

ARC/HPC @ **OntarioTech** Fall Update

New Resources, Support and
Training Courses

October 10, 2025, 12:00-1:00 pm

Armin Sobhani

SHARCNET | The Alliance

HPC Technical Consultant

✉ asobhani@sharcnet.ca

✉ armin.sobhani@ontariotechu.ca

🏠 <https://staff.sharcnet.ca/asobhani>



Supercomputing – Getting Help

Local Staff @ OntarioTech



Armin Sobhani

HPC Technical Consultant



Faculty of Science, UA 3020



905-721-8668 x3607



asobhani@sharcnet.ca



armin.sobhani@ontariotechu.ca



<https://staff.sharcnet.ca/asobhani>

Arrange an Office Visit for:

Use of systems

Installation of software

Access to commercial software and site licence

Debugging and optimizing code

Programming

Consultation on various research problems

Grant application for compute hardware

...

In Today's Update...

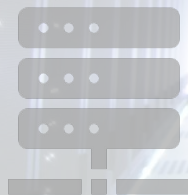


Where to Find Previous Updates

Slides and Recordings



Supercomputing @ OntarioTech



Academic / Research Computing @ OntarioTech

Campus IT Groups

Academic Computing

<https://itsc.ontariotechu.ca/>

OntarioTechU.Net

SHARCNET – HPC

Advanced Research Computing
(ARC)

Research data management
(RDM, e.g. for librarians)

Training on ARC, data science,
machine learning

More: <https://www.sharcnet.ca/>

Academic / Research Computing @ OntarioTech

Campus IT Groups

Academic Computing

<https://itsc.ontariotechu.ca/>

OntarioTechU.Net

SHARCNET – HPC

Advanced Research Computing
(ARC)

Research data management
(RDM, e.g. for librarians)

Training on ARC, data science,
machine learning

More: <https://www.sharcnet.ca/>

Academic / Research Computing @ OntarioTech

Campus IT Groups

Academic Computing

<https://itsc.ontariotechu.ca/>

OntarioTechU.Net

SHARCNET – HPC

Advanced Research Computing
(ARC)

Research data management
(RDM, e.g. for librarians)

Training on ARC, data science,
machine learning

More: <https://www.sharcnet.ca/>

Supercomputing – Resources

To run large and exascale simulations that need dedicated access to hundreds of thousands CPU and GPU cores and low latency, fast interconnect fabric; or to run hundreds of thousands of simulations simultaneously

**HPC
Clusters**

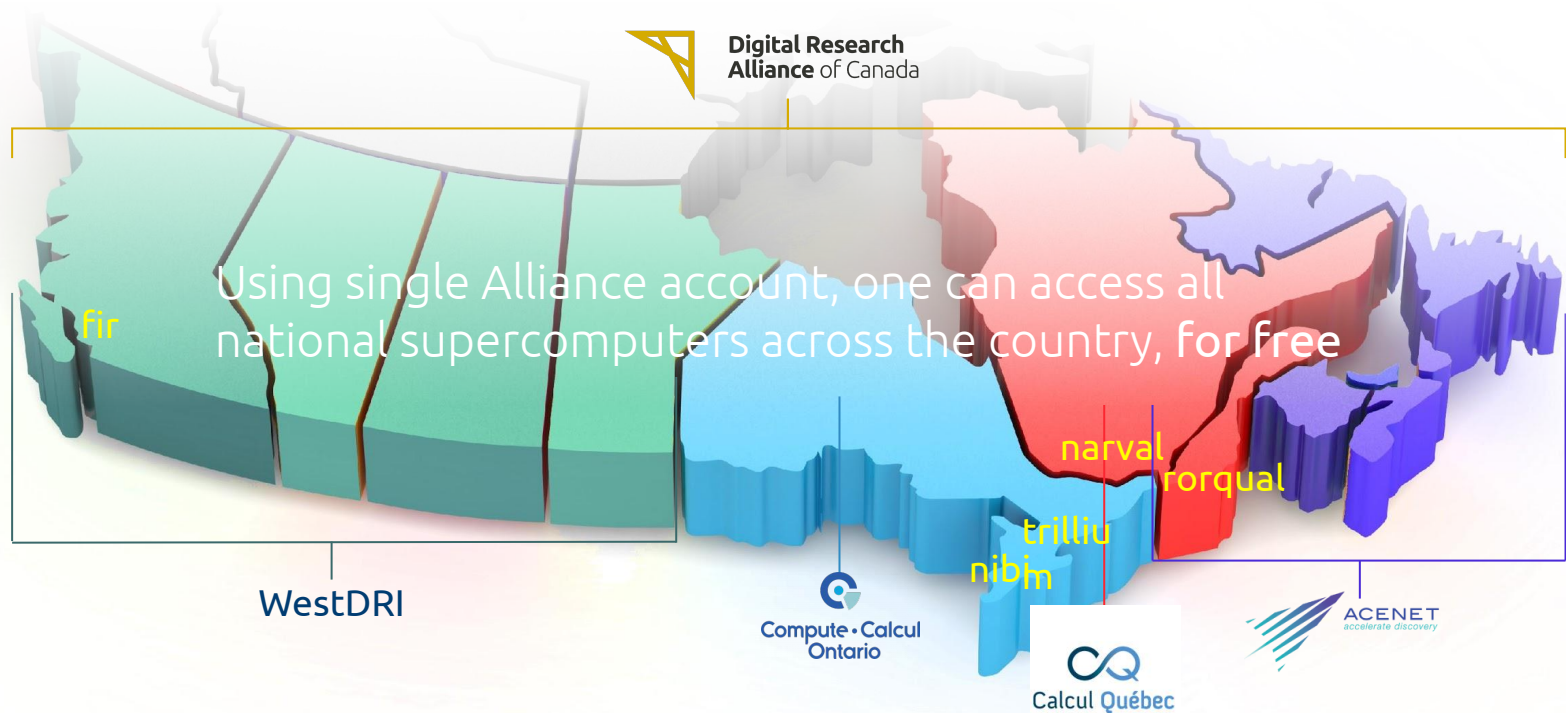
**Clouds
(IaaS)**

To run web services, databases or use virtual machines (VMs) with full control. The CPU and GPU resources are typically over committed, that is, a CPU core or GPU device might be shared by the running VMs

Storage

To store hundreds of thousands TB of research data

Resources – What and Where They Are...



Supercomputing – Getting an Account

Sign up for an account (FREE)

step-by-step



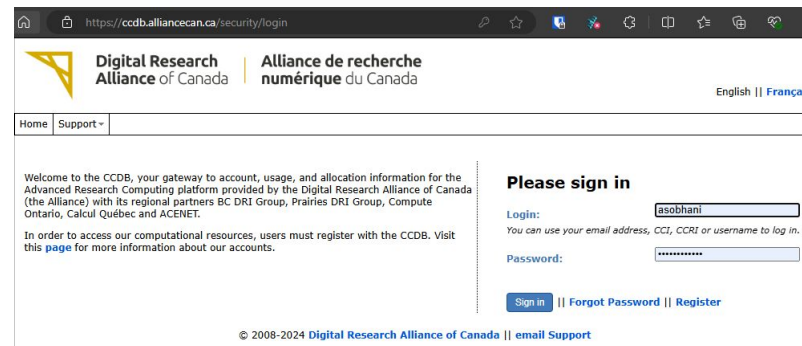
<http://ccdb.alliancecan.ca>



Your supervisor should have an account

Students, postdoc, visiting scholars and other research staff can sign up for an account with supervisor's role ID (CCRI)

This account allows you to access all the supercomputers and clouds across the country



The screenshot shows the login page for the Digital Research Alliance of Canada (CCDB). The page has a header with the logo and navigation links. The main content area includes a welcome message and a sign-in section. The sign-in section has fields for 'Login:' and 'Password:', with a 'Sign in' button. There are also links for 'Forgot Password' and 'Register'.

Multi-Factor Authentication (MFA) is now required



Supercomputing – Resources

Clusters across the Country

fir.alliancecan.ca

narval.alliancecan.ca

nibi.alliancecan.ca

rorqual.alliancecan.ca

trillium.alliancecan.ca

Cloud Services (IaaS)

arbutus.cloud.alliancecan.ca

beluga.cloud.alliancecan.ca

cedar.cloud.alliancecan.ca

nibi.cloud.alliancecan.ca

Storage Space

home
50G, backed up

project
1T per group, backed up

scratch
20T per user, purged 60 days

nearline
(tapes) - archive

Supercomputing – Resources

Clusters across the Country

fir.alliancecan.ca

narval.alliancecan.ca

nibi.alliancecan.ca

rorqual.alliancecan.ca

trillium.alliancecan.ca

Cloud Services (IaaS)

arbutus.cloud.alliancecan.ca

beluga.cloud.alliancecan.ca

cedar.cloud.alliancecan.ca

nibi.cloud.alliancecan.ca

Storage Space

home
50G, backed up

project
1T per group, backed up

scratch
20T per user, purged 60 days

nearline
(tapes) - archive

Supercomputing – Resources

Clusters across the Country

fir.alliancecan.ca

narval.alliancecan.ca

nibi.alliancecan.ca

rorqual.alliancecan.ca

trillium.alliancecan.ca

Cloud Services (IaaS)

arbutus.cloud.alliancecan.ca

beluga.cloud.alliancecan.ca

cedar.cloud.alliancecan.ca

nibi.cloud.alliancecan.ca

Storage Space

home
50G, backed up

project
1T per group, backed up

scratch
20T per user, purged 60 days

nearline
(tapes) - archive

Supercomputing – Resources

Clusters across the Country

fir.alliancecan.ca

narval.alliancecan.ca

nibi.alliancecan.ca

corqual.alliancecan.ca

trillium.alliancecan.ca

Cloud Services (IaaS)

arbutus.cloud.alliancecan.ca

beluga.cloud.alliancecan.ca

cedar.cloud.alliancecan.ca

nibi.cloud.alliancecan.ca

Storage Space

home
50G, backed up

project
1T per group, backed up

scratch
20T per user, purged 60 days

nearline
(tapes) - archive

Supercomputing – Resources

Clusters across the Country

fir.alliancecan.ca

narval.alliancecan.ca

nibi.alliancecan.ca

rorqual.alliancecan.ca

trillium.alliancecan.ca

Cloud Services (IaaS)

arbutus.cloud.alliancecan.ca

beluga.cloud.alliancecan.ca

cedar.cloud.alliancecan.ca

nibi.cloud.alliancecan.ca



Latest Status

<https://status.alliancecan.ca/>

Resources – HPC Clusters and Storage

National systems at a glance

Resource	Fir	Narval	Nibi	Rorqual	Trillium	Total
CPU cores	165,120	83,216	134,400	131,712	235,008	749,456
GPUs (H100)	640	632	312 ¹	324	244	2,152
Storage ²	51PB	35PB	25PB	62PB	29PB	202PB

Source: https://docs.alliancecan.ca/wiki/National_systems

1. Nibi has 36 nodes of 8 x NVIDIA H100s and 6 nodes of 4 x AMD Mi300As.
2. These numbers represent the major storage.

Systems being decommissioned, dates of closures:

- cedar (2019-2025), September 12, 2025
- graham (2017-2025), September 1, 2025
- niagara (2017-2025), September 30, 2025
- béluga (2019-2025), July 31, 2025, login only



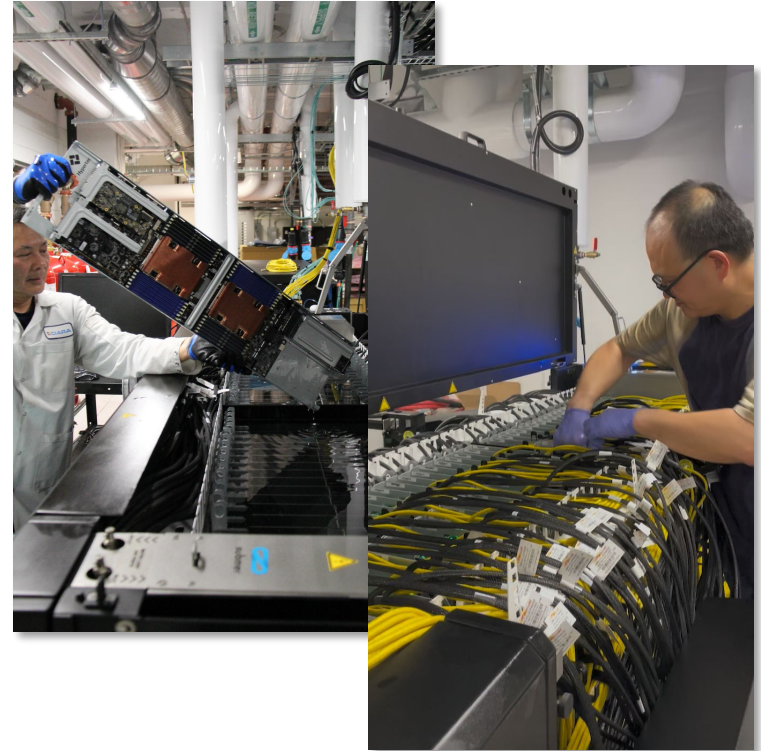
Introducing Nibi

SHARCNET's Main Cluster @ Waterloo
Built by Hypertec

Nibi Specs – CPU Nodes

Nodes	Cores	Memory	Storage	CPU
700	192	748 GB	3 TB	2 x Intel 6972P @ 2.4 GHz
10	192	6 TB	3 TB	2 x Intel 6972P @ 2.4 GHz

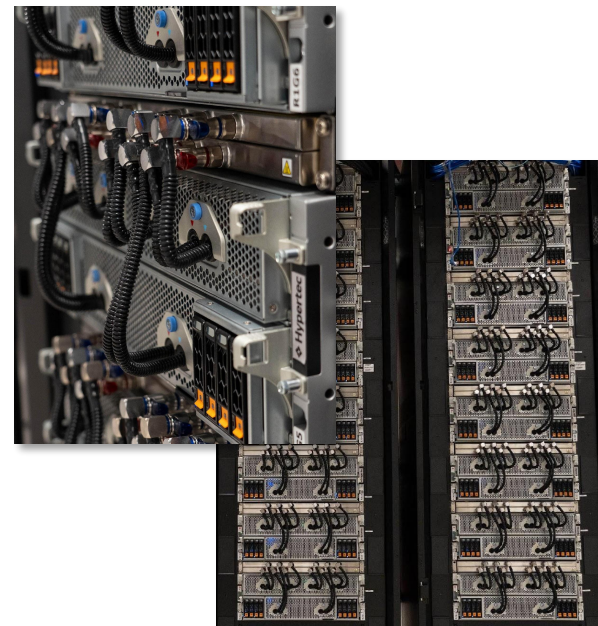
- 134,400 CPU cores
- 200 Gbit/s network bandwidth for CPU nodes
- All have Internet access
- Liquid immersion cooling



Nibi Specs – GPU Nodes

Nodes	Cores	Memory	Storage	GPU
36	112	2 TB	11 TB	8 x Nvidia H100 SXM (80 GB)
6	96	495 GB	3 TB	4 x AMD MI300A

- 312 GPUs
- 200 Gbit/s network bandwidth for GPU nodes
- All have Internet access
- Direct-to-chip liquid cooling



Nibi Specs – Storage

Parallel filesystem from
VAST Data

25 petabytes

All SSD



Nibi Launch Event @ Waterloo



Date: Friday, October 31, 2025

Location: Engineering 7 (E7), Pitch Space, 2nd floor

Time: 10 a.m. - 11:30 a.m.

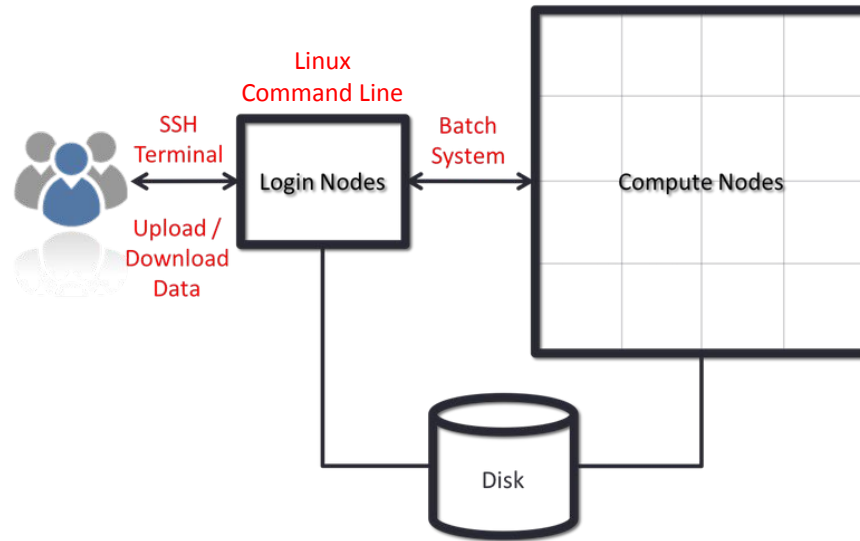
◀ Register by October 17

Accessing Resources

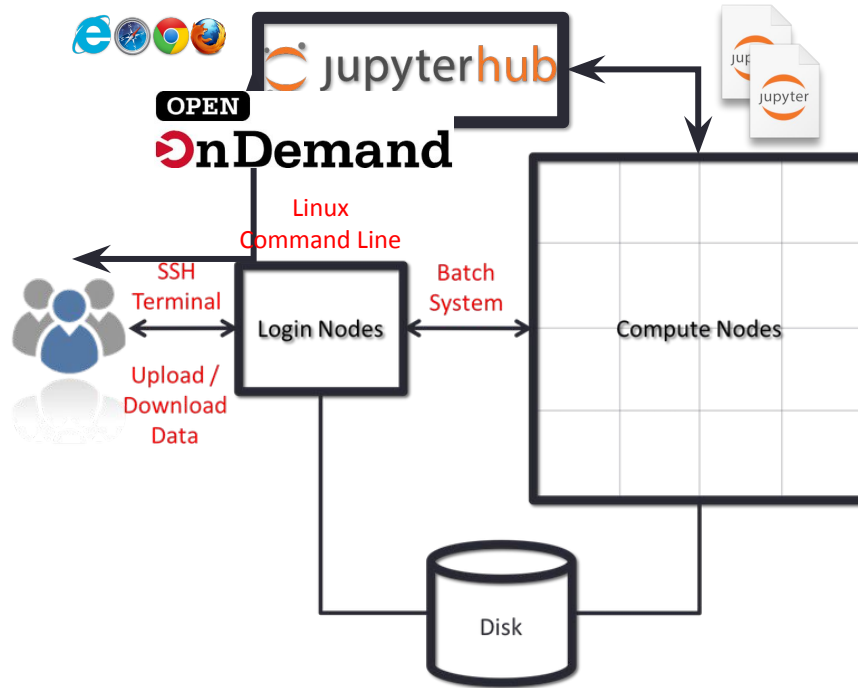
The new and existing ways



Resources – Connecting to Clusters



Resources – Connecting to Clusters



Connecting to Clusters – SSH Terminal

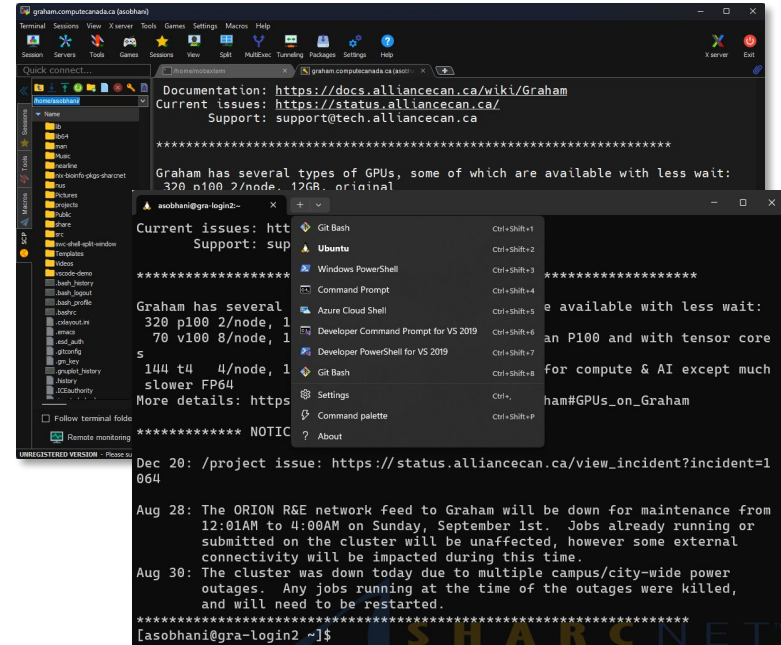
SSH Client

Windows 10 and 11

- Windows Terminal
 - OpenSSH in PowerShell or CMD
 - WSL
 - Git Bash
- MobaXterm

Linux and Mac

- OpenSSH
- ssh username@nibi.alliancecan.ca



```

graham@computeralliancecan.ca (ssh)
Documentation: https://docs.alliancecan.ca/wiki/Graham
Current issues: https://status.alliancecan.ca/
Support: support@tech.alliancecan.ca

*****
Graham has several types of GPUs, some of which are available with less wait:
320 p100 2/node, 12GB, original

*****
Current issues: https://status.alliancecan.ca/view_incident?incident=1064
Support: support@tech.alliancecan.ca

*****
Graham has several
320 p100 2/node, 1
70 v100 8/node, 1
144 t4 4/node, 1
slower FP64
More details: https://status.alliancecan.ca/view_incident?incident=1064

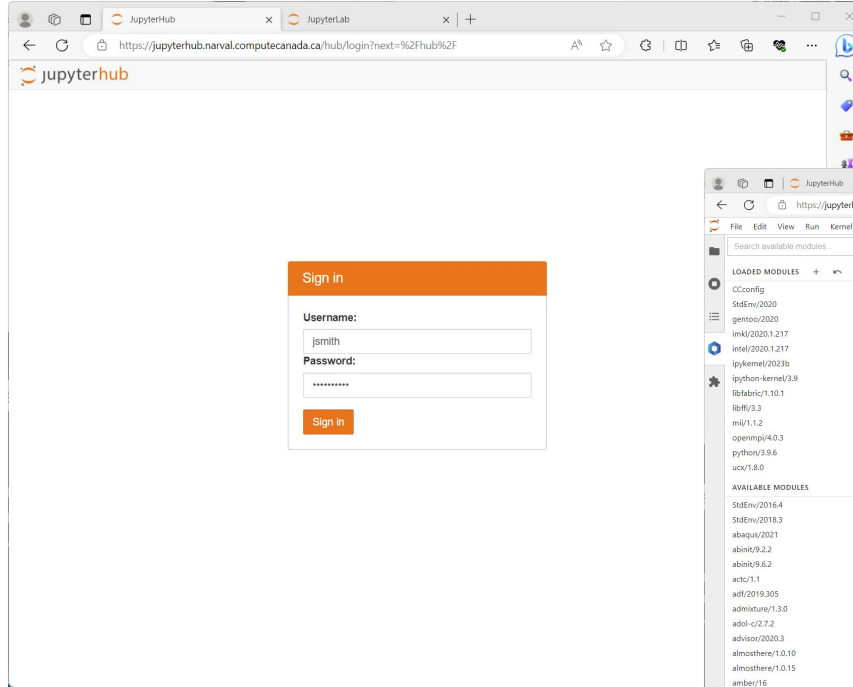
***** NOTICE *****
Dec 02: /project issue: https://status.alliancecan.ca/view_incident?incident=1064

Aug 28: The ORION R&E network feed to Graham will be down for maintenance from
12:01AM to 4:00AM on Sunday, September 1st. Jobs already running or
submitted on the cluster will be unaffected, however some external
connectivity will be impacted during this time.

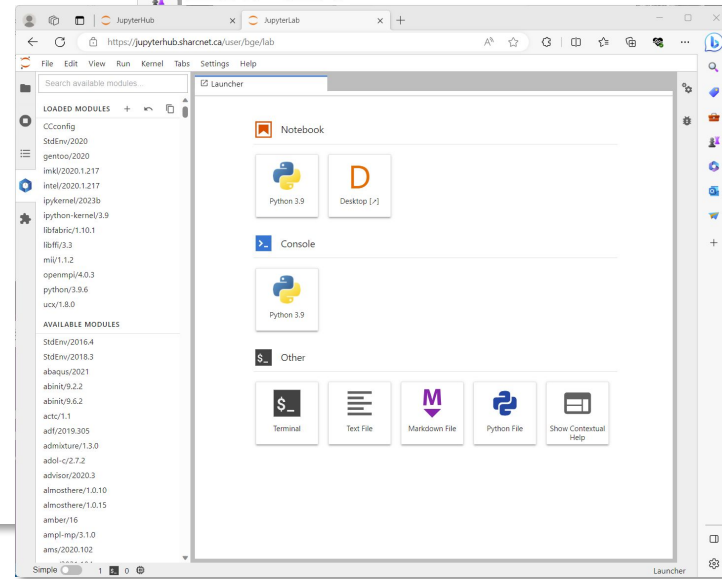
Aug 30: The cluster was down today due to multiple campus/city-wide power
outages. Any jobs running at the time of the outages were killed,
and will need to be restarted.

*****
[asobhani@gra-login2 ~]$
    
```

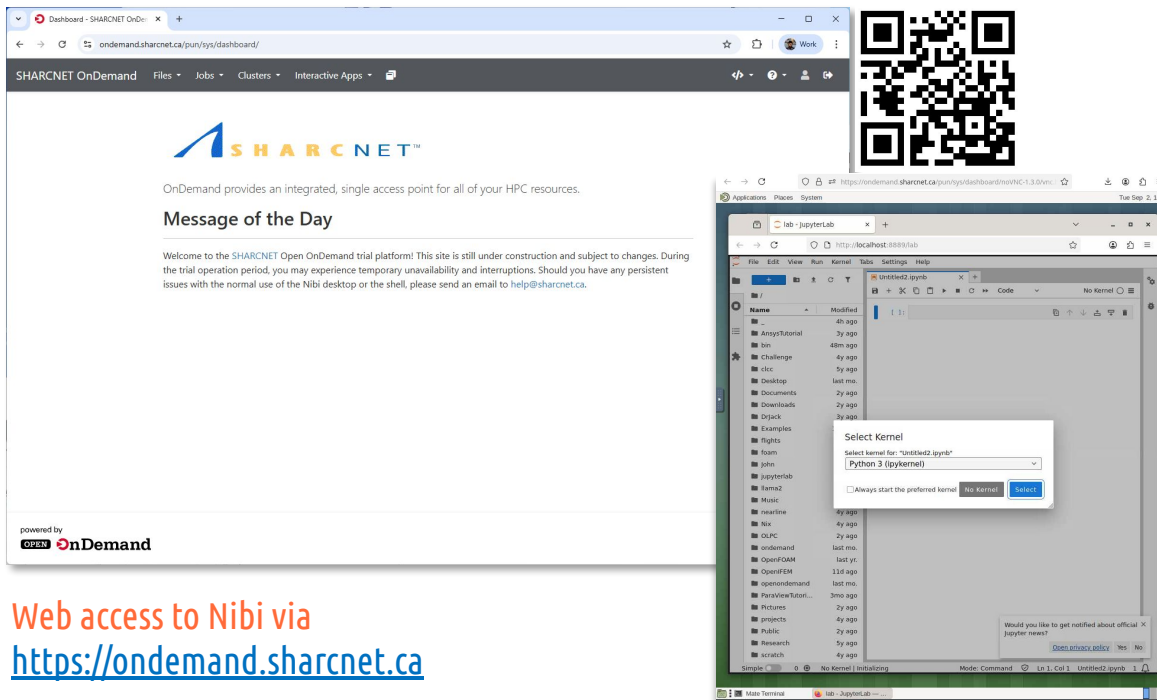
Connecting to Clusters – JupyterHub



Access to the cluster via Jupyter Notebook, terminal and desktop in a browser



Connecting to Clusters – OPEN nDemand

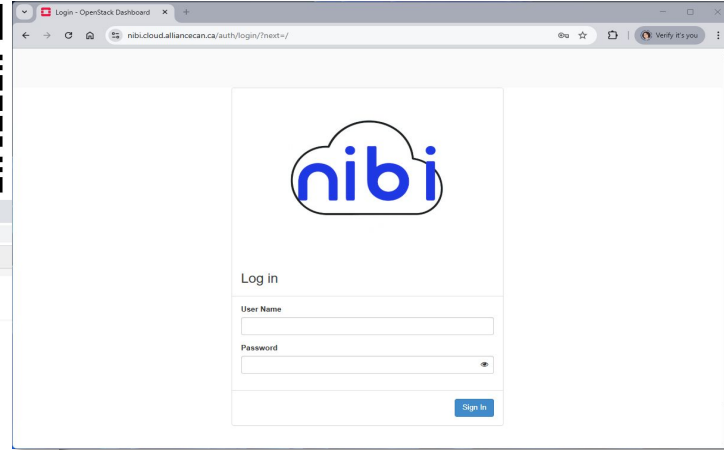
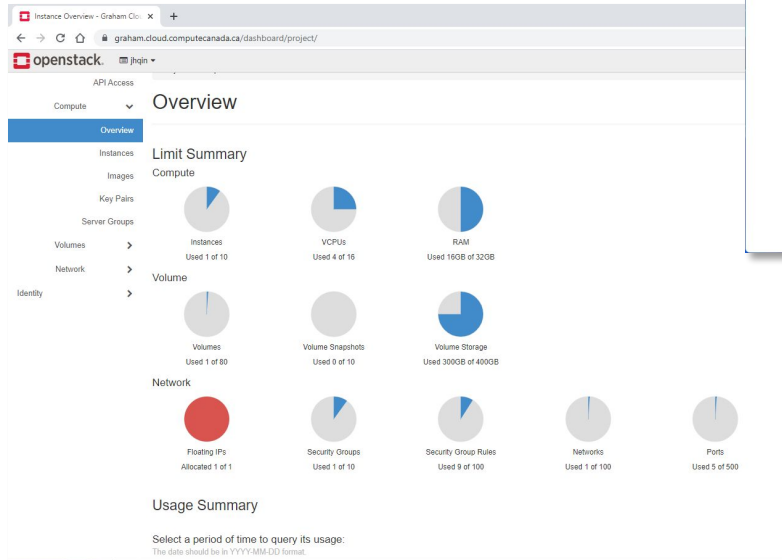


The image shows two overlapping screenshots. The background screenshot is the SHARCNET OnDemand dashboard, which includes a navigation bar with links to Files, Jobs, Clusters, and Interactive Apps. The main content area features the SHARCNET logo, a welcome message, and a QR code. The foreground screenshot shows a JupyterLab interface with a file browser on the left and a code editor on the right. A 'Select Kernel' dialog box is open, showing 'Python 3 (ipykernel)' as the selected kernel.

Web access to Nibi via
<https://ondemand.sharcnet.ca>

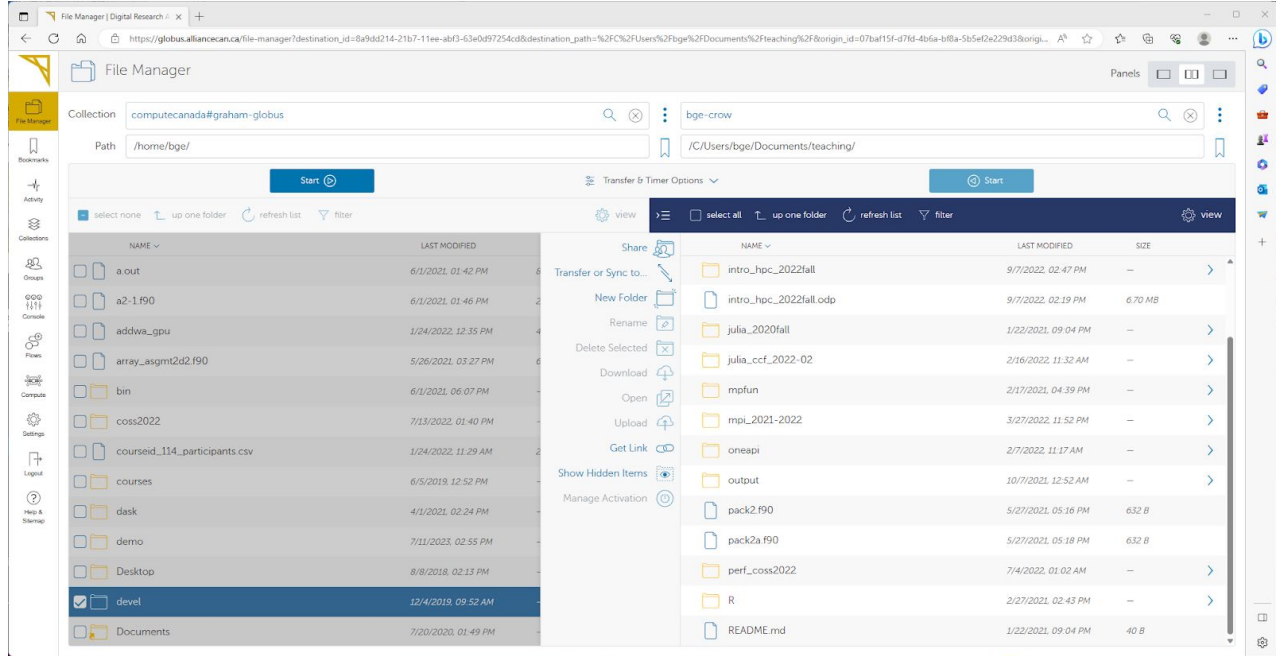
Resources – Connecting to Cloud

- arbutus.cloud.alliancecan.ca
- beluga.cloud.alliancecan.ca
- cedar.cloud.alliancecan.ca
- nibi.cloud.alliancecan.ca



- A cloud project must be created by the PI
- No Windows images, all VMs are Linux
- Up to 80 virtual CPU cores
- May have virtual GPUs
- Up to 10 TB storage
- Up to 25 persistent CPU cores

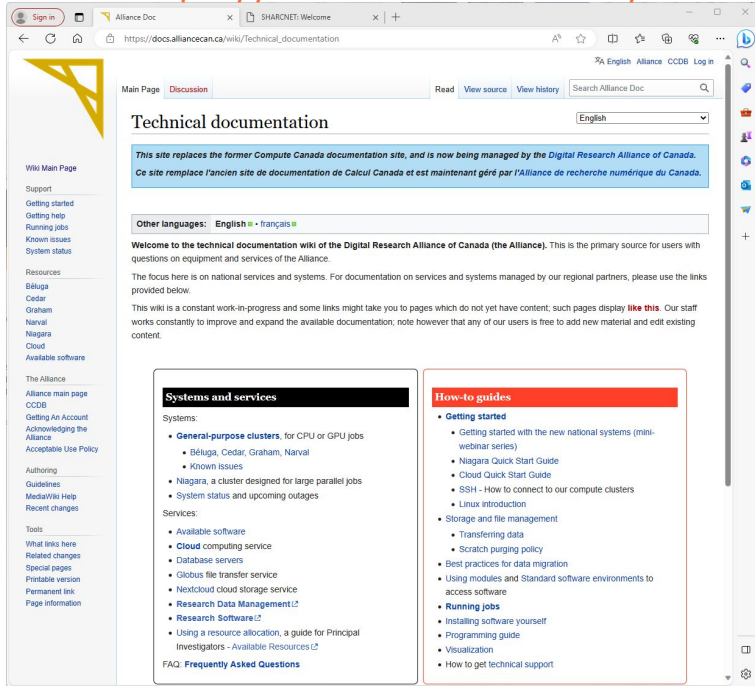
Resources – Transferring Files via Globus



Check <https://docs.alliancecan.ca/wiki/Globus>. Go to <https://globus.alliancecan.ca/> and follow the instructions

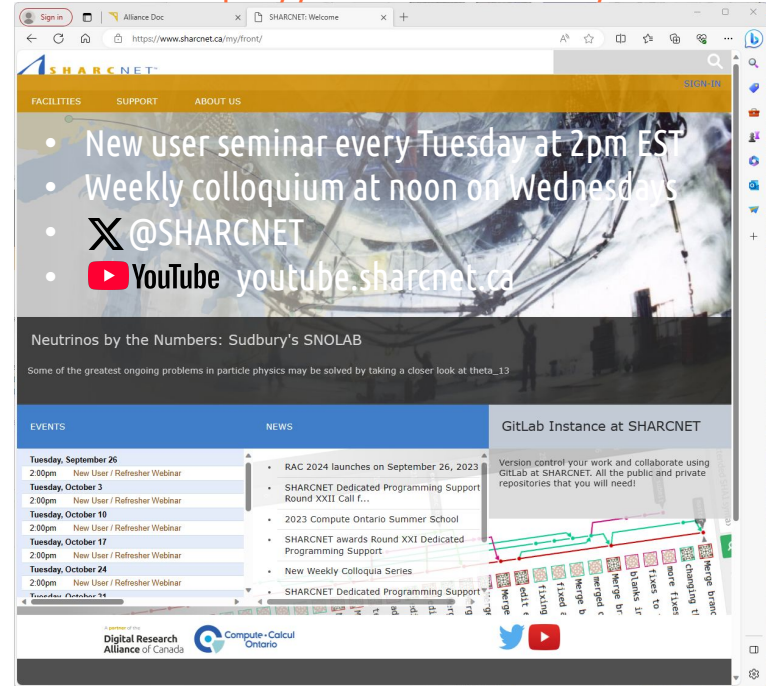
Resources – Getting Help

<https://docs.alliancecan.ca/>



The screenshot shows the 'Technical documentation' page of the Digital Research Alliance of Canada. The page is in English and features a sidebar with navigation links like 'Support', 'Getting started', and 'Running jobs'. The main content area includes a welcome message, a list of 'Other languages' (English and français), and a detailed 'Systems and services' section. This section lists various systems (Béluja, Cedar, Graham, Narval, Niagara) and services (Available software, Cloud computing service, Database servers, etc.). A 'How-to guides' section is also visible, listing topics like 'Getting started', 'Storage and file management', and 'Running jobs'.

<https://www.sharcnet.ca/>



The screenshot shows the SHARCNET website. The header includes 'FACILITIES', 'SUPPORT', and 'ABOUT US'. The main content area features a large banner with the text 'New user seminar every Tuesday at 2pm EST' and 'Weekly colloquium at noon on Wednesdays'. Below this, there is a section for 'Neutrinos by the Numbers: Sudbury's SNOLAB'. The website also has an 'EVENTS' section with a calendar of upcoming seminars and webinars, and a 'NEWS' section with recent updates. A 'GitLab Instance at SHARCNET' section is also present, highlighting version control services.

Resources – Getting Help

Help from beyond **OntarioTech**



Weekly Q&A session:

<https://www.sharcnet.ca/my/news/calendar>



Ticketing system (most recommended):

support@tech.alliancecan.ca



Staff contact info to email or phone:

<https://www.sharcnet.ca/my/contact/directory>

RAC 2026



Resources - Caps

Default Access

Compute – No limit in CPU and GPU cores, but low priority, hence longer wait time.

Storage – Limited storage space

- 50 GB home
- 1 TB project - work space
- 20 TB scratch
- 10 TB nearline (tape)

Cloud – Limited cloud resources

- 80 VCPU years
- Persistent 25 VCPU years
- 10 TB volume and snapshot storage

Request – No

Rapid Access Service (RAS)

Compute – May ask for increase in priority *temporarily*, to bump up jobs with that have deadlines.

Storage

- project - up to 40 TB over all clusters
- nearline - up to 100 TB
- Not available at some sites.

Cloud – Moderate increase.

Request – Any time

Resource Allocation Competition (RAC)

Compute – Best assurance of priority access to allocated number of CPU cores (200+) and GPU (25 RGUs).

Storage – Guaranteed access to:

- project (40+ TB)
- nearline (100+ TB)

Cloud – Guaranteed access to allocated cloud resources

Request – Annual application

RAS vs. RAC

RAS

Rapid Access Service

AKA Default Allocation

CPU/GPU: Opportunistic

Storage: 40 TB across all clusters

Cloud compute instance: 1 month

Cloud persistent instance: 1 year

RAC

Resource Allocation Competition

Annual (in fall)

Peer-reviewed
(scientific and technical)

Roughly 80% of resources

RAS vs. RAC

RAS

Rapid Access Service

AKA Default Allocation

CPU/GPU: Opportunistic

Storage: 40 TB across all clusters

Cloud compute instance: 1 month

Cloud persistent instance: 1 year

RAC

Resource Allocation Competition

Annual (in fall)

Peer-reviewed
(scientific and technical)

Roughly 80% of resources

RAS vs. RAC

RAS

Rapid Access Service

AKA Default Allocation

CPU/GPU: Opportunistic

Storage: 40 TB across all clusters

Cloud compute instance: 1 month

Cloud persistent instance: 1 year

RAC

Resource Allocation Competition

Annual (in fall)

Peer-reviewed
(scientific and technical)

Roughly 80% of resources

RAC – Types

RRG

Resources for **Research Groups**

Resource: **Compute and/or Storage**

CPU $\geq$ 200 core-years, or

GPU $\geq$ 25 reference GPU units (RGU) years, or

or project storage $\geq$ 41 TB, or

or nearline storage $\geq$ 101 TB

RPP

Research Platforms and Portals

Resource: **Cloud**

Persistent cloud storage $\geq$ 1 TB, or

Compute cloud $\geq$ 81 vCPUs, or

Persistent cloud $\geq$ 26 vCPUs

RAC – Types

RRG

Resources for **Research Groups**

Resource: **Compute and/or Storage**

CPU $\geq$ 200 core-years, or

GPU $\geq$ 25 reference GPU units (RGU) years, or

or project storage $\geq$ 41 TB, or

or nearline storage $\geq$ 101 TB

RPP

Research Platforms and Portals

Resource: **Cloud**

Persistent cloud storage $\geq$ 1 TB, or

Compute cloud $\geq$ 81 vCPUs, or

Persistent cloud $\geq$ 26 vCPUs

RAC – Types

RRG

Resources for **Research Groups**

Resource: **Compute and/or Storage**

CPU $\geq$ 200 core-years, or

GPU $\geq$ 25 reference GPU units (RGU) years, or

or project storage $\geq$ 41 TB, or

or nearline storage $\geq$ 101 TB

RPP

Research Platforms and Portals

Resource: **Cloud**

Persistent cloud storage $\geq$ 1 TB, or

Compute cloud $\geq$ 81 vCPUs, or

Persistent cloud $\geq$ 26 vCPUs

2026 RAC – Important Info

Important Dates

Applications accepted:
September 23 to November 4, 2025

Announcement of Results:
late March 2026

Implementation of allocations: early
April 2026

Info Sessions Recordings



RAC Overview



GPU Requests



Cloud Requests



2026 RAC – Links

Guides



Application Form



SHARCNET's Online Training

<https://training.sharcnet.ca/>



Introduction to ARC Series

Intro to ARC

Starts in early October

Two 1-hour classes each week

Include lectures and labs

Topics

HPC Python

Julia

C++

PyTorch

Jupyter

Apptainer

CMake

MPI

MATLAB

SHARCNET's Self-Paced Courses (NEW)

Self-Paced Courses

Just google for
SHARCNET self-paced

Online self-directed
courses, with quizzes
and/or home assignments

If successfully completed,
the Certificate of
Completion will be issued

Available Courses

Introduction to GPU
Programming

Introduction to Machine
Learning

Introduction to the Shell

Coming Soon

Introduction to SQL

Introduction to
Supercomputing

New Alliance User course

Parallel Code Debugging
and Profiling

Other SHARCNET's Online Training

Weekly Compute Ontario Colloquia Series

Every Wednesday at 12pm-1pm,
online

Topics of general interest to our
users

Delivered by SHARCNET, SciNet and
CAC staff, plus guest speakers

No registration is required

Alliance account is not required

Compute Ontario Summer Schools

Every June

Three weeks, 2 parallel streams, ~40
courses

Alliance account is not required

SHARCNET's YouTube Channel

<http://youtube.sharcnet.ca>



Hundreds of webinar recordings and
short videos

Q&A

