

Chomping at the gigabit - GTAnet about to connect

Twelve research and education institutions in Toronto will soon have access to a world of new opportunities. As members of GTAnet, Ontario's newest, and largest regional advanced network with gigabit connectivity, they will be able to connect to ORION to conduct research and education networking with unprecedented speed, volume and ease - not just between members of the network but across Ontario, Canada and around the world.

"This is a very exciting time for a number of us in the research and education community in Toronto," said Lan Nguyen, Vice President, Innovation and IT Partnerships at Centennial College.

"For the first time we will have the capacity to conduct and share projects across different sectors in a much more effective way," she said.

"GTAnet moves us in the right direction toward greater collaboration, innovative ways of thinking about how we approach specific research initiatives and the sharing of resources and intellectual capital."



In addition to Centennial, the 12 founding members of GTAnet include Baycrest Centre for Geriatric Care, George Brown College, the Hospital for Sick Children, The Humber Institute of Technology and Advanced Learning, Ryerson University, Seneca College, Sunnybrook and Women's College Health Sciences Centre, the University Health Network, the University of Toronto, the

Ontario College of Arts and Design, and York University.

With \$2.5 million in funding from the Optical Regional Advanced Network of Ontario toward acquisition of the necessary dark fibre and equipment for the network, the institutions will be linked to Ontario's advanced, high-speed R&E network through the ORION network infrastructure and to the rest of Canada and the world through the CA*net 4 national backbone.

"Any researcher who is doing work that already uses large data files will see the benefit of broadband connection quite quickly," says Eugene Siciunas, Director Computing and Network Systems for the University of Toronto. "Right now there are institutions involved in collaborative

(Continued on page 2)

For Seneca, ORION can't come too soon

Like all 12 members of GTAnet, Seneca College can't wait to get connected. Seneca currently has a maximum bandwidth connection to CA*net 4 of only 35Mb, which is shared among many users.

"We have projects that we have been doing over the past few years that have been constrained by the lack of bandwidth," said Terry Verity, Seneca's Chief Information Officer. "We also have other research projects that have been proposed which are even better proposals when we factor in broadband connectivity."

Seneca has been very active in putting forward proposals to access grants from the Canada Foundation for Innovation (CFI) and the Ontario Innovation Trust (OIT).

"We have very active proposals in place around grid computing and object repositories," said Verity. "We have two projects underway with CANARIE: one is the Bell project which involves an infrastructure across Canada to build standards for object repositories, which fits nicely with another current proposal which focuses more on developing local object repositories using both proprietary and open source software."

"We also began a collaboration with the Hospital for Sick Children in bioinformatics and molecular level research using distributed processing," said Hassan Assiri, Manager of Academic Computing Systems at Seneca. "This collaboration was expanded to include York University. The collaboration started off as pure research and has become part of the courses that we offer to bio-chemistry students at Seneca and York."

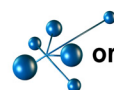
The data being created at the Hospital for sick Children involves tens of gigabits of information that has to be transferred back and forth between the hospital and students,

(Continued on page 2)

Discover in this issue:

- **Chomping at the gigabit - GTAnet about to connect**
- **For Seneca, ORION can't come too soon**
- **Convergence of technology explored at technical update**
- **New working groups to advise ORION**
- **Cordiano positions Ontario as a hotbed for bio-business**
- **ORION News Briefs**
 - Baker reports to ACAATO
 - Scherer awarded prestigious prize
 - ORION staff recognized
 - Global R&E club gets bigger, faster

The ORION Research and Discovery News is a monthly electronic publication providing news and information of interest to users of the Ontario Research and Innovation Optical Network and to the worldwide research and education community.



New working groups to advise ORION



ORION is stepping up its outreach to the network user community by soliciting the involvement in a number of new working groups to advise ORION on several key aspects of the new network.

Speaking to user institution representatives at ORION's annual Technical Forum on Feb. 24, ORION Project Director Sam Mokbel announced the network hopes to work with the user community to help establish working groups that will focus on such areas as the deployment of new applications and services over the network. "We are absolutely committed to soliciting the input of our user community," he said. "The involvement and contribution of these groups and the user community are essential, especially in the deployment of new services and applications, such as VoIP, disaster recovery and other advanced services."

Mokbel will lead a new ORION Technical Committee that will advise ORION on operational and technical matters, such as broad technical strategies, network design, and operations issues. ORION may also turn to the committee to participate in product or vendor evaluation panels and communicate some of their own user requirements to the rest of the committee.

Another group - the ORION User And Applications Forum - will provide advice on ORION user issues/concerns as well as "business" and applications requirements. This group is expected to provide leadership to a number of project-specific working groups that may be struck, including groups that may focus on such areas as disaster recovery, network backup, grid computing and large scale data resources. ORION President and CEO Phil Baker also launched the invitation for the user community involvement at a Feb. 20 meeting of the Association of Computing Services Directors. He noted that ORION is moving to establish a new ORION Strategy Reference Group, that may meet once or twice a year, with representation from key users of the network, R&E network colleagues, the research community and the private sector.

Its mandate will be to provide input into ORION's long range planning and focus on strategies for engaging and supporting research and innovation activities. Part of ORION's broad outreach is continued regular liaison meetings with key stakeholder organizations such as ACSD and similar organizations representing the college and school board communities, key funding agencies, and government departments and agencies. ORION also expects to host an annual conference and workshop, with the participation of user institutions and partner organizations. ORION expects to have the working groups in place by June, 2004.



For Seneca, ORION can't come too soon *(continued from previous page)*

often taking as much as 12 hours to move the data back and forth and another day to analyse the information. With gigabit connectivity, the transfer will be almost instantaneous.

The Hospital for Sick Children in Toronto runs a supercomputing resource called the Ontario Centre for Genomic Computing (OCGC), Canada's largest genomics supercomputer. Chip Campbell, Technical Director of the Centre for Computational Biology at The Hospital for Sick Children explains that limited bandwidth access to the hospital's genomics supercomputer meant that students and researchers could only perform relatively simple tasks and retrieve simple results.

"It's because of the ORION initiative that we are able to get GTAnet built and take advantage of connections to institutions such as York University and Sick Children's Hospital" added Verity.

"We also have a very good school of communication and media arts at Seneca," said Verity. "One of the very interesting things that we have done is partner with the University of Calgary to actually build and move through the network "sets" for television production."

Seneca students in Toronto digitally create a three dimensional virtual environment, explained Assiri. "Live video of an actor performing in front of a blue screen is sent to us from

Calgary. Our students superimpose the actor into the 3-D environment they created and transmit the composite video back to an audience in Calgary, theoretically in real time so that the audio and video remain relatively in sync to sell the illusion of an actor performing in our 3-D digital environment.

"With current bandwidth limitations we were experiencing anywhere from five-second to five-minute delays where only a split second delay was acceptable" added Assiri. "Without GTAnet we would continue to be limited as to how far we can push the envelope."

Seneca is also looking to ORION to provide strong international connections to Europe and Asia. "We are intent and have been working on building campuses in China," said Verity. "To connect academic content from those campuses back to our home campuses will be an important part of management and of moving curriculum to those locations. Our vice-president international is in China as we speak working on final contracts for a campus in Beijing. Once that campus is open, we know we will need high-speed connectivity between that campus in Beijing and here in Toronto."

"High speed networks take us into global markets," added Assiri.

Chomping at the gigabit ...

(continued from previous page)

research, like Baycrest and Sunnybrook, that have had to resort to using couriers to get large data files on tape from one location to the other."

GTAnet gives most of its members the ability to communicate large volumes of information at over one hundred times faster than before. That means, for example, the ability to become full participants in cutting-edge multi-media distance learning applications. It means being able to take part in global collaborations in high energy particle physics experiments for some researchers and access, for others, to the full research potential of the Canada's largest genomics supercomputer located at the Hospital for Sick Children. For some, it also means access to global networking.

"We still have to continually build awareness within all of our institutions as to the potential for broadband networking which allows researchers and educators to work in a different kind of way," says CIO of York University and Chair of GTAnet, Bob Gagne. "Many organizations already have projects in place that can leverage the advantages of broadband networking. As awareness of the potential for broadband networking grows within institution we're going to see further research projects coming into play."

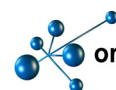
"The value of any network increases with the number of participants: the more participants in the network, the more valuable the network is for participants," he said. "Right now we have 12 members. We'll certainly be talking about the value of our network to other institutions right across Toronto."

Work on the GTAnet infrastructure is expected to begin shortly. "By the end of February we should have signed agreements with ORION and our dark fibre partner. Those are the big moments for us. We have all of our members on board. Now it's really a matter of getting the network built," said Gagne, who noted that the build is an eight-month process that begins in March.

The GTAnet project is quite significant, in terms of size. It features 180 kilometres of fibre for the actual segment runs. When measured by multiple strands of fibre on some routes, the network involves some 640 kilometres of fibre. The GTAnet network will connect its members using dark fibre acquired from the project fibre vendor, Group Telecom/360 Networks, to one of two network points of presence (PoPs) - one at the University of Toronto in the south and one at York University in the north.

One of the new possibilities that GTAnet CIOs are already talking about is a new approach to business continuity planning that is very different from what currently exists.

"For example," says Terry Verity, Chief Information Officer at Seneca College, "we can have a back-up server that, instead of being just for one institution, can serve a number of institutions. That kind of infrastructure opens up a huge range of possibilities that provides an environment that is very stable for all of our computing administrative needs with cost savings and greater efficiencies."



Convergence of technology explored at ORION technical update



A thought-provoking discussion on the convergence of technology and its impact on business and communications were among the highlights of this year's annual ORION Technical Forum, at the Nortel Networks headquarters in Brampton on February 24.

Some 60 people travelled from throughout Ontario to participate in the meeting, where the ORION user community received critical updates on the network from ORION's senior Engineering Team.

"These updates are very important. This is when we receive and share direct feedback from the users of the network's technology," said ORION Project Director Sam Mokbel.

Mokbel and his team, including Senior IP Engineer Shahid Ajaz, Senior Network Analyst Nadeem Junejo and Technical Support Specialist Tyson Vickers all gave critical operational updates, ranging from IP design issues, to NOC services and network security.

Mokbel reported that the CWDM PoP site at Sault Ste. Marie is now ready and operational, while the Timmins site should be completed by the end of March. Now that the network is virtually completed, ORION's Engineering Team and the users are now looking at the benefits and implementation of new, advanced services, such as VoIP and shared disaster recovery solutions.

The meeting was also an opportunity for ORION users to share their own experience in the deployment of the network. Laurentian University and Sheridan College both presented case studies on plans to introduce VoIP and other capabilities on their campuses, while the University of Waterloo shared its experience in bandwidth management.

Among the future network build plans, Mokbel reported that ORION is looking at the possibility of extending its fibre infrastructure in Ottawa to peer directly with Quebec's RISQ network. He said ORION is also reviewing diversity requirements and opportunities with private sector partners, and investigating connectivity to the R&E networks in Michigan and New York to provide mutual diversity and redundancy and to explore cooperative projects with their connected research and education institutions.

Nortel Networks, one of ORION's strategic partners, hosted the event at its facilities in Brampton. VP of Enterprise Sales - Canada Ron McDougall welcomed participants to the meeting, while keynote presenter, Chief Technology Officer and VP of Network Architecture for Nortel Networks Enterprise Solutions, Phil Edholm, shared his insight on the convergence of technology and the transformation of communications and business.

In a broad discussion that ranged from the cost-effectiveness of introducing VoIP solutions, to such possible advances as "neural implants", Edholm shared his outlook of the state of technology over the next five to 10 years.

He predicted an explosion in the use of advanced electronic devices with a dramatic increase in "edge intelligence" as well as significant increase in the use of personal agents, which will impact the users' ability to control the data they receive and process.

Copies of the meeting presentations may be viewed at the ORION Technical Meeting web page, at <http://www.orion.on.ca/members/workshops/Feb242004/index.html>



Cordiano positions Ontario as a hot-bed for bio-business



Ontario's Minister of Economic Development and Trade Joe Cordiano is aggressively promoting Ontario as a prime location for

international investment in biotech.

Speaking to more than 300 European and U.S. biotech industry leaders in Switzerland, Cordiano notes that nearly all of the world's biomedical giants have operations in the province.

"Ontario has everything bio-business needs to thrive: more than 38,000 industry professionals, leading medical education and research facilities, and some of the most valuable research and development incentives available anywhere," he said.

Ontario's biotech industry, which generates annual revenues of about \$1.42 billion, is concentrated in a "bio-corridor" stretching from London to Ottawa, with centres in Hamilton, Waterloo, Guelph, Toronto and Kingston. This concentration of research institutions and biotech companies fuels innovation and provides a competitive advantage referred to as "cluster-power."

"Ontario has a long history of leadership in medical research, from the discovery of insulin through to the development of 3D imaging techniques," said Cordiano.

He said the provincial government is working closely with the biotech industry and research institutions to build on this legacy "to make Ontario the best place to locate and expand a biotech business, turning leading-edge research into commercial reality."

The ORION network is seen as a critical infrastructure to enable to growth of biotech clusters in Ontario.

In a recent address to the biotech sector in Ontario, ORION President and CEO Phil Baker emphasized the network's ability to connect research institutions with industry research.

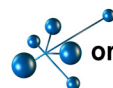
In remarks to a Networking Summit on the new Biotechnology Cluster Innovation Program (BCIP), Baker pointed out that Ontario currently has a competitive lead over other jurisdictions in the area of gigabit connectivity among other research and education institutions.

"ORION offers an ideal opportunity to establish virtual clusters of bio-medical and life science research, in partnership with ORION user institutions," he said.

R&D project methodologies are evolving rapidly to address new large-scale data and computational requirements. Access to large-scale data and computational resources in "real time" reduces researchers' wait time for data and results.

Collaboration within and across regions is key to geography-based and virtual cluster development. "ORION's gigabit infrastructure enables the seamless transmittal of data at this scale and magnitude and the degree of interactivity necessary for effective collaboration across distances.

ORION gives Ontario a clear competitive advantage over other jurisdictions by deploying a telecommunications infrastructure of ORION's scope and capacity for R&E and R&D," said Baker. Other jurisdictions are as far as 18 months behind Ontario in deploying this sort of infrastructure, he said. "We need to take advantage of this competitive lead."



Baker reports to ACAATO

In a report to members of the Association of Colleges of Applied Arts and Technology of Ontario's Annual Conference, in Kingston February 22, ORION President and CEO Phil Baker indicated that nearly half of all Ontario colleges of applied arts and technology have now signed on to the ORION network. The colleges include including Cambrian, Centennial, Confederation, Durham, Fanshawe, Fleming, George Brown, Humber, Lambton, Loyalist, Seneca and Sheridan Colleges. More will be connected in the weeks and months ahead. "This is the beginning of a new and exciting era for Ontario's colleges of applied arts and technology, which now have the same access to global research and education network resources as Canada's major universities," said Baker. "ORION represents clear opportunities to explore efficiencies in shared administrative systems and services, from data storage to disaster recovery for computer systems. Ontario's colleges are also now in a better position to explore collaborative research and advanced education services and technologies, such as virtual learning environments, access to large databases and multimedia archives and libraries, to name just a few", he noted.

Scherer awarded prestigious prize

Dr. Stephen Scherer of The Hospital for Sick Children (Sick Kids) and the University of Toronto (U of T) has been awarded the 2003 Steacie Prize in the Natural Sciences. The prize is one of Canada's most prestigious science awards. Dr. Scherer received the prize for his seminal contributions in the fields of human genomics and genetic disease research. He is a senior scientist in Genetics and Genomic Biology and an associate chief of Research at Sick Kids, and an associate professor in the Department of Molecular and Medical Genetics at U of T. Traditionally awarded to chemists, physicists and mathematicians, the prize was established

in 1964 in memory of former National Research Council (NRC) President E.W.R. Steacie and gives a young scientist under the age of 40 a \$15,000 prize and guest lectureship at the NRC Steacie Institute for Molecular Sciences in Ottawa. Previous awardees include luminaries such as Nobel Prize Winner John Polanyi from U of T. "It is an absolute honour to be awarded the Steacie prize and for our important research to be acknowledged," said Dr. Scherer, who also holds an investigator award from the Canadian Institutes of Health Research and an international researcher scholar award from the Howard Hughes Medical Institute. Dr. Scherer recently served on the ORION Reference Working Group, which was asked to provide strategic advice on the future and direction of the network.

ORION staff recognized

Randy Neals, ORION's Senior Manager of Strategic Partnerships was recently recognized as a nominee for the 2003 Premier's Awards. The awards are presented annually to college graduates who have excelled in their careers and made a significant contribution to society. Neals, a graduate of Sir Sanford Fleming College, was among the recipients and nominees honoured at the Association of Colleges of Applied Arts and Technology of Ontario's Annual Conference, in Kingston February 22. "All the nominees have extraordinary careers and provide important role models for younger students now making choices about their future education," said Training, Colleges and Universities Minister Mary Anne Chambers, who presented the awards and plaques. "I congratulate each of them on this honour, and also extend congratulations to the colleges for their proven track record in providing high-quality education and training that equips students to excel in our fast-changing world".

Global R&E club gets bigger, faster


The world's Research and Education (R&E) network community is expanding. The U.S. National Science Foundation (NSF) recently joined with a broad consortium of Russian ministries and science organizations and the Chinese Academy of Sciences (CAS) to announce the start of operations for the first round-the-world

computer network ring, which will be used for joint scientific and educational projects. Known as Little GLORIAD, the ring "begins" in Chicago at the NSF-supported StarLight facility, managed by the University of Illinois at Chicago and Northwestern University. The network crosses the Atlantic Ocean to the NetherLight facility in Amsterdam from which it continues to Moscow, then to the Russian science city of Novosibirsk, across Siberia to the border at Zabajkal'sk. After crossing the border to Manzhouli, the network continues to Beijing, then Hong Kong and crosses the Pacific Ocean to complete the ring in Chicago.

Abilene, the most advanced research and education network in the United States recently announced the completion of its upgrade from 2.5 Gigabits per second Gbps to 10 Gbps. The Internet2 backbone network upgrade quadruples the capacity to more than 15,000 times faster than a typical home broadband connection. Abilene partners, Indiana University, Juniper Networks and Qwest Communications, provided the equipment and services to successfully implement the network upgrade. The Abilene upgrade gives researchers, students and professors at more than 200 Internet2 member institutions a more robust network, on which to conduct research; supports both Internet Protocol version 4 (IPv4) and native IPv6 networks; and increases overall network performance.

Closer to home, federal and provincial dignitaries gathered at the University of New Brunswick's Fredericton campus February 16 for the official launch of the **New Brunswick / PEI Research Grid**. The new grid is linking as many as 10 institutions within the two provinces and to the CA*net 4 national backbone. UNB's CIO Greg Sprague says the one-gigabit ethernet network can scale to up to 10 gigabits. The Grid is a joint initiative of the Government of Canada, the provinces of New Brunswick and Prince Edward Island, CANARIE Inc., the National Research Council, the New Brunswick/Prince Edward Island Educational Computer Network, the Atlantic Canada Opportunities Agency, the Maritime Provinces Higher Education Commission and 360 Networks/Group Telecom.





orion research and discovery news
THE OFFICIAL NEWSLETTER OF THE ONTARIO RESEARCH AND INNOVATION OPTICAL NETWORK

About ORION

ORION is an advanced high-speed fibre optic network that connects research and education institutions to each other and to colleagues around the world. Spanning 3,700-kilometre to 21 cities throughout the Province of Ontario, ORION was created to bring leading-edge network capability to Ontario's publicly funded R&E community and to become a catalyst for creative and innovative next generation Internet applications.

ORION is owned and operated by the Optical Regional Advanced Network of Ontario (ORANO).

For more information, visit our web site at <http://www.orion.on.ca>. Communicate directly with the Editor of the ORION Newsletter at info@orano.on.ca.



ORION - CA*net 4 Days

*Most Ontario colleges and universities are now connecting to the ORION network -- one of the world's most advanced R&E networks dedicated exclusively to research and education. ORION and CANARIE have teamed up to host ORION-CA*net 4 Days throughout Ontario. Over 300 researchers and educators have participated in these workshops and presentations from leaders in advanced networking and collaborative technologies. Events have been held in Windsor, Ottawa, Sudbury, Toronto, Hamilton and London. More are planned, including events in Kingston and Waterloo. Visit the ORION - CA*net 4 Days Archive of presentations and papers and consult our schedule of future events.*

www.orion.on.ca/orioncanet4days

