Computer Networks 1

Lab 1

Network Devices

Student Name:.....Nguyễn Minh Tâm.....
Student No.:.....1952968.....

I. Objectives:

- Get to know basic network devices
- Understand functions of network devices
- Able to connect different network devices together to form a simple network

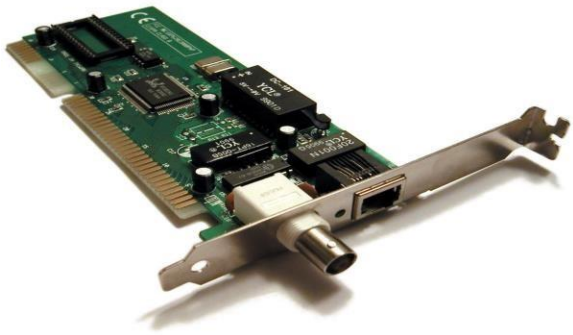
II. Content

1. Get to know network devices:

- ✓ Network Interface Card (NIC)
- ✓ Cables
- ✓ Hub
- ✓ Switches
- ✓ Routers
- ✓ Access Points
- ✓ Modems

2. Understanding functions of network devices

a. Network Interface Card (NIC)



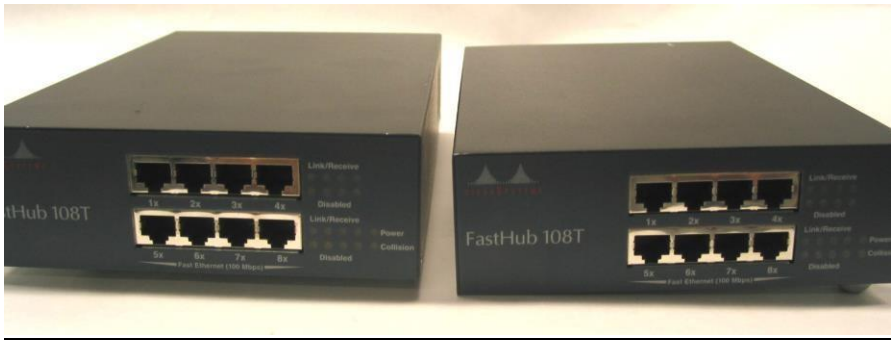
NIC functions: allow communications between computers connected via local area network (LAN) and communications over large-scale network through Internet Protocol (IP)

Code of NIC processors: 63119

Check NIC of a computer, what is its MAC address? DC:FB:48:5E:45:34

Cable to connect NIC to a network:
Type: Ethernet cable
Standard: RJ-45 connector

b. Hubs



Roles of hub in a network: connection point for devices in a network

Main characteristics: 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:

- Collision domain: using hub increases more chances of collision in between domains.
- Full duplex mode: because hub can only operate in half duplex mode, this means that data can be transmitted only once at a given time. As a result, hub needs to constantly switch its modes.
- Network architecture: hubs cannot support networks that are large in size
- Network traffic: since all attachments are received in post, hubs cannot reduce network traffic so even for busy networks, hubs generate high amount of network traffic.
- Bandwidth wastage: hubs has to share bandwidth for each device, which can lead to slow network

Hub ports: Available in 4 to 24 port sizes

c. Switches

Roles of switches in a network: hardware device that filters and forwards network packets from one networking device to another.

Main characteristics of switches: enable connected devices to share information and interact with each other

Differences between hubs and switches: a hub is a networking device that allows you to connect multiple PCs to a single network, whereas a switch conects various devices

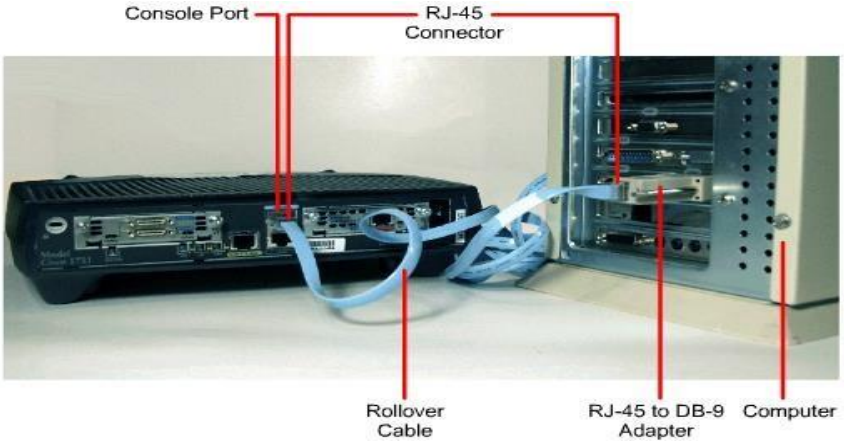
together on a single computer network

Weaknesses of switches:

- Costly
- Network connectivity issues are difficult to be traced through the network switch
- Broadcast traffic may be troublesome
- If switches are in promiscuous mode, they are vulnerable to security attacks (e.g: spoofing IP address or capturing of Ethernet frames)

Switch ports: 24 to 48

d. Routers

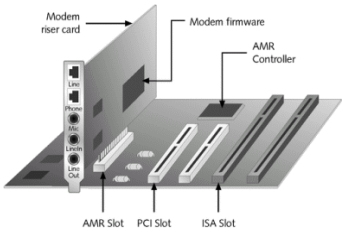


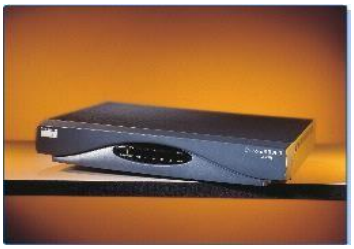
Roles of routers in a network: a switching device for networks
Main characteristics of routers: routers are multi-port devices with high speed backbones, support filtering and encapsulation like bridges
Differences between routers and switches: router works at a network layer and is responsible to find the shortest path for a packet whereas switch connects various devices in a network
Router ports: 4

d. Access Points

Roles of access points: a portal for devices to connect to a local area network
Main characteristics of access points: used for extending the wireless coverage of an existing network and for increasing the number of users that can connect to it
Access point's interfaces: the Ethernet interfaces that connect to end devices
Compare access point and other networking devices mentioned above: The router acts as a hub that sets up a local area network and manages all of the devices and communication in it. An access point is a sub-device within the local area network that provides another location for devices to connect from and enables more devices to be on the network.

e. Modem





Differentiate:

- Dial-up modem
- ADSL Modem
- Cable Modem

For each type of modem describle its roles and characteristics:

- Dial-up modem: is an analog signal carried over standard phone lines and translated on each end by computers. A dial-up connection is the least expensive way to access the Internet, but it is also the slowest connection.
- ADSL modem: are widely available and provid excellent performance with greater speeds and larger data transfers when compared to dial-up connections. ADSL connections are always activated, so there is no wastage of time waiting for a connection as with the dial-up technology.
- Cable modem: Cable internet connection is faster than a dial-up but sometimes slower than DSL. Internet connection is obtained using a cable modem. Cable connection will be shared on lines used for cable TV. To transmit data, space reserved for TV channels are used, some to handle upstream transmissions and others for downstream transmissions.

3. Connecting network devices:

Identify the type of network cable can be used for below network connections:

a) Computer and hub straight-through cable
b) Computer and switch straight-through cable
c) Computer and router straight-through cable

d) Computer hub and hub crossover cable
e) Hub and switch straight-through cable
f) Hub and router straight-through cable

g) Switch and switch crossover cable
h) Swith and router straight-through cable
k) Router and router crossover cable