Szkolenie: HPE
Managing HPE B-Series Switches

Cel szkolenia:

This course is designed for HPE B-series SAN administrators and is a follow-up to the HPE Introduction to SAN course. (This course does not cover SAN basics since those are discussed in the Introduction to SAN training.) This course introduces necessary FC theory such as routing, trunking, addressing, and services as well as B-Series associated topics such as proprietary features, HPE B-Series SAN management and monitoring options, SAN extension technologies, advanced SAN security, and hardware installation. NVME-oF theory is also presented. All practical parts are based on HPE B-Series SAN devices. This course helps students gain the experience needed to tackle the challenges of working in medium-sized and enterprise-class HPE B-Series SAN environments.

Course objectives

After completing this course, you should be able to:

- Present the B-series portfolio
- Perform an out-of-box initial configuration
- Configure initial security
- Verify switch status
- Identify important fabric parameters
- Perform common administrative tasks
- Explain chassis, fabric, and switch names
- Discuss the default port name
- Describe the Fibre channel networking model
- Recall the format of a WWN
- Describe Fibre Channel topologies
- Identify Fibre Channel addressing
- Identify the node and port types
- Identify the different class of service
- Describe the frame structure
- Describe the role of the principal switch
- Identify exchange-based routing
- Describe in-order delivery (IOD)

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- Manage interswitch links (ISL)
- Describe the benefits of trunking
- List the fabric services well-known addresses
- Explain zoning
- Explain quality of service (QoS) SID/DID traffic prioritization in the fabric
- Discuss NVMe-oF standard, types, and building blocks
- Discuss SAN extension technologies and implementations
- Explain the use and effects of buffer (BB) credits on distance and speed
- Discuss the different long distance settings and the supported distances for B-series switches
- Identify when a long distance license is required
- Describe the use of long wave SFPs
- Explain the limitations of long distance connection when using trunking
- Describe Fibre Channel over IP (FCIP) and its role in SAN extension
- Describe FCIP circuits, trunking, and tunnels
- Describe adaptive rate limiting and FCIP QoS
- Configure and verify a VE_Port-to-VE_Port connection
- Discuss FCIP performance and security
- Explain the Fibre Channel-to-Fibre Channel routing (FC-FC routing)
- Describe Fibre Channel-to-Fibre Channel routing terminology, concepts, and theory
- Explain virtual fabric terminology
- Describe switch connection control (SCC)
- Explain device connection control (DCC)
- Describe fabric configuration server (FCS)
- Explain authentication policy for fabric elements
- Distinguish the difference between the security policies
- Apply policy distribution
- Identify IP filter policies (IPFILTER)
- Explain in-flight encryption
- Describe technologies driving SAN management
- Discuss HPE B-series SAN management today
- List Fabric Vision technologies
- Talk about Flow Vision
- Describe monitoring and alerting policy suite (MAPS)
- Discuss Fabric Vision licensing
- Back up and manage configuration files
- List the steps for performing a successful firmware upgrade

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- Describe troubleshooting techniques
- Manage a data gathering process
- List common SAN problems and their solutions
- Outline topology choices and design considerations
- Describe SAN performance factors
- Identify levels of high availability in SAN architecture

Audience

This course is ideal for intermediate to advanced IT professionals seeking a learning path that includes knowledge of FC-SAN technologies and experience in HPE B-series SAN environments.

Plan szkolenia:

- Module 1: Installation and Configuration
  - HPE B-series SAN portfolio
  - Installation and configuration of a new switch
  - Switch configuration procedure
  - Activate a license feature
  - Setting names
  - Configuring syslog support
  - Checking switch status
  - Configuring 10 Gb/s Fibre Channel on supported platforms
  - Taking a configuration backup
  - Booting a switch
- Module 2: Fibre Channel Theory
  - Describe the Fibre Channel networking model
  - Different class of service
  - FC frame structure
  - Flow control
  - Recall the format of a WWN
  - Fibre Channel topologies
  - Port types
  - Fibre Channel addressing
  - NPIV technology and use-cases
- Module 3: FCP Routing and Trunking

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- Fabric terminology
- Principal switch
- Fabric initialization
- Frame routing - FSPF (Layer 2 routing)
- Exchange-based routing
- ISL Trunking
- Inter-chassis links
- Routing over trunks
- Trunks monitoring
- Deskew parameter
- Types of trunking

- Module 4: Fibre Channel Services
  - Link services
  - Fabric services
  - Well-known addresses
  - Simple Name Service
  - Fabric login sequence
  - Zoning overview and types
  - Zoning management and administration
  - Default zoning
  - Zone fabric locking
  - Zoning granularity
  - Adding a new B-series switch to a zoned fabric
  - Zoning best practices
  - Peer Zoning
  - Target-driven peer zoning
  - QoS zoning
- Module 5: NVMe-oF
  - What is NVME?
  - Why NVMe over fabrics
  - HPE Storage Networking - how NVMe improves performance
  - NVMe over fabrics (NVMe-oF) summary
  - NVMe over FC (FC-NVMe)
  - NVMe over Ethernet
- Module 6: Long Distance Connectivity
  - SAN extension technologies and implementations

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- Wave Division Multiplexing (WDM) overview
- CWDM
- DWDM
- FC over SONET/SDH
- Fabric OS Extended Fabrics
- Buffer to buffer flow control
- Configuring Extended Fabrics
- Trunking over long distance fabrics
- Protective switching
- Buffer-to-buffer credit allocation and management

- Module 7: FCIP
  - Fibre Channel over IP (FCIP) and its role in SAN extension
  - FCIP circuits, trunking, and tunnels
  - FCIP performance
  - FCIP compression
  - FCIP selective acknowledgement
  - FastWrite and Open Systems Tape Pipelining
  - Adaptive rate limiting and FCIP QoS
  - FCIP best practices
  - FCIP advantages and disadvantages
  - Configure and verify a VE_port-to-VE_Port connection
  - FCIP performance and security
  - FCIP analysis
  - B-Series distance extension product lines
- Module 8: FC-FC Routing and Virtual Fabrics
  - Fibre Channel-to-Fibre Channel routing (FC-FC routing)
  - SAN scaling
  - LSAN zones
  - Fabrics and EX_Port
  - EX_port trunking
  - Integration of Fibre Channel routing and FCIP
  - Logical fabrics and ISLs
  - Virtual fabrics theory
  - Fabric and Domain ID
  - Virtual fabric configuration
- Module 9: Security

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- Connection control (SCC) policy
- Device connection control (DCC) policy
- Fabric configuration server (FCS) policy
- Authentication policy for fabric elements
- Security policy distribution and consistency
- Identify IP filter policies (IPFILTER)
- B-series role-based access control (RBAC)
- Predefined and user-defined roles
- Setting password rules
- Authentication options and multi-factor authentication
- Authentication policy for fabric elements
- Switch and device authentication policy modes
- Setting up the authentication protocol (FCAP)
- Security and encryption
- In-flight compression and encryption

- Module 10: Management
  - Technologies driving SAN management
  - B-series SAN management interfaces and tools
  - Web tools
  - SANnav management software
  - HPE GreenLake for Storage Fabric Management
  - Simple network management protocol (SNMP) overview
  - B-series SNMP Fabric OS commands
  - REST(ful) API theory and usage
- Module 11: B-series Performance Monitoring
  - Fabric Vision technologies
  - Flow Vision overview
  - Flow definition and monitoring and management
  - SIM port concept
  - IO insight and VM Insight
  - Monitoring and alerting policy suite (MAPS) introduction
  - MAPS rules, policies, and dashboard
  - Fabric performance impact (FPI) monitoring
  - Configuration and operational monitoring policy automation services suite (COMPASS)
  - Other features
  - Discuss Fabric Vision licensing

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- Module 12: Maintenance and Troubleshooting
  - Back up and manage configuration files
  - Firmware upgrade
  - Troubleshooting techniques
  - Common troubleshooting problems and tools
  - End-to-end troubleshooting - SAN analytics
    - Features and capabilities
    - Traffic optimizer
    - Self-healing
    - Use cases
    - Instant visibility of SAN health
- Module 13: SAN Design
  - Topology choices and design considerations
  - HPE standard supported SAN topologies
    - Single-switch fabric
    - Cascaded fabric
    - Ring fabric
    - Meshed fabrics
    - Core-edge fabric
  - Initial cost of deployment
  - SAN performance factors
    - Topology data access usage
    - ISL oversubscription
    - Hop latency
    - Device attachment points
    - Data locality
    - Performance guidelines within the SAN
    - Recommendations for switch ISL connectivity
  - Levels of high availability in SAN architecture
  - Single point of connectivity knowledge
  - HPE SAN Design Reference Guide
  - Infrastructure documentation
- Lab 1: Switch Exploration
  - Connecting to a fabric switch using web tools
  - Exploring main web tools sections
  - CLI basics

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- Basic switch status commands
- Viewing port status
- Enabling/disabling the switch
- Enabling/disabling a port
- Changing the switch domain ID
- Backing up system configuration settings

- Lab 2: Administration and Configuration
  - Fibre Channel theory
  - Identifying port types
  - Viewing port configuration
  - Persistent port disabling
  - Configuring a port name
  - Denying F-port mode
- Lab 3: FC - Routing
  - Preparation and locating the principal switch in a fabric
  - Enabling and disabling trunking on switches
  - Display link cost
  - Display FSPF information
- Lab 4: Fabric Zoning
  - Clearing the zoning configurations
  - Setting default zone
  - Configuring WWN zoning via CLI and web tools
- Lab 5: SANnav Preparation
  - Starting the SANnav
  - Setting up discovery
- Lab 6: Long Distance
  - Working with long distance settings from CLI
- Lab 7: Configuring FCIP
  - Initial configuration tasks - connectivity and domain IDs
  - FCIP tunnel configuration
- Lab 8: Virtual Fabrics
  - Preparation - fabric and services
  - Preparation - ports
  - Enabling virtual fabrics
  - Configuring logical switches
  - Relocating ports

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- Configuration verification
- Cleanup

- Lab 9: Security Administration and Configuration
  - Creating a switch connection control policy
  - Creating a device connection control policy
  - Creating new switch user accounts in SANnav
  - Creating user accounts in web tools
  - Working with user privileges
  - Testing the effect of RBAC
- Lab 11: Monitoring
  - Checking external storage
  - Configuring Iometer
  - Performance Monitoring in SANnav
  - Real-time and historical performance data collection/investigation
  - Flow monitoring
  - Setting threshold policies (MAPS)
  - Performance reports
- Lab 12: Troubleshooting
  - Using CLI to obtain information about different switch health aspects
  - Using D_port functionality

Wymagania:

Before attending this course, you should have:

- A good technical understanding of networking and storage concepts
- Basic experience in managing Windows systems
- Completed HPE Introduction to SAN (H41BQS) or have knowledge of SAN fundamentals

Poziom trudności



Certyfikaty:

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

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Prowadzący:

Authorized HPE Trainer.

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