

Laboratory 0: Introduction to Cadence

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- You will set up Cadence Virtuoso to run with the correct libraries.
 - You will learn how to access the Cornell ECE servers remotely.
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1 Set up Virtuoso for the 1st time

Running Virtuoso for the first time requires the completion of the following three steps: (i) accessing the Cornell ECE servers, (ii) copying the configuration files, and (iii) creating a course library in Virtuoso.

1.1 Set up Virtuoso using the computers in lab PHL 314

Using the computers in the PHL 314 lab is the easiest and the fastest way to start working with Virtuoso. If you are planning to use computers outside of PHL 314, skip to Section 1.2.

1. Visit the class blackboard website at <http://blackboard.cornell.edu>
2. In the Content tab, go to folder “Lab material” and download “CadenceSetup.zip” to your Unix root directory (/home/<your-netID>).
3. Start a terminal window and type:

```
cd ~  
unzip CadenceSetup.zip  
  *If any file exist, create a backup and overwrite existing files  
mkdir Cadence  
mv cds.lib Cadence
```

Important: Conflicts with existing ECE server setups

If you have previously used the ECE servers for other courses, such as ECE5775 or ECE4750, then you might get a nasty error: “`init.c(556):ERROR:161: sCannot initialize TCL.`” You can fix such errors by commenting out the source scripts for the other classes. You can do this by adding # right before the relevant scripts in `.bashrc` or `.bash_profile` using your favorite text editor. You may have to log out and log back in to see the effect.

Before you start Cadence, you will need to setup the used libraries and other stuff. To do so, just type:

- `source setup-ece4740.sh`

Since you will need to execute this every time you login to the ECE servers, we can write a code to run this script every time you login by:

- `echo "source setup-ece4740.sh -q" >> ${HOME}/.bashrc`

We also need add a Cadence command to make sure to that the Cadence simulations are done in the analog domain. You can do this by:

- `echo "export CDS_Netlisting_Mode=Analog" >> ${HOME}/.bashrc`

Now that we have set the environment for ECE4740, you can launch Cadence Virtuoso. Type:

- `cd Cadence`
- `virtuoso &`

Wait a bit until Virtuoso shows up. A window of “What’s new in Cadence” will show up and you can select the option to avoid presenting it in the future. Now, you can skip to Section 1.7, “After Virtuoso is running” below to create the course folder.

1.2 Accessing Cornell ECE servers outside PH314

We will discuss how to access the Cornell ECE servers outside of PH314. First, you will need to acquire the CadenceSetup file from blackboard. Then, you will have to install a secure file transfer client to copy the CadenceSetup file to your root folder. We will now look at these two steps with more detail.

1.2.1 Downloading the CadenceSetup file

1. Visit the class blackboard website at <http://blackboard.cornell.edu>
2. In the Content tab, go to the “Lab material” folder and download “CadenceSetup.zip”.

1.2.2 Uploading the CadenceSetup file via an SFTP client

You can install the FileZilla client by visiting the following website:

- <https://filezilla-project.org/>

Run FileZilla. Go to File/Site Manager and enter the following details and press Connect to log in:

- Host: `ecelinux-01.ece.cornell.edu`
- Protocol: SFTP - SSH File Transfer Protocol
- Logon Type: Normal
- User: `<your-netID>`
- Password: `<your-password>`

Note that you can also use `ecelinux-02.ece.cornell.edu` as your Host. After you log in successfully, you can drag-and-drop the CadenceSetup file to your root directory.

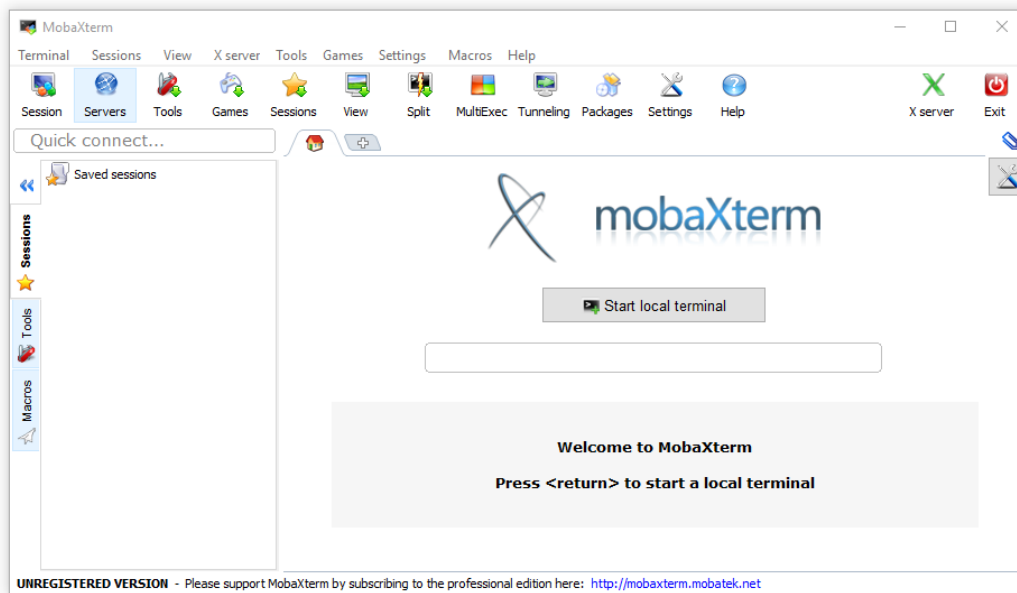


Figure 1: MobaXterm screen.

1.3 Access from Windows computers in lab PH318

You can also use the Windows computers in PH318 to login to one of Cornell ECE servers. Login first with your Cornell netID and launch MobaXterm. You will see the screen in Fig. 1. After you start your local terminal, use the following code to log in to the Cornell ECE servers:

- `ssh -X <your-netID>@ecelinux-01.ece.cornell.edu`

You can also access the ECE servers by using `ecelinux-02` in place of `ecelinux-01`. Here, the `-X` option after `ssh` enables X11 forwarding so we can display Cadence on your computer. Once you have logged in, follow the directions in Section 1.1 to start Cadence. In case you notice that your connection to the ECE servers is dropping, you can go to Settings/Configuration and select the “SSH keepalive” option (see Fig. 2). This option sends a small data packet every 60 seconds to prevent automatic disconnection.

1.4 Access from off-campus network

If you wish to connect to the Cornell ECE servers from off-campus/non-Cornell network, you will need to use Cornell’s virtual private network (VPN). If you are accessing Cornell ECE servers from Cornell network (eduroam/RedRover), then you can skip to Section 1.5 for Windows and Section 1.6 for Mac instructions, respectively. You can install a VPN client on your computer by following the directions at:

- <https://it.cornell.edu/cuvpn>

After you install and connect to Cornell VPN, follow the directions in Section 1.5 for Windows and Section 1.6 for Mac.

1.5 Accessing Cornell ECE servers from Windows

Follow the directions in Section 1.2 to install FileZilla to upload the `CadenceSetup` file. The easiest way to access the Cornell ECE servers is to install MobaXterm (Home Edition) on your computer by visiting:

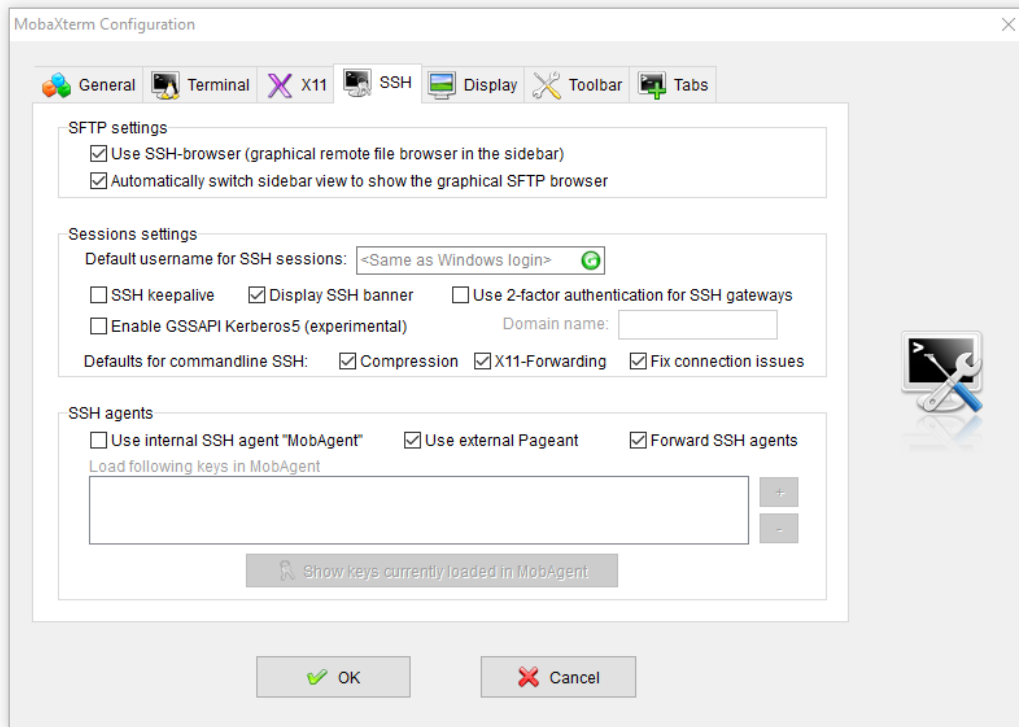


Figure 2: MobaXterm SSH keepalive.

- <http://mobaxterm.mobatek.net/download-home-edition.html>.

Install the program, start MobaXterm Personal Edition, and follow the directions in Section 1.3.

1.6 Accessing Cornell ECE servers from Mac

Follow directions in Section 1.2 to install FileZilla to upload the CadenceSetup file. You will need to install XQuartz to enable X11 forwarding on your Mac by visiting:

- <https://www.xquartz.org/>

After you finish installing X11, start Terminal. Open a new Terminal window (⌘+N) and type:

- `ssh -X <your-netID>@ecelinux-01.ece.cornell.edu`

You can also access the ECE servers by using ecelinux-02 in place of ecelinux-01. Here, -X option after ssh enables X11 forwarding so we can display Cadence on your computer. Once you have logged in, follow directions in Section 1.1 to start Cadence.

1.7 After Virtuoso is running:

Cadence Library Setup:

1. From your Cadence command window, select Tools → Library Manager.
2. In the Library Manager Window select File → New → Library and enter the following:
Library name: ece4740

3. Click OK.

A new window should pop up. Select the option marked “Attach to an existing technology library” and click OK. Wait a few seconds. In the next window, set “Technology Library” to gpdk090 and click OK. This creates a new library named ece4740 which uses the gpdk090 technology library we will use for the rest of the course. **You are now all set up for the ECE 4740 labs.**