



Telecom Training Center

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Course Objectives

After completing this course, the student will be able to:

- Gain in-depth understandings and practical knowledge of IP technology and its Security implementation at an Enterprise or bank environment
- Implement advanced designs and configurations in Layer 2 and 3 Data Networks
- Extend IP address using VLSM and route summarization
- Design and implement various routing protocols – RIP, OSPF and BGP
- Negotiate and Implement MPLS Service from Service Provider
- Design and implement Quality of Service (QoS) for different enterprise applications
- Design a secure enterprise network with Firewall, IPS and VPN

Course Overview

This Course provides a career oriented, comprehensive coverage of enterprise-level networking skills, including advanced Routing and Switching, IP QoS, MPLS Service, and IP Security, while providing opportunities for hands-on practical experience and softskills development.

This course covers the following technologies:

- Ethernet and LAN Switching
- Routing protocols and their efficient operations
- Route redistribution
- MPLS services from Service Provider – Layer 2 and Layer 3 VPN
- Quality of Service (QoS)
- IP Security
- Firewall and Intrusion Prevention System (IPS)
- Virtual Private Network (VPN)

Key Benefits

IP network and its Security are the critical building blocks of a successful enterprise IT infrastructure. In this course, you gain the essential knowledge required to deploy and use IP networks to offer mission critical data communications service. Through a combination of written and hands-on exercises, you acquire the skills to effectively select and deploy appropriate internetworking technologies.

Pre-Requisites for Participants

Background in TCP/IP and data communications is recommended.

Who Should Attend?

Network Managers
IT Managers
Network Engineers and Network Administrator

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Course Outline

Introduction and Overview

- Course Objectives
- New challenges facing Enterprise Network
- Business Motivation for a single convergent IP Infrastructure

LAN Technologies

- Evolution of IEEE Ethernet standards: From 10BaseT to 10 Gigabit Ethernet
- Media Access Control (MAC) Addressing
- LAN Frame Structures
- LAN Cabling Requirements – Coax, Copper, Fiber, Wi-Fi

Ethernet Switching Fundamentals

- Bridging and Switching Technologies
- Spanning Tree Protocol
- Virtual LANs (VLANs)
- Trunking Technologies and Applications
- Layer 3 Switching

IP Routing Concepts

- OSI 7-Layer Reference Module
- Layer 3 IP Addressing (IPv4 and IPv6)
- Designing Proper IP Address Space
- IP Routing – Static vs Dynamic, FLSM & VLSM & CIDR
- Routing Protocols Overview
- Routing Redistribution

Routing Information Protocol (RIP)

- RIP Operation
- RIP Version 1, Version2
- Feature Summary
- Workshop: RIP Configuration

Open Shortest Path First (OSPF)

- OSPF Overview
- OSPF Messages – Link State Advertisements (LSAs)
- OSPF Operations
- OSPF Hierarchical Design

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- ⊕ Areas
- ⊕ Designated Routers
- ⊕ Area Border Routers
- ⊕ ASBRs
- OSPF on Broadcast and Non-Broadcast Multi-Access (NBMA) Networks
- Feature Summary
- Workshop: OSPF Configuration

Border Gateway Protocol (BGP)

- BGP Overview
- BGP Operations
- BGP Messages
- BGP Attributes
- eBGP vs iBGP
- iBGP and IGP Synchronization
- Autonomous Systems
- Large-Scale BGP Peering
- Feature Summary
- Workshop: BGP Configuration

Multi Protocol Label Switching (MPLS) Technology

- The Drawbacks of Traditional IP Routing
- Basic MPLS Concepts and Label Switch Router (LSR) Types
- Label Distribution Protocol (LDP)
- Loop Prevention and Detection in MPLS
- MPLS Implementations
- Summary

Enterprise MPLS Implementations

- Layer 3 MPLS VPN Overview
- Provider Edge – Customer Edge Routing Protocols
 - ⊕ Static Routes
 - ⊕ OSPF
 - ⊕ RIP
 - ⊕ eBGP
- Layer 2 VPN Overview
- Pseudowire vs VPLS
- Summary
- Workshop: MPLS VPN Configuration

Negotiating and Implementing MPLS Service

- Benefits and Challenges of MPLS

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- Layer 3 VPN vs Layer 2 VPN
- MPLS Negotiation Strategy
- Implementing MPLS: Three Keys
 - ⊕ Prioritize Applications
 - ⊕ Clean Up The "Cloud"
 - ⊕ Be Dynamic
- Summary

Quality Of Service (QoS)

- QoS Overview
- Packet Classification and Marking
 - ⊕ IEEE 802.1p
 - ⊕ IP Precedence
 - ⊕ DiffServ Code Point (DSCP)
- Congestion Management - Queuing
- Congestion Avoidance
 - ⊕ Tail Drop
 - ⊕ Random Early Detection (RED)
 - ⊕ Weighted Random Early Detection (WRED)
- Shaping and Policing
- Summary

Need for Network Security

- Security Threats
- The Phases of an Attack
- Attack Methodologies
- Network Attack Piont
- Hacking Tools and Techniques

Firewalls

- Firewall Overview
- Firewall Technologies
 - ⊕ Packet Filtering
 - ⊕ Proxy Server
 - ⊕ Stateful Packet Filtering
- Network Address Translation (NAT)
- DMZ
- Application Firewalls
- Summary

Intrusion Detection and Prevention System (IDPS)

- IDPS Triggers

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- ⊕ Signature-Based
- ⊕ Statistical Anomaly-Based
- ⊕ Stateful Protocol Analysis
- Monitoring Locations
 - ⊕ Network-based Intrusion Prevention (NIPS)
 - ⊕ Wireless Intrusion Prevention Systems (WIPS)
 - ⊕ Network Behavior Analysis (NBA)
 - ⊕ Host-based Intrusion Prevention (HIPS)
- Summary

Encryption

- Overview
- Symmetric-Key Cryptography
- Symmetric-Key Management
- The Key Distribution Problem and Public-Key Cryptography
- The Digital Signature
- Public-Key Infrastructures (PKI)
- Summary

Authentication, Authorization and Accounting (AAA)

- RADIUS
- TACACS+

Virtual Private Network (VPN)

- VPN Technologies
 - ⊕ Layer 2 Tunnel Protocol – L2TP
 - ⊕ Point-to-Point Tunnel Protocol – PPTP
 - ⊕ Generic Routing Encapsulation – GRE
 - ⊕ MPLS VPN – Layer 2 and Layer 3
 - ⊕ IP Security – IPsec
 - ⊕ Secure Sockets Layer – SSL
- IPsec VPN
 - ⊕ Remote Access
 - ⊕ Site-to-Site VPN
- SSL VPN
- Summary



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Price: \$3,880 CAD per person per session, tax included

Included:

- 4 day IP-MPLS training course, text books and Certificate;
- 4 day and night accommodation, single occupancy in Nav Canada Training and Conference Center for each session;
- Daily breakfast, lunch and dinner on site;
- Continuous refreshment, coffee, tea, soft drink and snack service on site;
- Fully equipped classroom and facilities on site;
- Free WiFi internet access;
- Indoor swimming pool and fitness room on site.

Location: NAV CANADA Training and Conference Centre, 1950 Montreal Road, Cornwall (Ontario) K6H 6L2, Canada. <http://conference.navcanada.ca/>

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