

ACM IMC '25

# ru-RPKI-ready

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## The Road Left to Full ROA Adoption

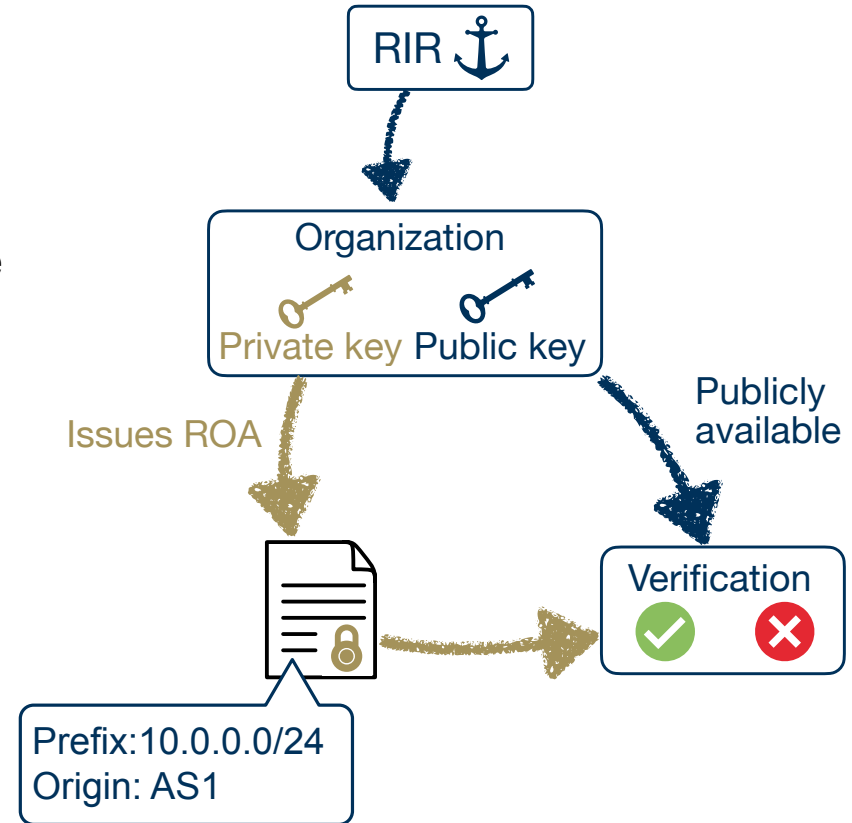
**Deepak Gouda**, Romain Fontugne, Cecilia Testart

October 30, 2025



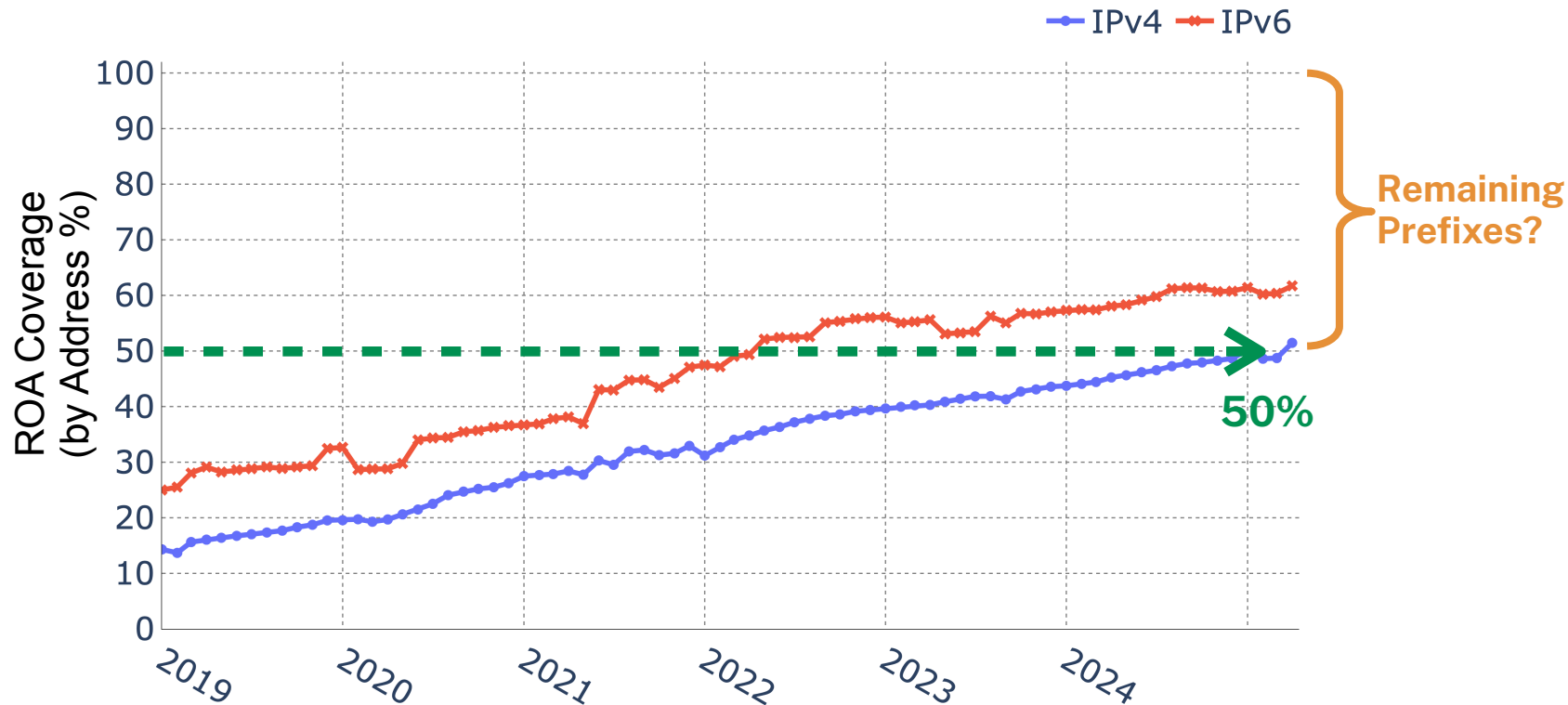
# Resource Public Key Infrastructure (RPKI)

- 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





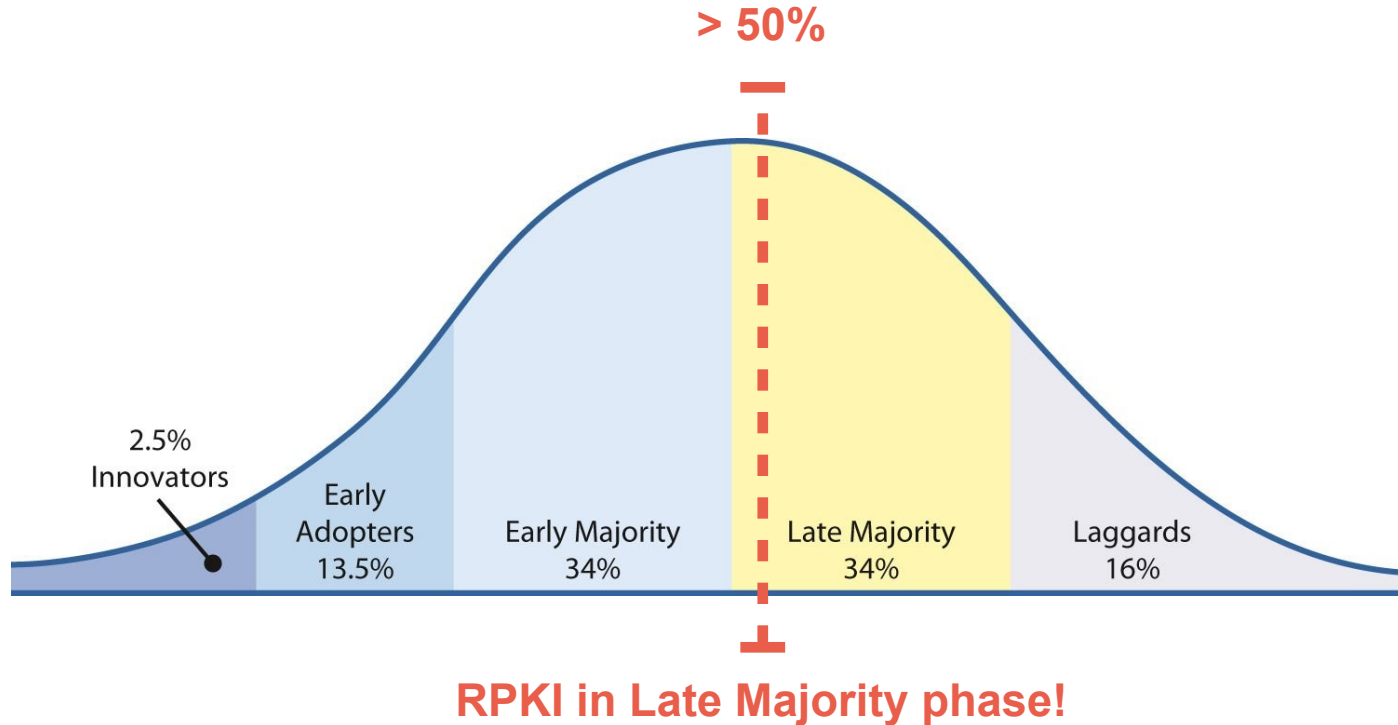
# ROA Adoption: Global Trend



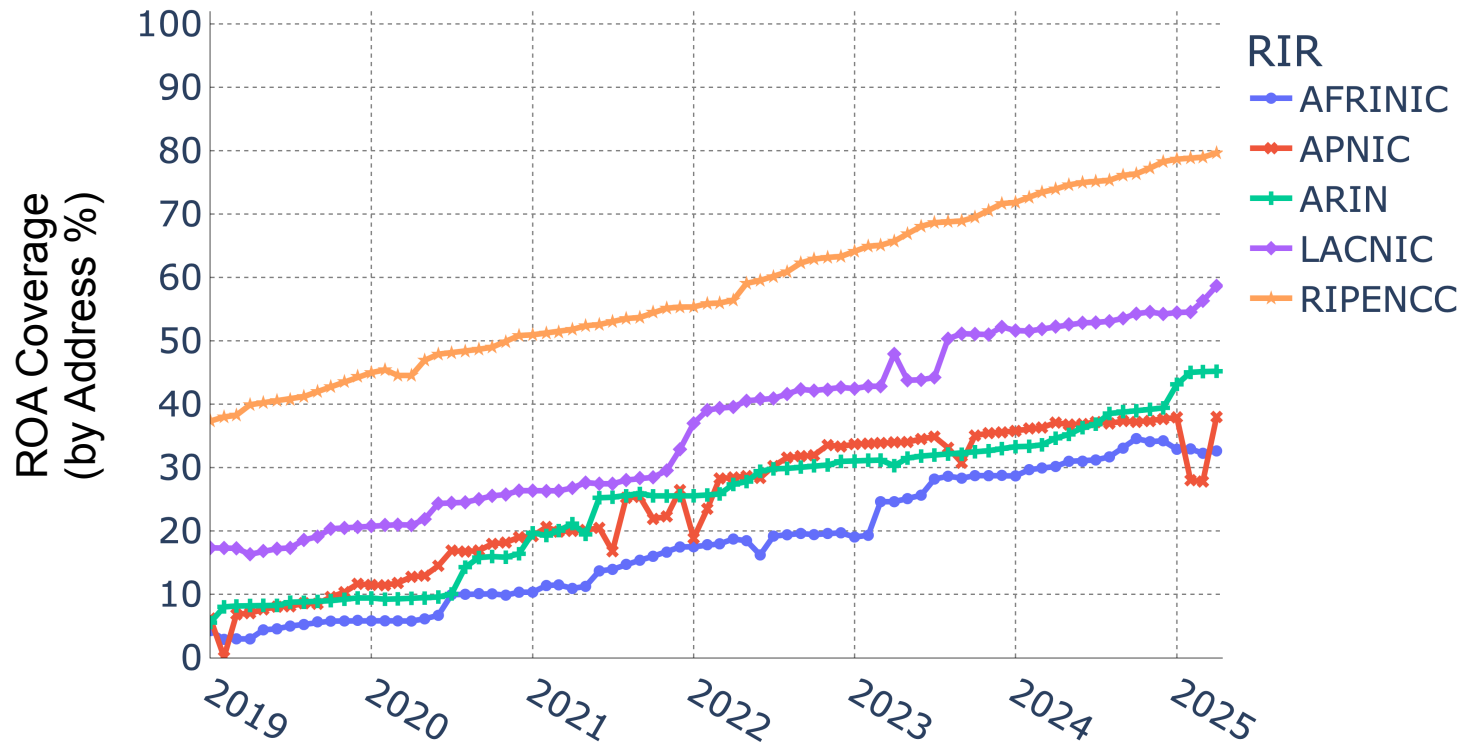
What efforts will be required to cover the remaining 50% of prefixes?

# Technology Adoption Process

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# ROA Adoption: Non-Uniform



**Not everywhere!**

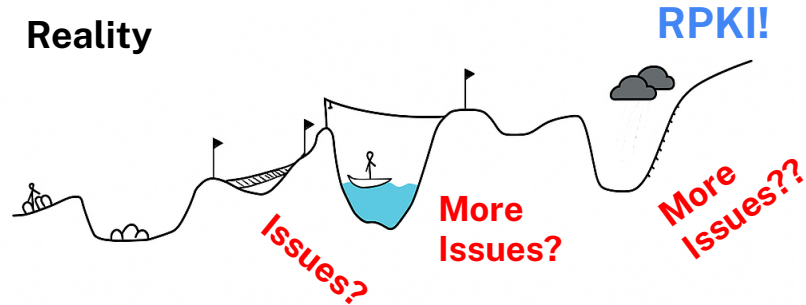
# RPKI Adoption: A Journey

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**Expectation**



**Reality**



# ROA Planning: Example

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| Prefix          |   | Origin ASN |
|-----------------|---|------------|
| 208.186.48.0/20 | → | AS21541    |

# ROA Planning: Example

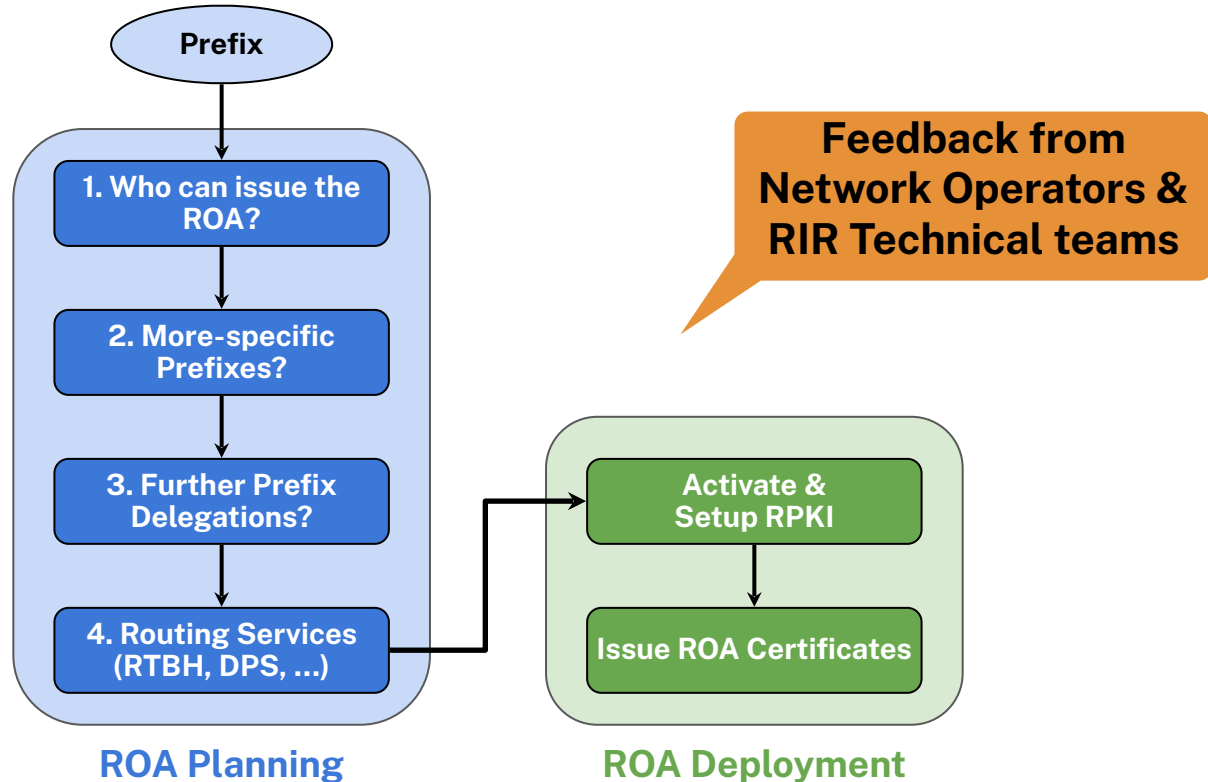
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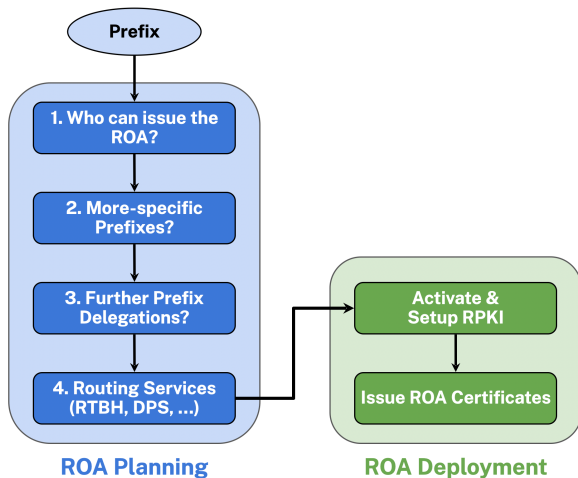
|                                                    | Prefix            | Origin ASN   |
|----------------------------------------------------|-------------------|--------------|
| ① Who can issue the ROA?                           | 208.186.48.0/20   | → AS21541    |
| ② What if more specific prefixes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

**ROA planning can be complex due to multiple factors!**

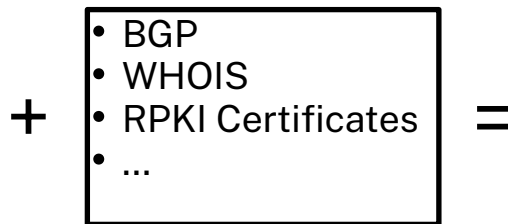
# A framework for issuing ROA

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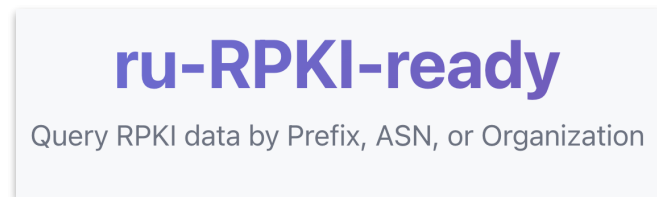




Our Framework



Public Data



Our Platform

# ru-RPKI-ready: Dashboard

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## 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

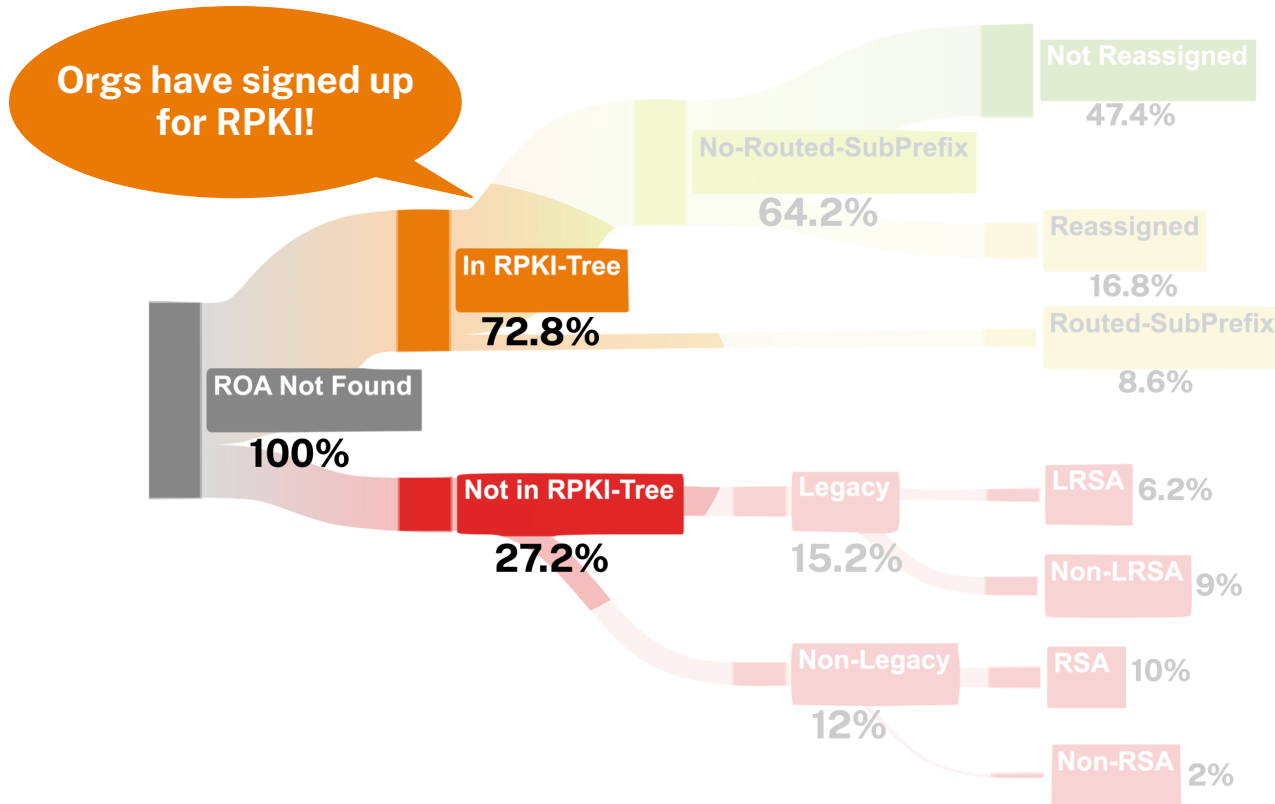
ROA Issuance Process (7 total)

How many ROAs?

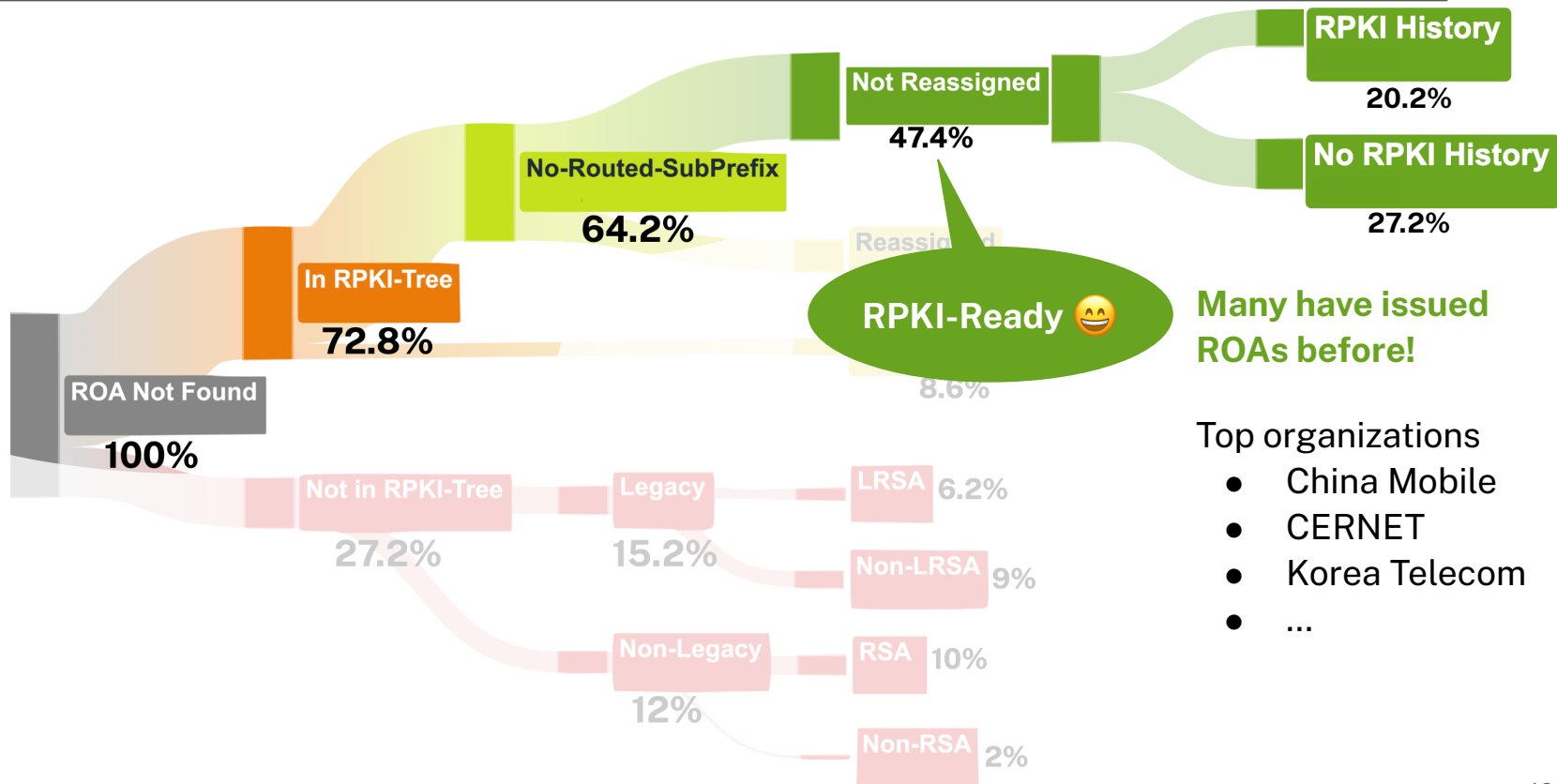
| PREFIX                          | ORIGIN ASN              | MAX LENGTH |
|---------------------------------|-------------------------|------------|
| <a href="#">208.186.48.0/24</a> | <a href="#">AS21541</a> | 24         |
| <a href="#">208.186.56.0/24</a> | <a href="#">AS21541</a> | 24         |
| <a href="#">208.186.57.0/24</a> | <a href="#">AS21541</a> | 24         |
| <a href="#">208.186.58.0/24</a> | <a href="#">AS21541</a> | 24         |
| <a href="#">208.186.60.0/24</a> | <a href="#">AS21541</a> | 24         |
| <a href="#">208.186.62.0/24</a> | <a href="#">AS21541</a> | 24         |
| <a href="#">208.186.48.0/20</a> | <a href="#">AS21541</a> | 20         |

# Characterization of Prefixes without ROAs

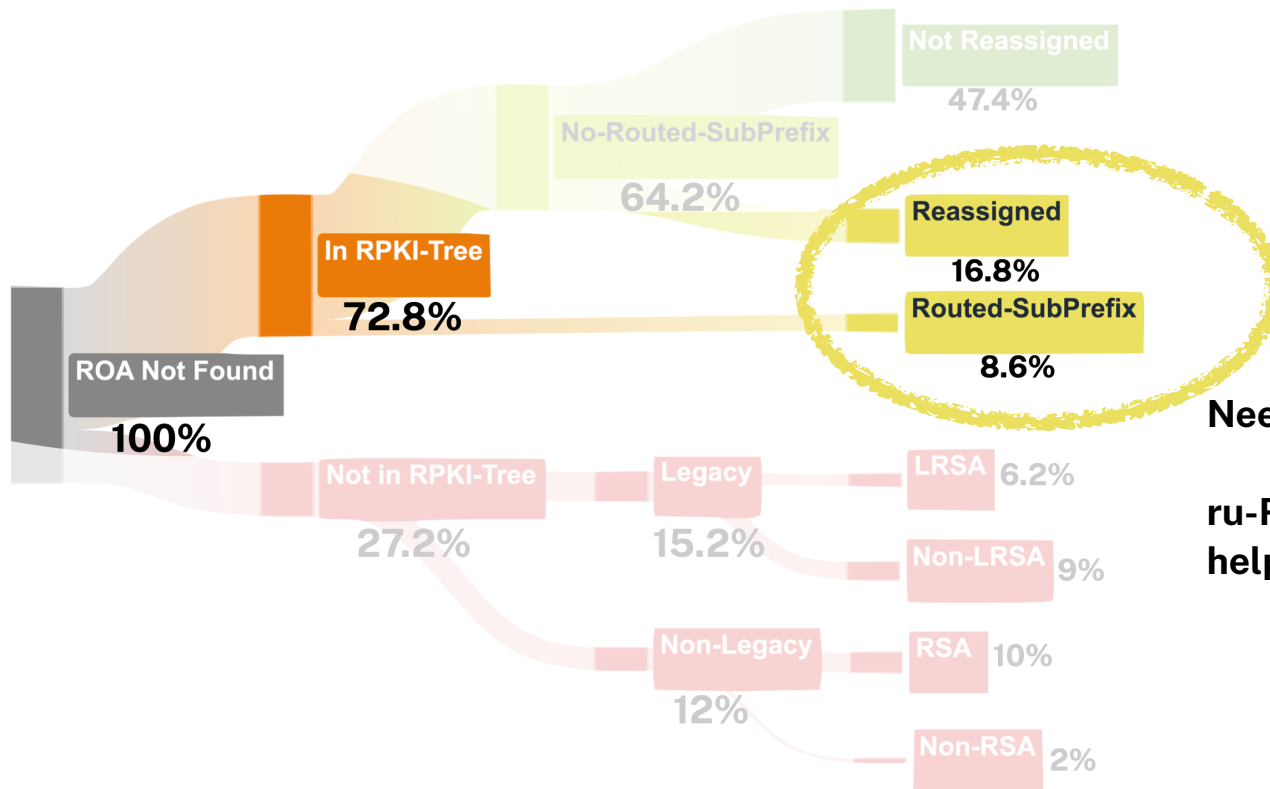
# Breakdown of Prefixes without ROAs



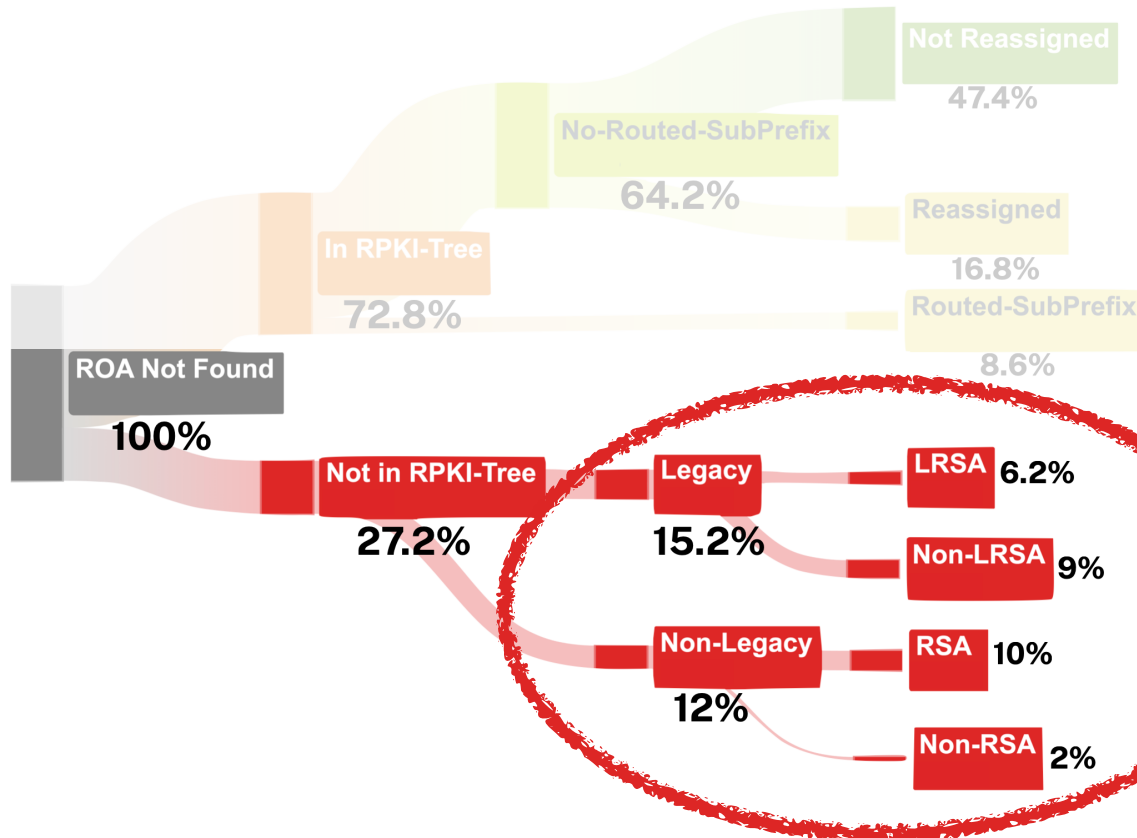
# Breakdown of Prefixes without ROAs



# Breakdown of Prefixes without ROAs



# 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**

