

Domain Name Service (DNS)

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Origins

- People have many identifiers: Full name, Pet name, Roll number, Passport number
- Internet hosts are no less

– Hostnames and IP addresses



→ web sense



E.g. www.facebook.com

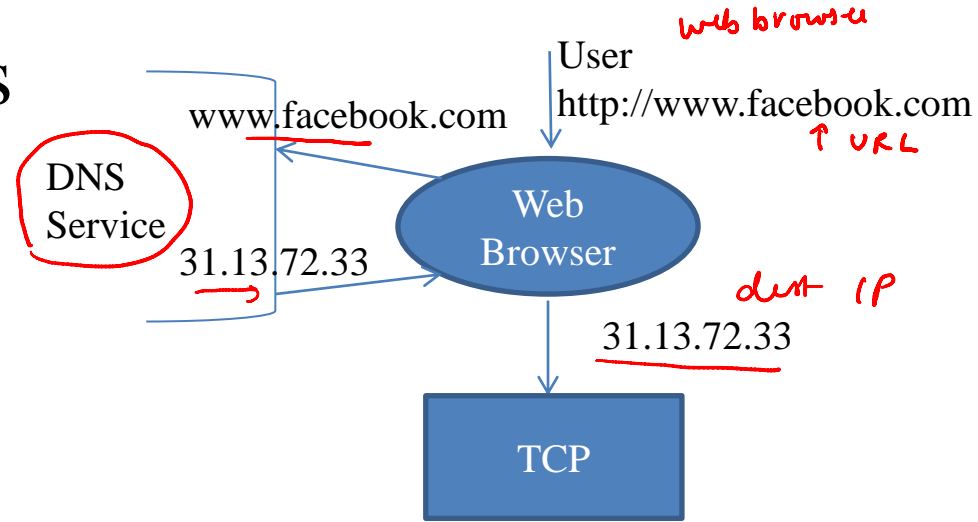
- Variable Length
- Mnemonic → easy to remember
- Carry no info to help route packets towards them

E.g. 31.13.72.33

- Fixed Length ✓
- Numeric
- Routing information embed within them

Problem and Solution

- People prefer hostnames
- Routers prefer IP addresses
- Need a service (DNS) that converts hostnames/domains to Values → IP address



Domain Name: Label that defines a realm of administrative autonomy
E.g. facebook.com; iitb.ac.in; mit.edu

DNS Services

- Host name to IP address translation

Host aliasing: “alias → other names”; many names may map finally to same IP address



- www.facebook.com. (alias hostname) maps to star.c10r.facebook.com. (canonical hostname)
 - www.facbook.com, www.facebok.com map to www.facebook.com
 - Helps run multiple services from same server
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DNS Services

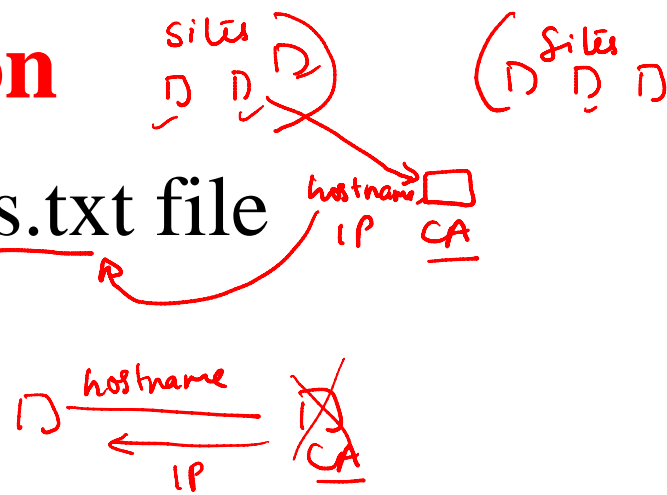
- Mail server aliasing: Help specify mailserver of a given domain
chebrolu@cse.iitb.ac.in
 - E.g. cse.iitb.ac.in maps to jeeves.cse.iitb.ac.in *↗ IP*
 - facebook.com maps to msgin.t.facebook.com
- Load distribution: Helps distribute load across replicated servers
www.google.com → many IP
 - A single hostname associated with many IP addresses; order rotated on each request

Implementation

- Original Implementation: hosts.txt file

- Centralized Architecture:

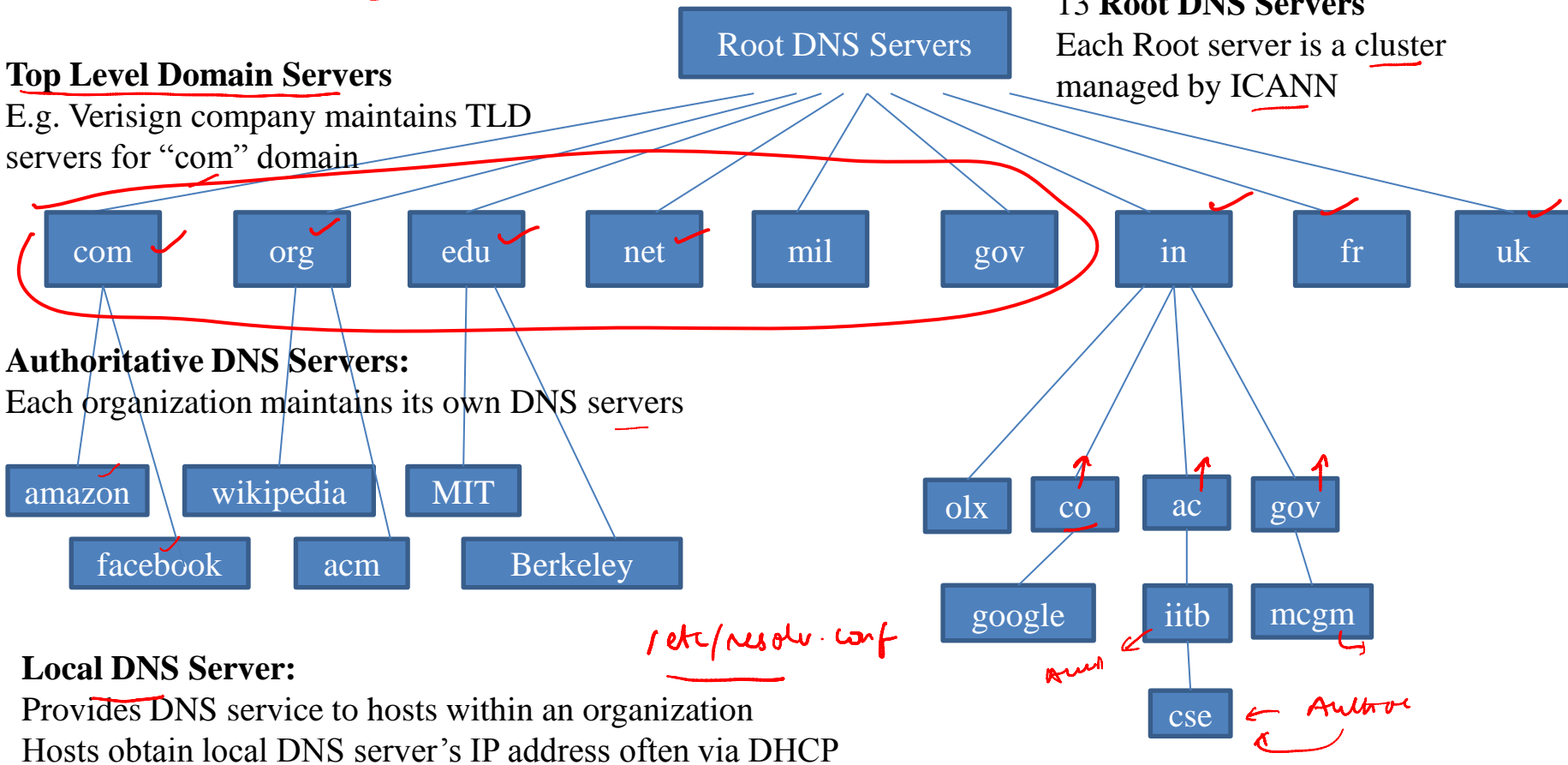
- Single point of failure
- Has to cope with high traffic volume
- Location: where should it be placed?
- Huge database maintenance
- Overall its not scalable



Hierarchical and Distributed Implementation

Top Level Domain Servers

E.g. Verisign company maintains TLD servers for “com” domain



13 Root DNS Servers

Each Root server is a cluster managed by ICANN

Authoritative DNS Servers:

Each organization maintains its own DNS servers

Local DNS Server:

Provides DNS service to hosts within an organization

Hosts obtain local DNS server's IP address often via DHCP

Root Servers

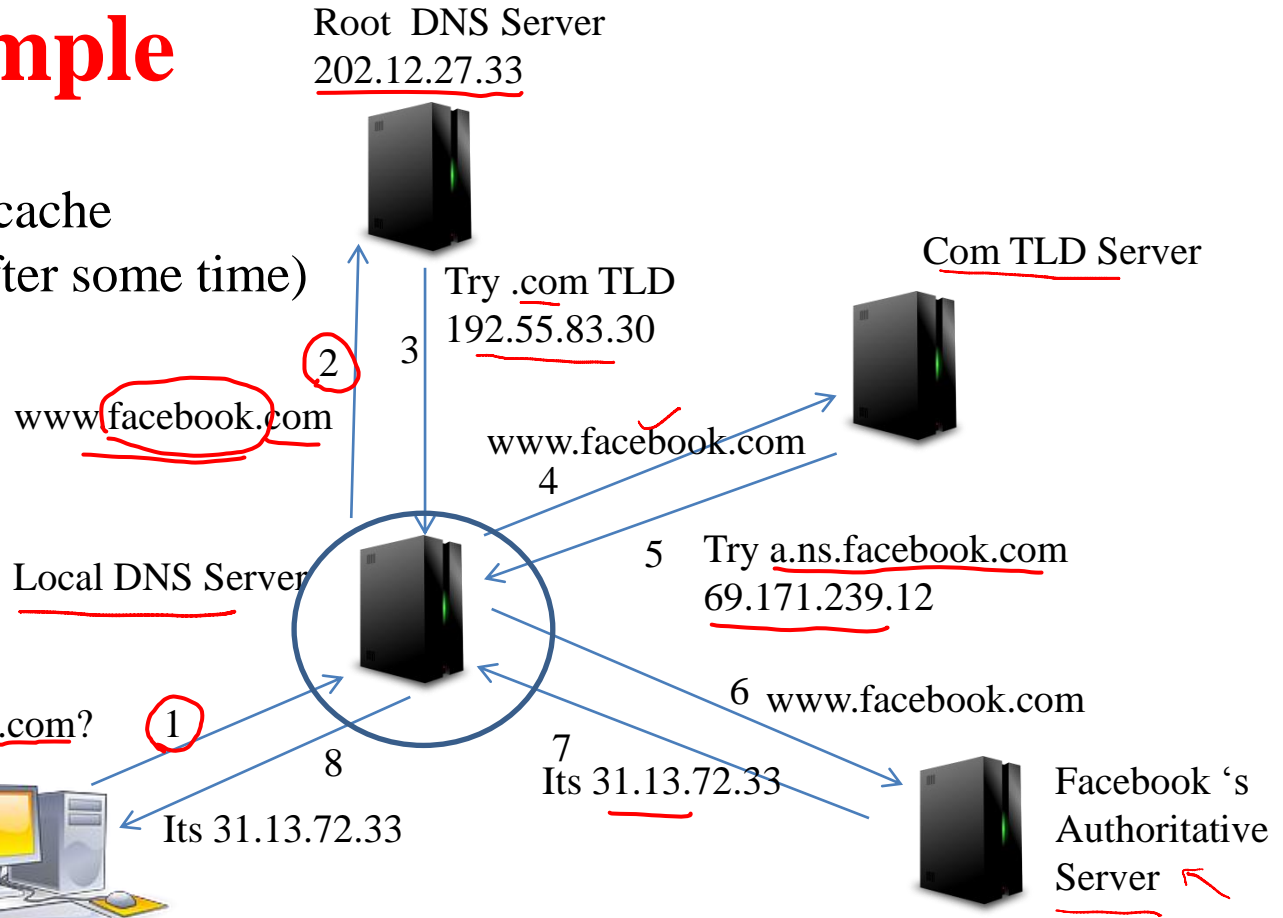


Example

Local DNS server can cache mappings (discarded after some time)

Cache
- .com TLD, IP
- .org TLD IP
TTL
Cache
www.facebook.com
31.13.72.33

Whats IP of www.facebook.com?



Break

