**Working with the COC-ICE cluster**

**Quick List (for use after you get the hang of it; if this is your first time, see below for more details):**

- Connect to VPN if off campus.
- Login: ssh <username>@coc-ice.pace.gatech.edu
- Start an interactive session on the cluster (requests 4 threads for 30 minutes; if you take longer you'll need to run this command again):
  qsub -l nodes=1:ppn=4 -l walltime=0:30:00 -q coc-ice -I
- Change to the correct directory (it may return you to your home directory).
- Compile: gcc -o helloworld1 helloworld1.c -fopenmp
- Run: ./helloworld1

File transfer options are discussed below.

Hint: If you are not doing much (not running a code for more than a few seconds, not doing significant development), you can compile and run on the login node directly, without starting an interaction session. But this should be reserved only for cases when there is not much to do, such as when you have developed and tested your code elsewhere and just want to make sure it can run on the cluster, or when you are testing a minor change from your previous working version.

**Details**

**VPN:**

If you are off campus, you must be connected to the GT VPN to log in to the cluster.

More info: https://docs.pace.gatech.edu/gettingStarted/logon/

https://docs.pace.gatech.edu/gettingStarted/vpn/

**Logging on:**

Once you are connected to the VPN if needed, follow the instructions below, but **replace login-s.pace.gatech.edu with coc-ice.pace.gatech.edu.**

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# SSH into the Cluster

## What is SSH?

- SSH stands for **S**ecure **Sh**ell
- A program for logging into a remote machine securely
- **SSH is how you log into and interact with the cluster**

> **Warning**
>
> To SSH into cluster you **MUST** be on campus wifi or connected to the Gatech VPN

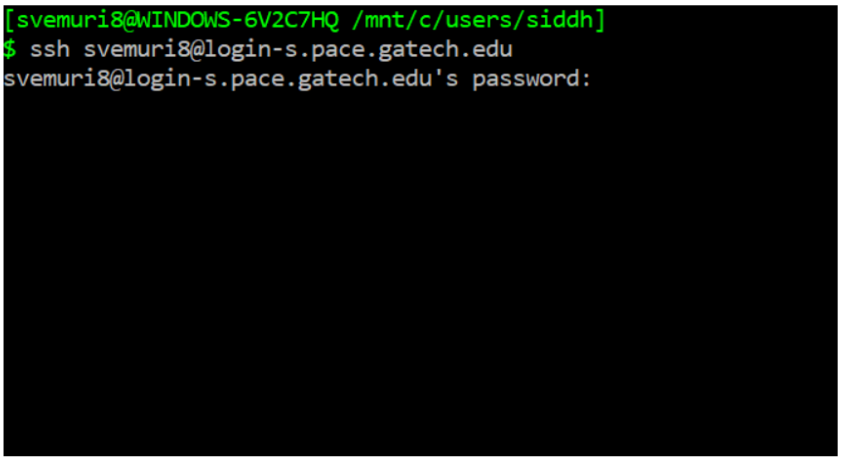
## Logging Into Cluster - Linux / Mac / Windows PowerShell

- Open up a new terminal and simply use this template:

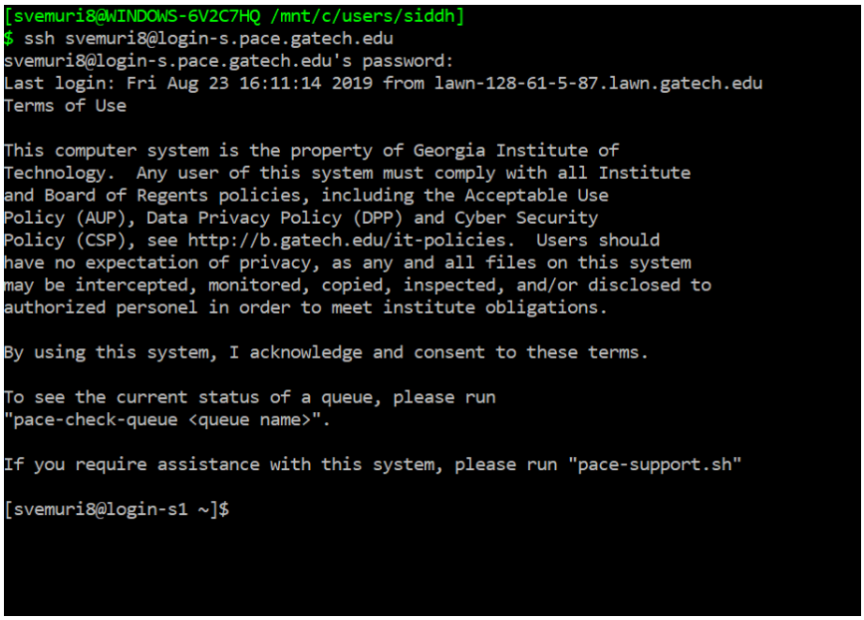
```
ssh someuser3@login-s.pace.gatech.edu
# Use your GT username in place of "someuser3"
# press <return> to run
# Must be on GT campus internet or connected to Gatech VPN
```

> **Tip**
>
> If "login-s" doesnt work, you can try "login-s1" through 4. Run the command `pace-whoami` while logged on to the cluster to see all the headnodes you can use.

- To get onto the data mover node, use `ssh someuser3@iw-dm-4.pace.gatech.edu`
- Next, you will be prompted for a pasword. Enter your **GT password**. Note when typing passwords in Linux, the password line will be blank and won't show characters. Press enter to login.



- You should be logged into your account on a headnode. You can now interact with the cluster, submit jobs, make files, and do anything else you would do normally on a computer.



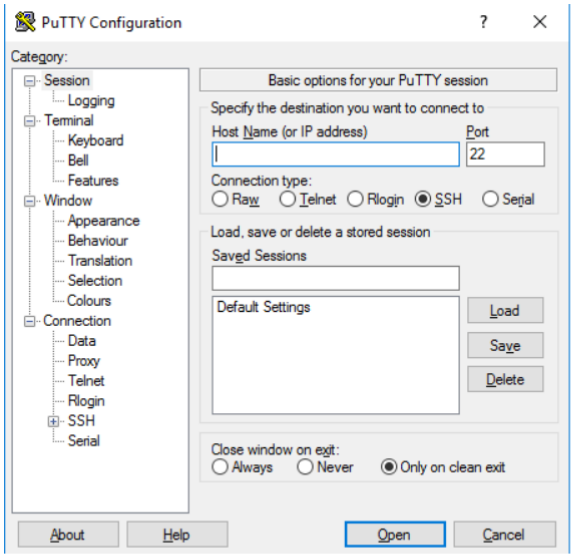

## Windows

### POWERSHELL

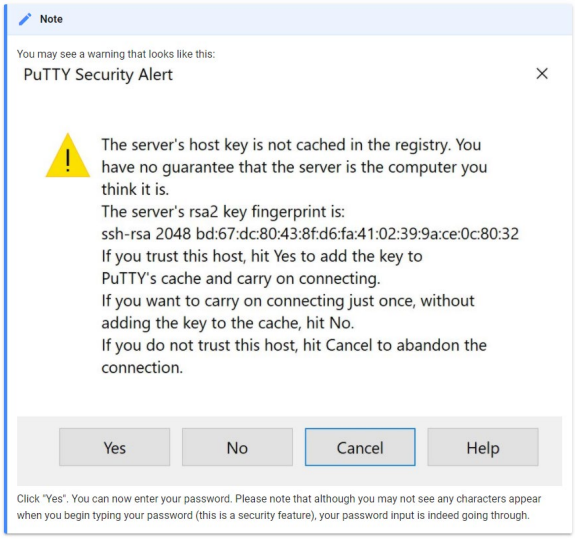
- We recommend that you SSH into the cluster through Windows PowerShell
- To do so, simply type "PowerShell" into the Windows search bar and click on the "Windows PowerShell" application that comes up.
- This will open a terminal where you can use the instructions from the `Logging Into Cluster` section above to SSH into the Cluster.

### PUTTY

- PuTTy is an alternative way to SSH into the Cluster if you are unable to use PowerShell.
- After you have installed PuTTy, open it and you should see a screen similar to this one.




- In the `HostName` bar, enter your account address: `someuser3@login-s.pace.gatech.edu`. Use your GT username instead of "someuser3".
- Click `open` and in the terminal type in your GT password when prompted for password.




- Congratulations! You are now logged into your account on a headnode and able to interact with the cluster through the terminal.

**Requesting an interactive session:**

On the cluster, jobs are typically submitted using a special script so that they can be scheduled by a scheduler algorithm in case all submitted jobs cannot all be run at the same time.

Here, you should request to run your job interactively, so that you can work on it, make changes, compile, and run iteratively. When making this request, you will need to specify a fixed period of time, called "walltime"; most likely you will not be able to request this for a long period of time, but you can resubmit the request if time runs out. Keeping this value on the small side allows other people who may have been waiting for an interactive job a chance to do their work, but if resources are available you will be able to get your request fulfilled right away. You will also specify the number of processors (ppn=processors per node), up to 24, but it is recommended that you run initially on a small number. The processors can be used to support one thread each, so if you wish to run on 4 threads, set this number to 4.

Use the following command to request 4 processors (which you can use to run up to 4 threads) for 30 minutes.

```
qsub -l nodes=1:ppn=4 -l walltime=0:30:00 -q coc-ice -I
```

You may need to wait for the job to start.

For short tests (e.g., code will not run more than several seconds), you may run on the login node (basically skipping this process), but you should not do this in general.

**Compiling and Running:**

Compilation remains basically the same, other than the need to add a flag at the end to indicate your code is using OpenMP.

gcc -o helloworldomp helloworldomp.c -fopenmp

Running is unchanged.

**File transfer:**

Several options: scp (linux), Winscp (Windows), FileZilla. See https://docs.pace.gatech.edu/. If you need to specify a port, try 22.

**Help:**

Contact the TAs for questions about running jobs on the cluster; office hours are a great option.

**More Information:**

https://docs.pace.gatech.edu/gettingStarted/newUser/