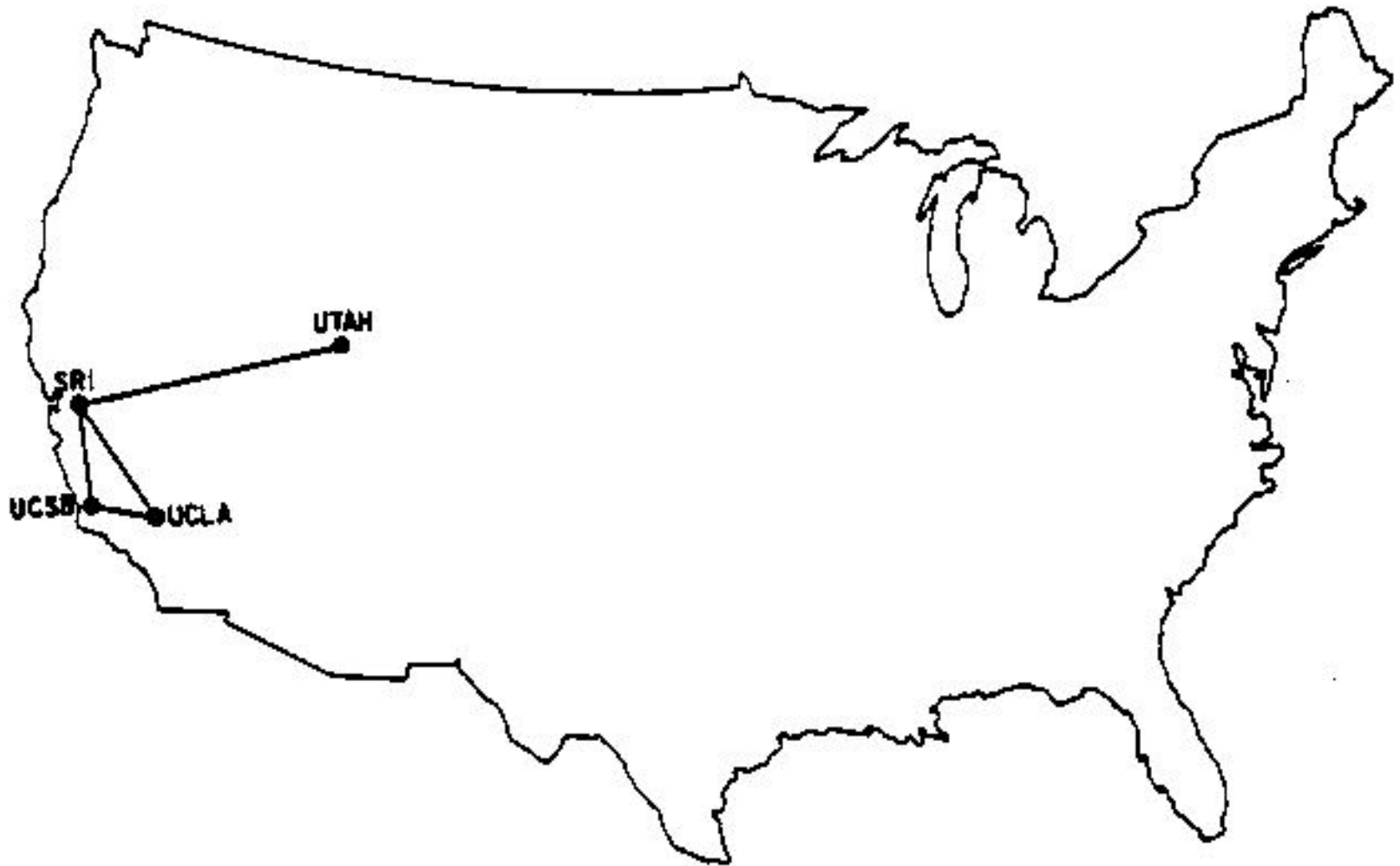




Monitoring the gTLDs:
When 6 million triggers is not enough

The domain name system

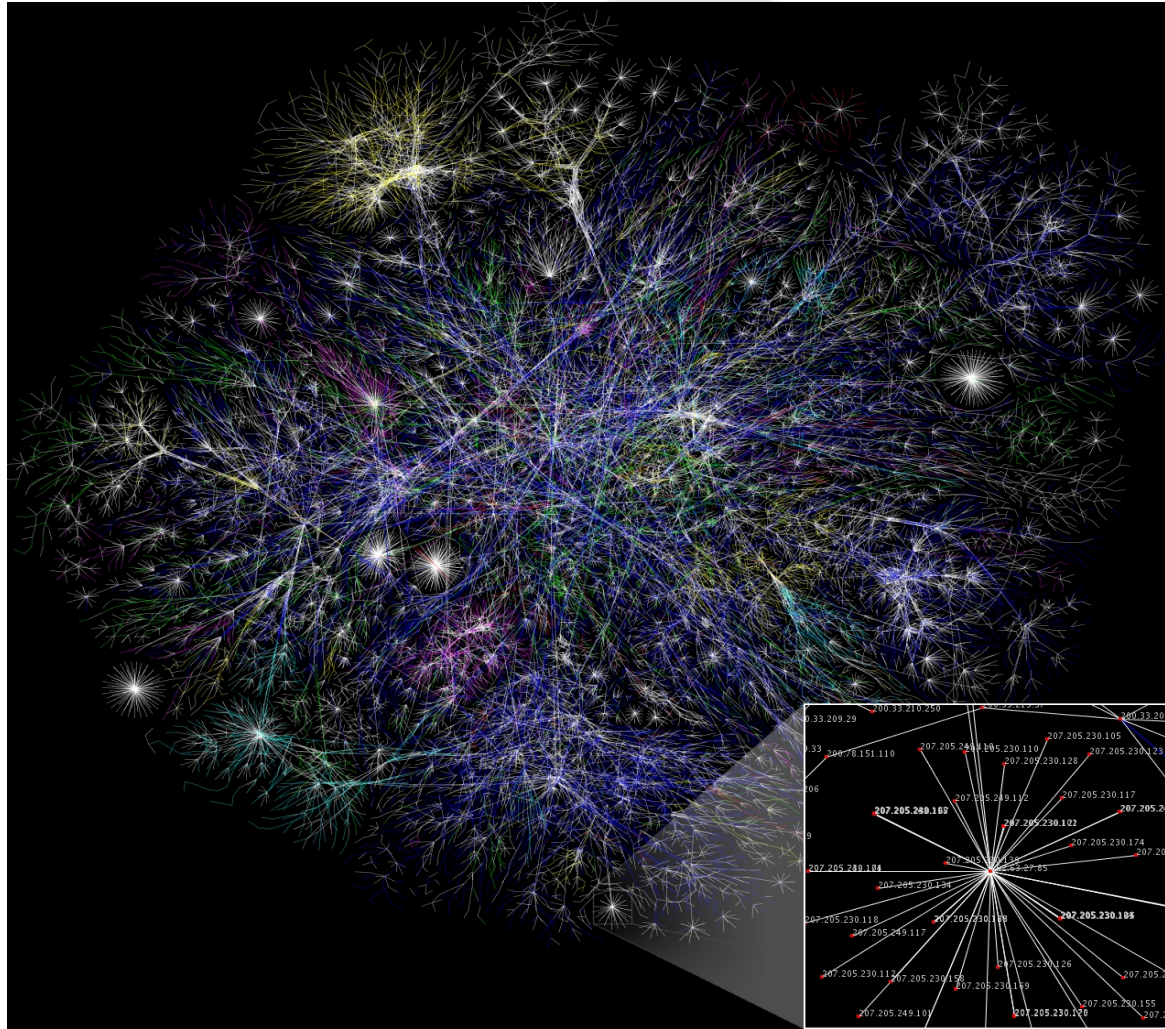
Internet in 1969



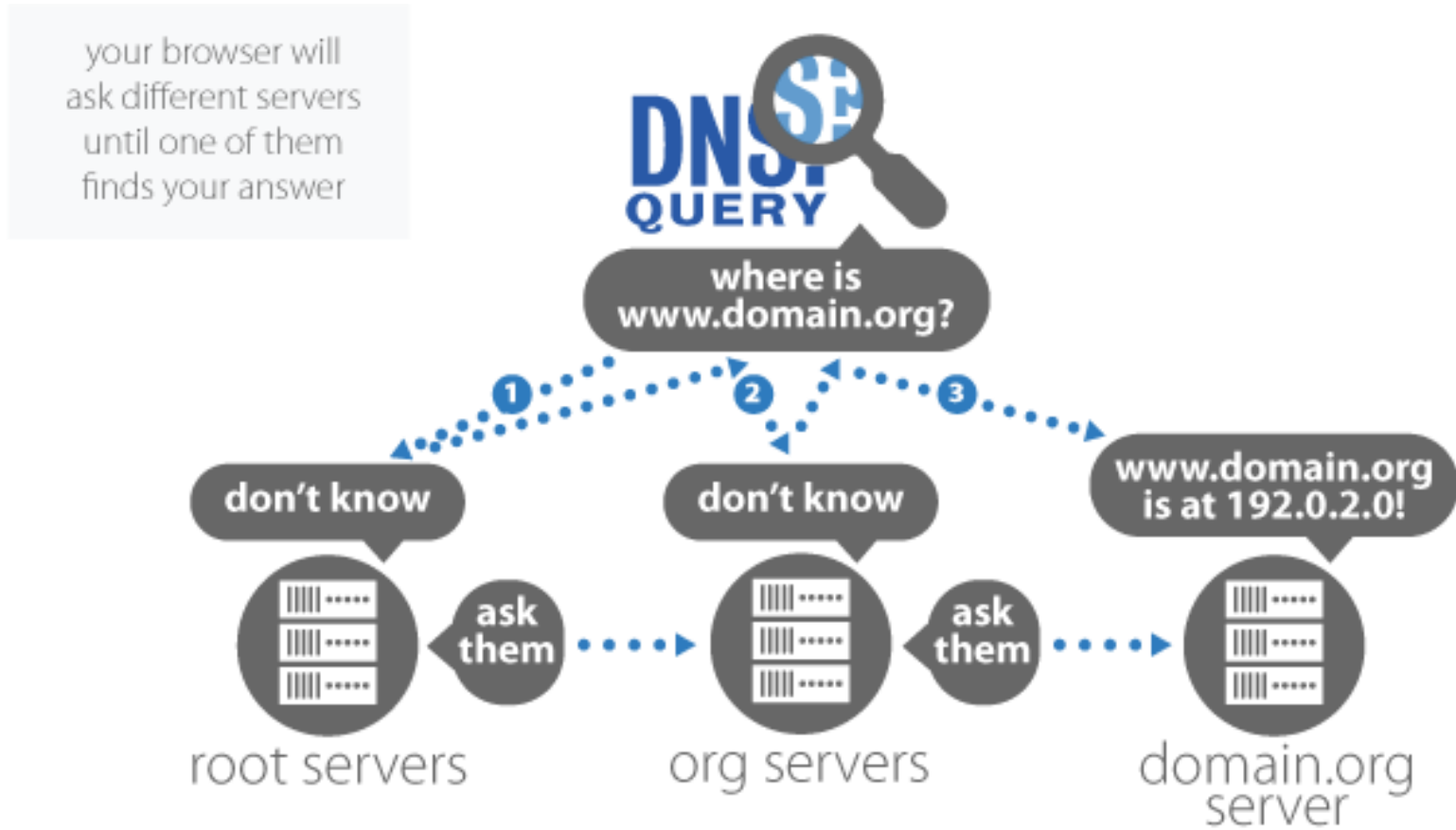
[1] ICANN blog - <http://blog.icann.org/2007/05/mapping-the-internet-one-node-at-a-time/>

[2] ARPANET technical information - <http://mercury.lcs.mit.edu/~jnc/tech/arpgeo.html>

Internet in 2005



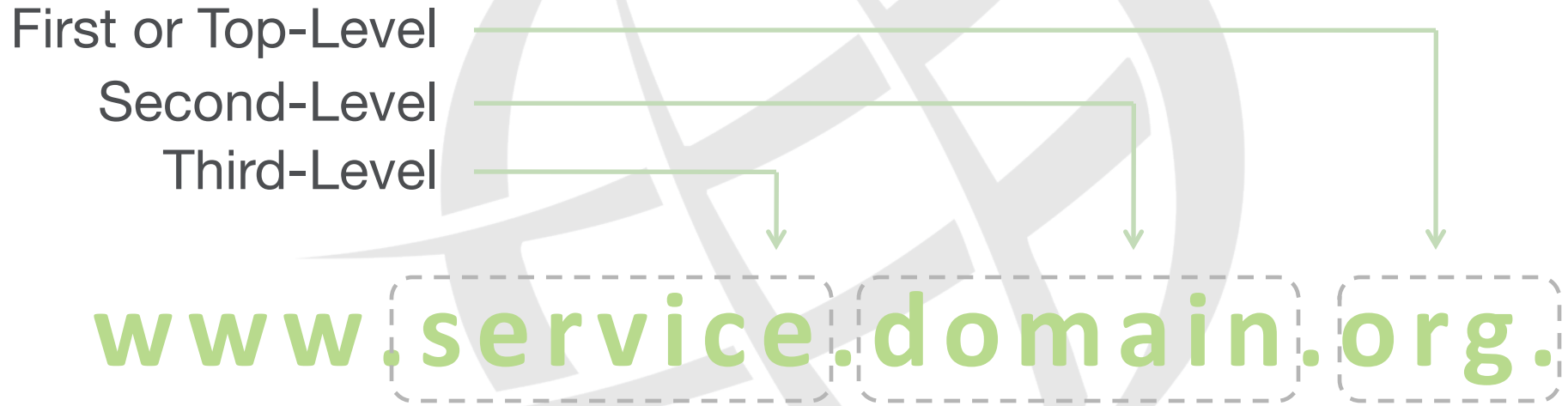
A Domain Name System query



DNS query what happens when you enter a domain name into your browser?

[1] ICANN - <http://whois.icann.org/en/dns-and-whois-how-it-works>

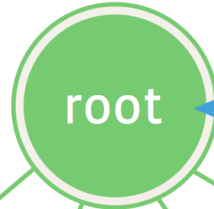
The Anatomy of a Domain Name



[1] ICANN - <https://svsf40.icann.org/.../presentation-new-gtld-basics-13mar11-en.pdf>

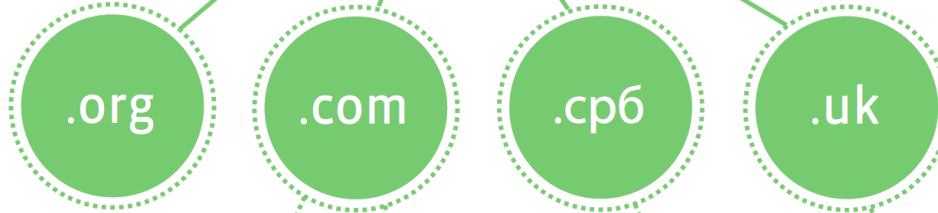
The Anatomy of a Domain Name

DNS Root

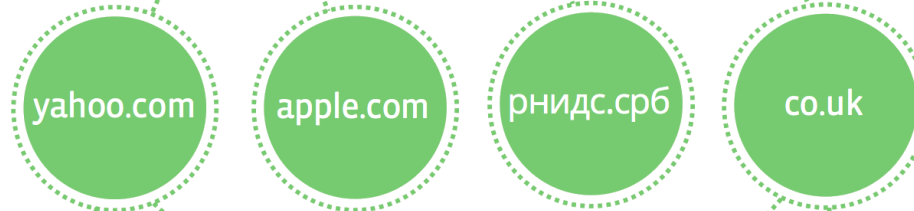


Managed by ICANN

Top Level Domains



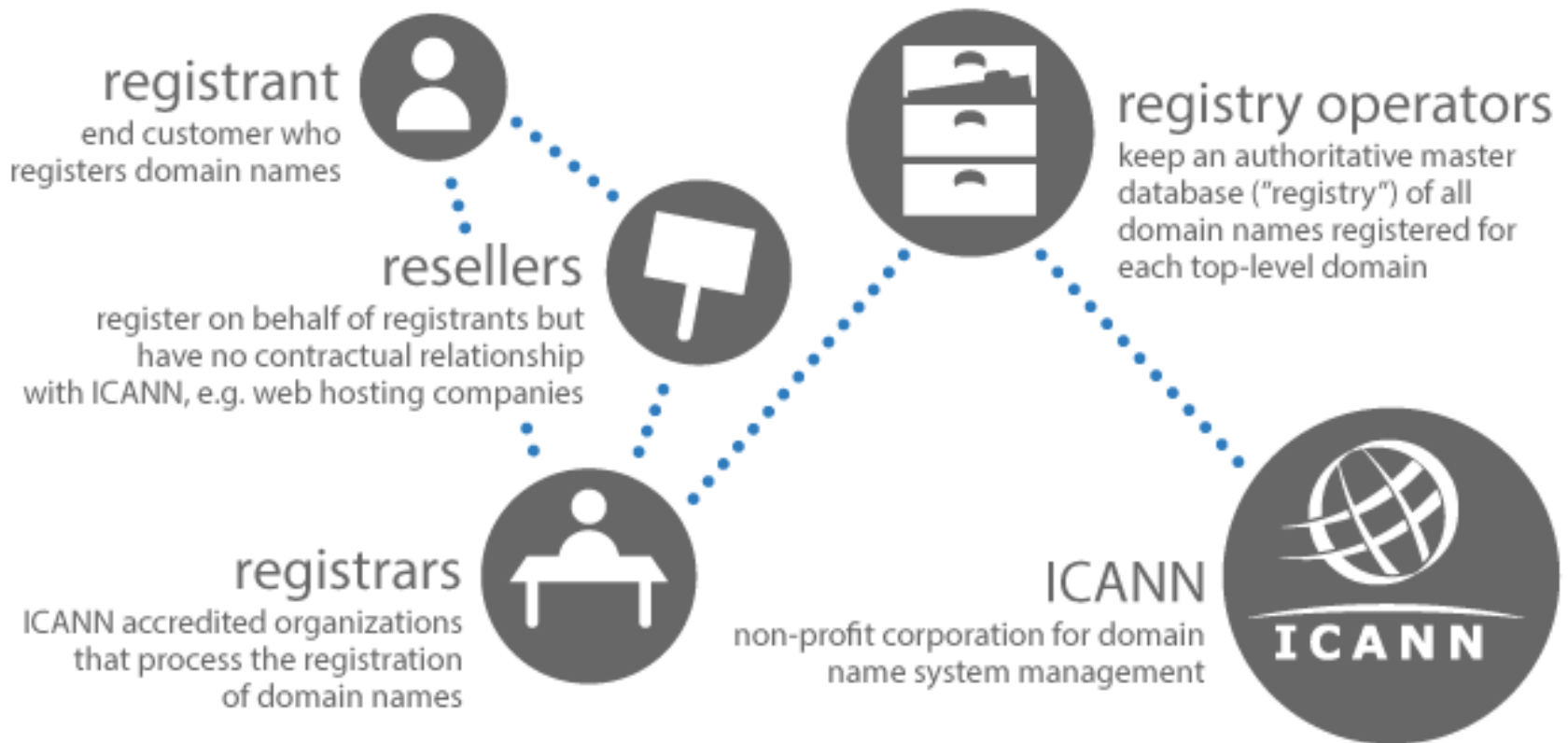
Second Level Domains



Third Level Domains



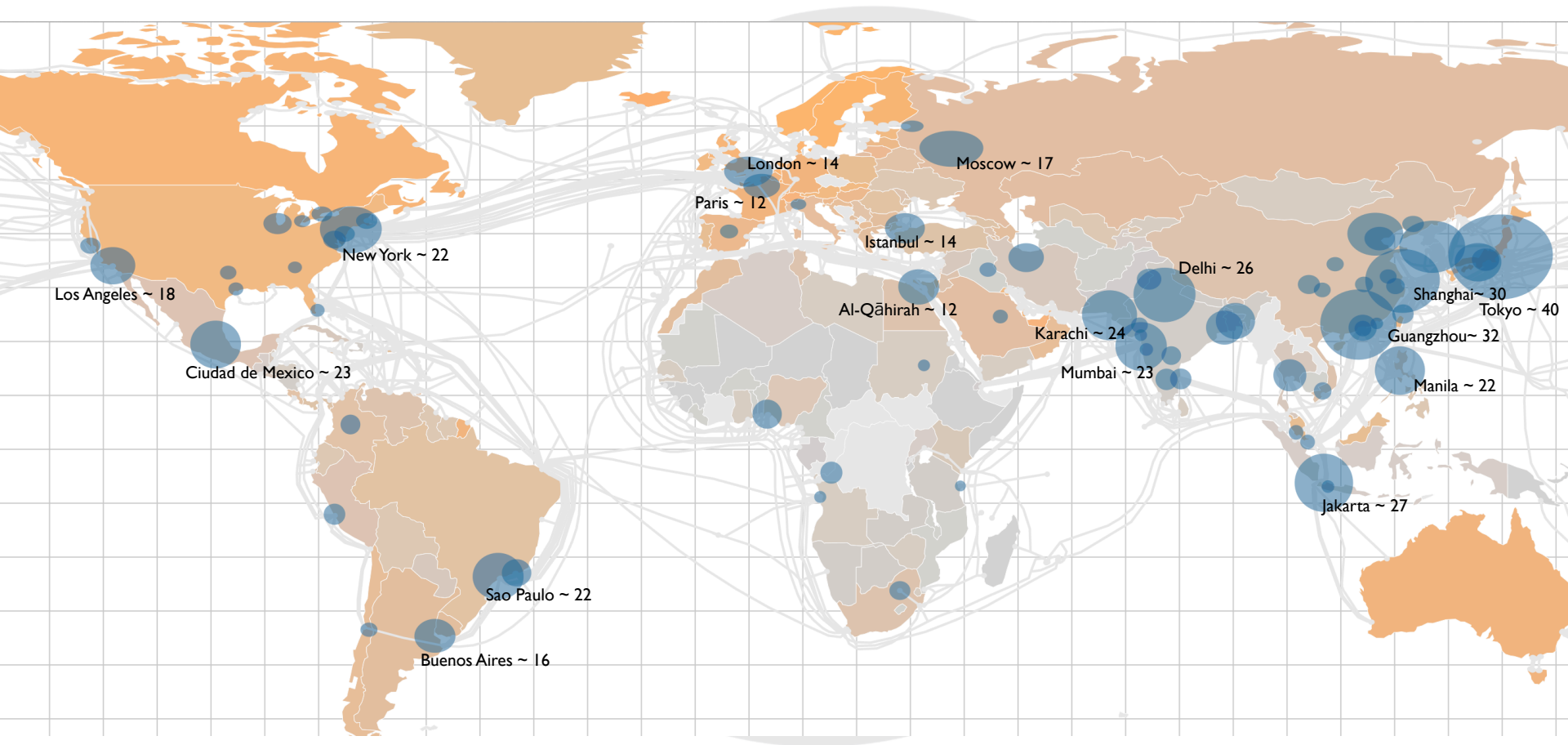
Domain name registration process



domain registry process

Who are the users of the Domain Name System?

Where are the users of domain names?



[1] United Nations, department of economic and social affairs, population division, population estimates and projections section - <http://esa.un.org/wpp/>

[2] United Nations, department of economic and social affairs, population division, world urbanization prospects - <http://esa.un.org/unpd/wup>

The Internet Corporation for Assigned Names and Numbers

What does ICANN do?



ONE WORLD. ONE INTERNET.

WHAT DOES ICANN DO?

To reach another person on the Internet you have to type an address into your device – a name or a number. That address must be unique, so computers will know where to find each other. ICANN maintains and administers these unique identifiers across the world. Without ICANN's management of this system, known as the Domain Name System or DNS, we wouldn't have a global, scalable Internet where we can find each other.

Community-Driven Policy

To keep pace with dynamic technologies and rapid innovation, ICANN enables consensus-driven, multistakeholder policy development, with broad representation from the global Internet community.

Multistakeholder Model:

Civil Society & Internet Users, the Private Sector, National & International Organizations, Governments, Research, Academic and Technical Communities are all represented.

Competition & Choice

From accrediting over 1000 registrars, to introducing new Top Level Domains (TLDs), ICANN works to expand consumer choice by fostering competition and innovation in the domain name marketplace.

WHICH FUNCTIONS DOES ICANN COORDINATE?

- Domain Name System (DNS)
- Internet Protocol (IP) address allocation
- Protocol-Parameter Registry
- Root Server Systems
- Generic Top-Level Domain name (gTLD) system management
- Country Code Top-Level Domain name (ccTLD) DNS
- Time zone database management

Security & Stability

ICANN supports DNS security through technical training and engagement, coordinating and collaborating with the community in the implementation of standards such as DNSSEC.

Interoperability

ICANN's work enables new technologies to flourish while maintaining interoperability across the global Internet. For example, management of the unique protocol identifiers allows communication using secure connections between users.

Contractual Compliance

ICANN oversees the contracts it maintains and enforces the consensus policies developed through the community-driven process. ICANN's Contractual Compliance function seeks to ensure compliance with the agreements and the consensus policies.

HOW DO I PARTICIPATE?

- Sign up for updates at myicann.org
- Join one of the many Public Comment Forums on ICANN's website
- Attend ICANN's Public Meetings in person or online to provide input at a Public Forum
- Join one of ICANN's Supporting Organizations or Advisory Committees

WHO'S INVOLVED?

A number of groups, each of which represents a different interest on the Internet. All of them come together with the Board of Directors to shape ICANN decisions.

Supporting Organizations

- Addressing
- Country Code Names
- Generic Names

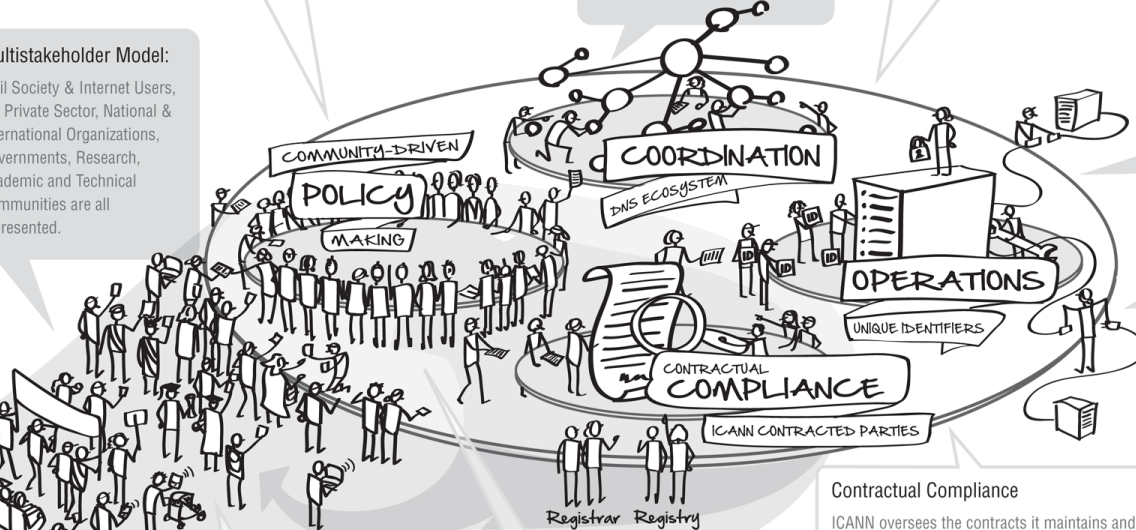
Advisory Committees

- At-Large
- Governmental
- Root Server System
- Security & Stability

Technical Advisory Bodies

- Technical Liaison Group
- Internet Engineering Task Force

Board of Directors



For more information or to get involved, please visit www.ICANN.org

The monitoring



Registry agreement

2. Service Level Agreement Matrix

	Parameter	SLR (monthly basis)
DNS	DNS service availability	0 min downtime = 100% availability
	DNS name server availability	≤ 432 min of downtime (≈ 99%)
	TCP DNS resolution RTT	≤ 1500 ms, for at least 95% of the queries
	UDP DNS resolution RTT	≤ 500 ms, for at least 95% of the queries
	DNS update time	≤ 60 min, for at least 95% of the probes
RDDS	RDDS availability	≤ 864 min of downtime (≈ 98%)

	RDDS query RTT	≤ 2000 ms, for at least 95% of the queries
	RDDS update time	≤ 60 min, for at least 95% of the probes
EPP	EPP service availability	≤ 864 min of downtime (≈ 98%)
	EPP session-command RTT	≤ 4000 ms, for at least 90% of the commands
	EPP query-command RTT	≤ 2000 ms, for at least 90% of the commands
	EPP transform-command RTT	≤ 4000 ms, for at least 90% of the commands

[1] ICANN - <http://www.icann.org/registries/agreements.htm>

Registry agreement

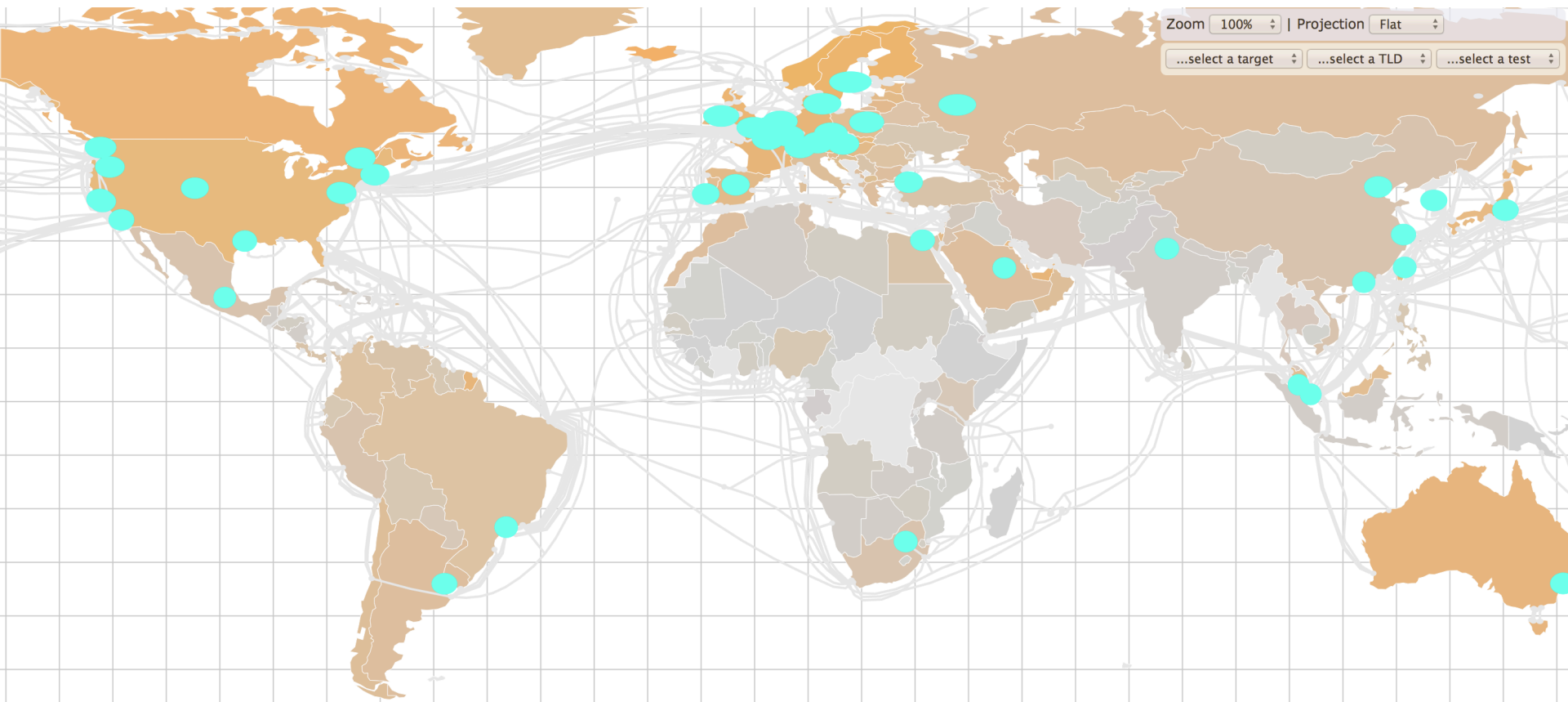
6. Emergency Thresholds

The following matrix presents the emergency thresholds that, if reached by any of the services mentioned above for a TLD, would cause the emergency transition of the Registry for the TLD as specified in Section 2.13 of this Agreement.

Critical Function	Emergency Threshold
DNS Service (all servers)	4-hour total downtime / week
DNSSEC proper resolution	4-hour total downtime / week
EPP	24-hour total downtime / week
RDDS (WHOIS/Web-based WHOIS)	24-hour total downtime / week
Data Escrow	Breach of the Registry Agreement as described in Specification 2, Part B, Section 6.

[1] ICANN - <http://www.icann.org/registries/agreements.htm>

SLA Monitoring



Complexity



Zabbix



Zabbix at ICANN

- Production critical system
- Over 12 **million** triggers, 2750 new values per second
- The system supports more than 1900 TLD objects
 - DNS/DNSSEC test every minute for:
 - every name server, for
 - every IP address
 - RDDS test every 5 minutes
 - EPP test every 5 minutes
- Calculation on all data points per TLD every minute
- 2 months of raw data in-memory
- Trends/results saved in perpetuity

- The code is going to be released to the community

Zabbix team



Zabbix team



Zabbix team



Zabbix team



Zabbix team



Other potential uses of Zabbix within ICANN

The future

- More TLDs
- Active-Active solution
- Zabbix monitoring across the organization
- Big Data!!!

Thanks!

