# Networks

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- A communication networks provides the means by which computers can transfer information to and from other computing devices.

- The Internet has become the most extensive network for computers to communicated across the world. The Internet uses the TCP/IP protocol. This is a packet switching approach.

- An intranet generally uses the same protocol as the Internet, however, it is focused on communication within an organization.

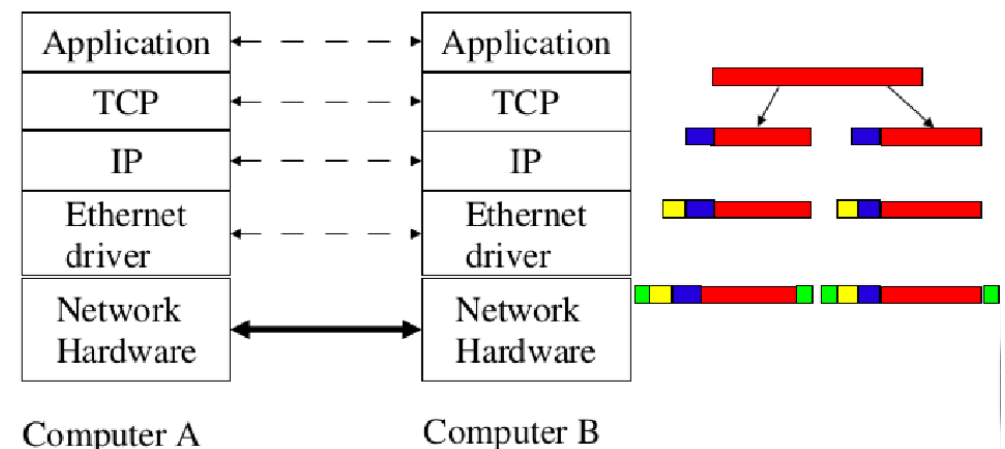- A LAN (Local Area Network) services a limited local area, also generally uses the Internet protocol.

Computers can be connected together in a number of ways, these organizations are known as topologies.

Fully Connected, Bus, Ring, Star, Tree, Partially Connected
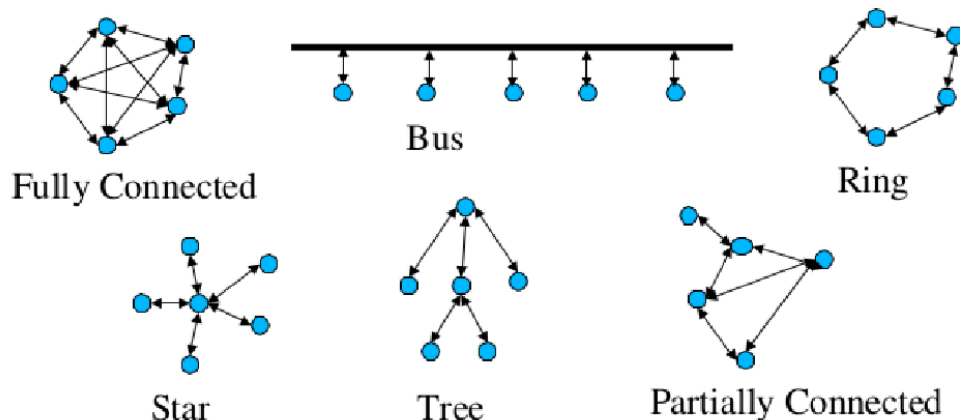
The layering design strategy is central for protocols to permit computer to communicate.

Application — TCP — IP — Ethernet driver — Network Hardware — Computer A / Computer B

- Ethernet has become one of the most popular standards for transmitting data between computers on a LAN.

- Ethernet will transmit data at either 10Mbps, 100Mbps, or 1Gbps (or faster for fiber version of ethernet 100Gbps)

- Ethernet's topology started as bus topology. However, now a LAN would generally use star topology with a switch at the center.

- Most Ethernet controllers have unique 48bit MAC address.

Preamble	Start of frame	Destination address	Source address	Data length	Data	Pad	Checksum

0–1500 bytes

- In the past Ethernet would be configured as a bus topology. Only one device may transmit information to the bus at any time. If two units transmit at the same time a collision will occur, both transmission with usually be compromised and will need to be re-transmitted.

- Ethernet provides a CSMA/CD(Carrier Sense Multiple Access/Collision Detection) mechanism to deal with this problem. Re-transmission involves waiting a random amount of time.