Implementing High Performance Computing Networks with SFS

Duration: 4 Days      Course Code: HPCSFS

Overview:
This course provides hands-on training for implementation of high-performance computing (HPC) networks with the Cisco® Server Fabric Switch (SFS) platform. The course begins with an overview of server fabrics, high-performance computing networks, and the InfiniBand protocol. Through a series of structured lecture and hands-on lab work, you will then learn how to install, cable, configure, and manage the InfiniBand fabric. You will also learn the basics of HPC performance tuning. For those students who are implementing multi-fabric I/O (MFIO) with the SFS platform, the course also covers implementation of the SFS Ethernet and Fibre Channel gateway modules, and remote server boot over InfiniBand.

Target Audience:
This course is designed for field engineers who are implementing the Cisco Server Fabric Switch in HPC environments.

Objectives:
At the end of this course delegates will be able to;

- Monitor port and card statistics and view logs
- Describe server fabric, InfiniBand and HPC basic architecture, applications and components
- Configure InfiniBand partitions
- Install HCAs on hosts, rack and cable the fabric components
- Describe what comprises a unified fabric and how it functions
- Configure and verify the InfiniBand fabric
- Install and configure the Ethernet and Fibre Channel Gateways
- Use switch management interfaces and identify recommended management practices for images and users
- Configure remote server boot over InfiniBand
- Describe the subnet manager and IB addressing
- Familiarity with network management and troubleshooting

Prerequisites:
The Knowledge and skills required for a delegates to sit this course are as follows;

- Ethernet and TCP/IP data networks
- Fibre Channel storage network
- Linux and/or Microsoft Windows system administration
- Server hardware maintenance
- Familiarity with network management and troubleshooting
Module 1: Fundamentals of High Performance Computing
Lesson 1: HPC Fundamentals
- Technical Computing Applications
- Technical Computing Challenges
- What is a Cluster?
- Types of Clusters
- Linux HPC
- Windows HPC

Lesson 2: The Basics of HPC Cluster Design
- HPC Cluster Components
- HPC Network Requirements
- HPC Cluster Architecture Solutions
- I/O Consolidation with InfiniBand

Lesson 3: InfiniBand Fundamentals
- Why InfiniBand?
- Solution Architecture
- Server Fabric Switches
- Blade Switches
- Gateways
- Host Channel Adapters
- Physical Layer
- Subnet Manager
- Addressing
- Quality of Service
- Remote Direct Memory Access
- Upper-Layer Protocols

Module 2: Designing HPC Server Fabrics

Lesson 1: HPC Cluster General Design Considerations
- Design Overview
- Networking Considerations
- Data Access Considerations
- Server Considerations
- Physical Infrastructure Considerations

Lesson 2: HPC Cluster InfiniBand Design
- HPC Cluster InfiniBand Technical Design Considerations
- HPC Cluster InfiniBand Cable Plant Design
- HPC Cluster InfiniBand Topologies

Lesson 3: Windows Compute Cluster Server and HPC Cluster Design
- Windows CCS Technical Design Considerations
- Windows CCS topologies

Lesson 4: Linux Clusters
- Linux Cluster Technical Design Considerations

Lesson 1: Cisco SFS Components
- The Cisco SFS 7000s
- InfiniBand Cabling Best Practices

Lesson 2: Switch Management
- Ports and Interfaces
- Command Line Interface
- Element Manager
- Chassis Manager
- SNMP
- Image Management
- User Management

Lesson 3: Subnet Management
- How Subnet Management Works
- High-Performance Subnet Manager

Lesson 4: Configuring InfiniBand Partitions
- What are InfiniBand Partitions?
- How Do P_Keys Work?
- Creating Partitions

Lesson 5: Cluster Bringup
- Cluster Bringup Process Overview
- Cluster Bringup Process: Planning
- Installing and Cabling Fabric Components
- Configuring Ethernet Attributes
- Validating the Physical Installation
- Preparing to Bring Up Switches
- Bringing up the Pod
- Troubleshooting Pods
- Connecting Pods and Core Switches

Lesson 6: Logging and Monitoring
- Port and Card Statistics
- Log Viewing
- HCA self-testing

Module 4: Building the Unified Compute Fabric

Lesson 1: Unified Fabric Overview
- Traditional Versus Unified Fabric Data Center Configuration
- Server Fabric Virtual I/O

Lesson 2: MFIO Components
- Cisco SFS 3012

Module 5: Configuring the Ethernet Gateway

Lesson 1: Ethernet Gateway Overview
- Virtual IP Interfaces
- Configuration Concepts

Lesson 2: SFS Ethernet Gateway Module Installation
- Installing and Removing an Ethernet Gateway
- Interpreting Ethernet Gateway LEDs

Lesson 3: Ethernet Gateway Configuration
- Dependencies
- Trunking
- Bridge Groups
- Redundancy Groups
- Bridging with Additional Partitions

Module 6: Configuring the Fibre Channel Gateway

Lesson 1: Fibre Channel Gateway Overview
- Fibre Channel Gateways as Virtual HBAs
- Fibre Channel Gateway Control
- Fibre Channel Gateway Redundancy

Lesson 2: Installing the Fibre Channel Gateway
- Installing and Removing a Fibre Channel Gateway
- Interpreting Fibre Channel Gateway LEDs
- Recovering from a FC Gateway Failure or Disconnect

Lesson 3: Configure and Verify Fibre Channel over InfiniBand
- Configuration Process
- Configuring Global Attributes
- Virtual WWNN and WWPN Generation
- Fibre Channel Switch Zoning
- LUN Discovery
- Creating Storage Association
- Editing ITL

Lesson 4: Storage Setup Process
- Linux Storage Setup
- Windows Storage Setup
- Storage Monitoring
- Recovering from a FC Gateway Failure or Disconnect

Appendix A: Boot over InfiniBand
Lesson 1: Boot over InfiniBand Overview
- How Boot over InfiniBand Works
- Boot over InfiniBand SAN
- Boot over InfiniBand PXE
Lesson 5: The Customizer Tool

What Is Customizer?

Module 3: Implementing Server Fabrics with the Cisco SFS

Lesson 2: Configure Remote Server Boot over InfiniBand on Linux
Configuring a Fibre Channel Connection
Installing an Image onto Fibre Channel Storage
Booting an Existing Image
Booting from PXE

Further Information:
For More information, or to book your course, please call us on Head Office 01189 123456 / Northern Office 0113 242 5931
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