

# Routing Security Update

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





# Agenda

- Global Resource Public Key Infrastructure (RPKI) activity
- RPKI adoption at ARIN
- New features and upcoming development





# RPKI Has Come of Age

# Benefits of RPKI



Provides operators another dataset to make more informed routing decisions



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



Reduces the overall attack surface for attempted hijacks on the greater Internet



# The Numbers Tell a Story

On 4 April, more than 49% of Internet IPv4 announcements were marked RPKI-valid.

IPv6 announcements crossed the 50% validity threshold for good in October 2023.



# RPKI is on the US Government's Radar

The Office of the National Cyber Director, in conjunction with key stakeholders and appropriate federal government entities, is developing a roadmap to increase the adoption of secure Internet routing techniques and technology.

They are exploring approaches and options to address Internet routing and Border Gateway Protocol (BGP) security concerns and using RPKI is a fundamental component of the plan.

## Recent Standards

- [RFC 9455/BCP238](#)  
Avoiding Route Origin  
Authorizations (ROAs) Containing  
Multiple IP Prefixes



## Proposed Standards

- [draft-ietf-sidrops-cms-signing-time-06](#)  
On the use of the CMS signing-time  
attribute in RPKI Signed Object
- [draft-ietf-sidrops-rfc6482bis-09](#)  
A Profile for Route Origin  
Authorizations (ROAs)
- [draft-ietf-sidrops-signed-tal-14](#)  
RPKI Signed Object for Trust Anchor  
Key



# RPKI Adoption in Our Region



# Three RPKI Services to Choose From



## Hosted RPKI

**Easiest to use!** Recommended for most organizations just getting started with RPKI. Ninety-eight percent of ARIN participants use Hosted RPKI.

## Delegated RPKI

Suggested for organizations that want cryptographic control of RPKI certificates; the organization should have a deeper understanding of routing security and a technical staff to run and support the high availability repository

## Repository and Publication Service

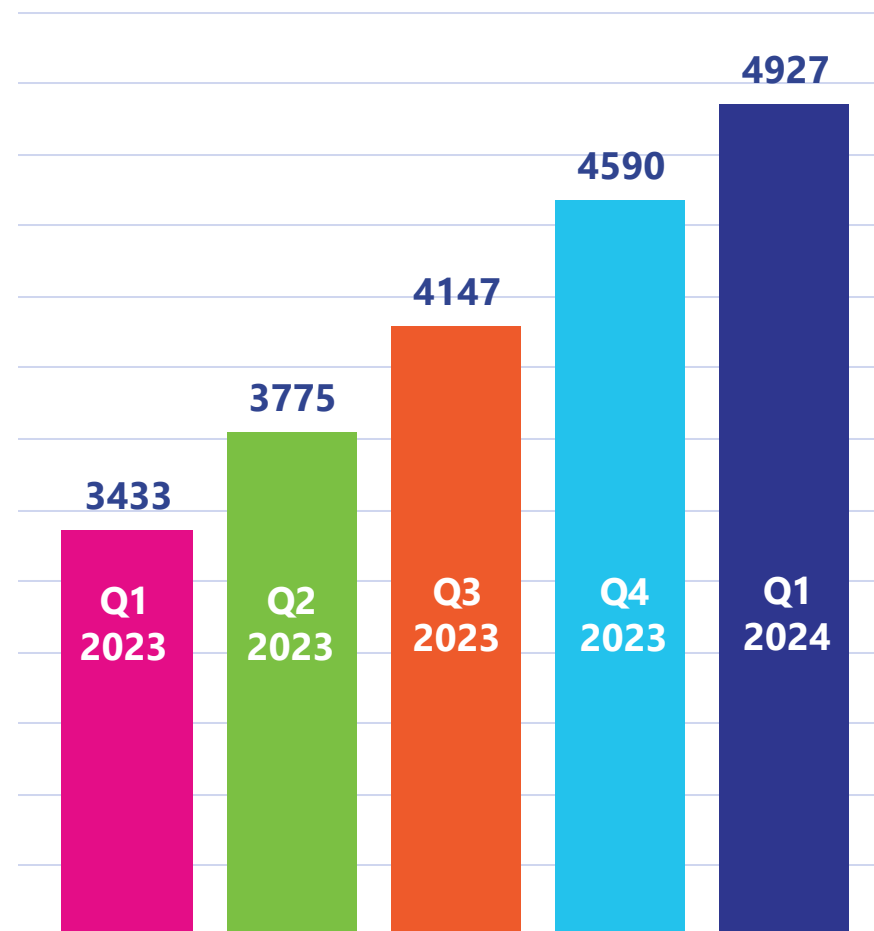
Suggested for organizations that wish to retain cryptographic control, but do not want to maintain the high availability repository and publication requirements

# RPKI Adoption– Deployment Type



Organizations registered to use RPKI services: **4,927**

- Hosted – **4,792**
- Delegated – **126**
- Repository Service (Hybrid) – **59**

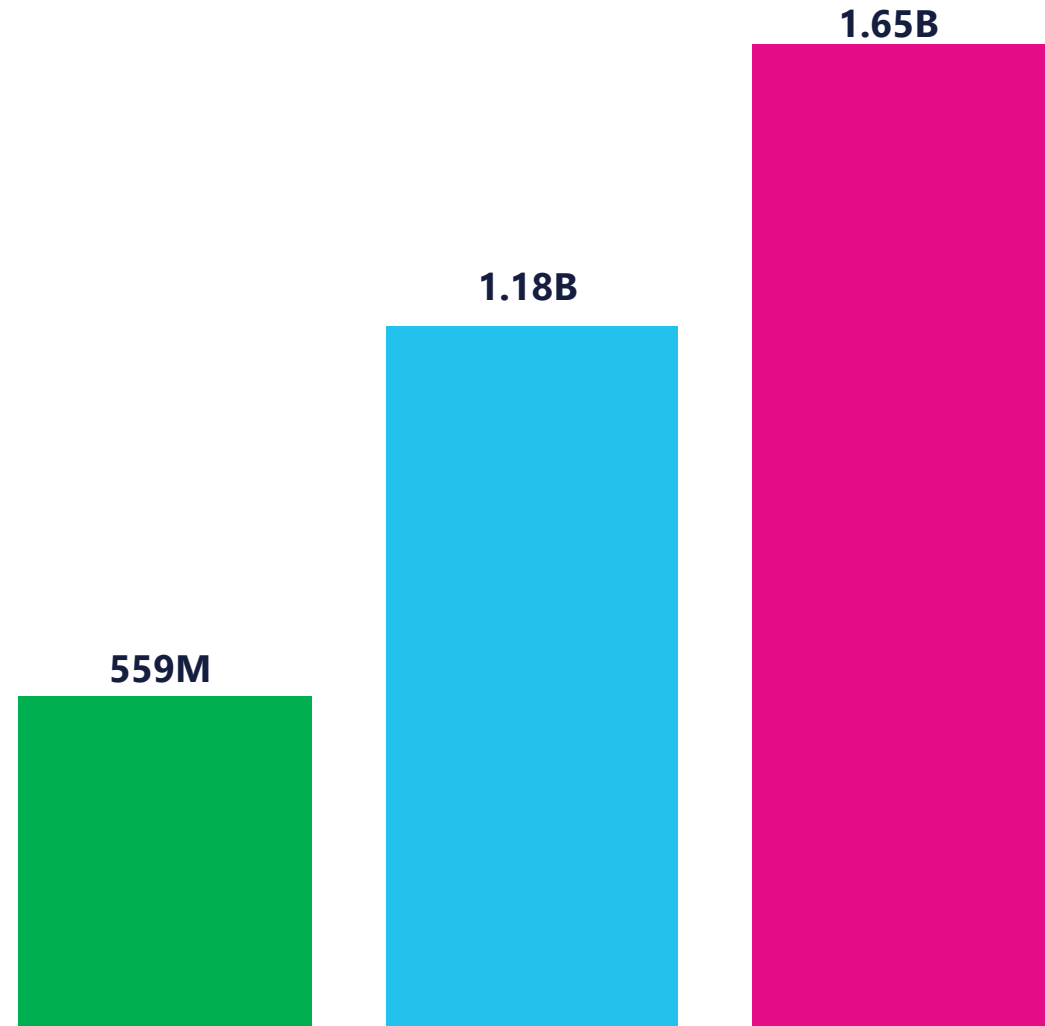


# RPKI Adoption – Address Coverage

■ RPKI Valid ■ Under Contract ■ ARIN Allocated

**34.6%** of 1.65 billion IPv4 ARIN-allocated resources are RPKI-valid

**47.2%** of 1.18 billion IPv4 resources held under an ARIN Agreement are RPKI-valid





# RPKI Adoption – Org Participation

## Percent of RPKI Adoption per Entity Type\*:



Government  
8.8% of 837



Educational Institutions  
12.4% of 2,201



Commercial/ISPs/  
Enterprises/Individuals  
12.4% of 39,620

## Percent of Allocated Resources Covered by RPKI ROAs:



Government  
5.1% of 905.6k /24s



Educational Institutions  
15.3% of 1,236.8k /24s



Commercial/ISPs/  
Enterprises/ Individuals  
49.2% of 6,4778.1k /24s

\* Entities in the ARIN Region and regardless of Agreement status; data as of 4 April



# Community Consultations and Upcoming Development

# RPKI/IRR Integration Consultation Outcome



ARIN is developing a service that gives organizations the option to create linked Internet Routing Registry (IRR) route objects that match the origin and prefix(es) entered in the RPKI Route Origin Authorization (ROA) at time of ROA generation.

Deployment of this new service is targeted for the second half of 2024.

Key features include:

- An organization level selection to enable or disable the service with a single click, with default set to ON. *(web UI only)*
- An option to override the organization default setting during each individual ROA create or delete action.
- An option to create linked IRR objects (in bulk) based on existing ROAs in the RPKI repository. *(web UI only)*
- Users retain the ability to create or delete IRR route objects independent of RPKI actions.

*Full details and example visuals coming soon to the ARIN website*

# RPKI/BGP Intelligence Consultation Outcome



ARIN will develop a new RPKI user interface that will provide more information to organizations on the state of routing announcements of their resources in the context of RPKI validity. This will help the organization make more informed decisions when modifying their RPKI configuration.

Deployment of this new service is targeted for late 2024/early 2025

Key features will include:

- A displayed list of Internet routing announcements in the global BGP table for an organization's certified resources.
- Determination of RPKI state based on currently available, validated repository data.
- Ability for the user to see the potential outcome to RPKI validity of Internet announcements based on a pending ROA change action.
- Suggestions for ROA changes based on both RFC standards and best current practices to achieve RPKI-valid state.



# RPKI Development Pipeline

- IRR/RPKI integration re-release (*second half of 2024*)
- RPKI/ROA Intelligence (*late 2024/early 2025*)
- RPKI advanced features to ARIN Online interface (*planned for the future*)
  - Enabling bulk changes to RPKI objects
  - New sorting and filtering options
  - Opt out from RPKI services at user discretion
- ❖ **Number Resource Organization RPKI Working Group**
  - Efforts may result in additional development not currently in the pipeline





Help us shape the future of  
Routing Security at ARIN!

Email: [routing.security@arin.net](mailto:routing.security@arin.net)

# Thank You

## Questions or Comments?

