

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

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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