

# Computer networks

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10th October 2018

## 1 Features of Ethernet

### 1.1 Wired System

### 1.2 Local Area Network (LAN)

### 1.3 Topology

## 2 PROPERTIES

### 2.1 Framing in Ethernet

### 2.2 Use of MAC (CSMA/CD)

### 2.3 Not very reliable

### 2.4 No flow control present

## 3 What is the structure of Ethernet frames?

Preamble - 8 bytes

Destination Address - 6 bytes

Source Address - 6 bytes

Type - 2 bytes ( It is used for De-Multiplexing) Delivering received data at receiver side to the required application layer processes is called as de-multiplexing.

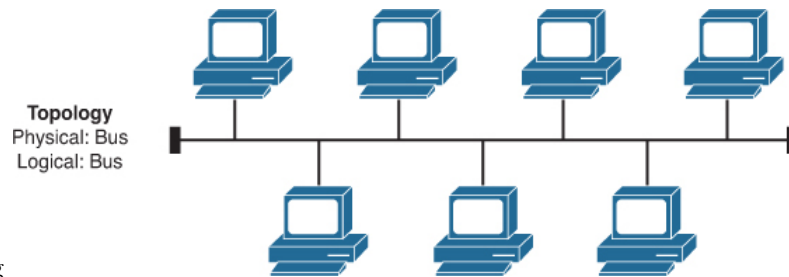
Payload/Data - 46 to 1500 bytes (The minimum data of 46 bytes is filled up by the headers of the previous processing layers header data), if not then padding bytes are added accordingly.

Cyclic redundancy check (CRC) - 4 bytes

## 4 Types of Topology of Ethernet

### 4.1 Bus Ethernet

Bus Ethernet : There is a long wire and the nodes are attached to the system through an Ethernet adapter. It is a shared medium. It is also a broadcast system and every computer attached to the system can see the frames being sent on the wire and it reaches everybody.



ethernet.jpg

Figure 1:

### 4.2 Star Ethernet

There is central hub which receives data from the node and it replicates/makes copy of the data and sends it to all the nodes connected to it. All data has to pass through the central hub.

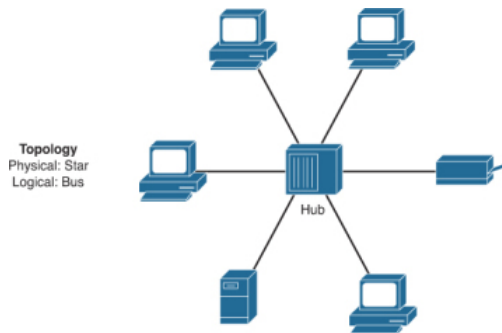


Figure 2:

### 4.3 Switch Network

When a central hub with a switch type of network receives a packet of data, it determines what computer or device the packet is intended for and sends it to that computer only. It does not broadcast the packet to all computers as what

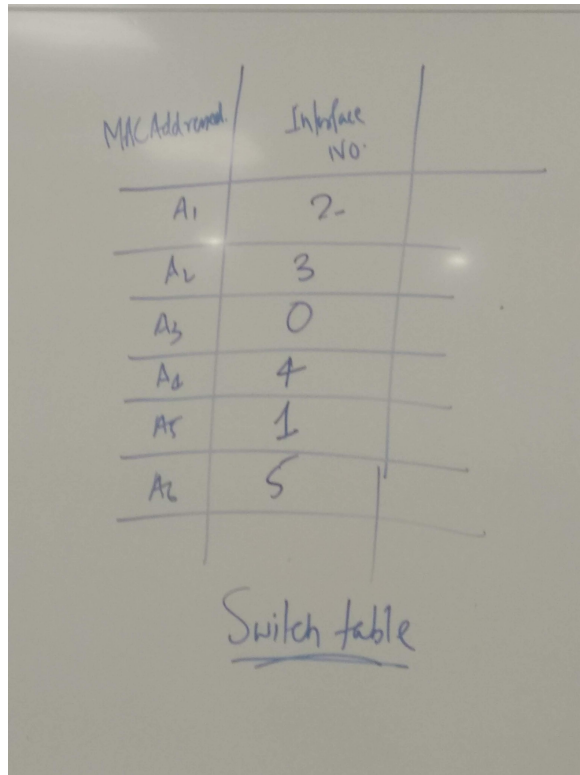
happens in a star topology without a switch network.

A switch works by doing these 2 tasks:

#### 4.3.1 Filtering

#### 4.3.2 Forwarding

It does both of these tasks using a switch table. Figure attached



A handwritten diagram of a switch table on a piece of paper. The table has two columns: 'MAC Address' and 'Interface No.'. There are six rows of data. Below the table, the words 'Switch table' are written and underlined.

MAC Address	Interface No.
A <sub>1</sub>	2
A <sub>2</sub>	3
A <sub>3</sub>	0
A <sub>4</sub>	4
A <sub>5</sub>	1
A <sub>6</sub>	5

Switch table

table.jpg

Figure 3:

#### 4.4 Self learning Switch

A self learning switch learns the mac address automatically. It also dynamically keeps on learning and updating that address. It reads the source address from the node that send data/packet to update the nodes Mac adores in the switch table. However, the destination address cannot help update the switch table. Every node needs to send a packet to the hub to update its interface number on the switch table. This switch table has 3 columns(MAC address, Interface Number , Time) with one column having a time stamp to automatically delete

the entry after a small time. The entry will get updated after that node sends a packet to the hub.

④ Self learning

MAC address	Interface No	time
A <sub>1</sub>	3	
A <sub>5</sub>	1	10:35 am

learning.jpg

Figure 4:

## 5 Switch Network

### 5.1 PROS

- Link heterogeneous property
- Collisions are avoided because of the presence of a switch.
- Switches can provide lots of statistics on the network usage.
- They also help in efficient use of the network as data is only sent through when the destination interface number is known by the switch table.

### 5.2 Requirements needed for switch networks

- Switches are transparent to nodes it means that Ethernet switches are designed so that their operations are invisible to the devices/nodes on the network.
- Buffers are required for every interface.