

Computing and networks

IPP Long Range Planning 2020

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Two submissions to the IPP LRP process on HEPNET and Computing

<https://wiki.heprc.uvic.ca/twiki/pub/HEPrc/RandallSobie/HEPNET-IPP-LRP-2020.pdf>

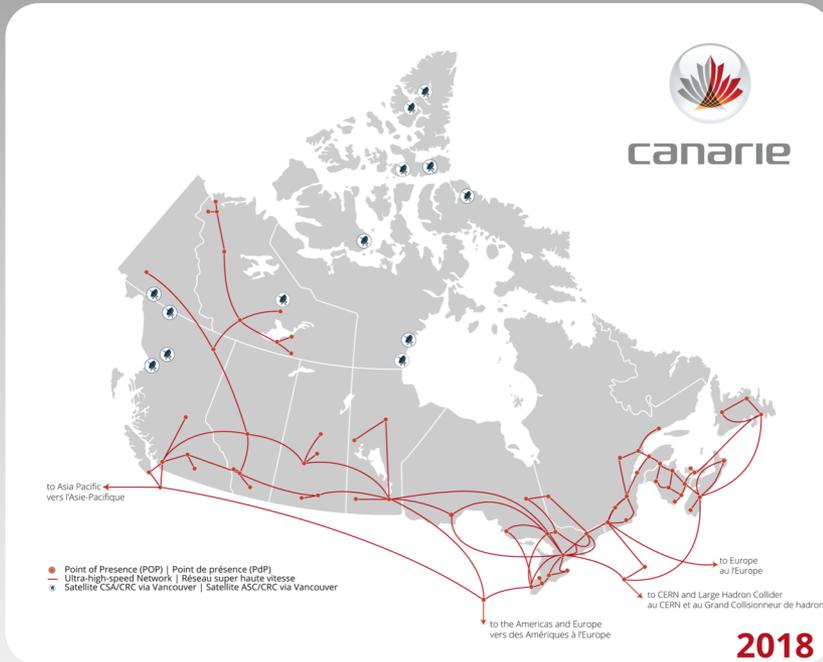
<https://wiki.heprc.uvic.ca/twiki/pub/HEPrc/RandallSobie/LRP-Computing-v2.pdf>



HEPNET/Canada

- HEPnet/Canada is responsible for national and international network connectivity for the subatomic physics community
 - Established in 1990
 - Funded with an April 2020 NSERC MRS award until March 2024
- HEPnet organization:
 - Directors : *Ogg 1990-1994; Karlen 1994-2004; and Sobie 2004-present*
 - Technical Manager: *Gable (2006-2015) and Seuster (2016- June 2020)*
 - IPP Advisory Committee: *Jillings, Moore, Warburton*
- Technical manager posting:
https://particlephysics.ca/wp/wp-content/uploads/job_posting_2020_HEPNET_Computing_Specialist.pdf
Looking for someone in HEP with computing expertise (MSc/PhD) but may open search to wide group in September

HEPNET coordinates the HEP network with the national and international organizations



National network and international links are provided by CANARIE

Provincial regional networks link the national network to the universities, and laboratories

CANARIE provides a dedicated link from the ATLAS Tier-1 to CERN (LHCOPN) and links to the private HEP routed network (LHCONE)

CANARIE estimates cost of HEP network to be \$1.4M per year (2019)

Links to Europe and Asia (100G+) through cost-sharing agreements between the international network organizations and CANARIE

Connections to the universities and laboratories provided by the provincial network organizations (e.g. BCNET, ORION, ..)

Key roles and impact of HEPNET

Role

- Coordinate networks with Canadian providers (CANARIE, provincial orgs, Compute Canada and the new NDRIO organization); contribute to the SNOLAB link to the regional network
- Represent Canadian network interests on international bodies (e.g WLCG, HEPiX, ICFA)

Networks

- LHCOPN – CERN-ATLAS-T1 link
- LHCONE – global routed network for LHC and other HEP experiments (e.g. Belle-II and DUNE); ongoing discussion of a “HEP-ONE” network (is there a need to isolate LHC traffic?)
- General research network for other traffic and also peering with selected industry (e.g. public clouds)
- Public networks - non-research traffic or connections from home

Network monitoring and trouble shooting

- Active monitoring of Canadian network and input to global monitoring system
- Contributing to the development of monitoring tools and the analysis of the data
- HEPNET uses its funds to purchase monitoring servers at the Compute Canada sites

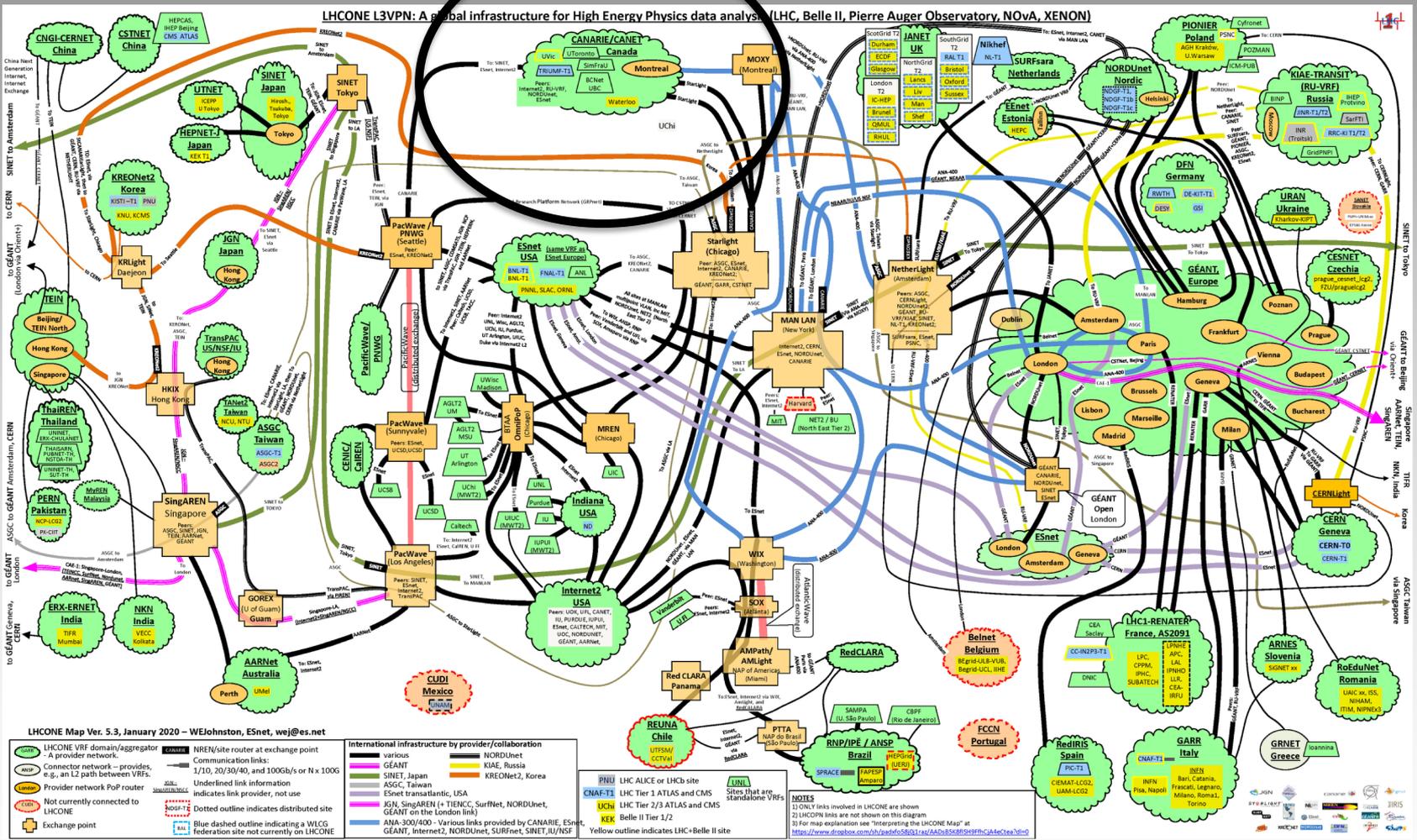
Network and data transfer R&D

- Involved in international demo projects involving industry
- Expect terabit/second networks in the 2022-2027 (impact on our computing models?)

Training of HQP

- Over 50 undergraduate students and many staff on HEPNET and cloud computing

Canada in the LHCONE network



Complex global network infrastructure, expanding its use to all HEP experiments

Computing in Canada

Computing is an integral part of subatomic physics research

- Medium to large scale high-throughput computing
- Storage and rapid access of large data samples
- Opportunistic and dedicated cloud computing
- High-performance computing (HPC) for detector modeling (GEANT), accelerator modeling and complex theoretical simulations.

Current infrastructure

- Resources provided through initiatives with CFI and Compute Canada
- Near-real computing and storage for ATLAS Tier-1 facility at SFU/TRIUMF
- Pending CFI proposals for upgrade of ATLAS T1 and BelleII Raw Data Centre (2020)

Computing and IPP (see IPP web site)

- IPP/CINP White Paper on Computing (July 2014)
- 2019 Update sent by IPP/CINP Directors to ISED, U15, NDRIO
- Presentation at 2020 IPP AGM

NDRIO (place holder name)

New Digital Research Infrastructure Organization

Budget 2018 \$527 million for DRI

\$50M used for refresh of Compute Canada systems

\$145M for CANARIE with a new focus on cybersecurity

\$375M for NDRIO for the three activities (DM, RS, ARC)

Transition from period until March 2022

Currently searching for CEO

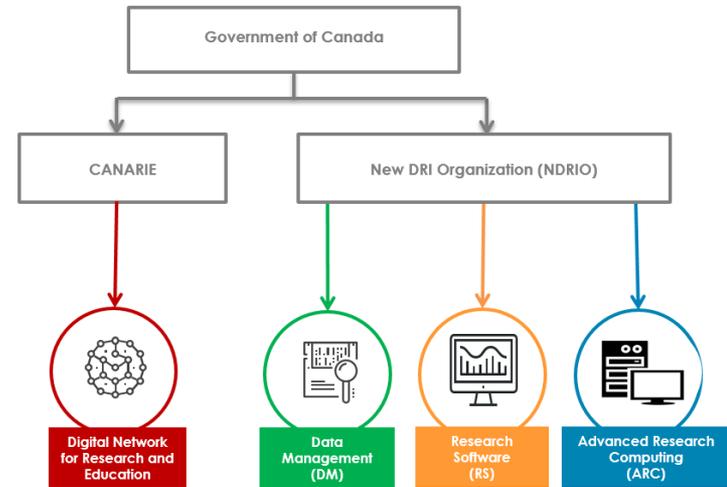
Preparing strategic plan and proposal to ISED

Ongoing technical discussions with Compute Canada

Some impact on schedule due to pandemic

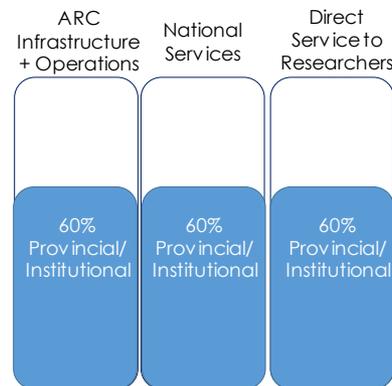
Forming Researcher Council (next slide)

Future National Structure of DRI Ecosystem

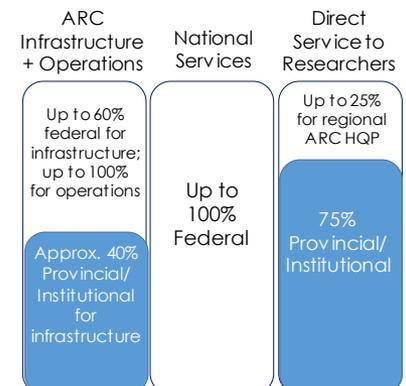


Transition period until March 31, 2022 to minimize disruption for regional and local partners, researchers, and Highly Qualified Personnel (HQP).

Current Funding Arrangement



New Funding Arrangement



Pre-COVID funding model

NDRIO Researcher Council

The new NDRIO Board (April 2020) has a strength in administration

The proposed Researcher Council will have 15-20 researchers whose role is to provide advice to the new management team and the Board

Diversity (regional, research field, gender, cultural) will determine the membership
*It is anticipated that not all fields will have representatives on the Research Council
Council members are meant to be more than representatives of their research field*

Nominations are meant to be provided by the (voting) Members (e.g. universities)
They will accept nominations from Associate Members and individuals

Nomination process opens July 20 and closes in August

The first Researcher Council will have a significant impact on NDRIO

Important to get representation on the first Researcher Council

Discussions on the best strategy:

Nominate a single candidate or a selection of candidates with different strengths?

Arrange for multiple nominations of each candidate?

Summary

- Computing and networks are a key infrastructure for the Canadian HEP community
 - A key component of our international commitments
 - Highly recognized contributions to the ATLAS, Belle II and other projects
- HEPNET/Canada has been a key organization for HEP since 1990
 - Strong advocate for CANARIE and its national network infrastructure
 - Ensures that HEP has excellent connectivity to our national and international projects
- Computing, data and software are undergoing a significant structuring with the creation of the NDRIO organization to replace Compute Canada
 - Dedicated or specialized facilities will continue to be funded by CFI
 - IPP needs to be actively involved in the creation and management of NDRIO