# Routing Security Update

**Brad Gorman** | *Senior Product Owner, Routing Security*

# Agenda

- Team Update
- Resource Public Key Infrastructure (RPKI) adoption
- New and upcoming features

# Team Update

# New to the Team

**Nathan Newman,** Technical Support Specialist

- ARIN staff member for over two years
- Previously worked on the Registration Services Department team responding to technical services requests
- Now focusing on routing security topics (RPKI, Internet Routing Registry, Domain Name System Security Extensions, etc.)

**Reach out! Email [routing.security@arin.net](mailto:routing.security@arin.net) with questions or issues**

# RPKI Adoption

# What is RPKI?

**RPKI** provides a cryptographically signed method for an Internet number resource holder to make an authoritative statement about the origin of a prefix(s) announced to the Internet (Route Origin Authorization, ROA).

# Benefits of RPKI

- Provides operators another data set to make more informed routing decisions (RPKI Validity State)

- Protects resource holders from impact resulting from human error or nefarious activity

- Reduces the overall attack vector for attempted hijacks on the greater Internet

# Key Terms

**A Trust Anchor (TA)** is an established point of trust from which an entity begins the validation of an authorized process.

**The Certificate Authority (CA)** is responsible for signing the cryptographic objects.
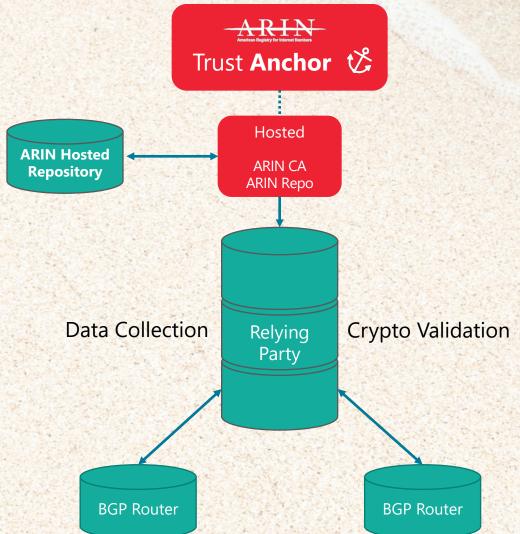
**A Route Origin Authorization (ROA)** is a signed statement made by the authenticated resource holder that consists of a prefix, a maximum prefix length, and originating ASN.

# RPKI Services at ARIN

## Hosted

- Resource holders make and manage authoritative statements, Route Origin Authorizations (ROAs) for their resources

- ARIN serves as the Certificate Authority (CA), managing all cryptographic components, and the repository and publication services for customer ROAs
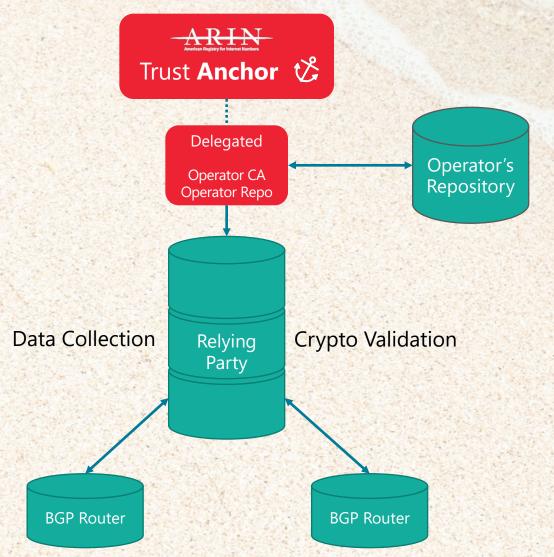
# RPKI Services at ARIN

## Delegated

- When an org runs cryptographic services (Certificate Authority or CA), repository, and publication services for their ROAs

- ARIN confirms the resources are assigned to the ROA's creator and the location of the repository where the ROA is stored

- Customers may choose to hand off the repository and publication functions to ARIN and use our **Repository Publication Service (RPS)**

# RPKI Adoption – ROA Count

- ## ARIN's Hosted Repository
  - ### Route Origin Authorizations (ROAs): **54,892**
  - ### Validated ROA Payloads (VRPs*): **66,774**

- ## ARIN's RPS Repository
  - ### ROAs: **1,150**
  - ### VRPs*: (prefixes): 2,979

*VRPs contain an IP prefix, a maximum length, and an origin AS number derived from a validated ROA, (validated by ARIN to contain authoritative data).*
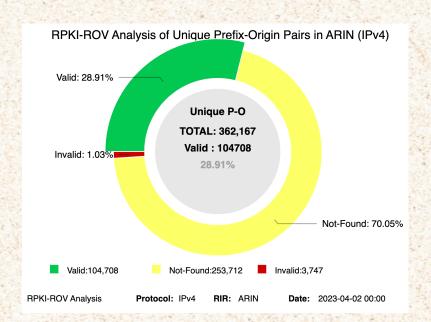


April 2022 - Present
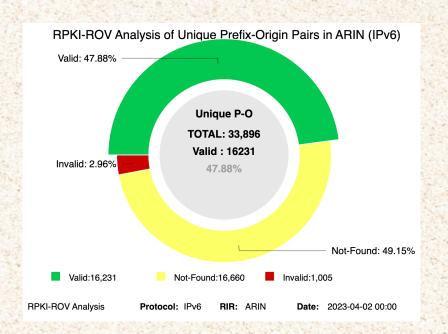
# RPKI Valid Route Announcements

**28.91%** of Internet routes with ARIN
IPv4 resources, marked as RPKI Valid

- **Up 6.5% year over year**

**47.88%** of Internet routes with ARIN
IPv6 resources, marked as RPKI Valid

- **Up 4.2% year over year**

### RPKI-ROV Analysis of Unique Prefix-Origin Pairs in ARIN (IPv4)

Valid: 28.91%

Invalid: 1.03%

**Unique P-O**
**TOTAL: 362,167**
**Valid : 104708**
28.91%

Not-Found: 70.05%

Valid:104,708   Not-Found:253,712   Invalid:3,747

RPKI-ROV Analysis   **Protocol:** IPv4   **RIR:** ARIN   **Date:** 2023-04-02 00:00

### RPKI-ROV Analysis of Unique Prefix-Origin Pairs in ARIN (IPv6)

Valid: 47.88%

Invalid: 2.96%

**Unique P-O**
**TOTAL: 33,896**
**Valid : 16231**
47.88%

Not-Found: 49.15%

Valid:16,231   Not-Found:16,660   Invalid:1,005

RPKI-ROV Analysis   **Protocol:** IPv6   **RIR:** ARIN   **Date:** 2023-04-02 00:00

*charts collected from the NIST RPKI Monitor –* **https://rpki-monitor.antd.nist.gov/ROV**

# RPKI Valid IP Resources

**45.3%** of eligible* ARIN IP resources announced are marked as RPKI valid**

- 508M (eligible) / 1.12B (allocated to ARIN)
- 5.0% increase year-over-year
- Globally, 38.2% of announced IP resources are RPKI valid

* Resources must be covered by a valid (L)RSA agreement to be eligible for RPKI services at ARIN

** To be considered RPKI valid there must be a VRP that exactly matches an existing route announcement in the global BGP table

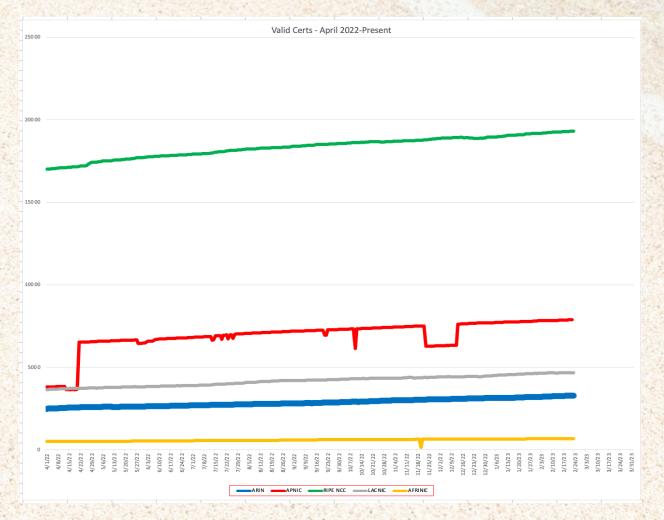# RPKI Adoption - Organization Participation

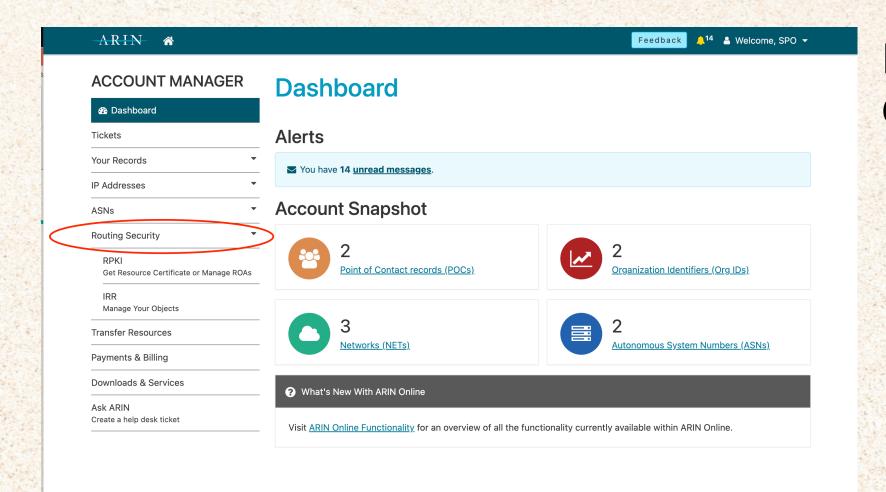- Organizations registered to use ARIN RPKI services: **3,422**
  - Hosted: **3,330**
  - Delegated: **92**
  - Repository Service (RPS): **31**



Valid Certs - April 2022-Present

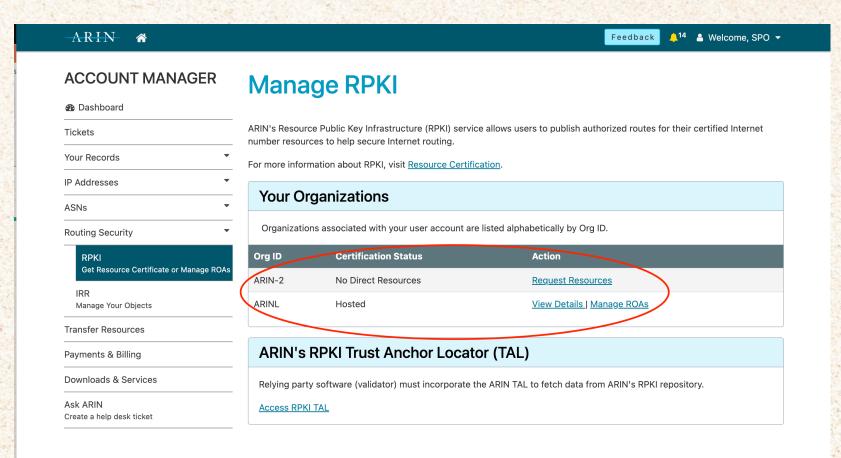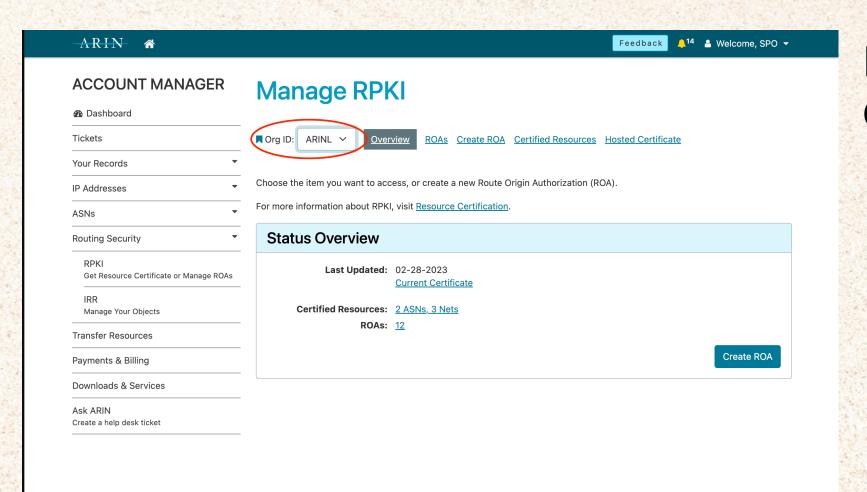# New Features

# New Features – Simplified Navigation



RPKI Navigation Changes
- **Routing Security dropdown**
- List of all linked Orgs
- Org "Picker"

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RPKI Navigation Changes
- Routing Security Dropdown
- List of all Linked Orgs
- **Org "Picker"**

# Development Pipeline

## No ROA signing requirement

- No more keys
- Simplified input method

## Auto renewal for ROAs

- ROAs do not expire
- 90-day lifespan, renewal at 30 days

## New RESTful API

- New knobs for new features
- Future-proof for new standards
- Legacy API still supported

# Thank You