Title: CompTIA Storage+ Powered by SNIA

Course Length: 4.5 Days

Course Instructional Method:

- Interactive Lecture
- Animations,
- Lab
- Exam Study Sessions

Course Documentation

- DVD containing:
  - Printable and Searchable PDF of HGAI course PowerPoint Slides (over 2,800 slides)
  - Infinity I/O's eCourse eBook PDF as an additional Study Guide in all HGAI Certification courses
  - Note this material is copyrighted and is for the exclusive use of the student only

Course Description (Overview):

A group of students were asked recently to define a "SAN." Some replies included "storage area networks," "server area networks," "system area networks" and the instructor's favorite, "The latest thing to sell!" SAN is all of these and more. This course takes a top-down approach in examining the information flow requirements levied on a Storage Network and how various technologies meet those requirements. It identifies why organizations are moving toward NAS and SAN. It provides a comprehensive technical examination of fibre channel, SCSI and IP Storage protocols, along with the role they play in a Storage Network.

The course examines the practical problems faced in the heterogeneous world where the "any to any" connectivity provided by SANs can present more problems than it solves. It identifies the techniques used to overcome these problems through the use of volume management, storage resource security and persistent binding. The course identifies the components and products that make up a NAS or SAN, examines the design and performance aspects of a SAN, and finally explores where Storage Networks are headed over the next few years

This course focuses on the latest storage network applications and technologies including:

Course Outline

- Course Introduction
- Certifications

- Basics
  - Basic Concepts
    - Networks vs. Storage
    - Capacity
      - Network Links
      - Storage
      - Servers
      - Network Devices
    - DAS, NAS, SAN, FAN & Hybrids
    - External vs. Internal SANs
    - Blocks, Files & Objects Overview

- Storage
  - Storage Concepts
    - Hard Disk Drive (HDD)
    - Solid State Drive (SSD)
    - Tape
    - JBOD
    - Storage Arrays
      - LUN Presentation
      - LUN Aggregation
      - Dynamic LUN Expansion
      - Thick & This Provisioning
      - Persistent Binding
    - RAID levels
    - Combined RAID Levels
    - MAID

  - Storage Technologies
    - SCSI Storage Overview
    - P-SCSI
    - SAS
    - SATA
- Networks
  - Fibre Channel Technologies
    - FC Overview
    - FC Topologies
    - FC Names & Addresses
    - FC Names & Addresses NPIV
    - FC Architecture
      - FC Architecture Overview
      - FC-0
      - FC-1
      - FC-2
      - FC-Services
      - FC-3

- FC-4 SCSI & IP

– Fibre Channel Components
  - HBAs and CNAs
  - FC Hubs & Loop Switches
  - FC Bridgges, Routers & Gateways
  - FC Fabric Switches
    - Switches
    - Switch Fabric Design
    - Switch Fabric Pathing
    - Switch Fabric Zoning & LUN Masking
    - Switch Fabric Router
    - Switch Virtual Fabrics
  - FC Animations

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

– Networking Concepts
  - Introduction to Networking
  - What is a layered stack?
  - Data Structures
  - Physical Transport Networks
  - Simplex and Duplex
  - Network Models
  - Circuit & Packet Switch
  - Bus, Loop & Expanse
  - Connection-Oriented vs. Connectionless
  - Bit Rate, Bandwidth, Latency and Throughput
  - Ports and PHYs
  - Names & Addresses
  - Flow Control
  - Segmentation & Offload

– System Interface Technologies
  - PCIe
  - InfiniBand

  - Storage Network Performance
    - Performance Prelude
    - Flow Control
    - FC Arbitrated Loop
    - FC Fabric
    - Fragmentation
    - Tools
  - Troubleshooting
    - Storage Networking Troubleshooting
    - Storage Networking Environmental
    - Storage Networking Troubleshooting Tools

- Applications

  - Data Protection
    - Backup & Recovery Overview
    - Technologies Overview
    - Methods & Levels
    - Snapshots & Replication
    - Networking
    - Virtual Tape Library (VTL)
    - Continuous Data Protection (CDP)
    - Data DeDuplication
  - Information Lifecycle Management (ILM)
  - Tiered Storage
  - Storage Virtualization
  - Storage Management
  - Continuity Management & High Availability
  - Storage Networking Security
  - Storage Networking Applications
  - Green Storage
  - Green Data
  - Cloud Storage

  - Storage Network File Systems

- Additional Information

  - Storage Networking Resources
    - Futures
    - Web Links
    - Bibliography
    - SearchStorage.Com online Quizzes
    - Practice Test

- Storage Networking Lab
    - Description
    - Equipment
    - FC Labs
    - iSCSI Labs
    - DAS Labs
    - NAS Labs
    - SAN Labs

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?:

- It provides a one-of-a-kind tutorial with an industry subject matter expert who has real-world experience and superior presentation skills
- It provides a vendor-neutral view of storage networking with a focus leveraging your investment in network infrastructure, existing and future storage and server assets
- It separates the myth from reality of the various storage networking solutions and technologies
- It explains the technical differences between Fibre Channel and IP Storage and when to use these technologies
- It puts you in position to understand what storage networks can and cannot do for you

- It will make you more knowledgeable in dealing with the plethora of vendors of storage networking products and services
- It takes a “network” view of storage networks yet identifies how storage networks differ fundamentally from other data networks like the Internet
- It takes complex storage networking topics and breaks them down in a simple, easy-to-understand way

Audience (Who should attend):

- 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 Management

Prerequisites: None