M98366A - Microsoft Networking Foundations

This series of courses provides an appropriate entry point to a future career in technology and assumes some hands-on experience or training but does not assume on-the-job experience. The course focuses on Microsoft Network Foundations

Course Outline

Duration: 3 days

Module 1 The OSI model

- OSI model
    - Layer 1 – Physical
    - Layer 2 – Data link
    - Layer 3 – Network
    - Layer 4 – Transport
    - Layer 5 – Session
    - Layer 6 – Presentation
    - Layer 7 – Application

Module 2 Local Area Networking

- Networking devices
    - Layer 2 switch
    - Layer 3 capable switch
    - Router
    - Hub
    - Access point
    - Bridge
    - Wireless LAN controller
    - Load balancer
    - Proxy server
    - Cable modem
    - DSL modem
    - Repeater
    - Voice gateway
    - Media converter
    - Intrusion prevention system
- (IPS)/intrusion detection
- system (IDS) device
    - Firewall
    - VPN headend

Module 3 Implementing wireless networks

- 802.11 standards
    - a
    - b
    - g
    - n (WiFi 4)
    - ac (WiFi 5)
    - ax (WiFi 6)
- Frequencies and range
    - 2.4GHz
    - 5GHz
- Channels
    - Regulatory impacts
- Channel bonding
- Service set identifier (SSID)
    - Basic service set
    - Extended service set
    - Independent basic service set (Ad-hoc)
    - Roaming
- Antenna types
    - Omni
    - Directional
- Encryption standards
    - WiFi Protected Access (WPA)/
- WPA2 Personal [Advanced
- Encryption Standard (AES)/
- Temporal Key Integrity Protocol (TKIP)]
    - WPA/WPA2 Enterprise (AES/TKIP)
- Cellular technologies
    - Code-division multiple access (CDMA)
    - Global System for Mobile
- Communications (GSM)
    - Long-Term Evolution (LTE)
    - 3G, 4G, 5G

• Multiple input, multiple output (MIMO)

and multi-user MIMO (MU-MIMO)

Module 4 Overview of TCP/IP

- Data encapsulation and decapsulation
- within the OSI model context
    - Ethernet header

    - Internet Protocol (IP) header
    - Transmission Control Protocol (TCP)/
- User Datagram Protocol (UDP) headers
    - TCP flags
    - Payload
    - Maximum transmission unit (MTU)

Module 5 Implementing an IPv4 addressing scheme

- IPv4 subnetting
    - Classless (variable-length
- subnet mask)
    - Classful
    - A
    - B
    - C
    - D
    - E
    - Classless Inter-Domain
- Routing (CIDR) notation

Module 6 Configuring IPv4

- Public vs. private
    - RFC1918
    - Network address translation (NAT)
    - Port address translation (PAT)
- IPv4 vs. IPv6
    - Automatic Private IP
- Addressing (APIPA)
    - Extended unique identifier (EUI-64)
    - Multicast
    - Unicast
    - Anycast
    - Broadcast
    - Link local
    - Loopback
    - Default gateway

Module 7 Troubleshooting IPv4

    - Missing route
    - Low optical link budget
    - Certificate issues
    - Hardware failure
    - Host-based/network-
- based firewall settings

- Blocked services, ports, or addresses
- Incorrect VLAN
- DNS issues
- NTP issues
- BYOD challenges
- Licensed feature issues
- Network performance issues
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Module 8 Implementing remote access

Identify the problem

- Gather information
- Question users
- Identify symptoms
- Determine if anything has changed
- Duplicate the problem, if possible
- Approach multiple

problems individually

- Establish a theory of probable cause
  - Question the obvious
  - Consider multiple approaches
  - Top-to-bottom/