

ASSIGNMENT

MODULE: 7 TERM-2 =====> CCNA-NETWORK FUNDAMENTALS

- 1. Which of the following messages in the DHCP process are broadcasted?
(choose two)**

Ans: A. Request
B. Offer

- 2. Which command would you use to ensure that an ACL does not block web-based TCP traffic ?**

Ans: B. Permit tcp any any eq 80

5. Explain LAN and WAN Network

Ans: LAN (LOCAL AREA NETWORK)

- It is a frequently used network .
- It connects computers through a common communication path, containing a limited local area.
- It is two or more computers connected over a server.
- Two technologies involved in this network are "Ethernet and wi-fi".
- It ranges up to 2km.
- Transmission speed is very high.
- Example : LAN is networking in home,school,library,laboratory,collage and office etc.

★ **ADVANTAGES OF LAN**

- Privacy- It is a private network, thus no outside regulatory body controls it.
- Giving it privacy
- High speed : It has higher speed around 100 mbps data transfer rate comparatively to WAN
- Supports different transmission mediums- many types of communications transmission medium such as an Ethernet cable, fibre and wireless transmission.
- Inexpensive and simple : It has low cost, installation expansion and maintenance and It installation is easy to use, good scalability.

★ **DISADVANTAGES OF LAN**

- In this network setup costs of installing are high because special software is required to make a server.
- Communication devices like Ethernet cables,switches,hubs,routers,cables are costly.
- Security threat : all data is stored in a single server computer, if it can be accessed by an unauthorised user, can cause serious data.

WAN (WIDE AREA NETWORK)

- Connects computers over a large geographical distance
- Range above 50 km
- We use leased-line & Dial-up technology.
- Transmission speed is very low.
- Very high maintenance and cost.
- Example: WAN is the internet.

9. Define network devices and hosts

Ans : Network devices are

- Hub
- Repeater
- Switch
- Router
- Bridge
- Brouter
- NIC
- ISDN
- MODEM

★ Hub

- A hub sends data to all computers which are connected to it because it cannot recognise the source or intended destination of the data
- It has 2/4/8 ports
- It works at the physical layer (layer-1) of the OSI Model.
- It is half-duplex
- It has single-collision domain
- It is LAN device
- It cannot store Mac addresses.
- It always broadcasts all incoming data to all connected devices.

☐ Two types of Hub

- Active and passive hub
- Active Hub : Active hubs need Electricity. Hub amplifies signals or Regenerates signals.
- Passive Hub : there is no change in the signal during Transmission and it sends the data as it is .
- No need for a power supply.
- It does not amplify signal , simple receive and forward

★ Repeater

- It works at the physical layer (layer-1) of the OSI Model.
- It regenerates your signals.
- LAN device

★ Switch (multiport bridge)

- It is a small device that joins multiple computers together within one local area network.
- It works at the data link layer(layer-2) of the OSI Model.
- It works on ASIC (application-specific integrated circuit).
- It make a CAM table (Content Accessible memory).
- It is full-duplex
- It maintains a CAM table .
- It first broadcast then unicast & multicast.

- Every port of the switch is a separate collision domain.
- Switch has one broadcast domain
- It has 6/8/16/24/32/48 ports .
- Its speed is slow , 10 mbps wireless and 100 mbps wired .

☐ **Types of switch**

- 2 types of switches are
- 1) Manageable
- 2) Unmanageable
- 1) Manageable switch: they are supporting a full suite of layer2,layer 2+ and layer3 switching functionality.
- They can help increase our network security.
- They give us more control over our network security.
- VLAN create in manageable switch
- 1. Store & Forward switch : The switch buffer and verifies each frame before forwarding, it little bit slow but very reliable
- 2. Cut through switch : The switch reads only upto the frame hardware address (mac address) before starting to forward it, no error checking.
- 3. Fragment free Switch : A method that attempts to retain the benefits of both store and forward and cut through by checking the first 64 bytes.
- Adaptive switching: A method of automatically selecting between the other three modes.
- 2) Unmanageable switch: it allows Ethernet devices to communicate with one another, such as a PC or network printer,and those are typically what we call “pluge and play”.
- No security provides

★ **Routers**

- It is a hardware device used to receive, analyse and move incoming packets to another network.
- It is used to convert the packets to another network interface, drop them,and perform other actions relating to the network.
- It has more capabilities than other network devices,such as a hub or a switch that are only able to perform basic network functions.
- Example, a hub used to transfer data between computers or network devices, but does not analyse or do anything with the data it is transferring.
- By contrast ,routers can analyse the data being sent over a network,change how it is packaged, and send it to another network or over a different network.
- Example : they are used in home networks to share a single internet connection between multiple computers.
- It works on layer3(network layer) of the OSI model.
- It is a WAN device.
- It connects two or more networks.
- It is an internetworking device.
- In a router, every port has its own broadcast domain.
- It is used Ip address, sent in the form of a packet.
- It is maintain Routing table.
- On router has 2/4/8/ ports

- It speeds fast , 10/100/1 gbps.
- Two types of router
- 1. Fix router
- 2. Modular router

★ Bridge

- It is Intelligent device work on mac address
- It works on layer 2 device (data link layer) of the OSI model .
- It used to connect multiple network segments or LAN segments.
- It reduces the amount of traffic on a LAN by dividing it into two segments.
- It is filter data traffic
- It has two collision domain

★ Brouter

- We can say short for bridge Router, a brouter is a networking device that serves as both a bridge and a router.

3. Explain Network Topologies

Ans: network Topologies : Physical arrangement of network computer or devices is called Topologies.

- Network topology is the physical layout of computers,cables,switches,routers,and other components of a network.

★ BUS TOPOLOGY

- All computers and network devices are connected to a single cable called a “ Bus topology”.
- Bus topology has a single central cable that serves as the shared communication medium for all network devices or all computers.
- Each devices is connected to this cable via tap or a connector (tee connector or terminator)

❖ Advantages of Bus topology

- 1. It used less cabling
- 2. It easy to install
- 3. It is less expensive
- 4. Small network
- 5. Low security

★ Ring topology

- In this topology all devices connected to a circular data path, it is called ring topology.
- Multiple repeaters are used for ring topology with a large number of nodes to send data and to prevent data loss repeaters are used in this network.
- This data travels in anti-clock(unidirectional) forms in only one direction but it can also do clock-(bidirectional) by having 2 connections between each network Node, it is called Dual Ring topology.
- It is used in LANs and WANs networks.

❖ Advantages of Ring topology:

- Flows of data in one direction which reduces the chance of packet collisions.
- It gives Equal access to the resources .

- Minimum collision.
- Data transfer speed is very high .
- Easy to manage.
- ❖ Disadvantages of Ring topology:
 - One workstation shuts down, it affects the whole network and nodes go down.
 - Slower in performance as compared to the bus topology.
 - It is expensive .
 - In this topology it is difficult to troubleshoot.

❖ **Star topology**

- It is also known as a star network.
- In this topology each device is connected to a central hub.
- Each device linked to a central network device is displayed as a star.
- Examples : in airports, hospitals, banks, and education institutes.
- Switch is also used as a central device instead of hub.
- We will use patch cables to connect the client,servers, and another network to the central hub .
- In this topology , each connected device is dependent on the central device ; if the central device gets any problem then the whole computer network fails for communication.

❖ Advantages of star topology :

- It is reliable
- High-performing as no data collisions can occur.
- It is less expensive .
- Easy to find fault because the links are often easily identified .\
- All devices require just one port.

❖ Disadvantages of star topology

- Required more cable
- More expensive than bus topology
- When the hub goes down everything goes down, without the hub no work for all devices.
- Requires more resources and regular maintenance because it is the central system of the hub .

★ **Mesh topology :**

- It is a type of network topology where devices are interconnected to multiple other devices, forming a mesh structure.

❖ Advantages of mesh topology

- If a single device fails then don't break the network.
- There is no traffic problem.
- Fault identification is easy .
- It provides multiple paths to succeed in the destination .
- It provides privacy and security .

❖ Disadvantages of mesh topology

- It is costly
- More difficult for installation.
- Complex process in mesh topology

- Require higher power
- ★ **Hybrid topology**
 - It is a combination of two or more different network topologies.
 - It is a combination of bus, ring, and mesh topologies.
 - ❖ **Advantages of hybrid topology**
 - We can add new nodes and delete the existing nodes easily.
 - It is secure, reliable.
 - Easy for Error detection and troubleshooting
 - Good performance and speed.
 - ❖ **Disadvantages of hybrid topology**
 - Design and implementation is difficult.
 - Installation process is difficult.
 - Implementation and setup and process is costlier.
- ★ **Tree topology**
 - In this topology, Where all devices are connected hierarchically.
 - This topology has a tree structure in which all the computers are connected like branches which are connected with the tree.
 - It is called a combination of a bus and star network topology.
 - ❖ **Advantages of tree topology**
 - It is very flexible and has better scalability.
 - It is highly secure.
 - It is used in WAN.
 - It is reliable
 - ❖ **Disadvantages of tree topology**
 - It is difficult to configure.
 - It requires more cables.
 - If the first level is problem then next level computer will also go under problems
 - It is a complex.

7. Describe the purpose and functions of various network devices

- Network devices : it is also known as networking hardware, are physical devices that allow hardware on a computer network to communicate and interact with one another.
- Example : Hub, Bridge, Switch, Routers, gateway, brouter, and NIC.
- **1. Hub**
 - A hub sends data to all computers which are connected to it because it cannot recognise the source or intended destination of the data
 - It has 2/4/8 ports
 - It works at the physical layer (layer-1) of the OSI Model.
 - It is half-duplex
 - It has single-collision domain
 - It is LAN device
 - It cannot store Mac addresses.
 - It always broadcasts all incoming data to all connected devices.
- **Two types of Hub**
 - Active and passive hub

- Active Hub : Active hubs need Electricity. Hub amplifies signals or Regenerates signals.
- Passive Hub : there is no change in the signal during Transmission and it sends the data as it is .
- No need for a power supply.
- It does not amplify signal , simple receive and forward

➤ 2. Repeater

- It works at the physical layer (layer-1) of the OSI Model.
- It regenerates your signals.
- LAN device

➤ 3. Switch (multiport bridge)

- It is a small device that joins multiple computers together within one local area network.
- It works at the data link layer(layer-2) of the OSI Model.
- It works on ASIC (application-specific integrated circuit).
- It make a CAM table (Content Accessible memory).
- It is full-duplex
- It maintains a CAM table .
- It first broadcast then unicast & multicast.
- Every port of the switch is a separate collision domain.
- Switch has one broadcast domain
- It has 6/8/16/24/32/48 ports .
- Its speed is slow , 10 mbps wireless and 100 mbps wired .

☐ Types of switch

- 2 types of switches are
- 1) Manageable
- 2) Unmanageable
- 1) Manageable switch: they are supporting a full suite of layer2,layer 2+ and layer3 switching functionality.
- They can help increase our network security.
- They give us more control over our network security.
- VLAN create in manageable switch
- 1. Store & Forward switch : The switch buffer and verifies each frame before forwarding, it little bit slow but very reliable
- 2. Cut through switch : The switch reads only upto the frame hardware address (mac address) before starting to forward it, no error checking.
- 3. Fragment free Switch : A method that attempts to retain the benefits of both store and forward and cut through by checking the first 64 bytes.
- Adaptive switching: A method of automatically selecting between the other three modes.
- 2) Unmanageable switch: it allows Ethernet devices to communicate with one another, such as a PC or network printer,and those are typically what we call “pluge and play”.
- No security provides

➤ **4.Routers**

- It is a hardware device used to receive, analyse and move incoming packets to another network.
- It is used to convert the packets to another network interface, drop them, and perform other actions relating to the network.
- It has more capabilities than other network devices, such as a hub or a switch that are only able to perform basic network functions.
- Example, a hub used to transfer data between computers or network devices, but does not analyse or do anything with the data it is transferring.
- By contrast, routers can analyse the data being sent over a network, change how it is packaged, and send it to another network or over a different network.
- Example : they are used in home networks to share a single internet connection between multiple computers.
- It works on layer 3 (network layer) of the OSI model.
- It is a WAN device.
- It connects two or more networks.
- It is an internetworking device.
- In a router, every port has its own broadcast domain.
- It is used Ip address, sent in the form of a packet.
- It maintains Routing table.
- On router has 2/4/8/ ports
- It speeds fast, 10/100/1 gbps.
- Two types of router
 1. Fixed router
 2. Modular router

➤ **5. Bridge**

- It is an intelligent device that works on mac address
- It works on layer 2 device (data link layer) of the OSI model.
- It is used to connect multiple network segments or LAN segments.
- It reduces the amount of traffic on a LAN by dividing it into two segments.
- It filters data traffic
- It has two collision domains

➤ **6.Brouter**

- We can say short for bridge Router, a brouter is a networking device that serves as both a bridge and a router.