2026-06-29

Exploring REANNZ HPC: Tools and Services for Researchers

Speaker: Anthony Shaw

REANNZ

REANNZ

Research and Education Advanced Network New Zealand

We are a Crown-owned membership organisation providing a **centralised national eResearch platform for research**, **science**, **education,** and **innovation** in Aotearoa New Zealand.

Core HPC Platform Services

HPC & data analytics

Data services

Training

Consultancy

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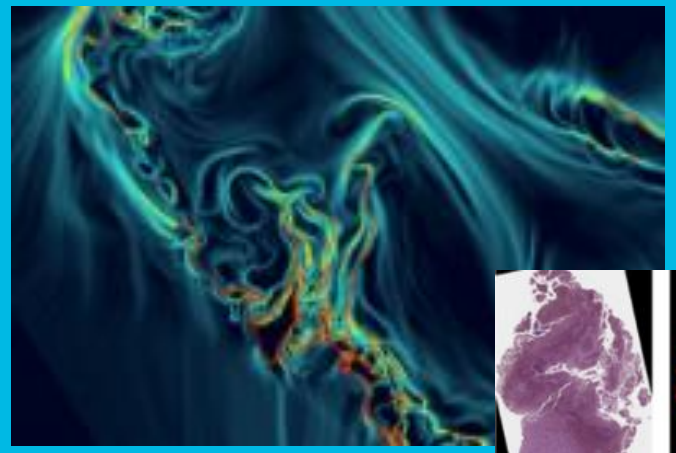
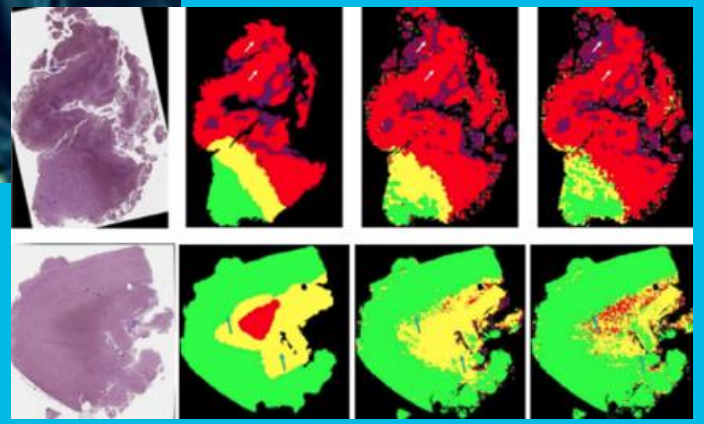
Disciplines Supported

Biology
Engineering
Astronomy
Physics
Chemistry
Computer Science
Medical Science
Earth Science
Social Science
Mathematics





High Performance Computing (HPC) and data analytics

Advanced computing and data analytics environments that support data-intensive work at speed and scale, Machine Learning (ML) approaches, research DevOps, and eResearch needs across institutions and communities.

Consultancy

Collaborate to streamline workflows, optimise code, integrate AI or ML approaches, and lift your team's computational capabilities.

Training

Researcher skill building and national training community development through local and global partnerships.

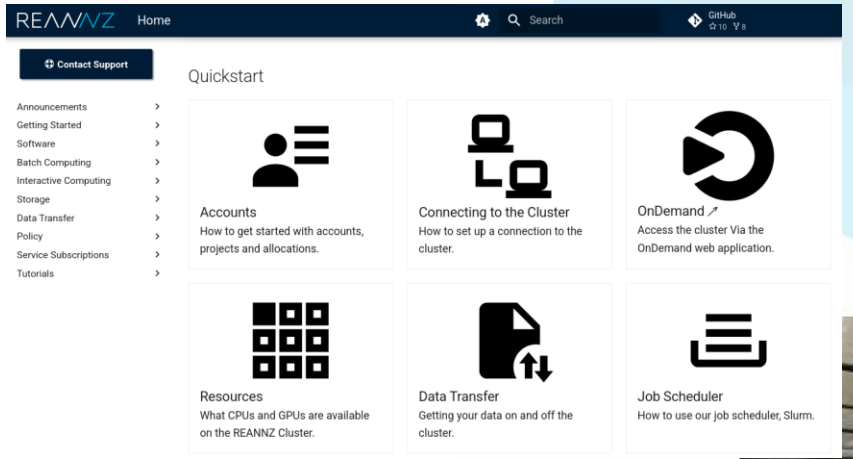
Data services

Store, process, analyse, visualise, transfer, and share data.

High Performance Computing & Data Analytics

Our HPC platform enables you to:

- access high-performance CPUs, specialised GPUs, and high-memory nodes
- work interactively using OnDemand to access Jupyter Notebooks, containers, and virtuallab environments
- bring your own code or access our extensive software library -- already built and compiled, ready for you to use
- scale your code and expand your projects



https://docs.nesi.org.nz/

There is no question too big or too small for our Support Team.

Email support@nesi.org.nz anytime or come to our weekly Online Office Hours.

What is High Performance Computing (HPC)?

Personal laptop =
a few cores and GBs
of memory

HPC =
thousands cores and
TBs of memory

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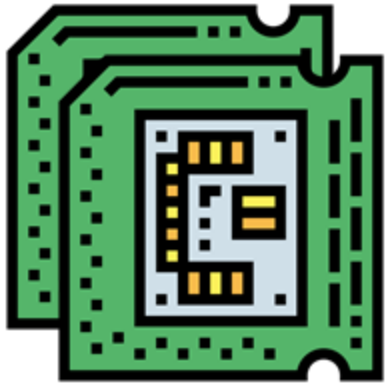
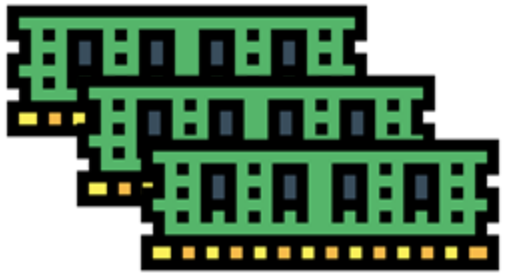
Contact: support@nesi.org.nz

Reasons to use HPC

Your problem can use **multiple CPUs**



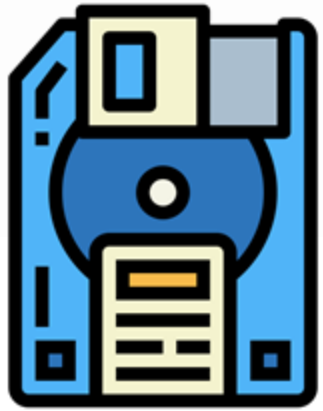
Your problem needs **more memory** (RAM)



Your problem can use **specialised resources** (GPUs)

Your problem needs a **long time to run** (days/weeks)

Your problem works on data too large for **available storage**



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Icons by smalllikeart

REANNZ HPC Resources

Compute:

- 135 nodes
- 19,368 cores (generally 128 or 168 per node)
- 92,256 GB RAM (generally 512 GB or 368 GB per node)
- 24 A100 GPUs
- 16 L4 GPUs
- 8 H100 GPUs

Storage:

- 3 PB of storage with seamless data movement to higher performance storage for running jobs.
- 50 TB cache, with 2 PB of tapes

You can find more details about the available resources on our Hardware support page.

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Research Developer Cloud

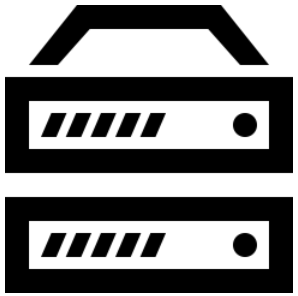
https://support.cloud.nesi.org.nz/

Cloud environment for developing custom solutions

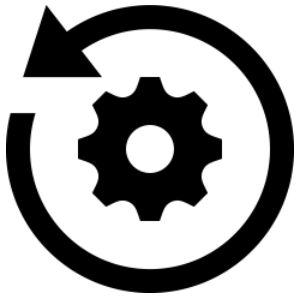
- **Cloud native support** – spin up VMs to build custom research solutions on our cloud
- **Infrastructure as Code** - APIs to support as-code approach for transparency, maintainability, and repeatability
- **Collaborate with NeSI experts** – collaborate with us to build shared knowledge for the sector

Features

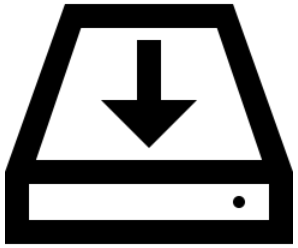
Compute



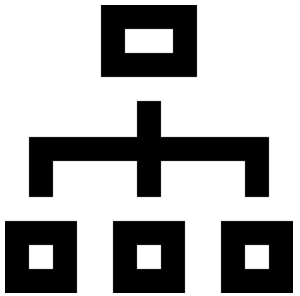
Images



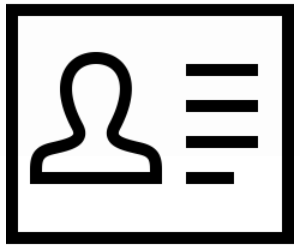
Storage



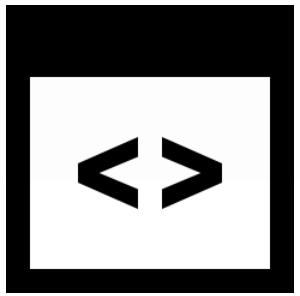
Networks



Identity



API



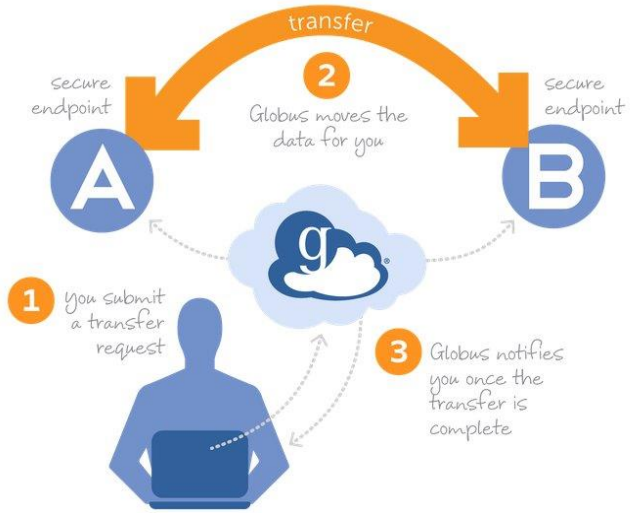
Data Services

Data Transfer

Secure, high-speed transfer & share capabilities for large research datasets. Supports collaboration within NZ and around the world.

- File Sender
- Globus

File Sender



Data Storage

Storage resources for projects using the REANNZ HPC platform.

- High-performance
- Freezer (long-term storage)

Shared Datasets

- Virtual labs and portals.
- Support of FAIR principles.

genomics aotearoa

rakeiora GENOMICS PLATFORM

Partnerships

Co-designing longer-term data management solutions:

- Aotearoa Genomic Data Repository
- Rakeiora Genomics Platform

Training

How we support digital skills and capability development

- **Webinars & Intro Sessions:** Regular tips, tools & HPC starter sessions
- REANNZ Training Calendar
- **Workshops:** Hands-on code profiling & optimisation
- **Bioinformatics Training:** National collaboration with Genomics Aotearoa
- **Instructor Training:** National support via Carpentries membership
- **Carpentries Workshops:** Nationwide workshops by certified instructors
- **YouTube Library:** Dynamic, updated online training hub
- **Training Catalogue:** Open-source materials on website & GitHub
- **Cloud-Based Training:** On-demand HPC & tailored data science access
- **Office Hours:** Weekly online drop-in for user support

A service available to all New Zealand-based researchers, providing training and support to build capability & develop skills in high performance computing, data science, and digital research methods.

To stay 'in the loop':

- Subscribe to our REANNZ training mailing list
- Learn about more upcoming events on our Training Calendar

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Contact: training@reannz.co.nz

Computational Science Consultancy

- A service offered to REANNZ HPC users, generally at no cost to the researcher
- REANNZ HPC Research Software Engineers work directly with research group members
- Goal is to raise the capability of the research groupraise the capability of the research groupraise the capability **of the research group**

Our Research Software Engineers can assist with:

- **Workflow parallelisation** – allowing more inputs to be processed simultaneously
- **Software parallelisation** – use of technologies such as OpenMP or MPI to process one single input more quickly
- **Code optimisation** – redesign of algorithms to improve overall speed or efficiency of resource use
- **Improving I/O performance** – speed up reading from or writing to the disk, or to reduce the amount of data that must be read or written
- **Porting to GPU** – accelerate code by offloading computations to a coprocessor
- **Improving software sustainability** – introducing best practices such as version control and unit testing

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Contact: support@nesi.org.nz

What you need to know

Environment

Linux *No windows, sorry*

Command Line* *Using Bash Unix Shell - Check out our command cheats sheets*

Batch Processing* *Can run without your direction*

Scheduled* *Resources booked though SLURM*

Shared Resource* *Be considerate :)*

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* *Mostly*

Software

Many software packages are **already installed & maintained**

List can be found @ docs.nesi.org.nz under:
'Supported Applications'

We may centrally **install software on request**

Provided it has a Linux version

Licensed software can be used on the platforms, though REANNZ does not usual maintain licenses

You may also install **your own software**

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Data Security

- We offer secure, NZ based data storage
- Data is by default only accessible by project team members and REANNZ support
- Only the project owner, or designated project team members, can add users to a project
- Secure, high speed data transfer with Globus
- Daily data snapshots, preserved for 7 days
- If you have unique data security requirements, or have any questions or concerns, please contact us

How to access the HPC

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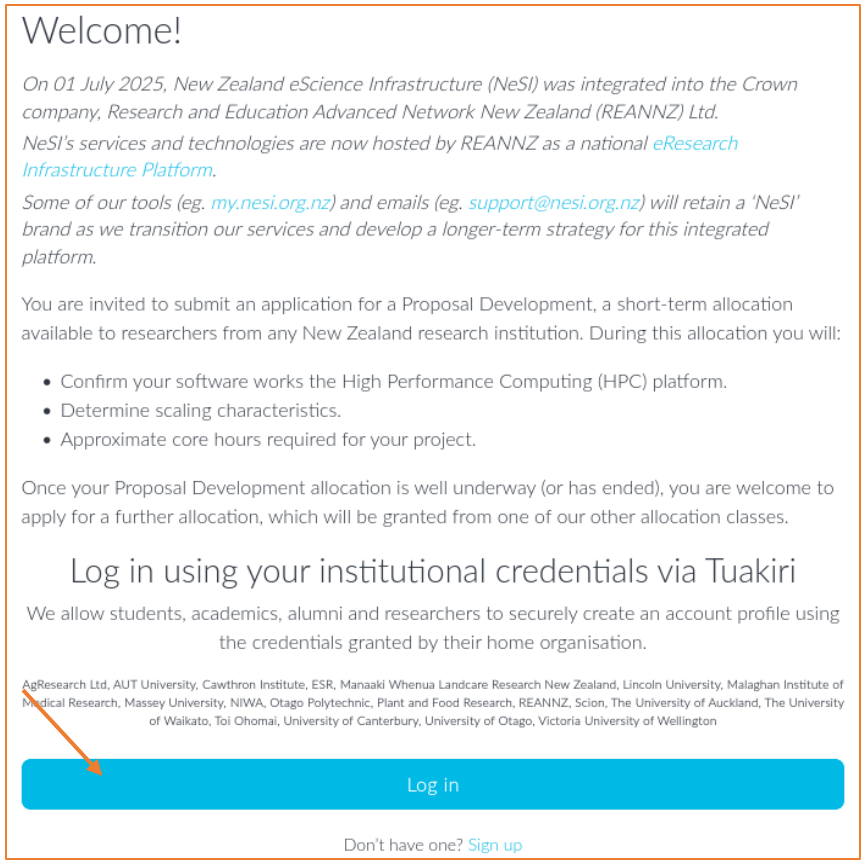
Requesting an Account

1. https://my.nesi.org.nz/ Note: Users from non-Tuakiri federated institutions need to sign up here: https://my.nesi.org.nz/register

2.



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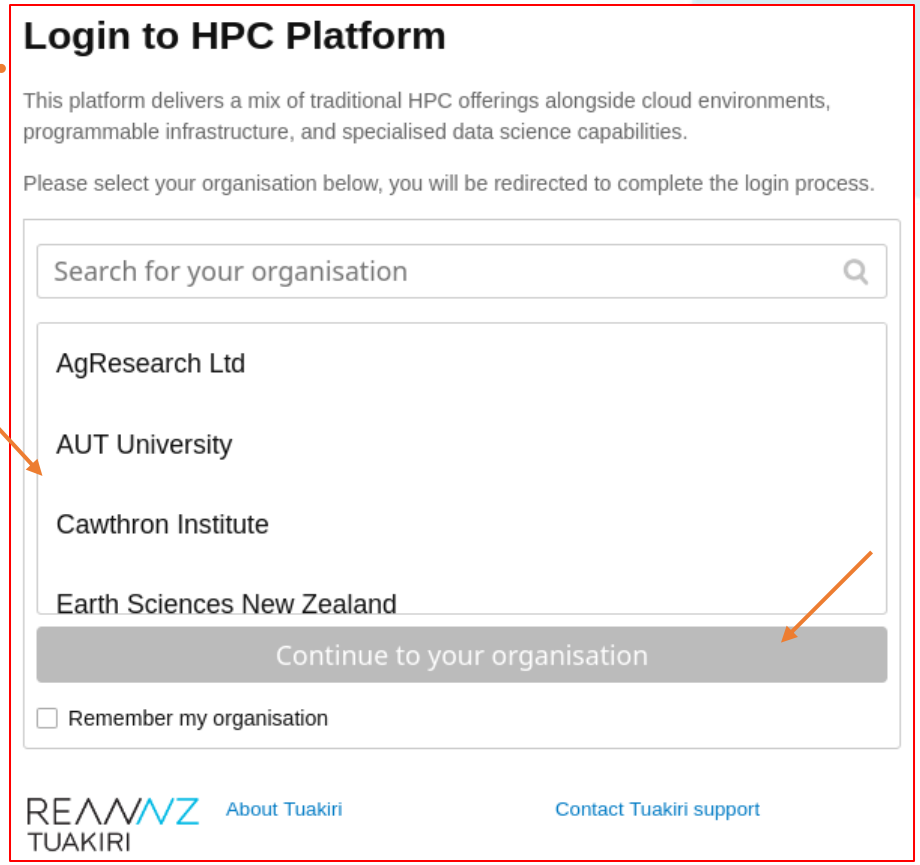

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Accessing the platforms

Mac/Linux users through terminal

Windows have to download a client
(e.g. WSL, MobaXterm, etc)

Using JupyterHub, via browser

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Details on setting up your login configuration can be found at support.nesi.org.nz

OnDemand

OnDemand allows you to access the REANNZ HPC resources through the browser as an alternative SSH terminal, while also offering interactive applications for you to work with. Some of the available applications include:

- JupyterLab
- VSCode
- RStudio
- Matlab
- A virtual desktop

- To access OnDemand merely navigate to https://ondemand.nesi.org.nz/ with your browser and log in with your institutional credentials.
- You can find more in depth instructions for accessing OnDemand on our support pages.

Let’s stay connected

Interested in news & events ...

Join our mailing list
(training alerts, newsletters, event announcements, etc.)
REANNZ Training Calendar

Technical questions ...

Email our Team: support@nesi.org.nz

Visit our Support site: https://docs.nesi.org.nz/

Weekly online Office Hours: https://docs.nesi.org.nz/Getting_Started/Weekly_Online_Office_Hours/

Ready to get started ...

Apply for access: https://my.nesi.org.nz/

Sign up for Introduction to High Performance Computing this Friday…

https://www.eventbrite.co.nz/e/introduction-to-high-performance-computing-resbaz-tickets-1987285621791

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Aotearoa New Zealand Research Software Conference

SUBMISSIONS NOW OPEN

REANNZ will host its annual national research software conference **online** on 7–8 September 2026. Previously known as the NZ Research Software Engineering Conference, the event has been renamed the Aotearoa Research Software Conference to better reflect inclusivity.

There is no conference theme and registration is **free**.

We welcome presentation submissions from anyone interested in sharing their work in research software.

To know more, please go to www.rseconference.nz