**Layers Functions Protocols**

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| 1. Application layer | * Useful work * Users interface with the application layer program to retrieve web pages * Transfer files | * HTTP * FTP * SMTP |
| 1. Transport layer | * Control flow of information between client & server | * TCP * UDP |
| 1. Network layer | * Routes packets between network | * IP |
| 1. Datalink | * Move data within two hosts/local area network(LAN) | * Ethernet * ATM * PPP |
| 1. Physical layer | * Defines the physical xtics of communication Hardware & medium | * Radio,twistedpair,fiber |

OSI LAYER- (All-Application layer), (people-Presentation layer), (Seem- Session layer), (To-Transport layer), (Need-Network layer), (Data-Datalink layer), (processing-physical layer).

* **Ip address** defines an addressing scheme that is independent of underlying physical address.
* **IP specifies** a unique 32 bit number for each host on the network. This number is known as **INTERNET PROTOCOL ADDRESS,** The IP address this terms are interchangeable
* Each packet send across the internet contain the IP of the source of the packet and the IP address of its destination.
* For routing efficiency the IP address is considered in two parts;

-Prefix which identifies the physical network.

-Suffix which identifies a computer on the network.

* A unique prefix is needed for each network in an internet.
* For global internet, Network numbers are obtained from internet service providers (ISPs).

**IP ADDRESS CLASSES**

* The first 4 bits determine the class of the network.
* The class specifies how many of the remaining bits belong to the prefix(network Id)& how many belong to the suffix(Host Id).
* Class A, B, C are the primary network classes.
* Class D reserved for multicasting.
* Class E reserved for future use

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| --- | --- | --- | --- | --- | --- |
| Classes | First 4 bits | Number of prefix | Max of network | Number of suffix bits | Max of Hosts per Network |
| A | 0xxx | 7 | 128 | 24 |  |
| B | 10xx | 14 | 16384 | 16 | 65536 |
| C | 110x | 21 | 2097152 | 8 | 256 |
| D | 1110 | multicast |  |  |  |
| E | 1111 | Reserved for future use |  |  |  |

* NB. Class A, B, C are the primary network classes.
* Class D reserved for multicasting.
* Class E reserved for future use

**NETWORK MASKS**

* They are used to identify which part of the address is the network ID & which part is the Hosts ID.
* This is done by logical Bitwise and of the IP address & the Net mask.

A 255.0.0.0 - 1st Bit position is network ID

* 3 Host ID

B 255.255.0.0 – 2 network ID, 2 host ID

C 255.255.255.0 – 3 network ID, 1 host ID

**Subnet address** – All hosts are required to support subnet addressing while IP address classes are the convention, IP addresses are typically sub netted to smaller address sets that do not match the class system.

The suffix bits are divided into sub net ID and Host ID.

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| --- | --- | --- |
| Network ID | Usable host | Broadcast |
|  |  |  |