

IP Routing and Switching Technologies

Course No. 1204

Duration: 3 Days

Course Overview:

In most of today's larger networks we'll find a mix of switches (bridges with more than two ports) and routers. Both have their strengths and weaknesses. This seminar will present a comprehensive and in-depth discussion on Bridges and Routers' function in today's networks.

Who should attend?

- Network Engineers, Network Operators, Network Managers or Network Designers who are responsible for designing, maintaining and operating public or private IP networks.
- Support, pre- and post sales engineers in vendor organizations.

Prerequisites:

- Attendees should have a basic understanding of Ethernet, IP and related protocols.

Course Content:

1. Introduction

- What is a Network?
- OSI Model
- TCP/IP Model
- Local and Wide Area Networks

2. Ethernet

- Ethernet history
- Basics on Ethernet
- Ethernet Header
- Ethernet Evolution
- Extending LANs

3. Repeaters and Hubs

- Repeaters and Hubs
- Shared Bandwidth
- Ethernet Hubs

4. Bridges and Switches

- Bridges: Definition and types
- The learning process
- Spanning tree bridging
 - Spanning Tree Protocol
 - Rapid Spanning Tree Protocol
- Link Aggregation
 - LACP
- Switches: From shared to dedicated bandwidth
- Broadcast and collision domains
- Switch features

5. VLANs

- Broadcasting with Ethernet switches
- Ethernet switches and multicast
- Ethernet VLANs
- Multiple Spanning Tree
- VLAN Trunks: IEEE 802.1Q
- Ethernet and VLAN QoS: IEEE 802.1p
- The MRP/GARP – Multiple Registration Protocol
 - VLAN Registration Protocols – GVRP/MVRP
- Link Layer Discovery Protocols (LLDP)

6. IP Addressing

- IP Basics
- Addressing
- Subnetting
- Variable Length Subnet Masks
- Internet Scaling Problems
- Classfull vs Classless Addressing
- CIDR
- NATs and Private Addressing
- IP Header
- IP Routing
- Address resolution
- ICMP
- VRRP

7. Routing

- Routers Function
 - Terminology, metrics
- Routing Algorithms
- Static vs. dynamic routing
- Multipath: ECMP
- Distance Vector routing
- Link state routing
- Interior routing protocols: RIP, OSPF, IS-IS
- Autonomous systems
- Exterior routing protocols: BGP
- Layer 3 Switches
- Routers vs Layer 3 Switches

8. QoS

- Queuing techniques
- Priority
- Congestion Control
- Traffic shaping
 - Leaky bucket
 - Token bucket algorithm
- Over provisioning

9. Summary