OSI
Model

OSI

Open systems interconnection

- **OSI** *was developed by Standard organization* **ISO** *in the year of 1984 .*

- **OSI** *Model defines and is used to understand how data is transferred from one computer to another in a computer network.*

NOTE :

- **ISO**-*International Organization for Standardization .*

In order to accomplish a successful communication between computers or different networks ,
***7 layers of OSI Model** was introduced by ISO.*

Each layer in OSI Model is a packge of Protocols

7 layers of OSI Model

Application layer

Presentation layer

Session layer

Transport layer

Network layer

Data Link layer

Physical layer

Receiver

Sender

7 layers of OSI Model

Application layer

Presentation layer   } *Software layers*

Session layer

Transport layer → *Heart of OSI model*

Network layer

Data Link layer   } *Hardware layers*

Physical layer

Easy way to learn 7 layers of OSI Model

"Please Do Not Throw Sausage Pizza Away "

- *P*lease - Physical Layer

- *D*o   - Data Link Layer

- *N*ot   - Network Layer

- *T*hrow   - Transport Layer

- *S*ausage - Session Layer

- *P*izza   - Presentation Layer

- *A*way   - Application Layer

Let's understand each layers of OSI Model separately .

1 Physical layer

- *It is responsible for the actual physical connection between the devices.*

- *When receiving data, this layer will get the signal received and convert it into Binary format (0s and 1s).*

- *It will then send them to the Data Link layer, which will put the frame back together.*
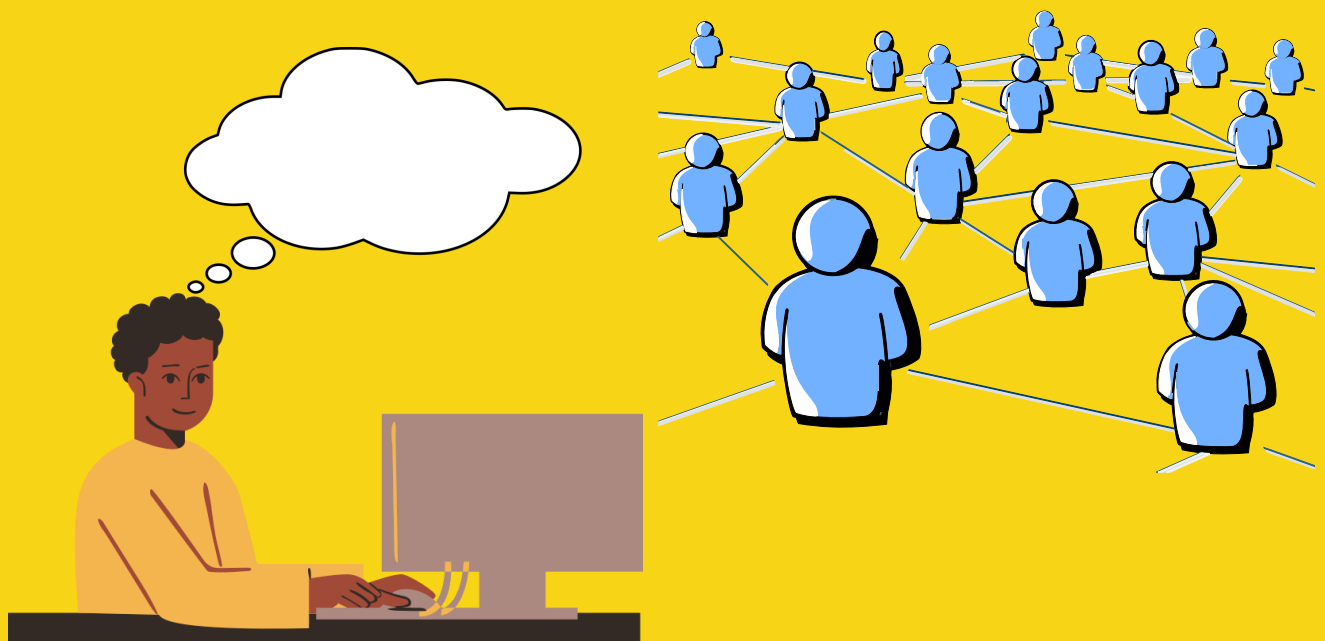
- The signal generated by physical layer depends on the type of media used to connect two devices .

- Hubs, Repeaters, Modem, Cables are examples Physical Layer devices.

2 **Data Link layer**

- *This is the second layer of OSI reference Model .*

It performs following functions:

- *Framing-* *Dividing the data received into manageable data frames and adding frame headers and trailers to the frames for transmission.*

- *Access Control -* *Managing access to the physical medium so that two devices do not transmit data simultaneously.*

- ***Physical addressing*** *of the data is also done at Data Link layer.*

- *Data Link layer also perform functions like* **Flow control** *and* ***Error control*** *.*

- *Switch and Bridge are examples Data Link Layer devices.*

3 Network layer

- *Network layer is the third layer of OSI reference model .*

- *It works for the transmission of the received data from one computer to another computer located in different networks.*

- *Networking devices such as Routers used for this purpose.*

The main functions of network layer :

- *Logical Addressing*
- *Routing*
- *Path Determination*
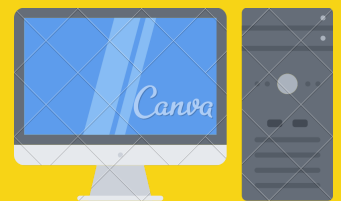
Logical addressing :

- *IP addressing done in Network layer is called Logical Addressing .*

Routing :

- *It is a method of moving data packets from Source to Destination.*

Path Determination :

- *Choosing the best possible path for data delivery from source to destination is called path determination as there are many ways.*

4 Transport layer

- *Transport layer is the fourth layer of the OSI Model .*

- *It is also called heart of OSI model.*

- *Transport layer controls the reliability of the communication through :*

  1. **Segmentation**
  2. **Flow control**
  3. **Error control**

Segmentation :

- *The data received is divided into small units called Segments .*

Flow control :

- *The transport layer controls the amount of data being transmitted at a moment of time.*

Error control :

- *Some data does not arrive at destination, The transport layer uses Automatic Repeat request Scheme to retransmit the lost or encrypted data .*

Transport layer protocols :

- ***TCP*** *: Transmission Control Protocol.*

- ***UDP*** *: User Datagram Protocol.*

5 **Session layer**

- ***Session layer*** *is the fifth layer of the OSI reference model .*

- *It helps in setting up and managing connections and Enabling sending and receiving of data.*

- ***Authentication*** *and* ***Authorization*** *both these functions are performed by* ***Session layer.***

- *Session layer keep track of file which are being downloaded.*

- *Session layer helps in session management.*

- *Our web browser performs all functions of session layer, Presentation layer and Application layer .*

- *Now data is transmitted to the next layer .*

- *Presentation layer is sixth layer of OSI reference Model.*

- *The Presentation Layer is responsible for formatting the data so that it can be presented to the Application Layer in a consistent, secure, and compatible manner.*

Some of the key functions of the Presentation Layer are:

1. **Data translation**
2. **Data compression**
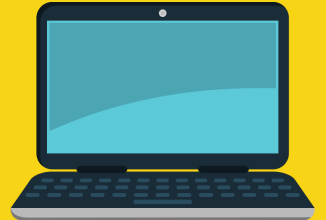3. **Data Encryption and Decryption**

- **Data Translation -** *Translating data from one format to another for compatibility between different systems.*

- **Data Compression -** *reduces the amount of space used to store the original file , and as the size reduces it can reach the destination in very less time.*

- *The bit reduction process is called data compression , and it can be lossy or lossless .*

- **Data Encryption -** *Converting plain text data into a secure and encrypted format for secure transmission across a network.*

- *To maintain the integrity of data before transmission , the data is encrypted.*

- *Encryption enhances the security of sensitive data.*

- *At sender side the data is **encrypted**.*

- *At receiver side data is **decrypted** .*

- ***SSL** (Secure Sockets Layer) is used for Encryption/Decryption.*
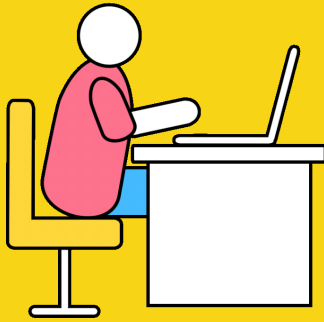
7 Application layer

- *This is the seventh layer in the OSI reference Model.*

- *It is used by Network application. Network application means Computer applications that use internet like Chrome, Firefox etc.*

- **Application layer** provides the interface through which we can transfer the data .

Some **Application layer** Protocols :

1. **TELNET**
2. **FTP**
3. **HTTP**
4. **DMTP**
5. **NNTP**

- *There are dozens of application layer protocols that enables various functions at this layer .*

- *All these protocols collectively form **application layer** .*

How data is passed through the layers ?

- *Physical layer receives the signals and convert them into binary format and pass it to the datalink layer as a frames.*

- *Frame is further Decapsulated, as data moves through higher layers.*

- *When it reaches presentation layer binary format data is converted into numbers and characters. And finally the data is moved to the Application layer.*

- *Application layer Protocols makes the sender's message Visible in the Receiver's computer screen .*

- *In this way , OSI Model helps in data Transfer .*

In Other words -

- *In the OSI model, data is transferred from one layer to another through a process known as protocol data unit (PDU) encapsulation.*

- *The PDU is a unit of data that is specific to each layer, and each layer adds its own header and/or trailer to the data as it is passed down the stack. This process is called encapsulation.*

- *The resulting PDU with added header/trailer becomes the data that the next lower layer processes.*

- *When data is transmitted, it is passed down the layers of the sender's OSI stack, with each layer adding its own header/trailer to the PDU.*

- *Once the data reaches the Physical Layer, it is transmitted across the communication medium to the receiving device, where it is passed up the layers of the receiver's OSI stack.*

- *As the data moves up the stack, each layer removes the corresponding header/trailer that was added by the sender, until the original data is delivered to the application layer of the receiver.*

This is how data is passed from one layer to other layer in OSI Model.

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THE
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