**IEEE 802.3**

Davinder Verma

121802201

Noor E Alam Siddique

157242199

Seneca College

**Abstract**

IEEE 802.3 is one of the working groups and collection of the Institute of Electrical and Electronics Engineers (IEEE) standards which is made by the working group defining the physical layer and datalink’s media access control (MAC) of wired Ethernet.

*Keywords*: IEEE 802.3, Ethernet

# Introduction

IEEE 802.3 Ethernet is one of the most popular used standards for networking and communication. It is used from home Wi-Fi to data networks of the big companies. It’s also very popular among the telecommunications networking. It has been in use for many years now and is regularly updated with the advancements in the technology. It has a great cost to performance ratio which attracts more and more users. It is controlled by the Institute for Electrical and Electronic Engineers (IEEE) and ISO.

**What is IEEE?**

IEEE is the professional association for electronic engineering and electrical engineering. Its main work is to maintain the education and technical advancement levels in many big IT industries. It also organizes technical committees which rapidly involve in the making and quality check of the new innovations.

**Why is 802.3 popular?**

It is widely used due to the short Ethernet patch cables with RJ45 connectors. They are commonly used with the desktop computers and routers. The ease of use makes them more and more popular. Now a days, everyone has Wi-Fi or at least an internet connection at home which makes it one of the most used technologies in the IoT.

## History

The Ethernet standards were developed by Xerox Corporation. It was an experiment coaxial cable-based system in the 1970s. Its success made 10 Mbps standard in 1980. The first IEEE 802.3 standard was approved in 1983 which was made from the Ethernet version 1. Since then the technology has just improved every year and will keep improving years to come until new standards are developed.

### How does it work?

### During the communication, the data get divided into frames. All the frames have particular format. These frames also contain the source and destination addresses. As the data is received, it is first gone through a error checking process which detects if the data is corrupted. If defected, it will discard this data and request a new data for re-transmission.

The communication is done on the OSI model as its protocol stack. The Ethernet is used till the 3rd layer.

It has adopted the 48-bit MAC address as used by the other 802 standards, which makes it easier to operate with other networking systems.

### Ethernet IEEE 802.3 Standards:

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| 802.3 | (1983) This first IEEE standard for Ethernet defined 10base5, 10 Mbps over thick coax. |
| 802.3a | (1985) 10Base-2 (thin Ethernet), 10 Mbps over thin coax. |
| 802.3b | (1985) 10-Broad-36 |
| 802.3c | (1986) 10 Mb/s repeater specifications (clause 9) |
| 802.3d | (1987) FOIRL (fiber link) |
| 802.3e | (1987) 1-Base-5 |
| 802.3i | (1990) 10Base-T (twisted pair) |
| 802.3j | (1993) 10Base-F (fiber optic) |
| 802.3z | (1998) 1000Base-X (Gigabit Ethernet) |
| 802.3bf | (2011) Provision of accurate indication of transmission and reception initiation times of some packets to support IEEE P802.1AS |

# 802.3u Data Frame Format

* **PRE:-** It is the preamble. It is seven bytes long. It only consists of ones and zeros. This tell the receivers that data is being shared.
* **SOF:-** It is the start of delimiter. Its 1 byte in size and consists of two bits of logical one.
* **DA:-** It is the address of the final destination and is 6 bytes long. The 1st byte from the left is immediately followed by the SOF.
* **SA:-** It is the address of the source and is 6 bytes long. It has the identity of the source.
* **Length / Type:-** Its 2 byte long and indicates payload data length.
* **Data:-** This has variable length depending on the amount of the data. Th length varies between 46 and 1500 bytes.
* **FCS:-** Its four bytes long and is the frame check sequence. It also has the 32-bit cyclic redundancy check (CRC) which is used for error checking.

**IEEE 802.3 popular versions**

**IEEE 802.3:-** This is the original standard for 10BASE-5. It was used with a thick single coaxial cable.

**IEEE 802.3a:-** This is used as a standard for the thin coax (10BASE-2).

**IEEE802.3i:-** Its used as the standard for the twisted pair (10BASE-T) used unshielded twisted pair (UTP) copper wire.

**IEEE 802.3i:-** Its standard for Ethernet over Fiver (10BASE-F) which uses fiber optic cables as their transmission medium.

**Conclusion**

Ethernet standards are controlled by the Institute for Electrical and Electronic Engineers (IEEE) and ISO. They are name IEEE 802.3 which is the most common local area network today with speeds of 100 Mbps speeds. Ethernet’s popularity continues to grow because of its exceptional performance to cost ratio. It now being used as a MAN technology (Metropolitan Area Network) called Metro Ethernet. The IEEE also had a study group researching making Ethernet a WAN technology, but that group is now on hold.

Wireless Ethernet is controlled by the IEEE 802.11 standard. Many people think that wired and wireless standards are competitors, but they are used in a complimentary fashion to provide cost effective network performance.

# References

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