# Historical Resource Transition and benefits of RPKI
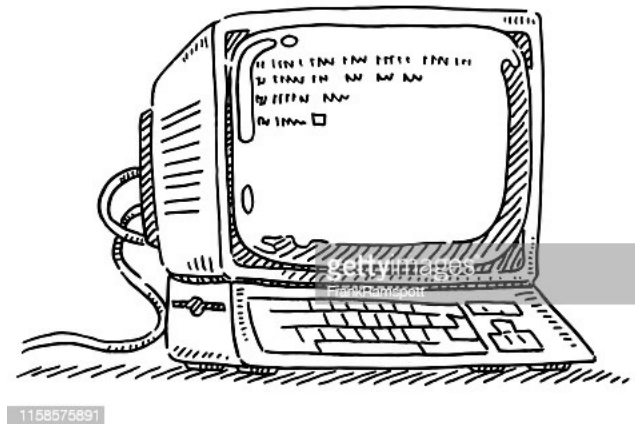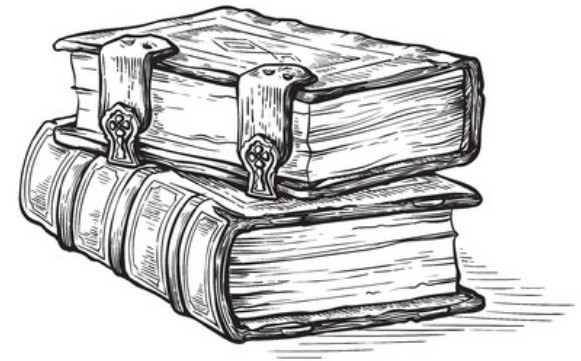
# Overview

- Background

- Challenges

- EC Resolutions

- What is RPKI and benefits

- Next Steps

# Historical addresses

- Pre-RIR delegations
  - Resources distributed by InterNIC, AUNIC, etc

- No formal agreement with APNIC

- Not managed under policy framework

www.apnic.net/historical-about

# Challenges

- Registration data quality
    - Inaccurate, outdated registration
    - Lack of registration
    - Difficult to establish custodianship

- In the past unprotected
    - 'Stealing' past unprotected records
    - Unauthorized usage of address space
    - Hijacking by spammers and hackers

# prop-018: Protecting historical records

- All historical resources protected by APNIC-HM maintainer

- Historical custodians had to sign up as Non-Members (AUD 200 'Historical Resource Maintenance')

- Access to basic Registration Services
  - MyAPNIC
  - Whois/IRR
  - in-addr.arpa

- **No RPKI Service**

# EC resolutions

- From 1 May 2021, RPKI access to be made available for all historical resources held under APNIC accounts

# EC resolutions

**Resolution 2021-09**: RESOLVES that all historical resource holders will need to become, or remain, a member or non-member of APNIC on and from 1 January 2023, in order to continue to receive registry services from APNIC

# APNIC Whois 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

# Routing Registry objects

```
route
route6
aut-num
as-set
rtr-set
filter-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
```

# Out of date route objects

```
whois -h whois.radb.net 203.76.192.0/24
```

```
route:        203.76.192.0/24
descr:        Proxy-registered
origin:       AS55821
source:       NTTCOM
```

```
route:        203.76.192.0/24
descr:        Proxy-registered
origin:       AS17970
source:       RADB
```

```
route:        203.76.192.0/24
descr:        REACH (Customer Route)
origin:       AS23944
source:       REACH
```

# Resource Public Key Infrastructure

What is RPKI?

A robust security framework for verifying the association between **resource holders** and their **Internet number resources**.

# Route Origin Authorization

What is contained in 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

eg : "ISP 4 permits AS65551 to originate a route for the prefix 198.51.100.0/24"

# ROA coverage – Asia Pacific

Display: **Addresses** (Advertised ROA-Valid Advertised Addresses), **IPv4**, **Percent** (of Total)



https://stats.labs.apnic.net/roas
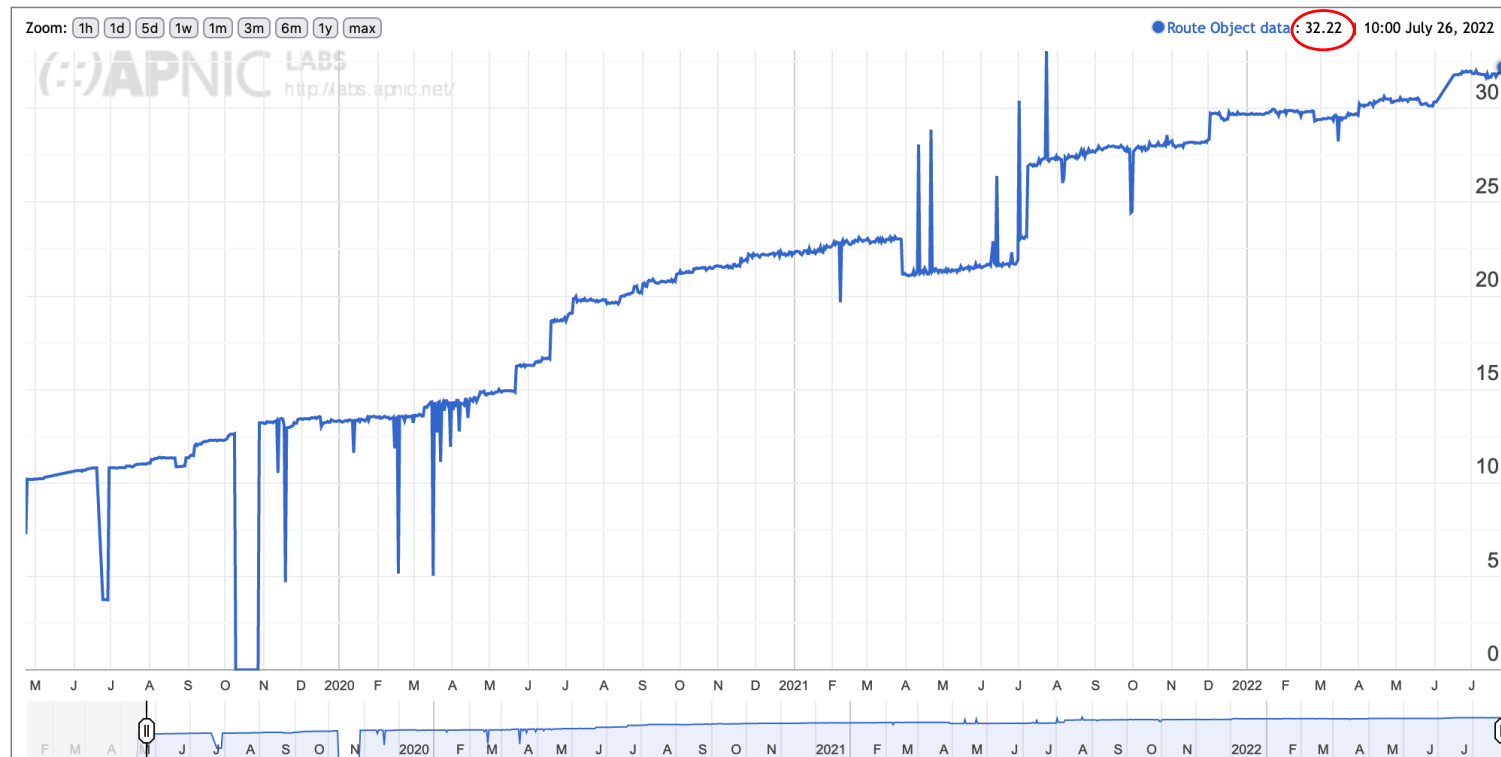
# Route Origin Validation

## Status
Displaying 30 major operators    [ + Show all ]   + Show ASN column

| NAME | TYPE | DETAILS | STATUS ▲ |
|---|---|---|---|
| Lumen | transit | signed + filtering | safe |
| Arelion (Formally Telia) | transit | signed + filtering | safe |
| Cogent | transit | signed + filtering | safe |
| NTT | transit | signed + filtering | safe |
| Hurricane Electric | transit | signed + filtering | safe |
| GTT | transit | signed + filtering | safe |
| TATA | transit | signed + filtering | safe |
| PCCW | transit | signed + filtering | safe |
| RETN | transit | partially signed + filtering | safe |
| Orange | transit | signed + filtering | safe |
| Comcast | ISP | signed + filtering | safe |
| Cloudflare | cloud | signed + filtering | safe |
| Amazon | cloud | signed + filtering | safe |
| Netflix | cloud | signed + filtering | safe |
| Wikimedia Foundation | cloud | signed + filtering | safe |
| Scaleway | cloud | signed + filtering | safe |

https://isbgpsafeyet.com/

APNIC

# RPKI: The Numbers - ROV



June
2020

https://www.potaroo.net/ispcol/2020-06/rov.html

# RPKI: The Numbers - ROV



December 2021

https://stats.labs.apnic.net/rpki
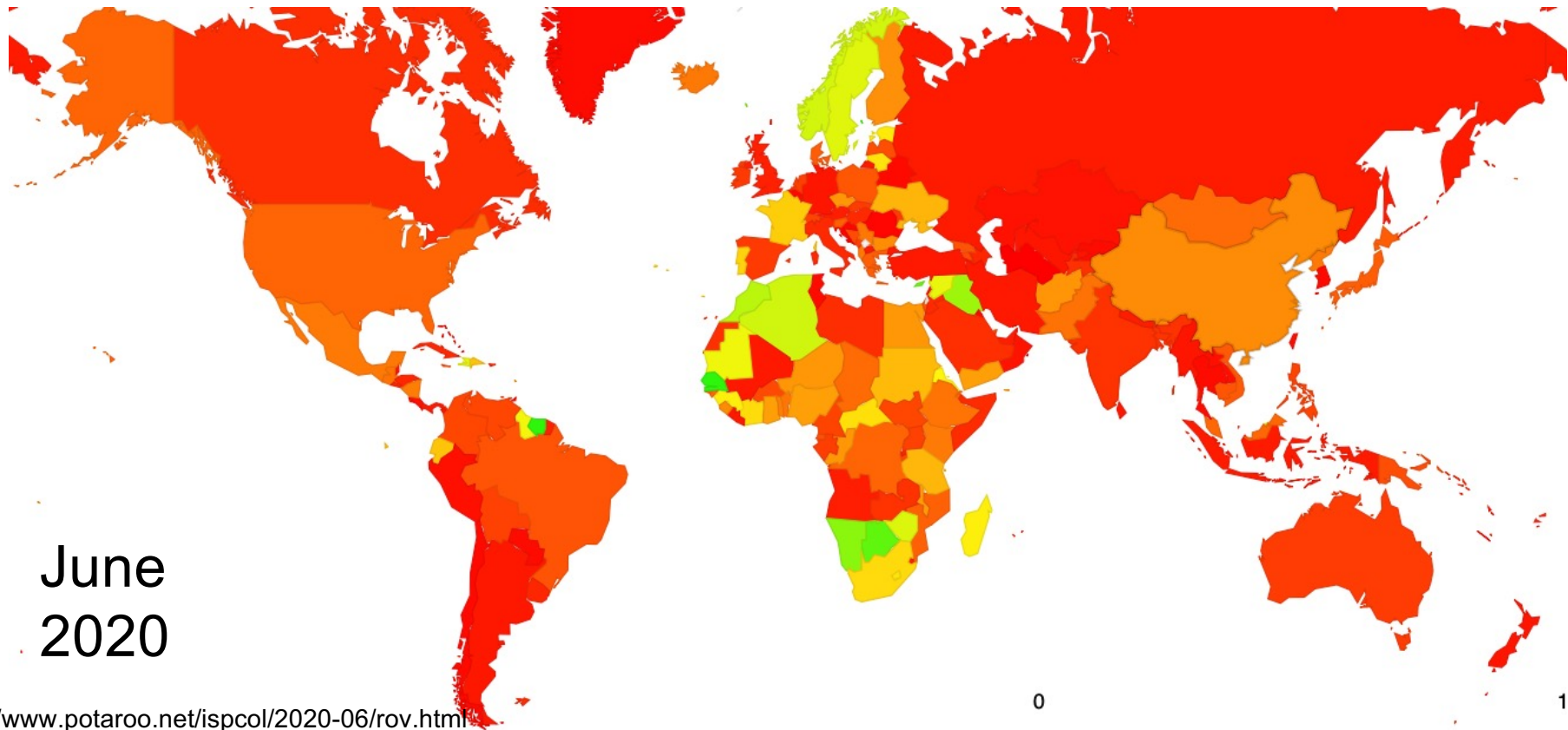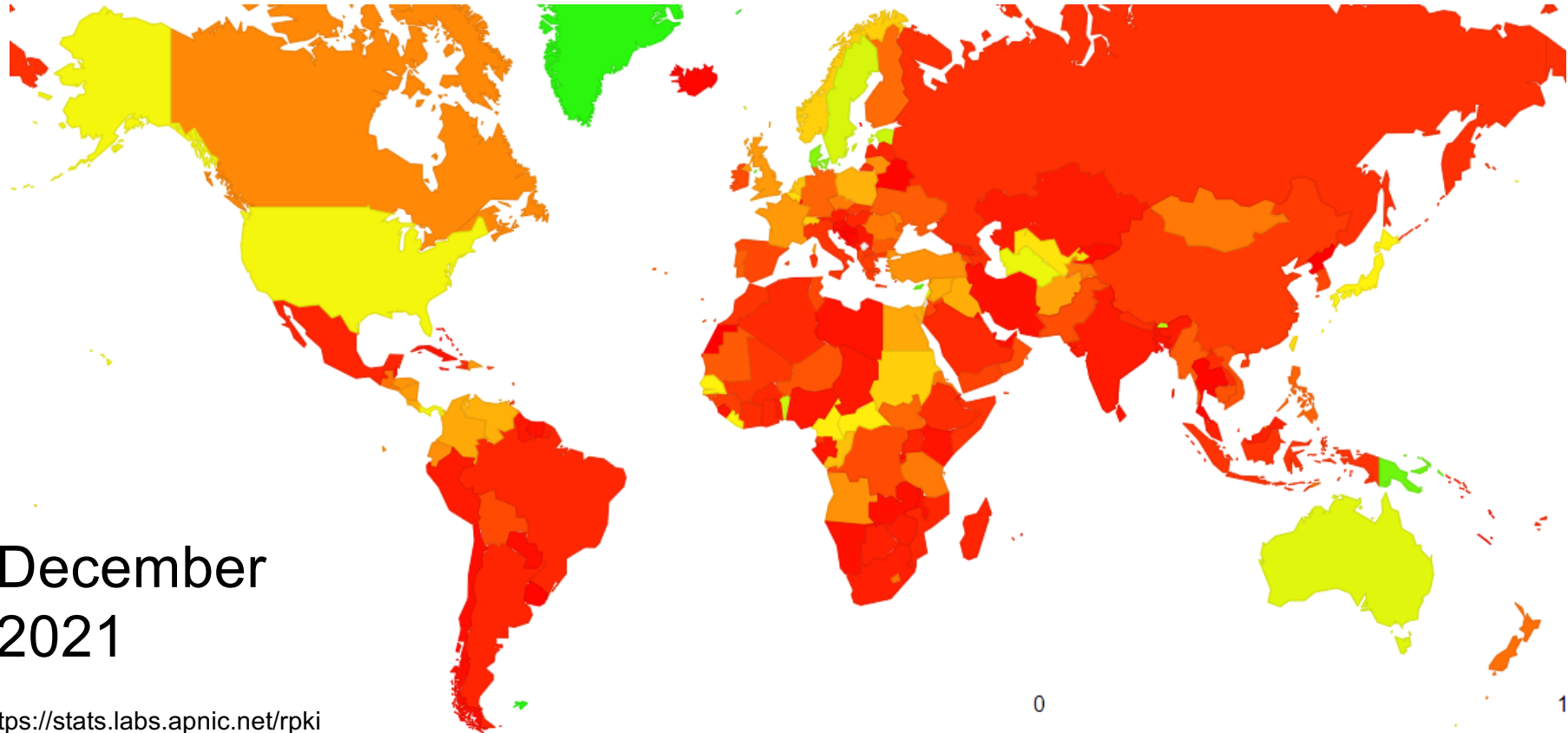
# Registry Services

- Historical resource registration will no longer be published in the APNIC Whois Database

```
% [whois.apnic.net]
% Whois data copyright terms      http://www.apnic.net/db/dbcopyright.html

%ERROR:101: no entries found
%
% No entries found in source APNIC,JPNIC,KRNIC,TWNIC,IDNIC,IRINN-GRS.

% This query was served by the APNIC Whois Service version 1.88.16 (WHOIS-AU1)
```

# Registry Services

- Resources will be placed into reserved status

```
apnic|JP|ipv4|27.98.0.0|32768|20100520|allocated|A926971F
apnic|JP|ipv4|27.98.128.0|16384|20100520|allocated|A926971F
apnic||ipv4|27.98.192.0|4096||reserved|
apnic|CN|ipv4|27.98.208.0|4096|20100525|allocated|A92BC92E
apnic|CN|ipv4|27.98.224.0|8192|20100524|allocated|A92FBBB4
```

# Registry Services

- Resources will be added under APNIC AS0 ROA
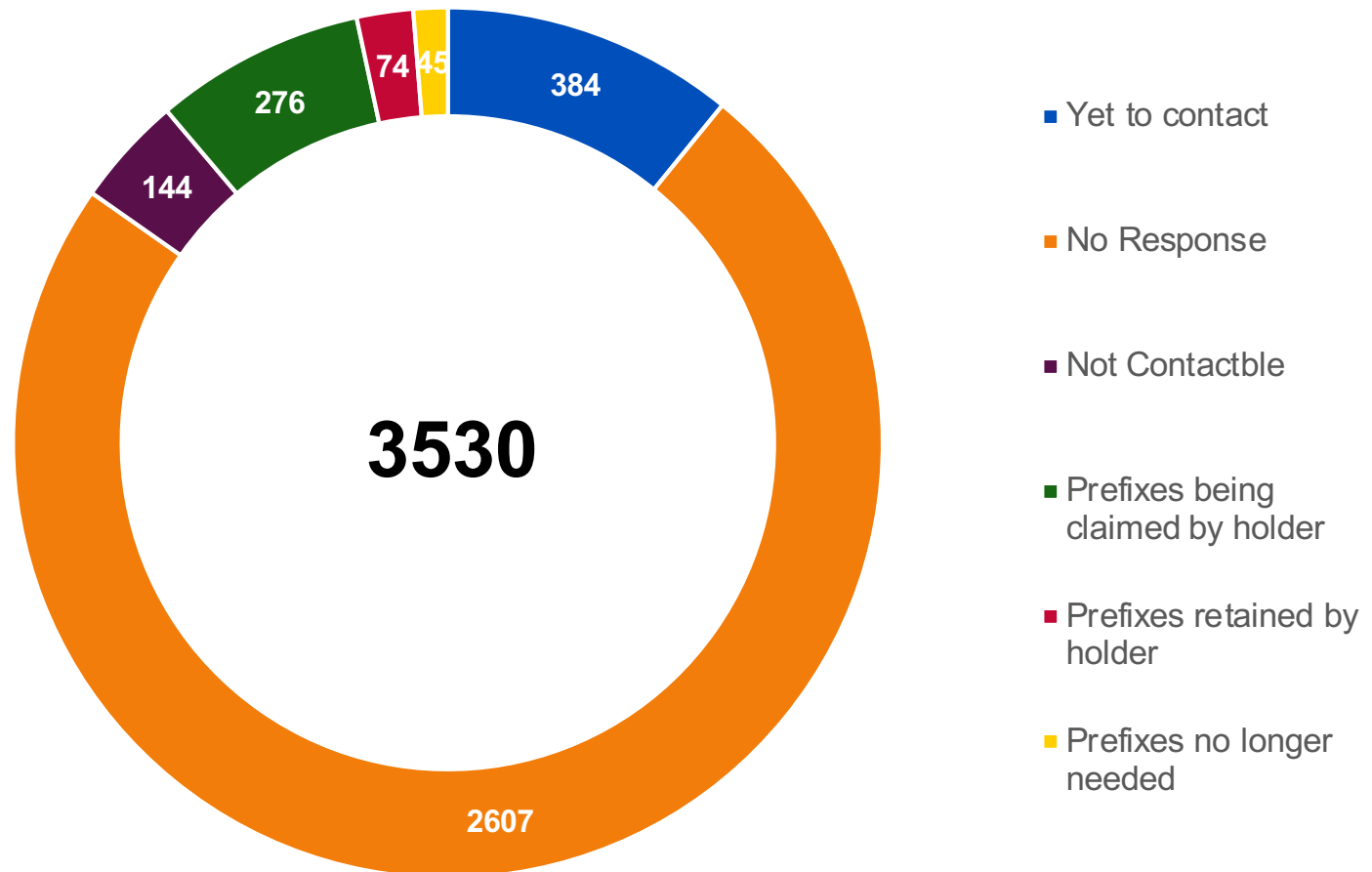
# Number of historical prefixes

| Prefix size | Number of prefixes |
|---|---|
| /15 | 1 |
| /16 | 85 |
| /17 | 1 |
| /18 | 3 |
| /19 | 10 |
| /20 | 38 |
| /21 | 59 |
| /22 | 183 |
| /23 | 404 |
| /24 | 3147 |

**Total number of prefixes: 3931**
**Total number of cases: 3530**

# Process to contact historical custodians

i.  Email whois contact associated with the prefix

ii. Search for alternate contacts via company registry, company website, web searches etc

iii. If prefix is being routed, contact ASN to identify custodian

# Case outcomes



- Yet to contact
- No Response
- Not Contactble
- Prefixes being claimed by holder
- Prefixes retained by holder
- Prefixes no longer needed

384

2607

144

276

74 45

**3530**

# Next steps

- Original custodians of historical IPv4 addresses
  - Sign-up as Members (most cost-effective option)
    - Associate Membership fee of AUD 500 per annum
    - This fee has been waived for the 12-months
    - First invoice from APNIC on the anniversary of your sign-up on renewal of your membership
    - Regular fee will apply for 'current' resources
  - Historical resource maintenance fee for Non-Membership accounts will be removed from the APNIC Non-Member Fee Schedule effective 1 January 2023
    - Convert to Associate Member (AUD 500) in 2023. Historical resources will not be considered in your fee calculation

# Next steps

- If you have acquired the original custodian as a result of business acquisition, merger or takeover
  - Required to setup a Member Account and transfer the resources under the Historical resource transfer policy

- APNIC trying to contact custodians of historical IPv4 address space

- Any queries contact your friendly APNIC Helpdesk!
  - https://help.apnic.net/s/contactsupport

# Questions ?