

The DNS Ecosystem

ISPCP Technical Capacity Building

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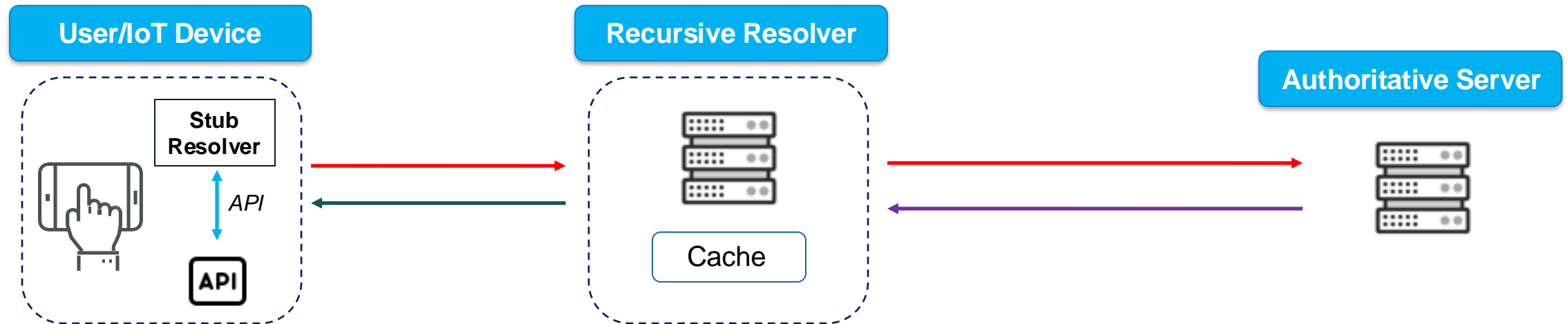


The Internet is millions of devices connected to a network of networks that talk with each other. The DNS, the Internet's address book helps facilitate that.



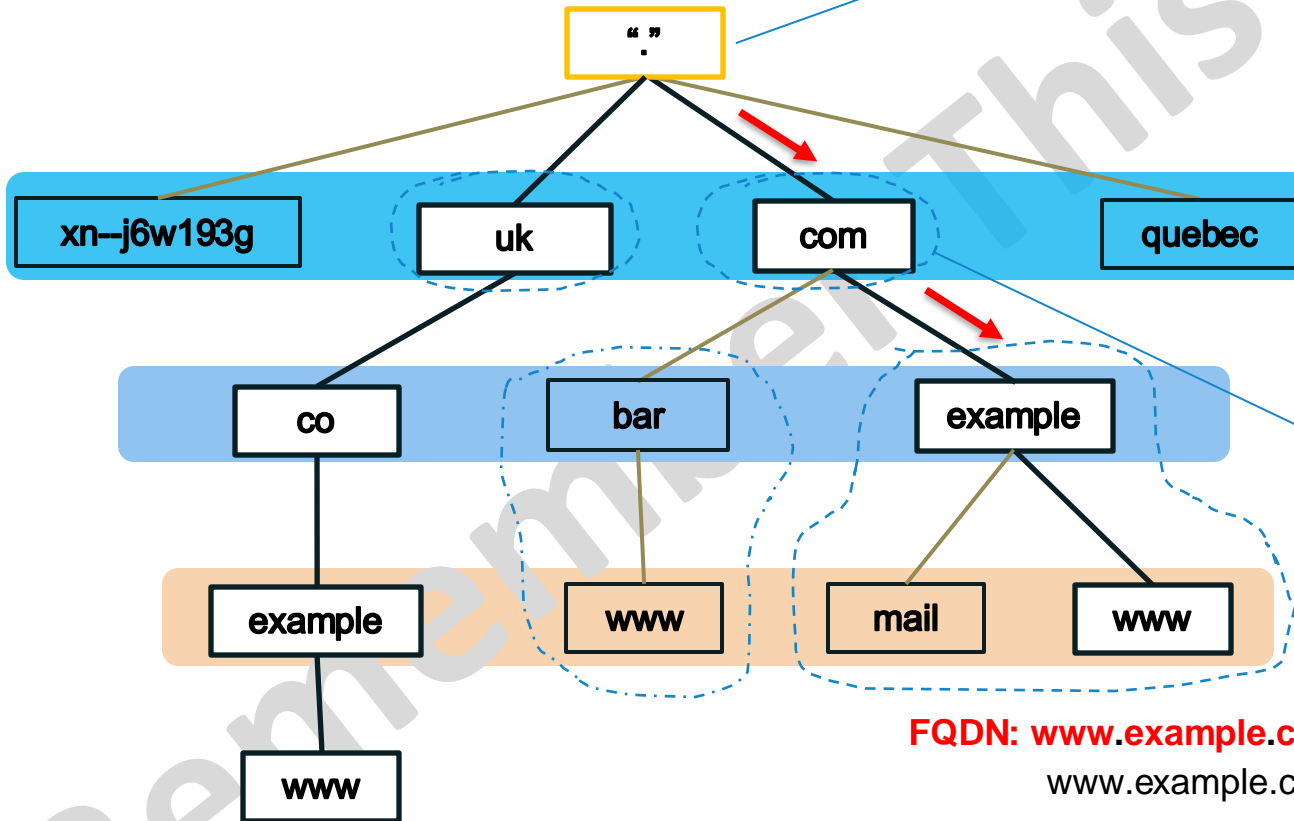
Components of the DNS Service

- The Stub Resolver [User device]
- The Recursive Resolver [ISP, Public, Corporate]
- The Authoritative [Name/Zone Manager / Operators]



Delegation

How it works

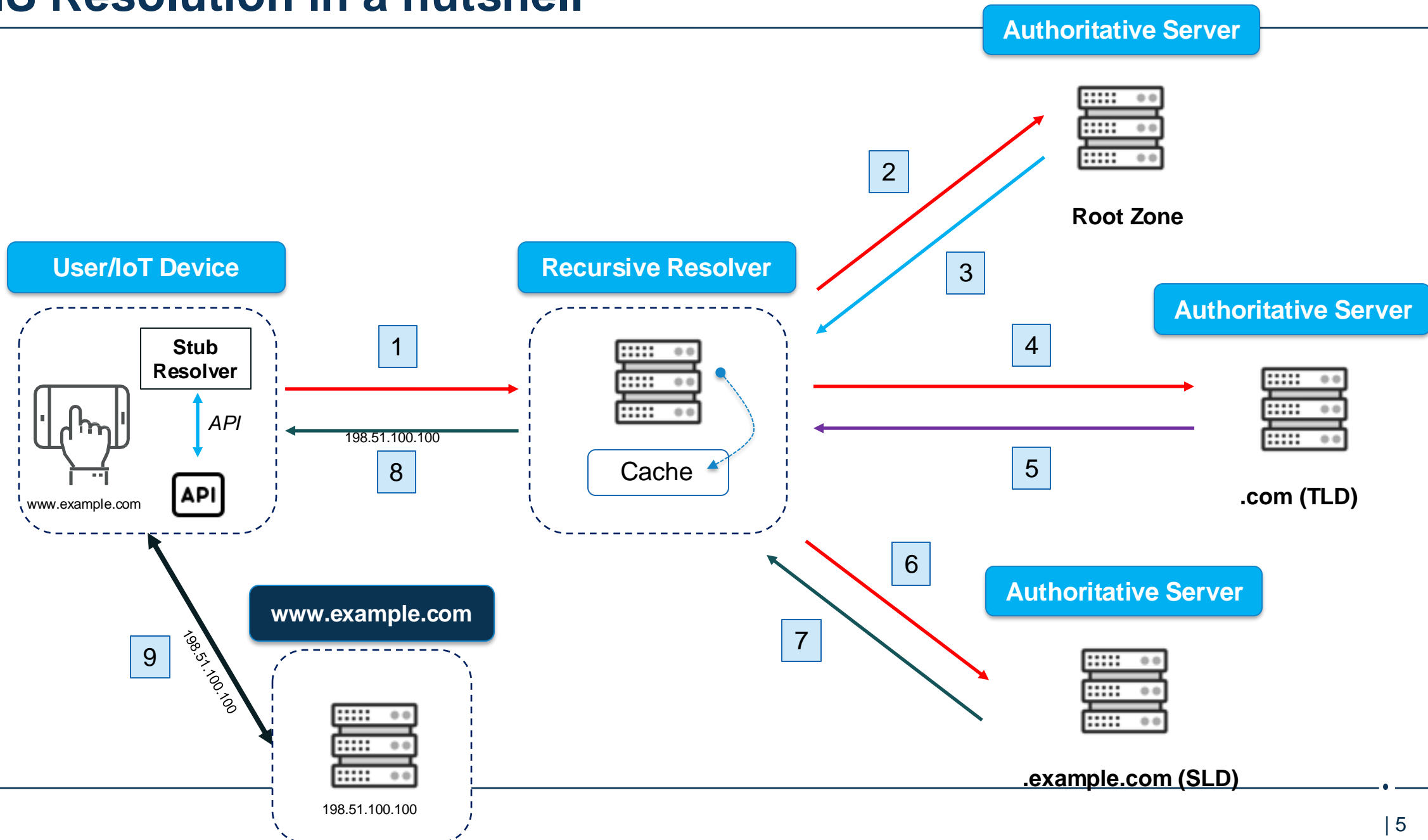


FQDN: www.example.com.
www.example.com

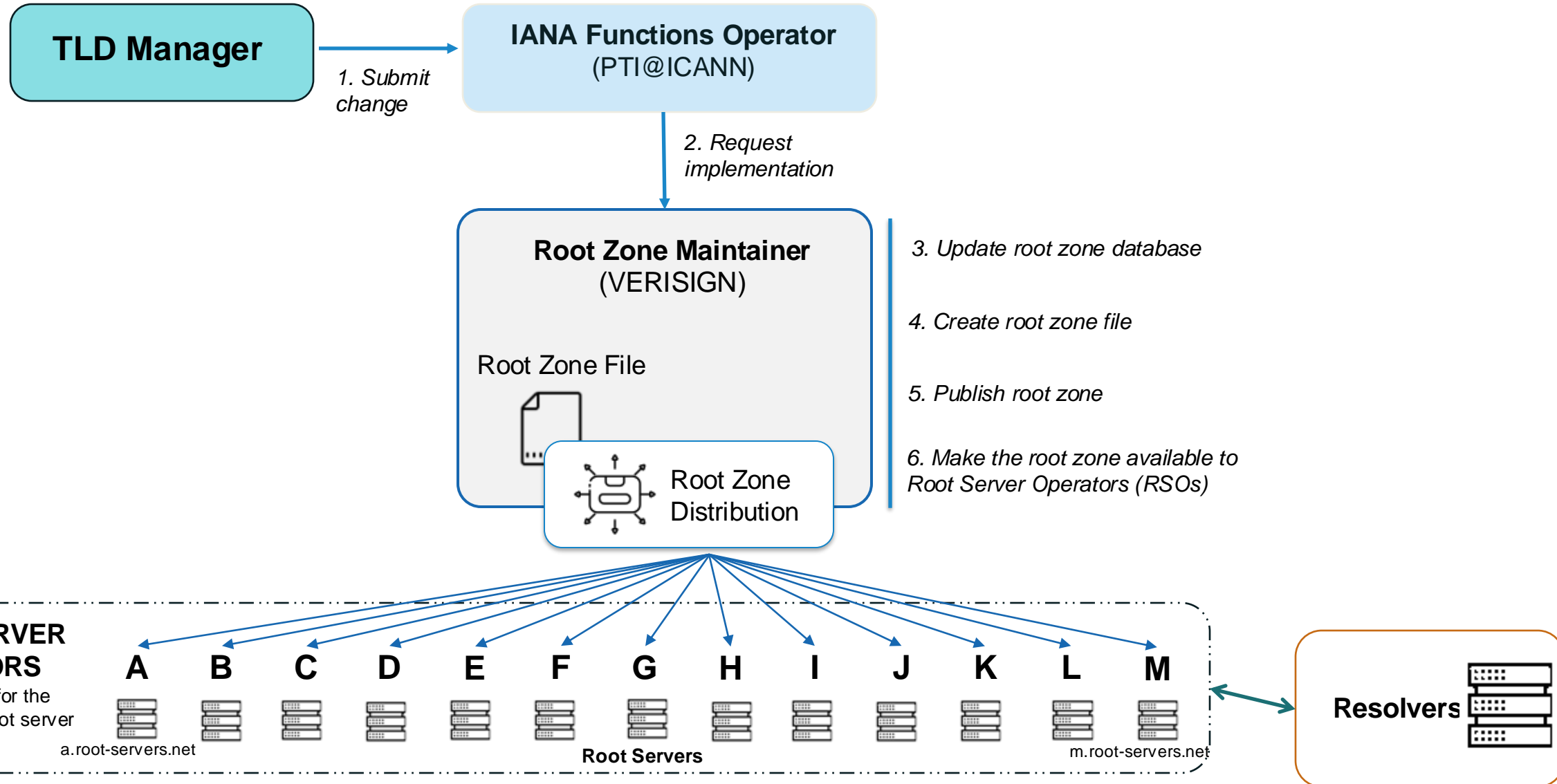
```
com. NS a.gtld-servers.net.
com. NS b.gtld-servers.net.
com. NS c.gtld-servers.net.
com. NS d.gtld-servers.net.
com. NS e.gtld-servers.net.
com. NS f.gtld-servers.net.
com. NS g.gtld-servers.net.
com. NS h.gtld-servers.net.
com. NS i.gtld-servers.net.
com. NS j.gtld-servers.net.
com. NS k.gtld-servers.net.
com. NS l.gtld-servers.net.
com. NS m.gtld-servers.net.
```

```
example.com. NS ns1.example.com.
example.com. NS ns2.example.com.
example.com. NS a.gtld-servers.net.
example.com. NS b.gtld-servers.net.
ns1.example.com. A 198.51.100.1
ns1.example.com. A. 203.0.113.150
```

DNS Resolution in a nutshell

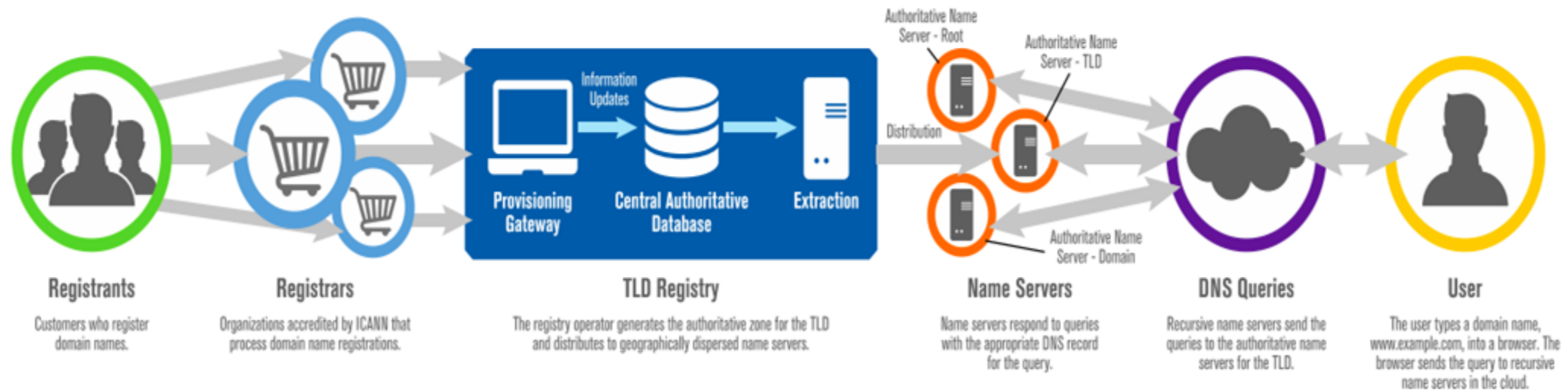


The DNS Root Zone Management

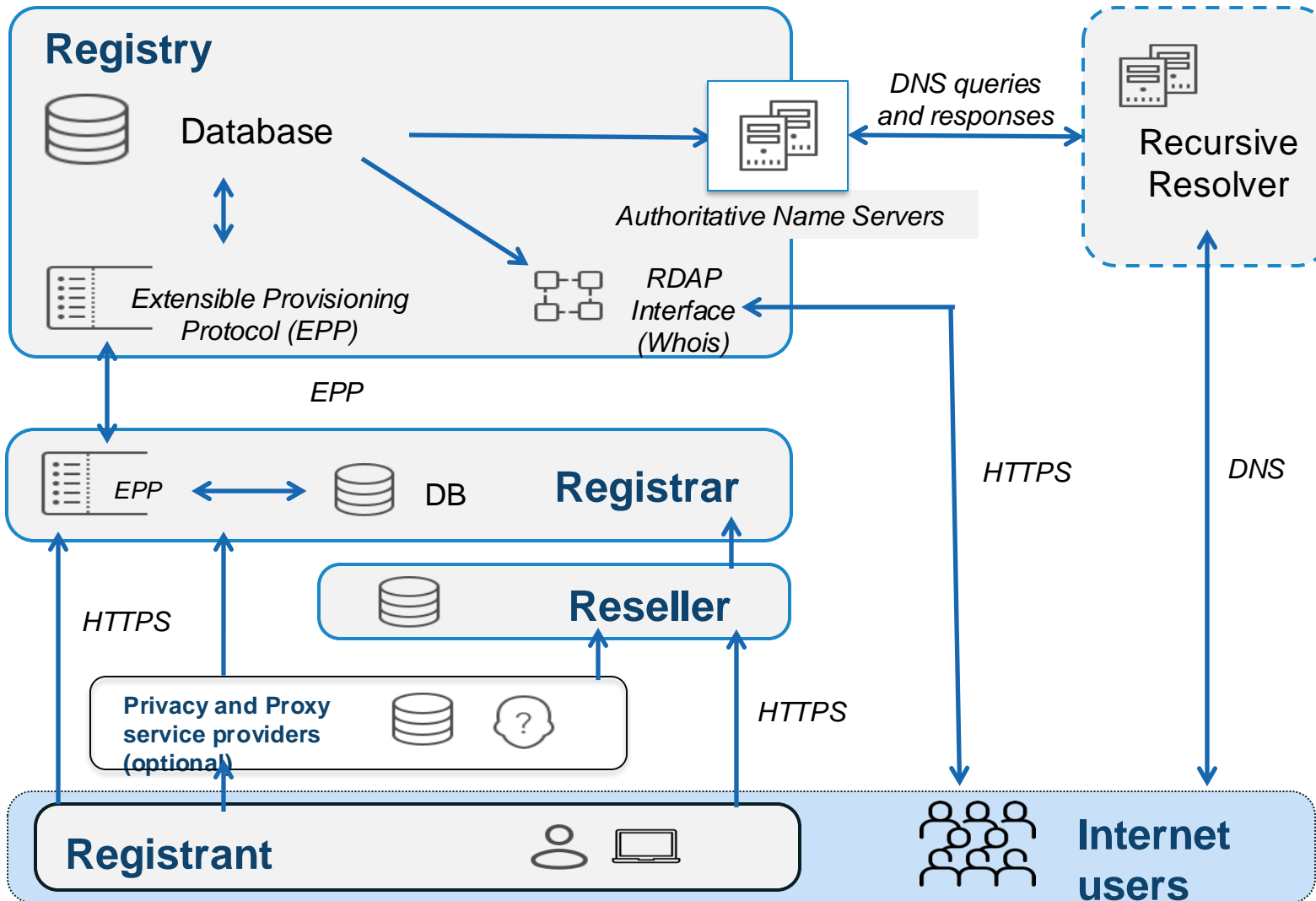


DNS Provisioning systems: multiple players and roles

- **Registries:** organizations operating TLDs from which registrars obtain domain names (Database of domain names and registrants)
- **Registrars:** Primary agent between registrant and registry (business organizations from which domain names are registered by registrants)
- **Resellers:** Agent between registrar and registrants (organizations that sell domain names to registrants)
- **Registrants:** A holder of a domain name registration (people who obtain domain names, usually at the 2nd level)



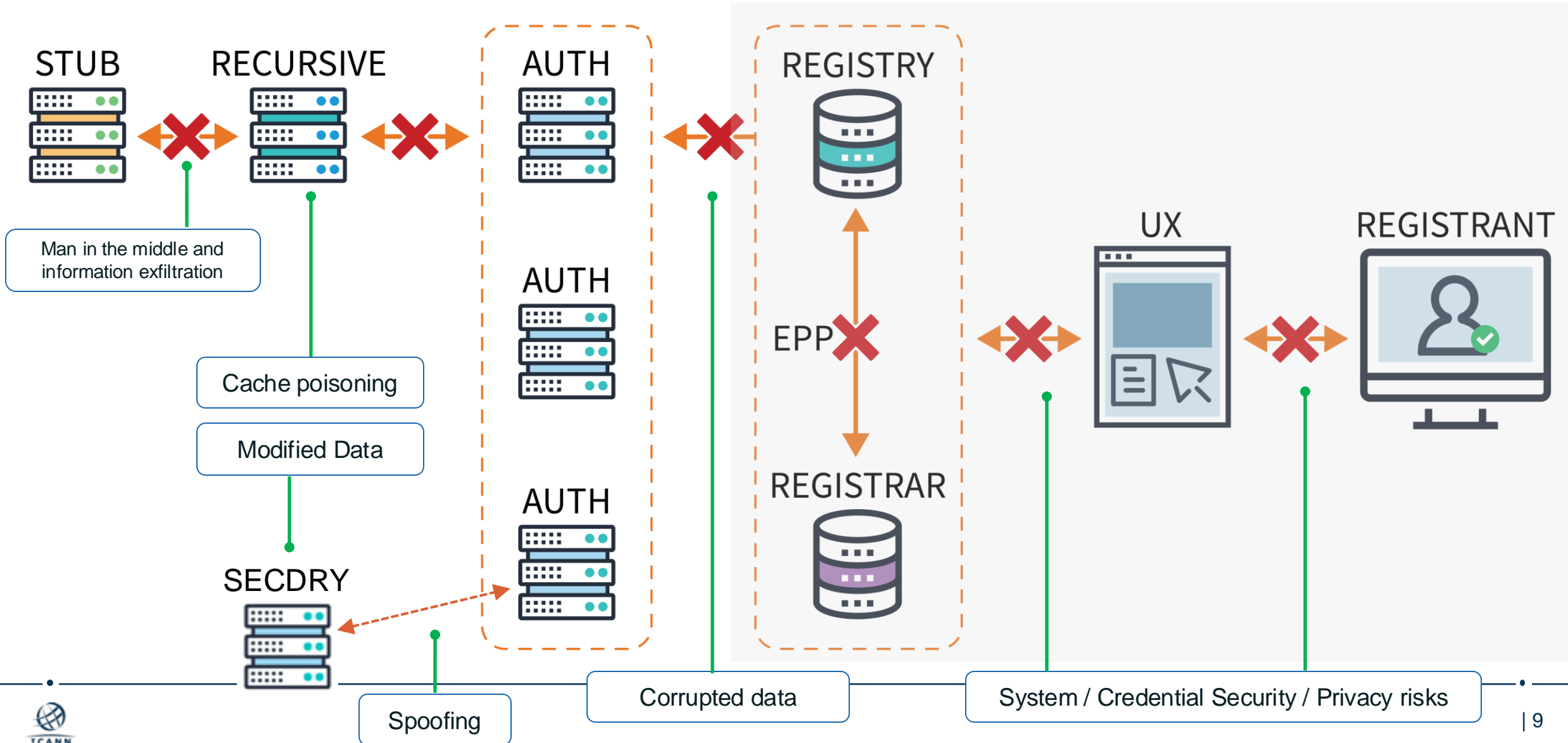
Domain Name Registries



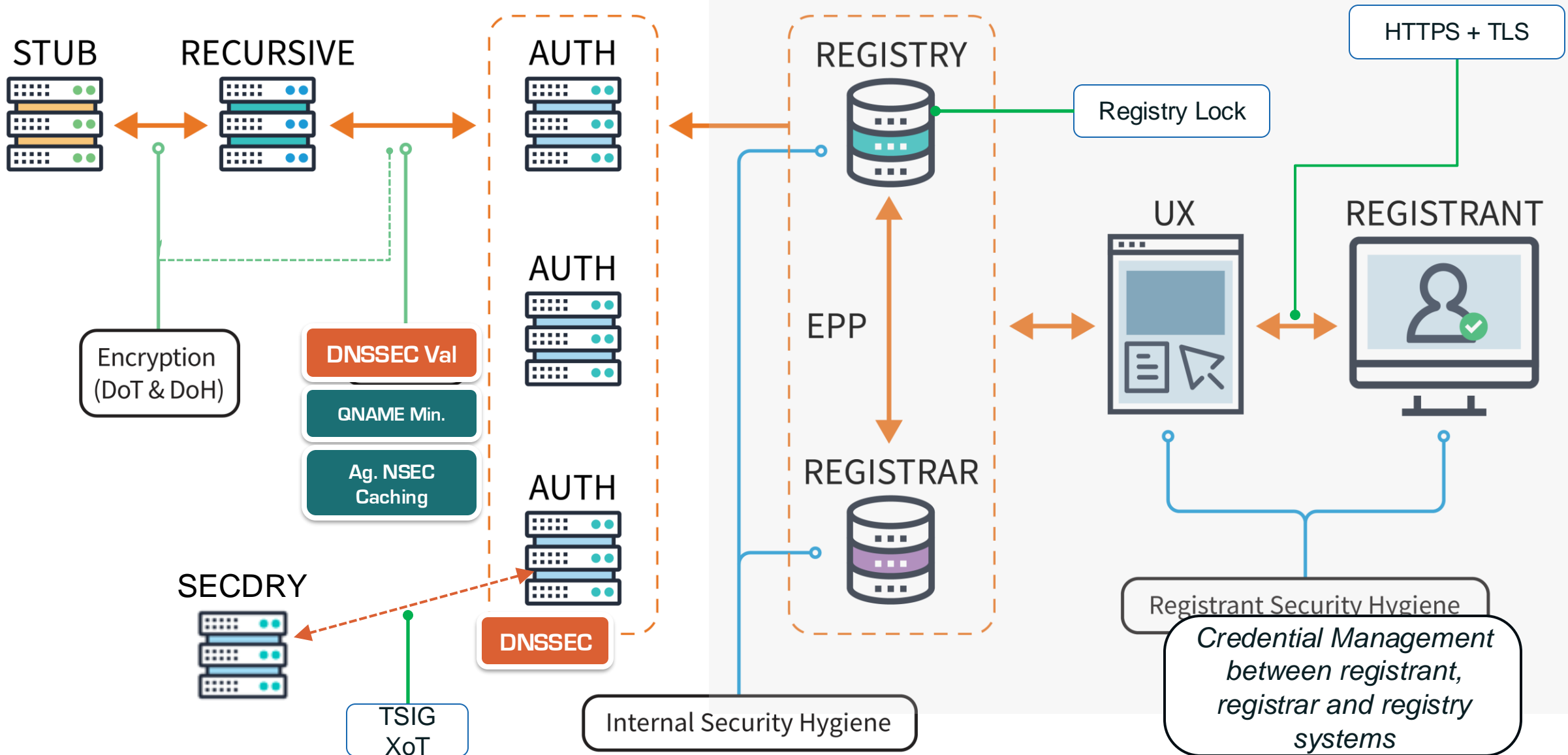
Registry as defined by Merriam-Webster:

- "a place where official records are kept"
- "a book or system for keeping an official list or record of items"

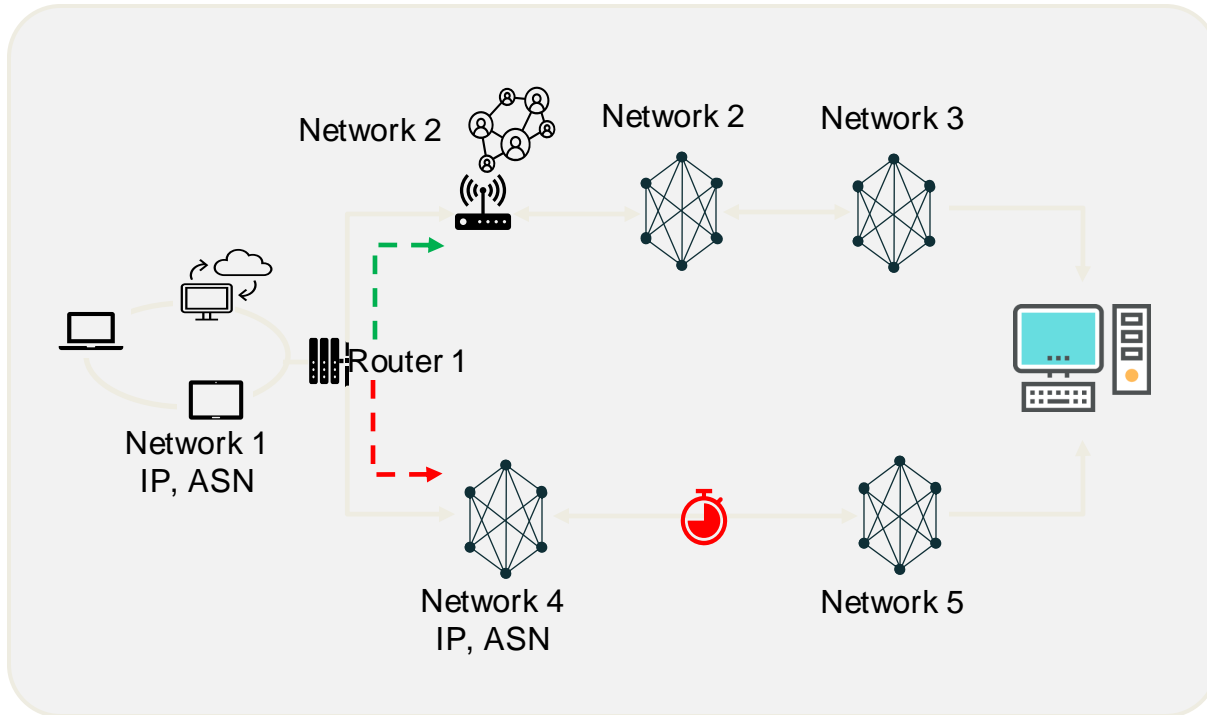
Some Security challenges in the DNS



Securing the DNS Ecosystem: mitigating some risks



Number identifiers : IP Addresses & ASNs



Components of IP Addresses Ecosystem

1. Internet Protocols Addresses (v4 & v6)

Number identifiers used to define the origin and destination of Internet traffic.

2. IP Address Space

All valid IP address ranges defined for routing Internet traffic

3. Routing (ASN)

How IP addresses are used on the Internet to allow traffic to go from point A to a point B (ISPs).

4. The Provisioning System

How IP addresses are assigned - (ICANN/RIRs/LIRs/ISPs/EU).

5. Routers & applications

Developed to process routing protocol (various)

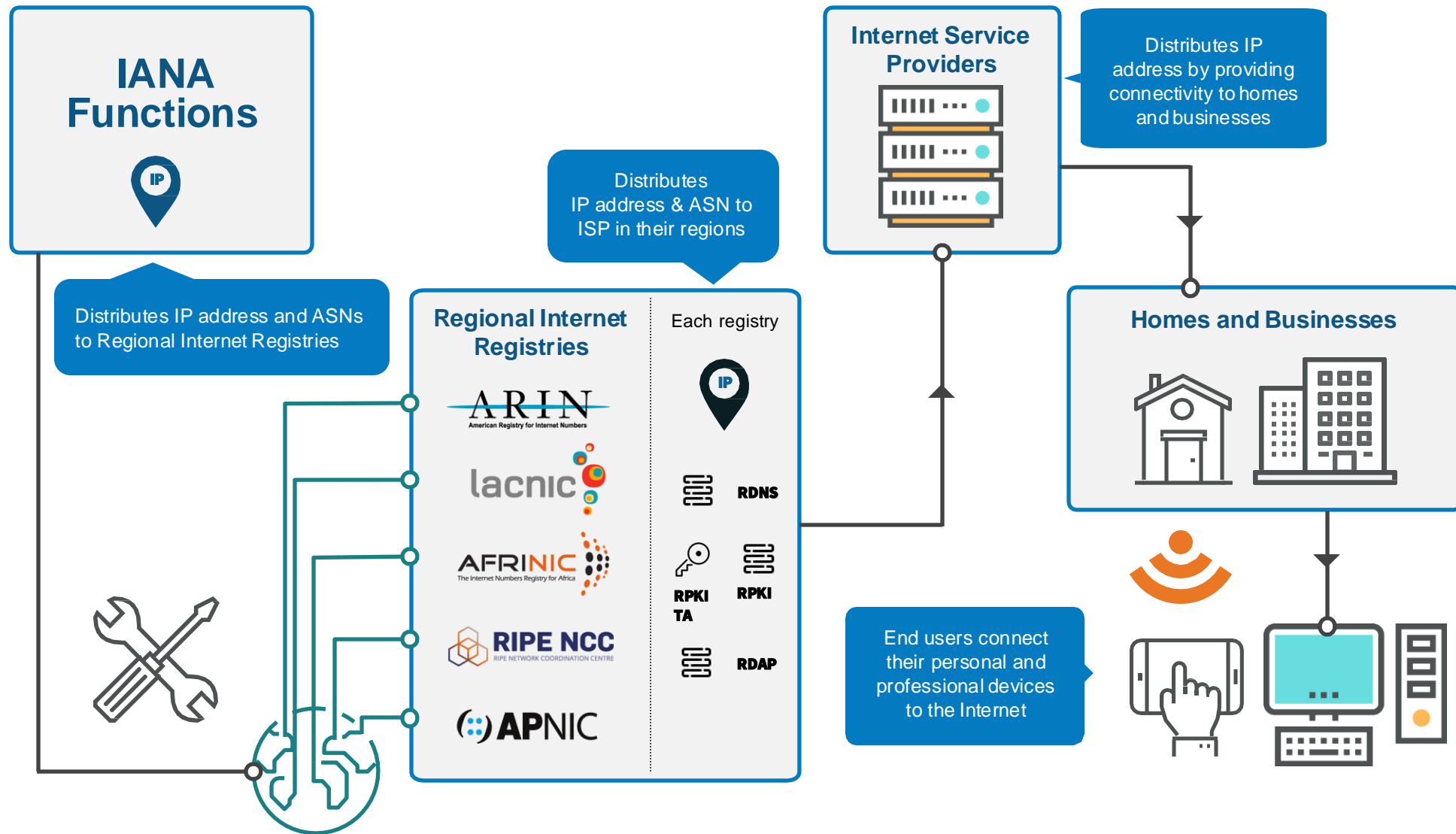
IP address and ASN representation

IPv4 198.51.100.0/24

IPv6 2001:db8::/32

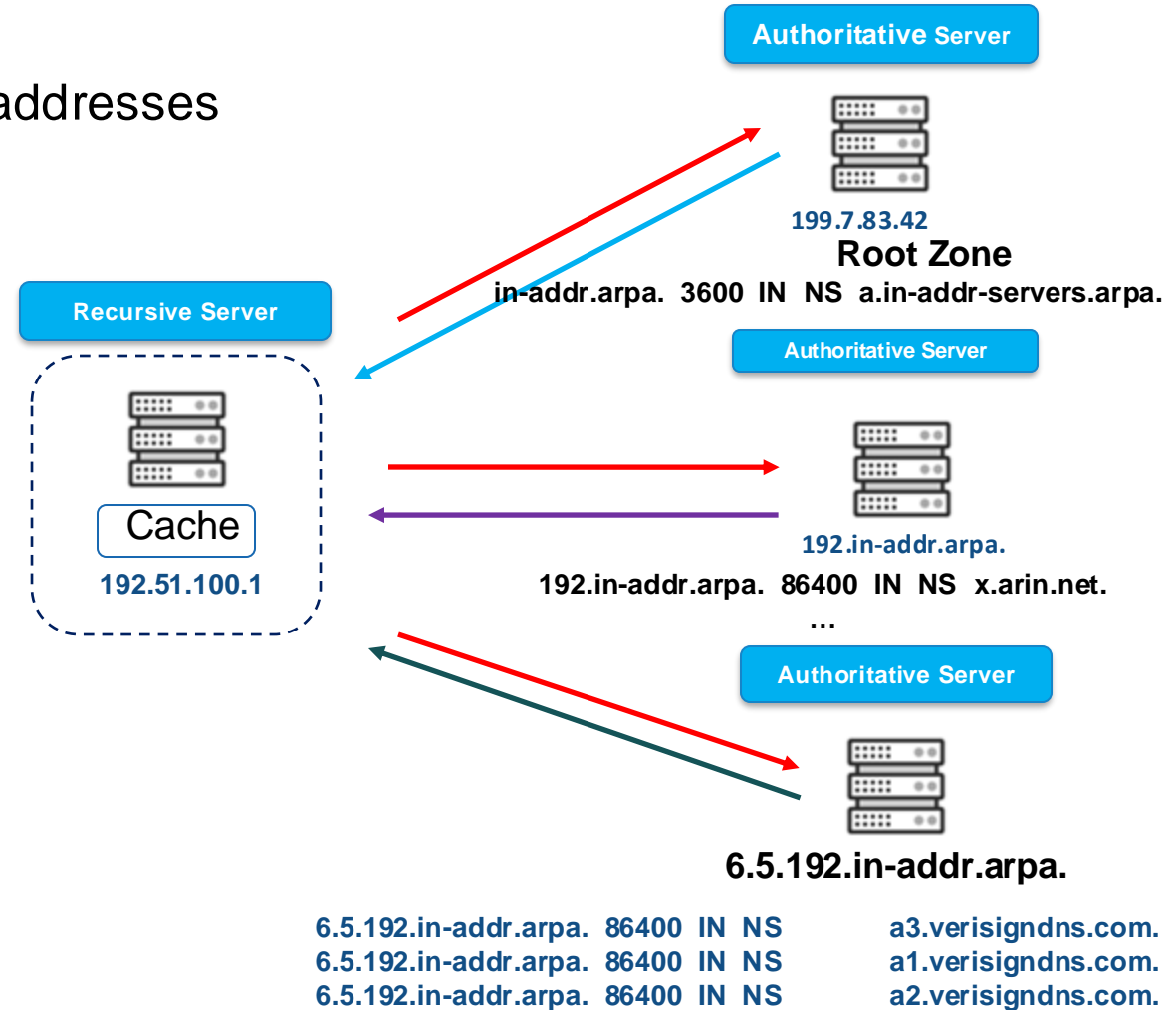
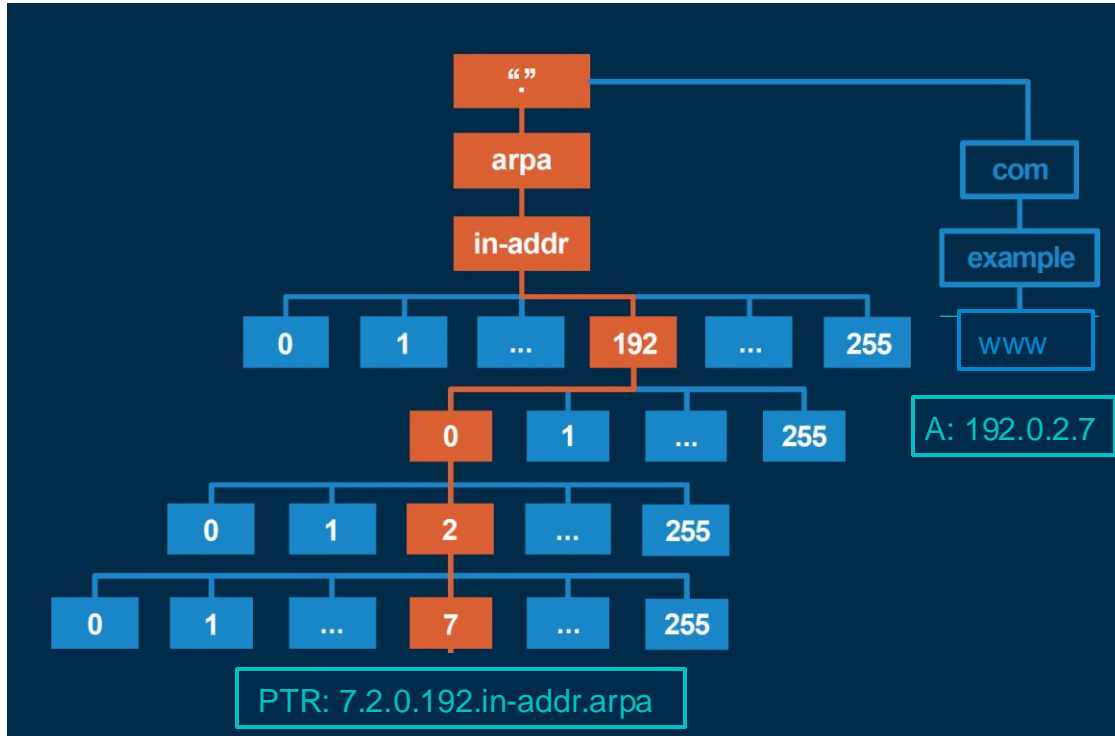
ASN 0 to 4294967295

How IP addresses Are Distributed



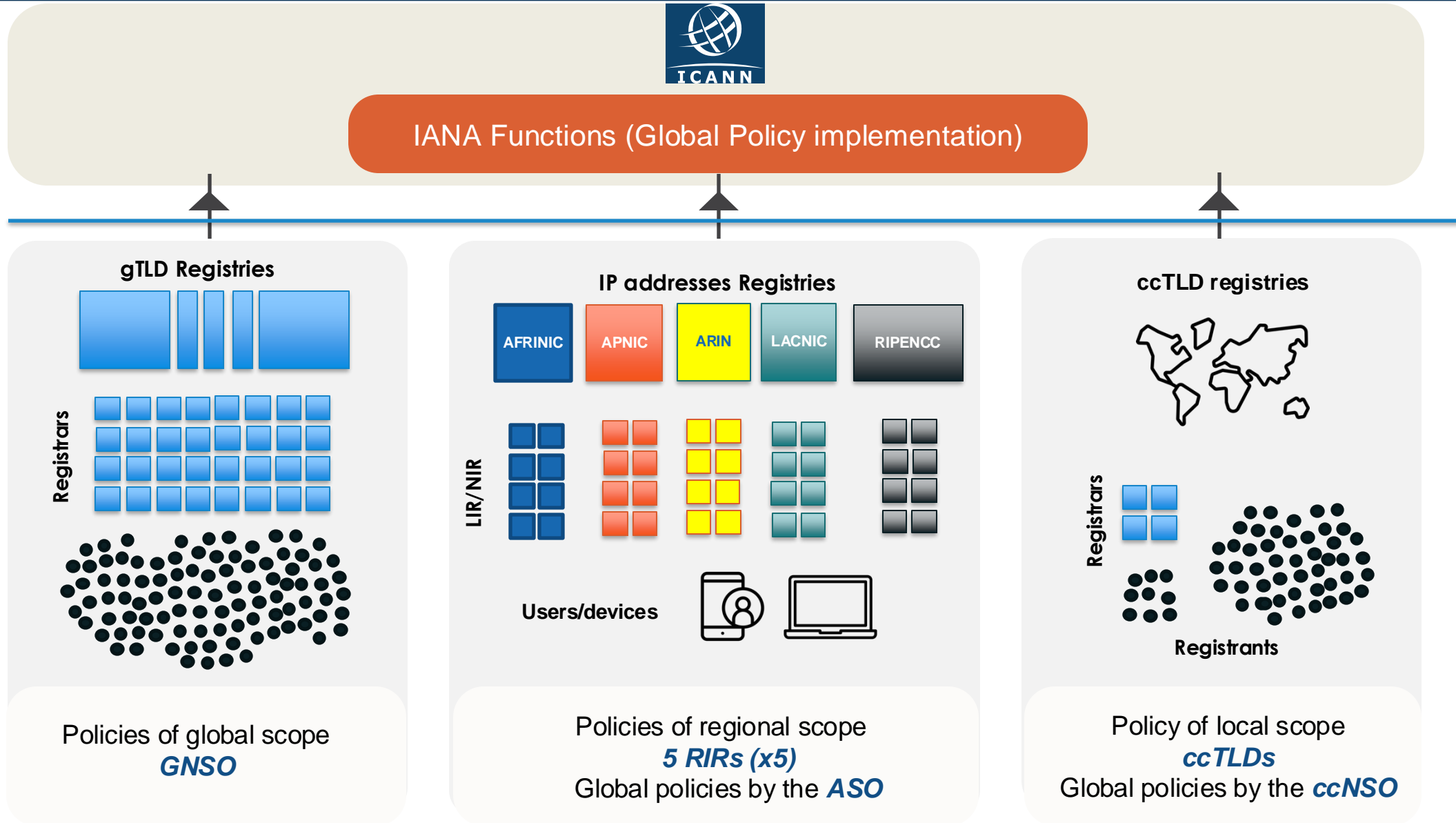
The RIR & The DNS

- Assigned IP Addressed to DNS servers
- Run reverse DNS (authoritative NSes) for IP addresses



Global PDPs coordination & implementation

Policy development scope



THANK YOU

Questions ?

Fill the form at:

bit.ly/ispcp20250123

