# Introduction to High Performance Computing with NeSI

**20 March 2025 | 10:00 am - 03:00 pm NZDT**

## Links:

**NeSI JupyterHub:**

**Software Carpentry HPC Intro:**

**NeSI Support Documentation:**

**Commands for catching up:**

**Final Exercise:**

[JupyterHub](https://jupyter.nesi.org.nz/hub/)

[Introduction to High-Performance Computing](https://nesi.github.io/hpc-intro/)

[Support Documentation](https://docs.nesi.org.nz/)

[Command History](https://nesi.github.io/hpc-intro/command-history/)

[HPC\_Excersise](https://docs.google.com/spreadsheets/d/1D5PnhE6iJOB3ZKkDCiBHnk5CNZlhmj_gS-IXKGkkVoI/edit?usp=sharing)

Please have your project ID handy: nesi99991

## Getting help:

* If you have a question or comment that is non-urgent please write it below ⬇
* If you are stuck and need help now, raise your hand in zoom by clicking **reactions > raise hand** and we will try to help you in a breakout room. Please lower your hand when you are no longer stuck

## Poll: (add a + next to line)

### What is your level of experience with Linux/Bash?

Never heard of it: ++   
Occasionally ctrl+c commands: ++

Basic understanding: +

Use Daily: ++++

### What is your level of experience with High Performance Computing?

What?: +++

Have used scheduled cluster: +++

Used NeSI before: +

I am a NeSI employee: +++

## Questions:

*Please place your questions and comments below:*

Q1: Do I have to be very good with the terminal to use NeSI?

A1: You will need to become competent I would say. And some of today is to get you to that point! You can become as skilled as you would like - Bash (the language of the command line/terminal) is a programming language and you can get as skilled at it as you see fit. I’ll also add that the better you are the easier your work will be (and save you from repetitive boring tasks).

Q2: Are these directories on NESI account similar to drives we have in PC?

A2: A drive/filesystem (usually) corresponds to a piece of hardware, e.g. a hard drive.

Where as a directory/folder is a way of organizing files on a drive/filesystem

Q3: can you not just do ls -l instead as you are already in that dir

A3: Absolutely yes, if you’re trying to ‘ls’ everything in your current directory, you won’t need to type in the absolute path 🙂

Q4: I am planning on producing large image/video stimuli datasets for testing humans and machine vision models. The software I am planning on using is<https://www.blender.org/>. Blender can operate via a Python API. Firstly, is this likely implementable with NeSI? If so, I was wondering if you could point me to documentation/ have any tips regarding working with non-standard NeSI software. Thanks in advance 🙂

A4: You can install your own software as long as it’s compatible with with the NeSI system, and doesn’t require any specific licensing (let us know if it does). We have a little bit of documentation on this here:  
<https://docs.nesi.org.nz/Scientific_Computing/HPC_Software_Environment/Installing_Third_Party_applications/>

A4.1: Blender is not really suitable for the HPC. Forwarding the display from HPC to your local display is possible but latency is high and many programmes struggle with this - including blender (/might not be possible). It would be better to separate the visual component of your work locally on your computer and run the compute heavy models on NeSI. “Non-standard NeSI software” is generally addressed on a case by case basis by us - the support team.

This type of work would be much better suited for our “[on demand” compute service](https://docs.nesi.org.nz/Scientific_Computing/Interactive_computing_with_NeSI_OnDemand/) where we can install interactive applications such as blender that run locally on the NeSI hardware.

Thank you, very informative. I was planning on running large batches of exporting from Blender, where there are relatively small differences which I code programmatically (imagine many for loops changing the location of a particular object in a scene, its properties etc). So, I was not intending to do any work that requires a live display (doing that locally) then rendering 10s or 100s of videos with one execute. Does that change 4.1?

What you have described above sounds entirely possible on NeSI. Though, is there a component to this that requires lots of compute resources? I.e., RAM, many CPUs working in parallel, etc. “many for loops” could be parallelised with a bit of work - but depending on the number of loops or the amount of work they do perhaps this could run on your local computer too? I am not familiar with Blender so I have limited knowledge here sorry! But I can look into it. I’m not sure if Blender offers an executable to do the “rendering 10s or 100s of videos with one execute” as you mention. If it does have an executable available that operates without the GUI then perhaps that would work well with NeSI. In summary I think we would need to look at your workflow in more detail and learn more about what Blender offers (:

*Awesome thank you, that’s very helpful as I start to think about implementing this project!*

Q5: Is there any project I could join to continue learning (as I am not a scientist)?

A5: we will leave everyone in the project nesi99991 for a little while after this workshop has finished. If you need more time or would like to apply for a project to do some testing etc, please let us know

Q6:

A6:

Q7:

A7:

Q8:

A8:

Q9:

A9:

Q10:

A10:

Feedback:

*Please give us feedback before you go!* [**https://forms.gle/nEkJiaHZT7kS9nSx7**](https://forms.gle/nEkJiaHZT7kS9nSx7)

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## Resources:

* NeSI JupyterHub [NeSI Account](https://jupyter.nesi.org.nz/hub/)
* NeSI [Office Hours](https://support.nesi.org.nz/hc/en-gb/articles/4830713922063-Weekly-Online-Office-Hours)
* Software Carpentry Shell Novice (recommended) <https://swcarpentry.github.io/shell-novice/>
  + EOI form for upcoming online workshop for Introduction to Command Line (10 April): <https://www.nesi.org.nz/news/2025/02/now-accepting-applications-introduction-command-line>
* Slurm - bash workflows (the sequel 😁) <https://github.com/nesi/slurm-bash-workflows>
* Got [NeSI](http://www.nesi.org.nz) questions? You can email us at [support@nesi.org.nz](mailto:support@nesi.org.nz) anytime.
* Click here to apply for access to NeSI: <https://www.nesi.org.nz/services/applyforaccess>
* Interested in learning more? You can check out recordings of our past NeSI webinars on NeSI’s Youtube channel: <https://www.youtube.com/channel/UCiEDJKtjWUVv-VSmD-jfWTA>
* Want to get notified about other training events? Sign up to receive the NeSI newsletter and/or training notifications by clicking here: <http://eepurl.com/grV9if>
* MPI4PY: <https://support.nesi.org.nz/hc/en-gb/articles/360001173875-MPI-Scaling-Example>
* Please give us feedback! **https://forms.gle/nEkJiaHZT7kS9nSx7**