

BeSTGRID: Broadband enabled Science and Technology GRID

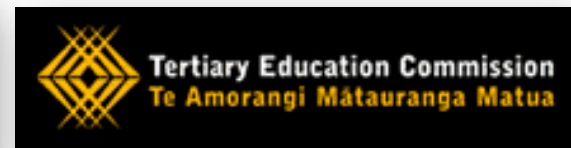
A/Prof Paul Bonnington

Director - BeSTGRID

Director of eResearch, University of Auckland

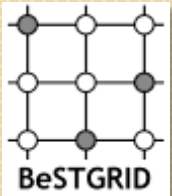
p.bonnington@auckland.ac.nz

www.bestgrid.org



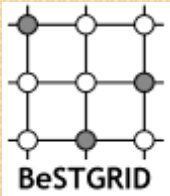
(for copies of this talk)

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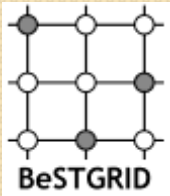
Outline

- eResearch
- KAREN
- Advanced Video Conferencing
- Virtual Research Environments
- GRID Computing
- Data GRID
- Federation Identity and Access Management



A new Research paradigm

- We are at the verge of the new paradigm shift in research
- The “eResearch paradigm” or data-centric research



Data-centric Research

*We will collect **more** research data in the next 5 years than all the data **ever produced** up until now*

It begins with Data....

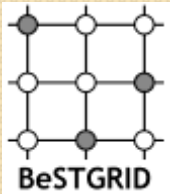


What is eResearch?

- “....intends to make access to computing power, scientific data repositories and experimental facilities as easy as the web makes access to information.”
- PM Tony Blair, July 2002
- UK National e-Science Grid

eResearch

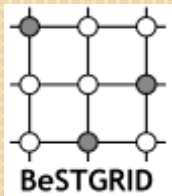
- eResearch is a ‘shorthand’ for a set of technologies to support this **collaborative networked** research that is **data-centric**
- The key technologies to support this eResearch revolution:
 - High speeds networks
 - High performance computing
 - Data and Information Management
 - Collaboration tools





KAREN

- **K**iwi **A**dvanced **R**esearch and **E**ducation **N**etwork
- Went live Dec 2006
- 10Gb/s NZ Backbone (“Squished” Ring)
- NZ\$40million, Government Funding
- NZ\$5million Capability Build Programme
- Linking all 8 New Zealand Universities and all 9 Crown Research Institutes, and National Library
- Additionally: ~622Mb/s link to US (and onto Europe)
- ~133Mb/s link to Australia



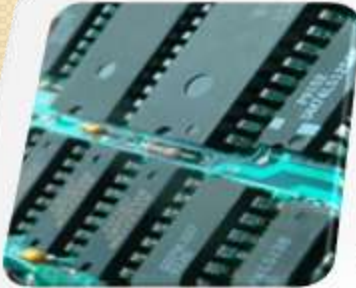
- The Advanced Network is only an infrastructural element for eResearch....
- ...it is like a “highway without cars” ...
- ...it is up to us to put the cars on the road

eResearch Themes



DATA

- Capture
- Storage
- Curation



COMPUTATIONAL

- Number crunching
- Simulation
- Data mining



COLLABORATION

- Video conferencing
- Blogs and Wikis
- Portals/communities

Collaboratories (VROs)

- TREND: Science and Engineering moving to
 - large-scale **collaborative projects**
 - based on global **eResearch collaboratories**
 - supported by:
 - US National Science Foundation (NSF)
 - US National Institutes of Health (NIH)
 - European Framework 6 and 7 programmes
- New Zealand must develop eResearch ability if our science and technology is to remain competitive in an international context

Example collaboratory

NEES

Search Site

ABOUT NEES | MEMBERSHIP | RESEARCH SITES | RESEARCH ACTIVITIES | EDUCATION | GOVERNANCE

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Headlines [RBS More News →](#)

Program Details Now Available for the NEES Fifth Annual Meeting

The NEES Fifth Annual Meeting, "NEES Research & Earthquake Engineering Practice: Strengthening the Connections," is packed with cutting edge research results and innovations in experimentation and information technology on topics ranging from bridges to flood protection to woodframe construction. The program is now complete, and you can read up on specific session topics and presenters at www.nees.org/5am.

Fifth NEES Annual Meeting

Each day begins with a plenary covering topics including research needs, new NEES research, and advances in experimental operations. Afternoons are devoted to informative breakout sessions that will get you up to speed on current research, walk you through implementation strategies, and allow you to

NEES @ Auckland



Example Early Adopters/Champions at University of Auckland



Integrative Biology - Bioengineering



Earthquake Engineering - Civil Engineering



Bio- and Biomedical Informatics



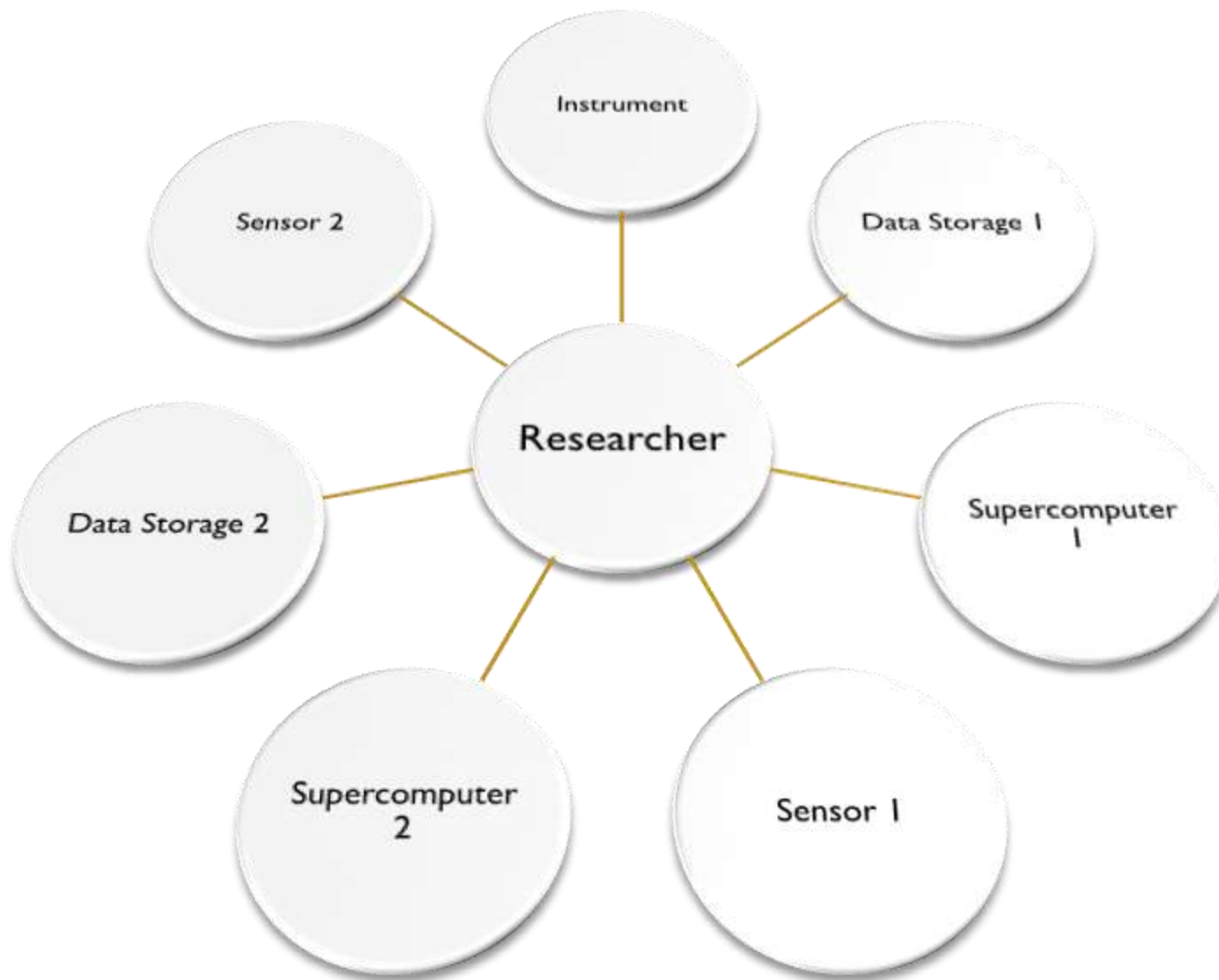
Synchrotron Analysis

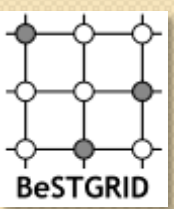
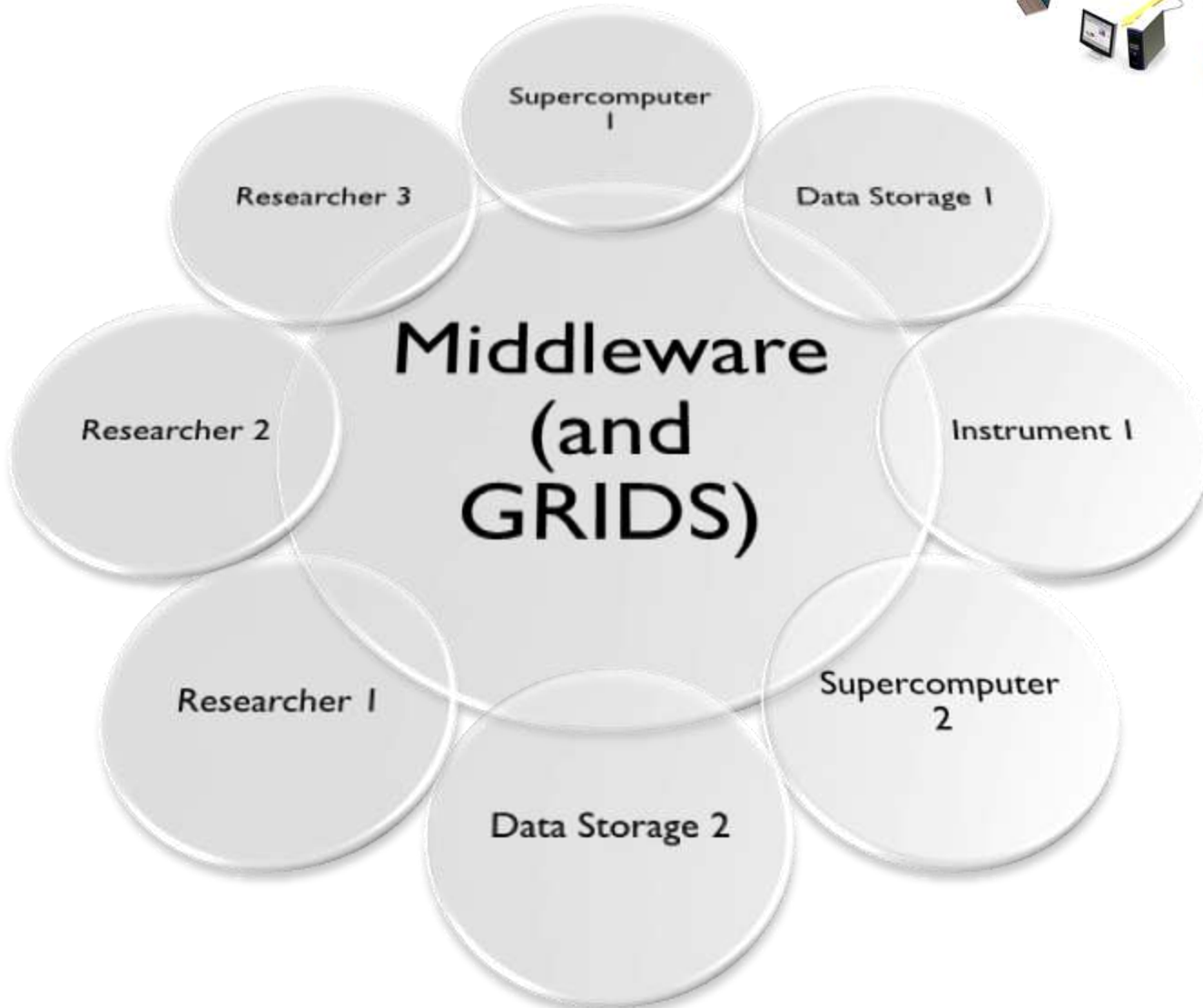
- Materials Chemistry
- Bio and Medical Imaging

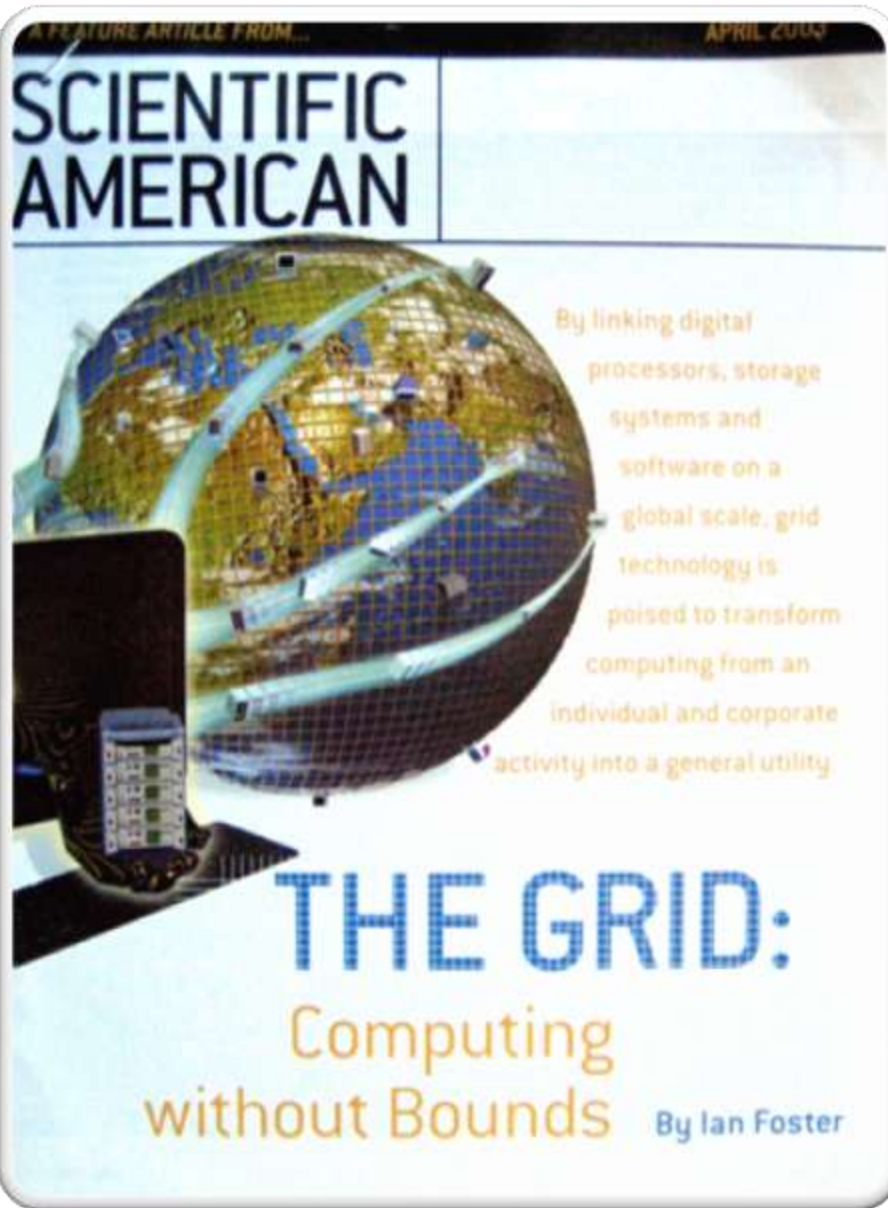


Social Sciences Data Archive

Current Researcher View



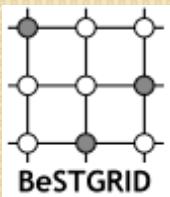


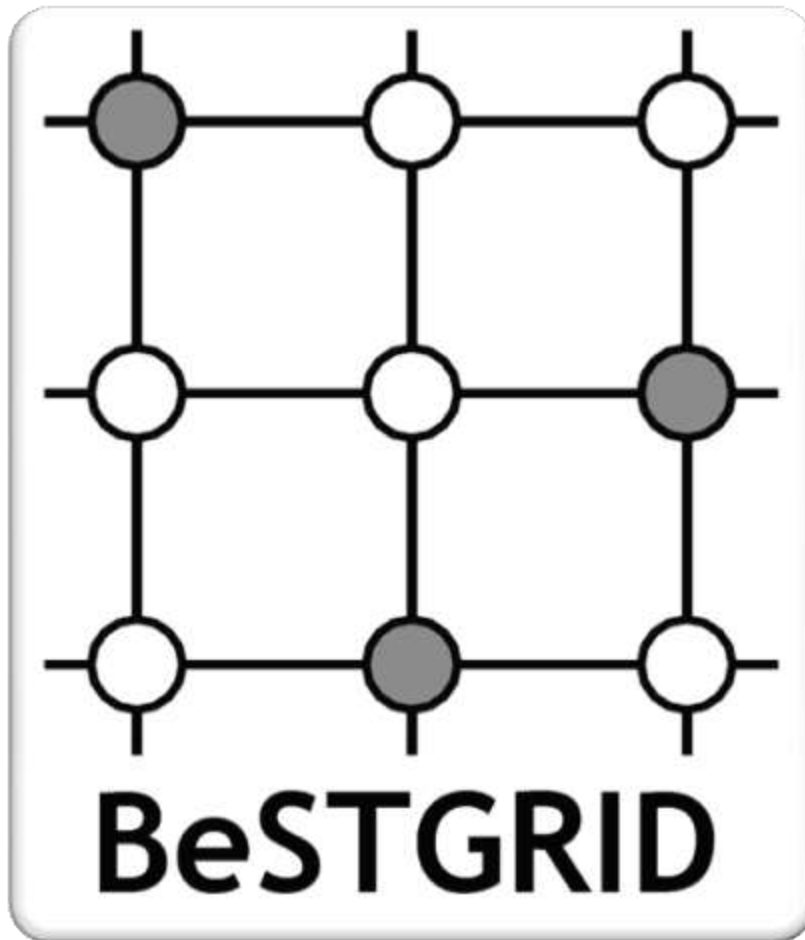


MIT Technology Review has named Grid computing one of "Ten Technologies That Will Change the World"

GRID: Make data storage or computational processing as ubiquitous as a national power grid

"Don't care where the resource located or generated"

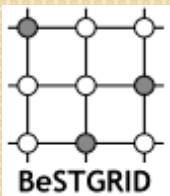




- **Broadband enabled Science and Technology GRID**
- www.bestgrid.org



BeSTGRID

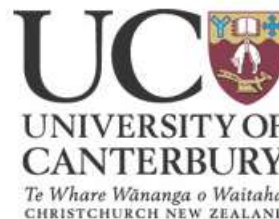


TEC iDF Grant

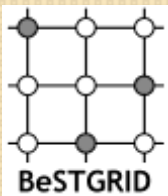


Tertiary Education Commission
Te Amorangi Mātauranga Matua

- Planning began over 3 years ago
- TEC Innovation and Development Fund
- \$2.5million: Sep 2006 – March 2008
- **www.bestgrid.org**

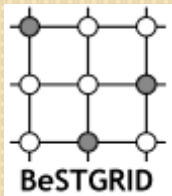


**Massey
University**



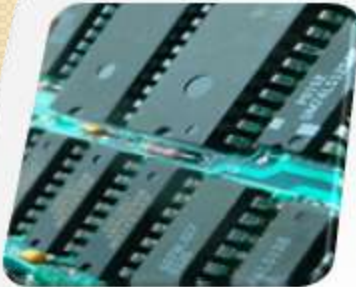
BeSTGRID Underlying Strategies

- **Application focused**
- **Demonstrate – lead by example – get the “early runs on the board”**
- **Don’t over-engineer the IT**
- **Avoid the “not invented here” syndrome**
- GRID Technology aligned with APAC Grid
- VPAC:Victorian Partnership for Advanced Computing
- Further technology sharing links with PRAGMA, James Cook University, Oxford and UC San Diego, Caltech
- Data GRID, Computational GRID, Collaboration GRID





DATA GRID



**COMPUTATIONAL
GRID**



**COLLABORATION
GRID**

BeSTGRID: Scope

B Federated Top Layer: Disciplines run their own research business on top of the core infrastructure (incl sensors, visualisation, webservices, portals)

E Middleware 'glue': GRIDS - Communication GRID, Data GRID, Computational GRID

S Centre(s) providing core eResearch infrastructure (communication, storage, computational)

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