

IRRd Now turned up to 11!



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What is IRRd?

- An internet routing registry database server
- Somewhat similar role as the RIPE database
- Authoritative updates
- Mirroring other IRRs and mirroring to others
- Query interface



Development principles

- BSD 2-Clause licensed
- Complete rewrite of v2/3
- Python 3 & PostgreSQL
- Planned for future expansion
- Strict requirements on data validation and consistency
- “100%” coverage unit tests
- Extensive documentation



IRRD 4.0

- First IRRd 4 release
- Feature parity with IRRd v2/3, no significant new features, but foundation has been laid to innovate
- Released May 2019
- Deployed on `rr.ntt.net`, `rr.arin.net`, `irr.lacnic.net`, etc



IRRD 4.1

- Released September 15th, 2020
- First big step in innovation
- Performance improvements
- Scope filtering
- Synthetic NRTM
- Many small improvements
- ... and



RPKI-aware mode

RIPE-731 style

- Fully automated RPKI validation on route(6) objects with RFC6811 origin validation
- RPKI-invalid objects hidden from output, rejected in auth updates
- Mirrors do not receive invalid objects
- Continuous updates, including mirror status
- Automated IRR conversion

```
route:        61.113.0.0/16
descr:        OCN (AS4713) CIDR BLOCK 29
               NTT Communications Corporation
               1-1-6 Uchisaiwai-cho, Chiyoda-ku
               Tokyo 100-8019 JAPAN
origin:       AS4713
mnt-by:       MAINT-AS4713
changed:      admin@ocn.ad.jp 20070423
source:       NTTCOM
rpki-ov-state: valid
```

```
route:        61.112.0.0/15
descr:        RPKI ROA for 61.112.0.0/15 / AS4713
remarks:      This AS4713 route object represents routing data retrieved
               from the RPKI. This route object is the result of an automated
               RPKI-to-IRR conversion process performed by IRRd.
max-length:   24
origin:       AS4713
source:       RPKI # Trust Anchor: apnic
```

```
route:          93.175.147.0/24
descr:          RPKI ROA for 93.175.147.0/24 / AS196615
remarks:        This AS196615 route object represents routing data retrieved
                from the RPKI. This route object is the result of an automated
                RPKI-to-IRR conversion process performed by IRRd.
max-length:     24
origin:         AS196615
source:         RPKI # Trust Anchor: ripe
```



```
route:          93.175.147.0/24
descr:          RPKI ROA for 93.175.147.0/24 / AS196615
remarks:        This AS196615 route object represents routing data retrieved
                from the RPKI. This route object is a result of an automated
                RPKI-to-IRR conversion process performed by IRRd.
max-length:     24
origin:         AS196615
source:         RPKI # Trust Anchor: ripe
```

```
route:          93.175.147.0/24
descr:          RIPE-NCC-RIS Routing Certification Beacon Prefix (invalid ROA)
mnt-by:         RIPE-NCC-RIS-MNT
origin:         AS12654
pingable:       93.175.147.1
ping-hdl:       DUMY-RIPE
created:        2010-12-13T16:14:50Z
rpki-ov-state: invalid
```

DISABLED
RPKI FILTER

Implementation

Periodic updates

- Periodic local import of all ROAs
- All current route(6) objects checked
- If object state changed:
 - Update local object metadata
 - Create NRTM ADD/DEL for mirrors
- Ensures all object status is eventually correct, mirrors have no RPKI-invalid objects

Implementation

NRTM & auth changes

- All authoritative changes validated against local RPKI data.
- Invalid? Object creation rejected.
- All NRTM ADD of route(6) validated against local data.
- Invalid? Store locally, but with RPKI-invalid flag, do **not** create NRTM ADD in local journal.

Source	route obj	invalid	r6 obj	invalid	
AFRINIC	90222	52	976	5	0.06%
ALTDB	14461	7	2135	86	0.56%
APNIC	413845	5448	210460	963	1.03%
ARIN	37135	474	7545	26	1.12%
-NONAUTH	53896	1672	2930	56	3.04%
BBOI	922	20	165		1.84%
BELL	29601	31	18		0.10%
JPIRR	10927	16	844	4	0.17%
LEVEL3	91259	4582	1117	99	5.07%
NTTCOM	438982	29190	6257	565	6.68%
RADB	1246893	134839	122929	6113	10.29%
RGNET	122	31	5		24.41%
RIPE	343246	3	37002		0.00%
-NONAUTH	56584	21	1573		0.04%
TC	11144	78	7773	57	0.71%
Total	2993917	176464	427292	7974	5.39%

Impact

Universal method to rid the ecosystem of stale or fraudulent IRR data, paving the way towards an eventual sunset of IRR

- RPKI information - if present - is the most authoritative source about the resource holder's intentions
- There are ~184.000 route(6) objects that are RPKI-invalid
- ... or 5.4% of all route(6) objects
- ... or 10% of RADB route(6)
- Hidden by default in IRRd 4.1
- Planned for deployment on rr.ntt.net



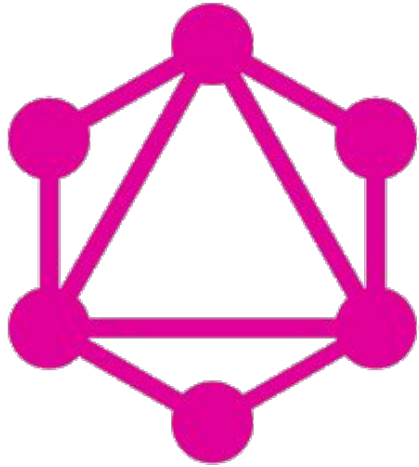
*Coming soonTM in
IRRd 4.2...*

Ancient interfaces

whois, smtp, all plain-text

- Whois is entirely plain-text
- Zero security or authentication
- Inconsistent query and output formats
- Limited flexibility
- Requires a lot of text parsing





GraphQL

<live demo>

IRRD community
support

INTERNET 
STIFTELSEN



NET

NOD



Thank you!

<https://github.com/irrdnet/irrd4>



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