

# IANA Naming Functions

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**PTI** | An ICANN Affiliate

# Agenda

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

# What is IANA and why is it important

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- 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

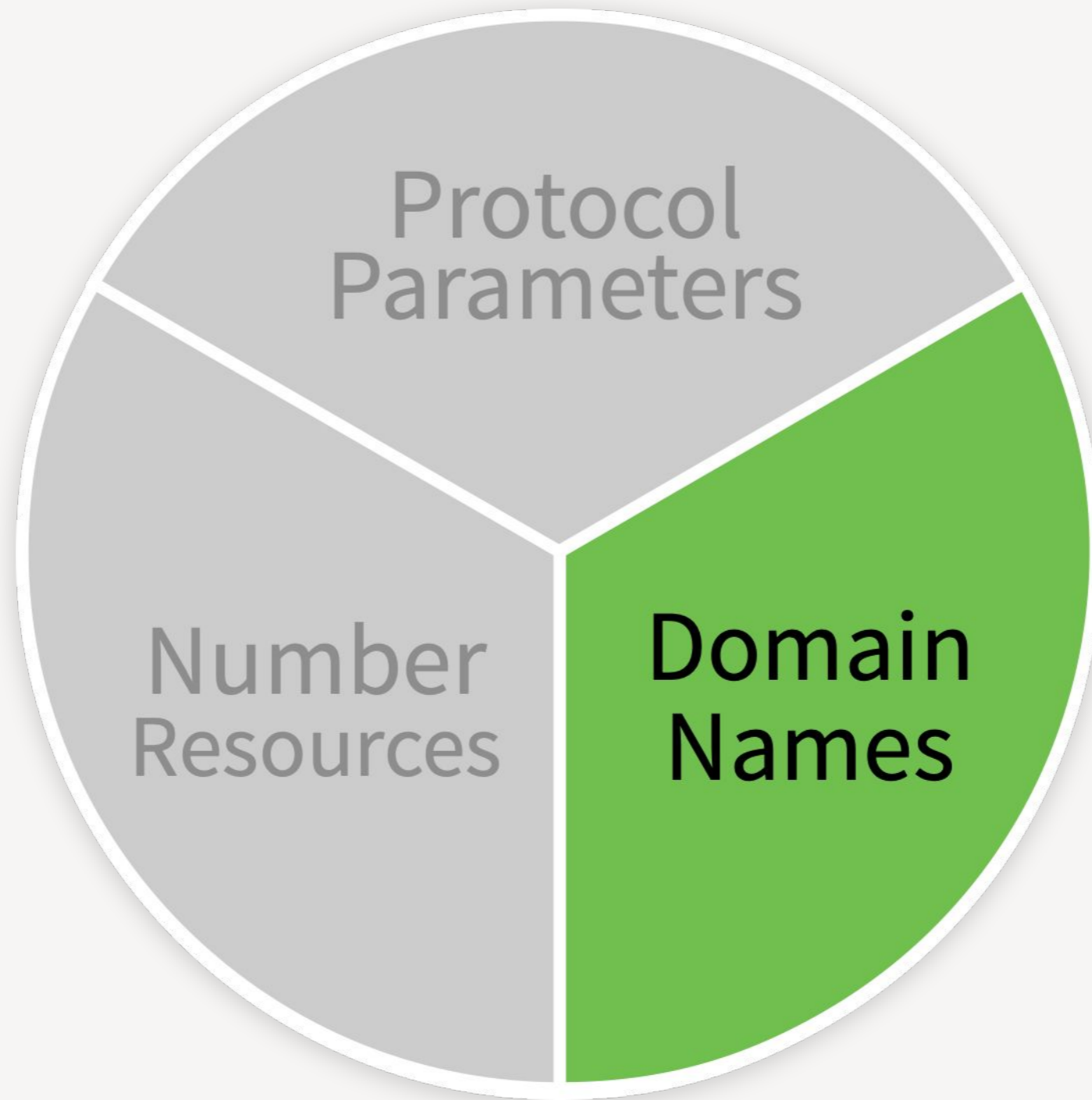
# Protocol Parameters & Number Resources

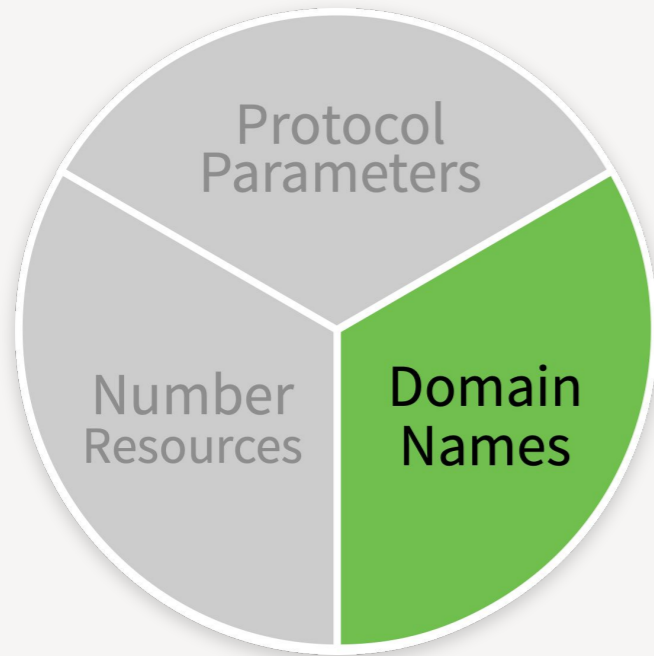
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- The **Internet Engineering Task Force** (IETF) develops the Internet standards that define **protocol parameter** systems.
- There are thousands of protocol parameter registries spanning many different technologies.
- Most protocol parameters' visibility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

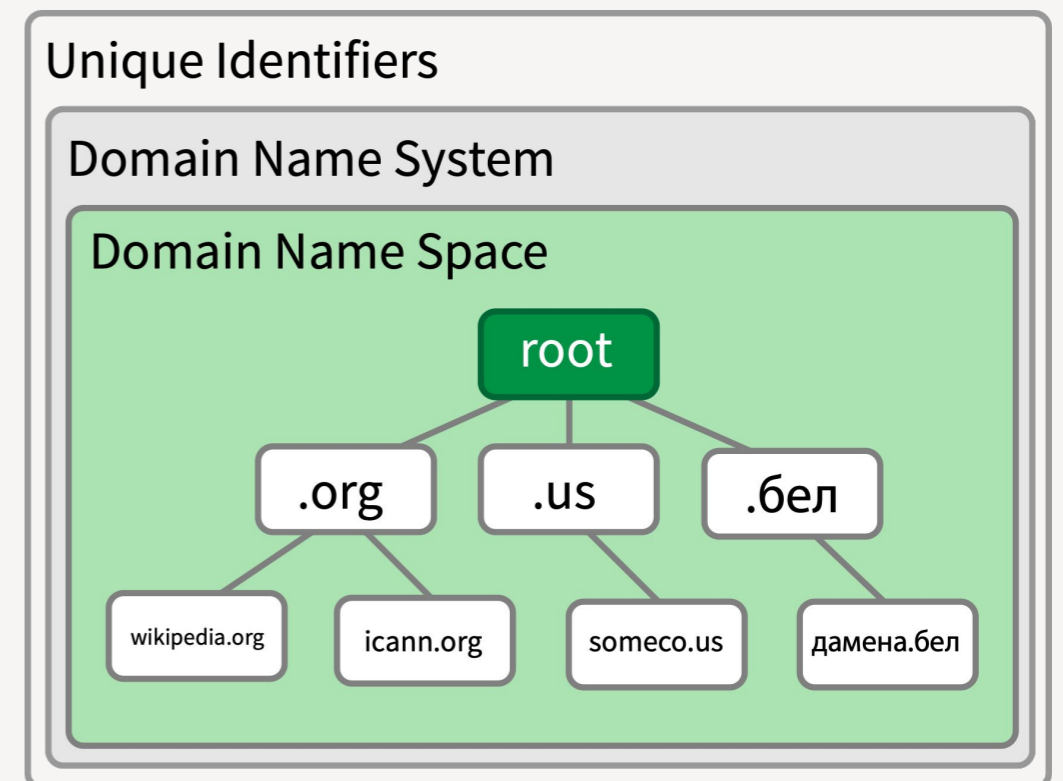
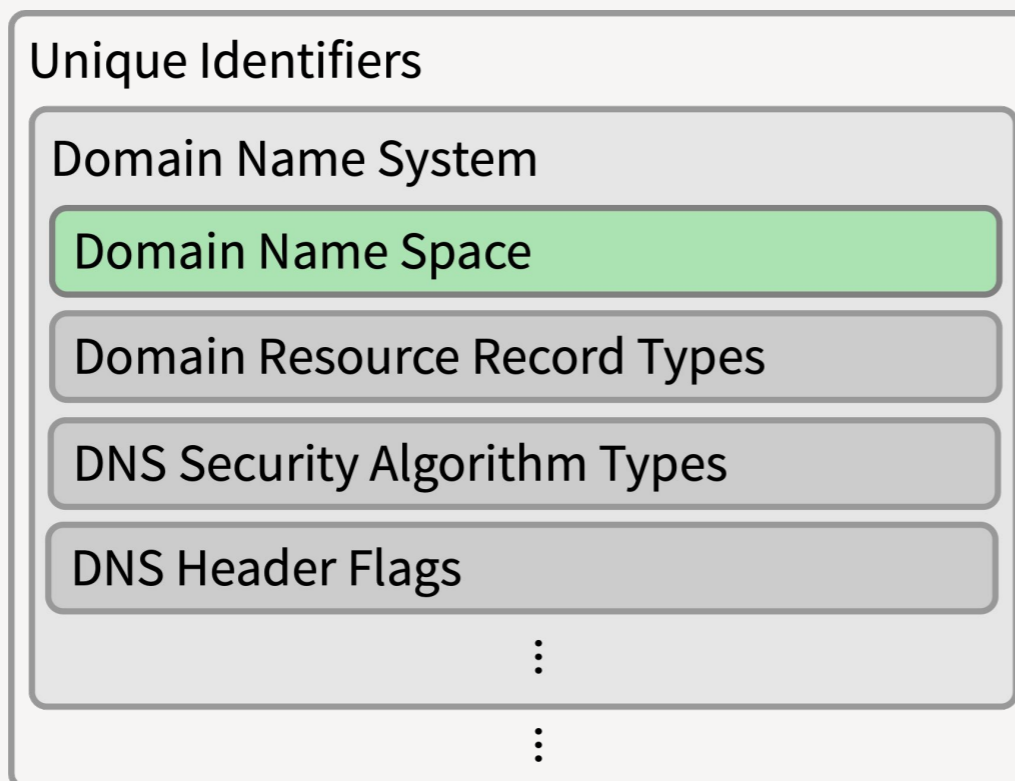
**Number Resources** are specialized forms of protocol parameters:

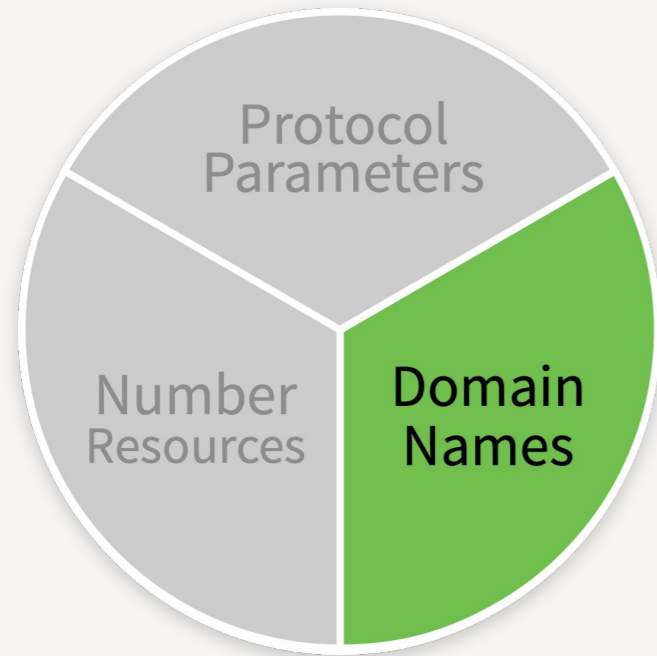
- IP Addresses: unique identifiers for devices on the Internet
- Autonomous System (AS) numbers: unique identifiers that group networks on the Internet
- Number Resources are predominantly hierarchically delegated through five Regional Internet Registries
- RIRs in turn delegate them to ISPs and network operators in their region





- 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

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- 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.

## REGISTRY ENTRY FOR .HAMBURG

### 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](mailto: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](mailto: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](http://whois.nic.hamburg)



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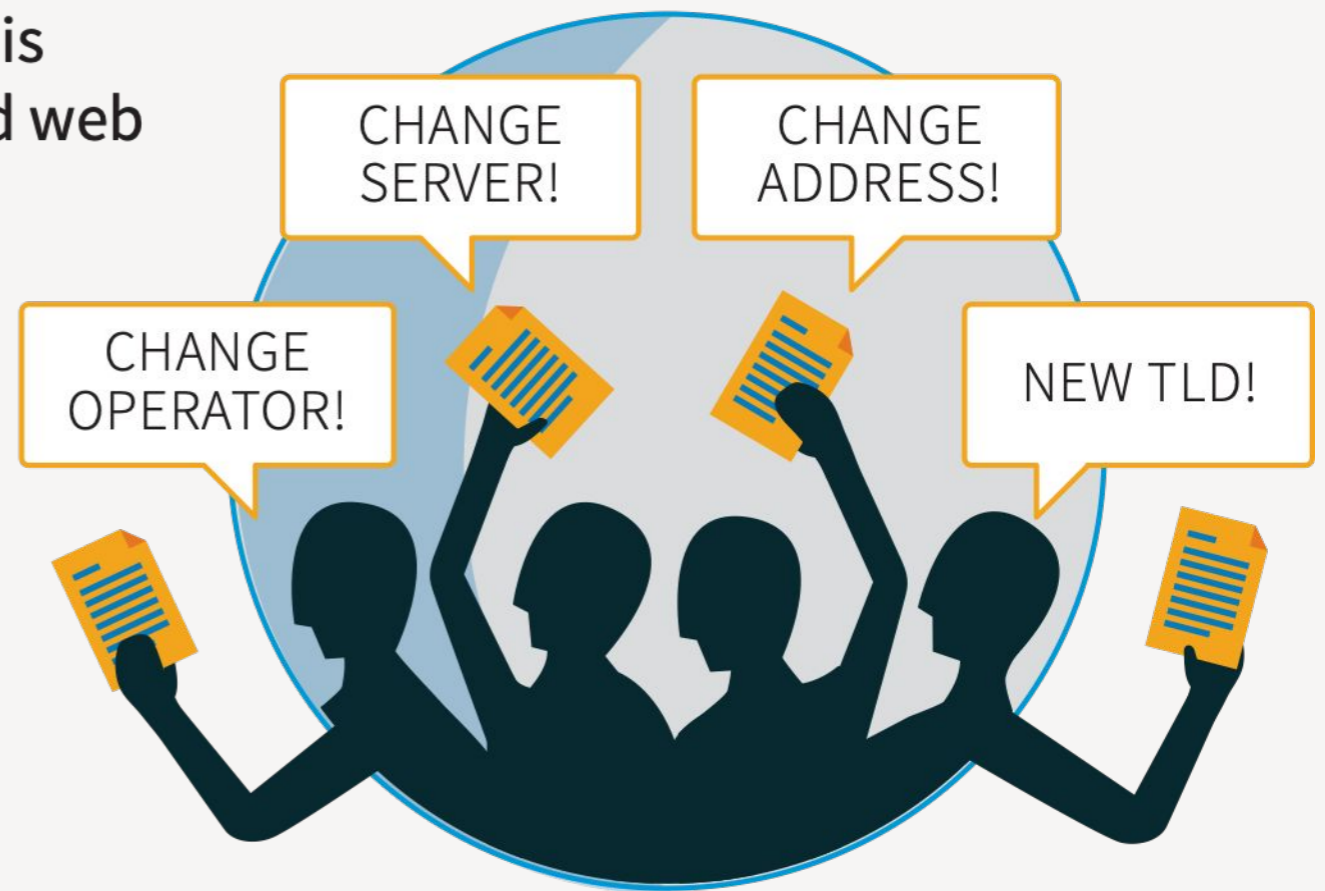
## Event Triggers Request

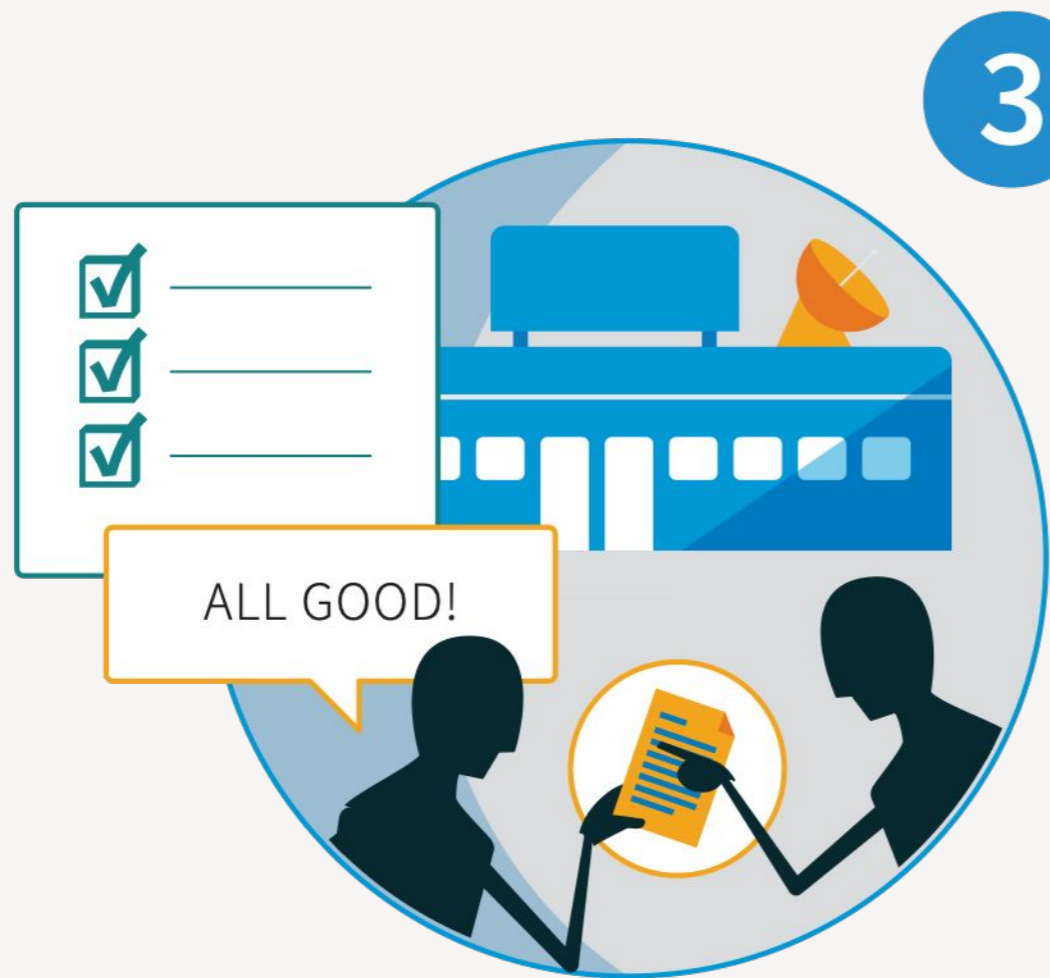
An event such as a change in TLD operator, routine maintenance (technical or staffing change) or a natural disaster triggers the need for a change request.

## 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).





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## Policy Check

IANA checks that the change request 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

## Consent

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

## Regulatory

- ✓ Request meets legal requirements

## Well-formedness

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

## Transfer of responsibility

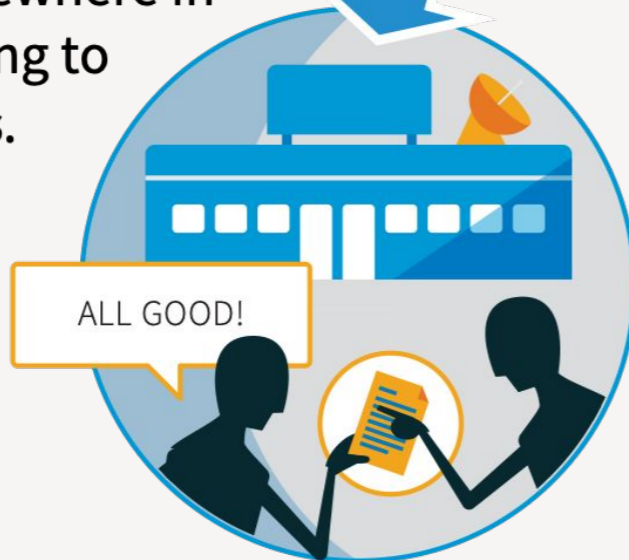
- ✓ Meets policy requirements for transfers (differs between ccTLDs and gTLDs)

# 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

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- ▶ 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

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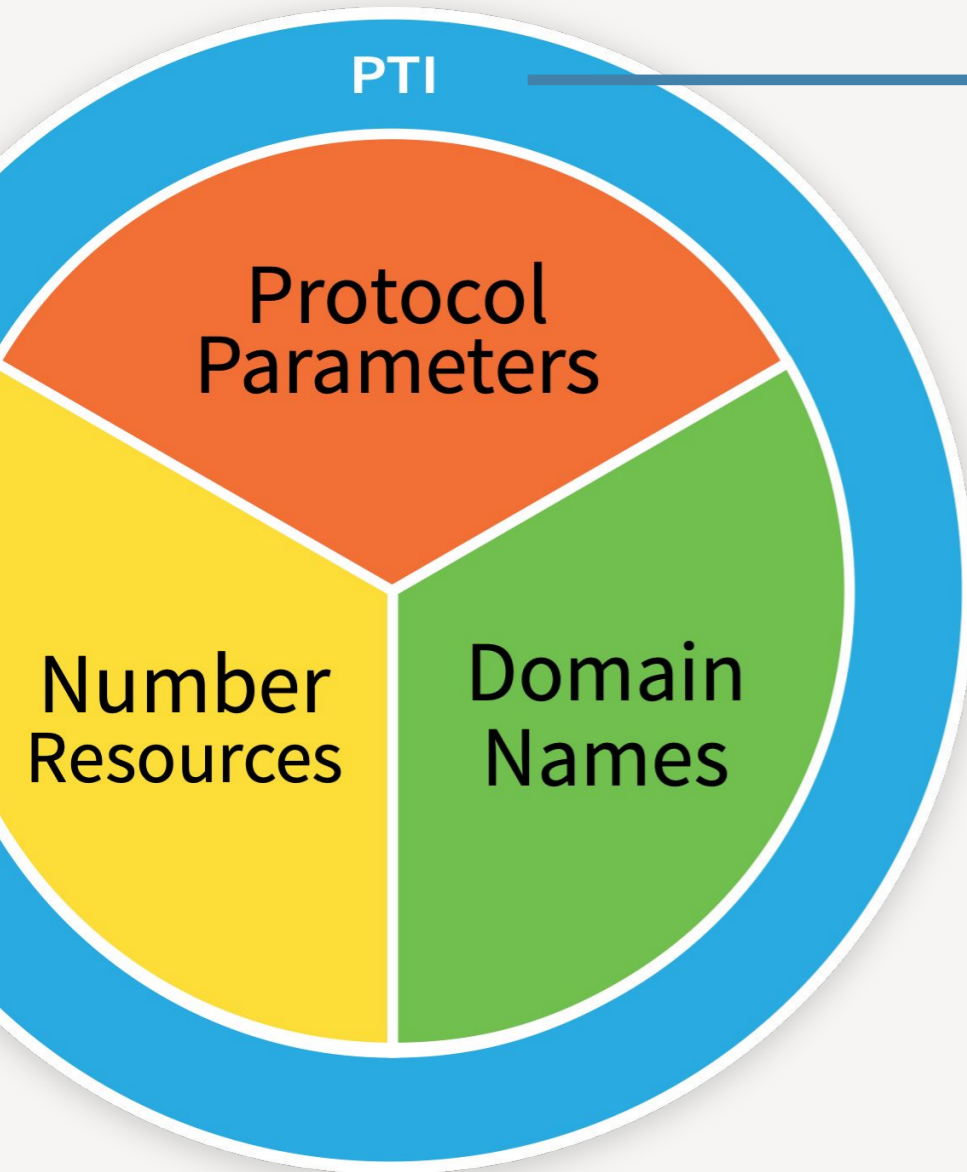
- ▶ .INT domains — Intergovernmental treaty organisations
- ▶ Label Generation Rulesets (LGRs, IDN tables) — registries share IDN language practices
- ▶ Managing the trust anchor for the DNS (the “Root Zone Key Signing Key”)
  - ▶ Using the key happens in public “key signing ceremonies”, involving trusted 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

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- ▶ 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 APPTTEE



**Xavier Calvez**  
ICANN CFO



**Kim Davies**  
PTI PRESIDENT



**Jia-Rong Low**  
ICANN VP, APAC



**Tobias Sattler**  
CHAIR  
NOMCOM APPTTEE

# Customer Standing Committee

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- ▶ 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

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- ▶ 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](http://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](http://sle-dashboard.iana.org)

### Monthly Performance Report from Public Technical Identifier Customer Standing Committee

February 2017

Summary of Performance  
 Exceptions and Narrative  
 Detailed Performance  
 Definitions

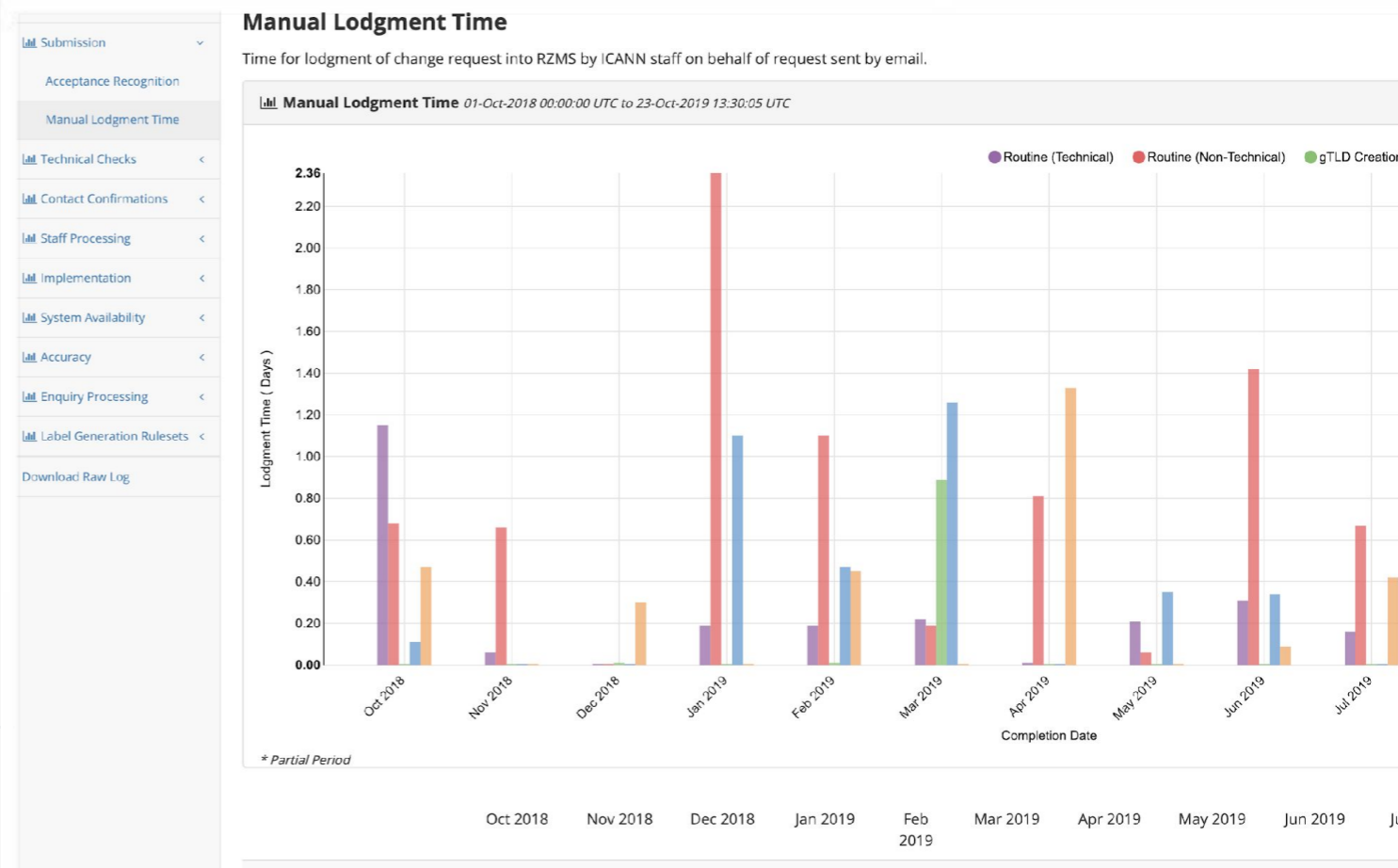
### Exceptions and Narrative for Reporting Period

Metric	Category	Expected	Actual
Manual Lodgment Time	Routine (Non-Technical)	3d	4.07d

Primary cause: Clarification needed from requestor  
 Analysis/Comments: Request started with an inquiry on how to make changes in the iANA root zone. No change request was included in the initial submission with the requestor, it was clarified that the procedure to lodge a request is to use the template form and required staff to lodge it in the iANA Stewardship transition impacted the cTLD ss, specifically the role of the ICANN Board going forward.

### Summary of Performance

Metric	Category	Expected	Actual	Detail
<b>Submission</b>				
Acceptance Recognition	Routine (Technical)	s60s (95.0%)	✓ 1.72s	p5
Acceptance Recognition	Routine (Non-Technical)	s60s (95.0%)	✓ 2.34s	p5
Acceptance Recognition	gTLD Creation/Transfer	s60s (95.0%)	✓ 1.44s	p6
Acceptance Recognition	ccTLD Creation/Transfer	s60s (95.0%)	✓ 0.72s	p6
Acceptance Recognition	Other Changes	s60s (95.0%)	✓ 1.95s	p6
Manual Lodgment Time	Routine (Technical)	s3d (95.0%)	✓ 0.92d	p7
Manual Lodgment Time	Routine (Non-Technical)	s3d (95.0%)	✗ 4.07d	p7
Manual Lodgment Time	gTLD Creation/Transfer	s3d (95.0%)	✓ —	p8
Manual Lodgment Time	ccTLD Creation/Transfer	s3d (95.0%)	✗ 3.38d	p8
Manual Lodgment Time	Other Changes	s3d (95.0%)	✓ —	p8
<b>Technical Checks</b>				
Technical Check (First)	Routine (Technical)	s50m (95.0%)	✓ 6.89m	p9
Technical Check (First)	gTLD Creation/Transfer	s50m (95.0%)	✓ 4.1m	p9
Technical Check (First)	ccTLD Creation/Transfer	s50m (95.0%)	✓ 2.6m	p10
Technical Check (First)	Other Changes	s50m (95.0%)	✓ —	p10
Technical Check (Retest)	Routine (Technical)	s3m (95.0%)	✓ 2.1m	p11
Technical Check (Retest)	gTLD Creation/Transfer	s3m (95.0%)	✓ —	p11
Technical Check (Retest)	ccTLD Creation/Transfer	s3m (95.0%)	✓ —	p12
Technical Check (Retest)	Other Changes	s3m (95.0%)	✓ —	p12
Technical Check (Supplemental)	Routine (Technical)	s1m (95.0%)	✓ 0.61m	p13
Technical Check (Supplemental)	gTLD Creation/Transfer	s5m (95.0%)	✓ 0.28m	p13
Technical Check (Supplemental)	ccTLD Creation/Transfer	s5m (95.0%)	✓ 0.29m	p13
Technical Check (Supplemental)	Other Changes	s5m (95.0%)	✓ —	p13
<b>Contact Confirmations</b>				
Email Dispatch	Routine (Technical)	s60000ms (95.0%)	✓ 1ms	p14
Email Dispatch	Routine (Non-Technical)	s60000ms (95.0%)	✓ 1ms	p14
Email Dispatch	gTLD Creation/Transfer	s60000ms (95.0%)	✓ 1ms	p15
Email Dispatch	ccTLD Creation/Transfer	s60000ms (95.0%)	✓ 0ms	p15
Email Dispatch	Other Changes	s60000ms (95.0%)	✓ 1ms	p15
Recognition of Confirmation	Routine (Technical)	s60000ms (95.0%)	✓ 0ms	p16
Recognition of Confirmation	Routine (Non-Technical)	s60000ms (95.0%)	✓ 0.4ms	p16
Recognition of Confirmation	gTLD Creation/Transfer	s60000ms (95.0%)	✓ 0ms	p17
Recognition of Confirmation	ccTLD Creation/Transfer	s60000ms (95.0%)	✓ 0ms	p17
Recognition of Confirmation	Other Changes	s60000ms (95.0%)	✓ 1ms	p17
<b>Staff Processing</b>				
Validation and Reviews	Routine (Technical)	s5d (90.0%)	✓ 3.43d	p18
Validation and Reviews	Routine (Non-Technical)	s5d (90.0%)	✓ 4.02d	p18
Validation and Reviews	gTLD Creation/Transfer	s10d (90.0%)	✓ 1.03d	p19
Validation and Reviews	ccTLD Creation/Transfer	s60d (100.0%)	✗ 93.32d	p19
Validation and Reviews	Other Changes	s0d	✓ 6.8d	p19
Third Party Approval	ccTLD Creation/Transfer	s60d	✓ 14.29d	p20
<b>Implementation</b>				
Root Zone Publication	Routine (Technical)	s72h (99.0%)	✓ 33.08h	p21
Root Zone Publication	gTLD Creation/Transfer	s72h (99.0%)	✓ 18.31h	p21
Root Zone Publication	ccTLD Creation/Transfer	s72h (99.0%)	✓ 17.07h	p22
Root Zone Publication	Other Changes	s72h (99.0%)	✓ —	p22
Notification of Completion	Routine (Technical)	s60s (95.0%)	✓ 0.36s	p23





# Service Level Agreements

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- 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

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- ▶ 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

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Questions?