

# Tytuł szkolenia: HPE SAN Essentials II: Advanced B-series Networking

Kod szkolenia: HM9Q2S

## Wprowadzenie

This course is designed for advanced B-Series SAN administrators and is a follow-up to the SAN Essentials I: Administration Fundamentals class. It does not cover basics since those are discussed in the Fundamentals training. This course introduces new topics such as advanced Fibre Channel (FC) features, additional B-Series management options, SAN extension technologies, advanced SAN security, and hardware installation. All practical parts are based on B-Series devices. This course helps students gain the experience needed to tackle the challenges of working in medium-sized and enterprise-class B-Series SAN environments.

## Adresaci szkolenia

Intermediate to advanced technical professionals seeking a learning path that includes more advanced knowledge of SAN technologies and experience in HPE B-series SAN environments.

### Prerequisites

- HPE SAN Essentials I: Administration Fundamentals (HM9Q1S)
- A good technical understanding of networking and storage concepts
- Basic experience in managing Windows systems

## Cel szkolenia

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

- Explain advanced FC terminology
- Describe the role of the principal switch
- Talk about FCP routing
- Explain ISLs and trunking
- Explain advanced FC concepts, SAN services, and associated well-known addresses
- Describe FC stack, Classes of Service, and frame structure
- Discuss additional zoning types (Peer, TDPZ, TI, QoS) as well as ingress rate limiting
- List and talk about SAN extension options, B-Series Extended Fabrics and Buffer-to-Buffer Credits
- Describe FCIP technology including tunnels, circuits FCIP QoS, performance and security
- Discuss FC-FC routing including definitions and elements
- Talk about Virtual Fabrics including IDs, types of logical switches and links between them
- Present SAN security in both theory and practice (policy distribution, SCC, DCC, FCS policies as well as IP Filter and AUTH policies)
- Talk about performance monitoring on HPE StoreFabric B-series products (Fabric Vision, with focus on Flow Vision and MAPS)
- Talk about additional SAN management options and switch firmware
- Present basic troubleshooting and diagnostics methods by using SAN Network Advisor, Web Tools, and CLI
- Perform Firmware upgrade

## Czas i forma szkolenia

- 14 godzin (2 dni x 7 godzin), w tym wykłady i warsztaty praktyczne.

## Plan szkolenia

### 1. FCP Routing and Trunking

- Fabric Terminology
- Principal switch
- Upstream and downstream links
- Fabric Initialization Process
- Basics of FSPF and frame routing within a fabric
- FCping
- Inter-Chassis Link
- Trunking

### 2. Advanced Fibre Channel Theory and Services

- FC stack and layers
- Class of service
- Frame structure and frame head
- Advanced Fibre Channel terminology
- Flow control
- Link and fabric services
- Well known addresses
- Fabric and N\_Port login sequence
- Registered State Change Notification
- Peer Zoning
- Target Driven Zoning
- QoS zoning
- Virtual Channels implementation
- QoS naming convention
- QoS over routers • QoS configuration
- TI Zoning theory
- TI Zoning implementation
- TI Zone Failover
- TI and FSPF
- TI Zoning configuration
- Ingress Rate Limiting

### 3. Long Distance Connectivity

- Why extend the SAN?
- Long distance cabling
- HPE Supported SAN extension technologies
- Cables and SFPs
- C/DWDM
- Fabric OS Extended Fabrics theory and configuration
- Working with Buffer-to-Buffer Credits

### 4. Fibre Channel over IP (FCIP)

- FCIP and its role in SAN extension
- FCIP Tunnels
- FCIP Circuits
- FCIP Trunking
- FCIP performance and security
- Selective Acknowledgement
- Compression
- Adaptive Rate Limiting (ARL)
- FCIP QoS
- FastWrite and Open Systems Tape Pipelining
- FCIP network best practices, advantages and disadvantages
- Basic configuration and analysis overview

- FC-FC Routing & Virtual Fabrics Introduction
- SAN scaling and Fabric services limits
- LSAN Zoning
- EX\_Ports
- Domains
- Trunking
- Integration of Fibre Channel routing and FCIP
- Supported platforms
- Virtual fabrics overview and terminology
- Logical Switch types
- FIDs and Domain IDs
- ISL Sharing
- ISL Types
- Basic configuration
- VF Supported platforms

#### **5. SAN Security**

- Security policies list
- Policy Database Distribution
- Switch Connection Control (SCC) policy
- Setting Device Connection Control (DCC) policy
- Fabric Configuration Server (FCS)
- FCS Switch Operations
- Authentication policy for fabric elements (FCAP and DHCHAP)
- IP Filter policies and rules
- How to configure them
- Encryption and compression

#### **6. Performance**

- B-Series Fabric Vision Introduction
- Fabric Vision Elements
- Dashboards
- Flow Vision Overview
- What is Flow?
- Flow Vision Elements - Flow Monitor
- Flow Monitor Example
- Flow Vision Elements - Flow Learning
- Flow Learning Example
- Flow Vision Elements - Flow Generator
- SIM port attributes and configuration
- Flow Generator Example
- Flow Generator + Monitor
- Flow Generator + Monitor Example
- Flow Vision Elements - Flow Mirroring
- Flow Mirror Example
- Flow Vision - IO Insight and VM Insight
- Monitoring and Alerting Policy Suite (MAPS)
- MAPS monitoring categories
- MAPS Groups and Conditions
- MAPS Rules, and Policies
- MAPS Dashboard
- Port monitoring using MAPS
- Monitoring Flow Vision Flow Monitor data with MAPS
- Fabric performance impact monitoring using MAPS
- Other Features: Fabric Performance Impact (FPI) Monitoring
- Other Features: Configuration and Operational Monitoring Policy Automation Services Suite (COMPASS)

- Other Features: ClearLink Diagnostics, Forward Error Correction (FEC), Credit Loss/Buffer Credit Recovery
- Fabric Vision licensing
- SAN Network Advisor and Fabric Vision technology

#### **7. Management and Troubleshooting**

- HPE SAN Network Advisor - its features and editions
- Configuration backup
- CP details for B-Series switches and Directors
- Firmware management and upgrade process
- General approach
- Information to collect
- Supportshow and supportsave
- Common issues
- Tools and features to use
- Diagnostic Tools and D\_Port use
- Checking FRUs status via SAN Network Advisor, Web Tools, and CLI

#### **8. Detailed lab outline**

- FC Routing (locating Principal Switch, changing)
- Link Cost, working with trunks)
- Fabric Channel Theory (Optional)
- Configuring Traffic Isolation zoning (CLI)
- Installing and configuring SAN Network Advisor
- Configuring Traffic Isolation zoning (Web Tools)
- TI zone checking (SNA)
- Configuring QoS zoning (SNA)
- Long distance (managing buffers)
- Configuring FCIP (SNA)
- Configuring Virtual Fabrics
- Security - users and RBAC (SNA)
- Fabric Vision (Flow Vision, MAPS, thresholds, reporting) (SNA)
- Configuring and troubleshooting zoning (SNA)
- Checking health and troubleshooting switches (SNA)
- Checking health and troubleshooting switches (CLI)
- D\_port functionality