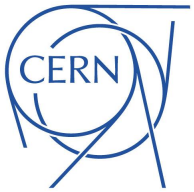
Site Network topology in CRIC

Alexey Anisenkov (BINP)

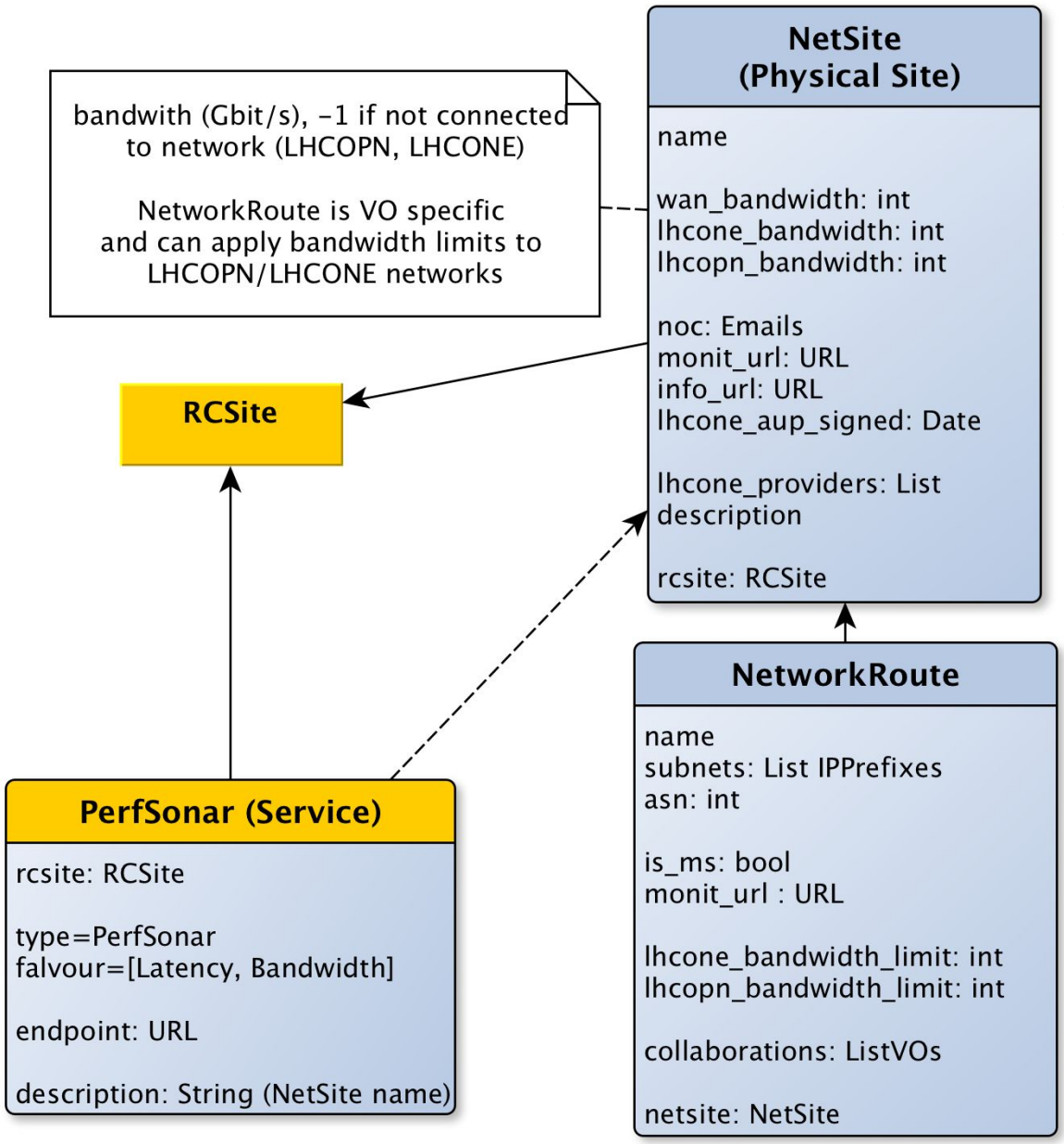


GDB, 8 Dec 2021

Motivation

- CRIC as Information system knows well about WLCG sites, services and Computing topology in general
- Today for enhanced Operations WLCG requires a central place to describe and store Site Network related information. Final goal is to get the single source of truth for overall WLCG network definition
- The first prototype for network information was implemented in AGIS/ATLAS CRIC (map of Experiment sites to the list of IPv4/6 prefixes; consumed by NOTED)
- Typical use-cases with networking topology data:
  - Configure (secure) LHCONE/LHCOPN networks and supply information to various IRR (Internet Routing Registries)
  - Monitoring the performance of WLCG sites and their associated networks
  - Test, debug and resolve network related issues
  - Correlate (translate) site services with underlaid networks
  - Identifying infrastructure bottlenecks that involve the network
- More details about use-cases/requirements in the talk (WLCG Ops Coord, 2 Dec 2021)
- CRIC Information model can be extended to provide appropriate WLCG network topology definition for end-clients

Network Information model



- The result of several prototypes/iterations with site network experts
- Site Network details
  - IPv4/IPv6 prefixes used by LHCONE/LHCOPN
  - Available bandwidth, bandwidth limits used by VOs/subnets
  - Network specifics (ASN, MS)
  - URLs to Monitoring/Info pages
  - NOC contact emails
  - (LHCONE) network providers
  - Acknowledge to LHCONE Acceptable Use Policy (AUP)
  - WLCG/HEP collaborations using given subnets
  - Associated PerfSONAR probes

Current Status

- Implemented Network topology is deployed into WLCG CRIC production
  - WebUI to browse and modify data (NetSites , Network Routes)
  - API export (RCSite JSON)
- WLCG CRIC is considered as the master source for network information
  (other CRIC plugins if needed will fetch data from WLCG CRIC)
- Permissions for operations:
  - per-Site ADMIN group to manage only own site network topology
  - global NETWORK_ADMINS group for experts
- Database has been populated with initial data grubbed from Wiki pages
  (validation by site admins is required)

Examples of CRIC WebUI

Inline hover-over tooltips with help message for a column

Network Sites

RC Site	NetSite	NOC	monit URL	info URL	AUP	LHCONE active	LHCOPN active	AUP date	WAN	LHCONE	LHCOPN	providers
wuppertalprod	DE-WUPPERTAL				✗	✗	✗		0	-1	-1	DFN
NIKHEF-ELPROD	NLT1-NIKHEF	noc@surfsara.nl			✓	✓	✓	2017-01-01	0	100	100	SURF
CERN-PROD	CH-CERN	noc@cern.ch			✓	✓	✓	2017-01-01	2100	400	1300	GEANT, Esnet, CERNlight
NIKHEF-ELPROD	NIKHEF-SCIENCE-PARK	noc@surfsara.nl			✓	✓	✓	2018-02-01	200	100	100	GEANT
RC Site	NetSite	NOC	monit URL	info URL	AUP	LHCONE active	LHCOPN active	AUP date	WAN	LHCONE	LHCOPN	providers

https://twiki.cern.ch/twiki/bin/view/CS/Public/LhcOPNE

Showing 1 to 4 of 4 entries

Previous 1 Next

Network Routes

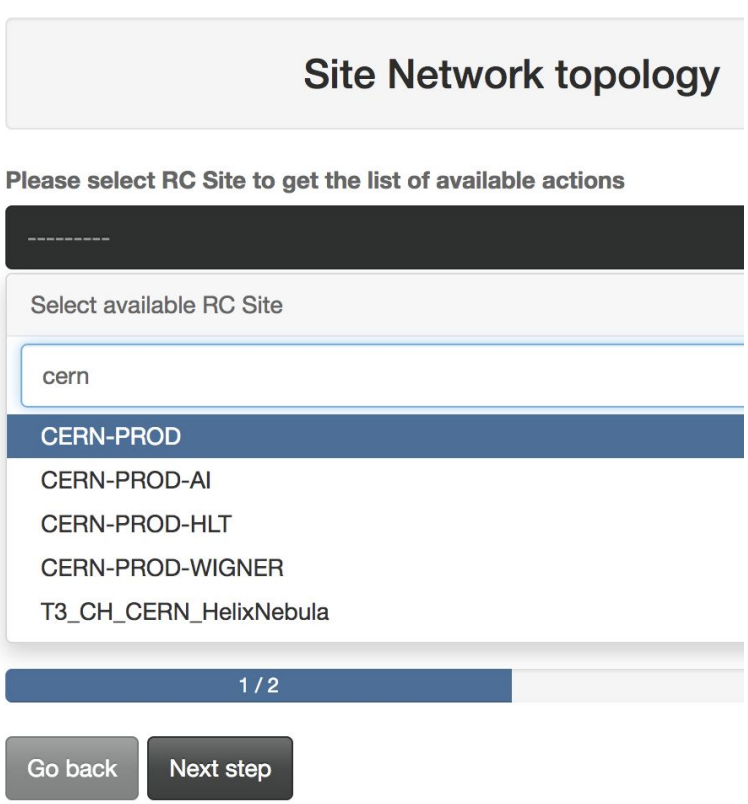
RC Site	NetworkRoute	NetSite	ASN	monit URL	MS	Subnets	LHCONE limit	LHCOPN limit	collaborations
CERN-PROD	CERN-PROD-ITS	CH-CERN	513		✗	137.138.0.0/16, 188.184.0.0/17, 188.185.0.0/17, 2001:1458:d00::/48			
CERN-PROD	CERN-PROD-LHCOPN-P2P	CH-CERN	513		✓	192.16.166.0/24, 2001:1458:302::/48	-1	1300	WLCG
CERN-PROD	CERN-PROD-LHCOPNE	CH-CERN	513		✓	128.142.0.0/16, 188.184.128.0/17, 2001:1458:301::/48, 2001:1458:302::/48, 2001:1458:303::/48	400	1300	WLCG, DUNE
NIKHEF-ELPROD	NLT1-NIKHEF-LHCOPNE	NLT1-NIKHEF	1104		✗	194.171.96.128/25, 194.171.98.112/29, 2a07:8504:120:e060::/64, 2a07:8504:120:e068::/64	100	100	WLCG, US-ATLAS, PierreAugerObservatory, XENON
wuppertalprod	wuppertalprod-LHCONE	DE-WUPPERTAL	680		✗	132.195.124.0/23	-1	-1	WLCG, PierreAugerObservatory

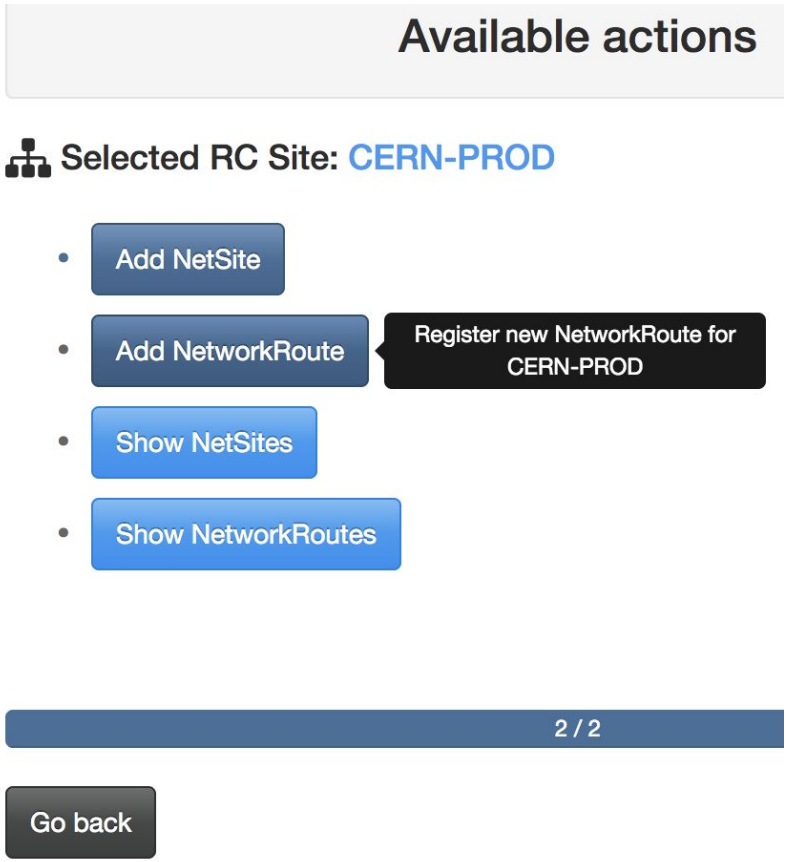
Total usable bandwidth (Gbit/s) for LHCONE for this set of subnets; -1 if not connected

Single entry point for Operations

Start link from the main page: Site Network topology (https://wlcg-cric.cern.ch/core/netsite/wizard/)

Select required site to get the list of available actions





Same links are available from RCSite detailed page, e.g:
https://wlcg-cric.cern.ch/core/rcsite/detail/CERN-PROD/

Next steps

- The implementation of PerfSONAR topology management in CRIC:
  - Upgrade CRIC models
  - Fetch data from psconfig source
- Network topology validation campaign by Site admins, Network experts
- Overview documentation for site admins (guidance and best practice for Network topology declaration in CRIC)
- CRIC API extension for dynamic queries/filters; built-in validation checks:
  - Resolve site (RCSite, NetSIte, NetworkRoute) by input IP, IP mask, etc
  - Resolve perfSONARs by NetworkRoutes
  - Check for (IP) inconsistency between RCSite.services and NetSites
  - …

For any requests/comments please contact CRIC devs:

cric-devs@cern.ch

https://its.cern.ch/jira/projects/CRIC/

https://wlcg-cric.cern.ch/core/netsite/list/

https://wlcg-cric.cern.ch/core/networkroute/list/