

Q.1] What is Ethernet ? Explain IEEE Standards.

Ethernet - Ethernet is defined as a Networking technology that includes the protocol, port, cable and computer chip needed to plug a desktop or laptop into a local area Network (LAN) for speedy data transmission via coaxial or fiber optic cables.

### Types of Ethernet

- Standard ethernet

- Fast ethernet

- Gigabit ethernet

- Ten-gigabit ethernet

The IEEE Standards in CN ensure communication b/w various devices ; it also helps to make sure that the N/w service , i.e., the internet and its related technologies must follow a set of guidelines and practices so that all the Networking devices can communicate and work smoothly.

IEEE 802.3 (ethernet) and IEEE 802.11 (Wi-fi ) Networks .

IIEEE core purpose is to foster technological innovation and excellence for the benefit of humanity.

Ethernet is a communication Technology developed in the 1970s by Xerox PARC that links computers in a LAN via a wired connection.

Q2] What is ATM? Explain all layers of ATM.

ATM stands for Asynchronous Transfer Mode.

ATM is a cell-switching, connection-oriented Technology, Multiplexing Technology. ATM supports all communication types, multiple services levels, LAN, MAN and WAN services.

ATM was a technology that was developed in the year b/w 1970 and 1980.

Data divided fixed sized packet called "cell".

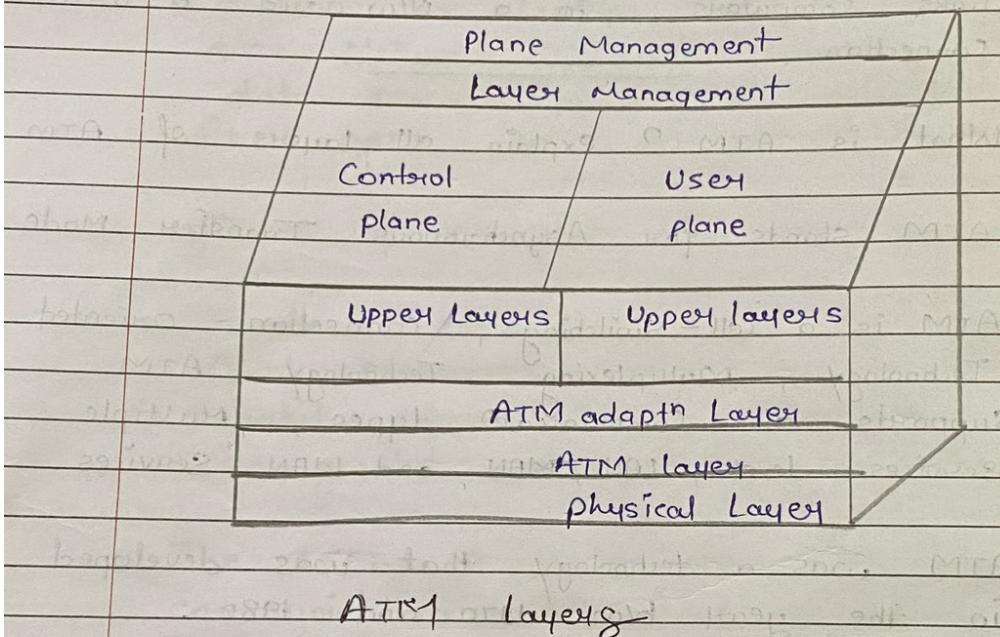
Each cell consists of 53 bytes long.  
Further the 53 bytes long can be divided into, 5 bytes header and 48 bytes payload.

ATM does not depend on the transmission medium.

There are 2 types of ATM.

- ① UNI header
- ② NNI header

### ATM Architecture



ATM has three dimensional architecture.

It contains the user plane, control plane and management plane.

Both the user plane and the control plane are divided into the following layers —

Physical layer

ATM layer

AAL

Upper layer

Physical layer - Provides transmission channels for ATM cells. At this layer, cells received from the ATM layer are transferred into a continuous bits stream after transmission overheads are added to them. Meanwhile, continuous bit streams received from physical media are stored to cells, which are then passed to the ATM layer.

ATM layer - Resides over the physical layer and implements cell-based communication with its peer by invoking the services provided by the physical layer.

It is independent of physical media, implementation of the physical layer and types of services being carried data passed to this layer takes the form of 48-byte payloads which are segmented and reassembled protocol data units and data passed from this layer to the physical layer is 53-byte cells, with the 48-byte payload being encapsulated in a five-byte header.

Other functions of the atm layer

include VPI / VCI transmission, cell multiplexing / demultiplexing and generic flow control.

ATM Adaptation Layer (AAL) - Provides interfaces b/w high-level protocols and the ATM layer. It forwards information between the ATM layer and upper layer protocols.

Four types of AAL are available - AAL1, AAL2, AAL3/4 and AAL5, each of which supports specific services provided in an ATM Network.

ATM upper layer protocols - Responsible for WAN interconnection, voice interconnection, Layer 3 interconnection, encapsulation, LAN emulation, multiprotocol over ATM, and traditional TP.

(Q.3) Describe IEEE 802.11?

IEEE stands for Institute of Electricals and Electronics Engineers.

IEEE 802 is a collection of Networking Standards that cover the physical and data link layer specifications for technologies such as

ethernet and wireless.

IEEE 802 specifies to a group of IEEE standards.

IEEE standards 802 are used for the controlling the LAN and metropolitan Area Network.

The user layer in IEEE 802 is serviced by the two layers -  
the data link layer  
and the physical layer.

IEEE 802.11 is used in most home and office N/w to allow laptops, printers, Smartphones and other devices to communicate with each other and access the internet without connecting wires.

IEEE 802.11 is also a basis for vehicle-based communication N/w with IEEE 802.11 p.

## Assignment

Unit - 4th

DATE  
PAGE 36

(Q.1) Explain Networking devices ?

Ans. Networking devices are physical devices that allow hardware on a computer N/w to interact and communicate with one another.

In layman's terms, we can describe N/w devices in Computer Networks as the devices that connect fax machines, computers, printers and other electronic devices to the N/w.

N/w Devices types

Hub

Switch

Router

Bridge

Gateway

Modem

Repeater

Access point

Hub - A hub joins multiple devices on the same LAN, broadcasting messages to all ports without examining frames.

Switch - A n/w switch forwards data to its proper destination, examining a packet's MAC address info to determine the intended device.

Router - A router directs data requests from one NW to another, using a packet's MAC address to forward it to its destination.

Bridge - A NW bridge acts as an interconnection b/w two LAN's, creating a single NW from separate LAN's.

Gateway - A gateway connects discrete NW and translates packet data so it can travel b/w the systems.

Modem - A modem modulates and demodulates signals b/w devices, such as analog to digital.

Repeater - A repeater strengthens a signal and retransmits it along to its destination.

Access point - An AP is a device that sends and receives data wireless over radio frequencies.

Q.2] Define Distance Vector algorithm with the suitable example.

Ans

The distance vector algorithm is a routing algorithm used in Computer Networks to determine the best path for data packets based on distance or cost metrics.

(P.3)

The distance vector routing algorithm is one of the most commonly used routing algorithms.

It is a distributed algorithm, meaning that it is run on each router in the N/w.

The algorithm works by each other sending updates to its neighbours about the best path to each destination.

This algorithm is also known as Bellman-Ford algorithm.

The distance vector algorithm works by each router in a N/w maintaining a table of the distances to all other routers in the N/w. This table is called the distance vector. The distance vector contains the distance to all the other routers in the N/w as well as the next hop router that the data packet should be sent to in order to reach its destination.

Q.3]

Differentiate b/w IPv4 and IPv6

IPv4	IPv6
1. IPv4 is a 32-bit address.	IPv6 is a 128-bit address
2. IPv4 is a Numeric address that consists of 4 fields which are Separated by dot (.)	IPv6 is an alphanumeric address that consists of 8 fields, which are Separated by colon.
3. IPv4 has a limited Number of IP addresses.	IPv6 has a large Number of IP addresses
4. It Supports VLSM (Virtual Length subnet Mask)	It does not support VLSM
5. IPv4 has 5 different classes of IP address that includes class A, class B, class C, class D & class E	IPv6 has varying number of classes and does not contain classes of IP addresses.

6

It generates 4 billion unique addresses

It generates 340 undecillion unique addresses

7

In IPv4, the IP address is represented in decimal.

In IPv6, the representation of the IP address is in hexadecimal.