



HPE Serviceguard I H6487S

This course teaches system administrators how to effectively use Serviceguard to protect mission critical applications from a wide variety of hardware and software failures. The 5-day course is 40 percent lecture and 60 percent hands-on labs using HPE servers. This course has been updated to support HP-UX 11.31 and Serviceguard version A.11.20 but is still applicable to earlier versions of the product.

HPE course number	H6487S
Course length	5 days
Delivery mode	ILT
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Why HPE Education Services?

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Audience

- HP-UX system administrators who currently, or soon will, develop, design, implement, and monitor Serviceguard clusters

Prerequisites

- HP-UX System and Network Administration I (H3064S) and HP-UX System and Network Administration II (H3065S) or
- HP-UX System and Network Administration for Experienced UNIX® System Administrators (H5875S) and
- HP-UX Logical Volume Manager (H6285S) or HP-UX VERITAS Volume Manager (HB505S) and
- POSIX Shell Programming (H4322S)

Course objective

- Configure a volume group or disk group that can be used on multiple systems and a basic package to run in a Serviceguard environment
- Configure and maintain a Serviceguard cluster
- Configure and implement an application monitor
- Replace a failed LVM lock disk
- Change the cluster configuration and add or delete a package to a running cluster
- Set up a Serviceguard package using the NFS toolkit and Oracle toolkit
- Configure a highly available network using redundant hubs, routers, and networks
- Perform a rolling upgrade
- Use Serviceguard Manager to manage a Serviceguard cluster
- Perform troubleshooting activities to resolve Serviceguard configuration problems

Benefits to you

- Protect your mission critical applications against a wide variety of hardware and software failures through effective use of Serviceguard
- Deliver highly available application services to your LAN-attached clients by configuring up to 16-nodes in an enterprise cluster
- Reduce your application downtime to near zero by learning how to configure your Serviceguard cluster and using Serviceguard's rolling upgrade facility
- Minimize, and in some instances eliminate, your application downtime by learning how to automate the detection of failures and restoration of application service

Detailed course outline

Module 1: Introduction to High Availability

- What Are the Risks?
- Reducing the Risk: Redundant Data
- Disk Configurations
- Reducing the Risk: Asymmetric Clusters
- Reducing the Risk: Minimizing Downtime
- Reducing the Risk: Network Redundancy
- Multi-Network Environment
- Redundant LAN Cards
- Redundant Hubs
- Redundant Routers
- Redundant Client Networks

Module 2: High Availability with Serviceguard

- Introducing Serviceguard
- High Availability with Serviceguard
- Features and Benefits of Serviceguard
- How Serviceguard Works
- Serviceguard Packages
- Redistributing Application Packages
- Minimizing Planned Downtime
- Serviceguard Bundle/Products
- HPE Serviceguard Solutions
- Serviceguard and Integrity VM
- Cluster File System
- Multi-Node Packages and Package Dependencies
- Oracle RAC and CFS
- Storage choices based on your priorities
- SGeRAC and LVM MORE
- System Management Homepage
- Serviceguard Manager
- Serviceguard Storage Management Suite
- Metrocluster
- Continentalclusters

Module 3: Storage for Serviceguard

- Serviceguard Disk Space Management Overview
- Boot and Root disk concepts
- General disk concepts
- Volume management in Serviceguard for HP-UX
- LUN, Disk, and DVD DSF Names for 11.31
- Review of LVM Concepts
- Configure a Shareable LVM Volume Group
- LVM Issues with Serviceguard
- Common LVM Commands
- LVM and VxVM Command Comparison
- Configure a Shareable VxVM Disk Group
- CFS Filesystem

Module 4: Cluster Concepts and Configuration

- Definition of a Cluster
- Major Components of a Cluster
- Network Interface Configuration
- Cluster Lock Configuration Using LVM Disks
- Cluster Lock Configuration Using a Quorum Server
- Quorum Server Redundancy
- Cluster Lock Configuration using Lock LUN
- Lock LUN support for HP-UX
- Lock LUN rules
- Comparison
- Heartbeat Configuration
- cmclsd Process
- Cluster Formation Requirements
- Steps to Configure a Cluster
- Cluster Configuration Procedure
- Viewing the Cluster: cmviewcl Command
- Checking the Cluster Log

Module 5: Additional Cluster Features

- Serviceguard Volume Groups
 - Marking Volume Groups for use in
 - Serviceguard
 - Exclusive Mode Volume Group Activation
 - Cluster Formation and Reformations
 - Ways to Initially Form the Cluster
 - Node Failures and Node Joins
 - Cluster Reformation ExamplevLocal LAN Card
 - Failover—Normal Network Flow
 - Local LAN Card Failover—Network Flow to Standby LAN Card
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Module 6: Packages and Services

- Packaging Concepts
- Sample Package Configuration
- Sample Configuration after Node Failure
- Package Switching
- Viewing Package Status
- Package Owner and State
- Modifying Package Status
- Review Commands for Controlling a Cluster
- Configuration of Packages
- Package Modules Types
- Modularized Package Control Script
- Modularized Package Control File
- Package Configuration Procedure
- Create the Package Configuration File
- Edit the Package Configuration File
- Verify and Distribute the Binary File
- Enhancements to cmapplyconf/cmcheckconf
- The Package Script Log File

Module 7: Package Policies

- Package Policies
- Package Type
- Failover Policies
- Failback Policies
- Example of Automatic Failback
- Access Control Policies
- Node Fail Fast and Service Fail Fast
- Package Dependencies
- Dependency Rules
- Complex Dependencies
- Cross node dependencies example
- Exclusionary dependency example
- cmapplyconf warning
- Complex dependency challenge
- Package Priorities
- Setting Package Priority
- Resource Dependency
- cmrunpkg review
- Package Weight/Node capacity
- Node Capacity/Package Weight challenge
- Configuration file example
- Node Capacity Configuration
- Package Weight Configuration Methods
- Package Weight/Node Capacity Rules
- Capacity "package_limit"
- Package priority & package weight rules
- Priority and Weight challenge

Module 8: Application Monitoring Scripts and ECMT Toolkits

- Package Startup and shutdown
- Rules for Service Processes
- Application Monitoring Script
- HA Toolkit Overview (or how to use monitoring)
- ECMT Version B.06.00
- Modular toolkit architecture
- Modular Oracle db toolkit deployment
- Configuration directory operations for Modular Packages

Module 9: Cluster Troubleshooting

- Troubleshooting in Serviceguard
- Approaches to identifying problems
- Double-checking supported configurations
- Log files
- Monitoring the syslog File
- Monitoring the package log file
- Useful Troubleshooting Commands
- Using cmviewconf and cmgetconf
- Using cmquerycl and cmcheckconf
- Using cmviewcl
- Common problem categories
- System administration errors
- Package control script hangs or failures
- Package Log File Enhancements
- Causes of cluster reformations
- Approaches to fixing problems
- Resolving Serviceguard command hangs
- Modifying debugging options
- Modifying startup debugging options
- Starting applications outside of a Serviceguard package
- cmgetconf
- The Built-in Safety Net
- Patch recommendations
- Common Cluster Configuration Issues
- Testing Cluster Operations
- Testing the package manager
- Testing the cluster manager
- Testing the network manager
- Notification for Package Failure

Module 10: Cluster and Package Online Reconfiguration	<ul style="list-style-type: none"> • Serviceguard Online Reconfiguration • Online cluster reconfiguration • Storage reconfiguration • Add a Node while a Cluster Is Running • Remove a Node while a Cluster Is Running • Add a Package while a Cluster Is Running 	<ul style="list-style-type: none"> • Remove a Package while a Cluster Is Running • Modify a Package while the Cluster and Package are Running • Modify a Package while the Cluster Is Running, but the Package Is Down • New Preview Functionality • SG commands—t option
Module 11: Highly Available NFS	<ul style="list-style-type: none"> • Highly Available NFS Server Package • Using the modular NFS Server Toolkit 	<ul style="list-style-type: none"> • Highly Available NFS Client Package
Module 12: The Highly Available Oracle Database	<ul style="list-style-type: none"> • Highly Available Oracle Package—Overview • Serviceguard Toolkits 	<ul style="list-style-type: none"> • ECMT modular Toolkit Contents • Create Oracle Package
Module 13: WBEM, EMS Resources and Serviceguard Packages	<ul style="list-style-type: none"> • EMS Overview • Configuration of EMS Requests • What can be configured • Select EMS Resources • Select EMS Configuration • Resource Dependency 	<ul style="list-style-type: none"> • Setting up a Package to use an EMS Resource • WBEM Overview • WBEM Services Value Proposition • WBEM relative to SNMP, DMI and EMS • HPE WBEM Based Enterprise Management • HP-UX 11i WBEM Providers
Module 14: High Availability Networking	<ul style="list-style-type: none"> • Network Redundancy • Multi-Network Environment • Redundant LAN Cards, Hubs and Routers • Redundant Client Networks • Multiple IP Addresses • Cross-subnet support • Serviceguard Command Changes • Serviceguard Package Configuration Changes 	<ul style="list-style-type: none"> • Cross subnet network configuration requirements • APA Auto-Port Aggregation (APA) Overview • APA/LAN Monitor Requirements • Configuring APA • IPv6 Networks • IP Monitor • Failures and Recovery
Module 15: Rolling Upgrade	<ul style="list-style-type: none"> • Minimizing Planned Downtime • Rules for Rolling Upgrade • New Cluster Manager (CM2) in SG 11.19 • Special Considerations for Upgrade to Serviceguard A.11.20 • CM2 Changes • CM2 similarity to CM • Cluster Reformation • Rolling Upgrade CM to CM2 Process • Special Considerations for Upgrade to Serviceguard A.11.20 • syslog messages during protocol switch • Rolling upgrade to A.11.19 restrictions • Special Considerations for Upgrade to Serviceguard A.11.20 • Serviceguard Rolling Upgrades • Operating System Rolling Upgrades 	<ul style="list-style-type: none"> • Cluster before Rolling Upgrade • Example of a Rolling Upgrade—Running Cluster with Packages Moved • Example of Rolling Upgrade—Node 1 Upgraded to HP-UX 11.31 • Example of Rolling Upgrade—Install Serviceguard, Rejoin Cluster • Example of Rolling Upgrade—Run Cluster with all Packages on Node 1 • Example of Rolling Upgrade—Upgrade Node 2 • When a Rolling Upgrade Is Not Possible • Dynamic Root Disk (DRD) for Serviceguard • DRD Use-case—recovery • DRD Use-case—maintenance
Module 16: Storage Maintenance for Packages	<ul style="list-style-type: none"> • Storage Maintenance for Packages • Modifying a Volume Group • Modifying a Logical Volume • Extending a Logical Volume to a specific disk • Reducing the size of a Logical Volume • Moving all data on one LVM disk to another • Make a Logical Volume/File System Larger or Smaller 	<ul style="list-style-type: none"> • LVM Maintenance to a Package • Add Disk to Volume Group Owned by a Package • Add Logical Volume/File System to Volume • Group Owned by a Package • Add a Volume Group to a Package • Manage VxVM Disk Groups • Manage VxVM Volumes

Course data sheet

Module 17: Serviceguard Manager

- HPE Cluster Monitoring Tools
- Serviceguard Manager B.03.xx for SMH
- SG Mgr B.03.00.10 Enhancements
- Topology Map Feature Highlights
- Graphical Map
- Navigation
- Contextual Menu
- Pop-up Summary
- Drag and Drop

Module 18: Live Application Detach and Other Features

- Serviceguard 11.20 Enhancements
- Live Application Detach (LAD)
- Live Application Detach—Rules
- Application Packages Can Use NFS
- Cluster-Wide Device File Names
- Cluster-Wide Device Files
- Cluster Verification
- Cluster Verification with SG Manager
- VxVM and LVM Monitor
- Serviceguard Manager A.05.03
- Easy Deployment

Module 19: Easy Deployment

- Easy Deployment Commands—cmdeploycl
 - Easy Deployment Commands—cmpreparecl
 - Easy Deployment Commands—cmpreparestg
 - Easy Deployment Commands—cmquerycl cmapplyconf
 - Serviceguard Manager B.03.00 Enhancements
 - Serviceguard Manager Easy Deploy
 - Easy Deploy Cluster Creation
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Next steps

- HPE Serviceguard II: Continentalclusters, CFS, & Oracle RAC (U8601S) or HPE Metrocluster (HB507S), HPE Integrity Virtual Machines (HB506S), HPE StorageWorks XP Disk Arrays (H6773S)

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