A Simple Secure Micro Service for Querying Bird

RIPE 73 IXP TOOLS HACKATHON

- Barry O'Donovan, INEX - Proposer, API Backend (PHP / Lumen)

- Daniel Karrenberg, RIPE - CLI Consumer (Python)

- Matthias Hannig, ECIX - Web Consumer (Python, React)

- Michael Cardell Widerkrantz & Daniel Melani, Netnod - examined Birdc / Go API implementation.

RATIONALE

- Scratch an itch that many IXPs have

- Need API access for:

  - Monitoring

  - Analysis / problem solving

  - A LG is a tool our members expect

RATIONALE

- Looked at existing LG implementations - none met Barry's requirements:

  - Bend to fit needs is less time than creating

  - Fitted his skill set for 'bending' (PHP)

  - Secure! Trustworthy!

SECURITY

- Naturally rate-limited - every response cached

  - Built in rate limiting for variable queries

- Strict parameter parsing and checking

- Bundled *birdc* wrapper script for safe sudo

- *birdc* only executed in restricted mode

OUTLOOK

- API endpoints mainly relate to BGP and route queries

- Ideally a temporary project!

- Would love to see Bird implement an API

    - (see GoBGP for a useful example)

EXAMPLE

```
{
  - api: {
        from_cache: true,
        ttl_mins: "1",
        version: "1.0.0"
    },
  - status: {
        version: "1.5.0",
        router_id: "185.1.69.126",
        server_time: "2016-10-23T14:23:50+00:00",
        last_reboot: "2016-04-12T15:00:34+00:00",
        last_reconfig: "2016-10-23T14:12:01+00:00",
        message: "Daemon is up and running"
    }
}
```

beye COMMAND

Daniel Karrenberg, RIPE - CLI Consumer (Python)

- generic command line interface

- for humans and scripting

- python (as yet unpackaged)

```
$ beye status
version     router_id      server_time          last_reconfig        last_reboot          message
---------   ------------   -------------------   -------------------   -------------------   _____
1.5.0       185.1.69.126   2016-10-23 15:15:49   2016-10-23 15:12:01   2016-04-12 15:00:33   Daemon is up and running


$ beye status -c version,message
version      message
---------   --------------------------
1.5.0        Daemon is up and running


$ beye status -c message -c version
message                        version
--------------------------   ---------
Daemon is up and running   1.5.0


$ beye status -p
1.5.0  185.1.69.126  2016-10-23 15:15:49  2016-10-23 15:12:01  2016-04-12 15:00:33  Daemon is up and running


$ beye status -p -c version
1.5.0
```

```
$ beye protocols bgp

protocol                state    bgp_state     imported    exported    preferred   description
--------------------    ------   -----------   ----------  ----------  ----------  ------------------------------------------
pb_as47720_vli228_ipv4  up       Established          7           0            7   Peering session for AS47720 - CIX
pb_as43760_vli226_ipv4  up       Established        142           0            0   Peering session for AS43760 - INEX Route Servers
pb_as5466_vli223_ipv4   up       Established         68           0           65   Peering session for AS5466 - Eircom Net
pb_as42090_vli239_ipv4  up       Established          5           0            5   Peering session for AS42090 - Rapid Broadband
pb_as196737_vli233_ipv4 up       Established          2           0            2   Peering session for AS196737 - Airwave
pb_as1213_vli222_ipv4   up       Established         23           0           22   Peering session for AS1213 - HEAnet
pb_as43760_vli227_ipv4  up       Established        139           0            0   Peering session for AS43760 - INEX Route Servers
pb_as31122_vli220_ipv4  up       Established         53           0           53   Peering session for AS31122 - Viatel
pb_as41736_vli232_ipv4  up       Established          2           0            2   Peering session for AS41736 - Nova Broadband
pb_as29644_vli221_ipv4  up       Established         22           0           22   Peering session for AS29644 - Airspeed Telecom
pb_as15405_vli230_ipv4  up       Established          3           0            3   Peering session for AS15405 - East Cork Broadba
```

```
$ beye protocols bgp -s birdseye.inex.ie | grep -v Established

protocol          state    bgp_state     imported    exported    preferred   description
--------------    ------   -----------   ----------  ----------  ----------  --------------
-                 -        Connect              0           0            0   RIB for AS10310
-                 -        Connect              0           0            0   RIB for AS31641
-                 -        Active               0           0            0   RIB for AS30900
-                 -        Connect              0           0            0   RIB for AS39233
```

```
$ beye routes protocol pb_as29644_vli221_ipv4

network          interface    gateway       metric    bgp.local_pref  bgp.med    bgp.as_path
---------------  -----------  -----------   --------  ----------------  ---------  ----------------------------
185.82.241.0/24  ens160       185.1.69.13      100               100  -          29644,201111,201111,201111
77.75.96.0/21    ens160       185.1.69.13      100               100  -          29644
185.82.240.0/24  ens160       185.1.69.13      100               100  -          29644,201111,201111,201111
194.0.196.0/24   ens160       185.1.69.13      100               100  -          29644,42342,42342,42342
185.7.184.0/22   ens160       185.1.69.13      100               100  -          29644,199588
185.51.104.0/22  ens160       185.1.69.13      100               100  -          29644
216.245.44.0/24  ens160       185.1.69.13      100               100  -          29644,11521
77.72.79.0/24    ens160       185.1.69.13      100               100  -          29644,42310
77.72.78.0/23    ens160       185.1.69.13      100               100  -          29644,42310
77.72.78.0/24    ens160       185.1.69.13      100               100  -          29644,42310
178.250.112.0/21 ens160       185.1.69.13      100               100  -          29644
192.231.20.0/24  ens160       185.1.69.13      100               100  -          29644,2127
91.217.88.0/23   ens160       185.1.69.13      100               100  -          29644,51516
148.252.8.0/21   ens160       185.1.69.13      100               100  -          29644
91.239.147.0/24  ens160       185.1.69.13      100               100  -          29644,198812
185.69.212.0/22  ens160       185.1.69.13      100               100  -          29644
167.3.34.0/23    ens160       185.1.69.13      100               100  -          29644,6448
185.113.232.0/22 ens160       185.1.69.13      100               100  -          29644
185.142.28.0/22  ens160       185.1.69.13      100               100  -          29644
31.193.216.0/21  ens160       185.1.69.13      100               100  -          29644
185.167.196.0/22 ens160       185.1.69.13      100               100  -          29644
208.94.70.0/24   ens160       185.1.69.13      100               100  -          29644,13971,13971,13971,13971
```

```
$ beye route 195.7.32.3 master

network        interface     gateway       metric  origin    local_pref  communities                      next_hop      as_path
------------   -----------   ----------    --------  -------   ------------  ----------------------------   ----------    ---------
195.7.32.0/19  ens160        185.1.69.12        100  IGP              100  [[5466,1],[5466,1],[5466,1]]   185.1.69.12      5466


$ beye route 195.7.32.3 master -c network,bgp

network        origin     local_pref  communities                      next_hop      as_path
------------   --------   ------------  ----------------------------   ----------    ---------
195.7.32.0/19  IGP               100  [[5466,1],[5466,1],[5466,1]]   185.1.69.12      5466
```

BIRD'S EYE APP DEMO

Matthias Hannig, ECIX - Web Consumer (Python, React)

http://hannig.cc:8001/birdseye/app/

Birdseye
Your friendly bird looking glass

ROUTESERVERS

rc1.cix.inex.ie (IPv4)
Bird 1.5.0

rc1.cix.inex.ie (IPv6)
Bird 1.5.0

routeserver01.ops.ixp
Bird 1.4.0

Filter by Neightbour, ASN or Description

Neighbour	ASN	State	Uptime	Description	Routes Recv.
185.1.69.15	47720	up	14 days	Peering session for AS47720 - CIX	7
185.1.69.8	43760	up	6 months	Peering session for AS43760 - INEX Route Servers	142
185.1.69.12	5466	up	5 days	Peering session for AS5466 - Eircom Net	68
185.1.69.21	42090	up	14 days	Peering session for AS42090 - Rapid Broadband	5
185.1.69.20	196737	up	14 days	Peering session for AS196737 - Airwave	2
185.1.69.11	1213	up	14 days	Peering session for AS1213 - HEAnet	23
185.1.69.9	43760	up	6 months	Peering session for AS43760 - INEX Route Servers	139
185.1.69.10	31122	up	14 days	Peering session for AS31122 - Viatel	53
185.1.69.19	41736	up	14 days	Peering session for AS41736 - Nova Broadband	2
185.1.69.13	29644	up	11 days	Peering session for AS29644 - Airspeed Telecom	22
185.1.69.17	15405	up	13 days	Peering session for AS15405 - East Cork Broadband	3

POST-HACKATHON WORK

- Looking glass built into PHP API

  - http://rc1-cix-ipv4.inex.ie/lg/

- Detailed README in GitHub repository

- Nagios Plugins Added - Now live at INEX:

  - Monitoring 24 Bird daemons

  - Monitoring ~350 individual route server BGP sessions

  - Nagios configuration generated from IXP Manager

REFERENCES

- Live API: http://rc1-cix-ipv4.inex.ie   (and -ipv6)

- Live Consumer: http://hannig.cc:8001/birdseye/app/

- GitHub - API: https://github.com/inex/birdseye [MIT]

- GitHub - Web: https://github.com/mhannig/birdseye [MIT]

- GitHub - CLI: https://github.com/dfkbg/birdseye [MIT]

- GitHub - Go: https://github.com/mchackorg/birdwatcher