

LAB INTRODUCTION

Web Engineering, as the name implies, is all about engineering on the World Wide Web. WWW is a product that runs on an infrastructure called the internet, which itself is just a very large computer network. To get started you will need an environment that simulates a portion of the Web, specifically the portion of the Server and the Client. The Client is easy, just grab a web browser (Firefox, Chrome, Safari, etc.) and you are done. The Server is a little more complex than that and will require some leg work.

There are many tools at your disposal that will allow you to achieve this task, your assignment is to implement some of these tools.

Submission Process

Please take a screenshot of your VM screen with the browser open and pointed to localhost. Upload the screenshot to canvas for submission.

Background:

In the olden days (CIRCA late 90's early 00's) the majority of the world's Internet was ran off of Linux servers (mostly because it was a free open source operating system that was targeted to be used as a server). These servers were notorious for having issues and needed constant attention, like a pet that's also a computer. This is not the case today, in fact most of the world's internet today is ran in the cloud (advanced topic covered in the sequel to the class Comp 584). However, during the transition from Server to Cloud there have been many leaps and bounds in progress with regards to the old way of doing things.

Virtualization is one of those inventions that makes a lot of the hassles of previous generations of computing much easier to deal with. In this class we will be utilizing a virtual machine to act as our server. The choice of virtual machine will be Oracle's Virtual Box and you will be creating a LAMP (Linux Apache MySQL PHP) Stack Server on it to host/test/build the remaining 4 labs for this class.

It is vital that you complete this lab as all of your future labs will be tested on an identical implementation on my computer for grading.

STAGE 0: Install Virtual Box

Head on over to the virtual box website and download and install the latest copy of the software for your operating system.

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

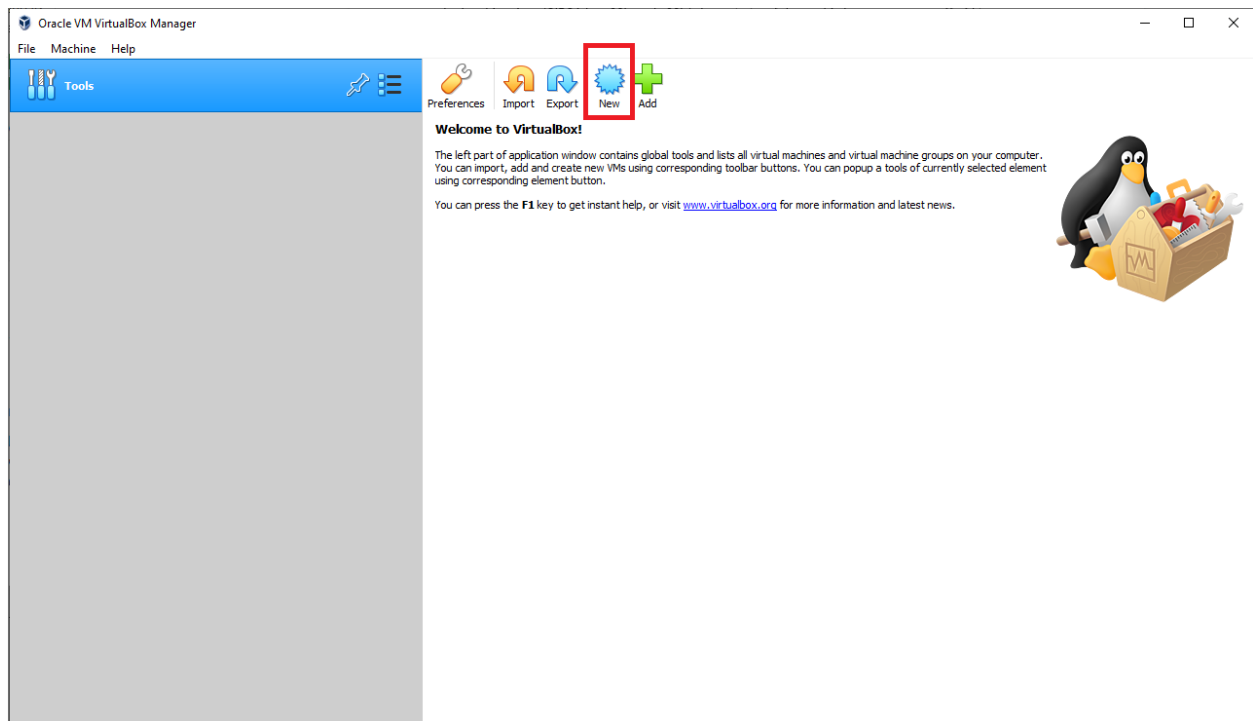
Be sure to also download and install the Extension Pack listed on the same page. As of writing this the current version for both is 6.1.32.

Next you will need to download the ISO for Ubuntu Linux Operating System Long Term Support (LTS), be sure to download the Desktop version and not the Server version of the OS as the desktop version comes with a GUI frontend and the server one does not. If you install the Server version you will not have a good time as everything is on the command line.

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

STAGE 1: Creating a Virtual Machine (VM)

Now that everything is installed and downloaded go ahead and fire up Virtual Box and select the “NEW” icon.



Next fill out modal and make sure that for type and version you have the correct items selected.

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Create Virtual Machine

Name and operating system

Please choose a descriptive name and destination folder for the new virtual machine and select the type of operating system you intend to install on it. The name you choose will be used throughout VirtualBox to identify this machine.

Name:

Ubuntu 20 LTS

Machine Folder:

C:\Users\jliab\VirtualBox VMs

▼

Type:

Linux

64

Version:

Ubuntu (64-bit)

Expert Mode

Next

Cancel

In the next two steps of the process you will allocate RAM and Hard Disk space. You should allocate at least 1GB (1024MB) of RAM, however, 2GB (2048MB) is recommended. For Disk space, 10GB should be more than enough, I recommend sticking with these allocations. Make sure to select VDI from the format menu for your Image format. Finally it is important that you select Fixed Size for disk allocation, this will ensure that a continuous block of disk space is allocated for your image from the very beginning.

The default location of the virtual disk file, here is an example from my installation:

File location and size

Please type the name of the new virtual hard disk file into the box below or click on the folder icon to select a different folder to create the file in.

C:\Users\jliab\VirtualBox VMs\Ubuntu 20 LTS\Ubuntu 20 LTS.vdi 

Select the size of the virtual hard disk in megabytes. This size is the limit on the amount of file data that a virtual machine will be able to store on the hard disk.

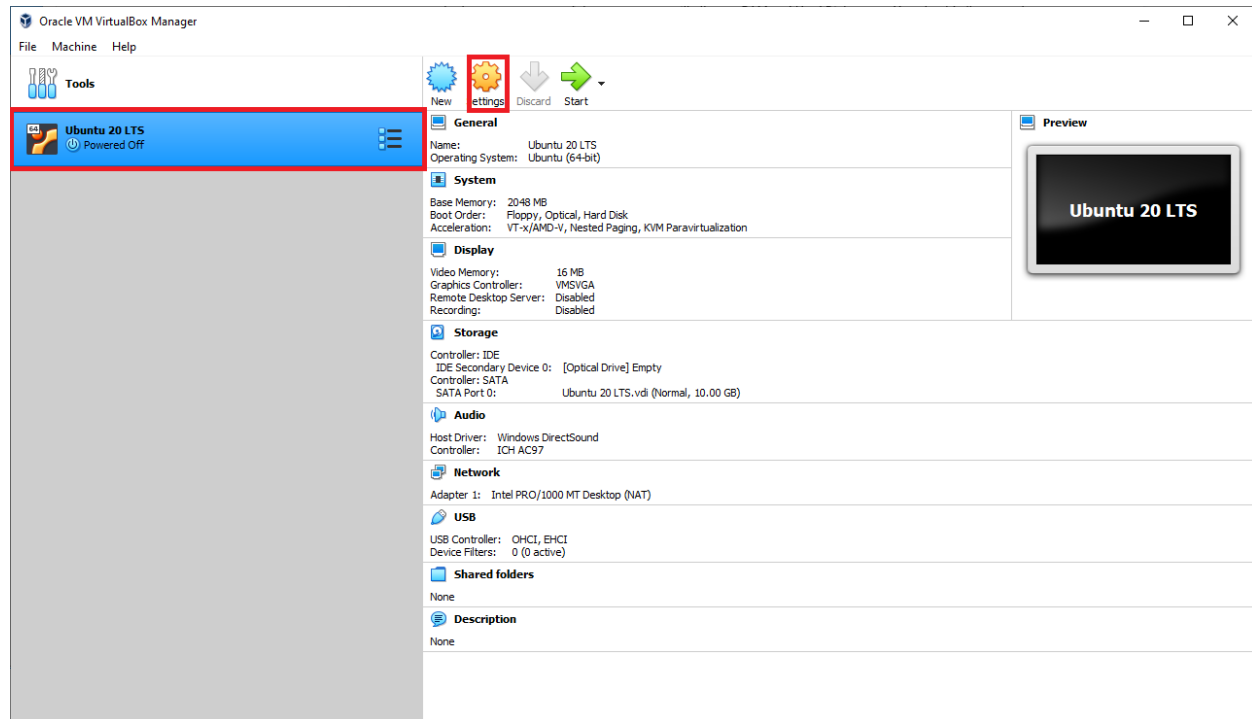


Create

Cancel

STAGE 2: Configure the Virtual Machine

Once the Disk is set up it is time to configure the machine. Select the VM we just created in the left pane and hit the Setting gear icon.



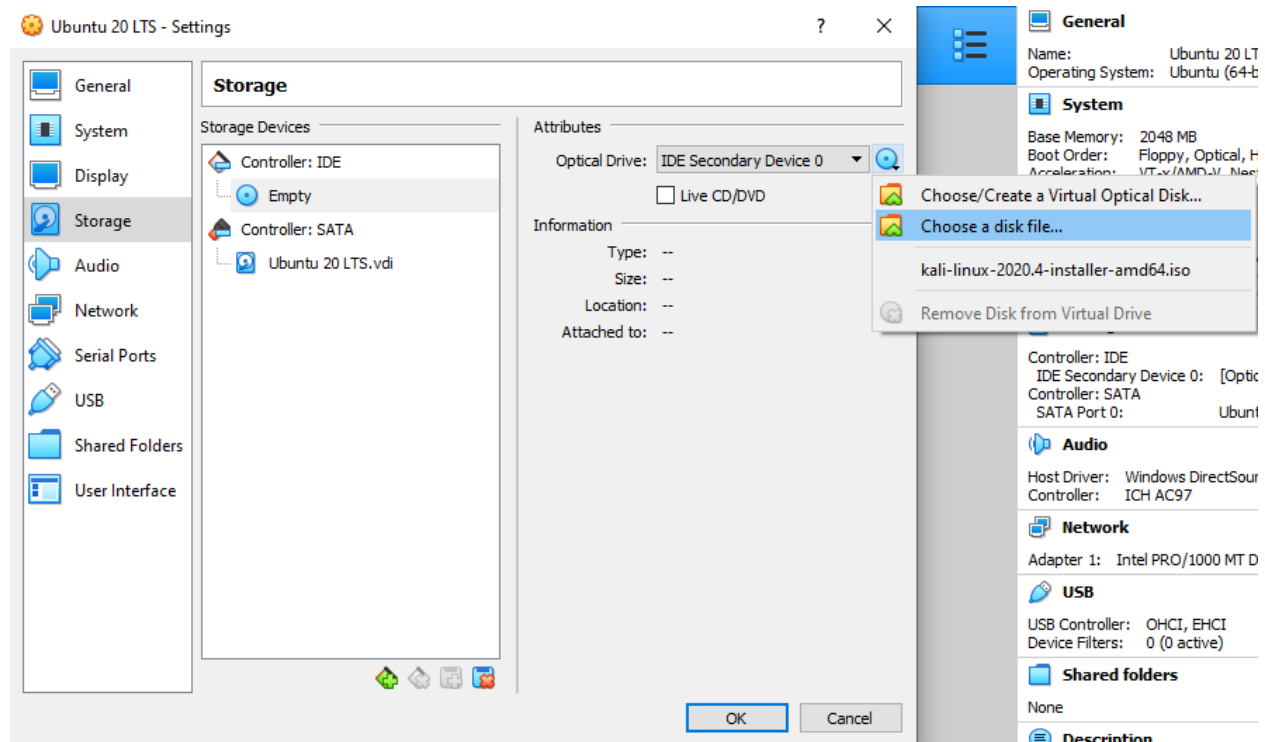
In the following menu we want to focus on the following Panes:

GENERAL: Select the advanced tab and set “Shared Clipboard: to Bidirectional

SYSTEM: Select the Processor tab and set “Processors” to 2

DISPLAY: Select the Screen tab and max out the slider for “Video Memory” to 128MB. Additionally, make sure the checkbox for “Enable 3D Acceleration” is enabled.

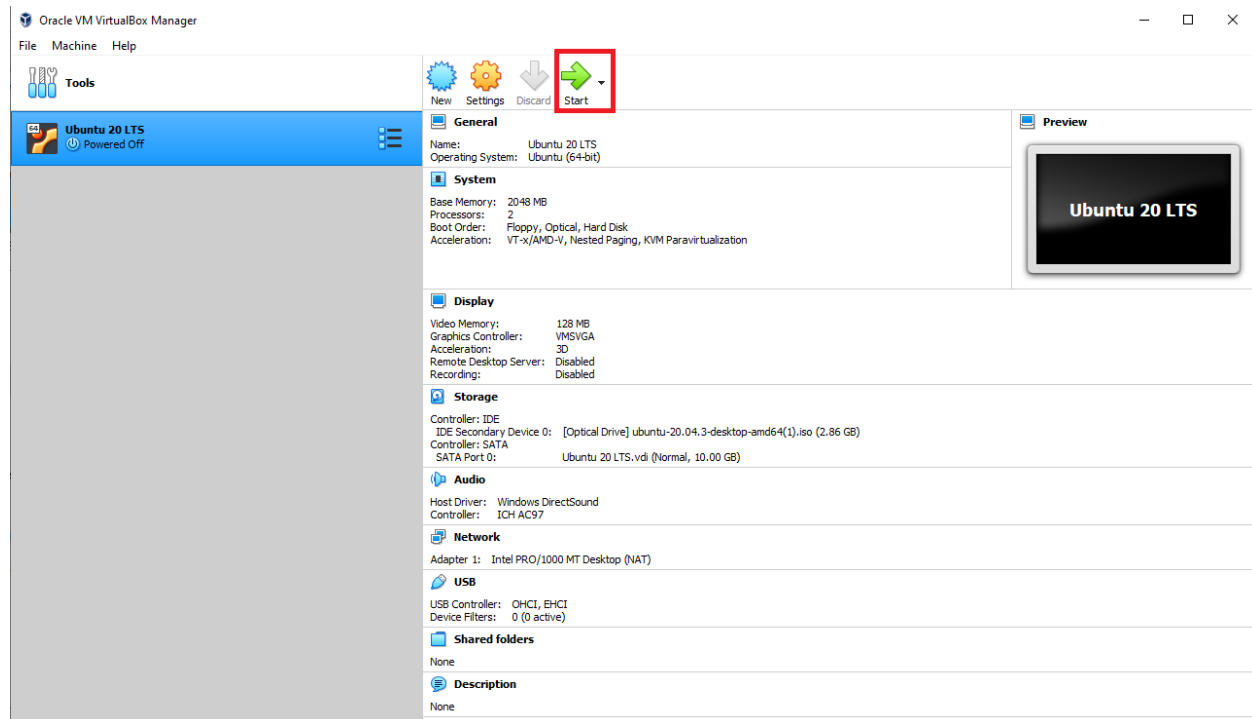
STORAGE: Select “Choose a disk file” in the Attributes menu (pictured below) and then navigate and select the Ubuntu ISO you downloaded earlier.



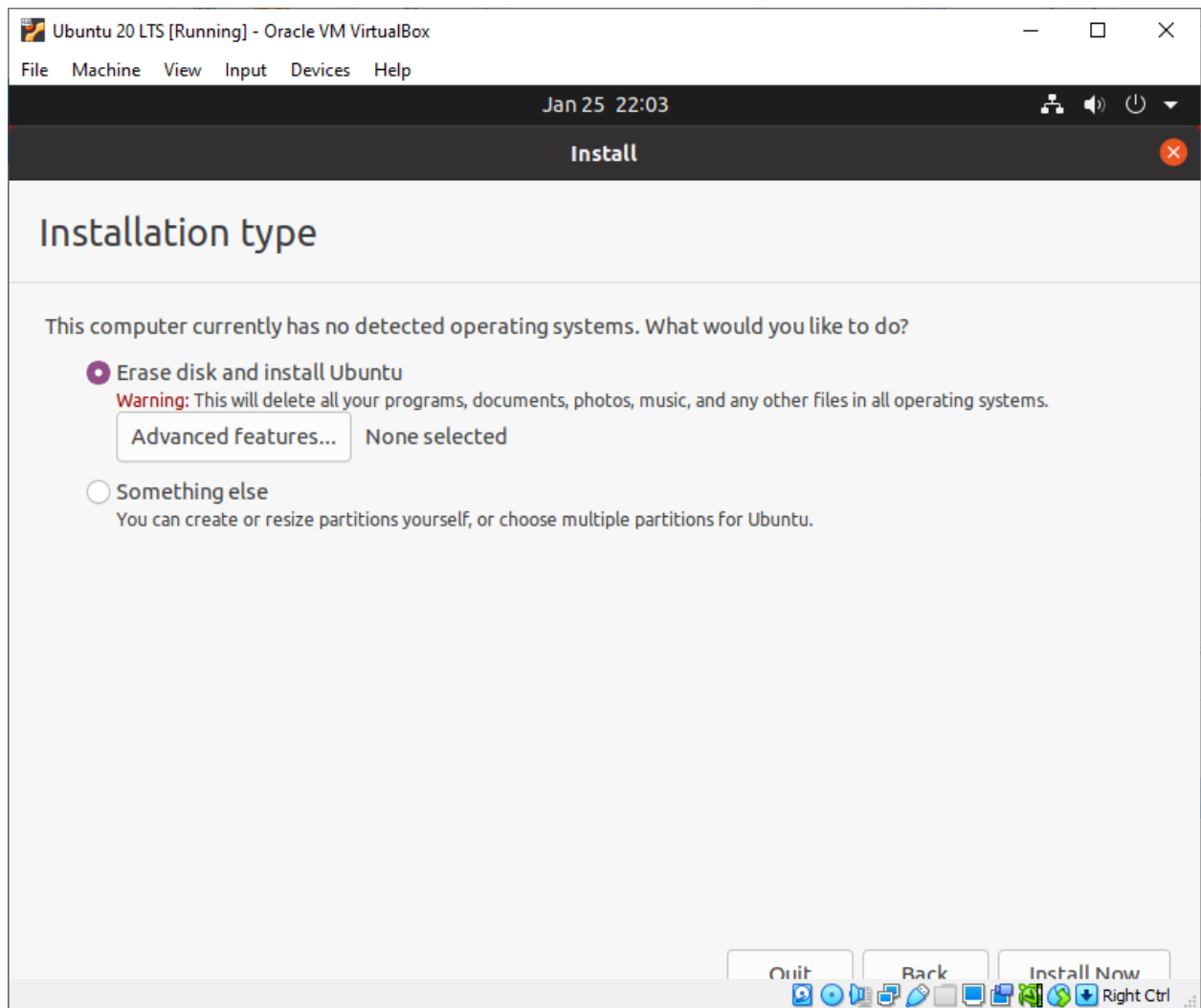
Finally, click the ok button and the VM is now ready to boot and install Ubuntu.

STAGE 3: Install the OS

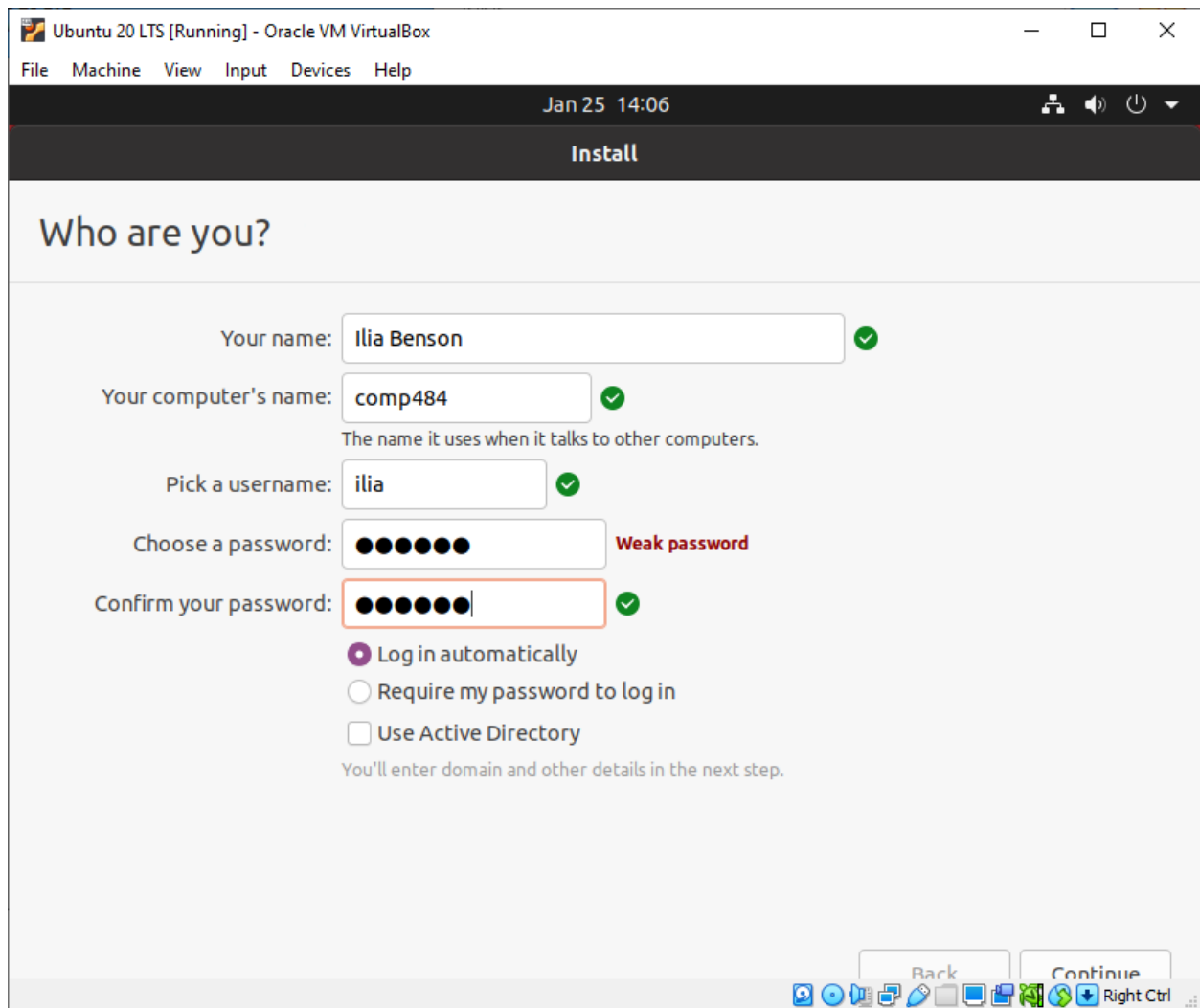
Click the “Start” button from the main Virtual Box window and allow the OS to Boot on the Virtual Machine, this may take several minutes.



At some point you will be greeted with a small window and a prompt to install the OS, Click the “Install Ubuntu” button and in the next prompt select “Normal Installation” and make sure the Updates and Third-Party Software Boxes are also checked. In the next and final prompt select “Erase disk and install Ubuntu” don’t worry this is asking about your virtual disk that you made earlier, not your computers actual hard drive. Click “Install Now” and continue on the popup.

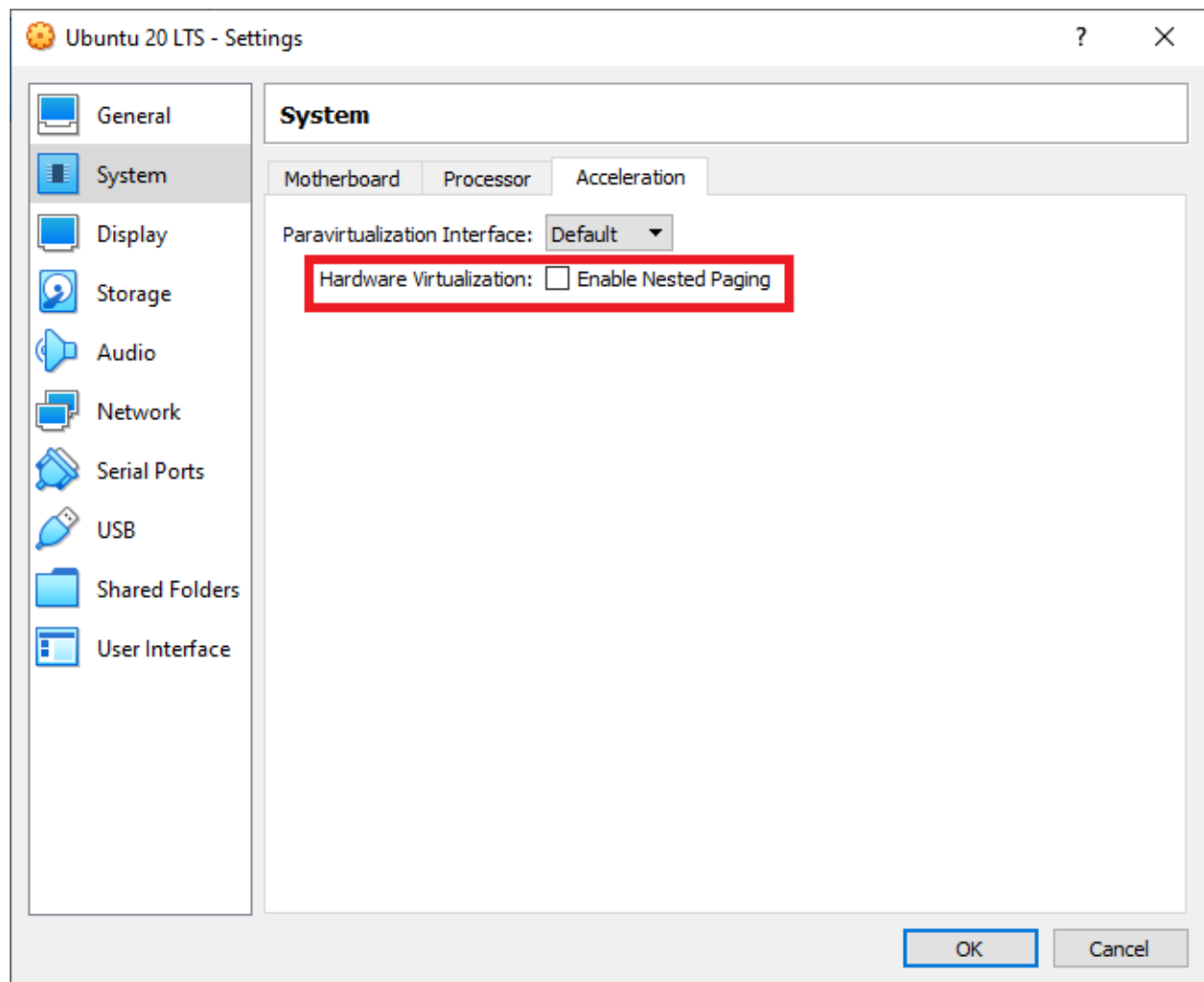


As the OS installs you will be able to configure some basic information such as your location (time zone) and your basic user information. I suggest keeping this simple, here is mine as an example:



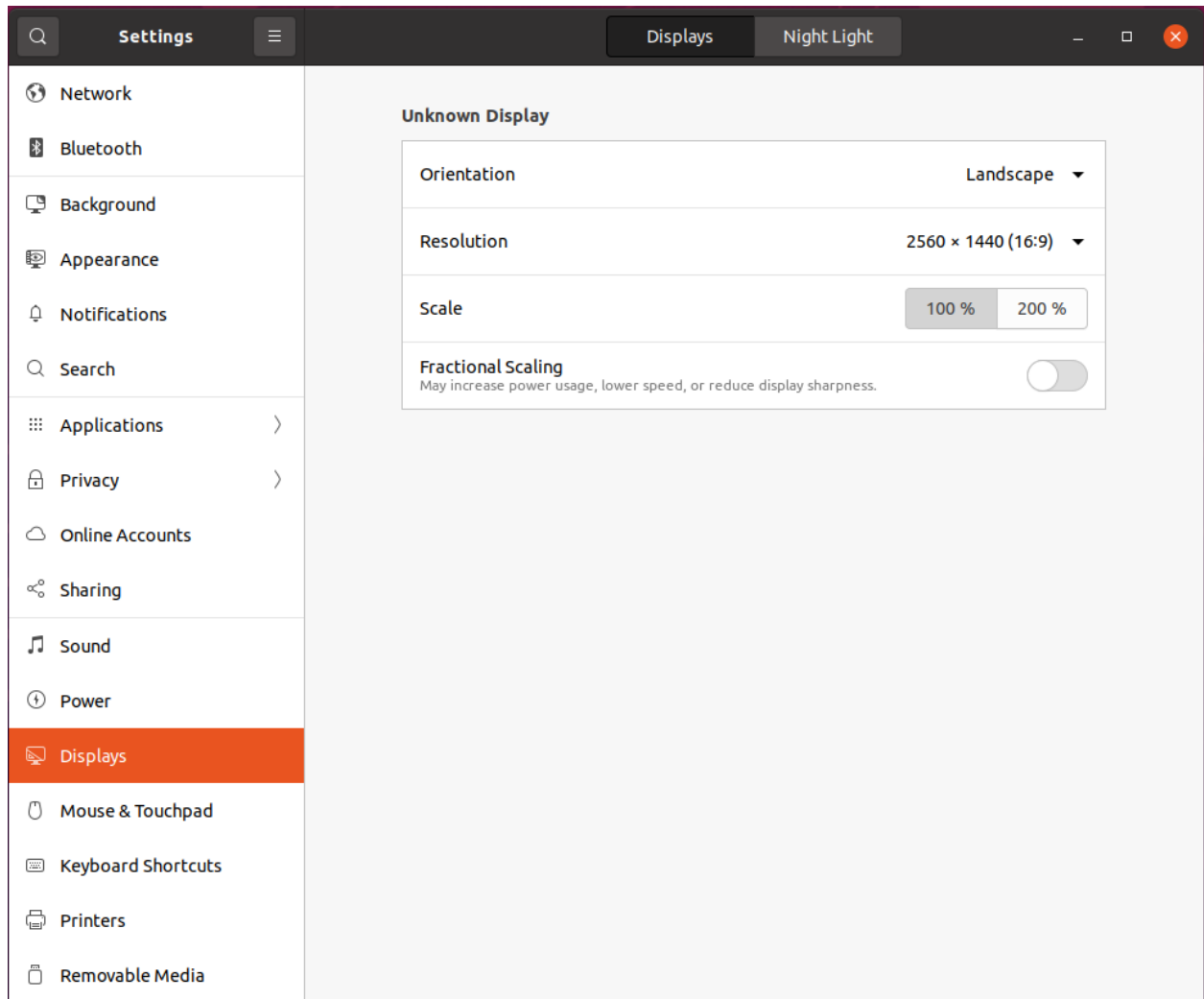
After this the installation will begin. This will take a few minutes. Once the installation is complete go ahead and click the restart button, this will restart the VM.

If for some reason your VM starts with a black screen it could be due to some Virtualization features that need to be turned off. To do this, simply select the File drop down menu and select close, from there just select power off machine. Then go into settings and under the System pane and Acceleration tab make sure the Enable Nested Paging is unchecked. Click ok and try launching the VM again.



STAGE 4: Install the Server Stack

Once the VM is rebooted, go ahead and login, we will now make a few quick adjustments to the OS. You are probably seeing a super small window, lets fix that first. In the upper right hand corner you will see an "Activities" tab, click it and type in "settings" in the search bar. Click on the setting gear icon and navigate to the "Display" pane on the left. Click on the display pane and adjust the display size Resolution to match your native screen resolution. Additionally you can use the "HOST" key and F to make the VM window full screen. For windows the HOST key is the RIGHT CTRL button, so you would press right CTRL+F to toggle fullscreen and back to windows mode



Once that is done you can repeat the same process but this time search for “terminal”. I suggest adding the terminal to the hot bar on the right, just click and drag the icon from the search menu to the hot bar.

Now lets update the OS:

```
$ sudo apt update -y && sudo apt upgrade -y
```

Results omitted but there should be a lot of action in the terminal window. This may take a few minutes.

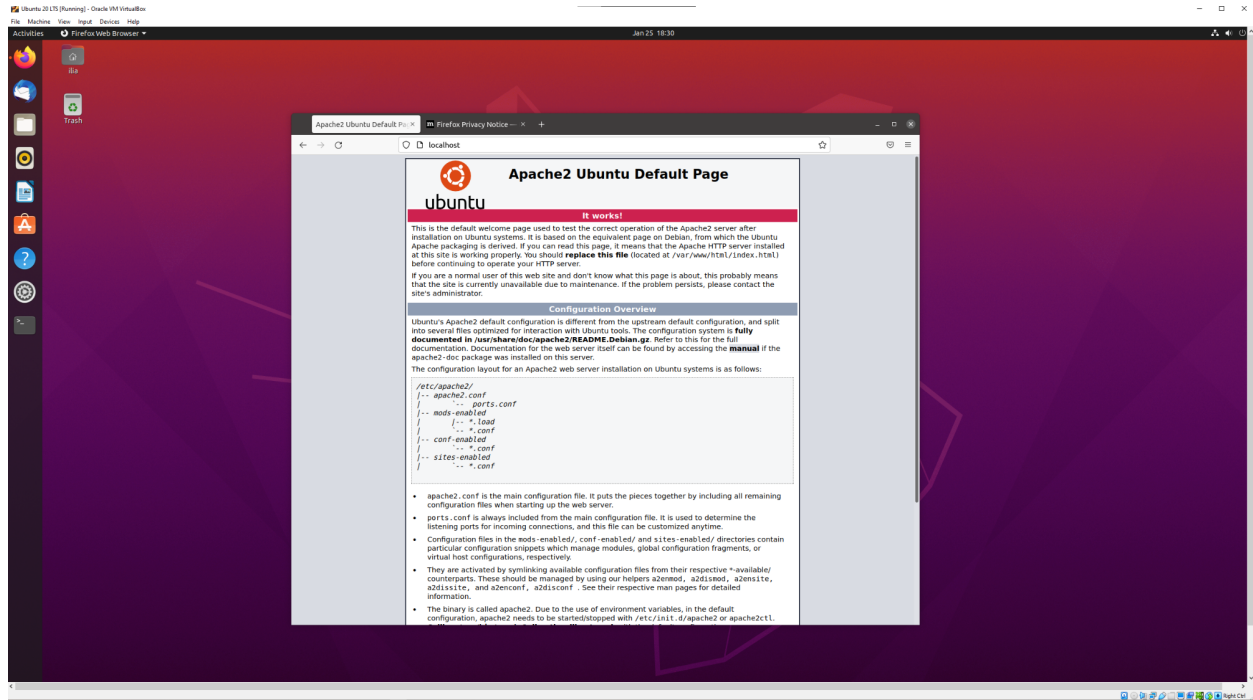
Once the OS is updated we should be ready to install everything else we need to make this VM a full LAMP stack. Ubuntu has made this very easy by providing a package:

```
$ sudo apt install taskel -y  
$ sudo taskel install lamp-server
```

Results omitted but there should be a lot of action in the terminal

window. This may take a few minutes.

To test the install all we need to do is open a web browser, such as the already installed firefox, and go to localhost in the address bar (note you should do this inside the VM and not on the host system).



Zoomed in photo below but I would like you to submit one where you can see that Ubuntu is running inside a VM.



Once you see this page you have completed the lab and can now shutdown the VM. click the power icon in the upper right corner and select "power off" ... you will have to do this 3 times.

END OF LAB.