BeSTGRID:
Broadband enabled Science and Technology GRID

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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

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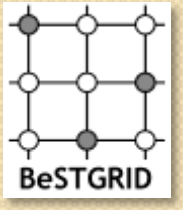
A new Research paradigm

- 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*

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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

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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

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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

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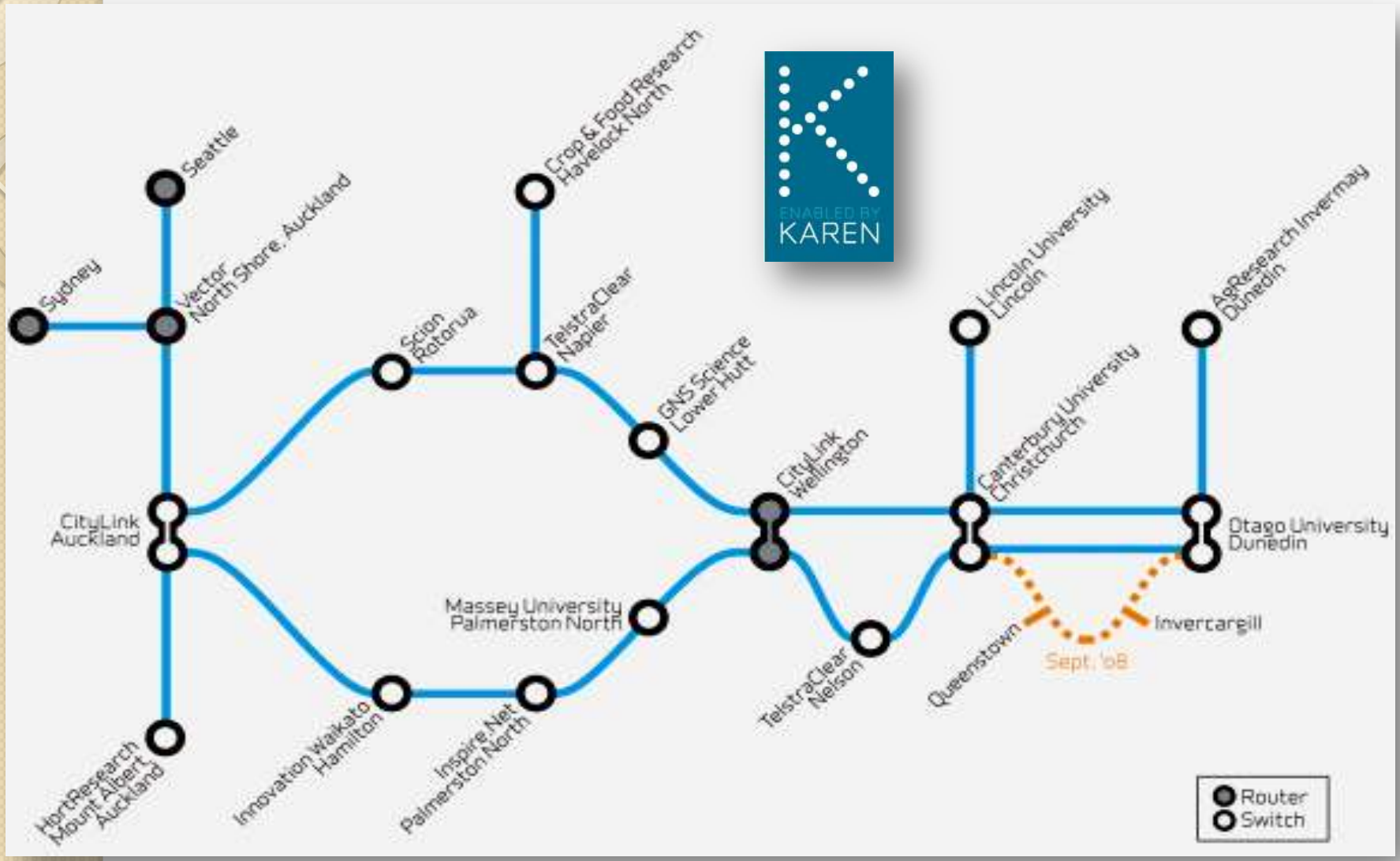
ENABLED BY
KAREN
Seattle
Sydney
Vector
North Shore, Auckland
Crop & Food Research
Havelock North
Scion
Rotorua
TelstraClear
Napier
GNS Science
Lower Hutt
CityLink
Auckland
CityLink
Wellington
Lincoln University
Lincoln
Canterbury University
Christchurch
AgResearch Invermay
Dunedin
Otago University
Dunedin
Massey University
Palmerston North
Invercargill
Queenstown
Sept. '08
TelstraClear
Nelson
HortResearch
Mount Albert
Auckland
Innovation Waikato
Hamilton
Inspire Net
Palmerston North
Router
Switch

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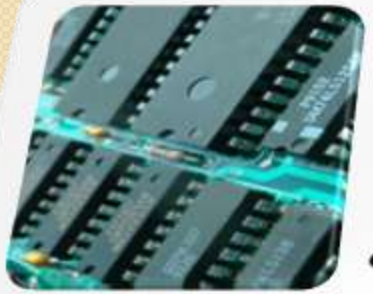
- The Advanced Network is only an infrastructural element for eResearch….
- ….it is like a “highway without cars”…
- …it is up to us to put the cars on the road

eResearch Themes

DATA

- Capture
- Storage
- Curation



COMPUTATIONAL

- Number crunching
- Simulation
- Data mining

COLLABORATION

- Video conferencing
- Blogs and Wikis
- Portals/communities

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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

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Example collaboratory

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NEES @ Auckland

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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

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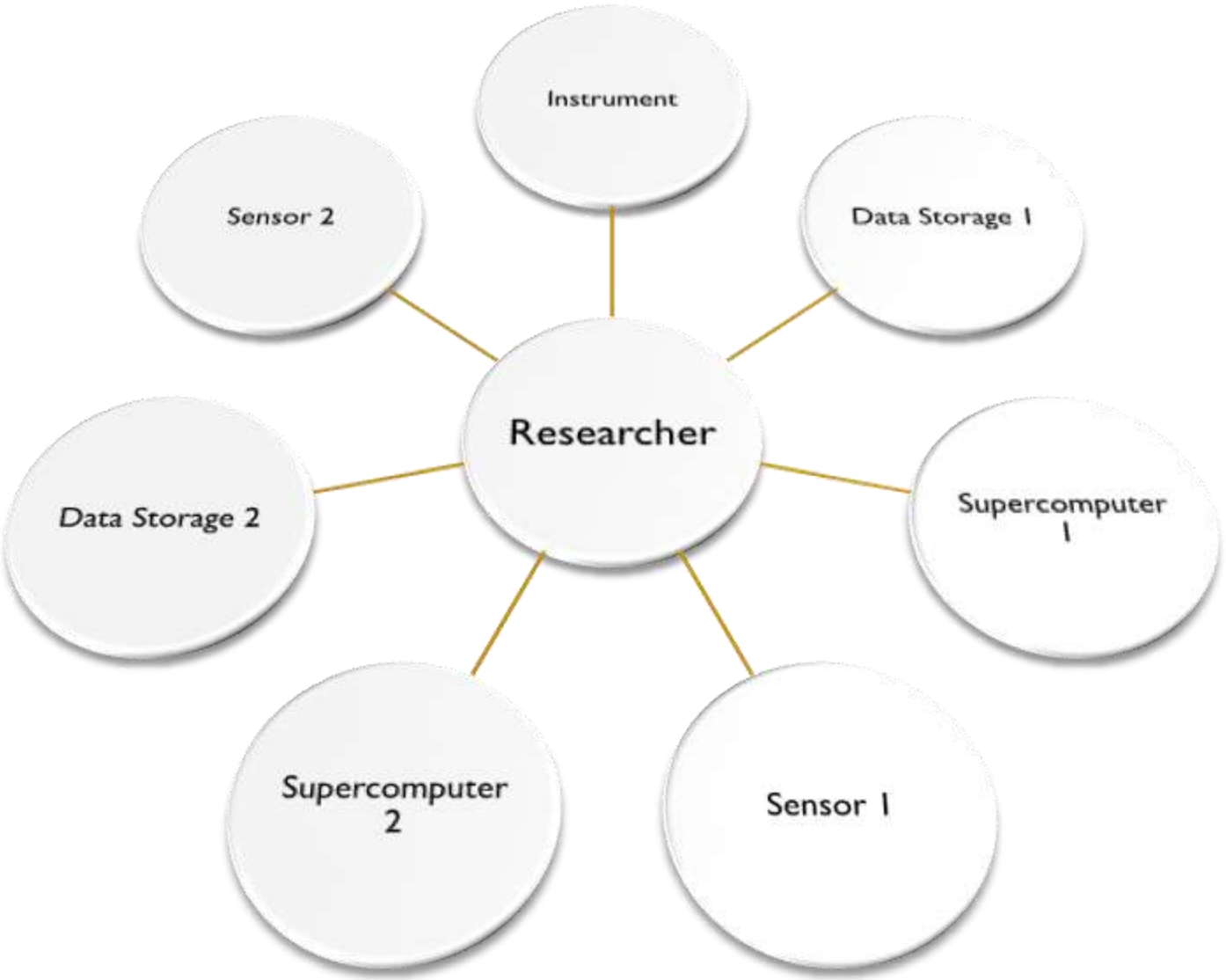
Current Researcher View



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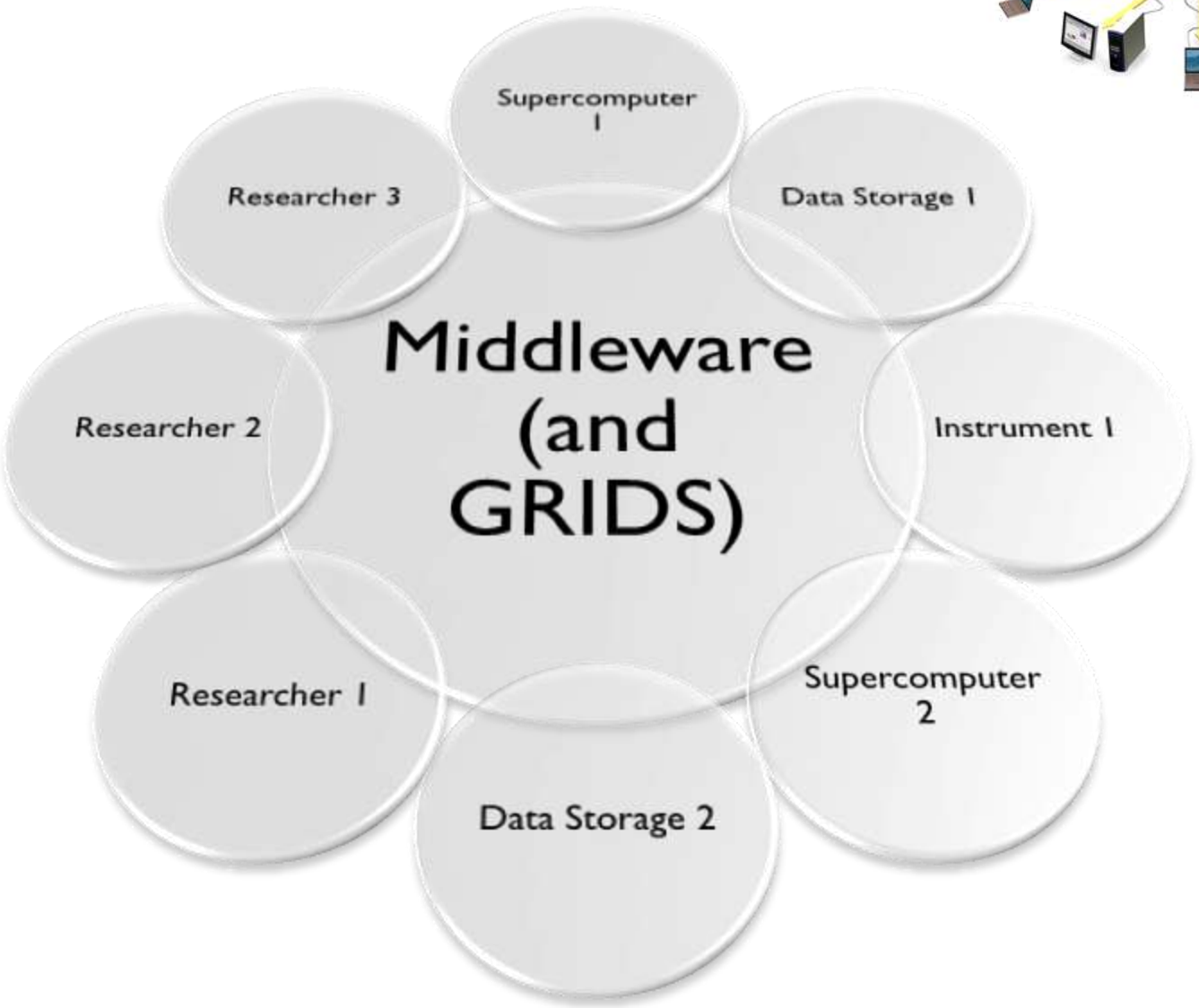
Supercomputer 1
Data Storage 1
Instrument 1
Supercomputer 2
Data Storage 2
Researcher 1
Researcher 2
Researcher 3
Middleware (and GRIDS)

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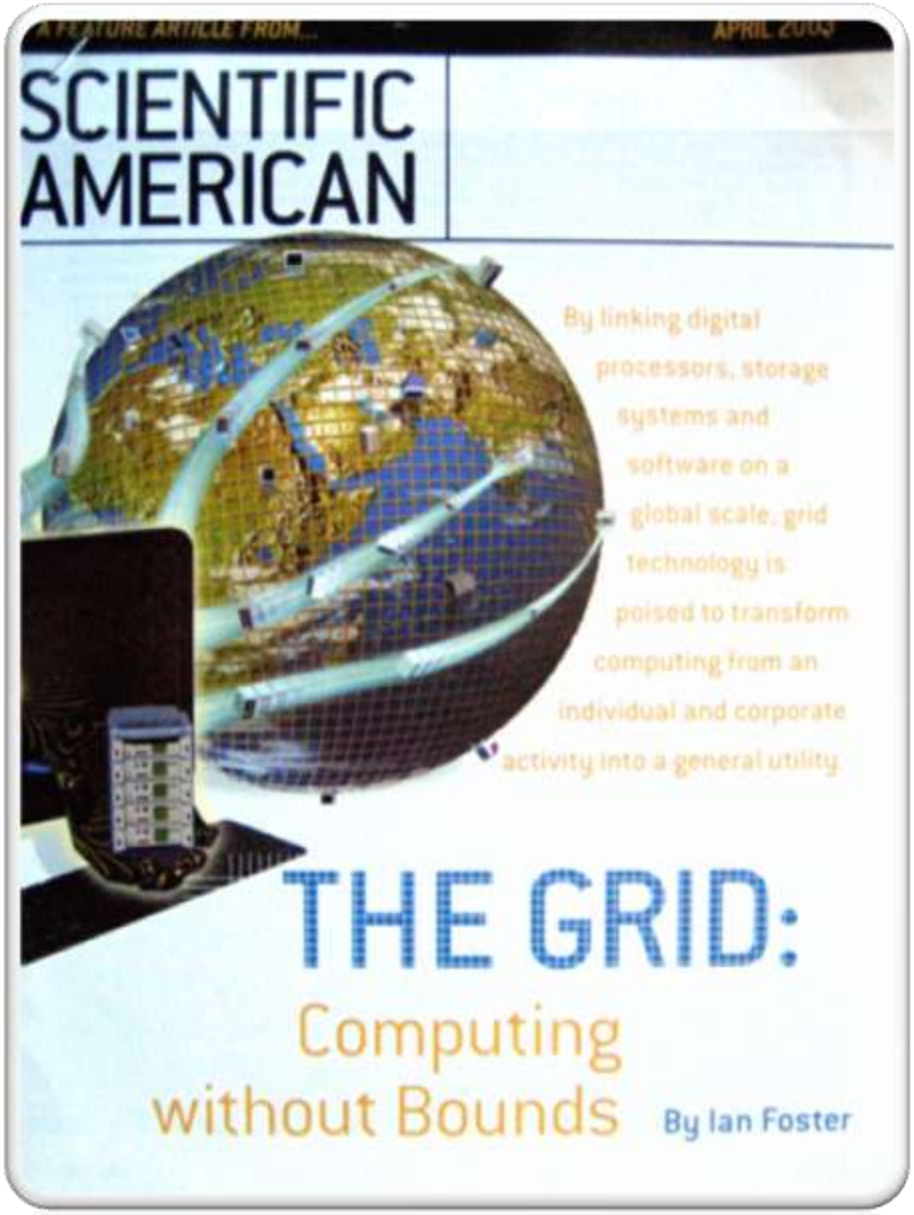

MIT Technology Review has named Grid computing one of "Ten Technologies That Will Change the World"

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

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

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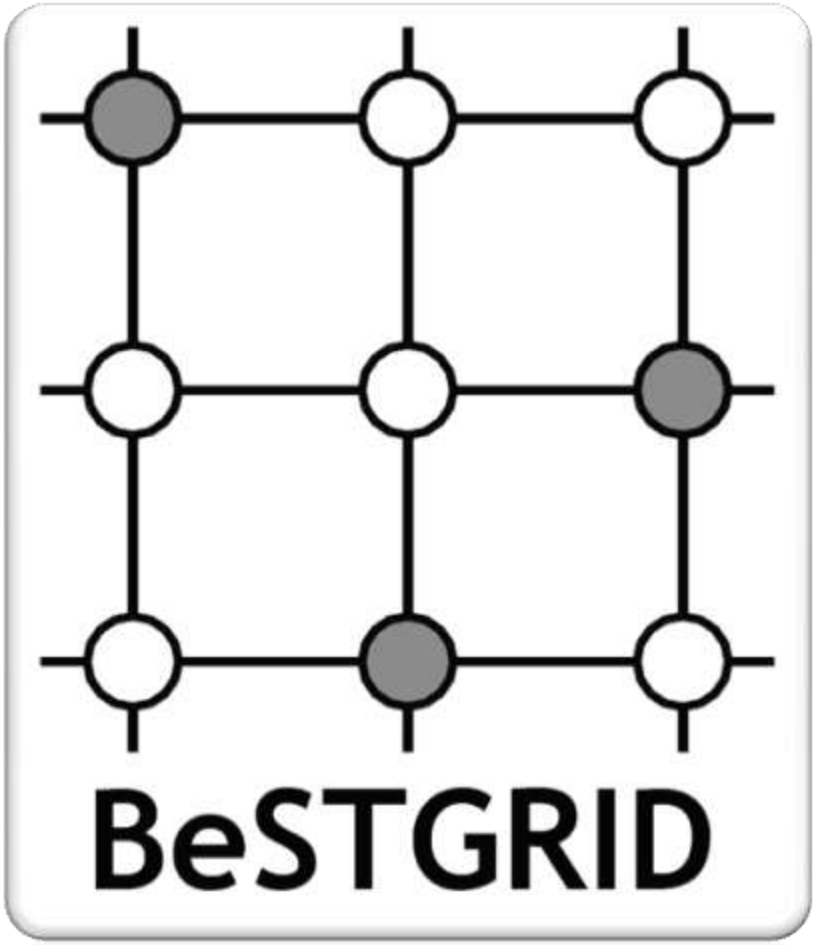
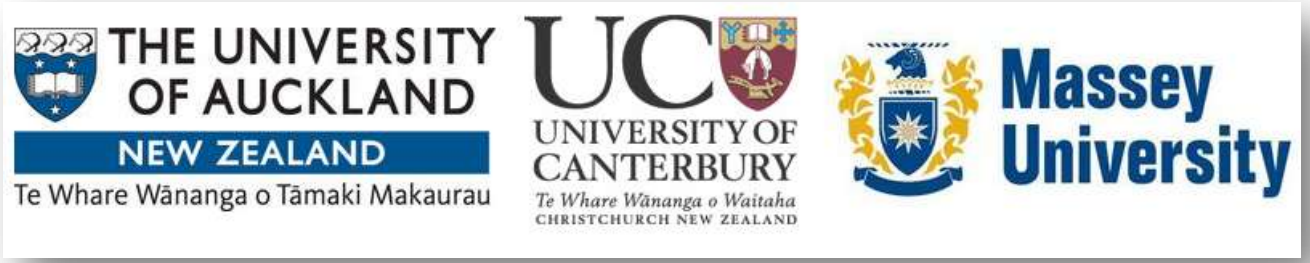


- **Broadband enabled Science and Technology GRID**
- www.bestgrid.org

Tertiary Education Commission
Te Amorangi Mātauranga Matua

TEC iDF Grant

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



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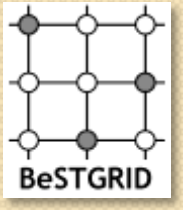
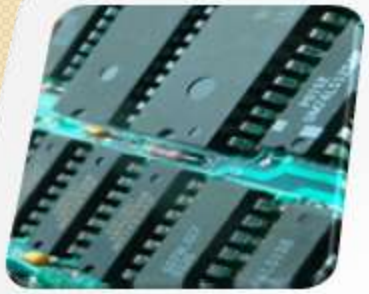
BeSTGRID Underlying Strategies

- **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

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