**IEEE Networking**

**IEEE 802** is a family of [IEEE](https://en.wikipedia.org/wiki/IEEE" \o "IEEE) standards dealing with [local area networks](https://en.wikipedia.org/wiki/Local_area_network" \o "Local area network) and [metropolitan area networks](https://en.wikipedia.org/wiki/Metropolitan_area_network" \o "Metropolitan area network).

More specifically, the IEEE 802 standards are restricted to networks carrying variable-size packets. By contrast, in [cell relay](https://en.wikipedia.org/wiki/Cell_relay" \o "Cell relay) networks [data](https://en.wikipedia.org/wiki/Data" \o "Data) is transmitted in short, uniformly sized units called cells. [Isochronous](https://en.wikipedia.org/wiki/Isochronous_signal" \o "Isochronous signal) networks, where data is transmitted as a steady stream of octets, or groups of octets, at regular time intervals, are also out of the scope of this standard. The number 802 was simply the next free number IEEE could assign,[[1]](https://en.wikipedia.org/wiki/IEEE_802" \l "cite_note-1) though "802" is sometimes associated with the date the first meeting was held — February 1980.

The services and protocols specified in IEEE 802 map to the lower two layers (Data Link and Physical) of the seven-layer [OSI](https://en.wikipedia.org/wiki/OSI_model" \o "OSI model) networking reference model. In fact, IEEE 802 splits the OSI Data Link Layer into two sub-layers named [logical link control](https://en.wikipedia.org/wiki/Logical_link_control" \o "Logical link control) (LLC) and [media access control](https://en.wikipedia.org/wiki/Media_access_control" \o "Media access control) (MAC), so the layers can be listed like this:

* [Data link layer](https://en.wikipedia.org/wiki/Data_link_layer" \o "Data link layer)
  + LLC sublayer
  + MAC sublayer
* [Physical layer](https://en.wikipedia.org/wiki/Physical_layer" \o "Physical layer)

The IEEE 802 family of standards is maintained by the IEEE 802 LAN/MAN Standards Committee (LMSC). The most widely used standards are for the [Ethernet](https://en.wikipedia.org/wiki/Ethernet" \o "Ethernet) family, [Token Ring](https://en.wikipedia.org/wiki/Token_Ring" \o "Token Ring), Wireless LAN ([Wi-Fi](https://en.wikipedia.org/wiki/Wi-Fi" \o "Wi-Fi)), Bridging and Virtual Bridged LANs. An individual working group provides the focus for each area. its starts with 802.1 to 802.12

802.2

802.2 "specifies the general interface between the network layer (IP, IPX, etc) and the data link layer (Ethernet, Token Ring, etc)

Basically, think of the 802.2 as the "translator" for the Data Link Layer. 802.2 is concerned with managing traffic over the physical network. It is responsible for flow and error control. The Data Link Layer wants to send some data over the network, 802.2 Logical Link Control helps make this possible. It also helps by identifying the line protocol, like NetBIOS, or Netware.  
  
The LLC acts like a software bus allowing multiple higher layer protocols to access one or more lower layer networks. For example, if you have a server with multiple network interface cards, the LLC will forward packers from those upper layer protocols to the appropriate network interface. This allows the upper layer protocols to not need specific knowledge of the lower layer networks in use.

802.3

802.3 is the standard which Ethernet operates by. It is the standard for CSMA/CD (Carrier Sense Multiple Access with Collision Detection). This standard encompasses both the MAC and Physical Layer standards. 802.3 is the standard which Ethernet operates by. It is the standard for CSMA/CD (Carrier Sense Multiple Access with Collision Detection). This standard encompasses both the MAC and Physical Layer standards.  
  
CSMA/CD is what Ethernet uses to control access to the network medium (network cable). If there is no data, any node may attempt to transmit, if the nodes detect a collision, both stop transmitting and wait a random amount of time before retransmitting the data.  
  
The original 802.3 standard is 10 Mbps (Megabits per second). 802.3u defined the 100 Mbps (Fast Ethernet) standard, 802.3z/802.3ab defined 1000 Mbps Gigabit Ethernet, and 802.3ae define 10 Gigabit Ethernet.  
  
Commonly, Ethernet networks transmit data in packets, or small bits of information. A packet can be a minimum size of 72 bytes or a maximum of 1518 bytes.  
  
The most common topology for Ethernet is the star topology.

802.5

The token is a special frame which is designed to travel from node to node around the ring. When it does not have any data attached to it, a node on the network can modify the frame, attach its data and transmit. Each node on the network checks the token as it passes to see if the data is intended for that node, if it is; it accepts the data and transmits a new token. If it is not intended for that node, it retransmits the token on to the next node.  
  
The token ring network is designed in such a way that each node on the network is guaranteed access to the token at some point. This equalizes the data transfer on the network. This is different from an Ethernet network where each workstation has equal access to grab the available bandwidth, with the possible of a node using more bandwidth than other nodes.  
  
Originally, token ring operated at a speed of about 4 Mbps and 16 Mbps. 802.5t allows for 100 Mbps speeds and 802.5v provides for 1 Gbps over fibber.  
  
Token ring can be run over a star topology as well as the ring topology.  
  
There are three major cable types for token ring: Unshielded twisted pair (UTP), Shielded twisted pair (STP), and fibber.  
  
Token ring utilizes a Multi-station Access Unit (MAU) as a central wiring hub. This is also sometimes called a MSAU when referring to token ring networks.

802.11

802.11 is the collection of standards setup for wireless networking. You are probably familiar with the three popular standards: 802.11a, 802.11b, 802.11g and latest one is 802.11n. Each standard uses a frequency to connect to the network and has a defined upper limit for data transfer speeds.

802.11a was one of the first wireless standards. 802.11a operates in the 5Ghz radio band and can achieve a maximum of 54Mbps. Wasn't as popular as the 802.11b standard due to higher prices and lower range.

802.11b operates in the 2.4Ghz band and supports up to 11 Mbps. Range of up to several hundred feet in theory. The first real consumer option for wireless and very popular.  
  
802.11g is a standard in the 2.4Ghz band operating at 54Mbps. Since it operates in the same band as 802.11b, 802.11g is compatible with 802.11b equipment. 802.11a is not directly compatible with 802.11b or 802.11g since it operates in a different band.  
  
Wireless LANs primarily use CSMA/CA - Carrier Sense Multiple Access/Collision Avoidance. It has a "listen before talk" method of minimizing collisions on the wireless network. This results in less need for retransmitting data.  
  
Wireless standards operate within a wireless topology.