### UIS Econ Prod Cluster Guide

1. **Current Software:**

MATLAB R2023b

STATA 18

GCC 11.4.0 (since C++17 language features are required for Dynare)

Dynare 5.4, In MATLAB, addpath('/econ\_share/apps/dynare/5.4-R2023b/lib/dynare/matlab')

Anaconda (Python 3.11.4)

To use this, source /econ\_share/apps/anaconda3-3.11/env-3.11

1. **Installation:**

* Raise access: <https://docs.google.com/spreadsheets/d/1LEcPF_tNwX6tu-ElTDboUpMsO3C_o0krMLnikJwXTDw/edit?usp=sharing>
* Install GU VPN Anyconnect from here: <https://uis.georgetown.edu/security/vpn/>
* note first time you have to put in [guvpn.georgetown.edu](http://guvpn.georgetown.edu/) and hit connect
* To use the VPN (Georgetown VPN, duo-two-factor), you need to first enter the NETID password and then the code in DUO.
* Then use: ssh <netid>@[econ-prod-1.uis.georgetown.edu](http://econ-prod-1.uis.georgetown.edu/) (replace your netid)
* Enter NETID password again

1. **Logging in**

- Log into GU VPN using NETID-password and password from DUO.

- In terminal/CMD: ssh pp712@econ-prod-1.uis.georgetown.edu

- Give NETID-password again

- You are in /home/<netid>

- /home is where other people's folders are

1. **Bash commands**

- uname -a: Show what kind of computer you're using.

- df: Check how much space is left on your computer.

- free: Look at how much memory your computer is using.

- pwd: Show your current location (directory).

- ls: List files and folders here.

- ls -l: Show more details about files and folders.

- ls -a: Show hidden files and folders.

- cd [directory]: Go to a different folder.

- cd ..: Move up one folder.

- cd ~: Go to your home folder.

- cd /: Go to the main folder.

- mkdir [folder]: Create a new folder.

- touch [file]: Create a new empty file or update an existing one.

- cp [source] [destination]: Copy files or folders.

- mv [source] [destination]: Move or rename files or folders.

- rm [file/folder]: Delete files or folders (be careful).

- rm -r [folder]: Delete a folder and everything inside (use with caution).

- head [file]: Display the beginning of a file.

- tail [file]: Display the end of a file.

- zip [archive.zip] [files]: Make a zip archive.

- unzip [archive.zip]: Open a zip archive.

- ps: List running programs.

- kill [process\_ID]: Stop a program.

- free -h (RAM)

- top: list running processes

1. **Vim - text editor**

- touch example.py

- vi example.py

- i (insert)

- ESC (get out of insert)

- :wq (save and exit)

- :!q (exit without save)

- SHIFT + V (select line)

- d (delete)

- SHIFT + G (select all below)

1. **Using software from CLI and scheduling jobs**

- R : use R

- python,python3 (use Python)

- python example.py (run script)

- CTRL + C (interrupt)

- nohup python your\_script.py > output.log 2>&1 &

- tail -f output.log

- cat output.log

- ps (check processes)

- jobs

- ps -ef | grep ex4.py

1. **Multiprocessing**

- nproc (check number of CPUs)

- lscpu | grep "CPU(s):" | awk '{print $2}'

- cat /proc/cpuinfo (full info)

- apply multi processing from within the software you are using e.g. in Python you can use “multiprocessing” package.

1. **Virtual environments**:

To prevent different package versions from interfering with each other, the virtual environment can be helpful in isolating package installation such that it does not affect the rest of the system.

- Create: python3 -m venv <venv\_name>

- e.g. python3 -m venv myenv

- Activate: source <venv\_name>/bin/activate

- source myenv/bin/activate

- Deactivate: deactivate

- installing packages:

- pip install <package\_name>

- pip install tensorflow

- save packages

- pip freeze > requirements.txt

- pip install -r requirements.txt

- These environments are permanent

For example, you can do the following to use the Python 3.11 base environment:

[chung@econ-prod-1 ~]$ mamba activate

(base) [chung@econ-prod-1 ~]$ python -V

Python 3.11.5

(base) [chung@econ-prod-1 ~]$ mamba deactivate

To set up a R virtual environment, e.g.,

[chung@econ-prod-1 ~]$ mamba create -n r-environment r-essentials r-base

[chung@econ-prod-1 ~]$ mamba activate r-environment

(r-environment) [chung@econ-prod-1 ~]$ R --version

R version 4.3.1 (2023-06-16) -- "Beagle Scouts"

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Platform: x86\_64-conda-linux-gnu (64-bit)

(r-environment) [chung@econ-prod-1 ~]$ mamba deactivate

1. **Jupyter Notebooks**

- Install Visual Code Studio and its plugin VSCode SSH Remote

- Make sure GU VPN is on.

- In the Remote Explorer add SSH Host "ssh netid@econ-prod-1.uis.georgetown.edu"

- It will ask for password

- Use VS Studio terminal to Create virtual environment - python3 -m venv myenv, source myenv/bin/activate

- Install jupyter notebook - pip install jupyter notebook

- Open jupyter notebook - jupyter notebook

- Command Click on the link in the terminal output

- I have confirmed that Jupyter Notebooks can be used on both clusters - Econ server and HPC through Visual Studio Code. Through this resource - <https://medium.com/@ivanzhd/vscode-sftp-connection-to-compute-engine-on-google-cloud-platform-gcloud-9312797d56eb>.

1. **Integrating with Github**

git config --global user.email "pranjal.rawat@outlook.com"

git config --global user.name "rawatpranjal"

git clone https://github.com/rawatpranjal/algorithmic-auctions.git

git add .

git commit -m 'give some text here'

git push https://rawatpranjal:<TOKEN>@github.com/rawatpranjal/algorithmic-auctions.git --all

get <TOKEN> from github authorization settings.

1. **Moving files:**

* Install FileZilla: <https://filezilla-project.org/download.php?type=client>
* Connect to GU VPN
* Hit the connect option (left top button), pick SFTP, put in NETID and PWD and HOST as [econ-prod-1.uis.georgetown.edu](http://econ-prod-1.uis.georgetown.edu/)
* Drag and drop between laptop and cluster.

1. **Passwords**

We can add passwords to config file to remove need for netid password second time.

* When in the cluster run "ssh-keygen"
* It will ask you to give a file name, skip this by hitting enter. But note the **filepath** location.
* Skip passphrase setup by hitting enter... until you get a weird looking image printed
* run "ssh-copy-id <netid>@[econ-prod-1.uis.georgetown.edu](http://econ-prod-1.uis.georgetown.edu/)"
* Then run " eval `ssh-agent` "
* Then run "ssh-add **filepath"**
* Done. You should not need netid the second time.

1. **Using GPU**

For GPU units see other guide. More can be found on this great resource - <https://hpc.georgetown.edu/> maintained by Mr. Woonki Chung (who has been a great help). You may have to talk to Prof Rust if you want to work on HPC.

You can also see Google Collab, Collab Pro.