Lab Assignment 1

Module ET4725 Operating Systems 1

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Assignment Objectives

1. Install Lubuntu as a guest OS in VirtualBox.

2. Share data between Lubuntu and the host OS.

3. Get comfortable with the UI and terminal in Linux.

Installation of VirtualBox

The specifications of my host OS system including Desktop Environment(DE) and Window Manager(WM):

Host: HP Laptop 15-db0xxx

CPU: AMD Ryzen 3 2200U with Radeon Vega Mobile Gfx (4) @ 2.500

GPU: AMD Radeon Vega Series

Memory: ~4GB

HDD: ~1TB

OS: Ubuntu 18.04.1 LTS x86_64

Kernel: 4.15.0-43-generic

Shell: bash 4.4.19

DE: GNOME 3.28.3

WM: GNOME shell

Now that we have the specifications of the system we will be using, let us go to the VirtualBox website and download a version that is specific to our OS.

The latest version for Linux OS's is VirtualBox 6.0.2, I chose the Ubuntu 18.04 / 18.10 / Debian 10 link which downloads a .deb package. When package finished installing I used the *sha256sum*

packagename.deb command on the package to make sure the checksums matched, Then I went ahead and installed the package using *sudo dpkg -i packagename.deb*.

Missing dependency

A small problem I ran into while installing VirtualBox was the installation required a dependency that was missing. The error was ***dpkg:*** *dependency problems ... virutalbox-6.0 depends on libqt5opengl5 is not installed*. Which means OpenGL version 5 is missing.

The solution was to install OpenGL using *sudo apt install libqt5opengl5*.

Installation of Linux as a guest OS

The next step of was to install a Linux OS as a guest OS on VirutalBox, for this task I chose Lubuntu. I visited the Lubuntu website and downloaded Lubuntu 16.04.3 LTS Desktop 64-bit version.

I then set up a profile on VirtualBox that would run the lubuntu.iso file that was downloaded. Here is my initial setup:

Name: lubuntu18.04.1LTS

Type: Linux

Version: Ubuntu (64-bit)

Base Memory: 1024 MB

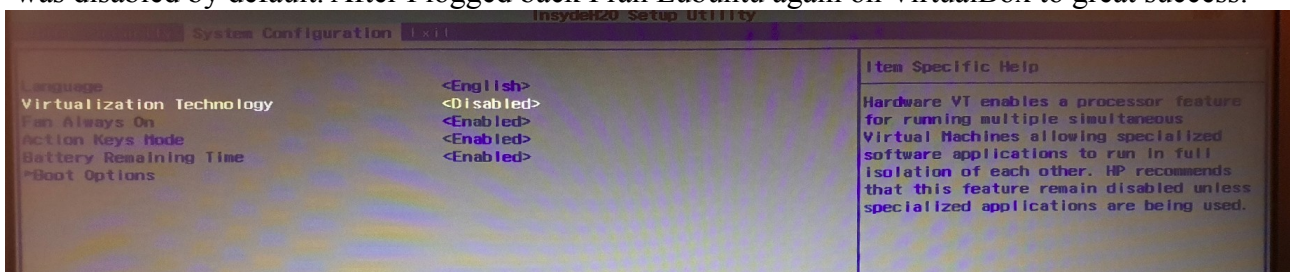*Storage: VDI - Normal, 10.00GB (8.00GB primary mounted at /, 2.00GB swap)*

Acceleration: Virtualization switched on (VTx/AMD-V, Nested Paging)

Since Lubuntu is such a lightweight OS I opted to give it only 1GB of memory, I will explain my decision here in the conclusion.
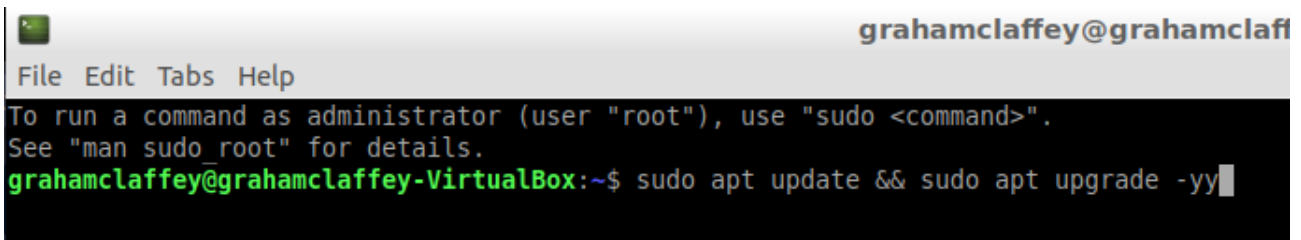
Unable to boot

After I had completed configuring the settings for Lubuntu on VirtualBox, I tried to boot up the system to find a message "*This kernal requires an x86-64 CPU, but only detected an i686 CPU*". From this message I started to think that I miss read my laptop specs, as this is a relatively new laptop I double checked this specs using *uname -p* which returned x86_64.

So my next step was to boot into the BIOS on my pc. There I found a Virtualization setting, which was disabled by default. After I logged back I ran Lubuntu again on VirtualBox to great success.

Setting up Lubuntu

With the installation phase of Lubuntu, everything worked as expected, with no issues. The first steps I took after installation was to update the system using the LXTerminal, I used the command *sudo apt update && sudo apt upgrade -yy*. When the system updated successfully, I installed the recommended packages from the lab document. I then created a shared folder between the host and guest OS's, at this point I found out I need to install the guest add-ons to mount the shared folder.

Permissions using scripts in guest add-ons

When I was attempting to enable guest add-ons to allow me to set up the shared drive. I ran into a problem with permissions in this folder. When I tried to execute the VboxLinuxAdditions.run script it would not execute even using the sudo command, due to lack of permissions.
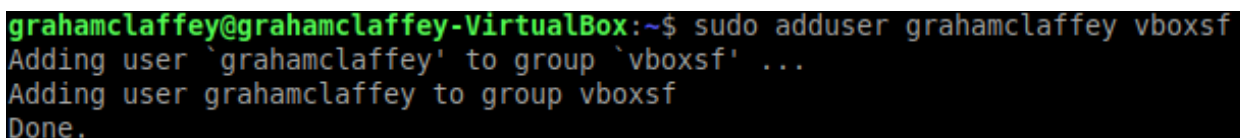
This brought me to activate the root account by giving the root account a password using the *passwd* command. I logged in as root and was able to execute the script. After this I restarted Lubuntu and the shared folder sf_VirtualBoxShare appeared on my desktop.

Using Lubuntu

While I have very briefly used Lubuntu in the past, back when I was distro-hopping from one Linux OS to another. I really enjoy the LXDE desktop environment for the responsiveness and simple for effective design. Even when I gave Lubuntu 1GB of memory to work with, it still has no trouble because of it's lightweight, using only 200MB while idle and while under load it was topping out at ~400-550MB. Lubuntu feels very similar to its parent Ubuntu in terms of package management at least. I have used most applications that Lubuntu offers, including Htop, Vim, Gdebi etc. I have also gotten familiar with some other applications as part of this assignment. Most notably System profiler benchmark which has me interested in trying it out on my host machine.
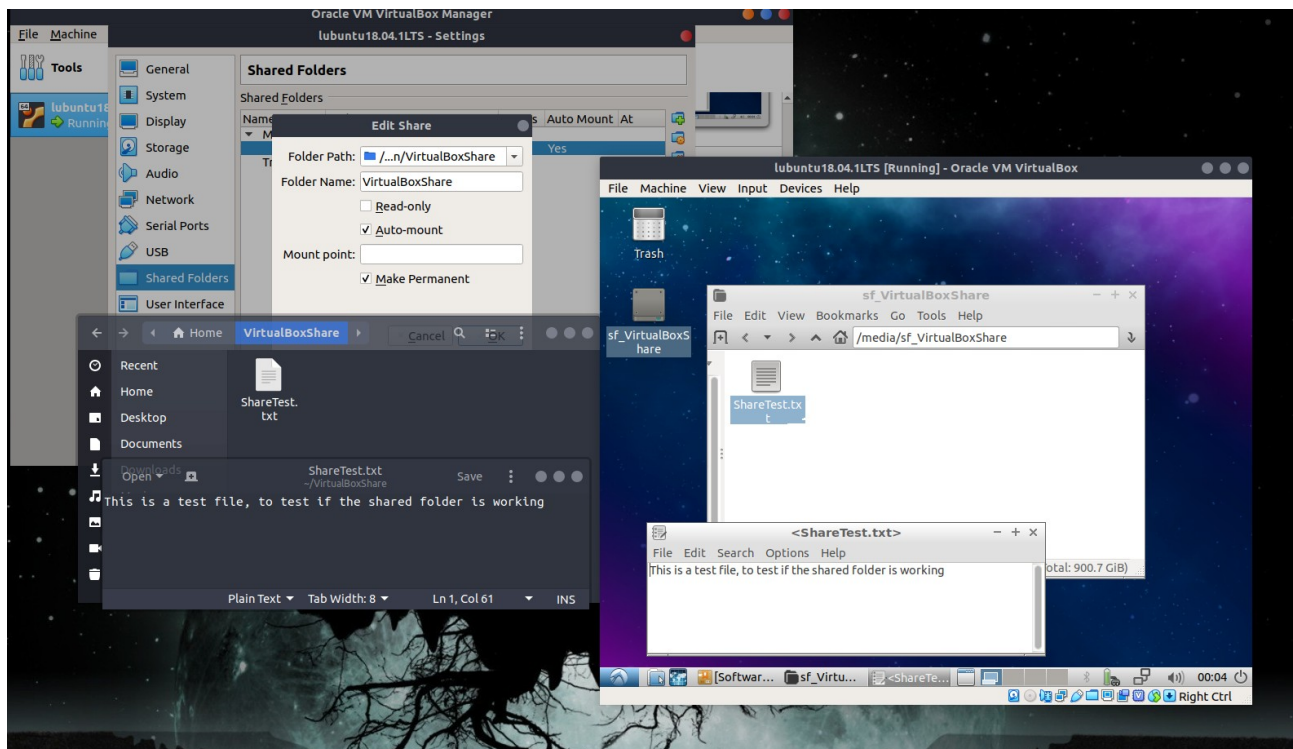
Accessing the shared folder

After the shared folder between the host OS and the guest OS appeared on the desktop, there was a small problem with accessing it. Similar to the previous problem I encountered, I tried accessing this folder as root, but to my surprise, this did not work.

When trying to access this shared folder as root failed, I referred to the lab assignment documents and tried the *usermod* and *chown* commands. Unfortunately, these commands didn't work for my problem, so I turned to Google to find a solution. After some searching, I found the *adduser*

command – which add a user to a group. I decided to add my user account to the vboxsf group using *sudo adduser grahamclaffey vboxsf*. Which fixed my problem and allowed me to access and transfer files via the shared folder.

Using terminal commands

Since I use Linux on a regular basis, I feel confident within a terminal setting. I am by no means an expert but I would know the more commonly used commands. An example of these commands would be:

- the apt for managing packages

  - *sudo apt update && apt upgrade -yy*

  - *sudo apt install htop -yy*

  - *sudo apt autoremove*

- Using the ls command to list segments of the file system

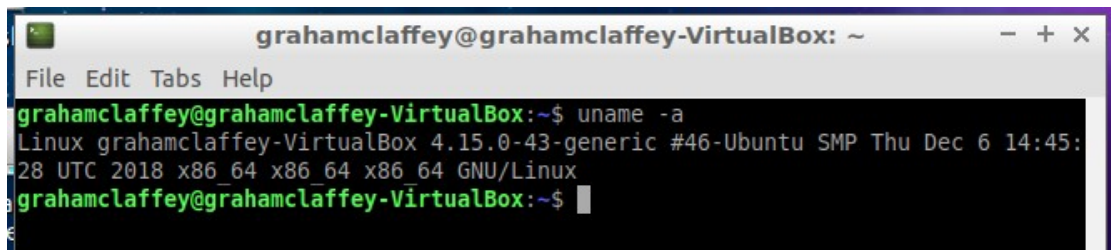 - *ls*

  - *ls -l*

  - *ls -al*

- The grep command to filter the specific text you are looking for in a file or search, very useful when the output from another command is piped into grep

  - *history | grep -i "systemctl"*

  - *cat example.cpp | grep -i -n "*.h"*

- - *sudo find / -type f -iname "*.conf" | grep -i -n "systemd/user.conf" > ~/log.txt*
- The uname command used to print your system information. Use the -a option to print all.
  - *Uname -a*

Shutting down Lubuntu

In regards to the states of the Lubuntu VM, I was able to suspend the execution of Lubuntu by using the GUI Machine drop-down menu and selecting the Pause (Host + P) option. This done from the lubuntu18.04.1LTS window, not the <u>M</u>achine drop down on the VirtualBox Manager window.

A side note: when closing the Lubuntu VM you can also choose the "Save the machine state" if you wish to come back to the same save state later.

Plan for remaining assignments

After the experience gained from doing this assignment, I plan for the other assignments to be carried out using a combination of my host Ubuntu machine and the guest Lubuntu machine. Since part of the assignment was to set up a shared folder between the host and guest, I don't see any reason not to continue in this manner.

It will make more sense in terms of the module structure if the plan is to continue expanding on our Linux/Lubuntu building skills, so I can more easily compare my progress to what has been covered in class.

Concluding comments

In conclusion, I gained valuable knowledge in setting up a guest operating system on VirtualBox, creating the shared folder between them will be useful in future projects. I did run into some bumps in the road, but with some work and help from Google, I managed to fix any difficulties that I encountered. The total time I spent on this assignment was ~10 hours mark, most of the time was spent on solving some strange issues with Linux or with my laptop in general, but most of these issues didn't take very long to solve.