Networking Technology Online
Course Outline

Introduction

Networking Technology Introduction

Welcome to InfoComm University
About InfoComm International
About Networking Technology
Network Technology Course Structure

What is a Network?

What is a Network? - Introduction

What is a Network? - Introduction

Defining the Modern Network

Networking Definition
Circuit Switching and Packet Switching
Why Use a Network?

Network Classifications

Geographical Network Classifications
Local Area Networks
Wide Area Networks
Private and Public Wide Area Networks

Network Topology

Network Topology Introduction
LAN Topologies
Wireless Topology
Hybrid Topology
WAN Topologies

Network Architecture

Client-Server Architecture
Peer to Peer (P2P) Architecture

Network Standards and Organizations

Network Standards and Organizations

What is a Network? - Conclusion

What is a Network? - Conclusion

What is a Network? - Section Test

Designing a New Network

Designing a New Network - Introduction

Designing a New Network - Introduction

Needs Analysis

Customer-Centric Industries
The Network Needs Analysis
The Customer is Always Right?
Customer Readiness

Physical and Logical Design

Designing a New Network
Physical Topology
Planning Structured Cabling
Organizational Structure
Electrical and HVAC Considerations

Assuring Security

Risk Analysis
Mitigation
Impact Analysis
Confidentiality, Integrity, and Availability

Assuring Quality

Fault Tolerance
Quality of Service
Differentiated Service Categories

Implementation

Developing a Timeline
Training
Documentation

Designing a New Network - Conclusion

Designing a New Network - Conclusion

Designing a New Network - Section Test

How Data is Encoded and Transported

How Data is Encoded and Transported - Introduction

How Data is Encoded and Transported - Introduction

Encoding

How AV Signals Become Binary Code
Encoding for Data Transmission

Bandwidth

Bandwidth
Bandwidth Bottlenecks

Baseband and Broadband

Baseband
Broadband

Simplex, Half-Duplex, and Duplex

Simplex Communication
Duplex Communication

The OSI Model

The OSI Model Introduction
Layers in the OSI Model

How Data is Encoded and Transported - Conclusion

How Data is Encoded and Transported - Conclusion

How Data is Encoded and Transported - Section Test

Common Networking Hardware and Software

Common Networking Hardware and Software - Introduction

Common Networking Hardware and Software - Introduction

Networking Components

Networking Device Review
Switches Versus Hubs

Network Operating Systems

What is a Network Operating System (NOS)?
Windows Servers
Windows NT Administrative Model
Active Directory
Windows NOS User Accounts
UNIX
UNIX History Command
UNIX Job Control
UNIX Domain Sockets

UNIX File Systems
UNIX File Permissions
UNIX Security

Servers

What is a Server?
Thin Servers
Server Components
Server/Computer Common Elements
Server Classification

Web Servers and Services

Web Servers
Web Server Communications
File Servers
Data Servers
Email Servers
Network Time Protocol (NTP) Server

External Storage Systems

External Storage Systems
Network Attached Storage (NAS)
Virtual Machines

Common Networking Hardware and Software - Conclusion

Common Networking Hardware and Software - Conclusion

Common Networking Hardware and Software - Section Test

The Physical Layer

The Physical Layer - Introduction

The Physical Layer - Introduction

Physical Transmission Media

The Physical Form of Data
Copper Cable
Cat Cabling
RJ-45 Connectors
Crossover Cables
Fiber Optic Cables
Fiber Connectors
Wireless Technology
Advantages and Disadvantages of Wireless Technology

Common Transmission Media Problems

EMI and RFI
Crosstalk (XT)
Wiring Faults
Wiring Faults Practice

Long Distance Communication Media

Long Distance Communication Media
PTSN-Based Internet Access
Other Long Distance Communication Media

The Physical Layer - Conclusion

The Physical Layer - Conclusion

The Physical Layer - Section Test

The Data Link Layer

The Data Link Layer - Introduction

The Data Link Layer - Introduction

Ethernet

What is Ethernet?
Ethernet Speeds
10 Mbps Ethernet
100 Mbps Ethernet
1 Gbps Ethernet
10 Gbps Ethernet
40/100 Gbps Ethernet

VLANs

What is a VLAN?
VLAN Frame Format
VLAN Uses
Requesting a VLAN
Setup and Maintenance

AV Data Link Protocols

AV Data Link Protocols
Audio Video Bridging (AVB)
EtherSound
Cobranet
Dante
Q-Sys
HDBaseT

The Data Link Layer - Conclusion

The Data Link Layer - Conclusion

The Data Link Layer - Section Test

Network Addressing

Network Addressing - Introduction

Network Addressing - Introduction

Network Layer Protocols

The TCP/IP Protocol Stack
Address Resolution Protocol (ARP)
Internet Protocol (IP)
How the Data Link Layer and Network Layer Interact
IPv4 Packet Format
IPv6 Packet Format
Fragmenting
Internet Control Messaging Protocol (ICMP)

IP Addresses

What is an IP Address?
Decimal Numbering
Binary Numbering
Hexadecimal Numbering
IPv4 Addressing
IPv4 Netmask
Network Classes
Classless Inter-Domain Routing (CIDR)
IPv6 Addressing
IPv6 Address Compression
IPv6 Netmasks

Types of IP Addresses

Reserved Addresses
Global IP Addresses
Private Addresses
Network Address Translation
IPv4 Broadcast Addresses
IPv6 Multicast Addresses
Loopback Addresses

IPv4 Subnetting and Supernetting

What is Subnetting?
Why Subnet?
Supernetting
Calculating Number of IPv4 Subnets - CIDR Notation
Calculating Number of IPv4 Subnets - Dot-Decimal Notation
Calculating Number of IPv4 Hosts
Determining an IPv4 Address's Subnet

IPv6 Subnetting

IPv6 Subnets
Calculating Number of Subnets for IPv6 Networks
Hosts on IPv6 Subnets

IP Address Assignment

Address Assignment
Dynamic Host Configuration Protocol (DHCP)
Reserve DHCP
BOOTP
APIPA

Naming Services

Naming Services
Host Files
DNS
DNS Hierarchy
ICANN
Subdomains
Zones
Fully Qualified Domain Name
DNS Operations
WINS

Network Addressing - Conclusion

Network Addressing - Conclusion

Network Addressing - Section Test

IP Data Transmission

IP Data Transmission - Introduction

IP Data Transmission - Introduction

Routing Protocols

Open Shortest Path First (OSPF)
Intermediate System to Intermediate System (IS-IS) Protocol
Routing Information Protocol (RIP)
Enhanced Interior Gateway Routing Protocol (EIGRP)
Border Gateway Protocol (BGP)

Transport Layer Protocols

Transport Layer Protocols
TCP Transport
UDP Transport
TCP versus UDP
Ports and Sockets

The Upper Layers

The Upper Layers

IP Data Transmission - Conclusion

IP Data Transmission - Conclusion

IP Data Transmission - Section Test

Network Security

Network Security - Introduction

Network Security - Introduction

Common Network Risks

Network Security
Network Vulnerabilities
Social Vulnerabilities
Network Threats
Denial of Service (DoS)
Masquerade Attacks
Malware

Security Tools

Security Awareness
Firewalls
Types of Firewalls
Application Layer Gateway / Session Border Controller
Third Party Security Tools
Audit Tools
Protocol Analyzer
Anti-Virus and Anti-Malware
Vulnerability Analysis Tools
Common Third-Party Tools

System Backups

System Backups
Hot and Cold Spares
Hot, Warm, and Cold Sites

User Authentication

Authentication and Authorization
User Authentication Protocols

Secure Transmission Protocols

Encryption
Secure Socket Layer (SSL) and Transport Layer Security (TLS)
Secure Shell (SSH)

Virtual Private Networks

VPNs
MPLS VPNs

Wireless Security

Wireless Security
Weak Wireless Security Measures
Wireless Security Protocols

Network Maintenance

Network Maintenance
Maintaining System Software
Maintaining System Hardware

Network Security - Conclusion

Network Security - Conclusion

Network Security - Section Test

Troubleshooting Networked Systems

Troubleshooting Networked Systems - Introduction

Troubleshooting Networked Systems - Introduction

Troubleshooting Methodology

Troubleshooting - A Logical Approach
Symptom Recognition and Elaboration
List and Localize the Faulty Functions
Failure Analysis

Network Infrastructure Troubleshooting Tools

Network Infrastructure Troubleshooting Tools

Troubleshooting with TCP/IP Utilities

ICMP
PING (Packet Internet Groper)
Tracert / Traceroute
Netstat
Ipconfig / Ifconfig
Address Resolution Protocol (ARP) Command Tool
Nslookup
Troubleshooting Windows NT and UNIX Based Operating Systems
Troubleshooting with Event Viewer and System Monitor

Troubleshooting Common Network Problems

Troubleshooting Common Network Problems
The User Cannot Log On to the Network
The User Cannot Access a Share
The User Cannot Access the Internet
The User's Computer Has Been Compromised by Malware

Troubleshooting Networked Systems - Conclusion

Troubleshooting Networked Systems - Conclusion

Troubleshooting Networked Systems - Section Test

Conclusion

Networking Technology Conclusion

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InfoComm University Products
Thank You
Acknowledgements

Appendices

Glossary
Bibliography