Module 5 : (Network Fundamentals and Building Networks)

Topic : Network

1) Interconnected computing devices that can exchange data and share resources with each other.
2) List common network components

- Router
- Switch
- Modem
- Hub
- Access Point
- NIC
- Cable
- Gateway

3) Loopback adaptor in network .

- Step 1: Open Device Manager. Press Windows key + R, type “devmgmt. ...

- Step 2: In the Device Manager window, select “Action” in the top menu bar, then click “Add legacy hardware”.
- Step 3: In the Add Hardware Wizard, click “Next”.

4) A network application is a software program which operates over a network and allows communication and data sharing between multiple devices and users.
5) A network node can be defined as the connection point among network devices such as routers, printers, or switches that can receive and send data from one endpoint to the other.
6) Types of devices

- Hubs.
- Switch.
- Router
- Bridge.

- Gateway.
- Modem.
- Repeater.
- Access Point.

7) Types of router

- Broadband
- Core Router
- Edge Router
- Wired Router
- Dynamic Router
- Bridge Router
- Area Borders
- Border Gateway Protocol
- Open Shortest Path First
- Routing Information Protocol

Topic : Types Of Network

1) Difference between a Lan,Man,Wan

- LAN is a network that usually connects a small group of computers in a given geographical area.
- MAN is a comparatively wider network that covers large regions- like towns, cities, etc.
- The WAN network spans to an even larger locality.

2) 6 Common network components.

- Network interface card (NIC)
- Network cable or wireless adapter.
- Router.
- Switch.
- Firewall.
- Modem or access point.

3) A wide-area network (WAN) is the technology that connects your offices, data centers, cloud applications, and cloud storage together.

4) The Internet backbone can be simply defined as the core of the Internet.
5) A campus area network (CAN) is a computer network that spans a limited geographic area.
6) Physical topology describes the actual or the physical layout of a network, such as the physical arrangement of wires, media (computers), or cables in a network.
7) A peer-to-peer (P2P) architecture consists of a decentralized network of peers - nodes that are both clients and servers.
8) One central node or hub communicates with several, up to hundreds in some cases, or end nodes.

Topic : Network Devices

1) The primary purpose of network devices is to transmit and receive data quickly and securely.
2) A network switch is equipment that allows two or more IT devices, such as computers, to communicate with one another.
3) List of cables in use of the network.

- Coaxial cable
- Ethernet (LAN) cable
- Optical fiber cable

4) An access point is a device that creates a wireless local area network, or WLAN, usually in an office or large building.
5) Three types of transmission mode

- Simplex transmission mode
- Half Duplex transmission mode

- Full Duplex transmission mode

6) The router is being used to connect to the internet, whereas the repeater is used to replicate the router's received signals and the repeater amplifies.
7) Multiplexers are part of computer systems to select data from a specific source.
8) A modem is a network device that both modulates and demodulates analog carrier signals (called sine waves) for encoding and decoding digital information for processing.
9) Monitor “event viewer”

- Click Start
- Control Panel
- System and Security
- Administrative Tools
- Double-click Event Viewer.

Topic : Install and configure DHCP, DNS

1) Dynamic Host Configuration Protocol (DHCP) is a client/server protocol that automatically provides an Internet Protocol (IP) host with its IP address and other related configuration information such as the subnet mask and default gateway.
2) Some examples of DHCP options are Router (default gateway), DNS Servers, and DNS Domain Name.
3) The Domain Name System (DNS) turns domain names into IP addresses, which browsers use to load internet pages.
4) A user opens a web browser, enters www.example.com in the address bar, and presses Enter.

Topic : Network Topologies

1) The 5 network Topology
- Bus Topology
- Ring Topology
- Tree Topology
- Star Topology
- Mesh Topology

2) Internet topology is the structure by which hosts, routers or autonomous systems (ASes) are connected to each other.
3) A protocol is a standardized set of rules for formatting and processing data.
4) Star Topology
5) Star topology is a network topology in which each network component is physically connected to a central node such as a router, hub or switch.

6) A hybrid network topology is an interconnection of two or more basic network topologies, each of which contains its own nodes.
7) Physical topology describes the actual or the physical layout of a network.

- Logical Topology is the arrangement of network devices and nodes to form a logical or physical structure.

8) Types of logical Topology

- Bus Topology
- Ring Topology
- Tree Topology
- Star Topology
- Mesh Topology
- Hybrid Topology
- P2P Topology

Topic : OSI Model

1) The open systems interconnection (OSI) model is a conceptual model created by the International Organization for Standardization which enables diverse communication systems to communicate using standard protocols.
2) List of application layer protocol

- TELNET
- FTP
- TFTP
- NFS
- SMTP
- LPD
- X window
- SNMP
- DNS
- DHCP

3) There are three main types of network protocols.
4) TCP/IP is a practical model that addresses specific communication challenges and relies on standardized protocols. In contrast, OSI serves as a comprehensive, protocol-independent framework designed to encompass various network communication methods.
5) TCP/IP is a suite of communication protocols used to interconnect network devices on the internet.
6) A wired network uses cables to connect devices, such as laptop or desktop computers, to the Internet or another network.
7) Wired network disadvanteges

- Less mobility for users.
- Installation time.

- Maintenance.
- If not laid properly, wires can make a space look untidy, be a trip hazard or become disconnected easily by accident.

8) Right-click Network Authentication Service and select Configure to start the configuration wizard.

Topic : TCP/IP

1) TCP/IP is a data link protocol used on the internet to let computers and other devices send and receive data.
2) Transmission control protocol
- Internet protocol

3) There are four different types of IP addresses:
- Public, Private, Static, and Dynamic.

4) A set of rules outlining how connected devices communicate across a network

to exchange information easily and safely.

Topic : Cables

1) Types of cable and connectors
- Coaxial
- Twisted pair
- FC connector
- Optical fiber
- USB connector
- Data cables
- Mini plug

2) Twisted pairs are commonly used for differential pairs.
- Shielded cables are using the shield to reduce noise that is added to the system.

3) There are four types of computer cable connections to a monitor.

- VGA, DVI, HDMI and DisplayPort.

4) Connect a shared printer using Settings

- Select the Start button, then select Settings > Devices > Printers & scanners.
- Under Add printers & scanners, select Add a printer or scanner.
- Choose the printer you want, and then select Add Device.

5) USB cable

6) A port is the point at which a peripheral attaches to or communicates with a system unit (sometimes referred to as a jack) while a connector is any connector used within computers or to connect computers to networks, printers or other devices.

7) **To connect a wireless printer, follow these steps**

- Select the Start button, then select Settings > Devices > Printers & scanners > Add a printer or scanner.
- Wait for it to find nearby printers, then choose the one you want to use, and select Add device.

8) Coax transmits data through insulated cables with a copper core. This cable can supply both your internet and television connection simultaneously. Fiber optic cables are composed of incredibly thin glass fibers that convert electrical signals into light to carry digital information from one location to another.

9) It uses a 5 GHz frequency band and supports data transfer rates of 54 Mbps or 6.75 megabytes per second. IEEE 802.11a was the first Wi-Fi (Wireless

Fidelity) system in the IEEE 802.11 family.

10) 2.4 GHz

11) 802.11a is incompatible with the 802.11b and 802.11g wireless standards.

Topic : TCP/IP concepts - IPv6, IPv4

1) The main difference between IPv4 and IPv6 is the address size of IP addresses.

- IPv4 is a 32-bit address, whereas IPv6 is a 128-bit hexadecimal address.

2) The TCP/IP model defines how devices should transmit data between them and enables communication over networks and large distances.

3) An IPv6 address is 128 bits in length and consists of eight, 16-bit fields, with each field bounded by a colon.
4) 0:0:0:0:0:0:0:0/128
5) A public IP address is a unique IP address assigned to your network router by your internet service provider and can be accessed directly over the internet.

- A private IP address is a unique address that your network router assigns to your device. It is used within a private network to connect securely to other devices.

6) Transmitting pins of one side connect with the receiving pins of the other side.
7) An IP address is the unique identifying number assigned to every device connected to the internet.

8) It has the capability to provide an infinite number of addresses.
9) Assign multiple ipv4

- Open the Control Panel –> Network and Internet –> Network and Sharing Center -> Change adapter settings (or just run the ncpa.cpl command)
- Open the properties of your network interface.
- Select TCP/IP v4 in the list of protocols and click Properties.

10) Type ping 2001:4860:4860::8888 and press Enter.

- Observe the results. If you see replies indicating success, you have IPv6 Internet connectivity.

11) Using traditional IPv4 notation, type the following: # ifconfig qfe1 192.168.84.3 subnet mask + 255.255.255.0.

- Using CIDR notation, type the following: # ifconfig qfe1 192.168.84.3/24. The prefix /24 automatically assigns the 255.255.

12) IPv6 is faster than IPv4

13) **8 tips for secure file sharing**

- Use end-to-end encryption.
- Choose a privacy-focused provider.
- Use strong passwords.
- Turn on two-factor authentication (2FA)
- Password-protect files.
- Set sharing time limits.
- Monitor file access.
- Use a VPN on public WiFi.

14) Enables application programs and computing devices to exchange messages over a network.

15) **Map a network drive in Windows**

- Open File Explorer from the taskbar or the Start menu, or press the Windows logo key + E.
- Select This PC from the left pane.
- In the Drive list, select a drive letter.
- In the Folder box, type the path of the folder or computer, or select Browse to find the folder or computer.
- Select Finish.

Topic : IP routing and Routing protocols

1) Routing is the process of path selection in any network.
2) The routing process starts when software on a host device uses a packet's contents, destination, or purpose to select a possible route from a routing table.

3) Hybrid routing protocols ensure efficient data transmission in companies with branches spread across multiple cities.
4) The range of Ad value is 0 to 255.
5) An autonomous system is a system that is capable of managing itself.
6) In static routing, routes are user-defined.
7) A process where a router can forward data via a different route for a given destination based on the current conditions of the communication circuits within a system.

Topic : Switching and VLANS

1) A VLAN is a way of logically separating a group of computers into a separate network.

2) Two benefits of creating VLANS

- ease of administration
- confinement of broadcast domains.

3) An excellent technique used to build on the underlying core strategy to control network access.
4) A static VLAN is a group of ports designated by the switch as belonging to the same broadcast domain.
5) VLANs are logical networks that partition a physical network into multiple virtual networks, and inter VLAN routing is necessary for communication between devices on different VLANs.
6) Trunk port is a type of connection on a switch that is used to connect a guest virtual machine that is VLAN aware.
7) To configure an interface to be an access interface, the switchport mode access interface command is used.

8) Deleting the VLAN Database from a Cisco Switch

- Deleting the switch configuration. This is the easy part.
- Switch#erase startup-config.
- Switch#reload.
- Deleting the switch Vlans.
- Switch#show Vlan brief.
- Switch#show flash.
- Switch#delete vlan.dat.
- Switch#sh flash.