Storage Networking over TCP/IP

Course Summary

Description

This course enables students to understand, evaluate and apply Storage Networking (SN) technology. In 2 days students will know the SN applications, issues, components, types, features, approaches, realities, terminologies, weaknesses, availability and some war stories. They will understand and more effectively deploy NAS, SAN, iSCSI, FCIP, iFCP, Virtualization and SAN Management (SMI-S, Aperi).

Objectives

At the end of this course, students will be able to:

- Understand the business challenges in data storage: data growth, keeping data accessible yet secure, while controlling costs to stay competitive
- Learn the terminology, issues, trade-offs, limitations, typical loss/gains figures, alternative approaches, components and standards
- Understand storage Virtualization and management issues
- Avoid endangering your organization with inappropriate equipment or technology that will not provide the expandability, access service, security and manageability needed for your organization and your job security
- Learn about the important trade-offs between Network Attached Storage (NAS) and a Storage Area Network (SAN) and their comm protocols
- Learn the Management architecture of the Storage Management Initiative and how it contrasts with Aperi
- Understand the performance and cost issues of the different technologies used to connect server devices and storage across LANs or WAN fabrics
- Leverage your investment in network infrastructure, existing and future storage and server assets.
- Understand the role and goals of various industry storage organizations
- Understand and effectively apply Virtualization, Ethernet, iSCSI

Topics

- Quick Overview Intro to Storage Networking
- SCSI/SPI: A Vital Foundation of SN
- Fibre Channel (FC) Technology Used within SN
- Network Attached Storage (NAS) & NAS Appliances
- SN Integration Tools: iSCSI, FCIP and iFCP
- Managing Storage Networking
- Storage Virtualization

Audience

This course is designed for anyone responsible for managing SN systems and information assets, those involved with storing, protecting and recovering info assets, data base administrators and disaster/ recovery strategists, Networkologists: Engineers, Consultants, Support Staff, Network Providers, Planners, Designers, Implementers, users of storage for recovery, restoral and Technical product engineering, product planning, marketing, sales support and all upper and middle level IT professionals.

Prerequisites

Students should have some familiarity with traditional networking facilities and terminology.

Duration

Two days

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Course Outline

I. Quick Overview Intro to Storage Networking
- A. Storage Networks: What, Why, Where, Benefits?
- B. Which server types do/do not benefit
- C. 3 Architectural parts of Storage Networks
- D. Filing, wiring, storing
- E. DAS, NAS, SAN: Features, applications, differences
- F. Open Storage Systems
- G. Interoperability testing issues
- H. Reality Check: 10 Challenges
- I. Lead in to Wiring sections
- J. Summary

II. SCSI/SPI: a vital Foundation of SN
- A. What is SCSI and SPI?
- B. It's highly versatile role in Storage Networking
- C. SCSI-1, -2, -3 & transfer rates
- D. Future SPI-4 & SPI-5
- E. SCSI Parallel Interface (SPI)
- F. Bus operation
- G. SCSI-3 = SPI-3: Features, Bus logical phases
- H. Simple Read examples and Queued I/O operations
- I. It's probably not your SCSI device
- J. What else is involved in DAS
- K. What else is involved in NAS
- L. Model for distributed processing
- M. Preview of SCSI, FCP, iSCSI, SRB
- N. Summary

III. Fibre Channel (FC) Technology Used within SN
- A. What is FC: Characteristics, limitations
- B. Flow control credit depletion issue
- C. The FC architecture
- D. The important FC-2 and FC-4
- E. Port nomenclature and relationships
- F. Elements of an FC network fabric
- G. Switches, directors, hubs, extenders
- H. FC Server functions
- I. World Wide Name
- J. The FC fabric operations
- K. Preview of FCIP and iFCP (chapter 5)
- L. Summary

IV. Network Attached Storage (NAS) & NAS Appliances
- A. NAS applications and configurations
- B. Hardware requirements for a NAS appliances
- C. Backup and Recovery for NAS appliances
- D. Protocols and File System Operations with NAS
- E. Unix-based systems: Unix File System +Network
- F. File System (NFS)
- G. Windows-based Systems: NT File System + Common
- H. Internet File System (CIFS)
- I. New developments in NAS
- J. NASD: Network Attached Secure Devices
- K. DAFS: Direct Access File System
- L. Summary

V. SN Integration Tools: iSCSI, FCIP and iFCP
- A. FC SAN Islands are Isolated and Unfortunate
- B. Consolidation is easier said than done
- C. 3 new transport protocols to link FC SANs
- D. An overview comparison of iSCSI, FCTP, iFCP
- E. ISCSI: internet SCSI
- F. FCIP: Fibre Channel over Internet Protocol
- G. IFCP: internet Fibre Channel Protocol
- H. Summary

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Course Outline (cont'd)

VI. Managing Storage Networking

A. SNMP: old but improving with SNMP version 3
B. The architecture of SNMP
C. Critical role of MIBs, ASN.1, BER
D. SNMP version 3
E. Web-Based Network Management using http,
F. XML and Java™
G. SAN configuration terminology
H. World Wide Names, zones, domains
I. RAID classes, Logical Unit Numbers
J. Assembling a SAN: 2 hosts, fabrics & RAIDs
K. SAN Management Frameworks
L. CIM: Common Information Model
M. SOAP: Standard Object Access Protocol
N. WBEM: Web Based Enterprise Management
O. Storage Networking Industry Association's (SNIA)
P. Storage Management Initiative Specification
Q. (SMI-S) v1.0, v 1.1
R. Capabilities and operating environment
S. Object Model: Names, events, credentials
T. Profiles and subprofiles for fabric, hosts, storage, server, HBA, switch, array, connection technology, zoning
U. Security: modeling device credentials
V. Service discovery of agents
W. Aperi: supported by IBM, Brocade, Cisco, McData
X. Brief overview of major vendor management products: IBM, EMC, hp, Brocade
Y. Summary

VII. Storage Virtualization

A. What is it?
B. Why do it? 10 applications
C. Two major virtualization options
D. Combined-path: features, pros/cons/vendors
E. Split-path: features, pros/cons/vendors
F. Differences in vendor implementations
G. Vendor lock-in and implementation issues
H. Summary

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