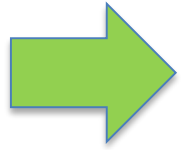# The ACTION Project

Bill Appelbe

HPCS 2014

Outline

- Why ACTION?

- What did we learn?

  - Survey results

- Where to from here?

  - The recommendations

- Summary and Questions

About ORION

ORION is an *ultra-fast fibre optic network* that supports and facilitates research, education and innovation (RE&I) across Ontario.

www.orion.on.ca   **@ORIONNetwork**

- More than a network
    - Range of network enabled services
    - Partnerships with commercial vendors
- ORION is a non-profit company
    - Funded by fee-for-service

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Ontario's High Performance Computing (HPC) facilities linked over ORION

SciNet High Performance Computing

SciNet - University of Toronto

Affiliated research hospitals and institutes
Baycrest Centre for Geriatric Care
Hospital for Sick Children
Mount Sinai Hospital
Ontario Institute for Cancer Research
University Health Network:
- Princess Margaret Hospital
- Toronto General Hospital
- Toronto Western Hospital

SHARCNET

SHARCNET
*The Shared Hierarchical Academic
Research Computing Network*

Brock University
Fanshawe College
Lakehead University
Laurentian University
McMaster University
Nipissing University
Ontario College of Art and Design
Perimeter Institute for Theoretical Physics
Sheridan College Institute of Technology and
Advanced Learning
Trent University
University of Guelph
University of Ontario Institute of Technology
University of Waterloo
University of Western Ontario
University of Windsor
Wilfrid Laurier University
York University

High Performance Computing Virtual Laboratory
HPCVL

High Performance Computing
Virtual Laboratory (HPCVL)

- Queen's University
- Royal Military College
- University of Ottawa
- Carleton University
- Ryerson University
- Seneca College
- Loyalist College
- St. Lawrence College

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The Need for ACTION

- ORION needed to know where advanced computing (AC) is headed

  - What services will researchers need in future?

  - Where are the gaps, needs and opportunities?

  - What services can ORION provide?

  - Who should we partner with?

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ACTION Challenges

Challenges

- Traditional surveys have a low return rate

- Typically focus on infrastructure

- Researchers often do not often know what services they need or what is available outside their research group

- Technology is evolving quickly

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ACTION Plan

- Community approach

- Government support – i.e. Ontario Ministry of Research and Innovation (MRI)

- Technical Working Group

- Face-to-face meetings with 50+ research groups

- Sample drawn from 7 institutions

- Representative sample of leading researchers drawn from a wide range of research areas

  - Not just traditional HPC users

- Systematic approach to gathering data

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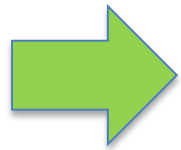
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What we Learned – Survey Results

What type of AC support do they use or need?

	Current Use?	Shortage/Need?	Increasing future need?
Compute	80%	30%	35%
Data access & management	75%	25%	70%
HQP – from outside research group	60%	35%	55%

Where do they get their support from?

	HQP	AC Infrastructure
Research group	70%	50%
Department or institution	35%	35%
Compute Canada	35%	35%

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- 80% of researchers were constrained by current AC

  - Whether compute, data, or HQP

  - Lack of HQP is as much of a current constraint (35%) as either access to compute or data!

- Data is forecast to be the greatest future need

- Most of the researchers we interviewed relied on local support and infrastructure

  - Compute Canada users are less than 5% of Canadian researchers

- Local institutional support for AC ($ & HQP) is highly valued

  - But varies greatly across Ontario

- Data access can be a major hurdle
  (e.g., Statistics Canada data)

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- Compute Canada's (CC) focus is on support of traditional batch HPC
  - Users often want more "interactive" computing

- There are many local clusters and specialist compute systems, but:
  - Far too many for CC to support
  - Many researchers would be willing "outsource" support or hosting

- Access to information about AC support and services is very limited
  - Researchers were often unaware of what support and expertise was available
  - Conversely, they had funds to hire support but could not easily locate it

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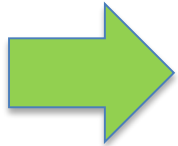
Recommendations

Caveats

- Only interviewed Ontario researchers

- A small sample size of "leading" researchers

- We believe AC support should go beyond traditional HPC users

    - While not neglecting them or "high-profile big science"

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Recommendations

The recommendations were based these criteria:

- Provincial solutions rather than institutional solutions

- Feasibility & return on investment

  - high likelihood of generating sustainable socio-economic benefit

  - do not require large outlays of new resources

- They require *collaboration* to succeed

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Information Website

Access to AC resources and information is vital

- Institutional HQP & research colleagues can only go so far
- Need greater access to information – i.e. a provincial information website

For example:

- Where is the GPU expertise in Ontario?
- What facility can host a commercial software package?
- Where can I find an intern?

Developing HQP Expertise

Multi-faceted approach:

- Degree programs (i.e. McMaster)
- Training courses
- Internships and job placement
- Conferences and workshops
- Online resources

Key questions:

- Is this a component or adjunct of the information website?
- How can we collaborate on development of content with institutions, nationally, and internationally?

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Cloud Computing for Researchers

- Everybody agrees that this is a "good thing"
  - Supports researchers who are not suited to traditional batch HPC
  - Can free up HPC systems for those that need fast interconnect and large-scale parallelism

- Provincial hosting is highly desirable
  - No network usage fees with ORION
  - Local jurisdiction

- How to support it is the open question
  - ORION's approach is to partner with industry
  - Economy of scale and commercial service levels

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Other Recommendations

Stronger provincial collaboration on:

Recommendation 4: Privacy and security – expertise and facilities

- Some research groups have facilities, expertise, infrastructure, and template agreements; but many more researchers need support

**Recommendation 5:** Platform development – especially bioplatforms

- Bioinformatics is evolving at a staggering pace which makes access to expertise and software platforms difficult for some researchers

Recommendation 6: Research data management

Recommendation 7: Better industry access to Advanced Computing

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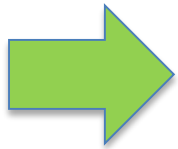
Summary

- Research dependence on advanced computing is accelerating and the needs and opportunities already outstrip supply
  - We need to develop beyond traditional HPC

  - And have much better advocacy and support for AC at all levels: institutional, provincial and national

- Collaboration is the only way forward:
  - We are working closely with Compute Ontario and the province (MRI)

  - Pooling resources to deliver better service and meet the needs of researchers

  - Diversifying and strengthening the funding base from government and industry

- For more information
  - Download the full report at http://orion.on.ca/action

  - Contact us at bill.appelbe@orion.on.ca

- Questions?

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