

Do we still need [unauth] IRR?

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ISOC - Network Resources

```
inetnum:      103.162.142.0 - 103.162.143.255
netname:      ISAL-SG
descr:        Internet Society Asia Limited
descr:        3 Temasek Avenue Level 21 Centennial Tower
country:      SG
org:          ORG-ISAL1-AP
admin-c:      ISAL1-AP
tech-c:       ISAL1-AP
abuse-c:      AI706-AP
status:       ASSIGNED PORTABLE
remarks:      -----
remarks:      To report network abuse, please contact mnt-irt
remarks:      For troubleshooting, please contact tech-c and admin-c
remarks:      Report invalid contact via www.apnic.net/invalidcontact
remarks:      -----
mnt-by:       APNIC-HM
mnt-routes:   MAINT-ISAL-SG
mnt-irt:      IRT-ISAL-SG
last-modified: 2021-02-05T03:52:16Z
source:       APNIC
```

```
% Information related to '103.162.142.0/24AS141384'
route:        103.162.142.0/24
origin:       AS141384
descr:        Internet Society Asia Limited
descr:        3 Temasek Avenue Level 21 Centennial Tower
mnt-by:       MAINT-ISAL-SG
last-modified: 2022-02-10T02:19:58Z
source:       APNIC
```

```
% Information related to '103.162.143.0/24AS141384'
route:        103.162.143.0/24
origin:       AS141384
descr:        Internet Society Asia Limited
descr:        3 Temasek Avenue Level 21 Centennial Tower
mnt-by:       MAINT-ISAL-SG
last-modified: 2022-01-27T10:06:57Z
source:       APNIC
```

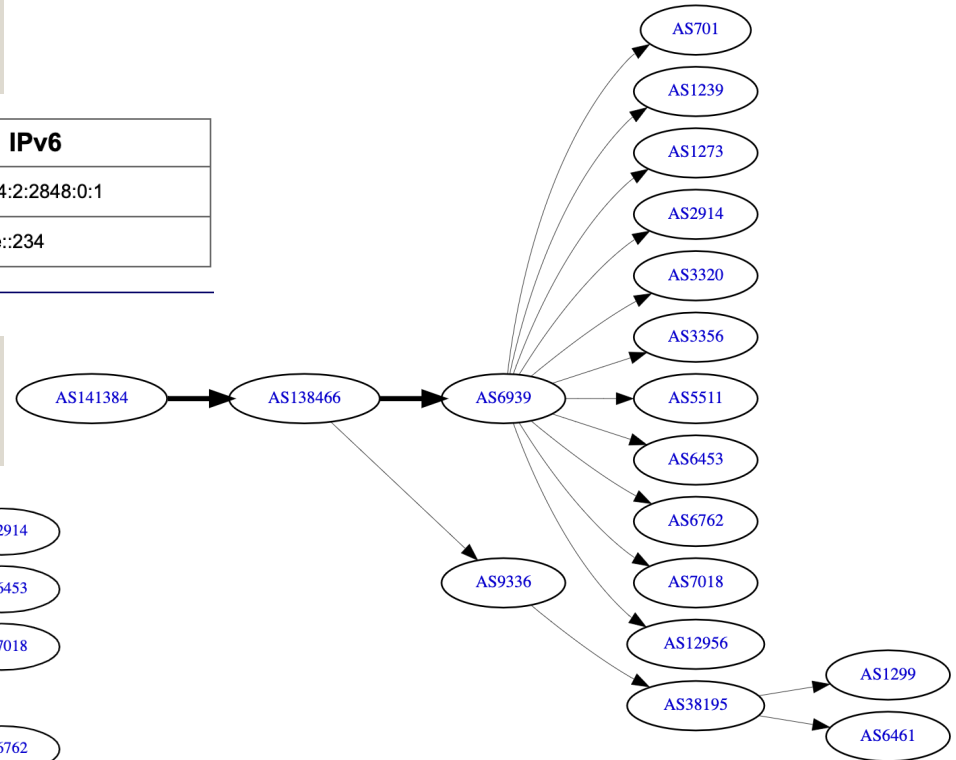


ISOC - Network Connectivity

AS141384 IPv6 Route Propagation

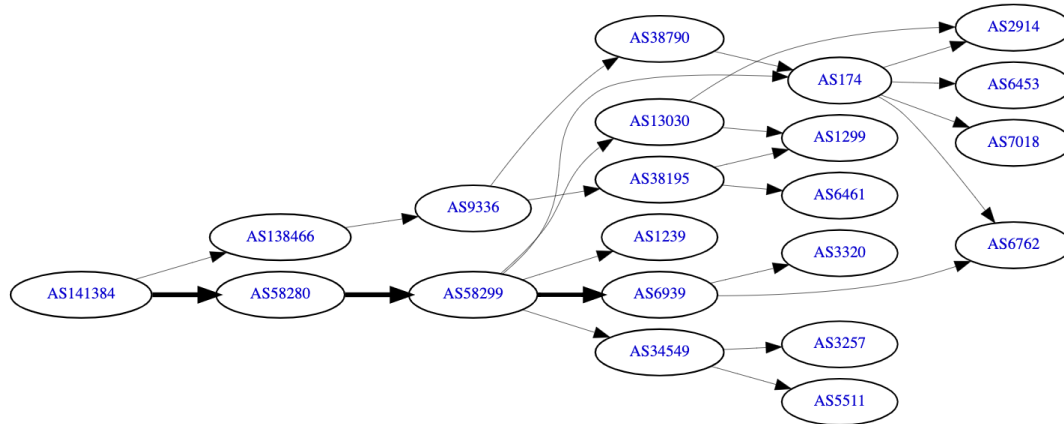
Exchange	CC	City	IPv4	IPv6
<u>IX Australia NSW</u>	 AU	Sydney	218.100.53.78	2001:7fa:11:4:2:2848:0:1
<u>IXP.ge</u>	 GE	Tbilisi	185.1.224.234	2001:7f8:11e::234

Updated 14 Aug 2022 13:46 PST © 2022 Hurricane Electric



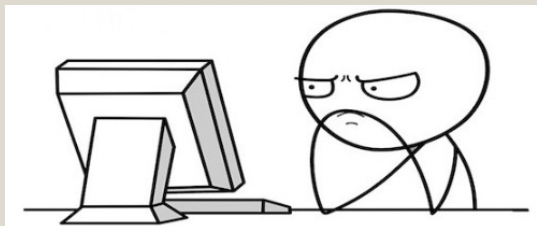
Updated 14 Aug 2022 13:46 PST © 2022 Hurricane Electric

AS141384 IPv4 Route Propagation



Updated 14 Aug 2022 13:46 PST © 2022 Hurricane Electric

RADb – HOW/WHY ?????



```
route: 103.162.142.0/24
origin: AS141384
descr: Proxy route
remarks: Proxy route
mnt-by: MAINT-AS7545
changed: core-neteng-support@tpg.com.au 20220203 #06:17:44Z
source: RADB
```

```
route: 103.162.142.0/23
origin: AS141384
descr: Proxy route
remarks: Proxy route
mnt-by: MAINT-AS7545
changed: core-neteng-support@tpg.com.au 20220203 #06:16:55Z
source: RADB
```

```
route: 103.162.142.0/24
descr: Proxy route object registered by AS2764
origin: AS38790
remarks: This route object was created by AAPT on behalf of a customer.
remarks: As some of AAPT's upstream networks filter based on IRR objects,
remarks: this route object has been created to ensure that the advertisement
remarks: of this prefix is not rejected.
notify: routing.shared@aapt.com.au
mnt-by: MAINT-AS2764
changed: nobody@aapt.com.au 20210902
source: RADB
```

```
route: 103.162.142.0/23
descr: Proxy route object registered by AS38195
origin: AS141384
remarks: This route object was created by Superloop on behalf of a customer.
notify: au.noc@superloop.com
mnt-by: MAINT-AS38195
changed: au.noc+irt@superloop.com 20220116
source: RADB
```

```
route: 103.162.142.0/23
descr: Proxy route object registered by AS2764
origin: AS38790
remarks: This route object was created by AAPT on behalf of a customer.
remarks: As some of AAPT's upstream networks filter based on IRR objects,
remarks: this route object has been created to ensure that the advertisement
remarks: of this prefix is not rejected.
notify: routing.shared@aapt.com.au
mnt-by: MAINT-AS2764
changed: nobody@aapt.com.au 20210302
source: RADB
```

```
route: 103.162.142.0/23
descr: Proxy route object registered by AS38195
origin: AS141384
remarks: This route object was created by Superloop on behalf of a customer.
notify: peering@superloop.com
mnt-by: MAINT-AS38195
changed: peering@superloop.com 20230219
source: RADB
```

The Problem

Network operators must publicly document their intended routing announcements in the appropriate RIR routing registry, RADb or an RADb-mirrored IRR. This includes ASNs and IP prefixes originating on their own networks, as well as the networks for which they provide transit services.

BUT – neither these prefixes belongs to AS38790 (or ever originated by) nor these objects were created by us.



Reminder – Its an honor System:

IRR eco-system outside RIR jurisdiction is based entirely on trust

- There is no system to validation whether these objects are legitimate
- Lack of reliability of data because of stale objects



Lets Investigate!

We decided to find out who is updating these objects in RADb

There were just too many ways to investigate the IRR data, we (Max Stucchi, Amreesh Phokeer, Aftab Siddiqui) decided to do the following

- Compare RIR delegation file with RADb – (this work)
- Compare data between RIR's IRRdb vs RADb and ALTDB
- All data is publicly available for further review

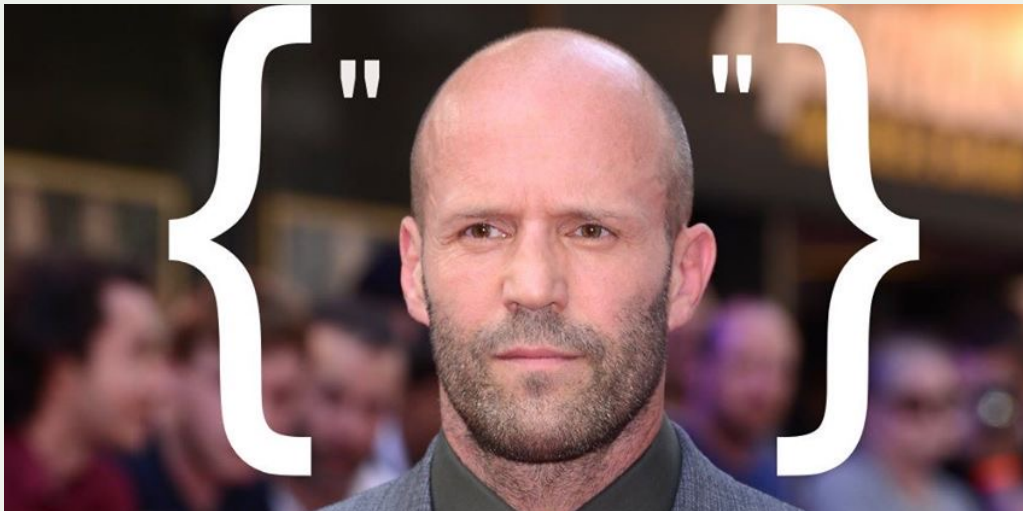


<http://103.162.143.30/route-check/data/>



Data - Snapshot

All route objects are in the JSON format for easy parsing.



```
[
  {
    "prefix": "1.0.0.0/24",
    "status": 4,
    "exacts_count": 0,
    "more_specifics_count": 0
  },
  {
    "prefix": "1.0.1.0/24",
    "status": 4,
    "exacts_count": 0,
    "more_specifics_count": 0
  },
  {
    "prefix": "1.0.2.0/23",
    "status": 4,
    "exacts_count": 0,
    "more_specifics_count": 0
  },
  {
    "prefix": "1.0.4.0/22",
    "status": 1,
    "exact": [
      {
        "descr": "(139763)",
        "origin": "AS56203",
        "mnt": "MAINT-AS2764",
        "last-modified": "nobody@connect.com.au 20120207",
        "source": "RADB",
        "prefix": "1.0.4.0/22"
      },
      {
        "descr": "Proxy route object registered by AS2764",
        "origin": "AS24130",
        "mnt": "MAINT-AS2764",
        "last-modified": "nobody@aapt.com.au 20130219",
        "source": "RADB",
        "prefix": "1.0.4.0/22"
      }
    ]
  },
]
```



ARIN Resource Status

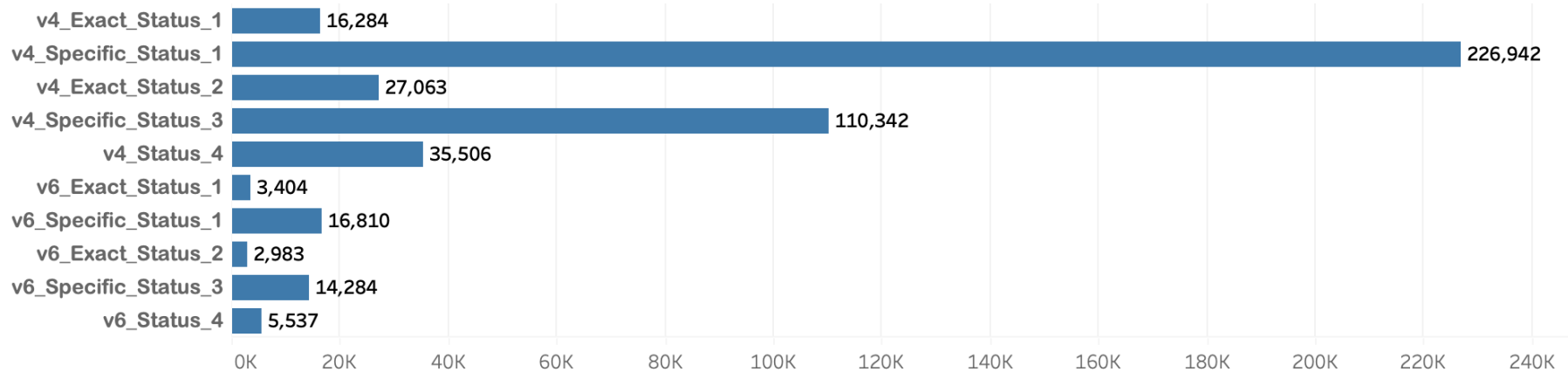
There are 4 – Status types

- Status 1 – There are objects for “**Exact**” allocation size and for “**More Specifics**”
- Status 2 – There are objects only for “**Exact**” allocation size, no “**More Specifics**”
- Status 3 – There are objects only for “**More Specifics**”
- Status 4 – There are no objects (neither “**Exact**” match nor “**More Specifics**”)



ARIN Resource Status v4 and v6

Summary v4 v6



APNIC Resource Status

- As per the APNIC delegation file 1.0.4.0/22 was allocated in 20110412.
- In RADb, there are 4 route objects of “Exact” match

apnic | AU | ipv4 | 1.0.4.0 | 1024 | 20110412 | allocated

<http://ftp.apnic.net/apnic/stats/apnic/delegated-apnic-latest>

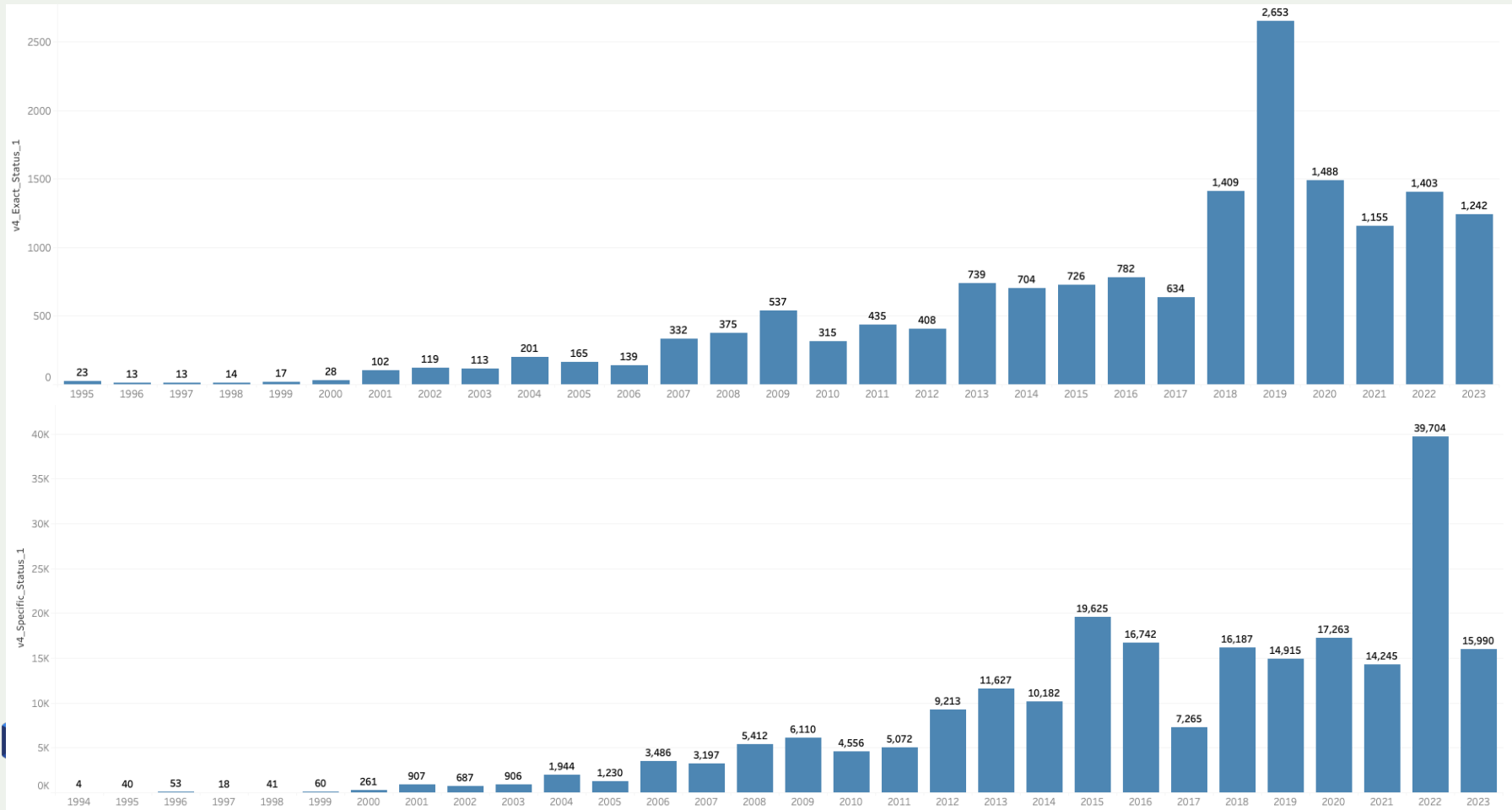


```
[
  {
    "descr": "(139763)",
    "origin": "AS56203",
    "mnt": "MAINT-AS2764",
    "last-modified": "nobody@connect.com.au 20120207",
    "source": "RADB",
    "prefix": "1.0.4.0/22"
  },
  {
    "descr": "Proxy route object registered by AS2764",
    "origin": "AS24130",
    "mnt": "MAINT-AS2764",
    "last-modified": "nobody@aapt.com.au 20130219",
    "source": "RADB",
    "prefix": "1.0.4.0/22"
  },
  {
    "descr": "Proxy route object registered by AS2764",
    "origin": "AS7545",
    "mnt": "MAINT-AS2764",
    "last-modified": "nobody@aapt.com.au 20130628",
    "source": "RADB",
    "prefix": "1.0.4.0/22"
  },
  {
    "descr": "Proxy route object registered by AS2764",
    "origin": "AS38803",
    "mnt": "MAINT-AS2764",
    "last-modified": "nobody@aapt.com.au 20210701",
    "source": "RADB",
    "prefix": "1.0.4.0/22"
  }
]
```

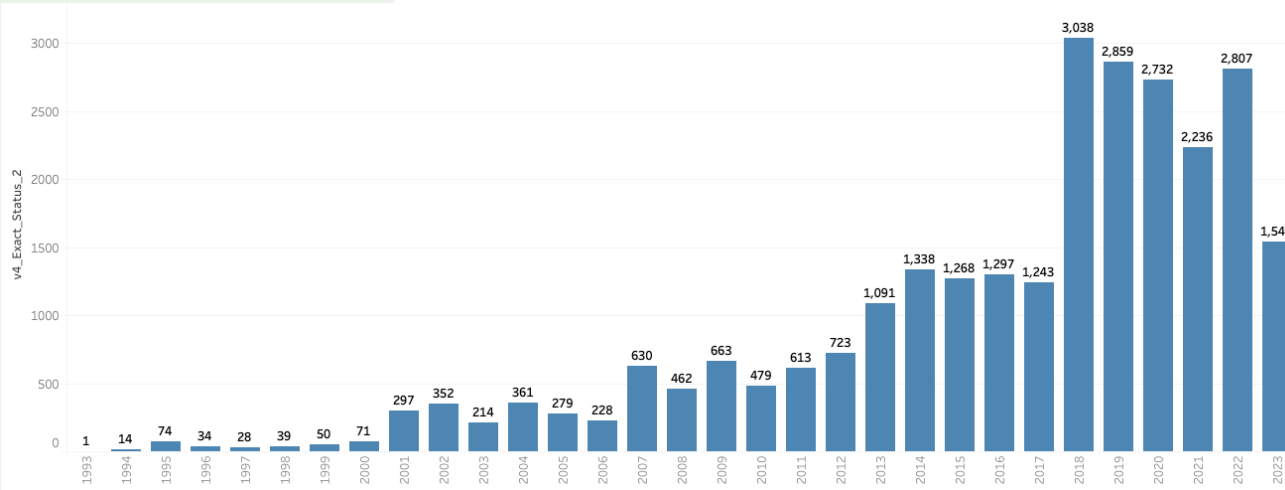
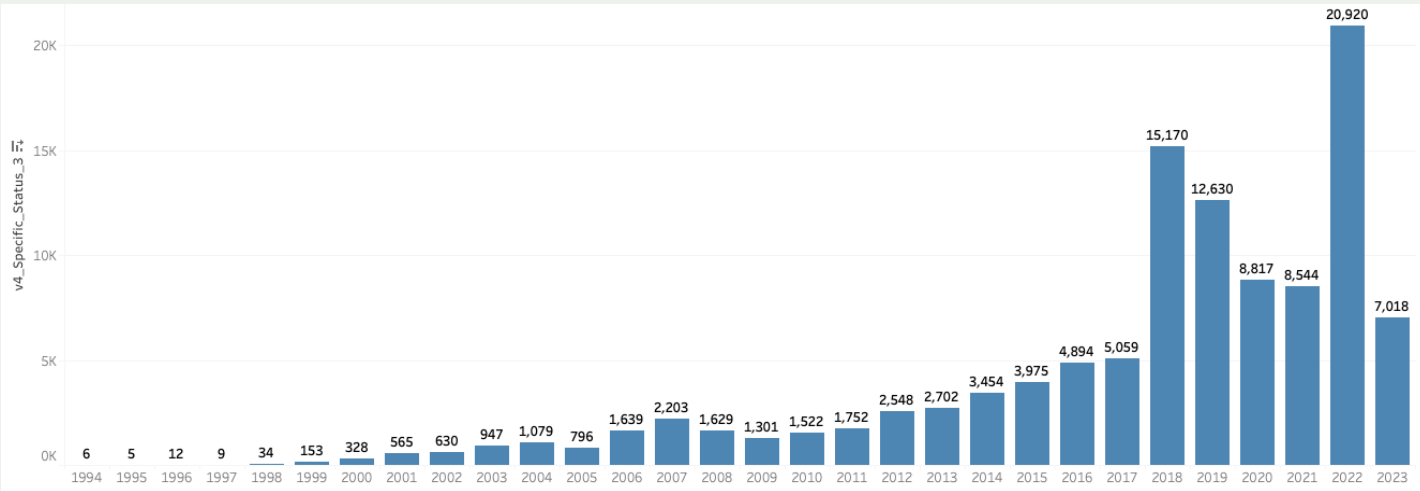
First look at non-problematic data



ARIN IPv4 Resource Status

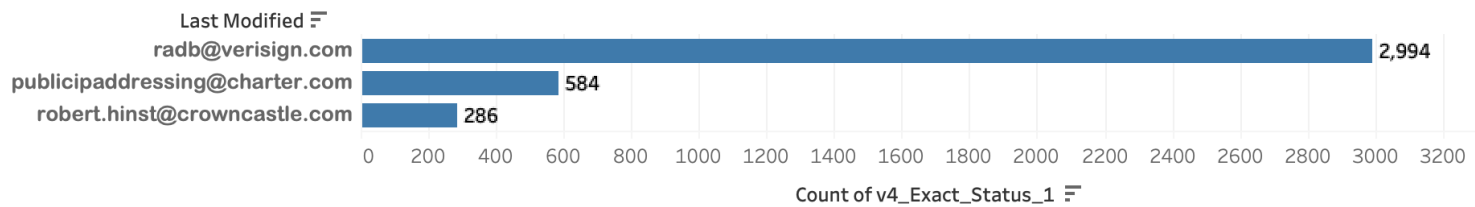


ARIN IPv4 Resource Status

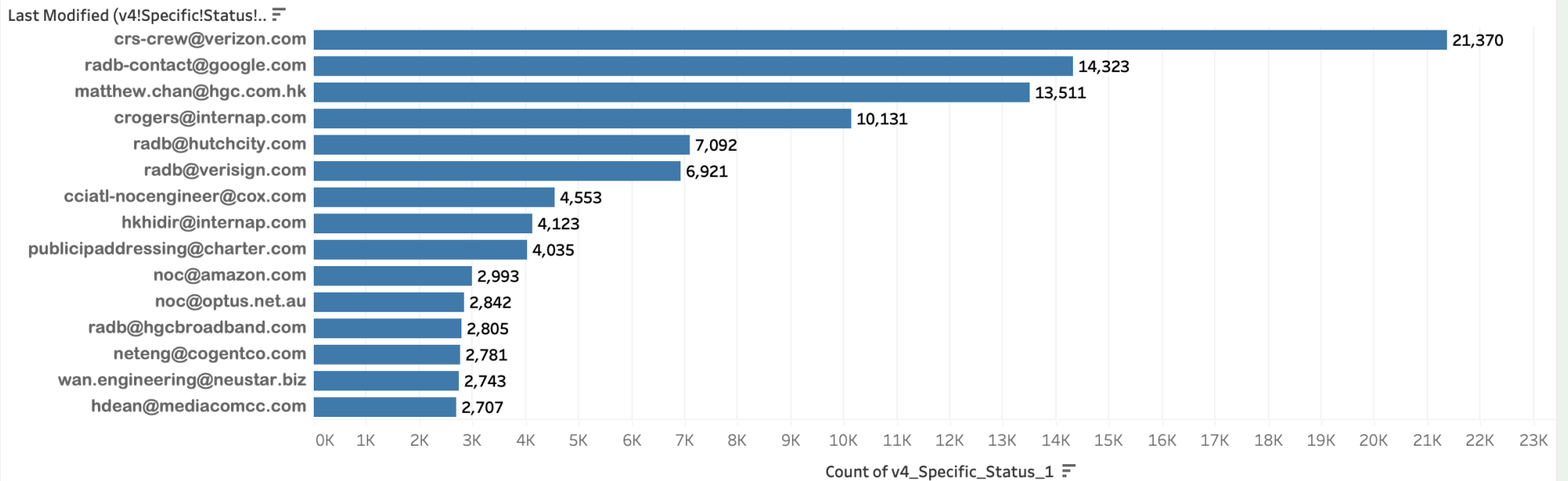


ARIN IPv4 Resource Status

Details Exact 1



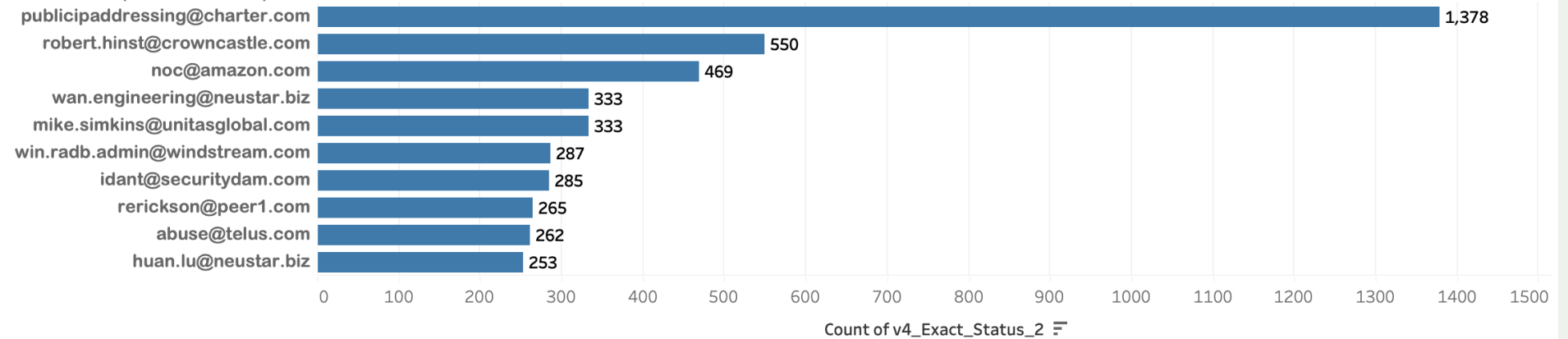
Details Specific 1



ARIN IPv4 Resource Status

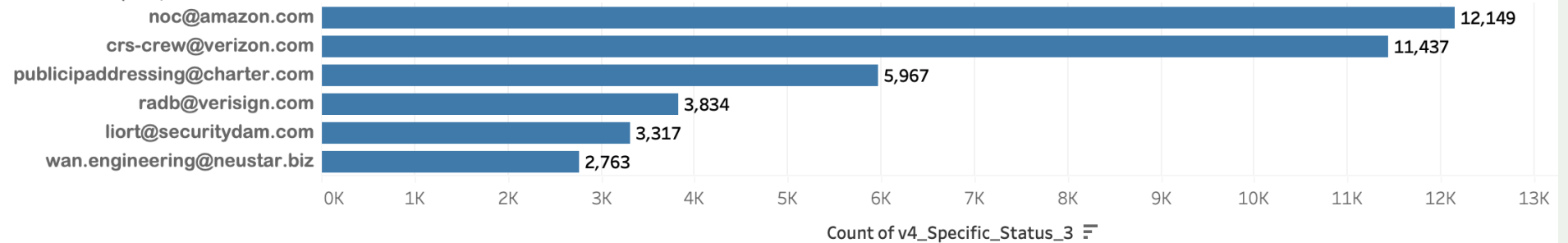
Details Exact 2

Last Modified (v4!Exact!Status!2) 🗑



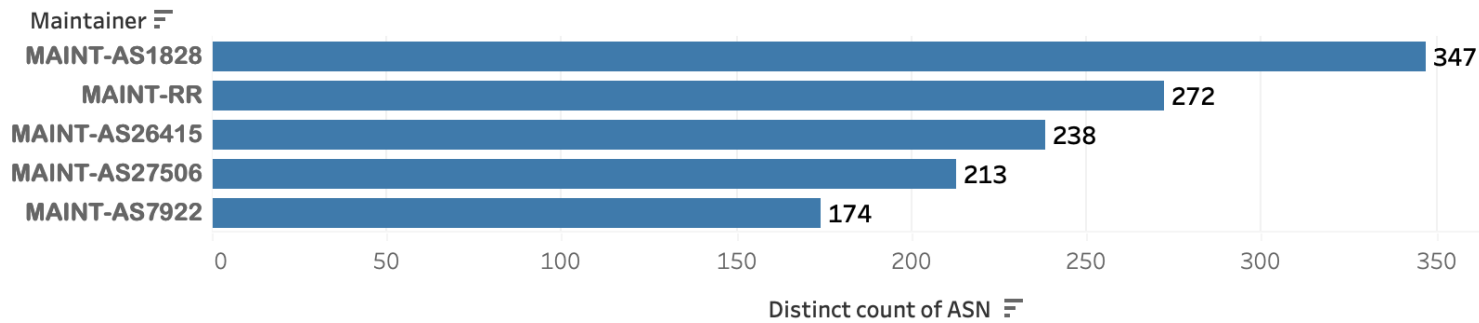
Details Specific 3

Last Modified (v4!Specific!Statu.. 🗑

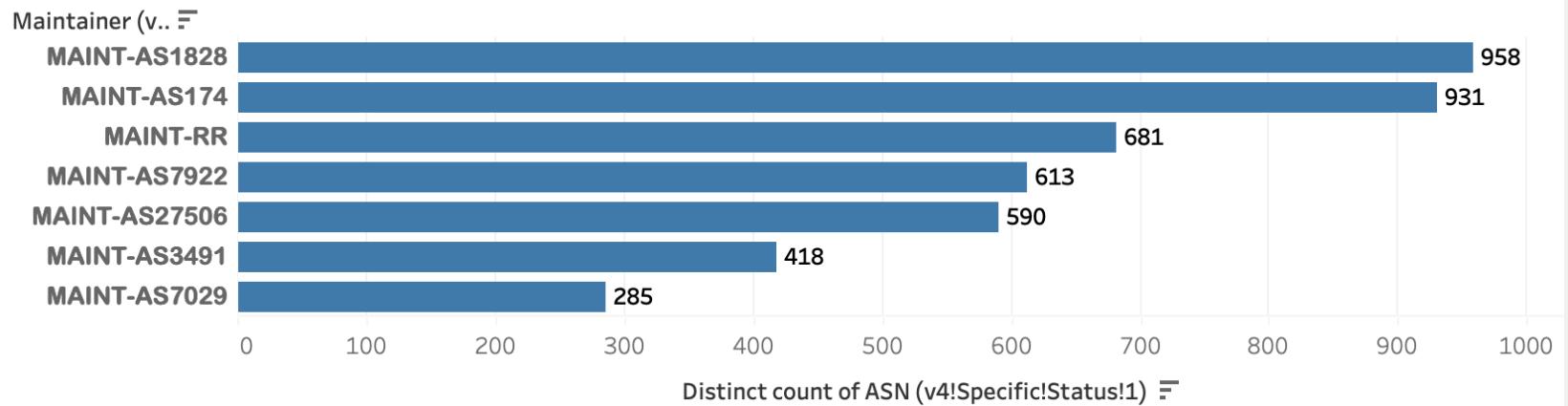


ARIN IPv4 Resource Status

Origin ASN Exact 1



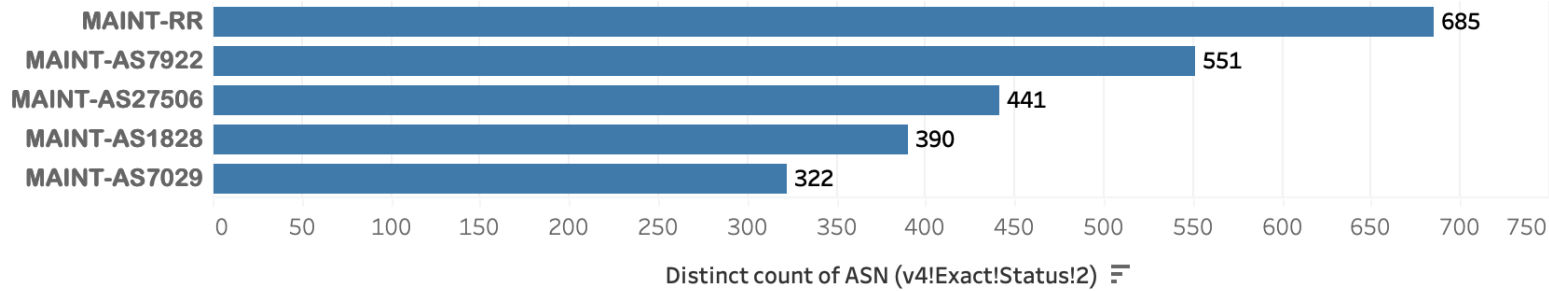
Origin ASN Specific 1



ARIN IPv4 Resource Status

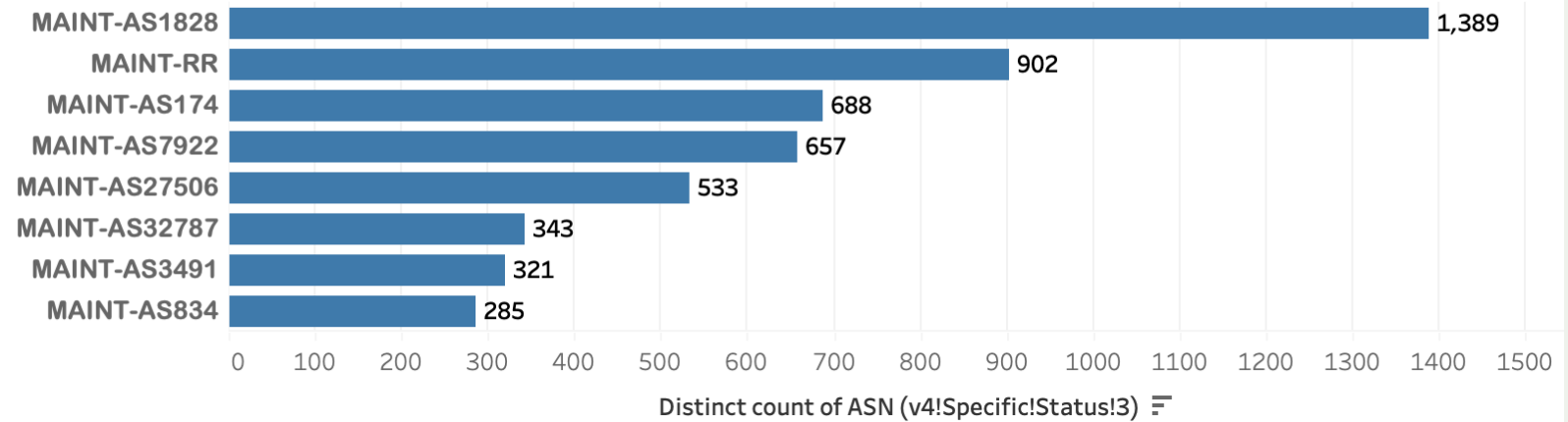
Origin ASN Exact 2

Maintainer (..)



Origin ASN Specific 3

Maintainer (v..)



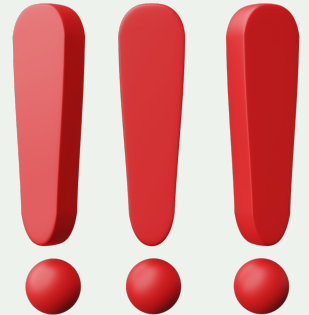
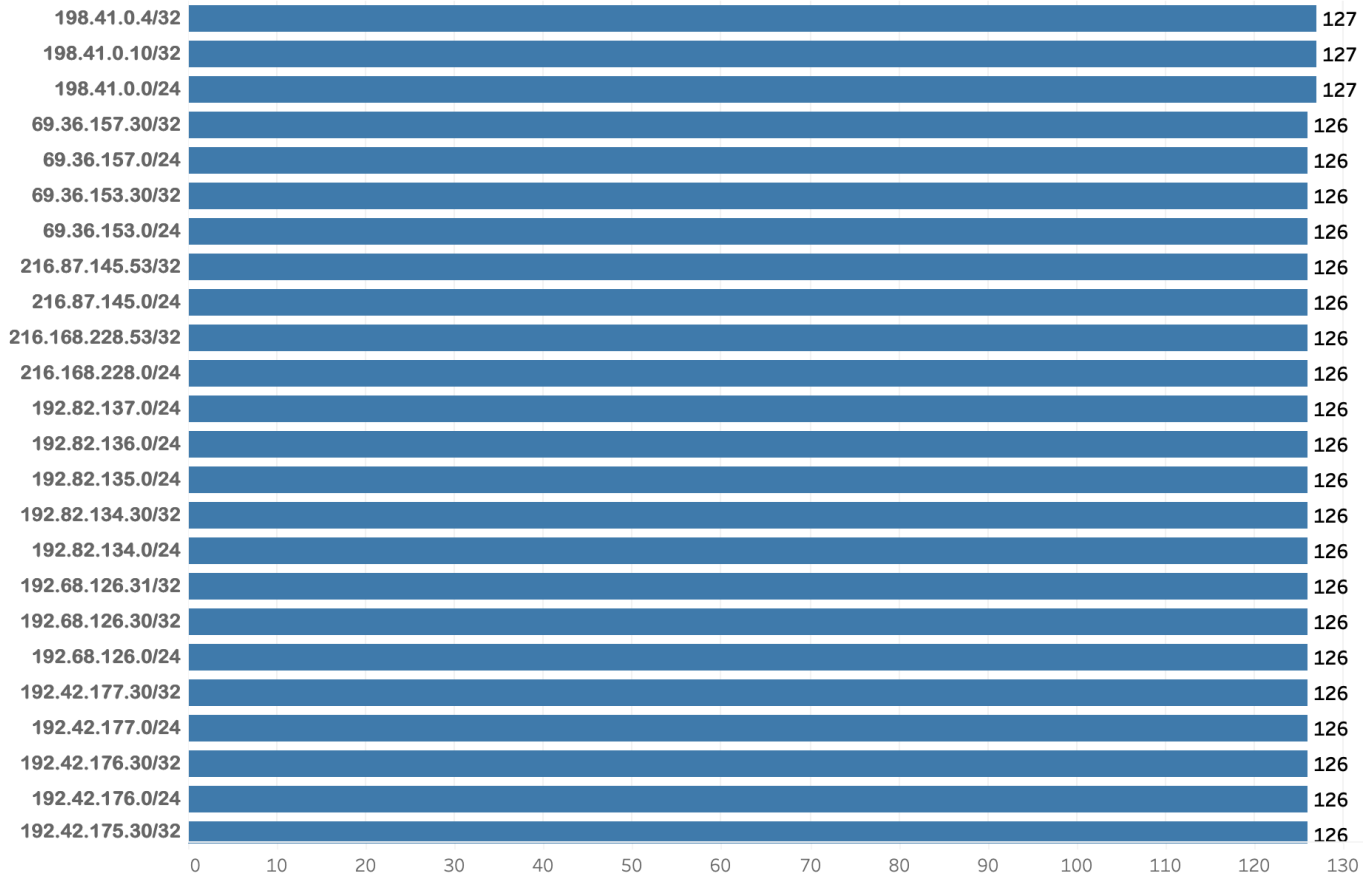
Now, Lets look at the problematic data



Route Objects with Unique Origin AS

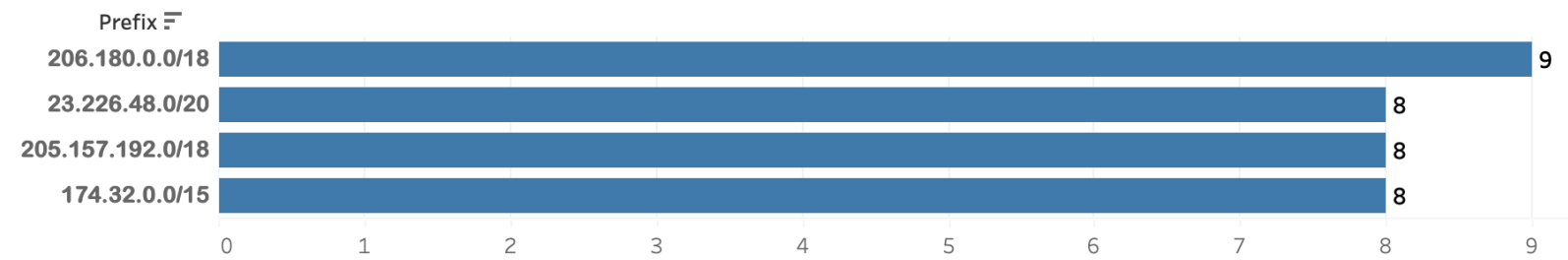
Max Specific 3 - ALL

Prefix (v4!Specific!Statu.. F

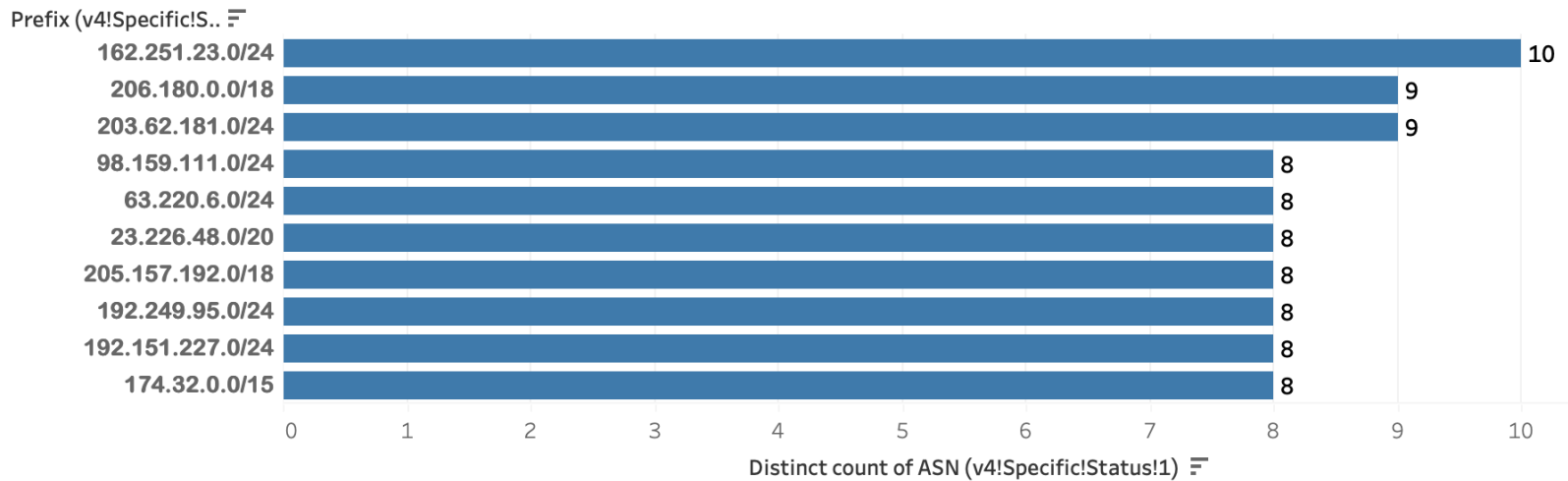


Route Objects with Unique Origin AS [range 8 – 10]

Max Exact 1



Max Specific 1

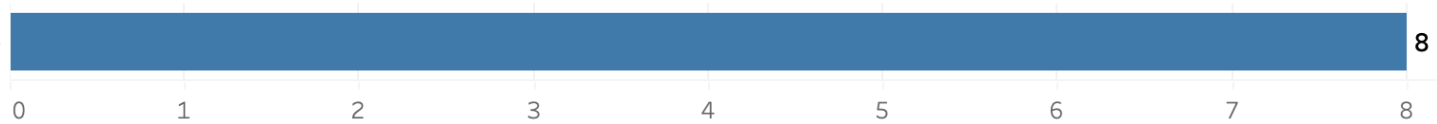


Route Objects with Unique Origin AS [range 8 – 10]

Max Exact 2

Prefix (v4!Exact!Status!..

23.141.32.0/24



Max Specific 3

Prefix (v4!Specific!Statu..

172.81.109.0/24

156.53.53.0/24

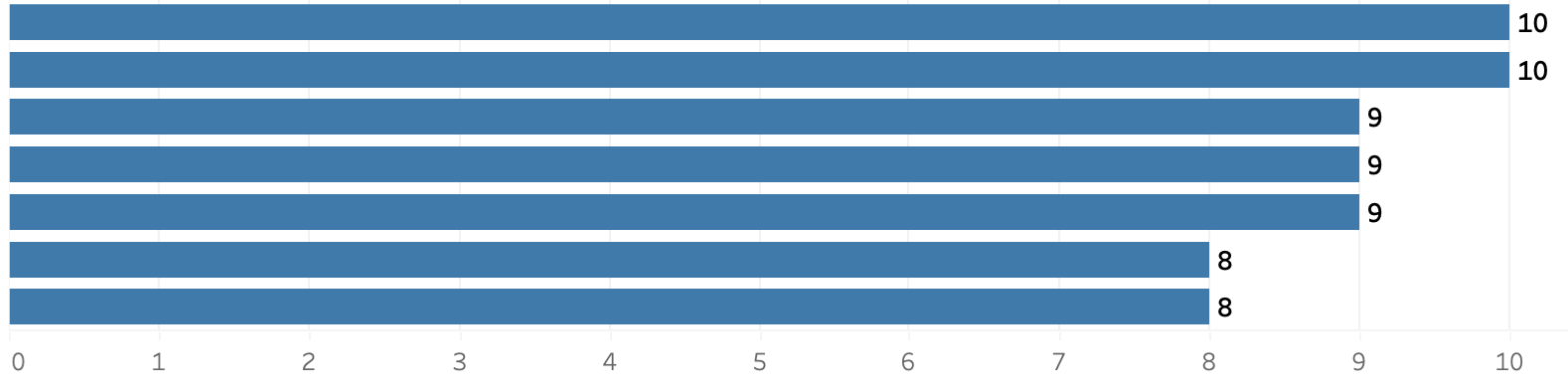
67.72.21.0/24

66.150.58.0/24

172.81.108.0/24

216.52.158.0/24

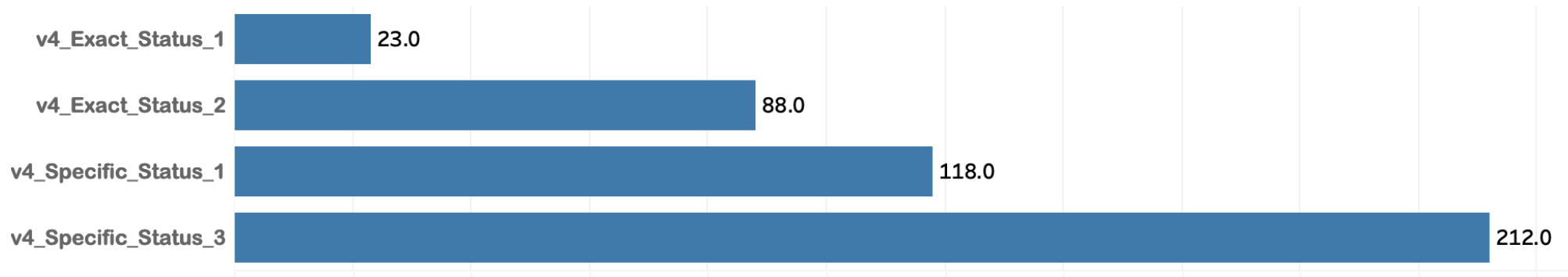
204.16.253.0/24



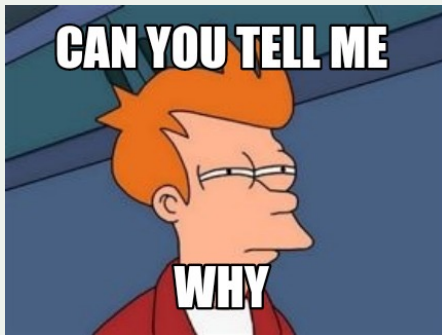
Route Objects with Bogon Origin AS

Private, Available and Reserved ASN in the ARIN delegation file.

Bogon Origin AS



Route Objects with Bogon Origin AS

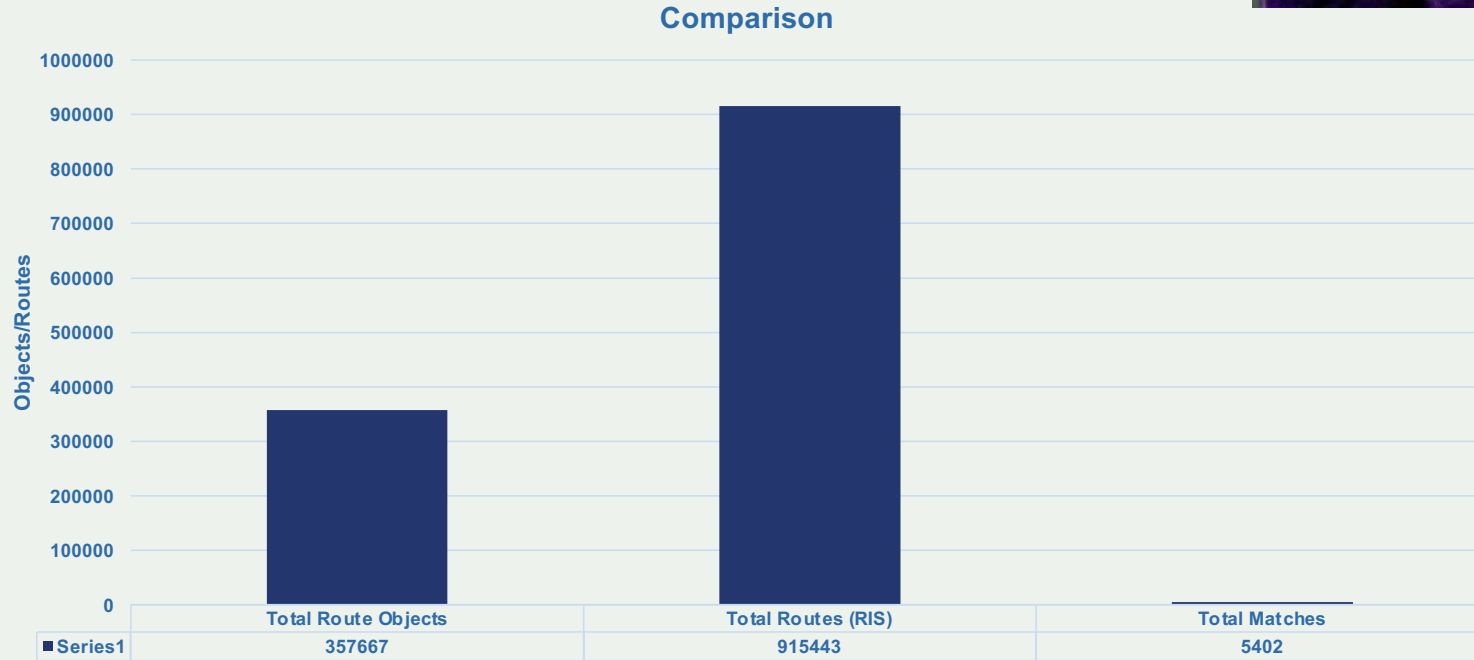


Private Origin AS

ASN (v4!Exa..	Prefix (v4!Exact!St..	Maintainer (v4!Exact!St..	Last Modified (v4!Exact!Status!2)	Year ..
AS64512	198.185.140.0/24	MAINT-AS7922	chris_johnson8@cable.comcast.com	2015
AS64543	23.190.208.0/24	MAINT-AS27506	andrew.day@crowncastle.com	2021
AS64596	198.136.250.0/24	MAINT-AS62	hostmaster@cyrusone.com	2018
AS64598	23.226.116.0/24	MAINT-AS27506	aday@lighttower.com	2018
AS64725	198.175.151.0/24	MAINT-AS4637	ip-noc@pacnet.net	2014
AS64730	204.89.23.0/24	MAINT-AS22773	cciatl-nocengineer@cox.com	2023
AS64991	192.197.253.0/24	MAINT-AS15290	ali.zerik@mtsallstream.com	2014
AS65015	153.11.0.0/16	MAINT-AS27506	rhinst@lighttower.com	2016
AS65103	64.5.118.0/24	MAINT-FLEXENTIAL	DL-BB-Engineering@flexential.com	2023
AS65109	204.239.3.0/24	MAINT-AS27506	nicholas.noda@crowncastle.com	2023
AS65226	163.123.212.0/22	MAINT-AS5056	will.hughes@aureon.com	2021
AS65246	198.17.32.0/24	MAINT-AS7459	ipneteng@mygrande.com	2019
AS65310	205.210.85.0/24	MAINT-AS812	darren.raycraft@rci.rogers.com	2017
AS65339	69.50.144.0/20	MAINT-AS7029	Mark.Borchers@windstream.com	2014
	198.136.234.0/24	MAINT-AS7029	Mark.Borchers@windstream.com	2014
AS65386	64.234.113.0/24	MAINT-SWITCH	netops@switch.com	2019
AS65435	205.196.69.0/24	MAINT-AS3257	netguard@gtt.net	2018
	205.196.99.0/24	MAINT-AS3257	netguard@gtt.net	2018
AS65454	192.189.95.0/24	MAINT-AS23520	emckenzie@columbus-networks.com	2015
AS65525	192.92.114.0/24	MAINT-AS396998	services@path.net	2023
AS65534	198.17.74.0/24	MAINT-AS23520	jalonso@columbus-networks.com	2010

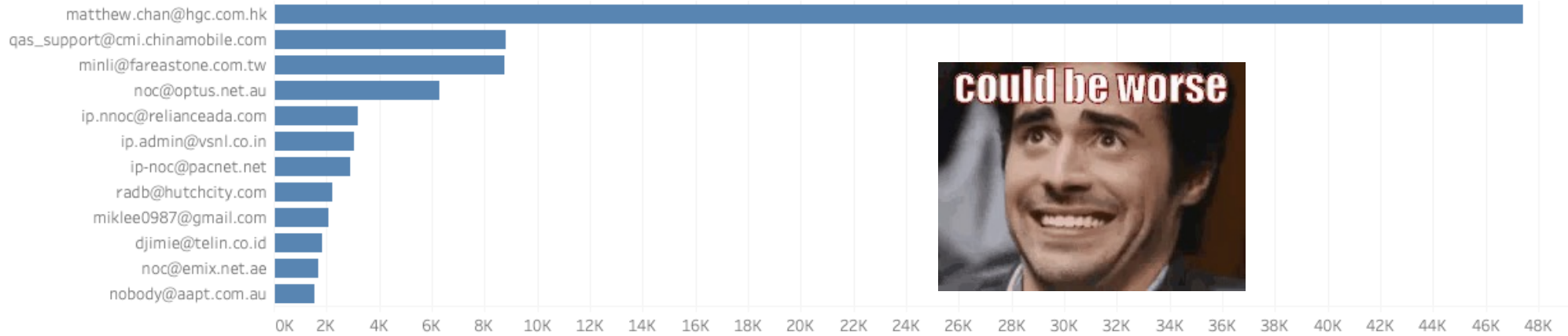


How many route objects matches routes?

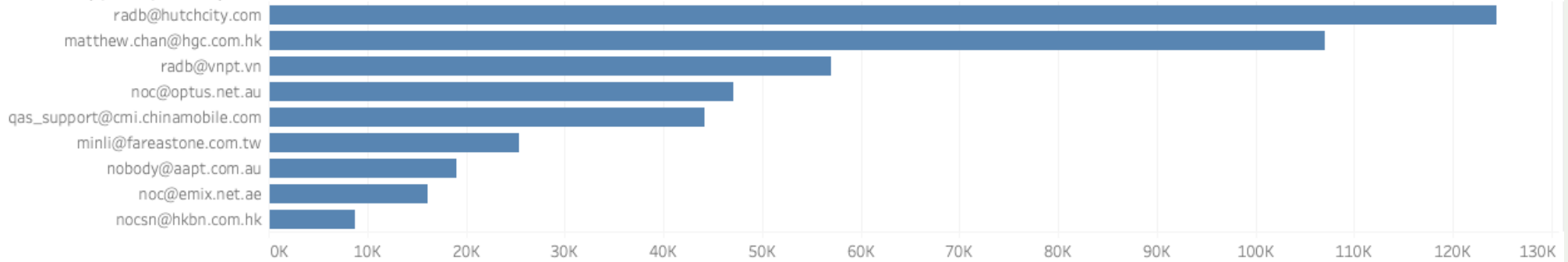


That's not bad!!!

Last Modified (apnic4!specifics!3) 🗄

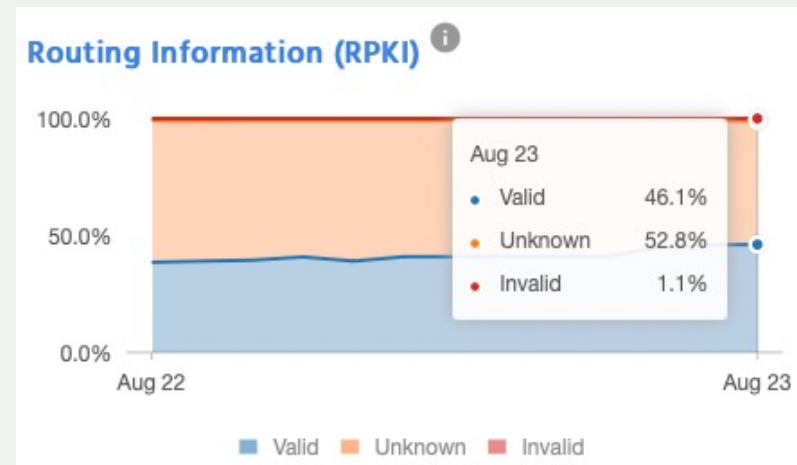
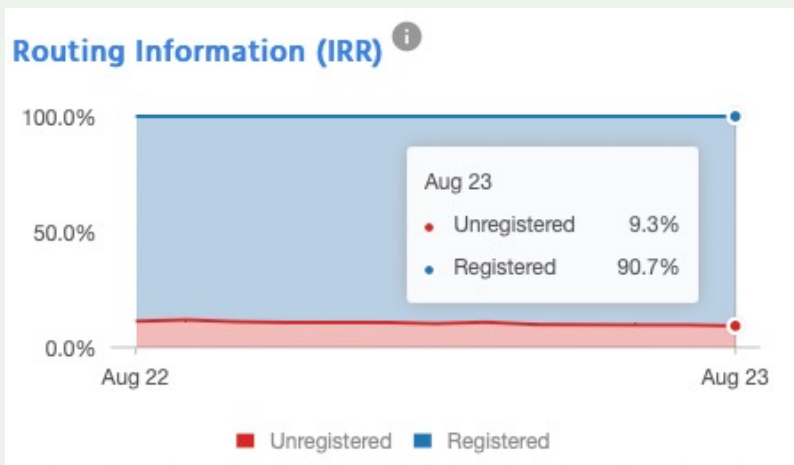


Last Modified (apnic4!specifics!1) 🗄



So, what is the problem?

- IRR data allows you to make informed routing decisions
- RPKI uptake is still not good enough to replace IRR
- Yes, we still need IRR, but not the unauthenticated ones
- Incorrect data in RADb means routing security loophole
- There are just too many incorrect/stale objects to clean up in 3rd party IRR db



So, what is the solution?

- Avoid using external databases like RADb and ALTDB. Stick to the RIR Internet routing registry services.
- Legacy resources holders must be allowed by RIRs to use IRR services to avoid using 3rd party IRR db
- Any operator running local IRR db must not sync with 3rd party IRR db
- Encourage operators to use RPKI (create ROAs – drop invalids)
- RIRs should offer user-friendly ways (like APIs) for updating IRR database records.
- Remove any bureaucratic obstacles preventing legacy resource holders from using RPKI.



Will you be interested in getting monthly reports of your resources?

Please help us identify more data points

<http://103.162.143.30/route-check/data/>

Kindly fill up this survey on

“Why do you use 3rd party IRR db”

<link>



Thank you.

manrs.org