

# Database for LHCONE prefixes

LHCONE virtual meeting  
16<sup>th</sup> 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	<a href="mailto:aglit2-noc@umichNOSPAMPLEASE.edu">aglit2-noc@umichNOSPAMPLEASE.edu</a>	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	<a href="mailto:noc@anlNOSPAMPLEASE.gov">noc@anlNOSPAMPLEASE.gov</a>	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	<a href="mailto:noc@twgridNOSPAMPLEASE.org">noc@twgridNOSPAMPLEASE.org</a>	ASGC	ASGC(Taipei)	10G	Y	Y

# Prefixes database

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

- **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**

# CRIC

On-line database for WLCG Computing Resources:

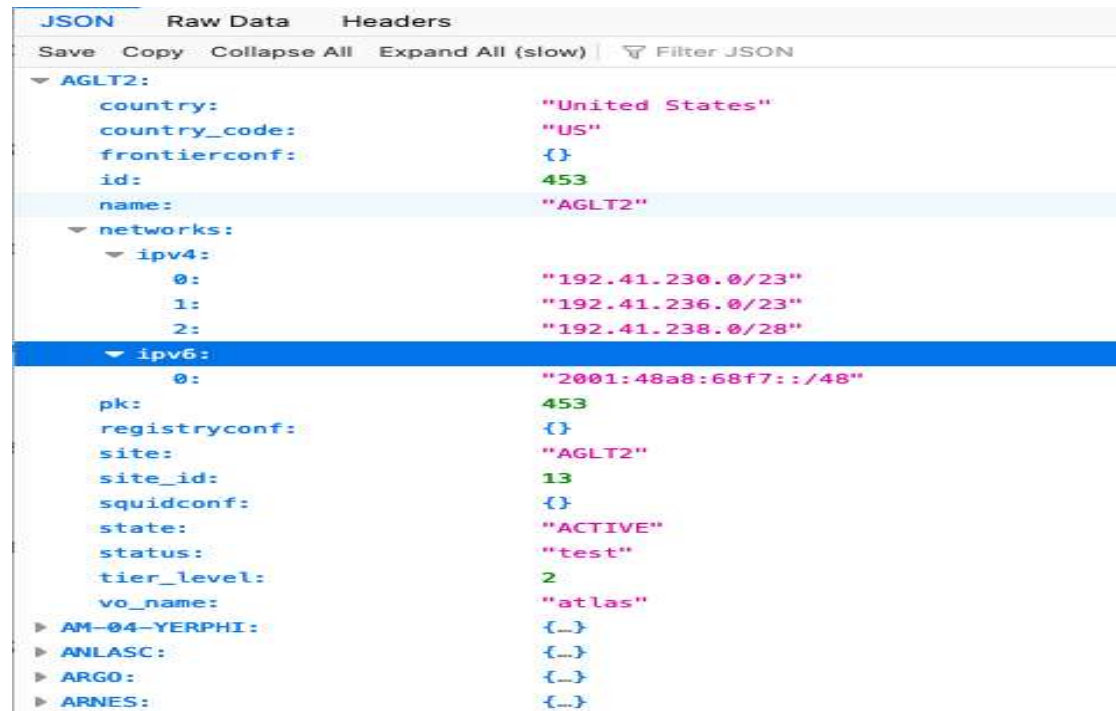
<http://wlcg-cric.cern.ch/>

- 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 active, displaying a tree view of site data. The root node is 'AGLT2', which is expanded to show its properties: 'country' (United States), 'country\_code' (US), 'frontierconf' ({}), 'id' (453), and 'name' (AGLT2). Under 'networks', there are two sub-sections: 'ipv4' and 'ipv6'. 'ipv4' has three entries: '0' (192.41.230.0/23), '1' (192.41.236.0/23), and '2' (192.41.238.0/28). 'ipv6' has one entry: '0' (2001:48a8:68f7::/48). Below the network information, other site properties are listed: 'pk' (453), 'registryconf' ({}), 'site' (AGLT2), 'site\_id' (13), 'squidconf' ({}), 'state' (ACTIVE), 'status' (test), 'tier\_level' (2), and 'vo\_name' (atlas). At the bottom, there are partial views of other site entries: 'AM-04-YERPHI', 'ANLASC', 'ARGO', and 'ARNES', each with a value of {}.

```
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?*

*lhcone-architecture@cern.ch*