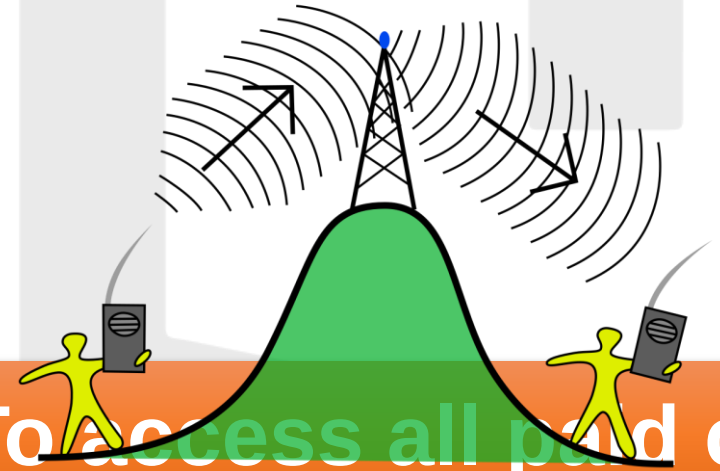
Repeater

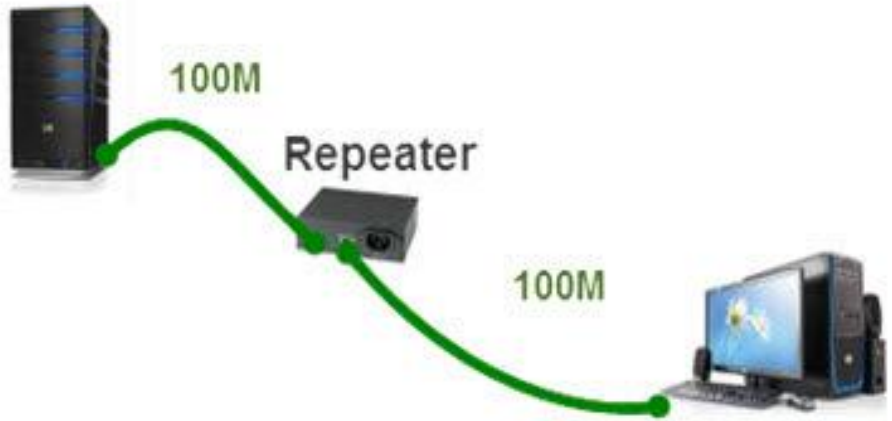
- When an information-bearing signal passes through a communication channel, it is progressively degraded due to loss of power. For example, when a telephone call passes through a wire telephone line, some of the power in the electric current which represents the audio signal is dissipated as heat in the resistance of the copper wire.

- The longer the wire is, the more power is lost, and the smaller the amplitude of the signal at the far end. So with a long enough wire the call will not be audible at the other end. Similarly, the farther from a radio station a receiver is, the weaker the radio signal, and the poorer the reception. A repeater is an electronic device in a communication channel that increases the power of a signal and retransmits it, allowing it to travel further. Since it amplifies the signal, it requires a source of electric power.

- Repeaters are used to extend transmissions so that the signal can cover longer distances or be received on the other side of an obstruction.

- In computer networking, because repeaters work with the actual physical signal, and do not attempt to interpret the data being transmitted, they operate on the physical layer, the first layer of the OSI model.





- Conclusion
  - Work in physical Layer
  - Collisions are possible
  - Range of Lan is increased

Hub

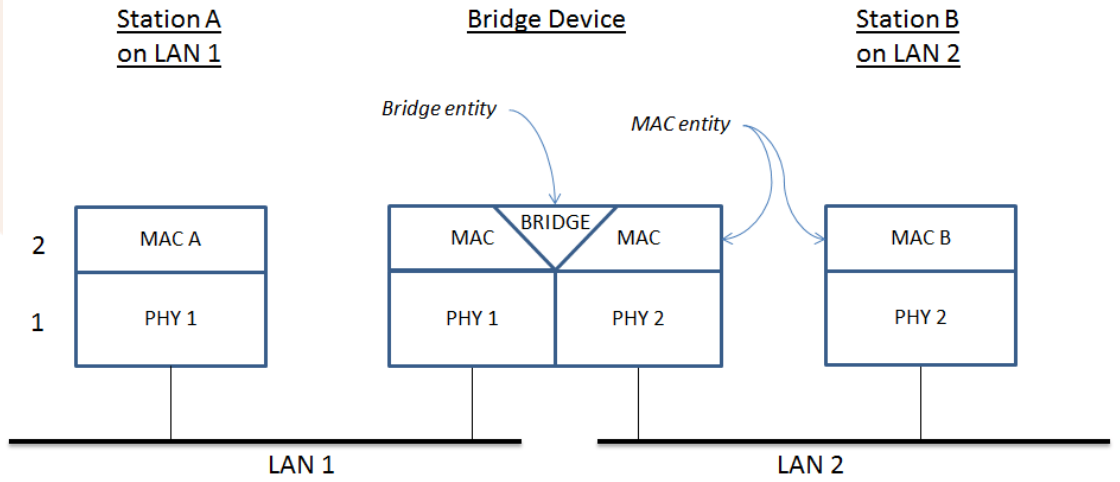
- Hubs are multiport repeater.
- An **Ethernet hub**, **active hub**, **network hub**, **repeater hub**, **multiport repeater**, or simply **hub** is a network hardware device for connecting multiple Ethernet devices together and making them act as a single network segment.
- It has multiple input/output (I/O) ports, in which a signal introduced at the input of any port appears at the output of every port except the original incoming. A hub works at the physical layer (layer 1) of the OSI model.
- Hubs are now largely obsolete, having been replaced by network switches except in very old installations

- Conclusion
  - Work in physical Layer
  - Collisions are possible
  - Traffic is very high
  - Cost is less

Bridge

- Bridge is used to connect two different lan
- A **network bridge** is a computer networking device that creates a single, aggregate network from multiple communication networks or network segments. Bridging connects two separate networks as if they were a single network.
- In the OSI model, bridging is performed in the data link layer (layer 2).
- Filtering, Forwarding, Flooding, and Store and Forward, no collision inside a bridge

A bridge connecting two LAN segments



- Conclusion
  - Work in physical Layer, Data Link Layer

Switch

- Switch is Connecting device which generally have many port, in compare to bridge which generally have two interface
- A **network switch** (also called **switching hub**, **bridging hub**, and, by the IEEE, **MAC bridge**) is networking hardware that connects devices on a computer network by using packet switching to receive and forward data to the destination device.
- A network switch is a multiport network bridge that uses MAC addresses to forward data at the data link layer (layer 2) of the OSI model.
- Switches for Ethernet are the most common form of network switch. The first Ethernet switch was introduced by Kalpana in 1990.
- Unlike repeater hubs, which broadcast the same data out of each port and let the devices pick out the data addressed to them, a network switch learns the identities of connected devices and then only forwards data to the port connected to the device to which it is addressed.

- Conclusion
  - Work in physical Layer, Data Link Layer
  - Collisions are not possible
  - Traffic is very less
  - Cost is high

Router

- A **router** is a networking device that forwards data packets between computer networks. Routers perform the traffic directing functions on the Internet. Data sent through the internet, such as a web page or email, is in the form of data packets. A packet is typically forwarded from one router to another router through the networks that constitute an internetwork (e.g. the Internet) until it reaches its destination node.

- A router is connected to two or more data lines from different IP networks. When a data packet comes in on one of the lines, the router reads the network address information in the packet header to determine the ultimate destination. Then, using information in its routing table or routing policy, it directs the packet to the next network on its journey.

- The most familiar type of IP routers are home and small office routers that simply forward IP packets between the home computers and the Internet. More sophisticated routers, such as enterprise routers, connect large business or ISP networks up to the powerful core routers that forward data at high speed along the optical fiber lines of the Internet backbone.

- Conclusion
  - Work in physical Layer, Data Link Layer, Network Layer
  - Filter, Forward, Flooding, Routing, no collision

Gateway

- A **gateway** is a piece of networking hardware or software used in telecommunications for telecommunications networks that allows data to flow from one discrete network to another.

- Gateways are distinct from routers or switches in that they communicate using more than one protocol to connect multiple networks and can operate at any of the seven layers of the open systems interconnection model (OSI).

- The term gateway can also loosely refer to a computer or computer program configured to perform the tasks of a gateway, such as a default gateway or router.

- Conclusion
  - Protocol Converter
  - Proxy
  - Network Address Translation
  - Firewall
  - Deep Packet Inspection