DEPARTMENTAL SERVERS

or “How to not leave your laptop on all the time”

Andrew Elliott; Weiyue Zheng; Iain Bell; Toby Kettlewell; and Aaron Coats
with Vinny Davies and Craig Alexander.

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School of Mathematics & Statistics

WELCOME!

Welcome to our training session on the **Euclid** servers.

In this session we will cover:

- What server resources do we have in the school
- How do we access the servers
- How do students in the school use them?
- Where do you go for help?

STRUCTURE OF SESSION

The session will be structured as follows:

First i will give:

- brief introduction to our cluster.
- Basic use.

Then I will hand over to our PhD students who will practically show you how they use the servers

1. Iain Bell (file transfers to the server.)
2. Weiyue Zheng (RStudio Server and command line)
3. Toby Kettlewell - (Command line and multiple jobs)
4. Aaron Coats (Use of our queuing system - SLURM)

If time an short exercise running something on our servers.

Friday beers??

INTRODUCTION TO THE CLUSTER

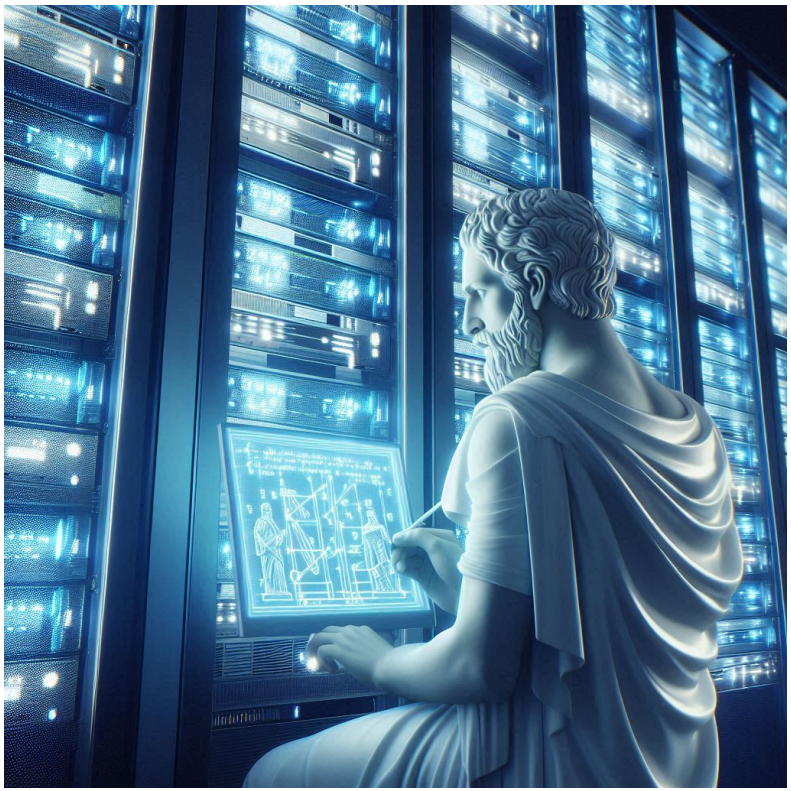
WHAT DO WE HAVE?

We have at our disposal:

34 servers each with different tradeoffs between CPU/RAM etc.

This includes:

- Over 1300 cores (not threads!)
- Over 7TB of system RAM
- 23 Nvidia GPUS - including 10 A6000 with 48Gb of VRAM.



Important: Many of these servers are for general use, but some belong to groups/academics and you should only use them if you are in this group.

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Four things to consider:

1. Am i allowed to use it?

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4. Does it have the software i need?
   Try it! - Ask around to other PhD students - might need to build locally in a pinch.

BASIC USE

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So you have selected your server.

How do you run your super complex code that will save the world/prove N=NP/win the Nobel?

- All of our servers run


Linux


- An open source OS - ran on many servers.
- Little different to Windows/Mac
- You need to access them using using SSH.
-
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WHAT IS SSH?

- **SSH (Secure Shell)** is a protocol for securely connecting to a remote computer.
- It provides a command-line interface to the server.
- Allows you to execute commands and manage resources remotely.
- Additionally transfer files between local and remote machines.

Mac OS/Linux

Use the terminal app:

You may need to install XQuartz for some use cases.

Mac OS/Linux

Use the terminal app:

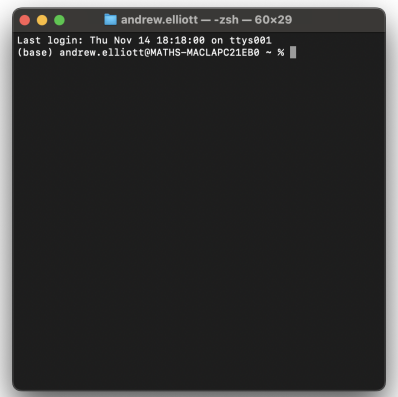
Windows

Few options:

Option 1

Install WSL

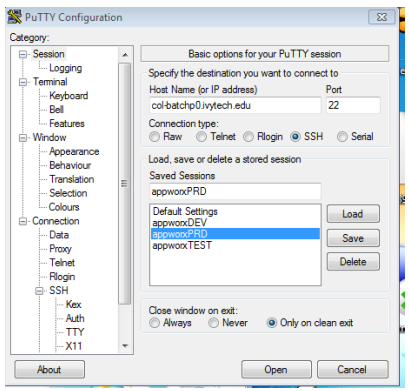
- Use Linux/Mac terminal
- Follow Mac guide



Option 2

Use dedicated App:

- Putty
- MobaXterm.



Source Wikimedia

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CONNECTING TO A LINUX SERVER

Step 1. Connect to the University network (so you are inside the firewall).

Mac OS/Linux

The command to connect is:

```
ssh username@hostname
```

So to connect to Euclid-1:

```
ssh username@euclid-
 01.maths.gla.ac.uk
```

It will be ask for the password.
(Alt you can set up SSH keys)

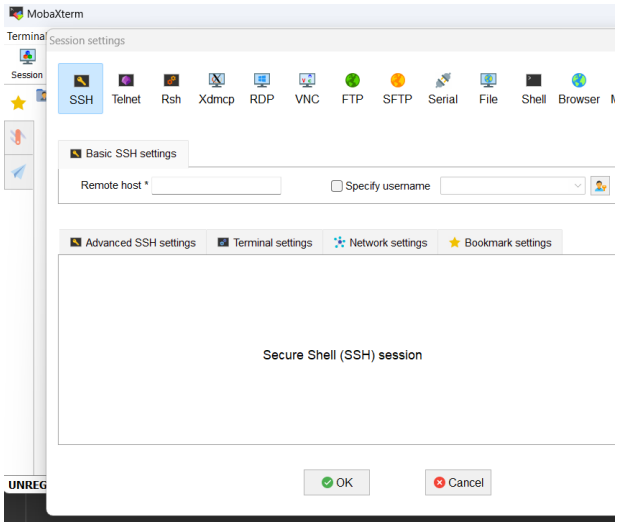
For graphical forwarding add `-X`

```
ssh -X user@hostname
```

Windows

Very similar, input the:

- username and password
- server you want to connect to



NOW YOU HAVE ACCESS NOW WHAT?

- The Linux command line is a text-based interface for interacting with our servers.
- Commands are issued by typing text and pressing Enter.
- Ability to automate tasks with scripts.

SUMMARY OF COMMANDS

Full terminal guide is beyond this session (see software carpentry[1]).

High-level commands for today:

Files and Folders

- `ls`: List files in current directory.

```
ls -lh
```

- `cd`: Change directory e.g.

```
cd myFolder
```

  or to go to the folder one above:

```
cd ../
```

Other useful commands:

- `top`: Monitor system processes (like task manager/activity monitor).
- `screen`: Manage sessions (see demo).

Make or Copy Files

- `cp`: Copy files or directories.

```
cp file1 file2
```

- `scp`: Copy files between machines (see demo).
- `mv`: Move/rename files or folders.

```
mv file1 file2
```

- `mkdir`: Create directories.

```
mkdir folderName
```

[1] `https://swcarpentry.github.io/shell-novice/`

PYTHON, R AND MATLAB ON THE SERVER

R

- R is on most if not all of the Euclids by default.
- To install packages you need to install locally (R will do this).
- You may need to update packages.

Python

- System Python is on most Euclids it is 3.10.2 right now.
- You can install packages locally via `pip`

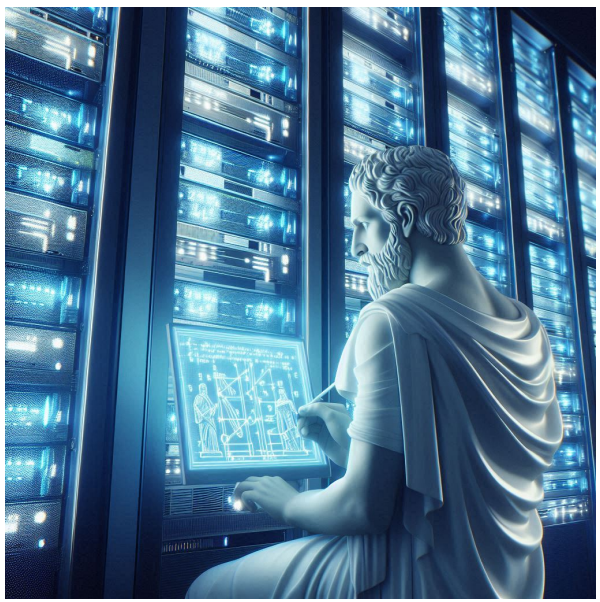
```
python -m pip install –user PACKAGENAME
```

- **(Recommended)** You can locally install Anaconda/Miniconda giving flexibility, and security against version changes.

Matlab

- Supported, but need to use screen forwarding to use.
- Can run `.m` directly with the right flags.

DEMOS!



Info also on GitHub:

`https://github.com/UofGAnalytics/ServerInfo`