PRACTICAL – 4

AIM: To study about OSI model network layer.

The OSI Model is based on the proposal developed by international standard organization (ISO)as a first step towards international standardization of protocols used in various layers.

The model is called ISO OSI (open system interconnection) reference model, because it deals withconnecting open systems (i.e. system that are open for communication with other systems).

OSI model has seven layers. The principles applied to t he seven layers ate as follows:

- A layer should be created where different level of abstraction is needed.
- Each layer define a well define function.
- The function of each layer should be chosen to minimize the information flow across the interface.
- The no of layers should be large enough that distinct functions need not be thrown together in the same layer out of necessity, and small enough that the architecture does not become widely.

Note: the OSI model itself is not networking architecture because it does not specify exact services and protocols to be used in each layer. it just tells what each layer should do.

Various layers are shown in figure:
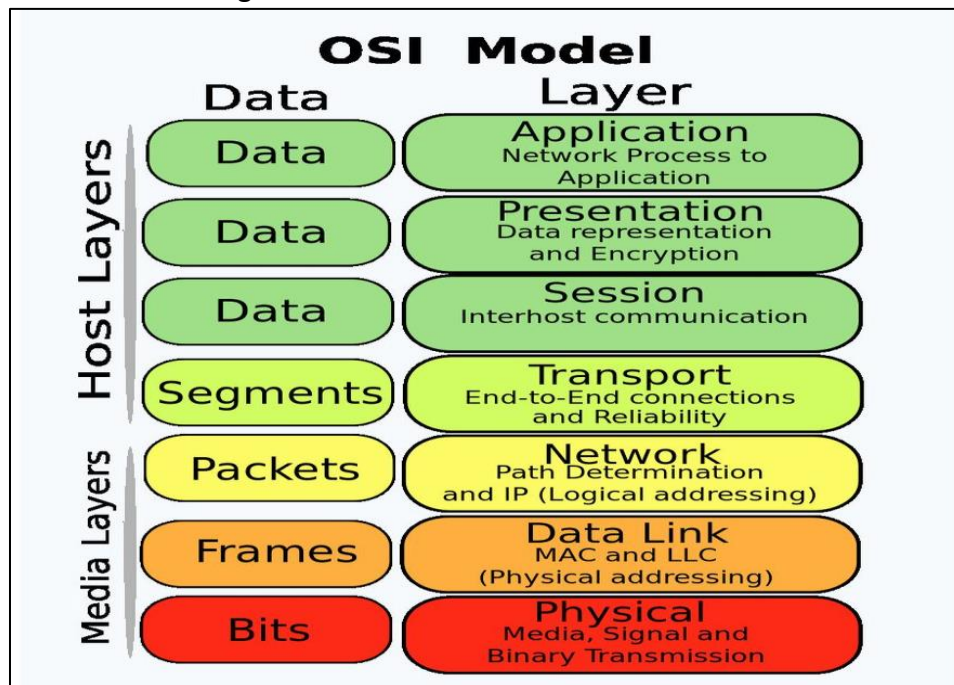
Physical layer:-

- It is connected with transmitting raw bits over a communication channel.

- The design issues have to do with making sure that when one side sends a 1 bit, other side as a 1 bit not as a 0 bit receives it.

- The volts used to represent a 1 or 0 bit, the direction of transmission, initial connection establishment, pins of NIW connector, a function of each pins etc. point should be considered.

- The design issues here largely deal with mechanical, electrical & procedural interfaces and physical transmission medium.

Data link layer:-

- Main task to take a row transmission facility and transform it into a line that appears free of undetected transmission errors to N/W layers.

- It accomplishes this by mapping data up into data frames transmitting the frames sequentially & processing the acknowledgement frames sent back by the receiver.

- Data link layer creates and recognizes frame boundaries.

- Noise burst online can destroy a frame completely. Data link layer s/w on source m/c can RETRANSMIT the frame. This layer also solves the problem caused by damaged, lost & and duplicate frames.

- Other issues that arise are how to keep the fast transmitter from drawing a slow receiver in data, how to deal if the line is used to transmit data in both directions, and how to control access toshared channels in case of broadcast networks.

Network layer:-

- It is concerned with controlling the operations of SUBNET. A key design issue is determining how packets are routed from source to destination.

- If too many packets in subnets at the same time, they will get in each other's way. Formingbottlenecks. The controls for such congestion also belong to N/W layer.

- Since operators of the subnet may well expect remuneration for their efforts there is often some accounting function built into the n/w layer.

- When a network travels from one n/w to another to get its destination, many problems can arise. It is up to n/w layer to overcome all these problems to allow heterogeneous n/w to be interconnected.

- In broadcast n/w, routing problem is simple, so n/w layer is thin or even nonexistent.

Transport layer:-

- To accept data from the session layer, split it up into smaller units if need be pass these to the n/w layer, and ensure that the pieces all arrive correctly at the other end.

- Under normal conditions, the transport layer creates a distinct n/w connection required by the session layer. If creating or, maintaining an n/w connection is expensive, the transport layer might multiplex several transport connections onto to same n/w connection to reduce cost.

- It also determines what types of services to provide session layer, and ultimately user of networks.

- The transport layer is a 2true end-to- end layer, from source to destination:

- In other words, a program on source m/c carries on a conversation with a similar program on a destination m/c, using message header and control messages.

- If hosts are multi programmed then need to be someone channel, the transport layer must take care of establishing and deleting connection across n/w. this requires naming mechanism and flow control.

Session Layer:-

- It allows user on different m/c to establish session between them. A session allows ordinary data transport and also provide enhanced services useful in some applications. A session might be used to allow a user to log into a remote time sharing system or transfer file between 2 m/cs.

- To manage dialogue control.

- Token management.

- Synchronization.

Presentation Layer:-

- It performs function that is requested sufficiently often to warrant finding solution for them, rater then letting each user solve the it is concerned with SYNTAX and SYMENTEC of information transmitted.

- Encoding data in a standard agreed upon way. In order to make it possible for computers with different presentation to communicate, the data structure to be exchanged can be defined in abstracted way, along with a standard encoding to be used "on the wire".

- The presentation layer manages these abstract data structure and converts from representation used inside the computer to n/w standard representation and back.

Application layer:-

- It contains a variety of protocols that are commonly needed.
- There is hundreds of incompatible terminal type in the world. Consider the right of the full screen editor that all to work over n/w with many different terminal types with different screen layout, escape sequence for inserting and deleting text, moving cursor etc.

- One solution is to define on abstract n/w VIRTUAL TERMINAL that editor and other programs can be written to deal with. All the virtual terminal software is in application layer.

- Another function is FILE TRANSFER. Transferring file between two different systems requires handling incompatibilities. This work belongs to application layer.

Questions:-

- Write the list of protocols that work at different layers.
- Compare OSI model and TCP/IP model.

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