



79 | COMMUNITY
FORUM

Overview of the IANA Functions

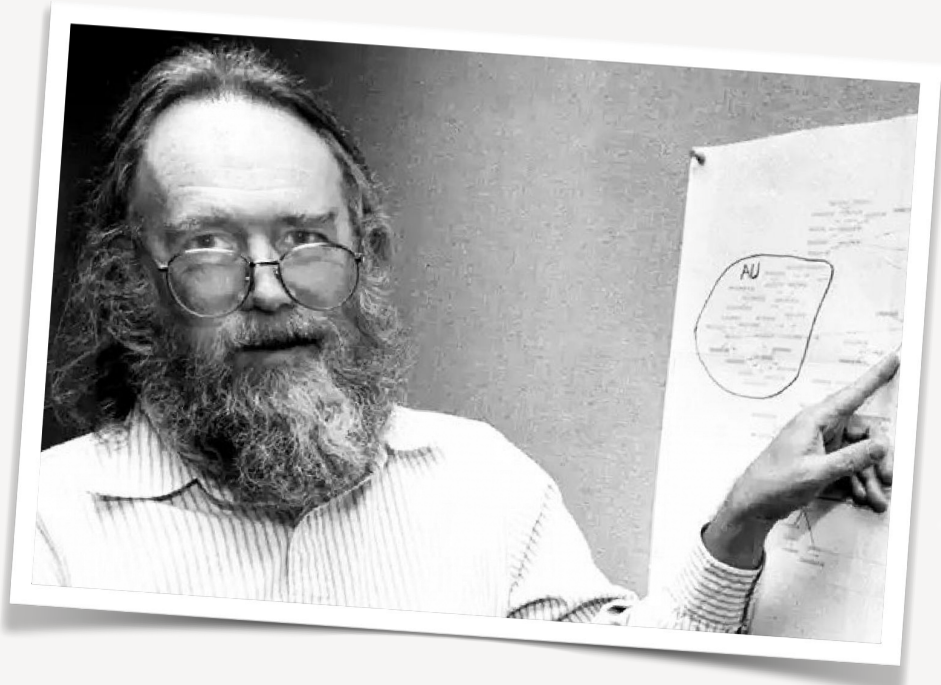
Marilia Hirano

Director, IANA Strategic Programs

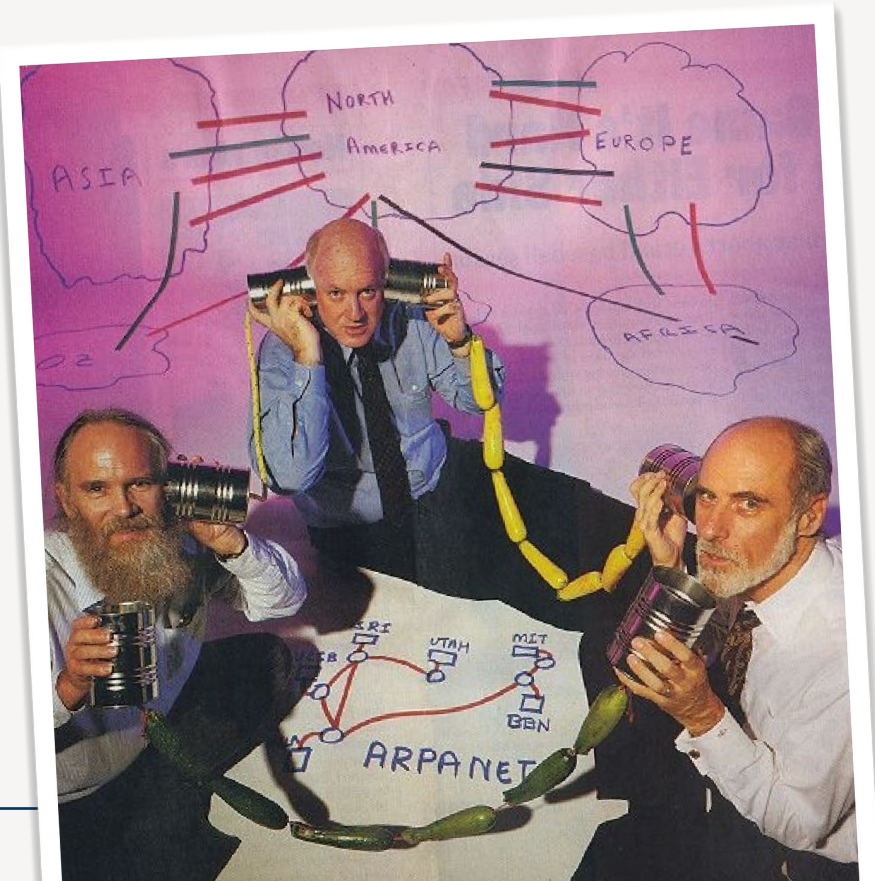


What are the IANA functions?

- The record keeper for the unique names and numbers used by Internet technologies to interoperate
- The IANA functions pre-date ICANN. In 1998, ICANN was established to be the home of the IANA functions
- The unique identifiers include protocol parameters, Internet numbers and domain names
- The IANA team maintains these records according to policies adopted by Internet names, numbers and protocol standards communities



Jon Postel (L) started the IANA; with Steve Crocker and Vint Cerf (R)



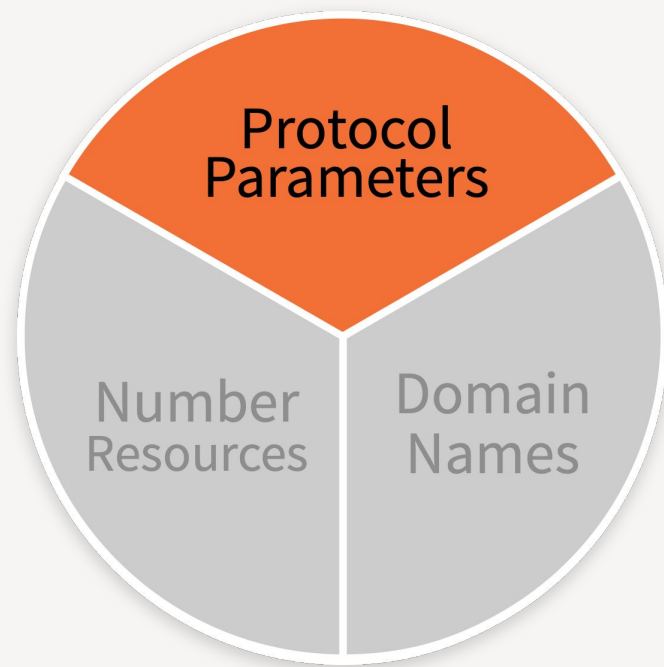
Why do the IANA functions exist?

- 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 authoritative registries are used by vendors, service providers, businesses, application developers and others to innovate and expand the use of the Internet

The collage includes several key network-related elements:

- BGP Identifier (4 bytes):** A diagram showing the structure of a BGP identifier, including fields for My Autonomous System (2 bytes), Hold Time (2 bytes), and Opt Param Len (1 byte).
- Parts of an SRV record:** A diagram showing the structure of an SRV record, including fields for service, proto, name, TTL, class, priority, weight, port, and target.
- Answers:** A list of DNS answers for the domain www.google.com, showing various record types and their values.
- OID Tree Example:** A hierarchical tree diagram showing the structure of an Object Identifier (OID) tree, starting from the Root and branching into various categories like directory, mgmt, experimental, and private.
- HTTP Status Codes:** A table listing various HTTP status codes and their meanings, categorized into 4XX Client Error and 5XX Server Error.
- TCP Connection Establishment:** A diagram illustrating the three-step process of establishing a TCP connection between two hosts, A and B, showing the exchange of SYN, SYN-ACK, and ACK packets.
- Transmission Control Protocol (TCP) Header:** A diagram showing the structure of a TCP header, including fields for source port number, destination port number, sequence number, acknowledgement number, window size, and urgent pointer.

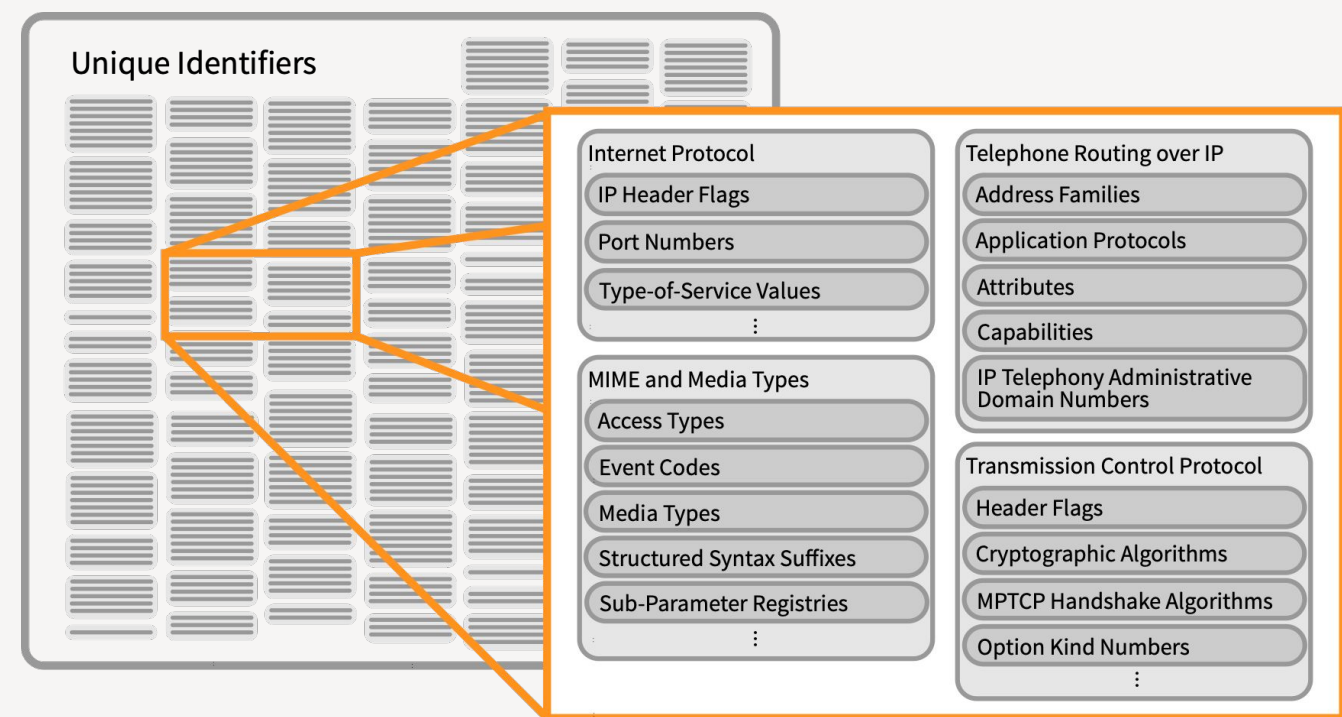
Core IANA Functions

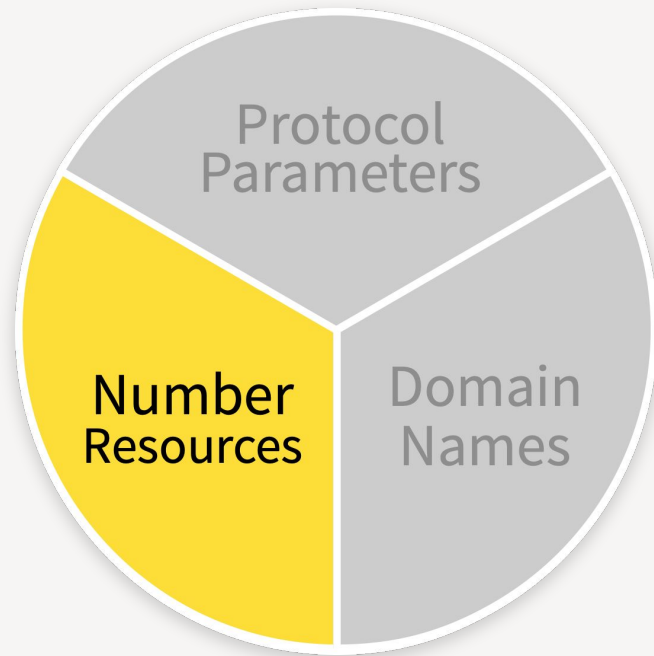


- **Protocol Parameters** are used everywhere and are directly issued by IANA.
- Most protocol parameters' visibility is **limited** to software implementers (i.e. inside software code).
- The **Internet Engineering Task Force (IETF)** develops the Internet standards that define protocol parameter systems.

IANA's role:

- Receiving and evaluating requests to create new registries and to add new values to registries
- Maintaining and publishing registry data
- Providing advice on upcoming standards efforts on how it would be implemented as part of the IANA functions





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

IANA allocates Number Resources to Regional Internet Registries

- RIRs in turn delegate them to ISPs and network operators in their region
- Some specialized allocations are made directly by IANA (e.g. multicast)
- Deterministic decision making is used.

Unique Identifiers

Internet Protocol

IPv4 Addresses

IPv6 Addresses

IP Header Flags

⋮

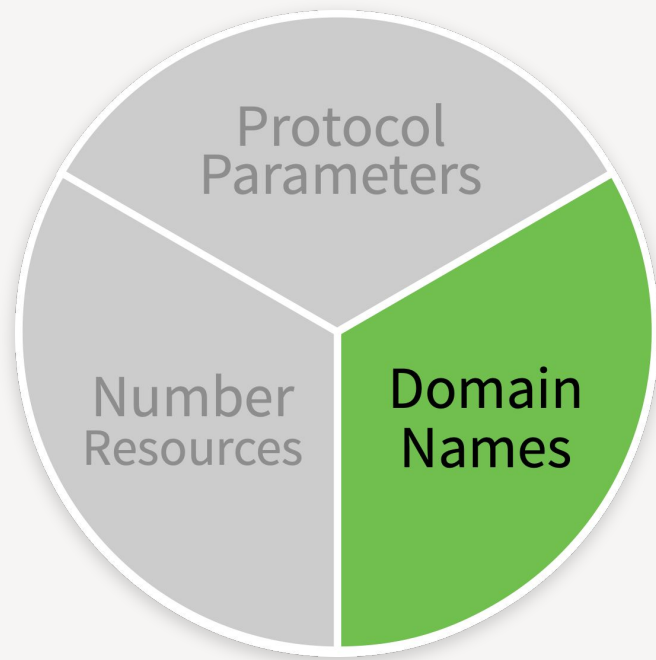
Border Gateway Protocol

AS Numbers

Path Attributes

⋮

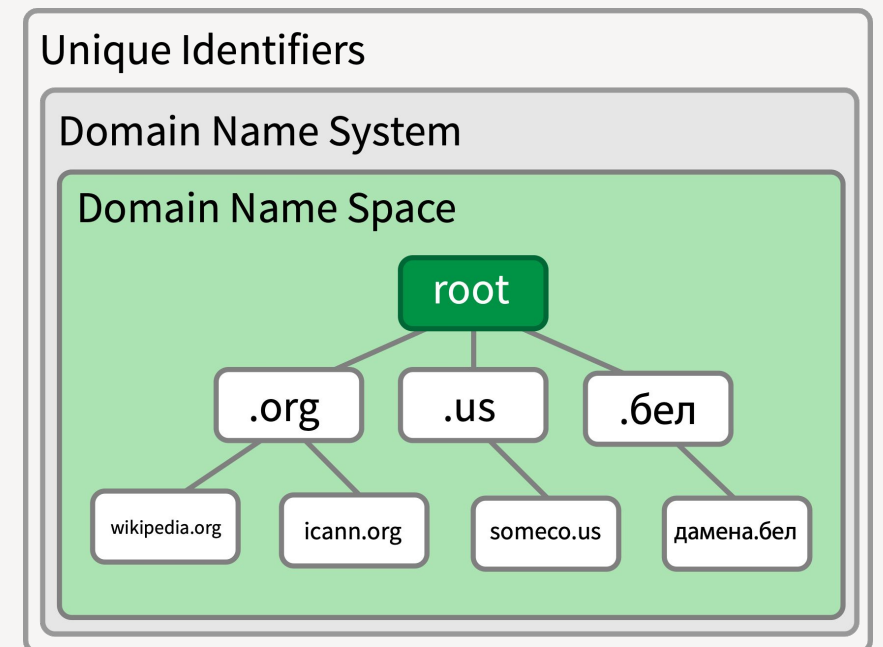
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- Most notable IANA function is managing the **DNS root zone**, which defines top-level domains
- Like number resources, the domain name space is hierarchically delegated, with IANA responsible for the upper-most level of allocations.

The IANA tasks include:

- Receiving and evaluating root zone changes requests against policies and operational requirements:
 - Assignment and transfer 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.



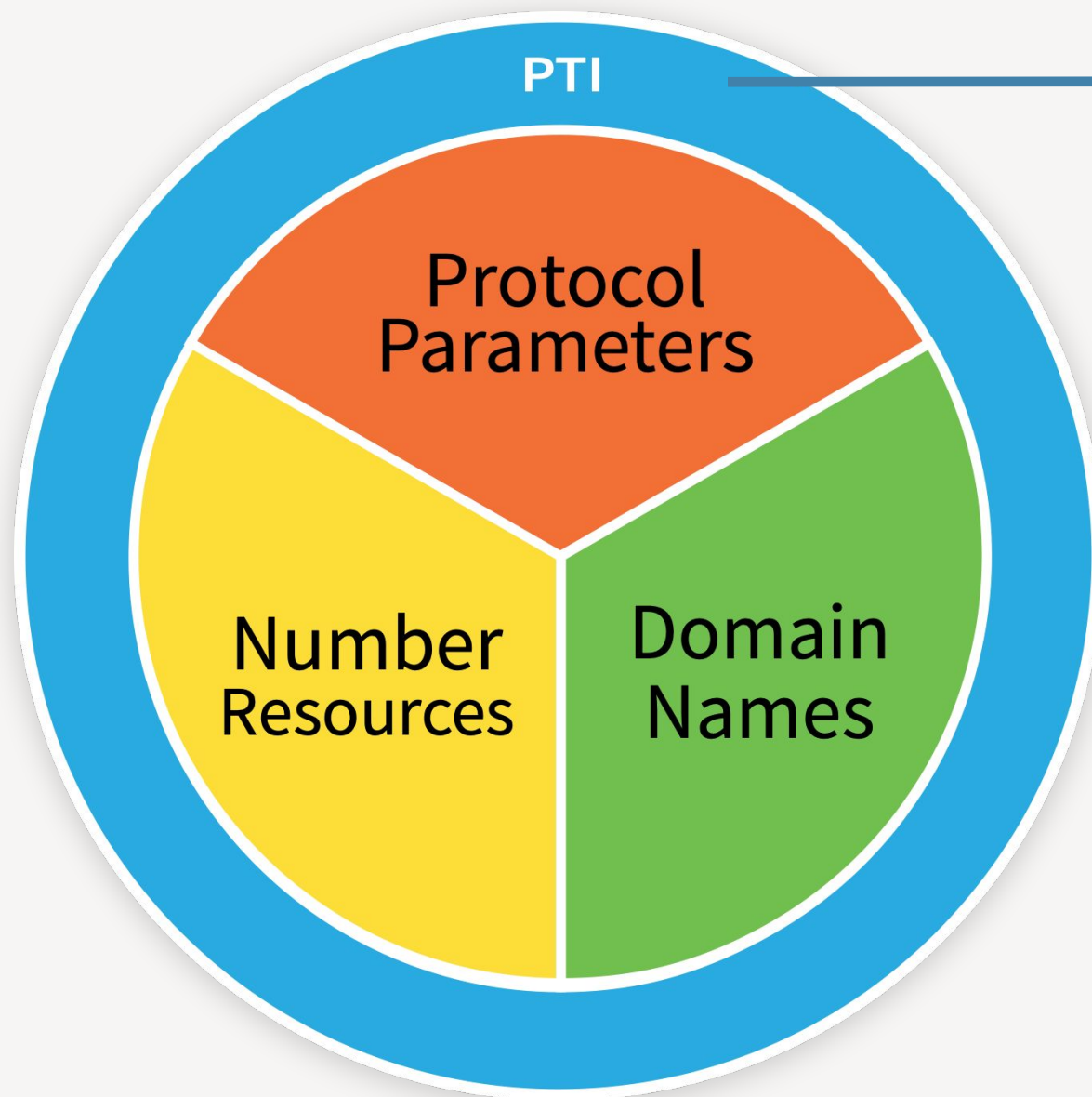
The IANA Department does

- ✓ Create registries based on policies from the community
- ✓ Maintain existing registries
- ✓ Allocate number resources
- ✓ Publish all registries for general public use

The IANA Department doesn't

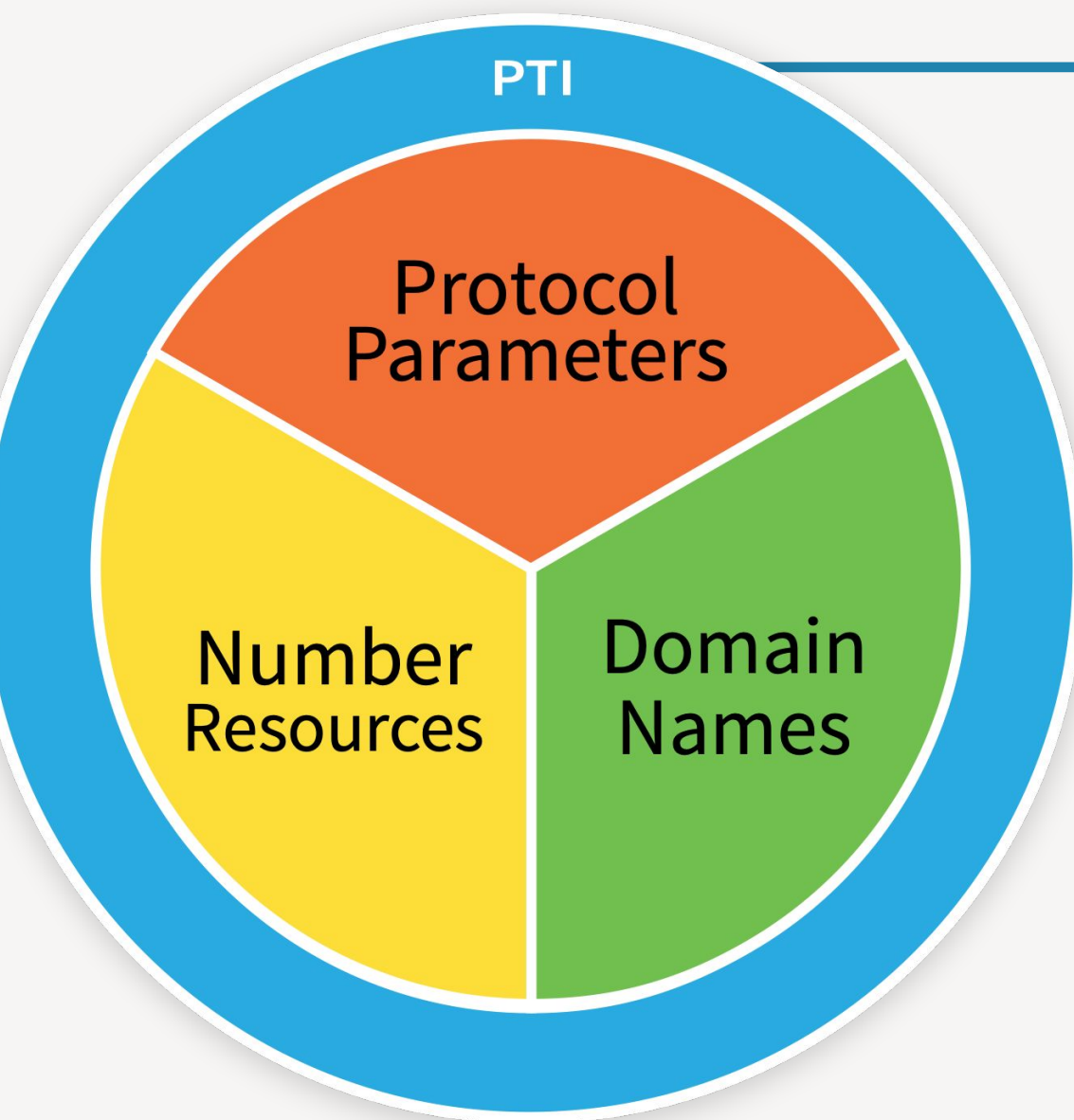
- ✗ Create nor interpret policy
- ✗ Determine what can be a domain name
- ✗ Choose TLD managers

Oversight & Accountability



Public Technical Identifiers

- Performs the IANA functions
- Is a non-profit organization created in 2016
- Hires the IANA staff
- ICANN is its sole member (i.e. affiliate of ICANN)



PTI Board

Five-member board of directors including
2 Nomcom appointees



Anupam Agrawal
NOMCOM APPTTEE



Xavier Calvez
ICANN CFO



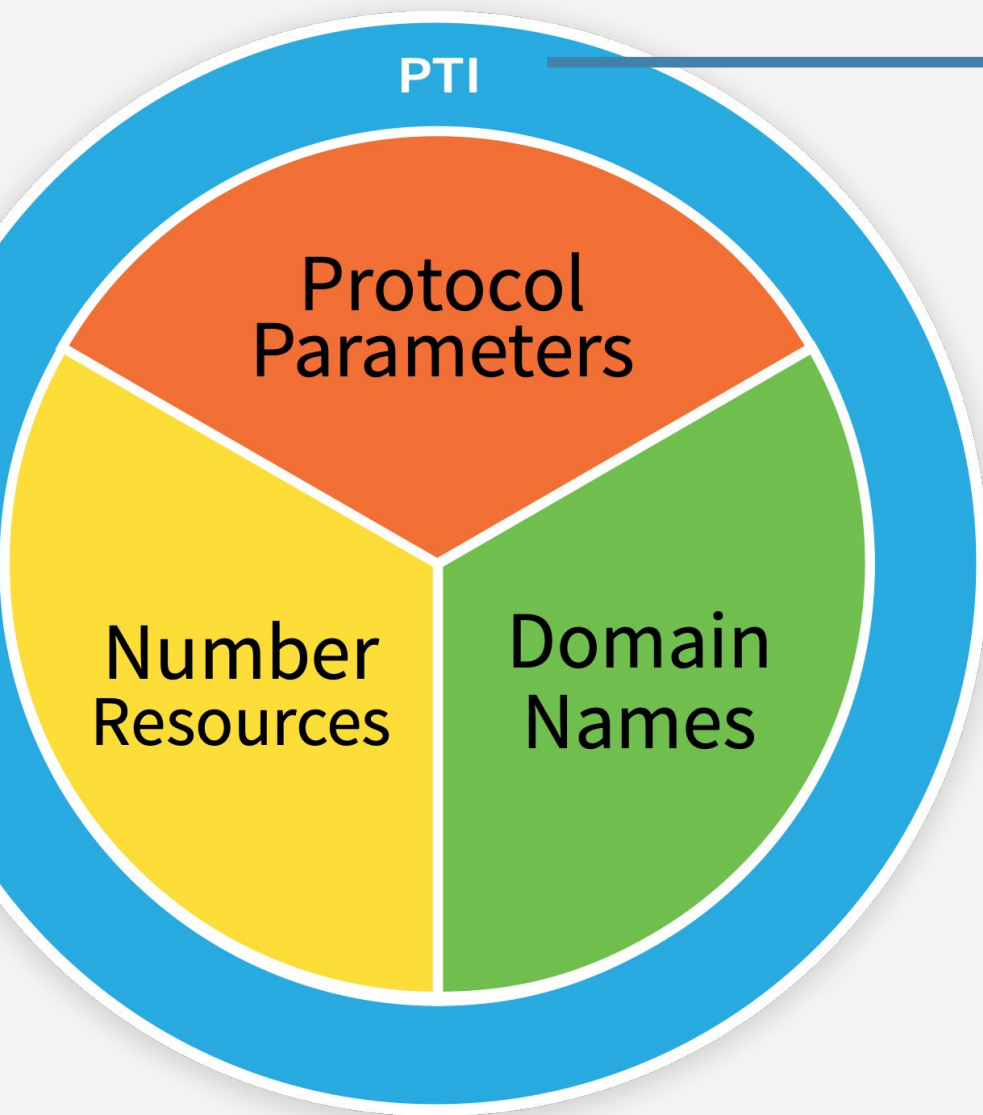
Kim Davies
PTI PRESIDENT



Jia-Rong Low
ICANN VP, APAC



Tobias Sattler
CHAIR
NOMCOM APPTTEE



IANA Staff



Shaunte Anderson



Amanda Baber



Dan Bougere



Tyler Carroll



Amy Creamer



Kim Davies



David Dong



Aaron Foley



Selina Harrington



Lawrence He



Marilia Hirano



Tania Hopkins



James Mitchell



Ali Mohammadi



Candice Montoya



Andres Pavez



Racquel Ross



Seman Said

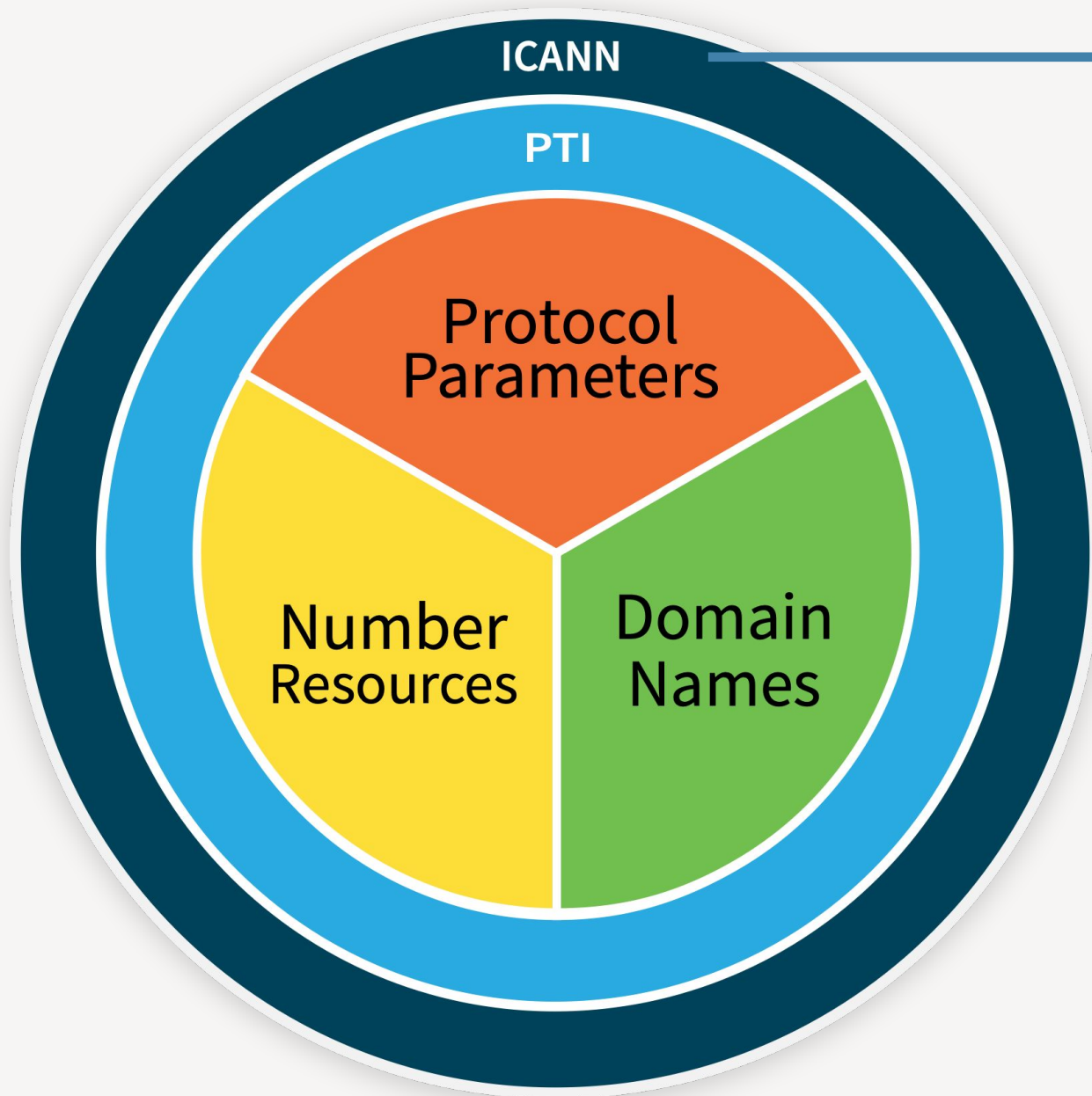


George Sarkisyan



Sabrina Tanamal

● Operations ● Strategic Programs ● Technical Services

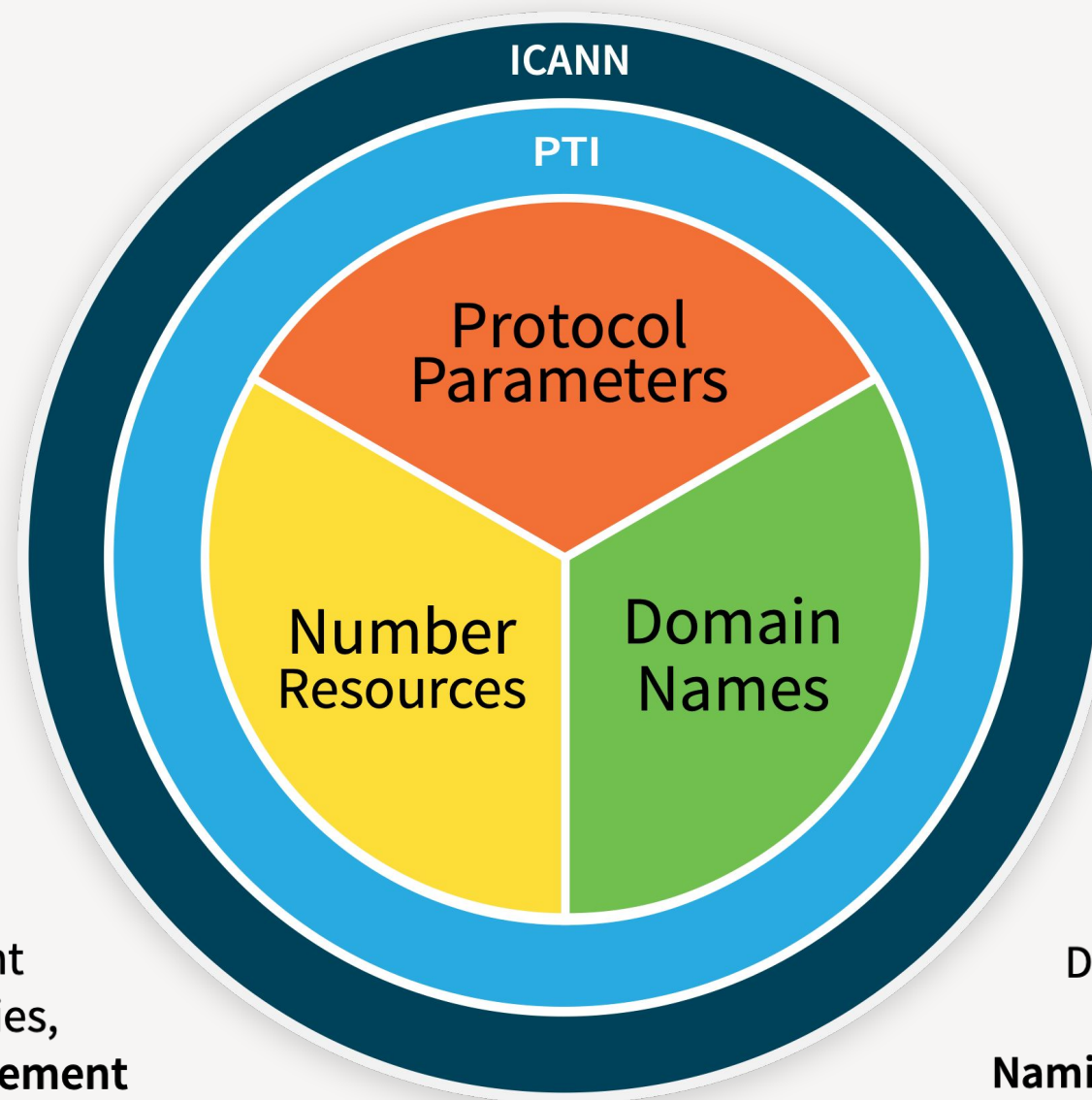


ICANN

- Responsible for the IANA functions
- Contracts PTI to perform the IANA functions
- Oversees PTI's performance
- Provides shared resources (Legal, IT, HR, Finance and many others)
- Provides all funding to PTI
- Supports additional accountability mechanisms such as Customer Standing Committee, IANA Naming Function Reviews

Contracts

Protocol Parameter oversight
through **Memorandum of Understanding**
between IETF and ICANN,
subcontracted from ICANN to PTI

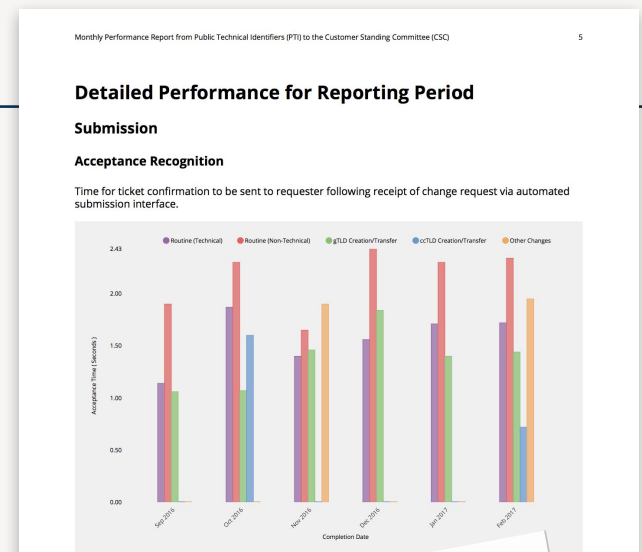


Number resource oversight
by Regional Internet Registries,
governed by **Service Level Agreement**
between ICANN and RIRs,
subcontracted from ICANN to PTI

Domain Name oversight by ICANN;
governed by
Naming Contract between ICANN and PTI;
performance oversight by
ICANN Customer Standing Committee

Accountability

- Each function has service level expectations defined and reported against
 - Reports against KPIs to the IETF for protocol parameters
 - Around 70 measurement categories to the Customer Standing Committee for naming functions
 - Performance reporting to the numbering community for IP address and AS number allocations
- These figures are reviewed through various processes
 - Monthly Customer Standing Committee meetings, plus IANA Naming Function Reviews
 - Regular meetings and dialogue with IETF leadership
 - Reports to RIRs and an annual IANA Review Committee process



IANA Protocol Parameter Service
Monthly Report
October 15, 2019

For the Reporting Period of
September 1, 2019 – September 30, 2019

Prepared by: Amanda Baber
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Number Resource Performance June 2019

Performance Summary

These performance targets are derived from section 4.3 of the Numbering Services for the allocation of unicast IP addresses a Internet Registries.

- ✓ Requests acknowledged on time (100%)
- ✓ Responded on time (100%)
- ✓ Implemented on time (100%)
- ✓ Implemented accurately (100%)

Individual Requests to Regional Internet Registries

Date	Request Type	Request Processing Details
2019-05-13	IPv6 Unicast	✓ Responded on time (0.3 days) ✓ Implemented on time (0.2 days) ✓ Clarification asked on time (2.1 days) ✓ Accurately implemented More info
2019-06-11	AS Number	2019-06-11 01:42:36 Request received from APNIC Less info 2019-06-11 15:12:36 Request acknowledged ✓ Acknowledged on time (within 2 business days) 2019-06-12 18:03:29 Implemented using resource(s) ✓ Implemented on time (within 4 business days) ✓ Implemented accurately

Accountability

- Third-Party Information Security Audits
- Internal Audits
- Customer Satisfaction Surveys
- Regular Review & Updates of Business Processes
- Contingency & Continuity Plans
- Structured Project Management Framework
- Regular engagement with the community



How was your recent IANA service experience regarding .fk?

IS IANA Services <noreply-45900088aa66416ba9fa085fb6874313@iana.org>
Seman Said;
Monday, October 15, 2018 at 3:39 PM
[Show Details](#)

Dear Colleague,

We'd like to hear about how your recent request was handled by the IANA Services team. Please take a single question survey to provide us your valuable feedback.

On 5 October 2018, you submitted a change request for the .fk top-level domain. How do you rate your experience?

Don't want to receive these surveys?
While your feedback as our customer is valuable, we don't want to bother you if you find these intrusive. We don't send more than one of these requests every 60 days. If you wish to permanently stop receiving customer survey [click here](#)

iana
Internet Assigned Numbers Authority

Domains Protocols Numbers About

Contingency and Continuity of Operations Plan Test Report

10 May 2023

ICANN and PTI maintain a Contingency and Continuity of Operations Plan ("CCOP") for the IANA Naming Function. This Plan is compiled and tested in accordance with section 5.2(b) of the IANA Naming Functions Agreement effective 1 October 2016, which reads:

"[PTI] shall collaborate with ICANN to develop and implement a [CCOP] for the IANA Naming Function. [ICANN] in collaboration with ICANN shall from time to time update and annually test the CCOP as necessary to maintain the security and stability of the IANA Naming Function. The CCOP shall include details on plan continuation of the IANA Naming Function in the event of cyber or physical attacks, emergencies, or natural disasters. [PTI] shall submit the CCOP to ICANN after each update and publish on the IANA Website a record documenting the outcomes of the CCOP tests within 90 calendar days of the annual test."

This current version of the CCOP was adopted by the President of PTI in September 2022.

CCOP Annual Test

The CCOP is tested annually to enable robust collaboration amongst the incident response team in a safe environment. The exercise tests awareness of activities conducted by each party in case of operational failure and seeks to identify opportunities to refine the approach described within.

This year IANA engaged a third-party to review the CCOP and to update the plan to match industry best practice and to ensure alignment with ICANN's Crisis Management Plan.

A tabletop exercise was held on December 14, 2022. Present for the test were the third-party vendor and the Continuity Team, composed of key staff members that perform the IANA functions that would take lead in restoration efforts. Also present were representatives from ICANN's Engineering & Information Technology department.

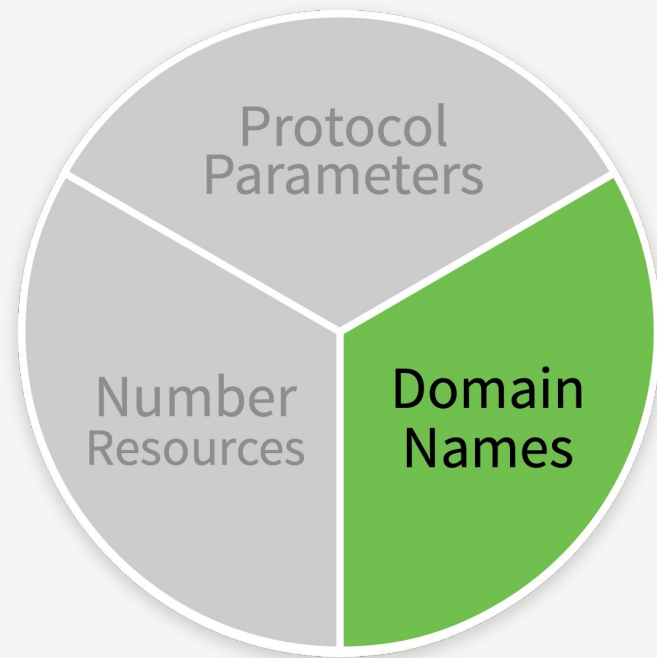
This year the plan was tested through a rapid series of short scenarios considering loss of people, facilities, applications, and vendors across all mission essential functions.

Findings

A report identifying strengths and opportunities for improvement was delivered to the PTI President on 10 May 2023. The report has been reviewed and has found the following:

- The exercise was successful in demonstrating that the plan adequately covered the mission essential functions;
- The PTI Continuity Team were effective in coordinating a response to disruptions;
- IANA should document the thresholds and individuals for leveraging geographically diverse ICANN personnel during a disruption;
- IANA should document the thresholds for bypassing standard regulatory reviews during a disruption;
- IANA should document the gaps in emergency and escalation contacts for vendors, including internal IC teams;
- IANA should ensure activation thresholds are in alignment with existing documentation, including the threshold and succession plans.





Other notable activities

.INT Registry

- .int domain is used for registering organizations established by international treaties between or among national governments.
- Started in 1988. Historically also included some non-treaty purposes (“international databases”) but this was phased out in 2000.
- Approximately 200 domains registered
- A small registry with very few legitimate requests per month, most are rejections for applicants that are [not eligible](#)



.ARPA Registry

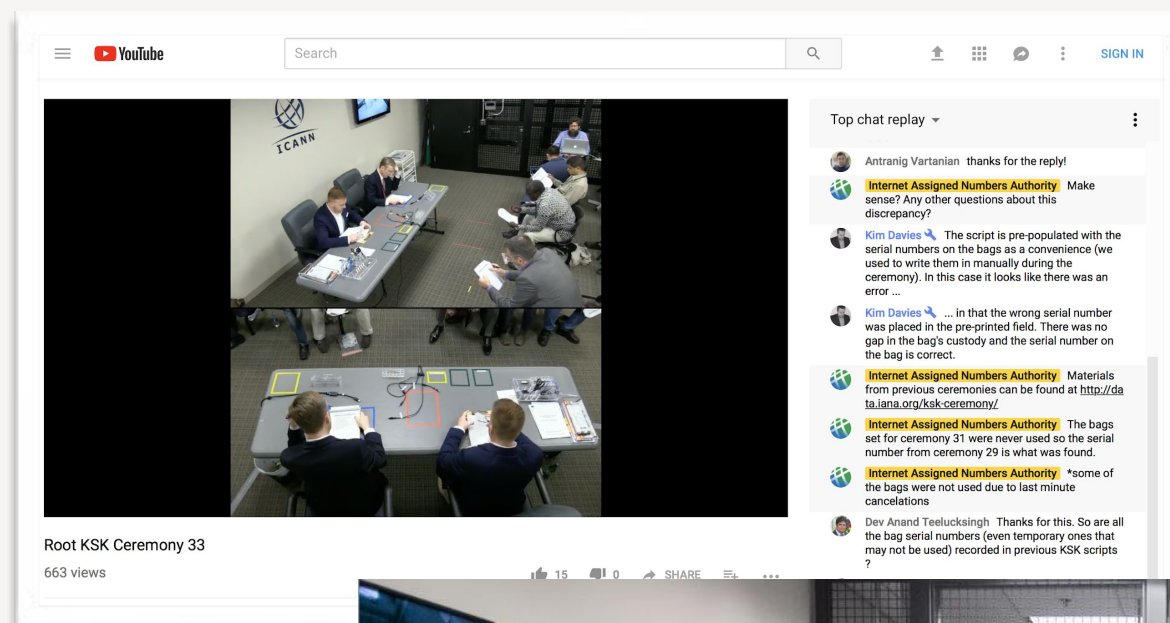
- Designated to be used exclusively for Internet-infrastructure purposes.
- For uses prescribed by RFCs, therefore considered a protocol parameter registry in terms of oversight, not part of the naming functions
- [IANA administers](#) the domain in cooperation with the Internet technical community through the guidance of the [Internet Architecture Board](#) (IAB).

Label Generation Rulesets

- LGR Repository (formerly “IDN tables”)
- Informal repository started by ICANN staff to share best practice for IDN deployment
- Contains the [definitive code points and associated eligibility rules](#) for which strings are permitted for registration within a TLD’s policy
 - Usually language-bound (e.g. Thai, Japanese, Urdu) or script-bound (e.g. Latin, Cyrillic, Arabic, Simplified Chinese)
- Became a contractual requirement for gTLD operators (not ccTLDs) to adhere to the “[IDN Guidelines](#)”, which in turn made it a requirement to submit these as they were part of the guidelines.
- Service level agreements exist with the Customer Standing Committee

The Root Key Signing Key

- ▶ As part of its root zone related functions, IANA manages the **key signing key**, the trust anchor used to secure the DNS with the DNSSEC protocol.
- ▶ An auditable process of performing **key signing ceremonies** to use this key is conducted using members of the community as key participants.



Root KSK Ceremony 52

This DNSSEC key signing ceremony is planned for
14 February 2024, 2100 UTC

Location	Root Zone Key Management Facility West El Segundo, California, USA
Ceremony Start	2024-02-14 21:00:00 UTC Wednesday 14 February 2024, 1 p.m. (local time at facility)
Objectives	Sign the ZSK for 2024Q2 Introduce Hardware Security Module 8W

Observing the ceremony

The key signing ceremony is a public event, and you are welcome to observe. Due to space constraints, only a small number of persons are able to participate as observers at a ceremony in person. We also broadcast ceremonies as they happen, and will provide recordings after the ceremony is concluded. Prior to observing a ceremony, we recommend you review the ceremony materials (i.e. the draft script) in advance.

In Person If you wish to attend as an observer in person, this must be arranged in advance. Priority is given to those that have a formal role in the ceremony, and then on a first-come first-served basis. This ceremony will be held in El Segundo, California, USA, and observers must meet all costs in travelling to the ceremony. Requests should be submitted at least 45 days before the ceremony (i.e. by 31 December 2023)



The ceremonies

- The process is streamed and recorded, with external witnesses watching every step. All materials (videos, code, scripts, etc.) are posted online at iana.org/dnssec
- The purpose is to ensure **trust in the process**. DNSSEC only provides security if the community is confident the HSMs have not been compromised.
- Media presence:
 - The Guardian
<http://goo.gl/JvPu62>
 - Vice News
https://video.vice.com/en_ca/video/this-is-the-nerdy-ceremony-that-keeps-the-internet-running/5a8ce4fbf1cdb31ab85c1221

Questions?