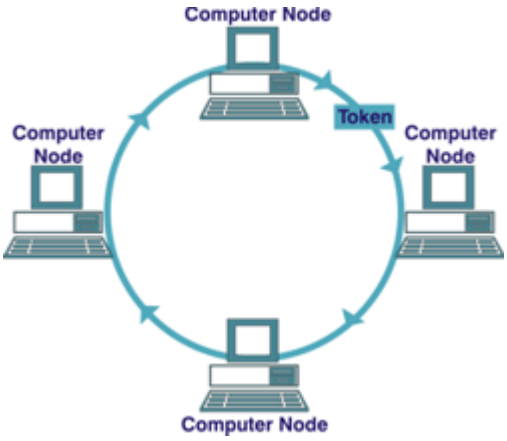
LAN Technologies

Local Area Network (LAN) is a data communication network connecting various terminals or computers within a building or limited geographical area. The connection among the devices could be wired or wireless. **Ethernet**, **Token Ring, FDDI** and **Wireless LAN** are examples of standard **LAN technologies.**

Token ring

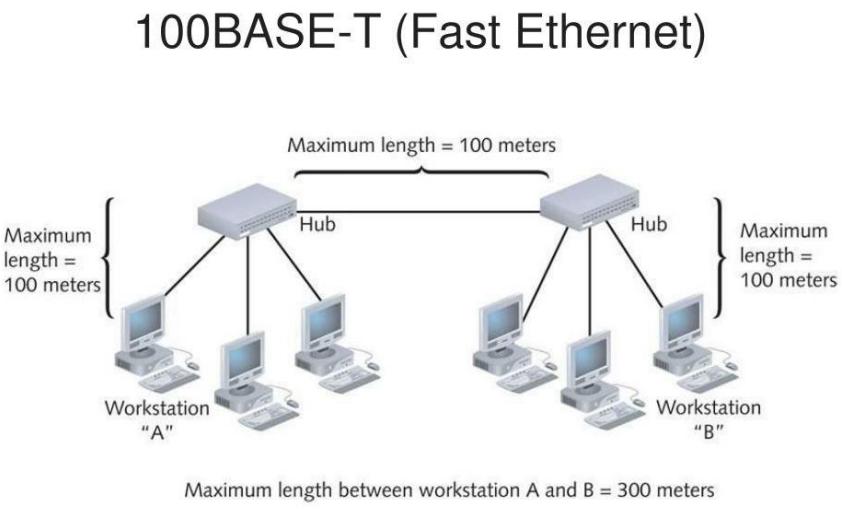


Token ring refers to the PC network architecture developed by IBM. The IBM token ring specification has been standardized by the **IEEE 802.5** standard.

A token which is a special bit pattern, travels around the circle. To send a message to it, and then lets it continue to travel around the network when a device has data to send, it must wait until it has the token and then sends its data. When the data transmission is complete the token is released so that other devices may use the network media. The main advantage of token passing network is that they are deterministic. In other words it is easy to calculate the maximum time that will pass before a device has the opportunity to send data.

Ethernet

Ethernet is the most widely installed local area network technology.



Specified in a standard IEEE 802.3. Ethernet was originally developed further by **Xerox**, **DEC** and **Intel**. An Ethernet LAN typically uses coaxial cable special grade of twisted

pair wires. Ethernet is also used in wireless LANs.

Also, Ethernet offers flexibility in terms of topologies which are allowed. Ethernet generally uses Bus Topology. Ethernet used protocol data unit is Frame. In order to handle **collision**, the Access control mechanism used in Ethernet is **CSMA/CD.**

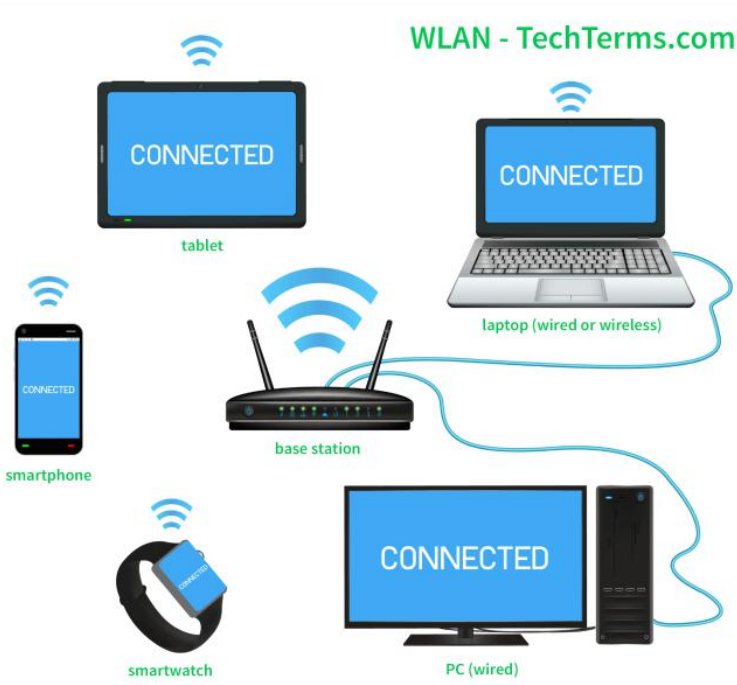
The most commonly installed Ethernets are called **10BaseT** and provide transmission speed up to 10Mbps.

Fast Ethernet or **100BaseT** provide transmission speed up to 100Mbps. Gigabyte Ethernet provides an even higher level of backbone support at 1000Mbps. (**1000BaseF**)

Wireless LAN

A wireless Local Area Network (**WLAN**) is a local area network that doesn't rely on wired Ethernet connection.

A **WLAN** can be either an extension to a current wire network or an alternative to it. A use of wireless LAN adds flexibiling a network. A WLAN allows users to move around while keeping their computers connected.

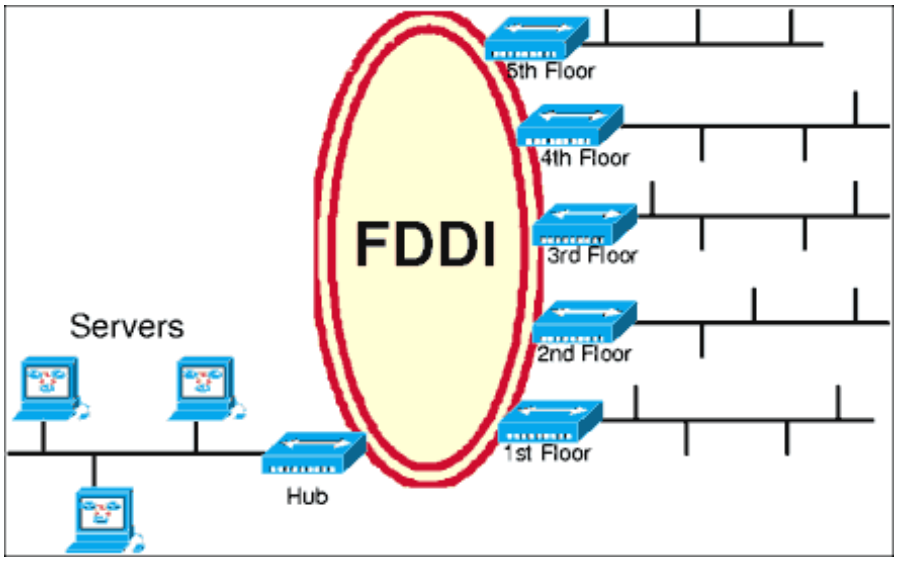


WLANs have data transfer speed ranging from 1 to 54 Mbps, with some manufacturers offering 108 Mbps solutions. The 802.11 n standards can be reaching 300 to 600 Mbps.

WI-FI is the most popular wireless communication protocol for the LAN. Private home and business network use WI-FI to network to computer and other wireless device to each other and the internet.

Bluetooth is another wireless protocol commonly used cellular phones and computer peripherals or short range network communication. Computers and other devices connect to a WI-FI network via a wireless access point.

FDDI (Fiber Distributed Data Interface)



FDDI is a set of ANSI (American National Standard Institute) and ISO standard for data transmission on fiber optic lines in a LAN. The FDDI protocol is based on the token ring protocol. In addition to being large geographically and FDDI LAN can support 1000's of users. FDDI is frequently used on the backbone for a WAN.

Standards

- **The Institute of Electrical and Electronic Engineer (IEEE),** is one international organization responsible for developing and providing networking technology specification for worldwide usage.

- We call these networking technology specification as **network standards.**

ITU (International Telecommunication Union)

ANSI (American National Standards Institute)

IEEE 802 Group

Some of the best-known IEEE standards are as follows:

- **IEEE 802.1 (LAN/MAN)**
- **IEEE 802.3 (Ethernet)**
- **IEEE 802.5 (Token Ring)**
- **IEEE 802.11 (Wireless LAN) 802.11b/g/n**

Ethernet Media Standards

Ethernet, Fast Ethernet and Gigabit Ethernet, are identified by three-part names, which is also known as Media Standard. An example of Media Standard is 10BASE-T.

Media Standard	Cable Type	Bandwidth Capacity	Maximum Length
10Base2	Coax	10 Mbps	185m
10Base5	Coax	10 Mbps	500m
10BaseT	UTP (CAT 3 or higher)	10 Mbps	100m
100BaseTX	UTP (CAT 5 or higher)	100 Mbps	100m
10BaseFL	Fibre Optic	10 Mbps	2Km
100BaseFX	Fibre Optic	100 Mbps	HD 400m/FD 2km
1000BaseT	UTP (CAT 5e or higher)	1 Gbps (1000 Mbps)	100m
1000BaseSX	Fibre Optic	1 Gbps (1000 Mbps)	MMF 550m
1000BaseLX	Fibre Optic	1 Gbps (1000 Mbps)	MMF 500m/SMF 10km
1000BaseCX	Fibre Optic	1 Gbps (1000 Mbps	100m
10GbaseSR	Fibre Optic	10 Gbps	300m
10GbaseLR	Fibre Optic	10 Gbps	SMF 10km