DNS/DNSSEC Workshop

In conjunction with LKNOG8

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ICANN

Introductions – Trainers

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Agenda

- Day 1
  - DNS Concepts
  - Root Servers
  - Recursive Servers
  - Authoritative Servers

- Day 2
  - Zone File Management
  - Internationalized Domain Names
  - Reverse DNS
  - Registry Operations and Best Practices

- Day 3
  - DNS Security and Abuse Handling
  - Transaction Signatures
  - DNS Security Extensions (DNSSEC)

- Day 4
  - DNS Security Extensions (DNSSEC) contd
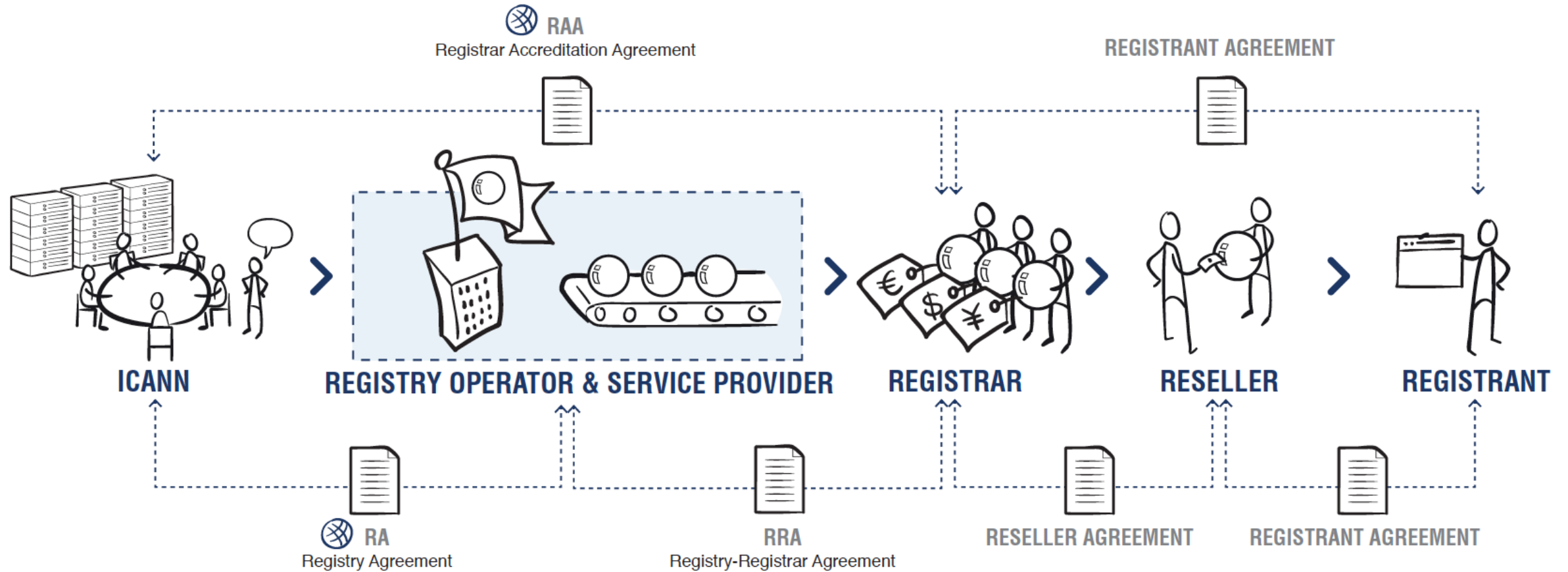 - Tools and Troubleshooting
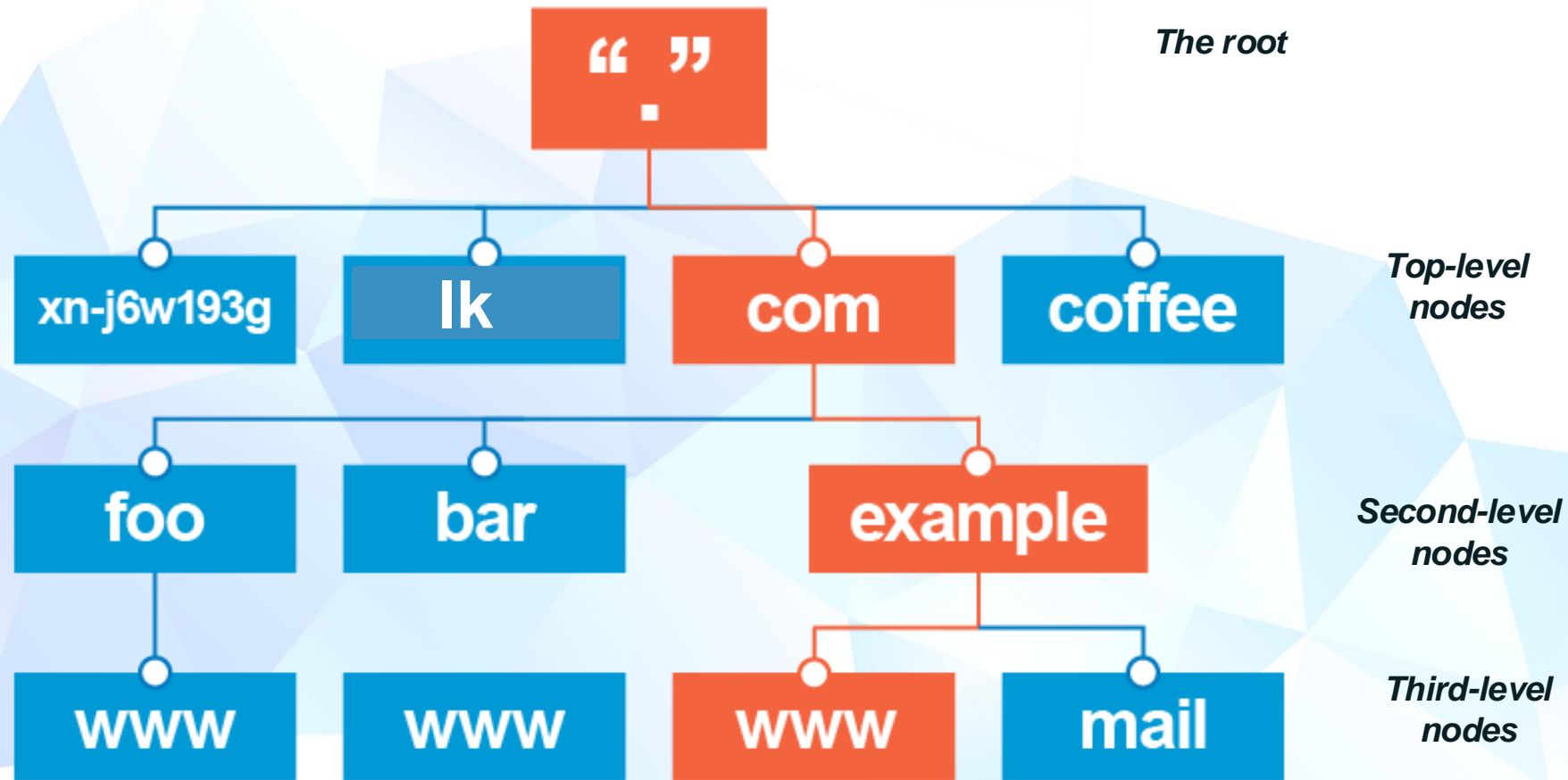 - Discussions/Q&A

DNS Concepts

DNS in a nutshell

- DNS is a distributed database
  - Data is maintained locally but available globally
- *Resolvers* send queries
- *Name servers* answer queries
- Optimizations:
  - Caching to improve performance
  - Replication to provide redundancy and load distribution
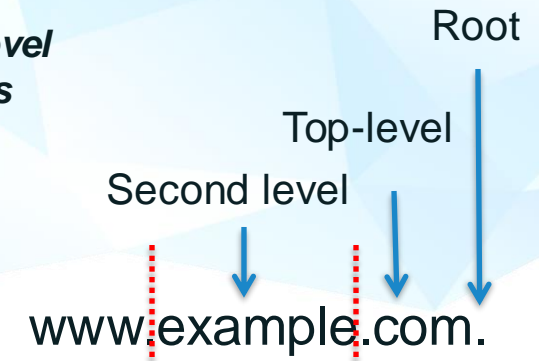
The DNS Ecosystem

DNS Hierarchy

The root

Top-level nodes

Second-level nodes

Third-level nodes

FQDN = **F**ully **Q**ualified **D**omain **N**ame

Root

Top-level

Second level

www.example.com.

ASCII Domain Name Label

www.cafe-123.com

Third-level domain

Second-level domain

Top-level domain (TLD)

② **Forming ASCII Labels**
Use **LDH**
- **L**etters [a-z]
- **D**igits [0-9]
- **H**yphen [H]

Label length = 63
Other constraints (e.g. on hyphen)

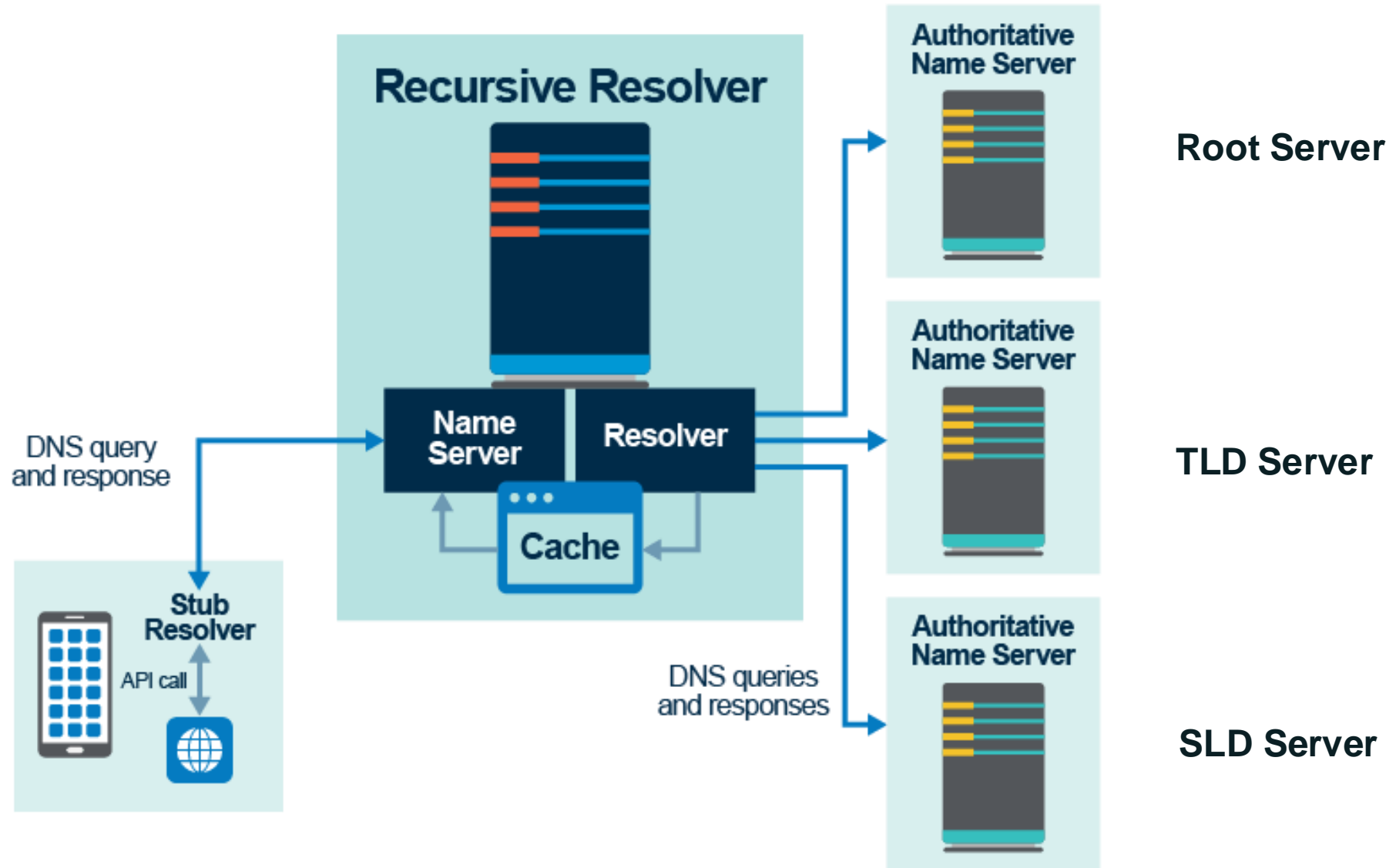① **Forming ASCII Labels**
Use only Letters
- Letters [a-z]
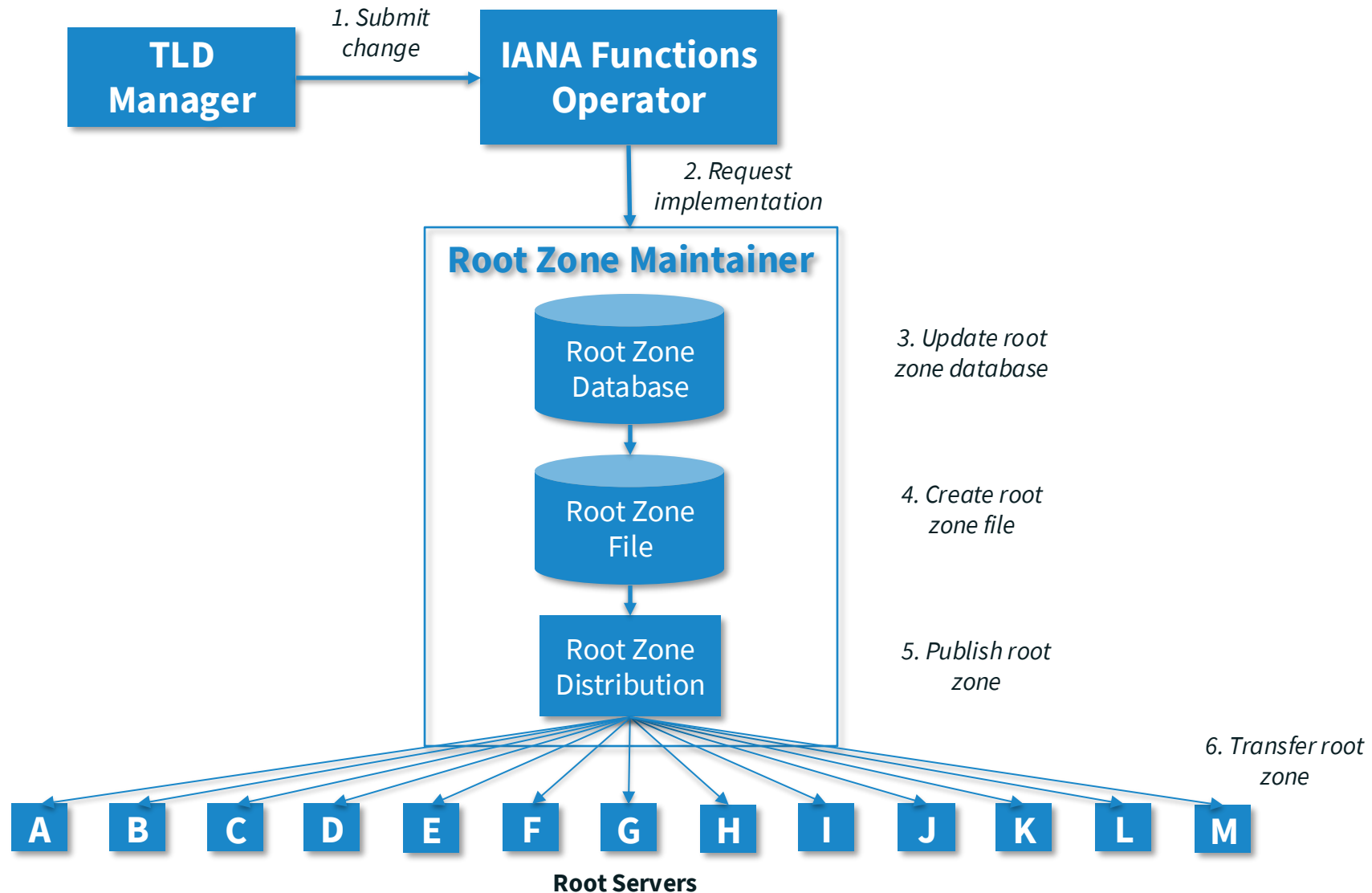
Label length = 63

DNS Components at a Glance

DNS Servers

- ⊙ Authoritative Servers
  - ○ Root Servers
  - ○ Primary
  - ○ Secondary

- ⊙ Recursive Servers
  - ○ Or Recursive Resolvers
  - ○ Or Caching Servers

Root Zone Change Process

TLD Manager

1. Submit change

IANA Functions Operator

2. Request implementation

Root Zone Maintainer

Root Zone Database

3. Update root zone database

Root Zone File

4. Create root zone file

Root Zone Distribution

5. Publish root zone

6. Transfer root zone

A B C D E F G H I J K L M

Root Servers

The DNS Ecosystem Relationships

Registrants
Customers who register domain names.

Registrars
Organizations accredited by ICANN that process domain name registrations.

TLD Registry
The registry operator generates the authoritative zone for the TLD and distributes to geographically dispersed name servers.

Name Servers
Name servers respond to queries with the appropriate DNS record for the query.

DNS Queries
Recursive name servers send the queries to the authoritative name servers for the TLD.

User
The user types a domain name, www.example.com, into a browser. The browser sends the query to recursive name servers in the cloud.

Questions?

Engage with ICANN – Thank You and Questions

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