



NeSI

New Zealand eScience  
Infrastructure

# New Zealand eScience Infrastructure

Growth & development of future capabilities

# Delivery Partners

## Host (Auckland)

- Head contract between Host and Crown (MBIE)
- Collaboration Agreement between Host and all Collaborators
- Directorate office provides national leadership, manages funds
- Director + 6 staff + advisors + 3 site managers



## NeSI @ Landcare (Landcare Informatics and IT)

- Subcontract with NeSI @ Auckland site
- Provides skills managed by NeSI @ Auckland
- 2 staff



## NeSI @ Otago (Otago ITS)

- Subcontract with NeSI @ Auckland site
- Provides skills managed by NeSI @ Auckland
- 3.5 staff



## NeSI @ Auckland (Centre for eResearch, Auckland)

- Site contract with Host
- Subcontracts with Otago and Landcare
- Site provides HPC and e-research services and skills
- Site manager + 10 staff



## NeSI @ NIWA (FitzRoy HPCF, NIWA)

- Site contract with Host
- Site provides HPC services and skills
- Site manager + 1.5 staff



## NeSI @ Canterbury (BlueFern, Canterbury)

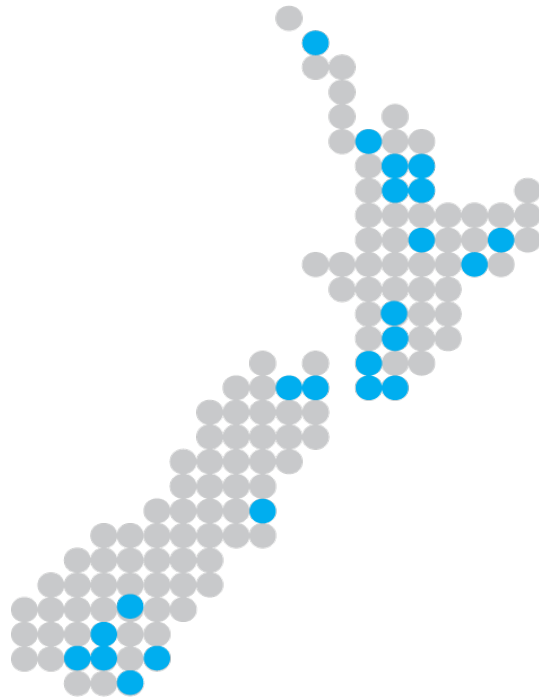
- Site contract with Host
- Site provides HPC and e-research services and skills
- Site manager + 8 staff

- MBIE
- New Zealand Genomics
- REANNZ

# National collaborative infrastructure



New Zealand's specialist land-based university

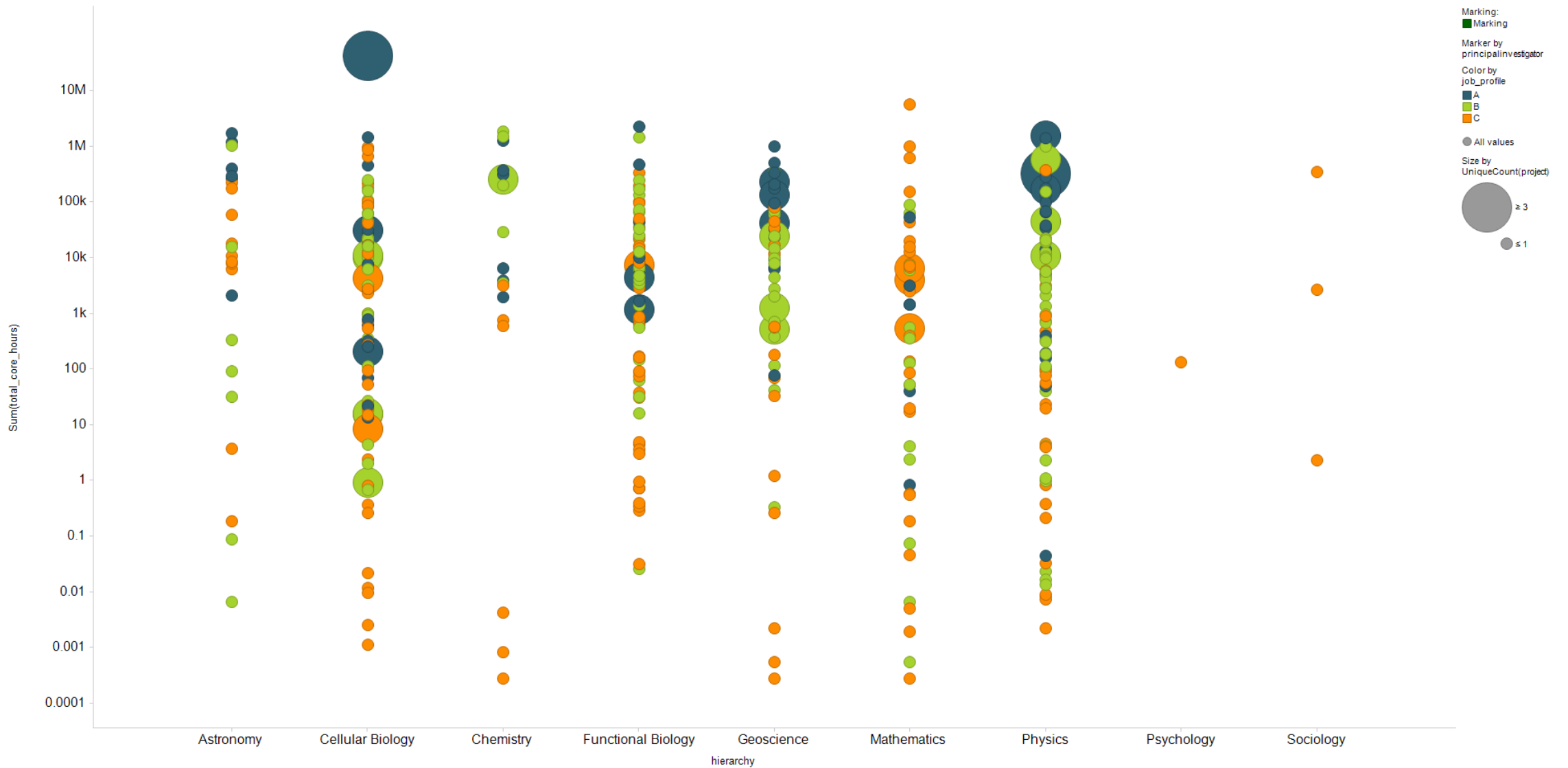


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CallaghanInnovation

# Research disciplines supported

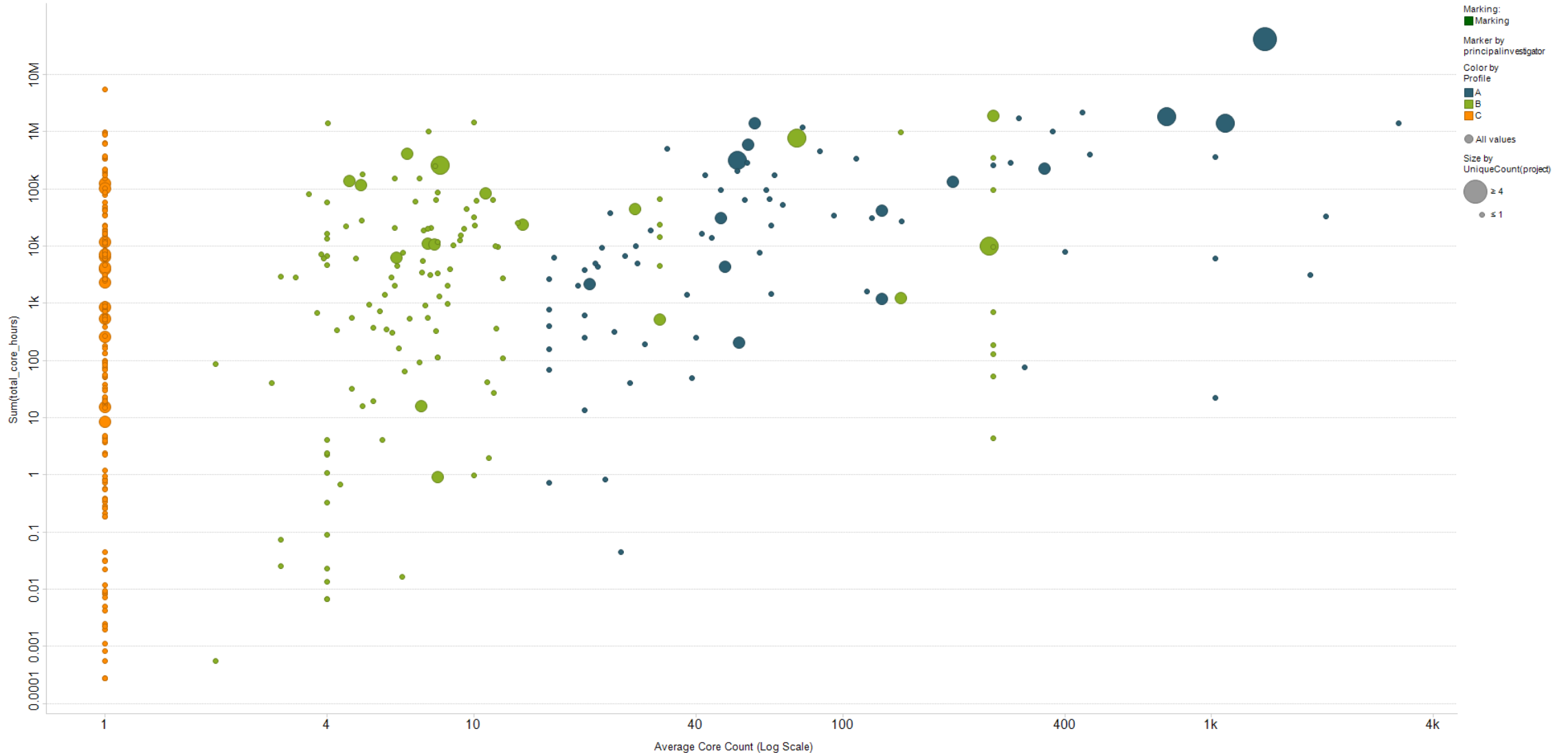
Sum(total\_core\_hours) vs. hierarchy



# Researchers use of NeSI HPC Platforms

Sum(total\_core\_hours) vs. Average Core Count (Log Scale)

Scatter Plot of Unique Research Projects by Resachers.



# Research outcomes



**74** citations & acknowledgements

<http://www.mendeley.com/groups/4317011/nesi/papers/>



**19** published case studies

<https://www.nesi.org.nz/case-studies>

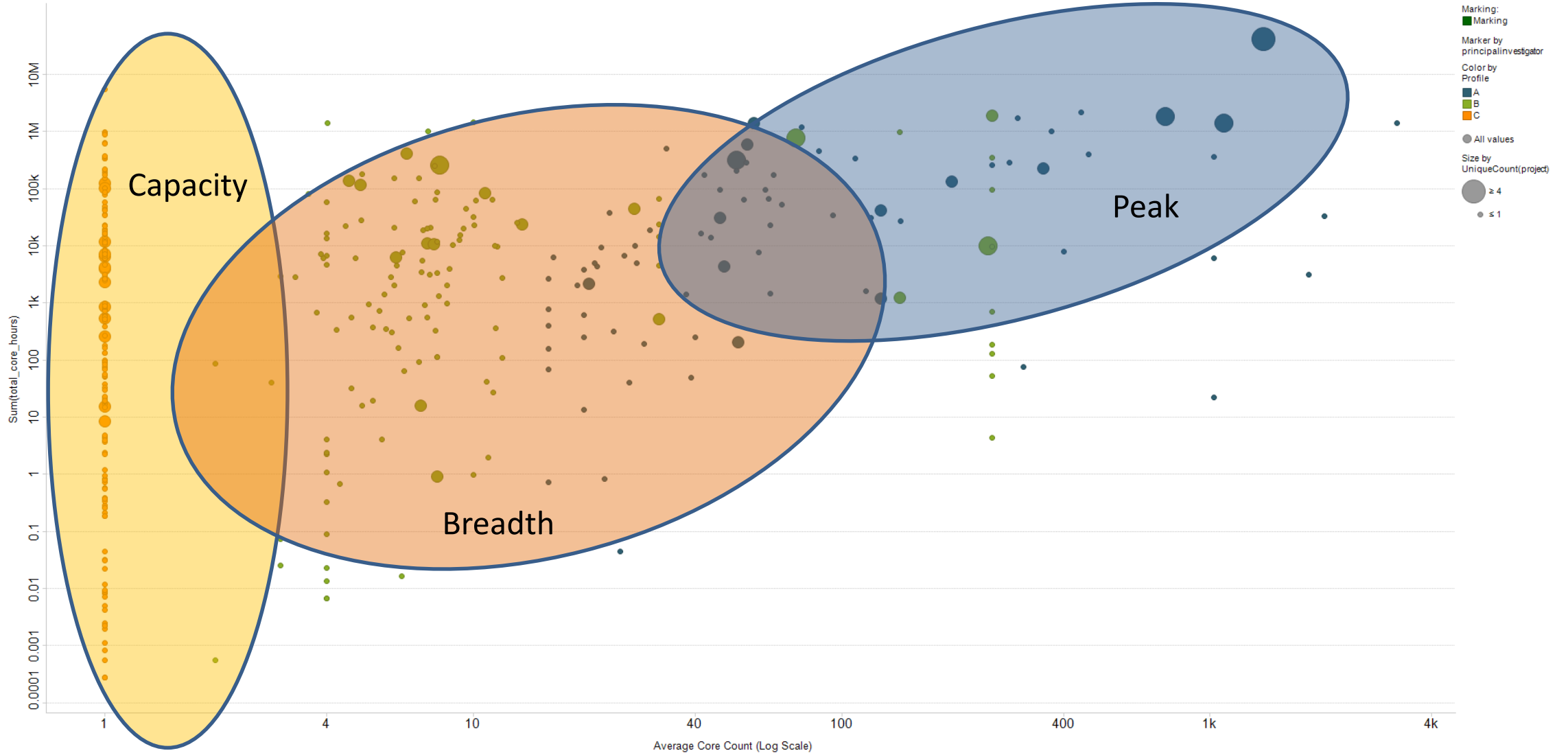
# HPC Platforms: research time-machines!

- 3,600,000,000 seconds
  - 60,000,000 minutes
  - **1,000,000 hours**
  - 41,666 days
  - **114 years**
- 360,000,000 seconds
  - 6,000,000 minutes
  - **100,000 hours**
  - 4,166 days
  - **11 years**

# NeSI Platform profiles

Sum(total\_core\_hours) vs. Average Core Count (Log Scale)

Scatter Plot of Unique Research Projects by Resachers.





# NeSI Platforms in Summary

## Pan, NeSI @ Auckland

iDataPlex Intel processor Cluster (IBM), large node memory + exotic hardware (i.e. GPGPUs)

- Breadth and Capacity profiles
- Optimised for Embarrassingly Parallel and Highly Scalable problems



## Foster, NeSI @ Canterbury

BlueGene/P Supercomputer (IBM)

- Capability & Breadth profiles
- Optimised for Embarrassingly Parallel and Highly Scalable problems

+ startup systems

- p755/POWER7 cluster
- iDataPlex Visualisation Cluster



## FitzRoy, NeSI @ NIWA

p575/POWER6 Supercomputer (IBM)

- Capability profile
- Optimised for tightly coupled (large) problems
- Operational/production-RAS (i.e. support levels)



# National Platforms Roadmap

Year	Focus
2014	<p>Optimise and sustain fit for purpose use of the existing infrastructure</p> <p>International Collaborations + Cloud Strategies</p> <ul style="list-style-type: none"> <li>i. Define NeSI's Cloud strategy and deliver a solution for brokering out to appropriate Cloud services</li> <li>ii. Establish partnerships and solutions to enable use of off-shore Australian HPC centres for research having low data-rate demands</li> <li>iii. Move non fit-for-purpose users to alternative services – e.g. commercial cloud services, other HPC centres</li> </ul>
2015	<p>Optimise and sustain fit for purpose use of the existing infrastructure</p> <p>Begin planning for replacement platforms late 2015</p> <ul style="list-style-type: none"> <li>i. Identify science directions and needs (software, hardware, services)</li> </ul>
2016	<p>Optimise and sustain fit for purpose use of the existing infrastructure</p> <p>Platform acquisitions and commissioning during late 2016</p> <ul style="list-style-type: none"> <li>i. Acceptance testing &amp; commissioning</li> </ul>
2017	<p>Optimise and sustain fit for purpose use of the existing infrastructure</p> <p>National Platforms Roadmap reviewed</p>
2018	<p>Optimise and sustain fit for purpose use of the existing infrastructure</p> <p>National Platforms Roadmap reviewed</p>

## Research needs based

- NSCs
- CoREs

## Technology changes

- Data
- Core capabilities

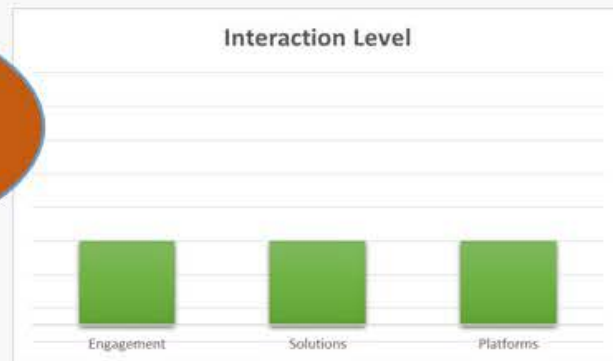
## National coordination

- Governance led

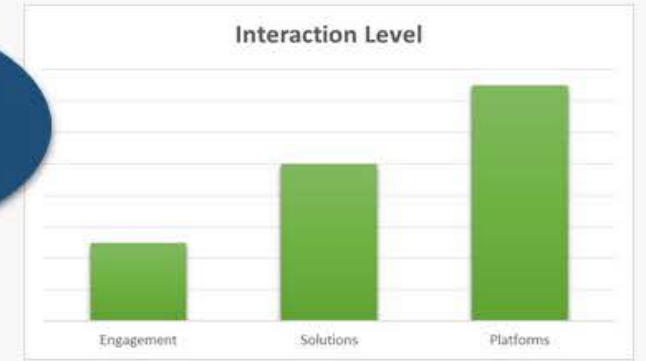
# Supporting, growing & developing capability

Low Touch Needs

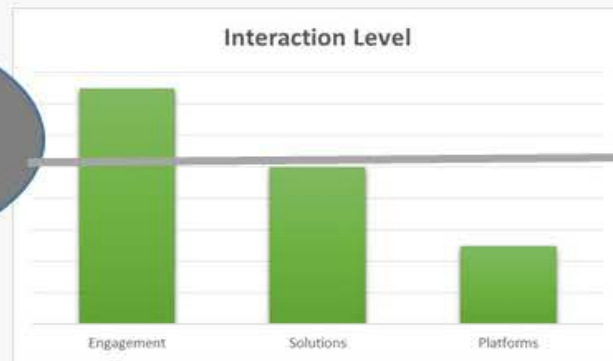
More 'simplistic' Approach and Opportunity to partner



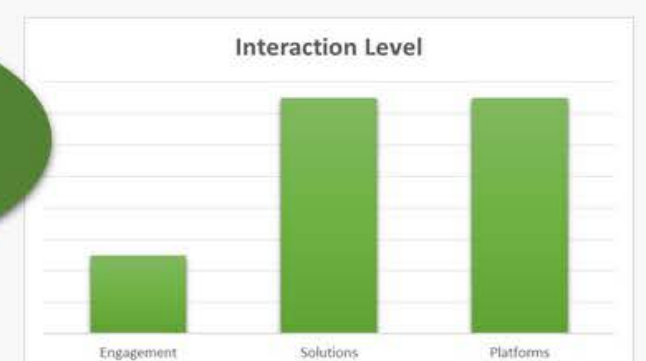
Bigger Research Problems, Bigger Solutions and Developing a National Platform



Low Solution Specialisation Needs



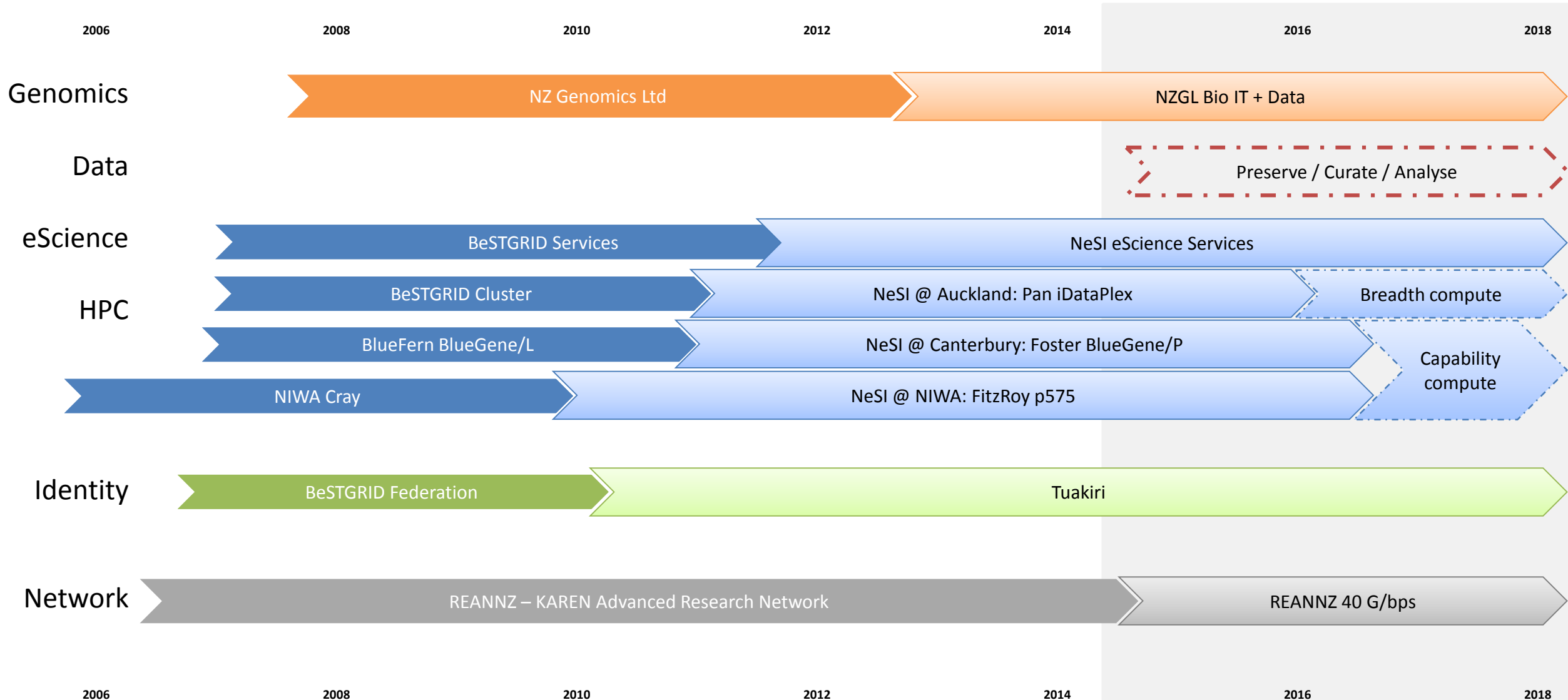
Growth and Development



High Solution Specialisation Needs

High Touch Needs

# Research e-Infrastructure Platforms roadmap



# Strategic initiatives

## eResearch 2020 (2013 – 2014)

- Demand driven vision, sector wide
- Endorsed by NeSI, NZGL, REANNZ, supported by NeSI

## e-Infrastructures Joint Working Group (2014 – ongoing)

- Composed of Board two members of NeSI, NZGL, REANNZ and CEOs
- Identifying joint approaches that enhance benefits to the sector

## eResearch NZ (2010 – ongoing)

- Supporting the development of a national Community of Practice
- Annual national conference – eResearch NZ 2014, 30 June – 2 July, Waikato

# Joint planning for future infrastructure and skills

1. Sponsorship by research leaders and deep engagement with research communities
2. Long term planning to reach alignment between research needs and future infrastructure
3. Ongoing collaboration to ensure performance of infrastructure and translation of skills into research capabilities

Let's keep talking ...