



# From BC(NET) to the World: A Global View of How We Stack Up

Jim Ghabbane, President and CEO | BCNET 2018 | April 23, 2018

# What is digital research infrastructure

## 1. What is an NREN?

A National Research and Education Network is both; 1) a high performance communications network owned and operated for and by the education and research community of a country and; 2) the organization that operates that network, organized as a consortium of members, a dedicated agency, a company, NGO, or other legal body. In World Bank partner countries an NREN may simply be a consortium of universities that organize themselves as a "buying club" in order to get a better price for Internet Service providers (ISPs), or it may be more sophisticated and be offering connectivity services to its members.

## 2. What does an NREN do?

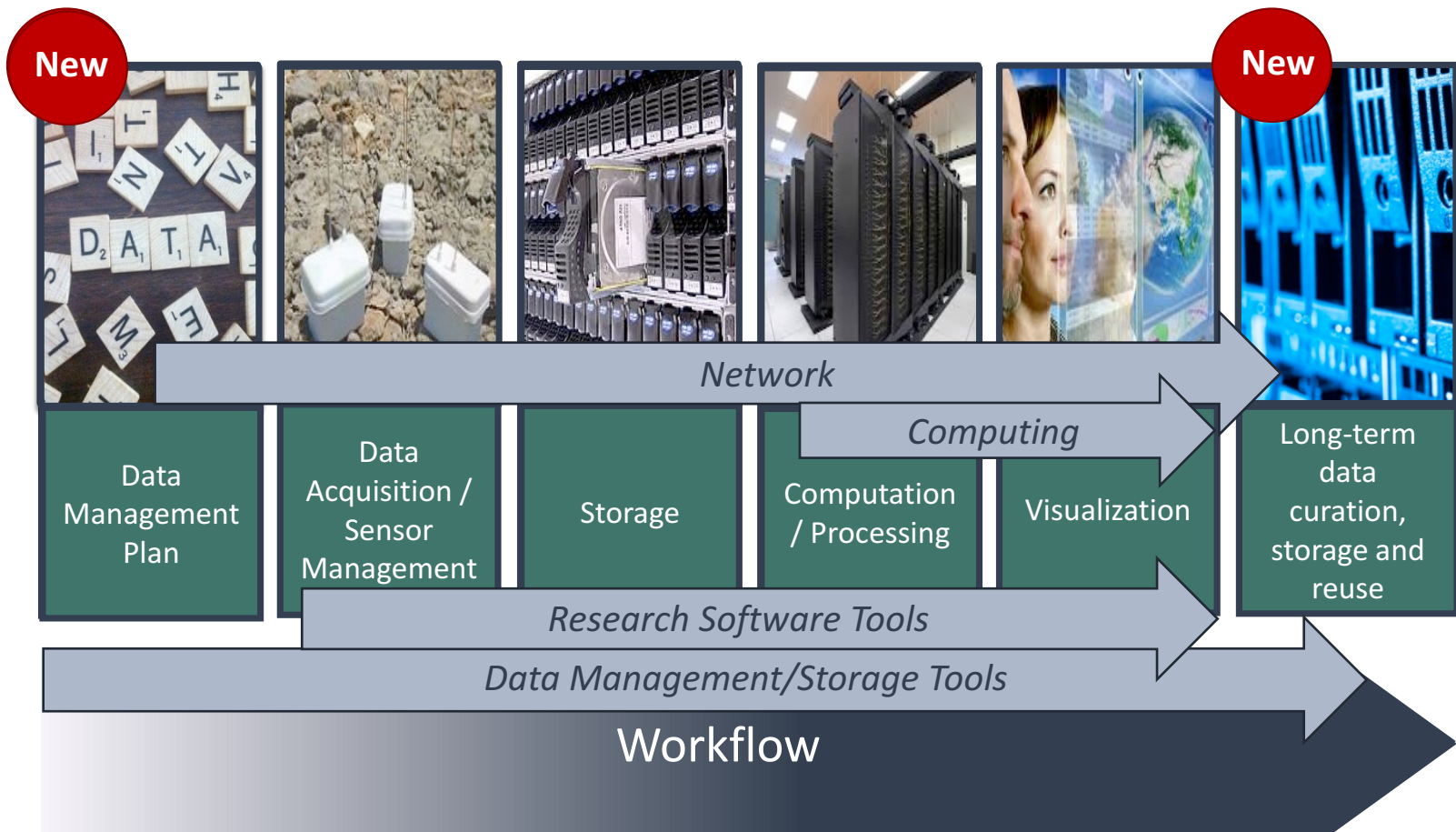
The primary role of an NREN is to operate a national backbone that connects a country's university campus networks to each other and to other R&E networks globally, and it may offer commodity Internet service. It may also have its own Network Operations Center to manage all traffic on the network and it provides technical support services to all of its members.

The extent of active management of a network varies among NRENs, but advanced NRENs are not only leasing "dark fiber" capacity on the fiber optic networks of owners such as telecommunications companies, or railways, and doing everything else that an operator would do with their own terminal equipment, routers, switches, servers etc. Dark fiber refers to individual strands or cores of fiber optic cable that are unterminated and unlit; it is up to an operator to do so. A number of cores can be bought or leased on a single

<sup>1</sup> Besides the work of the US Defense Department that set up DARPA net

# Digital Infrastructure

It's the enabler of the research workflow.



# The Pillars of Digital Research



**Network**



**Computing**



**Storage**



**Software**

Plus supporting personnel (HQP)

# Not All “N”RENs are the Same

## Single Country NRENs

*UK*



*Australia*



*Netherlands*



## Multiple RENS in One Country

*US*



*South Africa*



## Supranational Federation

*Pan-Europe*



*Scandinavia*



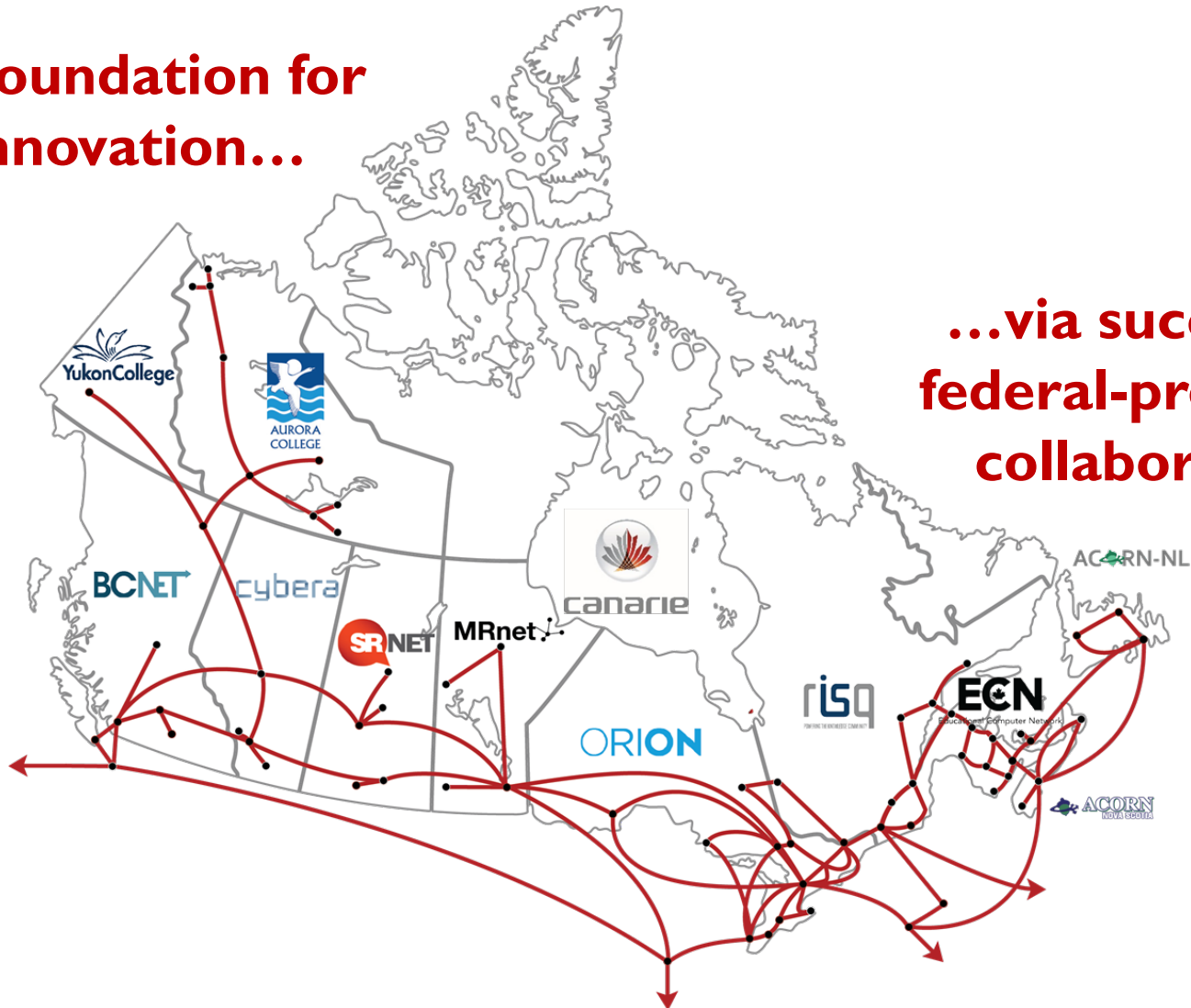
*Eastern & Southern Africa*



# Structure of Canadian NREN

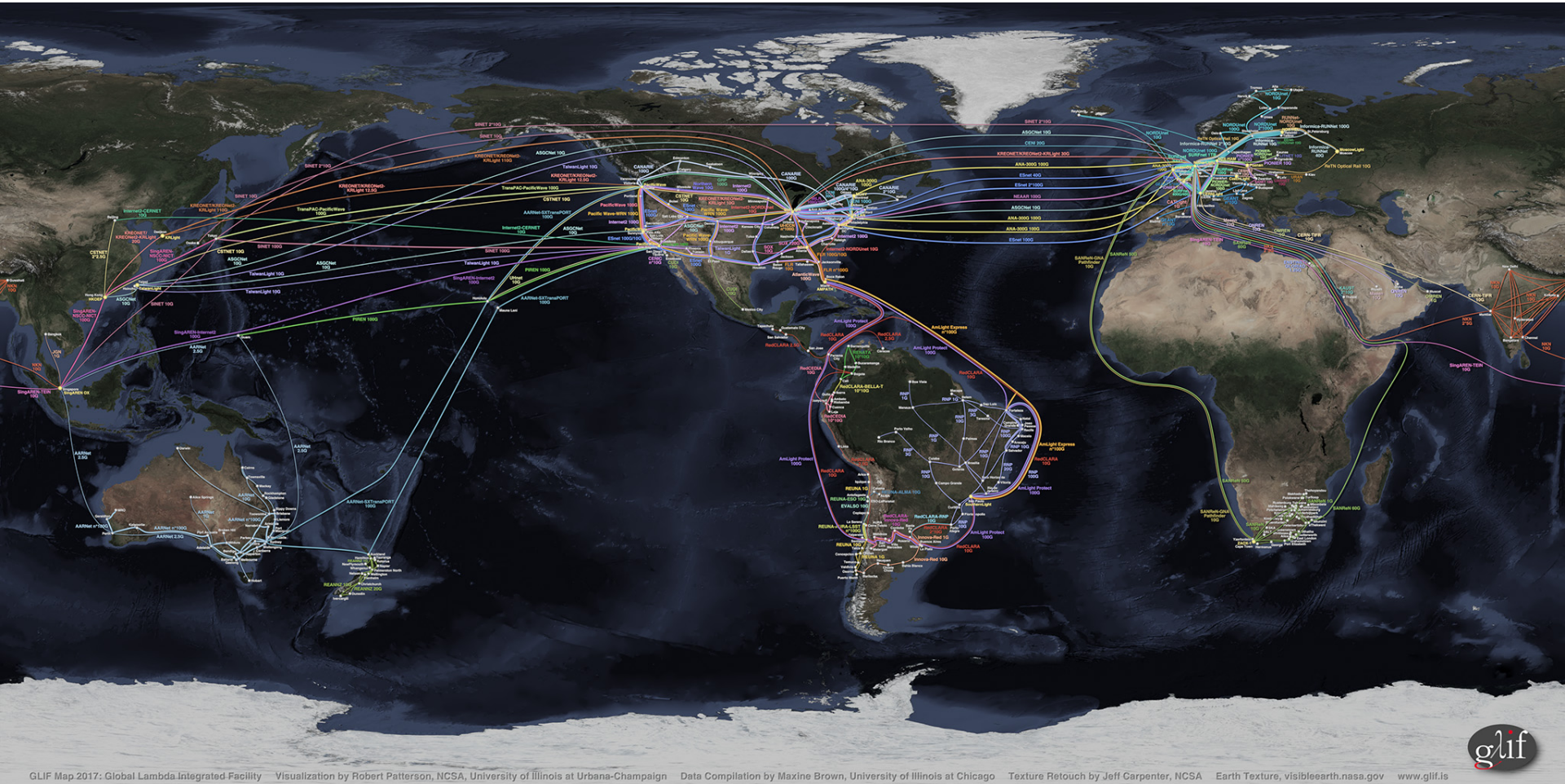
Canada's foundation for  
digital innovation...

...via successful  
federal-provincial  
collaboration





# NRENs take you from BC(NET) to the world.



Source: GLIF Consortium | <http://glif.is>

# NRENs dissolve borders.






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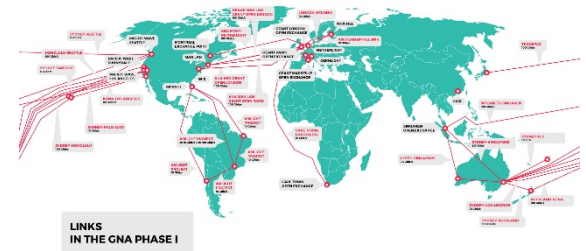
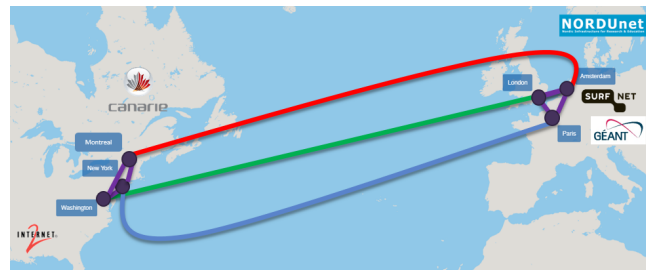


# How do we stack up?

CANADA'S SCORECARD	Absolute:	Relative:
Network		
Identity and Security		
Research Software		
Research Data Management		
Advanced Research Computing		
Coordination		

# How we stack up: Network

- > World class network
- > Federated NREN model is lauded globally
- > Leader in international collaborations:



- > Challenges remain in increasing/improving northern and remote connectivity

# How we stack up: Security and Identity

## > Security:

- Joint Security Project (2017)
- NREN Security Information and Event Management Project (2018)
- Discussing possible Shared Security Operations Centre (SOC) and future global SOC

## > Identity:

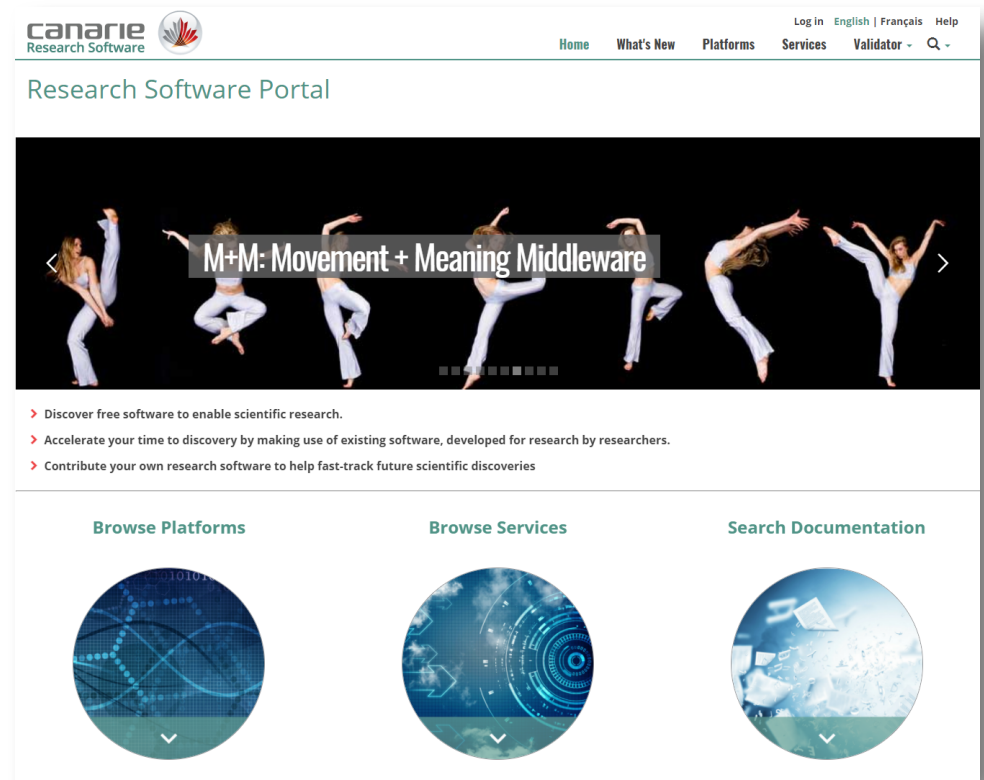
- Simplifying broader deployment
- Partnerships to extend reach of the Canadian Access Federation





# How we stack up: Research Software

- > Canada is one of a handful of countries creating new paradigms for research software.



# How we stack up: Data Management

> Broad space with numerous actors in different areas:



> ...and internationally:



# Filling Data Management Gaps

> New Research Data Management Funding Program:



Community Consultation to  
identity gaps (complete)

Call for Proposals based on  
community-identified need



National Data Services  
(software components & tools)

# How we stack up: Advanced Research Computing (ARC)



## Canadian scientists raise alarm over inadequate computing resources

[The Globe and Mail](#) - Feb. 2, 2016

Compute Canada, the organization tasked with supporting university-based researchers with their digital needs, says that the growing reliance on computation in many areas of science means that it is no longer able to provide its biggest users



## Big science receives \$328-million boost from Ottawa

[The Globe and Mail](#) - Jan. 9, 2017

The largest single award, nearly \$70-million in total, will go to Compute Canada to improve access to high-speed computing – a pressing need for scientists across many fields. Last year, Compute Canada said it was having an increasingly difficult



## Federal budget doles out cash for science

[CBC.ca](#) - Feb. 28, 2018

"Budget 2018 represents the single largest investment in investigator-led fundamental research in Canadian history," Morneau said Tuesday in his budget speech in ... The largest is \$572.5 million over five years for a "digital research infrastructure strategy" for what the budget called harnessing big data.

Why we have deficits—in good times as well as bad

Opinion - [Maclean's.ca](#) - Oct. 23, 2017

# ARC: It's about more than just money.

- > Beyond national ARC systems, support for cloud, and sub-national systems
- > ARC Federation continues to evolve





# How we stack up: Coordination

	Network	Identity Management	Research Software	Research Data Management	Advanced Research Computing
 <b>New Zealand</b>					
 <b>Australia</b>					
 <b>Netherlands</b>	  				 
<b>Canada</b>					

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QUESTIONS



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