

**ICANN**  
POLICY FORUM

74

**THE HAGUE**

DNSSEC and Security Workshop  
ICANN74 | 13 June February 2022



# DNSSEC, DANE & RPKI Deployments Around the World

ICANN74

Dan York, Internet Society

13 June 2022



# DNSSEC Validation

Roughly 30 - 32%

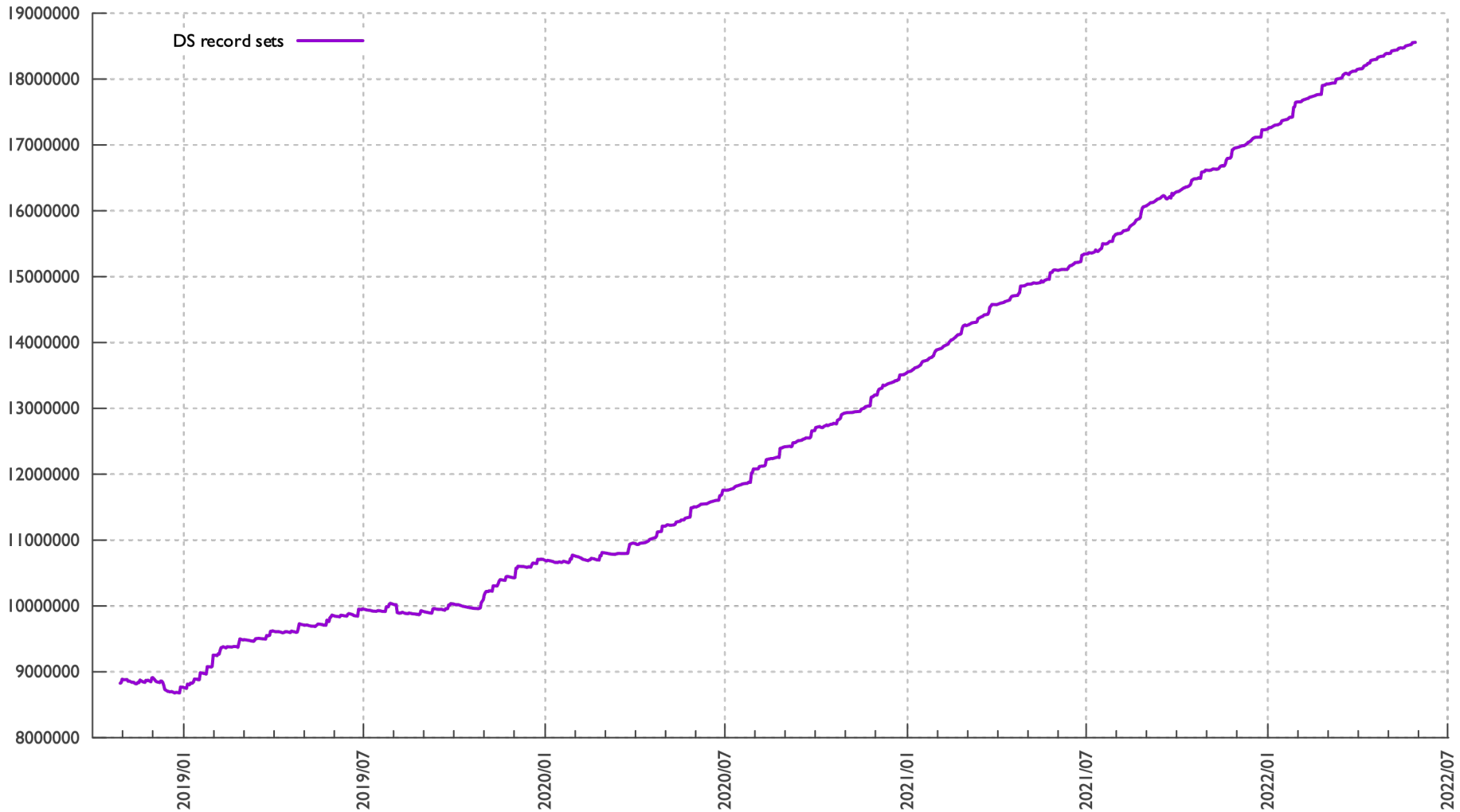


<https://stats.labs.apnic.net/dnssec/XA?hc=XA&hx=0&hv=1&hp=0&hr=1&w=7>

Code	SubRegion	DNSSEC Validates	Samples	Weight	Weighted Samples
QR	Micronesia, Oceania	86.06%	1,277	0.91	1,166
QS	Polynesia, Oceania	74.51%	1,518	0.68	1,033
QQ	Melanesia, Oceania	64.35%	4,415	1.28	5,636
QO	Western Europe, Europe	57.79%	193,567	2.22	429,044
XT	Southern Asia, Asia	54.08%	3,351,623	0.56	1,885,172
XW	Eastern Europe, Europe	49.22%	250,557	2.31	579,718
XV	Western Asia, Asia	48.97%	363,786	1.46	530,543
XR	Central Asia, Asia	40.47%	19,175	5.65	108,338
QP	Australia and New Zealand, Oceania	39.28%	36,852	1.85	68,113
XP	South America, Americas	38.26%	770,183	1.04	803,855
QM	Northern Europe, Europe	37.88%	264,407	0.97	256,833
XK	Southern Africa, Africa	37.30%	63,892	1.55	99,059
XQ	Northern America, Americas	36.32%	792,440	0.92	726,106
XJ	Northern Africa, Africa	25.85%	433,204	0.75	326,148
XI	Middle Africa, Africa	23.26%	44,447	1.57	69,902
XN	Caribbean, Americas	21.98%	127,419	0.46	58,998
XL	Western Africa, Africa	21.79%	309,132	0.96	297,855
QN	Southern Europe, Europe	21.47%	430,336	0.68	291,272
XH	Eastern Africa, Africa	20.65%	270,325	0.91	246,019
XU	South-Eastern Asia, Asia	19.30%	1,770,320	0.51	897,596
XO	Central America, Americas	12.99%	598,237	0.49	293,155
XS	Eastern Asia, Asia	4.52%	477,161	5.45	2,598,481

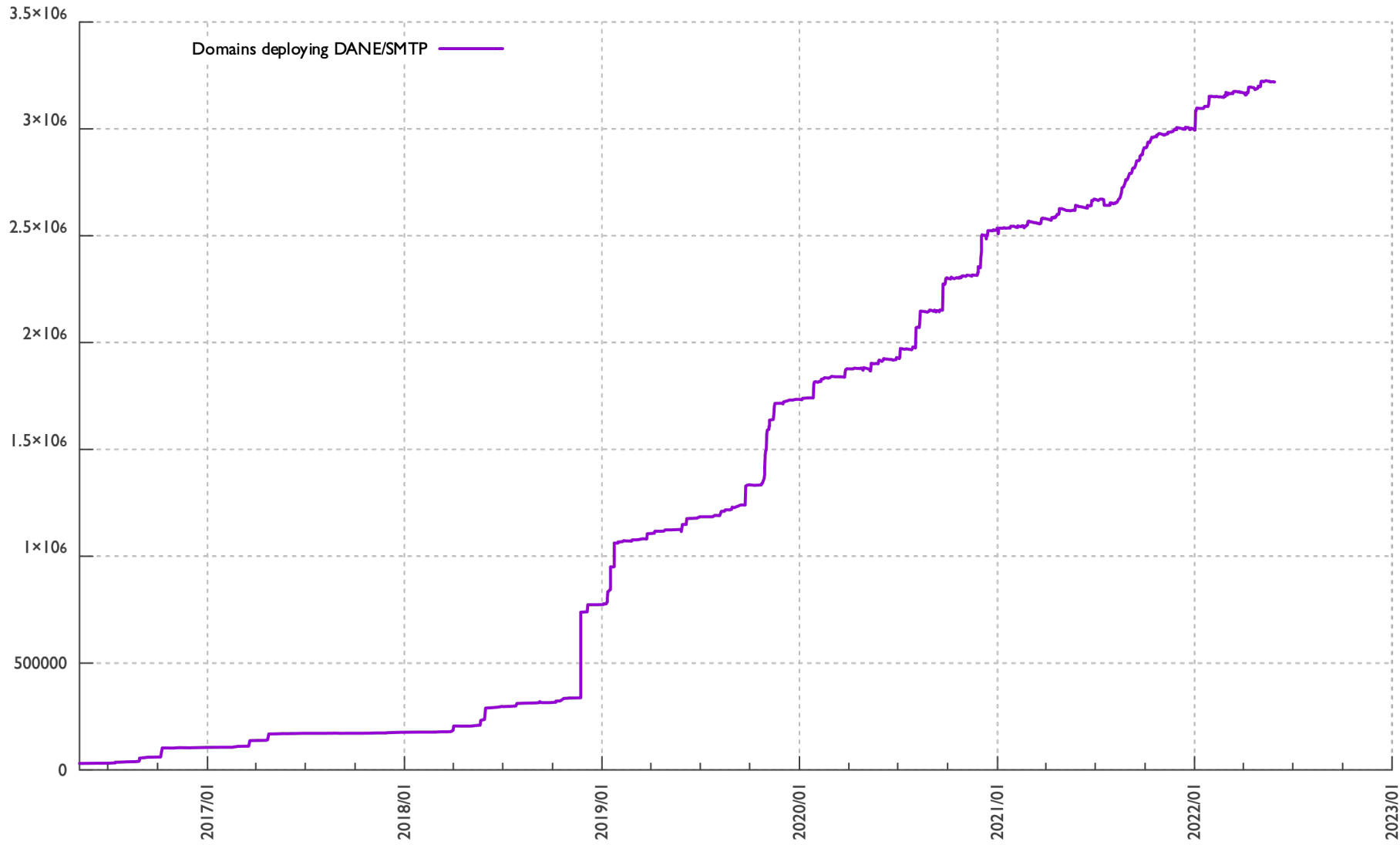
<https://stats.labs.apnic.net/dnssec/XA?hc=XA&hx=0&hv=1&hp=1&hr=1&w=7&p=0>

# Observed DS Record Count Growth



<https://stats.dnssec-tools.org/>

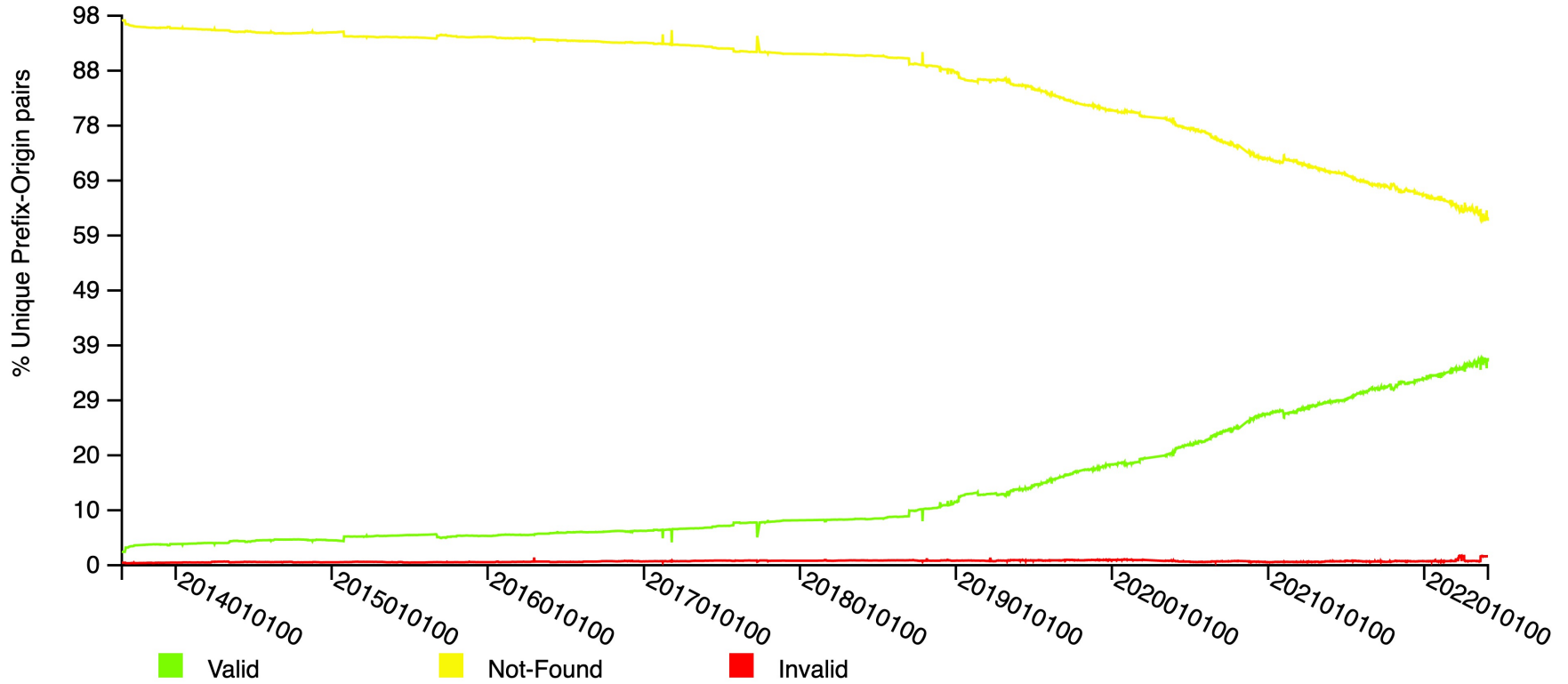
# Domains with signed MX and DANE records



<https://stats.dnssec-tools.org/>

# RPKI Global IPv4 Prefixes

RPKI-ROV History of Unique Prefix-Origin Pairs (IPv4)



NIST RPKI Monitor: RPKI-ROV Analysis

Protocol: IPv4

RIR: All

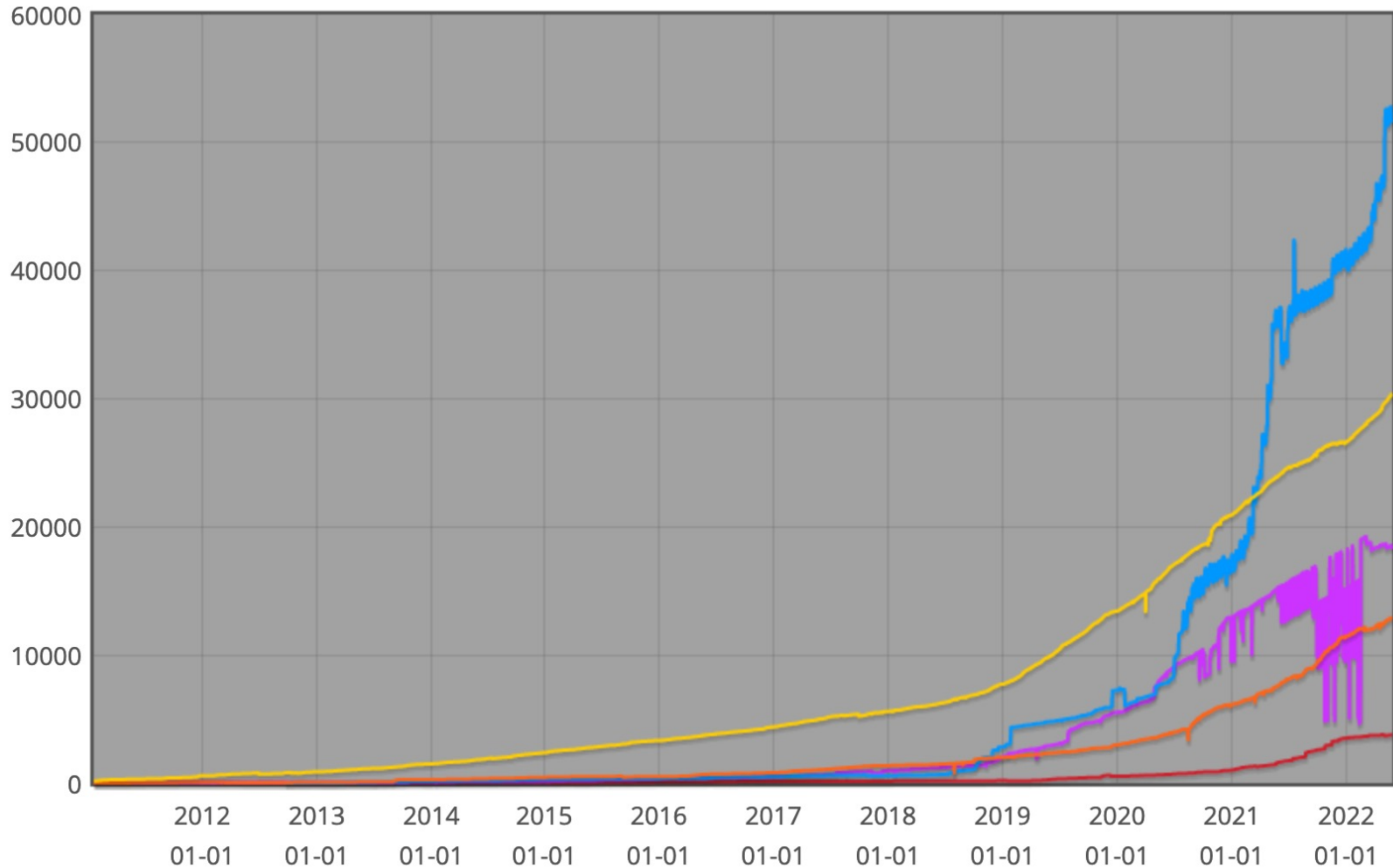
<https://rpki-monitor.antd.nist.gov/>

# RPKI Covered IPv4 Prefixes by RIR

Number of ROAs

- AfrinIC
- APNIC
- ARIN
- LACNIC
- RIPE NCC

This graph shows the total number of valid Route Origin Authorisation (ROA) objects created by the holders of a certificate

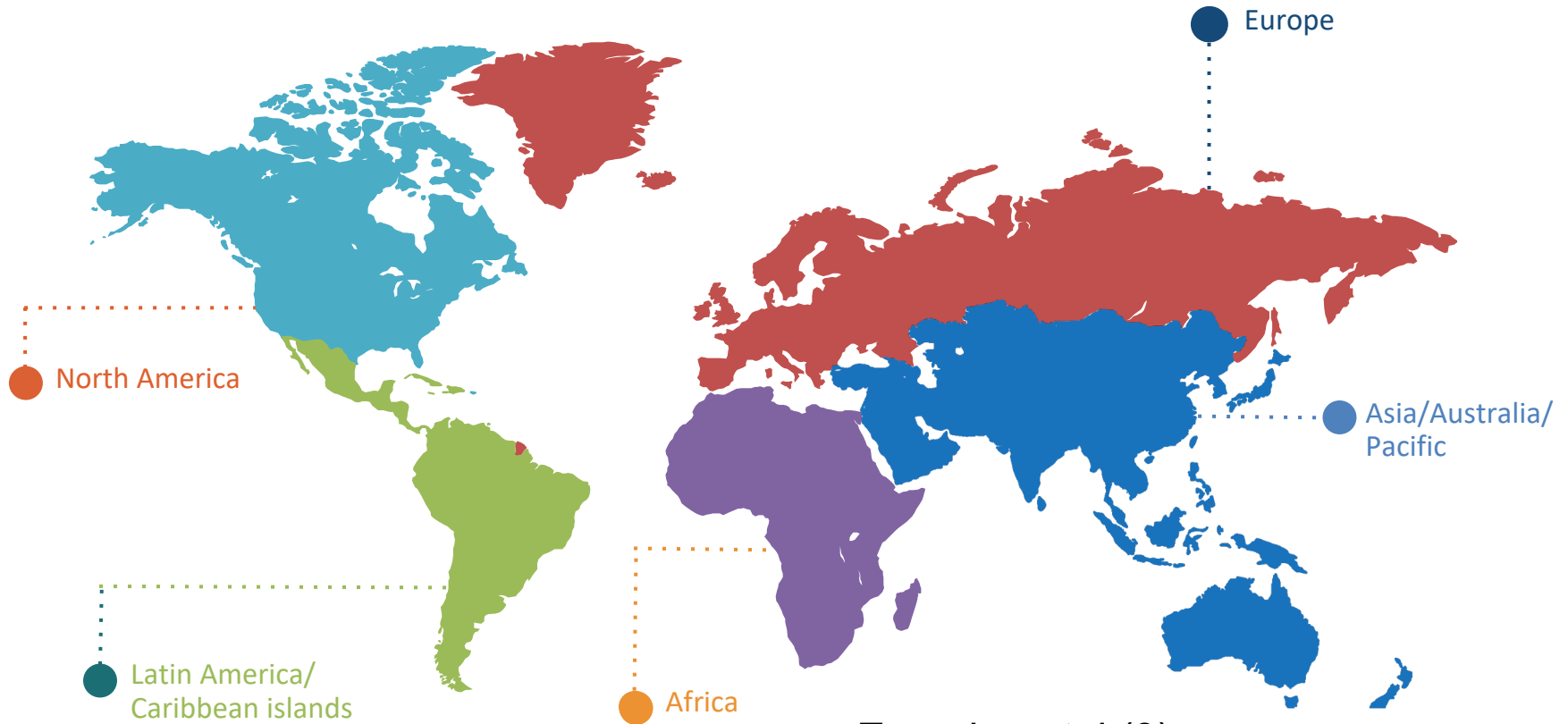


<https://certification-stats.ripe.net/>



# ccTLD DNSSEC Deployment Status

# ccTLD DNSSEC Status 2022-06-13



Experimental (9)  
Announced (4)  
Partial (1)  
DS in Root (59)  
Operational (78)  
DS Automation (7)

.RW signed 2022-05-13

# Questions & Answers

## DNSSEC Resources

[www.dnssec-tools.org](http://www.dnssec-tools.org)

[stats.dnssec-tools.org](http://stats.dnssec-tools.org)

[stats.labs.apnic.net/dnssec](http://stats.labs.apnic.net/dnssec)

## RPKI Resources

[rpki-monitor.antd.nist.gov](http://rpki-monitor.antd.nist.gov)

[certification-stats.ripe.net](http://certification-stats.ripe.net)

[www.securerouting.net](http://www.securerouting.net)

# Evolving the DNSSEC Deployment Maps

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# DNSSEC Deployment Maps

- 2009 – Shinkuro, Inc, begins collecting data, creates database, mapping system
- Maps began to be included in DNSSEC Workshops at ICANN meetings
- Included historical data, as well as future predictions based on announcements or presentations
- Mailed out weekly

# Five Initial Deployment States

- Deployment states:

**Experimental** – Internal experiments

**Announced** – Public commitment to deploy

**Partial** – Zone is signed but not in operation

**DS in Root**

**Operational** – Accepting signed delegations

# Information Reliability

- Inside the database, information reliability tracked with states:
  - Hearsay
  - Pretty Good
  - Authoritative Speech
  - Factual Observation

# DNSSEC Deployment Maps

- 2009 – Shinkuro, Inc, begins collecting data, creates database, mapping system
- 2014 – Internet Society assumes responsibility as part of its Deploy360 Programme
  - 2016 – stopped generating forward-looking maps
  - 2020 – maps promoted as part of “Open Standards Everywhere” project
- 2019 – ICANN decides as of ICANN 65 we can no longer display maps with country borders in the actual workshop (maps continue to be distributed via email and posted to Internet Society web site)
- 2021 – Internet Society adds sixth state “DS Automation”
  - Announced at ICANN 70 – March 2021



# Adding DS Automation

- Current deployment states:

**Experimental** – Internal experiments

**Announced** – Public commitment to deploy

**Partial** – Zone is signed but not in operation

**DS in Root**

**Operational** – Accepting signed delegations

**DS Automation** – Automating DS record updates

# DNSSEC Deployment Maps - Future

- 2009 – Shinkuro, Inc, begins collecting data, creates database, mapping system
- 2014 – Internet Society assumes responsibility as part of its Deploy360 Programme
- 2022 – **George Mason University** will assume responsibility for the deployment maps
  - More information to follow later this year as the transfer of operations occurs

# Thank You