**N+\_Chapter-4: The Current Ethernet Specifications**

1. What is Ethernet?

Ans. **Ethernet** is a family of computer networking technologies commonly used in LANs and MANs.Ethernet is a physical and data link layer technology of OSI model. It was invented by engineer Robert Metcalfe. It was commercially introduced in 1980 and first standardized in 1983 as IEEE 802.3

1. What is Collision Domain?

Ans. A **collision domain** is a section of a network connected by a shared medium or through repeaters where data packets can collide with one another when being sent, particularly when using early versions of Ethernet. A network collision occurs when more than one device attempts to send a packet on a network segment at the same time.

Or a collision domain is a part of a network where packet collisions can occur.

1. What is Broadcast Domain?

Ans. A **broadcast domain** is a logical division of a computer network, in which all nodes can reach each other by broadcast at the data link layer. A broadcast domain can be within the same LAN segment or it can be bridged to other LAN segments.

1. Write the difference between collision domain and broadcast domain.

Ans. Def.

Repeaters and hubs propagate collisions, LAN switches, bridges and routers do not.

### What is the difference between half and full duplex mode in Ethernet?

**Ans. Half duplex** mode enables networking devices to send data one-way at a time, means both networking devices cannot send data at the same time. It’s like walkie-talkie, only one person can talk at a time.

Let's talk about **full duplex**, it enables two networking devices to send data at the same time and it improves network performance. It’s like making a call to your friend by using telephone or cell phone, both of you can talk and listen at the same time.

or

A half-duplex system provides for communication in both directions, but only one direction at a time (not simultaneously). Typically, once a party begins receiving a signal, it must wait for the transmitter to stop transmitting, before replying.

A full-duplex system allows communication in both directions, and unlike half-duplex, allows this to happen simultaneously. Land-line telephone networks are full-duplex since they allow both callers to speak and be heard at the same time. A good analogy for a full-duplex system would be a two lane road with one lane for each direction.

***Half-Duplex:***  Half-duplex data transmission means that data can be transmitted in both directions on a signal carrier, but not at the same time.  For example, on a local area network using a technology that has half-duplex transmission, one workstation can send data on the line and then immediately receive data on the line from the same direction in which data was just transmitted.

***Full-Duplex:***  Full-duplex data transmission means that data can be transmitted in both directions on a signal carrier at the same time.  For example, on a local area network with a technology that has full-duplex transmission, one workstation can be sending data on the line while another workstation is receiving data.  A full-duplex link can only connect two devices, so many such links are required if multiple devices are to be connected together.

1. What is CSMA/CD ?

Ans. Carrier Sense Multiple Access/Collision Detect (CSMA/CD) is the protocol for carrier transmission access in Ethernet networks. On Ethernet, any device can try to send a frame at any time.

[Each device senses whether the line is idle and therefore available to be used. If it is, the device begins to transmit its first frame. If another device has tried to send at the same time, a collision is said to occur and the frames are discarded. Each device then waits a random amount of time and retries until successful in getting its transmission sent.]

**Carrier sense multiple access with collision detection** (**CSMA/CD**) is a media access control method used most notably in local area networking using early Ethernet technology. It uses a carrier sensing scheme in which a transmitting data station detects other signals while transmitting a frame, and stops transmitting that frame, transmits a jam signal, and then waits for a random time interval before trying to resend the frame.

CSMA/CD is a modification of pure carrier sense multiple access (CSMA). CSMA/CD is used to improve CSMA performance by terminating transmission as soon as a collision is detected, thus shortening the time required before a retry can be attempted.

1. What is channel bonding?

Ans. **Channel bonding** (also known as Ethernet bonding) is a computer networking arrangement where two or more network interfaces on a host computer are combined for redundancy and/or increased throughput.

[ Channel bonding is differentiated from load balancing in that load balancing divides traffic between network interfaces on per network socket (OSI model layer 4) basis, while channel bonding implies a division of traffic between physical interfaces at a lower level, either per packet (OSI model Layer 3) or a data link (OSI model Layer 2) basis.]

**1. What is Ethernet?**

Ans: *Ethernet* is a contention media-access method that allows all hosts on a network to share the same bandwidth of a link.

Ethernet uses both Data Link and Physical layer specifications.

3. **Describe** broadcast domain?

Ans: A broadcast domain is a restricted area In which information can be transmitted for all devices in the domain to receive.

Or a *broadcast domain* refers to the set of all devices on a network segment that hear all the broadcasts sent on that segment.

**4. What is CSMA/CD?**

Ans: Carrier sense multiple access with collision detection (**CSMA**/**CD**) is the protocol for carrier transmission access in Ethernet networks.

CSMA/CD was created to overcome the problem of those collisions that occur when packets are transmitted simultaneously from different hosts.

**5. Write a short on Duplexing?**

Ans: Duplexing is the way or method of communication.  
Duplexing two types:

1. Half-duplex: In half-duplex communication, a device can either send communication or receive communication, but not both at the same time.
2. Full-duplex: In full-duplex communication, both devices can send and receive communication at the same time.

**6. Describe Ethernet at the Data Link Layer?**

Ans: Ethernet at the Data Link layer is responsible for Ethernet addressing, commonly referred to as *hardware addressing* or *MAC addressing*. Ethernet is also responsible for framing packets received from the Network layer and preparing them for transmission on the local network through the Ethernet contention media-access method.

**7. Describe Ethernet Addressing?**

Ans: Ethernet addressing using MAC addresses. The hexadecimal addressing scheme used to create Ethernet address.

**8. Describe Ethernet Frames?**

Ans: The Data Link layer is responsible for combining bits into bytes and bytes into frames.

Frames are used at the Data Link layer to encapsulate packets handed down from the Network layer for transmission on a type of physical media access.

Ethernet Frames types: preamble, start frame delimiter(SFD)/synch, Destination Address(DA), Source Address(SA), Length or Type, Data, Frame check Sequence(FCS).

**9. Describe Channel Bonding?**

Ans: Channel bonding (also known as *Ethernet bonding*) is a computer-networking arrangement where two or more network interfaces on a host are combined for redundancy and/or increased throughput.

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