



Hewlett Packard Enterprise

Course Datasheet

HPE Accelerated SAN Essentials

Education Services course product number – UC434S

Course length – 5 days

Delivery mode – Instructor Led Training (ILT)

Register – [Click here to go to HPE Learning Portal](#)

This course provides a comprehensive and accelerated understanding of SAN technologies and concepts. Students gain experience needed to tackle challenges of working in enterprise class SAN environments. The course is 60 percent lecture and 40 percent hands-on labs using HPE servers.

Audience

- Technical professionals seeking an accelerated learning path that includes both conceptual knowledge of fibre channel SAN technologies and experience in heterogeneous SAN environments

Prerequisites

- Basic technical understanding of networking and storage concepts and terminology and
- Experience managing Windows or UNIX systems
- Recommended free web-based training: SAN Fundamentals (U5527AAE)

Course Objectives

After completing this course, students will be able to:

- Describe what is SAN and SAN benefits
- List SAN components
- Identify the differences between DAS, NAS, and SAN
- Compare different data access methods
- Talk about FC topologies
- Explain Fibre Channel layers and switch configuration parameters
- Talk about switch features
- Describe role of a host in a SAN network
- Identify host related virtualization options
- Boot from SAN and verify device connectivity
- Install and use host software/OS commands for HBA management
- Describe multipathing
- Talk about storage technologies and storage management options

- Explain advanced FC concepts and switch features
- Implement zoning and troubleshoot fabric segmentation
- Talk about SAN management options
- Describe iSCSI and iSCSI-based products
- List SAN extension options and FC-FC routing
- Talk about FCoE technologies
- Secure SAN data and mitigate risk
- Configure an HPE storage SAN and RBAC
- Talk about data protection (backup, replication)
- Cover SAN and storage planning performance aspects and monitoring
- Design and document SAN

Detailed Course Outline

- 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
 - Power-on sequence
- Fibre Channel (FC) Basics
 - FC terminology, WWNs, port types, topologies, and layers
 - FC layers elements
 - Class of service
- Fibre Channel Switches
 - Switch configuration parameters
 - Switches interoperability and TR technology
 - Principal switch selection and up/downstream links
 - Frame routing within a fabric
 - Trunking and port channels
 - ILs
 - Virtualization within the fabric
 - Basic switch management
- SAN hosts
 - Host role within SAN and virtualization
 - Converged network adapters
 - Host installation checklist and bus connections
 - Dynamic fabric provisioning
 - HBA management
 - Boot from SAN and load balancing
 - Multi-path SAN connections and software
 - Multi-path I/O (MPIO) components within OS
- Disk Targets
 - Disk drives and associated technologies
 - How disks are connected to controllers
 - LUN masking and array management
- Fibre Channel Advanced
 - Fibre channel addressing and reserved addresses

- Frames and transmission building blocks
- Ordered sets
- Primitive signals and sequences
- Flow control and different types of zoning
- Link and fabric services
- Fabric login and segmentation

- SAN Management
 - SAN management choices and considerations
 - Technologies driving SAN management
 - HPE SAN management today
 - SMI-S
 - HPE storage essentials
 - B/C/H-series management options

- iSCSI
 - IP storage
 - iSCSI stack, packet construction, and name convention
 - iSCSI connection, hardware options, and security
 - HPE StoreVirtual as a sample of an iSCSI system

- SAN Extension
 - Long distance cabling
 - SN extension reasons
 - SAN extension technologies and implementations
 - Cables and SFPs
 - C/DWDM
 - Fibre channel over IP (FCIP)
 - FCIP and its role in SAN extension
 - FCIP performance and security
 - AN extension performance
 - Brocade Fast Write and Cisco Write acceleration
 - Fibre routing implementations in a SAN

- FCoE / CEE
 - FCoE and CEE standards
 - FCoE I/O consolidation and terminology
 - FCoE stack and encapsulation
 - Lossless Ethernet
 - FCIP, iSCSI, and FCoE protocols
 - CEE and DCBX technology
 - FCIP,iSCSI and FCoE comparisons

- SAN Security
 - Basic storage security model and access points
 - Planning security in a SAN
 - Core components for securing SAN data management
 - Security policies
 - Data and management security models
 - B/C-series RBAC
 - RADIUS support
 - Security in practice
 - Authentication and encryption

- Data Protection
 - Reasons for data protection
 - Data protection challenges
 - Data classification
 - Protection and recovery methods
 - Backup types and their differences
 - Backup topologies
 - Disk and tape solutions
 - StoreOnce de-duplication
 - Split mirror and snapshot replication
 - Synchronous and asynchronous replication

- Performance
 - Factors affecting SAN, disk, and drive speed performance
 - Fibre channel technology and how it affects storage performance
 - Long distance connectivity
 - Performance guidelines
 - Planning a disk system that accounts for effects of RAID, cache, and chunk size on performance
 - I/O profiling
 - Performance monitoring

- SAN Design
 - Architecture choices and design considerations
 - HPE standard SAN topologies and topology design rules
 - SAN planning
 - 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

Next Steps

- Managing HPE 3PAR StoreServ I (HK902s)
- HPE XP Storage Array Administration and Configuration (HK905s)