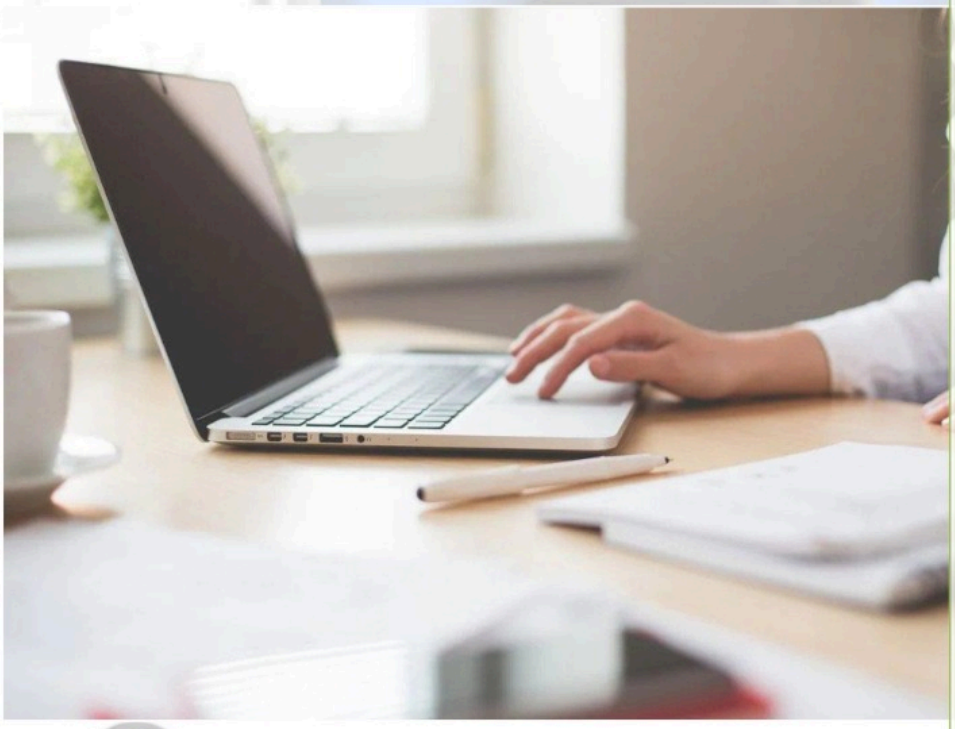
CRYPTUS CYBER
SECURITY PVT. LTD.



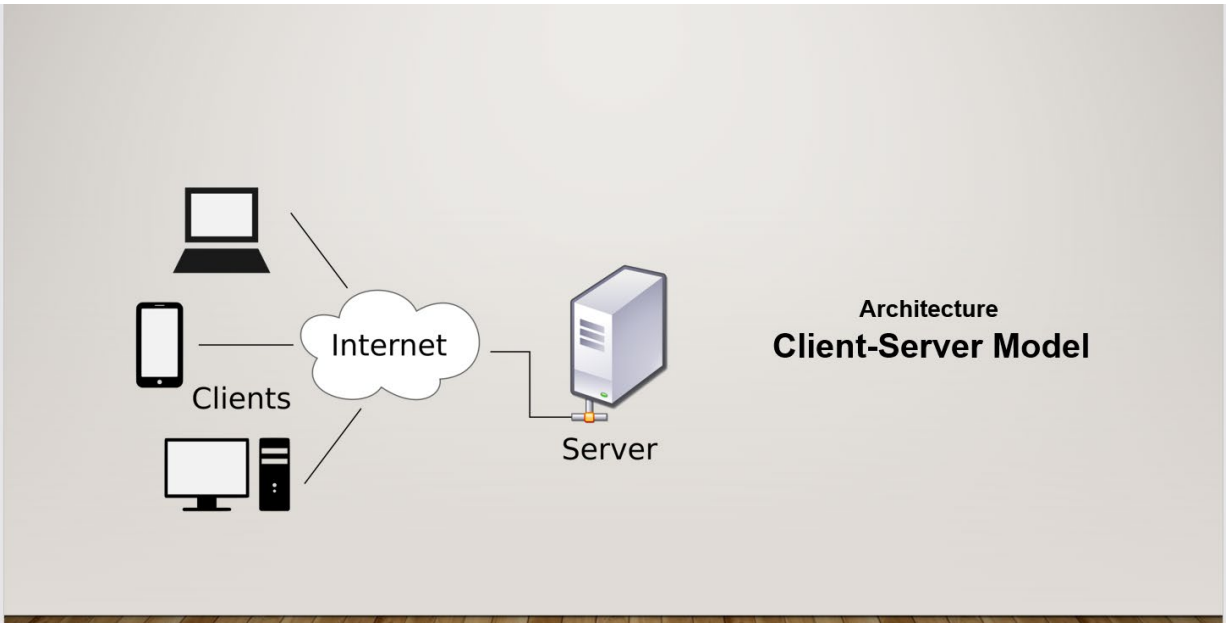
Network?

A network consists of two or more computers that are linked in order to share resources, exchange files or communication. The computers on a network may be linked through cables, telephone lines, radio waves, satellites, or infrared light beams.

Networking?

Networking, also known as computer networking, is the practice of transporting and exchanging data or information & having communication between connected nodes over a shared medium.

Client-Server Model:-



{How do web applications work}

Step 1: the user accesses a web application via a web browser or mobile application, triggering a request to a web server over the internet. Note that there may be security measure (i.e. firewalls or cloud access security broker) and load balances.

Step 2: the web server forwards the request to the web application server. The web application server performs the requested task – such as querying the database task – such as querying the database or processing the data – then generates the result of the request data.

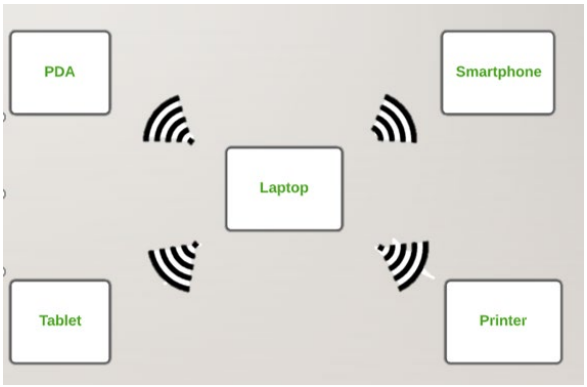
Step 3:the web application server sends the results back to the web server.

Step 4:the web sever delivers the requested information to the client (desktop , mobile device, tablet, etc.) and the information appears on the users display.

Basic Type Of Networking

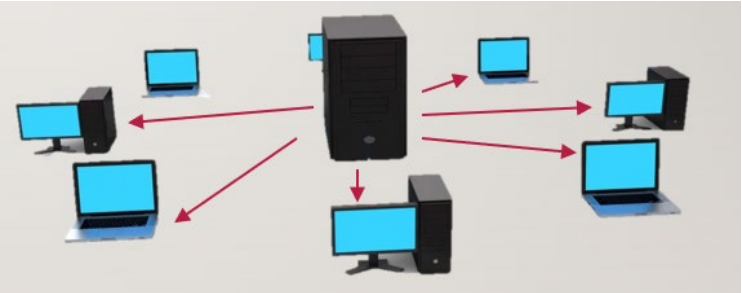
1. Personal Area Network (PAN)

PAN is the most basic type of computer network. This network is restrained to a single person, PAN offers a network range of 10 meters from a person to the device providing communication.



2. Local Area Network (LAN)

LAN is the most frequently used network. A LAN is a computer network that connects computers together through a common communication path, contained within a limited area, A LAN encompasses two or more computers connected over a server. The two important technologies involved in this network are Ethernet and Wi-fi.



3. Wide Area Network (WAN)

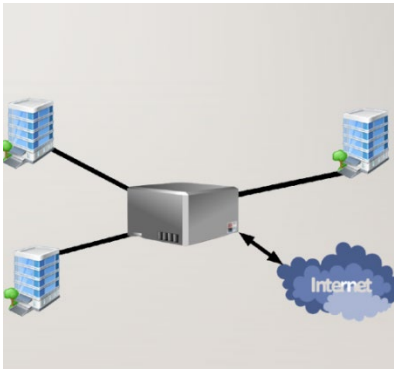
WAN is a type of computer network that connects computers over a large geographical distance through a shared communication path. It is not restrained to a single location but extends over many locations. WAN can also be defined as a group of local area networks that communicate with each other.

4. Wireless Local Area Network (WLAN)

WLAN is a type of computer network that acts as a local area network but makes use of wireless network technology like Wi-Fi. This network doesn't allow devices communicating over physical cables like in LAN, but allows devices to communicate wirelessly.

5. Campus Area Network (CAN)

CAN is bigger than a LAN but smaller than a MAN. This is a type of computer network which is usually used in places like a school or college. This network covers a limited geographical area that is, it spreads across several buildings within the campus.

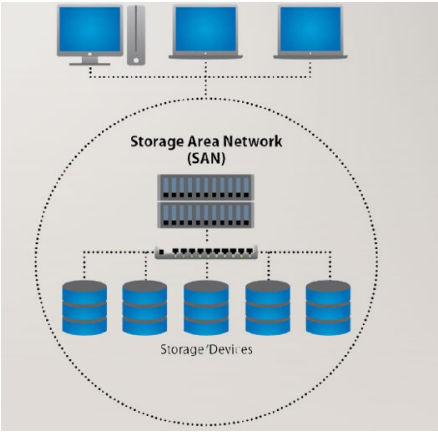


6. Metropolitan Area Network (MAN)

A MAN is larger than a LAN but smaller than a WAN. This is the type of computer network that connects computers over a geographical distance through a shared communication path over a city, town or metropolitan area.

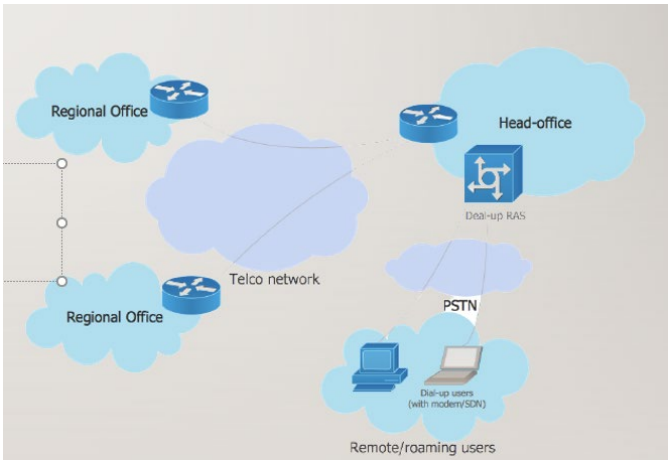
7. Storage Area Network (SAN)

SAN is an abbreviation of the **Storage Area Network**. Storage Area Network is a dedicated, specialized, and high-speed network which provides block-level data storage. It delivers the shared pool of storage devices to more than one server.



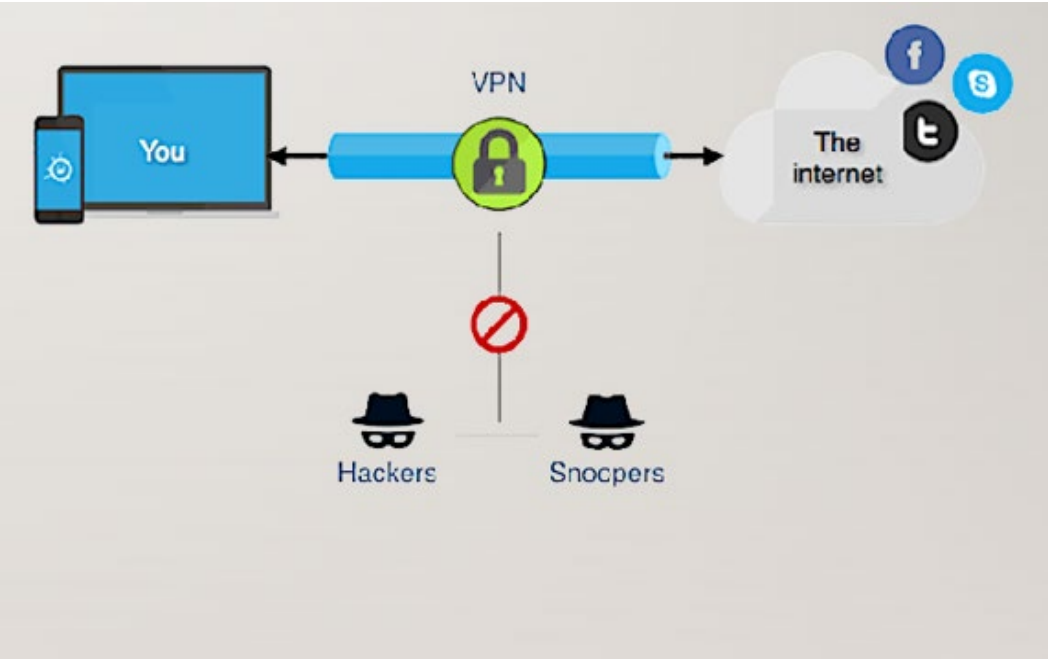
8. Enterprises Private Network (EPN)

EPN is a type of computer network mostly used by businesses that want a secure connection over various locations to share computer resources.



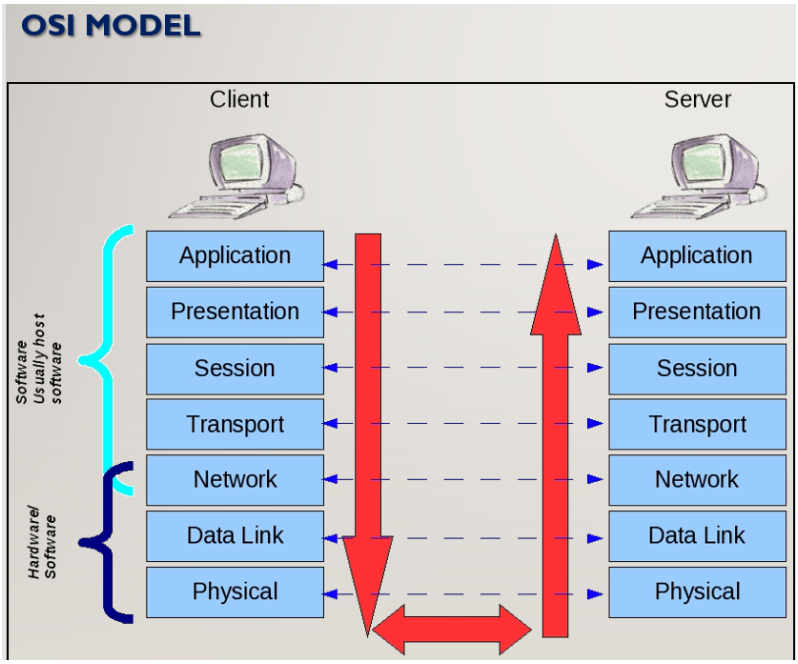
9. Virtual Private Network (VPN)

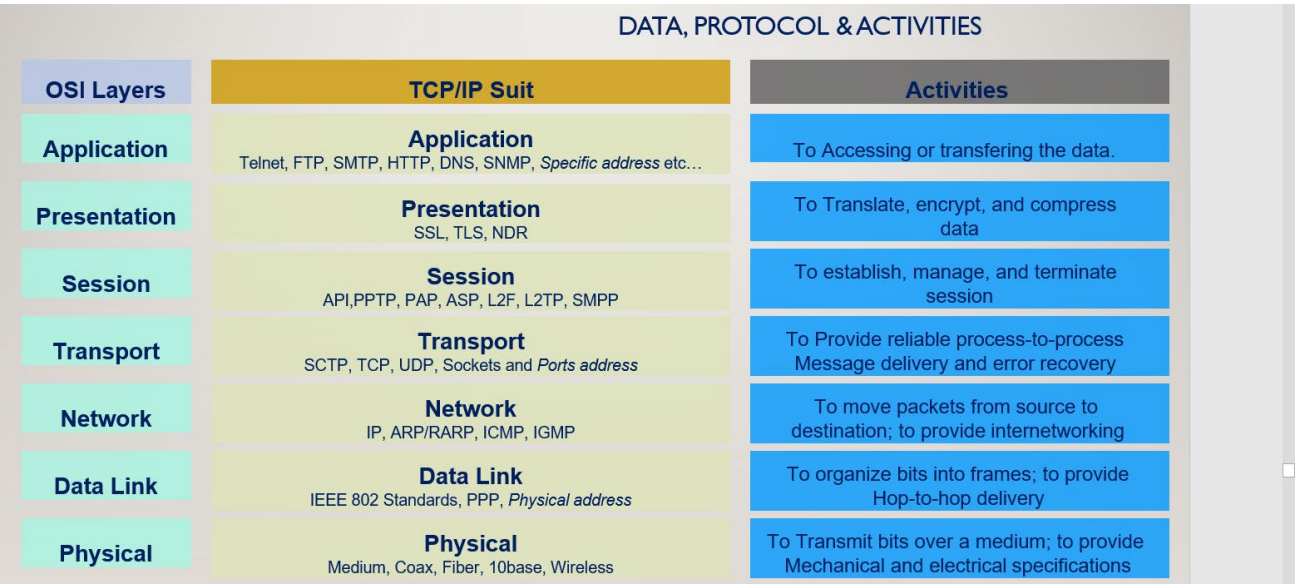
A virtual private network extends a private network across a public network and enables users to send and receive data across shared or public networks as if their computing devices were directly connected to the private network.



OSI MODEL

The OSI Model (Open Systems Interconnection Model) is **a conceptual framework used to describe the functions of a networking system**. The OSI model characterizes computing functions into a universal set of rules and requirements in order to support interoperability between different products and software.





The 7 Layers of the OSI Model

Physical Layer

The lowest layer of the OSI Model is concerned with electrically or optically transmitting raw unstructured data bits across the network from the physical layer of the sending device to the physical layer of the receiving device. It can include specifications such as voltages, pin layout, cabling, and radio frequencies. At the

physical layer, one might find “physical” resources such as network hubs, cabling, repeaters, network adapters or modems.

Data Link Layer

At the data link layer, directly connected nodes are used to perform node-to-node data transfer where data is packaged into frames. The data link layer also corrects errors that may have occurred at the physical layer.

The data link layer encompasses two sub-layers of its own. The first, media access control (MAC), provides flow control and multiplexing for device transmissions over a network. The second, the logical link control (LLC), provides flow and error control over the physical medium as well as identifies line protocols.

Protect Your Network Layers with Forcepoint NGFW

Network Layer

The network layer is responsible for receiving frames from the data link layer, and delivering them to their intended destinations among based on the addresses contained inside the frame. The network layer finds the destination by using logical addresses, such as IP (internet protocol). At this layer, routers are a crucial component used to quite literally route information where it needs to go between networks.

Transport Layer

The transport layer manages the delivery and error checking of data packets. It regulates the size, sequencing, and ultimately the transfer of data between systems and hosts. One of the most common examples of the transport layer is TCP or the Transmission Control Protocol.

Session Layer

The session layer controls the conversations between different computers. A session or connection between machines is set up, managed, and termined at layer 5. Session layer services also include authentication and reconnections.

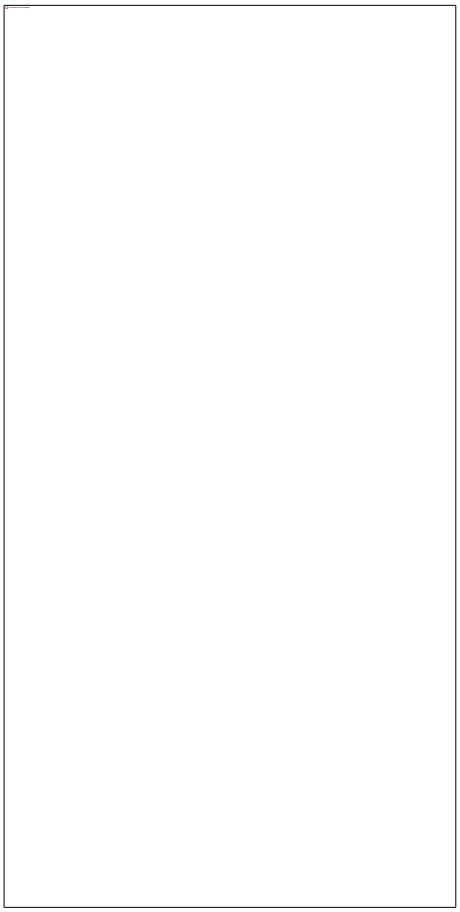
Presentation Layer

The presentation layer formats or translates data for the application layer based on the syntax or semantics that the application accepts. Because of this, it at times also called the syntax layer. This layer can also handle the encryption and decryption required by the application layer.

Application Layer

At this layer, both the end user and the application layer interact directly with the software application. This layer sees network services provided to end-user applications such as a web browser or Office 365. The application layer identifies communication partners, resource availability, and synchronizes communication.

TCP/IP MODEL



Application Layer

Application layer interacts with an application program, which is the highest level of OSI model. The application layer is the OSI layer, which is closest to the end-user. It means the OSI application layer allows users to interact with other software application.

Application layer interacts with software applications to implement a communicating component. The interpretation of data by the application program is always outside the scope of the OSI model.

Example of the application layer is an application such as file transfer, email, remote login, etc.

The function of the Application Layers are:

- Application-layer helps you to identify communication partners, determining resource availability, and synchronizing communication.
- It allows users to log on to a remote host
- This layer provides various e-mail services
- This application offers distributed database sources and access for global information about various objects and services.

Transport Layer

Transport layer builds on the network layer in order to provide data transport from a process on a source system machine to a process on a destination system. It is hosted using single or multiple networks, and also maintains the quality of service functions.

It determines how much data should be sent where and at what rate. This layer builds on the message which are received from the application layer. It helps ensure that data units are delivered error-free and in sequence.

Transport layer helps you to control the reliability of a link through flow control, error control, and segmentation or de-segmentation.

The transport layer also offers an acknowledgment of the successful data transmission and sends the next data in case no errors occurred. TCP is the best-known example of the transport layer.

Important functions of Transport Layers:

- It divides the message received from the session layer into segments and numbers them to make a sequence.
- Transport layer makes sure that the message is delivered to the correct process on the destination machine.
- It also makes sure that the entire message arrives without any error else it should be retransmitted.

Internet Layer

An internet layer is a second layer of TCP/IP layes of the TCP/IP model. It is also known as a network layer. The main work of this layer is to send the packets from any network, and any computer still they reach the destination irrespective of the route they take.

The Internet layer offers the functional and procedural method for transferring variable length data sequences from one node to another with the help of various networks.

Message delivery at the network layer does not give any guaranteed to be reliable network layer protocol.

Layer-management protocols that belong to the network layer are:

1. Routing protocols
2. Multicast group management
3. Network-layer address assignment.

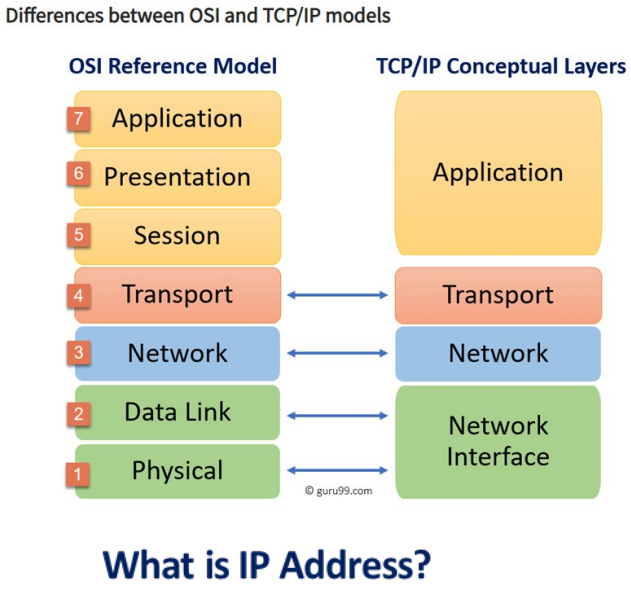
The Network Interface Layer

Network Interface Layer is this layer of the four-layer TCP/IP model. This layer is also called a network access layer. It helps you to defines details of how data should be sent using the network.

It also includes how bits should optically be signaled by hardware devices which directly interfaces with a network medium, like coaxial, optical, coaxial, fiber, or twisted-pair cables.

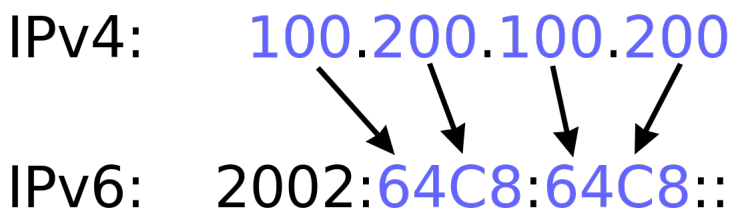
A network layer is a combination of the data line and defined in the article of OSI reference model. This layer defines how the data should be sent physically through the network. This layer is responsible for the transmission of the data between two devices on the same network.

Differences between OSI and TCP/IP models



What is IP Address?

An Internet Protocol address is a numerical label assigned to each device connected to a computer network that uses the Internet Protocol for communication. An IP address serves two main functions: host or network interface identification and location addressing.



VARIOUS IP CLASSES

IP has five different classes differentiated by characteristics.

- Class-A ranges from 0 to 127
- Class-B ranges from 128 to 191
- Class-C ranges from 192 to 223
- Class-D ranges from 224 to 239
- Class-E ranges from 240 to 255

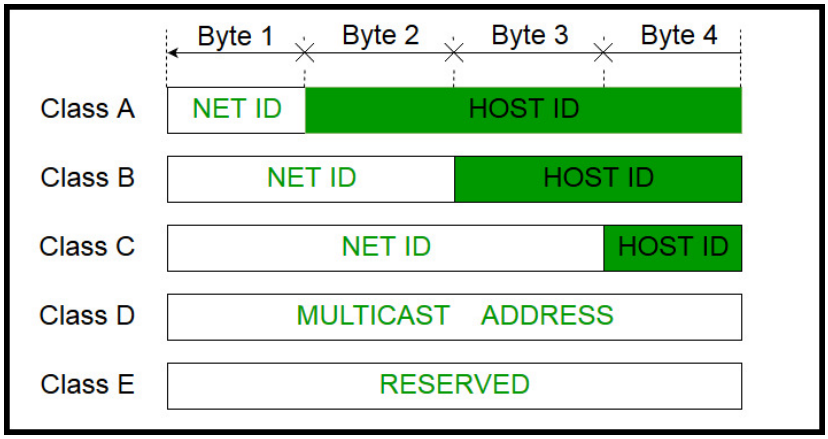
First Octet is defines the class of particular IP e.g. - 128.11.3.31 is follow in class –B

127.0.0.0 to 127.255.255.255 is a range of look back IP.

Class-A

Class A addresses only include IP starting from 1.x.x.x to 126.x.x.x only. The IP range 127.x.x.x is reserved for loopback IP addresses.

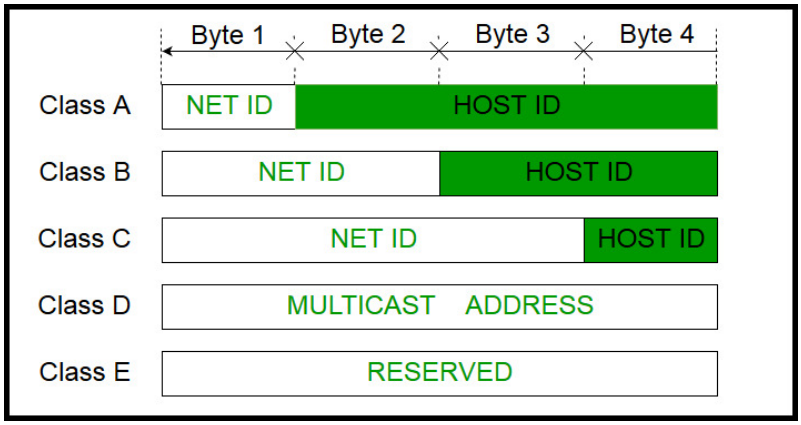
The default subnet mask for Class A IP address is 255.0.0.0 which implies that Class A addressing can have 126 networks (2^7-2) and 16777214 hosts (2^{24}-2).



Class B

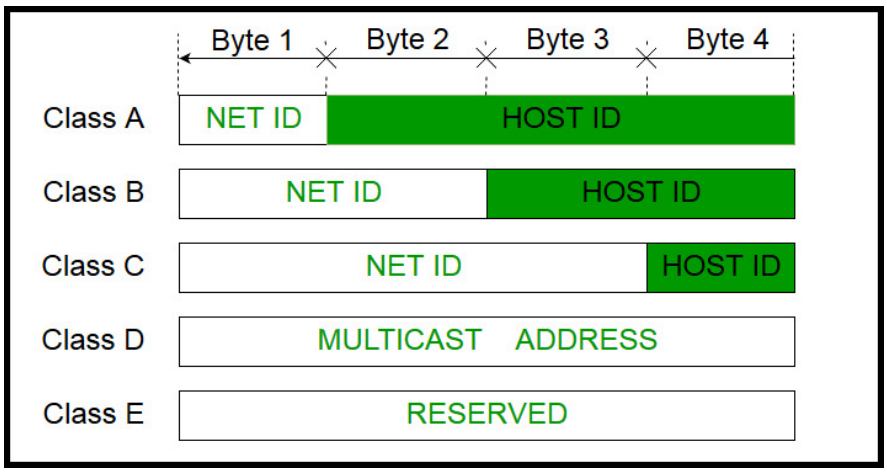
Class B IP Addresses range from 128.0.x.x to 191.255.x.x. The default subnet mask for Class B is 255.255.x.x.

Class B has 16384 (2^{14}) Network addresses and 65534 (2^{16}-2) Host addresses.



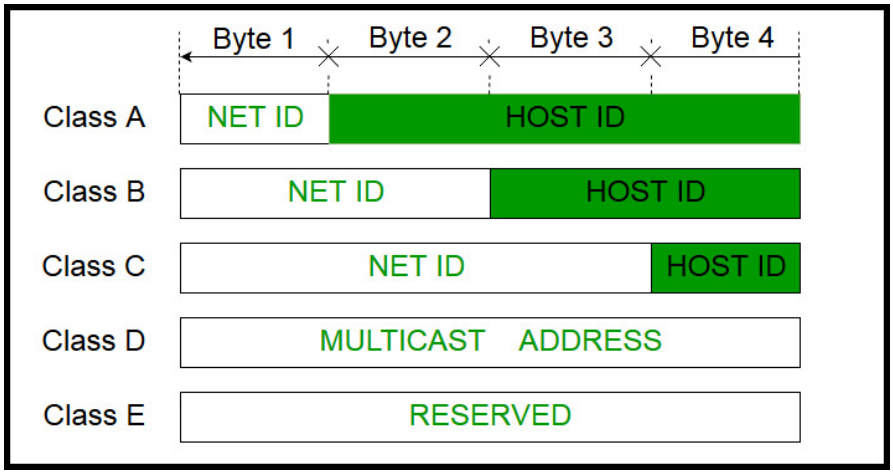
Class C

Class C IP addresses range from 192.0.0.x to 223.255.255.x. The default subnet mask for Class C is 255.255.255.x. Class C gives 2097152 (2^{21}) Network addresses and 254 (2^{8}-2) Host addresses.



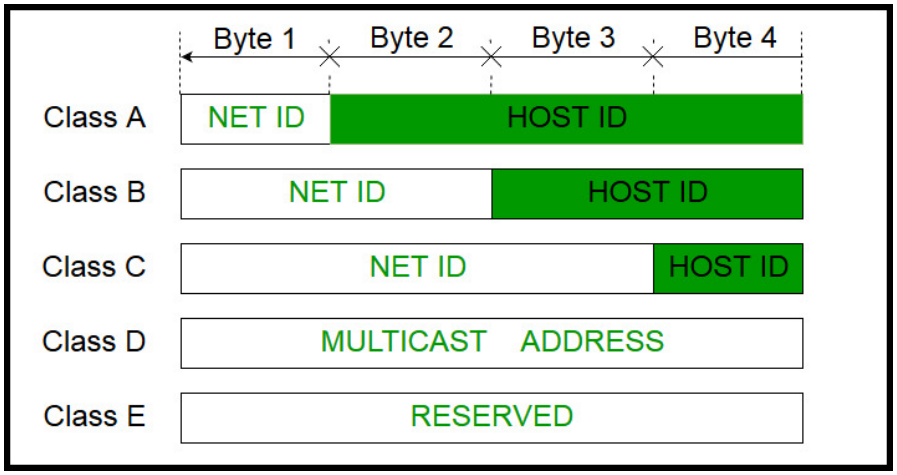
Class-D

Class D has IP address range from 224.0.0.0 to 239.255.255.255. Class D is reserved for Multicasting. In multicasting data is not destined for a particular host, that is why there is no need to extract host address from the IP address, and Class D does not have any subnet mask.



Class-E

This IP Class is reserved for experimental purposes only for R&D or Study. IP addresses in this class ranges from 240.0.0.0 to 255.255.255.254. Like Class D, this class too is not equipped with any subnet mask.


Byte 1
Byte 2
Byte 3
Byte 4
Class A
NET ID
HOST ID
Class B
NET ID
HOST ID
Class C
NET ID
HOST ID
Class D
MULTICAST ADDRESS
Class E
RESERVED

THANK YOU