**Ethernet**

❑ What is Ethernet is used for?

Ethernet is used **to connect devices in a network** and is still a popular form of network connection. For local networks used by specific organizations -- such as company offices, school campuses and hospitals -- Ethernet is used for its high speed, security and reliability.

# Ethernet is defined by data link layer and physical layer protocols.

**Ethernet History**

❑ Original concept via ALOHA net

❑ Radio waves are the obvious shared medium

❑ Need to control access to minimise collisions

**LLC ( Logical Link Control )**

The **Logical Link Control** (LLC) sublayer provides the logic for the data link; thus, it controls the synchronization, flow control, and error-checking functions of the data link layer.

❑ Handles communication between upper and lower layers

**MAC ( Media Access Control )**

The physical address -- which is also called a **media access control**, or MAC, address -- identifies a device to other devices on the same local network.

❑ Constitutes the lower sublayer of the data link layer

❑ Implemented by hardware, typically in the computer NIC

❑ Two primary responsibilities:

1. Data encapsulation

2. Media access control

**Ethernet MAC Layer**

**1. CSMA/CD**

Carrier-sense multiple access with collision detection (CSMA/CD) is **a medium access control (MAC) method used most notably in early Ethernet technology for local area networking**. It uses carrier-sensing to defer transmissions until no other stations are transmitting.

❑ Carrier Sense Multiple Access with Collision Detection

❑ Multiple Access: Bus topology, Shared Medium

❑ Carrier Sense: Listen to medium , don’t send until medium is free

❑ Collision Detection: Detect when collisions occur

❑ Listen on the wire Shared medium Can hear any signals currently being transmitted

❑ When there are no transmissions taking place and we wish to send a frame Then we begin to send

❑ Collisions can still occur Two (or more) stations transmit at same time Speed of electricity is not infinite

❑ When is a collision detected Stop sending Send jamming signal – why? Wait to retransmit

❑ Retransmission delays Fixed time. Random time? Change delays?

**2. CSMA/CA**