



RPKI “State Of The Union Address”

Resource Public Key Infrastructure
for Routing Security SIG
APNIC 56

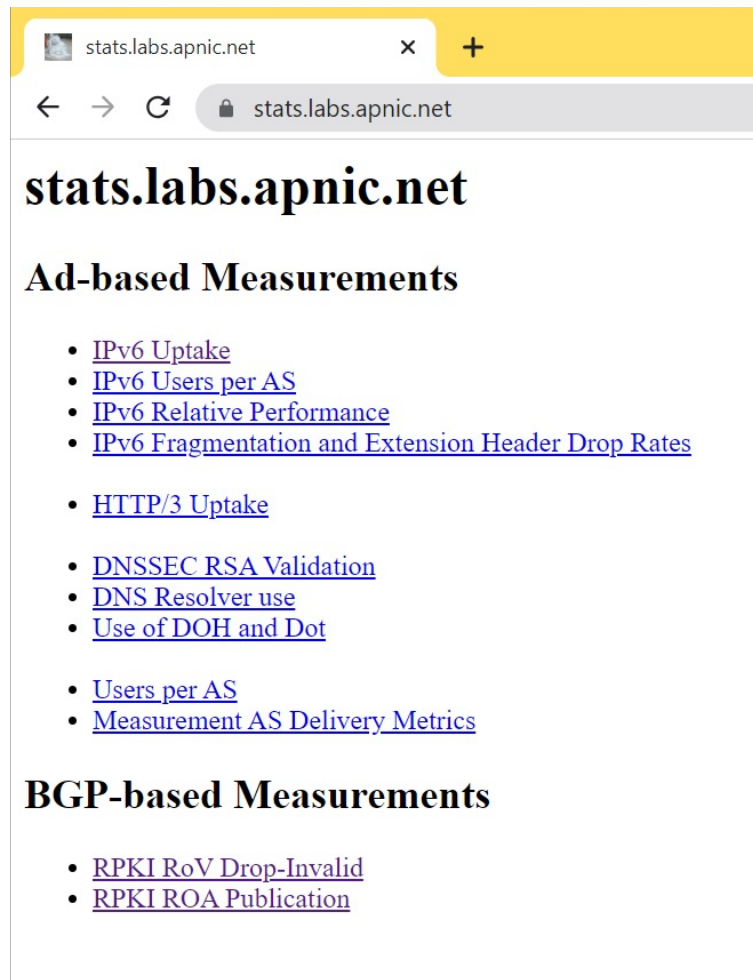
**HOW ARE WE DOING
IN ASIA PACIFIC?**

RPKI Uptake?

Stats.Labs.APNIC.Net

- RPKI RoV Drop-Invalid
- RPKI ROA Publication

Are *your* routes signed and have you started to *drop* invalid routes?



The screenshot shows a web browser window with the address bar displaying 'stats.labs.apnic.net'. The page title is 'stats.labs.apnic.net'. Below the title, there is a section for 'Ad-based Measurements' with a list of links: IPv6 Uptake, IPv6 Users per AS, IPv6 Relative Performance, IPv6 Fragmentation and Extension Header Drop Rates, HTTP/3 Uptake, DNSSEC RSA Validation, DNS Resolver use, Use of DOH and Dot, Users per AS, and Measurement AS Delivery Metrics. Below this is a section for 'BGP-based Measurements' with links for RPKI RoV Drop-Invalid and RPKI ROA Publication.

Live Demo

BGP Measurements

- RPKI RoV Drop-Invalid
- RPKI ROA Publication

APNIC

APNIC Labs Measurements and Data Ad-based Measurements

- IPv6 Uptake
- IPv6 Users per AS
- IPv6 Relative Performance
- IPv6 Fragmentation and Extension Header Drop Rates

- QUIC (HTTP/3) Uptake

- Users per AS
- Ad Program Measurement Delivery Metrics

DNS Measurements

- DNSSEC Validation
- DNS Resolver use
- Use of DOH and DOT
- Delegated and NXDomain Queries

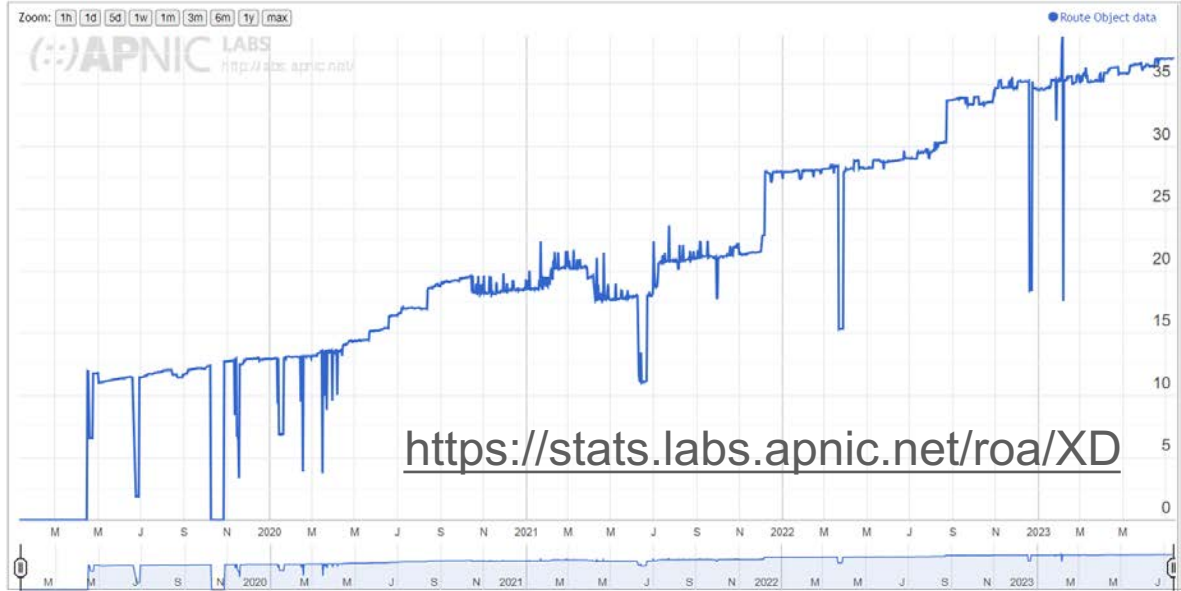
BGP Measurements

- RPKI RoV Drop-Invalid
- RPKI ROA Publication

ROAs Signed

Use of Route Object Validation for Asia (XD)

Display: **Addresses** (Advertised ROA-Valid Advertised Addresses), **Total** (IPv4 + IPv6), **Percent** (of Total)

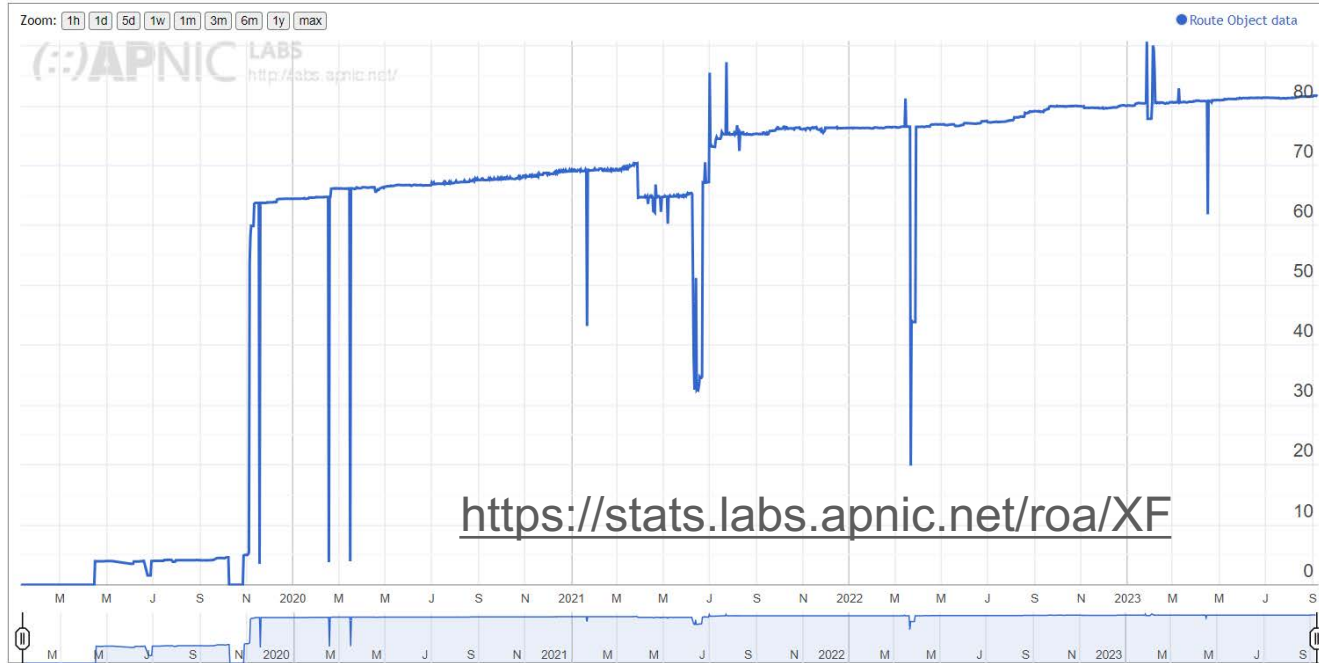


ROAs Signed

Use of Route Object Validation for Oceania (XF)

Display: Addresses (Advertised ROA-Valid Advertised Addresses), Total (IPv4 + IPv6), Percent (of Total)

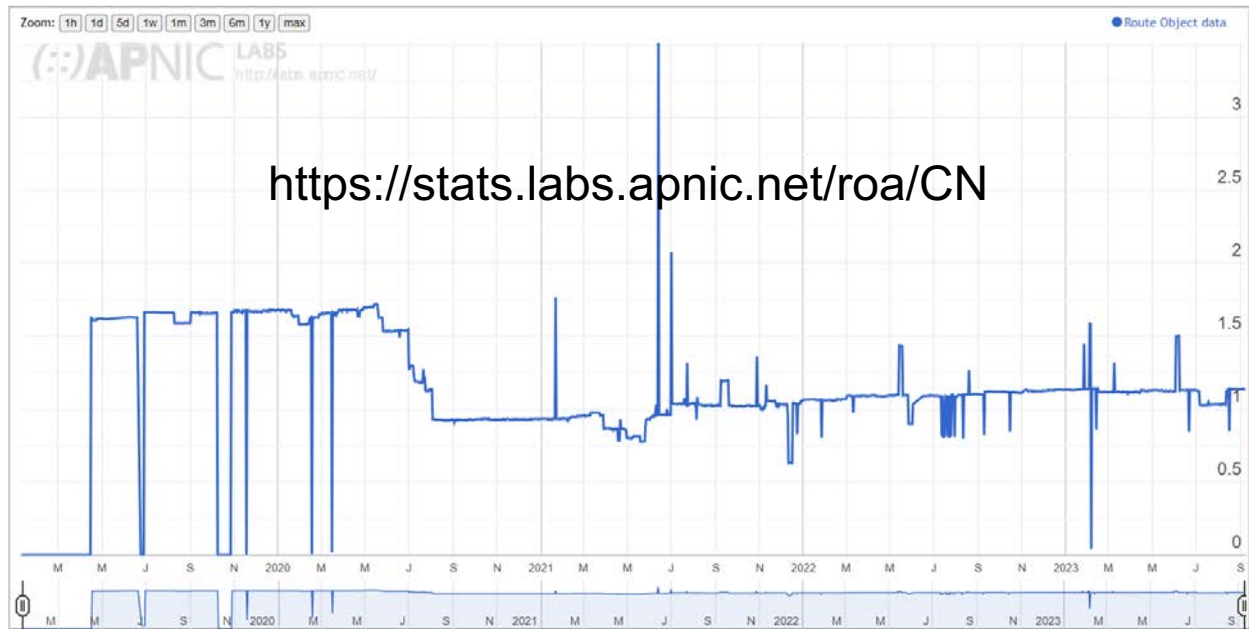
Region Map for Oceania (009)



ROAs (Not) Signed?

Use of Route Object Validation for China (CN)

Display: **Addresses** (Advertised ROA-Valid Advertised Addresses), **Total** (IPv4 + IPv6), **Percent** (of Total)



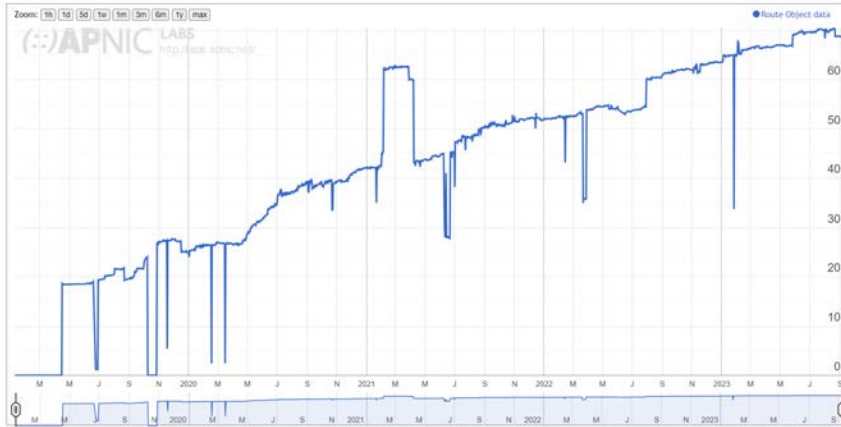
Region Map for Eastern Asia (030)



ROAs Signed

Use of Route Object Validation for South-Eastern Asia (XU)

Display: Addresses (Advertised ROA-Valid Advertisements), Total (IPv4 + IPv6), Percent (of Total)



Use of Route Object Validation for Eastern Asia (XS)

Display: Addresses (Advertised ROA-Valid Advertisements), Total (IPv4 + IPv6), Percent (of Total)

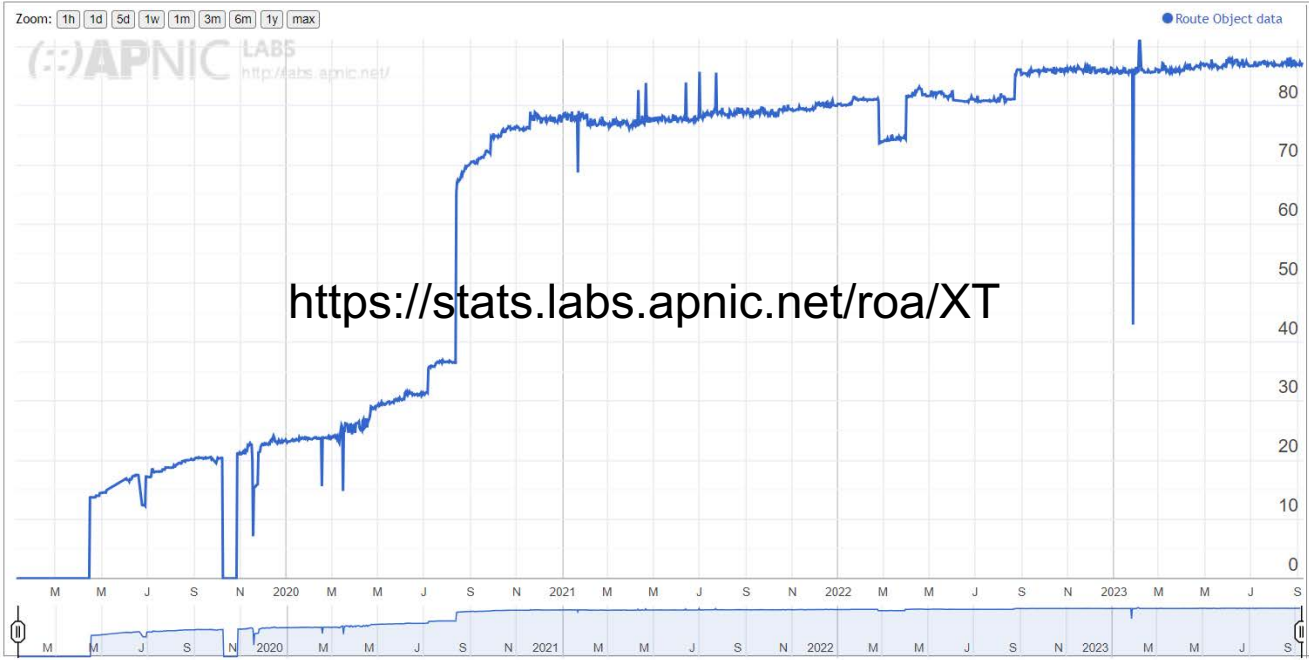
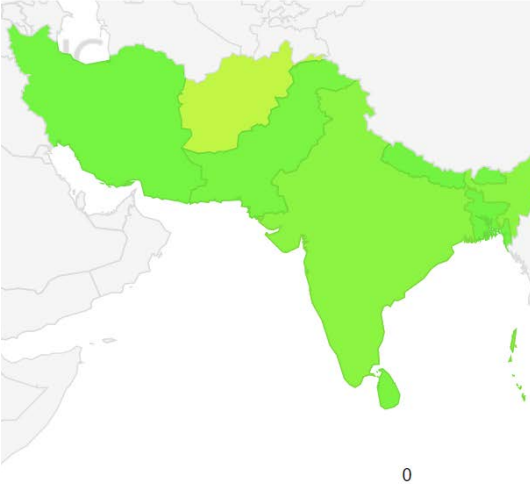


ROAs Signed

Use of Route Object Validation for Southern Asia (XT)

Display: Addresses (Advertised ROA-Valid Advertised Addresses), Total (IPv4 + IPv6), Percent (of Total)

Southern Asia (034)



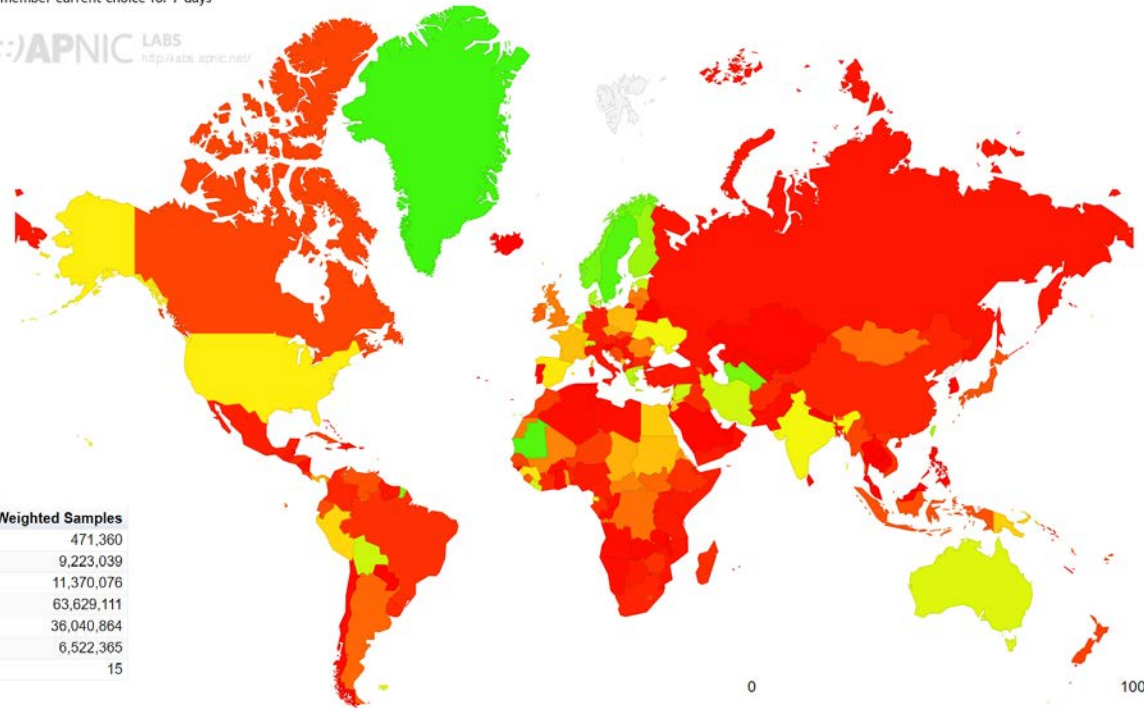
Validation ... Are we there yet?

I-Rov Filtering Rate by country (%)

[Click here for a zoomable map](#)

Remember current choice for 7 days

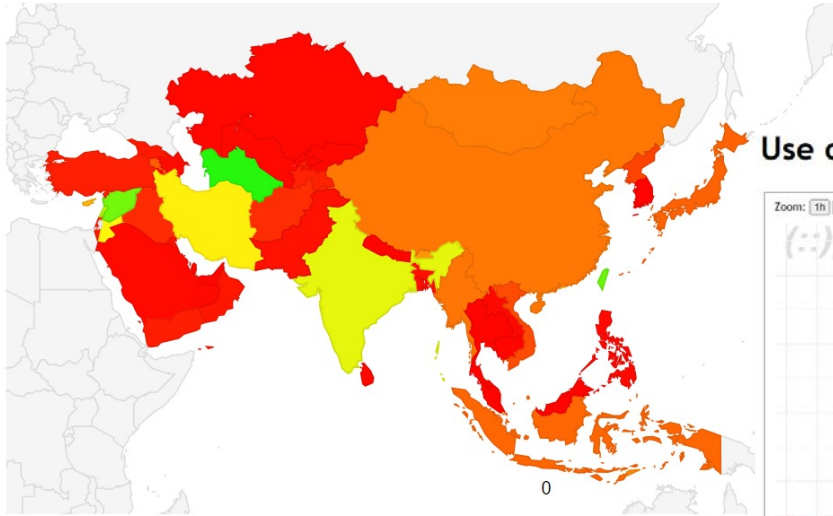
 APNIC LABS
<http://labs.apnic.net/>



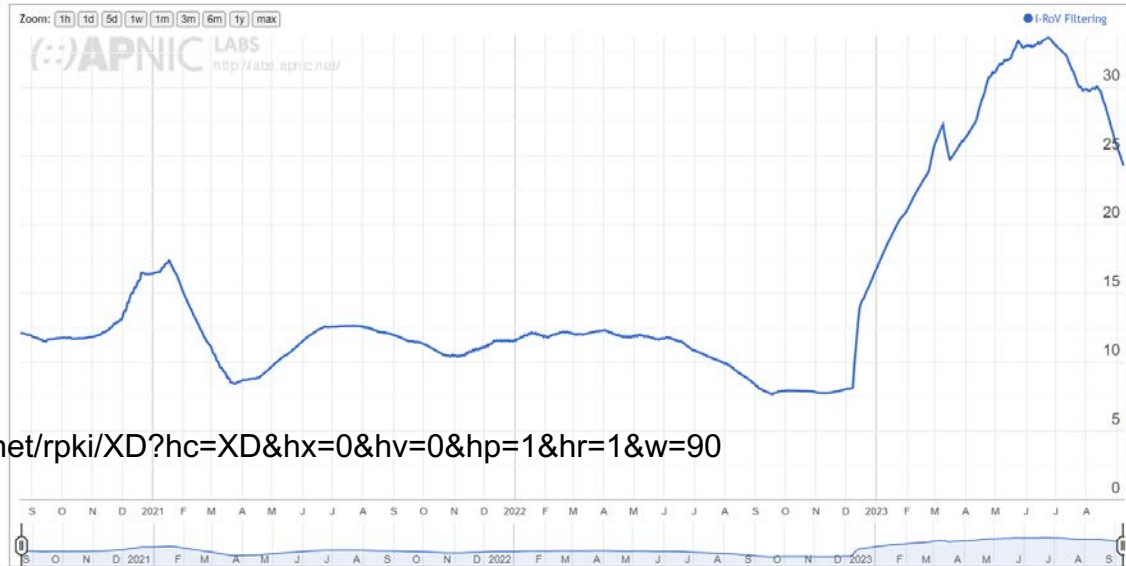
Code	Region	I-RoV Filtering	Samples	Weight	Weighted Samples
XF	Oceania	47.60%	354,451	1.33	471,360
XE	Europe	29.81%	5,375,471	1.72	9,223,039
XC	Americas	25.42%	13,692,309	0.83	11,370,076
XA	World	24.66%	63,629,111	1	63,629,111
XD	Asia	24.39%	40,507,732	0.89	36,040,864
XB	Africa	15.16%	3,699,133	1.76	6,522,365
XG	Unclassified	0	15	1	15

ROV Asia

Region Map for Asia (142)



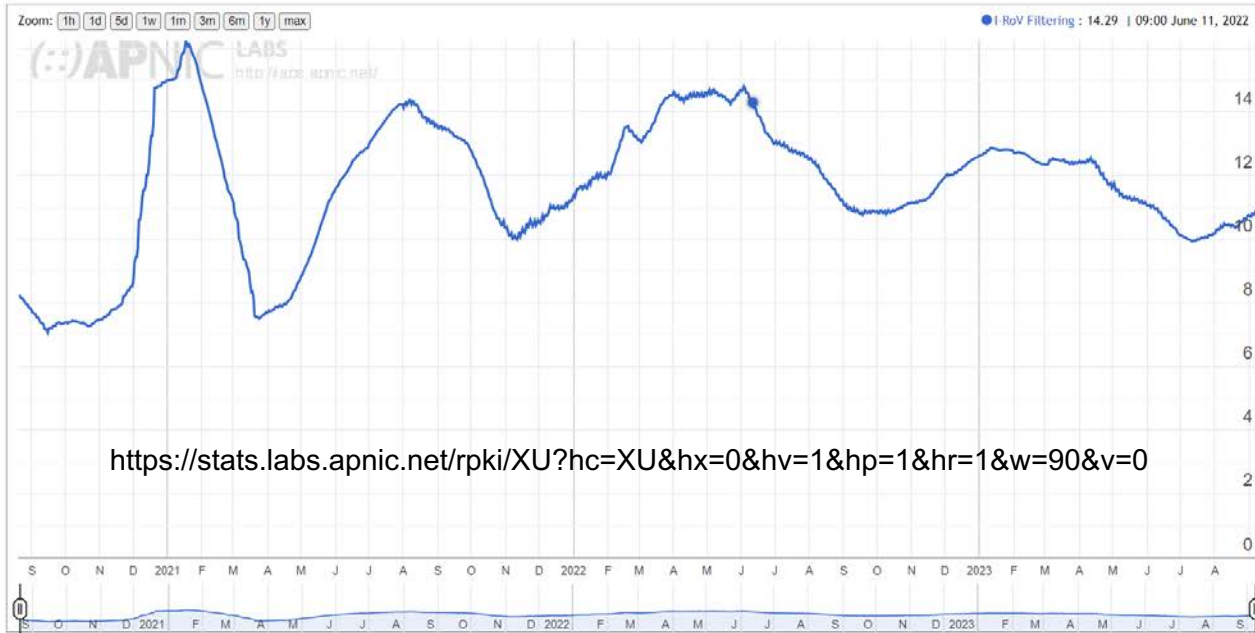
Use of RPKI Validation for Asia (XD)



<https://stats.labs.apnic.net/rpki/XD?hc=XD&hx=0&hv=0&hp=1&hr=1&w=90>

ROV South-East Asia

Use of RPKI Validation for South-Eastern Asia (XU)

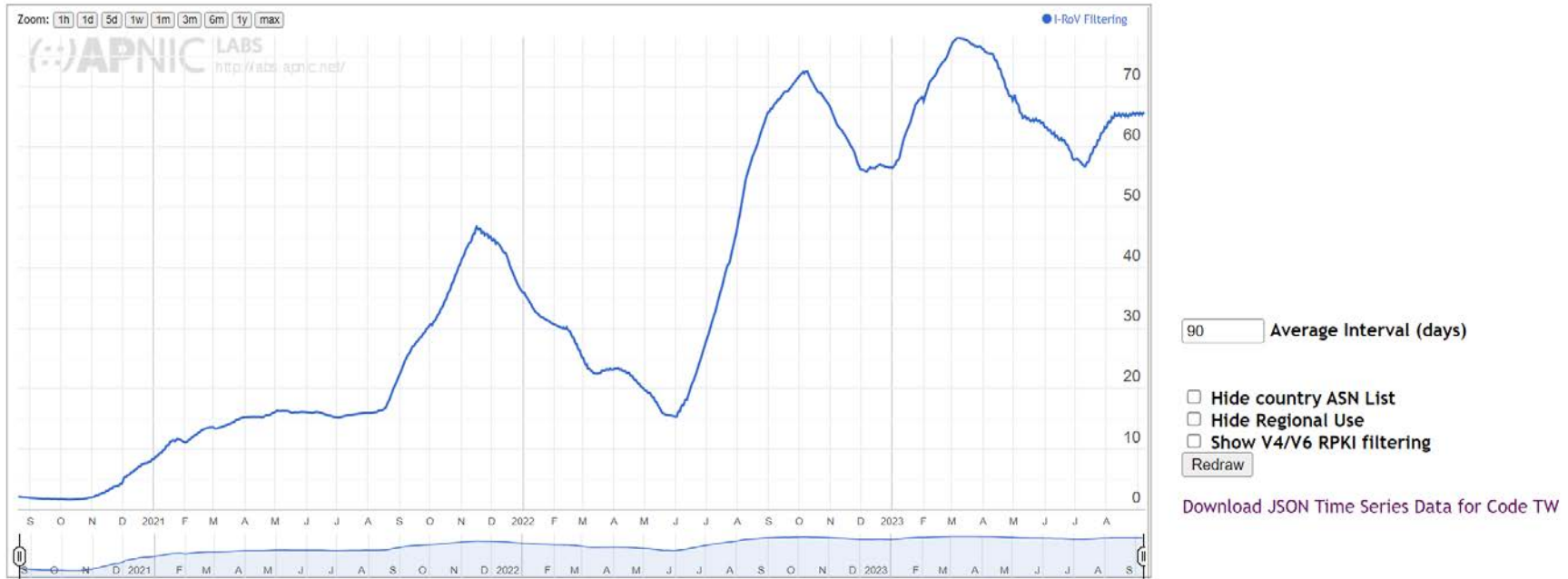


- Average Interval (days)
- Hide Regional Use
- Show V4/V6 RPKI filtering
-

[Download JSON Time Series Data for Code XU](#)

ROV “Most Improved”

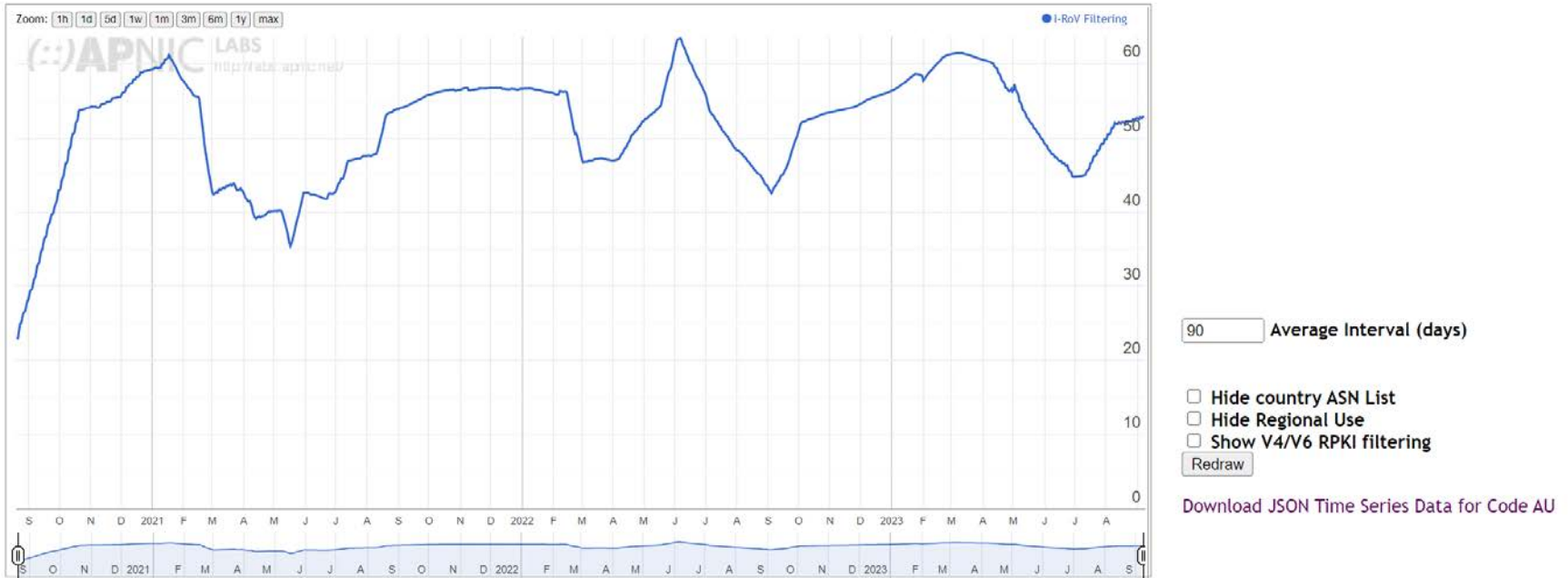
Use of RPKI Validation for Taiwan (TW)



<https://stats.labs.apnic.net/rpki/TW?hc=TW&hx=0&hv=0&hp=1&hr=1&w=90>

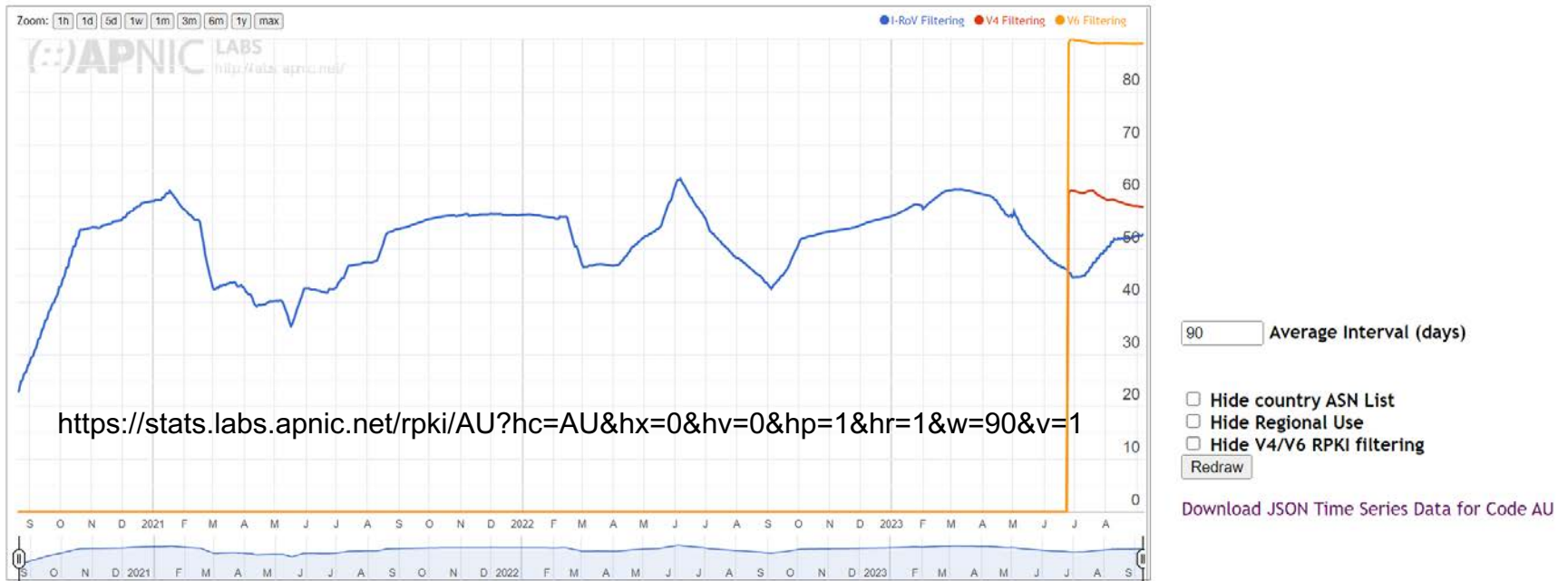
ROV “Measurement Stability 1”

Use of RPKI Validation for Australia (AU)



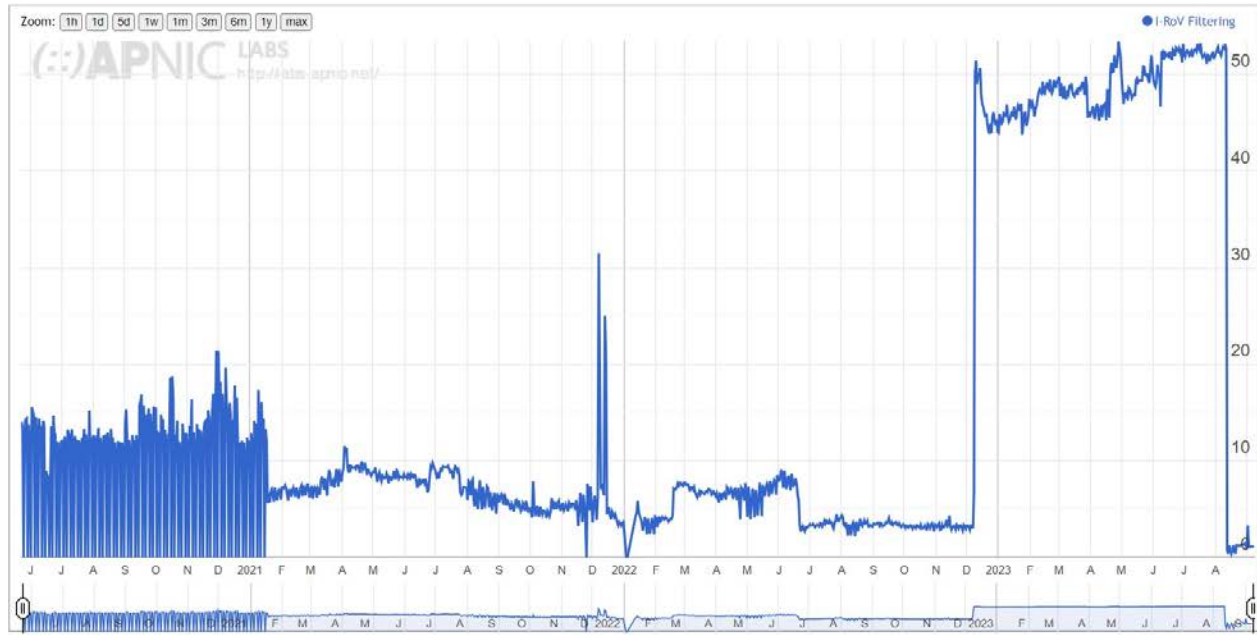
ROV “Measurement Stability 2”

Use of RPKI Validation for Australia (AU)



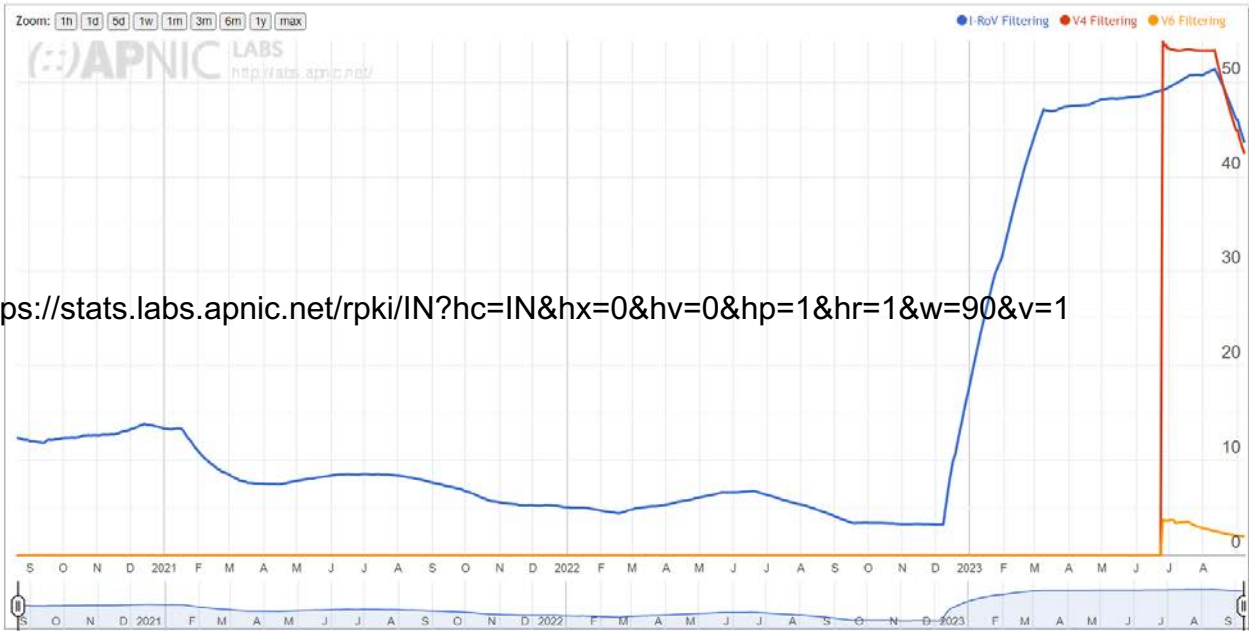
ROV “Opps 1”

Use of RPKI Validation for India (IN)



ROV “Opps 2”

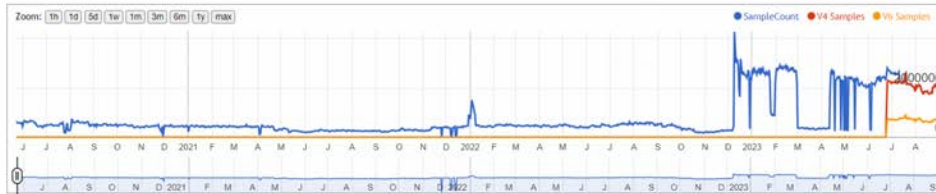
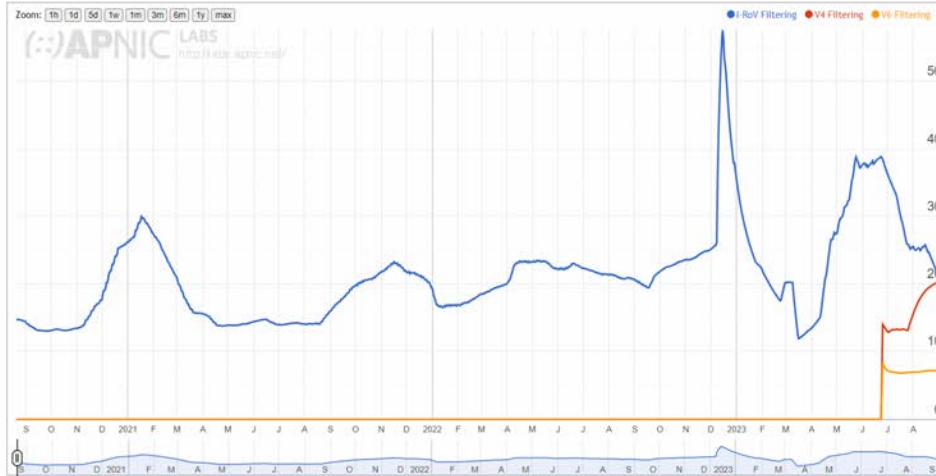
Use of RPKI Validation for India (IN)



<https://stats.labs.apnic.net/rpki/IN?hc=IN&hx=0&hv=0&hp=1&hr=1&w=90&v=1>

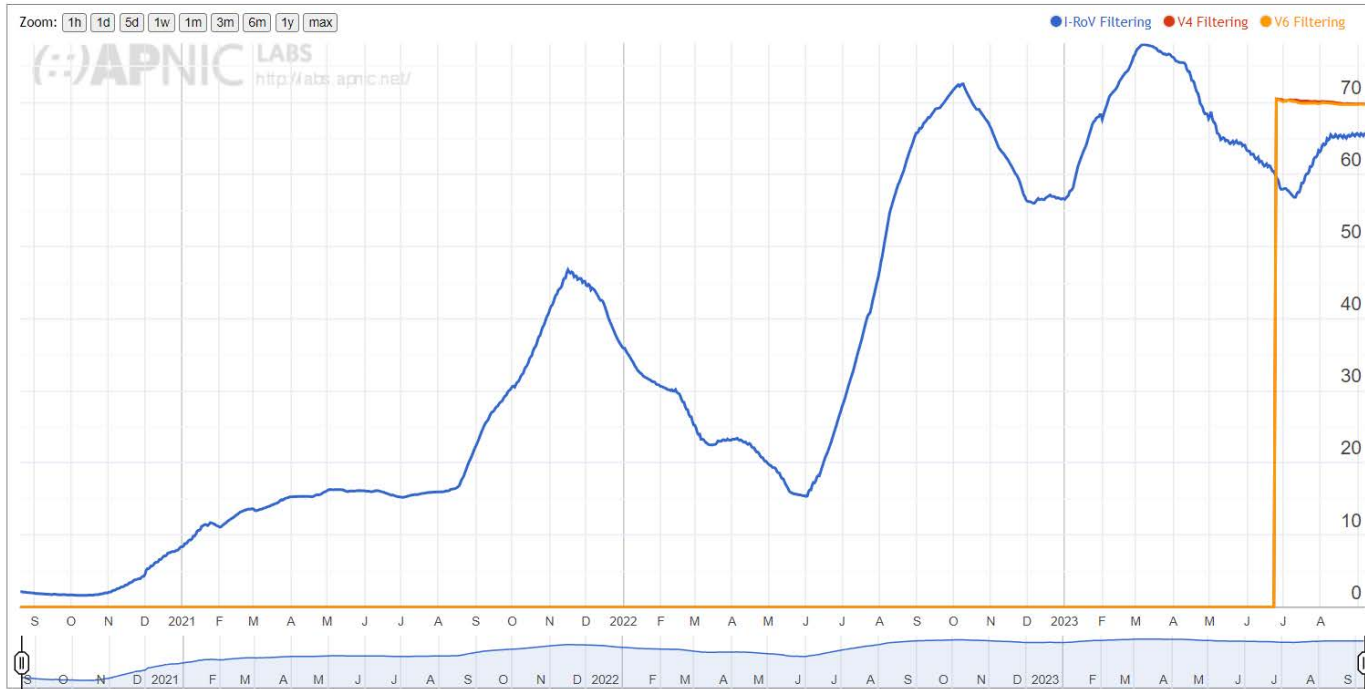
ROV East Asia

Use of RPKI Validation for Eastern Asia (XS)



ROV “Most Improved” (Take 2!)

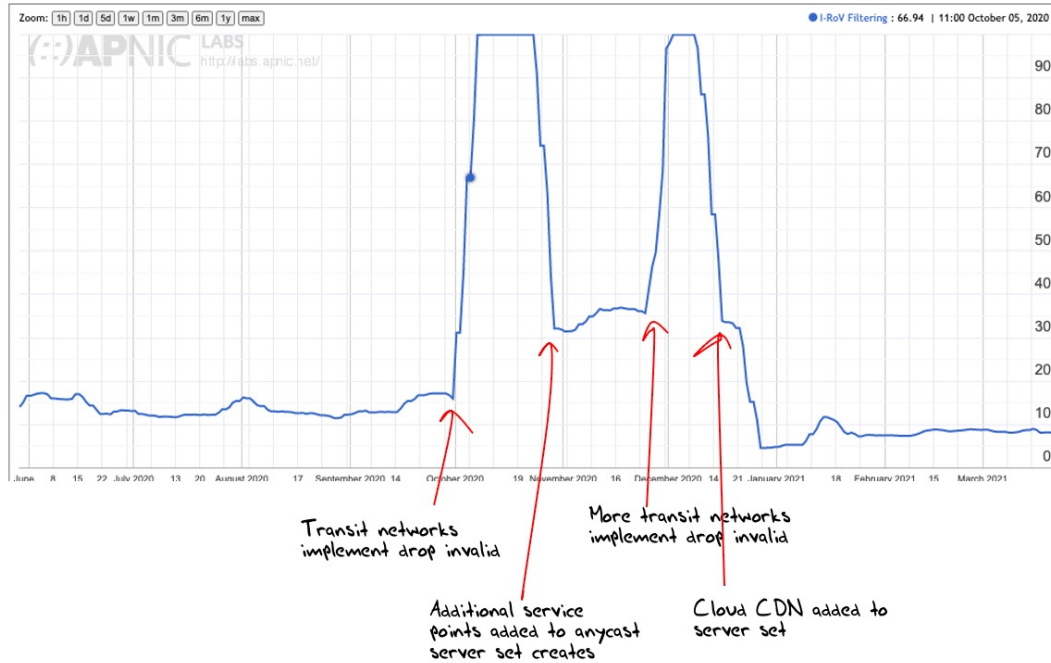
Use of RPKI Validation for Taiwan (TW)



<https://stats.labs.apnic.net/rpkv/tw?nc=1&v4=1&v6=1&nc=1&v4=1&v6=1>

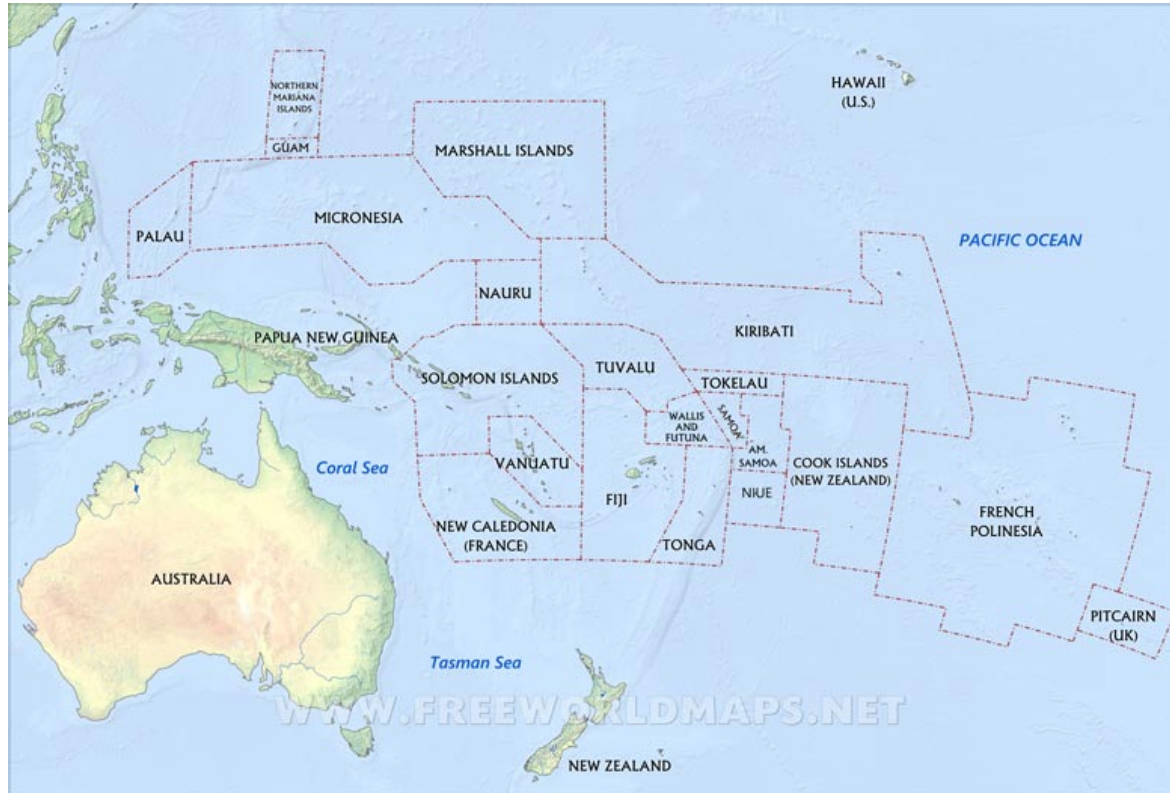
Measurements Are Hard

Use of RPKI Validation for South America (XP)



<https://labs.apnic.net/index.php/2021/03/23/measuring-roas-and-rov/>

Oceania To Do List



Who has work to do?

SIGN YOUR ROUTES!

Code	Region	V4 Valid	Pc ▼	V4 Invalid	Pc	V4 Unknwn	Pc	V4 Total Addr	V6 Valid	Pc	V6 Invalid	Pc	V6 Unknwn	Pc	V6 Total /32 Addr
PN	Pitcairn, Polynesia, Oceania	256	100.0%	0	0.0%	0	0.0%	256	0	0.0%	0	0.0%	0	0.0%	0
NC	New Caledonia, Melanesia, Oceania	135,936	99.6%	0	0.0%	512	0.4%	136,448	7	87.5%	0	0.0%	1	12.5%	8
FJ	Fiji, Melanesia, Oceania	139,264	99.1%	0	0.0%	1,280	0.9%	140,544	5	100.0%	0	0.0%	0	0.0%	5
TO	Tonga, Polynesia, Oceania	10,496	97.6%	0	0.0%	256	2.4%	10,752	2	100.0%	0	0.0%	0	0.0%	2
MH	Marshall Islands, Micronesia, Oceania	4,096	88.9%	0	0.0%	512	11.1%	4,608	1	100.0%	0	0.0%	0	0.0%	1
WS	Samoa, Polynesia, Oceania	16,640	87.8%	0	0.0%	2,304	12.2%	18,944	1	50.0%	0	0.0%	1	50.0%	2
VU	Vanuatu, Melanesia, Oceania	10,240	87.0%	0	0.0%	1,536	13.0%	11,776	0	0.0%	0	0.0%	1	100.0%	1
SB	Solomon Islands, Melanesia, Oceania	11,264	78.6%	0	0.0%	3,072	21.4%	14,336	0	0.0%	0	0.0%	0	0.0%	0
AU	Australia, Australia and New Zealand, Oceania	30,854,587	68.8%	80,480	0.2%	13,919,102	31.0%	44,854,169	4,627	97.3%	2	0.0%	123	2.6%	4,753
NU	Niue, Polynesia, Oceania	512	66.7%	0	0.0%	256	33.3%	768	0	0.0%	0	0.0%	0	0.0%	0
NR	Nauru, Micronesia, Oceania	5,888	57.5%	0	0.0%	4,352	42.5%	10,240	1	100.0%	0	0.0%	0	0.0%	1
NZ	New Zealand, Australia and New Zealand, Oceania	2,653,165	47.4%	11,283	0.2%	2,929,408	52.4%	5,593,856	92	71.3%	0	0.0%	35	27.1%	129
PG	Papua New Guinea, Melanesia, Oceania	33,024	46.9%	1,024	1.5%	36,376	51.7%	70,424	1	33.3%	0	0.0%	1	33.3%	3
KI	Kiribati, Micronesia, Oceania	1,024	22.2%	0	0.0%	3,584	77.8%	4,608	0	0.0%	0	0.0%	0	0.0%	0
GU	Guam, Micronesia, Oceania	30,976	13.4%	0	0.0%	200,192	86.6%	231,168	2	50.0%	0	0.0%	2	50.0%	4
PF	French Polynesia, Polynesia, Oceania	8,192	11.0%	0	0.0%	66,560	89.0%	74,752	1	33.3%	0	0.0%	2	66.7%	3
AS	American Samoa, Polynesia, Oceania	2,048	9.6%	0	0.0%	19,200	90.4%	21,248	0	0.0%	0	0.0%	1	100.0%	1
MP	Northern Mariana Islands, Micronesia, Oceania	1,024	3.8%	0	0.0%	25,600	96.2%	26,624	0	0.0%	0	0.0%	1	100.0%	1
CK	Cook Islands, Polynesia, Oceania	256	3.0%	0	0.0%	8,192	97.0%	8,448	0	0.0%	0	0.0%	0	0.0%	0
FM	Micronesia (Federated States of), Micronesia, Oceania	0	0.0%	0	0.0%	7,680	100.0%	7,680	0	0.0%	0	0.0%	1	100.0%	1
PW	Palau, Micronesia, Oceania	0	0.0%	0	0.0%	6,144	100.0%	6,144	0	0.0%	0	0.0%	1	100.0%	1
NF	Norfolk Island, Australia and New Zealand, Oceania	0	0.0%	0	0.0%	1,792	100.0%	1,792	0	0.0%	0	0.0%	0	0.0%	0
TK	Tokelau, Polynesia, Oceania	0	0.0%	0	0.0%	1,280	100.0%	1,280	0	0.0%	0	0.0%	0	0.0%	0
TV	Tuvalu, Polynesia, Oceania	0	0.0%	0	0.0%	4,096	100.0%	4,096	0	0.0%	0	0.0%	0	0.0%	0
WF	Wallis and Futuna Islands, Polynesia, Oceania	0	0.0%	0	0.0%	3,840	100.0%	3,840	0	0.0%	0	0.0%	0	0.0%	0

Who has more work to do?

DEPLOY ROUTE ORIGIN VALIDATION!

Code	Region	RPKI Validates	Samples	Weight	Weighted Samples
QP	Australia and New Zealand, Oceania	49.77%	331,487	1.28	424,330
QQ	Melanesia, Oceania	19.94%	13,265	2.73	36,258
QR	Micronesia, Oceania	12.15%	4,451	0.96	4,261
QS	Polynesia, Oceania	10.38%	5,248	1.24	6,510

Code	Region	RPKI Validates	Samples	Weight	Weighted Samples
MH	Marshall Islands, Micronesia, Oceania	66.67%	453	0.75	339
AU	Australia, Australia and New Zealand, Oceania	57.87%	271,484	1.29	350,339
PG	Papua New Guinea, Melanesia, Oceania	42.21%	4,099	5.23	21,425
TO	Tonga, Polynesia, Oceania	20.91%	751	0.94	704
WS	Samoa, Polynesia, Oceania	18.15%	1,526	0.89	1,365
VU	Vanuatu, Melanesia, Oceania	16.57%	1,189	1.2	1,425
MP	Northern Mariana Islands, Micronesia, Oceania	13.54%	495	0.84	415
NZ	New Zealand, Australia and New Zealand, Oceania	13.09%	59,988	1.23	73,972
FJ	Fiji, Melanesia, Oceania	12.65%	5,432	1.46	7,910
KI	Kiribati, Micronesia, Oceania	10.48%	248	1.29	320
FM	Micronesia (Federated States of), Micronesia, Oceania	6.27%	574	1.16	667
GU	Guam, Micronesia, Oceania	3.54%	2,203	1.03	2,260
PF	French Polynesia, Polynesia, Oceania	3.36%	1,813	2.04	3,704
SB	Solomon Islands, Melanesia, Oceania	3.03%	628	2.37	1,489
CK	Cook Islands, Polynesia, Oceania	1.95%	256	0.56	143
AS	American Samoa, Polynesia, Oceania	1.41%	851	0.43	368
NC	New Caledonia, Melanesia, Oceania	0.63%	1,917	2.09	4,006
PW	Palau, Micronesia, Oceania	0.25%	397	0.38	151
WF	Wallis and Futuna Islands, Polynesia, Oceania	0	30	3.22	96
TK	Tokelau, Polynesia, Oceania	0	1	10	15
NF	Norfolk Island, Australia and New Zealand, Oceania	0	15	1.23	18
NR	Nauru, Micronesia, Oceania	0	81	1.31	106
TV	Tuvalu, Polynesia, Oceania	0	20	4.7	94

Your TODO List is:

- Attend an APNIC workshop on RPKI.
- Decide on your ROA deployment: there's more than one way to sign routes.
- Plan for and set up VALIDATION on your network border routers.
- Implement MANRS and apply for the relevant program.
- Keep up to date on Best Current Operational Practices.

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