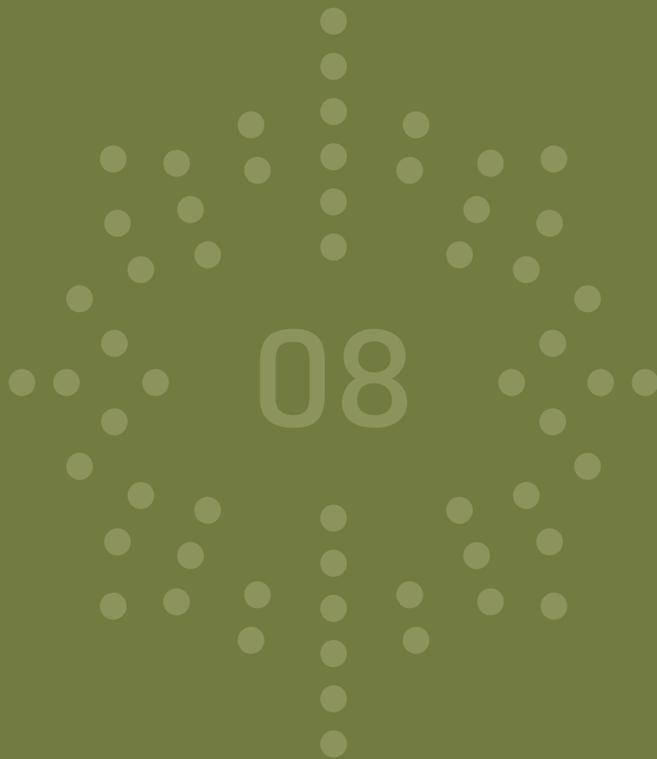




INVISIBLE  
INNOVATION





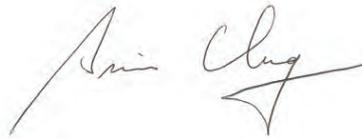
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# Message from the President



Cyberinfrastructure continues to evolve—advancing and accelerating the way research and business are conducted. Governments, companies, universities, and research organizations are increasingly seeing the leverage and competitive advantage offered by this emerging technology.



Brian W. Unger  
Interim President and Chief Executive Officer

Cybera is tracking this emerging technology, integrating international cyberinfrastructure developments, and fostering, facilitating, and leading local development and adoption. Cybera does this through the creation and coordination of innovative, generalized, pre-competitive, collaborative pilot projects with industry, university, and government partners. These projects demonstrate leading-edge grid computing middleware, data collection and management, powerful computer processing, and collaborative networking environments in support of research and development teams.

Over the past six months, Cybera has strengthened its internal organization and operations. This included a review of our long-range plans and strategies, and a closer alignment with the Alberta government's priorities in support of innovation. Four team leaders now guide Cybera operations: Jill Kowalchuk—Project and Partnership Development; Patrick Mann—Infrastructure and Technology Services; Jana Makar—Communications and Outreach; and Karim Teja—Administration and Contracts.

*Each of these teams, along with the guidance of Cybera's Board of Directors and International Strategic Advisory Committee (ISAC), are increasing the number of highly strategic industry and university-based cyberinfrastructure projects.*

Participation in pilot projects that demonstrate the benefits of cyberinfrastructure is a central and growing aspect of Cybera's business plan. This year, we are pleased to highlight initiatives that expand our support in areas such as grid and distributed computing, advanced research networks, data management and storage, remote sensors, and visualization and collaboration facilities. These pilots, almost half of which have been funded through the nationally competitive CANARIE Network-Enabled Platforms (NEP) program, build and employ tools that will

demonstrate increased productivity, cost savings, and reduced energy consumption. Further, our projects are breaking down barriers in the biogeoscience and space science research communities, generating virtualization tools that improve communication within organizations with distributed offices and remote staff, and helping innovative media distribution companies better serve clients.

The expertise Cybera is developing in these technologies can be deployed to the benefit of Alberta's public and for-profit sectors. Cybera is increasing its engagement in the private sector by working with partners with business challenges that can benefit from our cyberinfrastructure experience. These collaborations will increase Alberta's competitiveness and contribute to the development of a pool of talented researchers, developers, knowledge, and expertise within the province. In this report, you will read more about Cybera's projects and the solutions we are working towards through our partnerships and collaborations.

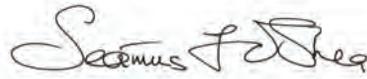
In May 2009, Cybera's ISAC gathered in San Diego, CA for its second meeting. The ISAC provides strategic advice and a diverse international perspective to Cybera, its Board of Directors, and the Government of Alberta. To date, Cybera has drawn from the ISAC's recommendations to focus its strategies and further align its efforts with the Government of Alberta's priority areas in energy and the environment, health, and bio solutions. Through the ISAC and various outreach activities, Cybera will continue to develop awareness of, and access to, the most advanced international and local technical developments and expertise.

Overall, we are facilitating research and development that leverages business innovation, decreases time to market, creates new opportunities, and ultimately, enhances the way Albertans live, work and play.

## Message from the Chair



Cybera has experienced a significant amount of growth in projects and services during its second year of operation. Through continuing and new relationships with academic and industry partners, the organization has been working hard to improve the global competitiveness of Alberta's research and development community.



Seamus O'Shea

Chair, Board of Directors

Last October, the Government of Alberta's Ministry of Advanced Education and Technology initiated a new Innovation and Research Framework, which was implemented in 2009. The framework highlighted information and communications technology as one of the strongest economic sectors vital to Alberta's future and one that plays a key role in improving health care, education, energy, and other priority areas throughout the province. Cybera is committed to fulfilling that role and will continue to innovate in those areas. That innovation is seen in Cybera's development and application of cyberinfrastructure-enabled projects and partnerships.

*Through collaborations with the provincial and federal governments, Cybera's members and partners, as well as experts from industry, Cybera is enabling people and institutions to advance their ideas and technologies.*

Growth can be seen in Cybera's high-speed network, CyberaNet, which experienced a 30 per cent increase in use by academic research groups over the past year. CyberaNet is a 10 Gb connection between the Universities of Alberta and Calgary and a 1 Gb connection to other member institutes in Alberta. We anticipate this usage will further increase over the coming months as Cybera continues to work with specialized groups to support cutting-edge research by facilitating access to technology and expertise. One of these specialized groups

is WestGrid, an organization that operates high performance computing, collaboration, and visualization infrastructure across western Canada. Cybera has been contracted by WestGrid to lead the implementation phase of its expansion, recently funded by the federal government and the western provinces, including Alberta. The creation at a national level of the new Compute/Calcul Canada consortium offers opportunities for Cybera to share its expertise with a wider audience.

This October, Cybera is co-hosting Summit 09: Partnerships in CI Development, a culmination of three events—Open Grid Forum 27, IEEE/ACM Grid 2009, and the Cybera/CANARIE National Summit—that will explore cloud computing, high performance computing, grid, Web 2.0, business development, advanced networks, and other emerging cyberinfrastructure. Summit 09 will be an opportunity for Cybera to showcase the advanced research activity and business innovation that are taking place in Alberta through the application of cyberinfrastructure. We are proud to be a part of events such as this.

The Board of Directors is also proud of Cybera's achievements to date and it is committed to continuing its active support of Cybera's growing expertise and leadership in cyberinfrastructure.



## 2008–2009 Highlights

300

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Combined attendees at Cybera's five member and stakeholder events throughout the year

917

---

Visitors to Cybera's website each month from across Canada, the United States, and overseas

10+

---

Ongoing project partnerships with industry and academic groups

\$7.9 mil

---

Total value of Cybera's projects, including leveraged funds

250

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Average number of visitors to Cybera's blog each month from across Canada and the United States

\$2 mil

---

Received from Alberta Advanced Education and Technology

❖ Established network 1 Gb connections to The Banff Centre.

361

---

Cyberport bookings throughout the year by staff, members, and stakeholders

30%

---

Increase in CyberaNet usage

❖ Cybera staff attended over 15 international conferences that focused on cyberinfrastructure or e-science

❖ Brought together nine leading experts on cyberinfrastructure from around the world to form Cybera's ISAC

1124

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Cybera News recipients from across Canada

21

---

Total number of Cybera membership, including representatives from academia, industry, and government

# Services

Cybera drives business and research success by partnering with academia and the private sector on projects that explore the latest technologies and strive to meet the needs of today's society.



Cloud computing infrastructure allows for data and software to be easily accessed through a network of online servers and connections through external devices, such as computers and mobile phones.

Through its access to computing infrastructure and cyberinfrastructure expertise, Cybera enables academic, industry, and government groups to accelerate research and product development in priority areas, including health, energy and environment, and ICT.

Cybera provides cyberinfrastructure related project management and consultation services in the areas of cloud computing, web-enabled collaboration platforms, high performance computing, and data management.

*Researchers and companies work with Cybera to investigate, develop, and test new technologies, or to launch their products in effective and innovative ways.*

Cybera's services are implemented through Cybera's pilot project program where the objective is to work with partners to demonstrate the benefits and advance the use of cyberinfrastructure and related tools in academic and industry applications. The outcome of the program is enhanced research effectiveness and the potential to re-purpose discoveries for use in a variety of other initiatives.



# A Closer Look at Cybera's Services



## Data Management, Cloud, and Other Computing Technologies

Cybera consults on, and provides access to, data management resources and the latest advancements in computing technologies, including cloud, grid, and high performance computing. These technologies enable innovative organizations to investigate ways to pilot or test new software and to better manage diverse and distributed data sets.

## Project Management and Proposal Development

Through strong relationships with government and other funding agencies, Cybera is actively engaged in numerous grants and awards programs available to organizations using cyberinfrastructure. Cybera staff are skilled in writing project proposals for such grants and are knowledgeable about the expectations of the funding agencies. Cybera also provides its pilot project partners with administration, communication, financial, and project management services.

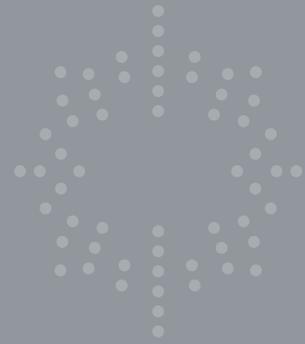
## Consulting and Outreach

Cybera has consultants on staff with knowledge and expertise in advanced collaboration technology, cloud and grid computing, data management, and other advanced technologies. The organization also has access to leading minds working on the latest trends in cyberinfrastructure, and skilled programmers who can develop flexible applications and customized middleware.

## CyberaNet: Driving Cybera's Services

Cybera operates CyberaNet, a high-speed network that connects research institutes across Alberta. The network provides an essential base infrastructure that enables Cybera to support groups performing research. The network runs at a speed of 10 Gb between the Universities of Calgary and Alberta and 1 Gb between other member institutes across the province. CyberaNet also provides a gateway to CANARIE, Canada's national research network, allowing member institutes to connect to 42 other networks around the world. In the past year, CyberaNet has seen a 30 per cent increase in usage.

CyberaNet also supports a virtual network using the Alberta SuperNet, providing connectivity to various education institutes and community organizations.



### CYBERPORT COLLABORATION FACILITIES

Cybera operates videoconferencing and advanced collaboration facilities called Cyberports. These facilities use the broadband capabilities of CyberaNet to allow colleagues to collaborate over long distances using high-definition videoconferencing and file sharing technologies. These Cyberport facilities are located at the Universities of Alberta and Calgary.

*The following are highlights of CyberaNet and Cyberport usage from the past year:*

#### ❖ Supporting the Multimedia Arts

In the fall of 2008, a 1 Gb connection to The Banff Centre was approved by CANARIE, which was deployed in the summer of 2009. This connection will provide research groups, including those studying multimedia and digital arts, and the Banff International Research Station, with a facility for advanced digital video editing, collaboration and visualization labs, videoconferences, and more.

#### ❖ Connecting Communities Around the World

In October 2008, the Calgary Cyberport played an integral part in the distributed meeting of the Communities without Boundaries working group. Comprised of a group of forward-looking communities, Communities without Boundaries is dedicated to the support and development of local coalitions of community champions and technology providers to promote the benefits of broadband usage in rural Alberta. The daylong meeting connected 28 external sites, including a residence in Hawaii, with 236 registered participants.

### ❖ Building Partnerships Across Campus

In the winter of 2008, Cybera gained access to a second collaboration space at the University of Calgary, which features high-definition videoconferencing and Access Grid capabilities. The Internet Research Studio, based in the Faculty of Communication and Culture, was one of the first Access Grid facilities at the University of Calgary. It has proven to be a valuable resource, relieving some of the overflow booking from the Cyberport, which is exceeding 60 per cent of its booking capacity. Through this partnership, the faculty is provided with the much needed technical support for the studio, while Cybera staff and members have a second high quality collaboration space to use on campus.

### ❖ Advancing Telemedia Arts Practices



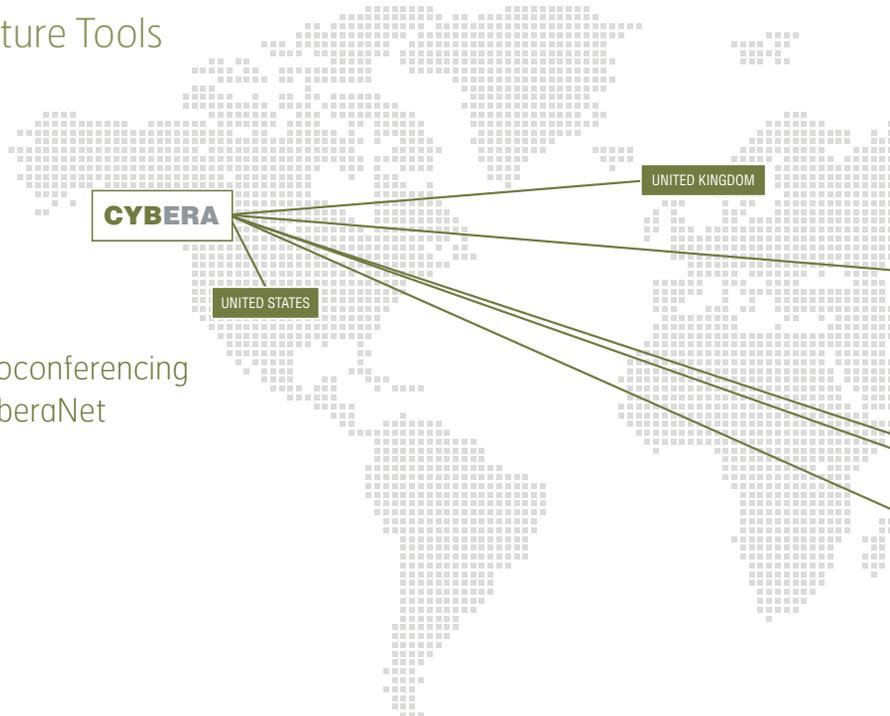
In January 2009, the Syneme lab at the University of Calgary received a dedicated 1 Gb connection with CyberaNet. The lab is run by Kenneth Fields, the Canada Research Chair in Telemedia Arts, an Associate Professor in the Department of Music, and an Adjunct Associate Professor in the Department of Computer Science at the University of Calgary. Fields' research focuses on digital music and other telematic arts. The Syneme lab supports a new program of artistic practice enabled by high-speed fiber

optic research links that allow multiple participants to engage in real-time, high-definition, software supported telepresence links. This connection to the network will advance research exploration in telemedia arts practices by allowing research groups to communicate to multiple collaborators simultaneously.

## Using Cyberinfrastructure Tools to Connect Globally

### ❖ International Videoconferencing Sessions Using CyberaNet

- Australia
- China
- New Zealand
- Singapore
- United Kingdom
- United States



❖ Enhanced Communication Capabilities for Summit of the Americas Coordinator Talk

In March 2009, the Calgary Cyberport was used to host the Latin American Research Centre for a talk by Hector Morales, the coordinator of the Summit of the Americas conference held in Trinidad and Tobago in April 2009. The talk attracted a wide cross-section of faculty and interested community members who listened to Morales speak. Attendees had the opportunity to ask questions about the upcoming summit. The Alberta SuperNet was used to connect a videoconferencing bridge at the Neil Crawford Centre in Edmonton to the American Consulate in Ottawa.

❖ Supporting Collaboration Between Alberta Teachers and the Canadian Space Agency

On May 4, 2009, the Calgary Cyberport was used to connect a group of Palliser school teachers to the Canadian Space Agency (CSA) in Montreal in preparation for a later downlink with Robert Thirsk, an astronaut with the CSA, who is presently at the International Space Station. Palliser Regional Schools was the only jurisdiction in Alberta to participate in this unique event. The downlink occurred in the Cultural Recreation Centre in Vulcan, AB in September 2009. During this pre-downlink videoconference, the teachers were provided with professional development from CSA staff. With this meeting behind them, the teachers returned to their classrooms to share their new knowledge with their students. Seventeen of these students were given the opportunity to ask a question 'live' to Thirsk during the downlink.



## VIDEOCONFERENCING SESSIONS USING CYBERANET

Data collected from April to March. Average of two hours per session.

# 41

External (Communities without Borders, Palliser Regional Schools, etc.)

# 45

Cybera Pilot Projects (CSSDP, GeoChronos, etc.)

# 58

Cybera Post-Secondary Members (PhD defenses, research exchanges, distributed lectures/courses, etc.)

# 85

WestGrid (Seminar series, research exchanges, distributed support team meetings, etc.)

# 318

Cybera (Board of Directors meetings, distributed staff meetings, videoconferenced member events, etc.)





# PROJECTS

Cybera's projects demonstrate the benefits and advance the use of cyberinfrastructure in research and business. In addition to developing middleware solutions that can be re-purposed to solve other challenges, the expertise acquired through these projects also helps build a skilled workforce that can better compete in an increasingly knowledge-based economy. This is the invisible infrastructure that supports Alberta's competitiveness and creates economic opportunities in a breadth of industry and research sectors.

# Canadian Space Science Data Portal

THE CHALLENGE: How to enable researchers to access, share, and analyze diverse data sets spread geographically across the world.

## Cybera's Solution

The Canadian Space Science Data Portal (CSSDP) project provides space scientists with access to a wide range of space data, observations, and investigative tools. It is a seamless, single-point of access to these resources through a custom web portal. More than 350 scientists are registered users of the CSSDP.

The project integrates data from sources such as the Canadian Geospace Monitoring Program and anticipates serving data from the NASA THEMIS satellite probes and the Alberta-based Enhanced Polar Outflow Probe (ePOP) satellite mission. This collection and presentation of space data is used to study the influence of the sun on near-Earth space environment, including phenomena such as geomagnetic storms, which cause the northern and southern lights. Geomagnetic storms are also known for often causing power outages, disturbances in polar communications, and the failure of satellites. The effects of space weather can also cause transpolar flight paths to be diverted, adding significant fuel costs to airlines.

A CANARIE NEP Project



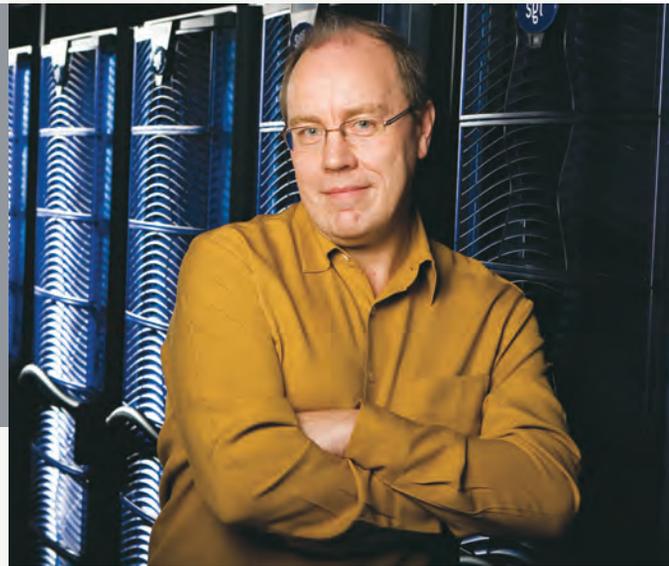
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*“Satellites happen to be in a region of the magnetosphere that is very strongly affected by energetic particles, so the ability to develop models that forecast what’s likely to happen to these satellites is very important.”*

Robert Rankin, Professor, Department of Physics, University of Alberta, and Principal Investigator, CSSDP

## ❖ How this Project Affects You

Research findings from the CSSDP project have influential industry applications. For example, space weather discoveries made using the portal will allow electrical, airline, pipeline, and other satellite-sensitive sectors to better protect their systems from the disruptive impacts of space weather fluctuations.



## Cyberinfrastructure at Work

The CSSDP project demonstrates the following cyberinfrastructure innovations:

- Data access across many different locations and data types
- Remote sensors that regularly collect data
- Advanced networks used to connect researchers
- Grid middleware that manages the portal and the sharing of information

Long term, the innovations demonstrated within this project can be utilized with any type of data, such as medical or environmental data sets—anywhere there is a disparate group of people needing access to a disparate set of data. The technical success this project has demonstrated to date has allowed the research group to approach the federal government to request long-term funding to sustain the portal.

## Investment

The CSSDP project is worth nearly \$1.5 million through contributions from Cybera and CANARIE.

## Partners

- AICT, University of Alberta
- CANARIE
- Cybera
- Department of Physics, University of Alberta
- Department of Physics, University of Calgary
- University of New Brunswick
- University of Saskatchewan

# Cloud-Enabled Space Weather Modeling and Data Assimilation Platform

**THE CHALLENGE:** To enable researchers to collaborate and make sense of complex weather data, and to increase computational resource capacity, while reducing operational complexity and costs.

## Cybera's Solution

The Cloud-Enabled Space Weather Modeling and Data Assimilation Platform (CESWP) is a CANARIE NEP v2 project that will simplify researcher access to space weather simulation tools using cloud computing technologies. The CESWP will provide a seamless entry point to these simulation tools that will dramatically improve the sustainability, flexibility, and performance of the simulation technology. It will also result in improvements in research productivity and efficiency. Space weather occurs in the environment existing between the sun and the Earth. It has an impact on Canada's and other countries' communication, power, and other distribution systems. Scientists are studying ways to forecast space weather events in an effort to avoid interruptions to these vital systems.

The CESWP is the second stage of the CSSDP CANARIE NEP v1 project that is nearing completion. The CESWP's versatile approach to a cloud computing service responds to the space science community's need to increase computational capacity while reducing operational complexity and costs. By using the CESWP, Alberta space scientists will improve their ability to collaborate with international and national partners.

A CANARIE NEP Project



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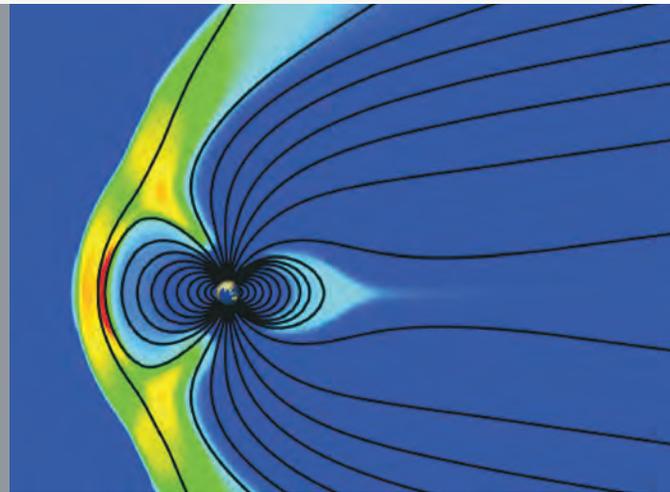
## Did you know...

The CESWP demonstrates green IT practices through:

- A reduction in dedicated machines, which will reduce continuous power consumption
- A reduction of carbon generated during CSSDP equipment manufacturing, both for initial purchase and ongoing renewal
- A reduction of duplicated IT resources across researchers

## ❖ How this Project Affects You

Canada will benefit from the CESWP by cementing its position as a leader within the international space sciences community. The two-year project, starting in November 2009, is timely in addressing a new Canadian government-mandate focused on space exploration. The CESWP will see an explosion in new data sets that require international cooperation and complex modeling in their analysis.



## Cyberinfrastructure at Work

The CESWP demonstrates the following cyberinfrastructure innovations:

- Cloud computing technologies to simplify access to leading-edge simulation tools
- Powerful computing resources to process large data sets
- Data storage and management capabilities
- Advanced networks to connect national and international partners

## Investment

The CESWP is funded by CANARIE and valued at over \$900,000.

## Partners

- AICT, University of Alberta
- CANARIE
- Cybera
- Department of Applied Mathematics, University of Waterloo
- Department of Physics, University of Alberta
- Grid Research Centre, University of Calgary
- University of New Brunswick

*Above: Magnetic field lines with one point on the Earth's surface and another point on the sun, providing a direct connection between the two. This is an occurrence known as space weather. (Image courtesy of the Department of Physics at the University of Alberta.)*

# DataGardens Virtualization

THE CHALLENGE: To use virtualization technologies to provide seamless integration between multiple data centres.

## Cybera's Solution

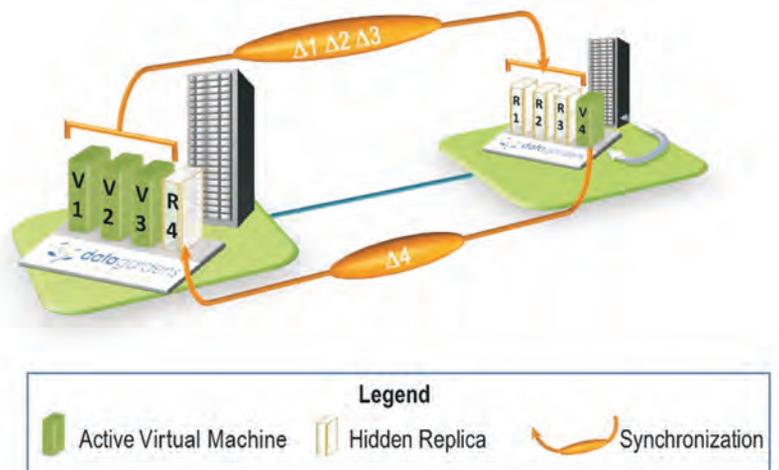
In December 2008, Cybera partnered with DataGardens to investigate the use of virtual network tools. This involved consolidating Cybera's various internal IT systems into a streamlined virtual architecture, also known as a Wide Area Virtual Enterprise (WAVE). A WAVE was built using DataGardens' flagship product, Syntropy, which is software that extends conventional virtualization services, such as virtual machine migration and virtual machine provisioning, so they can be leveraged across separate data centre environments or distributed sites.

In April 2009, using a \$50,000 Alberta Innovation Voucher, DataGardens again partnered with Cybera to carry out Quality Assurance testing for the commercial release of its Syntropy software. Formal Quality Assurance testing procedures were developed and the first version of the WAVE software was released. The eight-month project, which will be complete in December 2009, is worth a total of \$67,667.

June 2009 brought yet another collaboration opportunity for Cybera and DataGardens, this time as part of the Precarn Multi-site Adaptive Virtualized Information System (MAVIS) project. The MAVIS project, led by DataGardens, is investigating further development of the WAVE software, specifically network use optimization. A portion of the funding for this project was secured through a \$600,000 grant from Precarn, a not-for-profit company that supports the pre-commercial development of leading-edge technologies. This project should be complete in March 2010.

## ❖ How this Project Affects You

The evolving needs of multi-office companies were the source of inspiration for these DataGardens projects. In order to compete in the global economy, companies have begun distributing their staff and office space more broadly. This requires new approaches to handling the provisioning, synchronization, and management of various IT resources across multiple sites.



## Cyberinfrastructure at Work

The DataGardens Virtualization project demonstrates the following cyberinfrastructure innovations:

- CyberaNet used as a testbed environment to develop and trial the WAVE
- Virtualization tools to support and manage the data centre environment
- Customized middleware to implement optimization and load-balancing techniques

## Investment

The ongoing collaborative projects based on DataGardens technology have a combined value of over \$2 million with contributions from Precarn, DataGardens, Cybera, the University of Alberta, and the Government of Alberta.

## Partners

- Advanced Education and Technology, Government of Alberta
- Cybera
- DataGardens
- Department of Computing Science, University of Alberta
- Precarn

# EDM Studio

**THE CHALLENGE:** To reduce the barriers of cost and accessibility associated with a small company harnessing powerful computing resources.

## Cybera's Solution

EDM Studio is a Calgary-based company that uses computer simulation technology to create interactive or visually-engaging animation exhibits for museums and interpretive centres. These kinds of animations require extensive renderings ranging from simple to high-definition studio quality presentations. The large upfront costs associated with running massive compute infrastructure to process these renderings are unrealistic for a small company like EDM to incur. Therefore, an affordable, flexible, on-demand system, which was able to quickly respond to sporadic intensive use, was necessary.

Cybera, in partnership with the Grid Research Centre and the HP Labs Data Centre at the University of Calgary, offered EDM Studio a solution to its predicament. On-demand access was provided to powerful computing resources, allowing EDM to run its interactive simulations in a timely and cost-effective manner. The project enabled EDM to streamline workflow, utilize existing infrastructure, and limit its costs, while avoiding the burden of upfront capital costs.

## Cyberinfrastructure at Work

The EDM Studio project demonstrates the following cyberinfrastructure innovations:

- Creation of a dynamic resizable compute environment
- Virtual environment used to host computing resources
- Powerful computing resources to process data-intensive renderings
- Middleware development to manage the peaks and lows of hosting processing cycles

## Investment

This project, initiated by Cybera, is valued at over \$150,000.

## Partners

- Cybera
- EDM Studio
- Grid Research Centre, University of Calgary
- HP Labs Data Centre, University of Calgary



*The animation created in the EDM Studio project replicated Frank Slide, a historical rockslide in Alberta that buried a portion of the town of Frank in 1903, killing approximately 70 people.*

### ❖ How this Project Affects You

EDM Studio's digital installations and animations provide key learning and experiential tools for use in museums and interpretive centres. This helps visitors and student groups better understand our current surroundings, or in some cases, allows them to take a trip back in time to learn about our past.

*Frank Slide as it appears today.*

*(Photo courtesy of Alberta Culture and Community Spirit)*



# GeoChronos

THE CHALLENGE: To provide customized collaboration tools for the management of environmental monitoring data and to enable geographically dispersed researchers to access and share information.

## Cybera's Solution

GeoChronos is a set of collaboration and management tools, hosted in an online portal, that enables researchers from the earth observation community to integrate, analyze, visualize and share data and scientific applications. The portal combines integration tools, earth observation data and various computing resources into a single point of access. Using satellite technology, pictures of Earth are collected continuously and stored as data in the portal. GeoChronos then provides scientists with Facebook-like social networking tools to discuss, analyze and make effective use of this data.

In addition to improving the overall accessibility to earth observation data, GeoChronos will support the automation of scientific workflows. Raw data sets will be automatically transformed into usable data sets ready for analysis by scientists, resulting in increased research efficiency.

## Cyberinfrastructure at Work

The GeoChronos project is demonstrating the following cyberinfrastructure technologies:

- Web 2.0 and social networking tools for online collaboration among earth observation researchers
- Remote data management of earth observation findings
- Single point access to collaboration and visualization tools
- Advanced networks to connect earth observation researchers around the world

## Investment

The GeoChronos project is worth more than \$1.2 million through contributions from Cybera and CANARIE.

## Partners

- CANARIE
- Centre for Earth Observation Sciences, University of Alberta
- Cybera
- Grid Research Centre, University of Calgary
- Universidade Federal de Minas Gerais

## A CANARIE NEP Project



**canarie**



*“GeoChronos is a stepping stone towards a broader vision of bringing together a dispersed research community. It will raise awareness of the planet’s forgotten ecosystems, harnessing the power behind remote sensing and other cyberinfrastructure technologies to help governments evaluate the effectiveness of their environmental practices.”*

Arturo Sanchez-Azofeifa, Professor, Department of Earth and Atmospheric Sciences, and Director, Centre for Earth Observation Sciences, University of Alberta, and Principal Investigator, GeoChronos

## ❖ How this Project Affects You

The GeoChronos project is helping address a number of important environmental concerns that exist throughout the world. The research and analysis the portal supports is helping earth observation scientists develop a better understanding of the impacts of climate change, biodiversity, and environmental disturbances.

While still under development, about 50 scientists and students from around the globe are currently using the analytic and collaboration capabilities of the portal, which will be made available to the broader research community when the project nears completion in 2010. This project has also attracted the interest of the Inter-American Institute for Global Change with several Latin American governments on developing sophisticated tools for environmental monitoring in the Americas.

A screenshot of an interactive application for visualizing and analyzing data run from the GeoChronos portal.

# Geospatial Cyberinfrastructure for Environmental Sensing

**THE CHALLENGE:** To provide a user-driven platform for biogeoscience researchers to store and share ground-based sensor array data regardless of their location.

## Cybera's Solution

The Geospatial Cyberinfrastructure for Environmental Sensing (GeoCENS) project is a CANARIE NEP v2 project that will build an interactive web-based portal for scientific analysis and social networking among the biogeoscience research community. Scientists from this community rely on ground-based sensors to collect data for analysis and to monitor changes in all forms of environment, including climate, water, and biological species. Currently, individual research groups use their own sensors for collecting data.

The GeoCENS portal will allow scientists to remotely contribute their research data and knowledge into a combined system with an innovative two and three-dimensional graphic interface. Instead of deploying numerous sensors of their own, scientists and research groups will be able to spend more time analyzing and re-purposing the data shared within the portal. Various data sources will be accessible in historical and real-time, and users will be able to compare, remotely control, and analyze data sources from specific geographical areas.

The portal will be developed inline with the Open Geospatial Consortium's Sensor Web Enablement service standards and upon the NASA World Wind Java Standard Development Kit. GeoCENS is a continuation of the Cybera pilot project, Cyberinfrastructure for Monitoring Biogeosciences Processes in the Rockies.

## A CANARIE NEP Project



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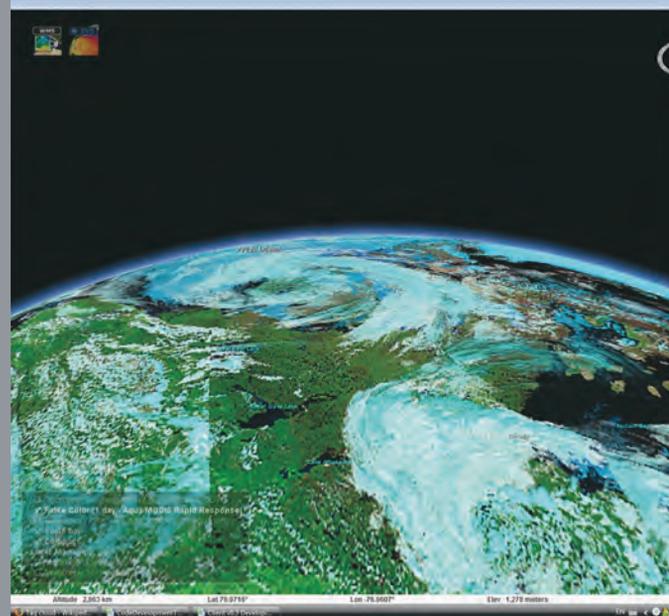


*“We will build a type of social network for biogeoscience researchers, so they can collaborate with each other effortlessly. It is like Facebook, but for a targeted group of scientists.”*

Steve Liang, Assistant Professor, Department of Geomatics Engineering, Schulich School of Engineering, University of Calgary, and Principal Investigator, GeoCENS

## ❖ How this Project Affects You

Canadians stand to benefit from the GeoCENS project, as the breakthrough findings enabled by this portal will shed light on how our social and economic activities impact the earth's ecosystem. Although the portal is being designed specifically for the needs of the biogeoscience research community, there are plans to make it available to the public further down the road. The objective is for anyone with an interest in biogeoscience, such as a school group, to be able to log into the portal, use a three dimensional virtual globe system, similar to Google Earth, and browse the areas that scientists are studying.



A satellite image of Earth stored in the GeoCENS portal.

## Cyberinfrastructure at Work

The GeoCENS project is demonstrating the following cyberinfrastructure technologies:

- Advanced networks to transfer and share data sources from geographically dispersed participants
- Data storage and management capabilities
- Remote sensors used to collect environmental data
- Web 2.0 and collaboration tools to enable scientists to communicate and share information

## Investment

The GeoCENS project is worth nearly \$1.2 million through contributions from Cybera and CANARIE.

## Partners

- Biogeosciences Institute, University of Calgary
- California Biodiversity Centre, University of California, Berkeley
- CANARIE
- Centre for Hydrology, University of Saskatchewan
- Cybera
- Department of Biological Sciences, University of Cincinnati
- National Ecological Observatory Network (NEON), Boulder, CO
- Open Geospatial Consortium

# Multi Media Processing

**THE CHALLENGE:** To simplify the repurposing and delivery process of digital media to enable television shows and movies to work seamlessly on any digital media player, from a cell phone to a set-top box, such as a Personal Video Recorder (PVR).

## Cybera's Solution

Initiated in May 2009, the Multi Media Processing project involves the creation of prototypes and middleware for a transcoding service that will improve the management and transformation process of different media files onto a media player. Typically, when downloading content files to a media player device, such as a cell phone, the files must be encoded in a particular way to be compatible with the device. Different devices usually require different encoding, making it complex and expensive for distributors to get their content onto a variety of devices. MoboVivo Inc. is one such distributor.

MoboVivo licenses television shows and movies for web and mobile devices, such as the Blackberry and iPhone. The transcoding service developed by the Multi Media Processing project will enable users to download video that will be usable on any media device. As a project partner, the University of Calgary also stands to benefit, as it will be able to re-purpose this technology to improve staff and faculty accessibility to varied formats of digital educational materials.

As part of Advanced Education and Technology's Alberta Innovation Voucher Pilot Program, Cybera will also provide research, development, and consulting to MoboVivo on its Rapid Repurposing (RRT) and social media technology. The result is middleware that will enable MoboVivo to manage its multi device market strategy and to reach large audiences through popular applications for Facebook. One application, built on Cybera developed middleware, is a social media iPhone and iPod application called MoboVivo previiv, which will allow users to edit, share, and vote on television shows and movies.

*“Our customers and our partners, like BBC and the Canadian Broadcasting Corporation, and potential customers, like Sony, have expressed a desire for solutions to their content management challenges. One potential customer currently has four dedicated transcoding resources, and is spending over \$250,000 a year, to make their content available in only a handful of formats. They are looking at the product emerging from this project as a business and technical solution.”*

Trevor Doerksen, Founder and Chief Executive Officer, MoboVivo Inc.

## ❖ How this Project Affects You

Once complete, the Multi Media Processing project will enable consumers to download their favourite television shows and movies to be usable on a variety of digital devices. This service is a fitting solution for today’s on-the-go society, where people, particularly youth, want their programs with them and viewable on any device, wherever they happen to be.



## Cyberinfrastructure at Work

The Multi Media Processing project is demonstrating the following cyberinfrastructure technologies:

- Grid middleware to manage the transcoding process
- Cloud computing to distribute the work on multiple processors and speed-up the transcoding process
- Cloud computing resources for testing and incubation of the transcoding prototypes and middleware

## Investment

The Multi Media Processing project is valued at almost \$215,000 with contributions from Cybera, the Government of Alberta, and MoboVivo.

## Partners

- Advanced Education and Technology, Government of Alberta
- Cybera
- Department of Information Technologies, University of Calgary
- Grid Research Centre, University of Calgary
- MoboVivo Inc.

# TRLabs Service Composition

**THE CHALLENGE:** To manage network bandwidth complexities related to on-demand network services, as well as seamlessly integrate those services with wireless devices.

## Cybera's Solution

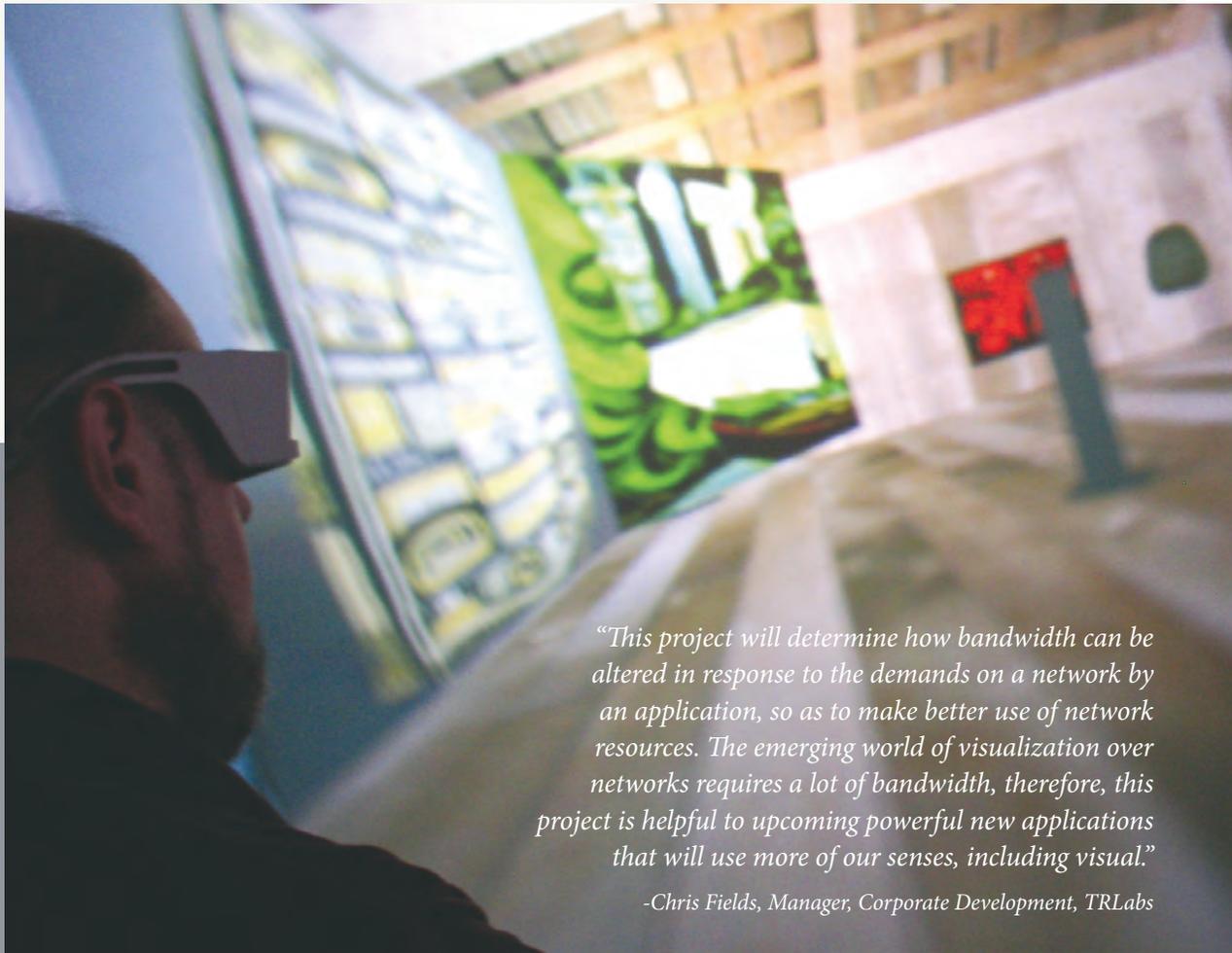
More and more consumers are looking for ways to download media onto their cell phones and laptop computers. As a result, Cybera, along with TELUS and SaskTel, are working with TRILabs, Canada's largest ICT research and development consortium, on a project that dynamically encodes content such that the resolution is appropriate for the end playback device. In addition, this project uses Internet Protocol Multi Media Sub-Systems (IMS) to export the peaks and lulls of content transmission to optimize the use of bandwidth in the last mile. This will simplify the process of accessing multimedia on wireless devices, such as the iPhone and Blackberry, and improve performance and the end users' experiences.

The objective behind this project is to respond to consumers' requests for audio and video, identify corresponding service providers, create electronic connections between those providers and consumers, and then manage that connection. This project, known as the TRILabs Service Composition project, started in June 2008 and will likely be completed in December 2009. TELUS and SaskTel will then have the option of implementing this solution to deliver content to consumers anytime, anywhere, and on any device.

## Cyberinfrastructure at Work

The TRILabs Service Composition project demonstrates the following cyberinfrastructure innovations:

- Middleware that responds dynamically to bandwidth usage peaks and lulls
- Powerful computing resources and equally powerful networking capabilities
- Advanced networking capabilities
- Data management systems to support on-demand service requests



*“This project will determine how bandwidth can be altered in response to the demands on a network by an application, so as to make better use of network resources. The emerging world of visualization over networks requires a lot of bandwidth, therefore, this project is helpful to upcoming powerful new applications that will use more of our senses, including visual.”*

*-Chris Fields, Manager, Corporate Development, TRILabs*

## ❖ How this Project Affects You

The results from this project will enable service providers to deliver content to any device on-demand, anywhere and at anytime. This means you will be able to enjoy more of your favourite movies and songs on your wireless devices, faster and at a higher fidelity.

This type of solution becomes critical when large telecommunications companies, such as TELUS and SaskTel, start packaging content from various third-party providers, such as MovoVivo, into services delivered dynamically on-demand to customers like you.

## Investment

The TRILabs Service Composition project is valued at over \$400,000 with contributions from all partners.

## Partners

- Cybera
- SaskTel
- TELUS
- TRILabs

# Secure Electronic Healthcare Record Infrastructure



**THE CHALLENGE:** To incorporate digital rights management into existing Alberta health record systems.

## Cybera's Solution

The Secure Electronic Healthcare Record Infrastructure (SEHRI) project is an investigation into a possible plan for how digital rights management security can be integrated into existing health record initiatives in Calgary and throughout Alberta Health Services initiatives as a whole. This project builds on the existing work being done by the Health Innovation and Information Technology Centre (HiiTeC) at the University of Calgary. The SEHRI project attempts to investigate ways to increase the security and privacy of data in current health care systems.

## Cyberinfrastructure at Work

The SEHRI project demonstrates the following cyberinfrastructure innovations:

- Testbed environment to develop and trial a data management system
- Development of a prototype system in information security

## How this Project Affects You

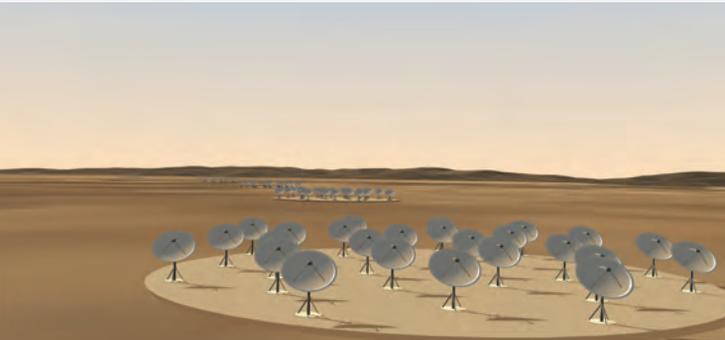
Digital rights management is a critical component of the effective and practical use of cyberinfrastructure technologies. Health data, in particular, has very stringent data security parameters and this project looks at how the technology characteristics can fit into the data security and privacy needs of electronic health care records.

## Investment

The SEHRI project is valued at \$105,000 with contributions from Cybera and MITACS.

## Partners

- Cybera
- HiiTeC, University of Calgary
- MITACS



# Designing and Creating Cyber-SKA Canada

**THE CHALLENGE:** To filter and distribute massive data flows from huge arrays of radio telescopes out to a global community of astronomers.

### ❖ How this Project Affects You

By assisting in the launch of this ground-breaking technology, both Canada and Alberta will solidify their global status as a valuable contributor to this important research area. Once enabled, the square kilometre array (SKA) technology could lead to discoveries of new phenomena in the cosmos or even uncover new evidence of other Earth-like planets and other life forms.

### Cyberinfrastructure at Work

This Designing and Creating Cyber-SKA Canada project has the potential to demonstrate the following cyberinfrastructure innovations:

- Data sharing across many different and distributed locations
- Remote sensors collecting massive amounts of data
- CyberaNet high-speed, high-bandwidth network used to transfer large data sets
- Integration of social networking tools to facilitate distributed collaboration

### Possible Partners

- CANARIE
- Cybera
- Grid Research Centre, University of Calgary
- IBM
- ISIS, University of Calgary

### Working Towards a Solution

The Institute for Space Imaging Science (ISIS) at the University of Calgary has joined efforts with more than 50 institutes in 17 countries to share in the research and development of the largest radio telescope ever built. The goal is to construct a network of antennas with 100 times the sensitivity of the largest existing arrays. This has the potential to enable new discoveries in areas of astroparticle physics and cosmology, fundamental physics, and solar system science.

As part of this large-scale international effort, ISIS has spearheaded a smaller branch project called “Designing and Creating Cyber-SKA Canada,” which was recently approved by CANARIE to receive funding as an NEP v2 project. Together with the Grid Research Centre, Cybera is investigating collaboration opportunities with ISIS to support its involvement in the SKA initiative. Cybera’s contribution to this NEP v2 project would involve providing access to and use of CyberaNet for the transfer of large data sets. Cybera would also work with the Grid Research Centre to integrate and implement social networking components to enable collaboration between the Cyber-SKA partners.

*This page, above: Image courtesy © XILOSTUDIOS and [www.skatelescope.org](http://www.skatelescope.org)*

# Cyberinfrastructure Outreach

Through various educational events, presentations, and networking opportunities, Cybera strives to engage industry, academia, government and the public in the importance of cyberinfrastructure and the impact it has on the way Albertans work, live, and play.

Cybera employs its website, blog, and other social networking sites, such as Facebook and Slideshare, to communicate upcoming cyberinfrastructure-related events or the benefits of applying tools, such as grid and cloud computing, advanced research networks, and visualization and collaboration facilities, to research and business.



In response to community feedback, Cybera has focused on developing clearer messaging and a more engaging public presence. The expertise of a web design and development company has been enlisted to help Cybera create a fresh and more dynamic look for its home website, [www.cybera.ca](http://www.cybera.ca). A new feature of the website, the Projects gallery, will showcase all of Cybera's pilot projects and be a resource base for all of Cybera's cyberinfrastructure initiatives. The new look will go live in the fall of 2009.



Left to right: Eleni Stroulia, Professor and Outreach Program Director, Department of Computing Science; Paul Liu, Associate Professor, Department of Computing Science; and Pierre Boulanger, Professor, Department of Computing Science, iCORE Industrial Chair, and Director, Advanced Man-Machine Interface Laboratory, University of Alberta, presented at the Spring Members' Event in Edmonton.

In April 2009, Cybera hosted two successful outreach events with guest speaker Duncan Stewart, Director of Deloitte Canada Research in Technology, Media and Telecommunications, Life Sciences and GreenTech. The Spring Members' Events, held at the University of Alberta and The Westin Calgary, explored why cyberinfrastructure technologies were identified as trends in Deloitte's 2009 Technology Predictions report. In addition to promoting the benefits of cyberinfrastructure technology in research and business, the events lead to valuable relationship building with key contacts in the academic research community in Edmonton and in Calgary industry.



Cybera hosted Bill Appelbe, Chief Executive Officer and Chief Scientist of the Victorian Partnership for Advanced Computing and member of Cybera's ISAC, as a guest speaker in December 2008. Appelbe spoke in Calgary on trends around academic and industry partnerships in cyberinfrastructure development. The talk was also broadcast over videoconference to members at the Universities of Alberta and Lethbridge.

*Last September, Summit 08: Driving Business Innovation took place in Banff, AB.*

Cybera's second annual conference doubled in size from 2007 to host over 100 attendees. Registrants included delegates from Alberta universities, start-up companies, industry vendors, funding agencies, and government ministries. Sessions explored the ways technology changes the face of business and guides the direction of innovation for industry and academic research and development.

Also last September, Cybera hosted the NEP Project Launch at the University of Alberta. Two of Cybera's pilot projects received funding through CANARIE's NEP fund. Those projects are the CSSDP and GeoChronos. The event acted as a launching pad for the next phase of both of these projects, and as an opportunity for those involved to meet face-to-face.



*Open Grid Forum 26 on May 28, 2009*

In addition to hosting its own events, Cybera staff and board members represented the organization at various events throughout Alberta and around the world. Participation in these external events has enabled Cybera to make many valuable connections and contributions to the international development and integration of cyberinfrastructure applications.

The following is a list of events attended by Cybera representatives:

- Open Grid Forum 26, Chapel Hill, NC, May 2009
- Coast to Coast Retreat, Vancouver, BC, April 2009
- Open Grid Forum 25, Catania, Italy, March 2009
- CANARIE-ITAC Green IT Workshop, Ottawa, ON, March 2009
- SuperComputing, Austin, TX, November 2008
- CANARIE Users' Forum 2008, Montreal, QC, November 2008
- CANARIE/ORION National Summit, Toronto, ON, November 2008
- Calgary Technology Inc Technology Showcase and Open House, Calgary, AB, October 2008
- IEEE Grid 2008, Tsukuba, Japan, September 2008
- Open Grid Forum 23, Barcelona, Spain, June 2008
- Global Petroleum Show, Calgary, AB, June 2008
- Structure 08, San Francisco, CA, June 2008
- WestGrid Retreat, Victoria, BC, June 2008
- Mount Royal College Technology Test Drive, Calgary, AB, May 2008
- CCAT Technology Trade Show, Calgary, AB, February 2008
- Open Grid Forum 22, Boston, MA, February 2008

# Partners



## Academic Information and Communication Technologies, University of Alberta

The Academic Information and Communication Technologies (AICT) department at the University of Alberta provides high performance computing and support services to researchers at the University of Alberta and partner institutions across Canada. AICT also maintains the University of Alberta's general-access research computational facilities, including several license servers. The AICT Linux clusters, for instance, offer a powerful solution to many high performance computing needs. These clusters are the perfect place to run fast parallel jobs that do not require the large shared memory space of the WestGrid machines. AICT helps researchers get the most from the university's computing resources and assists with code parallelization and optimization. Cybera's NEP projects are using AICT's computational facilities for software development.

## Government of Alberta

### Advanced Education and Technology, Government of Alberta

Advanced Education and Technology provides strategic leadership for the development of the next generation economy in Alberta. In collaboration with learning providers, industry, communities, government agencies and non-government organizations, the Ministry of Advanced Education and Technology strives to fulfill its mission by creating accessible, affordable and quality learning opportunities that are responsive to the ongoing learning needs of Albertans. The ministry co-operates with key innovation support agencies to foster support for commercialization and innovation activities across the province.



### CANARIE

CANARIE is Canada's advanced research and innovation network. It underpins leading-edge discovery research and big science, and connects innovators throughout the country and around the world. This non-profit corporation empowers 39,000 researchers at nearly 200 Canadian universities and colleges, as well as scientists at many research institutes, hospitals, and government laboratories. It also supports the development of new tools that enable researchers to leverage the network, helping them analyze very large amounts of data, collaborate more effectively, and apply research results in innovative ways. By participating in strategic regional, national and global collaborations, CANARIE stimulates research, innovation and growth, delivering economic, social, and cultural benefits to Canadians. Established in 1993, CANARIE is supported by membership fees, with major funding of its programs and activities provided by the Government of Canada.

## Grid Research Centre

The Grid Research Centre, based at the University of Calgary, pursues research in the areas of grid, cloud, and high performance computing. The Grid Research Centre has attracted interest and support of key partners in academia, industry and government. In addition to working with Cybera, the Grid Research Centre has established collaborations with HP Labs, Los Alamos National Laboratory, CANARIE, the Universities of Calgary and Alberta, WestGrid and the University of Bath. This collaboration involves the development of middleware, tools and services, and working with application specialists to automate computing activities.



## University of Calgary, Department of Information Technologies

The University of Calgary Department of Information Technologies provides computing and media services in support of learning, teaching, research and administration. The department has a wide range of responsibilities from providing the campus research and network services to ensuring critical day-to-day business operations. It provides support services for researchers at the University of Calgary and its partner institutions throughout Canada. It also provides testing of new innovations and generating initiatives that will lead to the next generation of IT services.



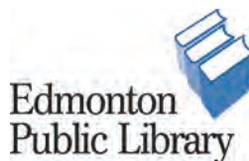
## WestGrid

WestGrid operates high performance computing, collaboration and data storage infrastructure for researchers across western Canada. It encompasses 14 partner institutions across British Columbia, Alberta, Saskatchewan, and Manitoba. WestGrid was the first resource provider in Canada to adopt a grid-enabled system for its high performance computing, collaboration and scientific visualization resources. Since 2004, this system has enabled WestGrid to build a user community across Canada in disciplines ranging from the sciences and engineering to the arts and humanities. WestGrid works closely with Compute/Calcul Canada, a national organization that coordinates and promotes the use of high performance computing, and the country's other regional high performance computing consortia to advance Canada's computing landscape. Cybera provides project management to WestGrid, specifically through coordinating WestGrid's financial, administrative and communications activities.



# Membership

Members from both academia and industry sectors provide Cybera's primary governance. Cybera's Board of Directors is made up of representatives from post-secondary institutions, organizations, industry, and government. This governance model has been designed to maximize input from key stakeholders and to serve the needs of cyberinfrastructure users.



*“TRLabs is actively engaged with Cybera. Not only does Cybera enable TRLabs to conduct research as a single distributed organization, it acts as TRLabs’ portal to distributed storage and computing resources, enabling TRLabs to explore and leverage the capabilities associated with cloud computing. Furthermore, Cybera and TRLabs are working together to address and solve issues of interest and relevance to industry. For example, Cybera is currently working with TRLabs to determine how the bandwidth of a network connection can be dynamically altered in response to the demands placed upon a network by an application so as to make more efficient use of network resources. This is especially relevant when considering the bandwidth limitations associated with numerous access networks deployed across North America.*

Rainer Iraschko, Vice-President Research, TRLabs

*“IBM recognizes the value and importance of cyberinfrastructure, or cloud computing, as the world continues to get more interconnected. We define cloud computing as: anytime, anywhere access to IT resources delivered dynamically as a service. Cloud computing is an integral part of IBM’s ‘Smarter Planet’ initiative. As the world gets smarter, demands for IT will grow—it is time to start thinking differently about infrastructure. IBM looks forward to continuing to work with Cybera in the future in this critical space.”*

Roger Piquette, Client Manager, IBM Canada



# Board of Directors



**KEITH ARCHER, The Banff Centre**

Keith Archer is the Director of Research at The Banff Centre. He is also the President of the Canadian Society for the Study of Higher Education and the Chair

of the Non-major Representatives Committee for WestGrid. Archer received a BA and a MA in political science from the University of Windsor and a PhD in political science from Duke University. He has served as a Professor of political science and the Associate Dean (Research) in the Faculty of Social Sciences at the University of Calgary, the Associate and Interim Vice-President (Research) at the University of Calgary, and the Editor of the Canadian Journal of Higher Education. Archer has been a member of a number of not-for-profit boards and has authored or contributed to seven books and over 30 articles and chapters.



**ANDREW BJERRING (member-at-large), CANARIE**

Andrew Bjerring was a founding member of CANARIE's Board of Directors and was the President and Chief Executive Officer for 15 years. Bjerring has participated in numerous organizations dealing

with networking and related applications. He is currently on the boards of the National Research Council's Institute for Information Technology and Ocean Networks Canada. He is also a member of the advisory panel for the Alberta Science and Research Investments Program. Bjerring spent 18 years as a faculty member, then, a Senior Administrator in Academic Planning and Information Technology Services at the University of Western Ontario. He obtained his BSc and MASc from the University of British Columbia and the University of Toronto, and his PhD from the University of Western Ontario.



**RAINER IRASCHKO, TRILabs**

Rainer Iraschko holds a PhD from the University of Alberta and a BSc in electrical engineering from the University of Toronto. In 1997, Iraschko joined MCI's Network Technology Development group where he investigated the efficiency

of MCI's North American transport network. Later, Iraschko moved to Silicon Valley, CA to launch ONI Systems and work as the Senior System and Network Architect for optical transport equipment. He helped ONI grow into a public company with a market capitalization in the billions. In 2001, Iraschko opened an office in Calgary, AB for Network Photonics Inc. Two years later, he started AccessNetwork Inc., a broadband access solutions company. In 2004, he joined TELUS as an Optical Networking Strategist for the evolution of TELUS' transport network. Presently, Iraschko is the Vice-President Research of TRILabs, a not-for-profit organization fostering industry growth through ICT innovation.



**LEE KRUSZEWSKI, Government of Alberta (ex officio)**

With over 22 years of industry and government experience, Lee Kruszewski is currently the Director of ICT Industries for Alberta Advanced Education and

Technology. In this role, Kruszewski is responsible for public and private research and commercialization partnerships, investment attraction, and industry and provincial strategy development. He is also responsible for the adoption of technology in the energy and environmental sectors. In previous roles, Kruszewski has managed software architecture, IT infrastructure, and intellectual property with a local wireless technology company and held various senior manager and product/systems/strategic planning positions with TELUS Corporation, a national Canadian telecommunications company. Outside of government Kruszewski has an active interest in sustainable development and conservation.

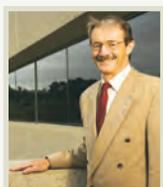


**BRIAN OLAFSON, AICTI**

Brian Olafson has had an exceptional and broad ranging career in the ICT industry. After graduating from the University of Alberta with a BSc, Brian embarked on a career with IBM, primarily in the areas of sales and marketing. Following,

Brian joined ISM Alberta Ltd. as Vice-President of Marketing and Sales. During part of this time he was also President of Payment Systems Corporation, which was a payroll and financial

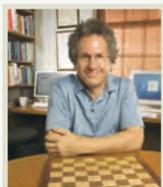
services company formed by ISM Alberta and the Government of Alberta. In 1997, he joined TELUS as the Vice-President of Managed Services. In 1999, Brian joined Bell as Vice-President for Western Canada. In 2002, he started as the Vice-President of the SuperNet project and the role of overseeing the successful construction of the Alberta SuperNet. In 2005, Olafson retired from Bell Canada and established Brian Olafson and Associates Management Consulting Ltd.



**SEAMUS O'SHEA (Chair),  
University of Lethbridge**

Seamus O'Shea is a Professor in the Departments of Chemistry and Biochemistry at the University of Lethbridge. O'Shea's research interests are in computational chemistry, especially

in the relationship between the properties of molecules singly and in pairs and those of the corresponding liquids and solids. He has served as the Vice-President (Academic) and Provost of the University of Lethbridge, where he was involved in the development of information technology strategies for the university and its partners in Alberta's public post-secondary system. O'Shea serves on iCORE's Board of Directors and is Co-Chair of the taskforce implementing ApplyAlberta, the province's on-line post-secondary application system.



**JONATHAN SCHAEFFER,  
University of Alberta**

Jonathan Schaeffer is a Professor in the Department of Computing Science at the University of Alberta, and is currently the Vice-Provost and Associate Vice-President for Information Technology. Schaeffer

is the iCORE Chair in High Performance Artificial Intelligence Systems. His research in artificial intelligence is best known for his work on computer games. He is the creator of the checkers program Chinook, the first program to win against a human in the World Checkers Championship.



**PETER SINGENDONK (Vice-Chair),  
Cisco Systems Canada**

Peter Singendonk is the Alberta Director for Systems Engineering at Cisco Systems. With over 29 years of industry experience, Singendonk has worked for multinational energy companies, systems integrators and

service providers. Joining Cisco in 1997, he has been actively involved as a Field Advisor and a member to numerous projects and committees such as Web 2.0, and Specialist Virtualization and Corporate Citizenship. Outside of Cisco, Singendonk is a board member for Cybera and regularly works with youth groups.



**BRIAN UNGER,  
University of Calgary**

Brian Unger is the Executive Director of the Grid Research Centre at the University of Calgary and Interim President of Cybera.

Unger is also a Special Advisor for the joint Cambodia-Canada project, Informatics for Rural Empowerment and Community Health, and a Co-Principal Investigator for WestGrid. He has served as the founding President and Chief Executive Officer of iCORE, the founding President of Netera Alliance (now Cybera), the founding Chair of C3.ca Inc, and the founding President and Chief Executive Officer of Jade Simulations. Unger was named a Canada Pioneer of Computing at an IBM CASCON conference. His list of awards includes the IWAY Public Leadership Award for outstanding contributions to Canada's information society and the ASTech award for Innovation in Alberta Technology for his research in parallel simulation and distributed computation.

# International Strategic Advisory Committee

In October 2008, Cybera formed an International Strategic Advisory Committee (ISAC). The ISAC provides strategic advice and a diverse international perspective to Cybera, its Board of Directors, and the Government of Alberta. The leading minds who make up this committee include:



**BILL APPELBE**, Victorian Partnership For Advanced Computing

Bill Appelbe is the founding CEO and Chief Scientist of Victorian Partnership for Advanced Computing (VPAC).

VPAC is a state-based research service provider. Appelbe obtained an honours

BSc at Monash University and his MASc and PhD in Electrical Engineering at the University of British Columbia. Subsequently, he was employed at the University of California, San Diego, then as an Associate Professor at Georgia Tech. He has been employed or funded by companies and organizations including IBM, HP, Sun Microsystems, Los Alamos, and Motorola. Appelbe's research interests include parallel programming tools, software engineering, and software frameworks.



**RICHARD FUJIMOTO**, Georgia Institute of Technology

Richard Fujimoto is Regents' Professor and the founding Chair of the Computational Science and Engineering Division at the Georgia Institute of Technology. He received his PhD and MASc from the

University of California, Berkeley, respectively in computer science and electrical engineering, and two BSc degrees from the University of Illinois, Urbana in computer science and engineering. His publications include three books and several award-winning articles on parallel and distributed simulation. Fujimoto has served as Co-Editor-in-chief of the journal *Simulation: Transactions of the Society for Modeling and Simulation International*, as well as a founding Area Editor for the ACM Transactions on Modeling and Computer Simulation journal.



**KATE KEAHEY**, Argonne National Laboratory

Kate Keahey is a Scientist in the Distributed Systems Lab at Argonne National Laboratory and a Fellow at the Computation Institute at the University of Chicago. Her research interests focus on

virtualization, policy-driven resource management, as well as the design and development of cloud computing infrastructure and tools. Keahey created and leads the open source Nimbus project, which provides an infrastructure-as-a-service cloud computing platform as well as other virtualization tools supporting a science-driven cloud ecosystem.



**GREGOR VON LASZEWSKI**, Center for Advancing the Study of Cyberinfrastructure, Rochester Institute of Technology

Gregor von Laszewski is conducting state-of-the-art research in cloud computing and green IT at Indiana University. He

is the software architect of the National Science Foundation project, FutureGrid. He worked for more than 10 years at the University of Chicago's Argonne National Laboratory, last as a scientist and a Fellow of the Computation Institute. He received a MASc from the University of Bonn in Germany and a PhD in computer science from Syracuse University. His research interests include green IT, grid and cloud computing, and general-purpose computing on graphics processing units.



**ALEXANDER REINEFELD**, Zuse Institute and Humboldt University of Berlin  
Alexander Reinefeld is the Head of the Computer Science Department at Zuse Institute Berlin and a Professor at the Humboldt University of Berlin. He received his PhD and MASc from the University

of Hamburg. He has been awarded a PhD scholarship by the German Academic Exchange Service and a Sir Izaak Walton Killam Post Doctoral Fellowship from the University of Alberta. Reinefeld has served as an Assistant Professor at University of Hamburg and as the Managing Director at the Paderborn Center for Parallel Computing. He co-founded the North German Supercomputing Alliance, the European Grid Forum, the Global Grid Forum, and the German e-science initiative D-Grid. He received an IBM Faculty Award and he has published numerous scientific papers.



**DEBASHIS SAHA**, eBay  
Debashis Saha is the Director of Kernel Systems Engineering at eBay. He has held senior management roles at Oracle Corporation's Server Technologies. Debashis has extensive experience in managing and developing software in

areas of distributed computing, database systems, Internet, and grid technologies. He has several patents and publications related to computer systems and very large-scale integration design. Debashis holds a MASc in electrical engineering and computer science from Massachusetts Institute of Technology and a BTech in computer science and engineering from Indian Institute of Technology in Kharagpur. He is the recipient of the President of India Gold Medal from the Indian Institute of Technology.



**ROB SIMMONDS**, Grid Research Centre, University of Calgary  
Rob Simmonds is the Director of Research for the Grid Research Centre at the University of Calgary. The Grid Research Centre performs research and development into solutions for grid, utility

and cloud computing, as well as the use of social networking tools for scientific applications. In addition, Simmonds is the Chief Technology Officer for WestGrid, which provides high performance computing, storage, and collaboration facilities at

universities across western Canada. Simmonds holds a PhD in mathematical sciences from the University of Bath in the United Kingdom and is an Adjunct Associate Professor in the Department of Computer Science at the University of Calgary.



**NANCY WILKINS-DIEHR**, San Diego Supercomputing Center  
Nancy holds a BA in mathematics and philosophy and an MASc in aerospace engineering. She has held engineering positions with General Dynamics and General Atomics in San Diego. Since

1993, she has held a variety of positions related to user services with the San Diego Supercomputer Center, including Associate Director of Scientific Computing. Currently, Wilkins-Diehr is the Area Director for the TeraGrid Science Gateways program, which enables scientists to develop web and client server interfaces to high performance computing, data, and visualization resources.



**BRIAN UNGER (CHAIR)**, University of Calgary

Brian Unger is the Executive Director of the Grid Research Centre at the University of Calgary and Interim President of Cybera. Unger is also a Special Advisor for the joint Cambodia-Canada project, Informatics for Rural Empowerment and Community Health, and a Co-Principal Investigator for WestGrid. He has served as the founding President and Chief Executive Officer of iCORE, the founding President of Netera Alliance (now Cybera), the founding Chair of C3.ca Inc, and the founding President and Chief Executive Officer of Jade Simulations. His list of awards includes the IWAY Public Leadership Award for outstanding contributions to Canada's information society and the ASTech award for Innovation in Alberta Technology for his research in parallel simulation and distributed computation.

# External Review Committee

Cybera's External Review Committee approves new projects and consults with the Chief Executive Officer on a strategic level as required. External Review Committee members are appointed by Cybera's Board of Directors to review and evaluate projects for implementation by Cybera, and to make recommendations to the board regarding Cybera's strategic initiatives.

- Randy Goebel, iCORE
- Wallace Kroeker, SMART Technologies
- Lee Kruszewski, Advanced Education and Technology, Government of Alberta
- Roger Pederson, TRILabs
- Brian Unger, University of Calgary
- Alex Zahavich, SAIT Polytechnic

# Staff

- Jean-Francois Amiot, Network Manager
- Aiden Buckland, Senior Systems Manager
- Amanda Debenham, Communications Officer
- Trevor Doerksen, Consultant
- Maggie Eakin, Office Coordinator
- Nicole Henderson, Communications Assistant
- Ken Hewitt, Consultant and Past President
- Natasha Kapty, Software Developer
- Angela Kouritzin, Director, Project and Partnership Development
- Jill Kowalchuk, Vice-President, Project and Partnership Development
- Jana Makar, Director of Communications
- Patrick Mann, Chief Technology Officer
- Meg Mendoza (Gigomeg Inc), IT Explorer
- Caroline Nicholson, Finance Administrator
- Lindsay Sill, Project Manager
- Karim Teja, Chief Financial Officer
- Jim Tubman, Project Manager and Developer, Multi Media Processing Project
- Brian Unger, Interim President and Chief Executive Officer
- Kim Wagstaff, Academic CI Coordinator

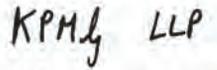
# Financials

## Auditors' Report to the Members

We have audited the statement of financial position of Cybera Inc. ("Cybera") as at March 31, 2009 and the statements of operations, changes in net assets and cash flows for the year then ended. These financial statements are the responsibility of Cybera's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In our opinion, these financial statements present fairly, in all material respects, the financial position of Cybera as at March 31, 2009 and the results of its operations and its cash flows for the year then ended in accordance with Canadian generally accepted accounting principles.

The logo for KPMG LLP, featuring the letters 'KPMG' in a stylized, handwritten font followed by 'LLP' in a similar style.

Chartered Accountants

Calgary, Canada  
July 10, 2009

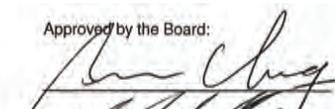
# Statement of Financial Position

March 31, 2009, with comparative figures for 2008

Assets	2009	2008
<b>Current assets:</b>		
Cash	\$1,514,253	\$1,434,380
Accounts receivable (note 3)	599,451	113,762
Goods and services tax receivable	11,451	13,907
Prepaid expenses	1,042	7,482
	2,126,197	1,569,531
<b>Property and equipment (note 4)</b>	10,504	—
<b>Intellectual property including software</b>	1	1
	2,136,702	\$1,569,532
<b>Liabilities and Net Assets</b>		
<b>Current liabilities:</b>		
Accounts payable and accrued liabilities (note 3)	\$765,381	\$279,510
Deferred revenue	760,000	1,234,426
	1,525,381	1,513,936
<b>Net assets (note 5):</b>		
Invested in property and equipment	10,504	—
Other unrestricted net assets	600,817	55,596
	611,321	55,596
<b>Economic dependence (note 6)</b>		
	\$2,136,702	\$1,569,532

See accompanying notes to financial statements.

Approved by the Board:

 Director  
 Director

## Statement of Operations

Year ended March 31, 2009, with comparative figures for 2008

	2009	2008
<b>Revenue</b>	<b>\$3,746,685</b>	<b>\$2,228,700</b>
Infrastructure	395,638	330,259
Projects	1,450,550	648,932
Services	155,021	224,669
Marketing and communications	289,699	197,892
Business development	227,804	228,616
General and administrative	666,281	596,488
Depreciation	5,967	2,893
Excess (deficiency) of revenue over expenses	\$555,725	\$(1,049)

See accompanying notes to financial statements.

## Statement of Changes in Net Assets

Year ended March 31, 2009, with comparative figures for 2008

	Invested in property and equipment	Other unrestricted net assets	2009	2008
Net assets, beginning of year	\$—	\$55,596	\$55,596	\$56,645
Excess (deficiency) of revenue over expenses	(5,967)	561,692	555,725	(1,049)
Investment in property and equipment	16,471	(16,471)	—	—
Net assets, end of year	\$10,504	\$600,817	\$611,321	\$55,596

See accompanying notes to financial statements.

## Statement of Cash Flows

Year ended March 31, 2009, with comparative figures for 2008

	2009	2008
<b>Cash provided by (used in):</b>		
<b>Operations:</b>		
Excess (deficiency) of revenue over expenses	555,725	\$(1,049)
Add item not affecting cash:		
Depreciation	5,967	2,893
	<b>561,692</b>	<b>1,844</b>
Changes in non-cash working capital:		
Accounts receivable	(485,689)	375,165
Goods and services tax receivable	2,456	(13,699)
Prepaid expenses	6,440	1,782
Accounts payable and accrued liabilities	485,871	(313,071)
Deferred revenue	(474,426)	(629,601)
	<b>(465,348)</b>	<b>(579,424)</b>
<b>Investments:</b>		
Expenditures on property and equipment	(16,471)	—
	<b>(16,471)</b>	<b>—</b>
Increase (decrease) in cash	79,873	(577,580)
Cash, beginning of year	1,434,380	2,011,960
Cash, end of year	\$1,514,253	\$1,434,380

See accompanying notes to financial statements.

# Notes to Financial Statements

Year ended March 31, 2009

## General:

Cybera Inc. ("Cybera") was incorporated on January 12, 1994 under Part II of The Canada Corporations Act as a corporation without share capital as WurcNet Inc. In 1999 it changed its name to Netera Alliance Inc. and in 2007 it changed its name to Cybera Inc.

Cybera is an Alberta-based, not-for-profit alliance that manages large-scale inter-institutional ICT projects, including research networks, high performance computing resources, digital content projects and collaboration facilities.

The objectives of Cybera are to provide information and communications infrastructure, project management, advocacy and technical expertise to leverage the resources, skills and services of its members, without preference or partiality to any individual member.

As a not-for-profit organization, the income of Cybera is not subject to tax under paragraph 149(1)(l) of the Income Tax Act (Canada).

## 1. Significant accounting policies:

### (a) Revenue:

Revenue from membership dues is recognized evenly over the term of the membership.

Project revenue, which is comprised of contributions towards project costs, is recognized on the basis of the deferral method. Under this method, restricted contributions are recognized as revenue when the related project costs are incurred. Restricted contributions received in a period before the related expenses are incurred are accumulated as deferred revenue. Unrestricted contributions are recognized as revenue when received or receivable.

### (b) Project expenses:

As part of the development of applications for the high speed network, Cybera provides funding for certain research and development projects. Cybera charges costs incurred on these projects to operations as incurred. Typically, Cybera does not retain ownership rights in the results of these projects, rather, these rights reside with the members.

### (c) Property and equipment and depreciation:

Property and equipment is recorded at cost. Depreciation of property and equipment is provided using the straight-line method at a rate of 50% per year.

### (d) Donations:

Cybera receives from its members and others, donations of professional time, services and office support. The value of these donations is not included in these financial statements as the related fair value cannot be reasonably determined.

### (e) Use of estimates:

The preparation of the financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of

assets and liabilities and disclosure of contingent assets and liabilities at the dates of the financial statements and the reported amounts of revenues and expenses during the reporting periods. Significant estimates include the valuation of accounts receivable, property and equipment and accounts payable and accrued liabilities. Actual results could differ from those estimates.

### (f) Financial instruments:

All financial instruments must be initially recognized at fair value on the balance sheet date. Cybera has classified each financial instrument into the following categories; held for trading financial assets and liabilities, loans or receivables, held to maturity investments, available for sale financial assets, and other financial liabilities. Subsequent measurement of the financial instruments is based on their classification. Unrealized gains and losses on held for trading financial instruments are recognized in earnings. Gains and losses on available for sale financial assets are recognized in changes in net assets and transferred to earnings when the asset is derecognized. The other categories of financial instruments are recognized at amortized cost using the effective interest rate method.

Upon adoption of the new standards, Cybera has classified cash as held for trading, accounts receivable as loans and receivables, and accounts payable and accrued liabilities as other liabilities.

## 2. Pending accounting pronouncements:

### (a) Financial instruments and capital disclosures:

In December 2006, the Accounting Standards Board ("AcSB") issued CICA section 1535, "Capital Disclosures"; 3862, "Financial Instruments—Disclosures" and 3863, "Financial Instruments—Presentation".

Section 1535 establishes guidelines for the disclosure and presentation requirements regarding Cybera's capital and how it is managed.

Sections 3862 and 3863 revise and enhance the financial instrument disclosure and presentation requirements. This guidance prescribes an increased importance on risk disclosures associated with recognized and unrecognized financial instruments and how such risks are managed.

Sections 1535, 3862 and 3863 are effective for Cybera on April 1, 2009. Cybera is currently determining the impact of these additional disclosure requirements.

(b) Financial Statement Presentation by Not-for-Profit Organizations: Recent amendments to Section 4400, Financial Statement Presentation by Not-for-Profit Organizations, will modify the requirement with respect to various elements of financial statement presentation. These amendments include:

- (i) Reporting certain revenues at their gross amounts in the statement of revenue and expenses.
- (ii) When a not-for-profit organization classifies its expenses by function and allocates some of its fundraising and general

support costs to another function, disclosing the policy adopted for expenses and amounts allocated from each of these two functions to other functions.

- (iii) The elimination of the requirement to treat net assets invested in property and equipment as a separate component of net assets.
- (iv) Cash flows from investing and financing activities must be disclosed separately.

The new standard is effective for Cybera on April 1, 2009. This standard will impact Cybera's disclosure provided but will not affect Cybera's results or financial position.

### 3. WestGrid and CANARIE projects:

The March 31, 2009 year-end balances include accounts receivable of \$469,209 (2008—\$113,762) and accounts payable and accrued liabilities of \$367,635 (2008—\$279,510) related primarily to the WestGrid and CANARIE projects (2008—WestGrid project) where claims were made on behalf of all participants with total revenue booked as a receivable and participant invoices booked as payables.

### 4. Property and equipment:

			2009	2008
	Cost	Accumulated depreciation	Net book value	Net book value
Computer equipment	\$16,471	\$5,967	\$10,504	\$-

### 5. Net assets:

In the event of dissolution or winding-up of Cybera, all of its remaining assets after payment of its liabilities would be distributed to other not-for-profit organizations.

### 6. Economic dependence:

Future operations are dependant on continued funding from the Alberta Government.

### 7. Related party transactions:

A director of Cybera was paid \$nil (2008 - \$4,500) for consulting services provided to Cybera during the year. A company controlled by a director of Cybera was paid \$3,400 (2008 - \$1,500) for consulting services provided to Cybera during the year.

### 8. Financial instruments:

Fair value of financial assets and financial liabilities:

Financial instruments include cash, accounts receivable and accounts payable and accrued liabilities and approximate their carrying value because of the short term nature of these instruments.

Credit risk:

Accounts receivable are subject to minimal credit risk as the majority of the receivables are from government-sponsored institutions.

### 9. Comparative figures:

Certain comparative figures have been reclassified to comply with the current year's presentation.

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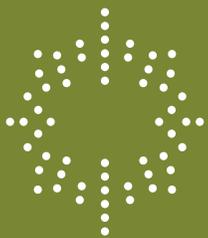
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