1885 SMI UNIVERSITY

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Assignment

Open System Interconnection

OSI LAYERS				
Layers Name	**#**	**Layer Responsibility / Functions**	**Central Devices**	**Protocol Used**
Physical	1	It is the last layer of the model responsible for preparing physical devices in the network for data acceptance. It can also terminate the connection between two nodes of a network. ***Key Function:*** **1. It enables bit synchronization using a clock that controls both sender and receiver.** **2. It also controls the transmission rate or several bits sent per second.** **3. This layer decides the ideal topology type for node arrangement in a network.** **4. It decides the transmission mode between the devices. The physical consist of – Hub, Repeater, Modem, and Cables.**	Hub, NIC, Cable, Wireless	**CAT5 is a twisted pair cable for carrying signals. This type of cable is used in structured cabling for computer networks such as Ethernet.** **RJ45 Connectors**
Data Link	2	This layer allows access to get the data by breaking it into frames for easier analysis. This ensures that data is error-free and reaches the next layer in time. It sends data in the form of packets. It has two sub layers **Logical Link Control (LLC) Media Access Control (MAC).** **Key Function:** **1. It frames the data in a way that is meaningful to the receiver using special bit patterns.** **2. It adds physical addresses of both sender and receiver in every frame.** **3. This layer controls error by detecting and retransmitting frames.** **4. Network Interface Card handles this layer using devices like switch & bridge.**	Switch, Bridge, Access Point	**Point-to-Point Protocol (PPP) is a TCP/IP protocol that is used to connect one computer system to another. Computers use PPP to communicate over the telephone network or the Internet. A PPP connection exists when two systems physically connect through a telephone line. You can use PPP to connect one system to another.** **LCP, Wi-Fi, Ethernet**
Network	3	It is the network controller layer responsible for transferring data from one node to another in a network. Every node has a unique address and this layer reads them to send data to the correct destination. It sends data in packet form while later connects after processing. **Key Function:** **1. It formulates a connection between different devices in a layer.**	Router	**IPV5, IPV6, ICMP &** **Routing Information Protocols (RIP) is implemented by in.routed, the routing daemon, which automatically starts when the machine boots. When run on a**

		2. It decides the ideal route for information transfer from source to destination. This process is known as routing.		**router with the s option specified, in.routed fills the kernel routing table with a route to every reachable network and advertises "reachability" through all network interfaces.**
		3. This layer follows an addressing scheme to find the correct IP address universally.		
		4. It breaks information into packets using internet protocol.		
Transport	4	The transport layer manages the delivery of packets and is the heart of the OSI model. It monitors the data, segmentation/desegmentation, and controls error. It follows two protocols **Transmission Control Protocol (TCP) User Datagram Protocol (UDP).**	Firewall	**UDP is a Transport Layer protocol. UDP is a part of the Internet Protocol suite, referred to as UDP/IP suite. Unlike TCP, it is an unreliable and connectionless protocol. So, there is no need to establish a connection prior to data transfer.** **TCP**
		Key Function:		
		1. It accepts data and breaks into smaller units while sending. And it reassembles the data while receiving.		
		2. It follows a service point address to deliver the message to the correct process.		
		3. This layer provides connection-oriented service by establishing a connection, transferring data, and terminating the process.		
		4. It also provides connectionless service by using data transfer. The receiver doesn't get an acknowledged receipt but the process is faster.		
Session	5	The number of computers in the network establishes a connection in this layer. It also takes care of establishing, managing, and terminating remote and local applications. They can also choose to terminate a complete session/transmission.	Gateway	**PAP is a password Authentication Protocol used by PPP links to validate users. PAP authentication requires the calling device to enter the username and password. If the credentials match with the local database of the called device or in the remote AAA database then it is allowed to access otherwise denied.** **NetBIOS**
		Key Function:		
		1. The layer can easily process the establishment, use, and termination of a connection.		
		2. It adds checkpoints as synchronization points into the data for identifying the error easily and avoiding data loss.		
		3. Two systems can also interact with each other in half-duplex or full-duplex.		
Presentation	6	This layer is responsible for converting data into semantics understood by an application. It formats the data by compression, encryption, etc.	-	**SSL provides security to the data that is transferred between web browser and server. SSL encrypts the link between a web server and a browser which ensures that all data passed between them remain private and free from attack.** **TLS**
		Key Function:		
		1. It allows the translation of operating languages. For example, translation of ASCII to EBCDIC.		
		2. This layer encrypts data into a code as ciphertext and decrypts data back into plain text. It is done by using a key value.		
		3. It compresses data and reduces bits needed for network transmission.		

Application	7	This is the layer where users interact with the data. The layer identifies communication partners that will allow data transmission for an application. Some of the applications are – Browsers, Messengers, etc.	-	**SMTP is an application layer protocol.** **The client who wants to send the mail opens a TCP connection to the SMTP server and then sends the mail across the connection.** **HTTP, FTP**
		<u>Key Function:</u>		
		1. File management by allowing users to access, retrieve and manage the files on a remote computer.		
		2. Allows users to go ahead with email forwarding and storage.		
		3. Provides distributed database sources and global information about several objects.		

References : **https://data-flair.training/blogs/osi-model-in-computer-network/**
https://en.wikiversity.org/