Renewed Policy Guidance on Integrated Hardware (Contributed Systems)

1) OBJECTIVE OF THE RENEWED POLICY GUIDANCE

The Government of Canada's Digital Research Infrastructure (DRI) Strategy aims to create a strong, national academic advanced research computing (ARC) platform by maximizing the impact of federal investments in ARC infrastructure through the sharing of resources. Efficiency, effectiveness, and value for money are all key values underlying a technically proficient, expert driven, agile platform that responds to researcher needs and an evolving research landscape.

Shared resources, through integration with the national computing infrastructure and related operating services, is a means to optimise the use of the national system by making unused cycles available to all researchers, maximizing the efficiency of existing highly qualified personnel and encouraging development of skills required to operate and access the systems, and/or reducing the overall infrastructure and operating costs. It also ensures the system is managed by expert staff and can generate economies of scale by streamlined procurement and better pricing with bulk purchases.

The Canada Foundation for Innovation (CFI) has a longstanding policy promoting consolidation and a national systems approach to ARC infrastructure and services.

As the operational funding for the national ARC platform transitions from the CFI's Major Science Initiative (MSI) to the Digital Research Alliance of Canada's (the Alliance) responsibility, there is a need to revisit and refresh the guidelines and provide the Alliance and CFI with updated policy guidance.

2) APPROACH FOR CONTRIBUTED SYSTEMS UNDER THE RENEWED POLICY GUIDANCE

The following renewed policy guidance on contributed systems is to take effect for funding decisions rendered by the CFI **after March 31, 2022**, or an earlier date mutually agreed upon between the national host sites, the Compute Canada Federation (CCF) and the Alliance, as part of their shared operational transition plan. The CCF and the CFI will continue to apply the current contributed systems guidelines until that date. The CFI continues to consider procurement of ARC as an eligible cost under its funding mechanisms (e.g., John R. Evans Leaders Fund, Innovation Fund, College Industry Innovation Fund, and other programs that may be announced from time to time).

By default, CFI funded ARC infrastructure exceeding $100,000 is expected to be integrated into the national ARC platform at a national host site appropriate for the funded computing infrastructure. Requests for integration of infrastructure below $100,000 may be accepted. Institutions intending to submit a CFI proposal including any ARC infrastructure exceeding

$100,000 must develop their proposals in consultation with the Alliance and national host sites. Additional information and guidelines on main equipment costing, supporting equipment costing and O&M costing will be made available on the Alliance's website. A plan to handle the funding of supporting equipment and system expansion necessary to housing the hardware that comes with CFI awards will be determined by the Alliance alongside the cost coverage schedule.

Host sites have discretion to accept or decline a system based on local factors, including but not limited to lack of space or capacity to install additional equipment. The Alliance will work with national host sites to determine an appropriate location within the national platform.

2.1 Definitions

National Host Site: Any data centre designated by the Alliance as an eligible location to host and receive nationally funded infrastructure. Current designated national host site locations include: McGill University (Beluga-Narval), University of Toronto (Niagara), University of Waterloo (Graham), Simon Fraser University (Cedar), University of Victoria (Arbutus) and Memorial University (ACENET).

National Platform: The collective ecosystem of all national host sites and supporting national services/personnel accessible to eligible Canadian researchers and their collaborators.

Integrated Hardware (Contributed System): Any computing hardware or computing resource that is installed and incorporated as part of an Alliance designated national host site. Default condition for all CFI-funded infrastructure.

Exemptions: Exemptions from integration are permissible on a limited basis. Exemptions refer to exemption from integration with the national platform at a host site and may include co-located hardware or external installation.

Co-located Hardware: Any computing hardware or computing resource installed at a national host site and operated by the national host site, but is not fully integrated into the national host site/platform. This takes advantage of the existing operating expertise and efficiencies located at a national host site. When not being used by the designated project, unused cycles may be available to other national users.

Funding of a portion of operational costs of co-located hardware by the Alliance is dependent on the possibility for access by other users.

External Installation: Any hardware installed outside an approved national host site, irrespective of location.

Operations & Maintenance (O&M): This refers to the tasks associated with the daily operations as well as normal repairs or replacement of parts, and other activities needed to preserve the system so that it continues to provide acceptable services and achieves its expected life. Costs include labor, electricity and cooling as well as replacement parts.

Warranties are expected to be part of the capital. Further guidance on decommissioning costs will be determined.

2.2 Proposed Integration Policy Guidance:

The CFI expects ARC infrastructure to be integrated into the national ARC platform, via processes facilitated by the Digital Research Alliance of Canada (the Alliance). As a key principle, such ARC infrastructure normally includes systems or resources such as the following:

- capacity or throughput computing;
- capability computing supporting tightly coupled, fine-grained applications;
- shared memory systems;
- systems supporting very large memory requirements;
- high performance storage;
- long-term storage;
- cloud computing;
- computing using specialized accelerators including GPU, CPU and others;
- high performance visualization systems; and,
- systems suitable for computational steering and interactive use.

This condition for integration will be imposed upon ARC infrastructure requests of $100,000 and above. Therefore, an institution wishing to request ARC infrastructure from the CFI is advised to develop its proposal in consultation with the Alliance, who will make publicly available information and guidelines on the process, costs, and information for each national host site, as available.

Institutions may request an exemption from integration only for specific reasons (see section 4.2). These requests will be assessed by the Alliance and will be granted only under strong and clear value to both the research project and the national platform.

The Alliance will assume responsibility for contributing a portion of O&M funding of integrated and co-located infrastructure, with the requirement that infrastructure capacity will be made available for national researchers when not in use by the project team. Cost coverage for O&M will be dependent upon criteria to be developed, and published by the Alliance. Sources of funds are expected to be identified in inter-institutional agreements and would minimally include the Alliance and institutional funds.

The following table provides an overview of the different scenarios of contributed systems and respective cost coverage for national host sites' operational expenses:

Table 1

		Alliance Cost Coverage*	
Contributed System	Location	Power / Other O&M	Technical Staff
Integrated Hardware (usable by national users)	National Host Site	Cost coverage dependent upon criteria to be developed by the Alliance in consultation with host sites and stakeholders.	100%
Co-located Hardware (not integrated, accessible to national users)	National Host Site	Cost coverage dependent upon criteria to be developed by the Alliance, in consultation with host sites and stakeholders.	Negotiated
External Installation (i.e. a stand alone system)	Any location not designated as a National Host Site	0%	0%

*** This reflects the Alliance coverage of host site expenses. The Alliance's provision of funds will be based on criteria to be determined by the Alliance, in consultation with host sites and stakeholders. Project teams should be prepared to manage the operational expenses associated with the project should this criteria not be reached. In such a case, host sites are expected to have 100% of their costs reimbursed by project teams.**

3) ROLES AND RESPONSIBILITIES

CFI

The CFI will remain independent in its funding competitions, specifications and responsible for its programming. The institutions will apply to CFI programs and may include computing requests as part of their proposals. It is recommended that researchers develop their computing

request in consultation with the host sites and the Alliance, as appropriate (e.g., to include general cost categories and ranges within their project proposal).

Alliance

The Alliance will be the central hub to facilitate the integration of successful ARC infrastructure projects. For successful projects with conditions for contribution of ARC infrastructure, the Alliance will provide coordination with the most appropriate host site. The Alliance will be responsible for assessing the integrations and the exceptions (see below), the negotiation of the institutional agreements, and providing O&M support as per the negotiated terms of the agreement. Final individual infrastructure consultations (specific technology, locations, etc.) and assessments of exemption requests will take place after projects are deemed meritorious by the CFI. The Alliance, in consultation with the host sites, will develop a process to facilitate project budgeting, i.e. a catalogue of infrastructure and other expense categories may be provided to assist institutions in the development of their proposals in advance of submission to the CFI.

The Alliance will support the O&M costs of integrated systems within the broader mandate of supporting national host site operations. The Alliance is expected to cover a portion of operational expenses associated with contributed systems commensurate with contribution to the national platform, on criteria to be determined. The Alliance may cover operational expenses associated with power costs, operational FTE support and ongoing maintenance, where appropriate.

Funding sources will include minimally the Alliance, CFI, and institutional sources. Awarded CFI projects will be provided funding for the infrastructure by the CFI. The Alliance will institute a cost recovery scheme to support the O&M costs, to be based upon criteria to be determined, to ensure that national funding aligns with national contribution. The Alliance will work with institutions and project leaders to determine their expected cost to integrate or co-locate at a national site.

Recipient Institutions

Successful institutions must enter into institutional agreements with the Alliance and the host site that will lay out O&M cost coverage. The IOF provided by the CFI can be used to cover cost recovery expenses as determined by the Alliance. Identification of an appropriate host site will be made through consultation with the institution, the Alliance and host sites in order to align with project goals.

National Host Sites

Host sites will have jurisdiction over whether the integrated equipment will be installed and managed within its site. If not accepted at one national host site, the Alliance will work to identify an alternative, appropriate national host site. Once accepted by a site, the national host site will be responsible for working with the recipient institution to procure and install the desired infrastructure. Host sites will provide operational management of the integrated infrastructure.

Host sites will house the equipment and may also advise on the technical aspects of the project. If the equipment cannot be installed within the national platform, an exemption recommendation will be provided by the Alliance to the CFI, to waive the condition (see Section 4.3 Exemption Requests).

4. PROCESS

4.1 Pre-award Consultation Stage

Applicant institutions should consult with the Alliance and host sites the relevant expenses to budget for operating costs, as per the requirements outlined in this document and other Alliance and national host sites' information and guidelines as available.

4.2 Successful Projects not Seeking Exemptions

For successful projects, CFI will continue to include the requirement to integrate ARC components into a national host site and will request a mandatory consultation with the Alliance. There may be projects which request partial integration/exemption, and the process to assess these requests will be made parallel to those requesting full exemptions.

Institutions will be required to consult with the Alliance, as the point of contact with host sites, on procurement and integration of their ARC equipment to the national system. If a request for exemption is made, a technical assessment will be conducted (see below).

Project teams, institutions, the host sites/eligible data centres, and the Alliance will work together to determine the following:

- Infrastructure and operating requirements;
- Location of the contributed system;
- Project timeframe and preparation for procurement work, if applicable; and
- Confirmation of costs based on finalized requirements.

An institutional agreement between the Alliance, the host site or data centre, and the institution for the installation of the infrastructure will be implemented and will outline priority access to the required infrastructure for a defined time period. Standard agreement templates will be made available where the Alliance will further define O&M funding arrangements and processes for contributed systems.

4.3 Exemption Requests

The expectation is that all infrastructure requests above $100,000 funded through the CFI will be integrated within the national platform. This expectation will be monitored by the CFI, in collaboration with the Alliance. Infrastructure under $100,000 may be integrated upon request, though this is not mandatory.

Exemptions will be assessed on a request basis only and will only be considered for successful projects. A list of exemptions and criteria will be maintained and made publicly available by the Alliance.

The following would be considered potential grounds for exemption to the integration requirement:

1) The researcher(s) require physical or administrator level access to the infrastructure (e.g. test beds);

2) There is a need to have the computing and the data acquisition in close proximity to reduce the latency in the data transfer;

3) The research uses or generates confidential data or sensitive data (i.e., health data, Indigenous data, etc.) and data privacy cannot be reasonably guaranteed on the ARC platform;

4) A requirement to use the system for in-person training that cannot be conducted virtually;

5) All host sites within the national platform are unable to install the compute equipment for technical reasons (e.g. technology incompatibility, lack of physical space, power or cooling).

Once CFI projects have been deemed meritorious, CFI will provide a list of projects to be integrated and projects requesting exemption to the Alliance.

Any recommended exemptions will have to be endorsed by the Alliance.

4.4 Decision on Accepted Exemption Requests

For successful projects requesting exemption from integration, a technical committee constituted by the Alliance will assess these requests.

The committee will be responsible for assessing the project exemption requests and determining whether the grounds for exemption from integration are sufficient.

Time periods will be defined for this process, to facilitate timely contribution agreement finalization by CFI. Host sites will be actively engaged in order to ensure that the technology can be appropriately integrated or, in the case of co-hosting, that space is available.

If an exemption is recommended by the technical committee, the recipient institution, the project team and the Alliance will explore potential co-location within a national host site, to leverage the expertise and experience in compute management and operations;

4.5 Notifications

The Alliance will provide written notification of the final decision on integration exemptions to the CFI and to the recipient institution, with a copy to the national host site or data centre where the infrastructure is expected to be hosted. For co-located systems, the institution will work with the agreed upon data centre and the Alliance to procure the infrastructure and access to the infrastructure.

In the case of co-location, the recipient institution will sign an institutional agreement with the national host site or data centre and the Alliance, including the outline for priority access to the required infrastructure for a defined time period, and the operational expectations of the project team and the Alliance.

If co-location is not possible, CFI expects that the recipient institution and the project team will locate the infrastructure at a regional/local IT data centre that can provide professional support and environment for the system.

4.6 Institutional Agreement

The Alliance will manage the institutional agreement to monitor compliance with its terms and conditions on inter-institutional transfers. If funds are transferred to the host site by the recipient institution, a copy of the signed institutional agreement must be sent by the recipient institution to the CFI prior to finalization.

After the completion of the research project or five years, should the institution desire continued access to the system, they will be expected to support the ongoing operations and maintenance of the system in order to maintain priority access to it.

The Alliance, collaborating with host sites and recipient institutions, will ensure compliance and support of institutional agreements from pre-integration to post-integration providing an “end to end” experience in executing this policy guidance.

5. Life-Cycle and Decommissioning

Operations of contributed systems installed prior to March 31, 2022 are eligible for MSI funding until March 31, 2022.

The Alliance will issue a subsequent policy statement outlining whether and what portion of an existing contributed system operations will be covered after March 31, 2022.

Current policies and agreements for end-of-life and decommissioning of research equipment are expected to remain in effect until such national-level standards have been established by the Alliance, in coordination with the national host sites. For contributed systems located at host sites, costs associated with decommissioning may be covered by the Alliance should such systems contributed cycles to national users.

CONCLUSION

The CFI and the Alliance will cooperate and maintain these policies and procedures. Updates will require the agreement of both organizations and national host sites and will be pre-published for consultation for a period of no less than 15 days, prior to the finalization of changes. CFI and the Alliance will post and maintain up to date policies on their website and proactively communicate the policy and its requirements to all interested and implicated parties. CFI will update its Policy and Program Guide, as appropriate.

Appendix A – BACKGROUND ON CONTRIBUTED SYSTEMS

The ARC platform provides Canadian researchers with access to the HPC resources needed to conduct digital and data intensive research.

The creation of a national ARC platform dates back to 2006 with a contribution made by CFI through the National Platform Fund. The National Platform Fund was created to invest in the refresh of the Canadian HPC infrastructure by soliciting a single proposal, bringing together several institutions under a large partnership project. A not-for-profit corporation called Compute Canada was created to help coordinate the platform. Four regional consortia (ACENET, Calcul Québec, Compute Ontario and WestGrid) are also actively involved in the management and coordination of HPC/ARC across Canada, collectively operating with Compute Canada and host institutions as the Compute Canada Federation (CCF).

Through this initial investment and subsequent re-funding, CFI supported a consolidation of computing resources, so that ARC infrastructure and access to it would be managed jointly by Compute Canada and host sites, and operated at the local site. The ARC platform was upgraded in 2015 and in 2017 with major investments through the CFI Cyberinfrastructure Initiative, and in 2019 via the ARC Expansion Program funding from Innovation, Science and Economic Development Canada.

Over the years, there has also been additional HPC capacity expansion of the ARC platform through contributions from other CFI programs such as the Leading Edge Fund/New Initiatives Fund, the Research Hospital Fund, the Innovation Fund and the John R. Evans Leaders Fund.