Internet Routing Registries

The Internet Routing Registry (IRR)

- It is a distributed database that contains routing information
- It can be used to help debug, configure, and engineer Internet routing.
- The IRR provides information that helps to validate the contents of BGP announcement or mapping an origin AS number to a list of prefixes
- Overview of the IRR http://www.irr.net/docs/overview.html

Routing Policy Specification Language (RPSL)

- RPSL is a language used to register routing policies and configurations in the IRR.
- RPSL is based on database "objects". Each database object contains some routing policy information and some necessary administrative data.
- Using RPSL in Practice http://www.irr.net/docs/rfc2650.txt

IRR Objects: Maintainer Object

```
mntner:     MAINT-AS15169
descr:      Google Inc.
admin-c:    AS15169 Network Operations
tech-c:     AS15169 Network Operations
upd-to:     noc@google.com
mnt-nfy:    noc@google.com
auth:       *************
remarks:    For network issues, mail: nst@google.com
remarks:    For peering questions, mail: peering@google.com
notify:     noc@google.com
notify:     nst@google.com
mnt-by:     MAINT-AS15169
changed:    noc@google.com 20110527  #21:45:03Z
source:     RADB
```

It is is used to provide authorization information for registrations. It lists the contact information and describes security mechanisms to update other objects.

IRR Objects: Autonomous System Object

```
aut-num:     AS15169
as-name:     Google
descr:       Google, Inc
import:      from AS-ANY    accept ANY AND NOT {0.0.0.0/0}
export:      to AS-ANY    announce AS-GOOGLE AND NOT {0.0.0.0/0}
admin-c:     Google Network Engineering
tech-c:      Google Network Engineering
notify:      noc@google.com
mnt-by:      MAINT-AS15169
changed:     joew@google.com 20040114
changed:     arin-contact@google.com 20070430  #21:54:13(UTC)
source:      RADB
```

It defines the import and export policies of an AS objects.

IRR Objects: AS-SET Object

```
as-set:      AS-GOOGLE
descr:       Google
members:     AS11344
members:     AS13949
members:     AS15169
members:     AS15276
members:     AS19425
members:     AS22577
members:     AS26910
members:     AS36040
members:     AS36384
members:     AS36492
members:     AS36561
members:     AS394725
members:     AS40873
members:     AS41264
members:     AS43515
members:     AS55023
members:     AS6432
members:     AS19527
```

- These are used to group autonomous system objects into a set.
- AS-SET objects start with "AS-". AS-SET objects are
- Useful to specify groups with specific policies such as peers, customers, or providers.

IRR Objects: Route objects

```
route:        35.224.0.0/14
descr:        Google
origin:       AS15169
notify:       radb-contact@google.com
mnt-by:       MAINT-AS15169
changed:      radb-contact@google.com 20190109
source:       RADB
```

```
route:        35.224.128.0/19
descr:        Google
origin:       AS15169
mnt-by:       MAINT-AS15169
changed:      noc@google.com 20180316  #16:46:22Z
source:       RADB
```

- It defines prefixes originated from an AS
- it is grouped together with other routes of the same origin AS.

Queries

To query the information in the IRR you can use the "whois" command or you can use online engines:

For example you can:

whois -h whois.radb.net 35.228.224.0/19

To query all the routes originated by Google you can use the "-i" flag:

-i origin AS15169 [Online query]

Verification

RIPE Stats

https://stat.ripe.net/widget/as-routing-consistency