist, 85
  - procedure, 109–125
  - recovery data, 112
  - rolling (OpenVMS Cluster), 100
  - shadowed disks, 94
  - stages of, 105

- time zones, 117
- User accounts
  - creating after installation or upgrade, 163
- User authorization file (*see* UAF)
- User Environment Test Package (*see* UETP)

V

- VC, 23
- VGA graphics as console device, 193, 201
- Virtual Connect (*see* VC)
- virtual console
  - defined, 337
- virtual device
  - defined, 337
- virtual machine
  - defined, 337
- Virtual media (*see* vMedia (Virtual Media))
- Virtual partition
  - defined, 337
- vKVM
  - defined, 337
- vMedia (Virtual Media), 248
  - defined, 337
  - for provisioning
    - setting up, 252
  - using independently of HP SIM, 284
- vms\_bcfg command, 209, 210
- vms\_show command, 210
- VMSI18N, 313
- VMSINSTAL utility, 161
  - installing layered products independently, 163
- Volume label
  - OpenVMS Alpha operating system CD, 25
  - OpenVMS Integrity servers OE DVD, 25
  - requirement for OpenVMS Clusters, 305
  - specifying
    - during installation, 59
    - during upgrade, 113
- Volume shadowing, 94 (*see also* Shadow sets)
  - backing up the system disk, 309
  - defined, 337
  - forming shadow set, 133
    - license required, 130
    - system parameters, 131
  - preparing for upgrade, 94
  - reforming shadow set, 164
- VOTES parameter
  - checking for rolling upgrades, 101

## W

- Warranted support, 41, 97
  - defined, 337
- WBEM Providers for OpenVMS
  - configuring, 146
  - defined, 338

- WBEM Services for OpenVMS
  - configuring, 142
  - defined, 338
  - installing, 68
  - installing or upgrading, 30
  - upgrading, 117
- WBEMCIM (*see* WBEM Services for OpenVMS)
- Welcome message
  - defining, 152
- Windowing products
  - installing, 68
  - reconfiguring, 36
  - upgrading, 117
- Writeboot utility, 183
- wwidmgr
  - show wwid command, 293