# GENI Lab 0

## Due: August 22, 2017

## 1. GENI Portal

> For this lab and all other GENI labs and assignments, if you are on a Windows computer, please use **Firefox** as your Web Browser.

- Go to https://portal.geni.net/, click "Use GENI".
- On the next page, click **NCSA**.

  > You have to do this because VSU is not one of those schools who have joined the *InCommon Federation* which allows you to login to GENI using school accounts.

- Login to the GENI Portal.

  Note: If you are redirected to a GENI agreement page, just check the boxes that indicate you agree to all policies and to let the portal work on your behalf, then submit the page.

- On the GENI Portal homepage, click the *Home* --> *Projects* tab, notice that you should see that you have already been added to the project **CS4121**. Click it and enter the project.

## 2. Create SSH Keys

As what you learned on Tuesday, in order to accomplish this GENI lab and all the GENI labs and assignments for the rest of the semester, you need a command-line based SSH terminal (i.e. the terminal in Mac, Linux, Google Cloud, or Putty).

In order to establish a secure connection between your GENI Portal and your SSH terminal, you need to generate **a pair of SSH keys**: a public key which is saved on the GENI Portal and a private key which needs to be downloaded to the terminal.

- Click your name at the top-right corner of the GENI Portal homepage, then SSH Keys.

- Click "generate and download an SSH keypair".
- On the "Generate an SSH private key" page, type a Passphrase, confirm it, and then click "Generate SSH private key". We will come back to this page later in Section 5.

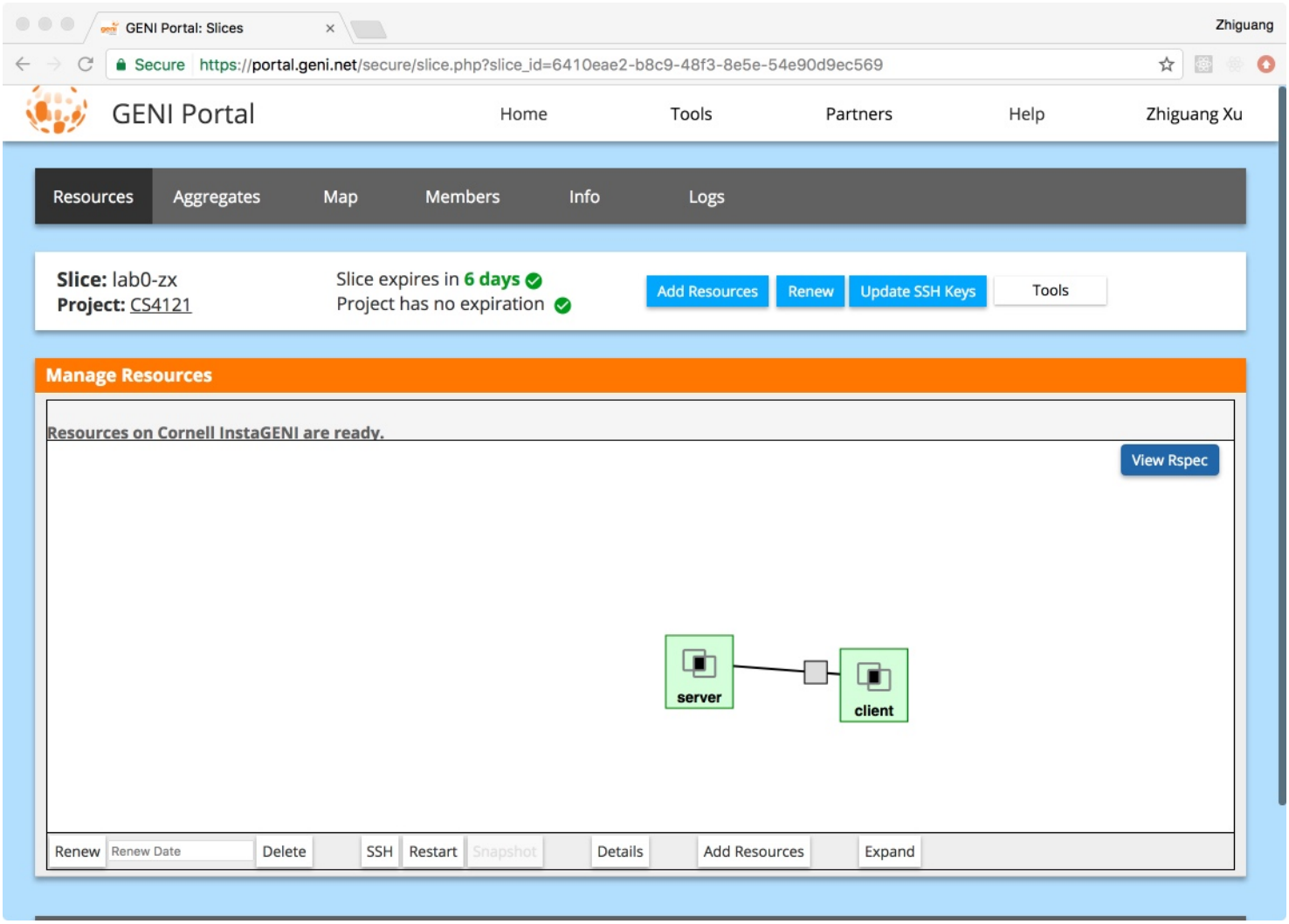
> Note: Make sure you understand that the "Passphrase" is not the "Private Key" itself. The passphrase is a phrase that you choose to protect the automatically generated private key.

## 3. Create a GENI Slice and Reserve Resources

- Now, go to the homepage of the project **CS4121** if you are away from it.
- Click "Create Slice", name it "**lab0-yourInitial**", and click "Create slice".
- Follow the steps 3.3. and 3.4 in **hands-on-lab0-setup.pdf** very carefully to reserve some resources at one of the sites whose name contains "InstraGENI".

Note: **It might take around 10-15 minutes for both of the nodes that you reserved above to turn green**. If this does not happen after some extensive time, you need to delete all the resources from your slice and try again. Make sure your slice is truly empty before trying again though. You may choose to reuse the same site or try a different one.

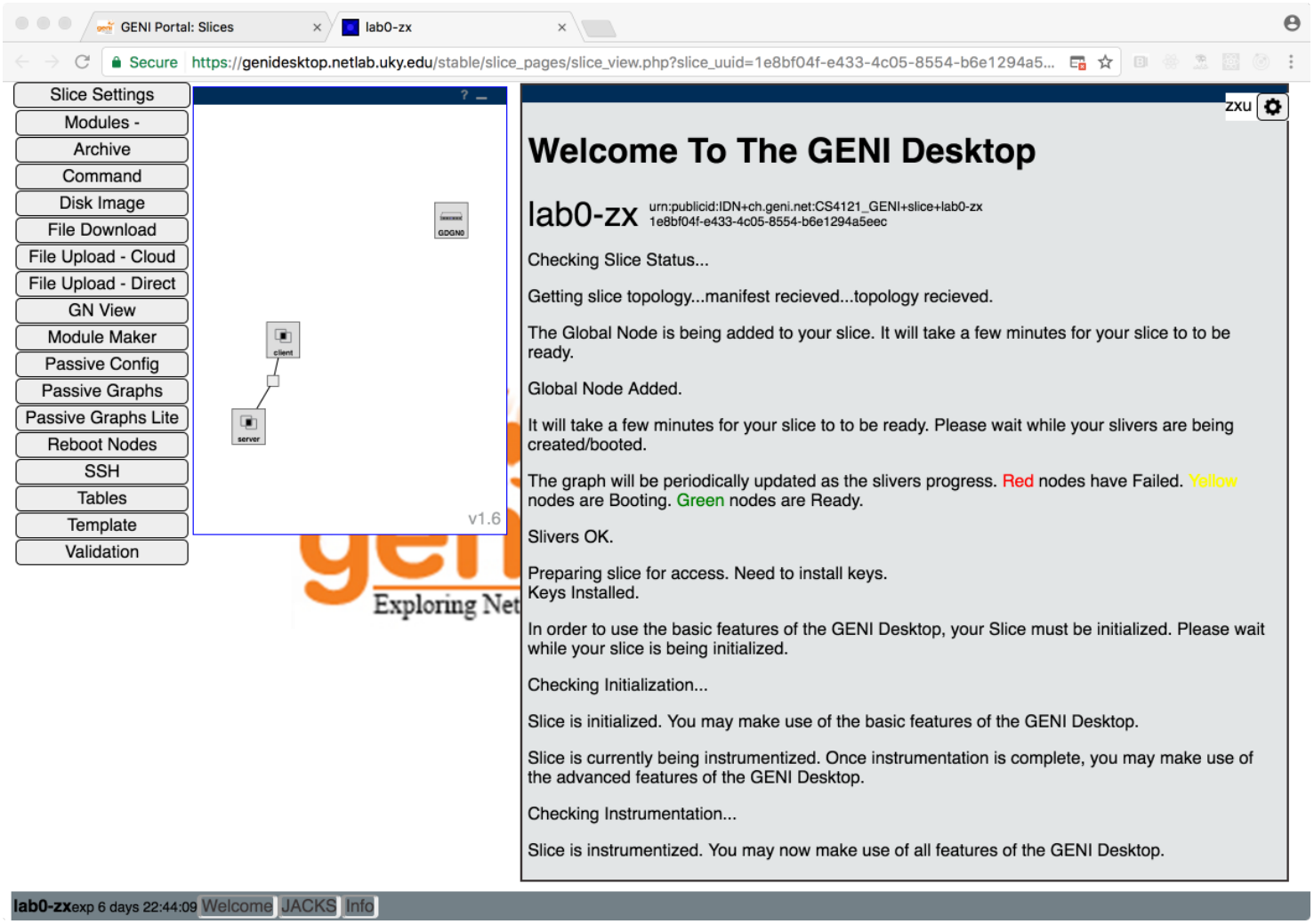
The following screenshot shows how your GENI portal should look like once the reservation step is completed.




## 4. GENI Desktop Instrumentization

> Do the following **only after** both nodes in the slice you created above have turned green.

- Click "Tools", then "GENI Desktop".
- If you are asked to authorize GENI Desktop, click "Authorize the GENI Desktop".
- In the new window, click the GENI logo. In the next window, check "Remember This Decision" and click "Authorize". After a moment, a list of all your slices will be displayed (if there are many). Click "CS4121:lab0-yourInitial".
- If you have not created a Global Node for your slice, GENI Desktop will prompt you to add one. Just click "OK".
- Then continue to wait until your GENI Desktop is fully instrumentized. The following screenshot shows how your GENI Desktop should look like then.




Note: **It might take quite some time (as long as half an hour) for all the steps above to complete**.

If you are really out of luck, i.e. it seems that your GENI Desktop never becomes ready even after an extensive amount of wait, you probably need to delete all the GENI resources (make sure they are all gone) and try Sections 3 and 4 above again. Perhaps you want to try a different site.

## 5. SSH Terminal

As mentioned in Section 2 above, you need an SSH terminal and you have the following three choices. **Choose one of them that is the most appropriate for you.**

### 5.1. Instrumentized GENI Desktop

Assuming that your GENI Desktop has been instrumentized, here is how you get your browser base SSH terminals.

- In the Desktop window, click "SSH".

- Click the "client" node, then "Open Browser tab SSH" (or "Open Browser Window SSH").
- If you see a security warning, click "ADVANCED", then "Proceed to .... (unsafe)".
- Do the same to get an SSH terminal for the the "server" node.

### 5.2. MacOS or Linux Shell

Since MacOS/Linux machines come with a fully functional terminal, it is very easy to establish a secure connection from your local computer to the GENI Portal.

- Click your name at the top-right corner of the GENI Portal homepage, then SSH Keys.

  > This step needs to be done once and only once on every local computer.

  - Click **Download Private Key**.
  - Follow the instructions under "On Linux and Mac, open a terminal" to login to the "client" node. Basically,

    ```
    cd ~/.ssh

    (if the ~/.ssh folder does not exist, do "mkdir ~/.ssh")

    mv ~/Downloads/id_geni_ssh_rsa ~/.ssh/

    chmod 0600 ~/.ssh/id_geni_ssh_rsa

    ssh-add -K ~/.ssh/id_geni_ssh_rsa
    ```

    The last step above is to add your private key to your key chain for your convenience so you don't have to specify the location of it everytime you use `ssh`.

- Click the "client" node on the GENI slice page for "CS4121:lab0-yourInitial", take notes of the "SSH To" line where url and port number are shown, e.g. `zxu@pc2.geni.it.cornell.edu:26090`
- Do the same for the "Server" node.
- Now, remotely login to the client node:

  ```
  ssh [username]@[hostname] -p [port]

  (E.g. ssh zxu@pc2.geni.it.cornell.edu -p 26090)
  ```

    - Say "yes" to the prompt "Are you sure you want to continue connecting".
    - Enter your Passphrase if prompted.

    - Run the command above to login to the "server" node.

### 5.3. Windows PuTTY

- Install PuTTY, a free SSH client for Windows: Just download `putty.exe` from http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html

- Click the "client" node on the GENI slice page for "CS4121:lab0-yourInitial", take notes of the "SSH To" line where url and port number are shown, e.g. `zxu@pc2.geni.it.cornell.edu:26090`

- Do the same for the "Server" node.

- Click your name at the top-right corner of the GENI Portal homepage, then SSH Keys.

    - Click **Download PuTTY Key**.

- Run PuTTY.

    - On the Basic options screen, in the Host Name field enter the url you noted above, e.g. `zxu@pc2.geni.it.cornell.edu`
    - In the Port field enter the port number you noted above, e.g. `26090`
    - Make sure Connection type is: SSH
    - Under the settings categories on the left navigate to Connection-> SSH ->Auth.
    - Next to the "Private key file for authentication" field at the bottom, click Browse... and select the PuTTY key file you saved to your computer, and click Open.
    - Click Open to establish the SSH connection.
    - If prompted about whether you trust the host (key not cached in registry), click Yes.
    - When prompted for the Passphrase, enter your Passphrase.

- If you see the prompt `yourname@client:~$` , you have successfully logged into the "client" node.

- Do the same to log into the "server" node.

## 6. What to Turn in?

Submit the following four screenshots:

- Homepage of your GENI slice "CS4121:lab0-yourInitial" where all nodes have turned green.
- Fully instrumentized GENI Desktop.

- An SSH terminal to the "client" node. You may choose one of the three options listed in Section 5 above.
- An SSH terminal to the "server" node.You may choose one of the three options listed in Section 5 above.

## 7. Warnings

- I don't take late submissions. Don't even try.
- This lab serves as the prerequisite to all other subsequent GENI activities down the road, i.e. without a completion of this lab, you will **NOT BE ALLOWED** to work on any of them.