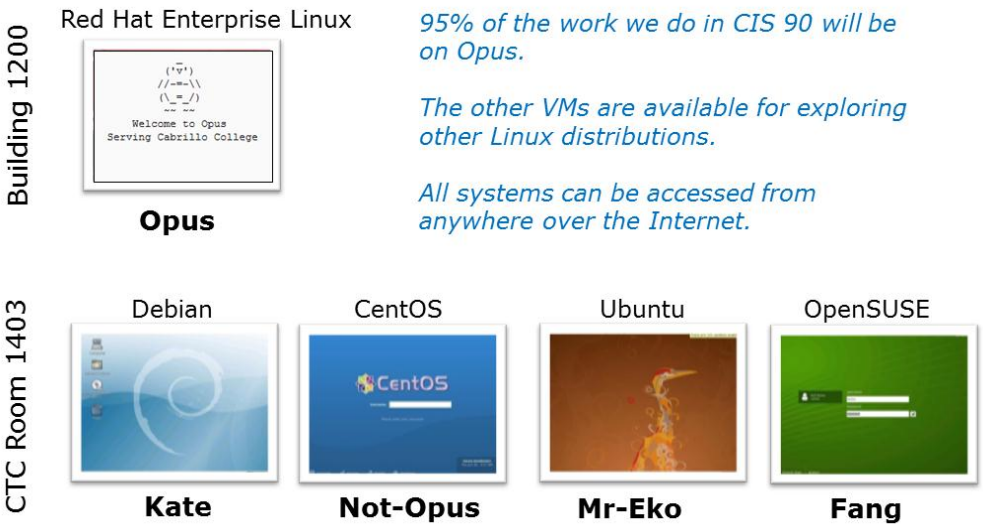
Cabrillo College

Lab 1: Accessing the Linux Operating System

This lab takes a look at UNIX/Linux through an online experience. In this lab, you will:

1. Power on some Linux systems.
2. Log and/or use several different Linux distributions.
3. Use virtual and graphical terminals.
4. Perform simple tasks using both commands and graphical icons.
5. Exit from a login session.
6. Shutdown some Linux systems.

You will get a chance to access and use each of the systems below:



Forum

If you get stuck, have a question, need clarification or want to share something you learned doing this lab then use the CIS 90 Forum at
http://opus.cabrillo.edu/forum/viewforum.php?f=46

Procedure

This lab can be done in the CIS Lab (room 1403 in the CTC) or remotely from off campus. There is an advantage to doing it in the CIS Lab because there are 10 Windows stations for use by CIS students with instructors & lab assistants nearby for help. See http://webhawks.org/~cislab/ for a map, hours of operation and when assistance is available.

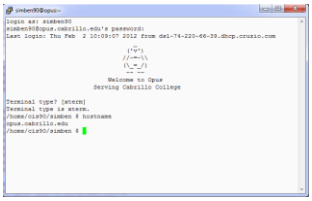
The lab documentation is geared towards starting from a Windows PC however it's also possible to do this lab from a Mac or Linux computer. Use the forum to ask ways of doing this.

To prepare, read through this lab document carefully before starting. Make sure you know your usernames & passwords for Opus, VLab and the VLab VMs.

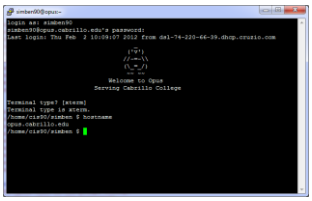
At the end, when you submit the lab, you will be asked for answers to questions based on what you have learned. You may submit more than once if you want to change your answers. Have fun exploring...

PART 1 - Opus

Step 1.1 - Login to Opus (a Red Hat Enterprise Linux system)



Custom colours



Default colours

This was covered in Lesson 1. For a refresh on how to do this refer to the following:

- Accessing Opus:
  http://simms-teach.com/howtos/133-win-opus-access.pdf
- Accessing Opus with Putty:
  http://www.youtube.com/watch?v=Wnu734GKMQI

Step 1.2 - Entering commands

As you do this lab, make sure you can answer each of the questions. You will need answers to some of these questions when you submit your work at the end.

a) Notice how the system prompts you for entering commands. The **prompt** is a string of text that ends with a $ symbol. Immediately following the prompt is where you will type a command.
b) Now type each command below and see what happens:
   - **date**
   - **cal**
     cal 2012
     cal 03 2012
     cal *<your birth month> <your birth year>*

- **who**
  This shows all current login sessions. Each line of output includes the user name, the terminal device, when they logged in and from where.
- **who am i**
  This shows only your login session information.
- **whoami**
  Note that removing the blanks makes a difference.
- **who -uH**
  Instructs the **who** command to add headers and some additional login information like idle time and the user's process id number. Note the terminal devices being used to access Opus are under the "LINE" column.

- **hostname**
  Shows the hostname of the system being used. This is quite handy when logged into multiple systems.

- **id**
  Find out who you are. This also shows additional information like your uid (user ID) number, gid (primary group ID) number and other account information.
- **id rsimms**
  The id command can be used to obtain account information on other users too.

- **clear**

- **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. You can use this later for questions asking which shell you are running.

- **tty**
  This shows the specific terminal device being used by the operating system to access Opus for this login session. This should match the abbreviated terminal device shown by the **who** and **who am i** commands

- **uname**
  This shows the name of the OS (operating system) kernel. Note this is different than the output of the **hostname** command which shows the name of the system.

  cat /etc/*-release
  We didn't cover this command in Lesson 1 but will in the future. On a Linux system this will usually show the specific "distro" (distribution) being run.

- **history**
  This command is very useful and command history is not deleted even after you log off.

- **exit**

This logs you off. If you need to repeat a command again on Opus, just log back in.

Step 1.3 - Multiple login sessions

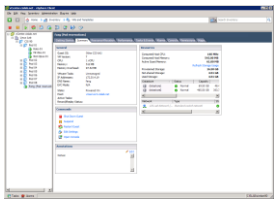
See if you can start up multiple Opus login sessions at the same time. There is no hard limit on the number of open sessions. Use the **who** command to see each of your login sessions. Note that each session has its own unique terminal device. Use the **exit** command to end each session.

PART II – VLab: Fang and MrEko VMs

The CIS VLab lets you access multiple Linux systems all running different distributions of Linux. Each system is a VMware VM (virtual machine). The VLab systems let you do tow things you cannot do on Opus:

- Have console access so you can run virtual terminals (tty1, tty2, etc.)
- Login as both a normal user (cis90) and the superuser (root)

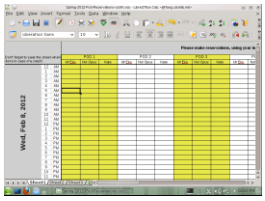
Step 2.1 - Login to VLab



This was covered in Lesson 1. For a refresh on how to do this refer to the following:

- Accessing VLab:
  http://simms-teach.com/howtos/304-cis-vlab-access.pdf
  - Accessing VLab from Windows:
    http://www.youtube.com/watch?v=xWlm6_CpcrE

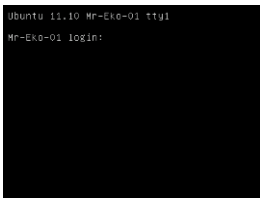
Step 2.2 – Fang (an openSUSE Linux system)



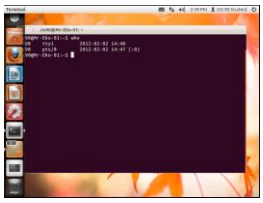
a) Find a free pod and reserve it using the Fang VM (Virtual Machine). Reservations are done by putting your initials into the spreadsheet under the VMs you want across from the date and time you want to use them.

Step 2.3 – MrEko (an Ubuntu Linux system)


Graphical session



Virtual terminal (tty1)


Graphical terminal in graphical session

a) Power on the Mr-Eko VM in your pod and login as the cis90 user.
b) 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!
c) From the keyboard, while holding down: **Ctrl-⊞-Alt**, tap **space**, then tap **F1**

d) This is a command-line 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.
e) Log in from this terminal session using the username cis90 and password as you did above. What is the command prompt on Mr-Eko?
f) Use the **who** command to see who is on this system. You should see both of your login sessions.
g) 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.)
h) Log in to virtual terminals tty2 and tty5 and verify using the **who** and **who am i** commands.
i) Using the commands you learned on Opus, answer the following questions:
    - Do you have the same uid (user id) on each of the virtual terminal sessions?
    - Is your command history the same for all login sessions?
    - How can you distinguish between the different login sessions?
    - What is the name of the computer you are interacting with?
    - If you log off one session, do you get logged off all the sessions?
j) 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? Hint, while holding down: **Ctrl-Alt**, tap **space**, then tap **F7**
k) A graphical user interface (GUI) 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 GUI interface.

l) Using the GUI, can you:
   - Find the current date?
   - Find a calendar of the current month?
   - Find out who else is on the system?
   - Log off?

m) 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 graphical terminal session in a separate window. On the left dash panel, select the Terminal application.

n) A 25 line terminal window should now appear so that you can run any UNIX command.

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

PART III – VLab: NotOpus and Kate VMs

Step 3.1 – NotOpus (a CentOS Linux system)

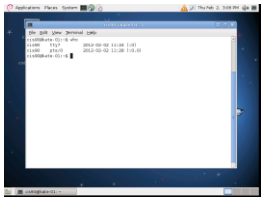
NotOpus

a) Power on the Not-Opus VM in your pod and login as the cis90 user.

b) CentOS is a replica distribution based off Red Hat Enterprise Linux. The same source code is used however the artwork differs. What differences do you notice between Opus and NotOpus?

c) Prove to yourself that you can log into NotOpus, use the GUI, at least one console virtual terminal (like tty1) and run a graphical terminal.

Step 3.2 – Kate (a Debian Linux system)



Kate

a) Power on the Kate VM in your pod and login as the cis90 user.

b) Debian is pure GNU/Linux distribution based on GPL licensed components. What differences do you notice between Kate and the other VMs?

c) Prove to yourself that you can log into Kate, use the GUI, at least one console virtual terminal (like tty1) and run a graphical terminal.

d) On Debian, use **cat /etc/*_version** (instead of **cat /etc/*-release**) to determine the version of the distribution.

PART IV – Submit this lab

To submit your lab, you will run a script on Opus that will ask you 30 questions. It is recommended that you stay logged into Opus and your three VMs so you can easily answer these questions. If logged out of a system, just log back in again. You can submit as many times as you wish up to the deadline. Each submittal will replace the previous one.

If you wish to preview the questions, they can be found in the Appendix of this lab.

To submit, you will use the **ssh** command to remotely log into Opus from one of the VMs (your choice). Select your favorite VM and from either a graphical or virtual terminal issue this command:

ssh *username*@**opus.cabrillo.edu**
(where *username* is your Opus username)

1. Note: You may receive a warning message about a key finger print. If you do, just type **yes** and press Enter.
   Supply your Opus 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 30 questions using the new commands you have learned in this lab.
3. Don't forget to log off all Opus sessions when finished and shutdown all three VMs.

Congratulations!! You've completed your first lab.

Grading Rubric

30 points total. One point for each correct answer. The four extra credit questions are optional and worth one point each.

Remember, late work is not accepted. If you can't finish the lab before the deadline then submit what you have before the deadline for partial credit.

Appendix

Skills check:

These questions are not asked by the submittal script, but knowing how to answer them will be very helpful to being able to quickly answer the submittal questions:

- What command shows all current login sessions?
- What command shows you the hostname of the system being used?

- What command shows you the name of the terminal device being used?
- What command shows you the name of the OS (Operating System) kernel being run?
- What command(s) show you the name of the specific distribution of Linux being run?
- What command shows you the username for the account you are logged in as?
- What command shows you the uid (user ID) number for the account you are logged in as?
- What command shows you the processes (including the shell process) being run?
- What keys must be pressed to bring up a virtual terminal, like tty2
- What command logs you off?

Questions asked during submittal:

# Opus
q1="On Opus, what is the prompt string?"
q2="On Opus, how many current login sessions are there?"
q3="On Opus, what is the hostname?"
q4="On Opus, what terminal device did you use?"
q5="On Opus, what OS kernel is being run?"
q6="On Opus, which distribution of Linux is being run?"
q7="On Opus, what is your username and uid (user ID) number?"
q8="On Opus, what shell is being used?"
q9="On Opus, can you bring up a virtual terminal, like tty2?"

# Not-Opus
q10="On Not-Opus, what is the prompt string?"
q11="On Not-Opus, what is the hostname?"
q12="On Not-Opus, what terminal device did you use?"
q13="On Not-Opus, what OS kernel is being run?"
q14="On Not-Opus, which distribution of Linux is being run?"
q15="On Not-Opus, what is your username and uid (user ID) number?"
q16="On Not-Opus, what shell is being used?"

# Mr-Eko
q17="On Mr-Eko, what is the prompt string?"
q18="On Mr-Eko, what is the hostname?"
q19="On Mr-Eko, what terminal device did you use?"
q20="On Mr-Eko, what OS kernel is being run?"
q21="On Mr-Eko, which distribution of Linux is being run?"
q22="On Mr-Eko, what is your username and uid (user ID) number?"
q23="On Mr-Eko, what shell is being used?"

# Kate
q24="On Kate, what is the prompt string?"
q25="On Kate, what is the hostname?"
q26="On Kate, what terminal device did you use?"
q27="On Kate, what OS kernel is being run?"
q28="On Kate, which distribution of Linux is being run?"
q29="On Kate, what is your username and uid (user ID) number?"
q30="On Kate, what shell is being used?"

# Extra credit
q31="Extra Credit: On any system, does logging off one session log you off all other sessions?"
q32="Extra Credit: On any system, does the history command remember commands for past login sessions?"
q33="Extra Credit: Does the history command remember commands entered on another system?"
q34="Extra Credit: On the same system, is your command history the same for each login session?"