Automate your IX's RS Config

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How to manage IX's Route Server config in 2019?

Introduction to peering at an Internet Exchange Point (IXP)

Quick intro to peering at IXP

1. Bilateral Peering - Members connects on the "shared peering fabric" and interested peers "speak" to each other and configure BGP sessions between them

2. Multilateral Peering - Members connects on the "shared peering fabric" and peer with the route server. Helps in reducing load of having BGP session with each & every member

What a route server does...

1. Exchanges routes without modifying next-hop and hence only routes are exchanged from the RS. Actual traffic stays direct across the switching fabric.

2. (Often desired) Exchanges routes transparently i.e does not injects it's ASN in the AS_PATH.

3. (Often desired) RS does the route filtering based on IRR to avoid chances of route hijacks and route leaks.

4. (Often desired) RS does offers BGP community support so that members can limit the route announcement as per choice

The Challenge

Offering route filtering based on IRR &
RPKI has a associated challenge that it
must be automatically updated so that
RS allows newer prefixes to be
announced without manual updation.

Offering bgp communities to RS peers
requires RS to have peer-specific export
policy which can be harder to generate
and manage by hand at scale.

Solution?

IXP RS Config automation!
Use tools to automatically generate config and manage it for you.

"Arouteserver Project"

Takes care of RS config for BIRD & OpenBGPD based route servers

Using arouteserver...

1. Setup the package & initialise it

2. Add peers details in the clients.yml

3. Generate the RS daemon config

4. Test the config ("configure check" in bird) and push it

Setting up arouteserver

On Debian/Ubuntu:

```
apt-get install python-dev  # for Python 2
apt-get install python3-dev # for Python 3
apt-get install bgpq3  # Needed for speaking to IRR

sudo apt-get install python-pip python-virtualenv
# setup a virtualenv
mkdir -p ~/.virtualenvs/arouteserver
virtualenv ~/.virtualenvs/arouteserver
source ~/.virtualenvs/arouteserver/bin/activate

pip install arouteserver
arouteserver configure
```

clients.yml

```yaml
asns:
  AS22:
    as_sets:
      - "AS-AS22MAIN"
  AS33:
    as_sets:
      - "AS-AS33GLOBAL"
clients:
  - asn: 11
    ip: "192.0.2.11"
    cfg:
      filtering:
        irrdb:
          as_sets:
            - "AS-AS11NETS"
```

Generating RS Config

```
arouteserver bird --ip-ver 4 -o /etc/bird/bird.conf
arouteserver bird --ip-ver 6 -o /etc/bird/bird6.conf


To automate using cron (with check):
Warning: Use carefully!

arouteserver bird --ip-ver 4 -o /etc/bird/bird4.new && \
    bird -p -c /etc/bird/bird4.new && \
    cp /etc/bird/bird4.new /etc/bird/bird4.conf && \
    birdcl configure
```

BGP Community Support

There is out of box BGP Community support including informational as well as actionalable BGP Community Support

Sample of BGP Communities offered by BharatIX in Mumbai

Function	Standard	Extended	Large
Do not announce to any client	0:65534	rt:0:65534	137251:0:0
Announce to peer, even if tagged with the previous community	65534:peer_as	rt:65534:peer_as	137251:1:peer_as
Do not announce to peer	0:peer_as	rt:0:peer_as	137251:0:peer_as
Prepend the announcing ASN once to peer	65511:peer_as	rt:65511:peer_as	137251:101:peer_as
Prepend the announcing ASN twice to peer	65512:peer_as	rt:65512:peer_as	137251:102:peer_as
Prepend the announcing ASN thrice to peer	65513:peer_as	rt:65513:peer_as	137251:103:peer_as
Prepend the announcing ASN once to any	65501:65534	rt:65501:65534	137251:101:0
Prepend the announcing ASN twice to any	65502:65534	rt:65502:65534	137251:102:0
Prepend the announcing ASN thrice to any	65503:65534	rt:65503:65534	137251:103:0
Add NO_EXPORT to peer	65281:peer_as	rt:65281:peer_as	137251:65281:peer_as
Add NO_ADVERTISE to peer	65282:peer_as	rt:65282:peer_as	137251:65282:peer_as

Other key features worth mentioning

1. Out of box support for ROAs

2. Support for GRACEFUL_SHUTDOWN of BGP sessions

3. Integration with peeringdb to pull AS-SET config for the peers

4. Integration with IXP Manager!

5. Full IX RS config generation based on peeringdb record of IXP

6. Ansible role for configuration via ansible

References

1. Arouteserver project on github - https://github.com/pierky/arouteserver

2. Arouteserver project documentation - https://arouteserver.readthedocs.io/en/latest/index.html

3. Ansible role - https://github.com/pierky/ansible-role-arouteserver

4. IXP Manager - https://www.ixpmanager.org/

5. BharatIX - www.bharatix.net

Thanks!

Questions:

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