

IANA Update

RIPE 86

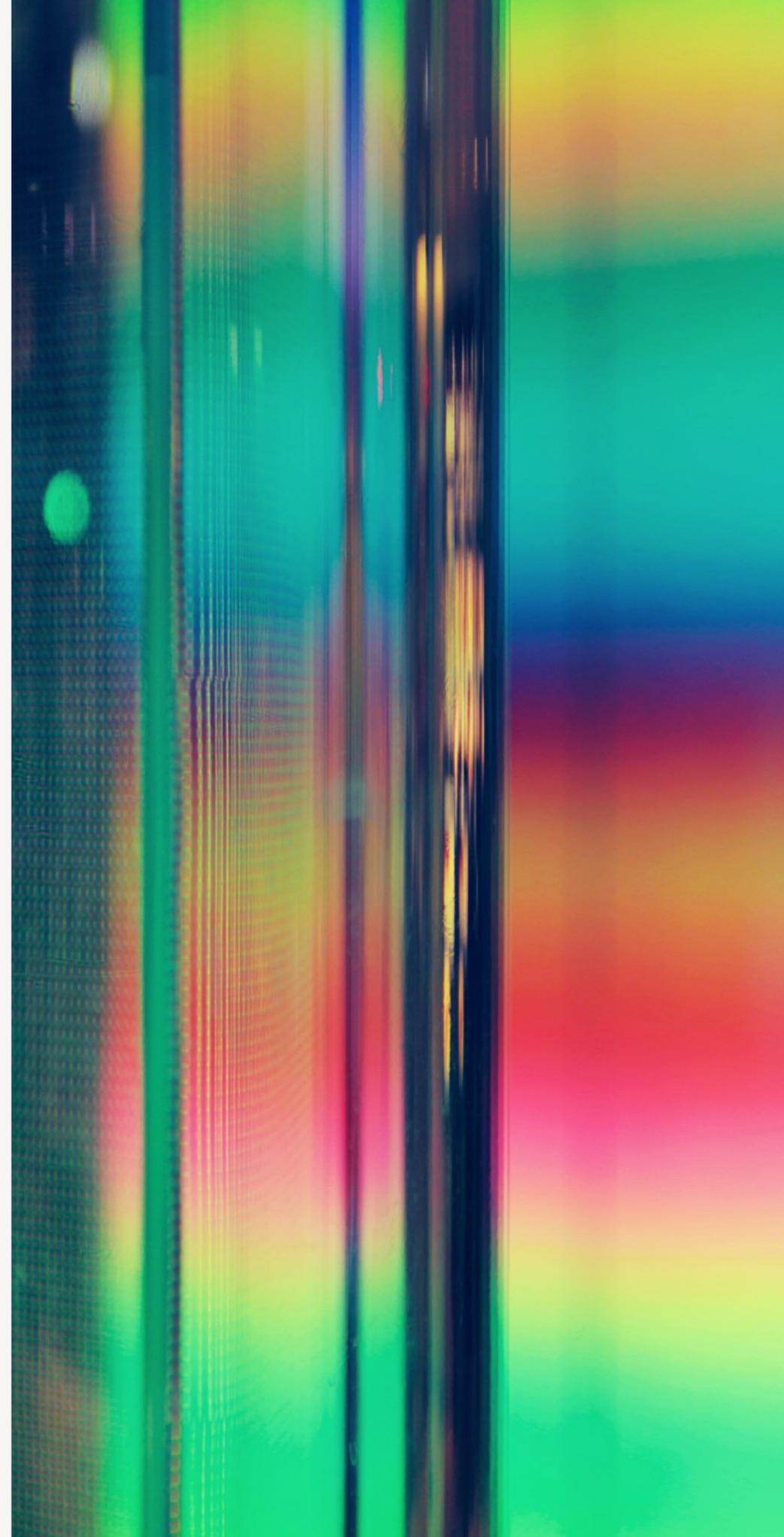
Kim Davies

VP, IANA Services, ICANN; President, PTI

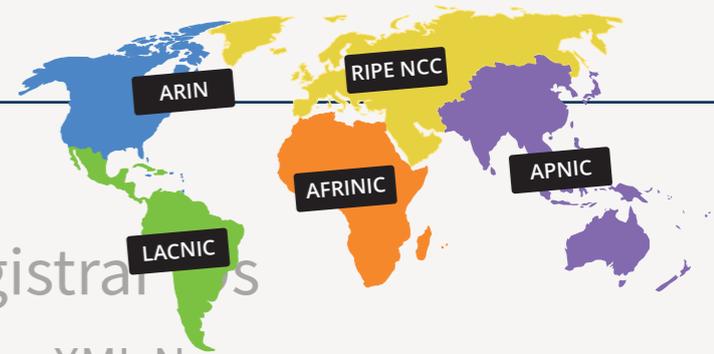
Rotterdam

25 May 2023

PTI | An ICANN Affiliate



Number Resource Services



URI Schemes

DNS Root Zone

Registrars

XML Namespaces

DNS Resource Records

Port Numbers

SIP Parameters

vCard Parameters

IDNA Code Points

IPv4 Addresses

Special-use Domain Names

IP Versions

HTTP Status Codes

Private Enterprise Numbers

MPLS Return Codes

IPv6 Addresses

TLS Cipher Suites

BGP Path Attributes

Media Types

STUN Attributes

Kerberos Parameters

RTSP Feature Tags

YANG Modules

Language Tags

Autonomous System Numbers

PGP Public Key Algorithms

RADIUS Types

SMI MIB Modules

OSPF Parameters

DNS Trust Anchor

Label Generation Rulesets

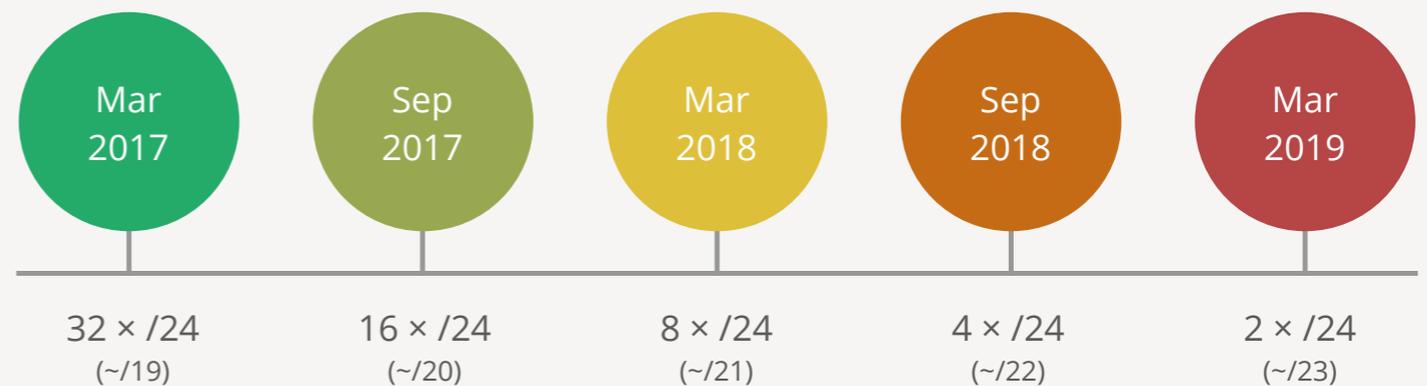
IPv4 Addresses

- 32-bit address space (≈ 4 billion addresses)
- 222 /8s designated for unicast use ($\approx 86\%$)
- The last 5 of these /8s were allocated on 3 February 2011 to the RIRs

<https://iana.org/assignments/ipv4-address-space>

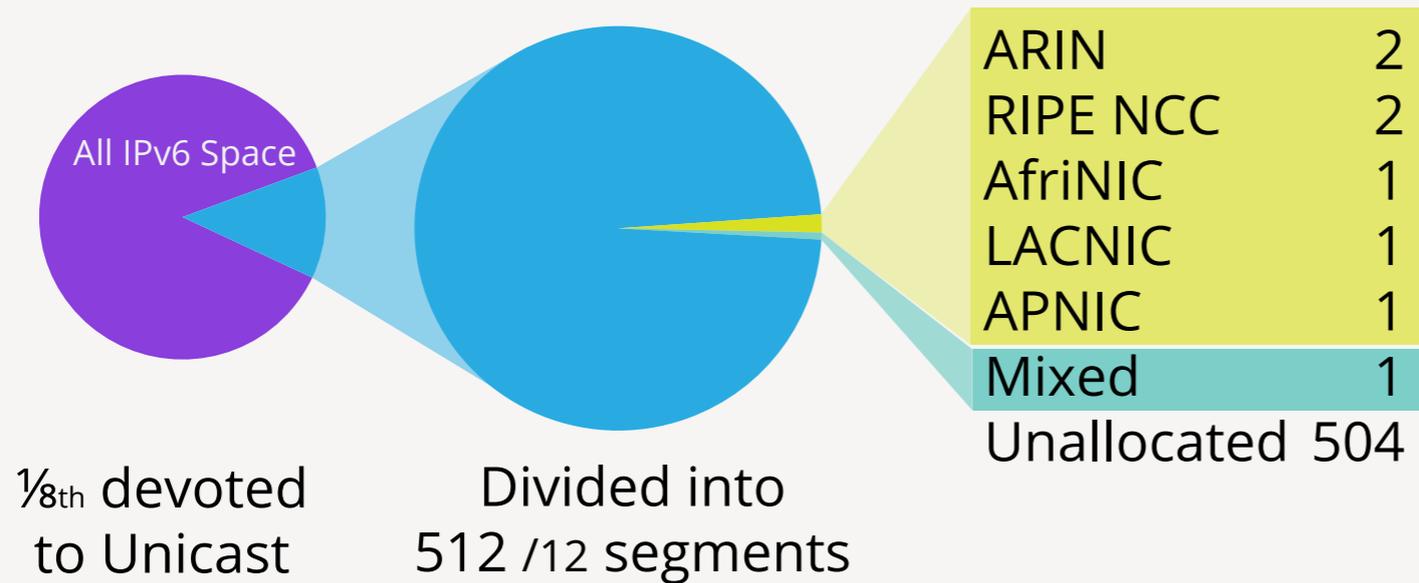
Prefix	Designation	Date	WHOIS	RDAP	Status
000/8	IANA - Local Identification	1981-09			RESERVED
001/8	APNIC	2010-01	whois.apnic.net	https://rdap.apnic.net/	ALLOCATED
002/8	RIPE NCC	2009-09	whois.ripe.net	https://rdap.db.ripe.net/	ALLOCATED
003/8	Administered by ARIN	1994-05	whois.arin.net	https://rdap.arin.net/registry	LEGACY
004/8	Level 3 Parent, LLC	1992-12	whois.arin.net	https://rdap.arin.net/registry	LEGACY
005/8	RIPE NCC	2010-11	whois.ripe.net	https://rdap.db.ripe.net/	ALLOCATED
006/8	Army Information Systems Center	1994-02	whois.arin.net	https://rdap.arin.net/registry	LEGACY
007/8	Administered by ARIN	1995-04	whois.arin.net	https://rdap.arin.net/registry	LEGACY
008/8	Administered by ARIN	1992-12	whois.arin.net	https://rdap.arin.net/registry	LEGACY
009/8	Administered by ARIN	1992-08	whois.arin.net	https://rdap.arin.net/registry	LEGACY
010/8	IANA - Private Use	1995-06	whois.arin.net	https://rdap.arin.net/registry	RESERVED
011/8	DoD Intel Information Systems	1993-05	whois.arin.net	https://rdap.arin.net/registry	LEGACY
012/8	AT&T Bell Laboratories	1995-06	whois.arin.net	https://rdap.arin.net/registry	LEGACY
013/8	Administered by ARIN	1991-09	whois.arin.net	https://rdap.arin.net/registry	LEGACY
014/8	APNIC	2010-04	whois.apnic.net	https://rdap.apnic.net/	ALLOCATED
015/8	Administered by ARIN	1994-07	whois.arin.net	https://rdap.arin.net/registry	LEGACY
016/8	Administered by ARIN	1994-11	whois.arin.net	https://rdap.arin.net/registry	LEGACY
017/8	Apple Computer Inc.	1992-07	whois.arin.net	https://rdap.arin.net/registry	LEGACY
018/8	Administered by ARIN	1994-01	whois.arin.net	https://rdap.arin.net/registry	LEGACY
019/8	Ford Motor Company	1995-05	whois.arin.net	https://rdap.arin.net/registry	LEGACY
020/8	Administered by ARIN	1994-10	whois.arin.net	https://rdap.arin.net/registry	LEGACY
021/8	DDN-RVN	1991-07	whois.arin.net	https://rdap.arin.net/registry	LEGACY

- Recovered pool allocated smaller blocks to RIRs from 2017—2019
- Space is now effectively exhausted



IPv6 Addresses

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

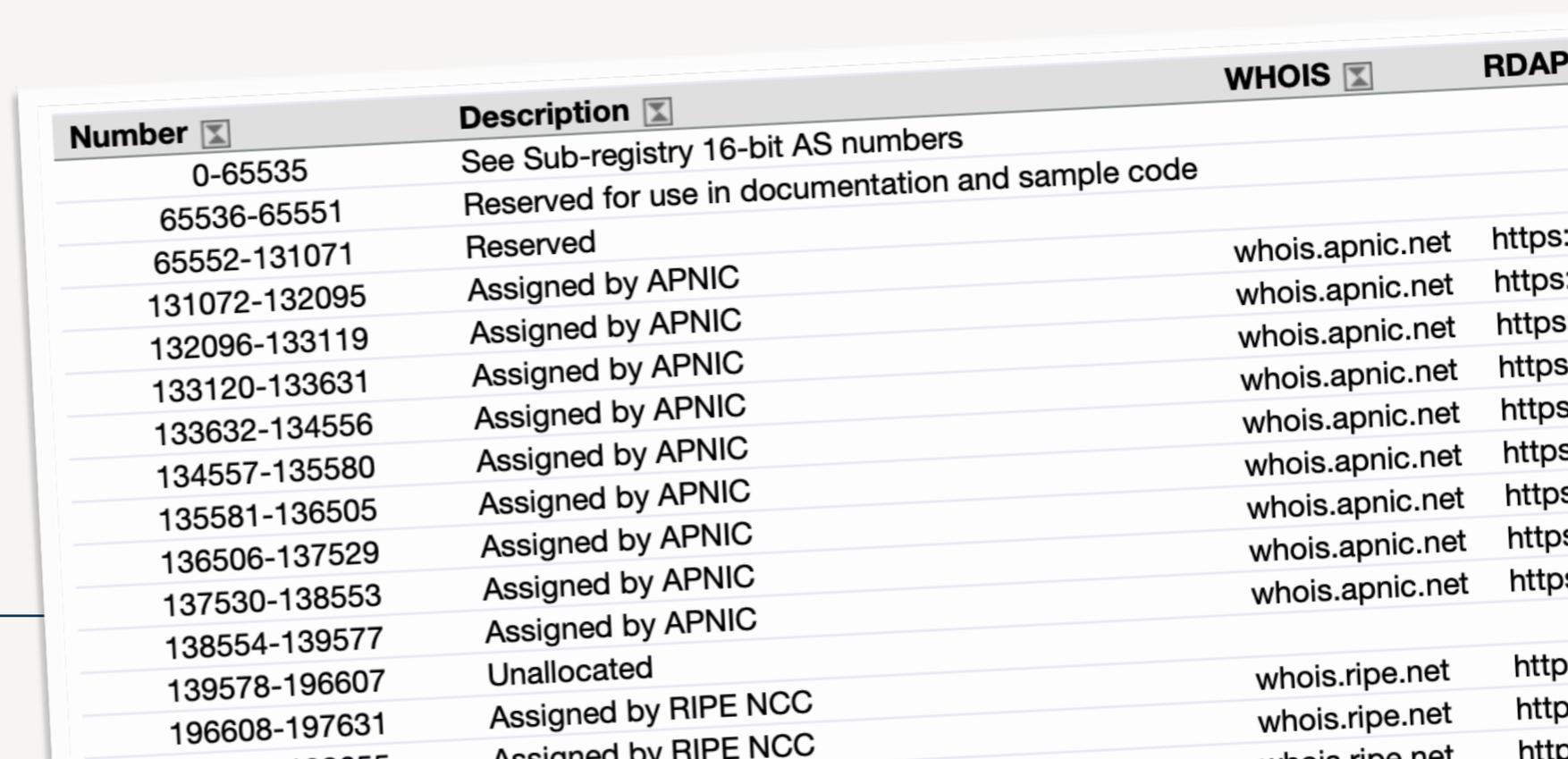


<https://iana.org/assignments/ipv6-unicast-address-assignments>

Prefix	Designation	Date	WHOIS
2001:0000::/23	IANA	1999-07-01	whois.iana.c
2001:0200::/23	APNIC	1999-07-01	whois.apn
2001:0400::/23	ARIN	1999-07-01	whois.arin
2001:0600::/23	RIPE NCC	1999-07-01	whois.ripe
2001:0800::/23	RIPE NCC	2002-05-02	whois.ripe
2001:0a00::/23	RIPE NCC	2002-11-02	whois.ripe
2001:0c00::/23	APNIC	2002-05-02	whois.a
2001:0e00::/23	APNIC	2003-01-01	whois.a
2001:1200::/23	LACNIC	2002-11-01	whois.l
2001:1400::/23	RIPE NCC	2003-02-01	whois.
2001:1600::/23	RIPE NCC	2003-07-01	whois.
2001:1800::/23	ARIN	2003-04-01	whois.
2001:1a00::/23	RIPE NCC	2004-01-01	whois.
2001:1c00::/22	RIPE NCC	2004-05-04	whois.
2001:2000::/20	RIPE NCC	2004-05-04	whois.

AS Numbers

- Identifiers that aggregate IP address collections for whole networks, simplifies routing
- 32-bit address space (≈ 4 billion addresses)
 - Originally a 16-bit ("2-byte") address space (65,536 addresses)
 - Expanded to 32-bit in 2007 by RFC 4893
- All two-byte AS numbers have been allocated or reserved
 - Last allocation was made 2021
- Approximately 98% remains unallocated



Number	Description	WHOIS	RDAP
0-65535	See Sub-registry 16-bit AS numbers		
65536-65551	Reserved for use in documentation and sample code		
65552-131071	Reserved	whois.apnic.net	https://
131072-132095	Assigned by APNIC	whois.apnic.net	https://
132096-133119	Assigned by APNIC	whois.apnic.net	https://
133120-133631	Assigned by APNIC	whois.apnic.net	https://
133632-134556	Assigned by APNIC	whois.apnic.net	https://
134557-135580	Assigned by APNIC	whois.apnic.net	https://
135581-136505	Assigned by APNIC	whois.apnic.net	https://
136506-137529	Assigned by APNIC	whois.apnic.net	https://
137530-138553	Assigned by APNIC	whois.apnic.net	https://
138554-139577	Assigned by APNIC	whois.apnic.net	https://
139578-196607	Unallocated	whois.ripe.net	http://
196608-197631	Assigned by RIPE NCC	whois.ripe.net	http://
	Assigned by RIPE NCC	whois.ripe.net	http://

<https://iana.org/assignments/as-numbers>

Accountability

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

Number Resource Performance
December 2018

Performance Summary

These performance targets are derived from section 4.3 of the Service Level Agreement for the IANA Numbering Services for the allocation of unicast IP addresses and AS numbers to the five Regional 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
2018-12-06	AS Number	✓ Responded on time (0.0 days)

Status of Unallocated R Addresses

Unallocated remaining Recovered IPv4 Address Allocations made from the Recovered IPv4 Address for Post Exhaustion IPv4 Allocation Mechanism

APNIC ASN Allocations

Allocations of autonomous system numbers are made to regional Internet registries according to their needs, based on allocation rates they publish. Specifically, RIRs are eligible for further allocations if their available address space is 80% allocated, or the available pool does not satisfy two months of need based on the previous six months' average allocation rate.

Current Pool and Eligibility

Category	Value
Eligibility Available	1,412
Two Month Need	140
Monthly Average	70
Last Allocation by IANA	2,848 ASNs (2019-06-12)

12 Month Forecast

The graph below uses APNIC's current average allocation rate to estimate if APNIC will be eligible for further allocations in the next 12 months. This can be used to estimate if APNIC will be eligible for further allocations in the near future.

2021 IANA Numbering Services Review Committee Report Published

22 MAR 2022

The IANA Numbering Services Review Committee (IANA RC) is pleased to announce that it has published the 2021 IANA Numbering Services Review Committee Report. The IANA RC was formed in 2016 and is responsible for publishing an annual report as advice to the NRO EC for its evaluation of the IANA numbering services.

This report follows a 30-day public comment period on the IANA Performance Matrix Summary Report published by the RIRs seeking input from the broader community.

This report is based on the 2021 IANA Performance Matrix Summary Report, as well as on any other information gathered from the global number community.

The 2021 IANA Numbering Services Review Committee Report is published at: <https://www.nro.net/2021-IANA-RC-Report>

The IANA RC noted that no incidents were reported in the IANA Numbering services to the RIRs in 2021.

On behalf of the IANA Review Committee
Martin Hannigan
Chair, IANA Numbering Services Review Committee

References:

- IANA Stewardship Transition Archive

IP Address Allocations

The chart below summarizes allocations of IPv6 addresses RIRs have made to network operators. IPv4 is not represented as IANA's supply has been exhausted and our allocation method for recovered address space does not factor in utilization.

Detailed information is available for each RIR by clicking the chart.

RIR	Number of IPv6 Address Allocations in /32s
APNIC	~100,000
AFRNIC	~200,000
ARIN	~400,000
LACNIC	~100,000
RIPE NCC	~900,000

Performance Dashboard

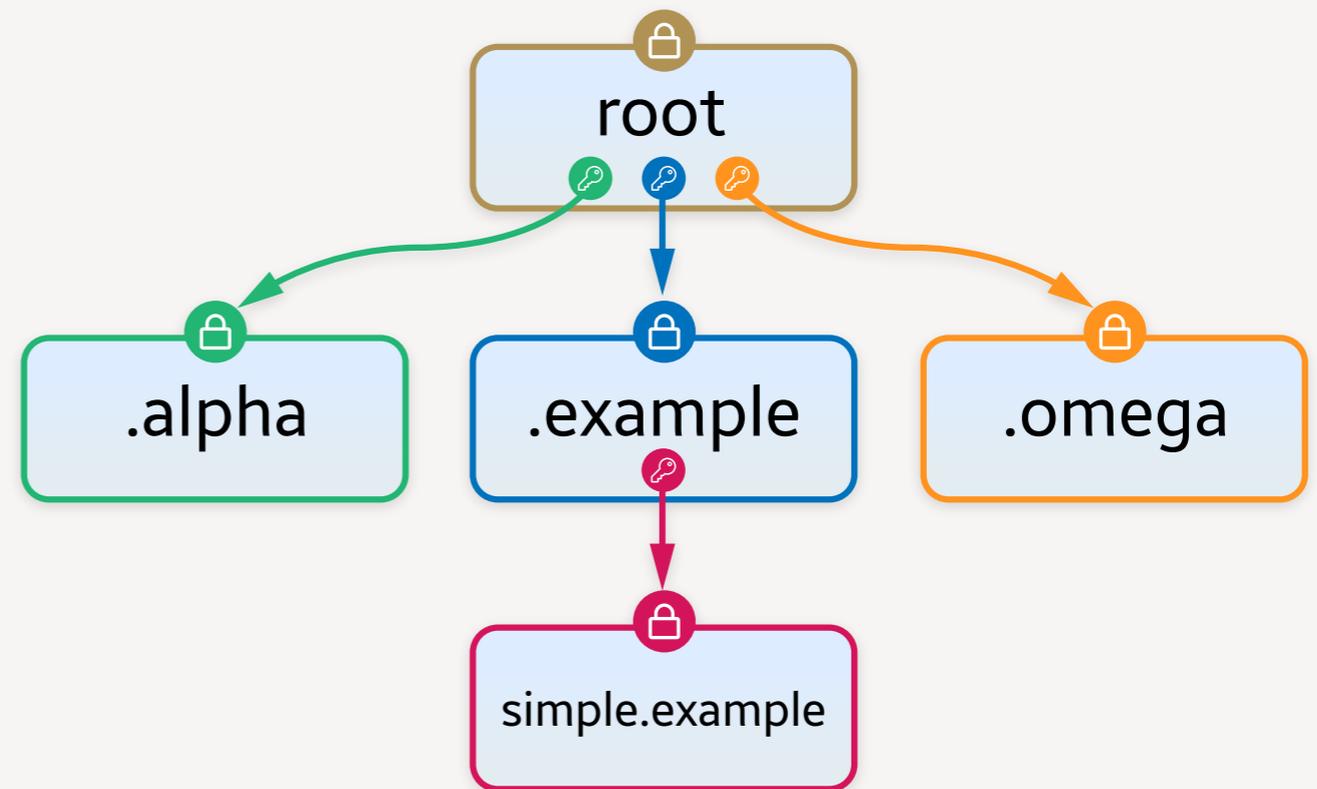
At a glance

- Naming**: 99.5% SLAs met between March and May 2022
- Protocol Parameters**: 99.3% SLAs met between March and May 2022
- Numbers**: 100% SLAs met between March and May 2022
- Satisfaction**: 100% customer satisfaction during May 2022
- System Status**: No known issues.
- Security**: No recent security events.

<https://iana.org/performance>

DNS Trust Anchor

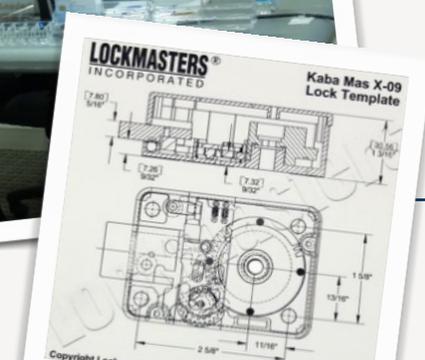
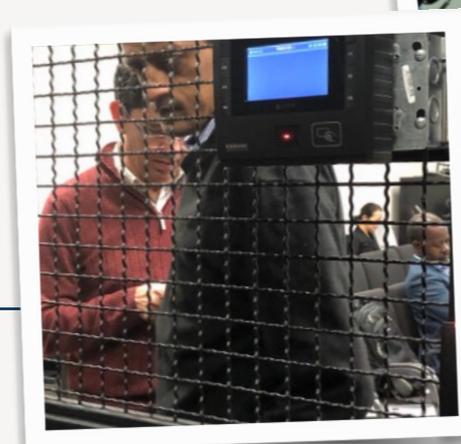
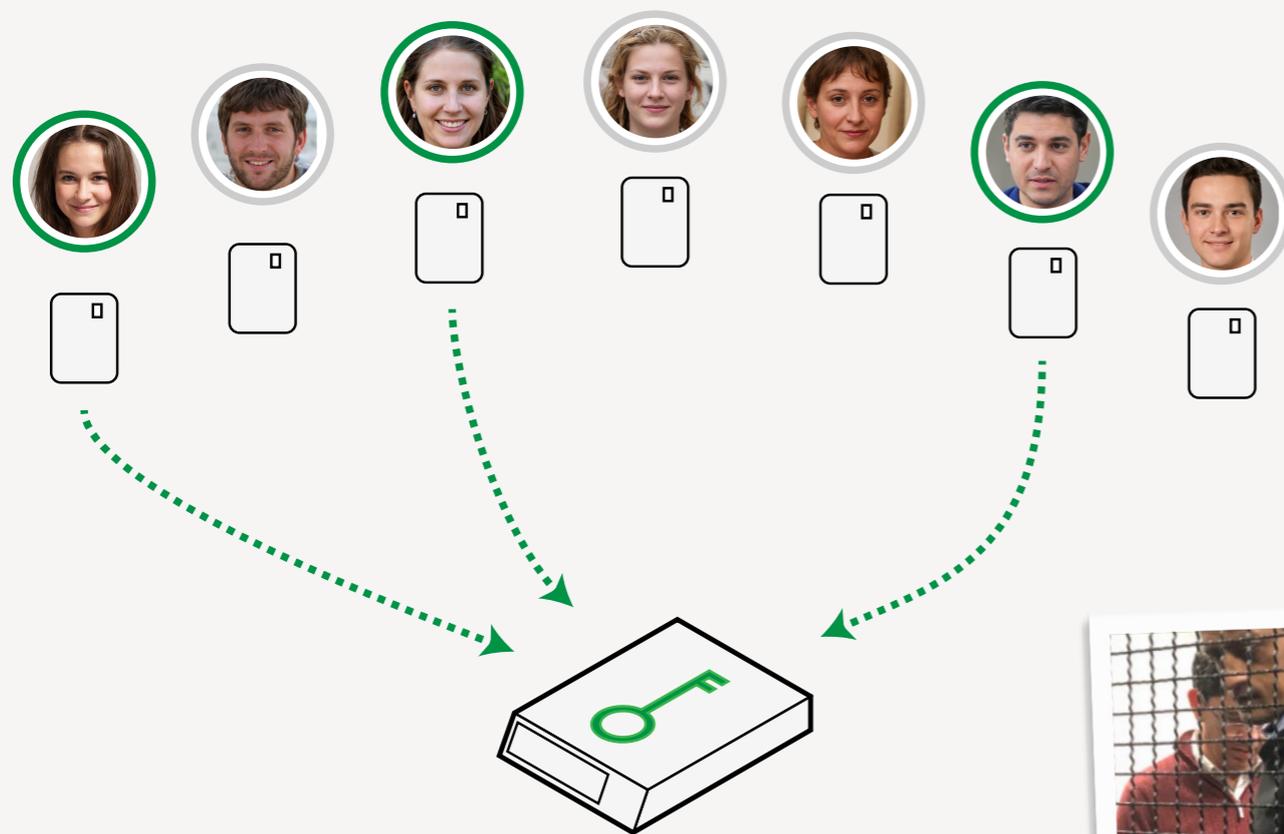
- Security for the DNS (DNSSEC) is a hierarchical system of public key cryptography that matches the hierarchical delegation of the DNS itself.
- The apex key is the **Root Zone Key Signing Key (KSK)**, which serves as the singular trust anchor for the system.
- We manage the key in a highly transparent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



Trusted Community Representatives

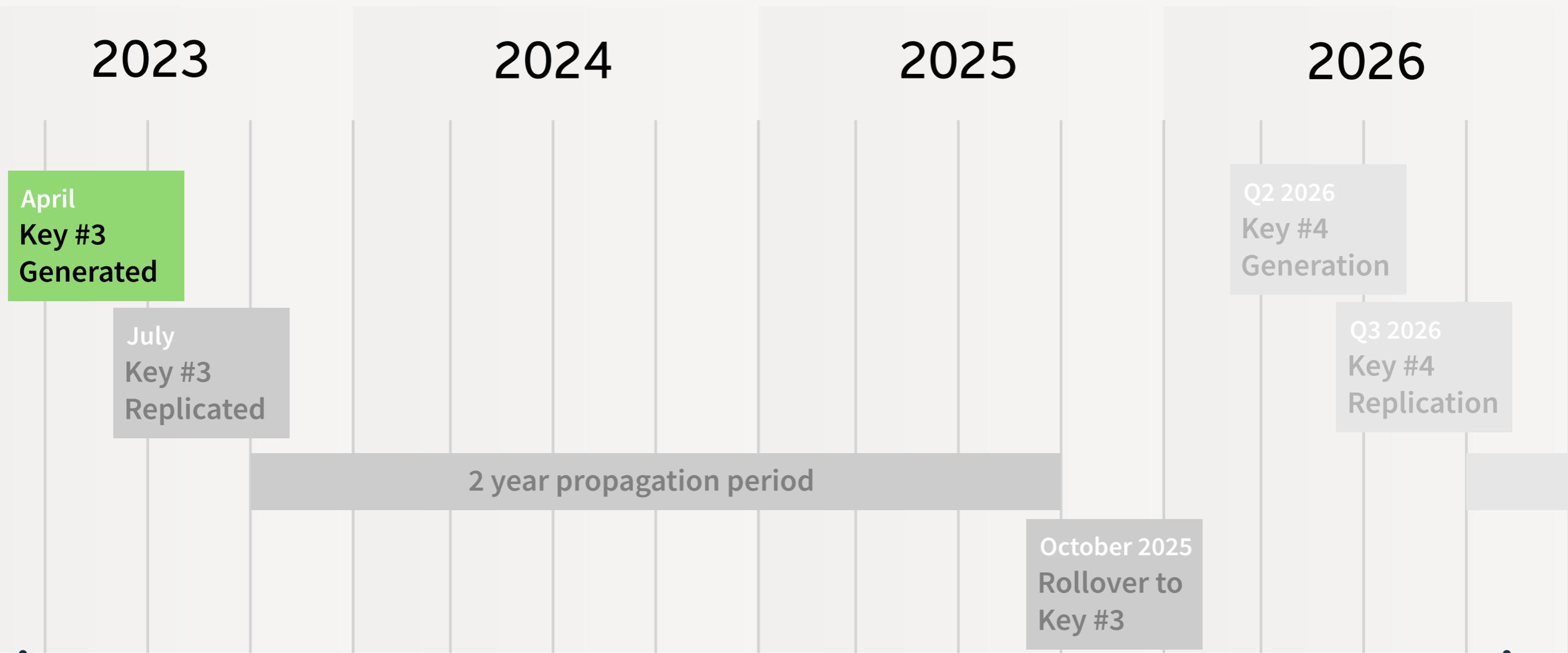
- Community members are a key part of how we protect the key and build trust.
- Participate in and oversee ceremonies
- Maintain credentials required to activate the key.
- We're looking for volunteers to enhance the diversity of our TCRs, to apply

<https://iana.org/tcr>



Key rollover

- Changing the Root Zone KSK is a highly orchestrated event
- Requires propagation of the new trusted public key to all validators
 - Through automatic update mechanisms, vendor updates, and the like
- First rollover in 2018, readying for the second rollover.



Thank you!

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