Szkolenie: HPE
HPE Introduction to SAN

Cel szkolenia:

This course is designed for new or entry-level SAN administrators, offering an overview of general SAN technologies. It provides a comprehensive understanding of everyday administration within an HPE SAN solution, covering a broad range of technologies and concepts such as Fibre Channel (FC), iSCSI, and NVMe-oF. It discusses basics and building blocks of FC and IP-SAN, as well as the role of SAN-enabled hosts and disk targets. Other topics include SAN management, basic SAN security, and performance aspects of SAN as well as long distance connectivity overview.

Course objectives

After completing this course, you should be able to:

- Define a storage area network (SAN)
- Describe SAN benefits
- Discuss data access methods
- Identify SAN hardware components
- Describe HPE Storage Networking elements and benefits
- Recall the format of a WWN
- Explain Fibre Channel (FC) terminology and port types
- Describe FC topologies
- Identify FC addressing
- List the steps for port initialization
- Identify the node and port types
- Describe the role of Simple Name Service
- Describe concepts associated with zoning
- Explain the data center bridging (DCB) standard
- Describe the Fibre Channel over Ethernet (FCoE) standard
- Discuss the Non-Volatile Memory Express over Fabrics (NVMe-oF) standard, types, and building blocks
- Discuss host connectivity
- Discuss N_Port ID Virtualization (NPIV) support and products based on it

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- Explain the function of multipathing and load balancing
- Discuss the need for SAN management
- Discuss technologies driving SAN management
- Describe HPE SAN management today
- Discuss SAN extension technologies and implementations
- Explain the use and effects of buffer (BB) credits on distance and speed
- Describe approaches to planning security in a SAN
- Outline the core components for securing a SAN
- Outline topology choices and design considerations
- Describe SAN performance factors
- Identify levels of high availability in SAN Architecture

Audience

This course is ideal for new or entry-level technical professionals seeking a learning path that includes conceptual knowledge of SAN technologies.

Plan szkolenia:

- Module 1: SAN Introduction
  - What is a SAN?
  - HPE Storage Networking: Enables systems for critical workloads
  - Business continuance
  - High availability
  - Server and storage consolidation
  - Centralized management
  - Basic methods of storage connectivity
  - SAN considerations
  - DAS versus NAS versus SAN
  - SAN components
  - HPE Storage Networking: Hardware positioning
  - Fibre Channel and Ethernet - Decoded and positioned
- Module 2: Fibre Channel
  - Fibre channel introduction
  - World Wide Name (WWN)
  - Nodes, ports, and links

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- SAN topologies
- Fibre Channel port types
- Fibre Channel addressing
- Basic Fibre Channel services
  - Simple Name Service
  - Zoning
- Fabric segmentation
- Fibre Channel networking products portfolios

- Module 3: iSCSI
  - Overview of iSCSI protocol
  - iSCSI maps SCSI onto a network
  - iSCSI stack
  - iSCSI initiators
  - iSCSI target discovery
  - iSCSI operations
  - iSCSI authentication
  - Internet Storage Name Service (iSNS)
  - iSCSI advantages and disadvantages
  - M-series switches
- Module 4: NVMe-oF
  - Data center bridging (DCB)
    - Data Center Bridging vs other technologies
    - Remote Direct Memory Access (RDMA)
  - Fibre Channel over Ethernet (FCoE)
    - FCoE integrated with FC SAN fabric
    - FCoE encapsulation
    - Converged network adapters
  - Non-Volatile Memory Express over Fabrics (NVMe-oF)
    - What is NVME?
    - Why NVMe over fabrics
    - NVMe based storage end-to-end
    - NVMe over the network - Fabric transport options
    - Deciding between the NVMe-oF options
- Module 5: Host
  - Host role within the SAN
  - Host and adapters

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- N_Port ID Virtualization (NPIV) overview
- HPE Virtual Connect
- Boot from SAN
- Host preparation and install
- Multipath concepts and load balancing

- Module 6: SAN Management
  - SAN management categories
  - B-series SAN management interfaces and tools
    - Web tools
    - SANnav management software
    - C-Series/Cisco Data Center Network Manager
    - HPE GreenLake for Storage Fabric Management
  - Management protocols and APIs
    - Simple Network Management Protocol (SNMP)
    - REST(ful) API
- Module 7: Long Distance Connectivity
  - Why extend the SAN?
  - SAN extension technologies
  - Wavelength Division Multiplexing (WDM) options
  - Fibre Channel over SONET/SDH
  - Fibre Channel over IP (FCIP)
  - IP network considerations
  - FCIP security and encryption
  - Buffer-to-buffer flow control
- Module 8: SAN Security
  - Basic security model
  - Attacks and exposures
  - Mitigation of risk
  - Storage security model
    - Data access
    - Management security
  - B-Series fabric security access control lists
    - SCC
    - DCC
    - FCS
    - IP Filter

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- B-Series role-based access control (RBAC)
- B-Series authentication options
- Data path and management path security summary

- Module 9: SAN Design
  - Topologies
    - HPE standard supported SAN topologies
    - Design using HPE supported SAN topologies
      - Single-switch fabric
      - Cascaded fabric
      - Ring fabric
      - Meshed fabric
      - Core-edge fabric
    - Performance
      - Topology data access usage
      - ISL oversubscription
      - ISL bandwidth aggregation
      - Hop latency
      - Device attachment points
      - Performance guidelines within the SAN
      - Backup performance considerations
    - Availability levels
    - 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
  - 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: Nimble-based iSCSI Configuration
  - Provisioning storage

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- Presenting storage
- Connecting to a volume
- Windows preparation and mounting the volume

- Lab 3: Administration and Configuration
  - Identifying port types
  - Viewing port configuration
  - Persistent port disabling
  - Configuring a port name
  - Denying F-port mode
- Lab 4: Host Preparation and Storage Allocation
  - HBA management via QConverge Console CLI
  - Host verification in SSMC
  - Volume provisioning
  - Disk discovery
- Lab 5: Fabric Zoning
  - Clearing the zoning configurations
  - Setting default zone
  - Configuring WWN zoning via CLI and Web Tools
- Lab 6: Basic Security Administration and Configuration
  - Creating user accounts
  - Working with user privileges
  - Testing the effect of RBA

Wymagania:

Before attending this course, you should have:

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

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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