Course ID	Course Title
TCPIP3	**TCP/IP Networks: An Overview**
Course Duration	
3 days	

Related Courses

- TCP/IP Short-course (TCPIP1, 1 day)
- TCP/IP Networks: Advanced Topics (TCPIP2, 2 days)
- SDN: Software Defined Networks (SDN1, 1 day)
- SDN/NFV: Software Defined Networks & Network Functions Virtualization (SDN-NFV, 2 days)
- Modern Telecommunications Overview (TELECOM1, 2-5 days)

Aimed At

Managers and professionals, both corporate and Government, whose work requires an overview of TCP/IP Networks.

Prerequisites

Some prior exposure to telecommunications networks and familiarity with IP concepts will be helpful.

Course in a Nutshell

This course provides a comprehensive overview of modern IP-based telecom systems. It covers IP and the Internet, the technologies behind them, their performance goals and limitations, and security issues. Topics such as VoIP, Virtual Private Networks (VPN), Cloud, SONET, and Multi-Protocol Label Switched (MPLS) systems are included.

Customize It!

We can tailor this course's content and technical depth to suit the audience backgrounds and needs.

Learn How To

- Solid foundation in IP-based systems
- Coverage of core protocols used in Internet
- Familiarity with technologies used to implement IP
- Understanding of strengths, weaknesses, performance abilities and limitations of various IP-based systems
- Coverage of the Internet and TCP/IP networks
- Network security basics

Course Outline

- Course overview

- Protocols and layers

  - How a network operates
  - What a protocol is
  - Purpose of and need for protocols and standards
  - The OSI protocol stack and how it relates to types of systems and technologies
    - Understanding telecom in terms of layers
    - How layers relate to technologies
    - OSI stack and end-end telecommunications

- Internet Protocol (IP) and Transmission Control Protocol (TCP)

  - What they are
  - TCP/IP layers
  - How they work: Encapsulation
  - Protocols and interfaces
  - How modern networks utilize them
  - How they are implemented in various technologies and types of systems
  - Quality of Service (QoS) and IP networks
  - IP and common applications

- TCP/IP protocols and devices

  - Layers, protocols, ports, and sockets
  - Client-server model
  - Layers and devices
  - Bridges, routers, switches and network topology
    - LANs
    - Virtual LANs
    - Using devices to create desired LAN topology

- Network link technologies

  - Overview of network types
  - Ethernet history and operation
  - DSL and its history and evolution
  - SONET operation and Packet over SONET (PoS)
  - Wireless LANs and protocol

- The Internet and how it works: Core protocols

- IPv4 and IPv6 addressing

  - Basic principles of IP addressing
  - Network/host boundary
  - IPv4 addresses
  - IPv6 addresses

- Subnets and supernets

- Address resolution and Address Resolution Protocol (ARP)

  - ARP and LANs
  - ARP packets
  - Types of ARP
  - ARP and IPv6

- IPv4 and IPv6 headers

  - Packet headers and addresses
  - IPv4 header
  - Fragmentation and reassembly with IPv4
  - IPv4 and IPv6 coexistence and differences
  - IPv6 header
  - Migration path
  - (For Government audiences) Current government requirements

- Internet Control Message Protocol (ICMP)

  - ICMP and ping
  - ICMP message format
  - Sending ICMP messages
  - Traceroute
  - ICMPv6

- Routing and forwarding of packets

  - Routers and routing tables
  - IP packet forwarding
  - Table lookup
  - Tunneling
  - IPv4 and IPv6
  - Router architectures

- UDP

  - How it works
  - Relationship with TCP
  - Header
  - Ports

- TCP and network management and operation

  - Connections and the three-way handshake
  - TCP and flow control
  - Congestion management

- Multiplexing and sockets

  - What a socket is and why it is needed
  - Layers and applications

- ◦ Socket interface
- ◦ Windows sockets and TCP/IP

- Routing, peering and Internet organization

  - ◦ Routing and peering
  - ◦ Autonomous systems
  - ◦ Routing policies

- Gateway protocols

  - ◦ Internet routing protocols overview
  - ◦ RIP
  - ◦ OSPS
  - ◦ IS-IS

- Border Gateway Protocol (BGP)

  - ◦ Why BGP is needed
  - ◦ BGP as a routing protocol
  - ◦ IBPG and EBPG

- Multicasting

  - ◦ Types
  - ◦ Dense and sparse multicasting
  - ◦ Notation
  - ◦ Concepts
  - ◦ Protocols

- MPLS and IP switching

  - ◦ MPLS operation
    - ▪ Labels
    - ▪ Switching vs routing
    - ▪ Label switched paths
    - ▪ Services in an MPLS network: VPNs, pseudowires, etc.
  - ◦ MPLS architecture and IP

- Application layer overview

- Dynamic Host Configuration Protocol (DHCP)

  - ◦ DHCP and addressing
  - ◦ DHCP servers
  - ◦ Using DHCP on a network
  - ◦ DHCP operation
  - ◦ DHCP and routers

- The Domain Name System (DNS)

  - ◦ Basic operation
  - ◦ DNS hierarchy

- Database and resolution
- DNS in practice

- FTP and its operation

  - Overview
  - FTP basics
  - FTP data transfers
  - Errors
  - FTP commands

- SMTP and email

  - Architectures for email
  - SMTP and email
  - Other email protocols
  - Using POP3

- HTTP and its operation

  - HTTP basics and history
  - HTTP coding
  - HTTP and web pages
  - HTTP requests and responses
  - HTTP methods
  - Cookies

- Internet security overview

  - Ways to secure IP traffic

- Secure Sockets Layer (SSL)

  - Privacy, integrity, authentication
  - Public Key Encryption (PKE)
  - SSL as a protocol

- Course wrap-up

  - Special topics and trends (updated each time the course is taught): IMS, SDN, NFV, IoT, M2M
  - Course recap and conclusion

DCN   *LfLnp*