**TCP/IP MODEL**

This is the same as **Transmission Control Protocol.**

This is the set of communications protocols used in the internet and similar computer networks.

It contains Four layers:

1. Application Layer
2. Transport Layer
3. Internet Layer
4. Network Access

**NETWORK ACCESS**

It corresponds to the combination of the Data Link Layer and Physical Layer of the OSI model. It looks out of hardware addressing and the protocols present in this layer allows for the physical transmission of data.

**INTERNET LAYER**

This layer corresponds to the Network layer of the OSI model. It defines the protocols which are responsible for logical transmission of data over the entire network. The main Protocols in this Layer include:

1. **INTERNET PROTOCOL (IP)-** It is responsible for delivering packets from the source host to the destination host by looking at the IP addresses in the packet headers.
2. **INTERNET CONTROL MESSAGE PROTOCOL(ICMP)-** It is encapsulated within IP diagrams and is responsible for providing host with information about network problems.
3. **ADDRESS RESOLUTION PROTOCOL-** It is responsible to find hardware address of a host from a known IP address. It type are: Reverse ARP, Proxy ARP, Gratuitous ARP and Inverse ARP.

**TRNSPORT LAYER**

It corresponds to the transport layer in OSI model. It is responsible for end-to-end communication and error free delivery of data. The protocols in this layer include:

1. **Transmission control protocol (TCP)-** It is known to provide reliable error free communication between end systems.
2. **User datagram protocol(UDP)-** It is the go to protocol if your application does not require any reliable transport as it is very cost effective.

**APPLICATION LAYER**

It corresponds to the Application, Presentation and Session Layer. It is responsible for node to node communication and controls user-interface specifications. It uses the following protocols:

1. **HTTP and HTTPS-** Hypertext transfer protocol(HTTP) is used by World Wide Web to manage communications between Web browsers and servers. HTTPS is efficient in cases where the browser need to fill forms, sign in and carry out bank transactions. The following are its functions
2. **SSH-** Secure shell(SSH) It sets up a secure session over a TCP/IP connection.
3. **NTP-**Network Time Protocol(NTP) It is used to synchronize the clocks on your computer to one standard time source.

**OSI MODEL (OPEN SYSTEM INTERCONNECTION MODEL)**

This is a conceptual framework use to describe the functions of a networking system. It contains the following layers:

1. **PHYSICAL LAYER**

It is the lowest layer in OSI model. It is responsible for the actual physical connection between devices. The physical layer contains information inform of bits. It is responsible for transmitting individual bits from one node to the next. The following are the functions of this physical layer:

1. **Bit synchronization**
2. **Bit rate control**
3. **Physical topologies**
4. **Transmission mode**
5. **DATA LINK LAYER**

It is responsible for node to node delivery of the message. It makes sure that data being transmitted is error free. This layer is divided into two sublayers:

1. **Logical Link Control (LLC)**
2. **Media Access Control (MAC)**

It use the ARP Protocol to know the receiver’s address. The following are its Functions:

1. **Framing**
2. **Physical addressing**
3. **Error control**
4. **Flow control**
5. **Access control**
6. **Network layer**

It is used for transmission of data from one host to other located in different networks. It has the following functions:

1. **Routing**
2. **Logical Addressing**
3. **Transport layer**

It provides services to the application layer and takes services to the Network layer. The data is transferred inform of segments. It is responsible for the End to End Delivery of the complete message. It has the following functions:

1. **Segmentation and Reassembly**
2. **Service Point Addressing**
3. **SESSION LAYER**

The layer is responsible for the establishment of connection, Maintenance of sessions, authentication and ensures security. It has the following functions:

1. **Session establishment, maintenance and termination**
2. **Synchronization**
3. **PRESENTATION LAYER/TRANSLATION LAYER**

The data from application layer is extracted here and manipulated as per the required format to transmit over the network. It has the following functions:

1. **Translation**
2. **Encryption/decryption**
3. **Compression**
4. **APPLICATION LAYER**

It is at the top of the OSI model. This layer serves as the window for the application services to access the network and for displaying the received information to the user. It has the following functions:

1. **Network Virtual Terminal**
2. **File transfer access and management(FTAM)**
3. **Mail services**
4. **Directory services**

Physical Layer

Application Layer

Data Link Layer

Network Layer

Transport Layer

Session Layer

Presentation Layer

SOFTWARE LAYERS HARDWARE LAYERS

Heart of OSI

**Differences between OSI and TCP/IP MODEL**

|  |  |
| --- | --- |
| **OSI** | **TCP/IP** |
| It refers to Open System Interconnection | It refers to Transmission Control Protocol |
| Has 7 Layers | Has 4 Layers |
| Is less reliable | Is more reliable |
| Has strict boundaries | Does not have very strict boundaries |
| Uses different session and presentation layers | Uses both session and Presentation layer in the application layer itself |
| Transport layer provides assurance delivery of packets | Transport layer provides assurance delivery of packets |
| Protocols are better covered and is easy to replace with the change in Technology | Protocols cannot be replaced easily |