**COMPONENETS USED IN COMPUTER NETWORK**

1. Data- A data is a raw material that convert into the information and share to on device to another device.
2. Device- A device is a hardware that can be used to create data, modify data, organize the data, formatting of the data as well as string of the data.
3. Media- A media is communication way that will help to connect two or than two devices using guided and unguided medium.

* Guided Media- Guided media are such media that use physical connection between devices like twisted pair, coaxial cable, fiber optics, etc.
* Unguided Media- Unguided medias are such media where logical connections can be provide using wireless or wi-fi, satellite, Bluetooth, Radio wave, etc.

1. Protocols- It is the set of rules that allow two or more than two system to share the data.

**Dedicated server**-A server or a computer machine that is used to provide resource sharing, user management, prototype define, policy authentication, resource management, membership allotment with high configuration and dedicated to work 24x7. They are faster than non-dedicated or simple pc. It is used to create client server architecture, cloud server architecture and distributed computing. The network using such server is called master server or network. There are special OS need to be installed in such server. For e.g. windows 2008, 2008R2. 2012 intersperse, 2012R2, 2016 standard, 2019 base, Ubuntu, Red hat, mint, fedora, Unix, IBM Db2. This such server use XENON processor with rapid capability.

**TRANSMISSION MEDIA**

There are two types of transmission media thar are used to create connection between device to device, system to system and network to network. It can be physical link and logical link. This are as following:

1. **Guided media**: Guided Media are those media in which connection are made using physical wire. For E.g. Coaxial Cable, Twisted pair and fiber optics.
2. **Coaxial cable**: Coaxial cable is used in TV, STB Box, Telecommunication, etc.
3. **Twisted pair**: Twisted pair are used in telecommunications, Internet, Wi-Max, Satellite TV and Ethernet cables.
4. **Fiber optics**: Fiber optics are the power source and big source of internet.

**IP ADDRESSING**

Ip address is a logical address to identify any system and location uniquely. IP address is a unique number having 32-bit and 128-bit. If we have 32-bit IP address it represents in the form of 4 blocks using decima number. If it is 128-bit IP address (IPV6) will represent in 8 blocks using hexadecimal number system. IP address is provided by Iana (Internet assign number authority) and RiR (Regional internet register).

**IPV4**

32-bit- 4 bytes

0.0.0.0= Self indicates IPs

**II**

**A= 10.0.0.0- 10.255.255.255**

**B= 172.16.0.0- 172.31.255.255**

**C= 192.168.0.0- 192.168.255.255**

**CLASSES OF IPs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **A** | N | H | H | H |
| **B** | N | N | H | H |
| **C** | N | N | N | H |

**A** - 1 - 126 = Very big organization

**B** - 128 - 191 = Middle organization

**C** - 192 - 223 = Short organization

**D** - 224 - 239 = Multi-Casting organization

**E** - 240 - 255 = Research

*(We can’t use class D and E) and 127.0.0.0 is loopback IP and Localhost-127.0.0.1*

**SUBNETTING:(Classless)**

To split big network in smaller one is called subnetting. There are three ways to calculate subnetting:

1. Slash method (/)
2. By Host
3. By Network

**Subnetting in Class C:**

**C-** Range of slash between is 124-132 (only 130 can be used)

**Formula/Steps:**

1. Create Subnet for given IP using bit conversion.
2. Calculate magic value i.e. last block decimal no.
3. Calculate Block size= 256- Magic value= no. of Host
4. No. of Network= 2**onbits**
5. No. of Host= 2**offbits**

**202.104.105.10/27 (Using Slash method)**

**Subnet mask-** 11111111.1111111.11111111.11100000  
 255.255.255.224

Magic Value= last Block decimal

Block Size= 256- Magic Value= 256-224= 32

No. of Network= 2**onbits** = 23 =8

No. of Host= 2**offbits** = 25 = 32

|  |  |  |
| --- | --- | --- |
| **Net IP** | **Usual IP** | **Broadcast** |
| 0 | 1-30 | 31 |
| 32 | 33-62 | 63 |
| 64 | 65-94 | 95 |
| 96 | 97-126 | 127 |
| 128 | 129-158 | 159 |
| 160 | 161-190 | 191 |
| 192 | 193-222 | 223 |
| 224 | 225-254 | 255 |

**STRAIGHT CABLE/CROSS CABLE COLOR CO-ORDINATION:**

Orange-White/Green-White  
Orange/Green  
Green-White/Orange-White  
Blue/Blue  
Blue-White/Blue-White  
Green/Orange  
Brown-White/Brown-White  
Brown/Brown

**NETWORK DEVICES**

**Router:** Router is a device that is used to broadcast information from one network to another network using gateway. For E.g. Router1841 Router1941, 4000 Series, 9000 Series.

**Switch:** Switches are used to process on the basic of mac address, first time broadcasting then Unicasting. Switch store all information CAM table (One of the databases of switch). Switch share information using three modes: Unicasting casting, Multi-casting ad broadcasting. There are layers are different layers of switches: layer-2, layer-3 and MLS-switch. Layer-2 are normal switches, layer-3 switches can be converted into router and MLS multi-layer switch is one of the high security devices. For E.g. 2960 series, 2560 series, 2900 catalyst, etc.

**Hub:** Hub is of the network device that is used to connect multiple end usual devices to the network. It is passive device that means we cannot manage ii. It is always used to broadcast device.

**Repeater:** Repeater is similar to router that is used to increase strength of network from weak to stronger one.

**Connected Wire:**

* Similar device- Crossover Cable

R-R= Serial DCE or Serial DTE with watch

* Different Device: Straight Copper Wire

S-Pc / R-S

* Console Cable:

It is used to manage and configure router, switch, firewall and all network.

**EIGRP**- Extended Integrated Gateway Routing Protocol

**OSPF-** Open Shortest Path First

**SERVER**

**Physical Server:**

1. Rack Server- medium expensive / Professional Server / manage easy / boot time high
2. Blade Server- Expensive server
3. Tower Server – less expensive / not portable