A Guide to the Research Computing Service

THE UNIVERSITY of EDINBURGH

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This booklet was produced in November 2018 by Information Services, IT Infrastructure division, Research Services Section.

The latest version can be downloaded from:

https://www.ed.ac.uk/is/research-computing-service

Research Computing

Advances in computing underpin some of the most significant research undertaken in recent decades, from genetic sequencing to climate change modelling and simulation.

Computational methods allow researchers to ask new questions and scale up their projects, offering exciting potential across all disciplines.

The University of Edinburgh provides a range of research computing services. This guide gives an overview of the services available, explaining what they are, why you should use them, and how to use them.

Research Computing Service:
https://www.ed.ac.uk/is/research-computing-service

Computational research also requires data management and storage, which is supported through the Research Data Service: https://www.ed.ac.uk/is/research-data-service

High Performance Computing (HPC)

High Performance Computing (HPC) involves the use of clusters of computers (nodes) and parallel processing techniques for solving complex computational problems and performing research activities.

HPC clusters run advanced applications for simulation, modelling, data analysis, manipulation, mining and visualisation.

While small amounts of processing can be carried out on a desktop machine or school network, researchers working with significant amounts of data will quickly require more processing power. Using an HPC cluster enables researchers to distribute a computational task across many compute cores, to lower time-to-solution, and enable computations at an otherwise unachievable scale. As a result, HPC is increasingly used across academic disciplines and research fields.

The University of Edinburgh provides access to a range of local, regional and national HPC facilities, including its own cluster, Eddie.

Eddie

What is Eddie?
Eddie is the University's research compute cluster. It runs a Linux operating system and consists of several thousand Intel® Xeon® cores. Eddie provides access to large-memory (multiple terabyte) compute nodes as well as a significant number of NVIDIA GPUs to support accelerated computing and deep learning.

Eddie provides a fast file system that allows hundreds of users to read and write to it at the same time.

Why should I use it?
Eddie allows you to run your analyses in parallel taking advantage of multiple compute cores. This way you can:

- analyse large amounts of data faster than on a desktop computer.
- perform computations that would not be possible on a desktop computer.

A number of software applications are installed on Eddie and you can also install and use your own if required.

Eddie connects with the University's file store for research data making it easy to transfer your data for analysis. Learn more about DataStore on page 9.

You can learn how to use Eddie even if you have little or no experience of cluster computing, as training, support and consultancy services are available (see pages 10 and 12).

How can I access it?
Eddie can be used by all research staff and postgraduate students – all you need is your University username.

There are free allocations of storage for individuals and groups. Further storage, priority compute and access to ring-fenced resources are available for grant-funded research.

A quick-start guide to accessing Eddie can be seen here:
https://www.wiki.ed.ac.uk/display/ResearchServices/Quickstart

More information on Eddie can be seen here:
https://www.ed.ac.uk/is/research-computing-service/eddie

Eleanor

What is Eleanor
Eleanor is the University's cloud computing service for research. It provides a platform to self-provision infrastructure, allowing you to create virtual machines configured to your exact requirements.

Eleanor offers familiar operating systems (CentOS, Scientific Linux, Ubuntu and Windows) and popular scheduling tools (Hadoop and Spark).

Why should I use it?
Renting servers in the cloud for research rather than purchasing is a cost -effective solution.

Eleanor is highly customisable you have full control of the installed software, and if more memory, CPUs or disk are required you can quickly reconfigure your virtual machine.

Eleanor is similar to the commercial cloud service, Amazon Web Services, but it is private: built on University infrastructure, located in our own data centres.

How can I access it?
All research staff and postgraduate research students can get access to a restricted amount of cloud resource at no cost for proof-of-concept and small-scale work. Funded access is available for research projects.

You can register to use Eleanor at:
https://registration.ecdf.ed.ac.uk/storage/
(under "My Research Cloud Projects")

More information on Eleanor can be seen here:
https://www.ed.ac.uk/is/research-computing-service/cloud

Storing your research data

Free and funded storage allocations are available on both Eddie and Eleanor to allow you to run your analysis. For longer-term storage of golden copy research data, we recommend DataStore.

What is DataStore?
DataStore provides file storage for active research data and is available to all research staff and postgraduate research students.

DataStore can be connected with both Eddie and Eleanor for easy transfer of your data for analysis.

Why should I use it?
DataStore is fully backed-up, secure, resilient, multi-site storage, and new allocations can be created immediately.

How can I access it?
A free individual allocation is given to all research staff and postgraduate research students. This is mapped to the M:drive on University Supported Desktops.

Shared group spaces and additional capacity for more demanding projects can also be arranged.

Connection instructions are available at:
https://www.wiki.ed.ac.uk/display/ResearchServices/DataStore

More information on DataStore can be seen here:
https://www.ed.ac.uk/is/research-data-service/working-with-data/data-storage

Training

Research computing training is provided through the University of Edinburgh's Digital Skills and Research Services Support teams.

This includes introductory courses on Eddie as well as more advanced training on parallel programming techniques.

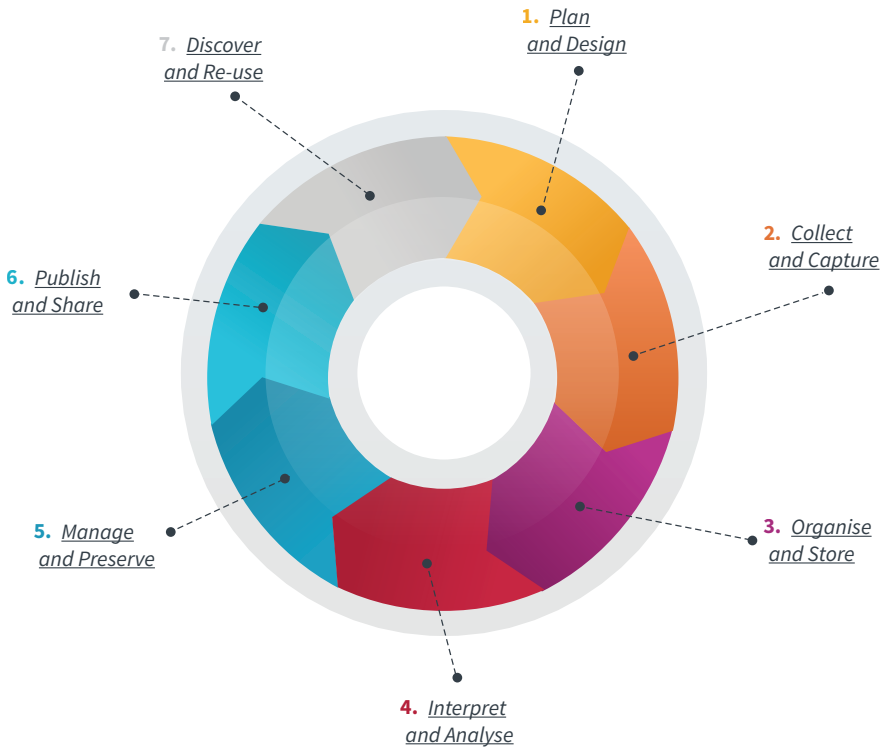
You can search for a course and book a place via the Event Booking channel in MyEd or the Digital Skills Resource Finder at https://www.digitalskills.ed.ac.uk/all-resources/

You can also request training to be delivered in your School or Institute by contacting us directly.

Course material can be seen here:
https://www.wiki.ed.ac.uk/display/ResearchServices/Courses

Digital Research Services

The University of Edinburgh provides a wide range of digital research services for use across the research lifecycle. The Digital Research Services website provides a single point of access to information about all services available, along with case studies, and skills development information. The Digital Research Facilitation team can work with researchers to ensure they get can access and get the best value out of services provided.



Website: digitalresearchservices.ed.ac.uk

Support

Research computing support and consultancy is available to staff and research students. You can contact us via email or in person. You are welcome to:

- Contact us via the IS Helpline: https://www.ed.ac.uk/is/helpline
- Meet us at the drop-in clinics, which take place weekly at different campuses: https://www.wiki.ed.ac.uk/display/ResearchServices/Drop-in+Clinics

We offer quick-start consultation with new and existing members of staff or research groups as well as in-depth consultancy if required.

We are also happy to discuss bespoke requirements that are not met by our current service offering.

If you require this document in an alternative format, such as large print or a coloured background, please contact the IS Helpline - https://www.ed.ac.uk/is/helpline