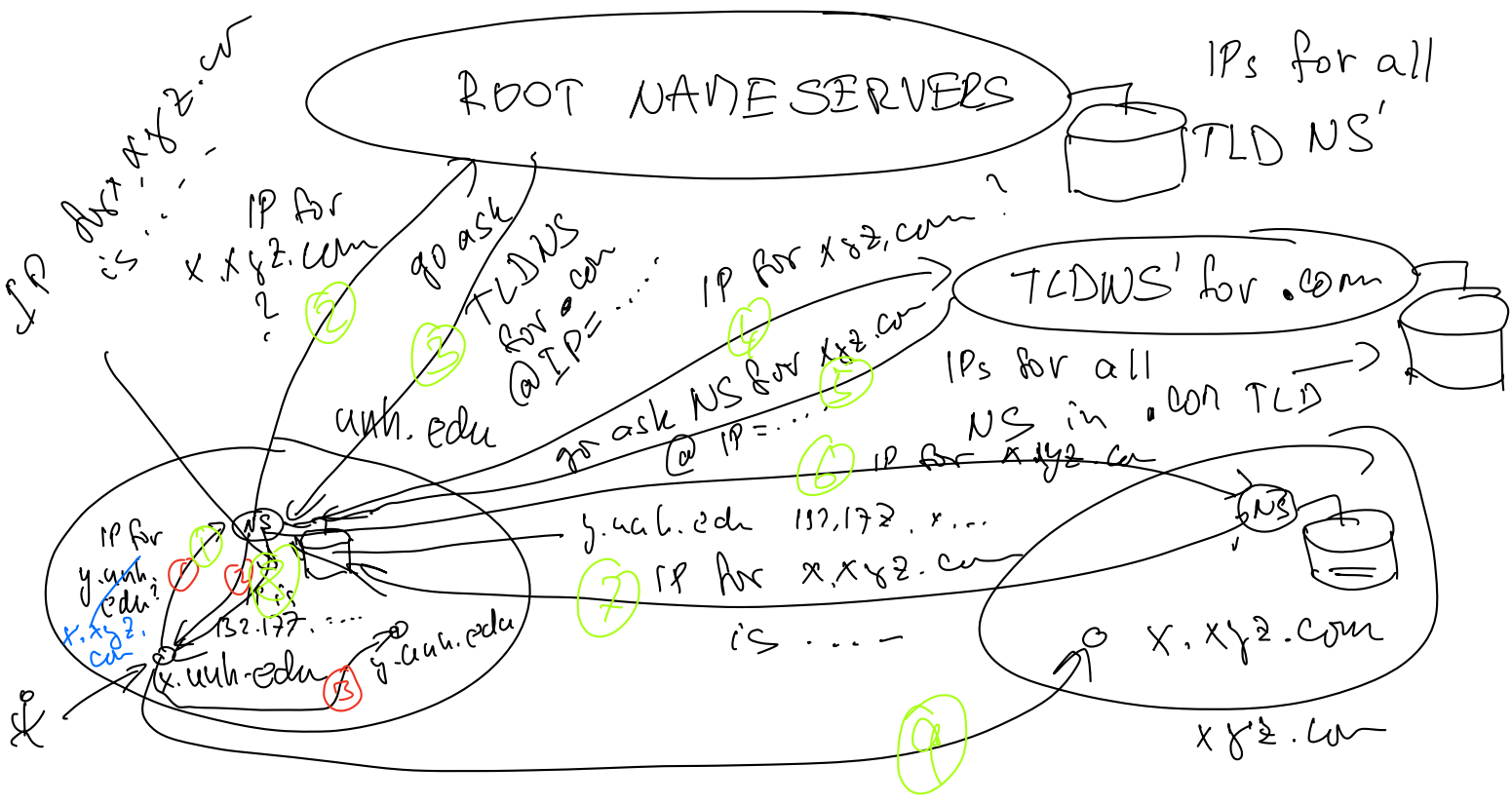# CS 725/825 & IT 725
Lecture 5
Domain Name Service

September 11, 2024

Domain Name Service

▸ Distributed, redundant, hierarchical database

  – ownership

  – characteristics of the organization (.com, .org, ...)

  – geography (.uk, .cn, .nh.us)

▸ Query delegation:

  – recursive

  – iterative (non-recursive)

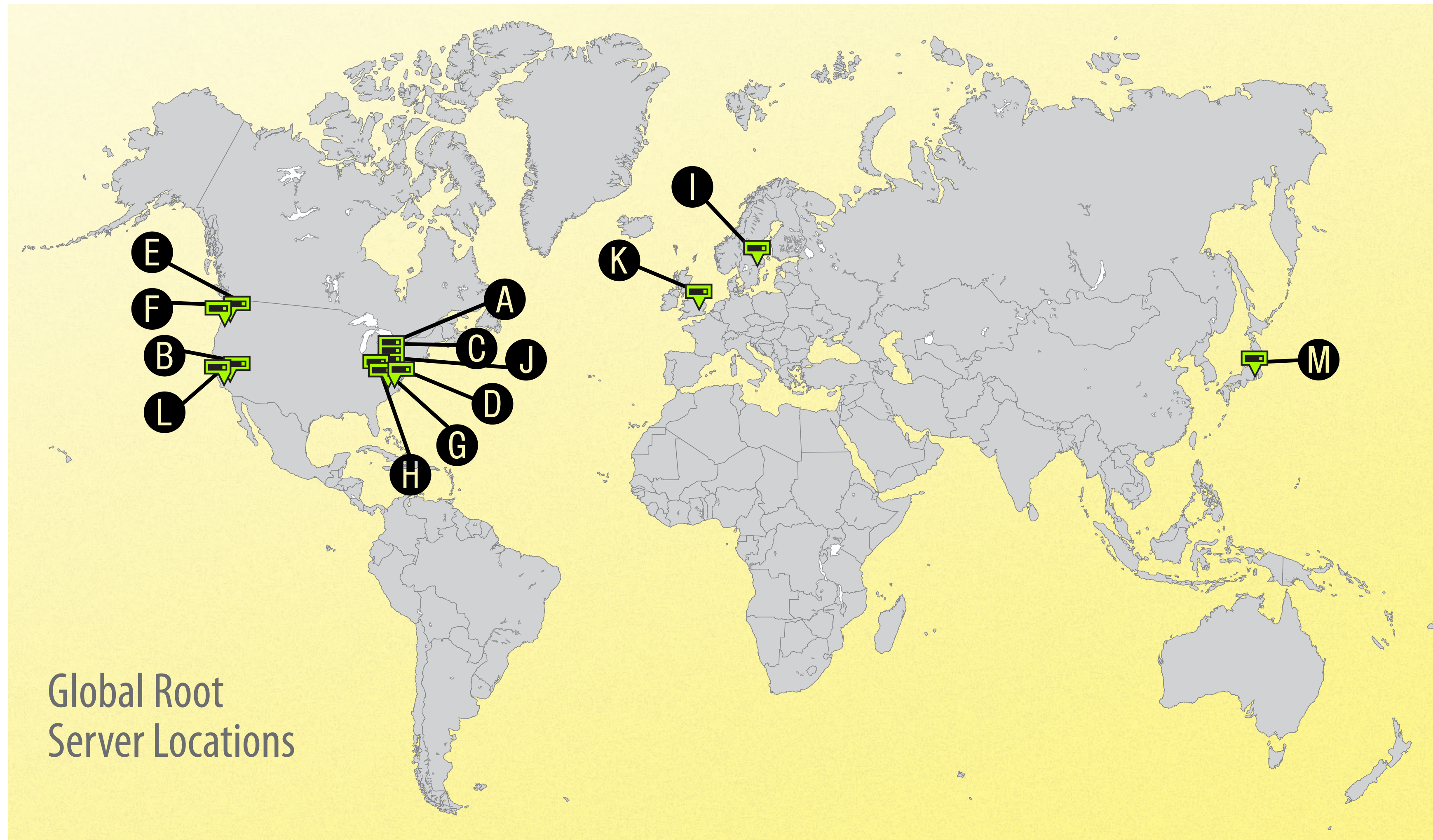# GLOBAL NAME RESOLUTION

ROOT NAME SERVERS

IPs for all
TLD NS'

IP for x.xyz.com
is ... -

IP for
x.xyz.com
? (8)

go ask
TLDNS
for .com
@IP=....

uuh.edu

IP for x8z.com ?

TLDNS' for .com

IPs for all
NS in .com TLD

go ask NS for x8z.com
@ IP=... (5)

(6) IP for x.xyz.com

NS

IP for
y.uuh.
edu ? (1)

NS

(2)

(6)

y.uuh.edu   132.178.x...

IP for x.xyz.com
is ... - (7)

x.xyz.com

x.uuh.edu

x,xyz.
com

132.177....

y.uuh.edu

(3)

xyz.com

Root Name Servers

Global Root
Server Locations

Image source: dyn.com

DNS Records (examples)

A	address record
AAAA	IPv6 address record
CNAME	canonical name record
MX	mail exchange record
NS	name server record
PTR	pointer record
SOA	start of authority record
TXT	text record

▸ DNS tools: nslookup, host, dig

DNS considerations

▸ Reliability and resilience

  – redundant servers, automatic consistency maintenance

▸ Performance

  – DNS lookup has to be completed before the next steps

  – "in-house" or outsourced DNS servers

▸ Security

  – basic protocol is not authenticated

  – recursive servers return cached responses

DHCP

▸ Dynamic Host Configuration Protocol

- to obtain IP address and other configuration params

- one or more servers on the same subnet

- utilizes IP broadcast (255.255.255.255) and UDP