IP Networking Workshop

IPC_405 | Expert-Led Live | Transport | Expert
Course Duration: 4 days

As IP and related technologies make their way into wireless service offerings and into mobility network architectures and operations, network staff will need to have a solid understanding of these technologies in order to continue meeting performance objectives. Having this foundation enhances one's value to the organization and improves productivity and effectiveness when working with these types of networking devices. Students will learn the supported features of new vendor equipment and how best to operate them, as well as to recognize how configuration changes affect other systems, diagnose performance issues, and trace fault conditions to their source. This session focuses on IP fundamentals: routing, protocols, addressing and tools. Hands-on exercises reinforce these concepts in the context of the 4G network architecture.

Intended Audience

This course is intended for those familiar with the 3G/4G wireless networks, but are relatively new to IP technologies. It is designed to be a compact IP course for those who may not necessarily need industry accreditation.

Objectives

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

- Read and explain the configuration file on the router
- Configure Ethernet VLANs and OSPF based IP networks
- Use a network analyzer to trace packet flows through the network
- Configure network nodes to support QoS requirements
- Troubleshoot simple Ethernet and IP issues
- Trace a packet flow through the various VLANs and IP subnets that make up the mobility network
- Describe how Ethernet and IP nodes provide resiliency to faults in the mobility network
- Sketch a typical end-to-end 4G architecture and explain how user plane traffic flows through it

Outline

1. Prologue
1.1 The wireless network
1.2 IP in the wireless network
1.3 IP workshop introduction

2. Internetworking Fundamentals
2.1 OSI and Internet models
2.2 Headers and encapsulation
2.3 Network devices: Switch, Router
2.4 Internetworking in mobile networks

3. Ethernet LANs
3.1 Ethernet MAC layer and framing
3.2 Ethernet PHY: 10/FE/GE/10GE
3.3 Address resolution protocol
Exercise: Lab: Wireshark

4. VLANs
4.1 Conceptual overview
4.2 Applications
Exercise: Lab: VLANs (simulate control and management planes)

5. IP Addressing
5.1 Broadcast, unicast, and multicast addresses
5.2 Public and private addresses
5.3 Static and dynamic addresses
5.4 IP subnet masks and prefixes
Exercise: Written lab: Subnets

6. Internet Protocol Operation
6.1 IP packet format
6.2 IP forwarding
6.3 IP routing and OSPF
6.4 Name resolution
6.5 ICMP functions
Exercise: Lab: IP forwarding

7. Transport Layer
7.1 Ports
7.2 TCP, UDP, SCTP
Exercise: Lab: Log analysis for TCP

8. Mobility
8.1 Packet core architecture
8.2 Authentication
8.3 Tunneling for mobility
Exercise: Lab: Simulated data session

9. Quality of Service (QoS)
9.1 IP QoS
9.2 MPLS QoS
9.3 Ethernet QoS
Exercise: Lab: QoS and priority

10. Network Availability
10.1 Layer 2 solutions
10.2 Layer 3 solutions