Hewlett Packard Enterprise

HPE SAN Essentials I: Administration Fundamentals HM9Q1S

HPE course number	HM9Q1S
Course length	3 days
Delivery mode	ILT, VILT
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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.

Audience

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

Course objectives

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

Detailed course outline

Introduction	• SAN definition, benefits and goals	• Tier storage
	• High-speed backup and high availability	• SAN components
	• Server and storage consolidation	• Host, target and interconnect device characteristics
	• DAS, NAS, and SAN concepts and comparisons	• SAN portfolio overview
	• SAN considerations	• Power-on sequence
Fibre Channel (FC) Basics	• Addressing	• FC terminology, WWNs, port types, and topologies
Switch Installation and Configuration	• In the box	• Time settings
	• Steps overview	• Licensing management
	• Environmental issues	• Login banner
	• Configuration parameters	• Switch, chassis, fabric and port names
	• Initial CLI and serial connection	• Syslog
	• Default passwords	• Checkin switch and ports status
	• IP settings	• Configuration file backup
	• CLI settings	• Rebooting
SAN Hosts	• Host role within SAN	• Boot from SAN
	• Converged network adapters	• Finding WWNs
	• NPIV overview, benefits, scalability and management	• Multi-path SAN and load balancing
	• HPE Virtual Connect overview	• Multi-path I/O (MPIO) components within OS
	• Host installation checklist and bus connections	
Disk Targets	• SATA interface	• Storage virtualization
	• SAS interface	• Storage deduplication
	• SSD technologies	• Provisioning types
	• Disk enclosures	• Data encryption
	• Connecting disks to controllers	• VVOLs
	• Storage presentation	• Portfolio overview
Fibre Channel Basic Services	• SNS/name server	• Zoning building blocks
	• SNS in web tools	• Basic zoning configuration via CLI and GUI
	• SNS related commands	• Fabric segmentation
	• Zoning overview	• Zoning best practices
SAN Management	• SAN management choices and considerations	• SNMP
	• Technologies driving SAN management	• SAN Network Advisor
	• HPE SAN management today	• REST API
	• HPE B-series management options overview	• HPE OneView
	• Web tools	

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

SAN Extension	• Basics and overview	• Fabric virtualization overview
	• Cables and SFPs	

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

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

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

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

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

Detailed lab outline

Lab 0: Accessing vLabs	• Exercise 1: Access the HPE vLabs	
Lab 2: B-series Switch Exploration	• Connecting to a fabric switch using web tools	• Viewing port status
	• CLI basics	• Setting the switch domain ID
	• Basic switch status commands	• Backing up system configuration settings
Lab 3: Administration and Configuration	• Configuring ports	• Configuring a port name
	• Persistent port disable	• 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	• Windows multi-pathing/native MPIO
	• Volume provisioning	• Windows host configuration formatting and mounting VLUNs
Lab 6: Fabric Zoning	• WWN zoning	
Lab 8: HPE Nimble-based iSCSI Configuration	• Task 1: Preparation	• Task 4: Windows host setup (NCM)
	• Task 2: Provisioning	• Task 5: Return to the Windows host to prepare and mount the volume
	• Task 3: Presenting	
Lab 10: Basic Security Administration and Configuration	• Creating a new user account	
Lab 11: HPE 3PAR Snapshot Management	• Preparing and creating a snapshot	

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