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DATE OF PERFORMANCE: 12-01-2022 DATE OF SUBMISSION: 13-01-2022

Experiment No. 1

Aim: To study TCP IP and OSI model theory.

Theory:

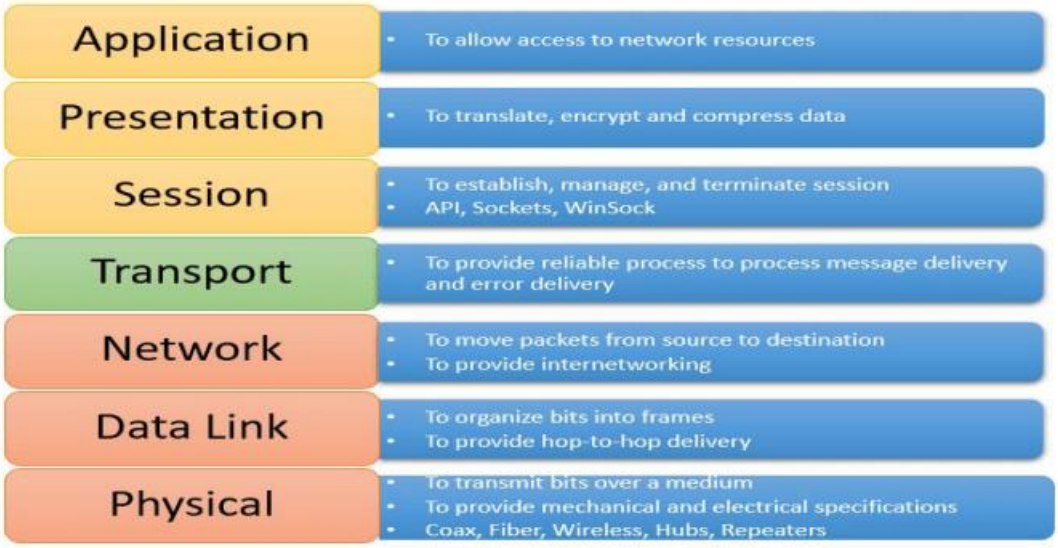
OSI:

The OSI Model is a logical and conceptual model that defines network communication used by systems open to interconnection and communication with other systems. The Open System Interconnection (OSI Model) also defines a logical network and effectively describes computer packet transfer by using various layers of protocols.

Layer Structure:

OSI model is a layered server architecture system in which each layer is defined according to a specific function to perform. All these seven layers work collaboratively to transmit the data from one layer to another.

Network Layers Diagram:



TCP/IP:

TCP/IP helps you to determine how a specific computer should be connected to the internet and how data should be transmitted between them. It helps you to create a virtual network when multiple computer networks are connected together.
TCP/IP stands for Transmission Control Protocol/ Internet Protocol. It is specifically designed as a model to offer highly reliable and end-to-end byte stream over an unreliable internetwork.

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Comparison between TCP/IP and OSI:

OSI	TCP/IP
OSI represents **Open System Interconnection**.	TCP/IP model represents the Transmission Control Protocol / Internet Protocol.
OSI is a generic, protocol independent standard. It is acting as an interaction gateway between the network and the final-user.	TCP/IP model depends on standard protocols about which the computer network has created. It is a connection protocol that assigns the network of hosts over the internet.
The OSI model was developed first, and then protocols were created to fit the network architecture's needs.	The protocols were created first and then built the TCP/IP model.
It provides quality services.	It does not provide quality services.
The OSI model represents defines administration, interfaces and conventions. It describes clearly which layer provides services.	It does not mention the services, interfaces, and protocols.
The protocols of the OSI model are better unseen and can be returned with another appropriate protocol quickly.	The TCP/IP model protocols are not hidden, and we cannot fit a new protocol stack in it.
It is difficult as distinguished to TCP/IP.	It is simpler than OSI.
It provides both connection and connectionless oriented transmission in the network layer; however, only connection-oriented transmission in the transport layer.	It provides connectionless transmission in the network layer and supports connecting and connectionless-oriented transmission in the transport layer.
It uses a horizontal approach.	It uses a vertical approach.
The smallest size of the OSI header is 5 bytes.	The smallest size of the TCP/IP header is 20 bytes.

OSI	TCP/IP
Protocols are unknown in the OSI model and are returned while the technology modifies.	In TCP/IP, returning protocol is not difficult.

Protocols supported at different levels:

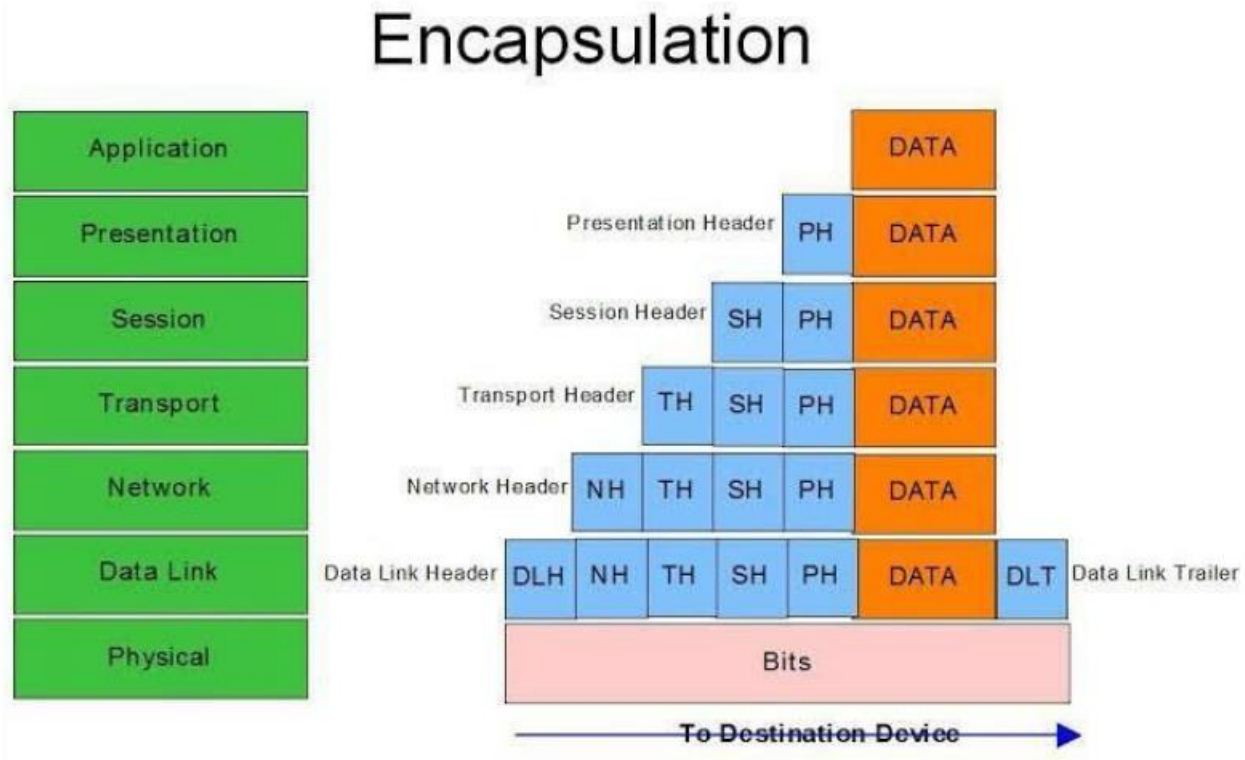
OSI Ref. Layer No.	OSI Layer Equivalent	TCP/IP Layer	TCP/IP Protocol Examples
5,6,7	Application, session, presentation	Application	NFS, NIS+, DNS, `telnet`, `ftp`, `rlogin`, `rsh`, `rcp`, RIP, RDISC, SNMP, and others
4	Transport	Transport	TCP, UDP
3	Network	Internet	IP, ARP, ICMP
2	Data link	Data link	PPP, IEEE 802.2
1	Physical	Physical network	Ethernet (IEEE 802.3) Token Ring, RS-232, others

Encapsulation:

In computer networking, encapsulation is a method of designing modular communication protocols in which logically separate functions in the network are abstracted from their underlying structures by inclusion or information hiding within higher level objects. The physical layer is responsible for physical transmission of the data, link encapsulation allows local area networking, Internet Protocol (IP) provides global addressing of individual computers, and Transmission Control Protocol (TCP) selects the process or application, i.e. the port which specifies the service such as a Web or TFTP server. During encapsulation, each layer builds a protocol data unit (PDU) by adding a header (and sometimes trailer) containing control information to the SDU from the layer above. Forexample, in the Internet protocol suite, the contents of a web page are encapsulated with an HTTP header, then by a TCP header, an IP header, and, finally, by a frame header and trailer. The frame is forwarded to the destination node as a stream of bits, where it is decapsulated (or de-encapsulated) into the respective PDUs and interpreted at each layer by the receiving node. The result of encapsulation is that each lower layer provides a service to the layer or

layers above it, while at the same time each layer communicates with its corresponding layer on the receiving node.

These are known as adjacent-layer interaction and same-layer interaction, respectively. In discussions of encapsulation, the more abstract layer is often called the upper layer protocol while the more specific layer is called the lower layer protocol. Sometimes, however, the terms upper layer protocols and lower layer protocols are used to describe the layers above and below IP, respectively. Encapsulation is a characteristic feature of most networking models, including both the OSI model and TCP/IP suite of protocols.



Conclusion:

Hence, we studied about TCP IP and OSI model theory.