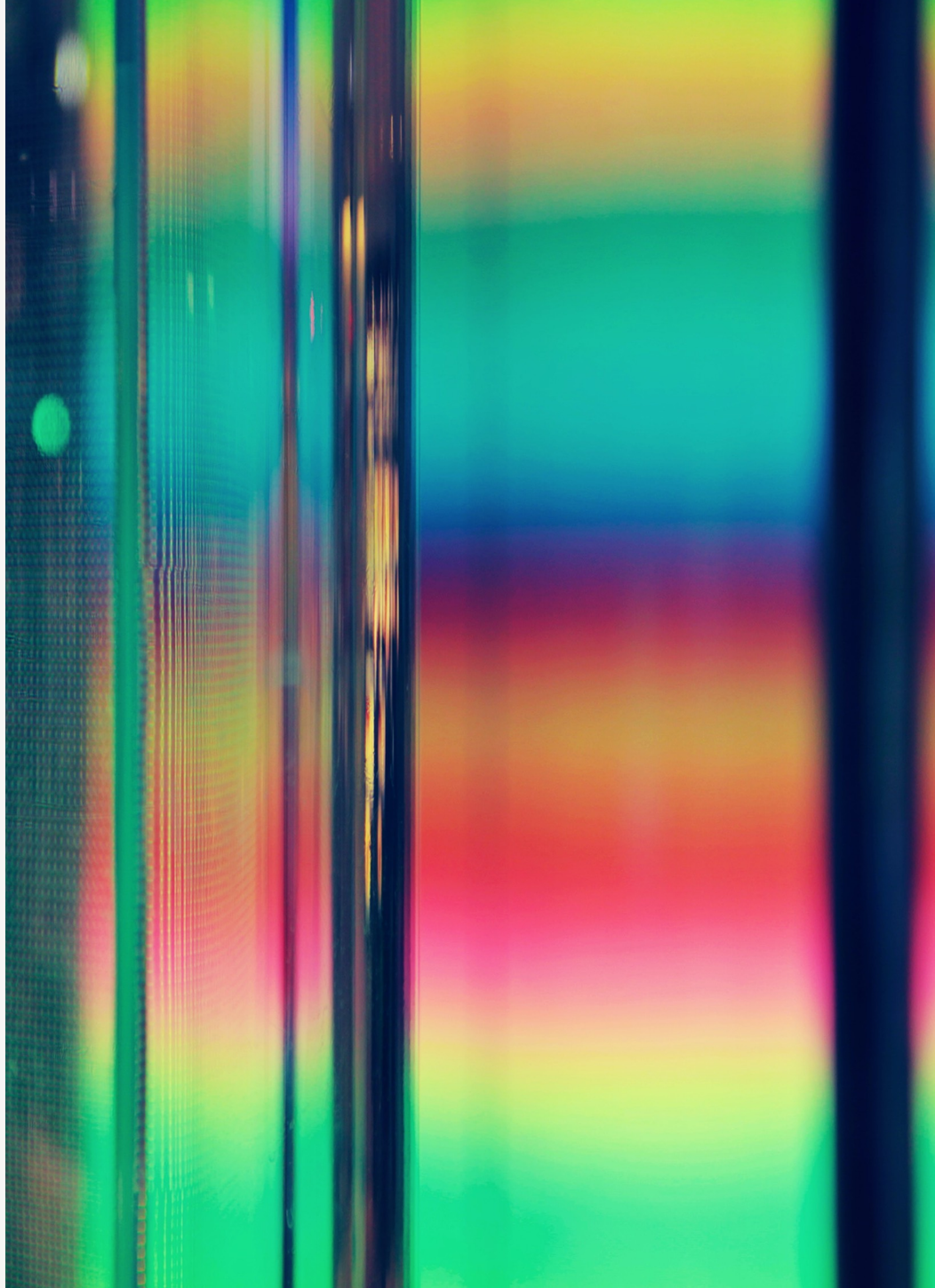
IANA Update

ARIN 54

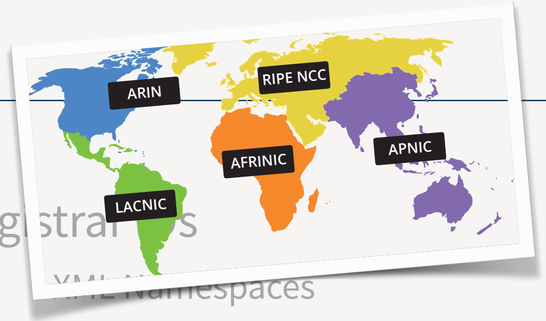
Kim Davies
VP, IANA Services, ICANN; President, PTI

Toronto
October 2024

PTI | An ICANN Affiliate



Number Resource Services



URI Schemes

DNS Root Zone

Registrars

DNS Resource Records

Port Numbers

SIP Parameters

vCard Parameters

IDNA Code Points

IPv4 Addresses

IP Versions

Special-use Domain Names

HTTP Status Codes

Private Enterprise Numbers

MPLS Return Codes

TLS Cipher Suites

BGP Path Attributes

IPv6 Addresses

Media Types

STUN Attributes

Kerberos Parameters

Language Tags

RTSP Feature Tags

YANG Modules

Autonomous System Numbers

PGP Public Key Algorithms

RADIUS Types

OSPF Parameters

SMI MIB Modules

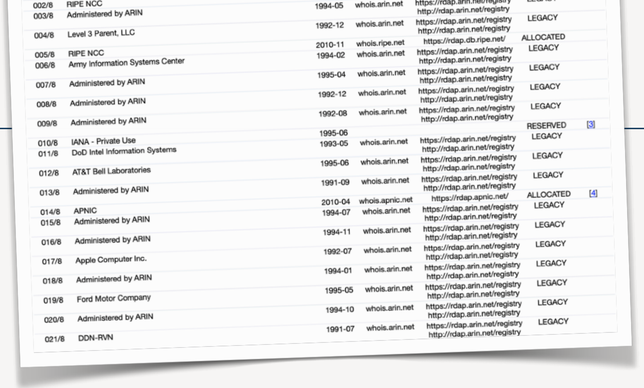
DNS Trust Anchor

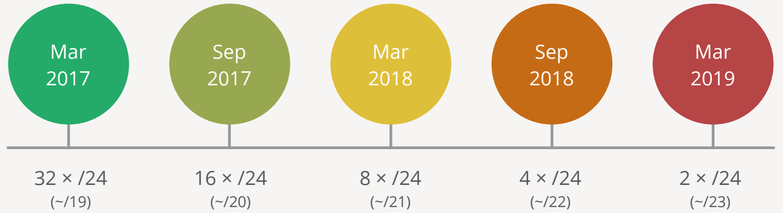
Label Generation Rulesets

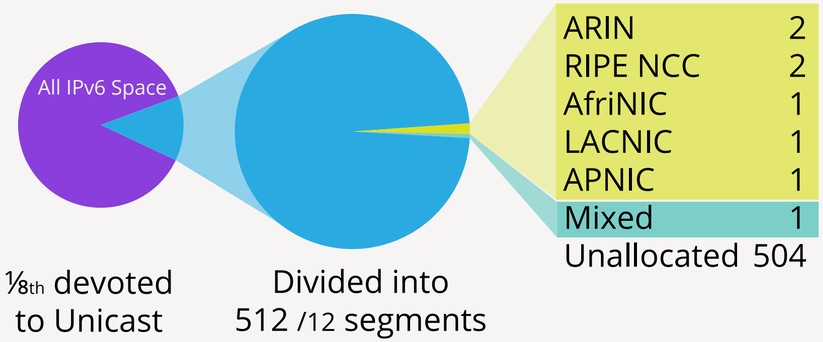
Address allocation status

IPv4 Addresses

- 222 /8s designated for unicast use (≈86%)
- The last 5 of these /8s were allocated on 3 February 2011 to the RIRs
- Recovery pool active 2017—2019, now exhausted



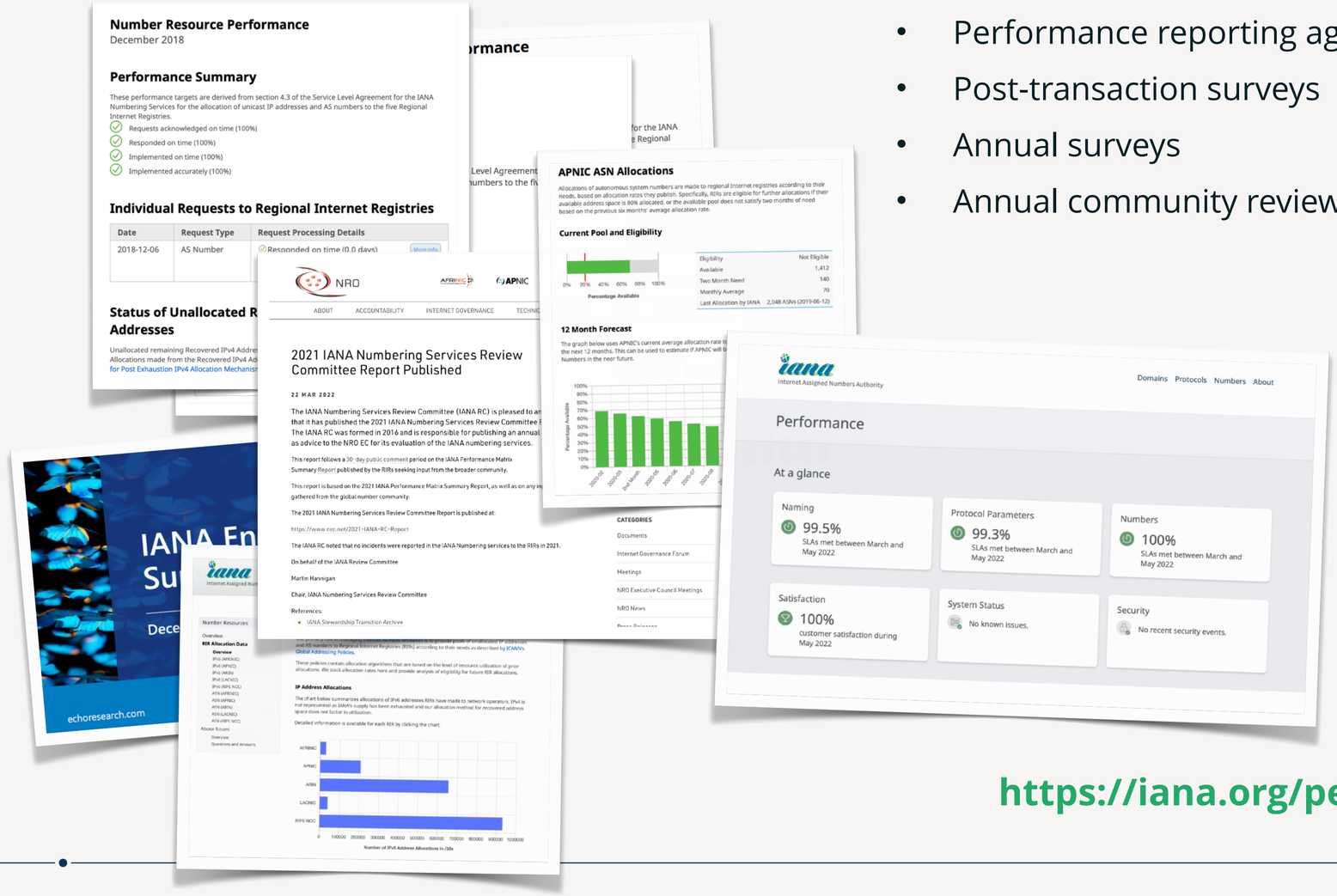




IPv6 Addresses

- Minimal allocation to date of available space (≈1.2% of unicast, ≈0.1% of total)

Accountability

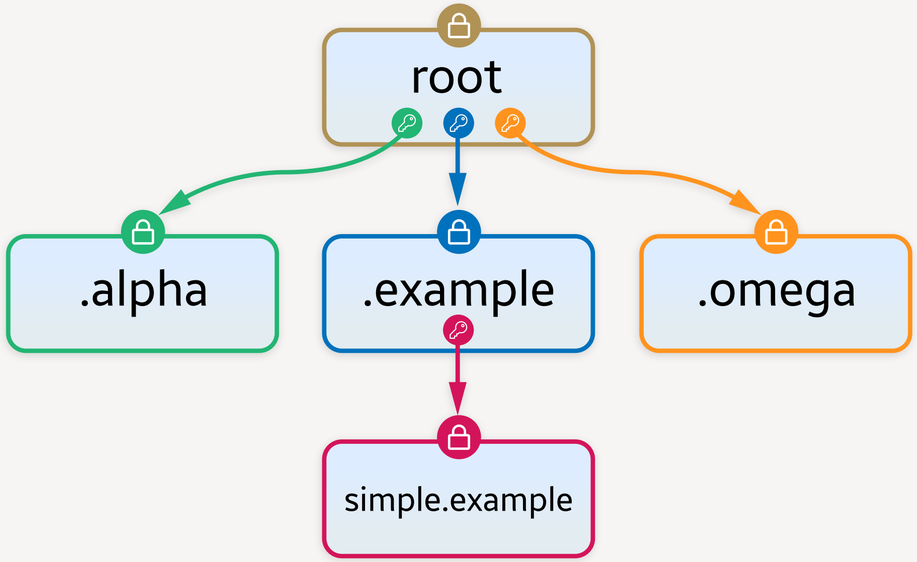


- Performance reporting against SLAs
- Post-transaction surveys
- Annual surveys
- Annual community reviews

https://iana.org/performance

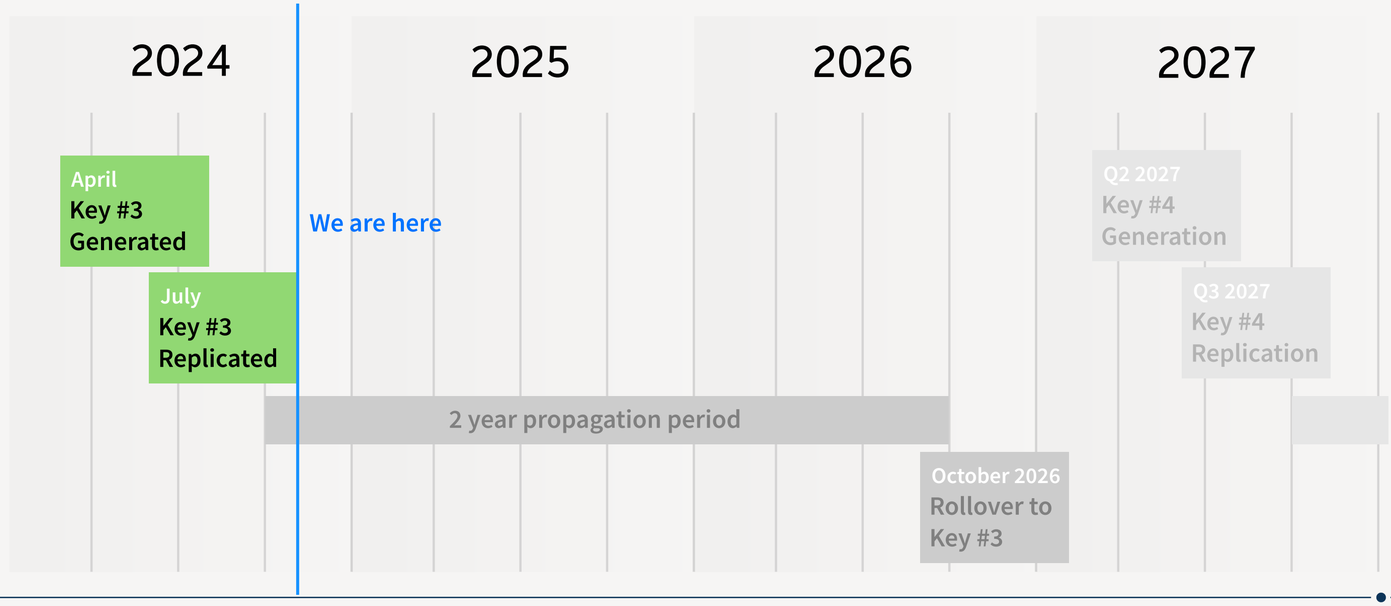
DNS Trust Anchor

- Security for the DNS (DNSSEC) is a hierarchical system of public key cryptography that matches the hierarchical delegation of the DNS itself.
- The apex key is the **Root Zone Key Signing Key (KSK)**, which serves as the singular trust anchor for the system.
- We manage the key in a highly transparent manner, with public key signing ceremonies and an open design model.



Updating the key

- We’ve embarked on the 2nd ever replacement of the key
  - Highly orchestrated event, propagation to all validators through vendor updates etc.
  - Delayed due to (a) COVID, and (b) key hardware vendor change; but now underway
- Implements a 3 year cadence, with new algorithm potential in 2027 and beyond



Now available

- The new trust anchor is now available for propagation (XML file)
  - Most users will adopt it naturally through software updates
  - Will appear in the DNS itself starting 11 January 2025

Key Status

This table provides additional guidance on how keys have been issues and used. Software implementers should rely on the XML trust anchors file for normative parameters on keys.

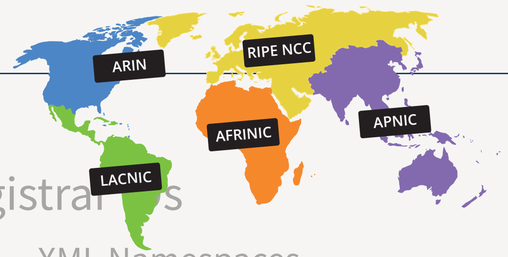
INFORMAL NAME	STATUS	DETAILS
KSK-2024	Pre-Publication	Generated 2024-04-26 (attestation) with key tag 38696 and label Kmyv6jo. Expected to be published in DNS on 2025-01-11, and actively signing starting 2026-10-11.
KSK-2017	Active	Generated 2016-10-27 (attestation) with key tag 20326 and label Klajeyz. Signing since 2018-10-11.
KSK-2023	Abandoned	Generated 2023-04-27 (attestation) with key tag 46211 and label Kmrfl3b. Will not be used, superseded by KSK-2024.
KSK-2010	Retired	Generated 2010-06-16 (attestation) with key tag 19036 and label Kjqmt7v. Signing between 2010-07-15 and 2018-10-11.

https://iana.org/dnssec/files

.INTERNAL

- Recently reserved for use in private networks
  - DNS equivalent to RFC1918 address space
- Will not be provisioned in the global DNS to avoid conflicts
- Compare and contrast with
  - .local — multicast DNS
  - .alt — alternate resolution techniques
  - .home.arpa — home network control protocol
- Internet Draft under development
  - https://datatracker.ietf.org/doc/draft-davies-internal-tld/

Number Resource Services



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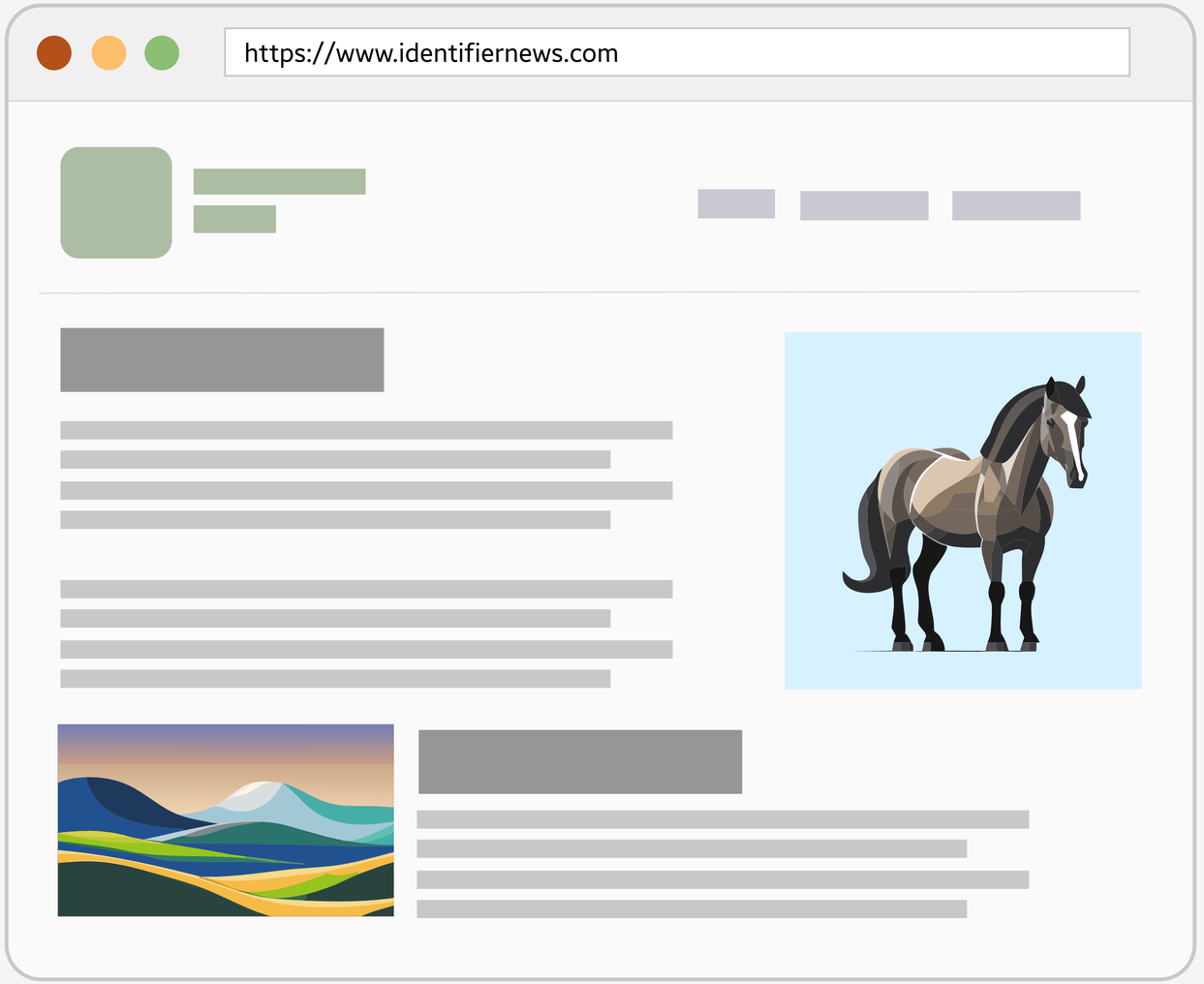
Exploring the IANA functions

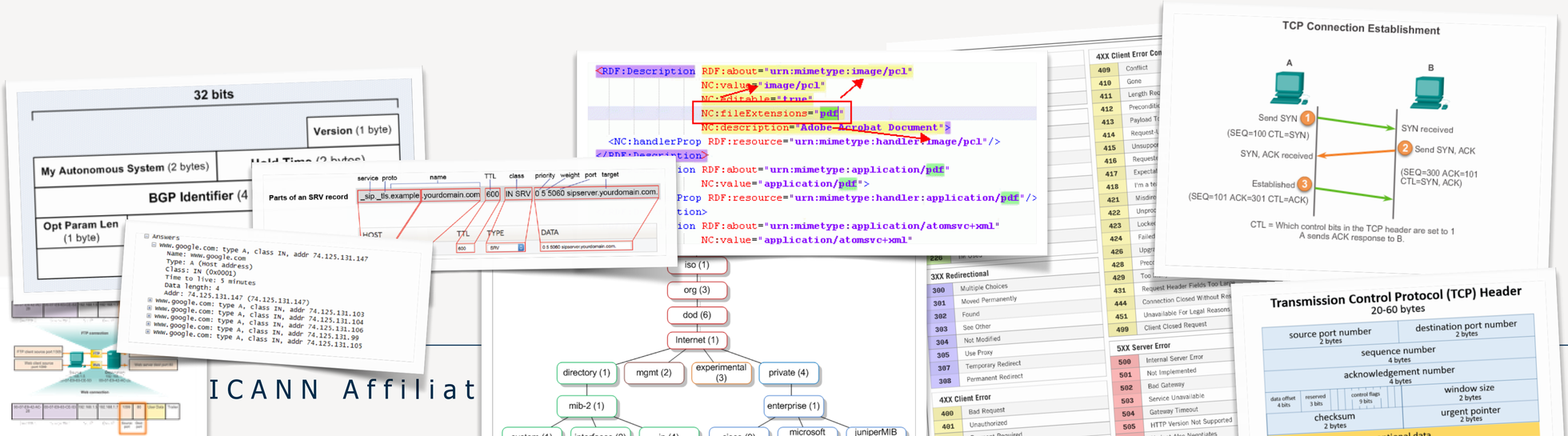

https://www.identifiernews.com

Unique identifiers are everywhere

- In retrieving a single web page, and think about some of unique identifiers that were involved:
  - The domain name - the human-friendly address of the website;
  - The URI scheme - that tells your computer the language (protocol) it needs to speak to request the website;
  - The IP address - the machine-readable identifier of the server the web site is located at;
  - The AS number - the neighborhood the server is located in where your ISP needs to send your request to;
  - The service name and port number - that connects to the correct service on the destination IP address;
  - The media type - which helps your computer decode the data it gets back into pieces it can understand and represent on your screen;
  - The header field specifies extra data for requests and responses; and
  - A language tag signals the language desired, available and sent.
  - And many more...

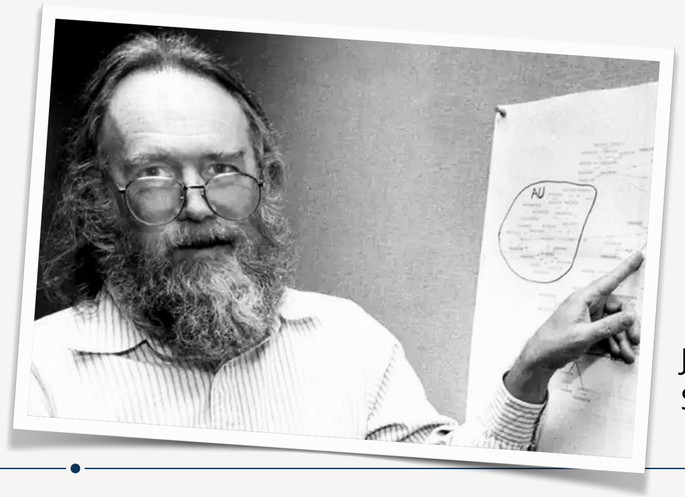
What do these all have in common?

- All of these unique identifiers are just a fraction of those necessary to transmit a single webpage across the Internet.
- Coordinating the Internet unique identifier systems is needed to ensure the Internet interoperates globally.
- If any one of those identifier types didn't have a common standardized meaning around the world, the web page would have failed to transmit across the Internet.
- **The IANA functions' responsibility is to manage all those identifiers globally.**

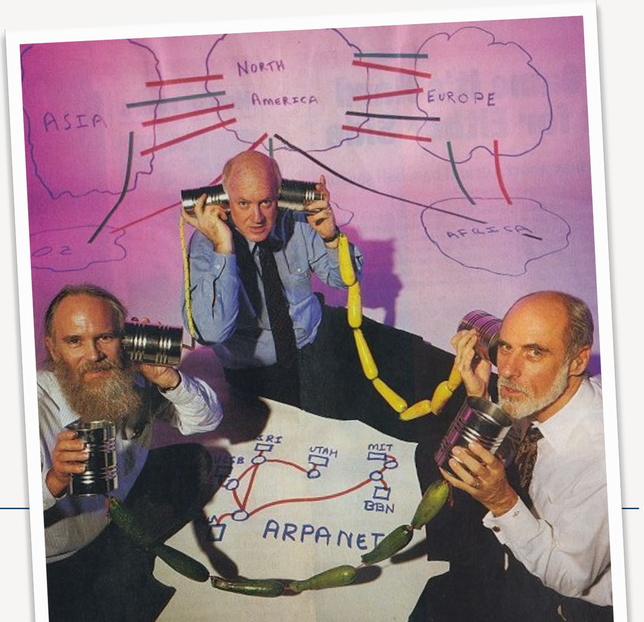


The IANA functions

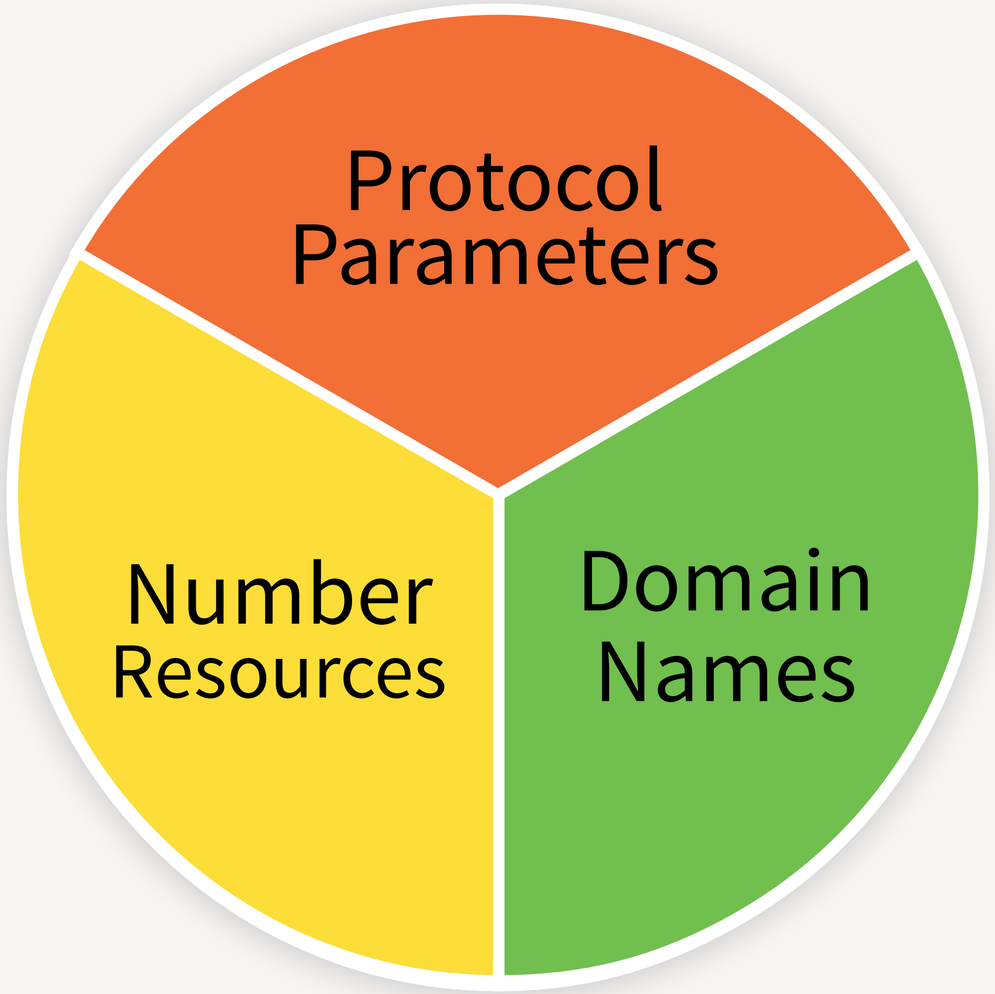
- The record keeper for the unique names and numbers used by Internet technologies to interoperate.
- The IANA functions pre-date ICANN. In 1998, ICANN was established to be the home of the IANA functions with global oversight.
- The IANA team maintains these records according to policies established in standards organizations and by the multi-stakeholder Internet governance community.

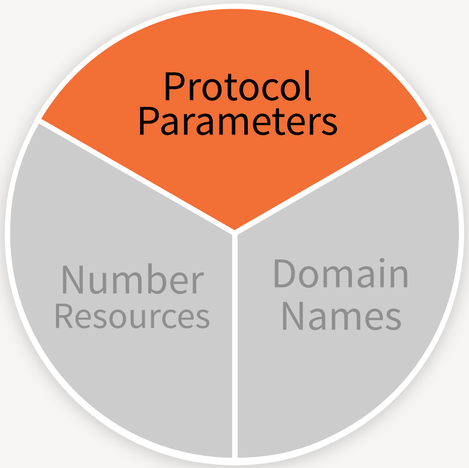


Jon Postel (L) started the IANA; with Steve Crocker and Vint Cerf (R)

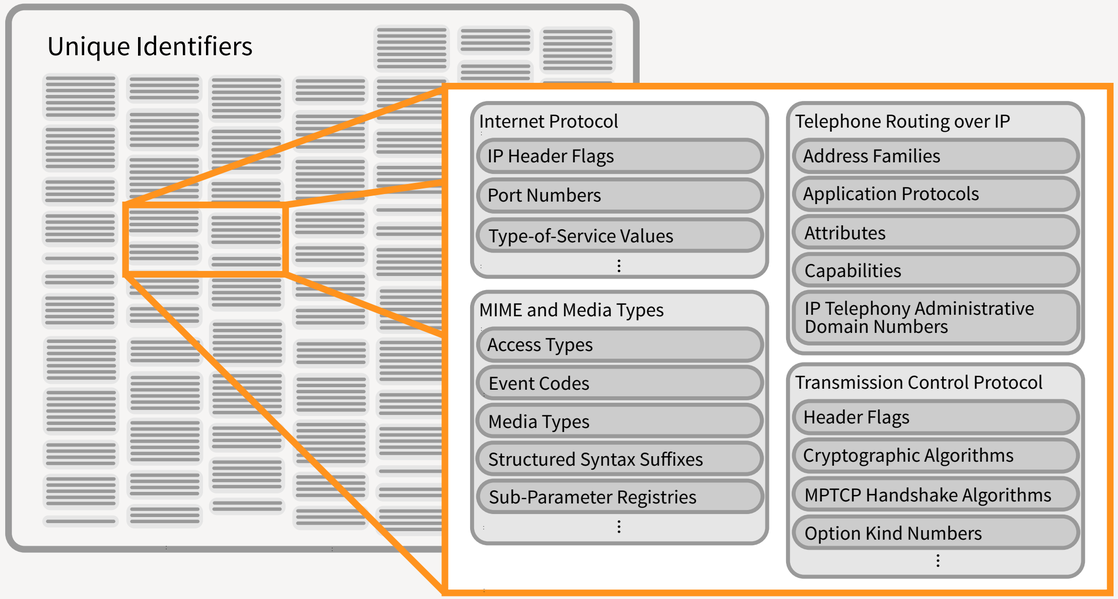


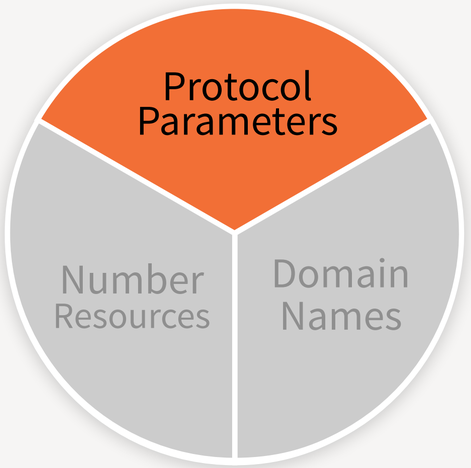
The core IANA functions areas



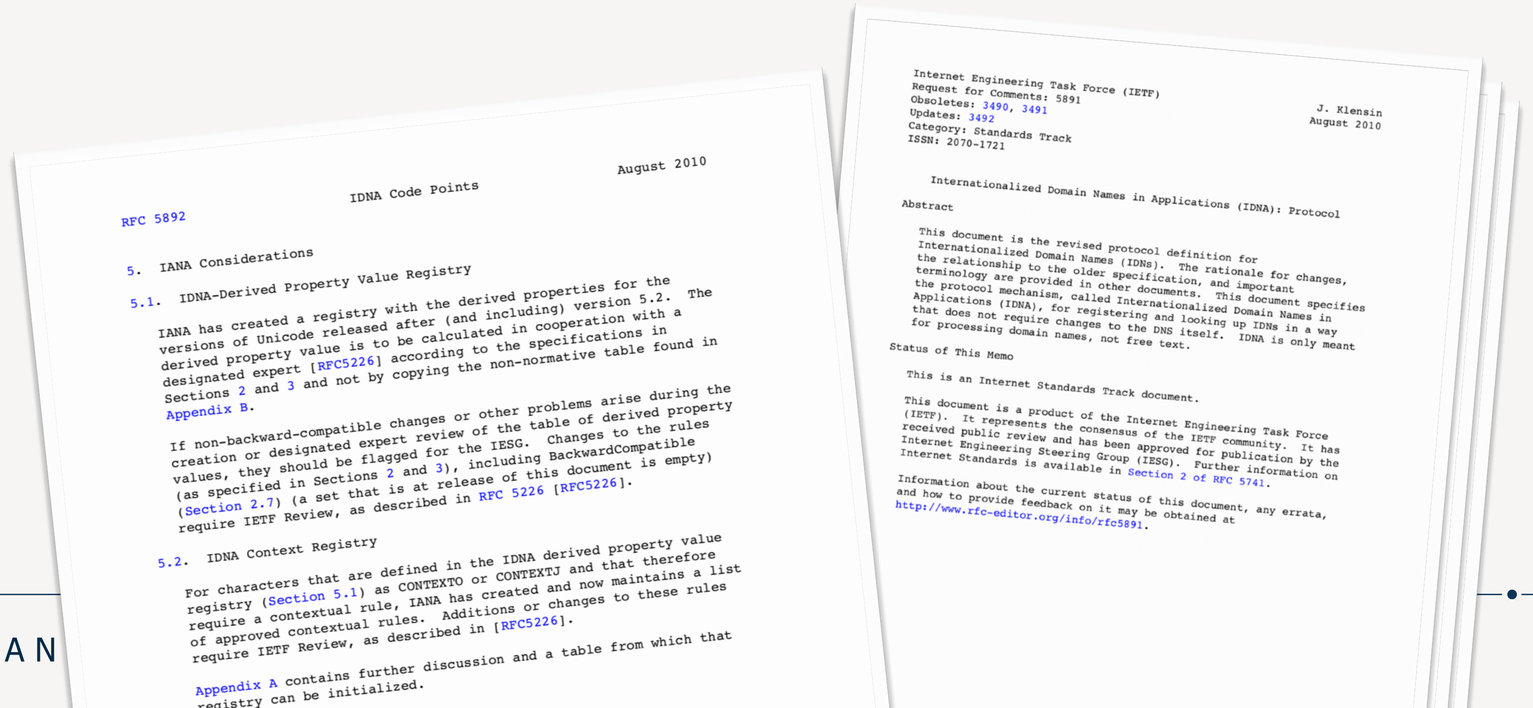


- **Protocol Parameters** are used everywhere and are directly issued by IANA. Rules differ for the qualifying criteria for each type. Applications are evaluated by IANA according to the set criteria.
- Most protocol parameters' visibility is limited to software implementors (e.g. inside software code).





- The **Internet Engineering Task Force** (IETF) develops the Internet standards that define protocol parameter systems. These documents include guidance on unique identifiers that IANA most implement, referred to as “IANA Considerations”:
  - Instructions on the creation of a unique registry for protocol parameters;
  - Registration policy;
  - Initial registrations and reserved values.



RFC 5892 IDNA Code Points August 2010

5. IANA Considerations

5.1. IDNA-Derived Property Value Registry

IANA has created a registry with the derived properties for the versions of Unicode released after (and including) version 5.2. The derived property value is to be calculated in cooperation with a designated expert [RFC5226] according to the specifications in Sections 2 and 3 and not by copying the non-normative table found in Appendix B.

If non-backward-compatible changes or other problems arise during the creation or designated expert review of the table of derived property values, they should be flagged for the IESG. Changes to the rules (as specified in Sections 2 and 3), including BackwardCompatible (Section 2.7) (a set that is at release of this document is empty) require IETF Review, as described in RFC 5226 [RFC5226].

5.2. IDNA Context Registry

For characters that are defined in the IDNA derived property value registry (Section 5.1) as CONTEXTO or CONTEXTJ and that therefore require a contextual rule, IANA has created and now maintains a list of approved contextual rules. Additions or changes to these rules require IETF Review, as described in [RFC5226].

Appendix A contains further discussion and a table from which that registry can be initialized.

Internet Engineering Task Force (IETF)
Request for Comments: 5891
Obsoletes: 3490, 3491
Updates: 3492
Category: Standards Track
ISSN: 2070-1721

J. Klensin
August 2010

Internationalized Domain Names in Applications (IDNA): Protocol

Abstract

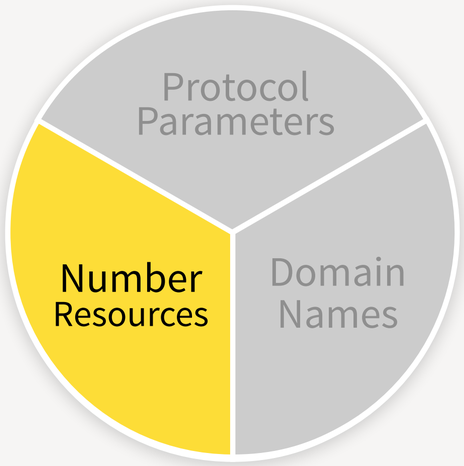
This document is the revised protocol definition for Internationalized Domain Names (IDNs). The rationale for changes, the relationship to the older specification, and important terminology are provided in other documents. This document specifies the protocol mechanism, called Internationalized Domain Names in Applications (IDNA), for registering and looking up IDNs in a way that does not require changes to the DNS itself. IDNA is only meant for processing domain names, not free text.

Status of This Memo

This is an Internet Standards Track document.

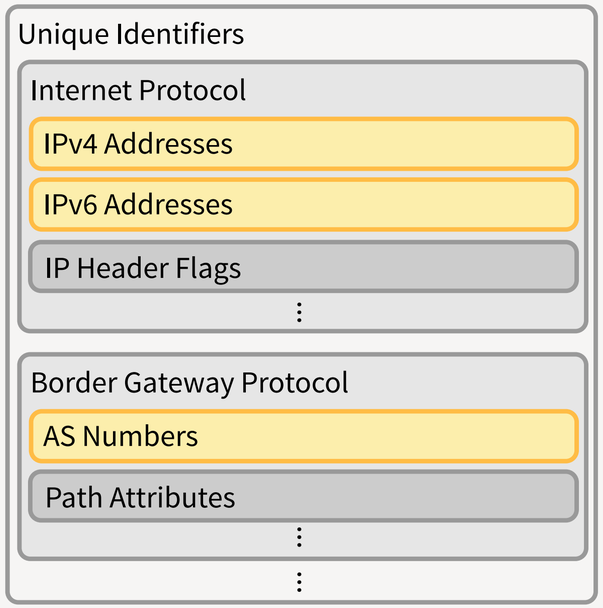
This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in Section 2 of RFC 5741.

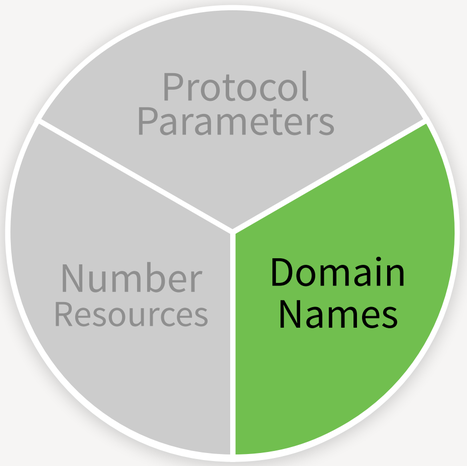
Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at http://www.rfc-editor.org/info/rfc5891.



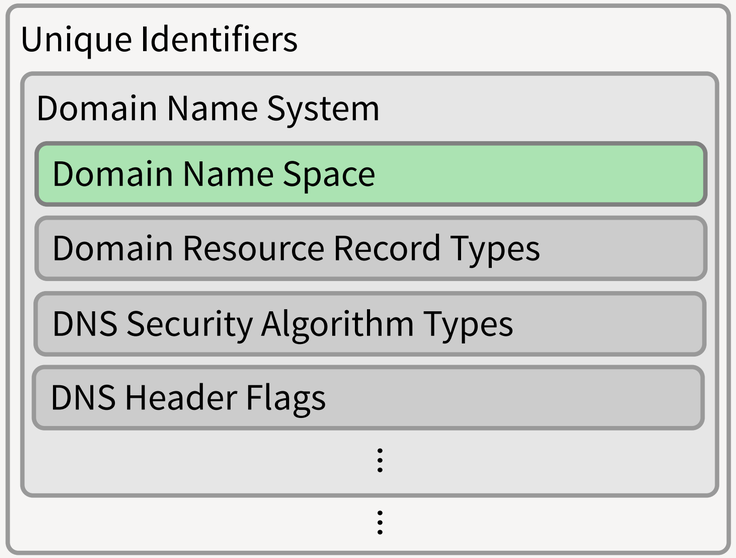
Number Resources are specialized forms of protocol parameters:

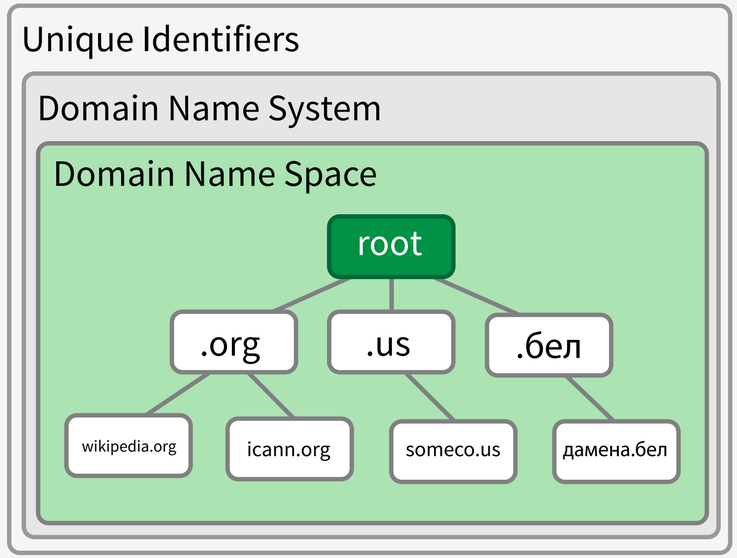
- IP Addresses: unique identifiers for devices on the Internet;
- Autonomous System (AS) numbers: unique identifiers that group networks on the Internet.

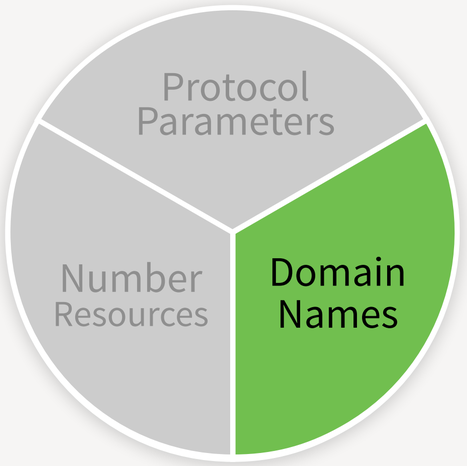




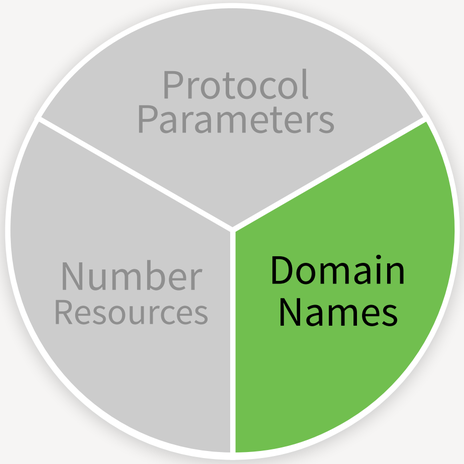
- Most notable domain name function is managing the DNS root zone, which defines top-level domains.
- Like number resources, the domain name space is hierarchically delegated, with IANA responsible for the upper-most level of allocations.



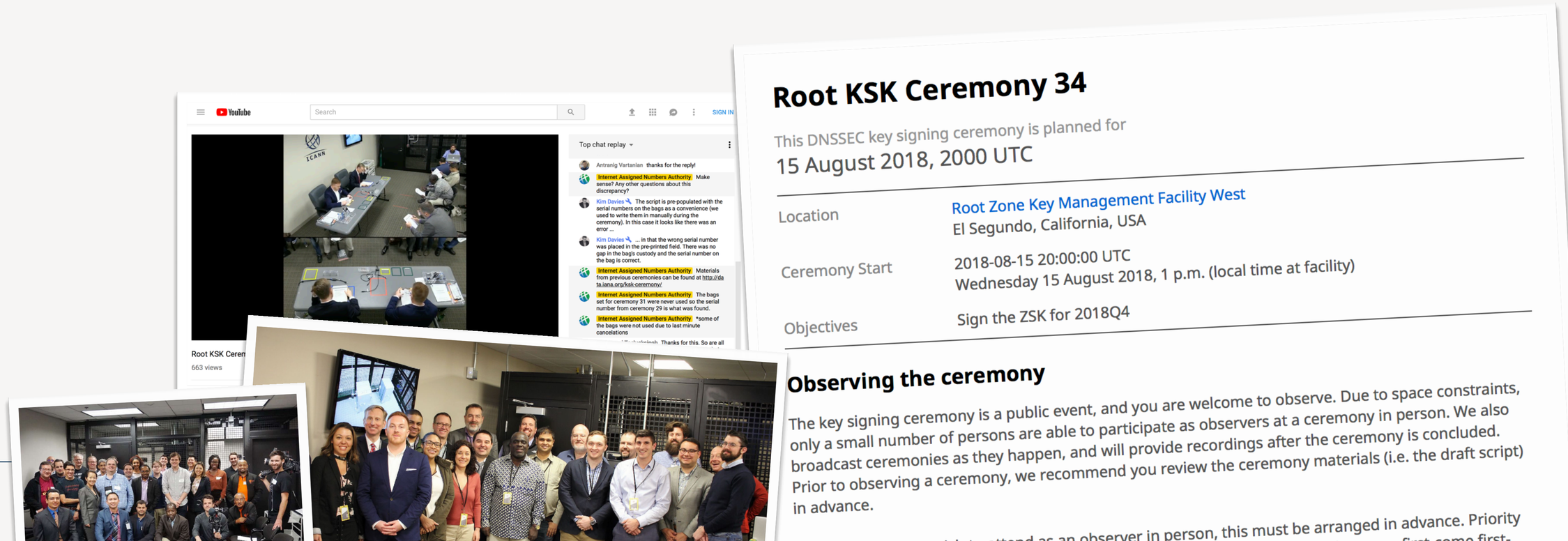


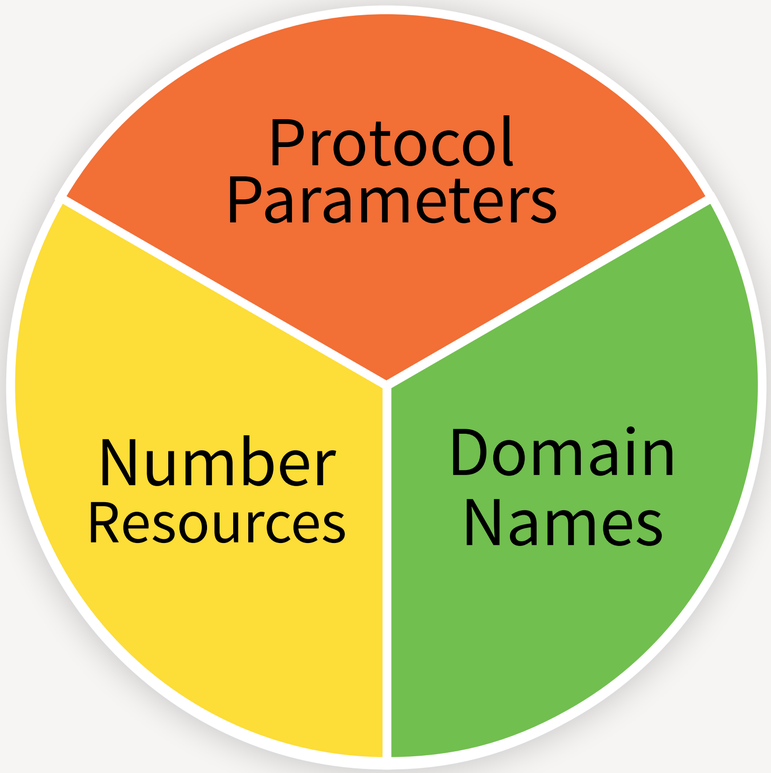


- The IANA tasks include:
  - Receiving and evaluating root zone changes requests against policies and operational requirements:
    - Assignment and transfer of TLDs;
    - Routine maintenance of name servers and other technical elements;
    - Changing Points of Contact.
  - Transmitting vetted changes for implementation in the root zone and root servers.
  - Operating the .INT domain for intergovernmental treaty organizations.
  - IDN table/LGR repository maintenance.

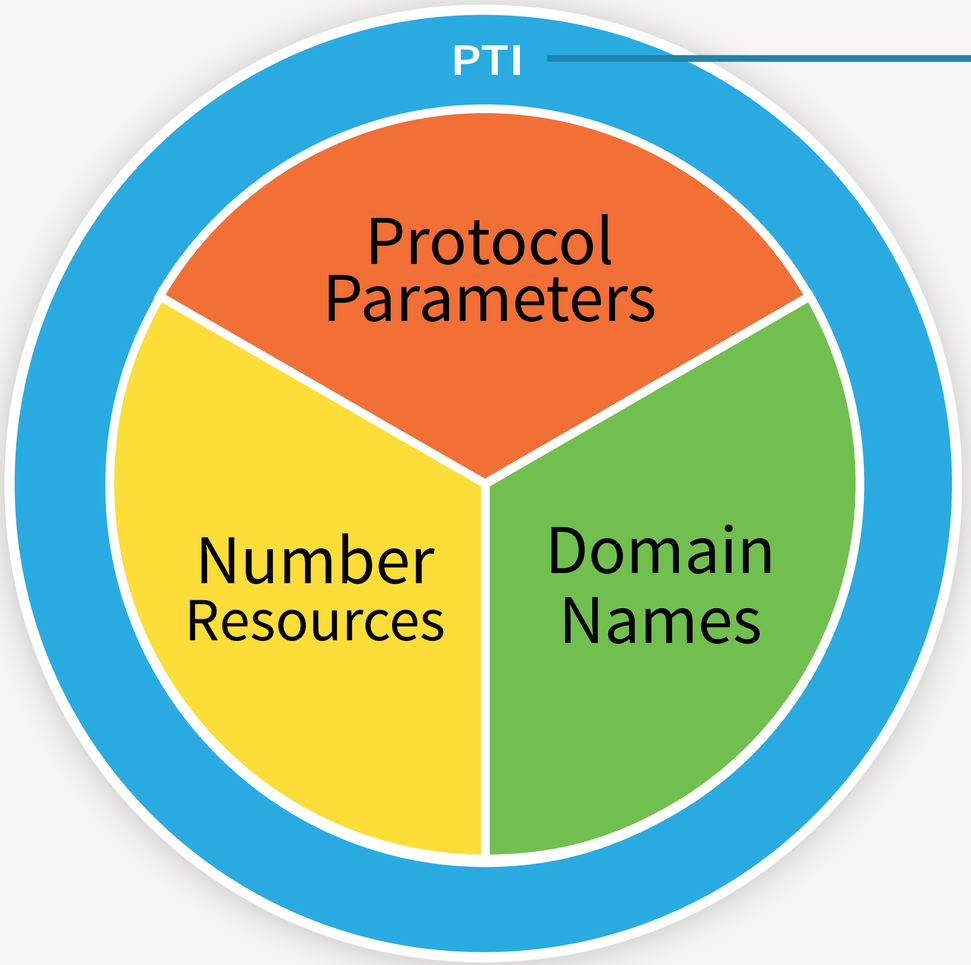


- Managing the trust anchor for the DNS (the “Root Zone Key Signing Key”)
  - Using the key happens in public “key signing ceremonies”, involving trusted community representatives and other oversight.
  - Includes managing the lifecycle of the key, including when it is replaced (a “rollover”).



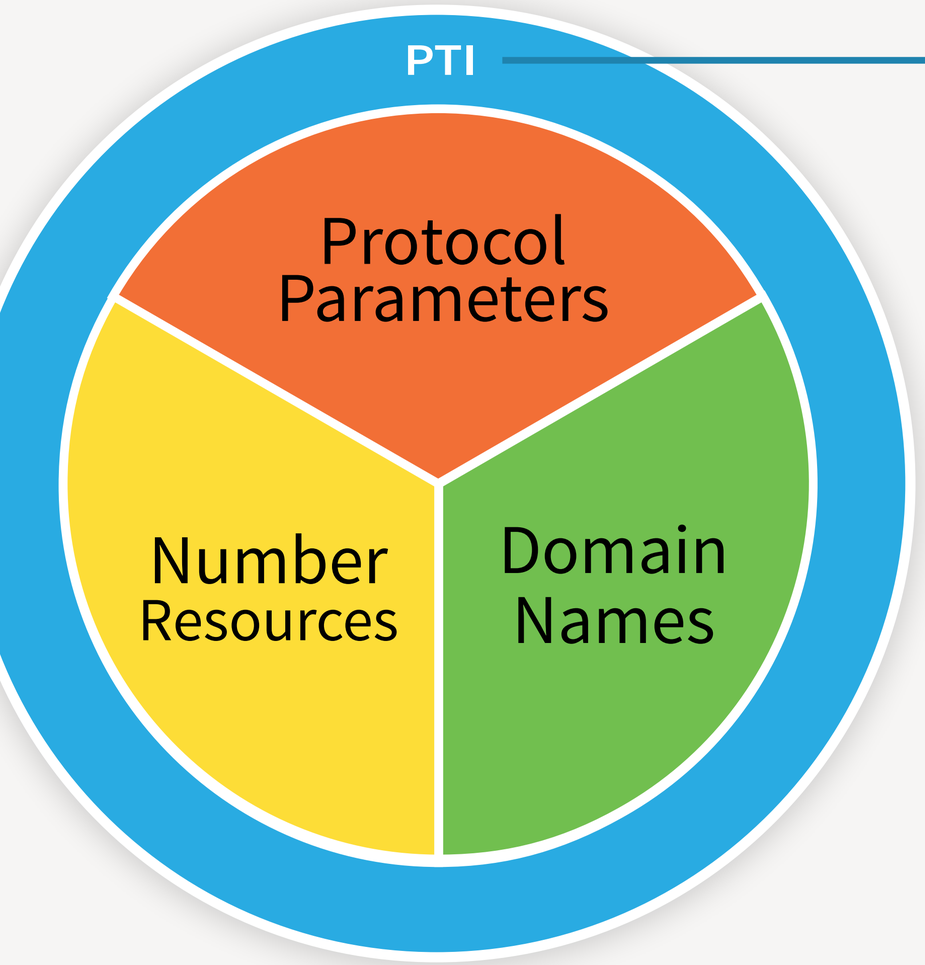


- Together, protocol parameters, number resources and domain names comprise the IANA functions.
- These divisions also represent the structure of the three primary accountability mechanisms for these functions.



Public Technical Identifiers

- Performs the IANA functions
- Hires the IANA staff
- Is a non-profit organization created in 2016
- Different legal entity to ICANN
  - ICANN is its sole member
  - “Affiliate”



IANA Staff

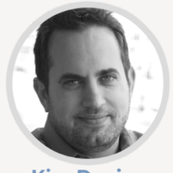
Shaunte Anderson

Amanda Baber

Kyla Bundy

Tyler Carroll

Amy Creamer


Kim Davies

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Tania Hopkins

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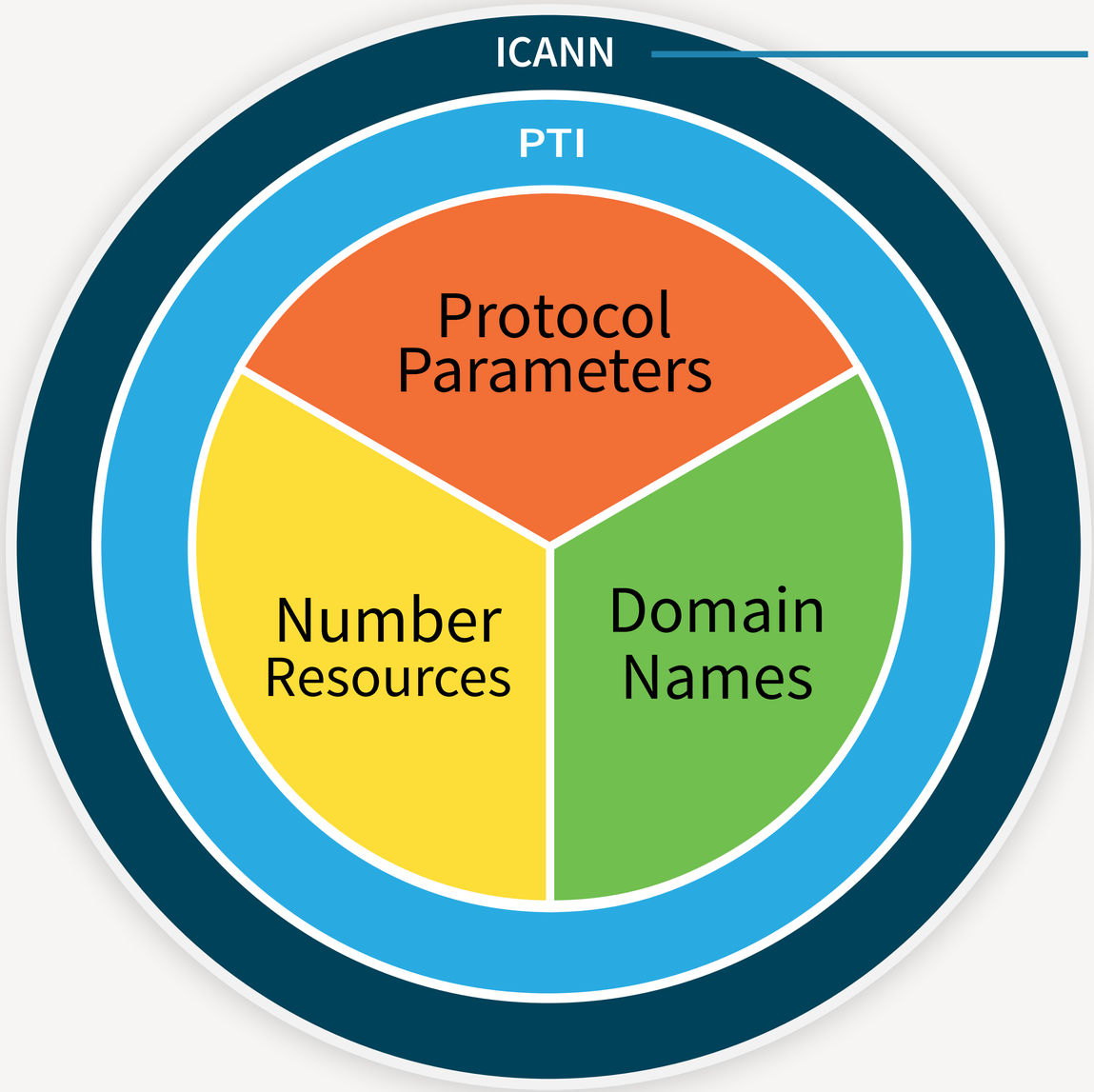

ICANN

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

The IANA as a service

- IANA is a record keeper for the global Internet that helps ensure interoperability
  - Unique assignment for a common purpose for around 3,500 types of Internet identifiers
  - Widely used identifiers (e.g. domain names, IP addresses) where many Internet users need their own unique assignments assigned through a delegated, hierarchical model
- Our job is to perform this service and maintain your trust to continue to perform is successfully.

Where should IANA be in 2030?

- Both ICANN and IANA are developing our next five year strategies
  - Where do we want to be in 5 years?
  - What does the community want to evolve?
- Consultations will commence later this year

- Implement the IANA stewardship transition

2016-2020

- First dedicated IANA strategy
- Five focus areas
- In its final year

2020-2025

?

2025-2030

… and how are we doing now?

- We perform an annual engagement survey of our customers and community.
- Its very short (<5 minutes) and provides us insights on how to improve

Thank you!

kim.davies@iana.org