An update on the NeSI AgResearch Partnership as the rubber hits the road

Ben Taylor, Georgina Rae, Thomas Berger & Blair Bethwaite

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MŌ MĀTOU

About AgResearch

AgResearch is one of seven Crown Research Institutes in Aotearoa. We use science to enhance the value, productivity and profitability of New Zealand's pastoral, agri-food and agri-technology sector.

Our research contributes to economic growth and beneficial environmental and social outcomes for New Zealand.

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Tackling bacteria on farm

We are using hyperspectral imaging to tackle harmful bacteria on farm. Our research could produce big savings in preventing food contamination and spoilage, especially in the face of climate change.

Hyperspectral imaging can detect bacterial spores on farms, so they can be targeted and “cleaned” before spreading into the animal gut, water sources or farm equipment.

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AgResearch eResearch Platform

- Enabling Platform underpinning all our science.
- Four strategic objectives:
  1. **Growing Capability** in digital research methods and tools
  2. Establishing a flexible **eResearch infrastructure** with fit-for-purpose components
  3. Deploying **new digital services** that support efficiency, quality and reproducibility of research
  4. Position AgResearch as a **Sector Leader** amongst the CRIs in the eResearch area

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Why does AgResearch need the eResearch Platform?

Governance

- Research Data lifecycle - stewardship and management
- FAIR and CARE of research data
- Māori data sovereignty
- Strategic Investments

Capability

- Developing data savvy workforce
  - Data management
  - Data science
- Other related skills e.g. HPC, data architects & data engineers

Infrastructure

- Data Growth
- Infrastructure Silo's
- Licensing
- Windows vs Linux

Developing efficiencies for researchers
Improving researchers' ability to collaborate nationally & internationally
Supporting open science

NeSI
New Zealand eScience Infrastructure

Growing the computational capability of New Zealand researchers for our wellbeing

collaborative values + eResearch expertise + shared infrastructure

NeSI designs, builds, and operates a national platform of shared infrastructure, advanced computing and data resources, and eResearch services. All researchers in Aotearoa New Zealand can access NeSI's platforms and services.

Training & capability-building
- beginner to advanced
- in-person & online
- collaborations with The Carpentries

Computing platforms & services
- high-capacity CPUs, GPUs and high-memory nodes
- flexible environments for research DevOps / RSEs

Consultancy & partnerships
- research software & data science engineering
- knowledge transfer & capability development

Data & software tools
- high-speed secure data transfer
- shared datasets and repositories
- supporting Māori data sovereignty

NeSI
New Zealand eScience Infrastructure

NeSI is a national collaboration of:

UNIVERSITY OF AUCKLAND
Waipapa Taumata Rau
NEW ZEALAND

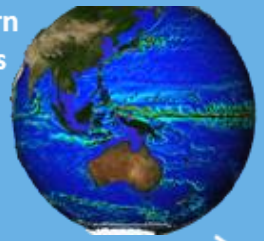
NIWA
Taihoro Nukurangi

UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND
SAPERE AUDE

Manaaki Whenua
Landcare Research

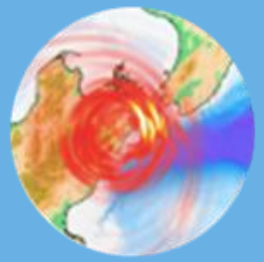
MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Dr Olaf Morgenstern and Dr Erik Behrens (Earth Science)
Deep South Challenge project using NeSI supercomputers for climate modelling.



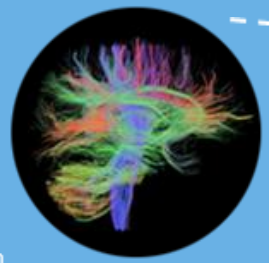
Andrew Chen (Engineering)
Using NeSI supercomputers for advancing image processing capabilities using computer vision

Yoshihiro Kaneko (Seismology)
GNS Science using NeSI supercomputers to recreate earthquake events to better understand their processes and aftermath effects.



Dr Kim Handley (Biological Sciences)
Genomics Aotearoa project using NeSI supercomputers to better understand environmental processes on a microbial level

Dr Richie Poulton (Psychology)
Using NeSI Data Transfer platform to send MRI scan images from Dunedin Multidisciplinary Health & Development Study Research Unit to a partner laboratory in the United States for analysis.



Dr Sarah Masters, Dr Deborah Crittenden, Nathaniel Gunby (Chemistry)
Using NeSI supercomputers to develop new analysis tools for studying molecules' properties.

New Zealand Context

- Te Ara Paerangi Future Pathways White Paper 2022 https://www.mbie.govt.nz/assets/te-pae-kahurangi-report.pdf (December 2022)
- Follow up to an earlier report, Te Pae Kahurangi, released in July 2020
- Promotion of collaboration and investments that build system agility
- Building with NeSI aligns with this direction
- Kaupapahere Rangahau Tuwhera (Open Research Policy)

We are officially partners in 2021

Memorandum of Understanding

(MOU)

between

AgResearch Ltd

and

New Zealand eScience Infrastructure - NeSI

9 July 2021

This is a Memorandum of Understanding (MOU) between AgResearch and NeSI.

1. Parties

1.1 AgResearch Limited of 1365 Springs Road, a Crown Research Institute, AgResearch

Services About us Community For researchers

New partnership will model a shared approach to building national capability in computational science

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New Zealand eScience Infrastructure (NeSI) and AgResearch today announced a new partnership that will design and deliver a future-focused eResearch Platform.

Through this partnership, AgResearch will meet its needs to innovate in advanced computing and data methods for its research while participating in the growth and development of national research infrastructure. AgResearch is the first to leverage the full power of NeSI's soon-to-be-launched multi-tenant cloud-native high performance computing platform.

- Ensuring eResearch platform objectives are met
- Developing an exemplar for the research sector

Purpose of partnership

- **Shares and fosters expertise** across both organisations
- Opportunities of an Infrastructure-as-Code based eResearch platform, consistency with and **shaping of future approaches**
- **Mutual support networks** for platform operations, user support, and in **establishing critical mass** through training and community-building
- Both organisations are discovering and **learning** about how best to support and develop a rich national eResearch ecosystem
- All our work together is **user driven/focus**

It takes a village…

figshare

DATACOM

NIWA
Taihoro Nukurangi

Hewlett Packard Enterprise

THE CARPENTRIES

REANNZ

NeSI
New Zealand eScience Infrastructure

Stack HPC

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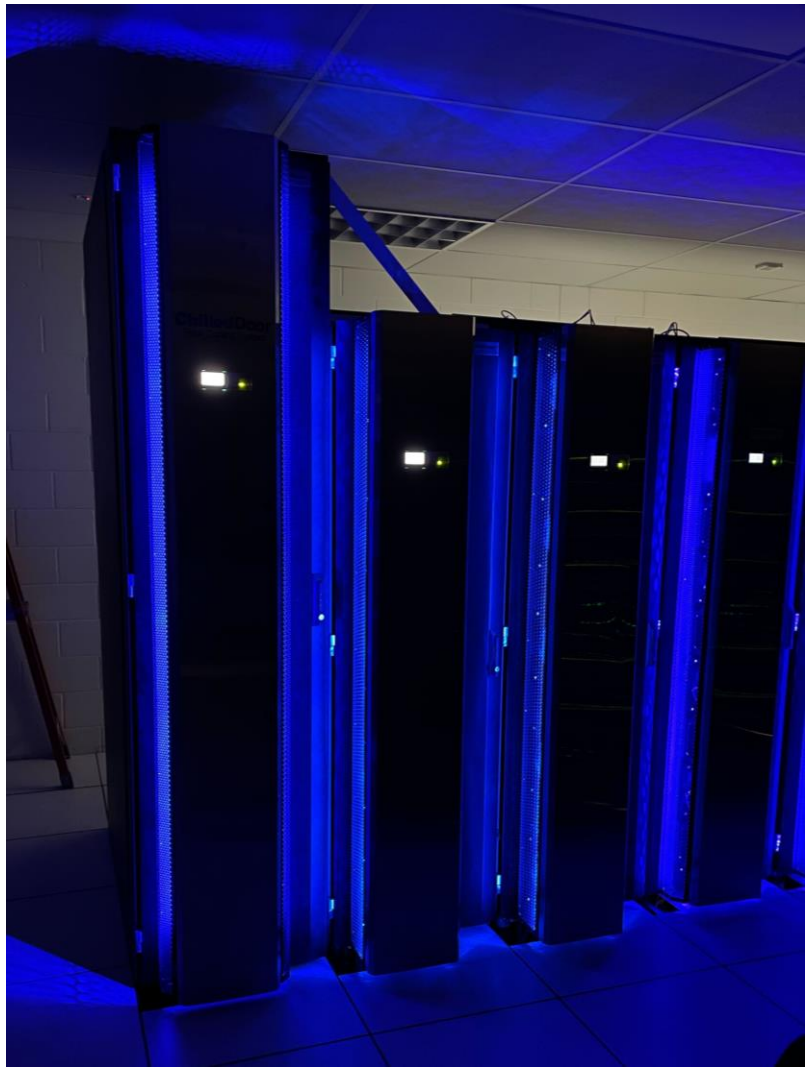
UNIVERSITY OF AUCKLAND
Waipapa Taumata Rau
NEW ZEALAND

Where are we at?

- eResearch Infrastructure Project
  - ✓ Storage Service
  - ✓ Migrated Data (1.3PB)

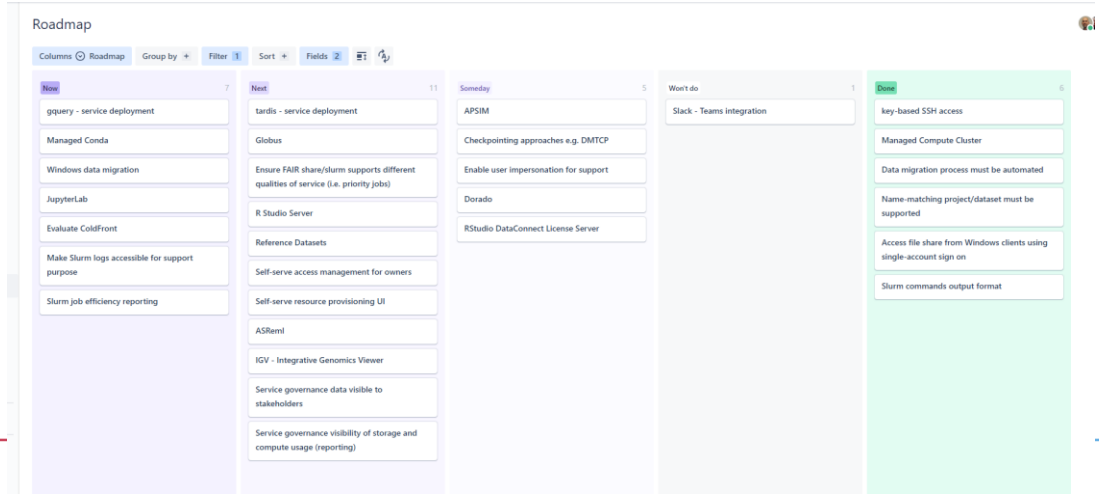
- eResearch Platform
  - ✓ Communities of Practices
  - ✓ Change in leadership
  - ✓ Output Management System (Figshare)



Learning #1 – stakeholder management

Constantly review and evolve your communications and engagement plan

- If you want someone to get the message – you need to be the one sharing it with them directly
- Ensure people know how to raise concerns with the project
- Mix of users, senior stakeholders
- Managing expectations (without timelines)

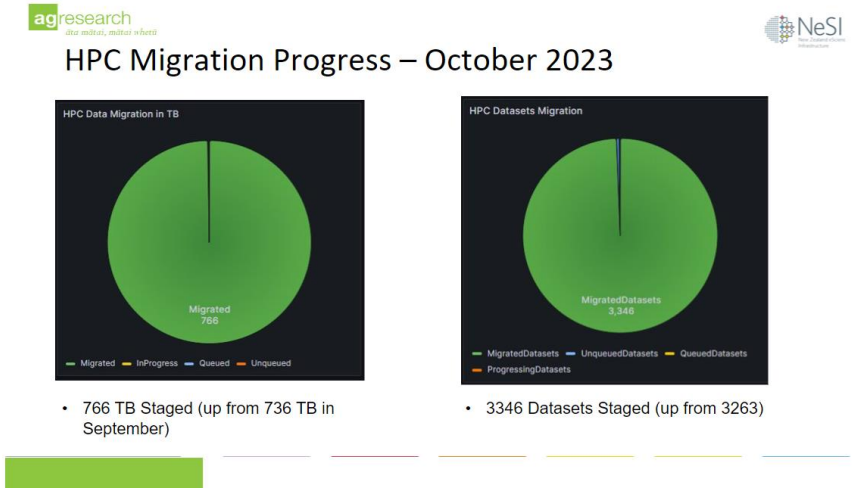


Learning #2 – Keep working on the team

- Deliberate on-boarding
- Dedicated time to bring people together in person
- For significant changes in ways of working you bring people in late at your peril
- Put effort into transparency / communications / visibility (but, tool fatigue)
- Shared purpose - everyone knows where we are heading
- Keeping the energy up
- Acknowledge that collaboration is hard/takes more work
- Continuously reconnect with the why

Learning #3 – research data-related change is hard

We knew would be challenging yet we've still underestimated



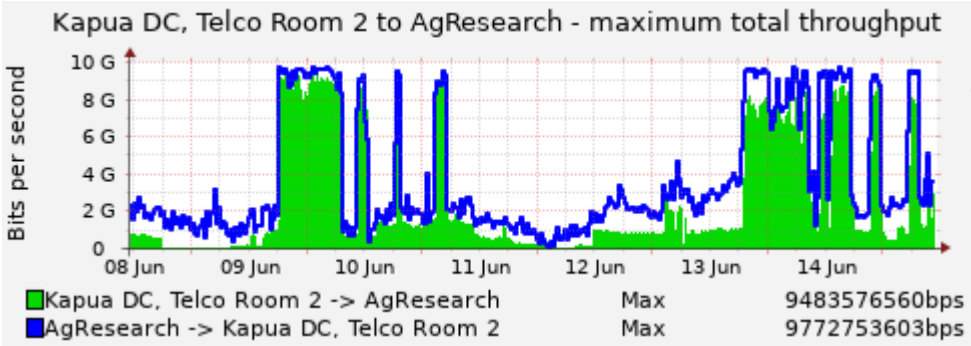
- Migrating all of a research organisation's research data takes time
- It's harder when data-intensive research has to continue
- Research Data Management practice opportunities are tempered by timelines, staff availability and timing key communications to harness energy

Benefits to the wider research sector

- New way of providing infrastructure - multi-tenanted hosting service
- But much more than the infrastructure alone
  - leveraging existing skills
  - bringing researcher needs to the fore
- De-risking the shortage of skills
  - NeSI has a whole team to help
  - local IT expertise
  - wider pool is de-risking
  - closer to the research
- This model / approach could be an exemplar for other research organisations in the sector - on us to keep sharing our learnings

Success so far

- Platform that can adapt to change in the sector
- Central place for data to be collaborated on/around
- Collaborative team, working together to enable researchers and research
- Continually refine and improve services



Early fruits of partnering

"Our new mass spectrometer (timsTOF Pro 2) produces a high volume of complex data. With the new server setup and the availability of Peaks Online, we are now able to crunch the larger volumes of data generated by our new machine."

Evelyne Maes (Proteomics Platform Leader & Science Team Leader)

PEAKS

Questions

Thomas Berger (this session) – Building custom web portals for HPC and mid-tier computing

Jun Huh (this morning) – NeSI's Flexible HPC – A programmable infrastructure for advanced research solutions

Georgina Rae (tomorrow afternoon) – Growing a Culture of Service Management at NeSI