

# **A Brief Introduction to Amarel**

See <https://sites.google.com/view/cluster-user-guide> for details

# Cluster Access

## Connecting via SSH Command Line Tool

- On Mac OS:
  - `ssh <netid>@amarel.rutgers.edu`
- On Linux/Unix
  - `ssh <netid>@amarel.rutgers.edu`
- Windows
  - Download an SSH Client (PuTTY)
  - Set Host Name: amarel.rutgers.edu
  - Log In: <netid>

# Setting up an SSH Key

- Currently works with Mac OS
- `ssh-keygen -t rsa`
  - Asks for a passphrase (leave empty) and location where to save the new key (select default)
  - `ssh-copy-id -i ~/.ssh/id_rsa.pub <netid>@amarel.rutgers.edu`
- Setup an alias
  - `vi ~/.bashrc`
  - `alias="ssh <netid>@amarel.rutgers.edu`
- <https://superuser.com/questions/8077/how-do-i-set-up-ssh-so-i-dont-have-to-type-my-password>

# Navigating Amarel

- /home/<netid>
  - 100 GB storage allocated
- /scratch/<netid>
  - 20 TB temporary storage
  - 90 day purge policy

# Login Node

- Starting shell after sign on to Amarel
- Not meant for running commands
- provide a shared environment where users can transfer data, build software, and prepare their calculations.

# Interactive Shells

- Gives you an active connection to a compute node (or collection of compute nodes) where you will have a login shell and you can run commands directly on the command line.
- Example:
  - `srun --partition=main --mem=2000 --time=30:00 --pty bash`

# SLURM Job Scheduler

- SLURM job script for a serial job

```
#!/bin/bash
#SBATCH --partition=main      # Partition (job queue)
#SBATCH --requeue             # Return job to the queue if preempted
#SBATCH --job-name=test       # Assign a short name to your job
#SBATCH --nodes=1             # Number of nodes you require
#SBATCH --ntasks=1            # Total # of tasks across all nodes
#SBATCH --cpus-per-task=1     # Cores per task (>1 if multithread tasks)
#SBATCH --mem=2000            # Real memory (RAM) required (MB)
#SBATCH --time=02:00:00       # Total run time limit (HH:MM:SS)
#SBATCH --output=slurm.%N.%j.out # STDOUT output file
#SBATCH --error=slurm.%N.%j.err  # STDERR output file (optional)
cd scratch/$USER
conda activate <conda environment>
python <script>.py <CLI inputs>
```

# Transferring Files To/From Amarel

- On your local machine open a terminal window
- Run `sftp <netdi>@amarel.rutgers.edu:/home/<netid>`
- This will open a connection between your machine and amarel
- Use `get/put` to retrieve/upload files from/to amarel
- Use `lpwd` to view the local working directory
- Use `lcd` to navigate folders locally
- Use `pwd` to view the remote (amarel) working directory



# Transfer from amarel directly to google drive/box

- Setup:
  - `ssh -Y <netid>@amarel.rutgers.edu`
    - Connects to Amarel with X11 tunneling
  - `module use /projects/community/modulefiles`
  - `module load rclone`
  - `rclone config`
    - Enter 'n' for new and name your connection 'amarel-box'
    - For box storage: Storage> 7
    - Leave client\_id> through access\_token> blank
    - box\_sub\_type> 1
    - Choose No for edit advanced config
    - Choose Yes for auto config
  - Wait for a Firefox window to open (it can take a while to load)
    - Enter box login credentials
    - Use single sign on
- Navigation:
  - `rclone ls amarel-box` : lists all top level directories in your box drive
  - `rclone copy <amarel directory> amarel-box:<box-directory>`

# Install Miniconda on Amarel

- Download the proper command line installer
  - <https://docs.conda.io/projects/miniconda/en/latest/>
  - Miniconda3 Linux 64-bit
- Save this file to your /home/<netid>/Downloads path
- Run: *bash Miniconda3-latest-Linux-x86\_64.sh* in the CLI
- Follow prompts

# Running a Jupyter Lab Session

- First install Jupyter lab in your conda environment
  - `conda activate <your-env>`
  - `pip install jupyterlab`
  - `jupyter server password`
    - Enter password you will remember
- On amarel run the command
  - `srun jupyter lab --no-browser --ip=0.0.0.0 --port=9999`
  - Next run `squeue -u <netid>` to find the node your session is running on
    - This can start with hal or slepner
- Open a local terminal window
  - Run `ssh -L 8888:<node>: 9999 <netid>@amarel.rutgers.edu`
- Navigate to your internet browser and enter the url
  - `Localhost:9999`
  - You may need to enter the password from earlier
  - You should see a jupyter lab session now

# Other material

- SLURM commands:
- <https://slurm.schedmd.com/pdfs/summary.pdf>