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# **CANARIE**

*Canada's Advanced Research and Innovation Network*

## **Powering Canada's Innovation Ecosystem**

**March 4, 2010**

**Hélène Joncas, Chief Strategy Officer, CANARIE**

# CANARIE Inc.



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- Canada's Advanced Research and Innovation Network
- Non-profit organization, incorporated in 1993
- 76 members (ORANs, academic, industry, institutional, government); elected board
- Primary funding from Government of Canada—over \$400M to date
- Other than nominal membership, no fees charged to regional networks or institutions



# CANARIE Inc (cont'd)



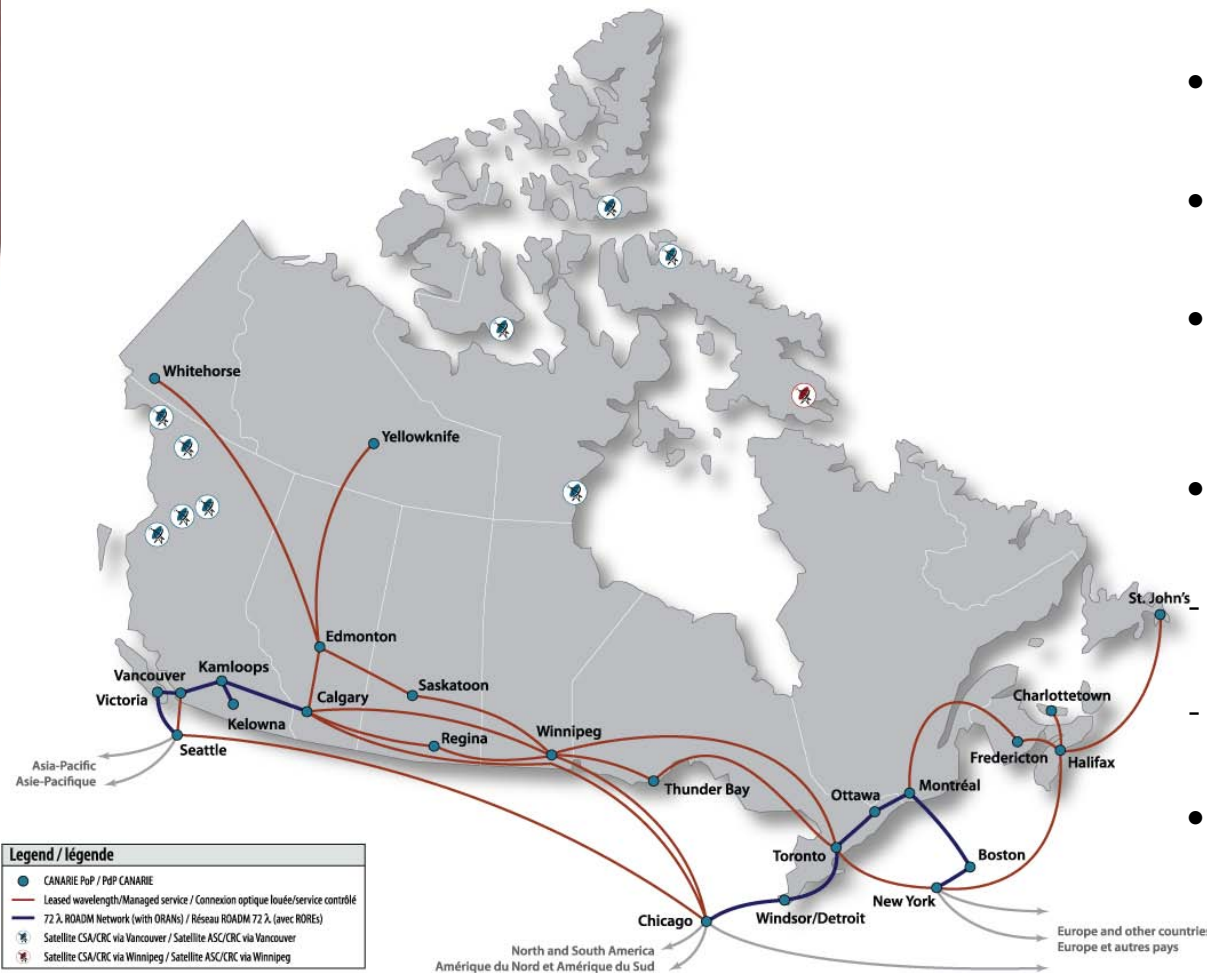
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- Enables 39,000 researchers at nearly 200 Canadian universities and colleges, and their collaborators around the world, to share and analyze massive amounts of data
- Facilitates development of next generation research networks, applications and services
- Funds network development, operations and expansion; applications and services; and supports regional networks (which with CANARIE backbone and institutional networks make up Canada's research network infrastructure)
- Partners with universities, federal departments and agencies, provincial research and education networks
- Supports 'Big Science' projects (TRIUMF, Neptune, CLS, etc)

# The CANARIE Network



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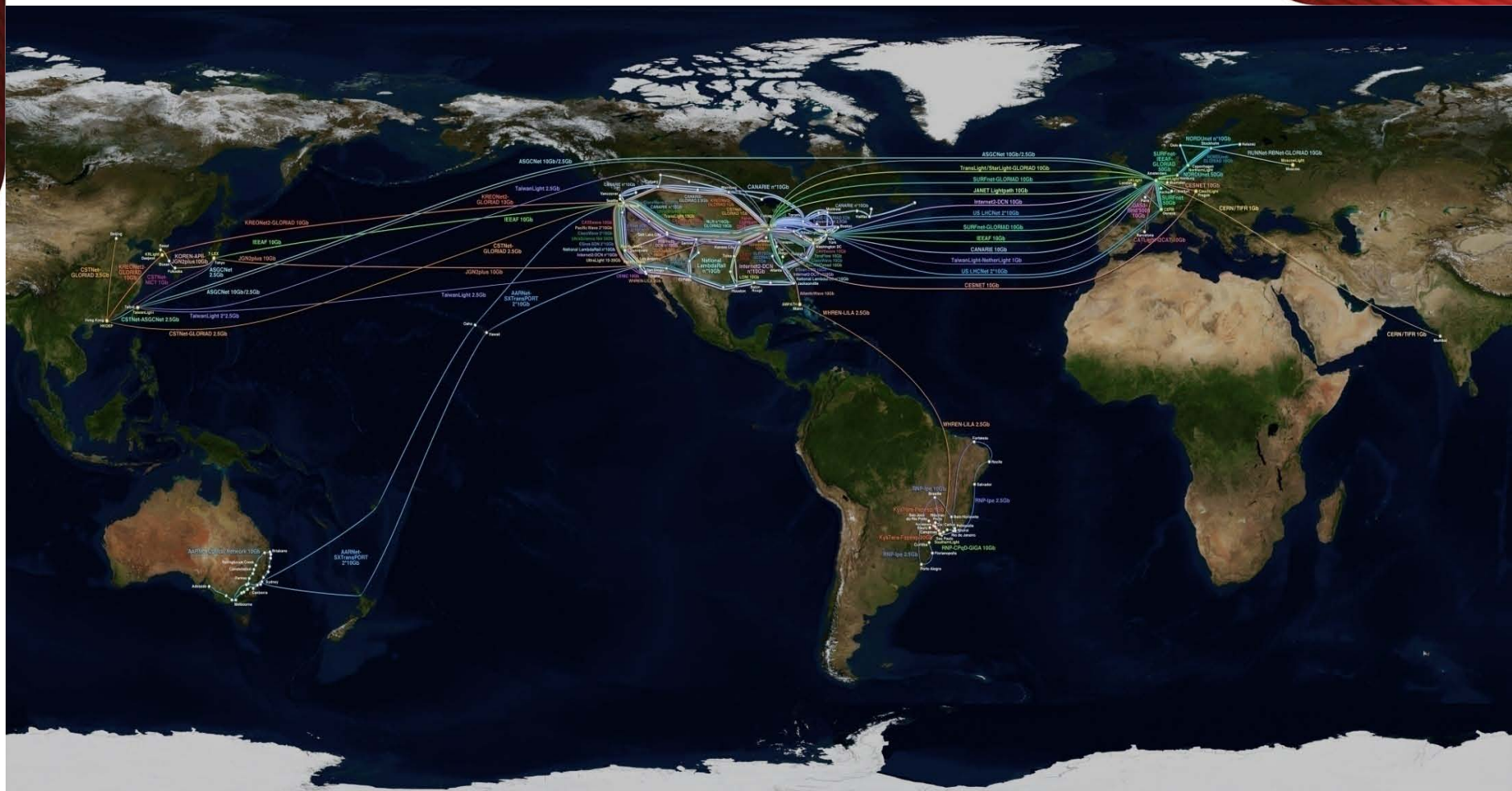


- Five generations of network since 1990
- Hybrid network- IP & Lightpath services
- IP backbone connects regional networks and international R&E networks
- Network built using two types of connections :
  - CANARIE-lit wavelengths over dark fiber
  - Carrier-leased circuits to extend beyond the ROADM
- Does not provide commodity Internet

# Connecting to the world- Global Lambda Integrated Facility



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# Current mandate- 2007-2012



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- Five-year funding agreement with Government of Canada- \$120 million
- Objectives:
  - Develop innovative technology (shared research tools and next-generation architectures)
  - Network operations: operate & develop essential research infrastructure
- Achievements:
  - Transition to new backbone completed
  - Two rounds of technology innovation projects (NEP-1:\$15M, NEP-2: \$12M)
  - Infrastructure extension (53 connections first round; second round closed)
  - Green IT Pilot funding (\$3M)
  - ORAN support programs
  - IP Layer modernization

# CANARIE's Network Enabled Platform Program (NEP)



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- Projects to support the creation of nationally and internationally distributed research teams and the development of tools to support collaborative research
- Scope: grid middleware, data repositories; sensor grids and remote equipment control; collaboration software



# NEP Projects with Atlantic connections



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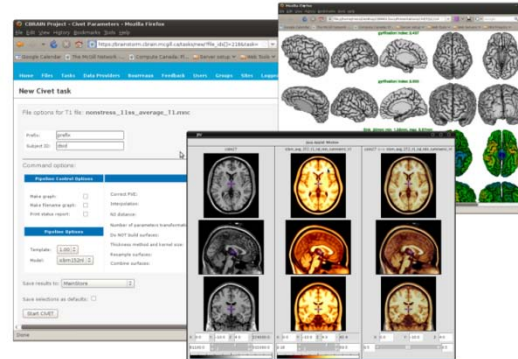
- *E-Research Platform for Ocean Knowledge Management (POKM)* – Dalhousie University is the Lead Contractor
- *Ocean Science Virtual Organization (NEPTUNE Canada)* -world's largest cabled seafloor observatory – Memorial University is a participant and UVic is lead contractor
- *Canadian Bioinformatics Resources as Semantic Services (C-BRASS)* -UNB is a participant and UBC is lead contractor
- *Disaster Response Network-Enabled Platform* – UNB is a participant and UBC is the lead contractor

# Other CANARIE NEP Projects

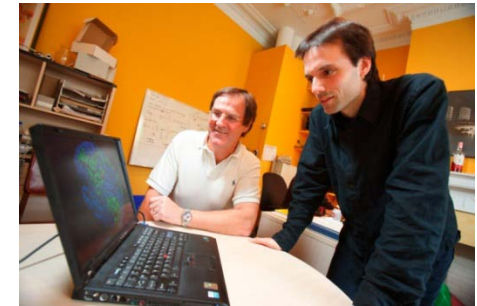


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- *CBRAIN*: platform for processing and sharing brain imaging data



- *Health Services Virtual Organization*: platform for ICT-based health services



- *Science Studio*: management system for remote control of projects at Canadian Light Source



# Green IT Pilot Program



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Develop computing and networking technologies to reduce carbon emissions:

- **\$2 million to GreenStar Network** to develop world's first wind & solar-powered internet network (Halifax based Bastion Host Ltd participant)
- **\$163K to CLUMEQ & SDSC** for design of ultra-efficient data centre for HPC applications
- **\$100K to IISD** to explore carbon-offset potential and business case for universities to use zero-carbon data centres
- **\$119K to UBC** to develop business case for universities to use carbon-offsets to finance data centre relocations





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# Working with ORANs

- Provincial/territorial **O**ptical **R**egional **A**dvanced **N**etworks are essential delivery partners
- Work bilaterally, and through ORAN Advisory Committee, CANARIE Technical Committee
- CANARIE provides financial support for ORAN:
  - operations
  - communications
  - Infrastructure
- In the Atlantic region, we work in partnership with Universities who host CANARIE's POPs and whose IT staff volunteer their time for ORANs
  - Their work is appreciated and very necessary





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# CANARIE Support - Atlantic Canada

- ORAN Infrastructure Program for provincial connections represents ~\$5M every five years
  - \$3.1M UNB
  - \$1.5M ACORN N-S
  - \$.5M ACORN Nfld
- ORAN Communications Program –(Round One)
  - \$21K ACORN N-S
  - \$19K ACORN Nfld
  - \$25K UPEI/UNB
- ORAN Activity Support Program
  - \$200K ACORN N-S
  - \$200K ACORN Nfld
  - \$300K UPEI/UNB
- In addition CANARIE pays directly for the interprovincial and international connectivity which represents for the Atlantic provinces
  - \$1M worth of equipment in the Atlantic provinces and
  - More than \$1M a year for the maintenance of the backbone network

# CANARIE – Impact in the Atlantic Region



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- The research network is critical to many research projects that involve multiple institutions.
- It is a critical enabler for the region and helps to level the playing field for smaller institutions and/or those in regions considered by some to be more "remote".
- Research activity on the campuses has increased over the past few years - to sustain the current activities as well as continue with anticipated growth, the CANARIE network is absolutely essential, especially given the new trends toward cloud computing/cyberinfrastructure models that rely more heavily on information resources that are not locally hosted on a researcher's campus.



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# CANARIE's Challenges

- Raising awareness of network benefits
- Increasing the usage of the network
- Integrating different components of cyberinfrastructure and leveraging benefits from the full suite
- Funding sustainability and stability for network and programs





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## Next Steps for CANARIE

- CANARIE is working on developing the case for renewal of its mandate and funding beyond the end of March, 2012
- Have put in place a process to review current programs and activities to demonstrate value and to identify specific elements of next mandate and required resources
- CANARIE will require the support of stakeholders, including Presidents of universities, VPRs and researchers
- We will need to keep you informed and engaged

***Questions? Input Welcome!***



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# **Need for a Cyberinfrastructure Vision in Canada**

# CANARIE Users' Forum 2009



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- 69 participants and all provinces represented
  - university CIO's and technical staff;
  - regional compute consortia executive and technical staff;
  - researchers from a variety of big science projects in the country;
  - researchers associated with CANARIE's NEP funded projects;
  - representatives of private industry;
  - and representatives of the ORANS
- Focus on Cyberinfrastructure quickly emerged
  - Not surprising in nature – quite surprising in fervour!
  - Need a vision
  - CANARIE asked to provide facilitative leadership



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# Evolving the Cyberinfrastructure Discussion

- CANARIE worked in partnership with Compute Canada and CUCCIO to evolve the discussion with two initiatives
  - Workshop with a sample of stakeholders to identify needs
    - People/Expertise in cyberinfrastructure,
    - Data Management,
    - A more integrated cyberinfrastructure environment
  - Meeting with CFI and the Granting Councils
    - Recognition that an integrated cyberinfrastructure environment is critical
    - Willingness to support

# Cyberinfrastructure Vision 2015

*NOTE: These are suggestions from the workshop participants rather than recommendations from the sponsoring organizations*



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## “Cyberinfrastructure Canada”

- Consolidation of organizations and creation of “Research Canada”, enabling a one-stop shop for Researchers’ CI needs such as:
  - Assistance with Funding proposals, Support, Resources, Integrated tools and technology
  - Singular application process that includes all cyberinfrastructure needs including expertise
- provides both cyberinfrastructure research and services
- “Centres of Excellence” for cyberinfrastructure research on computing, technology, middleware and data archiving

***Consolidation - A One Stop Shop***



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**Thank you - Merci**

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Canada's Advanced Research and Innovation Network  
Le réseau évolué de recherche et d'innovation du Canada