Hewlett Packard Enterprise

Enterprise Linux High Availability Clustering HK967S

HPE course number	HK967S
Course length	4 days
Delivery mode	ILT/vILT
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This is an in-depth course that focuses on two key areas, Linux high availability (HA) clustering and HA storage administration. Storage is integral to many HA clusters so as to make use of clustered storage technologies to enable active/active configurations.

Over the course of many in-depth lab exercises, each student will assemble a realistic three-node Linux cluster utilizing best practices. Each node has three network interfaces and each student's cluster has its own dedicated cluster VLAN.

The class contains a storage array for shared LUNs among the nodes. This enables students to perform very real world tasks in a real world setting, including multipathing, redundant ring communication, last man standing cluster, and shared storage scenarios. Course topics include: Cluster Architecture & Design, Pacemaker, Corosync, Fencing, Resource Management, Advanced Resource Management, Multipathing, Cluster LVM, Global File System v2.

Prerequisites

This course requires an advanced knowledge of Linux system administration. These skills are taught in the H7091S "Enterprise Linux Systems Administration" and U8583S "Linux Fundamentals".

Supported Distributions

Red Hat Enterprise Linux 7

Detailed Course Outline

Module 1: Introduction to Clustering and Storage Management	• Clustering Introduction • Cluster Building Blocks • Shared Storage • Hardware and Software Requirements • Network Considerations • Split Brain Prevention with Fencing • HA Components • Clustered Resources	• Configuration Tools • Red Hat Cluster Stack Roadmap • Running Commands on Multiple Systems • Lab Tasks – Running Commands on Multiple Hosts – Prepare System for Clustering – Static Network Configuration
Module 2: Corosync and Quorum Management	• Vocabulary • Network Topology • Ethernet Bonding • Communication Methods • IPv6 Considerations • Cluster Node Preparation • Enable and Configure pcsd • PCS & PCSD • Cluster Quorum • Advanced Quorum Techniques • Corosync	• Corosync - Redundant Ring Protocol (RRP) • Corosync Security • Joining and Leaving the Cluster • Quorum Administration • Upgrading • Lab Tasks – Install and Configure PCSD – Setup a Two Node Cluster – Setup a Three Node Cluster with PCS – Totem RRP – PCS GUI
Module 3: STONITH and Fencing	• Fencing Introduction • Node Level Fencing • Node Fencing: External • Node Fencing: Internal • Node Fencing: Pseudo • Resource Level Fencing • Fencing Architecture • STONITH Subsystem • Fencing Agents	• Fencing Agents listing • Resource Spotlight: IPAddr2 • STONITH Resources • Working With stonith_admin • Manual Fencing • Best Practices • Lab Tasks – Suicide Fencing with Storage Based Death – Fencing with fence_scsi
Module 4: Pacemaker Cluster Resource Manager	• Cluster Architecture Revisited • Pacemaker Architecture • Pacemaker Cluster Information Base (CIB) • Resource Management Overview • Component Relationships • Resource Agents • Types of Resources • Resource Naming Conventions • Resource Specific Parameters/Options • Resource Meta Parameters/Options • Resource Agent Operations	• Discover Resource Agents • Available Resource Agents • Add a Primative Resource • Resource Group Management • Resource Group Example • Resource Actions: Monitoring • Resource Administration • PCS vs. CRM_* • Lab Tasks – Simple Management with PCS-GUI – Using Resource Groups
Module 5: Advanced Resource Configuration	• Resource Placement Basics • Resource Ordering • Location Constraints • Relocating Resources • Relocation on Failure • Resource Standard: Clones & Multi-State • Resource Operations	• Troubleshooting • Cluster Maintenance • Lab Tasks – Setup a Web Farm – Using Constraints – Cluster Monitoring

Course data sheet

Module 6: Storage Technologies	• Remote Storage Overview • Remote Filesystem Protocols • Remote Block Device Protocols • Distributed Lock Manager • dlm_controld & dlm_tool	• Block Devices and the Device Mapper • Managing Loopback Devices • Lab Tasks – Manipulating Block Devices
Module 7: iSCSI	• iSCSI Architecture • iSCSI Target Implementations • iSCSI Target Node Preparation & targetcli • iSCSI Target Administration • iSCSI Target Defining Storage Objects • iSCSI Target LUN Administration • iSCSI Target Network Portal Configuration • iSCSI Target Security	• iSCSI Target Examples • Open-iSCSI Initiator Implementation • iSCSI Initiator Discovery • iSCSI Initiator Node Administration • Mounting iSCSI Targets at Boot • iSCSI Multipathing Considerations • Lab Tasks – iSCSI Initiator Configuration
Module 8: Kernel Device Management	• Managing Linux Device Files • Kernel Hardware Info – /sys/ • /sys/ Structure • udev	• I/O Elevators • Lab Tasks – Creating Custom UDEV Rules
Module 9: Device Mapper and Multipathing	• SAN Multipathing • Multipath Configuration • Multipathing Best Practices	• Lab Tasks – Multipath Configuration
Module 10: Advanced LVM & Cluster LVM	• Logical Volume Management • Implementing LVM • Creating Logical Volumes • Activating LVM VGs • Exporting and Importing a VG • Examining LVM Components • Changing LVM Components • Advanced LVM Overview • Advanced LVM: Components & Object Tags	• Advanced LVM: Automated Storage Tiering • Advanced LVM: Thin Provisioning • Advanced LVM: Striping & Mirroring • Advanced LVM: RAID Volumes • cLVM • Lab Tasks – Creating and Managing LVM Volumes – cLVM
Module 11: Global File System (GFS) 2	• GFS2 Overview • GFS2 Capabilities • GFS2 Theory of Operation • GFS2 Configuration Prerequisites • Setting Up Cluster LVM	• GFS2 Filesystem Creation & Mounting • GFS2 Filesystem Management • GFS2 Fencing Requirement • Lab Tasks – GFS2

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