

ACM IMC '25

ru-RPKI-ready

The Road Left to Full ROA Adoption

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October 30, 2025



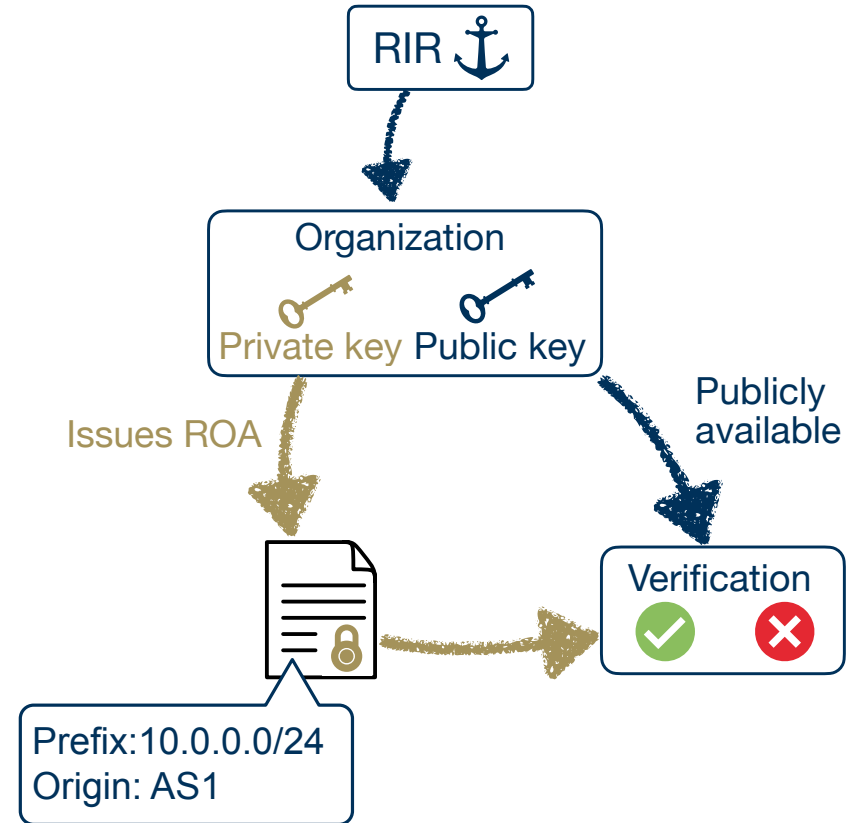
Georgia
Tech



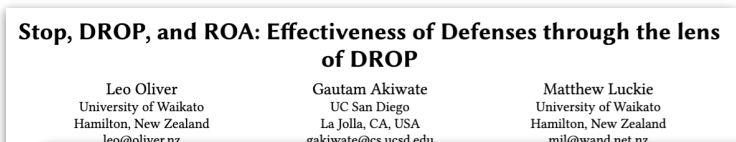
Internet Initiative Japan

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



of DROP IMC 2022



IMC 2022

Traffic Volume AS701 - Verizon

Query Time: Last 24h

Overview **Bandwidth Graphs** PoPs

Traffic Type: All Traffic Direction: From Cloudfl... Location: All Breakdown per: Location Metric: Bits

● Amsterdam, NL ● Ashburn, US ● Atlanta, US ● Boston, US ● Buffalo, US ● Charlotte, US ● Chicago, US ● Dallas, US ● Detroit, US
 ● Dublin, IE ● Los Angeles, US ● Miami, US ● Montgomery, US ● Montréal, CA ● Newark, US ● Norfolk, US ● San Jose, US ● Seattle, US
 ● Tampa, US ● (other)

Y-axis: Gbps

X-axis: 06:45 08:00 PM 09:00 PM Nov 04 01:00 AM 06:00 AM 09:00 AM 12:00 PM 02:45

Networking

[2] Cisco Thousandeyes

AWS secures internet routing with RPKI plus security checks

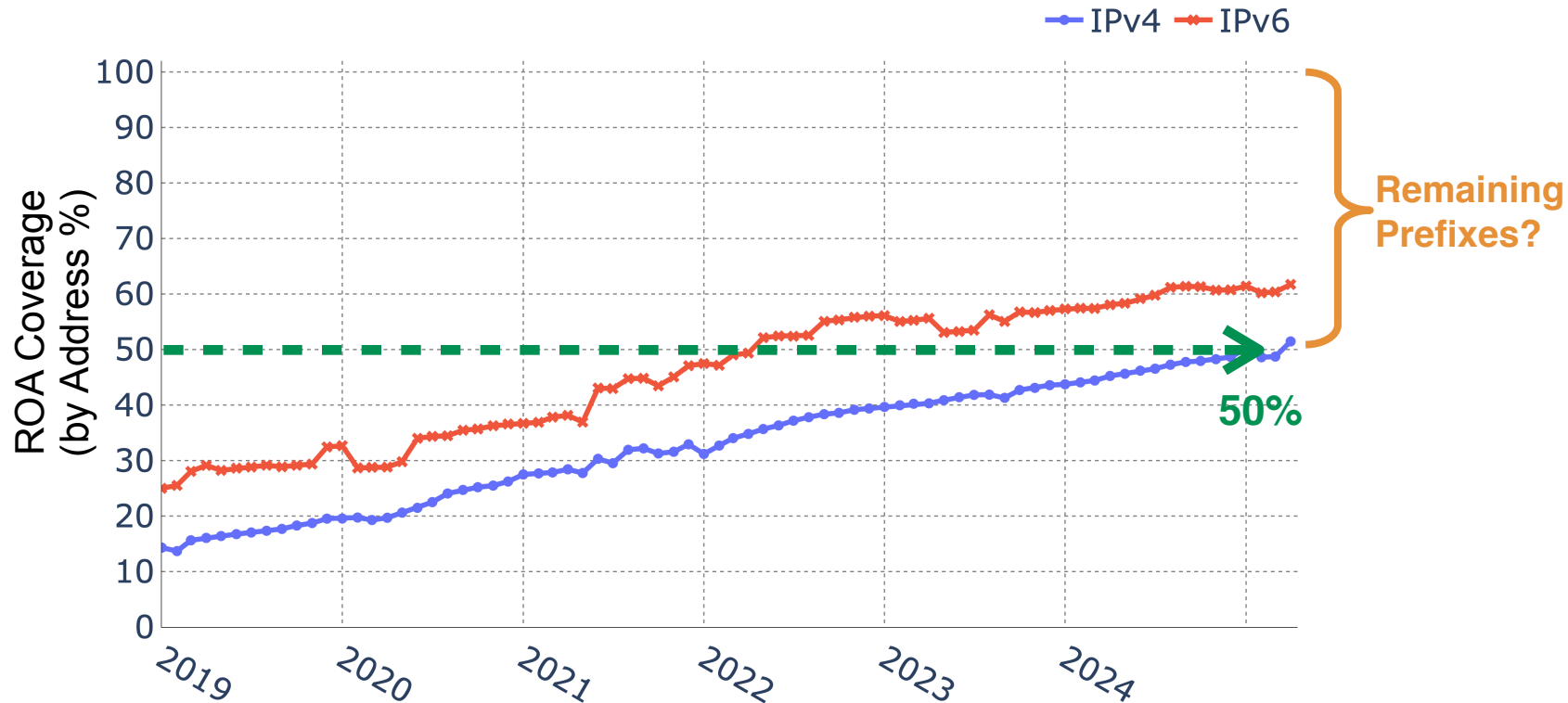
[3] Amazon

Expanding our commitment to secure Internet routing

[4] Google

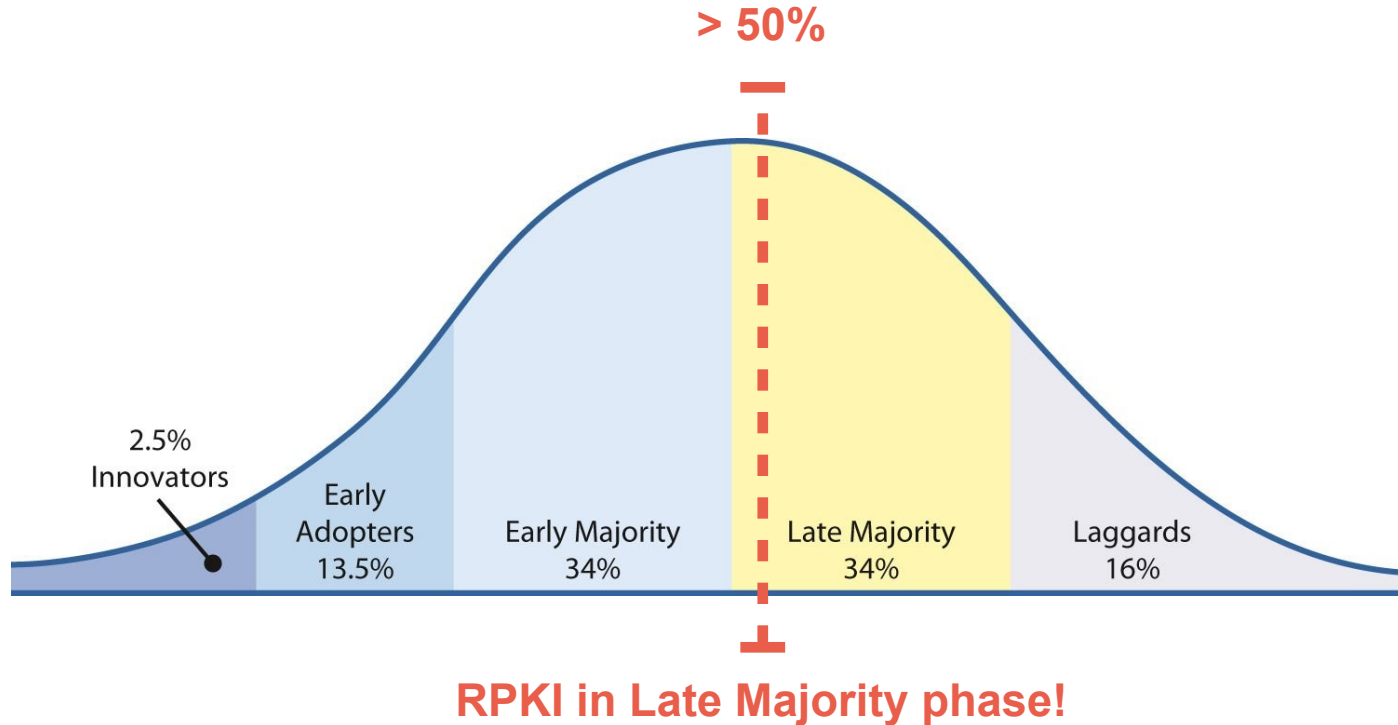
- 3

ROA Adoption: Global Trend

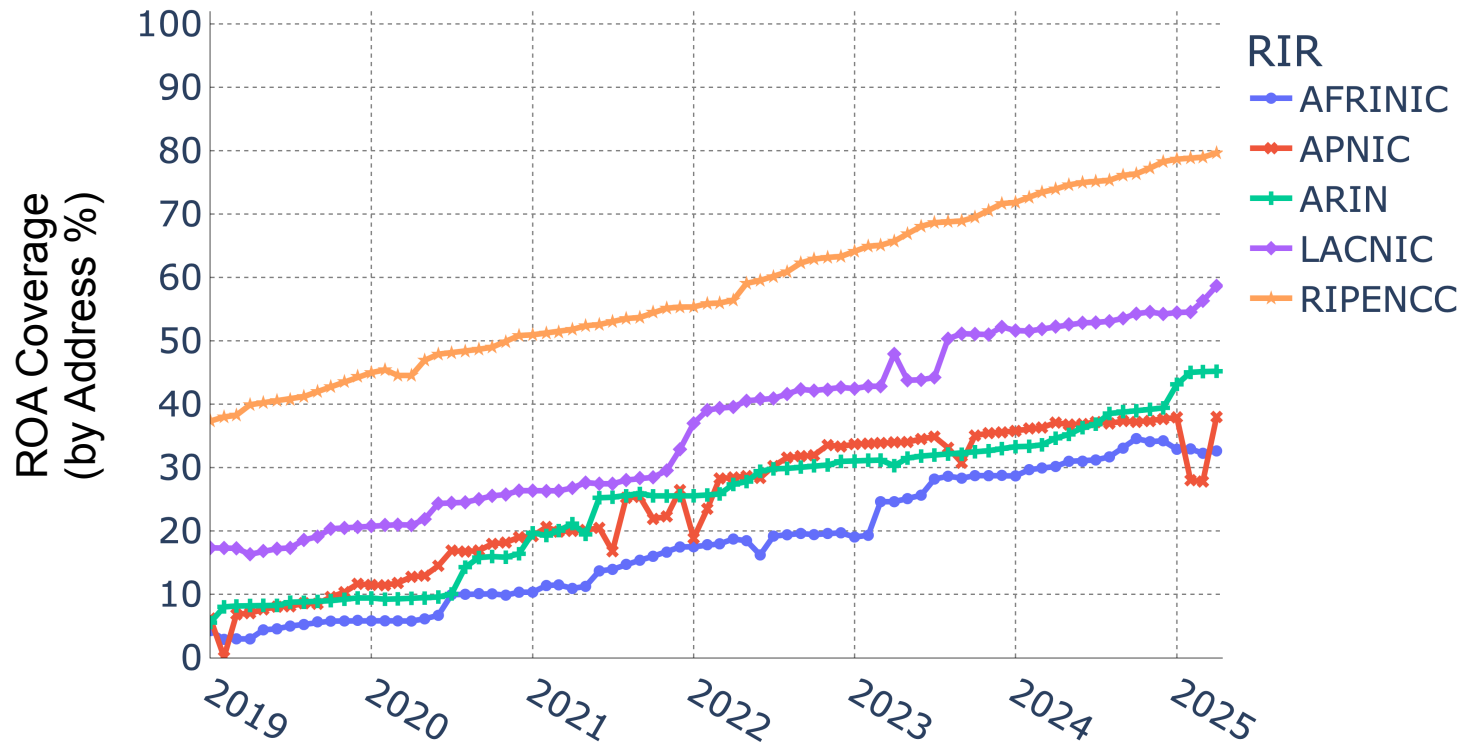


What efforts will be required to cover the remaining 50% of prefixes?

Technology Adoption Process



ROA Adoption: Non-Uniform



Not everywhere!

RPKI Adoption: A Journey

Expectation



RPKI!

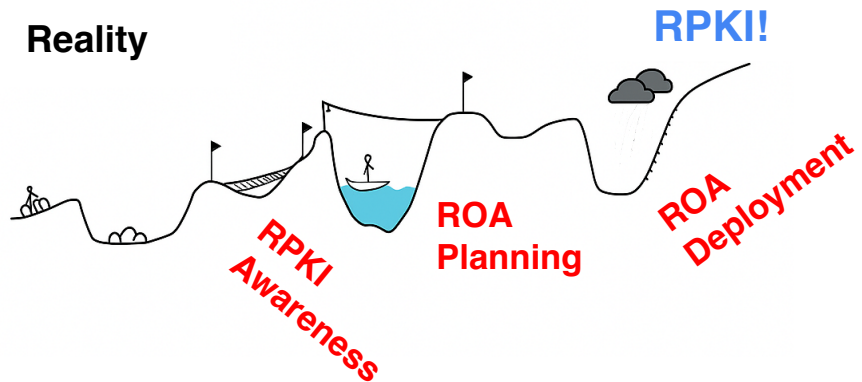


RPKI Adoption: A Journey

Expectation



Reality



ROA Planning: Example

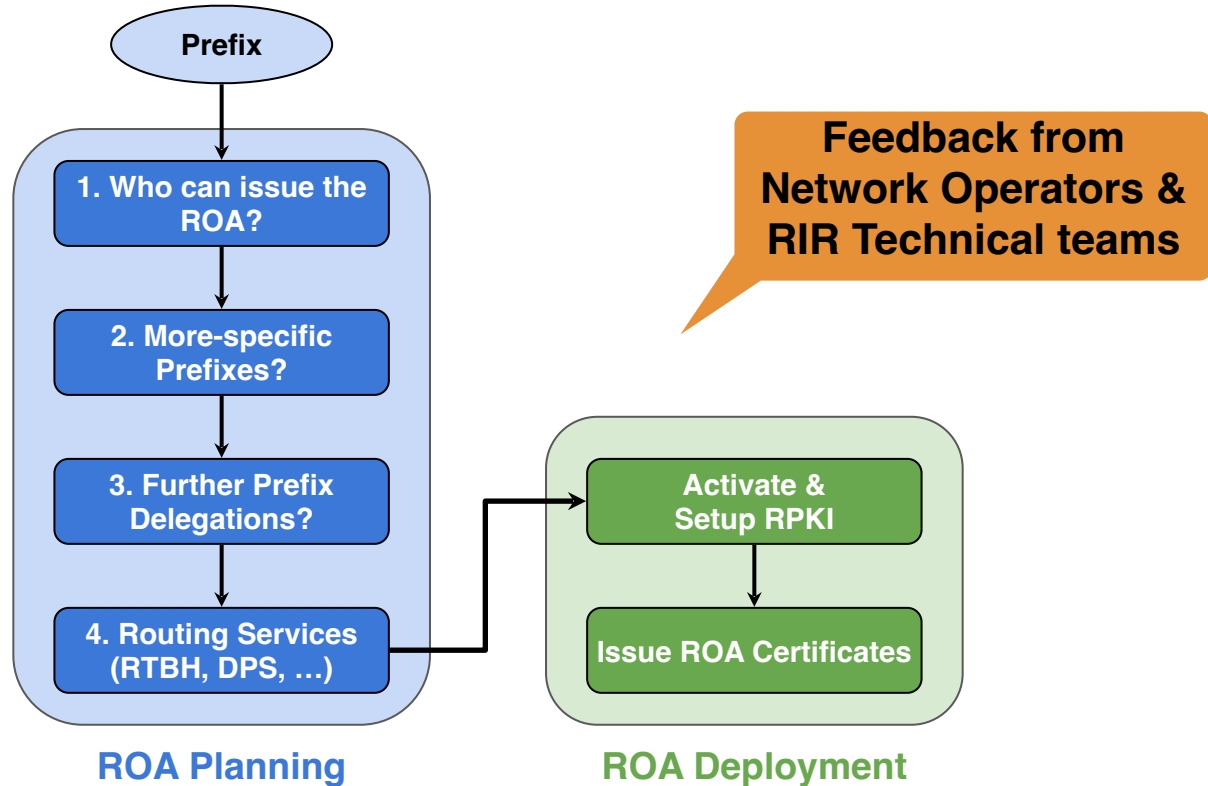
Prefix		Origin ASN
208.186.48.0/18	→	AS21541

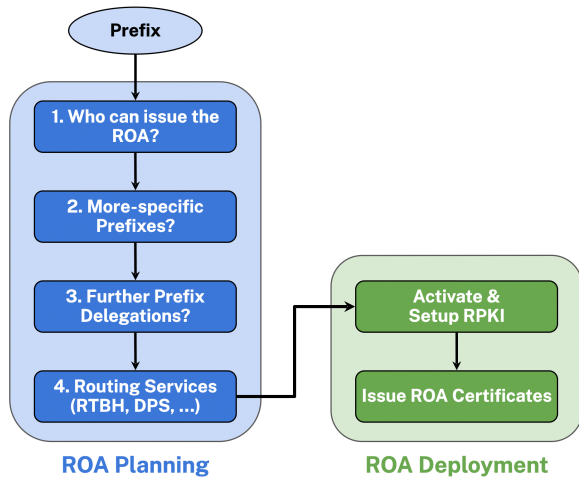
ROA Planning: Example

	Prefix		Origin ASN
① Who can issue the ROA?	208.186.48.0/18	→	AS21541
			Allstream Business US, LLC
② Are more specific prefixes being routed?	➡ 208.186.56.0/24	→	AS21542
	➡ 208.186.62.0/24	→	AS21543
			3 Origins ASNs ⇒ 3 ROAs!!
③ Are there customer organizations?			101Netlink

ROA planning can be complex due to multiple factors!

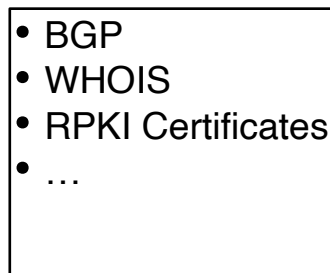
A framework for issuing ROA





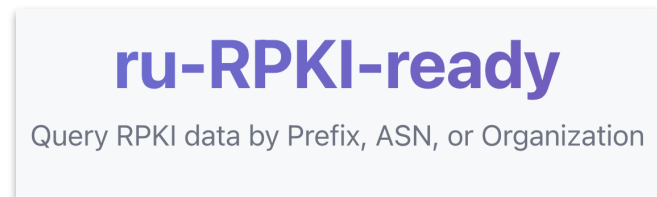
Our Framework

+



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?

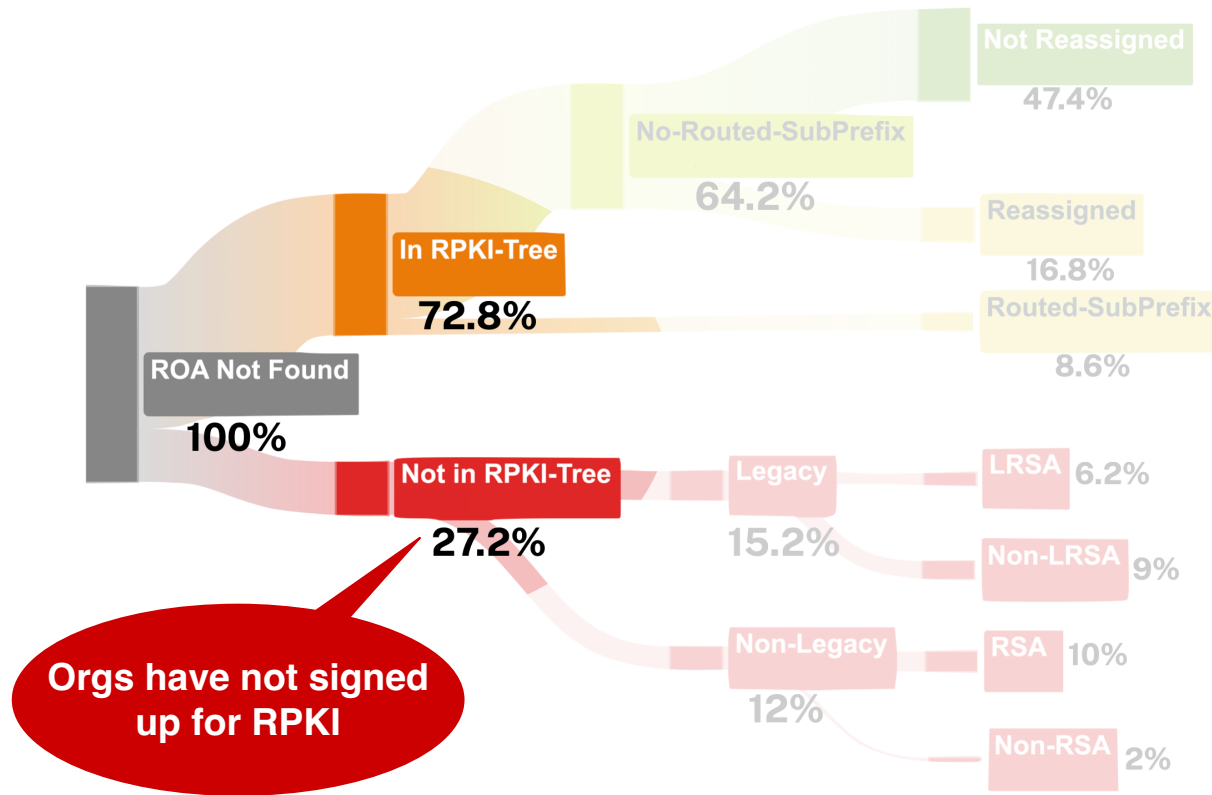
PREFIX	ORIGIN ASN	MAX LENGTH
208.186.48.0/24	AS21541	24
208.186.56.0/24	AS21541	24
208.186.57.0/24	AS21541	24
208.186.58.0/24	AS21541	24
208.186.60.0/24	AS21541	24
208.186.62.0/24	AS21541	24
208.186.48.0/20	AS21541	20



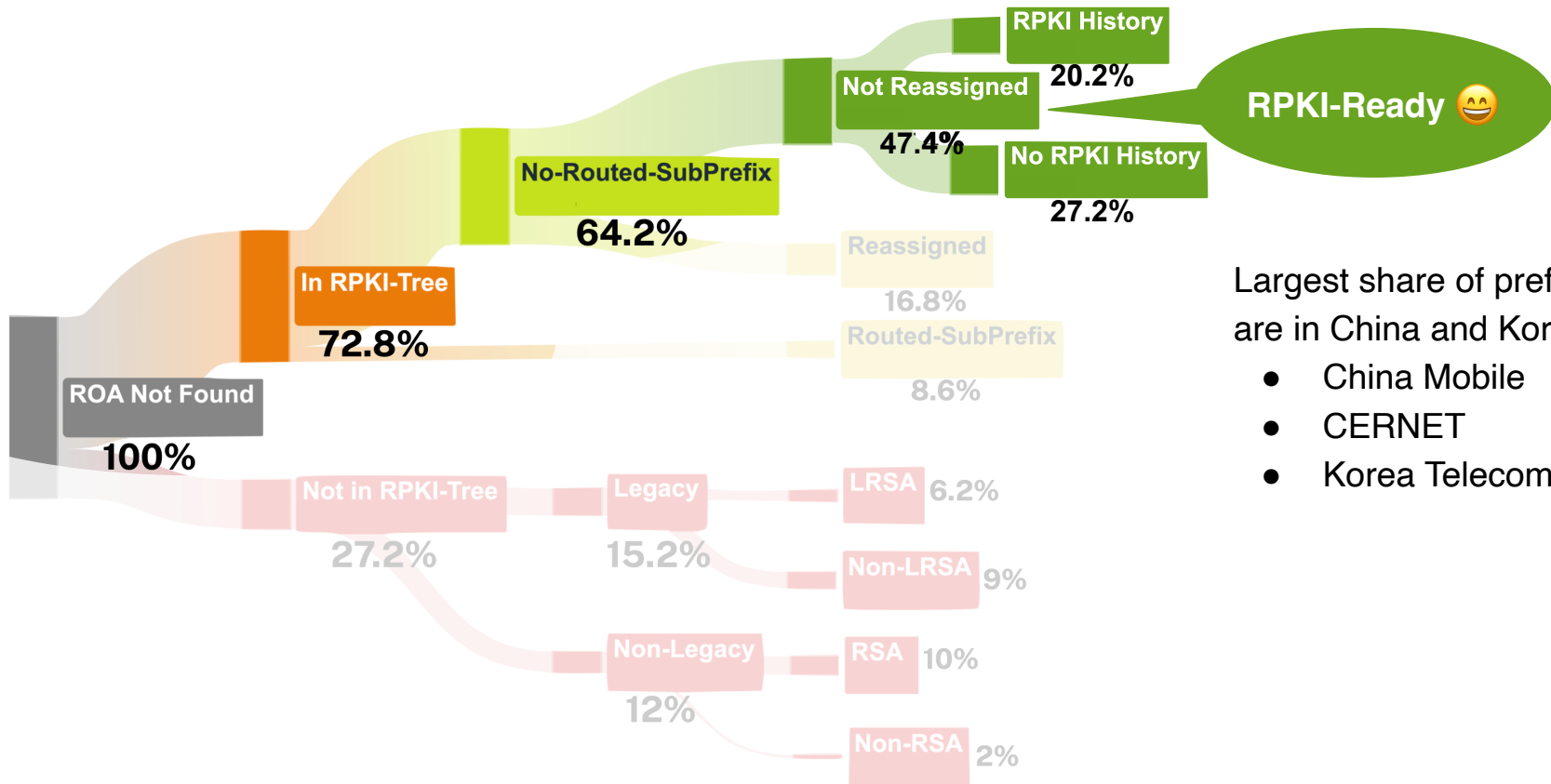
ROA Creation Order!

Characterization of Prefixes without ROAs

Breakdown of Prefixes without ROAs



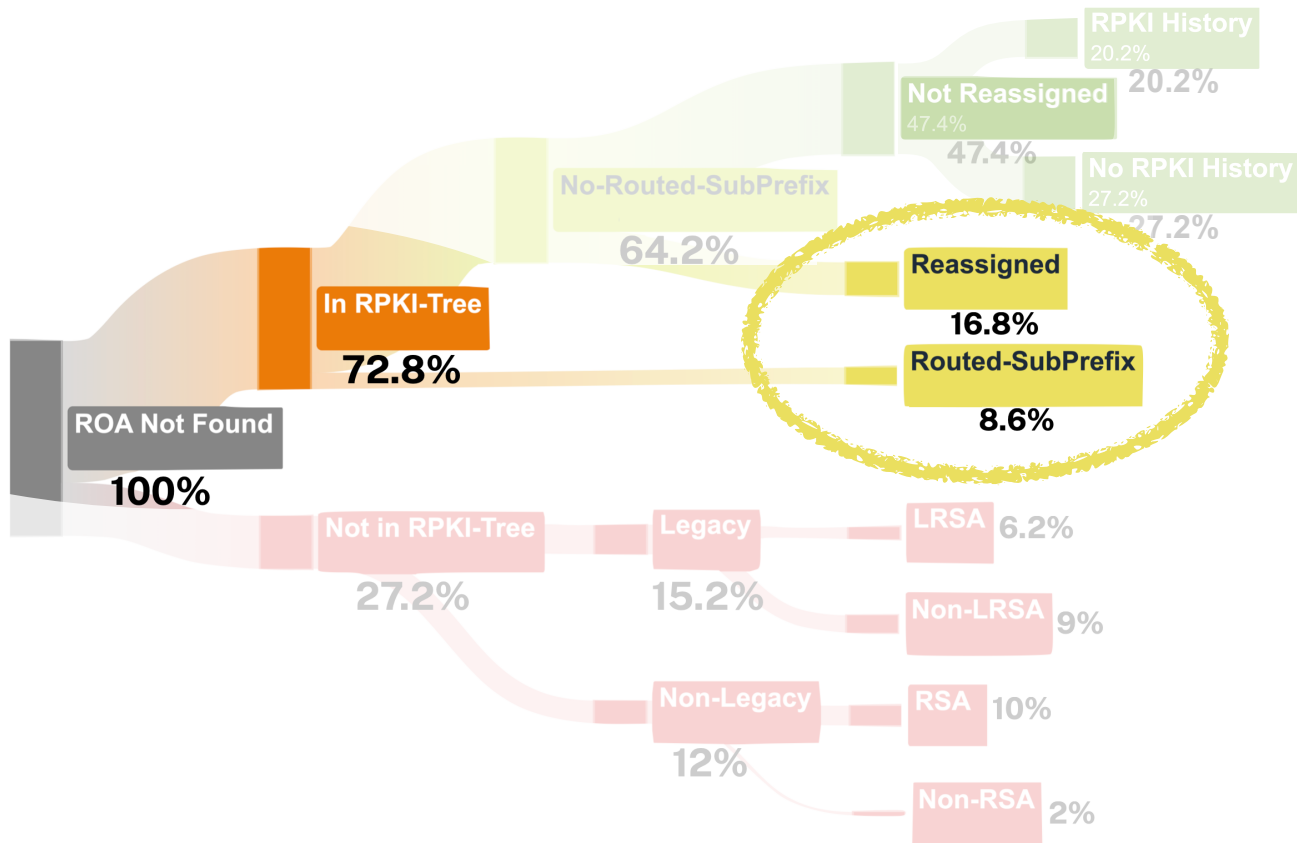
Breakdown of Prefixes without ROAs



Largest share of prefixes are in China and Korea:

- China Mobile
- CERNET
- Korea Telecom

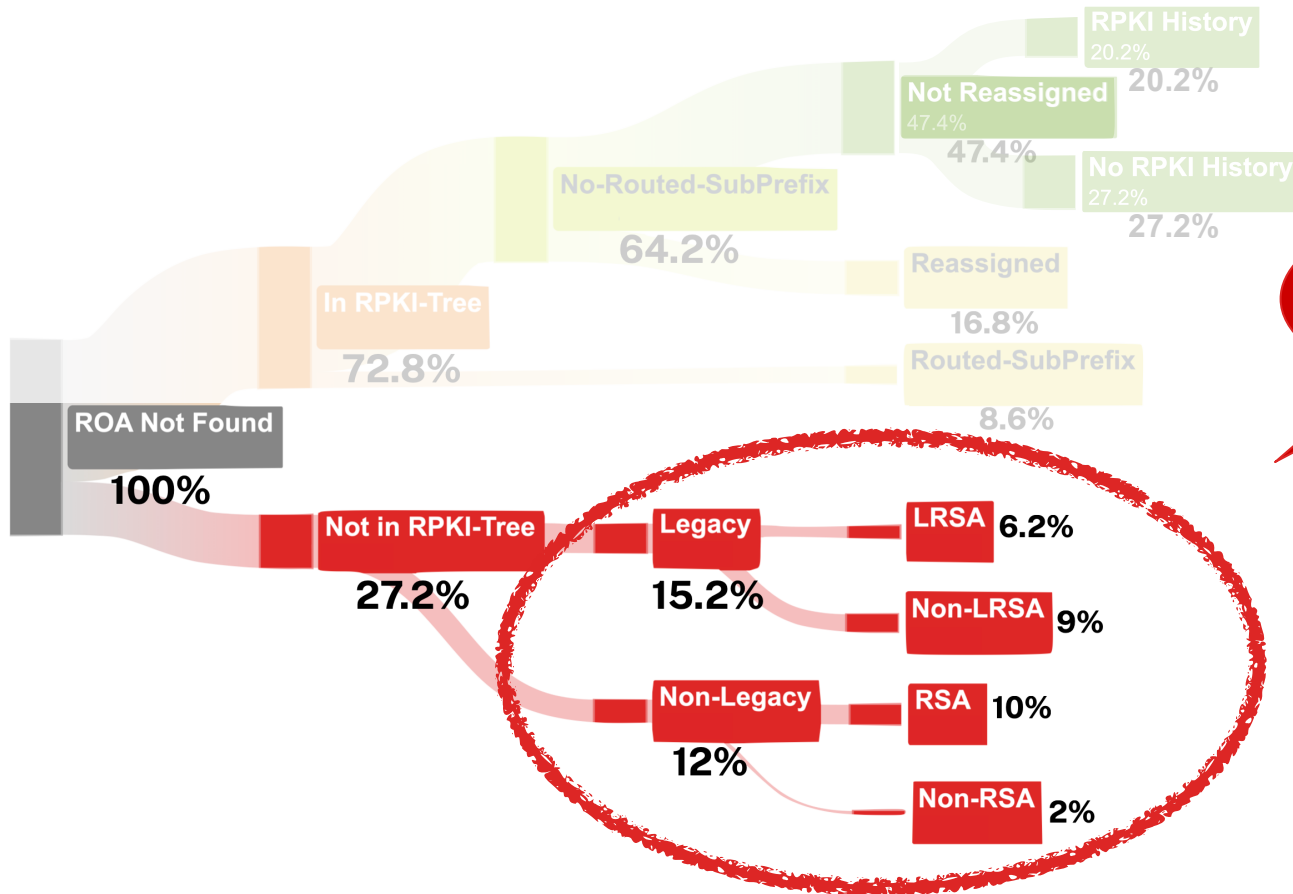
Breakdown of Prefixes without ROAs



Needs careful planning

ru-RPKI-ready can help!

Breakdown of Prefixes without ROAs



Not so easy 😞

Major US federal institutions

- DoD NIC
- USAIC
- Air Force Systems

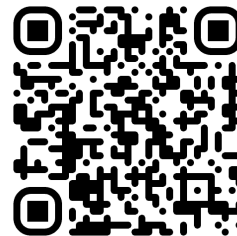
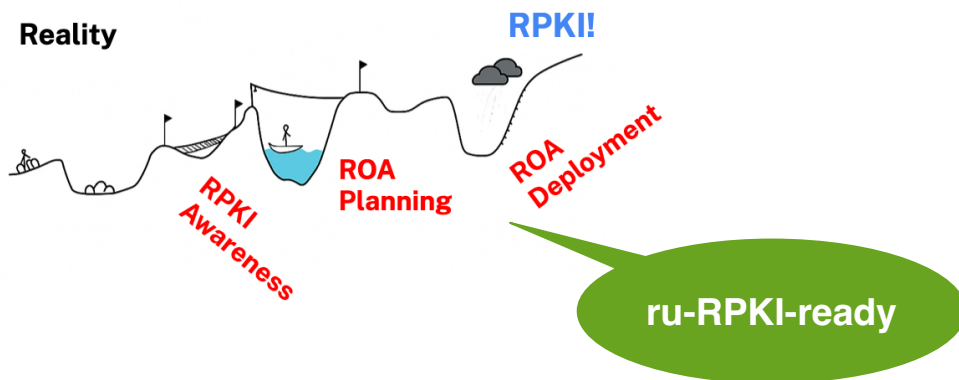
Key Takeaways

- Adoption of next 50% will face more challenges
- Non-technical aspects heavily impact the ROA adoption percentage
- RPKI needs to have continued support and training to overcome the barriers

Expectation



Reality





Questions!

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