

LSCI 1380

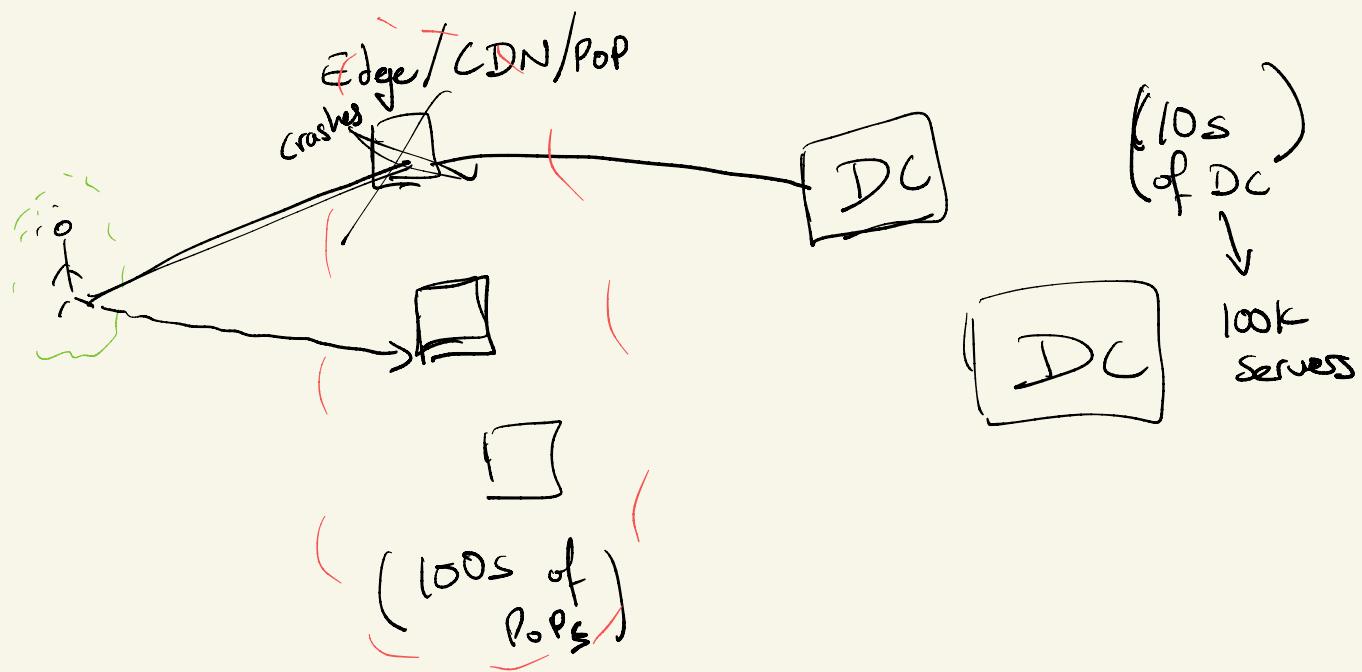
Day 6



Load Balancing

global LB
maps users to Datacenters

Cluster LB
One in a datacenter; maps users to servers



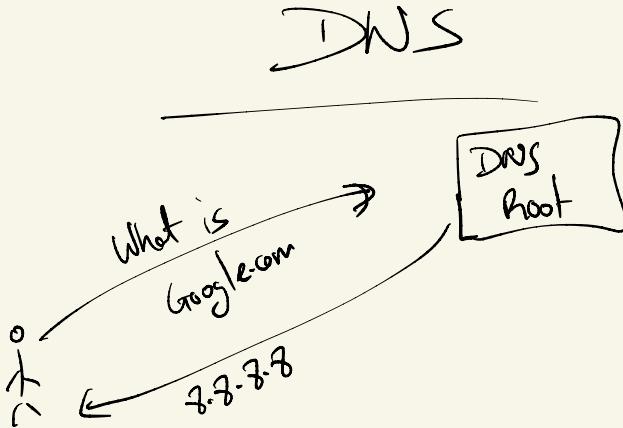
LB for Edge

- ① latency / closest location
- ② content-based
- ③ # of conn (capacity)
- ④ Health (availability)
- ⑤ policy (GDPR)

DNS: protocol for mapping users to Edge PoPs/CDNs
(alternative is BGP)

DNS v. BGP

FB	Azure Verizon
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Problems with DNS

- ① Single point of failure
- ② limited capacity
- ③ limited storage
- ④ overload

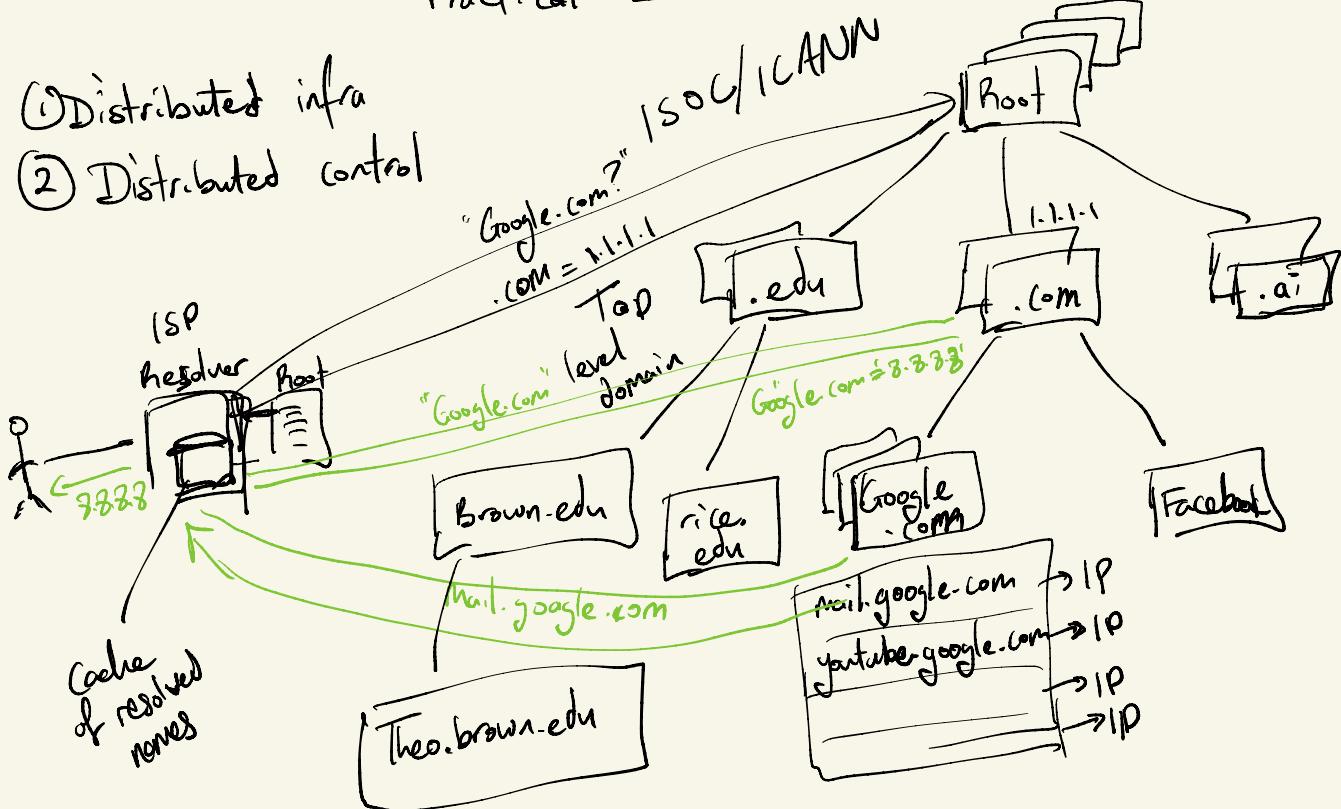
CDN1
10.10.10.10

CDN2
7.7.7.7

- Special Global LB logic @ Google.com Name server
 - ★ like zipcodes; IP addr encode location info
 - ★ when a user connects to a DNS server get user IP
 - ★ use user IP to determine user loc.
 - ★ pick CDN closest to user loc.

Practical DNS

- ① Distributed infra
- ② Distributed control



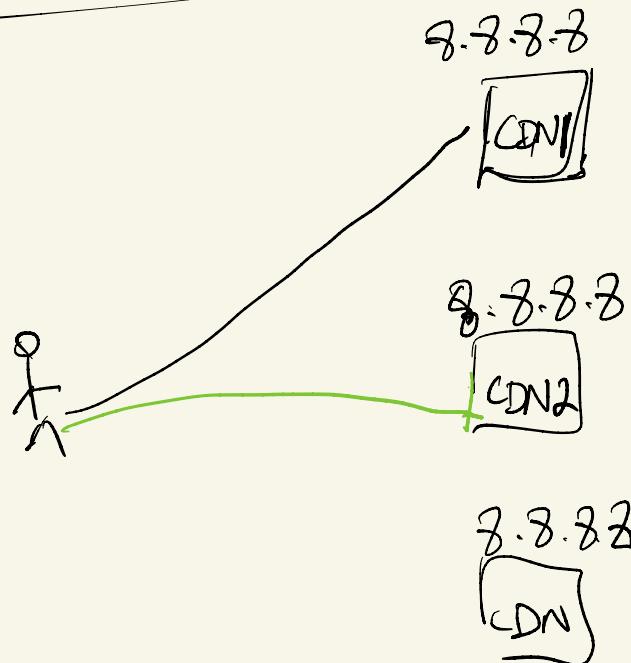
DNS Caching & Global LB

with caching improve performance by reducing lookups

But creates a problem \Rightarrow company can't change your cache & update policies

each DNS response has a TTL (Time To Live) which determines the time period a cache entry is valid for

BGP (ANYCAST)

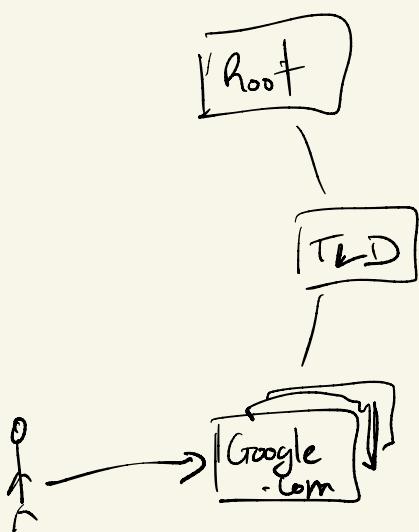


① Every CDN has some address

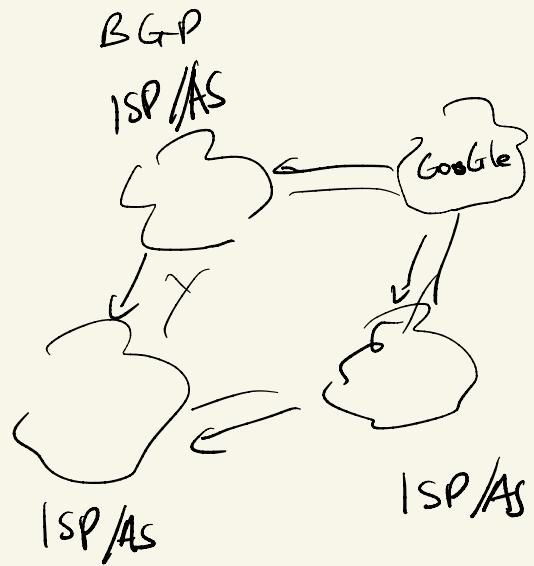
② network "automagically" routes to one location

(hopefully the closest location)

DNS



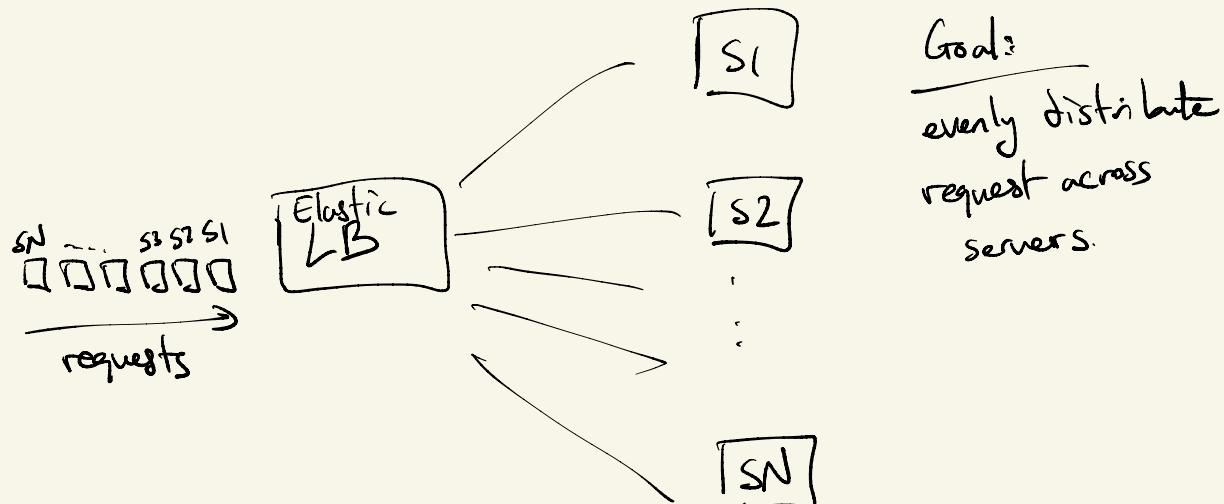
DNS server update
takes less time (simple
replication)



BGP Convergence takes time
(run the whole BGP)

Datacenter / cluster LB

- ① which DC has the data or service? send the user there...
- ② within the data center, many copies / replicas of your data or the application



Techniques

- ① Round robin
- ② Random

→ Don't maintain state
(requires a mapping for stateful services)

Next class

- ① Modulo LB
- ② Consistent hashing

LB (load Balancers)

① Global (maps users to CDNs)

- (*) DNS versus BGP
- (*) How to scale (distribution & caching)
- (*) complex policies (location, policy, content)

② cluster LB
(*) distribute load across servers
(*) random / round robin

What happens when you connect? When do you use CDNs Versus DC?

