

Asia Pacific RPKI Update

Dave Phelan - APNIC

#apnic58

TE WHANGANUI A TARA
WELLINGTON,
AOTEAROA NEW ZEALAND

30 August – 6 September 2024

Who Am I?

- Dave Phelan
 - Network and Infrastructure engineer for a LONG time
 - Trainer at APNIC
 - Parent to 2 Human children and 3 Fur Children
 - Likes Cat memes



What are we going to talk about?

- Numbers Numbers Numbers!!!
- RPKI Stats
 - ROA Coverage
 - ROV
 - Oddities





ROA Coverage

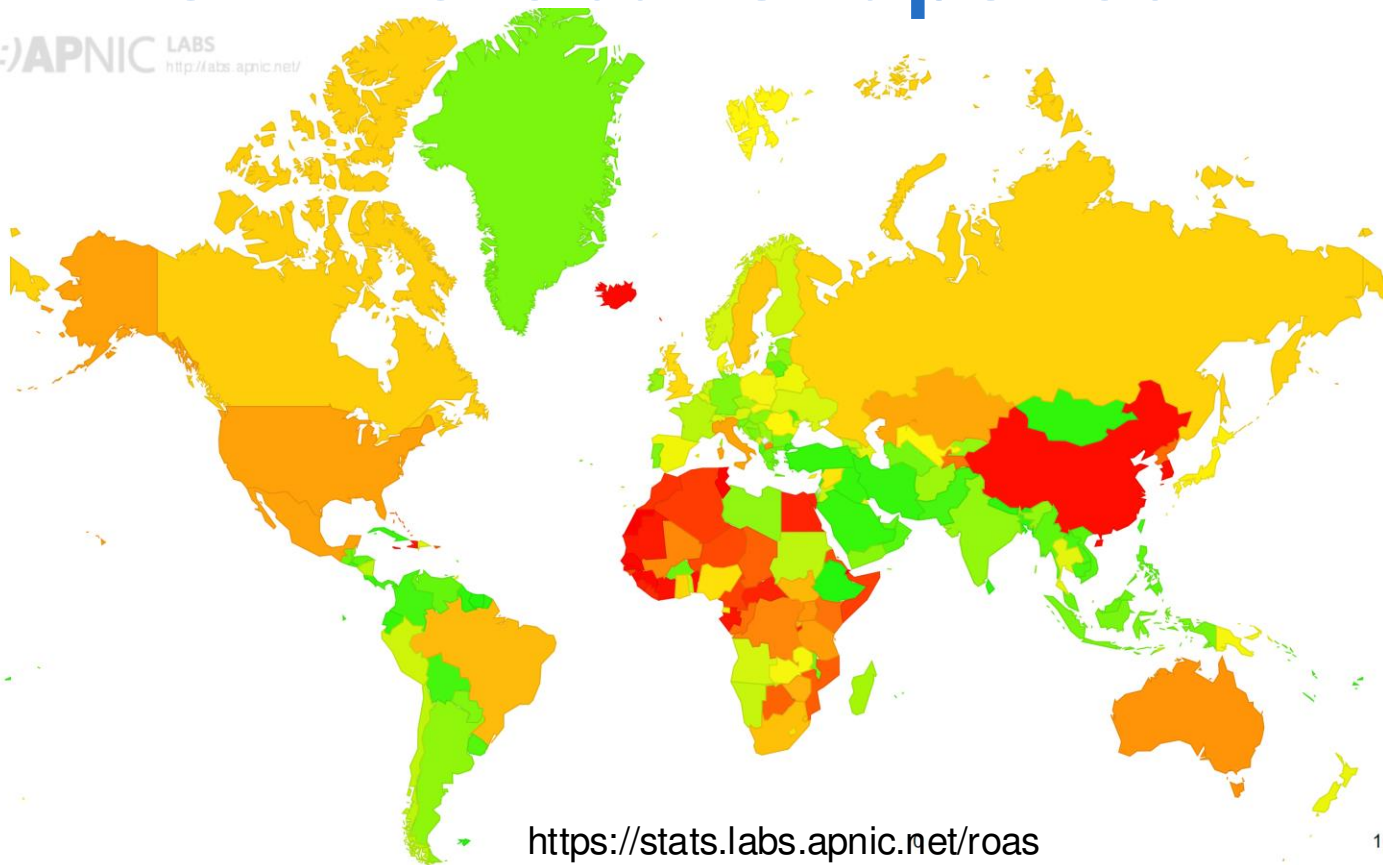
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RPKI ROA – Global Snapshot

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



<https://stats.labs.apnic.net/roas>

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RPKI ROA – Global Snapshot

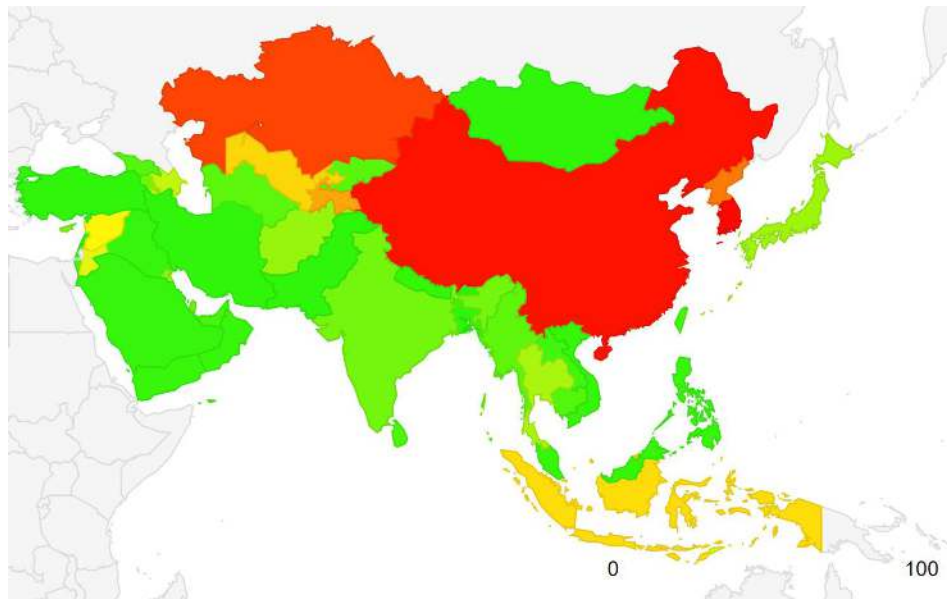
- 47.8% Global IPv4 Signed
- 57.9% Asia
- 34.6% North America
- 54.4% South America
- 53.6% Europe
- 30.4% Africa
- 69.6% Oceania

<https://stats.labs.apnic.net/roas>



RPKI ROA – Asia

- 3 Sub-regions
 - 86.3% South Asia
 - IN,LK,NP,BT,PK,BD,AF,MV
 - 29.5% East Asia
 - TW,JP,MN,CN,MO,KR,HK,KP
 - 76.3% South-East Asia
 - MY,VN,TH,SG,PH,ID,MM,LA,BN,KH,TL



<https://stats.labs.apnic.net/roa/XD>

RPKI ROA – South Asia Sub-Region

Code	Region	V4 Valid	Pc	V4 Invalid	Pc2	V4 Unknwn	Pc3	PoT
BT	Bhutan, Southern Asia, Asia	42204	99.30%	36	0.10%	256	0.60%	0.08%
MV	Maldives, Southern Asia, Asia	95488	98.70%	0	0.00%	1280	1.30%	0.18%
PK	Pakistan, Southern Asia, Asia	5111766	96.70%	47658	0.90%	127744	2.40%	9.81%
NP	Nepal, Southern Asia, Asia	562688	96.10%	256	0.00%	22528	3.80%	1.09%
BD	Bangladesh, Southern Asia, Asia	1776332	95.70%	9780	0.50%	70912	3.80%	3.45%
LK	Sri Lanka, Southern Asia, Asia	550400	91.40%	256	0.00%	51456	8.50%	1.12%
IN	India, Southern Asia, Asia	37117115	82.00%	364613	0.80%	7790336	17.20%	84.01%
AF	Afghanistan, Southern Asia, Asia	106752	73.30%	1024	0.70%	37888	26.00%	0.27%

<https://stats.labs.apnic.net/roa/XT>

RPKI ROA – East Asia Sub-Region

Code	Region	V4 Valid	Pc	V4 Invalid	Pc2	V4 Unknwn	Pc3	PoT
MN	Mongolia, Eastern Asia, Asia	160224	97.80%	289	0.20%	3328	2.00%	0.03%
TW	Taiwan, Eastern Asia, Asia	31522007	92.20%	2388393	7.00%	286464	0.80%	5.42%
MO	Macao Special Administrative Region of China, Eastern Asia, Asia	338944	89.00%	512	0.10%	41216	10.80%	0.06%
JP	Japan, Eastern Asia, Asia	127756808	72.20%	53800	0.00%	49228776	27.80%	28.06%
HK	Hong Kong Special Administrative Region of China, Eastern Asia, Asia	12881180	65.20%	65489	0.30%	6797598	34.40%	3.13%
KP	Democratic People's Republic of Korea, Eastern Asia, Asia	512	25.00%	0	0.00%	1536	75.00%	0.00%
CN	China, Eastern Asia, Asia	11332601	3.90%	461959	0.20%	277935104	95.90%	45.93%
KR	Republic of Korea, Eastern Asia, Asia	2122256	1.90%	3312	0.00%	107476172	98.10%	17.37%

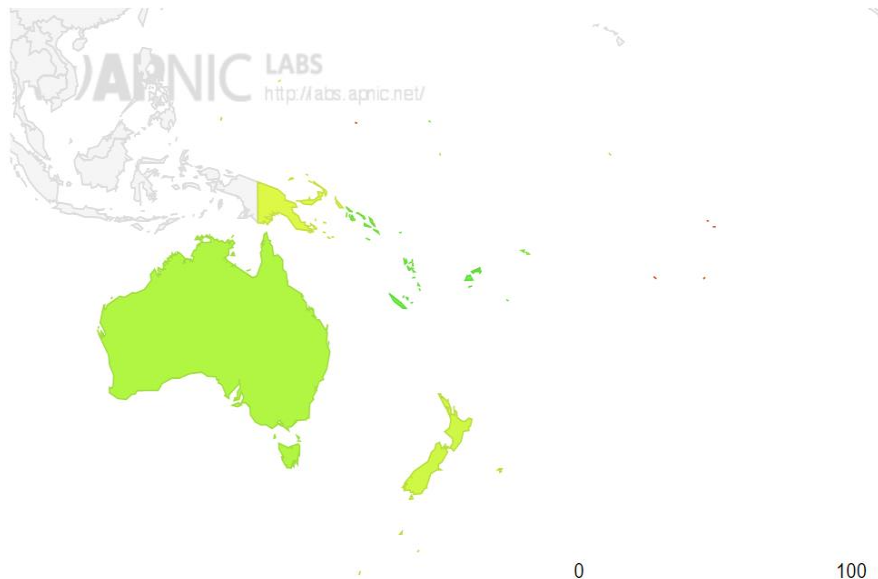
<https://stats.labs.apnic.net/roa/XS>

RPKI ROA – South East Asia Subregion

Code	Region	V4 Valid	Pc	V4 Invalid	Pc2	V4 Unknwn	Pc3	PoT
VN	Vietnam, South-Eastern Asia, Asia	15478037	96.10%	6635	0.00%	620288	3.90%	22.92%
MY	Malaysia, South-Eastern Asia, Asia	6548474	95.60%	22536	0.30%	280576	4.10%	9.75%
PH	Philippines, South-Eastern Asia, Asia	5829701	95.10%	35643	0.60%	262016	4.30%	8.72%
LA	Lao People's Democratic Republic, South-Eastern Asia, Asia	80896	93.20%	0	0.00%	5888	6.80%	0.12%
KH	Cambodia, South-Eastern Asia, Asia	392704	89.20%	768	0.20%	46592	10.60%	0.63%
MM	Myanmar, South-Eastern Asia, Asia	181248	86.20%	2048	1.00%	26880	12.80%	0.30%
SG	Singapore, South-Eastern Asia, Asia	10405495	80.90%	44427	0.30%	2418341	18.80%	18.31%
TH	Thailand, South-Eastern Asia, Asia	6235321	70.10%	40007	0.50%	2614784	29.40%	12.65%
TL	Timor-Leste, South-Eastern Asia, Asia	12800	65.80%	0	0.00%	6656	34.20%	0.03%
ID	Indonesia, South-Eastern Asia, Asia	8370391	45.20%	42025	0.20%	10124288	54.60%	26.38%
BN	Brunei Darussalam, South-Eastern Asia, Asia	62720	43.60%	768	0.50%	80384	55.90%	0.20%

RPKI ROA – Oceania

- 4 Sub-regions
 - Australia and New Zealand – 69.7%
 - AU,NZ,NF
 - Melanesia 89.9%
 - FJ,NC,PG,SB,VU
 - Micronesia – 51.6%
 - FM,GU,KI,MH,MP,NR,PW
 - Polynesia – 30.1%
 - AS,CK,NU,PF,PN,TK,TO,TV,WF,WS



<https://stats.labs.apnic.net/roa/XF>

RPKI ROA – AU, NZ and NF

Code	Region	V4 Valid	Pc	V4 Invalid	Pc2	V4 Unknwn	Pc3	PoT
AU	Australia, Australia and New Zealand, Oceania	31470880	70.60%	234208	0.50%	12886508	28.90%	89.38%
NF	Norfolk Island, Australia and New Zealand, Oceania	1280	62.50%	0	0.00%	768	37.50%	0.004%
NZ	New Zealand, Australia and New Zealand, Oceania	3291639	62.20%	7945	0.20%	1996040	37.70%	10.61%

<https://stats.labs.apnic.net/roa/QP>

RPKI ROA – Melanesia

Code	Region	V4 Valid	Pc	V4 Invalid	Pc2	V4 Unknwn	Pc3	PoT
NC	New Caledonia, Melanesia, Oceania	134655	99.10%	1	0.00%	1280	0.90%	35.56%
FJ	Fiji, Melanesia, Oceania	138496	98.40%	1024	0.70%	1280	0.90%	36.84%
VU	Vanuatu, Melanesia, Oceania	12800	92.60%	512	3.70%	512	3.70%	3.62%
SB	Solomon Islands, Melanesia, Oceania	14080	87.30%	0	0.00%	2048	12.70%	4.22%
PG	Papua New Guinea, Melanesia, Oceania	43520	57.60%	256	0.30%	31760	42.00%	19.76%

<https://stats.labs.apnic.net/roa/QQ>

RPKI ROA – Micronesia

Code	Region	V4 Valid	Pc	V4 Invalid	Pc2	V4 Unknwn	Pc3	PoT
NR	Nauru, Micronesia, Oceania	9984	97.50%	0	0.00%	256	2.50%	3.55%
MH	Marshall Islands, Micronesia, Oceania	3840	83.30%	0	0.00%	768	16.70%	1.60%
PW	Palau, Micronesia, Oceania	4864	76.00%	0	0.00%	1536	24.00%	2.22%
KI	Kiribati, Micronesia, Oceania	2560	62.50%	0	0.00%	1536	37.50%	1.42%
MP	Northern Mariana Islands, Micronesia, Oceania	17408	60.20%	0	0.00%	11520	39.80%	10.03%
GU	Guam, Micronesia, Oceania	109824	48.80%	0	0.00%	115200	51.20%	77.99%
FM	Micronesia (Federated States of), Micronesia, Oceania	256	2.80%	0	0.00%	8960	97.20%	3.19%

<https://stats.labs.apnic.net/roa/QR>

RPKI ROA – Polynesia

Code	Region	V4 Valid	Pc	V4 Invalid	Pc2	V4 Unknwn	Pc3	PoT
NU	Niue, Polynesia, Oceania	768	100.00%	0	0.00%	0	0.00%	0.54%
PN	Pitcairn, Polynesia, Oceania	256	100.00%	0	0.00%	0	0.00%	0.18%
TO	Tonga, Polynesia, Oceania	9728	97.40%	0	0.00%	256	2.60%	7.04%
WS	Samoa, Polynesia, Oceania	17152	81.70%	0	0.00%	3840	18.30%	14.80%
TK	Tokelau, Polynesia, Oceania	1280	55.60%	0	0.00%	1024	44.40%	1.62%
AS	American Samoa, Polynesia, Oceania	3328	17.10%	0	0.00%	16128	82.90%	13.72%
PF	French Polynesia, Polynesia, Oceania	9216	13.00%	0	0.00%	61696	87.00%	50.00%
WF	Wallis and Futuna Islands, Polynesia, Oceania	256	6.70%	0	0.00%	3584	93.30%	2.71%
TV	Tuvalu, Polynesia, Oceania	256	5.90%	0	0.00%	4096	94.10%	3.07%
CK	Cook Islands, Polynesia, Oceania	256	2.90%	0	0.00%	8704	97.10%	6.32%

<https://stats.labs.apnic.net/roa/QS>

ROV Dropping Invalids

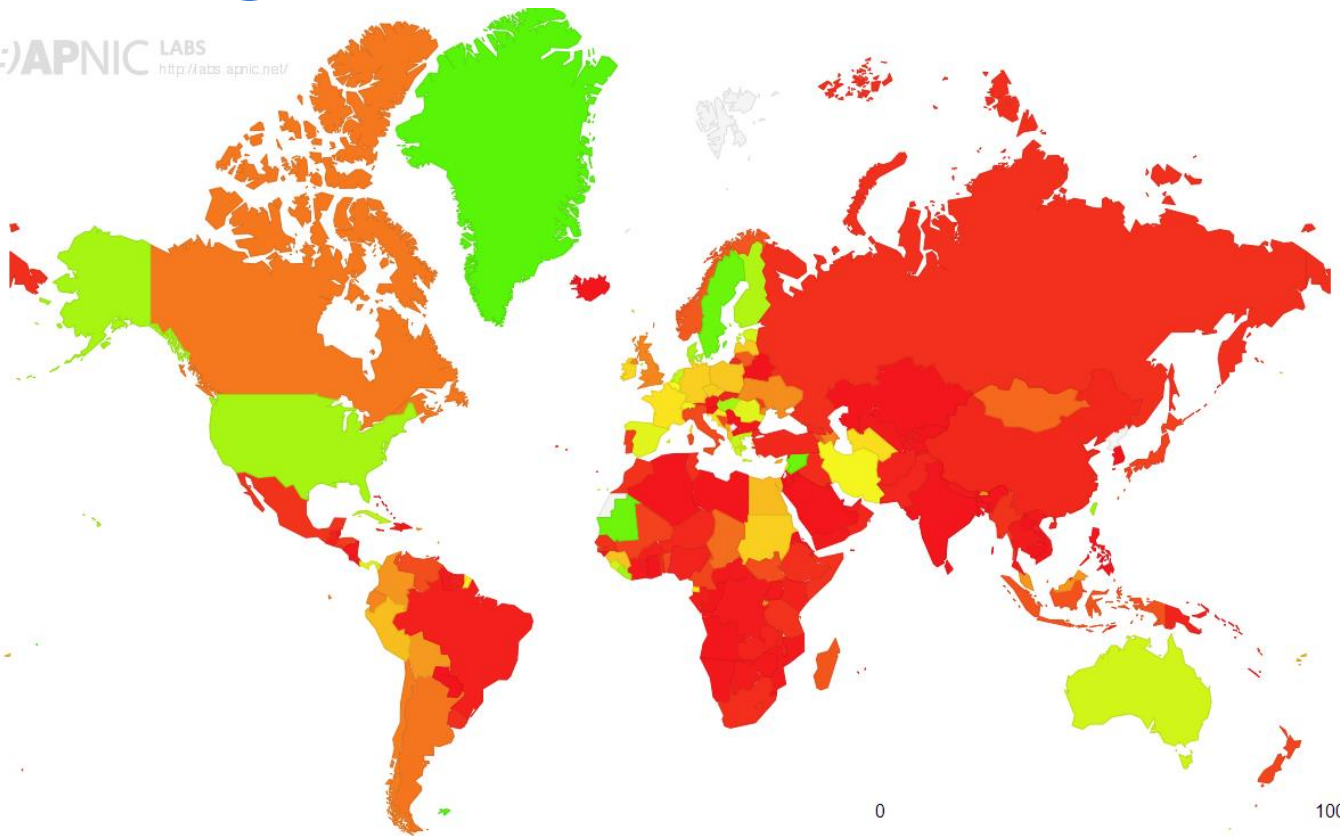
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Route Origin Validation

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Route Origin Validation

- Invalid Drop Rates in Asia are LOW
 - South East Asia – 11%
 - South Asia – 2.8%
 - East Asia – 10.4%



Route Origin Validation

- Oceania are Better - BUT
 - Many Economies benefit from “Fortuitous Validation”
 - My Upstream Validates, therefore I Validate
 - Default route exists
 - Invalids fall through to GWoLR



RPKI – What do I need to do

- ROA
 - Sign your Routes (RIR/NIR Portal)
 - Make sure your ROA's Match your BGP Routing
 - Routeviews.org
 - radar.cloudflare.com
 - Bgp.tools
 -Many other sites

RPKI – What do I need to do

- ROV
 - Full Routing Table
 - Attend some RPKI Training
 - Setup A Validator and start dropping invalid routes
 - Default/Partial Feed
 - Encourage Up-streams to Drop Invalids.

Questions?

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