

Fast Track for Deploying HPE FlexFabric Comware Technologies H8D09S

HPE course number	H8D09S
Course length	5 Days
Delivery mode	ILT, VILT
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This course gives network engineers an opportunity to plan for and implement networks utilizing HPE Comware devices. Participants will work HPE IRF, IMC, ACLs, QoS, OSPF, BGP, and Multicast technologies. This course covers basic and advanced topics; learner will experience both theory and hands on real hardware through lab exercises over five days.

The learner will configure and monitor Comware devices using open standard technologies. You will work with Layer 2 technologies, such as Multiple Instance Spanning Tree (MSTP) and Link Aggregation (Trunks). You will also learn about Layer 3 technologies, such as static routes, Open Shortest Path First (OSPF) with Multi-Area implementations, and Border Gateway Protocol (BGP), along with Multicast solutions leveraging Protocol independent Multicast (PIM) both dense and sparse modes.

Audience

This course is intended for network or systems administrators, network engineers, and consultants who plan to deploy HPE Comware 7 switches into a new or existing network.

Prerequisites

- This course is recommended for students who need to deploy HPE FlexFabric technologies based on Comware. It does not require completion of any previous HPE networking courses
- Network experience is required

Course Objectives

At the conclusion of this course, you should be able to:

- Protect devices with local and remote authentication using telnet, SSH, web, and SNMP access
- Navigate the HPE Comware CLI and manage the flash file system
- Upgrade the Comware switch operating system
- Configure VLANs on HPE Comware switches
- Configure a Comware switch for DHCP server and DHCP relay
- Configure multiple spanning tree and apply STP security features
- Differentiate between static and dynamic Link Aggregation
- Configure and troubleshoot Link Aggregation on HPE switches
- Implement and deploy HPE IRF with MAD technologies to protect your network
- Configuring and managing HPE Comware devices with HPE IMC
- Configure, design, and deploy Access Control Lists (ACLs)
- Configure, design, and deploy Open Shortest Path First (OSPF), in multi-area, and work with external routes
- Configure, design, and deploy Border Gateway Protocol (BGP)
- Configure, design, and deploy Quality of Service (QoS)
- Configure, design, and deploy Multicast (Protocol Independent Multicast Dense Mode and Sparse mode) along with IGMP technologies

Detailed course outline

Module 1: Introduction-SME	<ul style="list-style-type: none"> Welcome to Fast Track for Deploying HPE FlexNetwork Comware Technologies! Course schedule 	<ul style="list-style-type: none"> Introductions
Module 2: Basic Setup-SME	<ul style="list-style-type: none"> Accessing the console of an HPE Comware switch Levels of access and privilege levels CLI introduction and navigation 	<ul style="list-style-type: none"> Basic configuration Interface configuration Troubleshooting
Module 3: Protecting Management Access	<ul style="list-style-type: none"> Applying password protection to local and remote authentication Associating user roles with password and scheme authentication 	<ul style="list-style-type: none"> Implementing remote management with telnet, SSH, web, and SNMP access
Module 4: Management of Software and Configuration Files	<ul style="list-style-type: none"> Understanding the boot up process of the HPE switches Understanding how to use the flash file system on the HPE switches 	<ul style="list-style-type: none"> Upgrading the operating systems on the HPE switches Managing configuration files on the HPE switches
Module 5: VLANs	<ul style="list-style-type: none"> Reviewing VLANs and the various types of VLAN Understanding when to use each of the three VLAN port types Configure VLANs and assign IP addresses to VLAN interfaces 	<ul style="list-style-type: none"> Implementing basic routing on directly connected VLANs Verify connectivity within and between VLANs
Module 6: IP Services	<ul style="list-style-type: none"> Implementing DHCP server and DHCP relay on Comware switches Implementing secure NTP on Comware switches 	<ul style="list-style-type: none"> Understanding and configuring basic logging options Implementing DNS to resolve names to addresses
Module 7: Spanning Tree Protocol	<ul style="list-style-type: none"> Overview of pre-2004 IEEE 802.1D standard Overview of RSTP Overview of PVST+ 	<ul style="list-style-type: none"> Overview and configuration of MSTP on Comware switches Configuration of STP security features on Comware switches
Module 8: Link Aggregation	<ul style="list-style-type: none"> Reviewing problems with STP and load sharing with STP Introducing link aggregation 	<ul style="list-style-type: none"> Comparing and contrasting the different link aggregation types Configuring and verifying link aggregation on Comware switches
Module 9: IP Routing	<ul style="list-style-type: none"> VLANs and routing Static routing Dynamic routing with RIP 	<ul style="list-style-type: none"> Dynamic routing with OSPF Single area OSPF configuration
Module 10: Intelligent Resilient Framework (IRF)	<ul style="list-style-type: none"> Understanding the technologies and concepts involving IRF Understanding the advantages that IRF provides Describing a split stack and how the Multi-Active Detection (MAD) protocol deals with this problem 	<ul style="list-style-type: none"> Configuring a simple IRF topology Verifying and troubleshooting an IRF topology

Module 11: Introduction to Intelligent Management Center (IMC)	<ul style="list-style-type: none"> Understand the components of IMC Understand how to install IMC 	<ul style="list-style-type: none"> Understand how to access IMC Implement a basic configuration using IMC
Module 12: Access Control Lists (ACLs)	<ul style="list-style-type: none"> Define ACL and identify the criteria by which ACLs select traffic Configure ACLs on HPE Comware based switches to select given traffic 	<ul style="list-style-type: none"> Apply static ACLs to interfaces to meet the needs of a particular scenario Examine an ACL configuration and determine the action taken on specific packets
Module 13: Quality of Service	<ul style="list-style-type: none"> Configure HPE switches to honor the appropriate QoS marks applied by other devices Create a QoS policy that assigns a specified class of traffic to a priority queue Select and implement an appropriate strategy for queue scheduling Implement traffic policing policies that enforce the negotiated committed information rate (CIR), committed burst size (CBS), peak information rate (PIR), and excessive burst size (EBS) for a specified class of traffic 	<ul style="list-style-type: none"> Respond to congestion in advance by applying the appropriate traffic shaping and Weighted Random Early Detection (WRED) policies Determine the QoS mark that an HPE switch will assign to specific outbound traffic and, if necessary, adjust the mark
Module 14: Advanced Open Shortest Path First	<ul style="list-style-type: none"> Deploy HPE products in single-area and multiple-area OSPF systems Use area definitions and summaries to create efficient and scalable, multiple-area designs Advertise routes to external networks in a variety of OSPF environments 	<ul style="list-style-type: none"> Promote fast, effective convergence during a variety of failover situations Use virtual links as required to establish nondirect connections to the backbone Implement OSPF authentication
Module 15: Exterior Border Gateway Protocol	<ul style="list-style-type: none"> Establish and monitor eBGP sessions between your routers and Internet Service Provider (ISP) routers Advertise an IP block to multiple ISP routers 	<ul style="list-style-type: none"> Filter BGP routes as required for a dual-homed ISP connection Configure a BGP router to advertise a default route in OSPF or to redistribute and aggregate BGP routes, as appropriate
Module 16: IP Multicast	<ul style="list-style-type: none"> Route multicast traffic using Protocol Independent Multicast-Dense Mode (PIM-DM) or Protocol Independent Multicast-Sparse Mode (PIM-SM) Select and configure rendezvous points (RPs) based on particular environmental needs such as redundancy and efficient operation 	<ul style="list-style-type: none"> Minimize unnecessary multicast flooding Apply advanced controls such as source-specific multicasting (SSM) and administrative scopes to a PIM-SM deployment
Appendix A: Converged Infrastructure	<ul style="list-style-type: none"> FlexFabric FlexCampus FlexBranch 	<ul style="list-style-type: none"> FlexManagement Software-Defined Networks (SDN)
Appendix B: Basic Network Design Concept	<ul style="list-style-type: none"> Understanding the differences between the access, distribution, and core layers Comparing and contrasting a two-tier versus three-tier design Choosing appropriate links for connections 	<ul style="list-style-type: none"> Implementing the appropriate redundant solution Understanding IP addressing special needs Understanding good practices in OSPF designs

Detailed lab outline

Lab 1: Accessing HPE vLabs	<ul style="list-style-type: none"> Task 1: Verify starting state of switches Task 2: Explore the CLI 	<ul style="list-style-type: none"> Task 3: Configuring IP Addressing and Verifying Connectivity
Lab 2: Basic Setup	<ul style="list-style-type: none"> Task 1: Initialize the Lab Topology Task 2: Restrict Privileges on Comware 	<ul style="list-style-type: none"> Task 3: Set up Telnet and SSH Access for Comware
Lab 3: Protecting Management Access	<ul style="list-style-type: none"> Task 1: Initialize the Lab Topology Task 2: Password Recovery on the Comware Switches 	<ul style="list-style-type: none"> Task 3: Manage Files on the Comware Switches
Lab 4: Management of Software and Configuration Files	<ul style="list-style-type: none"> Task 1: Initialize the Lab Topology Task 2: Password Recovery on the Comware Switches 	<ul style="list-style-type: none"> Task 3: Manage Files on the Comware Switches
Lab 5: VLANs	<ul style="list-style-type: none"> Task 1: Initialize the Lab Topology Task 2: Creating VLANs Task 3: Enabling Connectivity in VLAN 11 	<ul style="list-style-type: none"> Task 4: Enable connectivity in VLAN 12 Task 5: Enable connectivity between VLANs 11 and 12
Lab 6: IP Services	<ul style="list-style-type: none"> Task 1: Initialize the Lab Topology Task 2: Configure a Comware Switch as a DHCP Server Task 3: Implement DHCP Relay 	<ul style="list-style-type: none"> Task 4: Synchronize Time using NTP Task 5: Implement a Syslog Solution
Lab 7: Spanning Tree Protocol	<ul style="list-style-type: none"> Task 1: Initialize the Lab Topology Task 2: Configure Single Instance STP 	<ul style="list-style-type: none"> Task 3: Configure Multiple Instance STP (Instance 0, 1, 2) Task 4: Examine MSTP Operation with Redundant Links
Lab 8: Link Aggregation	<ul style="list-style-type: none"> Task 1: Initialize the Lab Topology 	<ul style="list-style-type: none"> Task 2: Configure and Verify Link Aggregation
Lab 9: IP Routing	<ul style="list-style-type: none"> Task 1: Initialize the Lab Topology Task 2: Basic VLAN and IP Configuration Task 3: Configure and Verify Static Routing 	<ul style="list-style-type: none"> Task 4: Configure Loopback Interfaces Task 5: Configure OSPF in a Single Area Task 6: Configure Silent (Passive) Interfaces
Lab 10: Intelligent Resilient Framework (IRF)	<ul style="list-style-type: none"> Task 1: Initialize the Lab Topology Task 2: Prepare for IRF Lab Task 3: Establish an IRF Topology 	<ul style="list-style-type: none"> Task 4: Establish Distributed Link Aggregation Task 5: Restore your configurations from Lab 9
Lab 11: Introduction to Intelligent Management Center	<ul style="list-style-type: none"> Task 1: Initialize the Lab Topology Task 2: Configure SNMP Settings on the HPE Devices Task 3: Discover Devices in IMC 	<ul style="list-style-type: none"> Task 4: IMC Management and Reports Task 5: Manage VLANs
Lab 12.1: Configure Basic ACLs	<ul style="list-style-type: none"> Task 1: Establish VLAN 20 Task 2: Add VLAN 20 to OSPF Task 3: Place the client in VLAN 20 Task 4: Plan a basic ACL to protect the server VLAN 	<ul style="list-style-type: none"> Task 5: Create an ACL to protect the Server VLAN Task 6: Test the ACL Task 7: Remove the ACLs Task 8: Save configurations

Lab 12.2: Configure Advanced ACLs	<ul style="list-style-type: none"> Task 1: Control all traffic routed out of the Users VLAN Task 2: Test the ACL Task 3: Control all traffic routed out of the Guest VLAN 	<ul style="list-style-type: none"> Task 4: Test the ACL Task 5: Remove the packet-filters and put the client back to vlan 12 Task 6: Save configurations
Lab 13: Implement QoS	<ul style="list-style-type: none"> Task 1: Establish a baseline of behavior Task 2: Generate congestion Task 3: Set a port priority for all traffic 	<ul style="list-style-type: none"> Task 4: Prioritize traffic by application Task 5: Test the policy
Lab 14.1: Implement OSPF	<ul style="list-style-type: none"> Task 1: Build the topology Task 2: Configure OSPF with one area Task 3: Trace routes 	<ul style="list-style-type: none"> Task 4: Adjust costs to select new routes Task 5: Observe LSA propagation and SPF calculations Task 6: Disable the link between Comware-2 and Comware-3 Task 7: Save configurations
Lab 14.2: Implement Multiple OSPF Areas	<ul style="list-style-type: none"> Task 1: Divide the OSPF system into multiple areas Task 2: Explore the multi-area OSPF AS Task 3: Observe effects of area boundaries on LSA updates Task 4: Configure aggregated area summaries 	<ul style="list-style-type: none"> Task 5: Prohibit advertisements of area 0 routes in other areas Task 6: Observe effects of route aggregation on LSA updates Task 7: Save configurations
Lab 15.1: Establish an eBGP Session	<ul style="list-style-type: none"> Task 1: Build the topology Task 2: Configure a BGP session to ISP1 on the company router Task 3: Configure BGP sessions on the ISP1 router (Comware-3) 	<ul style="list-style-type: none"> Task 4: Create a BGP connection that uses authentication Optional: Task 5: backup the configurations
Lab 15.2: Advertise and Receive Routes Using eBGP	<ul style="list-style-type: none"> Task 1: Explore the BGP routing table Task 2: Advertise a route in BGP Inject a network into BGP using a null route (Comware-2) Inject a network into BGP using a null route (Comware-3) Task 3: Connect the company router to the OSPF AS 	<ul style="list-style-type: none"> Task 4: Advertise a default route in OSPF Task 5: Test the routing Task 6: Filter other ISP routes from BGP advertisements Observe the problem Solve the problem
Lab 16.1: Configuring PIM-DM	<ul style="list-style-type: none"> Task 1: Restore your switch configuration Task 2: Verify the topology Task 3: Prepare the multicast sender and receiver Task 4: Enable IGMP on users' default router (Comware-4) 	<ul style="list-style-type: none"> Task 5: Enable PIM-DM on routers between the receivers and source Task 6: Stream multicast traffic Task 7: Save configurations
Lab 16.2: Configuring PIM-SM	<ul style="list-style-type: none"> Task 1: Restore your switch configurations Task 2: Prepare the multicast sender and receiver Task 3: Enable multicast routing and IGMP on receivers' default 	<ul style="list-style-type: none"> Task 4: Enable PIM-SM on routers between the source and receivers Task 5: Configure a static RP Task 6: Stream multicast traffic Task 7: Configure dynamic RPs

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H8D09S C.00, August 2018