DNS : DOMAIN NAME SYSTEM

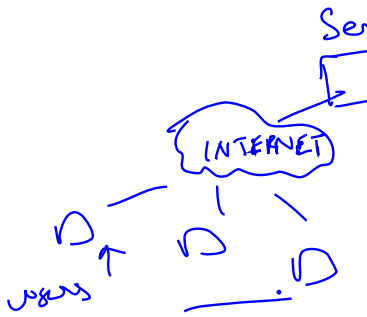
IP addresses 121 . 5 . 7 . 92

www.google.com → DNS → IP addresses

www.cse.iitb.ac.in

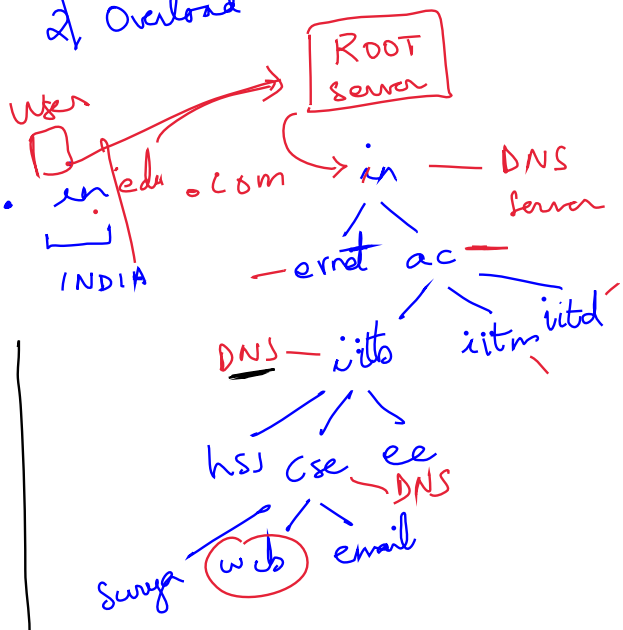
has to be robust

Idea



1) Single pt. of failure

2) Overload



ROOT SERVER

- Well provisioned — bandwidth, CPU

DOS - Denial of Service

- Redundancy — Multiple Root Servers

13 Root Servers

A . root-servers . net

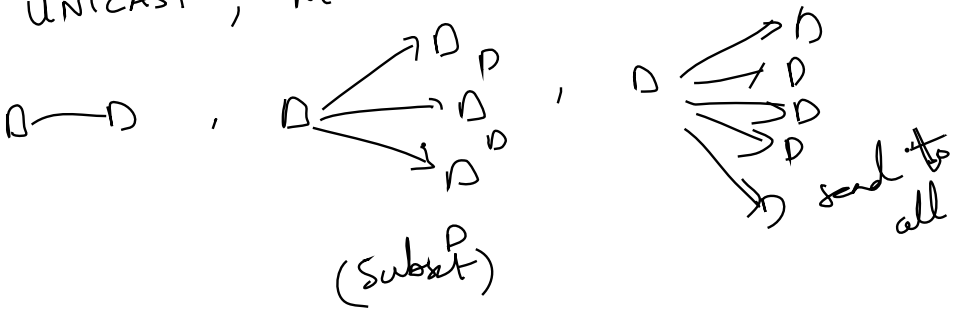
⋮

M . root-servers . net

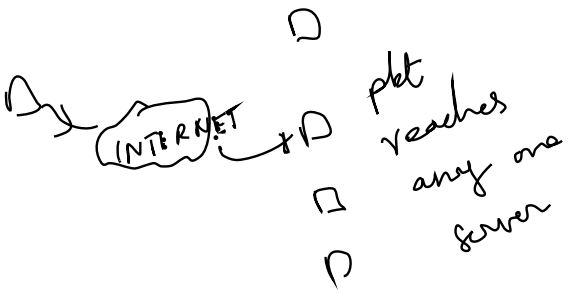
DNS pkt. size of 512 bytes
has space for 13 addresses at most

- Uses ANYCAST for more redundancy

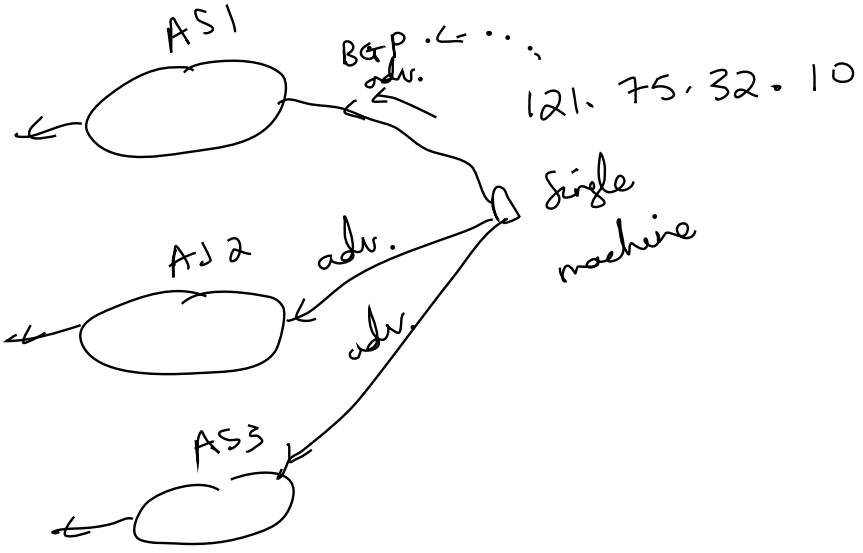
UNICAST, MULTICAST, BROADCAST

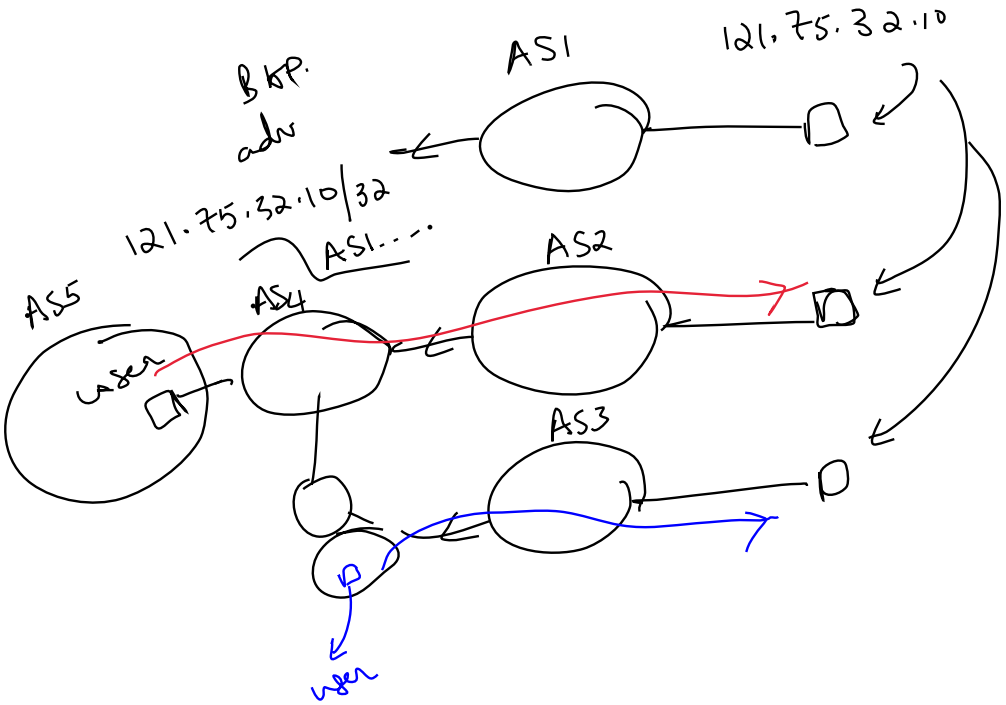


(Subset)



A.root-servers.net ⟶ mapped to many physical machines, geographically distributed





RESOURCE RECORD

< Name , Value , Type , Class , TTL >

- Name, Value → Mapping
- Type → Says How Value should be interpreted
- Class → IN (for the Internet)

Type	Value
A	IP address
NS	Name Server (host running the DNS service in domain corresponding to "Name")
CNAME	(alias of "Name"; canonical name of host specified in "Name")
MX	(name of host running mail server in domain specified in "Name")

Linux: dig www.google.com

↳ for tiny

Examples

Root Server has

✓ <edu, a3.nstld.com, NS>

name of DNS server of "edu" domain

✓ <a3.nstld.com, 192.5.6.32, A>

IP of "Name"

Server a3.nstld.com has

<princeton.edu, dns.princeton.edu, NS>

<dns.princeton.edu, 128.112.129.5, A>

Server dns.princeton.edu

<dns.cs.princeton.edu ....>

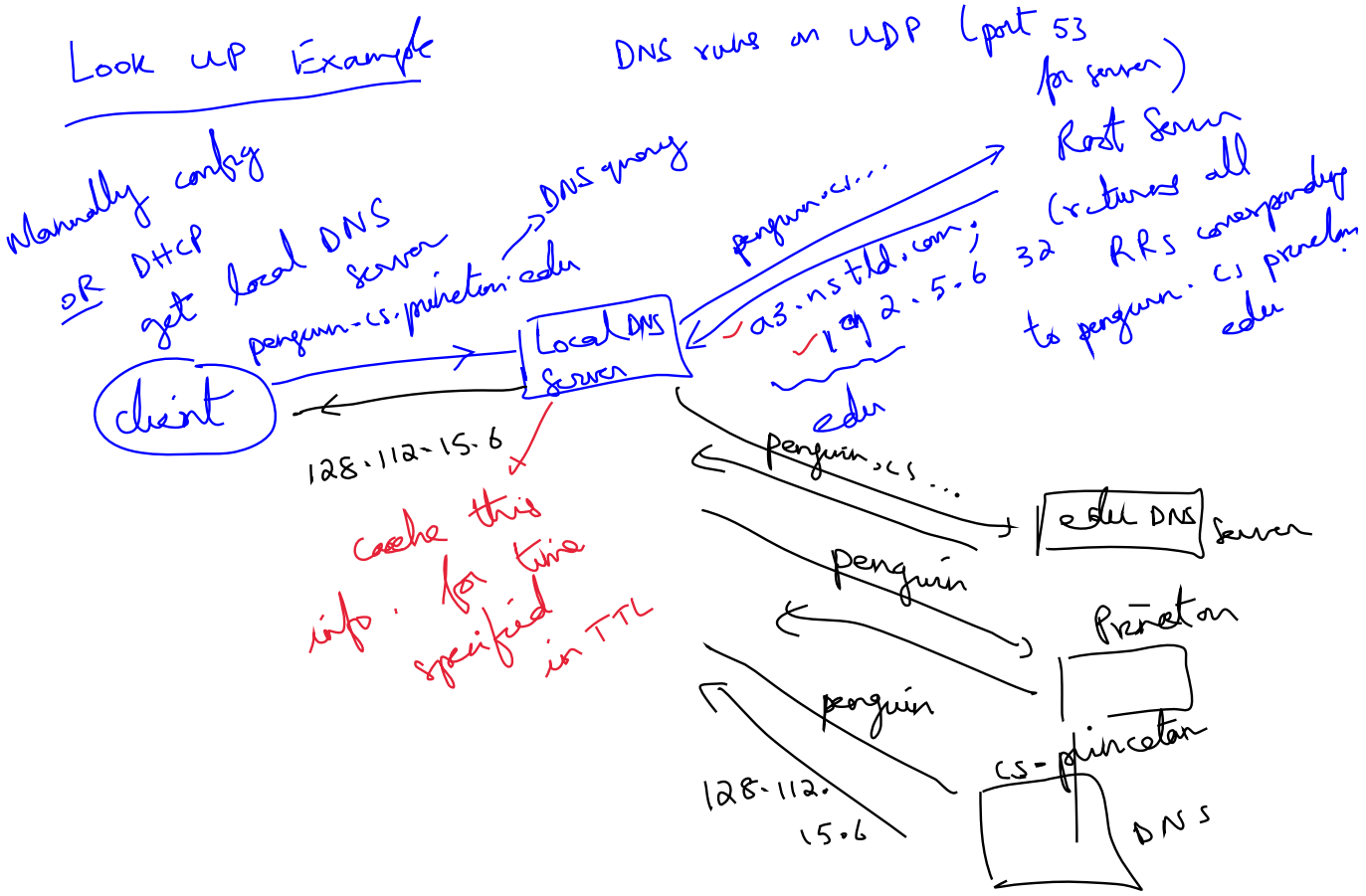
Server dns.cs.princeton.edu

<penguin.cs.princeton.edu, 128.112.15.6, A>

<www.cs.princeton.edu, corewalo.cs.princeton.edu, CNAME>

<cs.princeton.edu, mail.cs.princeton.edu, MX>

<mail.cs..... , 128.12.1.5, A>


Look up Example
DNS runs on UDP (port 53 for server)
Manually config OR DHCP get local DNS server
DNS query
penguin.cs.princeton.edu
client
Local DNS Server
penguin.cs...
a3.nstld.com; 192.5.6.32
Root Server (returns all RRs corresponding to penguin.cs.princeton.edu)
edu
128.112.15.6
cache this info. for time specified in TTL
penguin.cs...
edu DNS server
penguin
Princeton
penguin
cs-princeton
128.112.15.6
DNS