

# Certificate in Computing

# Lab Part 1

Download and install VirtualBox and understand some of the functions of this tool.

<https://www.virtualbox.org/>

Once installed navigate to the ubuntu website and download as seen in the Video Tutorial.

<https://ubuntu.com/download/desktop>

You may also want to experience other flavours of Linux operating systems, such as :

<https://www.opensuse.org/>

<https://www.techradar.com/best/best-linux-distros>

# Lab Part 2

On your new virtual machine gain some exposure to Linux commands.

Complete the following tasks using Linux on your new virtual machine and provide a submission below showing screenshots and commands used to complete the following tasks.

All should be completed using the Linux Terminal:

**Working with the Linux File System:**

* Open the Linux Terminal
  + Ctrl+Alt+T
* Establish Your Current Working Directory
  + pwd
* List All Files in current Directory in List Format
  + ls -1
* Create a New Directory Name "MyLinuxOS"
  + mkdir MyLinuxOS
* Navigate to your New Directory
  + cd MyLinuxOS
* Create a New File named "MyMovies"
  + touch MyMovies
* Edit the File to Include a list of your top 10 Favorite Films.
  + Echo ‘The Big Lebowski’ >> MyMovies
  + Echo ‘Interstellar’ >> MyMovies
  + Echo ‘Pulp Fiction’ >> MyMovies
  + Echo ‘Inglorious Bastards’ >> MyMovies
  + Echo ‘The Godfather’ >> MyMovies
  + Echo ‘Indiana Jones’ >> MyMovies
  + Echo ‘Jurassic Park’ >> MyMovies
  + Echo ‘The Wolf of Wallstreet’ >> MyMovies
  + Echo ‘Back to the Future’ >> MyMovies
  + Echo ‘Back to the Future 2’ >> MyMovies
* Save the File and Close

**System Management**:

* Establish the "Top" Processes Currently Running on your Linux VM
  + top
* Display Your Current System Activity
  + uptime

**Network Management**:

* Show Your Current Network Activity
  + Sudo iftop
* Display Your Current Network Connections
  + Netstat -an

**Summary:**

* Having installed your Hypervisor and Installed Your New Linux OS ,
* Can you Identify and Changes or Modifications which have occurred on your Host System?
* Recall , if you are running a Windows Machine by default, and have a Linux Virtual Machine,
* Windows is the Host and Linux is the Guest
* Complete the above tasks using the provided worksheet to assist you.

**Filesystem layout**

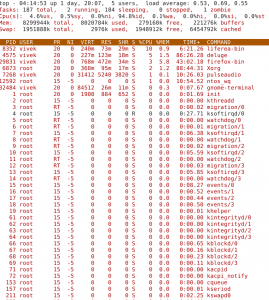
This is by no means a complete list, but it should prove to be an interesting adventure. For each of the directories listed below, do the following:

* **cd** into each directory.
* Use **ls** to list the contents of the directory.
* If you see an interesting file, use the **file** command to determine its contents.
* For text files, use **less** to view them.

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| Interesting directories and their contents | |
| **Directory** | **Description** |
| **/** | The root directory where the file system begins. In most cases the root directory only contains subdirectories. |
| **/boot** | This is where the Linux kernel and boot loader files are kept. The kernel is a file called **vmlinuz**. |
| **/etc** | The **/etc** directory contains the configuration files for the system. All of the files in **/etc** should be text files. Points of interest:  **/etc/passwd**  The **passwd** file contains the essential information for each user. It is here that users are defined.  **/etc/fstab**  The **fstab** file contains a table of devices that get mounted when your system boots. This file defines your disk drives.  **/etc/hosts**  This file lists the network host names and IP addresses that are intrinsically known to the system.  **/etc/init.d**  This directory contains the scripts that start various system services typically at boot time. |
| **/bin, /usr/bin** | These two directories contain most of the programs for the system. The **/bin** directory has the essential programs that the system requires to operate, while **/usr/bin** contains applications for the system's users. |
| **/sbin, /usr/sbin** | The **sbin** directories contain programs for system administration, mostly for use by the superuser. |
| **/usr** | The **/usr** directory contains a variety of things that support user applications. Some highlights:  **/usr/share/X11**  Support files for the X Windows system  **/usr/share/dict**  Dictionaries for the spelling checker. Bet you didn't know that Linux had a spelling checker. See [**look**](http://linuxcommand.org/man_pages/look1.html) and[**ispell**](http://linuxcommand.org/man_pages/ispell1.html).  **/usr/share/doc**  Various documentation files in a variety of formats.  **/usr/share/man**  The man pages are kept here.  **/usr/src**  Source code files. If you installed the kernel source code package, you will find the entire Linux kernel source code here. |
| **/usr/local** | **/usr/local** and its subdirectories are used for the installation of software and other files for use on the local machine. What this really means is that software that is not part of the official distribution (which usually goes in**/usr/bin**) goes here.  When you find interesting programs to install on your system, they should be installed in one of the **/usr/local**directories. Most often, the directory of choice is **/usr/local/bin**. |
| **/var** | The **/var** directory contains files that change as the system is running. This includes:  **/var/log**  Directory that contains log files. These are updated as the system runs. You should view the files in this directory from time to time, to monitor the health of your system.  **/var/spool**  This directory is used to hold files that are queued for some process, such as mail messages and print jobs. When a user's mail first arrives on the local system (assuming you have local mail), the messages are first stored in **/var/spool/mail** |
| **/lib** | The shared libraries (similar to DLLs in that other operating system) are kept here. |
| **/home** | **/home** is where users keep their personal work. In general, this is the only place users are allowed to write files. This keeps things nice and clean :-) |
| **/root** | This is the superuser's home directory. |
| **/tmp** | **/tmp** is a directory in which programs can write their temporary files. |
| **/dev** | The **/dev** directory is a special directory, since it does not really contain files in the usual sense. Rather, it contains devices that are available to the system. In Linux (like Unix), devices are treated like files. You can read and write devices as though they were files. For example **/dev/fd0** is the first floppy disk drive, **/dev/sda**(**/dev/hda** on older systems) is the first IDE hard drive. All the devices that the kernel understands are represented here. |
| **/proc** | The **/proc** directory is also special. This directory does not contain files. In fact, this directory does not really exist at all. It is entirely virtual. The **/proc** directory contains little peep holes into the kernel itself. There are a group of numbered entries in this directory that correspond to all the processes running on the system. In addition, there are a number of named entries that permit access to the current configuration of the system. Many of these entries can be viewed. Try viewing **/proc/cpuinfo**. This entry will tell you what the kernel thinks of your CPU. |
| **/media,/mnt** | Finally, we come to **/media**, a normal directory which is used in a special way. The **/media** directory is used for*mount points*. As we learned in the [second lesson](http://linuxcommand.org/lts0020.php), the different physical storage devices (like hard disk drives) are attached to the file system tree in various places. This process of attaching a device to the tree is called*mounting*. For a device to be available, it must first be mounted.  When your system boots, it reads a list of mounting instructions in the file **/etc/fstab**, which describes which device is mounted at which mount point in the directory tree. This takes care of the hard drives, but you may also have devices that are considered temporary, such as CD-ROMs and floppy disks. Since these are removable, they do not stay mounted all the time. The **/media** directory is used by the automatic device mounting mechanisms found in modern desktop oriented Linux distributions. On systems that require manual mounting of removable devices, the **/mnt** directory provides a convenient place for mounting these temporary devices. You will often see the directories **/mnt/floppy** and **/mnt/cdrom**. To see what devices and mount points are used, type [**mount**](http://linuxcommand.org/man_pages/mount8.html). |

**top - Process Activity Command**

The top program provides a dynamic real-time view of a running system i.e. actual process activity. By default, it displays the most CPU-intensive tasks running on the server and updates the list every five seconds.

*[](http://www.cyberciti.biz/tips/top-linux-monitoring-tools.html/top-output)*

### **Commonly Used Hot Keys**

The top command provides several useful hot keys:

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| **Hot Key** | **Usage** |
| t | Displays summary information off and on. |
| m | Displays memory information off and on. |
| A | Sorts the display by top consumers of various system resources. Useful for quick identification of performance-hungry tasks on a system. |
| f | Enters an interactive configuration screen for top. Helpful for setting up top for a specific task. |
| o | Enables you to interactively select the ordering within top. |
| r | Issues renice command. |
| k | Issues kill command. |
| z | Turn on or off color/mono |

## vmstat - System Activity, Hardware and System Information

The command vmstat reports information about processes, memory, paging, block IO, traps, and cpu activity.  
# vmstat 3

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| Command | Comment |
| ls | List the files |
| man <command> e.g. man ls | Show manual of a particular command |
| history | Show a history of the last commands typed in |
| cd ~ | Change directory to home directory. If using the Ubuntu image supplied on the course, and the using the login testuser, the home directory should be /home/testuser |
| pwd | Show the name of the current working directory |
| mkdir deploy | Create a new directory (Called deploy) in the current working directory. Having executed cd ~ above, this directory should create the deploy directory in your home directory |
| cd deploy | Change directory to directory deploy relative to current working directory. Should be absolute path /home/testuser/deploy |
| cd /home/testuser/deploy | Or alternatively, use the absolute path |
| touch testfile | Create a zero size file (testfile), in the deploy directory |
| ls –l | List the files, and include details of other attributes such as datestamp, permissions etc. |
| cp testfile testfile2 | Create a replica of testfile called testfile2 |
| rm testfile2 | Remove/delete testfile2 |
| netstat | Show network characteristics on Ubuntu/linux |
| ifconfig | Show the network interfaces on system |