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**Detailed report on OSI and TCP/IP protocol**

OSI protocol

OSI protocol stands for **Open Systems Interconnection.** It is a conceptual model. It has been developed by ISO – **‘International Organization of Standardization‘.** OSI has 7 layer that has unique function to perform, they are

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| 1. Application layer |
| 1. Presentation layer |
| 1. Session layer |
| 1. Transport layer |
| 1. Network layer |
| 1. Data link layer |
| 1. Physical layer |

1. Physical Layer

This layer is physically involved in data transfer, such as cables and switches. The physical layer contains information in the form of**bits and is responsible for synchronization of bits.** This layer also looks after the line configuration and Bit rate control is done at the physical layer.

1. Data Link Layer

This layer is responsible for node to node data transfer also make sure data transfer is error-free from one node to another, over the physical layer. It also defines the protocol for flow control between them.

Data link is further divided into 2 layers

* Medium Access Layer(MAC)
* Logical Link Control (LLC)

When a single communication channel is shared by multiple devices, MAC sub-layer of data link layer helps to determine which device has control over the channel at a given time.

1. Network Layer

This layer determines which path to take from source to destination such that the path is shortest of all. This is called routing. It stores the IP address of sender and receiver to indentify the device individually.

1. Transport Layer

This layer is responsible for end-to-end transfer of data and also acknowledges the successful / unsuccessful transfer of the data. The transport layer creates segments out of the message received from the application layer. Segmentation is the process of dividing a long message into smaller messages. Segmentation is the process of dividing a long message into smaller messages.

The transport layer is also responsible for flow control as it determines speed of transmission to ensure that there is interrupt due to different speed of transmission between sender and receiver. It also performs error control by confirming data is fully received.

1. Session Layer

This layer controls the dialog control (connections) between the computers. It creates , manages and ends the connection as per requirement .

1. Presentation Layer

This layer performs njtranslation, encryption /decryption (security of data) and compression (reduce the size of data) .

1. Application Layer

This layer produces data that has to be transferred over the network and displays the received information to users.

Network virtual terminator, email services, FTAM, directory services other functions of the top layer of OSI protocol.

**TCP/IP**

TCP/IP stands for TCP – Transmission Control Protocol and IP – Inernet Protocol .This model is used in real world and it is not that different from OSI model. There are 4 layers in this protocol as mentioned below

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| 1. Application |
| 1. Transport |
| 1. Internet |
| 1. Link |

Widely used in many communication networks other than the internet.

1. Application Layer

This layer performs the functions of top three layers of the OSI model: Application, Presentation and Session Layer. It is responsible for node-to-node communication and controls user-interface specifications. Some of the protocols present in this layer are: HTTP, HTTPS, FTP, TFTP, Telnet, SSH, SMTP, SNMP, NTP, DNS, DHCP, NFS, X Window, LPD

1. Transport Layer

It is responsible for end-to-end communication and error-free data delivery. Protect top-layer applications from data complexity. It is known to provide reliable and error free communication between end systems. Performs sequencing and segmentation of data. It also has a recognition function and controls the data flow through the flow control mechanism. It is a very efficient protocol but has a lot of overhead due to these characteristics. Increased overhead costs lead to increased costs. However, it does not provide such functionality. It is the protocol of choice if your application does not require reliable transport because it is very cost effective. Unlike TCP, which is a connection-oriented protocol, UDP is connectionless.

1. Internet Layer

This layer parallels the functions of OSI’s Network layer. It defines the protocols which are responsible for logical transmission of data over the entire network. The main protocols residing at this layer are :

**IP –** stands for Internet Protocol and it is responsible for delivering packets from the source host to the destination host by looking at the IP addresses in the packet headers. IP has 2 versions:  
IPv4 and IPv6. IPv4 is the one that most of the websites are using currently. But IPv6 is growing as the number of IPv4 addresses are limited in number when compared to the number of users.

**ICMP –** stands for Internet Control Message Protocol. It is encapsulated within IP datagrams and is responsible for providing hosts with information about network problems.

**ARP –** stands for Address Resolution Protocol. Its job is to find the hardware address of a host from a known IP address. ARP has several types: Reverse ARP, Proxy ARP, Gratuitous ARP and Inverse ARP

1. Data Link Layer

This layer corresponds to the combination of Data Link Layer and Physical Layer of the OSI model. It looks out for hardware addressing and the protocols present in this layer allows for the physical transmission of data.  
We just talked about ARP being a protocol of Internet layer, but there is a conflict about declaring it as a protocol of Internet Layer or Network access layer. It is described as residing in layer 3, being encapsulated by layer 2 pr