Working from home, using Mac OS X

Introduction

Fun fact: It is possible to remotely log in to the CS department's Linux machines from anywhere, using a system called ssh. This means that, using only your ingenuity and the technology at your disposal, you can log into one of the Sun Lab machines and run commands in the shell from your computer in your dorm room.

Why would I want to do that? Well, it's pretty cool. And you'll be able to do your homework assignments and hand them in without leaving your room to come to the CIT. All you have to do is follow these slightly complicated instructions.

Note: In many places in this document, terminal commands are are presented with things to fill in. To execute these commands, substitute the contents of the angle braces plus the angle braces with the correct text (e.g. `cd <directory>`) → `cd ~/jcarberr`)

Let's get started.

1 On your Mac: Create a key

1. Open a terminal, by going to `Applications` → `Utilities` → `Terminal`.
2. Type the following command and press return: `ssh-keygen -t rsa`.
3. The program will first prompt you where to save the key file. The default is your `.ssh` directory, which is what you want, so just press return.
4. The program will then prompt you for a password, or passphrase. It is optional, but *highly* recommended, because it protects your key in the event it is compromised (for example, if your laptop is stolen). Choose a long and strong password. You will have to enter it again for confirmation.
5. Two files will be created in the `.ssh` directory in your home directory: a **public key** file, and a **private key** file. The public key file ends in `.pub` and you will need to copy it to a department computer. The private key file *doesn't* end in `.pub` and **must not** be copied anywhere.

6. Copy your public key file to your desktop by typing the following command and pressing return: `cp ~/.ssh/*.pub ~/Desktop`

7. You'll now have a `.pub` file on your desktop. You'll need to copy this to a department machine somehow. Probably the easiest way is to email it to yourself.

2 In the Sunlab: Authorize your key

1. If you emailed your public key file to yourself, download and save it in your home directory (e.g. /home/jcarberr).

2. Open a terminal.

3. Type the following command and press return: `ssh-key-setup <key>` (where key is the name of the public key file that you copied from your Mac).

Good work so far. Isn't this fun?

3 Back on your Mac: Connecting

1. Open a terminal, as before.

2. Type the following command and press return: `ssh jcarberr@ssh.cs.brown.edu` (where `jcarberr` is your CS login name).

3. You will be prompted to enter the passphrase that you chose when generating the key.

4. Once you have entered your passphrase you will be connected to a terminal in one of the Sublab computers. You can use it as if you were sitting in the Sunlab.

4 Advanced: X11 forwarding

X11 forwarding allows you to use graphical applications like DrRacket or Eclipse remotely. If you are using Mountain Lion, please skip to the Mountain Lion Section.

1. Launch X11 on your Mac, by going to Applications $\rightarrow$ X11.

2. A terminal window will automatically launch.

3. Type the following command and press return: `ssh -Y jcarberr@ssh.cs.brown.edu` (where `jcarberr` is your CS login name) (also note the `-Y` which enables X11 forwarding).

4. You will be prompted to enter the passphrase that you chose when generating the key.

5. Once you have entered your passphrase you will be connected to one of the Sublab computers. You can use it as if you were sitting in the Sunlab. Any graphical application you run, like DrRacket or Eclipse, will be forwarded over your SSH connection and display on your Mac.

5 Mountain Lion

Note: Please skip this section if using a version of MaxOSX before Mountain Lion. If you're not sure what version of OSX you are using, you can check if you have X11 installed on your computer by typing "X11" into spotlight. If you have the program installed, you are not running Mountain Lion and can skip this portion.

Starting with Mountain Lion, Apple no longer includes an X11 server as part of the default software on Macs. We will need to rectify this by downloading and installing XQuartz onto your computer. XQuartz can be found at `http://xquartz.macosforge.org/landing/`. Download the latest version (2.7.4 as of 9/14/2013) and install it on your computer (the default configuration is fine). You will want to configure this application so that it runs automatically on startup. Once XQuartz is installed and running, take the following steps:

1. Open a terminal.
2. Type the following command and press return: `ssh -Y jcarberr@ssh.cs.brown.edu` (where `jcarberr` is your CS login name) (also note the `-Y` which enables X11 forwarding).
3. You will be prompted to enter the passphrase that you chose when generating the key.
4. Once you have entered your passphrase you will be connected to one of the Sublab computers. You can use it as if you were sitting in the Sunlab. Any graphical application you run, like DrRacket or Eclipse, will be forwarded over your SSH connection and display on your Mac.

6 Transferring Files using SFTP

Note: If you are running OSX 10.5/10.6/10.7 with Lion, consider downloading Fugu `http://download.cnet.com/Fugu/3000-7240_4-26526.html`. This is a graphical tool that will allow you to drag and drop files between the CS Dept. machines and your own over SSH.

Sometimes if the network is down or just slow, you may wish to work on CS work locally on your own computer (there is a link to download DrRacket on the homepage). In this case you will need to transfer your work between the CIT and your own computer. E-mail accomplishes this, but it's not very convenient. However, once you have followed the steps above you can also use a service called SFTP, which is right in your terminal. To use SFTP:

1. Open a new terminal (don't use the one you just used to ssh).

2. Type the following command and press return: `sftp jcarberr@ssh.cs.brown.edu` (where `jcarberr` is your CS login name).

3. Enter your passphrase.

4. You are now logged into both your computer and a computer in the Sun Lab. Most standard commands used to navigate (`cd`, `pwd`, etc.) still work and will navigate around your CS account. Add an `l` at the beginning of commands navigate around your own computer (`lcd`, `lpwd`, `lls`, etc.).

5. You can move files from your computer to the CIT using the following command: `put` <*location of file on your computer*> <*destination on CIT file system*>.

6. You can move files from the CIT to your computer using the following command: `get` <*location of file on CIT file system*> <*destination on on your computer*>.

7. For more commands use the `help` command or look online.