ĐẠI HỌC QUỐC GIA THÀNH PHỐ HỒ CHÍ MINH

TRƯỜNG ĐẠI HỌC BÁCH KHOA

KHOA KHOA HỌC & KĨ THUẬT MÁY TÍNH

BÀI NỘP LAB 1

MẠNG MÁY TÍNH (THỰC HÀNH)

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Mục lục

1 Lab 1a

1.1 NIC

- NIC functions: support for I/O interrupt, direct memory access (DMA) interfaces, data transmission, network traffic engineering and partitioning.

- Code of NIC processors: 00E04CFFFEC8220100

- Check NIC of a computer, what is its MAC address? 30-c9-ab-c3-3a-cb

1.2 Hubs

- Roles of hub in a network: Hub acts as a common connection point for devices

- Main characteristics: A hub contains multiple ports. When a packet arrives at one port, it is copied to the other ports so that all segments of the LAN can see all packets.

- Weaknesses of hub

  - It runs half-duplex

  - Can not filter information.

  - It can not connect different type of network architecture such as a token ring and Ethernet extra

  - It does not have a mechanism to reduce the network traffic

  - Passes packet to all connected segment

  - Can not reduce network traffic

  - It will broadcast to all the port

  - Extend the collision

- Hub ports: 4

1.3 Switches

- Roles of switches in a network: connect devices in a network and use packet switching to send, receive or forward data packets or data frames over the network.

- Main characteristics of switches: It uses packet switching technique to receive and forward data packets from the source to the destination device.

- Differences between hubs and switches:

Hub is a physical layer device i.e. layer 1.	Switch is a data link layer device i.e. layer 2.
A Hub works on the basis of broadcasting.	Switch works on the basis of MAC address.
A Hub is a multiport repeater in which a signal introduced at the input of any port appears at the output of the all available ports.	A Switch is a tele-communication device which receives a message from any device connected to it and then transmits the message only to the device for which the message is intended.

- Weakness

  - Weaknesses of switches: Costly –

  - They are more costly in contrast with network spans.

  - Tough Availability issues – Network availability issues are hard to be followed through the organization switch.

  - Issues in traffic broadcasting – Broadcast traffic might be problematic.

  - Defenseless – If switches are in the indiscriminate mode, they are defenseless against security assaults for example caricaturing IP address or catching Ethernet outlines.

  - Need for Proper Planning – Proper planning and arrangement are required to deal with multicast parcels.

- Mechanical Component can wear out – The switch's mechanical component can wear out with time.
- Physical contact is mandatory – Must have physical contact with the object to be actuated.

- Switch ports: Fixed-configuration switches are usually available with five, eight, 10, 16, 24, 28, 48, or 52 ports.

1.4 Routers

- Roles of routers in a network: helps direct data packets to their destination IP address.

- Main characteristics of routers: is a device that connects two or more packet-switched networks or subnetworks. It serves two primary functions: managing traffic between these networks by forwarding data packets to their intended IP addresses, and allowing multiple devices to use the same Internet connection.

Differences between routers and switches:

Switch is a data link layer device i.e. layer 2.	Router is a network layer device i.e. layer 3.
Switch works on the basis of MAC address.	A router works on the basis of IP address.
A Switch is a tele-communication device which receives a message from any device connected to it and then transmits the message only to the device for which the message is intended.	A router reads the header of incoming packet and forward it to the port for which it is intended there by determines the route. It can also perform filtering and encapsulation.
A Switch is an intelligent device as it passes on the message to the selective device by inspecting the address.	A route is more sophisticated and intelligent device as it can read IP address and direct the packets to another network with specified IP address. Moreover routers can built address tables that helps in routing decisions.

- Differences between routers and switches:

- Router ports: Ports are different channels through which your router sends and receives data. Your router has more than 65000 ports to use, which can be useful if you're doing multiple things at once.

1.5 Access points

- Roles of access points: APs are wireless network devices that act as a portal for devices to connect to a LAN.

- Main characteristics of access points: An AP is useful for extending the wireless coverage of an existing network and increasing the number of potential users.

- Access point's interfaces: An access point only provides an interface/portal for wireless clients to connect to your existing LAN. It does not route traffic between different networks, rather provides wireless access to an already existing local wired network.

1.6 Difference between Dial-up , ADSL and Cable modem

- Dial-up modem
  * • Dial-up modem: uses telephone cable (inside the the telephone) to helps users connect to the Internet. To connect two computers via an analogue telephone line, a modem is required at each end of the telephone line. The modem provides the interface between the digital computer system and the analogue telephone line.
  * Role: decode audio signals into data to send to a router or computer, and to encode signals from the latter two devices to send to another modem.
- ADSL
  * • ADSL Modem: ADSL works on existing copper phone lines by using a DSL filter, or splitter, to isolate the bands with higher frequencies so that the landline and the ADSL modem can be used at the same time.
  * Role facilitates fast data transmission at a high bandwidth on existing copper wire telephone lines to homes and businesses
  * Features of ADSL
    .

- · ADSL is one among the DSL family of technologies.
- · ADSL is used in the local loop of the telephone network, i.e. the part of the telephone network that connects the customer premises with the end office of the telephone company.
- · The telephone company uses a Digital Subscriber Line Access Multiplexer (DSLAM) at its end office so that multiple ADSL users can be connected to the high-speed backbone network.
- · Most ADSL communications are full-duplex communication. It is achieved by any of the following technologies
  frequency-division duplex (FDD)
  . echo-cancelling duplex (ECD)
  , time-division duplex (TDD)
- · The most common technology uses FDD. Here two separate bands are used for upstream and downstream communications.
- · ADSL uses frequency bands 26.075 kHz to 137.825 kHz for upstream communication and 138–1104 kHz is downstream communication. Voice transmission occurs at less than 4 KHz. So, data transmission occurs simultaneously with voice transmission.
- · ADSL filters are used on customer premises with non-DSL connections.
- · ADSL uses analog sinusoidal carrier waves for data transmission. The waves are modulated and demodulated at the customer premises with ADSL modems.

- Cable modem
  - • Cable Modem: A cable modem is a type of network bridge that provides bi-directional data communication via radio frequency channels on a hybrid fibre-coaxial (HFC), radio frequency over glass (RFoG) and coaxial cable infrastructure
  - Role : it is used to convert analog data signals to digital form and vise versa, for transmission or receipt over cable television lines, especially for connecting to the Internet
  - Characteristics of Cable Modem
    * When buying your modem or renting a cable modem through your Internet service provider, make sure the modem you choose has the following features:
    * Fast speeds.
    * Reliable Internet connection.
    * Easy to set up and manage.
    * Supports remote troubleshooting.
    * DOCSIS compatibility for more bandwidth channels.
    * MoCA support.