# Resources for Research Groups Competition

**Technical Justification Template 2018 for Large applications**

This proposal for Compute Canada resources will be reviewed for research quality and merit by a committee made up of your peers (ie. Canadian faculty members with expertise in the subject area). It will also be reviewed by Compute Canada technical staff in order to ensure that Compute Canada resources will be used appropriately and efficiently.

Please use the section headings below, leaving 2 cm (0.8 in) in all the margins and using Arial or Times New Roman fonts (12 pts). You may remove all explanations (text in *italics*) if desired. Please ensure that all pages are numbered. **This document must be submitted in pdf format *only*.**

This template is intended as a guide. Please remove any section or sub-section which does not apply to your application. For example, if you are not requesting a storage allocation, there is no need to include section 4.2. Suggested lengths for each section are included in the template, these are only suggestions.

Please consult the [Compute Canada Technical Glossary](https://www.computecanada.ca/research-portal/accessing-resources/glossary/).

**1. Introduction to the Research Problem and Research Justification**

*Outline the research problem for which Compute Canada resources are being requested, its importance/relevance as well as your general objectives. Typically 1 page.*

**2. Research Justification**

*In-depth discussion of the problem(s), your specific projects, your methodology, timelines, and specific goals. Typically 2-3 pages.*

**3. Training and Support of HQP**

*Describe how this allocation will support the training of Highly Qualified Personnel (HQP) that are reported on the online form. Typically up to 1 page.*

**4. Technical Justification**

*This section addresses the technical details of your computational and/or storage needs. Compute Canada needs enough information to ensure that compute cycles and storage are used as efficiently as possible, that resource requirements are estimated reasonably, and that the appropriate systems are being used. If you are not requesting an allocation of compute time then don't complete section 4.1. If you are not requesting a storage allocation then don't complete section 4.2. Typically the entire section 4 will be 1-2 pages long but projects involving several key codes and/or with complicated storage requirements may need more. If you do not know the meaning of the technical questions or need help benchmarking your code, do not hesitate to contact us at* *rac@computecanada.ca* *(or contact your local Compute Canada support person).*

**4.1 Compute Requests (complete only if required)**

***Note: Please ensure ALL resources requested in this document are properly reflected in the Resources Request section of the online application form on CCDB. Failing to do so may negatively impact the evaluation and final award of successful applications.***

**4.1.1 System Selection**

*In the online form, you have been asked to indicate if there is a preferred system on which your project should run. Provide reasoning for your choice of system(s). If possible mention other systems that might also meet your needs. Applicants should use the resource identification tables on the Compute Canada* [*website*](https://www.computecanada.ca/research-portal/accessing-resources/available-resources/) *to indicate the resources requested.*

**4.1.2 Code Details**

*In the online form, you have been asked to specify any special software needed to support your project (including home-grown codes). Provide details about the codes (e.g. name, key reference publication, essential numerical methods used, whether it is serial/parallel, the type of parallelism [if any], etc). Indicate whether the code is private (written by you or a collaborator), community, Open Source, or commercial, and whether there are any licensing requirements.*

**4.1.3 Code Performance & Utilization**

*If requesting compute cycles, discuss code performance (e.g. how many iterations/timesteps/Flops per hour of wall­clock time and the type of system used for this measure, how much RAM is required per job/process, etc.) and whether there are particular system or processor architectures for which the code is best suited. Discuss numbers and sizes of files expected to be produced per job. How much of the resulting data needs to be kept on the system longer than 2­3 weeks (e.g. longer than for simple post­processing)?*

*In the case of parallel codes, please discuss scaling efficiency and justify (in terms of performance) the typical job sizes you will run. A detailed description of scaling efficiency is* ***required*** *if parallel jobs will use 256 cores or more and is preferred even for smaller jobs sizes (note that Compute Canada can make cycles available for this type of code performance testing). Also indicate how much (temporary) disk storage will be required for actually running your jobs (not for storing/archiving results).*

*Is checkpoint restart implemented?*

**4.1.4 Memory Requirements**

*In the online form, you have been asked to specify memory requirements either per-core or per-node. If there is any additional information you would like to provide regarding memory requirements, please provide additional information here - otherwise leave blank.*

**4.1.5 Size of Request**

*In the online form, you have been asked to specify your compute requirements. In this document, please justify the stated computing needs and describe your level of confidence and experience with computing use. Explain how you estimated the total amount of compute time required for this project.*

*It is strongly recommended to include a list (or table) of projects and a justification for your resource request for each. For example:*

|  |  |  |  |
| --- | --- | --- | --- |
| *Project* | *Team Members* | *Estimated Number of core years* | *Associated Storage (temporary)* |
| *Project 1* | *Student X* | *10,000* | *100TB* |
| *Project 2* | *Students Y, Z* | *5,000* | *50TB* |
| *Totals:* |  | *15,000* | *150TB* |

*(where Project 1 and Project 2 are explicitly identified and justified in the preceding text.) This allows reviewers to determine the consequences of any cuts they apply to your allocation and helps demonstrate the reasonableness of your request.*

**4.2 Storage Requests (complete only if required)**

**4.2.1 Storage Details**

*Explain why a storage allocation is required as opposed to making use of scratch or other space made available by Compute Canada for running jobs. Is the allocation being requested in order to store codes and data files (this would be typical of many requests) or are there additional special requirements (e.g. for databases, web ­access, availability from multiple sites/systems etc)? Roughly how many individual files will be stored and what is their size distribution?*

*State whether the data being stored must be directly accessible by running jobs, or if it can be on remote network accessible server. Indicate if the data being stored is the only copy of the data that exists and state what would be required in order to regenerate the data if it was lost. Does this data need to be backed­ up by the site?*

**4.2.2 Storage Performance & Utilization**

*Will storage requirements vary during the year (e.g. will all requested storage be needed immediately in January or can the allocation grow/vary during the year)? Will the storage allocation be required to persist into the following year? Is storage performance (e.g. bandwidth and IOPS) critical to the project and, if so, what estimated I/O and IOPS rates are required and why?*

*Are you using data compression? If not, is compression possible?*

*Compute Canada provides many types of storage. Many long-term storage needs can be met by tape at much lower cost than disk. Tape is still accessible on a short-timescale and is suitable for data that is not being very frequently accessed. If you know that you cannot use tape storage for your longer-term needs, please explain.*

**4.2.3 Size of Request**

*In the online form, you have been asked to specify your storage requirements, for a variety of different storage types (e.g., /PROJECT, /NEARLINE). In this document, please justify the stated storage needs and describe your level of confidence and experience using each of these storage types. Explain how you estimated the total amount of storage required for this project.*

*It is strongly recommended to include a list (or table) of projects and a justification for your resource request for each. For example:*

|  |  |  |  |
| --- | --- | --- | --- |
| *Project* | *Team Members* | */PROJECT* | */NEARLINE* |
| *Project 1* | *Student X* | *1,000 TB* | *0* |
| *Project 2* | *Students Y, Z* | *0* | *1,000 TB* |
| *Totals:* | *3 students* | *1,000TB* | *1,000 TB* |

*(where Project 1 and Project 2 are explicitly identified and justified in the preceding text.) This allows reviewers to determine the consequences of any cuts they apply to your allocation and helps demonstrate the reasonableness of your request.*

**5. Progress Over Past Year**

*In the online form, you have been asked to provide an up-to-date CCV and to identify which of your publications were enabled by your use of Compute Canada resources. This is important for the future funding of Compute Canada and is useful for your review committee.*

*In this document, please highlight any notable RAC-enabled research that you have performed. This may be directly linked to a publication in your CCV publication record, or may be a work in progress.*