Comparison of Internet routing DBs and BGP

in Danube region, Europe and whole RIPE NCC service region

Tomáš Hlaváček • tomas.hlavacek@nic.cz
CEE Peering Days 30. 3. 2016

cz.nic | CZ DOMAIN REGISTRY

Data collection

- Started in March 2012

    - BGP

    - RIPE DB snapshots

- Analysis compiled in July 2015

    - Limited to RIPE DB / RIPE NCC service region

- OSS analysis tool written in Python
  https://github.com/tmshlvck/bgpcrunch

Data analysis

- Volumetric and "quality" stats from BGP

- BGP origin to route{,6} objects → stats & text

- AS-paths

  - aut-num objects for each AS in AS-path

  - import & export filters

  - → statistics & detailed text output

Origin

BGP:

```
      Network           Next Hop        Metric LocPrf Weight Path
*    217.31.192.0/20 91.210.16.16          11    240      0 15685 25192 i
*                    91.210.16.205          1    240      0 25248 25192 i
*                    91.210.16.3            1    240      0 25192 i
*>i                  217.31.48.125          1    256      0 25192 i
```

RIPE DB:

```
route:           217.31.192.0/20
descr:           CZNIC - NET
origin:          AS25192
member-of:       RS-CZ-NIC
mnt-by:          CZ-NIC-MNT
created:         2002-08-28T14:54:30Z
last-modified:   2009-10-08T11:26:22Z
source:          RIPE # Filtered
```
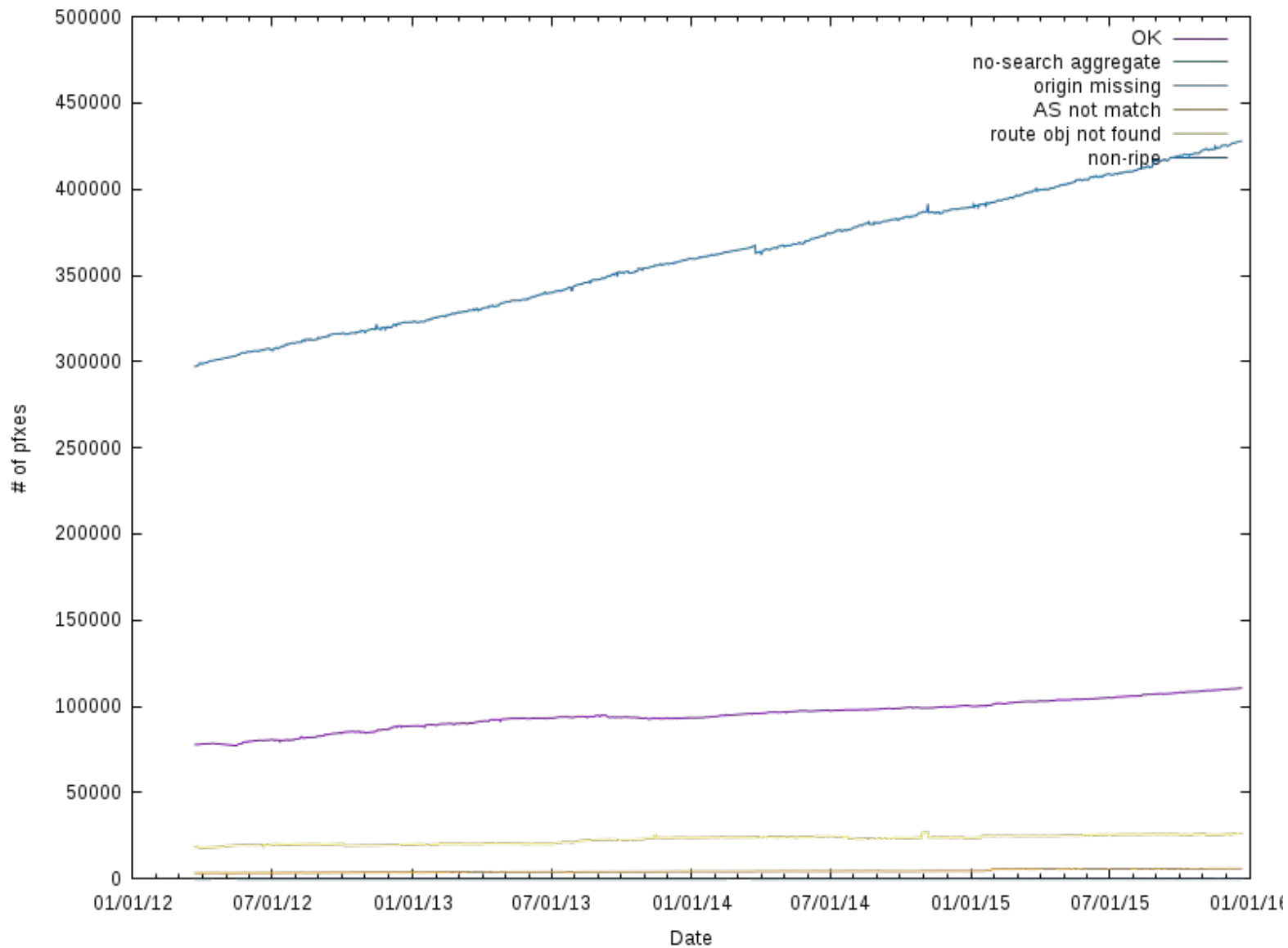
Origin validation – IPv4 (2015-06-21)

- OK: 104 778 (77.0%)

- route obj not found: 25 555 (18.8%)

- AS not match: 5778 (4.2%)

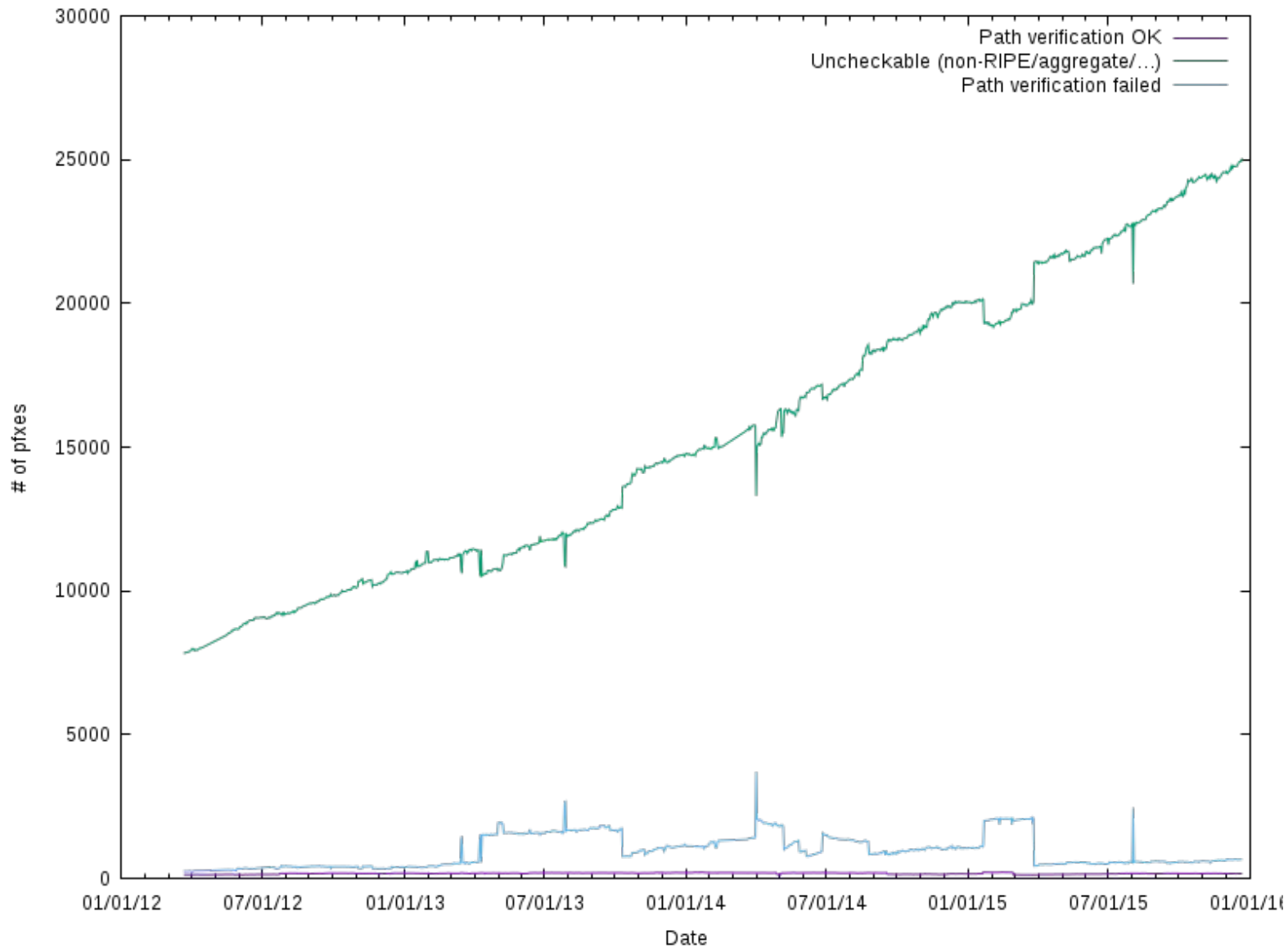- non-ripe: 407 049

Origin validation - IPv4

Origin validation – IPv6 (2015-06-21)

- OK: 7113 (80.7%)

- route obj not found: 1498 (17.0%)

- AS not match: 204 (2.3%)

- non-ripe: 13 837

Origin validation - IPv6

AS path

BGP:

```
      Network          Next Hop      Metric LocPrf Weight Path
*     217.31.192.0/20 91.210.16.16       11    240       0 15685 25192 i
*                     91.210.16.205       1    240       0 25248 25192 i
*                     91.210.16.3         1    240       0 25192 i
*>i                   217.31.48.125       1    256       0 25192 i
```

RIPE DB (AS25192):

```
aut-num:      AS25192
as-name:      CZNIC-AS
descr:        CZ.NIC, z.s.p.o.
org:          ORG-Cz1-RIPE
mp-import:    afi any.unicast from AS25192:AS-IX accept ANY
mp-export:    afi any.unicast to AS25192:AS-IX announce AS-CZNIC
```

AS25192:AS-IX :

```
as-set:    AS25192:AS-IX
descr:     Exchange Points
members:   AS-ANY
```

CZ.NIC | CZ DOMAIN REGISTRY

AS path (cont.)

AS-CZNIC:

```
as-set:    AS-CZNIC
members:   AS25192
```

AS29134:

```
aut-num:        AS29134
org:            ORG-Is1-RIPE
as-name:        IGNUM-AS
descr:          Ignum s.r.o.
descr:          Czech Republic
...
export: to AS25192 announce AS-IGNUM-NIX
import: from AS25192 action pref=256; accept ANY AND NOT fltr-bogons
```

fltr-bogons:

```
filter-set:        fltr-bogons
descr:             All bogon IPv4 prefixes.
filter:            fltr-unallocated OR fltr-martian
```
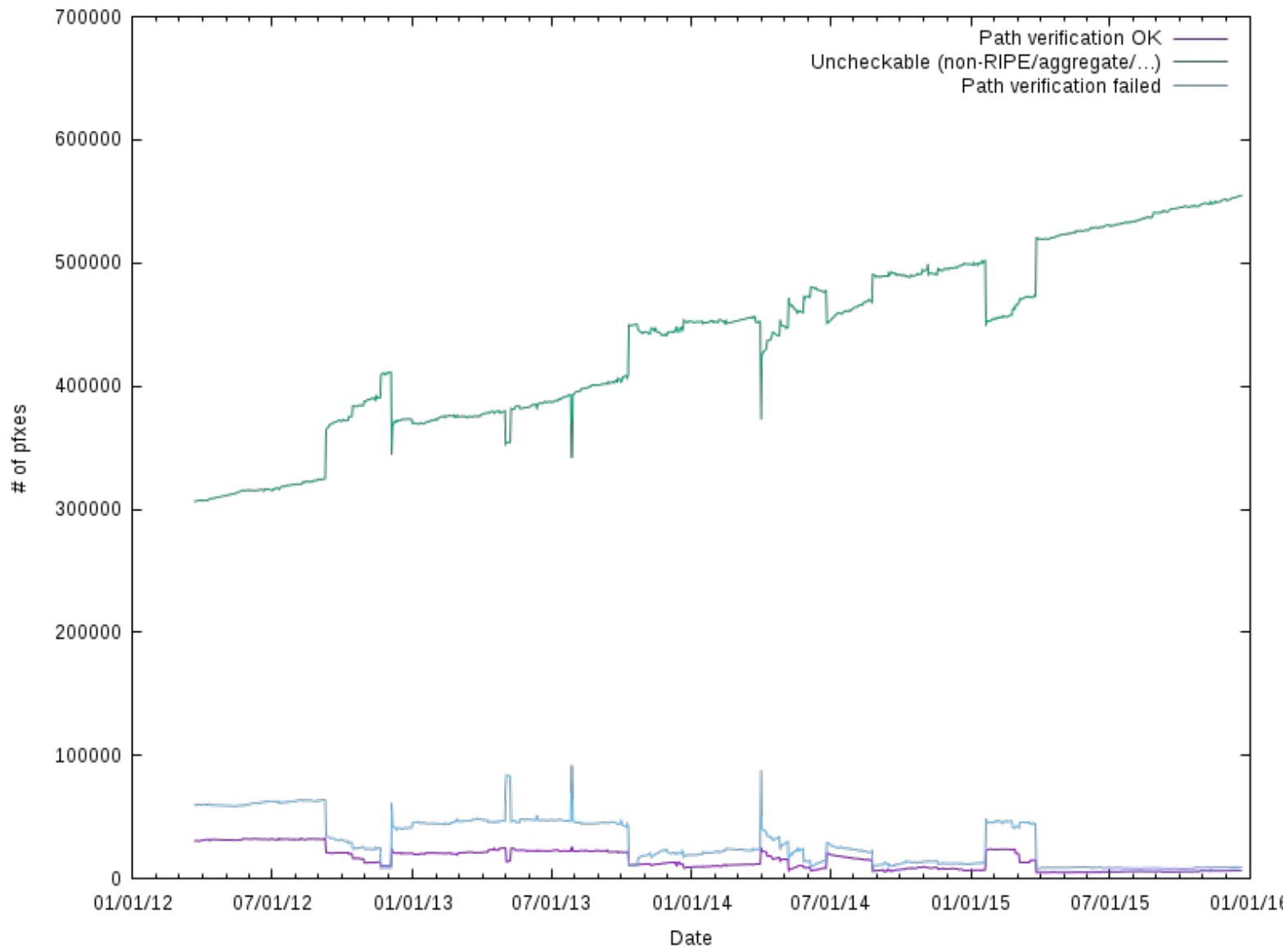
AS-path check – IPv4 (2015-06-21)

- Path verification OK: 8443 (37.3%)

- Path verification failed: 14168 (62.7%)

- N/A (non-RIPE/aggregate/...): 476 982

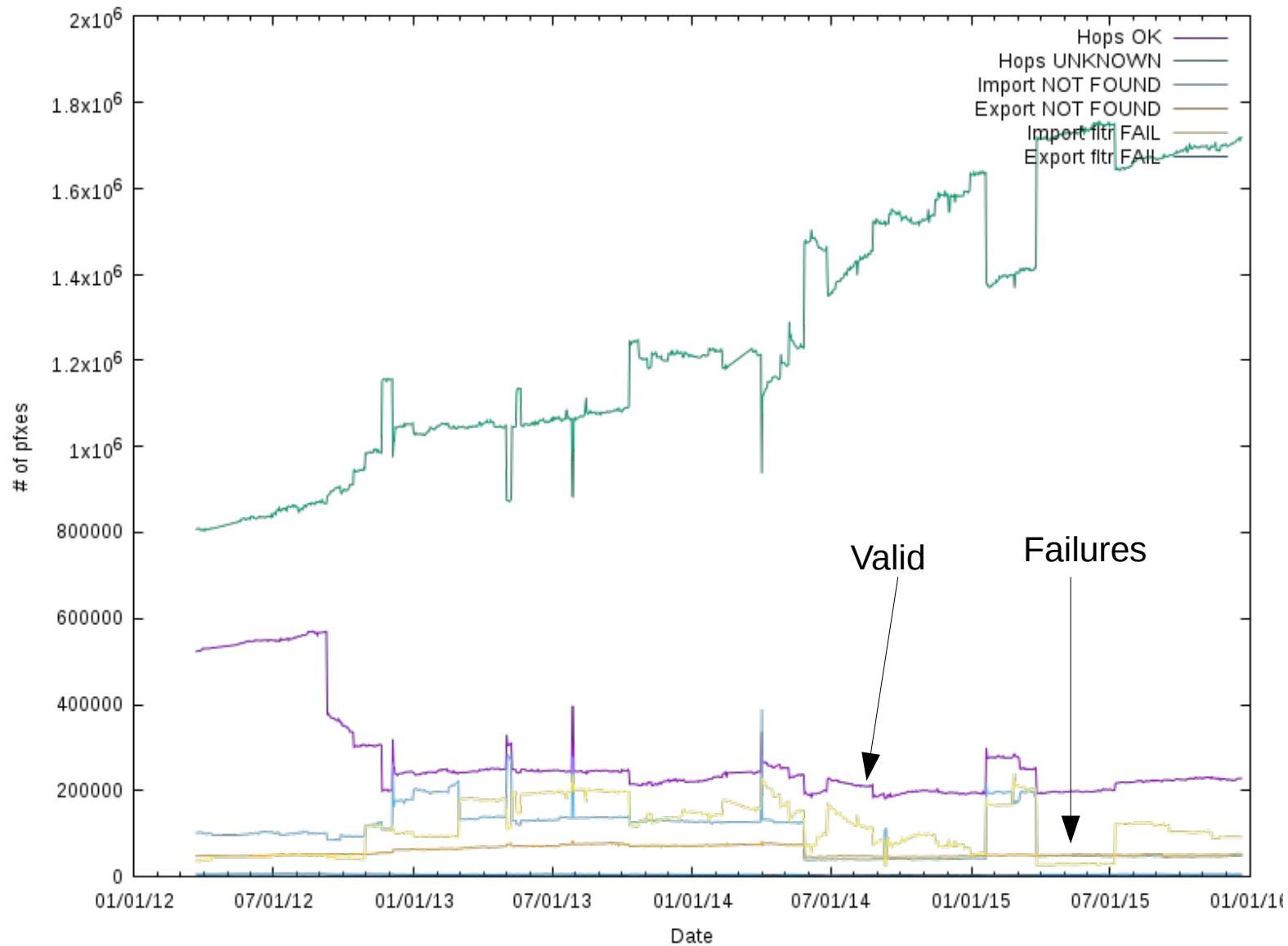# AS-path validation timeline - IPv4

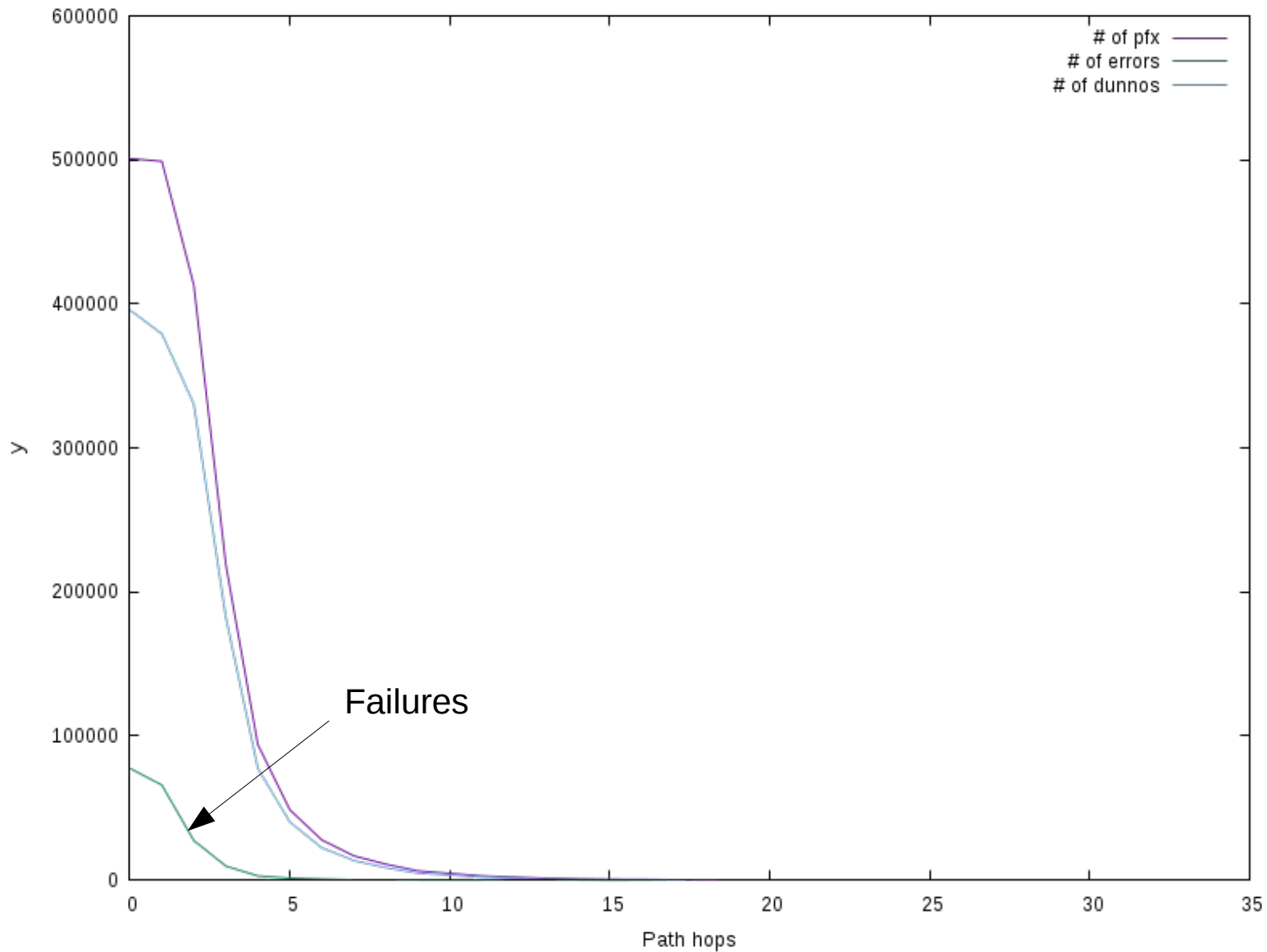# Hops in AS-paths – IPv4 (2015-06-21)

- Hops valid: 199 390 (51.2%)

- Total errors: 189 759 (48.8%)

  - import filter not-found: 40 118 (10.3%)

  - import filter failed: 99 608 (25.6%)

  - export filter not-found: 46 162 (11.9%)

  - export filter failed: 3 871 (1.0%)

- Unknown (non-RIPE/...): 1 455 575

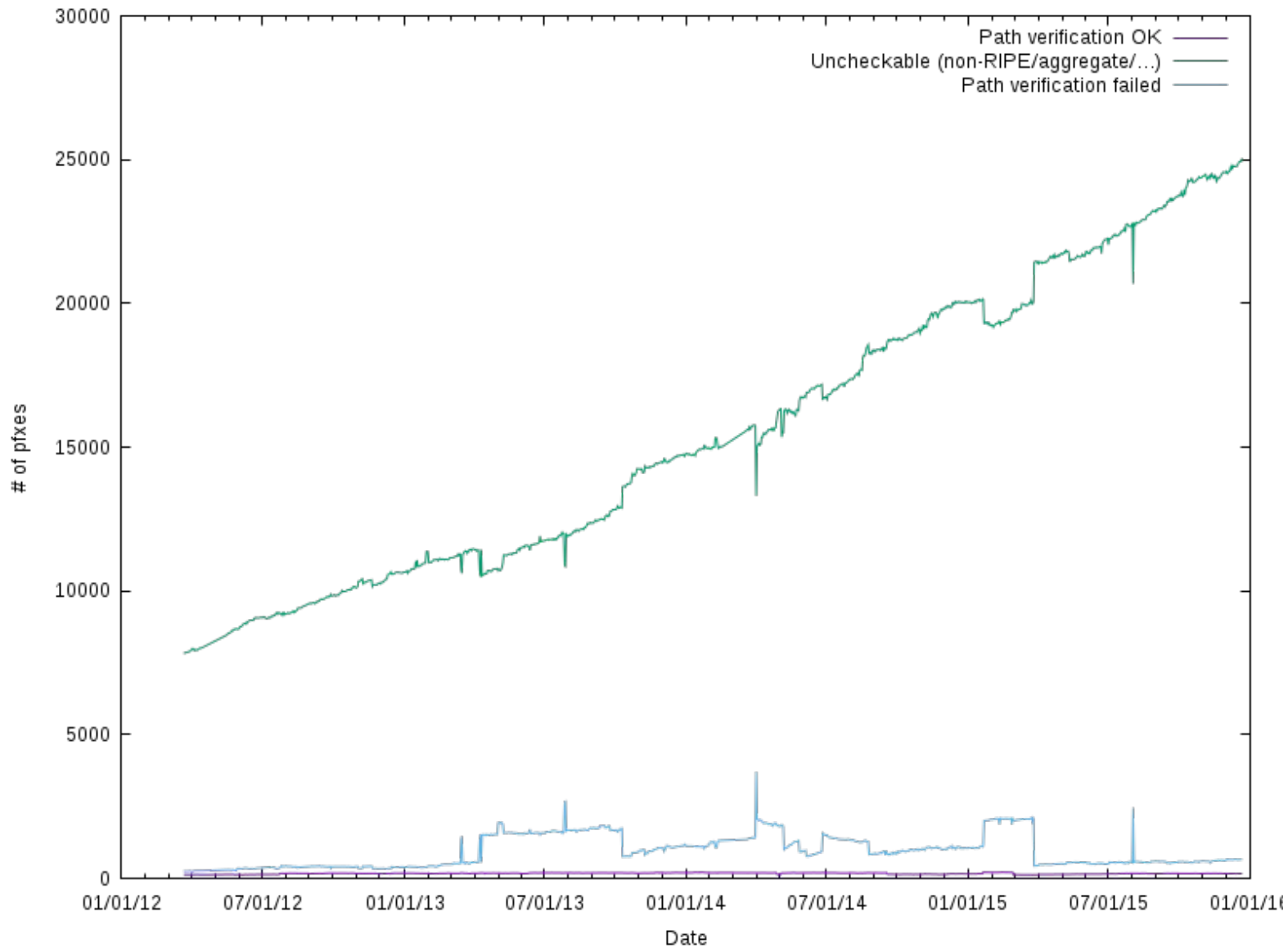# Validation of hops - IPv4

Validation of hops - IPv4

AS-path check – IPv6 (2014-06-21)

- Path verification OK: 159 (23.2%)

- Path verification failed: 525 (76.8%)
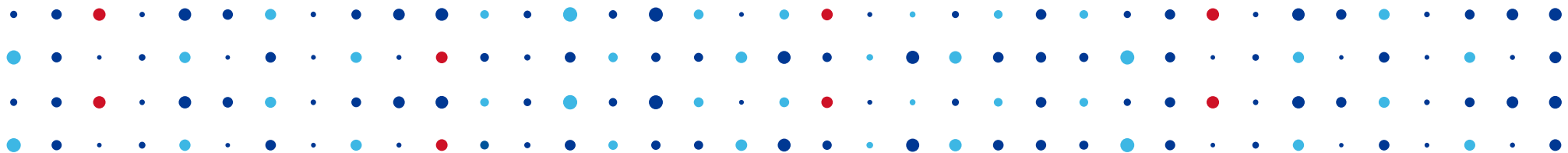

- N/A (non-RIPE/aggregate/...): 21984

AS-path validation timeline - IPv6

Conclusion

- Complete results reveal much more interesting facts!

- Would the overall result be different with all IRRs and the whole DFZ?

- What can we do to make the situation better?

  - More software?

  - More documentation?

  - RDL?

Thank You

Tomáš Hlaváček • tomas.hlavacek@nic.cz

Complete results

http://bgpcrunch.labs.nic.cz/