

Introduction to Working in the Linux Shell Environment

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Note: Do not attempt to copy/paste out of this document. Commands will likely not work!

Some software you will need (Note: these are examples of free software, not endorsements):

| <u>In order to</u> | <u>From Mac or Linux</u> | <u>From Windows</u> |
|---------------------------|----------------------------|----------------------|
| Connect to submit (ssh) | Terminal | PuTTY |
| Move files to/from submit | FileZilla, CyberDuck (Mac) | FileZilla, CyberDuck |
| Edit text files | TextWrangler (Mac) | Notepad++ |

Getting around in Linux:

- File paths (directories or folders): /, /home/magitz/, /scratch/hpc/magitz/
- pwd, cd, ls (Where am I, change directory, list directory)
- cp, mv, rm (copy, move, delete)
- more, less, head, tail, cat (examine files)
- nano, vim (text editors in Linux)

Making things easier:

- Tab completion
- history: redo something that you did before without retyping
- man: getting help, also -h or --help flag

Learning by doing:

1. Connect to HPC Center: `ssh user@submit.hpc.ufl.edu`
 - a. Type your password and hit return (no characters display while you type).
2. Where are you when you login? `pwd`
3. What files are there? `ls`
4. Make a directory: `mkdir test_script`
5. Now what's there? `ls -l`
 - a. Linux commands usually have flags to change how they work
 - b. `man`, `-h` or `--help` often give you help
6. Change into `test_script` directory: `cd test_script` or `cd tes<tab>`
7. Copy a sample file here (.): `cp /project/bio/training/2012-09-17/simple.pbs .`
8. Check that the copy worked: `ls`
9. Delete that file: `rm simple.pbs`
 - a. That file is now **GONE!** Not in your recycle bin or trashcan, but gone! *
*We may be able to retrieve *some* files, so if it's an important file, let us know **ASAP**.
10. Luckily we were working with a copy, let's copy it again: up-arrow, up-arrow, return
11. Look at the file: `less simple.pbs` (type q to exit when done)

12. For now, ignore lines that start with a # or #PBS, what does this script do?
 - a. Can we run this script here? Why not?
 - b. Connect to a test node: `ssh test[01-06]`
 - c. Notice that when you connect to a test node, you are in your home directory—same thing happens when your jobs start on compute nodes (see 15a below).
 - d. Get back where you want to be: `cd test_script`
 - e. Now we can run our script: `./simple.pbs`
 - f. Did it do what you expected?
 - g. Logout of test node: `logout`

13. Use the scheduler to run this job:
 - a. Can't run from home, so...
 - b. Change to scratch file space: `cd /scratch/hpc/$USER`
 - c. Submit the job: `qsub ~/test_script/simple.pbs` (~ means your home)
 - d. The scheduler pays attention to the #PBS lines to schedule and manage your job
14. Look at the result file: `less test.out`
15. How do the results differ?
 - a. **Note** this script, and any that you write, *should* have: `cd $PBS_O_WORKDIR`
 - i. Notice that the `pwd` command shows your job was in your home directory, not where you launched the job from.
 - b. Notice all of new environment variables like `PBS_O_WORKDIR`, `PBS_NP`, `TMPDIR`, etc. These can all be used in your scripts.

16. Time to get some data!
 - a. Find a file on your computer, or a web site, with some text. Copy and paste that into a new file in your text editor (E.g. TextWrangler, NotePad++). We're just looking for some text to process. It doesn't matter what it is!
 - b. Save the file as: **some_text.txt** (Check that line breaks are Unix)
 - c. Using your text editor or FileZilla, upload this file to your space in `/scratch/hpc/`
 - i. SFTP (port 22) to host: `submit.hpc.ufl.edu`
 - ii. Make a directory in `/scratch/hpc/$USER/` called: `word_cloud`

17. Go back to your ssh client and navigate to `/scratch/hpc/$USER/word_cloud`
18. Use `more`, `head` and `tail` to look at `some_text.txt`
19. Copy the example `cloud.pbs` script to your directory:
 - a. `cp /project/bio/training/2012-09-17/cloud.pbs .`
20. Edit this script to have your e-mail: `nano cloud.pbs`
21. Submit the cloud script: `qsub cloud.pbs`
22. Check your e-mail
23. Use FileZilla to download your results.
24. Open in a web browser