

ACM IMC '25

ru-RPKI-ready

The Road Left to Full ROA Adoption

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October 30, 2025



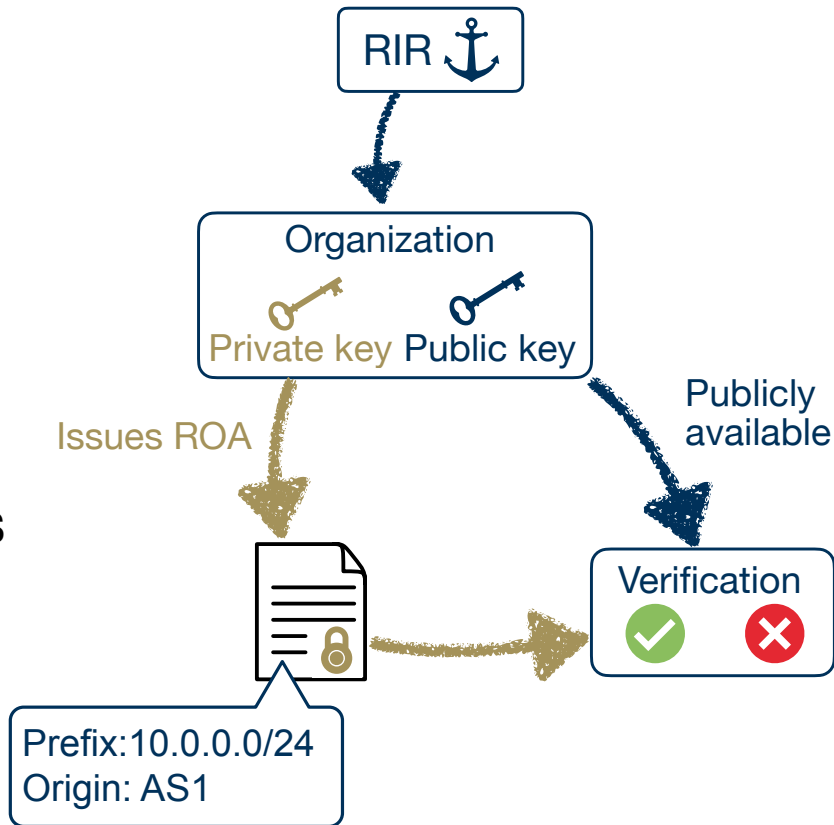
Georgia
Tech



Internet Initiative Japan

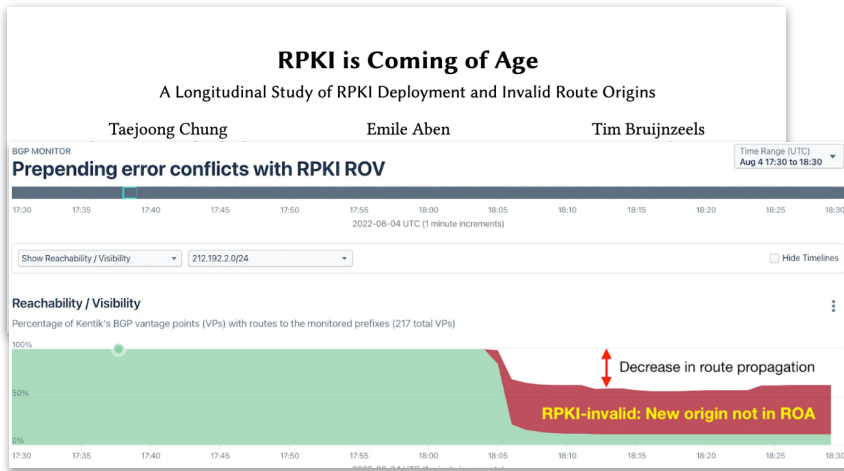
Resource Public Key Infrastructure (RPKI)

- BGP lacks built-in security mechanisms to verify routing announcements
- RPKI provides a cryptographically-verifiable mechanism to validate information in BGP announcements
- Route Origin Authorization certificates (ROAs) are issued by organizations to authorize an AS to originate a prefix in BGP



RPKI Adoption: Benefits

IMC 2019



[1] Kentik

AWS secures internet routing with RPKI plus security checks

by Camden Forgia and Jon Phillibert | on 02 MAY 2025 | in [Networking & Content Delivery](#), [Thought Leadership](#) | [Permalink](#) | [Share](#)

[3] Amazon

Stop, DROP, and ROA: Effectiveness of Defenses through the lens of DROP

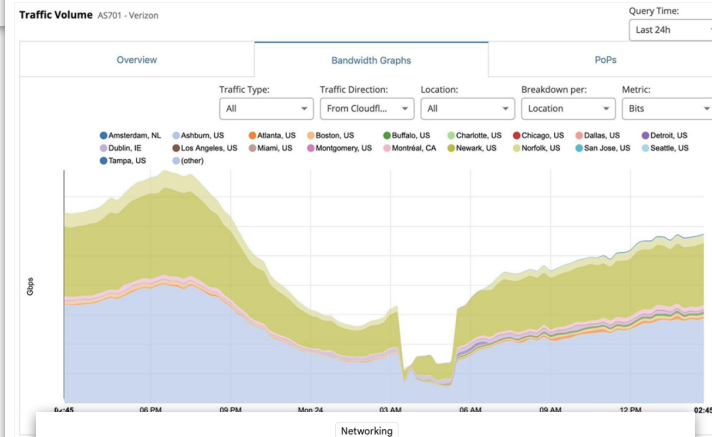
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IMC 2022

Visualizing the Benefits of RPKI



[2] Cisco
Thousandeyes

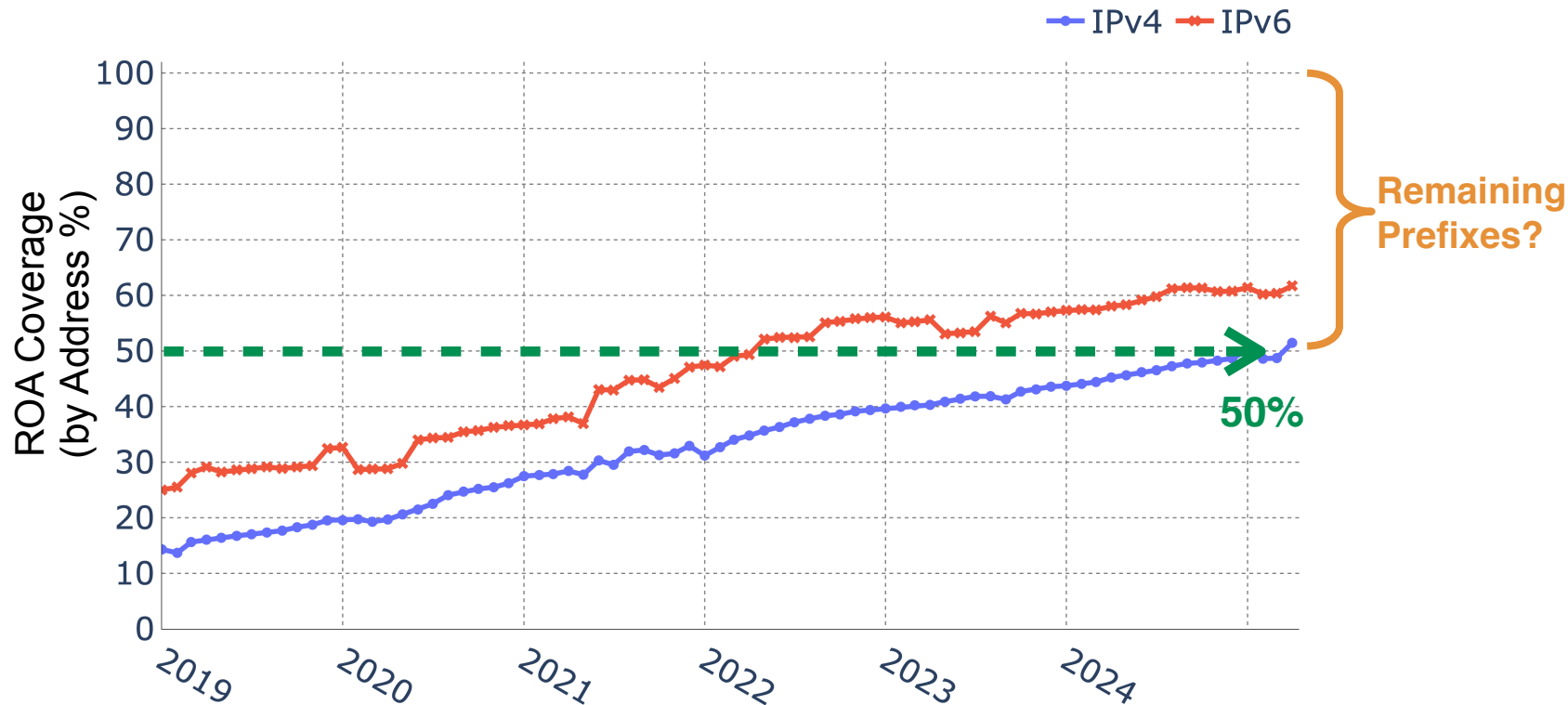
Expanding our commitment to secure Internet routing

December 2, 2020

[4] Google

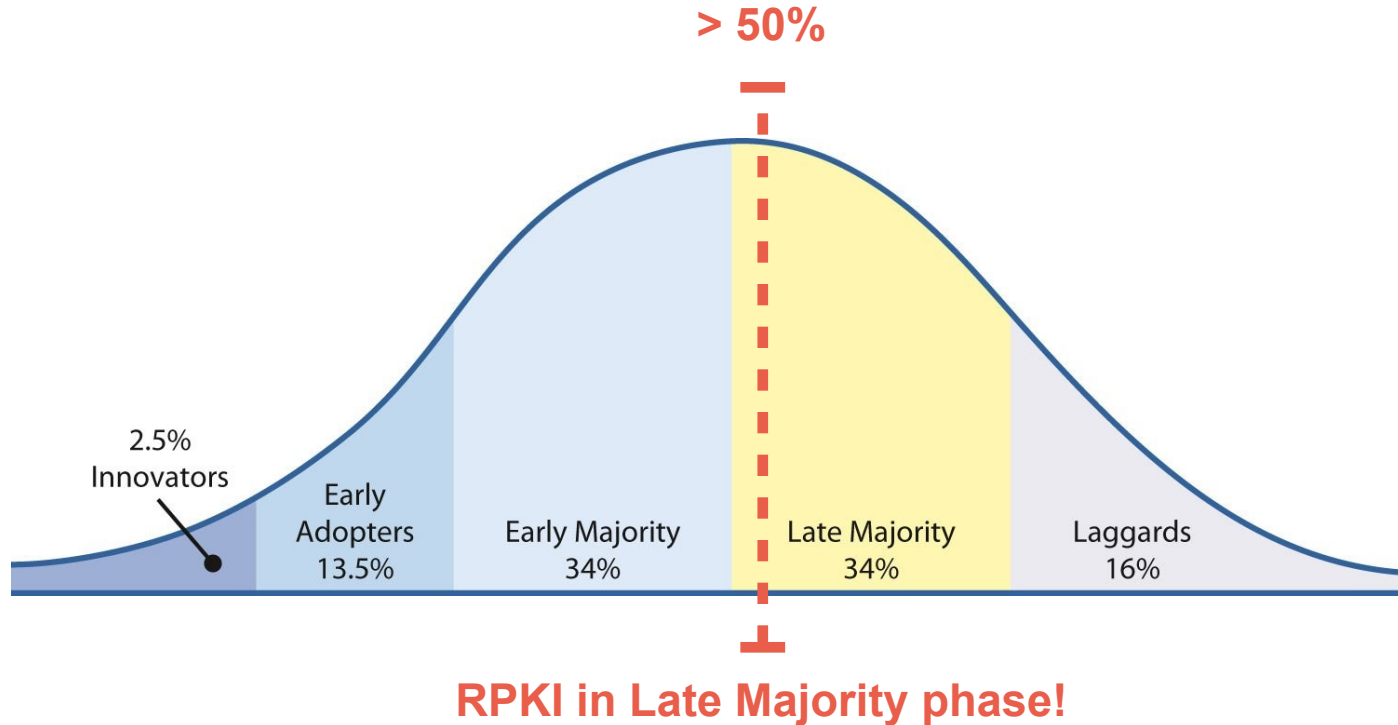
- [1] <https://www.kentik.com/blog/how-much-does-rpki-rov-reduce-the-propagation-of-invalid-routes/>
[2] <https://www.thousandeyes.com/blog/visualizing-the-benefits-of-rpki>
[3] <https://aws.amazon.com/blogs/networking-and-content-delivery/aws-secures-internet-routing-with-rpki-plus-security-checks/>
[4] <https://cloud.google.com/blog/products/networking/how-google-is-working-to-improve-internet-routing-security>

ROA Adoption: Global Trend

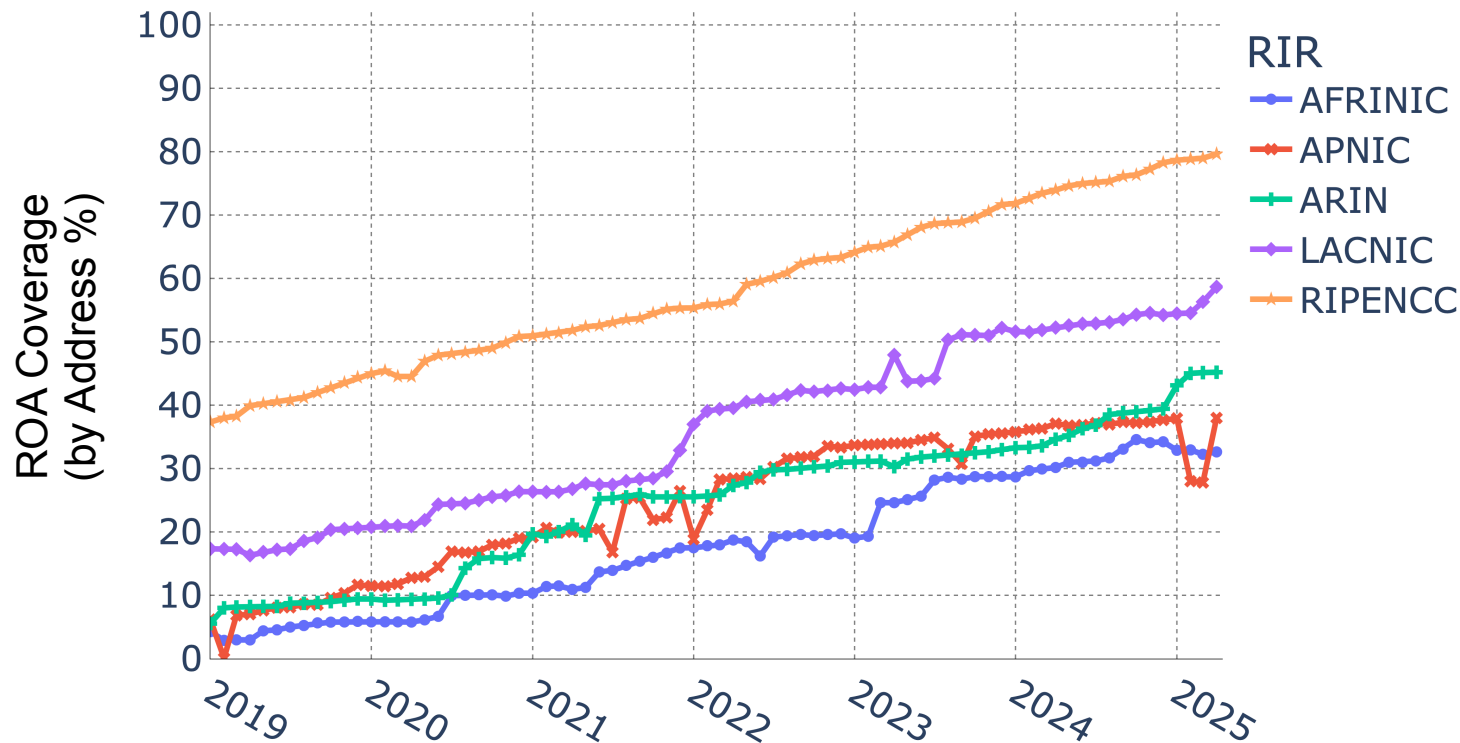


What efforts will be required to cover the remaining 50% of prefixes?

Technology Adoption Process



ROA Adoption: Non-Uniform



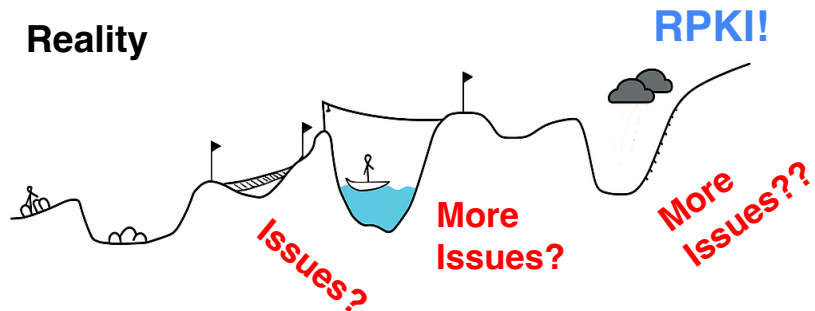
Not everywhere!

RPKI Adoption: A Journey

Expectation



Reality



ROA Planning: Example

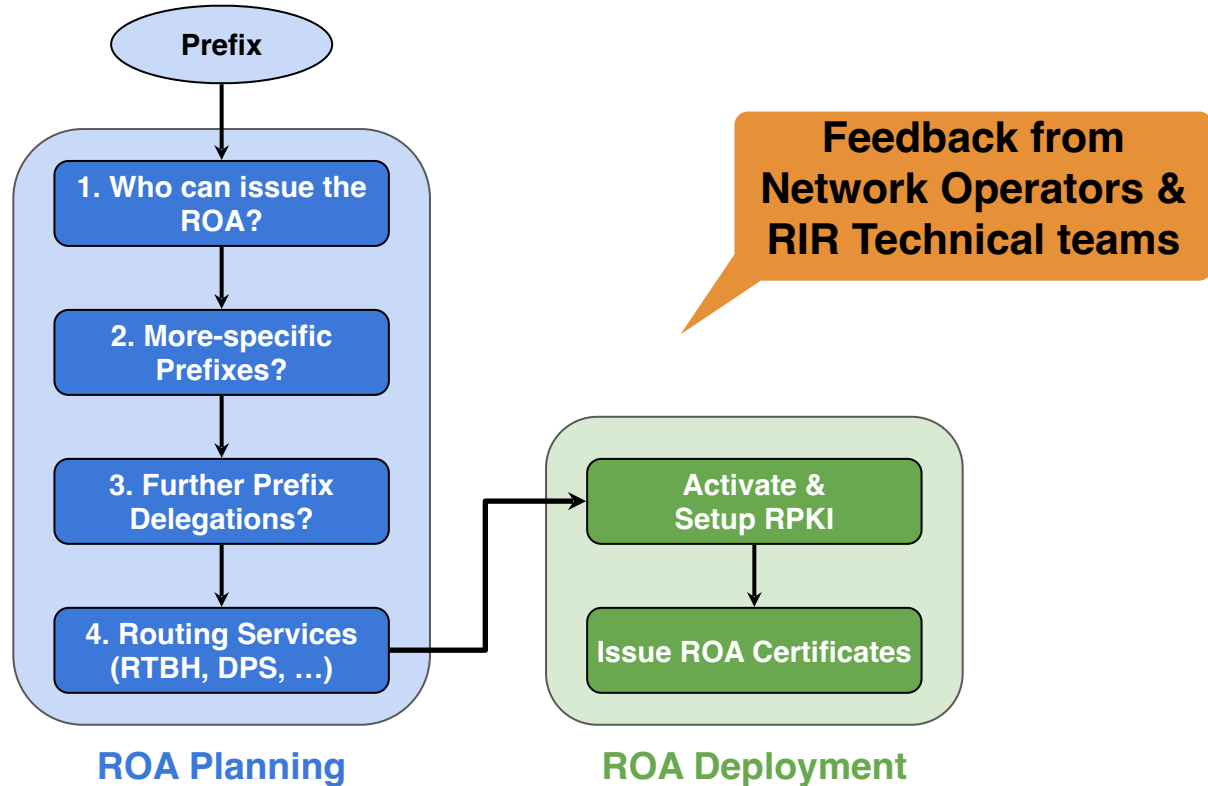
Prefix		Origin ASN
208.186.48.0/20	→	AS21541

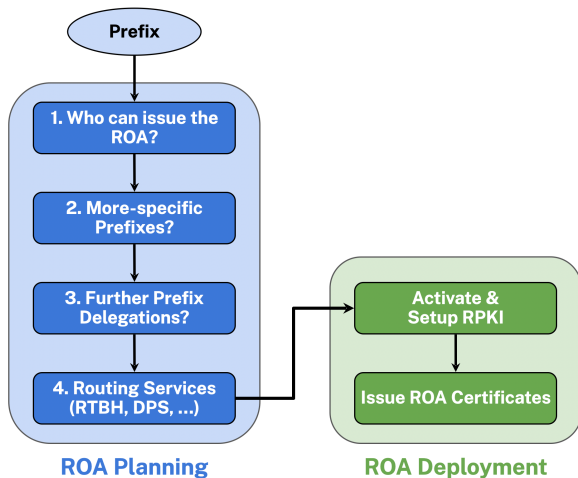
ROA Planning: Example

	Prefix		Origin ASN
① Who can issue the ROA?	208.186.48.0/20	→	AS21541
			Allstream Business US, LLC
② What if more specific prefixes are being routed?	➡ 208.186.56.0/24	→	AS21542
	➡ 208.186.62.0/24	→	AS21543
			3 Origins ASNs ⇒ 3 ROAs!!
③ Customer organizations?			101Netlink

ROA planning can be complex due to multiple factors!

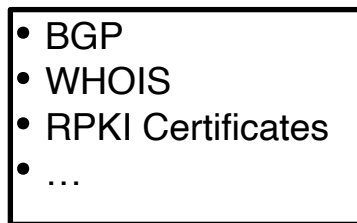
A framework for issuing ROA





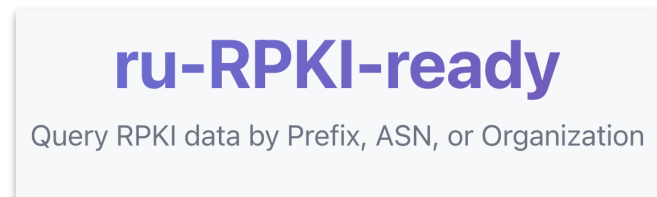
Our Framework

+



Public Data

=



Our Platform

ru-RPKI-ready: Dashboard

ru-RPKI-ready

Query RPKI data by Prefix, ASN, or Organization

Prefix Search

Bulk Search

ASN Search

Organization

Generate ROAs

Search by IP Prefix

208.186.48.0/20

Search

ru-RPKI-ready: Dashboard

ru-RPKI-ready
Query RPKI data by Prefix, ASN, or Organization

Prefix Search Bulk Search ASN Search Organization Generate ROAs

Search by IP Prefix

208.186.48.0/20 Search

Additional Tags!



PREFIX: 208.186.48.0/20

ORIGIN ASN: [AS21541](#)

RPKI ISSUING AUTHORITY: [Allstream Business US, LLC](#)

CUSTOMER ORGANIZATION: 101Netlink

CUSTOMER ALLOCATION TYPE: REALLOCATION

ROUTED SUB-PREFIXES:
['208.186.48.0/24', '208.186.56.0/24', '208.186.57.0/24',
'208.186.58.0/24', '208.186.60.0/24', '208.186.62.0/24']

ALLOCATION STATUS: ALLOCATION

RPKI CERTIFICATE:
46:CD:B7:E7:87:A9:20:32:5B:E6:E3:AA:56:58:59:CC:00:57:84:F2

TAGS: ROA Not Found | Certified | Reassigned | Diff SKI
Prefix,ASN | Covering | Frag-Ext | ROA Org | Large Org | (L)RSA

ru-RPKI-ready: Dashboard

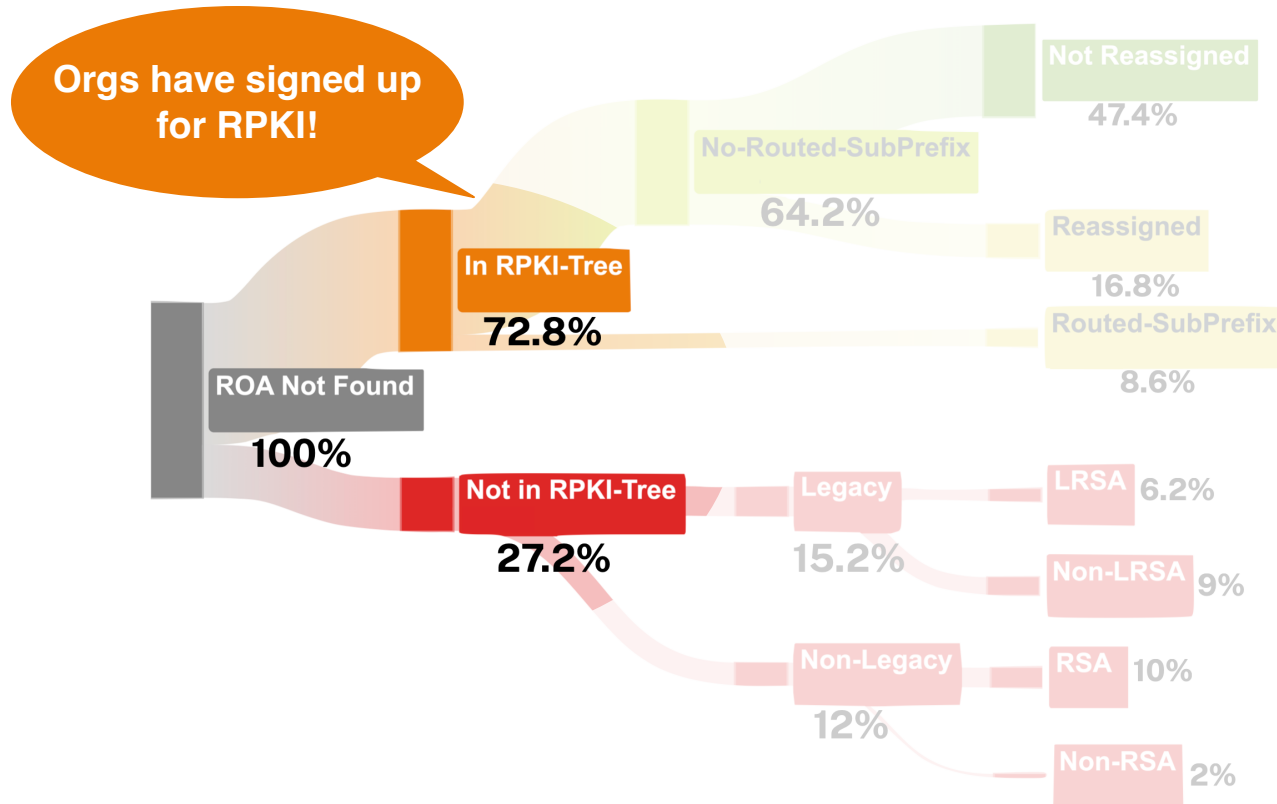
ROA Issuance Process (7 total)

How many ROAs?

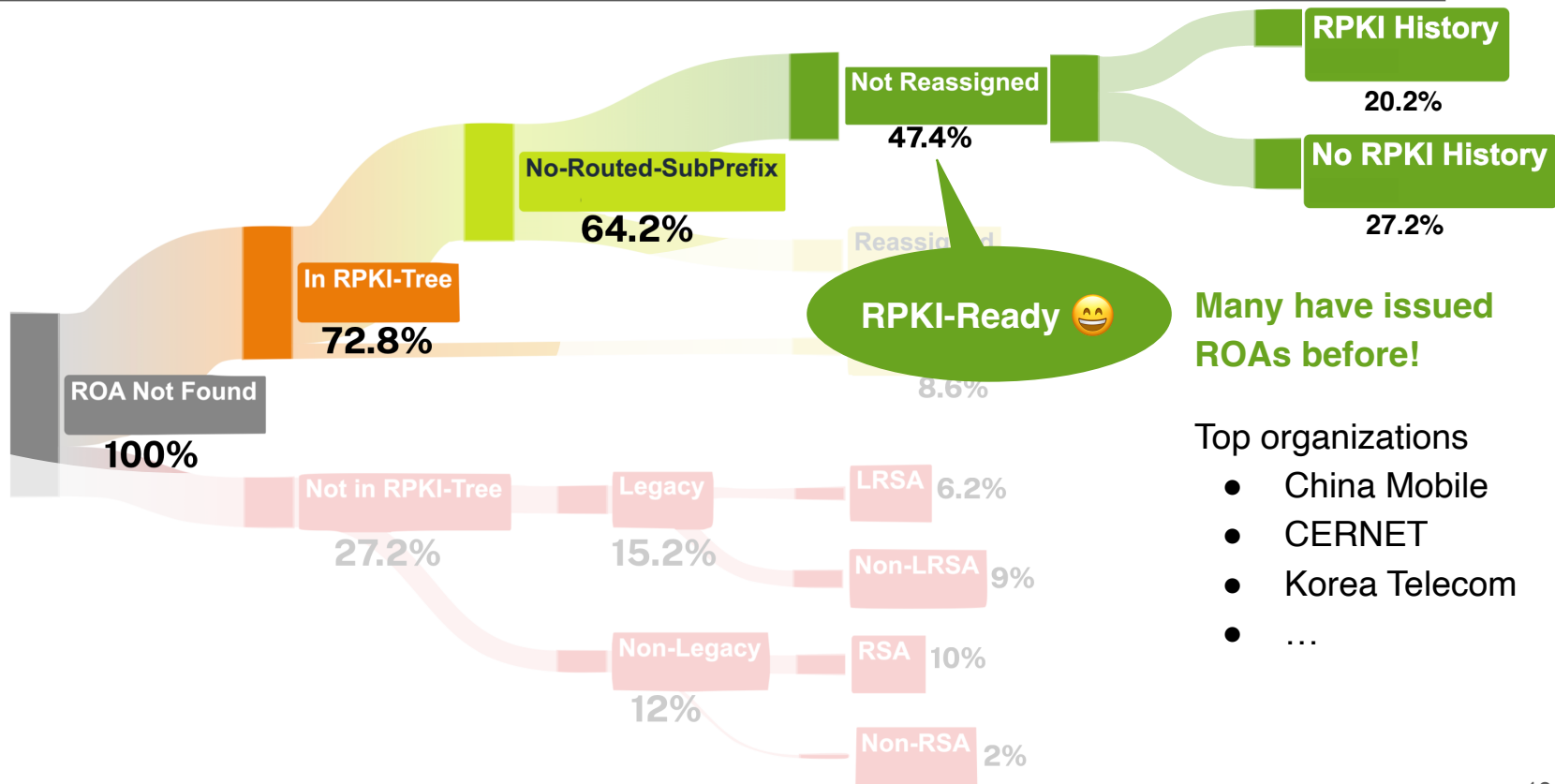
PREFIX	ORIGIN ASN	MAX LENGTH
208.186.48.0/24	AS21541	24
208.186.56.0/24	AS21541	24
208.186.57.0/24	AS21541	24
208.186.58.0/24	AS21541	24
208.186.60.0/24	AS21541	24
208.186.62.0/24	AS21541	24
208.186.48.0/20	AS21541	20

Characterization of Prefixes without ROAs

Breakdown of Prefixes without ROAs



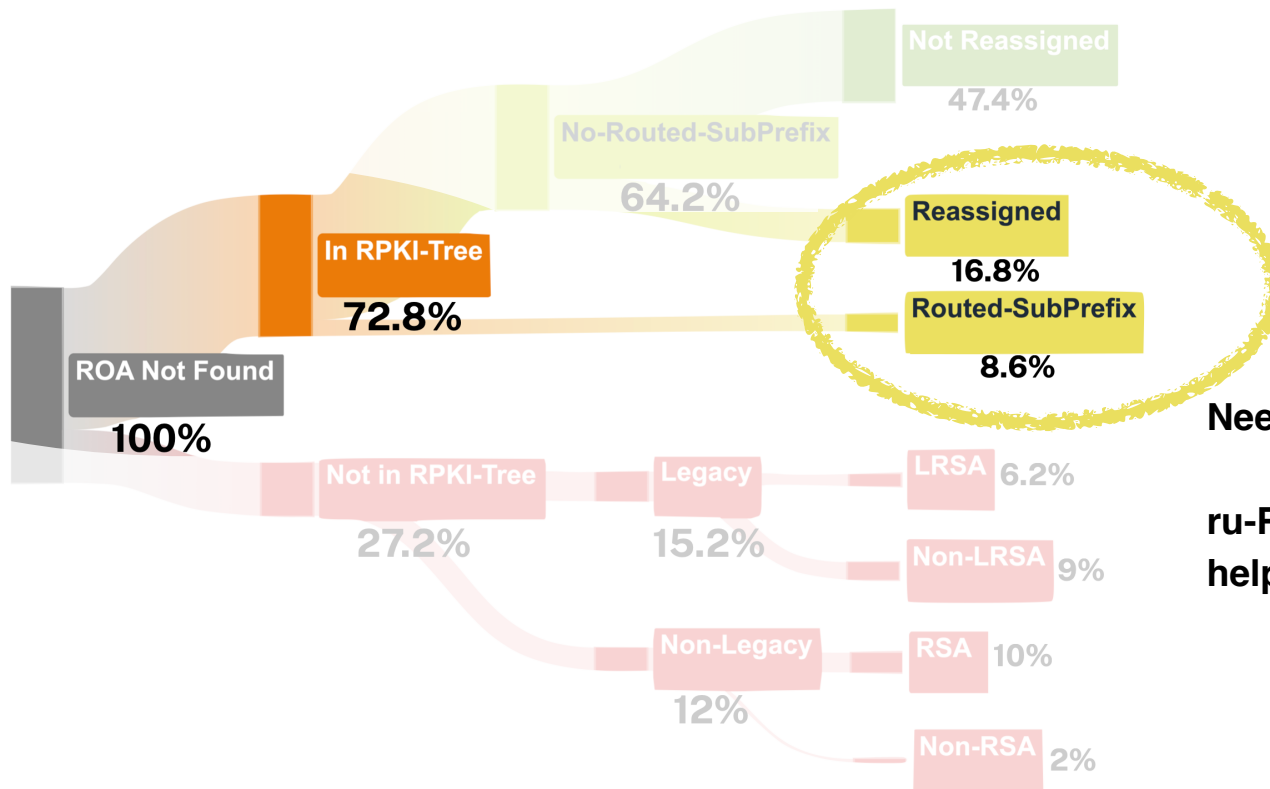
Breakdown of Prefixes without ROAs



Top organizations

- China Mobile
- CERNET
- Korea Telecom
- ...

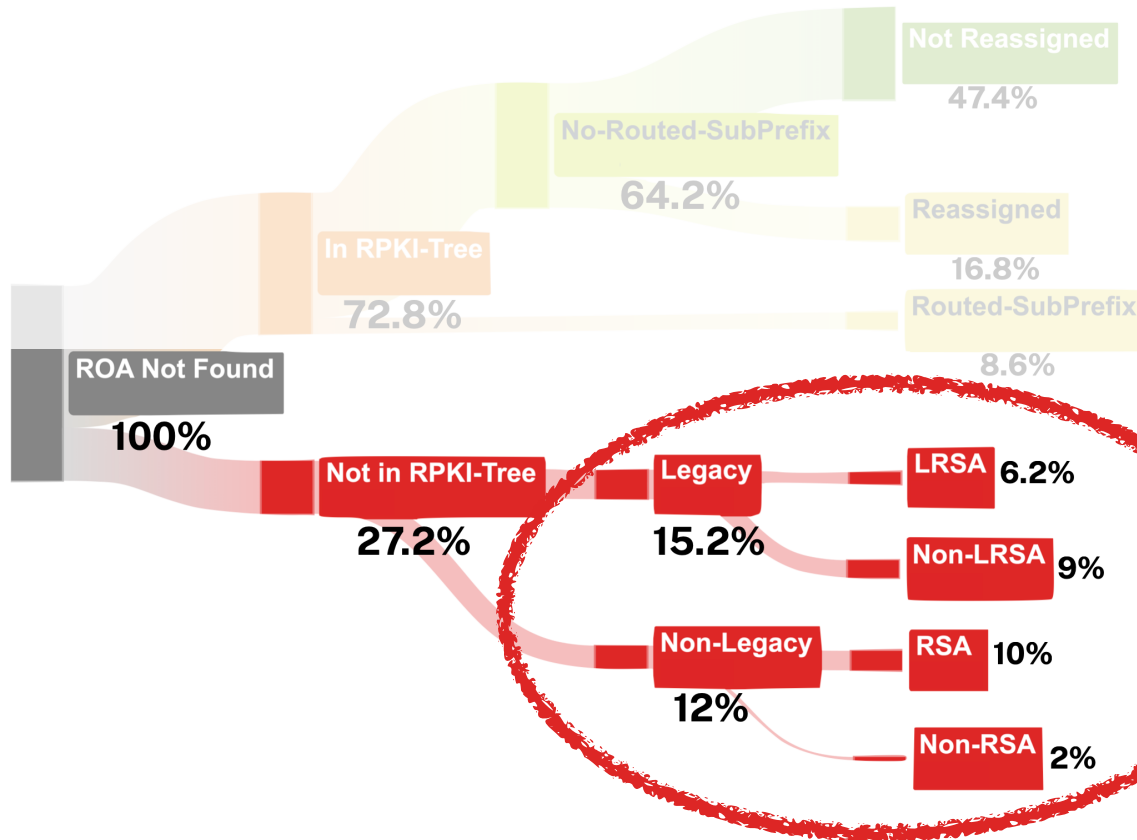
Breakdown of Prefixes without ROAs



Needs careful planning

ru-RPKI-ready can help!

Breakdown of Prefixes without ROAs



Not so easy 😞

Major US federal institutions

- DoD NIC
- USAIC
- USDA
- Air Force Systems

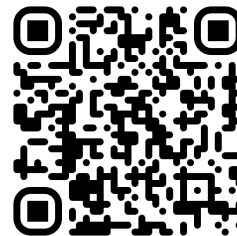
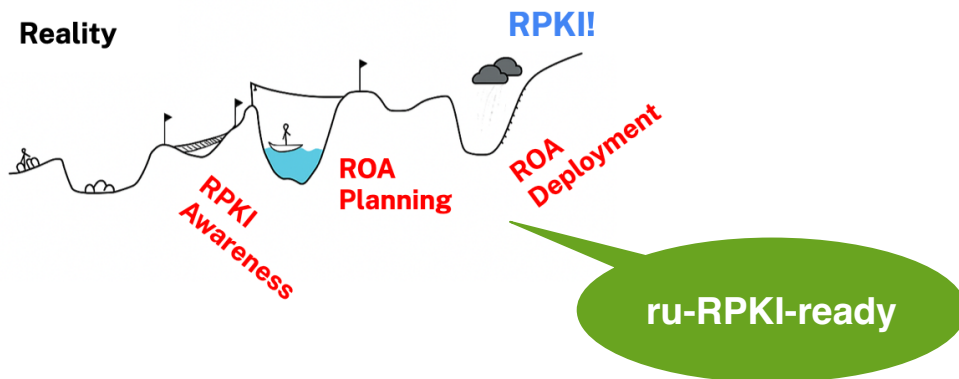
Key Takeaways

- ROA coverage for the next 50% prefixes will face more challenges
- Non-technical aspects impact the ROA adoption percentage
- Growth of ROA coverage needs continued support and training

Expectation



Reality





Questions!

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