Using IRR tools

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What is an IRR?

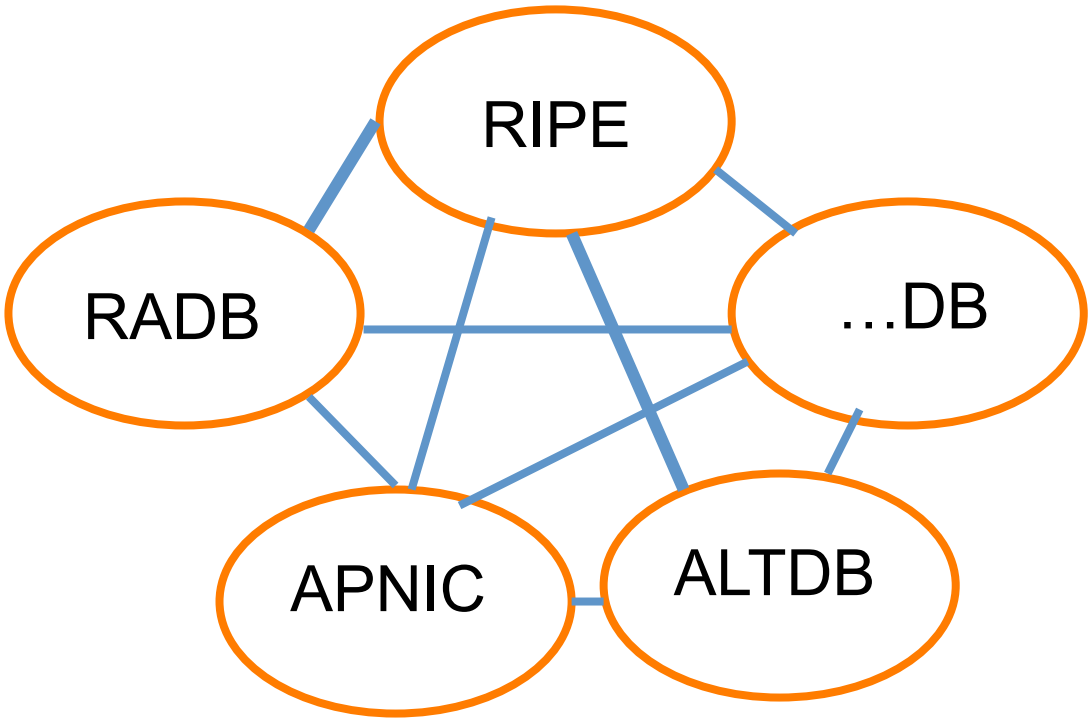
What is a Routing Registry?

- A repository (database) of Internet routing policy information
  - ASes exchanges routing information via BGP
  - Exterior routing decisions are based on policy based rules
  - However BGP does not provides a mechanism to publish/communicate the policies themselves
  - RR provides this functionality
- Routing policy information is expressed in a series of objects

What is a Routing Registry?

- Global Internet Routing Registry database
  - http://www.irr.net/
    - Uses RPSL
  - Established in 1995
- Stability and consistency of routing
  - network operators share information
- Both public and private databases
  - These databases are independent
    - but some exchange data
    - only register your data in one database

IRR = Distributed



IRR = APNIC RR + RIPE DB + RADB + C&W + ARIN + …

Overview of Routing Registry functions

- Route filtering
  - Peering networks
  - A provider and its customer
- Network troubleshooting
  - Easier to locate routing problems outside your network
- Router configuration
  - By using IRRToolSet
- Global view of routing
  - A global view of routing policy improves the integrity of Internet's routing as a whole.

Why use an IRR?

- Information – if every AS registers its policy and routes….
  - a global view of routing policy could be mapped
    - This global picture has the ability to improve the integrity of global Internet routing
  - Provides LIR/ISP with a mechanism to find all possible paths between any two points in the Internet
- Provides a high level of abstraction

Why use an IRR?

- Router configuration
  - By using IRRToolSet
    - Extract information from IRR to create a router readable configuration file
    - Vendor independent
    - Protect against inaccurate routing info distribution
    - Verification of Internet routing
- Network troubleshooting
  - Easier to locate routing problems outside your network

What is Routing Policy?

- Description of the routing relationship between autonomous systems
  - Who are my BGP peers?
    - Customer, peers, upstream
  - What routes are:
    - Originated by each neighbour?
    - Imported from each neighbour?
    - Exported to each neighbour?
    - Preferred when multiple routes exist?
  - What to do if no route exists?
  - What routes to aggregate?

Routing Policy Specification Language

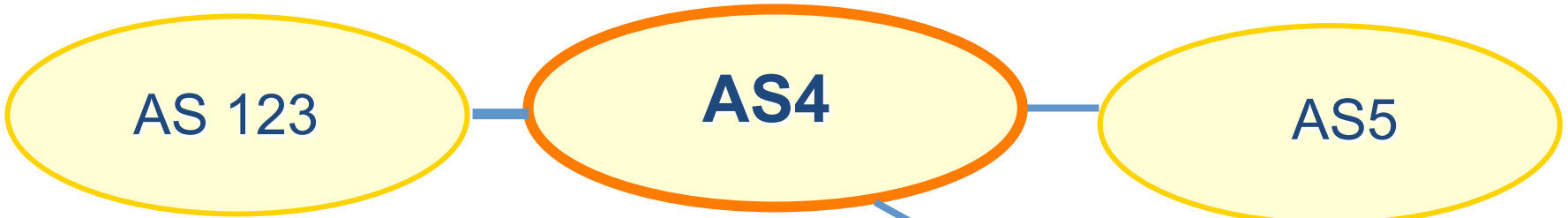
- Purpose of RPSL
  - Allows you to specify your routing configuration in the public IRR
    - Allows you to check “Consistency” of policies and announcements
  - Gives the opportunity to consider the policies and configuration of others
  - There are required syntax and semantics which need to be understood before using RPSL

Representation of routing policy

Example

- AS4 gives transit to AS5, AS10
- AS4 gives local routes to AS123

Representation of routing policy



aut-num: AS4
import: from AS123 action pref=100; accept AS123
import: from AS5 action pref=100; accept AS5
import: from AS10 action pref=100; accept AS10
export: to AS123 announce AS4
export: to AS5 announce AS4 AS10
export: to AS10 announce AS4 AS5

Not a path

APNIC Database & the IRR

- APNIC whois Database
  - Two databases in one

- Public Network Management Database
  - "whois" info about networks & contact persons
    - IP addresses, AS numbers etc
- Routing Registry
  - contains routing information
    - routing policy, routes, filters, peers etc.
  - APNIC RR is part of the global IRR

Common Example

```
aut-num:        AS2
as-name:        SAMPLE-NET
dsescr:         Sample AS
import:         from AS1 accept ANY
import:         from AS3 accept <^AS3+$>
export:         to AS3 announce ANY
export:         to AS1 announce AS2 AS3
admin-c:        SN36-AP
tech-c:         MF53-AP
mtn-by:         MAINT-SAMPLE-AP
changed:        sample@sample.net
```

Common Queries

- To check routing policy of an ASN
  - $whois –h whois.apnic.net AS24555
- To look at the AS-SET
  - $whois –h wohis.radb.net AS-LLNW
- Check the route-object
  - $whois –h whois.apnic.net 220.247.144.0/20

Some More Complex

on OS X, you can use these

to expand the AS-EXAMPLE, as-set.
#whois -h whois.radb.net \!iAS-EXAMPLE

to further exapand the member AS-SET, you can use
#whois -h whois.radb.net \!iAS-EXAMPLE,1

To find out prefixes from each origin AS, say AS42
#whois -h whois.radb.net \!gAS42

for v6 prefixes, use this
#whois -h whois.radb.net \!6AS42

How to Update records

- If your resources are from single RIR, check if they tie in the whois to a IRR service.
- If you have multiple RIR resources, or your RIR doesn't provide a Routing Registry, you can choose to use the more common public ones
  - RADB and ALTDB
  - Many Large providers also run their internal IRR for customers (but getting entries removed when you are no longer a customer can be tedious).
- APNIC runs tutorials on how to interact with their IRR. The training are also on their sites.

Thank you!