In order run the internet and to make the computer networking more user friendly and secure we use different network services and there are a lot of net work services. and they are directly connected with the network.

DNS

Computer speak to each other with numbers .Computer only understand the binary .Reading binary number can be easy for the computer but they are not easy for human. for example ip address is a 32 bit binary number but we represent it with dotted decimal number for us to understand. But remembering ip address for every address is really not a good idea. because you may visit thousands of different website and to do that you need to know all of their ip address. And for some reason these ip address can be changed . And human are not very good at remembering numbers .but we can assign different name for different address and thats where DNS come .DNS stands for the domain name system.

DNS is a a global and highly distributed network services that resolves string of letters into ip address .

It may sound quite simple .that a server take an string name and return the corresponding ip address. But to make sure the internet is working properly there is a lot of rules and process should be followed . if you want to search for some thing it is much easier to type www.google.com instead of their ip address. The name is call the domain name .domain name is a term that we use for something that can be resolved by the DNS.ip addres can change for different reason . But if the domain name is resolved the new address the end user dont eve know this thing other wise you have to keep tracking of the new ip address It gives the system administrator does changes in the server without any notice.

Another important thing is the more hop is going to cross to get the information the slower the process become .so if you are from india and try to reach www.google.com it will redirect you to the the nearest google server with the same domain name.because a singe domain name can have multiple ip address and can be run through multiple data center.dns helps to make the choice to select a ip address based on the geographical location . The process of resolving the ip address using the name is called the name resolution.

DNS server needs to configure at a node on a sepecfic number. To simplify the process just

remember four things must be configured for a host to operate on a network

1) ip address
2) Subnet mask
3) Gateway
4) DNS server

you can work without configuring the dns sever.but it will be difficult for you to use it

there are five primary type DNS servers

1) Caching name server
2) Recursive name servers
3) Root name servers
4) TLD(Top level Domain) name servers
5) Authoritative name servers

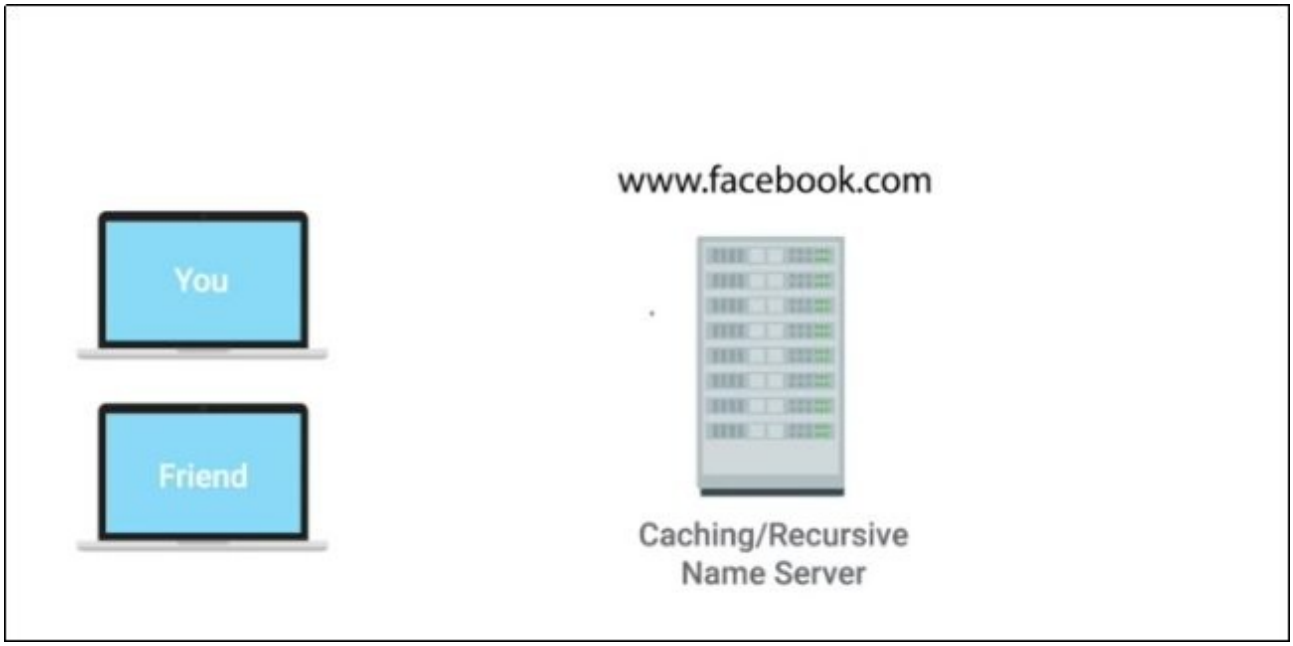
any dns servers can do multiple task at the same time. Caching and recursive DNS server can be provided by the Local ISP (Internet service provider)

Recursive name server :

recursive name server are those server who send the full DNS resolution request in a simple word it

send the request to find the ip address of that domain name to other server

Caching name server: once the Recursive name server finds the ip address of the domain name .the caching server remember the ip address for that dns . So if any one on that network or you ask for the domain this server does not have to do a domain resolution again .most of the ISP server does both at the same time.but they can operate separately



for example suppose you and your friend are on the same network. And a caching and recursive DNS server is configured .so when your friend try to access the www.facebook.com the recursive server will send a domain resolution request and after it getting the information it will send it to you and the caching server will store the information ,so next time when

you try to visit the site the server does not have to send the request.

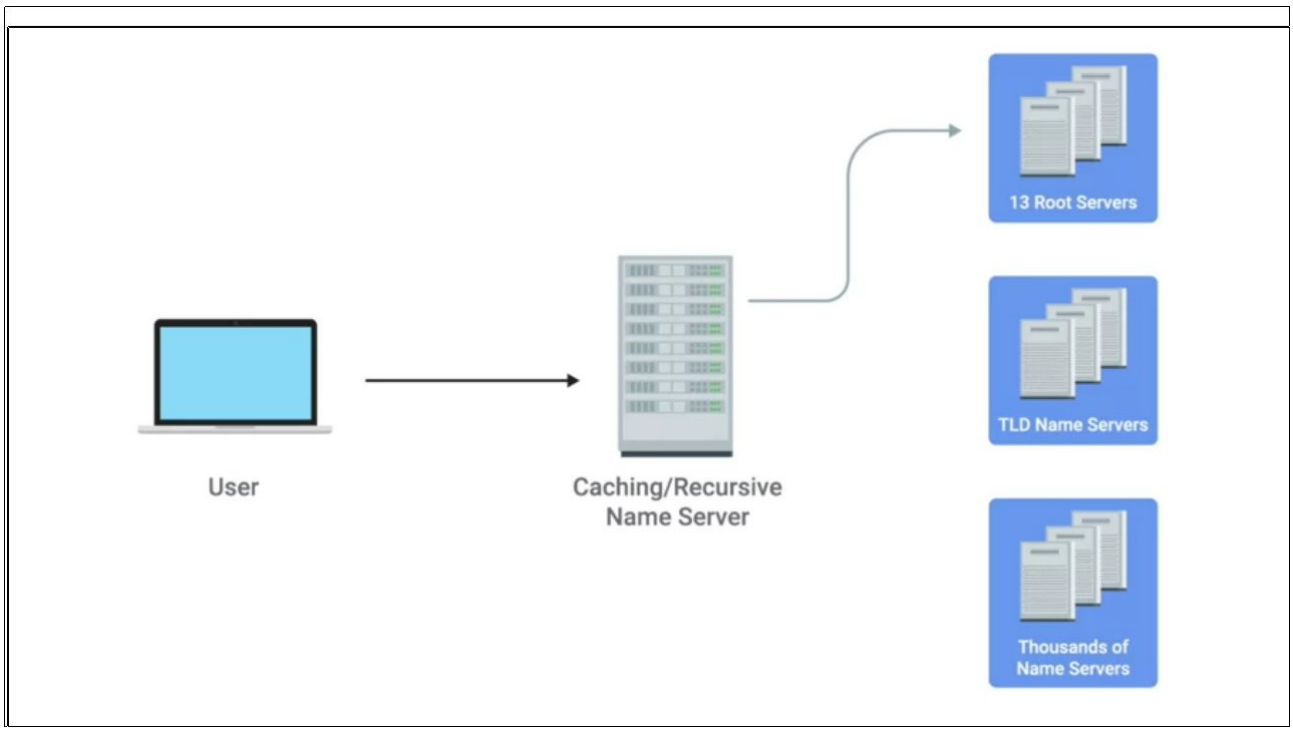
All domain in the global domain name have a TTL.TTL stands for Time To Live .this is a value in seconds . This value can be configured by the owner of a domain name for how long a name server is allowed to cache an entry before it should discard it and perform a full resolution again.in past it was very long but now a days this TTL has dropped to a few hours.

Until this point we know the recursive server send the DNS resolution request .lets find out what happen next

the Recursive name server contact the Root Name server .there are 13 total Root main server in the world and they are responsible for directing queries to TLD name server.

The Root server will reply lookup with a TLD name server.TLD stands for top lavel domain . A TLD is the last part of any domain name.like .com or .net or .edu Basically the Root server told the recursive server the lcoation of the TLD server that has that TLD. For each TLD there is a TLD name server.then the TLD server

respond with a redirect .this time it send the Authoritive server to look up .



Authoritative name server is responsible for the last two part of any domain name .which may be a DNS server for a organization responsible for look up. this server may be run by the organization .then the ip address from the authoritative server will be redirect to the recursive server and then the caching server save this information for a certain amount of time .this strict hierarchy is very important to get the correct ip address. Other wise malicious party can redirect traffic to do harmful things

DNS used UDP instead of the TCP for commication you may wonder why .thats because TCP is a connection oriented protocol thats why it send a lot of packets communicating than UDP Especially for creating connection it use three way handshake and for terminating connection it need four way handshake.so in UDP make less traffic for dns resolution

here are the difference

DNS RUNNING ON TCP:

1)User create connection with recursive server with three way handshake. Thats 3 packets

2) after the connection is established the host send the actual request for domain resolution thats 1 more packet then the recursive server send the host another ACK .so that's another packet.

3) now the recursive name server try to connect to the Root name server
thats take

3 way hand shake for opening+Actual request+ACK for request+SYN request+response of the SYN request + 4 way hand shake = 11 packets

4) now the recursive server has the TLD .then it needs another 11 packets to the TLD the server.

5) after getting the authoritative name server it will take another 11 packets to find

6) now the local recursive name server knows the ip address then It respond to the initial request thats 1 packet.then the host send a ACK thats another packets

7)Then the connection close with a 4 way handshake thats 4 packets

if we callculate it will be

3(cs)+1(re)+1(rep)+11(root)+11(tld)+11(auth) +1(ini rep)+1(reply of the reply)+4(end) = 44 packets

so it needs 44 total packets for a TCP connection to query a dns resolution

DNS RUNNING ON UDP:

1) host computer send 1 packet to recursive server
2) recursive server send the request to Root server thats 1 packet
3) Root server send the TLD server to recursive server thats 1 packet
4) then another 2 packets for TLD server
5) another 2 packets for the Authoritative server
6) then recursive server send the ip to the computer thats 1 packet

1+2+2+2+1 = 8 packets

UPD does not have any mechanism for reply.if the connection lost then it just send another request. Because UDP does not have error recovery.