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# SURVEY ON SEVEN LAYERED ARCHITECTURE OF OSI MODEL

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**Abstract: -** Due to the urgency in the need for standards for heterogeneous computer networks, International Standard Organization (ISO) created a new subcommittee for "Open System Interconnection" (ISO/TC97/SC16) in 1977. The first priority of subcommittee 16 was to develop architecture for Open System Interconnection which could serve as a frame work for the definition of standard protocols. As a result 18 months of studies and discussions, SC16 adopted a layered architecture comprising seven layers (Physical, Data Link, Network, Transport, Session, Presentation, and Application). In July 1979 the specifications of this architecture, established by SC16, were passed under the name of "OSI Reference Model" to Technical committee 97 "Data processing" along with recommendations to start officially, on this basis a set of protocols standardizations to start projects to cover the most urgent needs. These recommendations were adopted by TC97 at the end of 1979 as the basis for the following development of standards for Open System Interconnection within ISO. This paper explains the OSI Reference Model, which comprises of seven different layers. Each layer having their own responsibilities.

**KEYWORDS***:* ISO-International standard organization, OSI-Open system interconnection, Networking, Seven layers, protocol.

## INTRODUCTION

Networking evolved from the basic principle of moving data from one computer to another. The first method involved copying data to a storage media such as a floppy disk and then taking that storage media to another computer and copying the data. This was charmingly referred to as sneaker-net. As more efficient means were discovered—namely, electricity on a copper wire—networking became more popular. However, there were no standards in place. This meant that one network manufacturer implemented a different means of data transfer than another. If you had an IBM network, you purchased only IBM network devices. In 1984, a group known as the International Organization for Standardization (ISO) created a model called the Open Systems Interconnect (OSI).This model defined guidelines for interoperability between network manufacturers. A company could now mix and match network devices and protocols from various manufacturers in its own network without being locked

into using a single vendor. It also had a great side effect: Competition meant lower prices. Although the OSI model defined a set of standards, it is important to note that it is merely a model. Many other models exist in the networking industry; however, understanding a single model gives us the capability of understanding other models in the future. The OSI model is the most widely taught as the foundation for this knowledge. By using a layered model, we can categorize the procedures that are necessary to transmit data across a network. Let's explore this in more detail. Imagine that we are developers and we are about to create a new protocol for communication across a network. First, we need to define the term protocol: A protocol is a set of guidelines or rules of communication. Some think of a protocol as a dialect of a language; this is erroneous. The British and the Americans both speak the same language: English. However, certain words differ in meaning between the two countries. The timing of the exchange of words between the two cultures can also lead to difficulties in complete understanding. A protocol, then, is more than just the words of computers. It also includes the timing and the same dictionary so that at any time, both computers using the same protocol have an exact, complete understanding of each other. Each layer has specific functions it is responsible for• All layers work together in the correct order to move data around a network figure (1).

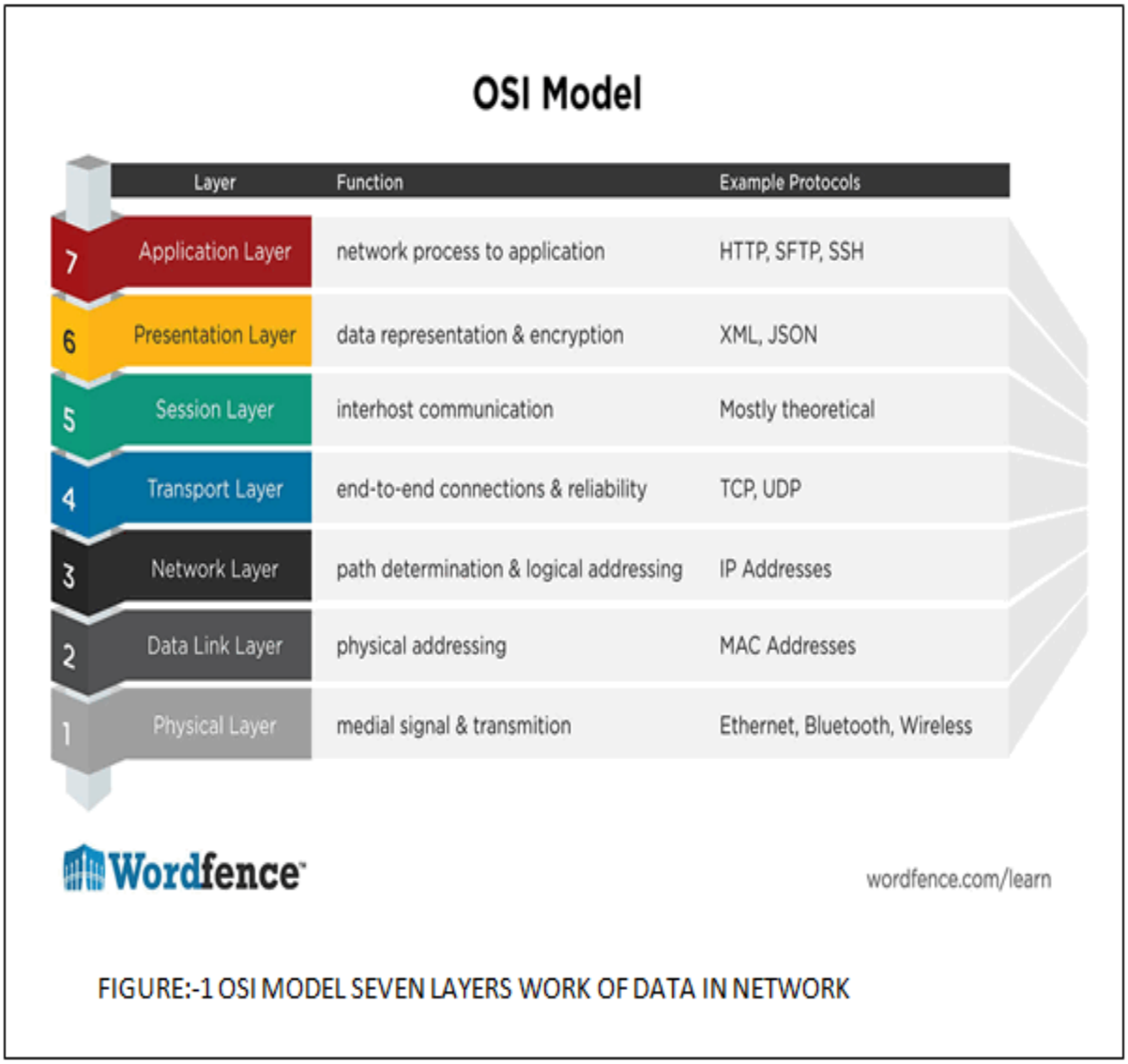



FIGURE:-1 OSI MODEL SEVEN LAYERS WORK OF DATA IN NETWORK

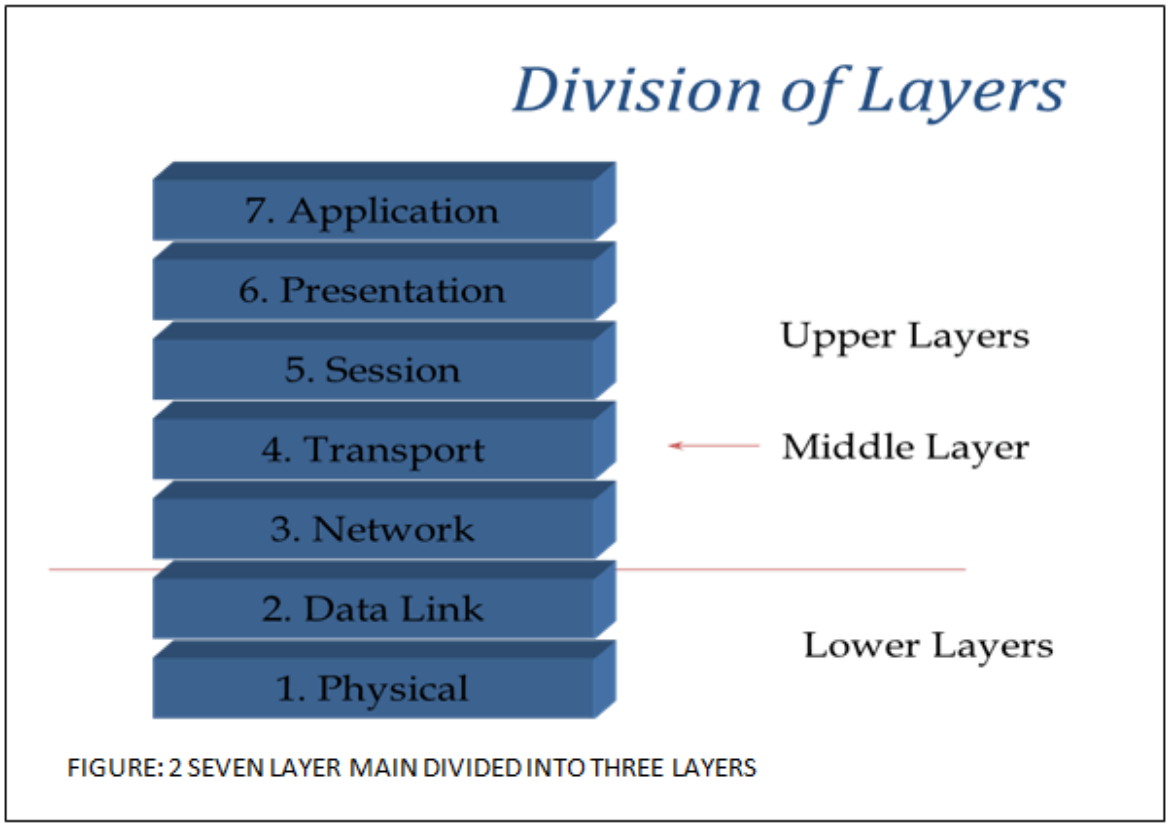



FIGURE: 2 SEVEN LAYER MAIN DIVIDED INTO THREE LAYERS

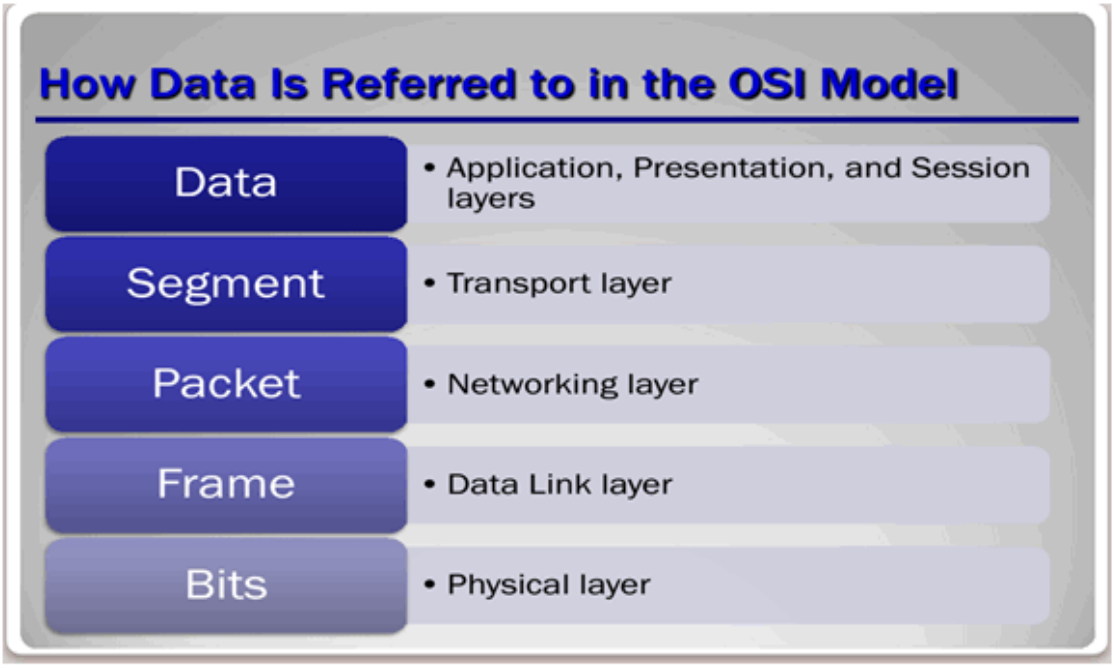



FIGURE: 3 OSI LAYERS MODEL REFER INTO DATA FOR NETWORK

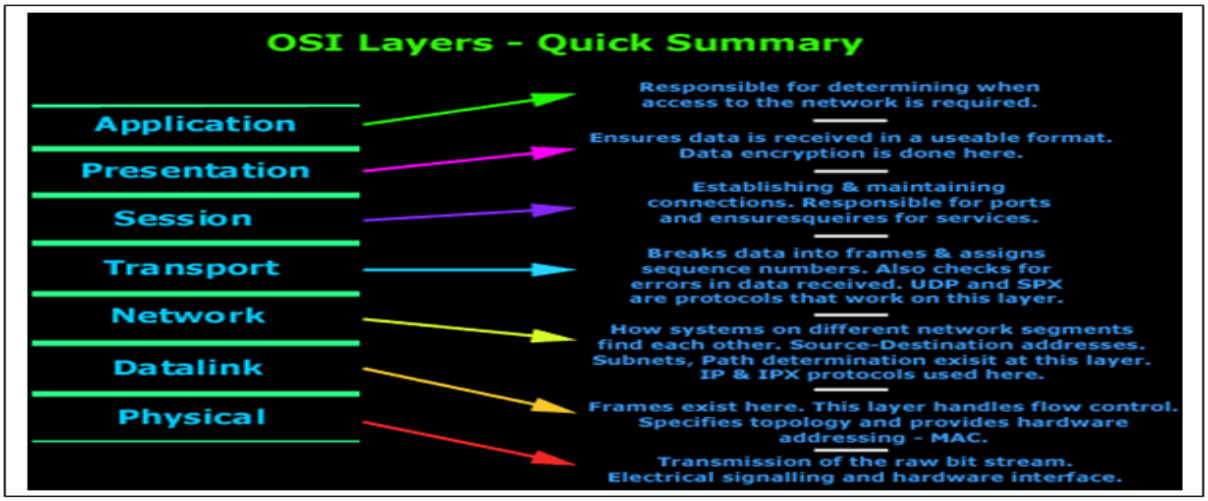
In this diagram figure 3 osi layer referred on different type of (bits, frame, packet, segment, data) . following importance of points are: The representation of information in Layer 6The flow of communications (contents and form) in Layer 5The completeness of the information and the security of transport in Layer 4 The way information should be transferred through the network in Layer 3 The security of transmission in Layer 2 The physical medium in Layer 1.

## LITERATURE SURVEY

OSI is a standard description or a reference model for defining how messages should be transmitted between any two points in a telecommunication network. Kayri et al., [1] proposed that, possible troubles on the related layer vary and possible troubles on each layer are categorized for functional network administration and they are standardized in an eligible way. Zimmermann et al., [2] proposed a model for architecture for Opens Systems Interconnection developed by SC16. In it he gave some indications on initial sets of protocols which now have been developed in OSI reference model. Scheidell et al., [3] proposed a theory which seeks to help the reader understand how the traditional OSI model applies to security, realize that three additional layers exert a powerful influence over security programs and decisions, and leverage tips for navigating OSI Layers 8, 9 and 10 to become more effective security professionals. Aschenbrenner et al., [4] briefly defined what OS1 is, the interrelationships of the various standards bodies, and the goals and benefits to users, vendors, country post telephone and telegraph bodies, common carriers, and governments. It should be noted that the same principle of restricted visibility is used in any manufacturer's network architecture in order to permit interaction of systems with different structures within the same network. These considerations lead SC16 to prefer the term of "Open Systems Interconnection Architecture" (OSIA) to the term of "Open System Architecture" which had been used previously and was felt to be possibly misleading. However, for unclear reasons, SC16 finally selected the title "Reference Model of Open Systems Interconnection" to refer to this Interconnection Architecture. The next section presents a description of OSI layering and principles of ISO for the seven layers of OSI Architecture followed by a brief explanation of how the layers were chosen. There after seven layers of OSI architecture and conclusion are presented in the subsequent sections, followed by an acknowledgement section and a summary of references for this manuscript.

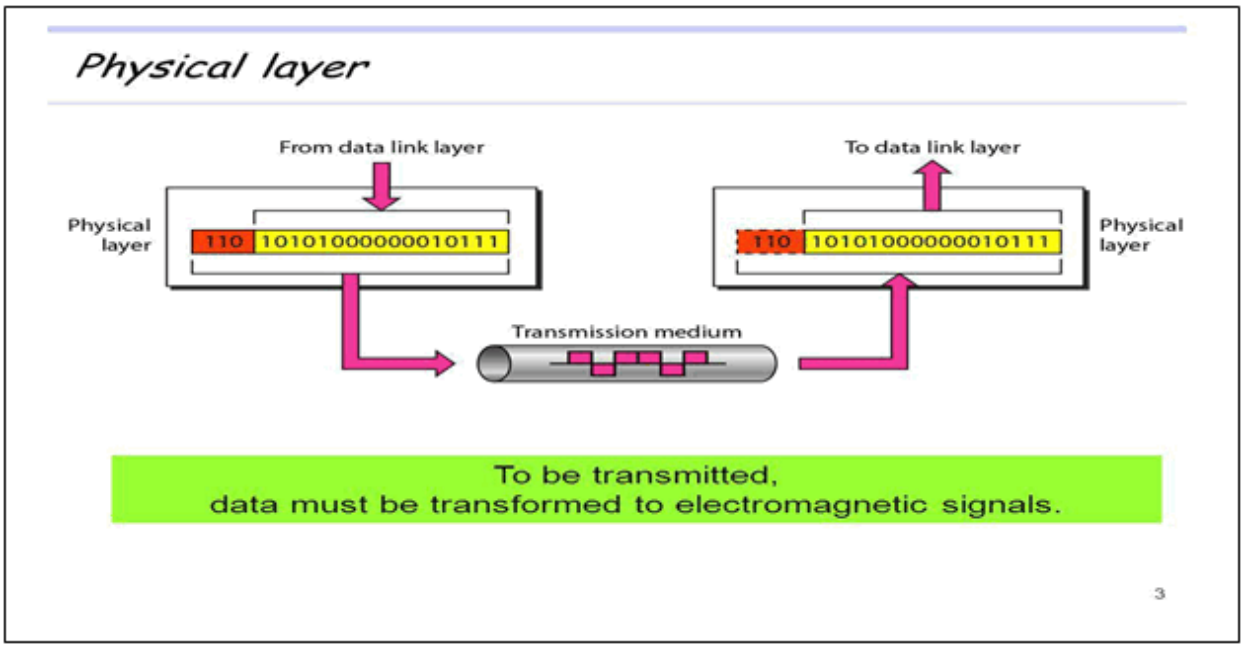
## METHODOLOGY USED

According to OSI document [ISO7498], the purpose of OSI is as follows:– "The purpose of this International Standard Reference Model of Open Systems Interconnection is to provide a common basis for the coordination of standards development for the purpose of system inter-connection, while allowing existing standards to be placed into perspective within the overall Reference Model



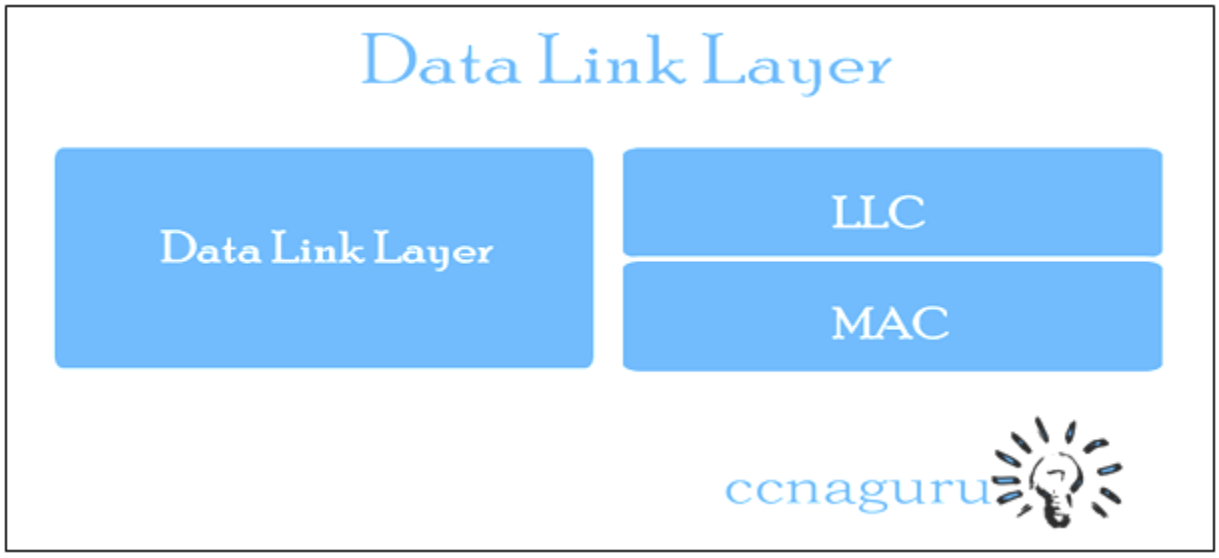
## PHYSICAL LAYER

This is lowermost layer of the OSI model. It provides the electrical and mechanical interface to the network medium (cable). This layer consists of simply the wire or media by which the network signals are conducted. Physical layer includes hardware (wire, plugs and sockets etc). In other words, this layer represent the physical aspects of the network such as cable and connectors. The basic functions of this layer are handles voltages, electrical pulses, connectors and switches so that data can be transmitted from one network device to another on figure(4).



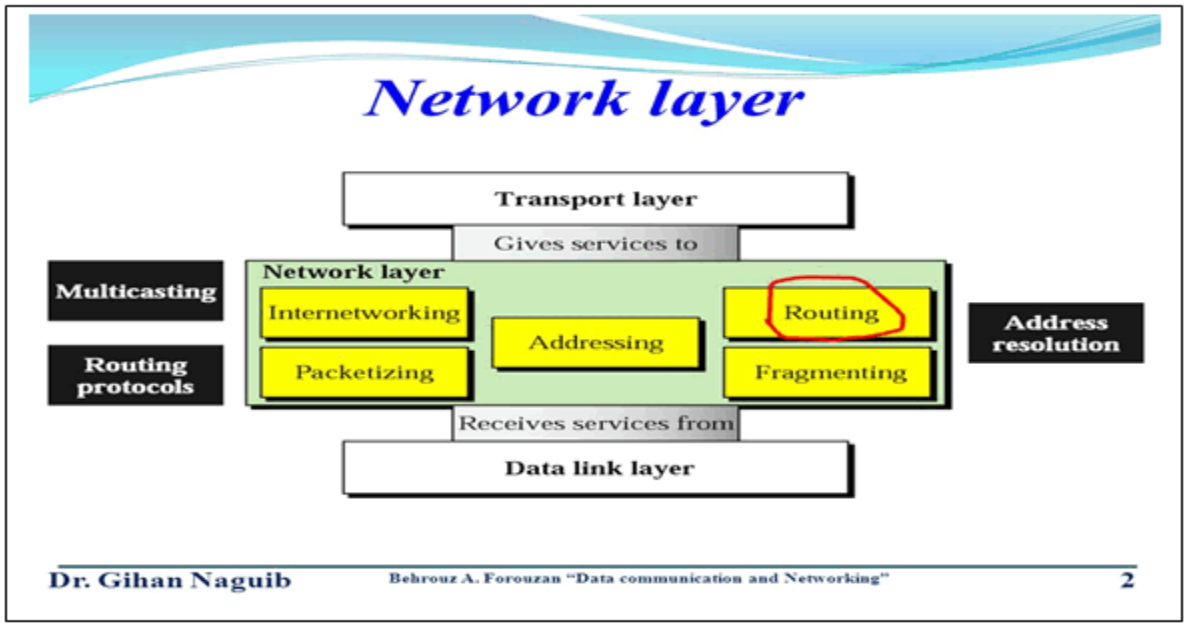

## DATA-LINK LAYER

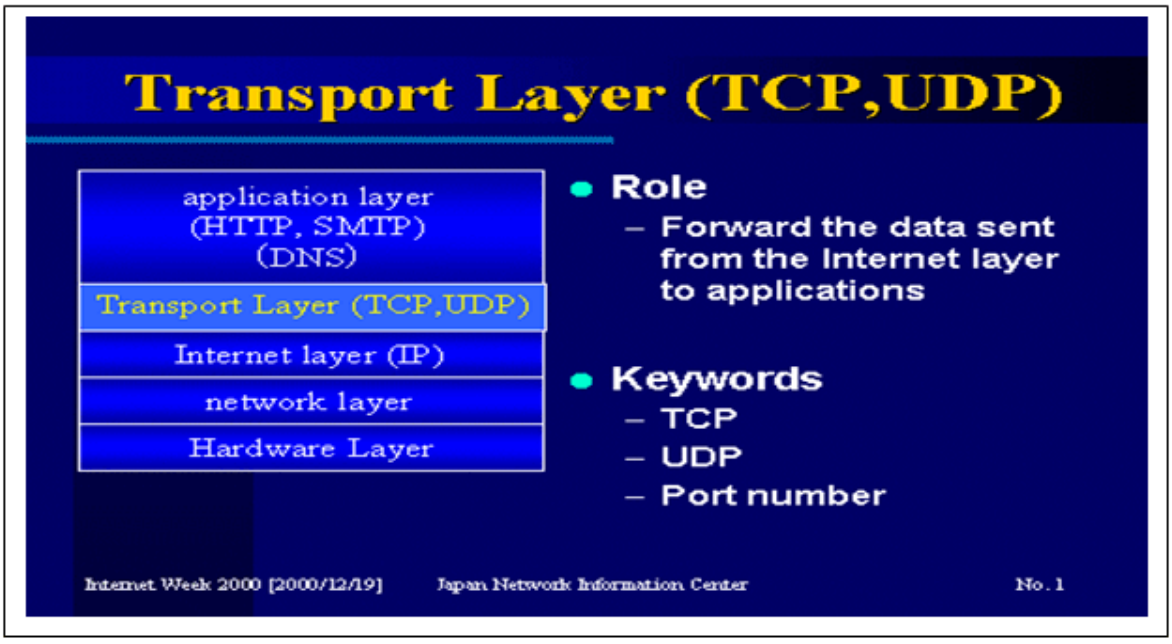
This is the second layer of OSI model. The data link layer is responsible for getting the data packaged from the physical layer. The data link layer is often subdivided into two parts Logical Link Control (LLC) and Medium Access Control (MAC).The main function of this layer are handles the physical transfer, farming ( the assembly of data into a single unit or block), flow control and error-control Functions over a single transmission link. The data link layer provides the network layer.To view figure (layer 5).



## NETWORK LAYER

It is the third layer of OSI model. This layer establishes the route between the sending and receiving stations. It handles the routing of data (sending in the right direction to the right destination on outgoing transmissions and receiving incoming transmission at the packet). The layer does routing & forwarding of data. In this layer use the Internet protocol (IP). Transport Layer It is forth layer of OSI model. It is responsible for constructing stream of data packets, sending and checking for correct delivery. Figure (6).This layer manages the end to end control (for example determining whether all packets have arrived) and error checking. The transport layer ensures data is successfully sent and received between two nodes. If data is sent incorrectly, this layer has the responsibility to ask for retransmission of the data. Especially it provides a reliable network independent message interchange service to the application group. This layer acts as an interface between the bottom and top three layers. In this layer use of TCP & UDP (User Datagram Protocol).



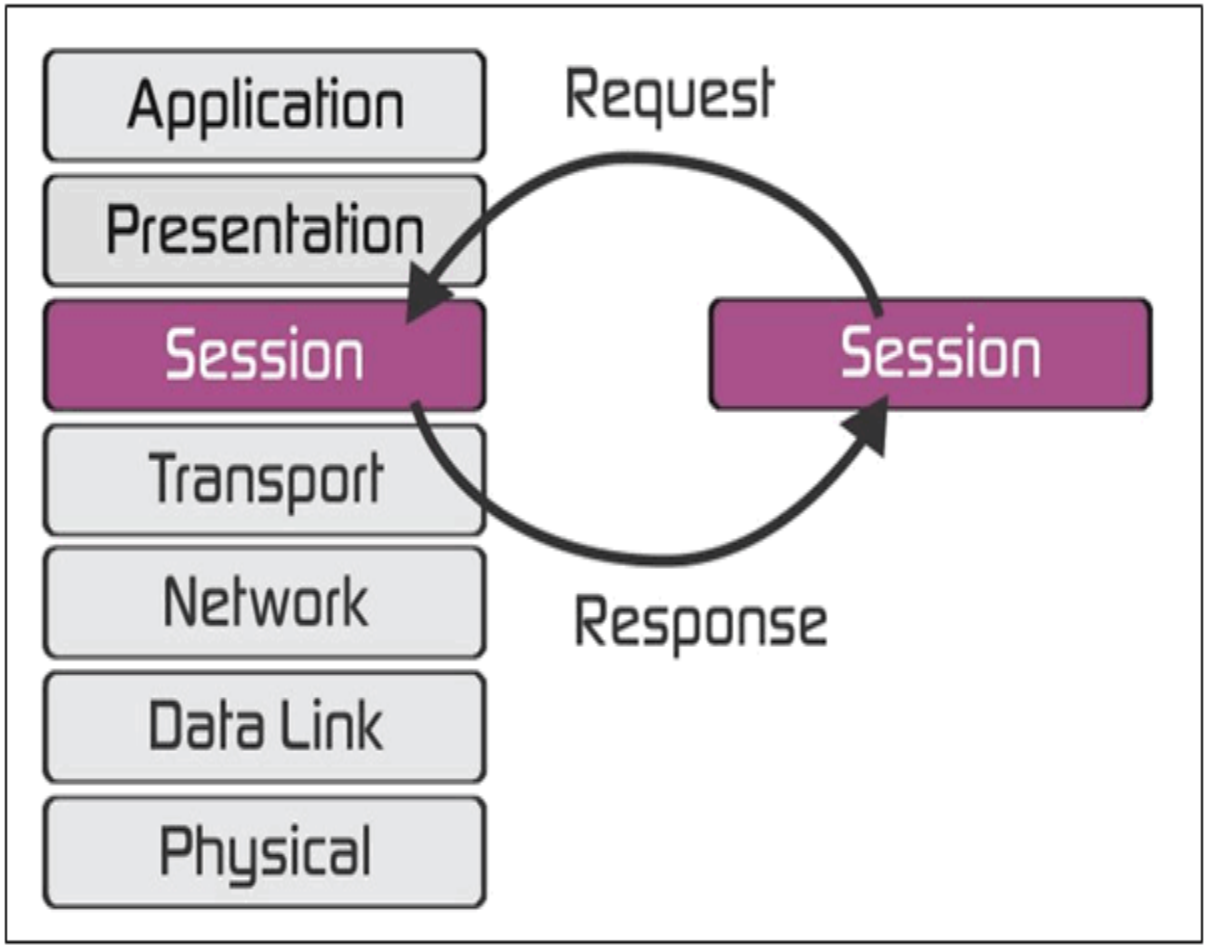



## TRANSPORT LAYER

It is forth layer of OSI model. It is responsible for constructing stream of data packets, sending and checking for correct delivery. This layer manages the end to end control (for example determining whether all packets have arrived) and error checking. The transport layer ensures data is successfully sent and received between two nodes. If data is sent incorrectly, this layer has the responsibility to ask for retransmission of the data. Especially it provides a reliable network independent message interchange service to the application group. This layer acts as an interface between the bottoms and top three layers. In this layer use of TCP & UDP (User Datagram Protocol. on figure (7).

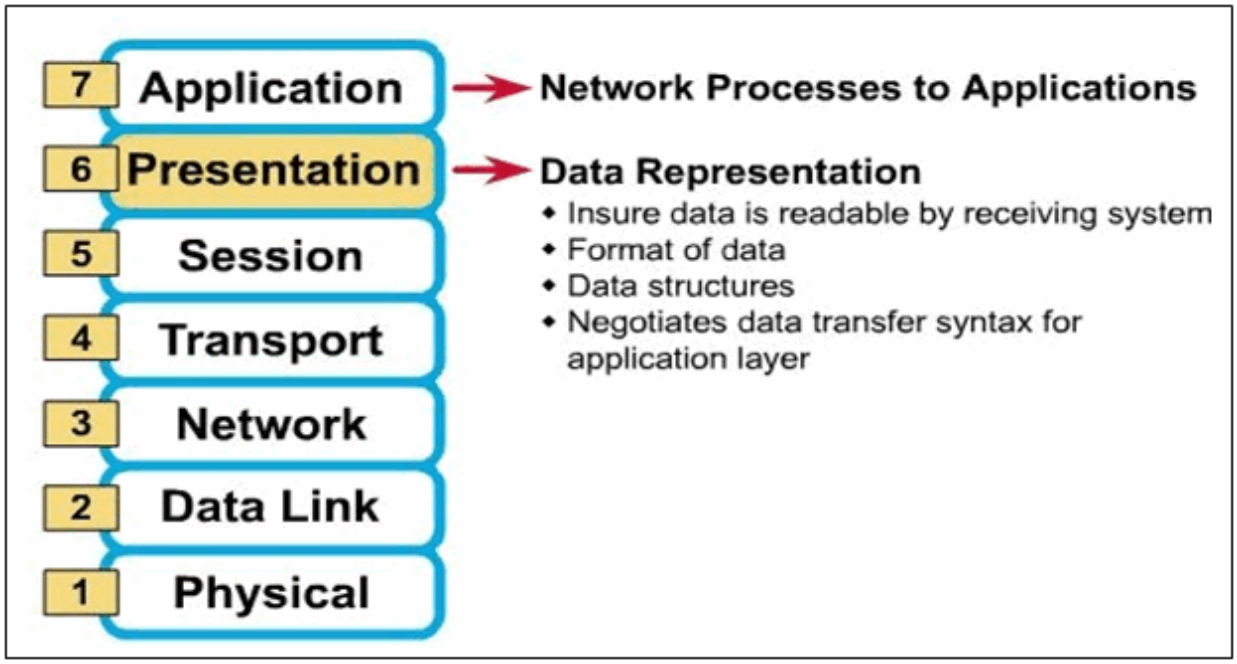
## SESSION LAYER

This is the fifth layer of OSI. It sets up and clear communication channels between two communicating component. The session layer decides when to turn communication on and off between two computers- it provides the mechanisms that control the data exchange process and coordinates the interaction between them. It provides coordination of the communication in an ordering manner. It determines one way and two way communications and manage the dialogue between both parties. In this layer uses of POP, TCP/IP protocols.to watch on this figure (8).




## PRESENTATION LAYER

This is the sixth or second last layer of OSI model. This layer defines how the system provides files and services in a uniform way to application. This layer can in some ways be considered the function of the operating system. When data is transmitted between different types of computer systems, the presentation layer negotiates and manages the way data is represented and encoded. In this layer POP, SMTP, FTP protocols are use figure (9).




## APPLICATION LAYER

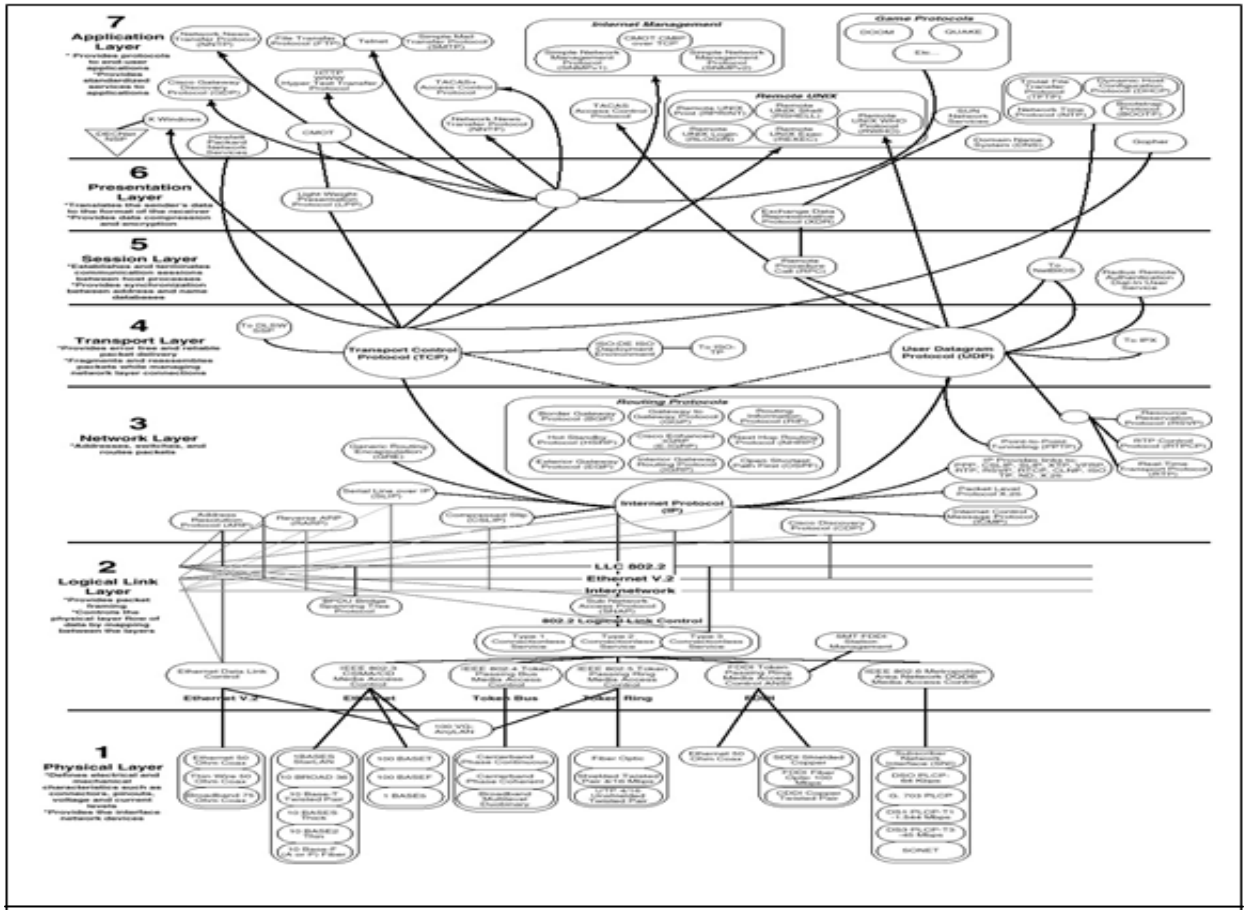
This is topmost or last layer of OSI model. This layer defines the languages that programs use to communicate with other programs. Common functions of this layer are opening, closing, reading and writing files, transferring files and e-mail message, executing remote jobs and obtaining directory information about network resources. It provides the interface between the software running in a computer and the network.In this layer provides functions to users software, including E-mail, web application, File Transfer Access and Management (FTAM), Directory services, network management on this figure (10).

## EXPERIMENTAL RESULT

Benefits of the osi model "BY separating the network communications into logical smaller pieces, the OSI model simplifies how network protocols are designed. The OSI model was designed to ensure different types of equipment (such as network adapters, hubs, and routers) would all be compatible even if built by different manufacturers." The OSI model has many benefits which include: a. Compatibility: The OSI model can fit to any compatible software/hardware from different users in other parts of the world. As software/hardware differs among various users so OSI is a model that is compatible to all. b. Easy Troubleshooting: Since each layer in an OSI is independent of each other so it makes it easier to detect and solve all errors prevailing in it. Easy Understanding Nature: OSI model is very interactive and even guides us to know what a model is, how it operates, and common Methodologies, how new technologies are developed in existing networks.. Security: OSI model have functionality for Encryption and Decryption which has a major.

## ADVANTAGES OF OSI MODEL

Reduces complexity: It breaks network communication process into smaller and simpler components, thus aiding component development, design, and troubleshooting. Standardizes interfaces: It standardizes network components to allow multiple vendor development and support. Facilitates modular engineering: It allows different types of network hardware and software to communicate with each other Interoperability between Vendors: It allows multiple vendor development through standardization of network components. Ensures interoperable technology: It prevents changes in one layer from affecting the other layers, allowing for quicker development. Accelerates evolution: It provides for effective updates and improvements to individual components without affecting other components or having to rewrite the entire protocol. Simplifies teaching and learning: It breaks network communication into smaller components to make learning easier. In this figure (11) osi layer working of network.



## DISADVANTAGES OF OSI MODEL

1. Many LANs are powerful (high speed) and has low error rates, so no need of the data integrity provided by OSI.
2. Many LAN applications need very fast setup with each other but comparatively it is slow.
3. The OSI model is too complex. Whereas, at the implementation level, TCP/IP is much more optimized and effective.
4. OSI model is not adapted at all to telecommunication applications on computer.
5. Due to the complexity of the model, the first implementations were pretty heavy and slow.

## CONCLUSION

In this paper we have tried to explain what exactly an OSI reference model is, why it is used and contribution of various researchers in this reference. OSI is basically an architecture which only gives us an idea how packets transfer over the network during any communication. OSI enhancements are done time to time for developing new technologies. Proposed seven different layers in his paper for improvising security in any network. Future implementation in OSI will lead to enhancement in security and many other fields.

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## BIOGRAPHY

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