TCP IP FIVE LAYER NETWORK MODEL

To really understand networking we need to know all the thing that is involved from cable to the protocols there are a lot of models thats describes how a computer communicates with other like

1)osi model

2)DOD model

3)TCP/IP model

we are going to talk about the TCP/IP model

#	Layer Name	Protocol	Protocol Data Unit	Addressing
5	Application	HTTP, SMTP, etc..	Messages	n/a
4	Transport	TCP/UDP	Segment	Port #'s
3	Network	IP	Datagram	IP address
2	Data Link	Ethernet, Wi-Fi	Frames	MAC Address
1	Physical	10 Base T, 802.11	Bits	n/a

lets start with the physical layer.
Its just like it sounds when we talk about the physical
layer we ment the hardware that connects the
computer it can be the different cable and their
specifications and their connectors.

Then comes the data link layer in the data link layer
we apply our dirst protocols. actually the data link
layer is responsible for interpreting this signal in a
common way that every network devices can
communicate with each other.Lots of protocols are
exists in this layer .But the most common on is the
ethernet. Although the wireless become more and
more popular.The ethernet standerds also define a
protocol responsible for getting data to node on the
same network

Then comes the network Layer.It allow multiple
/different network to communicate with each other
through the devices known as router.one of the most
popular example is the internet

[remember data link layer responsible for a single link
on the other hand the network is responsible for a
bunch of network. If you think about the Client and
Server Its the network layer that helps to do that]
but what protocol is used in the network layer??

IP [internet protocol] ip protocol is not a connection oriented protoccol like TCP because it dot give us the confirmation for the data receive.IP is the heart of the internet and most smaller networks around the world

Then comes the transport layer.Ever wonder that you are on the same router wifi using you devices and even so your mail comes to your mail client and if you run a server it data will go to the server (even you are on the single node) Thats because of the transport layer.
Network layer gives the data to the node The transport layer figure out which client and server supposed to get the data.the protocol that is used in the Transport layer is the TCP protocol.
[other transport protocol also use the IP like udp too.but TCP is the protocol that ensure that the data is sent correctly on the other hand the udp dont]

then come the application layer.they are the applicatoion like firefox like different software

NETWORKING DEVICES AND NETWORKING CABLES

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Lot of different cables and network deviecs are used to communicate with different network

lets talk about different network components of a wired network
1)cables: cables connect different devices to each other allowing the data to be transmitted over them. Most of the network cable are divided into two categories copper and fiber.copper cable are the most common for the networkig cables.They are made up wuth multiple copper cable inside the plastic wrapper/ insulators.you already know that computer communicate in binary form in the cable the binary data is sent by changing the voltages.the system at the receving end can interpret the voltage change as binary ones and zeros.the most common cable are the cat5,cat5e and the cat6 cables

this cat is known as category this category is separated by different categories also like the transfer rate and the different twisted.the cat5 is old tech and mostly

replaced by the cat5e.and cat5e is replaced by the cat6.They maybe look like the same but for the data sending speed are very different .

Cat5 had a problem in its cable which is called CROSSTALK

WHAT IS CROSSTALK

when an electric pulse in one wire is accidentally detected by another wire .so the receiving end cant understand whats the data is because of the network error.Higher lavel protocol have functionality for detecting the missing data and asking a request for them but this process takes more time but the CAT5e does this thing very less thats why more data can be transferred win CAT5e is a given time

CAT6 cable are more strict to crosstalk .Cross talk is very very less in the CAT6 cable thats make it more expensive They can transform more reliably and in more speed BUT there is a problem too.because of the internal structure of the CAT6 cable it has a shorter maximum distance when data is sending on max speed

THEN COMES THE FIBER which isn a short form
of the fiber optic cable

Fiber cables contain individual optical fibers which
are tiny tubes made out of glass about the size width
of a human hair.

Copper cable uses voltage change and the fiber use
the pulse of the light to transfer the data.fire is
preferable in a place where there is a lot of electrical
and magnetic interference fiber cable can transport
more speed and more distance but they are expensive
and fragile

HUBS AND SWITCHES

cable allow you to make a point to point networks but
it works on a single devices on each side .it is not very
useful when a lot of computer try to reach each other.
There are network devices that allow multiple node to
connect with each other .one of the simpliest devices
is the HUB.HUN is a physical devices that allow a
computer to communicate with multiples computer at
once
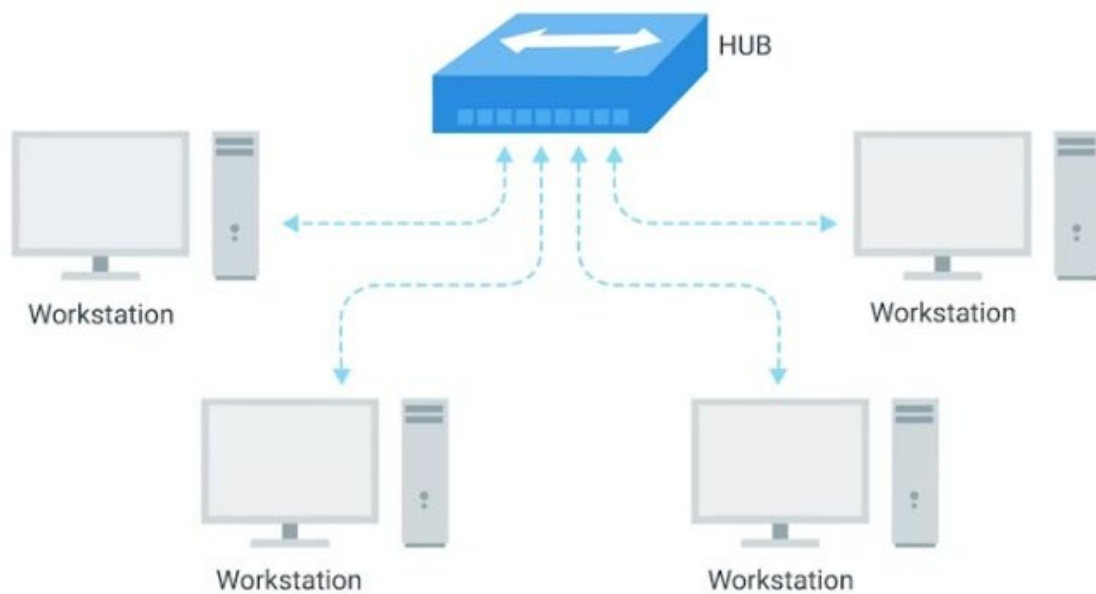
all the devices connected to the hub is end up talking with all the computer at once.But the node have to check every single time that the data that is broadcasting by another computer is ment for it or other .if meant for it then accept other wise reject.This cause a lot of problem and make a collision domain.

WHATS A COLLISION DOMAIN:

remember in a network segment only one devices can communicate at a time but if the multiple system try sending data at the same time.the electrical pulses sent across the cable can interfere with each other. Because of this situation the computer have to wait until they gat a chance to send the data.it casuse a lot of time and slow down the data communication process.thts why the HUB are not used

[REMEMBER HUB IS A PHYSICAL LAYER DEVICES]

on the other hand the Switchs are a little bit different than the hubs [SWITCHES ARE IN THE DATA LINK LAYER] and for that the switch can aactually inspect the data and determine which computer it has to send and then only send to that computer .that reduces the collision domain and the size of the data that is sending

ROUTERS

HUBS and SWITCHES are used to connect computers on a single network usually referred to the LAN or LOCAL area network.but sometimes we need to send data on other independent network.thats where the routers