

HPE Digital Learner FlexFabric Content Pack

HPE Content Pack number	CP003
Content Pack category	Category 1
Content Pack length	20 Hours
Learn more	View now

The first part of this Content Pack introduces network professionals to the basic features of modern networks through a series of HPE Networking Fundamental concepts short videos. The second part covers HPE FlexFabric Comware advanced features (IRF, MDC and EVI) with self-paced hands-on labs. Participants will learn how these technologies are implemented in the HPE Comware 7 platform.

Why HPE Education Services?

- IDC MarketScape leader 5 years running for IT education and training*
- Recognized by IDC for leading with global coverage, unmatched technical expertise, and targeted education consulting services*
- Key partnerships with industry leaders OpenStack®, VMware®, Linux®, Microsoft®, ITIL, PMI, CSA, and SUSE
- Complete continuum of training delivery options—self-paced eLearning, custom education consulting, traditional classroom, video on-demand instruction, live virtual instructor-led with hands-on lab, dedicated onsite training
- Simplified purchase option with HPE Training Credits

Audience

This course is intended for network or systems administrators, network engineers and consultants.

Content Pack components

This Content Pack consists of the following 12 courses:

- HPE Networking Fundamentals
 - OSI Model
 - Binary
 - Data Flows
 - IP Subnetting
 - IP Addressing
 - TCP and UDP
 - VLANs
 - Routing
 - Spanning Tree

- HPE FlexFabric Comware Advanced Features
 - Intelligent Resilient Framework (IRF)
 - Multitenant Device Context (MDC)
 - Ethernet Virtual Interconnect (EVI)

Content Pack objectives

By the end of the course, you should be able to meet the following objectives:

- Understand some of the HPE Networking Fundamentals key concepts
- Understand and configure some of the HPE FlexFabric Comware Advanced Features
- Understand the significance of IRF, MDC and EVI

Recommended learning

Students should possess experience with networking and common LAN protocols.

Detailed Content Pack outline

HPE Networking Fundamentals - OSI Model

This OSI Model video explains the reasons for using the OSI model and then explains each of the seven layers of the OSI model. It also explains the encapsulation and de-encapsulation process used in the OSI model. The differences between the TCP/IP Model and OSI Model are explained.

Outline

- Why the OSI model?
- Layers of the OSI model
- How traffic flows between hosts
- Sniff the wire using Wireshark

HPE Networking Fundamentals - Binary

This video explains the basics of binary. Converting a decimal value and IP address to binary and vice versa are explained and demonstrated.

Outline

- Why binary?
- Overview
- Converting an IP address to binary

HPE Networking Fundamentals - Data Flows

This video discusses the basics of Ethernet. The video starts with a discussion of unicast, broadcast and multicast. It then continues with explanations of Ethernet 10base2, CSMA/CD, MAC addresses, collision domains, broadcast domains, UTP cabling including categories (Cat 1 to 7a), T568A, T568B, straight through cables, cross over cables, auto crossover (auto MDI/MDIX) and DAC cables. Then the video discusses the flow of data in a network containing hubs, bridges and switches. Detailed examples of frame flow when using the various devices. Next the video discusses the flow of data in a network containing routers. Concepts such as ARP, routing tables are demonstrated and explained.

Outline

- Types of communication
- CSMA/CD
- Hubs
- Bridges
- Switches
- Routers
- Packet flows

HPE Networking Fundamentals - IP Subnetting

This video explains the reasons for subnetting and then demonstrates two methods to work out the subnet address, first host, last host and broadcast address when given an IP address and subnet mask. The two methods discussed are the binary method and quick method. The video demonstrates how to work out subnets for a given number of hosts or subnets. The formulas 2^n and $2^n - 2$ are discussed.

Outline

- Subnetting method 1 – Binary method
- Subnetting method 2 – Quick method
- How to subdivide a network or subnet when given:
 - A specific number of hosts required
 - A specific number of subnets required

HPE Networking Fundamentals - IP Addressing

This video explains the basics of IPv4 addressing. Topics such as network addresses, host addresses, IPv4 address format and address classes (A,B,C) are discussed. It also discusses special IPv6 addresses such as RFC1918 addresses, directed broadcasts, local broadcasts, loopback addresses, link local addresses and more.

Outline

- IP Address overview
- Address classes
- Special addresses
- Network masks

HPE Networking Fundamentals - TCP and UDP

This video explains the differences between UDP and TCP. Port numbers well known, Registered, Dynamic and Ephemeral are explained. Sockets are also explained. The UDP header is discussed. It also explains TCP options including the TCP 3 way handshake (SYN, ACK), other TCP flags such as RST and FIN, windowing, sequence numbers, acknowledgement numbers, MSS and flow control. Wireshark demonstration used to explain TCP using a real packet capture.

Outline

- Comparison
- Port numbers
- UDP
- TCP
- TCP 3 way handshake
- Windowing
- Sequence numbers

HPE Networking Fundamentals - VLANs

This video discusses the basics of VLANs. Concepts such as VLAN advantages, physical versus logical topology, access ports/untagged ports, trunk ports/tagged ports are discussed. Explanations of unicast and broadcast frame flows in a VLAN environment. Configuration of Provision and Comware access ports explained. It also discusses 802.1Q, voice VLANs, inter-VLAN routing and frame flows. Configuration of tagged Provision and trunk Comware ports are explained.

Outline

- VLAN overview
- 802.1Q
- VLAN Comware - Provision terminology

HPE Networking Fundamentals - Routing

This video discusses the basics of IPv4 routing, including routed and routing protocols, the advantages and disadvantages of static and dynamic routing protocols, route selection criteria, autonomous systems, EGPs, IGP, distance vector and link state routing protocols, administrative distance or preference, classful and classless routing protocols. It also discusses Distance Vector routing protocols in more detail. Concepts such as clock synchronization, counting to infinity, split horizon, route poisoning, poison reverse, hold down timers and triggered updates are explained. Next it discusses Link State routing protocols. Concepts such as router types (ABR, ASBR, internal, backbone), areas, SPF and topological database are explained.

Outline

- Routed vs. routing protocols
- Static vs. dynamic routing protocols
- Distance vector routing protocols
- Link state routing protocols

HPE Networking Fundamentals - Spanning Tree

This video explains the reasons for subnetting and then demonstrates two methods to work out the subnet address, first host, last host and broadcast address when given an IP address and subnet mask. The two methods discussed are the binary method and quick method. The video demonstrates how to work out subnets for a given number of hosts or subnets. The formulas 2^n and $2^n - 2$ are discussed.

Outline

- 802.1D
- PVST / PVST+
- 802.1w / Rapid Spanning Tree (RSTP)
- PVRST+ / RPVST+
- 802.1s / Multiple Spanning Tree (MSTP)

HPE FlexFabric Comware Advanced Features Intelligent Resilient Framework (IRF)

This self-paced seminar is an introduction to HPE Intelligent Resilient Framework (IRF). HPE IRF creates a large IRF virtual device from multiple devices to provide fast failover, scalability, manageability and high availability. It includes a WBT and hands-on lab where you will configure IRF.

Outline

Module 1: HPE IRF virtualization

Module 2: Traditional network issues

- Slow network convergence
- Management complexity
- Poor performance
- Too many tradeoffs

Module 3: IRF advantages

- Design and operational simplification
- Flatter topology
- Higher efficiency
- Scalable performance
- Faster failover
- Distributed high availability and resiliency
- Geographic resiliency
- In-Service-Software-Updates (ISSU)

Module 4: IRF versus STP

Module 5: Supported Comware products

Module 6: IRF analogy

- Chassis based switches
- Chassis based switches with IRF

Module 7: IRF topologies

- Daisy chain
- Ring

Module 8: IRF components

- Topology collection
- Logical IRF ports
- IRF domain
- Member IDs

Module 9: IRF resiliency

- N:1
- Protocol information
- Link
- IRF port

Module 10: Electing a master

Module 11: Switch configuration files

Module 12: IRF topology and forwarding traffic

- Switching at layer 2
- Routing at layer 3

Module 13: IRF split stack condition

Module 14: Multiple Active Devices (MAD)

- Functions of MAD
- MAD implementations

Module 15: Detecting a split stack

- Comware LACPUs
- BFD

Module 16: Preventing addressing conflicts and

Module 17: IRF configuration steps

HPE FlexFabric Comware Advanced Features Multitenant Device Context (MDC)

This self-paced seminar is an introduction to the HPE Multitenant Device Context (MDC). HPE MDC helps organizations consolidate switch hardware and reduce TCO. It includes a WBT and hands-on lab where you will configure MDC.

Outline		
Module 1: Feature overview	<ul style="list-style-type: none"> MDC overview IRF versus MDC 	<ul style="list-style-type: none"> MDC features MDC applications
Module 2: MDC benefits overview	<ul style="list-style-type: none"> MDC benefits 	
Module 3: Supported platforms	<ul style="list-style-type: none"> Supported products 	
Module 4: Use case 1, datacenter change management	<ul style="list-style-type: none"> Overview Development network 	<ul style="list-style-type: none"> Quality Assurance (QA) network
Module 5: Use case 2, customer isolation		
Module 6: Use case 3, infrastructure and customer isolation		
Module 7: Use case 4, hardware limitation workaround		
Module 8: MDC numbering and naming		
Module 9: Architecture	<ul style="list-style-type: none"> Control plane ASICS ASIC control 	<ul style="list-style-type: none"> Hardware limits Console ports
Module 10: Design considerations	<ul style="list-style-type: none"> ASIC restrictions 	<ul style="list-style-type: none"> Platforms
Module 11: Configuration Steps		
Module 12: Network virtualization types	<ul style="list-style-type: none"> RF MDC 	<ul style="list-style-type: none"> MDC and IRF
Module 13: IRF based MDC	<ul style="list-style-type: none"> IRF based MDC use bases Virtualization hierarchy MDC and IRF on 12500/12500E 	<ul style="list-style-type: none"> IRF based MDC use bases Virtualization hierarchy MDC and IRF on 12500/12500E
Module 14: MDC and ISSU		
Module 15: MDC deployment best practices	<ul style="list-style-type: none"> Avoid using MDC 1 for production networks MDC Role Based Access Control (RBAC) Use multiple links on different LPUs to prevent IRF 	<ul style="list-style-type: none"> Connect MDC IRF links correctly on 12500/12500E Minimize traffic on MDC IRF-port by deploying MLAG links to ToRs/Servers or other devices
Module 16: Sample MDC configurations	<ul style="list-style-type: none"> Admin MDC 	<ul style="list-style-type: none"> Non-default MDC

HPE FlexFabric Comware Advanced Features Ethernet Virtual Interconnect (EVI)

This self-paced seminar is an introduction to the HPE Ethernet Virtual Interconnect (EVI). HPE EVI extends layer 2 networks across data centers and enables VMs to be easily moved to any data center. It includes a WBT and hands on lab where you will configure EVI.

Outline		
Module 1: EVI Overview	<ul style="list-style-type: none"> • Introduction to EVI • • EVI Operation 	<ul style="list-style-type: none"> • EVI Configuration
Module 2: Supported Products	<ul style="list-style-type: none"> • Chassis Models 	<ul style="list-style-type: none"> • • Router Models
Module 3: EVI Operation	<ul style="list-style-type: none"> • EVI Terminology • EVI Concepts • EVI Network 	<ul style="list-style-type: none"> • EVI Neighbor Discovery • EVI Traffic Forwarding process
Module 4: EVI Traffic Optimization	<ul style="list-style-type: none"> • ARP Suppression 	<ul style="list-style-type: none"> • Selective Flooding
Module 5: EVI IS-IS Maximum MAC Address Announcement		
Module 6: Design Considerations	<ul style="list-style-type: none"> • Automatic Loop Avoidance 	
Module 7: Distributed L3 Gateway	<ul style="list-style-type: none"> • Active/Active DC Design 	<ul style="list-style-type: none"> • Active/Stand-by DC Design
Module 8: WAN Link Load Balancing		
Module 9: Location Awareness		
Module 10: Encryption Support	<ul style="list-style-type: none"> • Layer 2 Based Encryption - MacSec 	<ul style="list-style-type: none"> • Layer 3 Based Encryption - IPsec
Module 11: Hybrid Cloud Solution with EVI /VSR		
Module 12: HSR/MSR for End to End DC Cloud Solution		
Module 13: Configuration Steps for EVI	<ul style="list-style-type: none"> • Basic Configuration Steps for EVI <ul style="list-style-type: none"> – Step 1: Configure the EVI Site-ID (Optional) – Step 2: Configure the Transport Interface – Step 3: Configure the EVI Tunnel Interface – Step 4: Configure the EVI Network ID – Step 5: Configure the Extended VLANs – Step 6: Configure ENDS 	<ul style="list-style-type: none"> – Step 7: Configure ENDC – Step 8: Verify – Advanced Configuration Options – Advanced Step 9: ARP Suppression – Advanced Step 10: Selective Flooding – Advanced Step 11: Virtual-system IDs

Learn more at
www.hpe.com/ww/digitallearner

www.hpe.com/ww/digitallearner-contentpack

Interested in purchase of this Content Pack as a stand-alone WBT? [Contact Us](#) for information on purchasing this Content Pack for individual use.

Follow us:



© Copyright 2018 Hewlett Packard Enterprise Development LP. The information contained herein is subject to change without notice. The only warranties for Hewlett Packard Enterprise products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. Hewlett Packard Enterprise shall not be liable for technical or editorial errors or omissions contained herein.

Microsoft is either a registered trademark or trademark of Microsoft Corporation in the United States and/or other countries. The OpenStack Word Mark is either a registered trademark/service mark or trademark/service mark of the OpenStack Foundation, in the United States and other countries and is used with the OpenStack Foundation's permission. We are not affiliated with, endorsed or sponsored by the OpenStack Foundation or the OpenStack community. Pivotal and Cloud Foundry are trademarks and/or registered trademarks of Pivotal Software, Inc. in the United States and/or other countries. Linux is the registered trademark of Linus Torvalds in the U.S. and other countries. VMware is a registered trademark or trademark of VMware, Inc. in the United States and/or other jurisdictions.