

High Order Literacy for the 21st Century: Improving the quality of library engagement: an Australian perspective

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Professor Tom Cochrane

Deputy Vice-Chancellor, Technology Information and Learning Support

Queensland University of Technology

Brisbane, Australia



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(Australia)

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The Revolution in Science

“A scientific revolution is just beginning. It has the science-based innovation potential to create an era of that could completely eclipse the last half-century of technology-based innovation; and with that, a new wave of global social, technological and economic growth.”

(Towards 2020 Science)

Research Challenges

Today's research challenges are complex and global:

- climate change and sustaining ecologies and the environment
- improving the health of our population and containing infectious disease
- managing disaster reduction and security
- predicting and living with extreme geological activity

Such problems demand a profound understanding of complex systems: unattainable by isolated efforts, and impossible without in-silico science

“New Science”

- The new astronomy
- The LHC (CERN)
- Genotype and Phenotype (dbGaP)
- DART (Tsunami assessment/reporting)
- Many others: Barcode of Life; Global Earth Observation System of Systems; World-Wide Protein Data Bank; Integrated Public Use Microdata Series...etc

Definitions

eResearch

“**eResearch** is research which involves and is dependent on increasingly sophisticated computing techniques and data management and manipulation; it encompasses:

- In-silico science and new research techniques made possible by ICT
- An over riding and urgent need for a collaborative approach to research
- Easy access to resources that present physical challenges because they are expensive, large, distant or fragile connecting researchers in real-time to work on priority problems”

(Australian Government, Department of Innovation, Industry, Science and Research, DIISR)



eScience

“**eScience** is about global collaboration in key areas of science, and the next generation of infrastructure that will enable it.”

(John Taylor, UK eScience Program)

Cyber-infrastructure

“ In 2003, the NSF published the ‘Atkins Report’ on ‘Revolutionizing Science and Engineering through Cyberinfrastructure’ The report defined **Cyberinfrastructure** as:

- Grids of computational centers
- Comprehensive libraries of digital objects
- Well-curated collections of scientific data
- Online instruments and vast sensor arrays
- Convenient software toolkits”

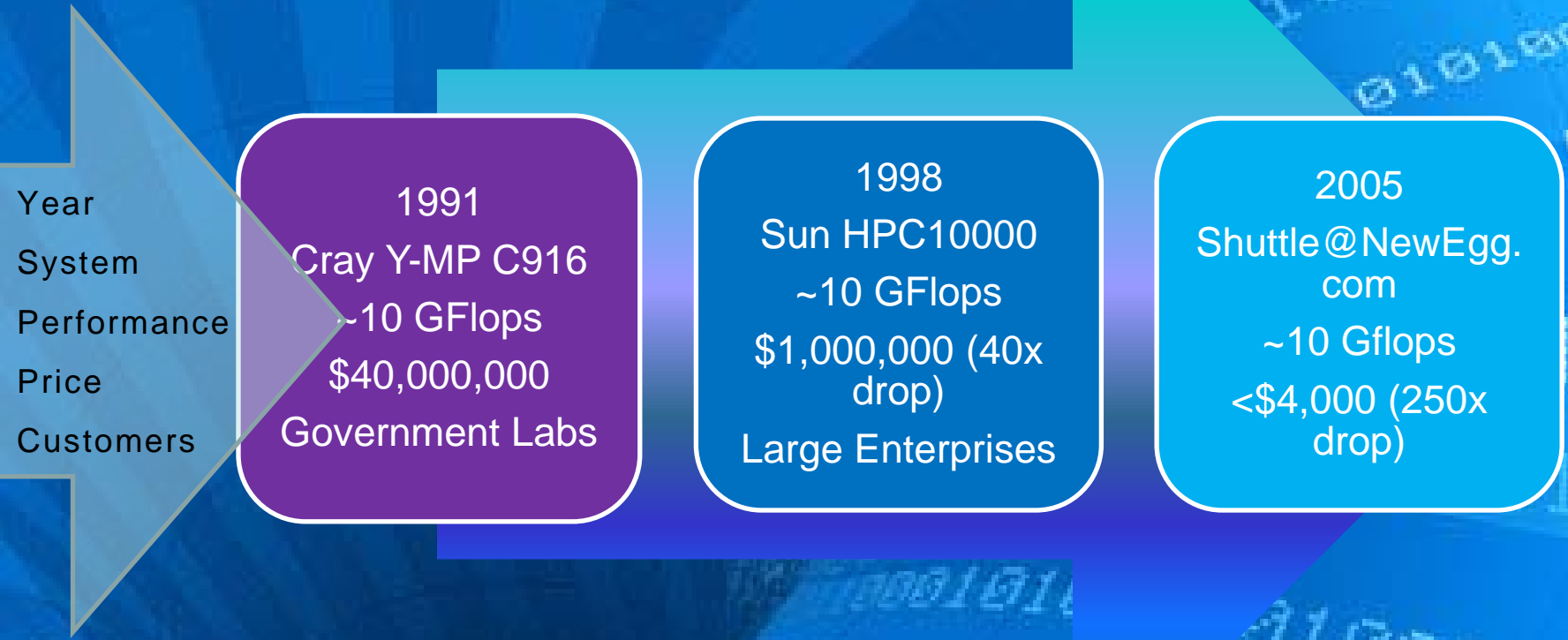
(Tony Hey)

Cyberscholarship

“The widespread availability of digital content creates opportunities for new forms of research and scholarship that are qualitatively different from traditional ways of using academic publications and research data. We call this ‘cyberscholarship’ ”.

(NSF/JISC The Future of Scholarly Communication, 2007)

Moore's Law and High Performance Computing Trends Perspective



The Data Deluge

“In 2006, the amount of digital information created captured and replicated [world-wide] was...161 billion gigabytes. This is about 3 million times the information in all the books ever written.”

(From The Expanding Digital Universe..)



eResearch Infrastructure

“**eResearch infrastructure** is the range of technologies, tools and techniques, all of which must be supported by specialized skill sets which support eResearch. As above, it is essentially collaborative in its development, deployment and support.”

(DIISR)

Hierarchy of Infrastructures

- “1. Institutional, local level infrastructure
2. Project infrastructure
3. Integrated national facilities infrastructure
4. Systemic or strategic infrastructure
5. Landmark infrastructure”

(DIISR)

Some of the Tools



Grisu
Condor
SRB
Shibboleth
EVO
Access Grid
Jabber
Drupal
Plone
Globus



Literacies - the Triple Challenge

In the '90's

- Information literacy
- Academic literacy
- Technological literacy

In 2009

- Information literacy continues
- Academic literacy continues
- What is technological literacy?

Technological Literacy

- “Technological literacy is a critical thinking skill based on understanding general patterns that transcend specific technologies....whereas technological competency requires a detailed understanding of specific technologies”

[Wikipedia]

The Library Response

Information literacy programmes

- The challenge of embeddedness

Academic literacy

- Provider or supporter?

Technological literacy

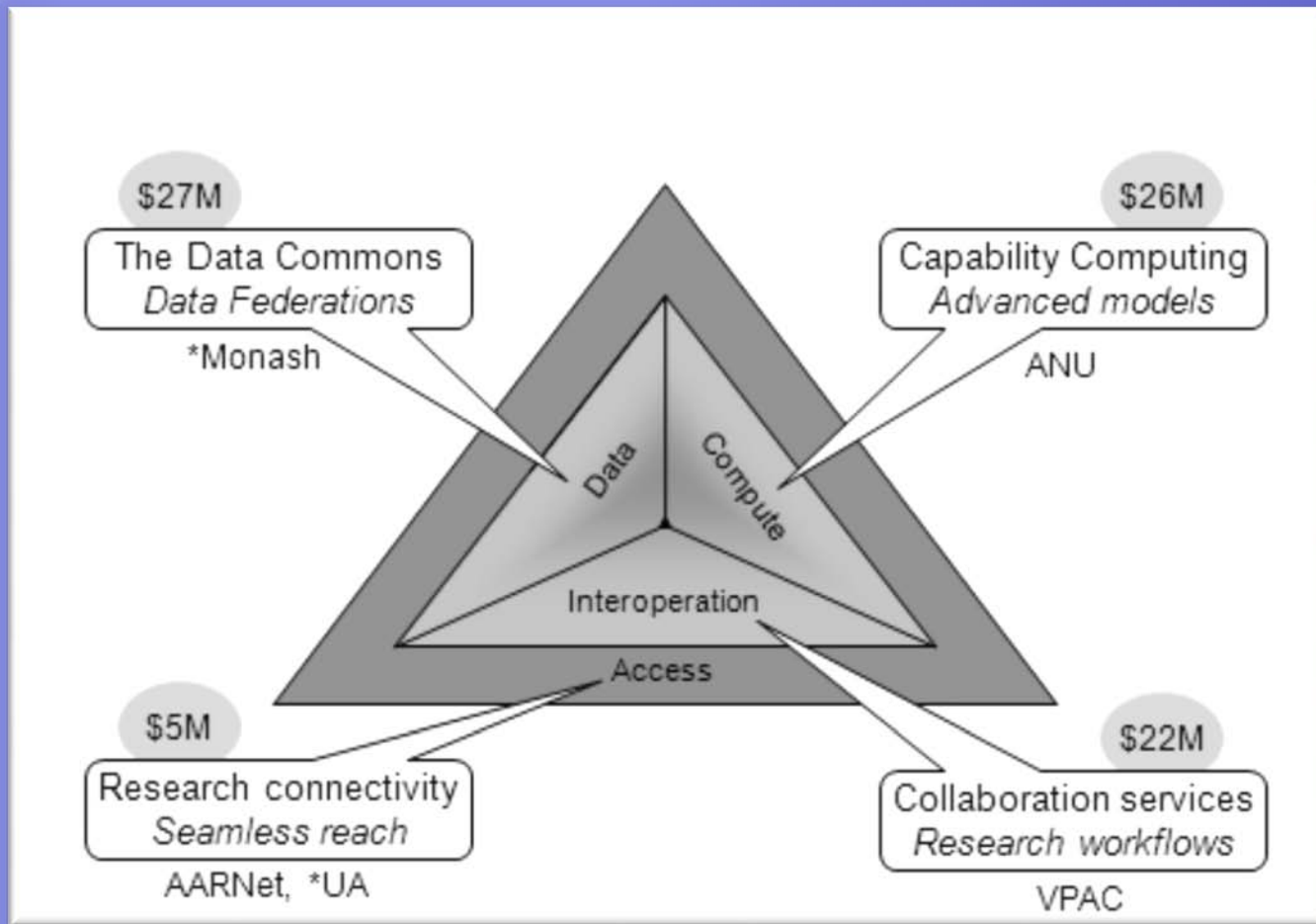
- The new challenge for library engagement



A New Vocabulary

- Web based collaboration environments
- Real time collaboration tools
- Content management systems
- Cloud computing
- Scientific workflows
- Federated access
- Hierarchical storage management
- Semantic web

Supporting Collaboration



(DIISR)

Australian Super Science Initiatives

(May 2009)

Initiative	\$\$\$
Data Storage and Collaboration Tools	\$97M
Data Commons	\$48M
National Research Network	\$37M
Australian National Centre of SKA Science	\$80M
Climate High Performance Computing Centre	\$50M

3 Workforce Approaches

- Laissez faire
- Remaining on familiar ground conceptually –
but expanding roles
- Leading aggressive transformation

Partnering, Libraries and IT

- Providing vital services supporting researchers and research students
- Contributing to the ongoing development of the University's eResearch Strategic Plan and collaborating on its implementation
- Providing expert advice, presenting new research support initiatives and contributing to optimum decision making
- Linking to Commonwealth and State eResearch initiatives

In conclusion



Action Points for Libraries

- Opening dialogue with IT support groups about meeting skills deficits amongst researchers within discipline areas.
- Defining and considering a range of skills and knowledge in supporting research collaboration and computationally intensive research, and agreeing which of these should be addressed.
- Considering the recruitment of new forms of skills, or the extent to which existing staff may be able to adapt. The answer to this will be highly localised, and depend on the range of existing skills and the capability of the library to move into new recruitment.
- Maintaining broad and active channels of communication with the area of university responsible for research support, as a partnership with this area is essential for everything else.

Discussion

