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# Tytuł szkolenia: HPE SAN Essentials I: Administration Fundamentals

Kod szkolenia: HM9Q1S

## Wprowadzenie

This course is designed for new or entry-level HPE B-series SAN administrators. It provides a comprehensive understanding of everyday administration within an HPE SAN solution, covering a broad range of technologies and concepts such as FC, iSCSI, and FCoE. It discusses basics and building blocks of FC and IP-SAN with examples based on HPE B-series products, as well as the role of SAN-enabled hosts and disk targets. HPE B-series SAN features and management options are also presented. Other topics include data protection, basic SAN security, and performance aspects of SAN components. Please note that advanced technologies are only introduced in this course, while they are fully covered in the SAN Essentials II: Advanced B-series Networking class. This training helps students gain the experience needed to tackle the challenges of working in medium-sized and enterprise-class HPE B-series SAN environments. This course covers general SAN technologies and HPE StoreFabric B-series specific topics.

## Adresaci szkolenia

New or entry-level technical professionals seeking a learning path that includes both conceptual knowledge of SAN technologies and experience in HPE B-series SAN environments.

### Prerequisites

- Basic technical understanding of concepts and terminology related to networking and storage
- Basic experience in managing Windows systems

## Cel szkolenia

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

- Describe SAN and SAN benefits
- List SAN components
- Present the overall HPE SAN portfolio
- Identify the differences between DAS, NAS and SAN
- Compare different data access methods
- Talk about FC topologies
- Discuss WWN identifiers and FC addressing
- Talk about basic switch features and configuration parameters
- Perform initial switch installation, configuration and verification
- Describe the role of a host in a SAN network and host-related technologies including NPIV and load balancing
- Present the role of storage in a SAN network and storage-related technologies including disks and interfaces types, encryption, deduplication and VVOLS overview
- Explain basic FC concepts and SAN services, such as zoning and name server
- Talk about basic HPE B-series SAN management options and technologies
- Describe iSCSI protocol and HPE Nimble storage array as an iSCSI-based product example
- Talk about FCoE technologies including building blocks and how it compares to FCIP and iSCSI
- Present the theory of SAN security and basic HPE B-series based implementation as well as authentication options
- Talk about data protection (backup, replication) including theory, topologies, technologies and related HPE products: HPE StoreOnce, tape, HPE Cloud Bank Storage and HPE RMC
- Cover SAN and storage planning performance aspects and monitoring options
- Design and document SAN

## Czas i forma szkolenia

- 21 godzin (3 dni x 7 godzin), w tym wykłady i warsztaty praktyczne.

## Plan szkolenia

### 1. Introduction

- SAN definition, benefits and goals
- High-speed backup and high availability
- Server and storage consolidation
- DAS, NAS, and SAN concepts and comparisons
- SAN considerations
- Tier storage
- SAN components
- Host, target and interconnect device characteristics
- SAN portfolio overview
- Power-on sequence

### 2. Fibre Channel (FC) Basics

- Addressing
- FC terminology, WWNs, port types, and topologies

### 3. Switch Installation and Configuration

- In the box
- Steps overview
- Environmental issues
- Configuration parameters
- Initial CLI and serial connection

- Default passwords
- IP settings
- CLI settings
- Time settings
- Licensing management
- Login banner
- Switch, chassis, fabric and port names
- Syslog
- Checkin switch and ports status
- Configuration file backup
- Rebooting

#### **4. SAN Hosts**

- Host role within SAN
- Converged network adapters
- NPIV overview, benefits, scalability and management
- HPE Virtual Connect overview
- Host installation checklist and bus connections
- Boot from SAN
- Finding WWNs
- Multi-path SAN and load balancing
- Multi-path I/O (MPIO) components within OS

#### **5. Disk Targets**

- SATA interface
- SAS interface
- SSD technologies
- Disk enclosures
- Connecting disks to controllers
- Storage presentation
- Storage virtualization
- Storage deduplication
- Provisioning types
- Data encryption
- VVOLs
- Portfolio overview

#### **6. Fibre Channel Basic Services**

- SNS/name server
- SNS in web tools
- SNS related commands
- Zoning overview
- Zoning building blocks
- Basic zoning configuration via CLI and GUI
- Fabric segmentation
- Zoning best practices

#### **7. SAN Management**

- SAN management choices and considerations
- Technologies driving SAN management
- HPE SAN management today
- HPE B-series management options overview
- Web tools
- SNMP
- SAN Network Advisor
- REST API

- HPE OneView

## **8. iSCSI**

- IP storage overview
- iSCSI stack, packet construction and name convention
- iSCSI initiator options
- iSCSI discovery methods and security
- HPE Nimble array as an iSCSI product example

## **9. SAN Extension**

- Basics and overview
- Cables and SFPs
- Fabric virtualization overview

## **10. FCoE/CEE**

- FCoE and CEE standards
- FCoE I/O consolidation and terminology
- FCoE stack and encapsulation
- Lossless Ethernet
- Priority-based Flow Control (PFC)
- Enhanced Transmission Selection (ETS)
- Congestion Notification (CN)
- Data Center Bridging Capabilities Exchange (DCBX)
- FCIP, iSCSI and FCoE basic comparison

## **11. SAN Security**

- Basic storage security model and access points
- Planning security in a SAN environment
- Core components for securing SAN data management
- Data and basic management security models
- RBAC
- Roles management
- Password rules and local/remote authentication

## **12. Data Protection**

- Reasons for data protection
- Data protection challenges
- Data classification
- Protection and recovery methods
- RPO and RTO
- Backup types and their differences
- Backup topologies
- Tape libraries overview
- HPE StoreOnce overview and introduction
- Deduplication
- HPE Cloud Bank Storage
- Local and remote replication
- HPE RMC

## **13. Performance**

- Factors affecting SAN performance
- SAN performance planning and considerations
- Latencies and congestion
- Performance guidelines within the SAN
- Recommendations for switch ISL connectivity
- Determining the required bandwidth
- Storage performance (drive and RAID selection)

- Performance monitoring

#### 14. SAN Design

- Architecture choices and design considerations
- HPE-standard SAN topologies and topology design rules
- Advantages, disadvantages and scalability of different topologies
- Data locality
- Topology data access usage
- SAN infrastructure performance factors
- Levels of high availability in SAN architecture
- SAN planning and documentation utilities

#### Lab 0: Accessing vLabs

- Exercise 1: Access the HPE vLabs

#### Lab 2: B-series Switch Exploration

- Connecting to a fabric switch using web tools
- CLI basics
- Basic switch status commands
- Viewing port status
- Setting the switch domain ID
- Backing up system configuration settings

#### Lab 3: Administration and Configuration

- Configuring ports
- Persistent port disable
- Configuring a port name
- Deny F-port

#### Lab 4: Installing and Using the QConverge Utility for QLogic HBAs in Windows

- Installing the QConverge HBA configuration utility
- Login and management

#### Lab 5: Host Verification and Storage Allocation

- Host verification in SSMC
- Volume provisioning
- Windows multi-pathing/native MPIO
- Windows host configuration formatting and mounting VLUNs

#### Lab 6: Fabric Zoning

- WWN zoning

#### Lab 8: HPE Nimble-based iSCSI Configuration

- Task 1: Preparation
- Task 2: Provisioning
- Task 3: Presenting
- Task 4: Windows host setup (NCM)
- Task 5: Return to the Windows host to prepare and mount the volume

#### Lab 10: Basic Security Administration and Configuration

- Creating a new user account

#### Lab 11: HPE 3PAR Snapshot Management

- Preparing and creating a snapshot