Volume 4, Issue 9, September 2014 ISSN: 2277 128X
International Journal of Advanced Research in Computer Science and Software Engineering
Research Paper
Available online at: www.ijarcsse.com

OSI Reference Model

Aarushi Madan
Department of Computer Science
India

Aarusi Tuteja
Department of Computer Science
India

Bharti
Department of Computer Science
India

Abstract-Considering the urgent need for standards which allow constitution of different computer network, ISO developed anew organization for "Open System Interconnection "(ISO/TC97/SC16)" in 1977. The first precedence of organization 16 was to develop an ideafor open system interconnection which could work as a guideline for the definition of standard rules. After studies and discussions of around 18 months, SC16 accepted a layered structure containing seven different layers. In July 1979 the detailed description of this structure, established by SC16 and recognized by the name "OSI Reference Model". The main idea of OPEN SYSTEM INTERCONNECTION is to improve the standard that will make possible to connect different types of computer together. These rules were adopted by TC97 at the end of 1979 on the basis of following development of standards for open system interconnection with in ISO. This paper OSI model by SC16. This paper also discussed how system network structure related.

Keywords- Open System Interconnection (OSI), International Standard Organization (ISO), protocol, switches, bridges.

I. INTRODUCTION

The OSI Model i.e. Open Systems Interconnection modelis a tool for understanding the data communication between two different networks. The plan suggested by ISO named OSI (open system interconnection) includes all the aspects of network communication. The OSI model is not the set of rules, it is a model for understanding and creating a network that is flexible and able to exchange the information. It contains seven layers for the communication between the networks. Each layer performs particular functions to coordinate with the layers above it and provide services to the layers below it. The lowest three layers targets on passing information through the network to the destination i.e. user.Theupper four layers perform theiraction in the end to complete the process.The first meeting of SC16 was organized in March 1978, and initial discussions took place that a result could be reached rapidly on a layered structure which would satisfy most requirements of Open Systems Interconnection with the ability of being expanded later to meet new requirements.

This paperdelivers an understanding of each of the seven different layers, involving their functions and their relations between each other. This research paper will help us to get an overview of the network process, which then act as a framework for understanding the communication of computer networking.Finally, this paper talks about comparisons between the different layers of OSI model.

II. SYNOPSIS ON THE OSI MODEL

The OSI MODEL: Understanding of the seven layers of OSI Model.

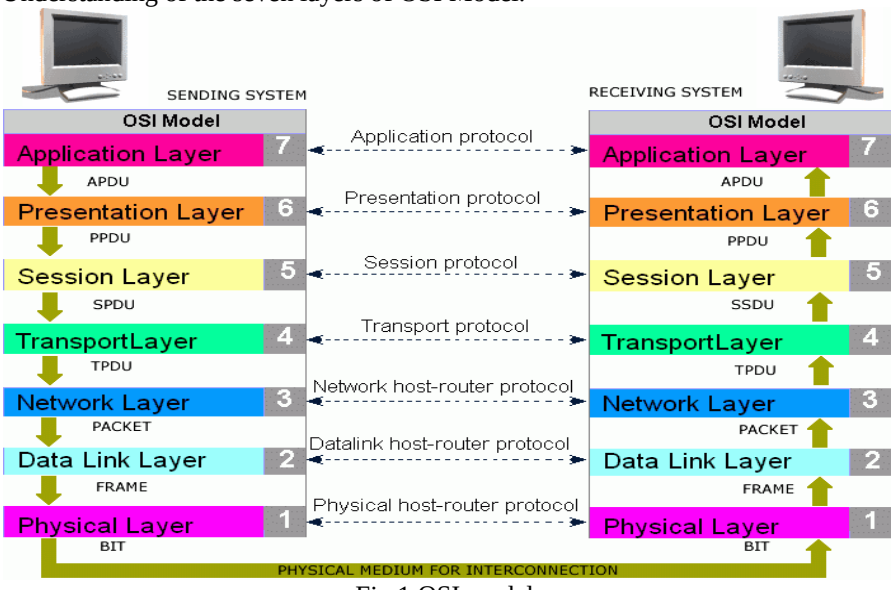

Fig 1 OSI model

© 2014, IJARCSSE All Rights Reserved

The OSI model provides a means to separate computer networking functions into several layers. Such a model of layers with different functions is also called a "protocol stack". Rules, perform their function in both hardware and software or, as with most protocol suites, make the two combinations.The lower layer i.e. physical layer is concern only with the hardware whereas other layers work with the software of the system. The ISO (International Organization for Standardization) standard 7498-1 gives the idea of the model. The OSImodel is a seven-layer model proves right in communications between two computers.In this model all network components work together to give the desirable output to the user.

The main benefits of the OSI model are:

- It helps the users to understand the network picture
- It gives the idea to the users that how hardware and software work together
- It separates the complex network into the manageable modules
- In networking profession it is used to compare the basic functional relationship between different network
- Developed new technologies can be easily understand

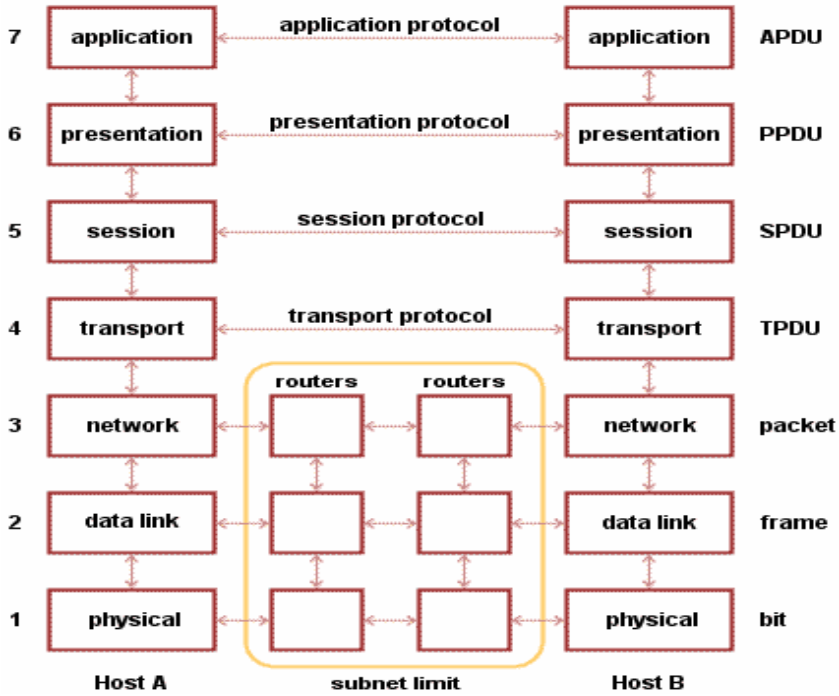

Fig 2 illustrates the working of OSI Model

III. LAYER 1 – THE PHYSICAL LAYER

The physical layer of the OSI model is the first layer,which is an interface, as well as the medium (cable) between one node to another. On a computer network it provides the information about electrical, mechanical, functional, and procedural specifications.

Physical layer includes the following components-

- Wiring system components
- Pin assignments and connector designs
- Hub, repeater, and patch panel arrangements
- Cable less system components

In a Local Area Network location, Category 5e UTP (Unshielded Twisted Pair) cable uses physical layer for the connection of individual devices. Fiber optic cabling is also used the physical layer for connection to create a backbone link. The physical layer only concern with hardware.

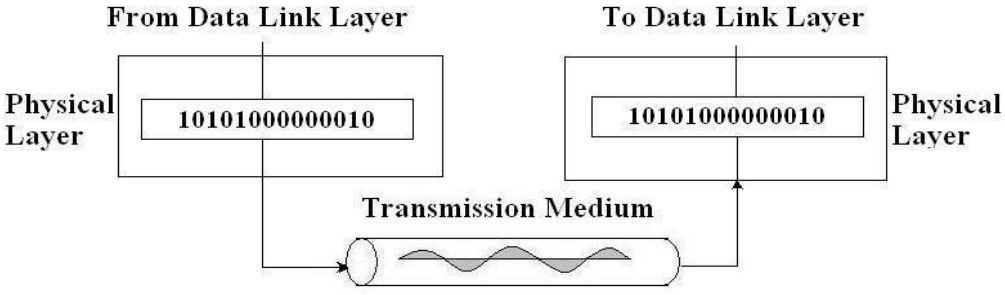

Fig 3 Illustrates data transmission in physical layer

© 2014, IJARCSSE All Rights Reserved

IV. LAYER 2 – THE DATA LINK LAYER

The second layer of OSI model is Data Link Layer, responsible for the exchanging the data between two nodes. It gives the different methods for sharing the data between multiple devices within a single network. It make the physical layer the first step of data transmission to desirable link.

The functions illustrate by the data link layer-

- This device allows to send and receive messages.
- It provides the physical address so that the data of the device able to sent on the network.
- Error can be detected easily.

Common networking components that function at data link include-

- Network interface cards(NIC)
- Ethernet and Token Ring switches
- Bridges

A switch uses thebit to sort and forward message on a network segment which is transferred from physical layer to the data link layer.Bridges and Switches work in a same manner; however, bridging is directly linked to CPU which is a software programwhereas switches use Application-Specific Integrated Circuits which performs the specific functions in hardware, which is faster than bridges.

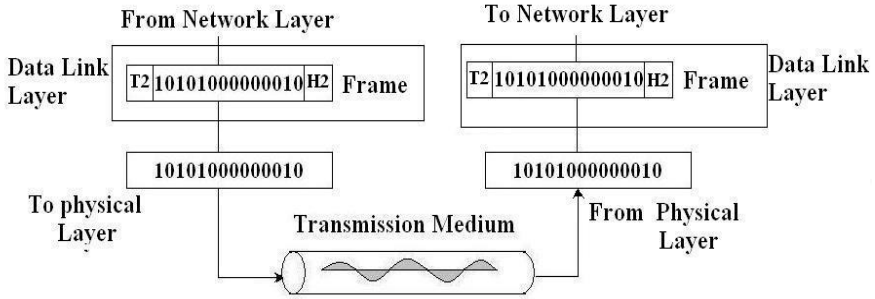

Fig 4 Illustrate data link layer

V. LAYER 3 – THE NETWORK LAYER

The third layer is network layer of the OSI model, which provides the logical information from physical layer to the user. Firstly, software organization, such as Novell, developed the network layer. The IP address used by the internet provide the connectivity to billions of computer network. The network layer addressing is separated into many smaller parts known as subnets, so that it is easy to manage.The data transmit between different network with the help of routers and the use subnet portion of the IP address.

The major functions of network layer is:

a) Logical Addressing: The data link layer manages the addressing problem locally. If packet extends the network boundary, then logical address is required. When the packet is transferred from upper layer to lower layer the network layer puts a header to the packet containing source and destination logical address.

b) Routing: In a large networking system, the connecting devices i.e. router or switches switch the packets to their final destination.

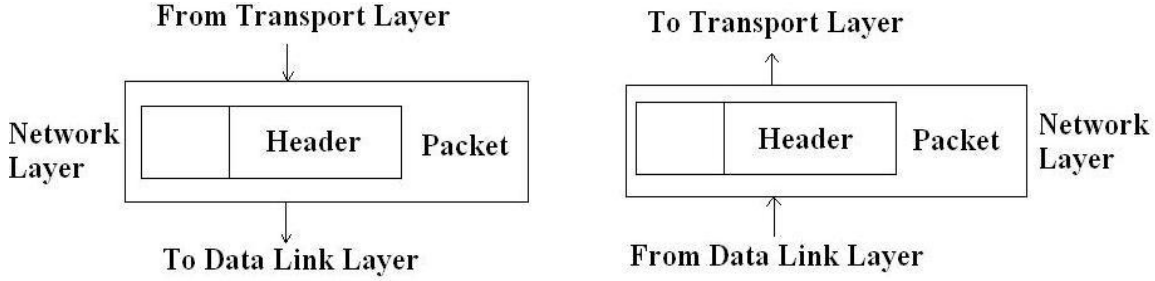

Fig 5 illustrates Network layer

VI. LAYER 4 – THE TRANSPORT LAYER

The transport layer of the OSI model, performs end-to-end communication between different devices through a network. The transport layer transfers the packets of data from the host i.e. network layer to the destination i.e. session layer. The name of the data unit in transport layer is TPDU (Transport Protocol Data Unit).

The functions of transport layer are:

a) Port Addressing: Computers run several programs simultaneously therefore transport layer includes the port address to specify the process which ensures the process-to-process delivery.

© 2014, IJARCSSE All Rights Reserved

b) Segmentation and reassembly: If the size of the message is large, then it is divided into different modules. The transport layer reassembles the segments at arrival of segments at particular destination with the help of the sequence number. The packets which are lost during transmission can be identified easily using transport layer.

c) Connection control: The transport layer can be either connection-oriented or connectionless. Connection oriented transport layer establishes the connection between the destination source and the transport layer before delivering the packets. In connectionless transport layer each segment of the layer is treated independently packet and delivers to the transport layer of the destination machine.

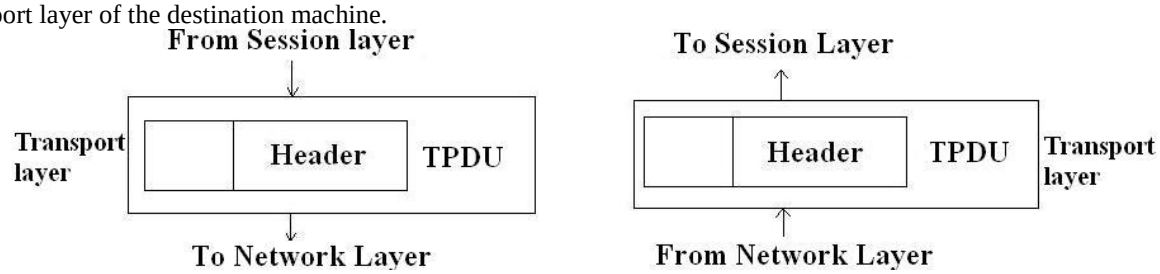

Fig.6 illustrates the transport layer

VII. LAYER 5 – THE SESSION LAYER

The session layer develops a dialogue between transport layer and presentation layer which offers several services. The data or send packets are exchanged on either ends till the session lasts.

The functions of session layer are:

- Computer generated connection between application units
- Synchronizingthe data
- Creating the dialog entities
- Connecting different parameter
- Responses the data received during a particular session
- Retransmission of data if it is not received by a device

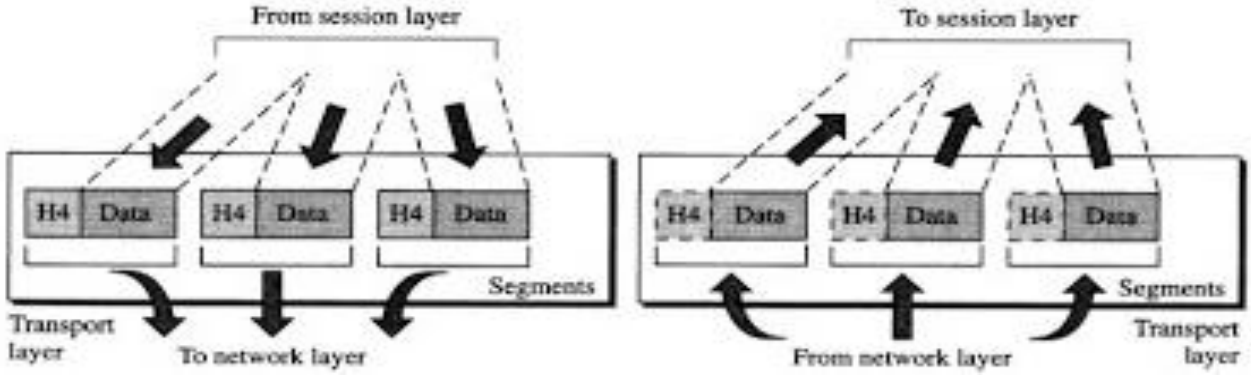

Fig.7 illustrates the session layer

VIII. LAYER 6 – THE PRESENTATION LAYER

The presentation layer deals with the format of the transmitted data. The data is converted into generic format for outgoing messages and in case of incoming messages, the data is converted from the generic form to readable form to the receiving application.

The functions of presentation layer are:

- Coding and decoding of a message for security purpose
- Change in size of a message so that the message becomes efficient
- Graphics configuration
- Translates the data

IX. LAYER 7 – THE APPLICATION LAYER

The application layerprovides an interface between the user and the presentation layer. The presentation layer transmits the data to the application layer and the data unit in this layer is called APDU (Application Protocol Data Unit). It directly links with the application such as web browser or email. With the help of application layer E-Mail and Messaging can be exchanged and handled. File transfer are also supported in this layer.

X. CONCLUSION

In this new era there has been a vast development in the different layer of OSI model which affect the communication of computer system. The OSI model is too complex and expensive as it is bound in seven rigid layers. In the OSI model users face many challenges as it is not adapted to the tele-communication applications. People has a natural tendency to use TCP\IP model rather than OSI MODEL.

© 2014, IJARCSSE All Rights Reserved

REFERENCES

[1] "J. Day, "Terminal protocols," this issue, pp. 585-593.
[2] Depavath Harinath, "Dynamic Buffer Sizing Algorithms for 802.11-Based networks" International Journal of Advanced Research in Computer Science (IJARCS),vol.3, No. 7, Nov-Dec 2012.
[3] "J. W. Conard, "Character oriented data link control protocols,"
[4] H. Zimmermann and N. Naffah "On open systems architecture", Proc. ICCC, pp.669 -674
[5] ISO/TC97/SC16, "Reference model of open systems interconnection", 1979.
[6] H. Zimmermann "High level protocols standardization: Technical and political issues", Proc. ICCC, pp.373 - 376, Aug.1976.
[7] Hubert Zimmermann, "OSI Reference Model- the ISO Model of Architecture for Open System Interconnection" IEEE transaction on communications, vol.28, issue 4, April 1980.
[8] J.Day, Zimmermann H, "The OSI reference model" published in IEEE vol.71,issue 12, pages:1334-1340,1983.
[9] ISO/TC97/SC16, "Provisional model of open systems architecture", DOC.N34, Mar. 1978.

© 2014, IJARCSSE All Rights Reserved