Computer Networking – Part 3

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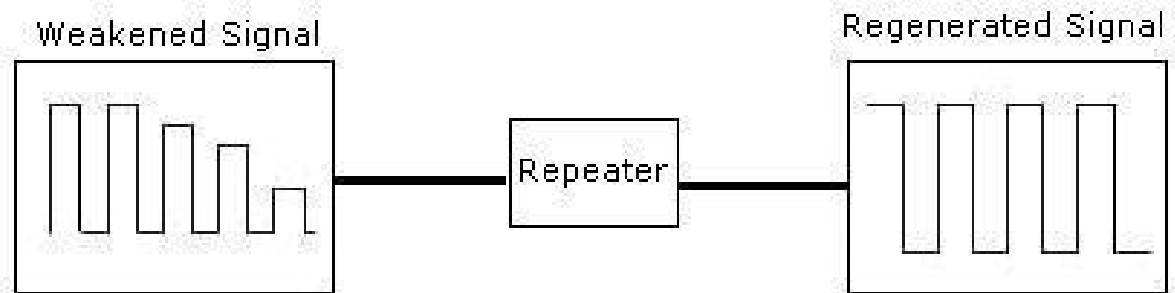# Network Devices used and their basic functions

Network Cable

- Any computer that is to be connected to a network, needs to have a network interface card.
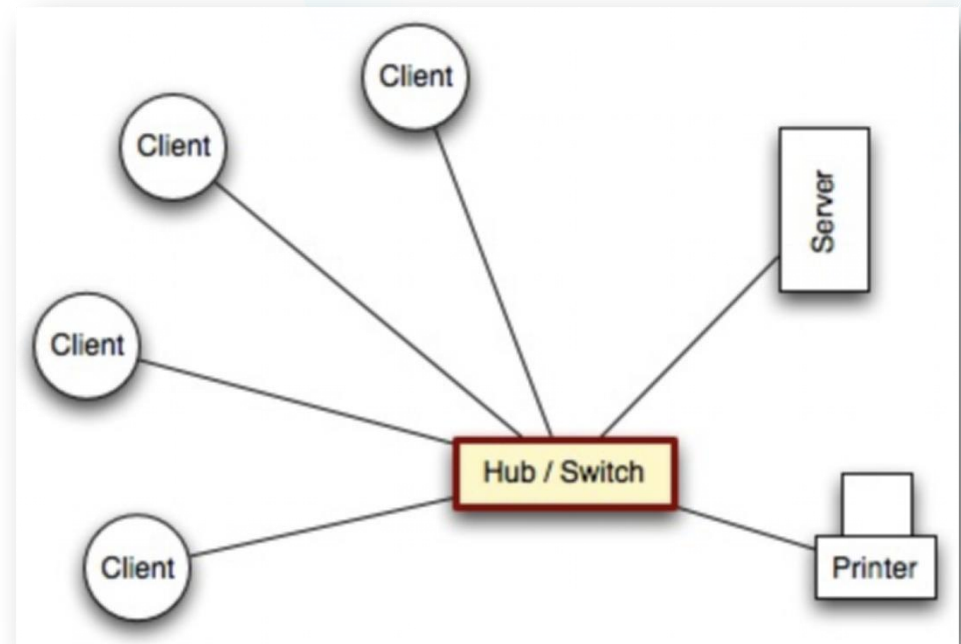
Repeater

- A repeater is a network device that retransmits a received signal with more power and to an extended geographical or topological network boundary than what would be capable with the original signal.

Hub

- A hub is the most basic networking device that connects multiple computers or other network devices together.
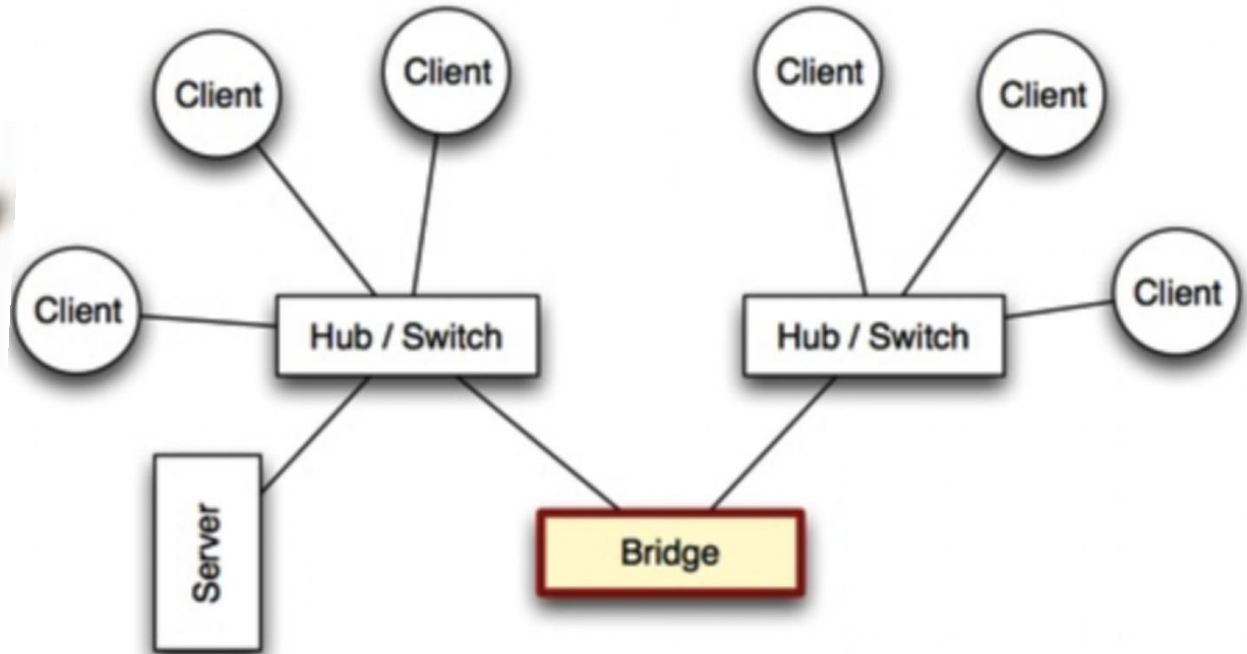
Switch

- A switch, like a hub, is a device that connects a number of computers together to make a LAN.

- A switch is a more 'intelligent' device than a hub: if it receives a message, it checks who it is addressed to, and only sends it to that specific computer.
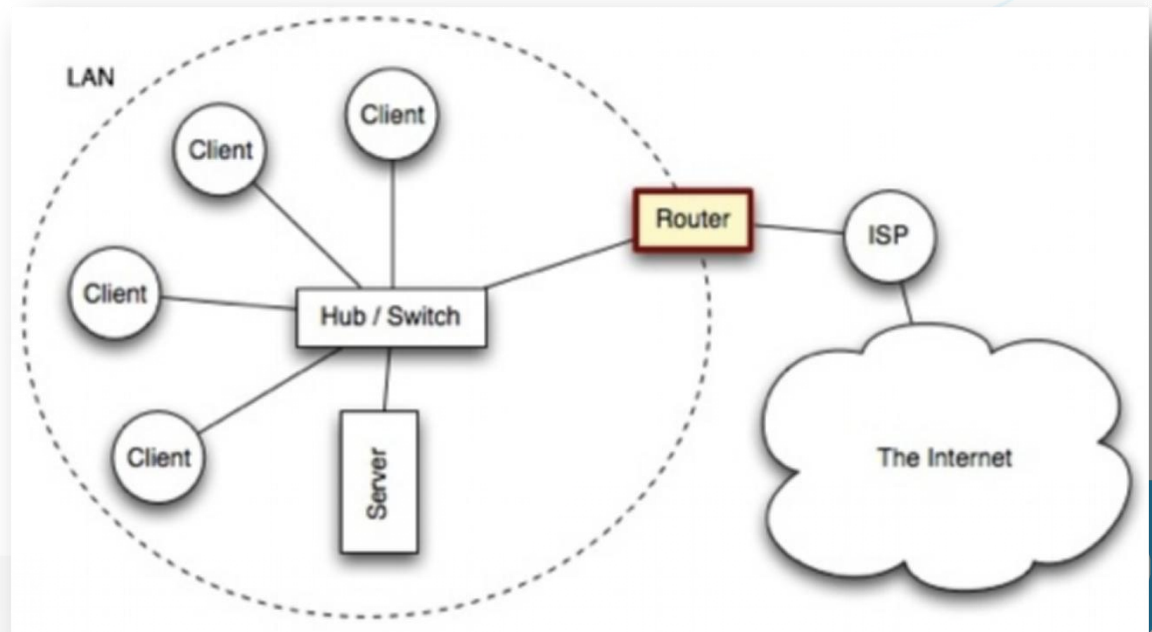
Bridge

- A bridge is a network device that typically links together two different parts of a LAN.

Router

- A router is a network device that connects together two or more networks

- A common use of a router is to join a home or business network (LAN) to the Internet (WAN)

Gateway

- A network gateway is an internetworking system capable of joining together two networks that use different base protocols.
- A network gateway can be implemented completely in software, completely in hardware, or as a combination of both.
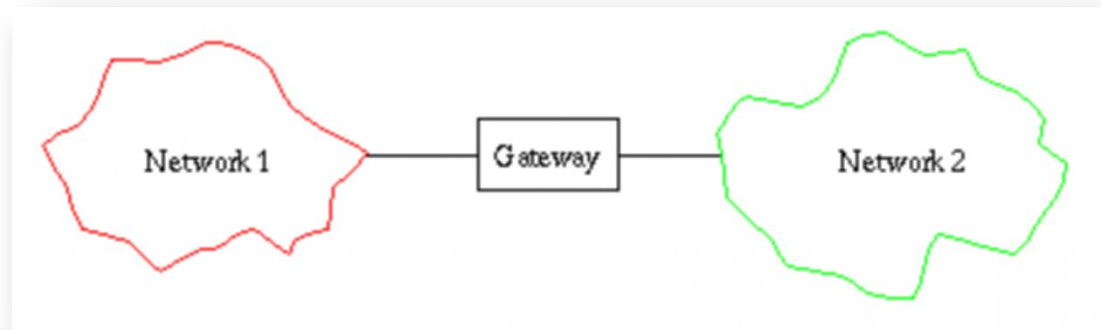
Basic Protocols

Ethernet - IEEE 802.3(CSMA/CD)

- IEEE 802.3 is a working group and a collection of IEEE standards produced by the working group defining the physical layer and data link layer's media access control (MAC) of wired Ethernet.

- 802.3 is a technology that supports the IEEE 802.1 network architecture

- 802.3 also defines LAN access method using CSMA/CD.

  http://www.ieee802.org/3/

Ethernet - IEEE 802.3(CSMA/CD) Cont.

The term Ethernet refers to the family of local area network (LAN) implementations that includes three principal categories.

• Ethernet and IEEE 802.3—LAN specifications that operate at 10 Mbps over coaxial cable.

• 100-Mbps Ethernet—A single LAN specification, also known as Fast Ethernet, that operates at 100 Mbps over twisted-pair cable.

• 1000-Mbps Ethernet—A single LAN specification, also known as Gigabit Ethernet, that operates at 1000 Mbps (1 Gbps) over fiber and twisted-pair cables

Token Ring

- A Token ring local area network (LAN) technology is a protocol which resides at the data link layer (DLL) of the OSI model.

- It used a special three-byte frame called a token that travels around the ring.

- Token-possession grants the possessor permission to transmit on the medium. Token ring frames travel completely around the loop.

Token Ring

Media Access Unit
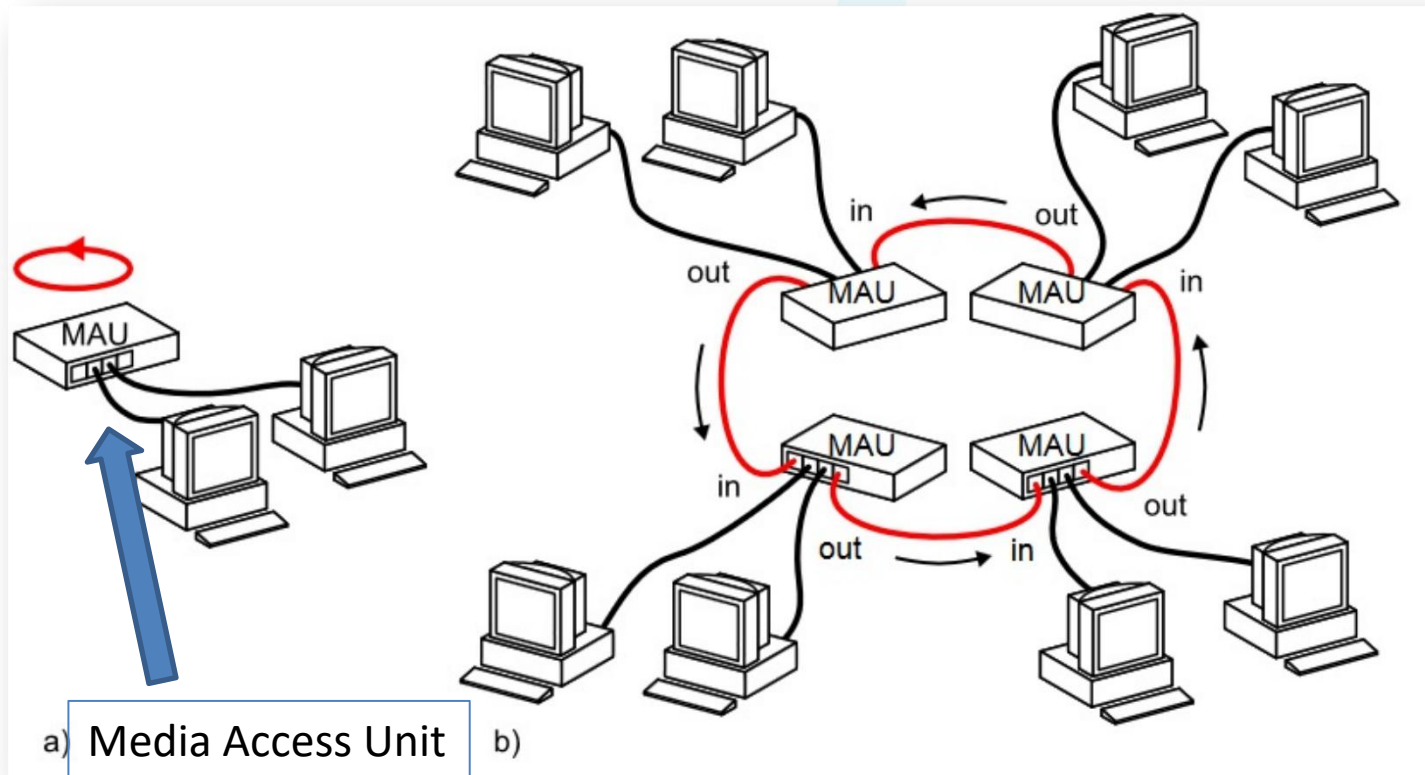
TCP/IP

- The Internet Protocol (IP) is the method or protocol by which data is sent from one computer to another on the Internet.

- TCP (Transmission Control Protocol) is a protocol that works with the Internet Protocol (IP) to send packets of data between computers over the Internet.

- Together, the TCP and IP protocols establish rules for how information is passed through the Internet.

UDP (User Datagram Protocol)

- UDP is a communications protocol that offers a limited amount of service when messages are exchanged between computers in a network that uses the Internet Protocol (IP).

- UDP is an alternative to the Transmission Control Protocol (TCP) and, together with IP, is sometimes referred to as UDP/IP .

ICMP (Internet Control Message Protocol)

- When information is transferred over the Internet, computer systems send and receive data using the TCP/IP protocol. If there is a problem with the connection, error and status messages regarding the connection are sent using ICMP, which is part of the Internet protocol.

FTP (File Transfer Protocol)

- The File Transfer Protocol is a standard network protocol used to transfer computer files from one host to another host over a TCP-based network, such as the Internet.

- FTP is built on a client-server architecture and uses separate control and data connections between the client and the server.

SMTP (Simple Mail Transfer Protocol)

- This is the protocol used for sending e-mail over the Internet.
- Your e-mail client uses SMTP to send a message to the mail server, and the mail server uses SMTP to relay that message to the correct receiving mail server.
- Basically, SMTP is a set of commands that authenticate and direct the transfer of electronic mail.

POP (Post Office Protocol)

- In computing, the Post Office Protocol is an application-layer Internet standard protocol used by local e-mail clients to retrieve e-mail from a remote server over a TCP/IP connection.

- POP has been developed through several versions, with version 3 (POP3) being the current standard.

IMAP (Internet Message Access Protocol)

- Internet Message Access Protocol is a protocol for e-mail retrieval and storage, developed as an alternative to POP.

- IMAP, unlike POP, specifically allows multiple clients simultaneously connected to the same mailbox, and through flags stored on the server, different clients accessing the same mailbox at the same or different times can detect state changes made by other clients.

PPP (Point to Point Protocol)

- It is the Internet standard for dial-up modem connections.
- PPP is a set of rules that defines how your modem exchanges packets of data with other systems on the Internet.
- If you connect to your ISP with a dial-up modem, you are most likely using PPP

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