

Securing your resources with RPKI and IRT

Zen Ng

mmNOG

16 January 2020

Agenda

- IPv4 and ASN transfer policy
 - Transfer policies
 - Transfer services
 - prop-116
- APNIC Routing Registry
 - RPKI and ROA
 - prop-132
- POC and IRT
 - prop-125

IPv4 and ASN Transfer (prop-50 + prop-107)

- Transfer of IPv4 and ASNs between:
 - APNIC Members (✓)
 - APNIC and NIRs (✓)
 - APNIC and RIRs (✓)
- Spirit of this policy:
 - Allow Members to transfer unused IPv4 and ASNs to Members who still have a need for them

Transfer of IPv4 and ASNs between APNIC Members

- How to initiate such a transfer request?
 - Source account to initiate transfer and recipient account to accept transfer via MyAPNIC
 - Recipient account to justify the need for the resources that will be transferred
- Are there any transfer fees involved?
 - 20% IPv4 transfer fee

Transfer of IPv4 and ASNs between APNIC and NIRs

- Transfer from NIR member to APNIC Member or vice versa
- Source account to initiate transfer request
- Internet registry (IR) of source account to contact IR of recipient account
- Who will be evaluating the request?
 - IR of the recipient account to evaluate transfer request
- How long will the whole process take?
 - Depends on how long the recipient responds with IR

Transfer of IPv4 and ASNs between APNIC and RIRs

- Transfer from RIR member to APNIC Member or vice versa (RIPE and ARIN)
- Source account to initiate transfer request
- IR of the recipient account to evaluate transfer request
- 20% transfer fee applies to source and recipient of APNIC

IPv4 transfer pre-approval

- To allow recipient account to demonstrate the need for the IPv4 block that will be transferred in advance
- List recipient organization needs on the listing page
- Currently working on a listing page to list members with additional IPv4 address
- For more information, please visit:
 - <http://www.apnic.net/pre-approval>

Registered brokers

- Help facilitate IPv4 and ASN transfers
- They are not APNIC agents
- APNIC is not involved in the fees they charged
- <https://www.apnic.net/manage-ip/manage-resources/transfer-resources/transfer-facilitators/>

APNIC transfers mailing list

- Facilitate discussion on topics related to IPv4 transfers
- Mailing list: 'APNIC Transfers'
- Share availability of unused IPv4 addresses
- Discuss your requirement for IPv4 addresses
- To subscribe to the mailing list, please visit:
 - www.apnic.net/mailling-lists

prop-116: Prohibit to transfer IPv4 addresses in the final /8 block

- Implemented in December 2017
- Does not allow Members to transfer any 103/8 block that is delegated for less than 5 years
- Spirit of policy: for newcomers in the industry to kickstart their businesses

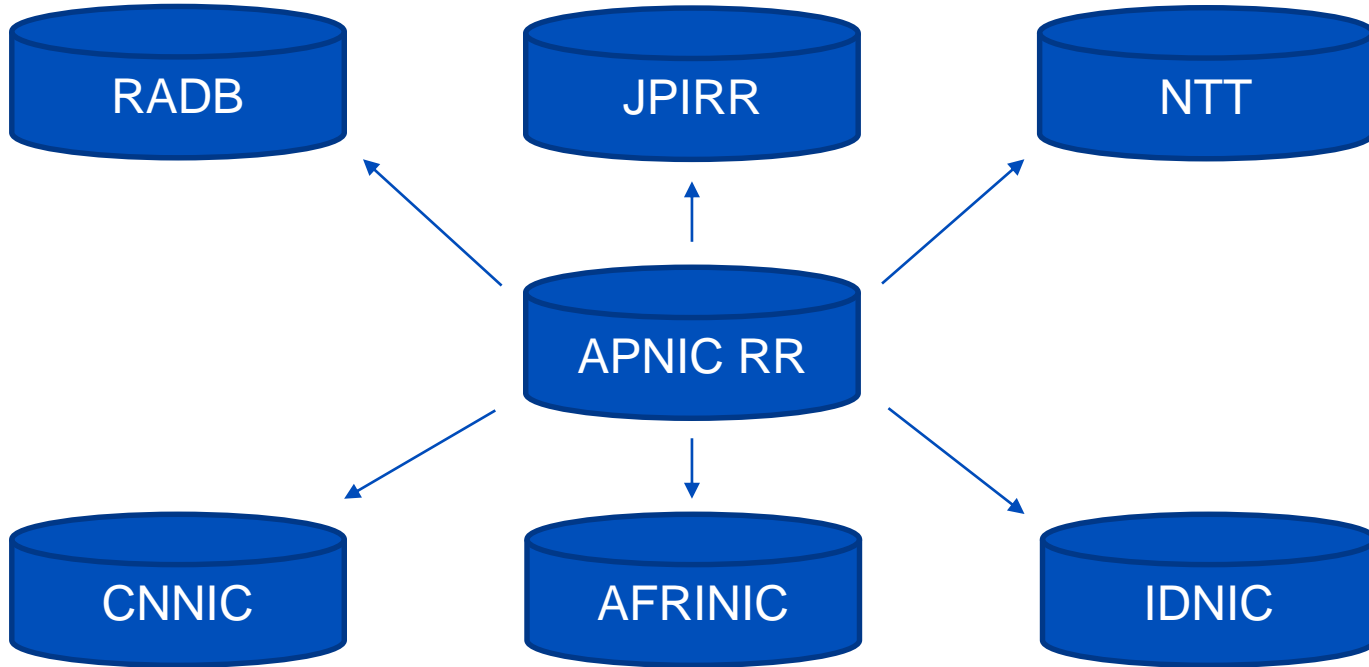
What needs to happen next?

APNIC Routing Registry and ROAs

APNIC database and the Internet Routing Registry (IRR)

- APNIC Whois Database
 - Two databases in one
- Public network management database
 - Whois information about networks and contacts (IP addresses, ASNs and so forth)
- Routing Registry (RR)
 - Contains routing information (routes, filters, peers and so forth)
 - APNIC RR is part of the global IRR

APNIC RR NRTM agreements



Routing Registry objects

route

aut-num

rtr-set

route6

as-set

filter-set

route-set

peering-set

route and route6 object

Represents a single IPv4/IPv6 route injected into the Internet routing mesh.

```
route6:          2001:df2:ee01::/48
descr:           Prefix for APNICTRAINING LAB DC
origin:          AS45192
mnt-by:          MAINT-AU-APNICTRAINING
last-modified:   2016-06-23T14:32:38Z
source:          APNIC
```

```
route:           202.125.97.0/24
descr:           Prefix for APNICTRAINING LAB DC
origin:          AS45192
mnt-by:          MAINT-AU-APNICTRAINING
country:         AU
last-modified:   2016-06-16T23:23:17Z
source:          APNIC
```

as-set object

A group of Autonomous Systems with the same routing policies.

```
as-set:      AS17821:AS-APNICTRAINING-ISP
descr:      AS-SET for APNIC Training ISP
tech-c:      AT480-AP
admin-c:     AT480-AP
mnt-by:      MAINT-AU-APNICTRAINING
members:     AS131107, AS45192, AS135541, AS135540, AS135533
members:     AS135534, AS135535, AS135536, AS135537, AS135538
last-modified: 2018-12-28T02:41:05Z
source:      APNIC
```


RPKI: ROA

- Resource Public Key Infrastructure (RPKI) is the infrastructure framework designed to secure the BGP table
- ROA (Route Origin Authorization) is a digitally signed, cryptographic object that is generated by the Resource Certification service
- What's contained in a ROA?
 - The AS number you have authorized
 - The prefix that is being originated from it
 - The most specific prefix (maximum length) that the AS may announce

Resource Certification

Measure	1/1/2018	Current	Growth
Members with certs	13.0%	14.4%	1.4%
Members with ROAs	7.4%	9.0%	1.6%
IPv4 under ROAs	3.3%	5.0%	1.7%
IPv6 under ROAs	0.9%	5.85%	4.95%

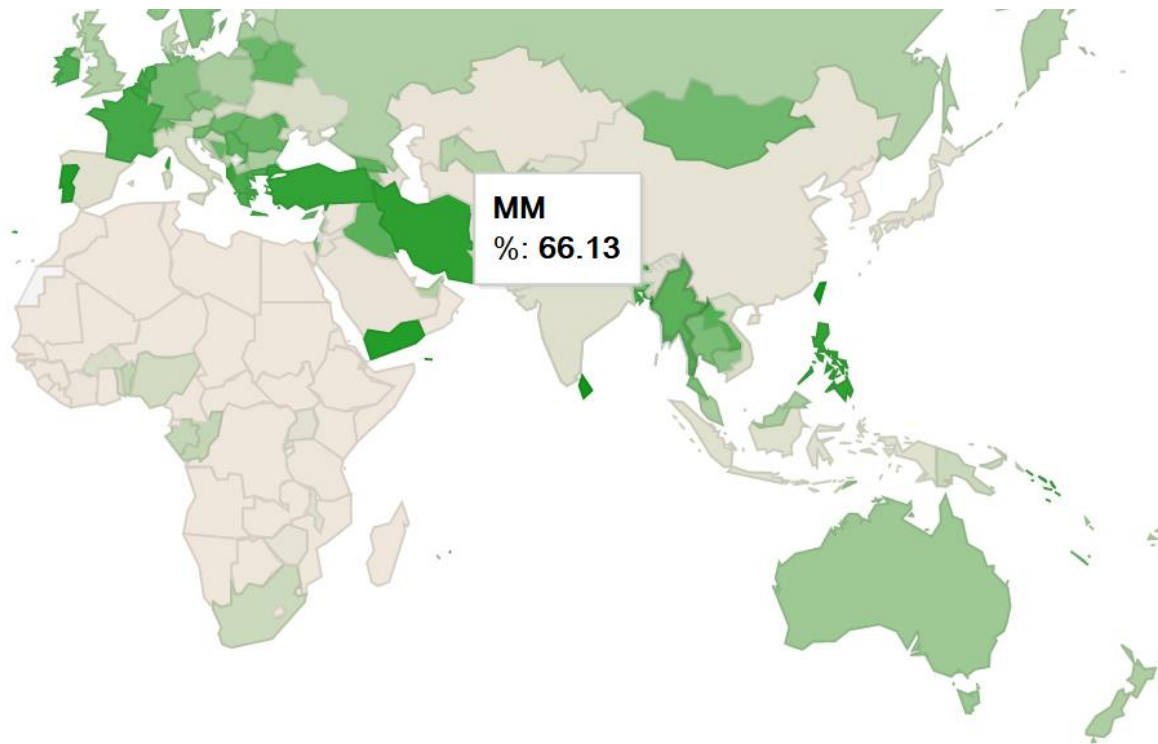


apnic.net/rpki

ROA adoption in SEA

Country	ROA Adoption Rate (%)
Philippines	83.90%
Laos	68.89%
Malaysia	30.82%
Thailand	51.61%
Cambodia	43.56%
Vietnam	9.32%
Indonesia	6.83%

How is Myanmar doing?



<https://lirportal.ripe.net/certification/content/static/statistics/world-roas.html>

Take control of your routing security

Create route ✕

Prefix

Origin AS

Most specific announcement

ROA Enabled

Whois Enabled

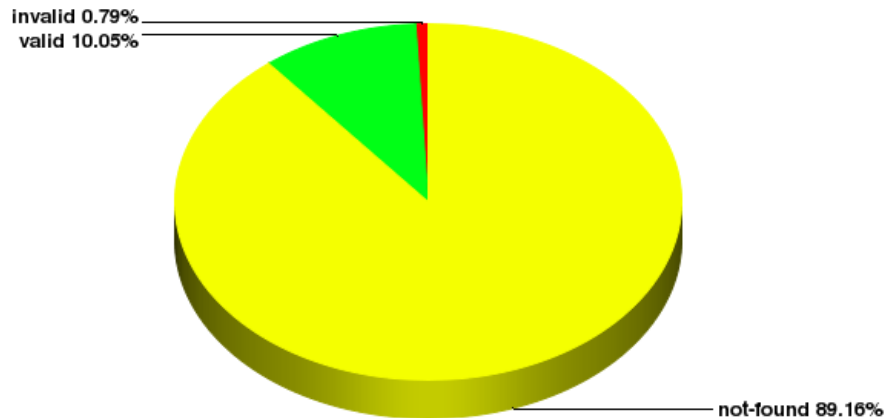
Define Whois route attributes

Options Notify additional contacts

RPKI status – global

783,476 Unique IPv4 Prefix/Origin Pairs

not-found (698,531) valid (78,723) invalid (6,222)



Valid	10.05%
Invalid	0.79%

NIST RPKI Monitor 2018-10-20

<https://rpki-monitor.antd.nist.gov>

RPKI status – APNIC region

197,006 Unique IPv4 Prefix/Origin Pairs



Valid	5.10%
Invalid	0.94%

- Provide tools in MyAPNIC to ensure your ROAs are up to date?

NIST RPKI Monitor 2018-10-20

<https://rpki-monitor.antd.nist.gov>

prop-132: RPKI ROAs for unallocated and unassigned APNIC address space (was: AS0 for Bogons)

- Reached consensus at APNIC 48
- Create RPKI ROAs with Origin AS 0 for APNIC's unallocated address space
- Spirit of this policy: to restrict the propagation of BGP announcements covering such bogon space

More on policy...

prop-125: Validation of “abuse-mailbox” and other IRT emails

- Reached consensus at APNIC 46
- Require network administrators to validate their email addresses in IRT objects every six months
- Spirit of this policy: to make sure the IRT contacts is always up to date and contactable

Contact review in MyAPNIC

Contact Review and Update

To meet [Resource Management Policy](#), you must keep all your contact details up-to-date. Please review and update your contact information below. A green tick indicates other users have already reviewed and confirmed the records. If you do not have the permission to edit all records, please contact your Corporate Contacts or the person responsible for the information.

! STEP 1

Membership contacts

! STEP 2

Organization details

! STEP 3

Incident response contacts

Please update the contact details for handling network abuse or security incident reports for your Internet number resources. This information is mandatory by APNIC policy and is used to publish as an IRT object in the whois database.

! Action Required

The following IRT email addresses have not been validated and have been recorded as invalid in the whois database.

- noc@net.internet2.edu

Please check your IRT email inboxes and follow the validation link, or update your IRT email addresses.

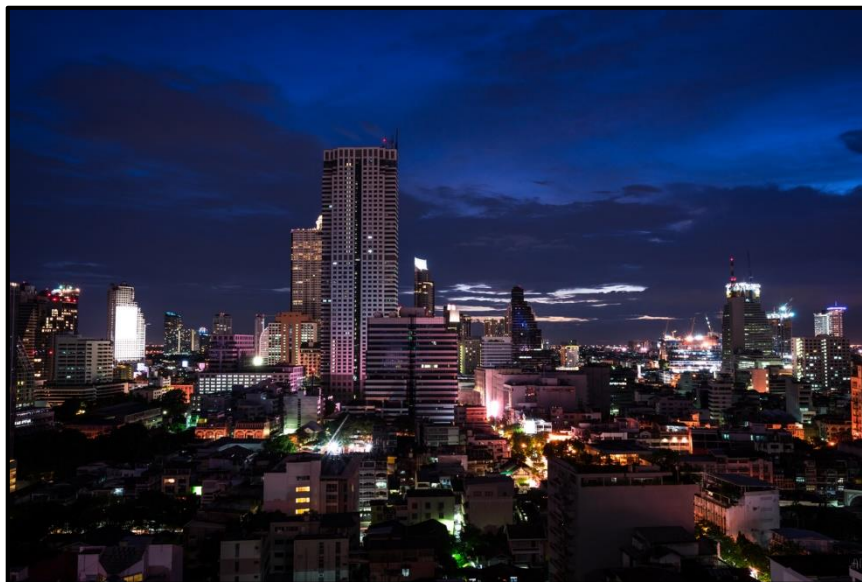
APRICOT 2020/APNIC 49



APRICOT 2020
Melbourne, Australia
12 to 21 February 2020

Next conference: APNIC 50

- Can't make it to APRICOT 2020?
- Please join the next one in Dhaka, Bangladesh, September 2020





Questions

