



NRO RPKI Program Update

What we have been doing

Sofía Silva Berenguer
RPKI Program Manager - NRO

2001:610:2400 193.0.0.202 62:109:128 195:048:02:03 178:12:02:02 2001:610:240 193.0.0.203
62:109:128 195:048:02:03 2001:610:240 193.0.0.202 62:109:128 195:048:02:03 178:12:02:02 2001:610:240 193.0.0.203
193.0.0.203 2001:610:240:0 193.0.0.202 62:109:128 195:048:02:03 178:12:02:02 2001:610:240 193.0.0.203
2001:610:240:0 193.0.0.202 62:109:128 195:048:02:03 178:12:02:02 2001:610:240 193.0.0.203
Number Resource Organization

What I would like you to take from this preso...



AWARENESS ABOUT THE
NRO RPKI PROGRAM AND
WHAT WE'VE BEEN DOING



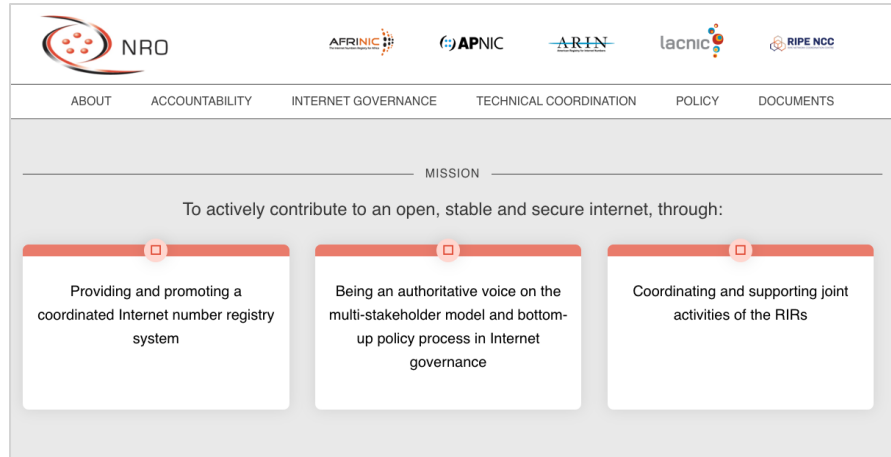
ENOUGH INTEREST TO
REACH OUT



ENOUGH CURIOSITY TO
WANT TO LEARN MORE

A bit about me and the NRO

- About me
 - Telematics Engineer → Product Manager → Ontological Coach
 - IETF attendee but have not actively participated in any WG
 - LACNIC → Master's → APNIC → NRO
- NRO = Number Resource Organization



The NRO RPKI Program purpose

“To provide a more consistent and uniformly secure, resilient and reliable RPKI service”

Why is this program important?

- It creates a space for structured **coordination and collaboration** on RPKI among the RIRs
- Current diversity/inconsistency among RIRs
 - In RPKI related services/features being offered
 - Hosted/delegated, testing env, API
 - In user experience
 - In API endpoints
 - In design decisions, implementations, etc.

E.g. Differences in the UI

Information Center - (Afrinic Ltd.)

Home > ROA > Add ROA

Add ROA

Please be patient while your transaction is being processed.

* Name: Please enter a unique ROA name. Spaces will be replaced by '-'.
RPKI_Course_ROA

Your AS Numbers: Please select your ASN from this list or enter any other valid ASN in the field below.
33764

* AS Number: ASN must be between 0 - 4294967295 in ASPLAIN format. "Reserved" and "Unallocated" ASNs will be rejected. "0" is allowed.
33764

IPv4 address range: Please select your prefix in the drop down list and click the 'v' button, then you can specify the details.
196.192.140.0/22

IPv4 prefixes: Please enter [Prefix] [Prefix Length] [Max Length] (Maximum length of more specific prefixes)
196.192.140.0 /22 /22

IPv6 address range: Please select your prefix in the drop down list and click the 'v' button, then you can specify the details.
2001:429:140

IPv6 prefixes: Please enter [Prefix] [Prefix Length] [Max Length]
2001:429: /40 /40

* Not Valid Before (YYYY-MM-DD): 2022-01-07

* Not Valid After (YYYY-MM-DD): 2024-01-08

Cancel

Create route

Prefix: 2406:6400::/32

Origin AS: AS135541

Most specific announcement: /36

ROA

- You are not permitted access to RPKI. Click [here](#) to enable two-factor authentication, which will allow you access to RPKI.

Options

- Define Whois route attributes
- Notify additional contacts

ACCOUNT MANAGER RPKI: Create ROA

Dashboard

Tickets

Your Records

IP Addresses

ASNs

Routing Security

Transfer Resources

Payments & Billing

Downloads & Services

Add ARIN

Create a help desk ticket

Create route origin authorizations (ROAs) for the IP resources covered by your RPKI certificates.

Create a Route Origin Authorization (ROA)

*Origin AS: 33870

Prefix: 169.112.152.0/24 Max Length: 24

*Prefixes:

Additional Prefix

ROA Name:

Optional: Provide a helpful nickname, such as 'OOOS_Mitigation'

Next Step

A Route Origin Authorization (ROA) is a cryptographically signed object that states which Autonomous System (AS) is authorized to originate a particular prefix or set of prefixes.

For more information, visit ARIN's [Route Origin Authorizations](#) documentation.

Servicios de Registro Admón

Inicio / Organización / RPKI

ROAs / Crear ROA / Crear Route(s) / CERTs

Crear ROA / Crear Route(s)

Para generar un ROA hace falta dar un nombre de referencia, ingresar las fechas de validez inicial y final, el ASN de origen y los recursos de numeración que se le quieren asociar a este. Los bloques de direcciones IP que pueden ingresar son los que admiñen registrando. Si la organización está usando el IRR esta operación afectará los route(s) objeto

Nombre: [input type="text"] ASN: 0

Validez desde: 02/04/2021 Validez hasta: 02/06/2023

Extender la validez del ROA automáticamente*

#Este es un comentario

#ejemplo
#10.0.0.0/8-30
#2000:0000/32-34

#Recursos autorizados
#201.219.252.0/22-22
#169.100.-/3-31

Guardar

RPKI Dashboard

9 CERTIFIED RESOURCES NO ALERT EMAIL CONFIGURED

41 BGP Announcements

4 ROAs

4 Valid 1 Invalid 36 Unknown

3 OK 1 Causing problems

BGP Announcements Route Origin Authorisations (ROAs) History

Create ROAs for selected BGP Announcements

Review and publish changes

3 Unknown

Staged ROAs

- AS12654 2001:7fb:fe01::/48 -- 48
- AS12654 2001:7fb:fe0f::/48 -- 48
- AS12654 2001:7fb:fe0c::/48 -- 48

Affected announcements

- AS12654 2001:7fb:fe01::/48 UNKNOWN -- VALID
- AS12654 2001:7fb:fe0f::/48 UNKNOWN -- VALID
- AS12654 2001:7fb:fe0c::/48 UNKNOWN -- VALID

**Are those differences hindering
the adoption of RPKI?**

What do we want to achieve?

- **Purpose:** “To provide a more consistent and uniformly secure, resilient and reliable RPKI service”
- More specifically, we want to achieve the following **outcomes:**
 - Definition of what a **single global RPKI system** looks like.
 - Better **understanding** and improved **transparency of the robustness** of the RPKI system
 - **Enhanced security consistency** of the RPKI system across the different RIRs
 - The technical community is kept **informed and engaged** throughout the program, and their **concerns are addressed in a coordinated way.**

What does a single global RPKI system look like?

- RPKI-related services/features with **current status for each RIR**
 - To identify and prioritise gaps
- Exploration of alternatives to improve **current TA configuration**
- **Experimental orgs** in each RIR to experience UX differences first-hand (*for those RIRs with policies that allow this*)
- **User research** on barriers for ROA creation

User research on barriers for ROA creation

- **Why?**
 - Are the differences in the RIRs' RPKI implementations hindering RPKI adoption, more specifically ROA creation?
 - If so, which differences are the most problematic?
 - So that we can focus on making those aspects of the RPKI system more consistent
- **Who?**
 - Network operators responsible for IP space allocated by multiple RIRs
- **How?**
 - Survey + interviews

Participation in user research activities

- 203 responses to the survey
 - 80 manage IP addresses allocated by more than one RIR (*and made it to the end of the survey*)
 - 7 have not created ROAS yet
 - 27 have created ROAS for some of the RIRs they received IP space from but not all
 - 46 have created ROAs through all of the RIRs from which they received IP prefixes
- 21 people expressed interest in participating in the interview
 - 11 people completed the interview (one person in writing)
- **Thanks so much to everyone who participated!**

Robustness of the RPKI system

- Different aspects of robustness have been documented for each RIR
- Operational Practice Statements for each RIR on:
 - TA operations
 - RIR level CA(s)
 - Hosted CAs-as-a-Service for members
 - Delegated CAs for members / NIRs
 - Publication Service and Repository for TA
 - Publication Services for RIR hosted CAs
 - Publication-as-a-Service for remote delegated CAs

What's next?

- Deep dive into **learnings and insights from user research** to prioritize opportunities
- Discuss and plan for **2025**
 - Continue exploration of alternatives to improve current TA configuration
 - Understand how the documentation generated this year can be made available to the technical community in a way that is useful and valuable
 - And more!
- Continue to identify how we can contribute to **reducing barriers to RPKI adoption**



LEARN MORE AND REACH OUT

2001:610:240:0 193:0:0:202 62:109:128 195:048:02:03 178:12:02:02 2001:610:240 193:0:0:203
62:109:128 195:048:02:03 193:0:0:202 62:109:128 195:048:02:03 178:12:02:02 2001:610:240 193:0:0:203
193:0:0:203 2001:610:240:0 193:0:0:202 62:109:128 195:048:02:03 178:12:02:02 2001:610:240 193:0:0:203
2001:610:240:0 193:0:0:202 62:109:128 195:048:02:03 178:12:02:02 2001:610:240 193:0:0:203
Number Resource Organization

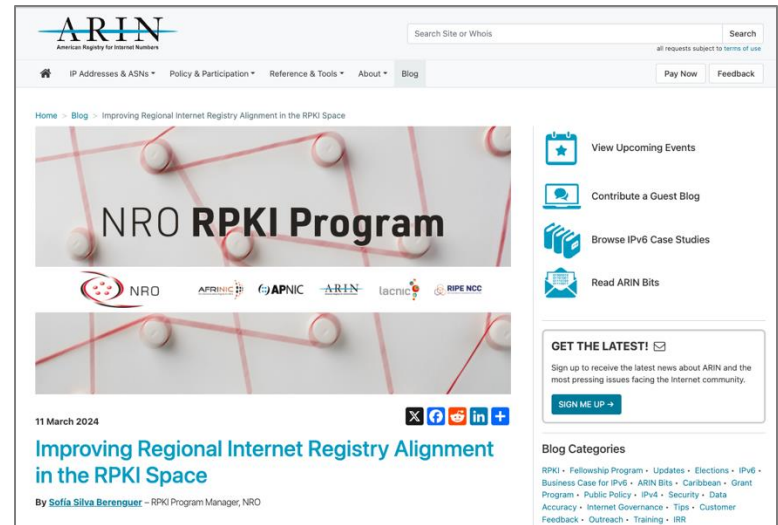
Do you want to know more?



- Visit our webpage:
 - https://www.nro.net/technical-coordination/security/certification/#rpki_program

- Read our blog series:
 - <https://www.arin.net/blog/2024/03/11/improving-rir-alignment-rpki/>
 - <https://www.arin.net/blog/2024/05/15/nro-rpki-program-series-2/>
 - <https://www.arin.net/blog/2024/08/27/nro-rpki-program-series-3/>

 - *Watch out for a 2024 wrap up article very soon!*



We want to hear from you!

- What are the **main barriers or obstacles** for RPKI adoption that could be solved (or at least improved!) through **better coordination and collaboration** among the RIRs?
- What barriers or challenges have you experienced?
- Please share them sending an email to rpki_program@nro.net



**THANKS FOR YOUR
ATTENTION!**

2001:610:2400 193:0:0:202 62:109:128 195:048:02:03 128:12:02:02 2001:610:240 193:0:0:203
62:109:128 195:048:02:03 2001:610:240 193:0:0:203 2001:610:240 193:0:0:202
193:0:0:203 2001:610:240:0 193:0:0:202 62:109:128 195:048:02:03 128:12:02:02 2001:610:240 193:0:0:203
2001:610:240:0 193:0:0:202 62:109:128 195:048:02:03 128:12:02:02 2001:610:240 193:0:0:203
Number Resource Organization