

# Understanding Storage Area Networks – 2 day

Solution Technology



Storage Area Networks (SANs) have become one of the hottest topics in the data storage industry. This seminar introduces the Storage Area Network examines how Fibre Channel has redefined the storage environment.

## 2 day SAN (this page)

Beginning with a look at storage attachment architectures, this two-day seminar continues with a look at the applications driving SAN adoption and wraps up with an introduction to the Fibre Channel & iSCSI technologies that make SANs possible.

## 5 day SAN (see overleaf)

This seminar builds on the 2 day Understanding Storage Area Networks seminar and adds coverage of topics such as Storage Fundamentals including the SCSI protocol, disk and tape drive concepts, RAID and JBOD, IP-based SANs, and Storage Networking Issues. It is recommended for students needing a broader and deeper knowledge of Storage and Storage networking concepts, applications, and technologies.

### Storage Architectures and Applications

#### Direct Attach Storage (DAS)

What is DAS?

DAS Basics

DAS Business Needs

DAS Components and Configurations

DAS Protocols

DAS Advantages and/Disadvantages

#### Network Attach Storage (NAS)

What is NAS?

NAS Basics

NAS Business Needs

NAS Components and Configurations

NAS Protocols

NAS Advantages and Disadvantages

#### Storage Area Networks (SAN)

What is SAN?

SAN Basics

SAN Business Needs

SAN Components and Configurations

SAN Protocols

SAN Advantages and Disadvantages

#### SAN Applications

Storage Consolidation

Backup and Restore

Disaster Recovery

Storage Outsourcing

### Fibre Channel Overview

What is Fibre Channel?

Nodes, node ports, and Links

Fibre Channel Standards and Structure

FC-0: Physical Interface

GBICs, SFPs, GLMs, and MIAs

Fiber Optic Links

Electrical Links

FC-1: Encoding and Decoding

8B/10B Encoding

Ordered Sets

Port State Machine

FC-2: Framing Protocol

Session Management

Exchange Management

Sequence Management

Frame Structure

Link Control Frames

Flow Control

Classes of Service

Link Services

Fibre Channel Topologies

Point-to-Point

Arbitrated Loop

Switched Fabric

**Who Should Attend:** This seminar provides a basic introduction to the concepts, terminology, and types of products associated with Storage Area Networks implemented using the Fibre Channel & iSCSI technologies. It is directed towards developers, integrators, managers, marketing personnel, technical writers and others who may be new to the realm of Storage Area Networks.

**Note:** For a more comprehensive examination of the details of the Fibre Channel technology, please refer to our Fibre Channel Technology seminars.

**Prerequisites:** An understanding of current computer operating systems. No in-depth network or storage knowledge is assumed.

**Course Length:** 2 Days

# Understanding Storage Area Networks – 5 day

**Solution Technology**



Storage Area Networks (SANs) have become one of the hottest topics in the data storage industry. This seminar introduces the Storage Area Network examines how Fibre Channel has redefined the storage environment.

This seminar builds on the 2 day Understanding Storage Area Networks seminar and adds coverage of topics such as Storage Fundamentals including the SCSI protocol, disk and tape drive concepts, RAID and JBOD, IP-based SANs, and Storage Networking Issues. It is recommended for students needing a broader and deeper knowledge of Storage and Storage networking concepts, applications, and technologies.

## **Storage Fundamentals**

SCSI Command Protocol Concepts  
Disk Drive Concepts  
Data Buffering and Caching Concepts  
JBOD and RAID Concepts  
Tape Concepts  
File System Concepts

## **Storage Architectures and Applications**

### **Direct Attach Storage (DAS)**

What is DAS?  
DAS Basics  
DAS Business Needs  
DAS Components and Configurations  
DAS Protocols  
DAS Advantages and/Disadvantages

### **Network Attach Storage (NAS)**

What is NAS?  
NAS Basics  
NAS Business Needs  
NAS Components and Configurations  
NAS Protocols  
NAS Advantages and Disadvantages

### **Storage Area Networks (SAN)**

What is SAN?  
SAN Basics  
SAN Business Needs  
SAN Components and Configurations  
SAN Protocols  
SAN Advantages and Disadvantages

### **SAN Applications**

Storage Consolidation  
Backup and Restore  
Disaster Recovery  
Storage Outsourcing

### **Fibre Channel Overview**

What is Fibre Channel?

Nodes, node ports, and Links  
Fibre Channel Standards and Structure  
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Port State Machine  
FC-2: Framing Protocol  
Session & Exchange Management  
Sequence Management  
Frame Structure  
Link Control Frames  
Flow Control  
Classes of Service  
Link Services  
Fibre Channel Topologies  
Point-to-Point  
Arbitrated Loop  
Switched Fabric  
**iSCSI Overview**  
What is iSCSI  
iSCSI Concepts and Overview  
iSCSI, iFCP and FCIP  
Positioning iSCSI vs. Fibre Channel  
iSCSI Naming and Discovery  
Security Considerations  
iSCSI Components and Configurations  
TCP Offload Engines (TOEs)  
iSCSI Performance Considerations  
**Storage Networking Issues**  
Interoperability Certification  
Defining the Storage Requirement  
Data Protection Fuels Storage Demand

**Who should attend:** This comprehensive seminar provides a deeper introduction to the concepts, terminology, and types of storage and storage networking. It is directed towards developers, integrators, managers, marketing personnel, technical writers and others who may be new to the realm of Storage Area Networks.

**Note:** For a more comprehensive examination of the details of the Fibre Channel and iSCSI technologies, please refer to our Fibre Channel and iSCSI technology seminars.

**Prerequisites:** An understanding of computing and data storage concepts as well as current computer interfaces or networks is useful, though not required.

**Course Length:** 5 days