Lab 1: Accessing the Linux Operating System

This lab takes a look at UNIX through an online experience on an Ubuntu Linux client and a Red Hat Enterprise server. In this lab, you will:

1. Log on to a Linux system locally and remotely
2. Log on to a Linux system using both character-based and graphical interfaces
3. Start a terminal window session from a graphic desktop.
4. Start multiple sessions on a single system
5. Perform simple tasks using both commands and graphical icons
6. Exit from a login session

Forum

If you get stuck, have a question or want to share something you learned with this lab then use the CIS 90 Forum at http://simms-teach.com/forum/viewforum.php?f=17

Procedure

It is recommended that you do this first lab in the CIS Lab (room 2504) or the CTC because you will need access to a system that can run Windows and Linux. There are 10 CIS lab stations labeled CIS-Lab-XX (where XX is 01 to 10). These stations are Windows PC's with VMware Server installed. There are a variety of Linux VMs (Virtual Machines) on each station. A VM behaves exactly like a real physical system.

Read through this lab document carefully before starting. There are a number of questions to answer as you work through the lab. You may wish to print out a copy of this lab to serve as a guide and for recording your answers. When you submit the lab, you will be asked for some of these answers. You may submit more than once if you want to change your answers. Have fun exploring…

PART 1 - Accessing a Remote Linux server from Windows using PuTTY

Step 1.1 - Locate a Windows system

For this part of the lab you will need a Windows PC with PuTTY installed. Locate one of the CIS-Lab-XX stations in the CIS Lab or the CTC to use. These systems will have everything you need to complete this lab.

We will need to use SSH (Secure Shell) over the network to access a remote UNIX/Linux system. While SSH is built into Linux it is not part of Windows. To get around that, we are going to use a free third party program called PuTTY. The system we will SSH into is named Opus.

Opus is a different and separate computer than the Windows PC you are using. Opus is a server. It is mounted in a rack located in a cold, dark, and locked room in a different building on campus. Using PuTTY you will connect with Opus over the campus network from the Windows PC in the CIS Lab or the CTC. Any commands you issue using PuTTY will be executed by the remote Opus computer. Opus is running a distribution of Linux called Red Hat Enterprise Linux.

For future labs you may wish to access Opus from your home Windows PC. Check the Howto on PuTTY installation for more information.

Step 1.2 - SSH from Windows

From the Windows PC, run the PuTTY program. Double-click the desktop icon and specify the host name of the remote system (opus.cabrillo.edu), and SSH as the connection type.
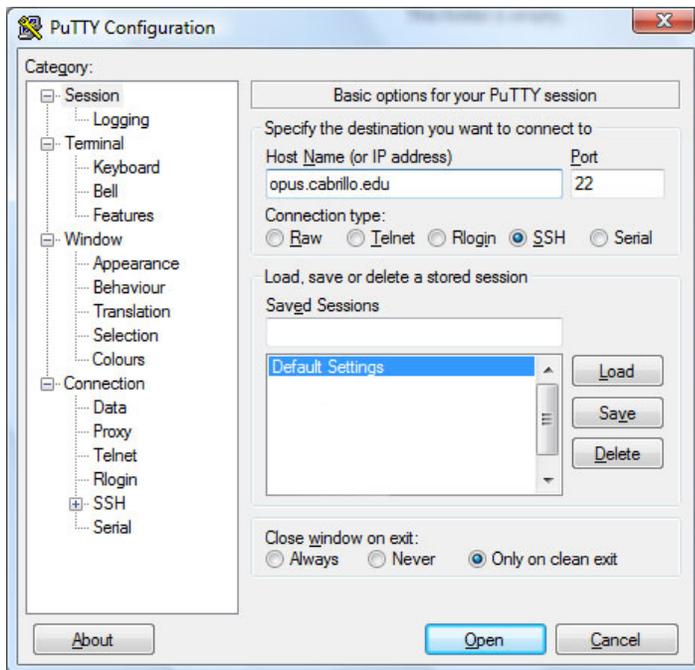

Note: when attempting to connect to Opus for the first time from a given machine, you may get an alert and asked to confirm the identity of Opus, (17:9a:6b:17 …), click "Yes" to continue.

Next you will be prompted for a username and password.
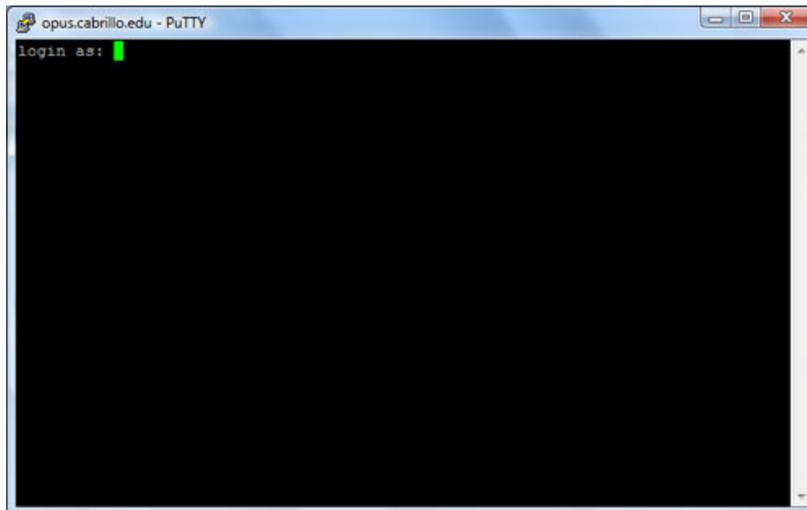
For this initial lab, use **guest90** as the username and the password that was given out in class. When you get the **Terminal Type? [xterm]** prompt, just press Enter.
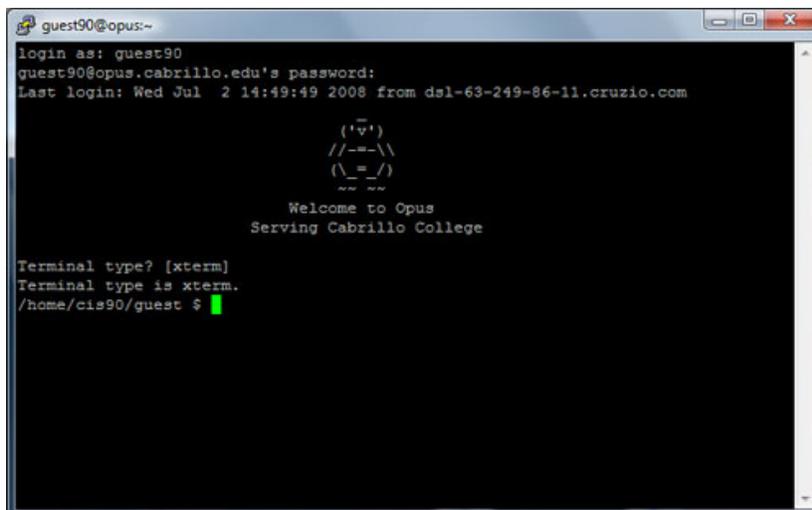
Congratulations! You are now logged in.

Step 1.3 - Entering commands

As you do this lab, please record you answers to the following questions. You will need these answers when you submit your work.

a) Notice how the system prompts you for entering commands. **The prompt is a string of text that ends with a $ symbol**. What is the **prompt string** on Opus?

b) We will use some simple commands to gather some information before we logout. Type each command below and answer the questions. Remember to press Enter after each command.
   date
   Is the date and time correct?

c) **cal**
   How many months does it display?

d) **who**
   How many users are currently logged onto the system?
   If there is more than one person besides yourself, who has been on the longest?

e) **who am i**
   Now you can see just your own session. What terminal device are you using to access Opus?

f) **hostname**
   Use hostname to show the name of the computer you are interacting with. This is very useful if you have multiple sessions going with different systems and you need to verify that name of the system you are sending commands to.

g) **id**
   Find out who you are. What is your uid (**user id**) number?

h) **clear**
   What happens to your screen?

i) **ps**
   This command shows your active processes. Every command or program you are running shows up as a process. At this point you are running a **shell** program and the **ps** command. The names of these two processes are shown in the CMD column. What is the name of the shell you are using?

j) **tty**
   This shows the **terminal device** the operating system using to read input and write output for this login session. What terminal device are you using to access Opus?

k) See what you can discover about the following commands. What do each of the following commands do?
   o **uname**
   o **history**

l) To exit your current login session, type **exit** and you will terminate your shell, which will log you off the system.

PART II – Using a local Linux system

Step 2.1 - Locate a Linux System

In the first part of the lab we accessed a remote Linux system over the network using SSH. In this portion of the lab we will be using a local Linux system. Because it is local we have direct hands-on access. A console is used rather than having to connect over the network.

Our local hands-on system will be a VM (Virtual Machine). All the CIS-Lab-XX stations in the CIS Lab and CTC have VMWare Server installed along with a number of Linux VMs. The VM used for this lab has been installed with the Ubuntu distribution of Linux.

Start up VMware Server using the desktop icon.

When you get the host prompt, choose Local host and click OK

Next review the various VM's in the left Inventory panel and look for the VM named **192-frodo**. If the Inventory is not showing, the F9 key can be used to toggle it on and off.

We are using one of the VM's designed for the CIS 192 class. Just to make sure we have a pristine version of the Frodo VM, right click on **192-frodo** in the Inventory panel and select **Revert to Snapshot**. This restores the entire Linux system back to the original installation and configuration.
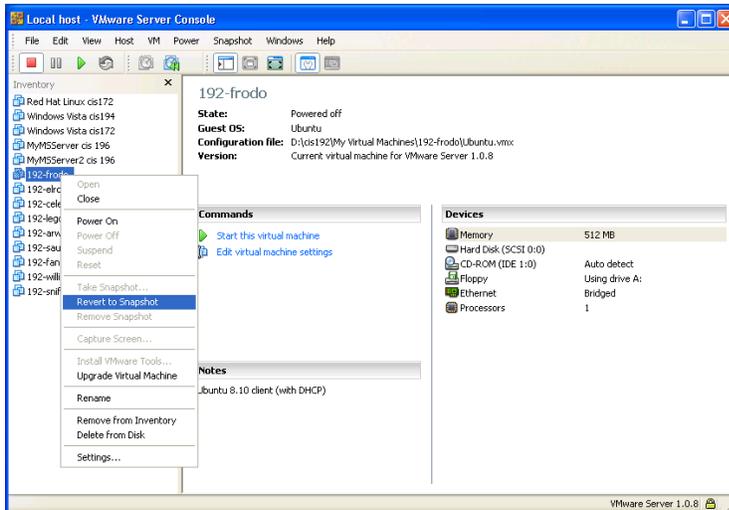

To start up Frodo click on the blue link "**Start this virtual machine**"

Step 2.2 – Login

After the VM has booted up, note the graphical interface and the text box prompting you to enter your login name.

Click inside the VM window. The VM will capture your mouse and it will be "stuck" inside the VM. If you need to release the mouse again, hit press the left Ctrl and Alt keys at the same time. Login into the graphical system using **cis90** and password you were given in class.
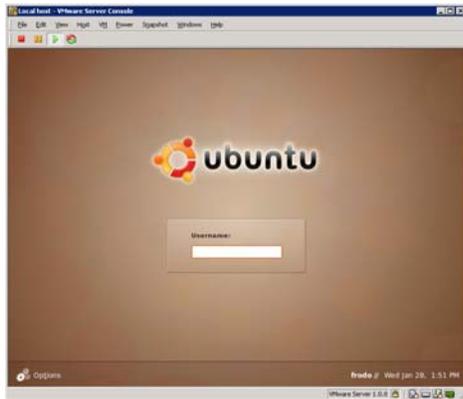
What did you notice to be different with Frodo's graphical login compared to the non-graphical Opus login? Were you asked for a terminal type?

After logging in you will see the Ubuntu desktop.


Step 2.3 – Virtual and graphical terminals

1. The multiuser capabilities of UNIX/Linux are usually exercised by users logging in from different terminals e.g. terminals in various locations around an office building. An added feature of being at the console of a UNIX machine is that you can run multiple login sessions from a single console. Let's do that!

    From the keyboard, type: **Ctrl-Alt-F1**
    where **F1** is function key 1. Be sure that these keys are all down at the same time.
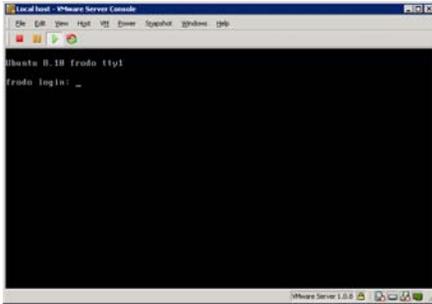
2. This is a character-based interface allowing you to login in a non-graphical format. We often call this a terminal interface because it resembles the interface of a standard serial terminal. Sometimes you'll hear the term *virtual terminals* used to describe these logon screens because they look and behave as if they were real terminals.
3. Log in from this terminal session using the username **cis90** and password as you did above. What **prompt string** are you seeing in this local terminal interface?
4. Use the **who** command to see who is on this system. You should see both of your login sessions. How can you tell them apart?
5. In general, you can log in to a local UNIX machine from as many virtual terminals as the operating system supports. How many does Linux support?
   (Hint: Holding down the **Ctrl-Alt** keys, press the other **function keys (2-7)** one at a time.)
6. Log in to virtual terminals tty2 and tty5 and verify using the **who** and **who am i** commands.
7. Using the commands you learned on Opus, answer the following questions:

   a. Do you have the same user id on each of the virtual terminal sessions?
   b. Is your command history the same for all login sessions?
   c. How can you distinguish between the different login sessions?
   d. What is the name of the computer you are interacting with?
   e. If you log off one session, do you get logged off all the sessions?

8. Before graphical user interfaces came out on UNIX, this was the way that users were able to simulate multiple windows. UNIX had this concept of *windows* before Microsoft did, the UNIX community called them *screens*. Let's go back to our graphical session. Do you know how?
   Press: **Ctrl-Alt-F7**
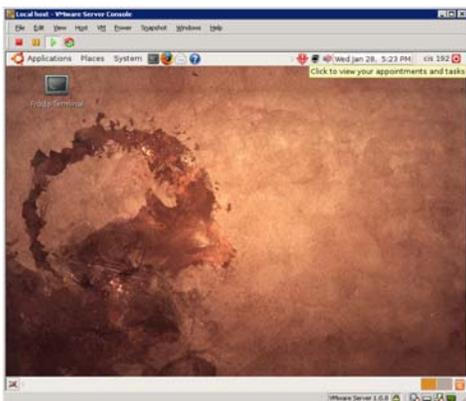
9. A graphical interface is often thought as being easier to use than a command-line interface, because you don't have to memorize commands, and you don't have to type so often. Instead, you use the mouse to look around for meaningful icons and menus, and just point, click and double-click. See if you can accomplish the tasks we did from the command-line by making menu selections from the *Applications* and *System* menus on the upper left of the task bar).

    How do you:
    a. Find the current date?
    b. Find a calendar of the current month?
    c. Can you find out who else is on the system?
    d. Log off?

10. Sometimes it's just easier to use a terminal when you know what you want to do. A graphical session allows you to run a terminal session in a separate window. Click on the *Applications* menu and select *Accessories*. On that menu, select *Terminal*. A 25 line terminal window should now appear so that you can run any UNIX command.

    Using **who** and **who am i** commands, what terminal device you using now? (Warning: typing the exit command will close this window session.)
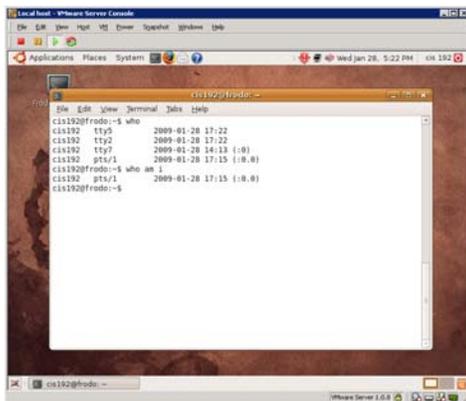
Step 2.4 - Submit this lab

For your last task, you will use the **ssh** command to remotely log in to Opus and submit your lab. From your terminal window, type the following line:

ssh guest90@opus.cabrillo.edu

1. Note: You may receive a warning message about a key finger print. If you do, just type **yes** and press Enter.
    Supply the password (and terminal type) when prompted.
2. Once you are logged on to Opus, run the submit command.
    submit
    This is not a UNIX or Linux command, but it is a script file. It will first ask which lab you are submitting. Since this is Lab 1 enter a 1. Then it will ask you for your first and last name so that we can prepare a home directory for you. It will also ask you for the answers to 12 questions about the information you collected from this lab.

3. Don't forget to log off both the Opus computer and your local terminal session and your Graphical Desktop.

Congratulations!! You've completed your first lab.

Grading Rubric

30 points total. Six points for a successful submittal using Opus and two points for each correct answer.