THE OSI MODEL

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ABSTRACT:

A reference model is a conceptual blueprint of how communication should take place. It addresses all the process required for effective communication and divides these processes into logical grouping called layers. When a communication system is designed in this manner, it is known as layered architecture. The OSI isn't a physical model, though. Rather, it's a set of guidelines that application developers used to create and implement application that run on a network. It also provides a framework for creating and implementing networking standards, devices, and internetworking schemes. This paper explains the OSI Reference Model, which comprises of seven different layers. Each layer is having its own responsibilities.

HISTORY OF Osi MODel

Work on layered model of network architecture was started by **International Standard Organization (ISO).**

OSI has two major components :

1. **Abstract model of networking called Sevel Layer Model or Basic Reference Model**
2. **Set of specific protocols**

First the OSI model was developed and then the protocols were developed.

The concept of a seven-layer model was provided by the work of Charles Bachman, Honeywell Information Services.

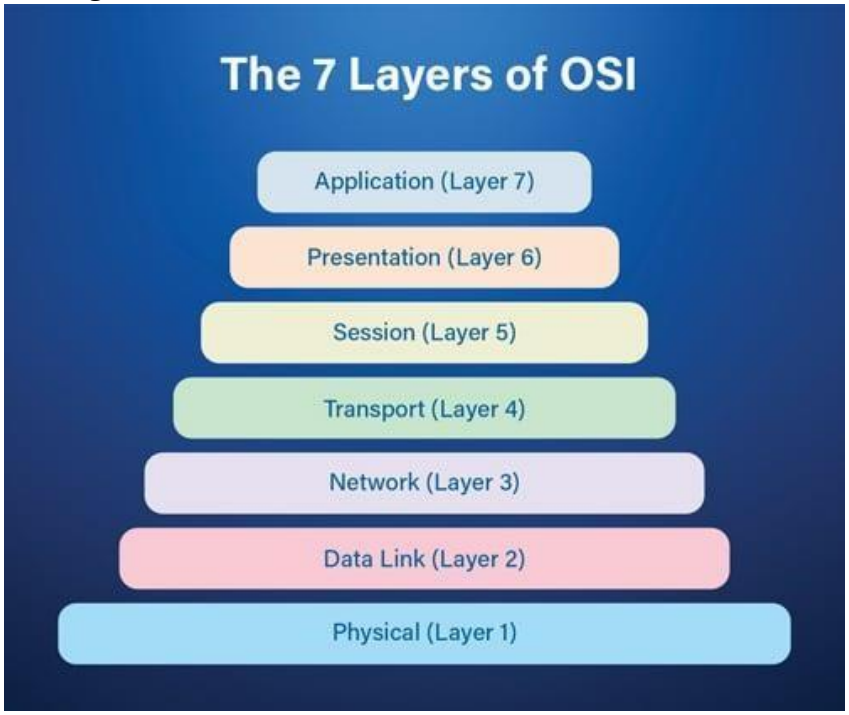
Various aspects of OSI design evolved from experiences with the ARPANET, the fledgling Internet, NPLNET, EIN, CYCLADES network and the work in IFIP WG6.1. The new design was documented in ISO 7498 and its various addenda. In this model, a networking system was divided into layers. Within each layer, one or more entities implement its functionality. Each entity interacted directly only with the layer immediately beneath it, and provided facilities for use by the layer above it.

Protocols enabled an entity in one host to interact with a corresponding entity at the same layer in another host. Service definitions abstractly described the functionality provided to an (N)-layer by an (N1) layer, where N was one of the seven layers of protocols operating in the local host.

INTRODUCTION TO OSI MODEL

The OSI model **is an open system which is a set of protocols that allows any two different systems to communicate** regardless of their underlying architecture. The OSI model is a layered framework for the designing of network systems which allows communication between all types of computer systems. It

consists of **7 separate layers** but they are somewhere related, each of which defines a part of the process of moving information across a network.

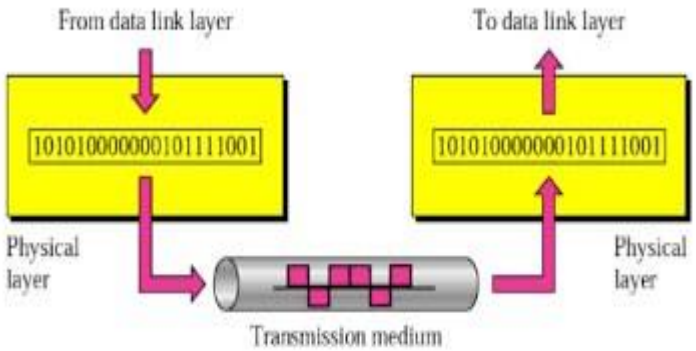


The seven layers can be set to belong from 3 subgroups. Layers 1,2 and 3-physical, data link, network-are the network support layers; which deals with the physical aspect of moving data from one device to another. Layers 5,6 and 7-session, presentation and application-can be though as the support layers; which allows interoperability among unrelated software systems. Layer 4, transport layer, links these 2 subgroups and ensures that what the lower layers have transmitted is in a form that the upper layers can use.

LAYERS OF THE OSI MODEL

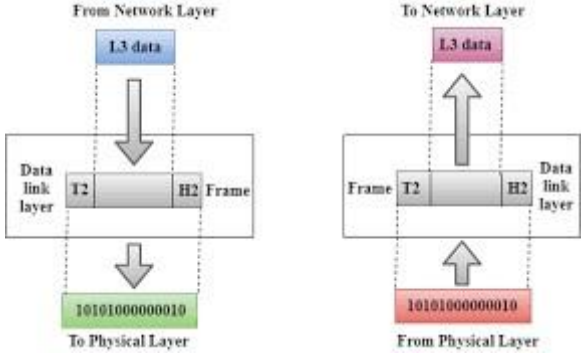
1. Physical Layer

It is the layer which is responsible for movements of individual bits from one node to the next. The physical layer coordinates the functions required to carry a bit stream over a physical medium. It activates, deactivates and maintain physical conditions. Tis layer is responsible for transmission of raw data over network. Repeater work at this layer. Data or signal encoding is done at this layer.



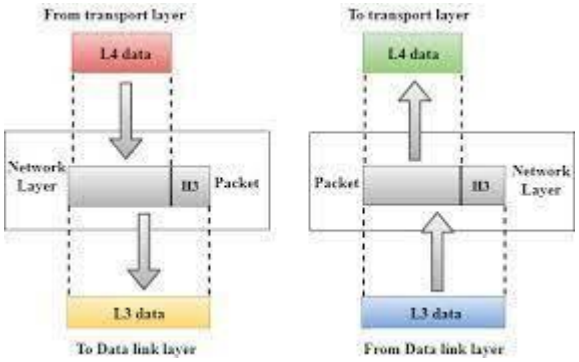
2. Data Link Layer

It is the layer which is responsible for moving frames from one hop (node) to the next. The data link layer transforms the physical layer, a raw transmission facility, to a reliable link. It makes the physical layer appear error-free to the upper layer (network layer). Error control, Physical addressing , Flow control , Access control , Framing this are some responsibilities performed by this layer.



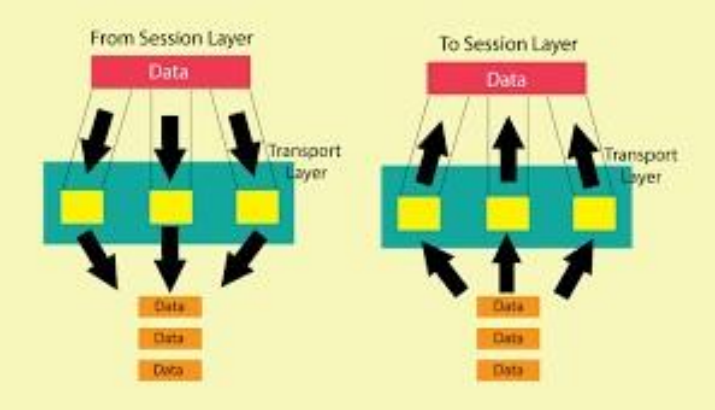
3. NETWORK LAYER

It is the layer which is responsible for the delivery of individual packets from the source host to the destination host. In other words, the network layer is responsible for the source-todestination delivery of a packet, possibly across multiple networks. If two systems are connected to the same link, there is no need for a network layer. But, if the 2 systems are connected to different links with connecting devices between the networks, then there is a need for the network layer to accomplish source-to-destination delivery. Routing , congestion control, quality of control , addressing this are some responsibilities of network layer.



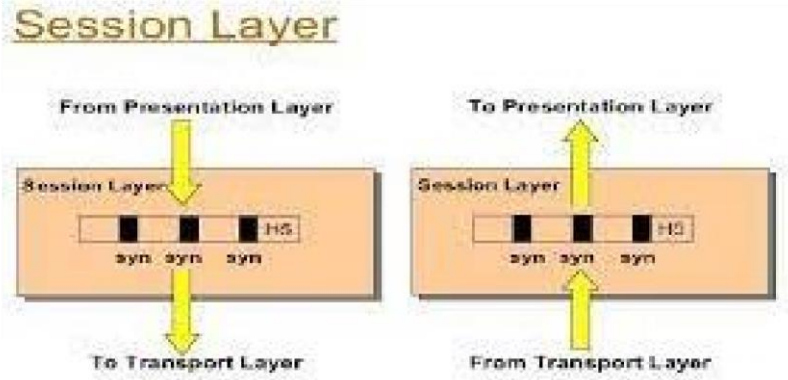
4. TRANSPORT LAYER

It is the layer which is responsible for the delivery of a message from one process to another. In other words, the transport layer is responsible for process-to-process delivery of the entire message. While the network layer oversees source-to-destination delivery of individual packets, it does not recognize any relationship between those packets. A process can be said as an application program running on a host. The transport layer ensures that the whole message arrives intact and in order, looking at both error and flow control at the source-to destination level. Some of the other responsibilities of the transport layer include Flow control , Service-point addressing , Segmentation and reassembly , Error control , Connection control.



5. SESSION LAYER

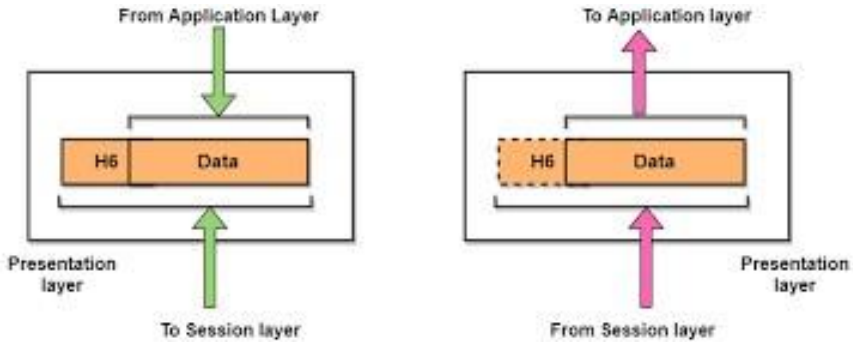
It is the layer which is responsible for dialog control and synchronization. The services provided by the 1st three layers are not sufficient for some processes. The session layer is the network dialog controller. It can establish, maintain and synchronize the interaction among communicating systems. Specific responsibilities of the session layer include Synchronization , Dialog control, token management.



6. PRESENTATION LAYER

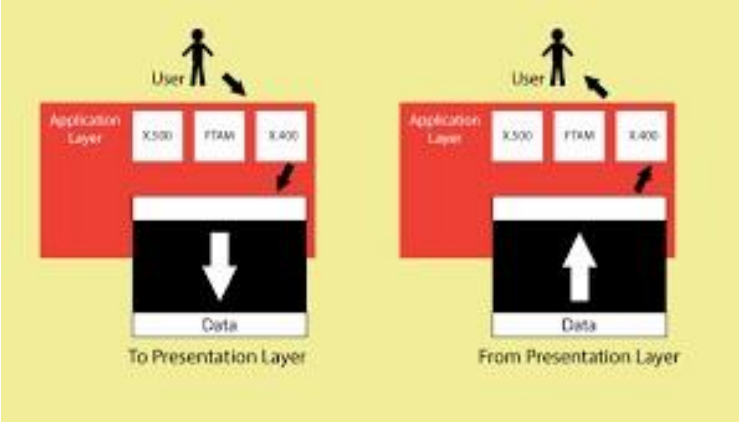
It is the layer which is responsible for translation, compression and encryption. This layer is concerned with the syntax and semantics of the information exchanged between the two systems. Specific responsibilities of the presentation layer include the following:

- Translation: Encoding of information into bit streams to be transmitted.
- Encryption: Transformation of original information to another form by the sender.
- Compression: Reduces the number of bits contained in information.



7. APPLICATION LAYER

It is the layer which is responsible for providing required services to the user. The application layer enables the user (human or program) to access the network. It provides user interfaces and support for services such as remote file access and transfer, e-mail, shared database management etc. The services provided by the application layer includes Mail services, File transfer, management and access, Directory services, Network virtual terminal.



BENEFITS OF THE OSI MODEL

The OSI model has many benefits which include:

a. Security: The Open Systems Interconnection (OSI) model is one of the many useful tools we can use to stop cybersecurity threats. This long-standing standard separates a network into seven layers, offering suggestions for protecting each of them. OSI model have functionality for encryption and decryption which has a major contribution for security purpose. This make it reliable.

b. Easy troubleshooting: Since each layer in an OSI model is independent of each other so it makes it easier to detect and solve all problems prevailing in it .

c. Scalable: OSI model is designed in such a way that it can be extended further.

d. Easy to understand: OSI model is very interactive and guides us to know what a Model is, how it operates and common methodologies, how new technologies are developed in existing networks.

e. Network support: OSI model is generic on default. Which means that it is supported by wide range of device manufacturers. Most computer networks use OSI as their standard model.

CONCLUSION

In this paper, we have tried to give information about what an OSI reference model is, why it is used, what are its benefits, different layers of it. OSI model is basically used for the transfer of data over a network which moves through different layers.

OSI enhancements are done time to time for developing new technologies. Future implementation in OSI model will lead to enhancement in security and many other fields.