

In-Depth Fibre Channel

**Solution
Technology**



In-Depth Fibre Channel *Course Length: 3 Days*

This three-day seminar provides an extremely low level view of this high-performance computer system interface. No other course is able to match our bit level exploration of the technology with discussions on real life scenarios and applications to help apply the learning experience.

Introduction, Concepts & Terminology

The need for a new interface
Performance trends
Storage trends
Parallel I/O limitations
Serial interface alternatives
Technology assumptions
Key Fibre Channel objectives
I/O and Network convergence

FC-0: Physical Interface

Physical interface concepts
Link rates & distances
Optical or electrical?
Optical interfaces
Optical data transmission
Single-mode optical fiber
Multi-mode optical fiber
Electrical interfaces
Electrical characteristics
Fibre Channel connectors

FC-1: Data Link Control

8B/10B encoding/decoding
Disparity
Special characters
Ordered sets
Frame delimiters
Primitive signals
Primitive sequences
Link Level Protocols

FC-2: Transport Protocol

Transport protocol concepts
Exchange management
Exchange multiplexing
Sequence management
Segmentation/reassembly
Sequence initiative
Frame structure
Frame header description
Optional headers
Frame data field
Error detection (CRC)
Link Control frames
Acknowledge (ACK)
Busy (BSY)
Reject (RCT)
Flow control

Link level (buffer-to-buffer)
Source to destination (end-to-end)
Classes of service
Class 1: Dedicated connection
Class 2: Connectionless
Class 3: Datagram
Class 4: Virtual circuits

FC-3 Fibre Channel Services

Common services
Basic link services
Extended link services
Session management
Login services
World-wide names
Service parameters
Port login trace example
The Name Server

FC-4: Protocol Mappings

Protocol mapping concepts
Information sets
Protocol Information Units
SCSI-3 architectural model
SCSI protocol data objects
SCSI protocol functions
SCSI Fibre Channel Protocol
SCSI-3 mapping concepts
Command information set
Transfer ready information set
Data information set
Response information set
FCP Information Units
FCP command flowchart
Inquiry command trace
Write command trace

Topology Overview

Topology concepts
Common characteristics
Topology comparison
Point-to-Point
Arbitrated Loop (FC-AL)
FC-AL characteristics
Loop initialization
Arbitration
Opening & Closing loop circuits
Is the loop fault tolerant?
Switched Fabric
Fabric functions
Frame routing techniques
Fault tolerant fabrics
Addressing methods

Who Should Attend: This seminar is targeted towards development and support engineers, integrators, technical managers and others with a need for an in-depth understanding of the Fibre Channel technology.

Prerequisites: An understanding of current computer interfaces or networks is desirable, although not necessary.

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