



**canarie**

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**CANARIE Annual Business Plan 2016-17**

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## 1 Overview

CANARIE is pleased to present its Annual Business Plan for fiscal year 2016-17 (FY17). The document includes past accomplishments as well as CANARIE's future plans to achieve its expected results. Risks and risk mitigation strategies are also presented.

CANARIE's programming and activities are defined by the following trends that are shifting the research and innovation landscape:

- 1) the digitization of research,
- 2) the use of data analytics in all research fields,
- 3) data preservation and reuse, and
- 4) the adoption of cloud technologies in all sectors.

These trends continue to drive CANARIE's programs and investments into Canada's National Research and Education Network (NREN). In FY17, CANARIE will continue to launch and execute programs that build on strong foundations and evolve to support better alignment and integration of the components of digital research infrastructure.

CANARIE's planned activities include the ongoing evolution and expansion of the research and education network; management of the Research Software program and the expansion of the user community for these powerful research software tools; and the evolution of services, and expansion of the user base for the Digital Accelerator for Innovation and Research (DAIR) program. To complement its key programs, CANARIE will continue to offer value-added services (access and identity management solutions) to introduce efficiencies in research workflows as well as to improve the user experience. CANARIE will work with the research community and the granting councils to foster the development of a national approach to research data management. Lastly, CANARIE will continue to work with its private sector and academic partners in the Centre of Excellence in Next-Generation Networks (CENGN), to support the rapid commercialization of leading-edge networking technologies.

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## 2 About CANARIE

### Role of CANARIE

CANARIE's role in Canada's innovation ecosystem was set out in its 1993 Articles of Incorporation: *to contribute to Canadian competitiveness in all sectors of the economy, to wealth and job creation and to the quality of life of Canadians*. CANARIE achieves this by designing and delivering digital infrastructure, and driving its adoption among Canada's research, education and innovation communities.

This direction to CANARIE to contribute to competitiveness "in all sectors of the economy" informs the horizontal perspective that CANARIE takes to Canada's innovation ecosystem. Rather than addressing the needs of a specific vertical sector, CANARIE looks across the public, private and not-for-profit research, education and innovation sectors to identify gaps, and then, through community engagement, works to address those gaps with a range of services and programs.

This horizontal view has driven CANARIE activities over the course of its history, and has helped shape Canada's digital infrastructure landscape. The following represents a sampling of these initiatives:

- laying the groundwork, with universities and provincial partner networks, for the first commercial Internet in Canada;
- incubating the Internet Registration Authority in Canada, now known as CIRA;
- supporting hundreds of Canadian businesses, educational and health organizations in their transition to digital models and processes via the Technology Development, Technology Diffusion program, Technology Applications Development program, and E-business, E-learning and E-health programs; and
- developing the grid certificate authority in Canada that provides secure access to data generated from the Large Hadron Collider and other advanced digital technologies.

More recently, CANARIE has:

- worked with provincial and territorial network partners to continually evolve what is arguably one of the world's leading National Research and Education Networks, which supports Canadians from coast to coast to coast engaged in advanced research, education and innovation;
- worked with global peers to align international research and education infrastructures to support globally collaborative research, including, most recently, the completion of the world's first 100G transatlantic network link;
- ensured Canadians benefit from a robust Identity and Access Management framework, aligned with international frameworks, that provides secure access to digital services and resources in Canada and around the world;
- identified the gap in research software in the ecosystem and championed the development of powerful research software tools to accelerate discovery, including the creation of a software registry that makes reusable software tools available to all researchers; and
- incited Canada's small business community to embrace cloud computing technologies, providing more than 500 businesses with cloud resources that enable rapid product development and accelerated time-to-market.

CANARIE's current activities build on these successes and respond to evolving research, technology and policy environments. For example, CANARIE understands the value and impact of ever-increasing amounts of digital data on research, education and innovation, and is working with stakeholders to ensure

Canadians have the digital infrastructure ecosystem that can leverage these data assets to support Canadian leadership in the global knowledge economy.

## **CANARIE Funding**

The majority of the funding for CANARIE is provided by the Government of Canada, through a Contribution Agreement with Industry Canada. The Government of Canada's ongoing confidence and investment in CANARIE since 1993 is a testament to the critical nature of the infrastructure and the role that digital infrastructure plays in leveraging complementary government investments in research and innovation.

## **Focus of Activities: 2015 – 2020 Mandate**

CANARIE's focus in its current mandate is on strengthening Canada's digital infrastructure ecosystem, as Canadians engaged in data-intensive, collaborative research and innovation are increasingly dependent on this critical infrastructure. CANARIE activities in the current mandate will focus on the following three areas, which align directly with the Expected Results outlined in CANARIE's Contribution Agreement with Industry Canada.

### ***Network Operations***

In order to address the evolving needs of users in the research, education and innovation communities, CANARIE operates and evolves a pan-Canadian collaboration capability through the delivery of a world-leading high performance network and network-based services. CANARIE will:

- a) Increase network capacity and performance to keep pace with the growth in demand (currently an annual average growth rate of 50%);
- b) Expand network reach to address the needs of the research and education communities from coast to coast to coast; and
- c) Evolve the network services portfolio to enhance research, collaboration and innovation.

### ***Technology Innovation***

CANARIE will create and fund research software technologies to bring new collaboration capabilities not previously offered to Canada's research community. CANARIE will:

- a) Drive the adoption of software tools and services to utilize and exploit Big Data;
- b) Increase the impact of tools and services to users;
- c) Support research data management through the development of tools and applications; and
- d) Promote the collaborative development of data management tools.

### ***Private Sector Innovation***

In order to leverage CANARIE resources to stimulate commercialization, CANARIE delivers a cloud-based program, the Digital Accelerator for Innovation and Research (DAIR) that enables advanced ICT research and provides an opportunity for entrepreneurs to accelerate time-to-market. CANARIE will:

- a) Leverage the network to support innovation, development and adoption of transformative ICT technologies; and
- b) Facilitate academic and private sector partnerships to drive collaborative innovation and commercialization.

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## 3 2014-15 Accomplishments

The following sections describe CANARIE's accomplishments under each of the three Objectives from the Contribution Agreement that governed CANARIE's programs from 2012-2015:

### 3.1 Network Operations and Evolution

To evolve and expand the CANARIE network in a flexible and cost-effective manner over the long-term, CANARIE's vision is to deploy fibre from coast-to-coast across Canada. In high-use, high-growth network corridors, CANARIE purchased fibre and therefore has the flexibility to add capacity and deploy transformative technologies at a considerably lower incremental cost. The alternative, which is a leased services model, has the cost/traffic curve that is linearly much higher, and would become prohibitively expensive as network traffic continues to grow annually at 50%.

In FY15 CANARIE

- Completed the central fibre network build along the Calgary-Regina-Winnipeg corridor with a 100Gbps (100 billion bits per second) service activated from Calgary to Winnipeg.
- Continued extending the fibre network east to Halifax to better serve Atlantic Canada as well as provide a foundation for future Canadian landing spots of trans-Atlantic circuits.
- Issued an RFP for 100Gbps wavelength services for the northern corridor for Vancouver-Edmonton-Saskatoon-Winnipeg-Toronto, as well as for services to international Research and Education (R&E) exchanges, in Seattle, Chicago and New York
- Continued to work with its provincial and territorial network partners to evolve the National Research and Education Network (NREN) through the Network Alliance Infrastructure (NAI) program. Throughout the mandate, CANARIE provided \$6.67M in network investments.
  - As a result of CANARIE's cost-sharing initiative, this program's funding attracted complementary provincial funding of \$4.78M to bring the total to \$11.45M. This supported upgrades to equipment, increases in network capacity and reliability, and extensions in reach of the NREN.
- Funded and built, in partnership with R&E networks in the United States and Europe, the first redundant 100Gbps infrastructure between four open exchange points spanning the North Atlantic.
- Continued to represent Canada in other international initiatives to advance research and education networks
  - Participating in the Global Lambda Integrated Facility (GLIF), an international consortium that provides advanced networking services to support data-intensive scientific research. GLIF brings together the world's premier networking engineers to develop an international infrastructure and advanced services.
  - Led Canada's involvement in the Global Ring Network for Advanced Applications Development (GLORIAD), a network of networks linking research networks across Asia, North America and Europe, allowing scientific and research communities in three continents to move large volumes of data effortlessly.

- Continued to operate the Canadian Access Federation (CAF), a service to enable higher-education community to access Wi-Fi services (through *eduroam*) and other protected online content using their existing institutional credentials (i.e. username and password).

### 3.2 Technology Innovation

In FY15, CANARIE continued to champion the development of powerful research software tools that accelerate discovery and enable research funds to be focussed on research activity, rather than software development. Research software enables users to seamlessly access digital infrastructure and resources without having expert knowledge of these infrastructures, thereby expanding use of these resources across many research domains.

These tools are made available via CANARIE's online research software portal ([science.canarie.ca](http://science.canarie.ca)). The online portal is the first of its kind in Canada, where users find reusable software services and examine each service's availability and usage statistics. The purpose of the online portal is to create a nationally recognized clearinghouse for research software that provides seamless access to these tools to spur broad adoption by the research community.

In FY15, CANARIE

- Oversaw the completion or development of 67 software platforms and components with 44 registered on the portal. The remaining software packages will be added in the beginning of the next fiscal year.
- Collaborated with the UK's Software Sustainability Institute (SSI) to share and leverage best practices for research software.
- Issued and implemented a call for the NEP-RPI Program to allow platform developers to continue to evolve their platforms until the anticipated re-launch of the program under CANARIE's 2015-20 mandate. This approach allows continuity of the program and availability of the software tools to the users the program serves.
- Provided funding, consistent with community input, to support Research Data Canada (RDC). RDC is an organization with the overarching goal to improve the management of research data in Canada.

### 3.3 Private Sector Innovation

Under the Private Sector Innovation objective, CANARIE leveraged its infrastructure and relationships to support adoption of digital technologies by Canadian SMEs to advance innovation and commercialization.

In FY15, CANARIE

- CANARIE developed strong partnerships with a range of organizations to increase the visibility of the DAIR offering to Canadian SMEs. These include the Funding Road Show, Startup Canada, the IRAP Concierge program, the Association of University Research Parks, colleges, and a range of incubators across the country. These partnerships supported a more than 2x year over year growth of DAIR users -ending at 370 versus the prior year's 172.
- CANARIE became a founding partner in the Centre of Excellence in Next-Generation Networks. CENGN is a consortium of industry, academic and research leaders who are pooling their expertise and equipment to lower the commercialization barrier to for Canadian SMEs and researchers.

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## 4 2016-17 Planned Activities

FY17 is the second fiscal year of CANARIE's 2015-2020 mandate. In order to deliver on its expected results for the mandate, CANARIE will undertake the following activities in the 2016-17 fiscal year:

### 4.1 Network Operations

CANARIE will continue to undertake all required activities to support and evolve the existing CANARIE network and the services delivered over it.

- 1) Network Program – As a result of this program, the CANARIE network will continue to operate and evolve as essential research infrastructure to support research, education and innovation. To achieve the results of this program, the following activities will be undertaken in the 2016-17 fiscal year:
  - i. Operate the network
  - ii. Increase capacity, redundancy, reliability
  - iii. Enhance network security and measurement monitoring tools
  - iv. Enhance user access to support tools
  - v. Increase network capacity and service support to the Yukon and Northwest Territories

The following measurable short and medium term outcomes will be achieved in FY17:

- Improved core nodes reliability (Target: enhancements completed on one core node)
  - Network security monitoring and measurement system implemented
  - Deployment of support tools accessible through the user portal (Target: 2)
- 2) NREN Program – As a result of this program, CANARIE will continue to strengthen the impact of the co-delivery model and ensure greater consistency of access to infrastructure and services across the NREN. To achieve the results of this program, the following activities will be undertaken in the 2016-17 fiscal year:
    - i. Extend capacity, redundancy, reliability through RAN networks
    - ii. Extend 100G reach outward from CANARIE
    - iii. Connect institutional facilities
    - iv. Strengthen the NREN partnerships
    - v. Launch second competitive call

The following measurable short and medium term outcomes will be achieved in FY17

- Second competitive funding call issued to meet NREN requirements
  - Increased reliability and capacity on network segments shared by RANs
  - Strategic alignment of NREN partners on evolution of the NREN
- 3) Canadian Access Federation (CAF) Program – As a result of this program, Canada will continue to benefit from robust identity and access management services that enable secure



and efficient remote access to distributed resources and tools, anytime. To achieve the results of this program, the following activities will be undertaken in the 2016-17 fiscal year:

- i. Adapt services to evolving standards
- ii. Increase awareness and adoption
- iii. Increase ease of service deployment, operation, use
- iv. Expand on identity services

The following measurable short and medium term outcomes will be achieved in FY17:

- Increased adoption of CAF services – (Target: 135 CAF participants)
- 4) Infrastructure Extension Program (IEP) – As a result of this program, government research institutes will continue to leverage the research network in support of collaborative research with national and international partners. To achieve the results of this program, the following activities will be undertaken the 2016-17 fiscal year:

- i. Provide high-speed network connections to government research facilities
- ii. Ensure connections are adequate to meet user needs

The following measurable short and medium term outcome will be achieved in FY17:

- Connections provided to government research facilities

## 4.2 Technology Innovation

- 1) Research Software – As a result of this program, CANARIE will continue to develop software tools that enhance the usability and accessibility of research infrastructure for all Canadian researchers. To achieve the results of this program, the following will be undertaken in the 2016-17 fiscal year:

- i. Continue to enhance and promote the research software portal at [science.canarie.ca](http://science.canarie.ca)
- ii. Continue to expand awareness of the Research Software program within the Canadian R&E community
- iii. Support and monitor funded projects in the 2015 call
- iv. Launch a call in order to consolidate around fewer, more re-useable platforms
- v. Develop collaborative funding and awareness programs with other funders and providers of research software

The following measurable short and medium term outcomes will be achieved in FY17:

- A 20% increase in visits to [science.canarie.ca](http://science.canarie.ca) over 2015 levels.
- Completion of program collateral to increase program awareness
- Contracts in place and execution underway for all approved projects. Expecting 7 - 9 projects.
- Launch of the second call in which existing platforms are funded to extend their applicability to new researchers.
- Agreements in place in support of aligned community engagement with other funders and providers of research software.

2) Research Data Management – As a result of this program, CANARIE will ensure that Canada’s data is available to accelerate discovery and commercialization by the academic and private sectors. The following activities will be undertaken in the 2016-17 fiscal year:

- i. Community coordination in support of policy creation, national standards, infrastructure and tools requirements in support of research data management

The following measurable short and medium term outcomes will be achieved in FY17:

- Support provided to advance research data management solutions

### 4.3 Private Sector Innovation

The activities undertaken will include the delivery of the following programs, along with key initiatives listed under each program:

1) DAIR Cloud Testbed – As a result of this program, CANARIE will continue to leverage the CANARIE network to support Canadian firms’ ability to develop and test innovative ICT applications. To achieve the results of this program, the following activities will be undertaken in the 2016-17 fiscal year:

- i. Operate the cloud platform
- ii. Enhance technical capabilities of the DAIR cloud infrastructure with features to help users reduce time to market.
- iii. Create and publish educational content related to efficient use of cloud services.

The following measurable short and medium term outcomes will be achieved in FY17:

- Continued increase in the total number of DAIR users (Target: 850)
- New features added to the DAIR cloud infrastructure
- Content released to educate SMEs on efficient use of cloud services

2) CENGN Network Testbed – As a result of this program, the CANARIE network will be used to foster academic and private sector collaboration, innovation and commercialization of new ICT technologies in partnership with CENGN. To achieve the results of this program, the following activities will be undertaken in the 2016-17 fiscal year:

- i. Network connectivity and related support for CENGN test bed initiative

The following measurable short and medium term outcome will be achieved in FY17:

- Additional participants in CENGN beyond the FY16 pilot will be able to leverage the CANARIE network for commercialization of new ICT products and services.

## 5 Program Delivery Timelines

		2016-17			
Eligible Activities	Initiatives	Q1	Q2	Q3	Q4
<b>Network Operations</b>					
Network Program	Operate the Network	Ongoing			
	Increase capacity, redundancy, reliability	Project to increase network redundancy			
	Enhance network security and measurement monitoring tools	Deployment of monitoring services			
	Enhance user access to support tools	Development of support tools			
	Increase network capacity and service support to Yukon and Northwest Territories	Project to increase connectivity			
NREN Program	Extend capacity, redundancy, reliability through RAN networks	Ongoing			
	Extend 100G reach outward from CANARIE	Ongoing			
	Connect institutional facilities	Ongoing			
	Strengthen NREN partnerships	Ongoing			
	Launch second competitive call			EOI/Proposals	Approval
CAF Program	Adapt services to evolving standards	Ongoing			
	Increase awareness and adoption	Ongoing			
	Increase ease of service deployment, operation, use	Ongoing			
	Expand on identity services	Ongoing			
IEP Program	Provide high-speed network connections to government research facilities	Ongoing			
	Ensure connections are adequate to meet user needs	Ongoing			
<b>Technology Innovation</b>					
Research Software Program	Continue to enhance and promote the research software portal at science.canarie.ca	Ongoing			
	Continue to expand awareness of the Research Software program	Expand Awareness			
	Support and monitor funded projects in the 2015 call	Ongoing			
	Launch a call in order to consolidate around fewer, more re-useable platforms			Launch	
	Develop collaborative funding and awareness programs with other funders and providers of research software	Develop collaborative funding and awareness			
Research Data Canada	Community coordination in support of policy creation, national standards, infrastructure and tools	Ongoing			
<b>Private Sector Innovation</b>					
DAIR Cloud Testbed	Operate the cloud platform	Ongoing			
	Enhance technical capabilities of the DAIR cloud infrastructure			Enhance capabilities	
	Create and publish educational content related to efficient use of cloud services		Create content		
CENGN Network Testbed	Network connectivity and related support for CENGN testbed initiative	Ongoing			

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## 6 Financial Plan

Economic Action Plan 2015 announced funding for CANARIE in the amount of \$105 million over five years to support the activities of CANARIE. CANARIE has identified a cash flow requirement of \$23.479 million for the 2016-17 funding year.

CANARIE covenants and agrees to hold, invest, administer, and disburse that amount in accordance with the stipulations of the Contribution Agreement. No interest or investment income is payable by the Minister on the funds to be provided.

### 6.1 Program Revenues and Expenses

<i>For the fiscal year</i>	<u>2016-17</u>
<i>(in 000s)</i>	
<b>REVENUES</b>	
<b>FUNDING</b>	
Industry Canada Funding	<u>23,479</u>
<b>TOTAL FUNDING</b>	<u><b>23,479</b></u>
<b>PROGRAM REVENUES</b>	
User Fees	461
Interest Income	<u>152</u>
<b>TOTAL PROGRAM REVENUES</b>	<u><b>613</b></u>
<b>TOTAL REVENUES</b>	<u><b>24,092</b></u>
<b>EXPENSES</b>	
<b>PROGRAM EXPENSES</b>	
<b>Network Operations</b>	
Network Infrastructure & Services	12,231
NREN Program	3,495
<b>Technology Innovation</b>	
Research Software	2,922
Digital Infrastructure Innovation	875
Research Data Management	325
<b>Private Sector Innovation</b>	<u>1,092</u>
<b>TOTAL PROGRAM EXPENSES</b>	<u><b>20,940</b></u>
Operating Expenses & General Overhead	<u>3,152</u>
<b>TOTAL EXPENSES</b>	<u><b>24,092</b></u>
<b>EXCESS OF REVENUES OVER EXPENSES</b>	<u><u><b>0</b></u></u>

## 6.2 Cost Recovery

The following table summarizes CANARIE's cost recovery projections for the fiscal year.

<i>For the fiscal year</i> <i>(in 000s)</i>	<u>2016-17</u>
<b>CASH</b>	
IEP End User Fees - federal	100
IEP End User Fees - Non-federal	159
CAF Participation Fees	200
DAIR User Fees	2
<b>TOTAL CASH</b>	<u><b>461</b></u>
<b>IN-KIND</b>	
Research Software	<b>304</b>
<b>MATCHING FUNDS</b>	
NREN Program	998
DAIR	29
<b>TOTAL MATCHING FUNDS</b>	<u><b>1,027</b></u>
<b>TOTAL COST RECOVERY</b>	<u><u><b>1,792</b></u></u>

Throughout 2016-17, CANARIE will continue to charge fees to users of CANARIE services and programs.

- As part of the legacy infrastructure extension program (IEP), CANARIE supports the costs to connect federal and non-federal labs to the NREN. The federal IEP connections cost recovery is a fixed annual amount paid by Shared Services Canada to offset the total annual cost of supporting these connections. For non-federal IEP connections, FY2016-17 is the fourth year of a five-year plan to wind down funding for those connections; the amount in the budget represents 80% cost recovery of planned expenditures.
- The cost recovery in 2016-17 for CAF will consist entirely of participation fees. DAIR cost recovery is comprised of user fees.
- In-kind cost recovery for the Research Software program represents a contribution from users that includes the Principal Investigators time, research infrastructure, such as computing and storage, lab space, and power, utilized during development.
- The overall NREN program will result in at least a 65/35 split of costs between CANARIE and other funding sources (e.g., provincial government, network alliance partner funds, etc.) for funding projects. CANARIE's contribution level will be determined on a project by project basis – i.e., some may have a higher than 65% contribution (up to 100%) from CANARIE, and others may be lower. CANARIE will ensure the outcome of the program meets its overall cost recovery target, hence, greater priority will be given to projects which have leveraged contributions.
- The DAIR program expects to achieve matching funds on projects.

## 6.3 Funding Requirements

As indicated in the Program and Operating Revenues and Expenses Budget shown above in Section 6.1, CANARIE's cash requirement for the 2016-17 fiscal year is \$23.479 million. Subsequent to the FY17 cash

requirement, the balance remaining to be drawn down from the \$105 million Contribution will be \$66.521 million for the remaining three years of this mandate.

#### **6.4 Investment Policy and Strategy**

CANARIE shall continue to invest and manage any advanced funds according to investment policies, standards and procedures that a prudent person would follow in making investment decisions regarding property belonging to others. CANARIE will manage the funds in accordance with the Contribution Agreement and in particular the investment directives contained in Article IV of the Contribution Agreement. The objectives are twofold: (a) to provide funds on an "as needed" basis to meet the disbursement needs of CANARIE and (b) to maximize the investment income earned by CANARIE, subject to the Investment Strategy and Investment Policy adopted by CANARIE.

The Investment Policy and the Investment Strategy specify permitted transactions, risk limitations for all market and credit risks faced by CANARIE, and levels of authority of officials who can commit CANARIE to different types of transactions. The Investment Policy and Investment Strategy must be updated for the mandate and then reviewed annually. They were most recently updated, reviewed, and approved by the Audit and Investment Committee in October 2015. The Investment Policy is guided by the constraints contained in the Contribution Agreement. CANARIE is in the process of appointing a new Investment Advisor / Portfolio Manager for the current mandate.

## 7 Risk Assessment, Mitigation Strategies, and Performance Monitoring Strategies

Due to the diversity and complexity of the ecosystem CANARIE operates in, risk management is essential for CANARIE to achieve the expected results defined in the Contribution Agreement.

Identified risks are classified based on the likelihood of occurrence of the risk, as well as the severity of the negative impact of the risk. The treatment of identified risks will vary based on these two dimensions as per the table below:

		Likelihood		
		Low (LL)	Medium (ML)	High (HL)
Potential Impact	Low (LI)	Accept risks	Accept risks with monitoring	Monitor and manage risks
	Medium (MI)	Accept risks with monitoring	Develop formal risk mitigation measures	Develop formal risk mitigation plan
	High (HI)	Identify mitigation steps and monitor regularly	Develop formal risk mitigation measures and monitor regularly	Develop formal risk mitigation plan and monitor regularly

### 1) Risks to delivery of the Contribution Agreement expected results:

#### a) Insufficient funds to meet emerging needs over the duration of the mandate (ML, MI)

##### Risk Statement:

The amount of funding has remained flat from the previous mandate and may hinder the organization's ability to fully deliver on its expected results.

##### Risk Mitigation:

- Where possible, continue to reduced fixed costs in the network as well as IEP as these represent the highest recurring annual costs to the organization;
- Monitor cost recovery to ensure targets are being met; and,
- Leverage Board oversight to ensure appropriate balance of investments across programs.

#### b) Network Operations Risks (ML, MI)

A critical component in undertaking the Network Operations activities is the completion and operationalization of the 100G national backbone from Halifax, NS, to Victoria, BC.

##### Risk Statement:

There is a risk that fibre needed to complete certain segments is either unavailable or too costly to procure or maintain. Among other things, this would make CANARIE less agile to respond to the needs of the research community, as well as face ever growing network costs by use of a growing number of leased wavelength services.

Risk Mitigation:

- Establish and maintain senior level relationships with fibre and equipment providers;
- Engage Board and advisory committee members, where appropriate, to work within their organizations to support this initiative; and
- Identify suppliers of new fibre to build additional capacity in the main east-west corridor.

c) Technology Innovation Risks (LL, HI)

The main program supporting this activity is the Research Software program. This program goal is to develop software tools that enhance the usability and accessibility of research infrastructure for all Canadian researchers, while addressing a broader set of research disciplines.

Risk Statement:

Low adoption of the new interdisciplinary software development and adoption approach by the broader research and education community poses a significant risk to this program.

Risk Mitigation:

- Continued early engagement with research developers and researchers by using workshops, online communication tools etc.;
- Continued engagement with the Research Advisory Committee and ensuring its evolution to allow researchers' input to guide the program, while gaining their buy-in; and
- Strengthen alignment with other research software funders e.g. the CFI and Genome Canada, partnering with them to ensure greater synergies among funded platforms.

d) Private Sector Innovation Risks (LL, HI)

The main program supporting this eligible activity is the Digital Accelerator for Innovation and Research (DAIR) service. The primary goal of this program is to incentivize growth of Canada's ICT sector.

Risk Statement:

There is a risk that DAIR will not evolve to offer new services that are critical to the changing needs of the ICT sector, SMEs in particular, and therefore become less relevant.

Risk Mitigation:

- Continuous interactions with SMEs and commercialization-supporting organizations (e.g. incubators, accelerators) to evolve the DAIR program;
- Marketing outreach programs to increase the awareness of the DAIR service;
- Working with other organizations that focus on SMEs such as IRAP to develop a consolidated offering;
- Assess the utility of the service via user surveys and performance metrics.



## 2) Program Delivery Risks

### a) Service Delivery via RANs (LL, HI)

#### Risk Statement:

The provincial and territorial RAN partners are separate organizations and, as such, may have objectives which are not aligned with CANARIE objectives. As a result this non-alignment could impact, or impede, CANARIE's ability to deliver on its mandate.

#### Risk Mitigation:

Ongoing effort to ensure alignment of provincial and territorial objectives with national objectives is essential. Specific activities include:

- Ongoing support for the NREN Governance Committee, comprised of CANARIE and RAN presidents;
- Creation of an NREN Business Strategic Plan to identify NREN priorities;
- Ensure program funding to the RANs is structured in a manner to assist in attaining NREN objectives that also support CANARIE's network objectives; and
- Ensure one CANARIE Board member represents RANs.

### b) Attrition (ML-MI)

#### Risk Statement:

Loss of senior staff, key employees or key Board members could jeopardize the organization's ability to deliver on its programs.

#### Risk Mitigation:

For Board members:

- Board members are asked for a minimum 3 year term commitment;
- The Vice-Chair is the planned successor to the Chair and agrees to a 6 year term commitment upon commencing as Vice-Chair; and
- The Governance and Nominating Committee meets at least quarterly.

For internal staff:

- Succession planning for key staff;
- Performance evaluation with career discussions with all employees every 6 months; and
- Ongoing IT investments for information and knowledge retention.

## 3) Performance Monitoring Strategies

CANARIE collects metrics internally for all its programs, services, and for the network. External performance metrics are collected from the community in the form of user surveys and reports, and reporting from the regional networks. CANARIE works with Industry Canada to integrate this information as part of an overall performance management strategy. Additionally, performance data for each eligible activity are included as part of CANARIE's annual reporting.

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## 8 Representation

CANARIE Inc. represents that it is not in default under the terms of the Contribution Agreement that is currently in force.