Szkolenie: HPE
Managing HPE Comware

Hewlett Packard Enterprise

Cel szkolenia:

This course introduces network professionals to the basic features of modern networks such as setup, protecting management access, VLANs, IP services, LACP, DRNI, static routing, dynamic routing with OSPF, ACLs, QoS and redundancy technologies such as HPE Intelligent Resilient Framework (IRF). This course also gives network professionals an opportunity to plan for and implement core networks utilizing HPE Comware devices. Participants configure HPE Intelligent Resilient Framework Multi-Active Detection, Multi Area OSPF, BGP, Multicast, and Virtual Routing technologies. This course covers both basic and advanced topics; learners experience both theory and hands-on with real hardware through lab exercises.

This course is the combination of:

- HQ7C2: HPE Comware Configuration and Implementation Fundamentals
- H61M9: HPE Comware Core Technologies

Course objectives

By the end of this class, you should be able to:

- Identify HPE Comware networking protocols and configuration
- Prepare to configure and manage HPE Comware devices
- 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 HPE Comware switch operating system
- Configure VLANs on HPE Comware switches
- Implement basic routing on directly connected VLANs or links
- Configure a HPE Comware switch for DHCP server and DHCP relay
- Interpret HPE Comware logs
- Differentiate between static and dynamic link aggregation
- Configure and troubleshoot link aggregation on HPE switches
- Configure Distributed Resilient Network Interconnect (DRNI)
- Identify applications for static and dynamic routing
- Use best practices for IP addressing and OSPF routing when implementing a network design
- Configure single-area OSPF routing

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- Configure Access Control Lists (ACLs)
- Configure Quality of Service (QoS)
- Understand the basic operation of HPE Intelligent Resilient Framework (IRF)
- Identify HPE Intelligent Resilient Framework advantages when compared with other technologies that manage redundant paths
- Configure and verify a simple HPE Intelligent Resilient Framework topology
- Implement and deploy HPE Intelligent Resilient Framework with Multi-Active Detection technologies to protect your network
- 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 Multicast (Protocol Independent Multicast) along with IGMP technologies
- Understand, describe and configure Multi-CE (MCE) which enables a switch to function as a customer edge (CE) device of multiple VPN instances

Audience

This course is for network administrators and engineers who plan to deploy HPE Comware switches into new or existing networks.

Plan szkolenia:

- Module 1: Introduction
  - Introduce HPE Comware networking protocols and configuration
  - Prepare to configure and manage HPE Comware devices
  - Lab Activity 1: Accessing HPE vLabs
    - Connect to HPE vLabs
    - Connect to the 5945 switches, server, and client
- Module 2: Basic Setup
  - Initiate a console connection to an HPE Comware switch
  - Describe characteristics and purpose of each privilege level
  - Navigate the HPE Comware CLI
  - Perform basic configuration
  - Configure interfaces
  - Troubleshoot common problems with basic connectivity
  - Lab Activity 2: Basic Setup
    - Define the HPE Comware switch password and host name
    - Explore the HPE Comware CLI

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- Set up and configure required interfaces
- Assign an IP address to the VLAN 1 interface
- Access the switches using REST APIs
- Check basic connectivity

- Module 3: Protecting Management Access
  - Apply password protection to local and remote authentication
  - Associate user roles with password and scheme authentication
  - Implement remote management with SSH, Telnet, and SNMP access
  - Lab Activity 3: Protecting Management Access
    - Define super passwords on HPE Comware switches
    - Restrict privileges for certain users
    - Set up SSH access on HPE Comware switches and allow access by various users
    - Use password control
- Module 4: Managing Software and Configurations
  - Understand the boot up process of HPE Comware switches
  - Understand how to use the flash file system on HPE Comware switches
  - Upgrade operating systems on HPE Comware switches
  - Manage configuration files on HPE Comware switches
  - Lab Activity 4: Managing Software and Configurations
    - Access the boot ROM menu
    - Perform password recovery on HPE Comware switches
    - Manage files in flash memory on HPE Comware switches
    - Manage software files on the HPE Comware switches
    - Manage configuration files on the HPE Comware switches
- Module 5: VLANs
  - Understand the use of VLANs and the various types of VLANs
  - Choose the correct VLAN port type for various situations
  - Configure VLANs and assign IP addresses to VLAN interfaces
  - Implement basic routing on directly connected VLANs
  - Verify connectivity within and between VLANs
  - Lab Activity 5: VLANs
    - Understand the use of VLANs and the various VLAN types
    - Configure access and trunk ports on HPE Comware switches
    - Implement directly connected routing on HPE Comware switches
    - Verify VLAN configuration and connectivity
- Module 6: IP Services

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- After completing this module, you should be able to configure the following services
  - DHCP server and DHCP relay
  - NTP
  - Logging
  - DNS
- Lab Activity 6: IP Services
  - Configure an HPE Comware switch as a DHCP server
  - Implement DHCP relay
  - Synchronize time using NTP
  - Implement a syslog solution

- Module 7: Link Aggregation
  - Introduction to link aggregation
  - Compare and contrast the different link aggregation types
  - Understand how the link aggregation control protocol works (LACP)
  - Configure and verify link aggregation on HPE Comware switches
  - Lab Activity 7: Link Aggregation
    - Configure and verify static link aggregation on HPE Comware switches
    - Configure and verify LACP link aggregation on HPE Comware switches
    - Link aggregation troubleshooting and verification

- Module 8: DRNI - Distributed Resilient Network Interconnect
  - Describe DRNI features
  - Understand DRNI basic operations
  - Understand the basic configuration of a DRNI system
  - Configure and verify DRNI on HPE Comware switches
  - Lab Activity 8: Distributed Resilient Network Interconnect (DRNI)
    - Setup up DRNI
    - Configure a multi-chassis aggregate link
    - Verify redundancy

- Module 9: IP Routing
  - Describe how HPE Comware switches route traffic between directly networks
  - Describe the operation of static routes and configure static routes
  - Describe the basic operation of OSPF and configure singlearea OSPF
  - Lab Activity 9: IP Routing with Single Area OSPF
    - Configure and verify static routing
    - Create loopback interfaces
    - Configure OSPF in a single area

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- Configure silent interfaces

- Module 10: ACLs - Access Control Lists
  - Define ACLs and identify the criteria by which ACLs select traffic
  - Configure ACLs on HPE Comware based switches to select given traffic
  - 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
  - Lab Activity 10: Access Control Lists (ACLs)
    - Add a guest VLAN and guest user
    - Enable QoS and ACL hardware resource mode
    - Configure a basic access control list (ACL) to protect the server VLAN
    - Control all traffic routed out of the guest VLAN with an advanced ACL

- Module 11: QoS - Quality of Service
  - Configure HPE Comware 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
  - 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 Comware switch will assign to specific traffic and, if necessary, adjust the mark
  - Lab Activity 11: Quality of Service (QoS)
    - Enable QoS and ACL hardware resource mode
    - Establish a baseline of behavior without congestion
    - Generate congestion and observe the effects on traffic
    - Prioritize all traffic on a given port
    - Prioritize traffic by application

- Module 12: HPE Intelligent Resilient Framework (IRF)
  - Understand the technologies and concepts involving HPE Intelligent Resilient Framework
  - Understand the advantages that HPE Intelligent Resilient Framework provides
  - Describe an HPE Intelligent Resilient Framework split fabric and how the multi-active detection (MAD) protocol deals with this problem
  - Configure a simple HPE Intelligent Resilient Framework topology
  - Verify and troubleshoot an HPE Intelligent Resilient Framework topology
  - Lab Activity 12: HPE Intelligent Resilient Framework (IRF)
    - Establish an HPE Intelligent Resilient Framework topology

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        - Configure distributed link aggregation
        - Restore your original configurations
- Module 13: HPE IRF Multi-Active Detection
    - Describe the HPE Intelligent Resilient Framework Multi-Active Detection functionality
    - Configure BFD Multi-Active Detection
    - Lab Activity 1: Configuring HPE IRF MAD
        - Establish an HPE IRF topology
        - Establish distributed link aggregation
        - Configure BFD Multi-Active Detection
        - Test BFD Multi-Active Detection
        - Restore your original configurations
- Module 14: Multi-Area OSPF
    - Describe area types
    - Describe LSA types (Type 3)
    - Explain summarization
    - Explain external route redistribution
    - Lab Activity 2: IP Routing with Multi-Area OSPF
    - Lab 2.1: Implement Single-Area OSPF
        - Build the topology
        - Configure OSPF with one area
        - Explore and observe Multi-Area LSAs
        - ABR Route Summarization and Route Filtering (notadvertise)
        - Observe effects of route aggregation
    - Lab 2.2: Implement Multi-Area OSPF
        - Divide the OSPF system into multiple areas
        - Explore the multi-area OSPF AS
        - Configure aggregated area summaries
        - Prohibit advertisements of area 0 routes in other areas
    - Lab 2.3: Implement Multi-Area OSPF
        - Reconfigure routers to support new topology
        - Configure the ASBR
        - Add a redundant connection to the new site
        - Configure a redundant ASBR
        - Configure stub areas
        - Configure totally stub areas
        - Add a redundant ABR

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- Module 15: IP Routing Using BGP Protocol
  - Explain BGP concepts
  - Explain BGP peering
  - Describe BGP BFD
  - Describe BGP route filtering
  - Lab Activity 3: IP Routing Using BGP protocol
  - Lab 3.1: Configuring topology and establishing BGP sessions
    - Build the topology
    - Configure a BGP session to ISP1 on the company router
    - Configure a BGP sessions on the ISP1 router
    - Configure BGP sessions between ISP1 and ISP2
    - Configure authenticated BGP sessions between local AS and ISP2
- Lab 3.2: Advertise and receive routes using eBGP
  - Explore the BGP routing
  - Inject a network into BGP using a null route
  - Inject a network into BGP using a null route
  - Connect the company router to the OSPF AS
  - Advertise a default route in OSPF
  - Test the routing
  - Filter other ISP routes from BGP advertisements
- Module 16: Multicast (IGMP/PIM)
  - Explain and configure IGMP protocol
  - Explain and configure PIM dense mode
  - Explain and configure PIM sparse mode
  - Lab Activity 4: Configuring IGMP and PIM-Sparse Mode
    - Restore and verify the network topology
    - Prepare the multicast sender and receiver
    - Enable multicast routing and IGMP on receivers’ default gateway
    - Enable PIM-SM on routers between the source and receivers
    - Configure a static RP
    - Stream multicast traffic
    - Configure dynamic RPs
- Module 17: MCE (Multi-VPN Instance Customer Edge) aka VRF-Lite
  - Describe and configure MCE and vpn-instance
  - Describe route leaking
  - Lab Activity 5: Configuring Multi-VPN Instance Customer Edge (aka VRF-Lite)

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- Lab 5.1: Configuring basic MCE (VRF Lite)
  - Restore devices to lab default settings
  - Configure backbone IP connectivity
  - Configure IP VPN services for Customer A
  - Configure OSPF dynamic routing inside IP VPN instance
- Lab Activity 5.2: Configuring advanced MCE (VRF Lite)
  - Configuring IP VPN instance routing limits
  - Configuring route leaking between VPN instances

Wymagania:

Prior to this course, students should have basic networking experience. It does not require completion of any previous HPE networking courses.

Poziom trudności

Certyfikaty:

The participants will obtain certificates signed by HPE (course completion).

Prowadzący:

Authorized HPE Trainer.

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