EQUINIX

Routing Control at Peering Points

Apricot 2012

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Peering Points Types

- Bi-Lateral
  - Fine grained control
  - Potentially complicated to manage
- Multi-lateral
  - Coarse grained control
  - Simple to manage
    - for some definition of ‘manage’
- Multi-lateral with peering options
  - Fine grained control
  - Simple to manage

Warning

- Configurations are simplified to illustrate relevant commands
- DO NOT USE AS IS
- You'll want to add things like
  - Outbound Filters
    - Ensure address aggregation, filter subnets
    - Community Filters, announce customer routes only
    - Bogons, martians and other bad stuff
  - Inbound Filters
    - Max Prefixes
    - iACLs
    - Bogons, martians, specifics and other bad stuff
  - Also turn off things like CDP, STP, VTP, Proxy-ARP, IGP routing announcements, etc for good peering point etiquette

Example: DE-CIX

http://apps.db.ripe.net/whois/lookup/ripe/aut-num/AS6695.html

block of announcement of a route to a certain peer 0:peer-as
announcement of a route to a certain peer 6695:peer-as
block of announcement of a route to all peers 0:6695
announcement of a route to all peers 6695:6695

There are additional BGP communities for controlling announcements
•6695:65000 peer is using bad netmask (80.81.192.0/24)
•6695:65001 peer is using bad netmask (80.81.193.0/24)

•6695:65003 prefix is injected at DE-CIX1
•6695:65004 prefix is injected at DE-CIX2
•6695:65005 prefix is injected at DE-CIX3
•6695:65006 prefix is injected at DE-CIX4

•6695:65281 set community NO-EXPORT

Please take care when setting 0:x communities as this changes the local-preference:

Community	local-preference
0:6695	0
0:x, x!= 6695	50
else or nothing	100

Routing Control (1)

announcement of a route to all peers 6695:6695
block of announcement of a route to a certain peer 0:peer-as

- Default Open Policy
  - Announce to all peer, except certain routes
- Example
  - Announce all routes to MLPE participants, except to AS10, AS20, AS30

```
router bgp 40
 neighbor 80.81.192.1 remote-as 6695
 neighbor 80.81.192.1 route-map decix-in in
 neighbor 80.81.192.1 route-map decix-out
out

route-map decix-out permit 10
 set community 6695:6695 0:10 0:20 0:30

route-map decix-in deny 10
 match as-path 10

ip as-path access-list 10 permit ^10
ip as-path access-list 10 permit ^20
ip as-path access-list 10 permit ^30
```

Routing Control (2)

announcement of a route to a certain peer 6695:peer-as
block of announcement of a route to all peers 0:6695

- Default Closed Policy
  - Announce only to selected peers
- Example
  - Announce only to AS10, AS20, AS30

```
router bgp 40
 neighbor 80.81.192.1 remote-as 6695
 neighbor 80.81.192.1 route-map decix-in in
 neighbor 80.81.192.1 route-map decix-out out

route-map decix-out permit 10
 set community 0:6695 6695:10 6695:20 6695:30

route-map decix-in permit 10
 match as-path 10

ip as-path access-list 10 permit ^10
ip as-path access-list 10 permit ^20
ip as-path access-list 10 permit ^30
```

Routing Control (3)

- Mixed policy
  - Open for local routes
  - Selective for International routes
- Example
  - Announce international only to AS10, AS20, AS30

```
router bgp 40
 neighbor 80.81.192.1 remote-as 6695
 neighbor 80.81.192.1 route-map decix-in in
 neighbor 80.81.192.1 route-map decix-out out

route-map decix-out permit 10
 match community 40:4000 # local routes
 set community 6695:6695

route-map decix-out permit 20
 match community 40:5000 # international
routes
 set community 0:6695 6695:10 6695:20 6695:30

route-map decix-in permit 10
 match as-path 10
 set community 40:5000

route-map decix-in permit 20
 set community 40:4000

ip as-path access-list 10 permit ^10
ip as-path access-list 10 permit ^20
ip as-path access-list 10 permit ^30
```

Route Preferencing

Community	local-preference
0:6695	0
0:x, x!= 6695	50
else or nothing	100

- Useful for load balancing multiple, redundant links
- Example
  - Send Local routes
  - Backup for Intl routes

```
router bgp 40
 neighbor 80.81.192.1 remote-as 6695
 neighbor 80.81.192.1 route-map decix-in in
 neighbor 80.81.192.1 route-map decix-out out

route-map decix-out permit 10
 match community 40:4000 # local routes
 set community 6695:6695 # default lpref = 100

route-map decix-out permit 20
 match community 40:5000 # international routes
 set community 0:65000 # local pref = 50
```

Legacy Patch

6695:65000 peer is using bad netmask (80.81.192.0/24)
6695:65001 peer is using bad netmask (80.81.193.0/24)

- DECIX used to run /24 subnet
- Upgraded to /23
- Now at /22
- Informational service to prevent blackholing

```
router bgp 40
 neighbor 80.81.192.1 remote-as 6695
 neighbor 80.81.192.1 route-map decix-in in
 neighbor 80.81.192.1 route-map decix-out out

route-map decix-in deny 10
 match community 6695:65001

route-map decix-in permit 20
```

Other information service

6695:65003 prefix is injected at DE-CIX1
6695:65004 prefix is injected at DE-CIX2
6695:65005 prefix is injected at DE-CIX3
6695:65006 prefix is injected at DE-CIX4

- Distributed Exchange
- Allow multihomed participants to exchange traffic locally without transiting backbone
- Example
  - Accept DE-CIX1 and DE-CIX2 routes

```
router bgp 40
 neighbor 80.81.192.1 remote-as 6695
 neighbor 80.81.192.1 route-map decix-in in
 neighbor 80.81.192.1 route-map decix-out out

route-map decix-in permit 10
 match community-list 10

ip community-list 10 permit 6695:65003
ip community-list 10 permit 6695:65004
ip community-list 10 deny any
```

Prepending

Prepend TIX AS8235 to *all* TIX-Peers
set community 8235:65500
Prepend TIX AS8235 to *selected* TIX-Peer N-times
set community 6550N:AAAA (N can be 1 to 3)

- Allow granular traffic control across multiple exchanges
- Example
  - Prepend 1 time to everybody
  - Prepend 3 times to AS10 only

```
router bgp 40
 neighbor 194.42.48.40 remote-as 8235
 neighbor 194.42.48.40 route-map tix-in in
 neighbor 194.42.48.40 route-map tix-out out

route-map tix-out permit 10
 set community 8235:65500 65503:10
```

Blackhole Peering

set community 24115:666

- Traffic will be null-routed at IX
- Participants may accept 3rd party blackhole routes to reduce backbone load
- Example
  - Announce blackhole for 1.2.3.4
  - Accept blackholes from peers

```
router bgp 40
 neighbor 119.27.63.40 remote-as 24115
 neighbor 119.27.63.40 route-map eqixhk-in in
 neighbor 119.27.63.40 route-map eqixhk-out out

route-map eqixhk-out permit 10
 match community 40:666 # internal blackhole
comm
 set community 24115:666

route-map eqixhk-in permit 10
 match community 24115:666
 set community 40:666
 set ip nexthop 192.168.0.1 # internal null
route

interface null0
 ip address 192.168.0.1 255.255.255.255
```

Equinix Internet Exchange Features

https://ix.equinix.com/ixp/mlpeCommunityInfo

Definition	Community String
Default Open Policy – Announce to all except to AS12345	24115:24115 0:12345
Default Closed Policy – Announce to none except to AS12345	0:24115 24115:12345
Prepend once to AS12345	65501:12345
Prepend twice to AS12345	65502:12345
Prepend three times to AS12345	65503:12345

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Questions?