CompTIA Storage+ Powered by SNIA

http://www.snia.org/education/courses/training_tc

Course Length: 4 1/2 days

• 9AM–5PM (Monday-Thursday) local time
• 9AM – 2PM (Friday) local time

Course Fee: $2,790 USD

• Register: https://www.regonline.com/Register/Checkin.aspx?EventID=635346

Course Locations:

• December 1-5, 2014 – Colorado Springs, CO [SNIA Technology Center]
• January 19-23, 2015 – San Jose, CA [The Sainte Claire hotel] – coincides with SNIA Annual Members' Symposium

Course Instructional Method:

• Interactive Lecture
• Exam Study Sessions
• Lab
• Students to bring their own laptop
• VPN will allow students to work on equipment when class is not held at the SNIA Technology Center in Colorado Springs, CO.

Course Documentation:

• Password protected eBook's of all material
• This material is copyrighted for the exclusive use of the student only

Course Description (Overview):

This course educates the student on the abundance of technologies that power today's data centers. It not only addresses the underlying technology alternatives that connect, virtualize, secure, manage, and store the massive data accumulated by all data center applications, it also concentrates how to minimize the total cost of ownership while simultaneously increasing asset utilization and application performance. This course examines system design points and common components used to architect, construct, and design a storage networked solution aimed at powering any business application.

This course goes beyond passing a certification exam and dives into actual troubleshooting and best practices associated with real storage networking equipment and applications. This course provides you with well-defined and documented industry standard techniques and tools that will assist you in troubleshooting or configuring any storage networking product you experience regardless of vendor.

Course Descriptions – CompTIA Storage+ Certification Topics

Course Introduction

- Certifications

Basic Data Center Concepts

- Networking and Storage Basics

Data Center Components

- Network Links
    - Optical/Copper
    - Ethernet Links
    - Pluggable Modules
    - Bend Radius and Cabling Considerations
    - Link Speeds (FC, Ethernet, InfiniBand, PCIe, SAS, and SATA)
- Switching Infrastructure
- Storage Devices
- Servers
    - Host System Designs
    - Application Servers
    - Management Servers
- Network Devices

DAS, NAS, SAN, & Multiprotocol Fabrics

External vs. Internal SANs

Blocks, Files & Objects Overview

Storage Concepts

- Hard Disk Drive (HDD)
    - Enterprise
    - Client
    - Interfaces
- Solid State Drive (SSD)
- Tape
- JBOD
- Storage Arrays
    - RAID Architectures
    - LUN Presentation
    - Aggregation and Dynamic LUN Expansion
    - RAID levels
    - Combined RAID Levels
    - MAID
- High Availability, Multipath, & Load Balancing

Storage Technologies

- SCSI Storage Overview
    - Legacy P-SCSI
    - Legacy Fibre Channel
- SAS
- SATA

- PCI Express (next generation)
- Networks
    - Fibre Channel
    - Ethernet
    - InfiniBand
    - Serial Attached SCSI

Fibre Channel Technology

- FC Overview
- FC Topologies
- Fabric Designs
- FC Names & Addresses
- Node Port ID Virtualization (NPIV)
- FC Architecture
    - FC Architecture Overview
    - FC-0 (8, 16, 32 and 128 Gbps Links)
    - FC-1
    - FC-2
    - FC-Services
    - FC-3
    - FC-4 SCSI & IP
- Fibre Channel Components
    - HBAs and CNAs
    - FC Hubs & Loop Switches (historical reference)
    - FC Bridges, Routers & Gateways
- FC Fabric Switches
    - Switches and Distributed Fabrics
    - Switch Fabric Design
    - Fabric Paths and Routing
    - Zoning & LUN Masking
    - Switch Fabric Router
    - Virtual Fabrics

IP Storage & iSCSI Technologies

- Storage Networking & IP
- IP over FC (IPFC)
- Fibre Channel over IP (FCIP)
- Internet SCSI Protocol (iSCSI)
- Data Center Ethernet-based Networks
    - Converged Enhanced Ethernet and Data Center Bridging (CEE & DCB)
    - Fibre Channel over Ethernet (FCoE)

Networking Concepts

- Introduction to Ethernet
- What is a layered stack?
- Data Structures
- Physical Transport Networks

- Simplex and Duplex
- Network Models
- Circuit & Packet Switch
    - Jumbo Frames
- Connection-Oriented vs. Connectionless
- Bit Rate, Bandwidth, Latency and Throughput
    - 10Gb, 25Gb (new), 40Gb, and 100 Gb Ethernet
- Ports and PHYs
- Names & Addresses
- Flow Control
- Segmentation & Offload
- Oversubscription
- FC trunking & Link aggregation

Host System Interconnect Technologies

- PCIe (Legacy PCI & PCI-x)
- InfiniBand (Clustered Server Applications)
- RoCE (RDMA over Converged Ethernet)

Storage Network Performance

- Performance
    - I/O Process
    - Transfer Size and Performance
    - Random vs Sequential Access
    - IOPS performance and Megabytes per Second (MBPS)
    - I/O Profiles Application Workloads
    - HHD_SSD MBPS IOPS
- RAID performance
    - Command Queuing
    - Multiple LUN performance
    - Caching Buffering Concepts
    - Alignment Fragmentation
- Flow Control
    - FC Arbitrated Loop
    - FC Fabric
    - Fragmentation
    - Tools

Troubleshooting

- Configuring and Implementing SAN Components
- Troubleshooting Techniques
- Storage Networking Troubleshooting Tools
- Benchmarking Software

Data Protection and Backup

- Backup & Recovery Overview
- Technologies Overview
- Methods & Levels
    - Tape Backup Methodologies
    - Incremental, Differential, and Synthetic
- Snapshots & Replication
- Network Management Data Protocol (NDMP)
- Tape and Virtual Tape Library (VTL)
- Continuous Data Protection (CDP)
- Archiving
- Purging
- Encryption

Storage Provisioning

- Thin/Thick Provisioning
- Volume Management
- Persistent Binding
- File System Concepts
- Object-based Storage
- Data Deduplication

Information Management

- Tiered Storage
- Storage Virtualization
- Storage Management
    - SMI-S, CIM, and WEBM
- Continuity Management & High Availability
- Storage Networking Security
- Storage Networking Applications

Storage Networking Environmental

- Power, HVA, Air Flow Issues, and Fire Suppression
- Rack Loading and Safety Techniques

Storage Networking Resources

- Futures
- Web Links
- Practice Tests

Storage Network Certifications:

This course is explicitly designed to prepare the student for many vendor neutral and vendor specific Storage Network Certification Programs including:

CompTIA

- CompTIA Storage+ Powered by SNIA exam leading to the CompTIA Storage+ Powered by SNIA credential

Storage Networking Industry Association (SNIA)

- Storage Networking Storage Management & Administration exam leading to the SNIA Certified Storage Engineer (SCSE) credential
- SNIA Architect – Assessment Planning & Design exam leading to the SNIA Certified Storage Architect (SCSA) credential
- SNIA Certified Storage Networking – Expert (SCSN-E) credential

Course Objectives (What you will learn):

What's exciting about it, why it's important, where it's going?

- Learn from an expert storage networking technologist with over 20 years of experience
- This detailed seminar includes all of the topics needed to understand Storage Networking concepts and solutions including Ethernet, Fibre Channel, Serial Attached SCSI, SATA, iSCSI, FC over Ethernet, InfiniBand, RoCE, and PCI Express technologies.
- Students will gain a fundamental understanding of the entire Storage Networking industry and all the components that enable today's and tomorrow's Data Centers.
- Students will gain a fundamental understanding of the how tiered storage enables cost effective Data Centers and all the standards and associations that drive today's Storage Networking technologies (FCIA, STA, SNIA, etc.).
- Topics include Storage Fundamentals which detail SCSI protocol; disk, tape, optical, Flash, file system concepts, RAID (all levels) and JBOD, as well as DAS, NAS and SAN components, configurations, and protocols.
- This seminar also details practical and typical SAN Applications including consolidation, backup/restore, and disaster recovery with key insights into issues facing today's IT departments including interoperability, management, and defining storage requirements such as capacity planning, high availability, and security.
- Learn how emerging technologies and can impact future data center designs.

Audience (Who should attend):

- This seminar is recommended for students needing a broad deep knowledge and understanding of Storage and Storage networking concepts, applications, and technologies.
- All storage network practitioners
- Anyone who designs, implements, manages, specifies or selects Storage Networking technologies
- IS/IT technical staff and managers, product developers, systems integrators, systems engineers and technical marketing personnel
- Product and project teams that are involved with applications, systems, storage and end users will benefit from this course.
- Developers, integrators, engineers, administrators, managers, marketing personnel and others with a need for an understanding of Storage Networking will find this seminar extremely informative.
- Anyone involved in storage or data communications networking will understand the similarities and differences between thee environments and will be in position to take on the challenges introduced by Storage Networking.

Job Roles:

This course content and technical level are targeted for professionals working in roles similar to the following:

- Product /Application/Service Development
- Product /Application/Service Support
- Customer Management & Technical Personnel
- Sales/Pre Sales/Marketing & Systems Engineers
- Technical Project

Prerequisites:

Computer technology degree or equivalent experience
Understanding of computer theory and technology (i.e. CPU, server, storage, network, switch, RAM, etc.).