



***Strategic Plan: 2007-2012***  
*(approved by the Board on September 14, 2007)*

## **1. INTRODUCTION:**

SHARCNET is a consortium of universities, colleges and research institutes providing a range of high performance computers and software, linked by an advanced fibre optic network. Its overall aim is to promote the use of high-performance computing to accelerate the production of research results for researchers, Canadian industries, the economy and society in general. SHARCNET is a leading provider of this critical enabling technology and of training for highly qualified, computationally-expert individuals. Thus, it plays a major role in supporting innovation in both academic and industrial research environments.

Formally established in June, 2001, SHARCNET is now entering its third phase. The first phase saw the establishment of the consortium after initial successful CFI and ORDCF proposals and the installation of the equipment. The second phase saw SHARCNET expand the number of partner institutions and realize a second successful CFI application and successful ORF application. These latter applications enabled SHARCNET to significantly expand its computational and network infrastructure. With new equipment and ORF funding in place, SHARCNET must now prepare for the next phase and begin looking ahead.

SHARCNET has emerged as one of seven high performance computing consortia in Canada and is the largest Canadian HPC consortium by number of institutions and installed HPC power, and supports the largest number of users and range of research in Canada. In looking ahead, SHARCNET must identify its goals and objectives over the next few years – what are its priorities and where should it focus given inevitably limited financial and human resources? The landscape for high performance computing in Canada has changed significantly since SHARCNET's inception, in particular:

- The Long Range Plan for High Performance Computing has been widely circulated and has become a roadmap for the near future. Part of that plan advocated the creation of a coordination and advocacy organization, now to be called Compute/Calcul Canada. Given SHARCNET's position as one of the leading consortia in Canada, it needs to play a leading role in the evolution of national directions and Compute/Calcul Canada. SHARCNET must identify its role nationally and internationally in the HPC community.
- As a major provider of high performance computing in Canada, SHARCNET must also work with the other consortia and the national network provider, CANARIE, to ensure that computational facilities and services for researchers across Canada are efficiently utilized and that the investments of CFI and other funding agencies are used effectively.

- On behalf of its member institutions and partners, SHARCNET needs to identify the priorities and directions necessary to support existing researchers, identify potential new and exciting uses of HPC and promote the use of HPC to new researchers and students. How should the limited resources be best utilized to meet these needs?
- There are good indications that the funding model for HPC may be rationalizing both nationally and within Ontario. Nationally, CFI has developed the National Platforms Fund (NPF) specifically targeting HPC as a cross-disciplinary enabling technology requiring ongoing support. However, given that funding programs can change with governments, the future funding model for HPC in Canada remains uncertain and is only an assumption at this point.

Internationally, there is increasing momentum for governments, particularly in the US (NSF's Office of CyberInfrastructure) and Europe, to direct funding toward "cyberinfrastructure" to form the foundation for collaborative research and development, for sharing of resources and for creating an environment for interdisciplinary research. **Cyberinfrastructure** can be defined as follows: *The comprehensive infrastructure needed to capitalize on dramatic advances in information technology has been termed cyberinfrastructure. Cyberinfrastructure integrates hardware for computing, data and networks, digitally-enabled sensors, observatories and experimental facilities, and an interoperable suite of software and middleware services and tools.*<sup>1</sup> SHARCNET needs to carefully establish its focus and mandate within this continuum of infrastructure and services.

The aim of this Strategic Plan is to identify the broad vision and directions for SHARCNET for the next few years, keeping in mind the realities of the HPC landscape as outlined above. With limited computational, financial and human resources, SHARCNET must identify priorities to guide its plans and programs. We begin by revisiting SHARCNET's Vision and Mission statements.

## 2. VISION AND MISSION:

While SHARCNET's overall aim remains essentially the same, that is, to promote the use of HPC in research, its maturity and evolution as an organization requires the need for a more refined vision and mission which are better aligned with its future needs and expanded role.

The original SHARCNET Vision was:

*To establish a world-leading, multi-university and college, interdisciplinary institute with an active academic-industry partnership, enabling forefront computational research in critical areas of science, engineering and business.*

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<sup>1</sup> From NSF'S CYBERINFRASTRUCTURE VISION FOR 21<sup>ST</sup> CENTURY DISCOVERY, Version 7.1, NSF Office of CyberInfrastructure, July 2006, page 5.

The proposed SHARCNET Vision is:

***To become a world-leading high performance computing consortium promoting forefront research and innovation.***

The revised vision reflects the need for SHARCNET to become more visible nationally and internationally and to create an environment for research in any field requiring large-scale or intensive computation and to help promote innovation, whether within academic or industry settings. It is consistent with the requirement of the primary public agencies providing funding for SHARCNET – CFI and the government of Ontario – that we enable excellent research.

In order to attain its Vision, SHARCNET's Mission must change as well. The original SHARCNET Mission was:

*SHARCNET exists to enable world-class computational research so as to accelerate the production of research results.*

The proposed SHARCNET Mission is:

***To promote and facilitate the use of high performance computational techniques among researchers in all fields and to train a new generation of computationally-skilled individuals.***

### **3. STRATEGIC PLAN:**

In looking forward, SHARCNET needs to take steps to realize its vision, building on existing initiatives, and taking steps to position itself to attract future funding on behalf of its researchers. It must focus its resources and efforts on key initiatives. Considering the current national and provincial environments and current facilities and programs, SHARCNET's strategic plan will focus on several broad elements. We elaborate on these below.

SHARCNET must, as one of the largest HPC consortia in Canada, take a leadership role in advancing the objectives of the Long-Range Plan and HPC generally across Canada. SHARCNET must also be able to demonstrate in tangible ways the value of HPC generally, and of SHARCNET specifically, to politicians and policy makers at all levels.

***Increased Leadership in Provincial, National and International Initiatives.*** Take an active role to move forward with the creation of Compute/Calcul Canada and to support its position as a key player in advocating the importance of HPC in Canada and the need for ongoing funding and support; work with the other Ontario HPC consortia and with the provincial network, ORION, to ensure that Ontario remains a leader in Canada in the use of HPC and development of HPC expertise.

***Document Importance and Impact of HPC.*** Continue efforts to gather evidence of, and report on, the importance of the role of HPC in research and innovation and on its impact in academia, industry and society.

Besides communicating the importance of HPC and the research results stemming from its use, SHARCNET must continue to raise awareness of the role of HPC among students, the broader public and the business community. Tangible public support for SHARCNET's activities, results and programs and impact on socio-economic factors through industrial collaboration can provide substantial support for future SHARCNET proposals and applications. Three additional aspects of the Strategic Plan are:

***Communicate the Importance of HPC to Students, Community & Government.*** Focus on outreach to students, the broader general community and government officials in order to promote the importance and impact of HPC.

***Engage the Business Community.*** Begin to explore ways in which it can engage the broader business community in the use and benefit of HPC.

***Development of HQP.*** Continue to put an emphasis on developing highly-qualified personnel ("HQP") by providing a focused suite of HPC tools, support and training; work with representatives of the Colleges to develop and leverage HPC skills training at the College level.

Finally, SHARCNET must look to enhance the operational environment to support existing and future researchers—perhaps collaborating virtually—including developing those platforms, services and software necessary to realize a focused and clearly defined component of cyberinfrastructure - advanced computing leveraging continuing improvements in microprocessor speeds, converging advances in networking, software, visualization, data systems and collaboration platforms<sup>2</sup>.

***Broaden the Range of Disciplines Using HPC.*** Actively seek to broaden the range of disciplines taking advantage of HPC, recognizing that many existing disciplines have quite different cultures of computing when compared to more traditional computational areas.

***Maximize Use of Facilities on Behalf of Existing Members.*** Concentrate on increasing the use and enhancement of existing computing platforms and services for the benefit of existing members while maintaining its current partner size, and consider how best to maximize use and efficiencies. SHARCNET recognizes that focusing on enhancing facilities for its current membership is paramount and also recognizes that judicious expansion of its membership should only be considered when beneficial to all parties.

***Enhance Services and Tools for use of HPC.*** Focus on the development or acquisition of services, software, tools and platforms to enhance the use of HPC for researchers and those researchers from disciplines not traditionally computationally-aware. Clearly elucidate the range of services and infrastructure that SHARCNET should attempt to provide in support of HPC within the overall cyberinfrastructure vision.

***Achieve Appropriate Staffing Levels.*** Work with Compute/Calcul Canada and other provincial and federal agencies to increase its technical staff in order to better meet the needs of

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<sup>2</sup> From NSF'S CYBERINFRASTRUCTURE VISION FOR 21<sup>ST</sup> CENTURY DISCOVERY, Version 7.1, NSF Office of CyberInfrastructure, July 2006, page 4.

SHARCNET researchers and to provide enhanced services, tools and software for its researchers and the broader HPC community.

#### **4. EVOLUTION OF THE STRATEGIC PLAN:**

Since a Strategic Plan outlines broad directions, specific initiatives must be identified, prioritized and executed in order to achieve the Strategic Plan. Several initiatives were already underway prior to the drafting of the Strategic Plan and many others have been started since the approval of the Strategic Plan in September 2007. Since technologies, priorities and initiatives change, the Strategic Plan should be reviewed periodically, preferably on an annual basis.