

Database for LHCONE prefixes

LHCONE virtual meeting
16th of September 2020

Introduction: LHCONE BGP routing

- Sites announce to LHCONE the IP prefixes used by their computing resource (using BGP)
- These IP Prefixes are declared in this [LHCONE Twiki page](#)
- Some Providers filter the incoming prefixes announced by their client sites
- Some Sites would like to filter the prefixes received by their LHCONE Provider

Issues with filtering

- Twiki page difficult to parse by automation tools
- Twiki page not always up to date

Connected Research Computing Centers

#	Site	AS number	Announce v4	Announce v6	NOC	Access VRF	Access Point	Bandwidth	Active	AUP ack
1	AGLT2	229	192.41.230.0/23 192.41.236.0/23 192.41.238.0/28	2001:48A8:68F7::/48	aglt2-noc@umichNOSPAMPLEASE.edu	ESnet	Starlight, Chicago	100G	Y	Y
2	Alberta Univ (T2)		142.244.83.0/27 142.244.105.64/27			Canarie	Vancouver		Y	
3	ANL	683	140.221.68.0/24 140.221.69.0/24 140.221.96.0/24	2620:0:dc0:4800::/59	noc@anlNOSPAMPLEASE.gov	ESnet	Starlight, Chicago	100G	Y	Y
4	ASGC (T1+T2)	24167	117.103.96.0/20 202.169.168.0/22 202.140.160.0/19	2400:4500::/64 2400:4500:0:1::/64 2400:4500:0:2::/64	noc@twgridNOSPAMPLEASE.org	ASGC	ASGC(Taipei)	10G	Y	Y

Prefixes database

Evaluated two solutions for a database to store the prefixes announced to LHCONE:

- **IRR**: Internet Routing Registries
- **CRIC**: WLCG Computing Resources Information Catalogue

IRR: Internet Routing Registries

IRRs

- Based on Whois protocol
- Provided by Internet RIRs* (RIPE, ARIN, APNIC...) and others companies (RADB...)
- Already used by network operators
- Route-Set object exists and it is made for what we need

* *RIR: Regional Internet Registry*

IRRs for LHCOPN

Already used for LHCOPN prefixes ([RS-LHCOPN](#) and [RS-LHCOPN6](#)) and French LHCONE prefixes

```
# whois -h whois.ripe.net RS-LHCOPN  
% The objects are in RPSL format.
```

```
route-set:      RS-LHCOPN  
descr:          LHCOPN prefixes  
members:        206.12.1.0/24      # AS36391 CA-TRIUMF  
members:        206.12.9.0/29      # AS36391 CA-TRIUMF  
members:        206.12.9.128/25    # AS36391 CA-TRIUMF  
members:        128.142.0.0/16      # AS513   CH-CERN  
members:        188.184.128.0/17    # AS513   CH-CERN  
members:        192.108.45.0/24      # AS58069 DE-KIT
```

...

IRRs for LHCONE

Proposal: define a top ROUTE-SET that include ROUTE-SETS for the different regions or the different providers

```
# whois -h whois.ripe.net RS-LHCONE
```

```
route-set:      RS-LHCONE
remarks:        Under construction
tech-c:         LHC1
admin-c:        LHC1
members:        RS-LHCONE-EUROPE
members:        RS-LHCONE-NORTH-AMERICA
members:        RS-LHCONE-ESNET
members:        RS-LHCONE-GEANT
mnt-by:         LHCONE-MNT
mnt-by:         CERN-MNT
created:        2020-07-07T12:35:15Z
last-modified:  2020-07-07T12:48:35Z
source:         RIPE
```



Delegated ROUTE-SETS

- RS can contain prefixes and/or other RSs.
- Updates can be delegated to any member of the IRR

```
route-set:      RS-LHCONE-EUROPE
members:        128.142.0.0/16    # AS513     CH-CERN
members:        188.184.128.0/17   # AS513     CH-CERN
members:        188.185.48.0/20    # AS513     CH-CERN
members:        188.185.128.0/17   # AS61339   CH-CERN
mp-members:    2001:1458:301::/48 # AS513     CH-CERN
mp-members:    2001:1458:303::/48 # AS513     CH-CERN
members:        RS-LHCONE-FRANCE-IN2P3-CCIN2P3-LYON
tech-c:         LHC1
admin-c:        LHC1
mnt-by:         CERN-MNT
mnt-by:         LHCONE-MNT
created:        2020-07-07T09:38:43Z
last-modified:  2020-07-07T12:37:52Z
source:         RIPE
```

IRR advantages

- World-readable
- Based on open standards, already used by operators
- Use can be extended to other communities beyond LHCONE
- Easy delegation of Write privileges (within the same IRR)

IRR limitations

Only members of a IRR can get a maintainer object.

As a consequence, IRRs of the different regions should be used (RIPE for EUROPE, ARIN for North America...)

...but Registries are implemented in different ways

=> RS would be distributed in multiple databases, with different formats

=> Or: choose one DB and delegate updates to the members of that DB

CRIC:

Computing Resources Information Catalogue

On-line database for WLCG Computing Resources:

<http://wlcg-cric.cern.ch/>

- Used by ATLAS and CMS, other experiments may follow
- JSON output, simple to parse
- Already contains LHCONE prefixes of WLCG sites

LHCONE prefixes in CRIC

CRIC already contains LHCONE prefixes of WLCG sites
(imported by the LHCONE twiki page for NOTED)

<http://wlcg-cric.cern.ch/api/core/site/query/?json>



The screenshot shows a JSON viewer interface with tabs for "JSON", "Raw Data", and "Headers". The "JSON" tab is selected, displaying a hierarchical tree of site configuration data. The root node is "AGLT2:", which includes fields like "country", "country_code", "frontierconf", "id", "name", and "networks". The "networks" node has sub-nodes for "ipv4" and "ipv6". The "ipv4" node contains three entries (0, 1, 2) with IP ranges. The "ipv6" node contains one entry (0) with an IP range and a "pk" field. Other fields include "registryconf", "site", "site_id", "squidconf", "state", "status", "tier_level", and "vo_name". The "vo_name" field is set to "atlas". Other nodes shown include "AM-04-YERPHI:", "ANLASC:", "ARGO:", and "ARNES:". The "Raw Data" tab shows the raw JSON code, and the "Headers" tab shows the HTTP headers.

```
JSON Raw Data Headers
Save Copy Collapse All Expand All (slow) Filter JSON
{
  "AGLT2": {
    "country": "United States",
    "country_code": "US",
    "frontierconf": {},
    "id": 453,
    "name": "AGLT2",
    "networks": {
      "ipv4": [
        {"0": "192.41.230.0/23"}, {"1": "192.41.236.0/23"}, {"2": "192.41.238.0/28"}
      ],
      "ipv6": [
        {"0": "2001:48a8:68f7::/48", "pk": 453}
      ]
    },
    "registryconf": {},
    "site": "AGLT2",
    "site_id": 13,
    "squidconf": {},
    "state": "ACTIVE",
    "status": "test",
    "tier_level": 2,
    "vo_name": "atlas"
  },
  "AM-04-YERPHI": {},
  "ANLASC": {},
  "ARGO": {},
  "ARNES": {}
}
```

CRIC advantages

- Additional key-value can easily be added, to include all the information already in Twiki and more
- Single source database that can be updated directly by the LHCONE sites
- JSON format easy to parse with open source libraries
- World-readable (as the IRR)
- Not WLCG sites can be added as well (it already happens for other projects) (as the IRR)

CRIC limitations

Tailored for and controlled by WLCG

Next-steps

Next steps

- Decide if a solution is needed (now)
- Decide which one to use: Twiki, IRR, CRIC (recommend one now, then discuss on mailing-list)
- Work on the implementation (volunteers needed)
- If CRIC: decide which other key-value pairs can be useful (later, WG and mailing-list)

Questions or comments?

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