IANA Naming Functions

Selina Harrington
Amy Creamer
February 6, 2024

PTI | An ICANN Affiliate

Agenda

- Recap of January's briefing
- Root Zone Management
- Performance monitoring & reporting

What is IANA and why is it important

- IANA is the record keeper for the unique names and numbers used by Internet technologies to interoperate

- The IANA team maintains these records according to policies adopted by Internet names, numbers and protocol standards communities

- Coordinating the Internet unique identifier systems is needed to ensure the Internet interoperates globally

- If Internet-connected devices do not use the same system of identifiers and numbers to talk to one another, the system will not interoperate (i.e. speak a common language)

- The unique identifiers include protocol parameters, Internet numbers and domain names

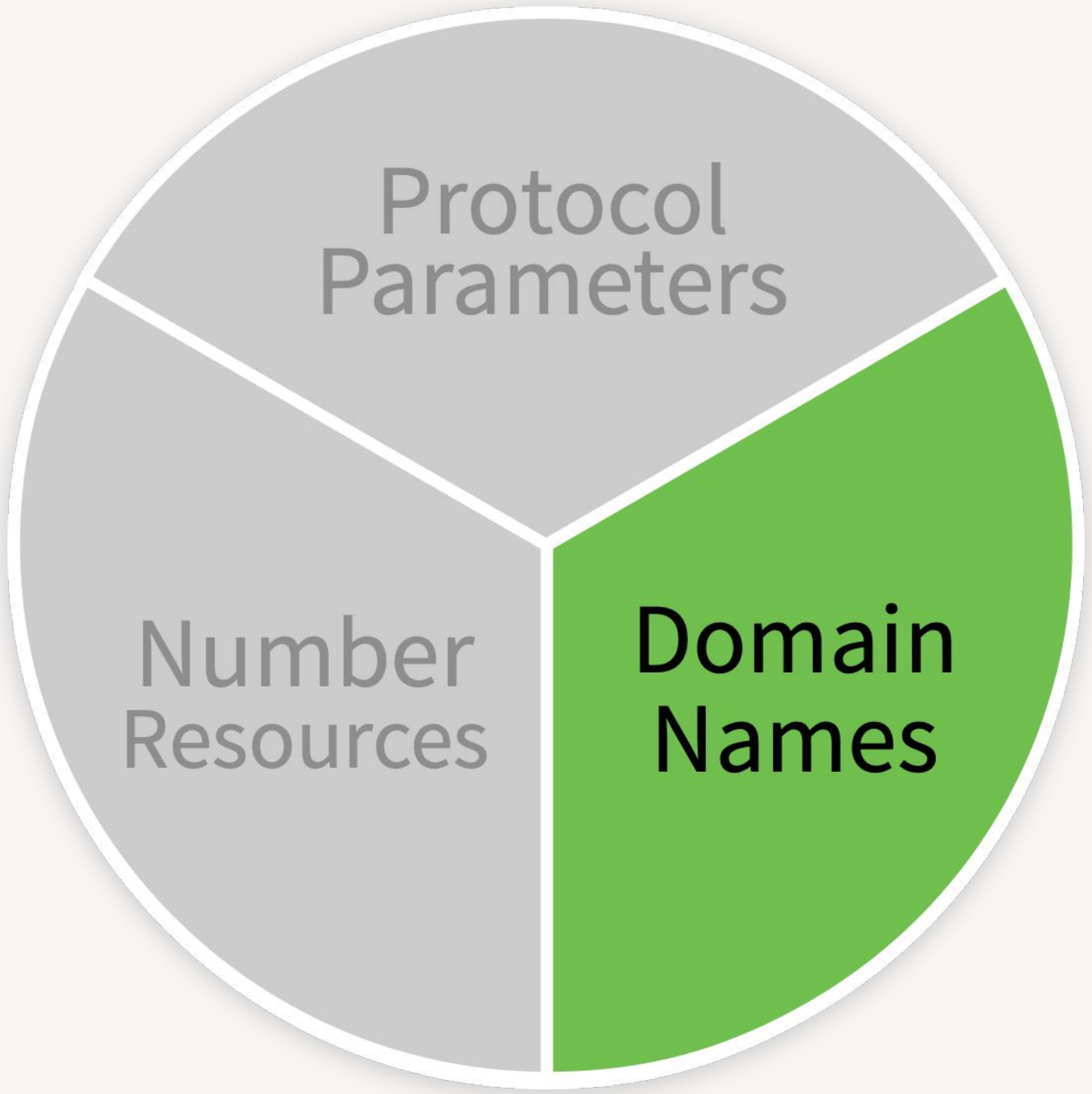
Protocol Parameters & Number Resources

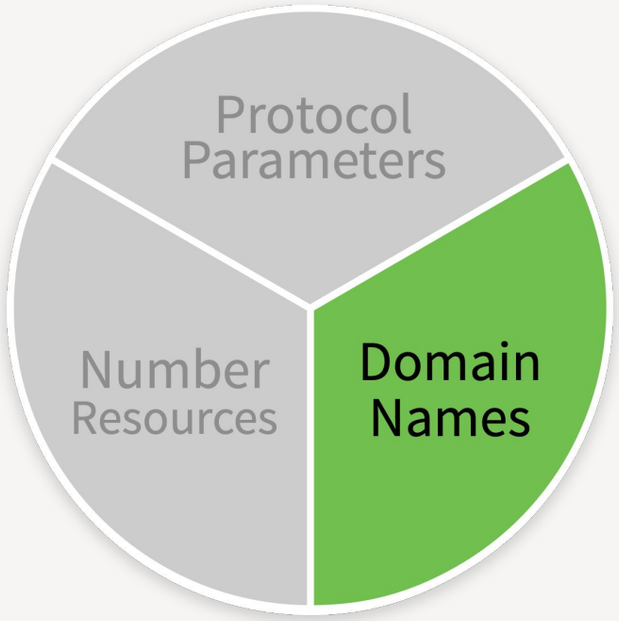
- The **Internet Engineering Task Force** (IETF) develops the Internet standards that define **protocol parameter** systems.
- There are thousands of protocol parameter registries spanning many different technologies.
- Most protocol parameters' visibility is limited to software implementers (i.e. inside software code).

Number Resources are specialized forms of protocol parameters:

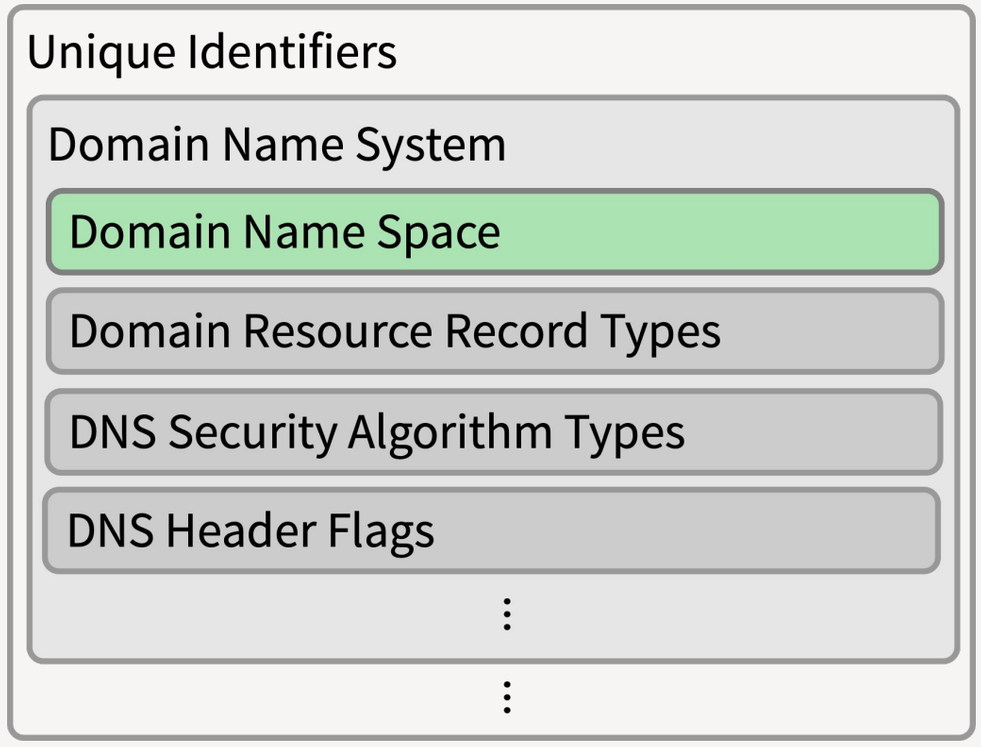
  - IP Addresses: unique identifiers for devices on the Internet
  - Autonomous System (AS) numbers: unique identifiers that group networks on the Internet

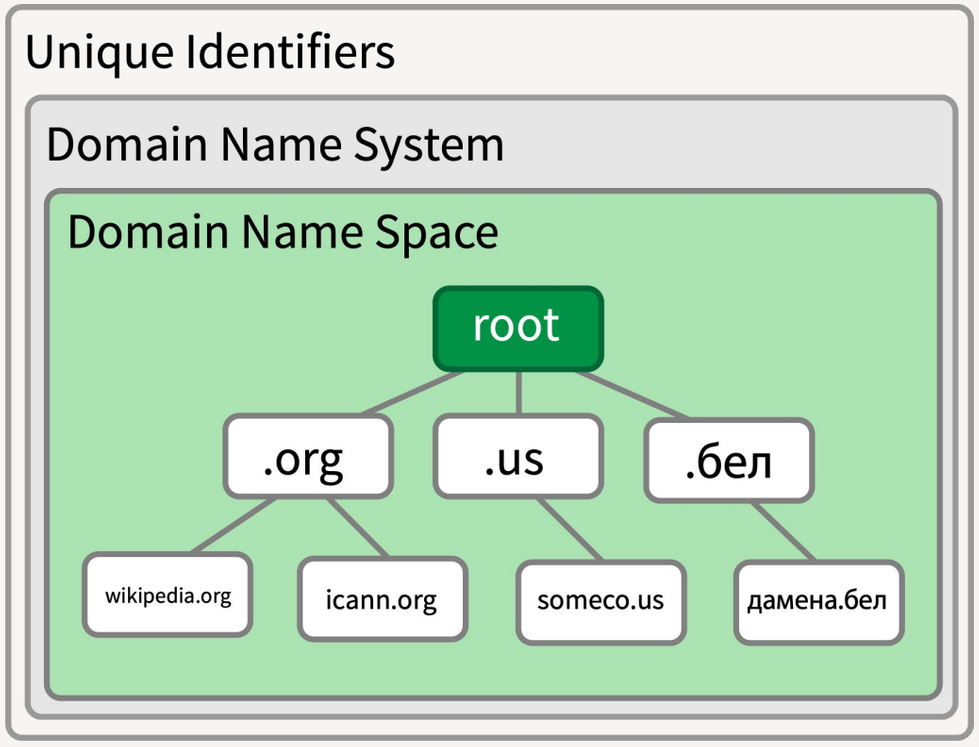
- Number Resources are predominantly hierarchically delegated through five Regional Internet Registries
- RIRs in turn delegate them to ISPs and network operators in their region

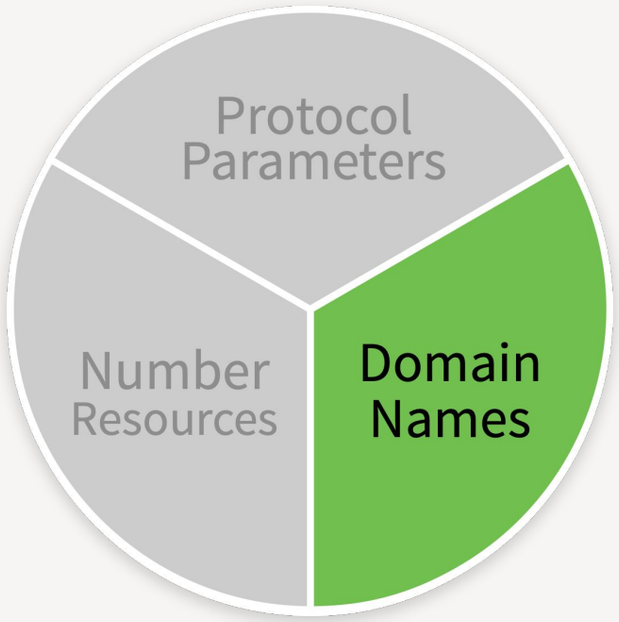

Protocol Parameters
Number Resources
Domain Names



- Most notable IANA function is managing the DNS root zone, which defines top-level domains
- The domain name space is hierarchically delegated, with IANA responsible for the upper-most level of allocations







- The IANA tasks include:
  - Receiving and evaluating root zone changes requests against policies and operational requirements:
    - Delegation, transfer, and removal of TLDs
    - Routine maintenance of name servers and other technical elements
    - Points of Contact
  - Transmitting vetted changes for implementation in the root zone and root servers

Root Zone Management

- Managing the content of the root zone
  - Delegations, transfers, and removal of TLDs
  - Maintaining delegation data for existing top-level domains (technical changes to the root zone file itself, and administrative details regarding who manages the domain)
- Primary workflow is processing change requests:
  - Existing top-level domain operators update the data in their record
  - Prospective new operators submit delegation or transfer requests
- Secondary workflows include answering root zone related questions from community, managing root server entries.

REGISTRY ENTRY FOR A TOP-LEVEL DOMAIN

Operator

Recognized Company or Organization

Formal Legal Name, Physical Address

Contacts

Administrative Contact

Name, Job Title,
Company, Address,
Phone, Fax, Email

Technical Contact

Name, Job Title,
Company, Address,
Phone, Fax, Email

Technical configuration

Data that goes in the root zone

Authoritative name servers
IP addresses of name servers
DNSSEC (“DS”) records

Metadata

Courtesy information not tied to operations

URL to Operator’s website, location of WHOIS service, domain converted to A-label, language etc.

Operator

Hamburg Top-Level-Domain GmbH

Gertigstrasse 28, Hamburg, 22303

Germany

Contacts

Oliver Joachim Sueme
Hamburg Top-Level-Domain GmbH
Gertigstrasse 28, Hamburg, 22303
Germany
Email: os@dothamburg.de
Voice: +49 40 27806736
Fax: +49 40 380 89 810

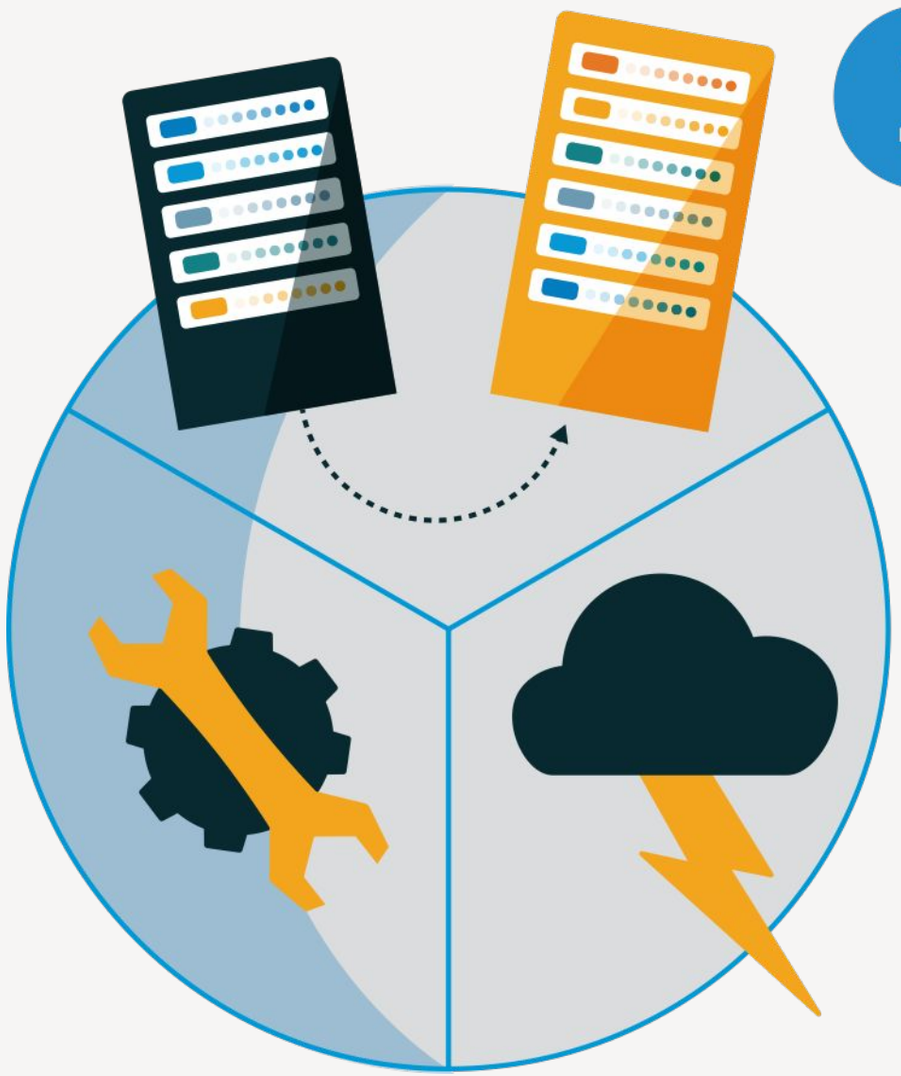
Martin Schlicksbier
TLD-BOX Registrydienstleistungen
Jakob-Haringer-Strasse 8
5020 Salzburg
Austria
Email: iana@tld-box.at
Voice: +43 662 2345 48730

Technical configuration

NS a.dns.nic.hamburg (194.0.25.21 2001:678:20:0:0:0:0:21)
NS b.dns.nic.hamburg (193.170.61.10 2001:62a:a:2000:0:0:0:10)
NS c.dns.nic.hamburg (193.170.187.10 2001:62a:a:3000:0:0:0:10)
DS 53866 8 2 AF2F53F6B523F31C04A741B3826D27CBAE16F4BA6F...
DS 26479 8 1 1C9F5D68C413E8A9A2C8E1C1637B8A4DA2CA6827
DS 26479 8 2 4A48334EF87D7FC156E886E5A2B2682FCF0679ED6FC...
DS 53866 8 1 D26808AE1E19086BCF5FC88D59066C3AD22F2E56

Metadata

http://www.dothamburg.de
whois.nic.hamburg



1

Event Triggers Request

An event such as a change in TLD operator, routine maintenance (technical or staffing change) or a natural disaster triggers the need for a change request.

2 Change Request

A TLD operator submits a change request to IANA Department within ICANN. This is typically done through an automated web service ICANN provides called the Root Zone Management System (RZMS).

3 Policy Check

IANA checks that the change re - quest meets policy and technical requirements and confirms consent from the appropriate parties. If issues are found, IANA clarifies with the TLD operator.

Technical

- ✓ Name Servers are responding
- ✓ Name Servers return correct data that matches the request
- ✓ DNS data can be verified using the supplied DNSSEC DS records
- ✓ Supplied email addresses work

Regulatory

- ✓ Request meets legal requirements

Well-formedness

- ✓ Supplied data is clear, well-formed and consistent

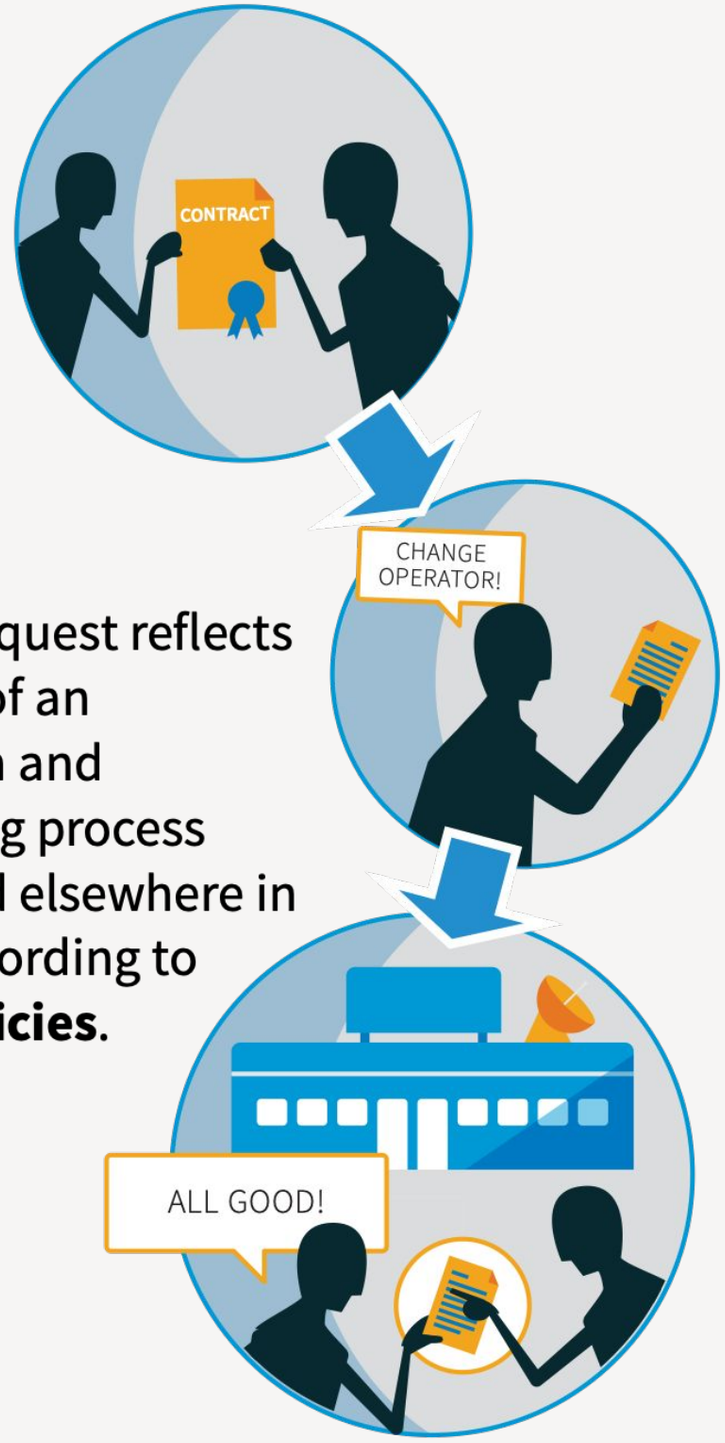
Consent

- ✓ Existing contacts agree to change
- ✓ New contacts agree to their new responsibilities
- ✓ Other impacted TLDs agree

Transfer of responsibility

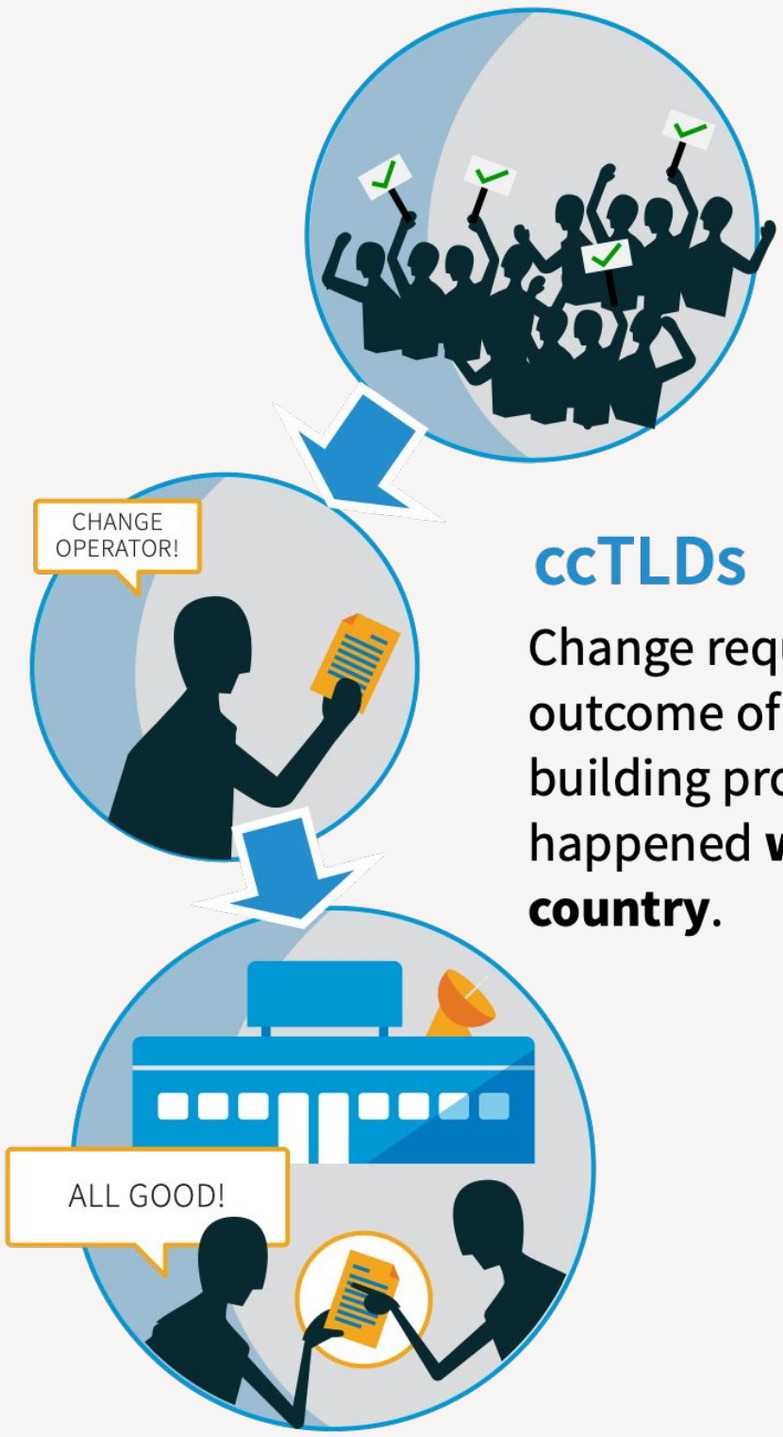
- ✓ Meets policy requirements for transfers (differs between ccTLDs and gTLDs)

Transfer of Responsibility



gTLDs

Change request reflects outcome of an evaluation and contracting process conducted elsewhere in ICANN according to **GNSO policies**.



ccTLDs

Change request reflects outcome of a consensus building process that happened **within the country**.

4 Implement changes

After authorization to proceed, any technical changes to the root zone are implemented. This includes applying a tamper-evident seal using DNSSEC, and distributing the updated root zone file to root server operators. The Root Zone Database is updated with the changes.

Root Zone Maintainer

- Verisign is contracted as the “root zone maintainer”, its responsibility is to disseminate the root zone data to the root server operators
- This preserves the separation of duties that existed pre-transition. Verisign is contracted by ICANN, not PTI.
- Operationally, IANA sends off vetted and authorized root zone change deltas to Verisign via EPP for placement in the root zone. Verisign applies duplicate technical checks in order to catch any potential operational issues with the changes prior to implementation. Verisign maintains hidden distribution masters that the 12 root server operators retrieve the zone file from.
- Verisign signs the root zone using a zone signing key that they maintain, endorsed by the key signing key that IANA maintains.

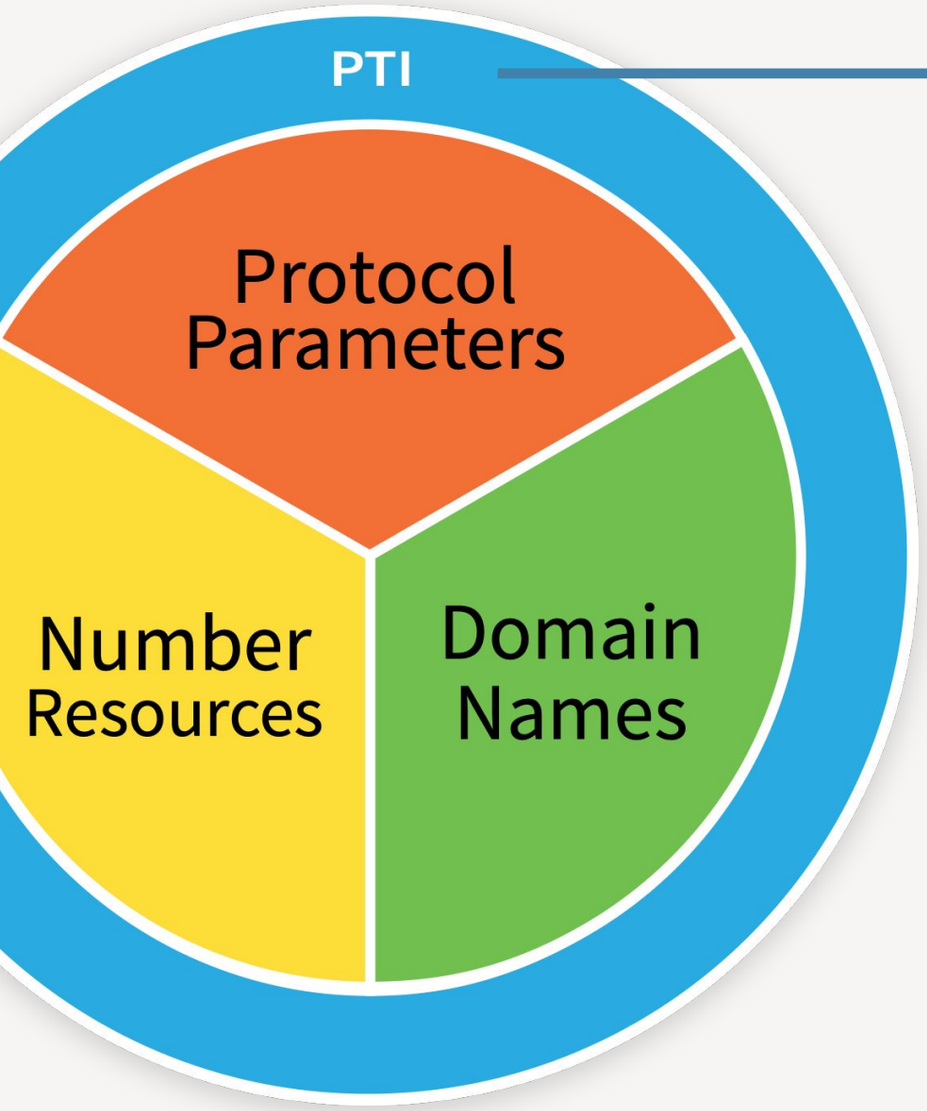
Domain Names — Other functions

- .INT domains — Intergovernmental treaty organisations
- Label Generation Rulesets (LGRs, IDN tables) — registries share IDN language practices
- Managing the trust anchor for the DNS (the “Root Zone Key Signing Key”)
  - Using the key happens in public “key signing ceremonies”, involving trusted community representatives and other oversight.
  - Includes managing the lifecycle of the key, including when it is replaced (a “rollover”)

Accountability and Performance

Naming Functions Oversight Contracts and Agreements

- The IANA functions are governed by a number of different contracts and agreements, all posted at https://pti.icann.org/agreements
- For the naming function, the primary agreement is the IANA Naming Function Contract, where ICANN contracts PTI to perform these services
- Other agreements include the Root Zone Maintainer Agreement.
  - agreement between ICANN and Verisign
  - intended to ensure stable, secure, and reliable maintenance of the root zone post-transition.



PTI Board

Five-member board of directors including 2 Nomcom appointees

Anupam Agrawal
NOMCOM APPTEE

Xavier Calvez
ICANN CFO

Kim Davies
PTI PRESIDENT

Jia-Rong Low
ICANN VP, APAC

Tobias Sattler
CHAIR
NOMCOM APPTEE

Customer Standing Committee

- The Customer Standing Committee meets regularly to review month-to-month performance of the IANA naming functions according to its SLAs.
- IANA staff provide comprehensive performance reports, and attend meetings to provide any necessary context. The committee works with a high level of collaboration.
- Over the first three years the CSC bootstrapped, including identifying and developing necessary procedures such as the Remedial Action Procedure, and SLA change process.
- Has already undergone a charter review and two effectiveness reviews
- Has 4 member seats and up to 6 liaisons from PTI and other SO/ACs

Root Zone Evolution Review Committee

- RZERC is tasked with performing oversight of significant architectural changes to the root zone. Historically, NTIA took on this role to authorize major changes:
  - To implement automation in the root zone
  - To sign the root zone
- To date RZERC has largely been concerned with bootstrapping its internal processes, but has not been asked to formally review any significant architectural changes to the root zone.

Performance Reporting

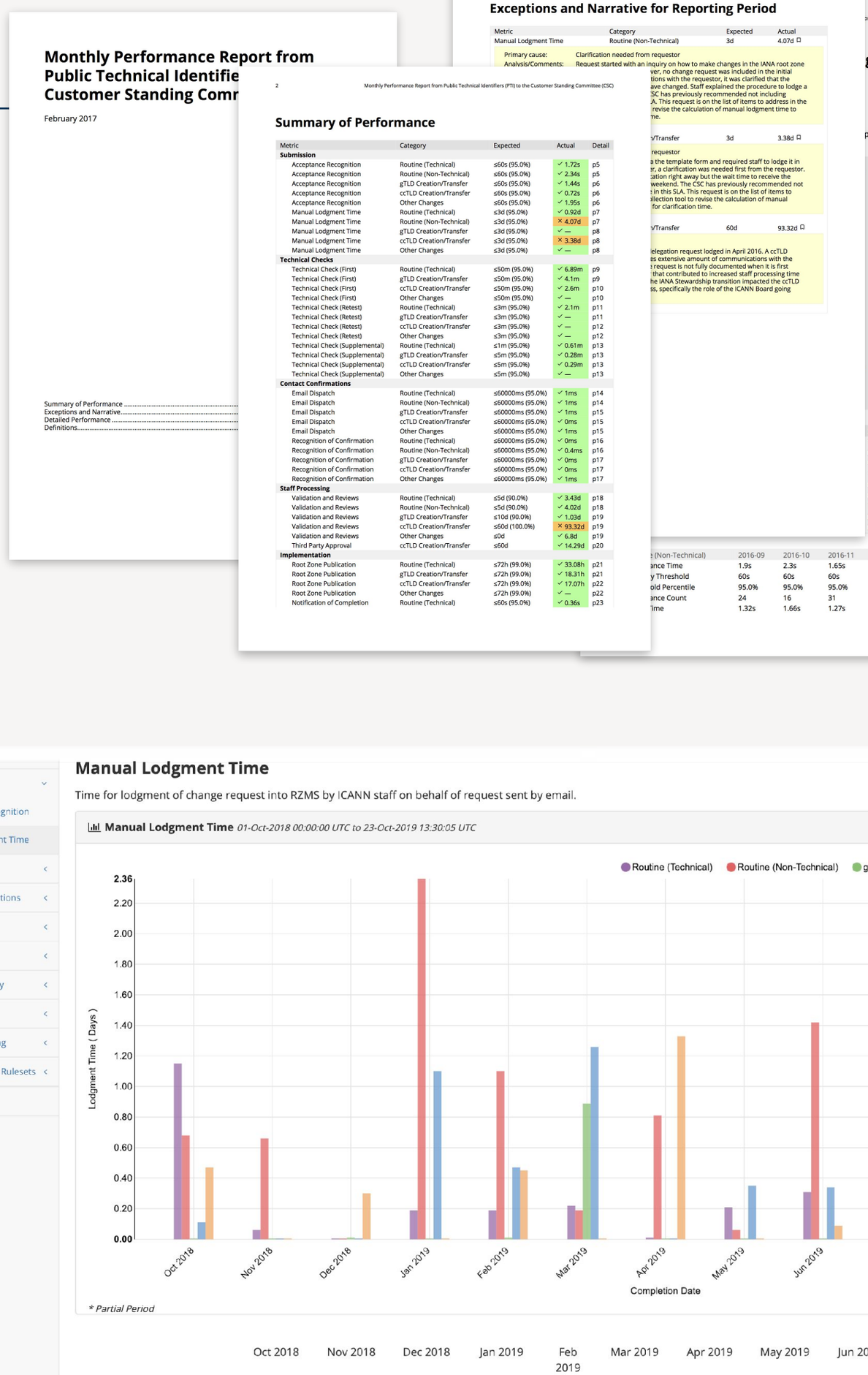
PTI produces monthly reports on its performance for its three functional areas.

iana.org/performance

Dashboard providing real-time reporting of performance metrics defined by the naming community for root zone management performance.

sle-dashboard.iana.org

PTI | An ICANN Affiliate



Service Level Agreements

- Each of the three functions has service level expectations defined and reported against

- IANA's performance on 64 defined thresholds for the naming functions are reported on monthly
  - the SLA definitions and thresholds are found on the PTI Agreements page: https://pti.icann.org/agreements
  - Monthly Performance Reports: https://www.iana.org/performance/csc-reports

- The performance report is reviewed through monthly Customer Standing Committee meetings
  - The CSC publishes a report of their findings for the community: https://www.icann.org/en/csc/reports

Current projects pertaining to naming functions

- Continuing to enhance the Root Zone Management System
  - Multi-factor authentication, authorization model, technical check evolution, API OT&E environment
- Supporting the ccNSO work on Policy for a Review Mechanism Pertaining to IANA decisions which apply to ccTLDs
- Replacing Hardware Security Modules (HSM)
- Planning future KSK rollovers
- Supporting Root Server Operators work to formalize relationships and SLAs for RSO performance

Questions?