Survey Paper on Benefits of Open System Interconnection In Network

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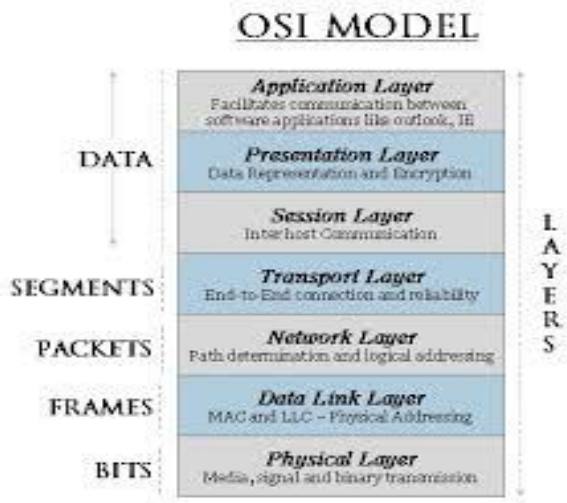
Abstract- *The open system interconnection model, better known as the OSI model, is a network map that was originally developed as a universal standard for creating networks. But instead of serving as a model with agreed-upon protocols that would be used worldwide, the OSI model has become a teaching tool that shows how different tasks within a network should be handled in order to promote error-free data transmission. These jobs are split into seven layers, each of which depends on the function's "handed-off" from other layers. As a result, the OSI model also provides a guide for troubleshooting network problems by tracking them down to a specific layer. Here we'll take a look at the layers of the OSI model and what functions they perform within a network The OSI Developed by representatives of major computer and telecommunication companies beginning in 1983, OSI was originally intended to be a detailed specification of actual interfaces. Instead, the committee decided to establish a common reference.*

I. INTRODUCTION

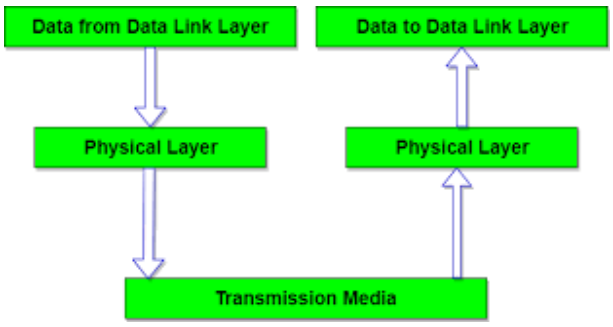
The history of the development of the OSI model is, for some reason, a little-known story. Much of the work on the design of OSI was actually done by a group at Honeywell Information Systems, headed by Mike Canepa, with Charlie Bachman as the principal technical member. This group was chartered, within Honeywell, with advanced product planning and with the design and development of prototype systems.

In the early and middle '70s, the interest of Canepa's group was primarily on database design and then on distributed database design. By the mid-70s, it become clear that to support database machines, distributed access, and the like, a structured distributed communications architecture would be required. The group studied some of the existing solutions, including IBM's system network architecture (SNA), the work on protocols being done for ARPANET, and some of the concepts of presentation services being developed for standardized database systems. The result of this effort was the development by 1977 of a seven-layer architecture known internally as the distributed systems architecture (DSA).

The Open Systems Interconnection model (OSI model) is a conceptual model that characterizes and standardizes the communication functions of a telecommunication or computing system without regard to its underlying internal structure and technology. Its goal is the interoperability of diverse communication systems with standard protocols. The model partitions a communication system into abstraction layers. The original version of the model defined seven layers.



A layer serves the layer above it and is served by the layer below it. For example, a layer that provides error-less communications across a network provides the path needed by applications above it, while it calls the next lower layer to send and receive packets that comprise the contents of that path. Two instances at the same layer are visualized as connected by a *horizontal* connection in that layer.

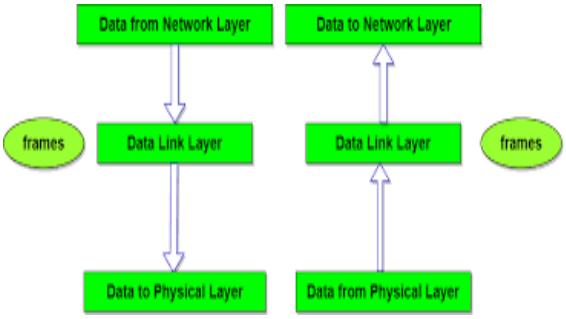


Layer 1: physical layer

Physical layer is the only one layer of OSI model which actually deals with the physical connection of two different work-stations. This layer defines the hardware equipment, cabling, wiring, frequencies, pulses used to represent binary signals etc. Physical layer provides its services to Data-link layer which is in bits pattern.

Layer 2: Data Link Layer

The data link layer is used for the encoding, decoding and logical organization of data bits. Data packets are converted into framed and addressed by this layer, which has two sub layers. The first sub layer is the media access control (MAC) layer. It is used for source and destination addresses. The MAC layer allows the data link layer to provide the best data transmission path and manage data flow control. The second sub layer is the logical link control (LLC). It manages error checking and data flow over a network.

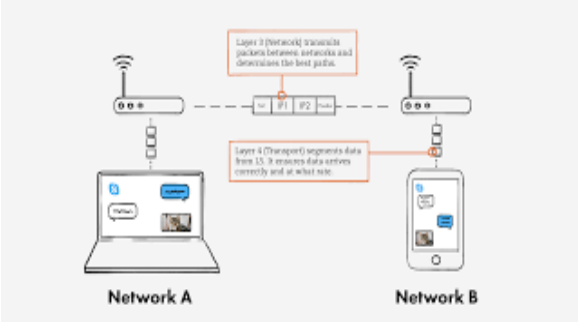


It makes sure the relative physical protocol is assigned to the data. The data link layer is the second layer in the OSI Model. The three main functions of the data link layer are to deal with transmission errors, regulate the flow of data, and provide a well-defined interface to the network layer.it also provides error control and flow control mechanism to data frame.

Layer 3: Network layer

The network layer is the third layer of the Open Systems Interconnection Model (OSI Model) and the layer that provides data routing paths and forwarding techniques for network communication. Data is transferred in the form of packets via logical network paths in an ordered format controlled by the network layer.

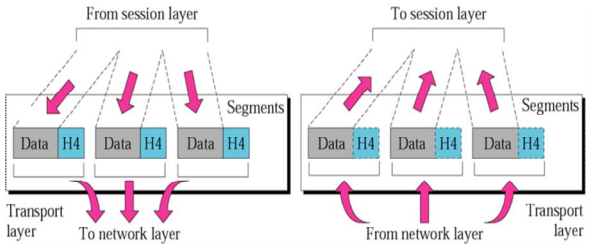
It provides logical address to data packets generally called is IP address. Network is expert in host to host communication like in post office procedure.



The protocols supported at network layer are TCP and IP.these are for total forwarding of data from source to destination.

Layer 4: Transport layer

The transport layer is the layer in the open system interconnection (OSI) model responsible for end-to-end communication over a network. It is also called as process to process communication. For this communication type it supports TCP and UDP protocols.It provides logical communication between application processes running on different hosts within a layered architecture of protocols and other network components. Transport layer is responsible for Error control and flow control. It also solves different congestion happened in network.



Other layers session, presentation and application layers are called as software layers.

The session layer permits two parties to hold ongoing communications called a session across a network. The applications on either end of the session can exchange data or send packets to another for as long as the session lasts. The session layer handles session setup, data or message exchanges, and tears down when the session ends.

The presentation layer formats the data to be presented to the application layer. It can be viewed as the translator for the network. This layer may translate data from a format used by the application layer into a common format at the sending station, and then translate the common format to a format known to the application layer at the receiving station.

This is the level that the user often interacts with. This is where data turns into websites, chat programs and so on. Many protocols run at this layer, such as DNS, FTP, HTTP, HTTPS, NFS, POP3, SMTP, and SSH.

II. ADVANTAGES OF THE OSI MODEL

It has all flexibility to adopt features of other protocols. It allows multiple-vendor development through the standardization of network components. It allows various types of network hardware and software to communicate. It prevents changes in one OSI layerfrom affecting other layers to accelerate development.

1. It is a truly generic model. And it is considered as a standard model in computer networking.
2. Layers in OSI model architectures are distinguished according to the services, interfaces, and protocols.
3. Since the protocols are hidden, any protocols can be implemented in this model. So I call it as a generic model. It has all flexibility to adapt too many protocols.
4. It supports connection-oriented as well as connectionless services. So we can use the connection-oriented model when we need reliability and connection-less services when we need a faster data transmission over the internet. Read difference between Connection-Oriented and Connectionless Services Protocol for more detail.

III. CONCLUSION

In this paper I have tried to explain what exactly an OSI reference model is, what is the history of it, why it is used and contribution of various researchers in this reference. OSI is basically an architecture which only gives us an idea how data transfer over the network during any communication type. OSI enhancements are done time to time for developing new technologies.

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