

**The following are some of the important differences between CSMA/CA and CSMA/CD.**

Sr. No.	Key	CSMA/CA	CSMA/CD
1	Effectiveness	CSMA/CA is effective before a collision.	CSMA/CD is effective after a collision.
2	Network Type	CSMA/CA is generally used in wireless networks.	CSMA/CD is generally used in wired networks.
3	Recovery Time	CSMA/CA minimizes the risk of collision.	CSMA/CD reduces recovery time.
4	Conflict Management	CSMA/CA initially transmits the intent to send the data, once an acknowledgment is received, the sender sends the data.	CSMA/CD resends the data frame in case a conflict occurs during transmission.
5	IEEE Standards	CSMA/CA is part of the IEEE 802.11 standard.	CSMA/CD is part of the IEEE 802.3 standard.
6	Efficiency	CSMA/CA is similar in efficiency as CSMA.	CSMA/CD is more efficient than CSMA.

## **What is IEEE 802.3?**

IEEE 802.3 is a set of standards and protocols that define Ethernet-based networks. Ethernet technologies are primarily used in LANs, though they can also be used in MANs and even WANs. IEEE 802.3 defines the physical layer and the medium access control (MAC) sub-layer of the data link layer for wired Ethernet networks.

## **IEEE 802.3 Popular Versions**

There are a number of versions of IEEE 802.3 protocol. The most popular ones are.

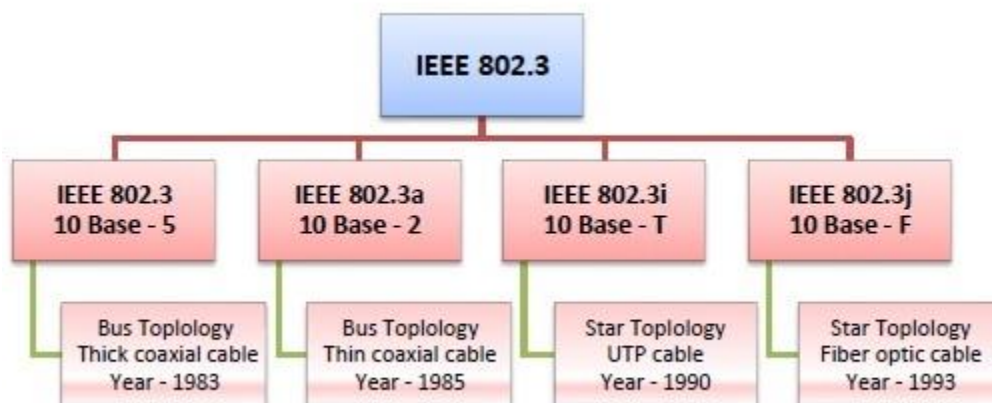
**IEEE 802.3:** This was the original standard given for 10BASE-5. It used a thick single coaxial cable into which a connection can be tapped by drilling into the cable to the core. Here, 10 is the maximum throughput, i.e. 10 Mbps, BASE

denoted use of baseband transmission, and 5 refers to the maximum segment length of 500m.

**IEEE 802.3a:** This gave the standard for thin coax (10BASE-2), which is a thinner variety where the segments of coaxial cables are connected by BNC connectors. The 2 refers to the maximum segment length of about 200m (185m to be precise).

**IEEE 802.3i:** This gave the standard for twisted pair (10BASE-T) that uses unshielded twisted pair (UTP) copper wires as physical layer medium. The further variations were given by IEEE 802.3u for 100BASE-TX, 100BASE-T4 and 100BASE-FX.

**IEEE 802.3j:** This gave the standard for Ethernet over Fiber (10BASE-F) that uses fiber optic cables as medium of transmission.



## Gigabit Ethernet

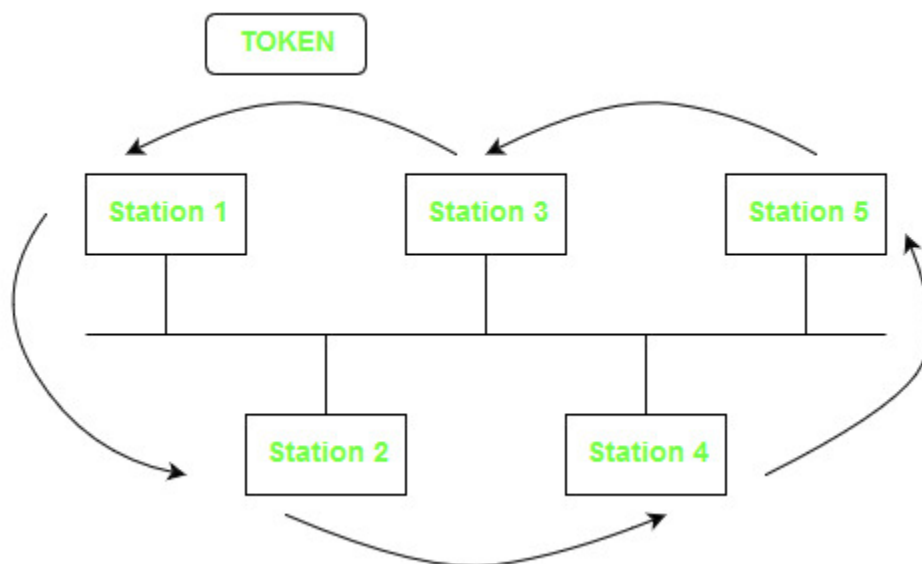
Gigabit Ethernet, a transmission technology based on the [Ethernet](#) frame format and protocol used in local area networks (LANs), provides a data rate of 1 billion bits per second (one [gigabit](#)). Gigabit Ethernet is defined in

the [IEEE 802.3](#) standard and is currently being used as the [backbone](#) in many enterprise networks.

Gigabit Ethernet is carried primarily on [optical fiber](#) (with very short distances possible on copper media). Existing Ethernet LANs with 10 and 100 Mbps cards can feed into a Gigabit Ethernet backbone. An alternative technology that competes with Gigabit Ethernet is [ATM](#). A newer standard, [10-Gigabit Ethernet](#), is also becoming available.

### Token Bus (IEEE 802.4)

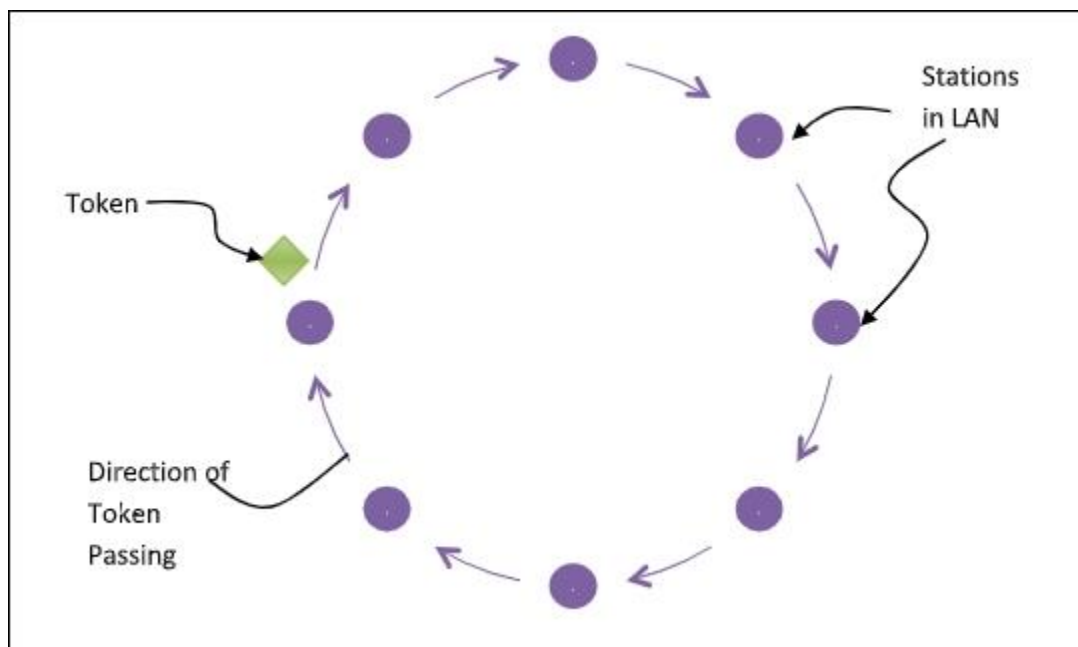
Token Bus (IEEE 802.4) is a popular standard for the token passing LANs. In a token bus LAN, the physical media is a bus or a tree and a logical ring is created using coaxial cable. The token is passed from one user to other in a sequence (clockwise or anticlockwise). Each station knows the address of the station to its “left” and “right” as per the sequence in the logical ring. A station can only transmit data when it has the token. The working of token bus is somewhat similar to [Token Ring](#).



The above diagram shows a logical ring formed in a bus based token passing LAN. The logical ring is shown with the arrows.

## Token Ring

Token ring (IEEE 802.5) is a communication protocol in a local area network (LAN) where all stations are connected in a ring topology and pass one or more tokens for channel acquisition. A token is a special frame of 3 bytes that circulates along the ring of stations. A station can send data frames only if it holds a token. The tokens are released on successful receipt of the data frame.



## Differences between Token Ring and Token Bus

Token Ring	Token Bus
The token is passed over the physical ring formed by the stations and the coaxial cable network.	The token is passed along the virtual ring of stations connected to a LAN.
The stations are connected by ring topology, or sometimes star topology.	The underlying topology that connects the stations is either bus or tree topology.
It is defined by IEEE 802.5 standard.	It is defined by IEEE 802.4 standard.
The maximum time for a token to reach a station can be calculated here.	It is not feasible to calculate the time for token transfer.