RAC 2023
Q&A Session
Acknowledgement
What is The CAC

- The Centre for Advanced Computing (CAC) at Queen's University supports the research community by providing access to innovative digital research infrastructure (DRI).

- The CAC delivers high performance, and highly secure computing, supporting hundreds of Canadian research groups, comprising thousands of researchers working in a variety of fields.

- Our mission is to empower researchers to conduct world-class leading research by enabling Digital Research Infrastructure (DRI) services that advance research outcomes, collaborations, and impacts.

https://cac.queensu.ca/
Digital Research Infrastructure (DRI)
RAC: Resource Allocation Competition

- Annual competition for allocation of compute (and cloud) resource on Alliance clusters
- Two application streams: RRG and RPP

Resources for Research Groups (RRG)

- Compute Nodes
- Storage

2022:
- Core years: ~250,000
- CPU: 2,600
- Nearline (Tape): 74,000 TB
- Projects: 52,000 TB

Research Platform and Portal (RPP)

- Cloud
- vCPUs
- RAM
- Storage
## Available Compute Resources

<table>
<thead>
<tr>
<th>Cluster</th>
<th># of CPUs</th>
<th># of GPUs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Beluga</strong></td>
<td>~32,000</td>
<td>V100: 680</td>
</tr>
<tr>
<td><strong>Narval</strong></td>
<td>~73,200</td>
<td>A100: 636</td>
</tr>
<tr>
<td><em><em>Niagara</em>/Mist</em>*</td>
<td>~81,000 (40 core)</td>
<td>V100: 216</td>
</tr>
<tr>
<td><strong>Graham</strong></td>
<td>41,548</td>
<td>P100: 320</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V100: 56(16 gb)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V100: 16(32 gb)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T4 : 144</td>
</tr>
<tr>
<td><strong>Cedar</strong></td>
<td>94,528</td>
<td>P100: 584</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V100: 768</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>~316k</td>
<td>~3400</td>
</tr>
</tbody>
</table>
## Accessing Compute Resources

<table>
<thead>
<tr>
<th>CCDB Account</th>
<th>Default</th>
<th>RAS</th>
<th>RAC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eligibility:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>be a faculty member at a Canadian academic institution; <strong>AND</strong> have an active Federation account with an Academic Principal Investigator role (Faculty, Adjunct Faculty or Librarian).</td>
<td>1 TB of /project space</td>
<td>Additional storage on /project and /nearline</td>
<td>RRG and RPP competition</td>
</tr>
<tr>
<td></td>
<td>20 TB of /scratch</td>
<td>Can request cloud resources</td>
<td>Allocation of:</td>
</tr>
<tr>
<td></td>
<td>Access to Cedar, Beluga, Narval and Graham</td>
<td>Opportunistic usage</td>
<td>• Compute</td>
</tr>
<tr>
<td></td>
<td>Opportunistic usage</td>
<td></td>
<td>• Storage</td>
</tr>
<tr>
<td></td>
<td>No cloud resources</td>
<td>Opportunistic usage</td>
<td>• Cloud resource</td>
</tr>
</tbody>
</table>
Who Should Apply for a RAC?

- Researchers who expect to use more resources than what is typically available with a ‘Default’ allocation (50 core years, 10 GPU years, 10 TB storage) during the next allocation cycle.
- Researchers who need access to Cloud based portals

<table>
<thead>
<tr>
<th>HPC</th>
<th>Cloud</th>
</tr>
</thead>
</table>
| CPU > 50 Core Years OR  
GPU > 10 GPU Years OR  
Project Storage > 10 TB OR  
Nearline Storage > 10 TB | Compute Cloud > 80 VCPU OR  
Persistent Cloud > 25 VCPU OR  
Volume & Snapshots > 1 TB OR  
Shared Filesystem > 10 TB OR  
Object Storage > 10 TB |
RAC Guiding Principles

The RAC is guided by the following principles:

● all applications are given fair consideration through both a scientific and technical review process;
● resources are awarded based on the merits of the computational research project presented, rather than the merits of the overall research program;
● there is no direct correlation between the amount of computational resources needed and the quality (excellence) of the research outcomes of a project - important research can be done with a small amount of computational resources; and
● the challenges arising from the shortage of resources and other constraints within the system are shared among all applicants.
RAC Scoring

All applications submitted to the RAC are peer-reviewed and scored. The final RAC score is based on the following:

- the scientific excellence of the specific research project for which computational resources are being requested;
- the scientific feasibility of the proposed research project;
- the appropriateness of the resources requested to achieve the project’s objectives;
- the likelihood that the resources requested will be efficiently used.

Every year a cutoff score is determined, below which no allocation is granted, for RAC 2023, the minimum overall score required to receive an allocation is 3.0.
Scoring Matrix

RAC applications are scored based on a 5-point scale as shown in the table below. **Applications with a score below 3.0 are considered unsuccessful and will not be awarded.**

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Range</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>4.0 - 5.0</td>
<td>The application excels in all relevant aspects of the review criteria. Any shortcomings are minimal.</td>
</tr>
<tr>
<td>Good</td>
<td>3.0 - 3.9</td>
<td>The application excels in most relevant aspects of the review criteria and reasonably addresses all others. Certain improvements are possible.</td>
</tr>
<tr>
<td>Fair</td>
<td>2.0 - 2.9</td>
<td>The application excels in some relevant aspects of the review criteria. Relevant aspects could be better addressed and/or need to be revised or improved.</td>
</tr>
<tr>
<td>Poor</td>
<td>1.0 - 1.9</td>
<td>The application broadly addresses relevant aspects of the review criteria. Relevant aspects of the review criteria are unclear, are missing or require major revisions or improvements.</td>
</tr>
<tr>
<td>Insufficient</td>
<td>0 - 0.9</td>
<td>The application fails to provide convincing information, has serious inherent flaws or gaps and/or relevant aspects of the review criteria are missing. Extensive revisions will be required.</td>
</tr>
</tbody>
</table>
RAC Application Process

- New RRG/RPP Applications may be delegated
- New Applications require updated CCV
- New Applications undergo a Tech and Scientific Review
- RRG/RPP Reports cannot be delegated
- Fast Track by invitation only
- Out of Round applications no longer accepted

Years 2 and 3
PI writes short progress report including explanation for low usage, cluster change and request for incremental increase in storage
# RRG vs RPP

<table>
<thead>
<tr>
<th>Resources for Research Groups</th>
<th>Research Platforms and Portals</th>
</tr>
</thead>
<tbody>
<tr>
<td>The RRG is a peer-reviewed application process for projects whose <strong>primary purpose</strong> is to <strong>conduct research</strong> requiring compute, storage and cloud resources to meet their goals.</td>
<td>The RPP is a peer-reviewed application process for projects whose <strong>primary purpose</strong> is to <strong>provide a service through scientific gateways</strong> that improve access to shared datasets, enhance existing online research tools and facilities, or advance national or international research collaborations.</td>
</tr>
<tr>
<td>● However, projects <strong>primarily</strong> needing persistent instances in the cloud to provide a service through a platform or a portal should apply through the RPP application process instead.</td>
<td>● However, projects <strong>primarily</strong> needing compute resources in a cluster to conduct research should apply through the RRG process instead.</td>
</tr>
</tbody>
</table>

**Note:** Departmental Applications will not be accepted
Fast Track

- Fast track (FT) application process is available by invitation only (emails were sent out for this year).
- PIs with an existing RRG award who meet the FT eligibility are allowed to submit a lightweight progress report.
- No scientific review.

Eligibility Criteria

- RRG application must have received a score greater than or equal to 3.0.
- Can apply through FT process for upto 2 consecutive year, i.e., for year-2 & 3.

Change requests

- 10% increase in /project and /nearline space, capped at 50 TB of additional space.
- Change of resource location.

Note: The amount of storage requested must include any existing storage allocation or data that you may currently have in any of our clusters PLUS any new, additional storage needed. For example, if you are currently using 50 TB of storage in any of our clusters and need an additional 50 TB, then the request should be for 100 TB.
# Important Dates

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources for Research Groups (RRG) submissions</td>
<td>September 22 to November 2, 2022</td>
</tr>
<tr>
<td><strong>Fast Track Submissions</strong></td>
<td></td>
</tr>
<tr>
<td>Research Platforms and Portals (RPP) submissions</td>
<td></td>
</tr>
<tr>
<td>Q&amp;A Sessions – Everybody welcome</td>
<td>October 4, 2022 (English) – <a href="#">Register</a></td>
</tr>
<tr>
<td></td>
<td>October 5, 2022 (French) – <a href="#">Register</a></td>
</tr>
<tr>
<td>Annual RPP Progress Report submissions</td>
<td>November 7 to December 7, 2022</td>
</tr>
<tr>
<td>Announcement of RAC 2023 results</td>
<td>Late March 2023</td>
</tr>
<tr>
<td>Implementation of RAC 2023 allocations</td>
<td>Early April 2023</td>
</tr>
</tbody>
</table>
New RRG Application

Scientific Review Committee
Please choose which of the following Scientific Review Committees should evaluate your proposal.

- Astronomy, Astrophysics and Cosmology 2022
- Bioinformatics 2022
- Chemistry, Biochemistry and Biophysics 2022
- Computer Sciences and Mathematics 2022
- Engineering 2022
- Environmental and Earth Sciences 2022
- Humanities and Social Sciences 2022
- Nano, Materials and Condensed Matter 2022
- Neurosciences, Medical Imaging and Medical Physics 2022
- Subatomic and Space Physics 2022

Research Summary:

Research Summary: Give a brief summary of your research project. This summary should be written for the general public in a format that can be used for a press release. If you have a successful resource application, this text will be published on our website and in other Digital Research Alliance of Canada print materials as required. Please use the outline text below and fill in the blanks as a guideline. [300 words maximum]

This research is focused on... (insert 2-3 sentences providing a high-level summary of your research). The Digital Research Alliance of Canada infrastructure is used to... (insert 1-2 sentences describing specifically how our infrastructure is used in your research). Last year, some of our research activities included... (insert a minimum of 1 / maximum of 3 examples of key research activities accomplished last year, e.g. any project milestones reached, awards received, invited talks given, or other notable research activities). The results of this research have the potential to impact Canadians by... (insert 2-3 sentences outlining any industry applications and/or contributions to general knowledge). This research would not be possible without the Digital Research Alliance of Canada infrastructure because... (insert 1-2 sentences identifying why our resources are essential to your research).

Please explain
New RRG Application

Secondary contact

You have the option to add a secondary contact person to your application. If desired, please enter the CCRI of a any user with an active account that can act as a technical or secondary point of contact for the project(s) related to your application. Our staff may contact this person in case there is any technical or administrative question related to your application.

A CCRI is an identifier of the form abc-123-01.

Secondary contact (CCRI):

There is no secondary contact associated with this application.

Co-Pls

Add Co-Pls to your application. Co-Pls must be Faculty and have an activated Alliance account to be able to submit your application. Enter the CCRI of your Co-Pls and click on "Add". You can add as many Co-Pls as needed. Once added, the table will show whether any action is required from each Co-PI (highlighted in red) or if no action is required (highlighted in green). All boxes must be in green before submitting the application. For confidentiality reasons, you will not be able to see other people’s CCV. Please follow up with your Co-Pls directly to ensure that proper action is taken in a timely manner. Ask your Co-Pls to consult the CCV Submission Guide.

Co-Pls must go to the following page to upload their updated CCV: https://ccdb.computecanada.ca/reporting.

A CCRI is an identifier of the form abc-123-01.

Co-PI (CCRI):

There are no co-PIs associated with this resource application.

Delegate

None specified

Delegate
New RRG Application

Canadian Common CV for Michael Hanlan

All PIs are required to submit a Canadian Common CV (CCV) with an application to any Alliance competition.

Please consult the CCV Submission Guide for detailed instructions on how to fill in and submit your CCV.

**CCV Submission Confirmation Code**

**Max. 7 digit**

Update CCV

Currently saved CCV

CCV missing. Michael Hanlan must submit a CCV

**CCV Publications Reporting**

For each of your reported publications, please check the box to indicate that the publication was supported or enabled by our resources. When a new CCV is uploaded, publications you have not yet provided an answer for are surrounded by a red border. In order to submit this application, you must provide an answer for all publications: there should be no red borders left once you complete this process. Note that, when there is a red border, you need to click twice on the box next to the publication to uncheck it. Please consult the CCV Submission Guide for details about how to upload a new CCV.
Research and Technical Justification

Upload a PDF document that describes the research rationale, research achievements expected including timelines, technical requirements and technical justification for the project (written for a broad scientific audience). Also include the research progress over the past year if you had a previous award.

Use one of the templates provided for your request. Please review prior to writing and submitting your request.

Templates: (Microsoft Word, LaTeX)

Guidelines for the length of your proposal are provided in the template. You may only upload one file. If you upload more than one, only the last will be saved. [Maximum 5 MB]

No file uploaded

Browse... No file selected.

Document Language

Please indicate the language in which the attached document is written. This field is required.

English ☐ French ☒
New Resource Request

Please consult the Resources for Research Groups application guide for further instructions on how to complete this application.

Please use the Technical Glossary when filling out this application.

For support, please contact allocations@tech.alliancecan.ca.

Select resource

**Compute Resources:**
- belugacompute, (Calcul Québec)
- cedarcompute, (BC DRI Group)
- grahamcompute, (SHARCNET)
- narvalcompute, (Calcul Québec)
- niagara-compute, (SciNet)

**GPU Resources:**
- belugagpu, (Calcul Québec)
- cedar-gpu, (BC DRI Group)
- graham-gpu, (SHARCNET)
- narval-gpu, (Calcul Québec)

**Storage Resources:**
- arbutus-dcache, [former ndc-uvic] (BC DRI Group)
- beluga-storage, [former ndc-calculquebec] (Calcul Québec)
- cedar-storage, [former ndc-sfu] (BC DRI Group)
- graham-storage, [former ndc-waterloo] (SHARCNET)
- hpss-storage, (SciNet)
- narval-storage, (Calcul Québec)
- niagara-storage, [former ndc-toronto] (SciNet)

Save resource request  Cancel
New resource request

narval-compute, (Calcul Québec)

Reason for selecting system

- 1. My group has been using this system in the past.
- 2. My group has significant data already stored on this system that is not available elsewhere.
- 3. I have to select a system but I don’t mind receiving an allocation on any other suitable one.
- 4. There is special hardware or software available on this system which is not available elsewhere.
- 5. Other

Provide additional details as needed (mandatory for options 4 and 5 only).

Core years

Base system memory per core (GB)
Storage Request

New resource request

narval-storage, (Calcul Québec)

Reason for selecting system

- 1. My group has been using this system in the past.
- 2. My group has significant data already stored on this system that is not available elsewhere.
- 3. I have to select a system but I don’t mind receiving an allocation on any other suitable one.
- 4. There is special hardware or software available on this system which is not available elsewhere.
- 5. Other

Provide additional details as needed (mandatory for options 4 and 5 only).

Data will also be stored on another system.

Please indicate the storage types that apply to your project, indicating how much storage of each type you need. Please explain the reasons for your choice(s) in the Application document. Only use this section if you need more than what is available via the Rapid Access Service.

Project Storage (TB)

Nearline Storage (TB)

Save resource request  Cancel
## Cloud Request

<table>
<thead>
<tr>
<th>VCPU cores, RAM, Disk</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 VCPU cores, 7.5GB ram, 36GB ephemeral local disk</td>
<td>0</td>
</tr>
<tr>
<td>2 VCPU cores, 7.5GB ram, 36GB ephemeral local disk</td>
<td>0</td>
</tr>
<tr>
<td>2 VCPU cores, 15GB ram, 72GB ephemeral local disk</td>
<td>0</td>
</tr>
<tr>
<td>4 VCPU cores, 15GB ram, 144GB ephemeral local disk</td>
<td>0</td>
</tr>
<tr>
<td>4 VCPU cores, 30GB ram, 144GB ephemeral local disk</td>
<td>0</td>
</tr>
<tr>
<td>4 VCPU cores, 45GB ram, 144GB ephemeral local disk</td>
<td>0</td>
</tr>
<tr>
<td>8 VCPU cores, 30GB ram, 288GB ephemeral local disk</td>
<td>0</td>
</tr>
<tr>
<td>8 VCPU cores, 60GB ram, 288GB ephemeral local disk</td>
<td>0</td>
</tr>
<tr>
<td>8 VCPU cores, 90GB ram, 288GB ephemeral local disk</td>
<td>0</td>
</tr>
<tr>
<td>16 VCPU cores, 60GB ram, 576GB ephemeral local disk</td>
<td>0</td>
</tr>
<tr>
<td>16 VCPU cores, 90GB ram, 576GB ephemeral local disk</td>
<td>0</td>
</tr>
<tr>
<td>16 VCPU cores, 120GB ram, 576GB ephemeral local disk</td>
<td>0</td>
</tr>
<tr>
<td>16 VCPU cores, 180GB ram, 576GB ephemeral local disk</td>
<td>0</td>
</tr>
<tr>
<td>1 VGPU cores, 8GB GPU ram, 4 VCPU cores, 22GB ram</td>
<td>0</td>
</tr>
</tbody>
</table>

- **Number of volumes**: 
- **Number of snapshots**: 
- **Number of Floating IPs**: 

<table>
<thead>
<tr>
<th>Storage Type</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume and snapshot storage (GB)</td>
<td></td>
</tr>
<tr>
<td>Shared filesystem storage (TB)</td>
<td></td>
</tr>
<tr>
<td>Object storage (TB)</td>
<td></td>
</tr>
</tbody>
</table>

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Image credits and logos: Digital Research Alliance of Canada, Alliance de recherche numérique du Canada, Centre for Advanced Computing, Queen's University.
New RRG Application

Do you need help with visualization?

Do you require assistance with visualization for this allocation? Large datasets can be visualized directly on our systems.

Require Visualization help □

Are there any considerations that we should take into account regarding the privacy and security of the data? □

Software Requirements

Does this project require specific software and/or commercial licenses? □

Please explain
New RPP Application

Scientific Review Committee
Please choose which of the following Scientific Review Committees should evaluate your proposal.

Select committee (required)

Basic Information

Applicant | Michael Hanlan
CCRI: ljp-910-01
Privileged Federation Staff
Centre for Advanced Computing
Queen's University

Application round | Research Platforms and Portals 2022

Project Title | test_rpp

Duration (in years) | 3 | Update

If you change the duration, you must delete any existing resource request and create new ones to match the updated number of years.

Research Summary

Research Summary: Give a brief summary of your research project. This summary should be written for the general public in a format that can be used for a press release. If you have a successful resource application, this text will be published on our website and in other Digital Research Alliance of Canada print materials as required. Please use the outline text below and fill in the blanks as a guideline. [300 words maximum]

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RAC Consultation

Applicants are encouraged to consult with a Federation staff prior to October 31, 2022, to allow adequate time for support by technical staff.

1. Advise the group on what process to apply: RPP, RRG/FastTrack. When in doubt, ask the RAPAC (support@tech.alliancecan.ca)

2. Understand the needs of a research group and their RAC project, and determine whether those needs justify submitting a RAC application;

3. Provide technical assistance with the calculation of the resources needed for a RAC application;

4. Be in the lookout for "departmental" applications, which will not be accepted, and flag about it to the RAPAC committee if the application is submitted;

5. Storage requests: explain to applicants that any storage request (including for Fast Track) must include any allocation or existing data currently used in a cluster PLUS any new space needed: some users only request the new space needed, which is not what we want.

6. Ask groups to use the Compute Calculator spreadsheet (links are included in the templates) to estimate CPU and GPU needs.
RAC Consultation

7. Groups requesting IPs need to know that IPs are a very scarce resource and that we may not be able to meet the demand.

8. Remind applicants that it is required to use the application template provided and advice them on how to present the resource request justification for the resources requested.

   a. **IMPORTANT:** there should be no discrepancies between the resources requested in the attached document and the online form: *in case of discrepancy, the online form will prevail.*

9. Applicants should mention in their application any previous experience they may have done computational research and/or using computational resources (with the Federation or elsewhere).

10. Applicants are encouraged to mention in their application that they pre-consulted with a Federation staff.

11. Warn PIs to carefully review their application before submitting, particularly it has been delegated to someone else.

   *Advising applicants on how to present information about the science of their RAC application is not part of this process.*
New RPP Application

**RPP** projects typically involve cloud resources, usually through the development of a front-end gateway on persistent virtual machines, with possible backend compute either through cloud compute nodes or job-based submission to the national clusters. Many platforms and portals also include large databases.

Projects applying must:

1. provide a service to a larger research community via a set of cloud-based tools, applications and/or data, thus enabling them to access national computational resources via a common interface;
2. be able to develop, operate and manage the proposed portal or platform with minimal support from the **Federation**.
Questions?
For More Information…

- Download this Slide Deck for this Q&A
- Link to 2023 RAC Application

Main RAC page on the Alliance website: Resource Allocation Competition
Application guidelines and documentation
  - RAC Application Guide
  - RRG application template (Word: English, French)
  - RPP application template (Word: English, French)
  - Fast Track application guide
  - Available Resources
  - FAQs (in translation)
  - CCV submission guide
National Platform Sites

- Cedar
- Graham
- Niagara
- Narval
## RRG Evaluation Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weight</th>
<th>Considerations</th>
<th>Page limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Methods</td>
<td>70%</td>
<td>● Research outline</td>
<td>6 Pages</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Expected outcomes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Progress over the past years</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Computational Methods</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Resource Request Justification</td>
<td></td>
</tr>
<tr>
<td>Resource Management and Expertise of the Team</td>
<td>30%</td>
<td>● Funding</td>
<td>2 Pages</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Computational Expertise of the Team</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Management Strategy</td>
<td></td>
</tr>
</tbody>
</table>
## RPP Evaluation Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weight</th>
<th>Considerations</th>
<th>Page limits</th>
</tr>
</thead>
</table>
| **Project Justification**                    | 50%    | ● Project description, Objective and Goals  
● Use of Platform/Portal  
● Expected Outcomes  
● Progress Over the Past Year  
● Resource Request Justification | 6 Pages |
| **Resource Management and Expertise of the Team** | 50%    | ● Funding  
● Computational Expertise of the Team  
● Management Strategy | 2 Pages |