

Introduction to DNS system

Purpose of naming

- Addresses are used to locate objects
- Names are easier to remember than numbers
- You would like to get to the address or other objects using a name
- DNS provides a mapping from names to resources of several types

Domain Name

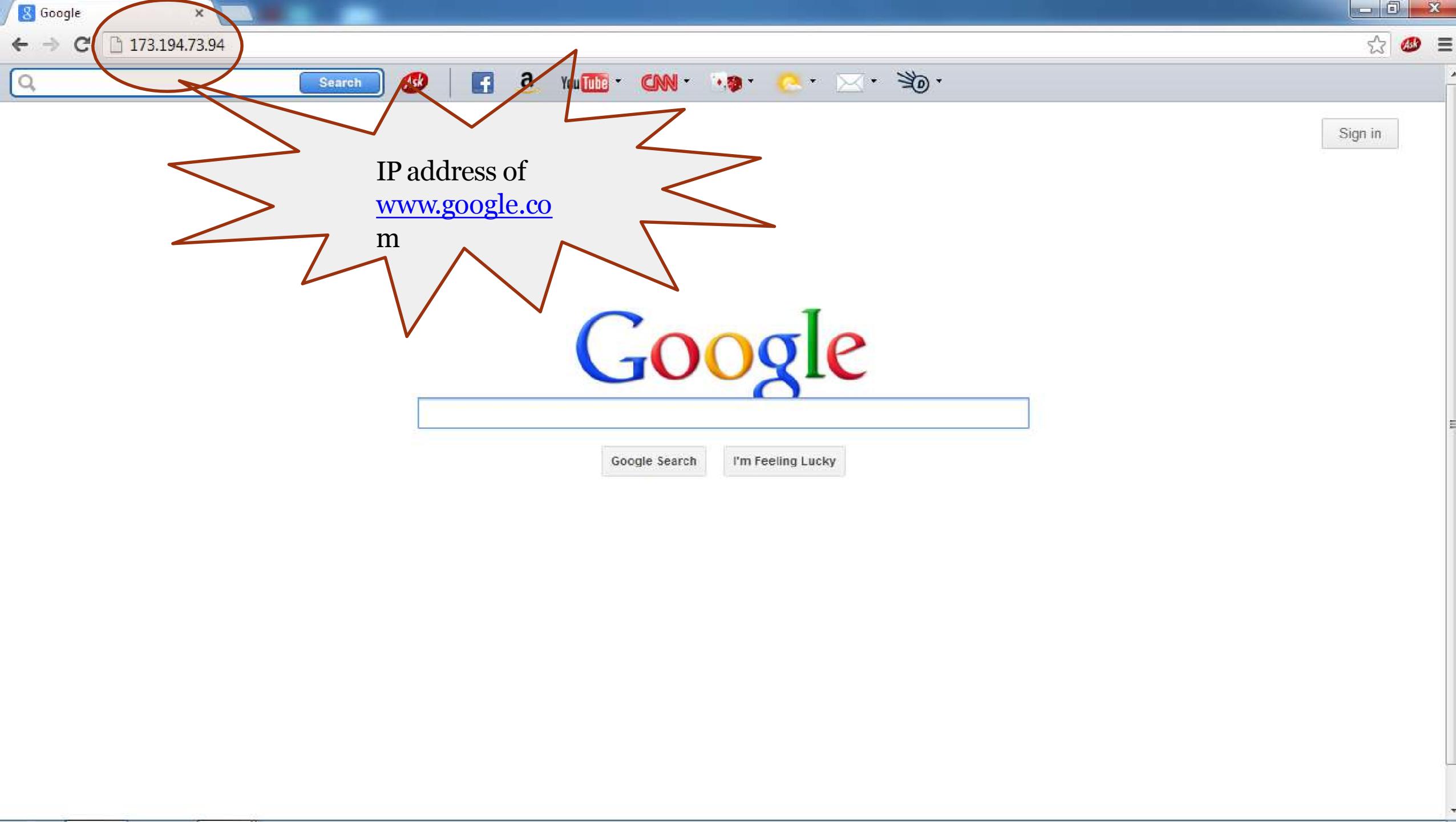
- Domain name is a way to identify and locate computers connected to internet
- No two organizations can have same domain name
- A domain name always consists of two or more components separated by periods called dots (.)
EXAMPLE: www.yahoo.co.in, www.facebook.com etc.
- Once a domain has been established subdomains can be created within the domain
EXAMPLE: The domain for the large company could be “Vni.com” and within this domain subdomains can be created for each of the company’s regional office.
Eg: Bombay.vni.com

Structure of domain Name

- Last name. subdomain. second-level domain. top-level domain

EXAMPLE: vijay.Bombay.vni.com





IP address of
www.google.co

m

Google

Google Search

I'm Feeling Lucky

Top Level Domains

Top level domains are classified into 3 categories:

- Organizational or generic domains
- Geographical or country domains
- Reverse domains

Organizational/Generic domains

- It consists of three character code which indicates the primary function of the organization or their generic behavior
- Most commonly used top level domains are:
 - **.com** for commercial organization → eg www.yahoo.com
 - **.net** for networking organizations → eg www.zedge.net
 - **.gov** for government organizations → eg www.newjersey.gov
 - **.edu** for educational organizations → eg www.uducause.edu
 - **.org** for non-commercial organizations → eg www.eklavya.org
 - **.mil** for military organizations → eg www.dod.mil
 - **.int** for international organizations → eg www.itu.int

Geographical/Country Domains

- ❑ It consists of two characters which represents different countries/regions all around the world
- ❑ These codes have been standardized by International Standard Organizational (ISO)

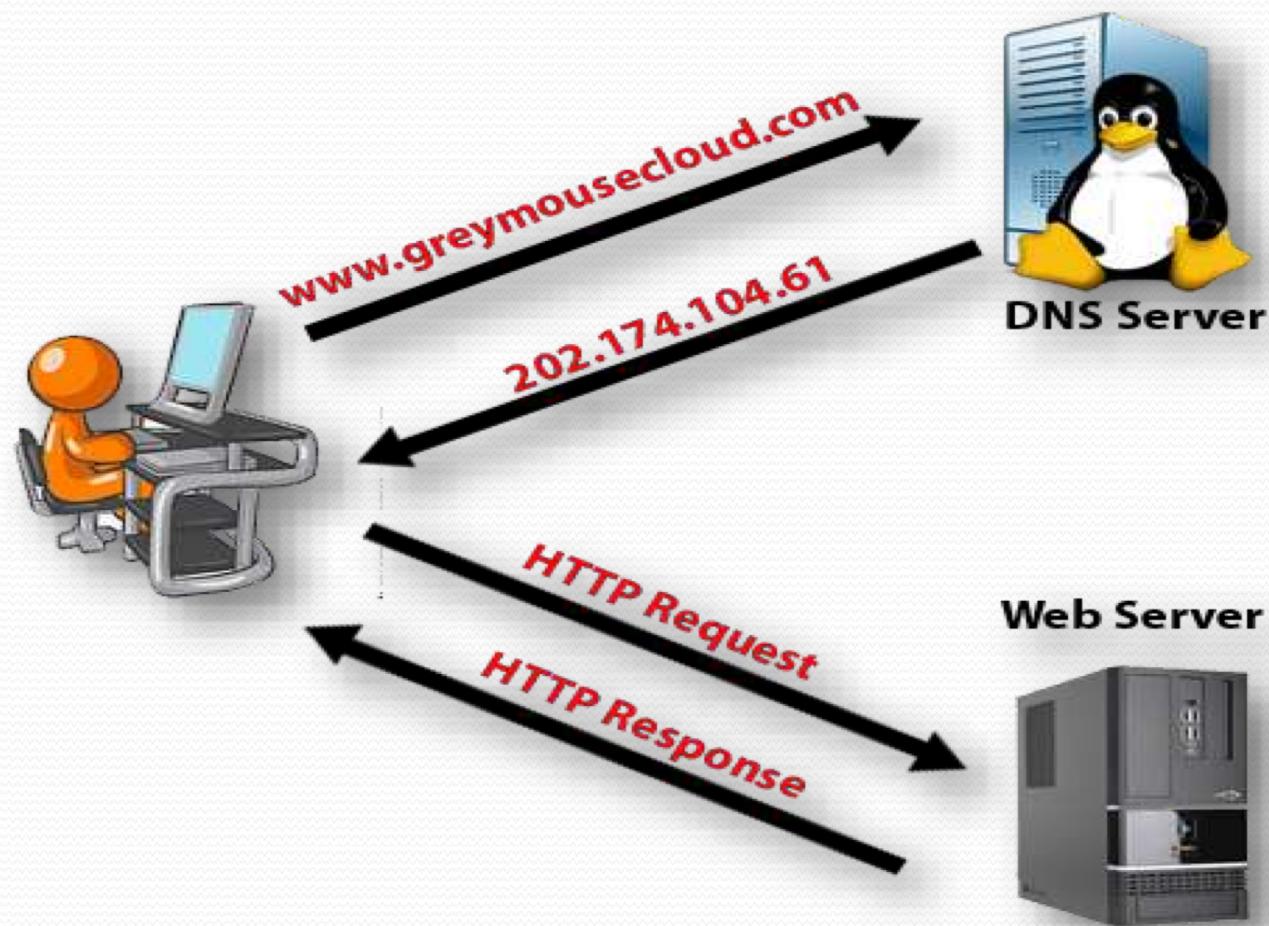
EXAMPLE:

- ❑ .in → India
- ❑ .jp → Japan
- ❑ .us → United States
- ❑ .fr → france
- ❑ .it → Italy
- ❑ .cn → China
- ❑ .au → Australia

- Each domain name has a corresponding IP address
- When the user types the domain name in the address bar, the corresponding IP address is supplied. Such a translation is possible with the help of system called DNS (DOMAIN NAME SYSTEM)
- DEFINITION:

“DOMAIN NAME SYSTEM is a collection of the databases that contain information about domain names and their corresponding IP address.”

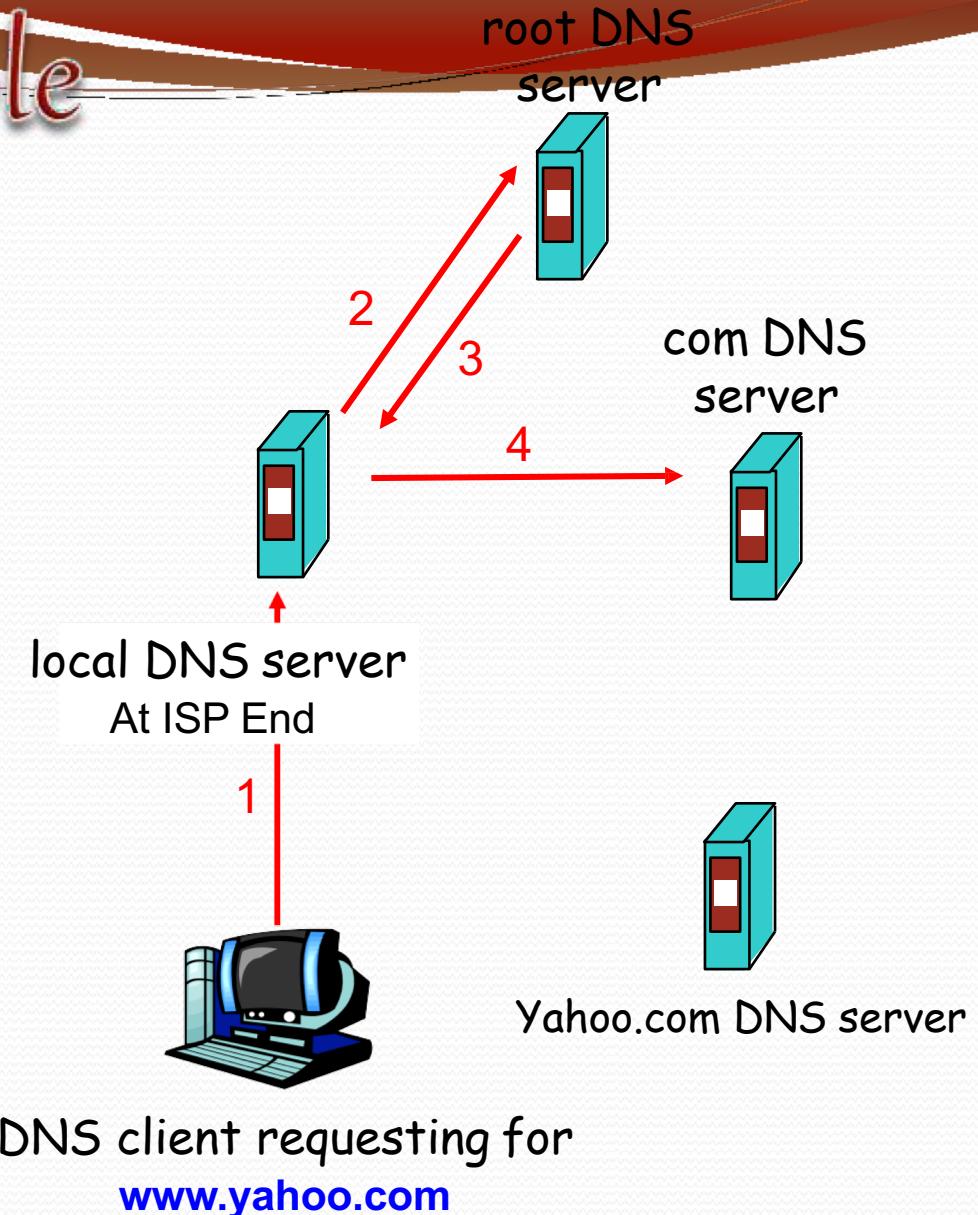
Working Of DNS



- When an application program needs to communicate with other computer, it needs to translate the name and the other computer into its IP address. The applications program that requests the service then becomes the client of DNS.
- It then sends the request to DNS server. The server looks up the name and then returns correct IP address.
- A large number of DNS servers may be involved to get the right IP address. After receiving the correct IP address, the communication between two computers starts.

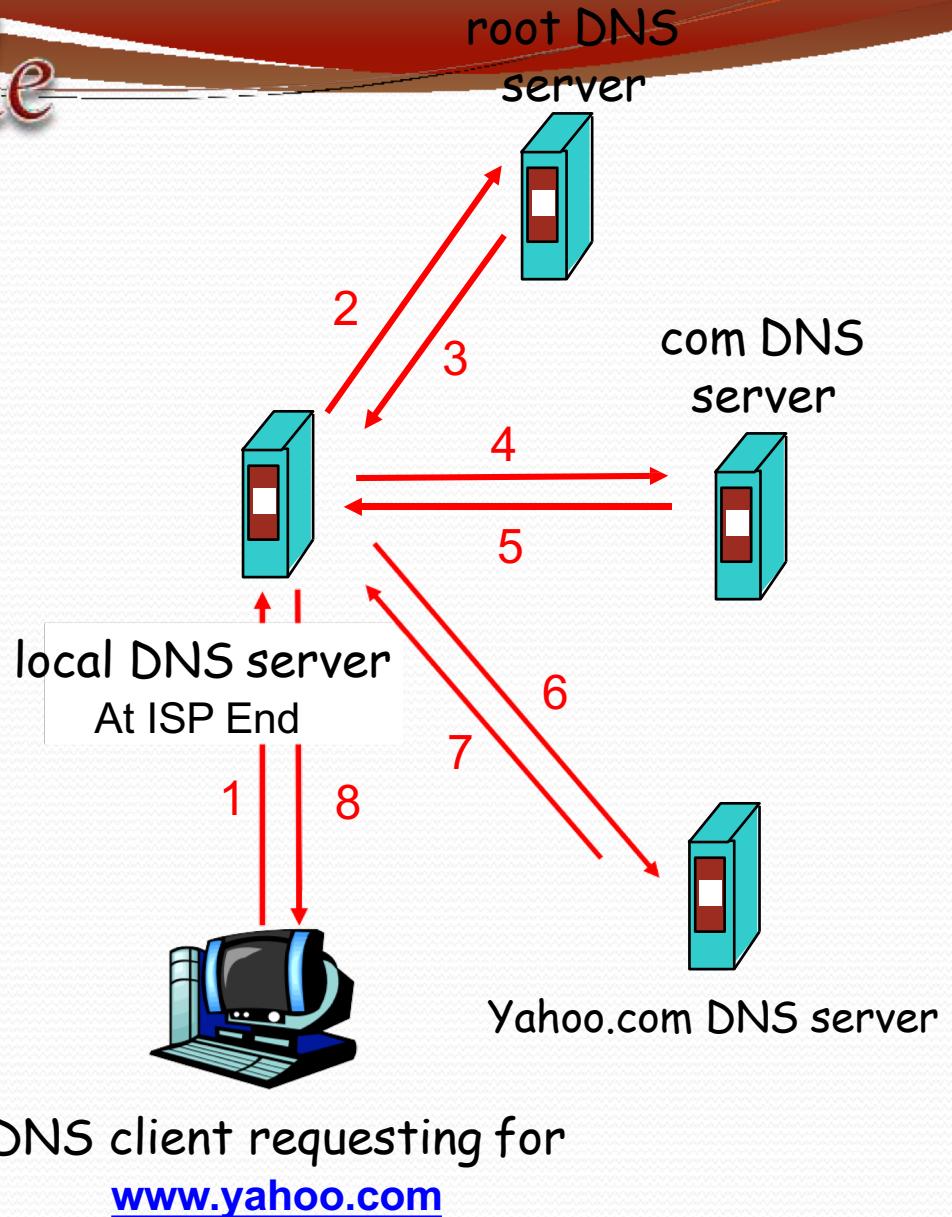
DNS example

1. When you type name www.yahoo.com into your browser it asks local DNS server (at ISP's end) for its IP address.
2. When local DNS server does not find the IP address of given name, it forwards request to root DNS server and again enquire about IP address of it.
3. The root DNS server replies “ I do not know the IP address of www.yahoo.com but know the IP address of the com DNS server”.
4. The local DNS then asks the com DNS server for IP address



DNS example

5. The com DNS server replies with same answer it does not know the IP address of www.yahoo.com but know the IP address of yahoo.com DNS server which is then return to local DNS server.
6. The local DNS server then ask the yahoo.com DNS server for IP address
7. It then replies with IP address corresponding to www.yahoo.com which it has
8. The local DNS server then sends this IP address back to the client computer that send the request



Features of dns

Global Distribution

- Data is maintained locally, but retrievable globally
- No single computer has all DNS data
- DNS lookups can be performed by any device
- Remote DNS data is locally catchable to improve performance

Scalability

- No limit to the size of the database
- One server has over 20,000,000 names
- No limit to the number of queries
- 24,000 queries per second handled easily
- Queries distributed among masters, slaves, and caches

Dynamicity

- Database can be updated dynamically
 - ◆ Add/delete/modify of any record
- Modification of the master database triggers replication
 - ◆ Only master can be dynamically updated
 - ☞ Creates a single point of failure

Reliability

- Data is replicated
 - ◆ Data from master is copied to multiple slaves
- Clients can query
 - ◆ Master server
 - ◆ Any of the copies at slave servers
- Clients will typically query local caches
- DNS protocols can use either UDP or TCP
 - ◆ If UDP, DNS protocol handles retransmission, sequencing, etc.

Loose Coherency

- The database is always internally consistent
 - ◆ Each version of a subset of the database (a zone) has a serial number
 - ☞ The serial number is incremented on each database change
- Changes to the master copy of the database are replicated according to timing set by the zone administrator
- Cached data expires according to timeout set by zone administrator