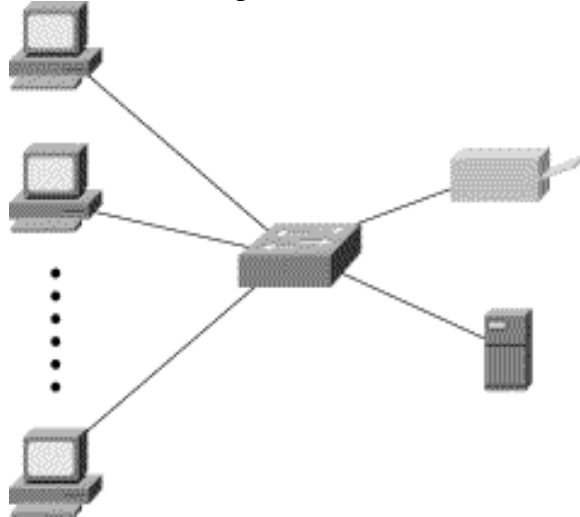


## Fast Ethernet

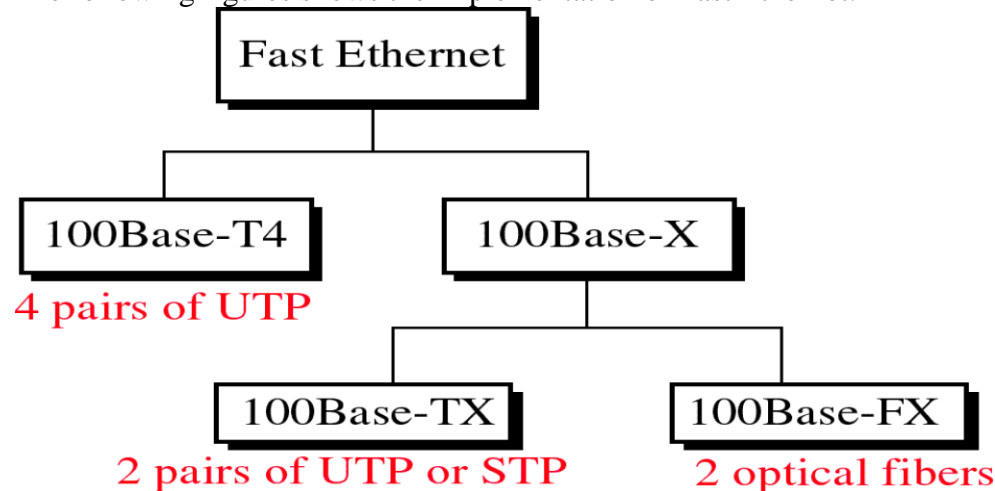
IEEE name for Fast Ethernet is 802.3u. It is backward-compatible with standard Ethernet. The data rate supported by this is 100Mbps. It is designed in star topology and can be half duplex and full duplex. In half duplex stations are connected through hub and in full duplex connected via switch.



Star Topology

A new feature is added in fast Ethernet called as auto-negotiation. Auto-negotiation allows two devices to negotiate mode or data rate of operation.

The following figure shows the implementation of Fast Ethernet.



Here 100 indicate the data rate 100Mbps and Base indicates baseband signal.

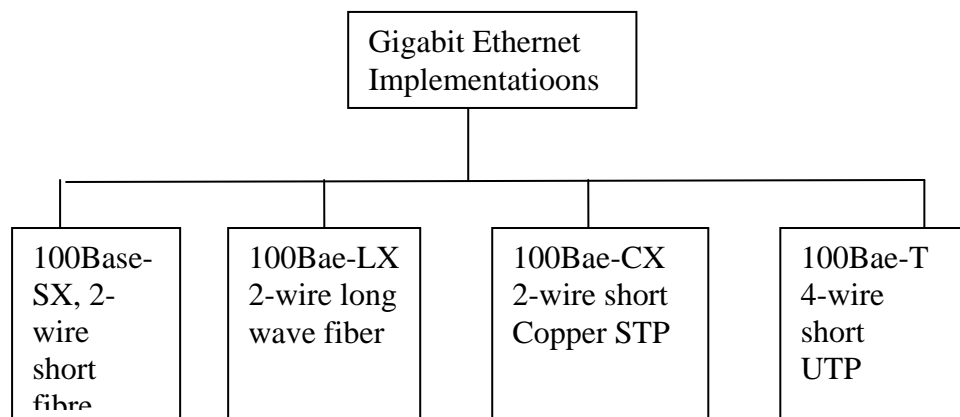
## Gigabit Ethernet

The IEEE standard for this is 802.3z. The important points of Gigabit Ethernet are

1. Data rate of 1 Gbps was achieved
2. it is compatible with standard Ethernet and fast Ethernet
3. it uses same 48-bit address
4. it uses same frame format
5. supports the auto-negotiation of fast Ethernet.
6. Uses Ethernet frame format and MAC technology
7. CSMA/CD access method.

The 2 new feature of are as follows

1. Carrier Extension: To allow for a longer network, we increase the minimum frame length. Carrier extension approach defines the minimum length of a frame as 512 bytes. So padding is used to a frame that is less than 512 bytes. In this way, the maximum length of the network can be increased 8 times to a length of 200m.
2. Frame Bursting: Carrier extension is very inefficient if we have a series of short frames to send. Each frame carries redundant data. To improve efficiency, frame bursting was proposed. Instead of adding an extension to each frame, multiple frames are sent. However, to make these multiple frames look like one frame, padding is added between the frames so that channel is not idle. In other words, the method deceives other stations into thinking that a very large frame has been transmitted.



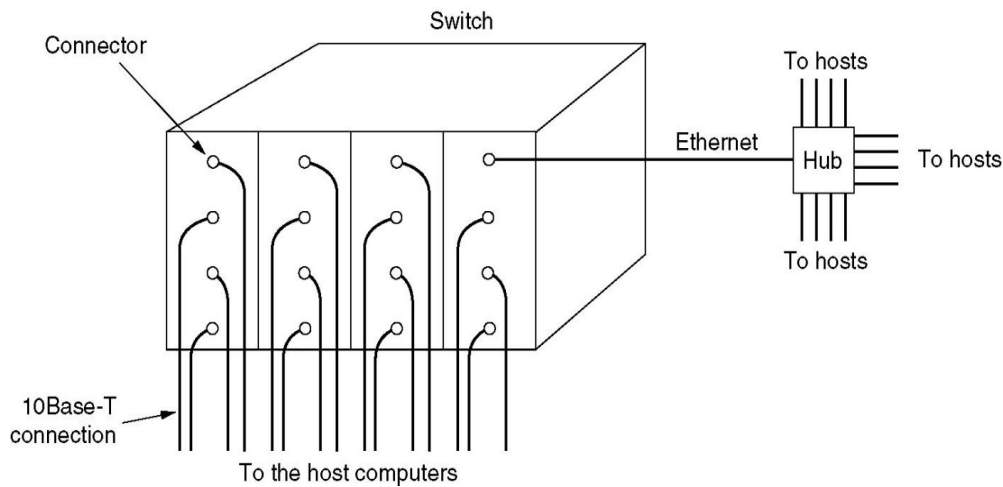
### 10 gigabit Ethernet

IEEE committee name for 10 gigabit Ethernet is 802.3ae. The goals of the ten-gigabit Ethernet design can be summarized as follows:

1. Data rate is 10 Gbps
2. Compatible with standard, fast and gigabit Ethernet.
3. uses 48-bit address
4. Allow the interconnection of existing LANs into a metropolitan area networks or a wide area network
5. The following are the implementation of 10-Gigabit Ethernet

- 10GBase-L - 10 Km (Singlemode Fiber)
- 10GBase-E - 40 Km (Singlemode Fiber)

## Switched Ethernet



Switched Ethernet gives dedicated 10 Mb/s bandwidth on each of its ports. On each of the ports one can connect either a thick/thin segment or a computer. In Ethernet (IEEE 802.3) the topology, though physically is star but logically is BUS, i.e. the collision domain of all the nodes in a LAN is common. In this situation only one station can send the frame. If more than one station sends the frame, there is a collision. In Switched Ethernet, the collision domain is separated. The hub is replaced by a switch, which functions as a fast bridge. It can recognize the destination address of the received frame and can forward the frame to the port to which the destination station is connected. The other ports are not involved in the transmission process. The switch can receive another frame from another station at the same time and can route this frame to its own final destination. In this case, both the physical and logical topologies are star. The throughput can be further increased on switched Ethernet by using full-duplex technique, which uses separate wire pairs for transmitting and receiving. Thus a station can transmit and receive simultaneously, effectively doubling the throughput to 20 Mb/s on each port