

Assignment 0

Familiarization with Linux

Due Date: Wednesday April 12th, 2017 @ 11:59 pm, tentative

Objective

The purpose of this assignment is for everyone to create a local Linux Virtual Machine for use in future TCSS 422 projects and gain some experience using CentOS. Please download and install CentOS 7. **Installing from the Everything ISO is recommended.** During the installation please include *the Developer Tools*. CentOS is an open source/free distribution of RedHat Linux- a leading commercial distribution of Linux. CentOS tends to be more stable than other Linux distros such as Fedora or Ubuntu as there are fewer updates. Consequently, releases of new Linux features in CentOS tend to lag other distributions. The most widely used Linux distributions in industry include Red Hat/CentOS, SUSE, and Ubuntu.

Task 1 – Install Oracle Virtual Box

Oracle VirtualBox can be downloaded from: <https://www.virtualbox.org/wiki/Downloads>

Assuming you have access to a computer, choose the appropriate link from the list for your host operating system to download VirtualBox:

VirtualBox 5.1.18 for Windows hosts x86/amd64
VirtualBox 5.1.18 for OS X (MAC) hosts amd64
VirtualBox 5.1.18 for Linux hosts

Once you've downloaded VirtualBox, follow the instructions to complete the installation.

If you do not have access to a computer for Virtual Box and CentOS, Stephen Rondeau, senior computer specialist for the Institute of Technology, is setting up CentOS 7 based VirtualBox VMs to support TCSS 422. If you haven't already requested a VM to be setup, please do so. An announcement was sent using Canvas for a Google Forms survey to request an Institute Virtual Machine.

Task 2 – Create a CentOS Virtual Box VM

CentOS can be downloaded from: <https://www.centos.org/download/>

If available, please install 4GB RAM (2GB minimum), 2+ CPU cores, and a minimum of 10 GB free disk space. 30-50 GB could be used if sufficient space is available. One student last quarter ran out of disk space near the end of the quarter leading to headaches.

Video on 64-bit CentOS 7 Installation (windows): <https://www.youtube.com/watch?v=Eb-FetgKB6k>

Task 3 – Become familiar with Linux

For this task you will use the internet, and/or a good Linux book to run a series of Linux commands to discover information about your CentOS Virtual Machine. The goal is to help familiarize yourself with some common Linux commands and to give you an opportunity to gain experience using the internet and various references to discover how to navigate and introspect information about your new Linux Virtual Machine.

There is NO C programming required. Instead, you will capture the output from a sequence on Linux commands to a file, and submit this output file to Canvas. Additionally, you should submit as a separate text file, a numbered list of commands that answers each of the questions. 50% of the credit will come from determining the command which displays the answer. The other 50% will come from interpreting the output of the Linux command to answer the question.

First, you must discover a Linux command that provides an answer to the question. For each question, there could be more than one valid Linux command to answer the question. **Any** command, or **sequence of commands**, is ok as long as the correct answer is provided as output by the system.

(Note: you can't just print out a random answer with the "echo" statement, it has to come from using Linux system commands)

To create the output file, write a simple BASH script which executes the series of commands.

OUTPUT PREPARATION – Create a simple bash script

Create a "bash" script which provides the commands to the session to answer each of the questions. Then, run this script file, and capture its output in a text file, and submit the text file to Canvas. Submit the script file to Canvas, along with its captured output file. Here is an example:

```
# here is the output of the script
$ cat myscript.sh
echo ; echo "command #1: pwd"
pwd
# now lets run the script and capture its output
# assign the script so that the user account has execute permission
first
$ chmod u+x myscript.sh
# Here is an example of I/O redirection.
# The output of the script is redirected
# to the file called "example.txt"
$ ./myscript.h > example.txt
$ cat example.txt

command #1: pwd
/home/fred
$
```

Questions

Question 1 – What is the Process Identification Number (PID) of your user’s shell process?

Question 2 – What is the version of the Linux kernel installed on your CentOS VM?

Question 3 – How many virtual CPU cores does the VM have access to?

Question 4 – What is the total memory size in MB of the VM?

Question 5 – What is the free disk space of the root disk partition in MB? In Linux, the root partition is always mounted at “/”. A mount point is the directory or location in the file system where an I/O device has been mounted. The mount point is used to access the device through a file system.

Question 6 – What are the logical volume names of all logical disk volumes on your CentOS VM?

Question 7 – What is the total number of inodes on the root filesystem? Please look up what an inode is, and how to display the number of free/used inodes.

Question 8* – What is the average round trip time (RTT) of 10 ICMP ping packets from your CentOS VM to www.google.com?

Question 9 – What is the name of the file system used for (1) the boot and (2) the root partitions. These will generally be the same? Please look up what file systems are in Linux, and how to determine the file system of a particular file system.

Question 10* – Using the lshw command, report the list of capabilities of your CPU. You will likely need to install lshw using yum. This will be a long list. Is the “ht” capability provided? (yes/no) Here is the wiki page describing “ht”: <https://en.wikipedia.org/wiki/Hyper-threading>
Look up the meaning of one other CPU capability.

* - These questions require networking to be configured on the CentOS VM.

Question 11 & 12- Look up two Linux commands you are unfamiliar with. Provide an example of using the command in your script. In the textfile that contains the answers to the questions, provide a description ***in your own words*** of what the command does.

What to Submit

To complete the assignment, upload the following files to Canvas:

- 1- A **simple bash script** containing the list of commands that answers each question

File naming as following: A0_{lastname}.sh

Example: A0_Lloyd.sh

- 2- The **output of the bash script** captured by running the script, and redirecting the output “>” to a file.

File naming as following: A0_output_{lastname}.out
Example: A0_output_Lloyd.out

- 3- A **textfile containing a numbered list of answers** to each of the questions. Each answer must appear on the captured output of the bash script.

File naming as following: A0_answers_{lastname}.txt
Example: A0_answers_Lloyd.txt

For questions 11 and 12, include a written description of the command you've researched. Your description should not be a copy of the man page. Your description should be ***in your own words*** describe what the main functions of the command are.

Grading

This assignment will be scored out of 20 points. (20/20)=100%

Each question is worth 2 points: one point is for providing output that contains the answer, and one point for listing the answer correctly.

Two questions are bonus. Answering bonus questions allows you to still receive 100% on the assignment while skipping or incorrectly answering up to 2 questions.