Course 731: Network Architecture and Performance

Course Description…

As networks and data communications get more complicated with wider areas and faster speeds, wireless connections and multi-media transmissions, the network infrastructure becomes harder and more complex to design and maintain. This course addresses the design, architecture, and maintenance of computer networks from the basic cable media on up to the topologies of modern intra-network highways.

Learning Objectives…

- Understand the basic components of networks and how they fit together into the overall infrastructure
- Develop network models and topologies to handle new and increasing demand on the infrastructure
- Apply the tools and techniques needed to gauge usage and handle growth, both with wired and wireless connections
- Include security and network maintenance in the design and topologies of local and wide area networks

Who should attend…

Audience includes hardware and network technicians, architects, and administrators who want to understand the technology behind the network infrastructure with which they're working.

Prerequisites…

A basic understanding of network and computer terminology and applications is recommended.

Course Outline…

Introduction and Overview

Course Objectives

Unit 1: Basic Network Architecture Components

Unit Objectives

Basic Networking Structures

- Transmission media
- Messaging options and clocking
- Cabling options

Local Area Networking

- Structure and protocols
- Performance
- LAN Devices

Wide Area Networking

- Structure and protocols
- WAN Devices
- Alternative approaches

Unit 2: Network Topologies and Options

Unit Objectives

Standard LAN Topologies

- BUS architecture
- STAR architecture
- Wireless LANs
- Other architectures

Inter-network Topologies

- Bridge topologies – Spanning Tree
- Router topologies and performance
- RIP
- OSPF
- Switches and VLAN topologies

Wide Area Topologies

- Switched approaches
- ATM
- Point to point
- Mesh and fabric topologies
- Wireless

Unit 3: Network Performance

Unit Objectives

Performance Factors

- Serialization Delay and computation
- Queuing
- Throughput
- Designing for latency
- Intermediate device performance issues

Traffic Flow

- Determining traffic flow
- The Traffic Flow Matrix
- Device impacts on traffic flow

Quality of Service

- QoS criteria
- ATM versus MLPS
- Designing for QoS

Unit 4: Network Design Issues

Unit Objectives

Overall Network Design

- Networked communities
- Concept of immunity
- Network competition

Fat and Thin Client Approaches

- Classical thin client architecture
- Fat client approach
- Modern thin client networks

Maximizing TCP/IP Networks

- Network layer services
- Transport layer services
- Application layer protocols

Designing for Fault Tolerance

- Fault tolerance and propagation
- Causality and dependency
- Faults and cause trees
- Monitoring
- Redundancy

Sharing Bandwidth

- Convergence
- Voice and data
- VOIP

Steps of Network Design and Modification

- Determining network requirements
- Defining the network
- Defining traffic flow and usage
- Device configuration design
- Device interconnection
- Design verification
- Implementation considerations
- Network Infrastructure Organization
- Performance tuning

Unit 5: Mixed and Multimedia Networks

Unit Objectives

Bandwidth Considerations

- Mixed mode scenarios
- Handling variances in bandwidth demand
- Variations on push-pull

Multi-Media Topologies

- Point to multipoint
- Broadcast
- Video teleconferencing
- Peer-to-peer

Impact of Standards on Network Topology

- Video transmission standards
- Streaming media
- Broadcast standards and transmission
- The effects of compression

Unit 6: Network Security and Management Design Issues

Unit Objectives

Basic Security Considerations

- Access
- Authentication
- Availability

External Network Security

- DMZ and firewall architecture
- Network Perimeter

Internal Network Security

- Encryption
- Trusted third party security architecture
- Setting internal perimeters

Designing for Management

- The managed network
- SNMP
- Architecting for network management

Unit 7: The Bottom Line

- Future of network usage and design
- Ideas to use
- Where to go for more information

Please contact your ROI representative to discuss course tailoring!!!