Switches and Routers: A Comprehensive Hands-On Introduction - 4 Days

Course 364 Overview

You Will Learn How To

- Build and design scalable networks
- Compare the operational benefits of Ethernet and WLAN
- Deploy switches using Spanning Tree and VLANs
- Employ a variety of LAN interconnection techniques
- Determine the optimum routing protocol for various internetworking environments
- Integrate network management and security

Course Benefits

Switches and routers are the critical building blocks of a successful internetwork infrastructure. In this course, you gain the essential knowledge required to deploy and use switches and routers in IP networks. Through a combination of written and hands-on exercises, you acquire the skills to effectively select and deploy appropriate internetworking technologies.

Who Should Attend

Network managers, technicians, engineers and consultants involved in designing, implementing or managing networks. Knowledge of computer networking principles at the level of Course 450, "Networking Comprehensive Introduction", is assumed.

Hands-On Training

Hands-on exercises provide you with experience deploying routers and switches. Exercises include:

- Setting up a new switch and router from initial factory configuration
- Building and optimising a switched LAN
- Network testing using ping and traceroute
- Implementing an IP address design
- Exposing switch and router security weaknesses
- Deploying and optimising VLANs and Spanning Tree
- Comparing RIPv1 and RIPv2 with a protocol analyser

Switches and Routers: A Comprehensive Hands-On Introduction - 4 Days

Course 364 Outline

Introduction and Overview

- Motivations for internetworking
- Connecting the enterprise
- Structuring large networks

Access LAN Technologies

LAN standards

- Overview of IEEE 802 architecture
- 802.3 evolution
- 802.11 wireless LAN standards

Ethernet

- Media choices, mixing copper and fibre
- Half/full duplex operation
- Link aggregation
- Frame format variations
- Attaching 10 and 100 Mbit/s workgroups

Backbone technologies

- Gigabit and 10 Gigabit Ethernet
- Backbone media choices: Cat, 6, MMF, SMF

Wireless LANs

- Comparing a, b, g and n
- The wireless office
- Access points, wireless bridges and routers
- WLAN security issues

LAN Switching

Core concepts

- Transparent learning and bridging
- Interpreting the forwarding table
- Incorporating resilience with spanning tree and Rapid Spanning Tree
- Switch performance metrics and terminology

Advanced switching topics

- VLAN concepts
- IEEE 802.1Q tag-based VLANs
- IEEE 802.1p priority scheme
- Routing between LANs with multilayer switches

Deploying switches

- Building and enhancing access LANs
- Deploying backbone and core switches

Interconnecting LANs

WAN technology choices

- Leased fixed and dial-up services
- Site interconnection with leased lines and transparent LAN services

Remote connectivity

- Fundamental concepts
- Resilience, redundancy and performance
- The importance of routers

Routing: The Network Layer

Basic concepts

- Router operation
- Network layer functions
- Address administration and subnetting

Local routing

- Direct vs. indirect routing
- Static and dynamic routing methods

Routing Protocols

Fundamentals

- Routing protocol operation
- Route dissemination
- Distance Vector vs. Link State protocols
- Comparing RIPv1 and RIPv2
- Static and dynamic routing
- Interpreting routing tables

Enterprise routing

- Scalable interior routing protocols
- Deploying OSPF
- Protocol security vulnerabilities

Beyond the enterprise

- Exterior gateway protocols
- Policy-based routing
- Connecting autonomous systems with BGP

Advanced Internetworking

Migrating to IPv6

- Motivation for IPv6
- Addressing concepts
- Neighbor discovery

Maintaining quality of service (QoS)

- Fair queuing techniques
- Priority by protocol and application type
- Priority and congestion control
- Managing networks with SNMP