RPSL in the Wild

Mark Prior

connect.com.au

Agenda

- Overview of environment in Australia
- Summary of Connect's routing policy
- Why use RPSL?
- Examples
- Problems

Background

- Four major IAPs in Australia
  - Telstra
  - UUnet Australia (OzEmail)
  - connect.com.au
  - Cable & Wireless Optus
- Charge customers for bytes received
- Differentiate by source, domestic v's international (terrestrial or satellite)

Background

- Small/Medium ISPs try to minimise their costs for traffic
  - Multiple providers
  - Peer at (Australian) regional *IXes
  - Satellite links (asymmetric flows)
- Little BGP experience
- Small routers (cisco 2500's common)

Connect's Filter Philosophy

- Filter routing announcement on import to Connect's network
- Classify route and colour with BGP community
- Announce routes based on BGP community

Connect's Route Import Policy

- Don't trust routing announcements from customers
  - Filter by prefix
  - Filter by AS path
- Filter peers by AS path only, to avoid nasty accidents
- Believe providers will "get it right"

Filter mechanism

- On import we classify traffic type with a number of BGP communities; POP location, route type (customer, peer, domestic or international)
- Also set local preference so customer announced routes are preferred
- Use route type community to determine which prefixes to export

Filter mechanism

- Customers can use communities to signal special actions
  - 2764:1 only export for “cheap” transit
  - 2764:2 don’t export out of local POP
  - 2764:3 to 2764:5 alter local preference
  - 2764:6 tag for domestic transit only
  - 2764:7 don’t export to non customers
  - 2764:8 use external satellite not terrestrial
  - 2764:10 prefer Optus for transit over Telstra

Why use (RPSL) Policy?

- Consistent configuration between BGP peers (peers & customers)
- Expertise encoded in the tools that generate the policy rather than engineer configuring peering session
- Automatic, manageable solution for filter generation

Use of RPSL

- Use RtConfig v4 (part of RAToolSet from ISI) to generate filters based on information stored in our routing registry
  - Avoid filter errors (typos)
  - Filters consistent with documented policy (need to get policy correct though)
  - Engineers don't need to understand filter rules (it just works :-)

Customer Import Policy

```
import: {
    from AS-ANY
        action med=0;
        accept ANY AND NOT { 0.0.0.0/0 };
    }refine {
    from AS-ANY
        action community.append(2764:65408); pref=25;
        accept community.contains(2764:3) AND NOT AS2764:RS-PRO
    from AS-ANY
        action community.append(2764:65408); pref=15;
        accept community.contains(2764:4) AND NOT AS2764:RS-PRO
    from AS-ANY
        action community.append(2764:65408); pref=5;
        accept community.contains(2764:5);
    from AS-ANY
        action community.append(2764:65408); pref=0;
        accept ANY;
    } refine {
    from AS2764:AS-CUSTOMERS
        accept PeerAS AND <^AS+$>;
    from AS2764:AS-TRANSIT
        accept AS2764:AS-CUSTOMERS AND PeerAS AND <^AS2764:AS-CUSTOMERS:
    }
```

RtConfig Configuration Template

```
@RtConfig set_map_first_no = 10
@RtConfig set_map_increment_by = 10
@RtConfig set_prefix_acl_no = 130
@RtConfig set_aspath_acl_no = 130
@RtConfig set_pktfilter_acl_no = 130
@RtConfig set_community_acl_no = 30
@RtConfig set_max_preference = 100
!
router bgp 2764
neighbor 203.63.122.193 remote-as 93
neighbor 203.63.122.193 description
@RtConfig set_map_name = "AS9313-EXP
@RtConfig export AS2764 203.63.80.23
@RtConfig set_map_name = "AS9313-IMP
@RtConfig import AS2764 203.63.80.23
!
end
```

cisco Configuration

```
! access-list 135 - customer routes
!
no ip as-path access-list 130
ip as-path access-list 130 permit ^(9313_)+$
!
no route-map AS9313-IMPORT
!
no ip community-list 32
ip community-list 32 permit 2764:3
!
route-map AS9313-IMPORT permit 20
 match as-path 130
 match community 32
 match ip address 135
 set local-preference 75
!
no ip community-list 33
ip community-list 33 permit 2764:4
!
route-map AS9313-IMPORT permit 30
 match as-path 130
 match community 33
 match ip address 135
 set local-preference 85
!
no ip community-list 34
ip community-list 34 permit 2764:
!
route-map AS9313-IMPORT permit 40
 match as-path 130
 match community 34
 match ip address 135
 set local-preference 95
!
route-map AS9313-IMPORT permit 50
 match as-path 130
 match ip address 135
 set local-preference 100
!
router bgp 2764
neighbor 203.63.122.193 route-map
!
end
```

Problems?

- Policy can easily get very complex and result in even more complex router configuration
- Line limit on cisco AS path filters (need to be careful when using as-sets)
- ISI/Qwest whois server doesn't cope with the community format while Merit's IRRd has problems using AS sets by reference

References

- RPSL - RFC 2622
  - ftp://munnari.oz.au/rfc/rfc2622.Z
- Using RPSL in Practice - RFC 2650
  - ftp://munnari.oz.au/rfc/rfc2650.Z
- RAToolSet
  - ftp://ftp.isi.edu/ra/RAToolSet
- RPSL Training Page
  - http://www.isi.edu/ra/rps/training

Contact Details

```
person:         Mark R. Prior
address:        connect.com.au pty ltd
                C/- AAPT
                Level 1, 45 Pirie Street
                Adelaide 5000
                South Australia
phone:          +61 8 8203 2288
fax-no:         +61 8 8203 2287
e-mail:         mrp@connect.com.au
nic-hdl:        MP151
changed:        mrp@connect.com.au 19980316
source:         RADB
```