

Course ID
SW-ROUTE
Course Duration
5 days

Course Title
Introduction to Switching and Routing

Related Courses

- IP-Based Systems: TCP/IP and Mobile IP (IPSYS, 2-3 days)
- Multimedia Applications: IMS, SIP, and VoIP (MULTIMEDIA, 2 days)
- VoIP: Protocols, Design, and Implementation (VOIP, 2-3 days)
- State-of-the-art of VoIP Technology for Professionals, Managers, and Executives (VOIP-EXEC, 1 day)
- VoIP Security (VOIPSEC, 2 days)
- MPLS: Integrated Routing with End-to-End QoS for the Next Generation Networks (MPLS, 2-3 days)

Aimed At

This course is aimed at network, server and storage administrators who are tasked with implementing basic, intermediate and complex network architectures that require an intimate working knowledge of a variety of common and standard protocols, features and services.

Group Size

5-25

Prerequisites

Those wishing to take this course should have a basic knowledge of networking requirements and functionality. Detailed knowledge of specific protocols and their operation is not required.

Course in a Nutshell

Network protocols form the foundation and support successful and effective network architectures. Therefore it is imperative to understand the functionality of physical layer, switching, and routing protocols in order to leverage performance advantages. This course delivers a layered model and presents the interaction between common protocols, features and services, so that the student may develop a holistic view of successful and performance based network deployments.

Customize It!

Let us know your reason for studying switching and routing so we can customize the course to your specific needs. If you do not possess prior knowledge of basic network functionality, we can augment the course material to deliver a solid foundation for students with varying degrees of expertise.

Learn How To

- Describe common physical layer LAN and WAN services
- Understand Ethernet network architectures (Layer 2 switching)
- Implement an effective IP addressing scheme including subnetting
- Understand the functionality of routing protocols including OSPF, EIGRP, IS-IS, BGP and RIP (Layer 3 Routing)
- Understand TCP and UDP transport layer protocols including reliable delivery

Course Outline

- Introduction to the Open Systems Interconnect (OSI) Model
 - Physical Layer Protocols
 - Data Link Layer Protocols
 - Network Layer Protocols
 - Transport Layer Protocols
 - Session Layer Protocols
 - Presentation Layer Protocols
 - Application Layer Protocols
- Understanding Network Architectures
 - Bus, Ring and Star Topologies
 - Basic Device Functionality
 - LAN Topologies
 - WAN Topologies
- Binary Number Systems
 - Binary Formats and Weighting
 - Binary Coded Decimal
 - Hexadecimal
 - Converting between Binary Formats
- Physical Layer Functionality
 - Channel Capacity
 - Binary Coding (RZ, NRZ, Manchester, uni-polar and bipolar)
 - Clock and Data Recovery
 - LAN Physical Layer Protocols (IEEE 802.3)
 - WAN Physical Layer Protocols (Frame Relay, SONET, CWDM, DWDM, Metro Ethernet, VPLS)
- Data Link Layer Functionality
 - PHY Layer Coding
 - Media Access Control (MAC)
 - Ethernet Networking Evolution
 - MAC addressing
 - Ethernet II Frame Format
 - Logical Link Control (LLC)

- Ethernet Switching Methodology
- Virtual Local Area Networks (VLANs)
- Spanning Tree Protocol (STP)
- Internet Protocol Addressing
 - IPv4 Structure
 - IPv6 Structure
 - Class A, B, C and D Networks
 - Private Network Addressing
 - Subnetting and Variable Length Subnet Masking (VLSM)
- Internet Protocol (IP) Functionality
 - IP Network Architectures
 - IP Frame Format
 - IP Protocols (ping, traceroute)
 - Address Resolution Protocol (ARP)
- Layer 3 Routing
 - Static and Default Routing
 - Routing Tables
 - Routing Algorithms
 - Interior Gateway Protocols (RIP, EIGRP, OSPF, IS-IS)
 - Exterior Gateway Protocols (BGP)
 - Equal Cost Multipathing (ECMP)
 - Route Redistribution
- Transport Layer Functionality
 - Transmission Control Protocol (TCP)
 - User Datagram Protocol (UDP)
 - Reliable Transport
 - Port Numbers for Common Services
- LAN and WAN Network Interoperability
 - Frame and Packet Encapsulation
 - Address Translation
 - Point to Point Protocol (PPP)
 - Authentication Methods
- Networking Example
 - Physical through Transport Layer Functionality
 - Review Network Architectures and Topologies
 - OSI Layer Interactions
- Wrap-up
 - Course Recap and Q/A
 - Evaluations

**How You Will
Learn**

- A seasoned instructor will present this course in interactive lecture format.
- Along with the lecture, we will use exercises to enrich the instruction and drive home the essential points. The course can be optionally taught as a hands-on workshop at no added cost.
- If you already know something about the technology, we will build on that. We'll compare and contrast what's familiar with what's new, making the new ideas easier to learn as well as more relevant.
- If your background is less technical, we will use meaningful examples and analogies to simplify the complex subject matter.
- You will receive a printed Participant Handbook which will help you remember and retain what you learned in class and apply it on your job.

Revised

2Rnj