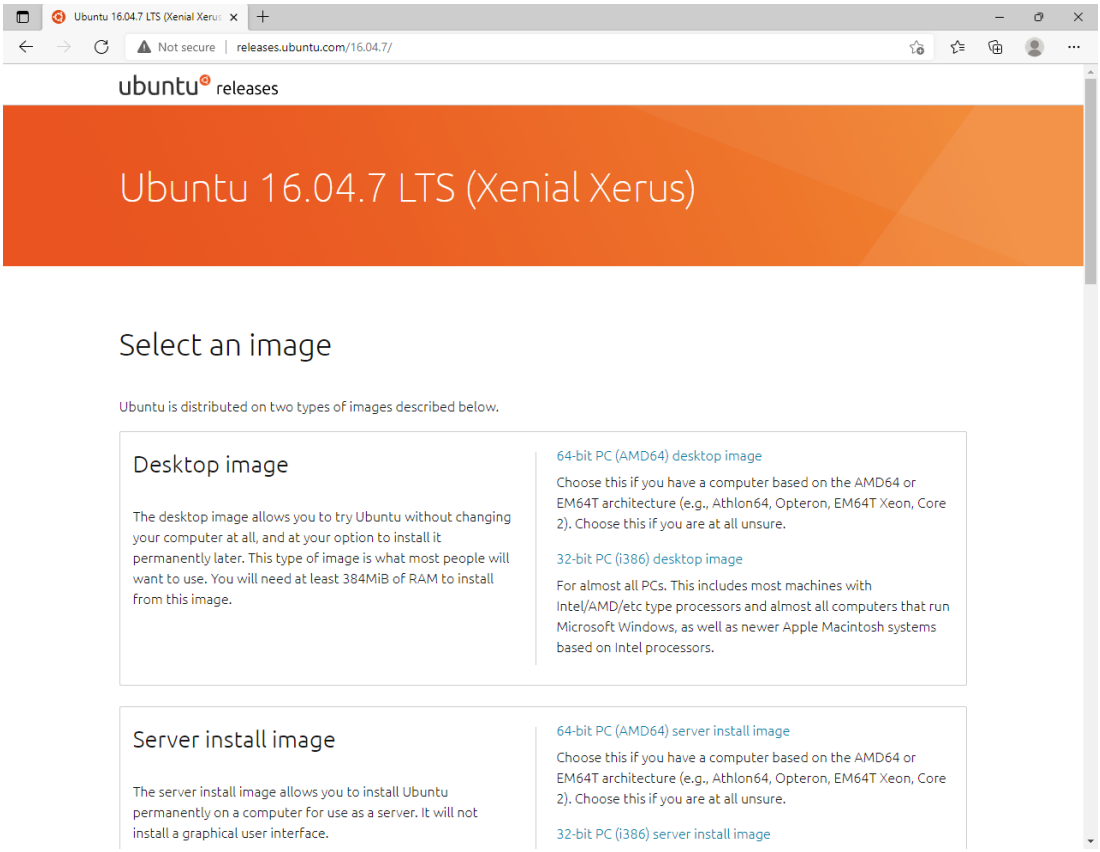
Introduction:

This document serves as a guide on how to install and configure OCSSW in SeaDAS on a Linux based virtual machine running on a Windows computer. While the process itself is not very complicated from a technical standpoint, there are a few parameters that need to be set up and configured before OCSSW can work properly.

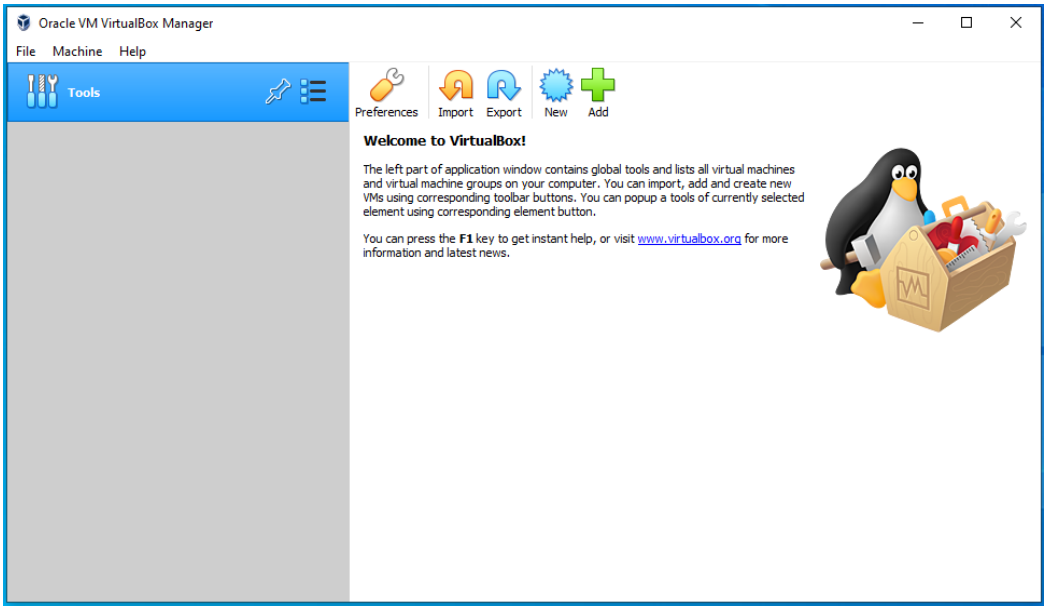
Installing and Configuring the Virtual Machine & Operating System:

The first process that needs to be undertaken is setting up the virtual machine. The software that we will be using to configure the virtual machine is Oracle's VirtualBox, a free software that can run virtual machines with many types of operating systems and can be found here: https://www.virtualbox.org/wiki/Downloads. For the exercise, we will use the latest version of VirtualBox (version 6.1.30).

We will be installing Linux within our virtual environment and the version of Linux we will be utilizing is Ubuntu. You will need to download the .iso file for Ubuntu, in this case version 16.04, on Ubuntu's website: https://releases.ubuntu.com/16.04.7/. The version of Ubuntu you will be running is dependent on whether your computer is a 32- or 64-bit machine (that can be found under Control Panel -> System on Windows).

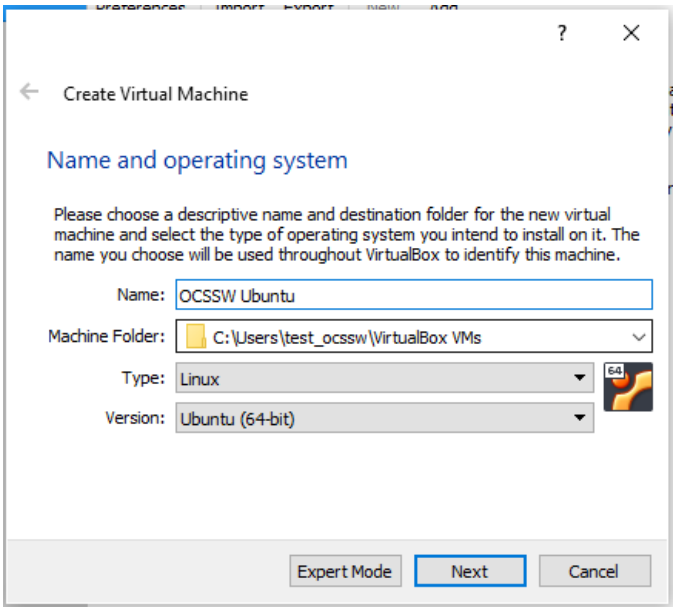


After installing VirtualBox, the interface will look like this and we are ready to load Ubuntu into VirtualBox.

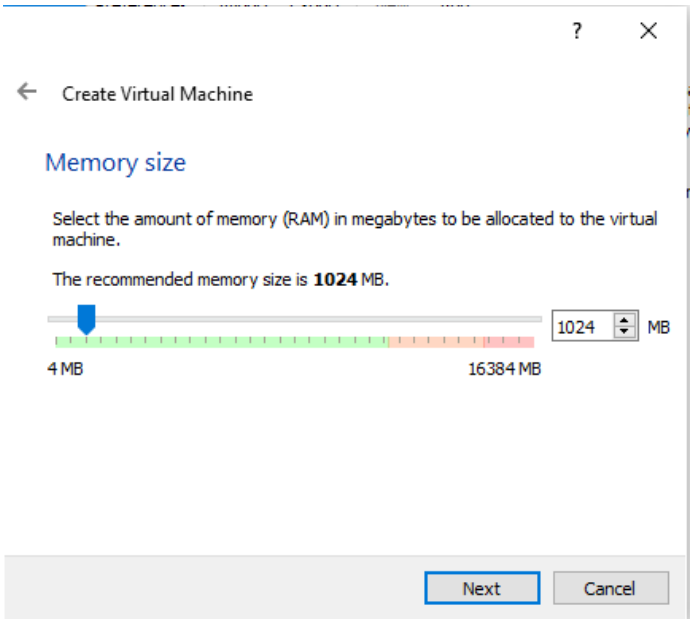


We will begin by creating a new virtual machine. Click New, then you will be redirected to a new window. Give your virtual machine a name and choose the folder where you want the virtual

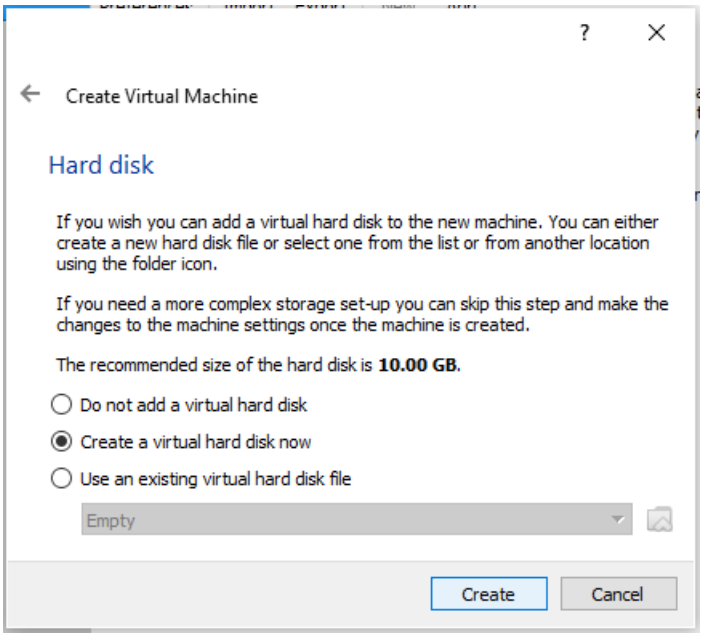
machine to be saved. Having the name of the operating system in the name of the virtual machine will automatically change the type and version fields to match the operating system you want to use. Click Next to move to the next window.



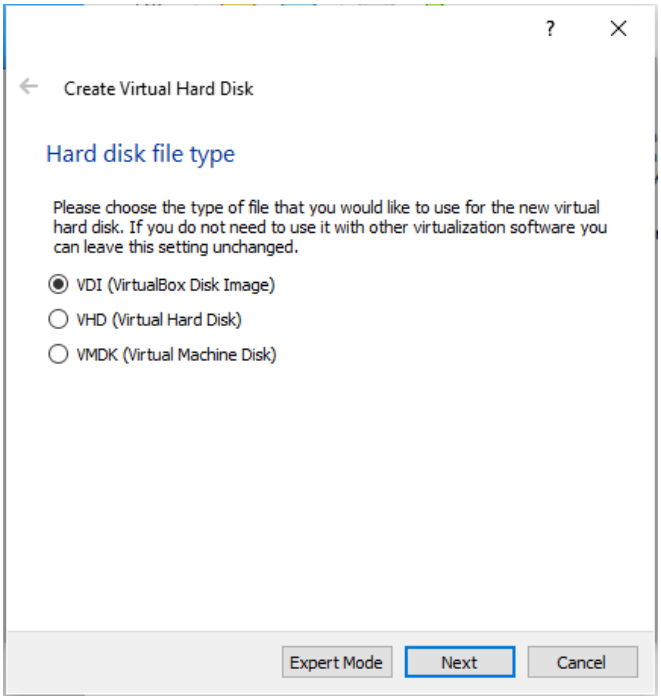
You will select the amount of memory you want to allot to the virtual machine. The recommended amount of memory is 1024 megabytes and we will be sticking to that. Click Next to move to the next window.



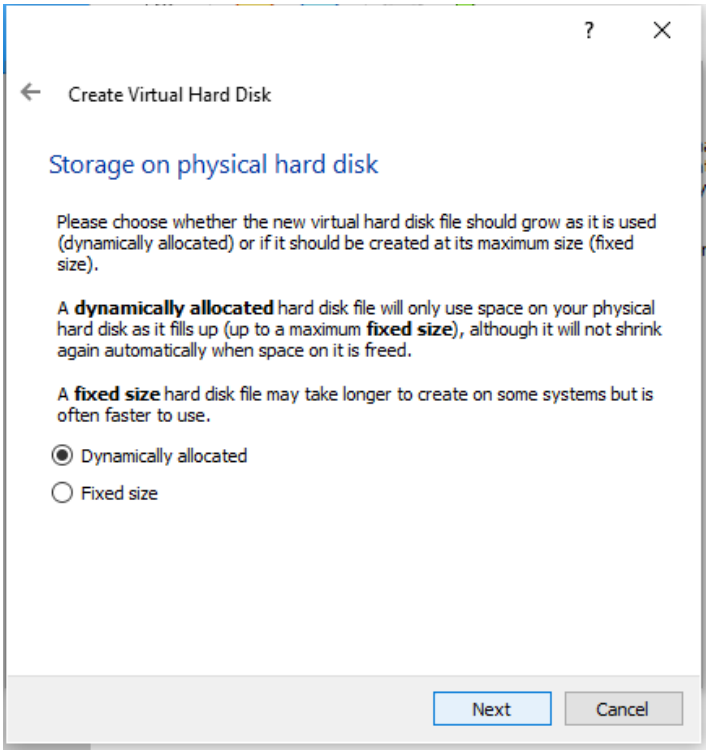
We will now create a hard disk for the virtual machine. “Create a virtual hard disk now” is selected by default and makes a dedicated virtual hard drive for the machine. Click Create to make the hard drive.



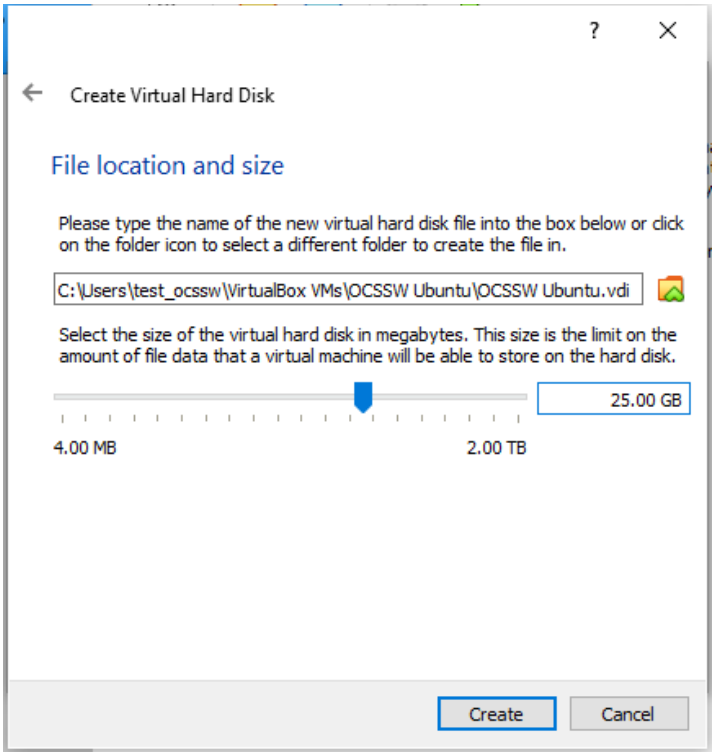
The hard disk file type we are going to leave VDI as the default option. Click Next to move to the next window.

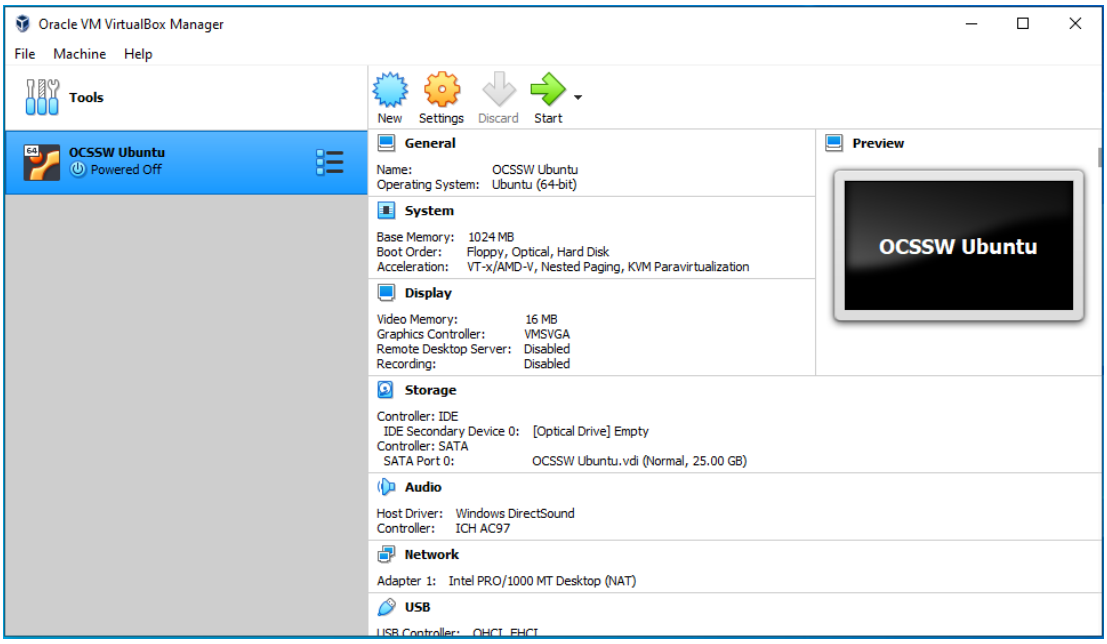


We will use the “Dynamically Allocated” hard disk file, since fixed storage uses dedicated space on your computer’s real hard drive and we want to avoid any complications with space allocation. Click Next to move to the next window.

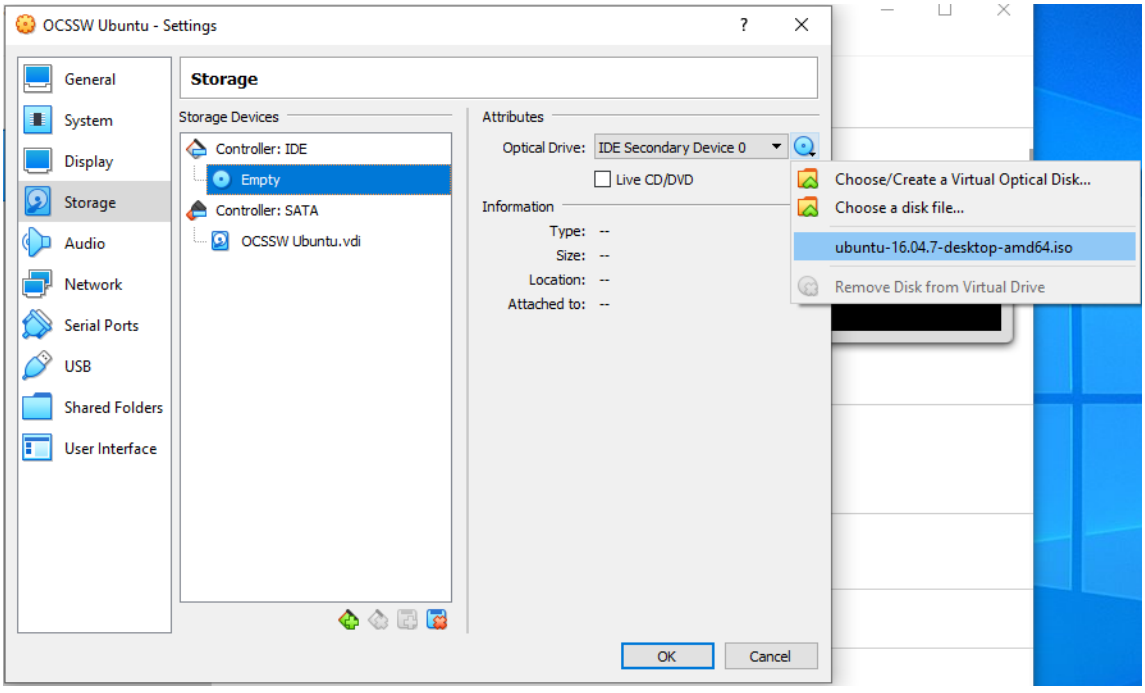


Select where you want your virtual hard disk to live on your computer and the amount of space to allocate to the drive. Since OCSSW and SeaDAS take up sizable space in addition to all of the packages we will need to install, it is recommended that you allot at least 25 gigabytes of space for everything to work properly. We have now configured our virtual machine.

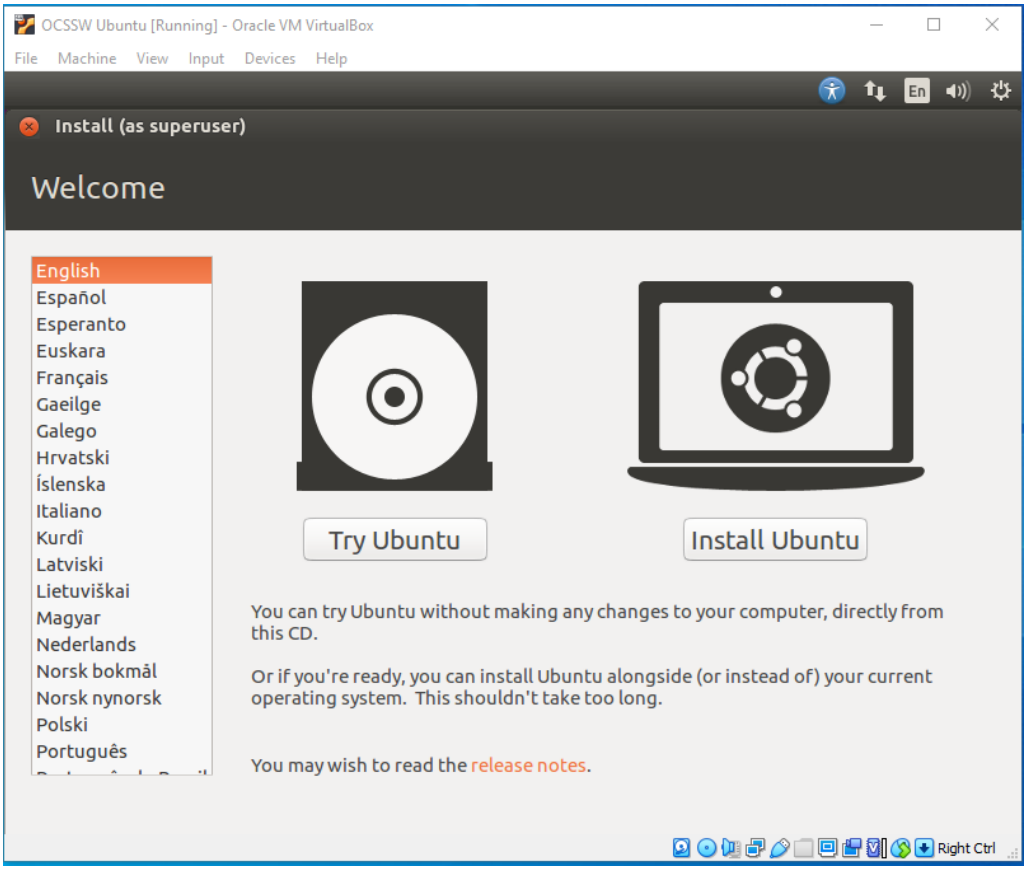




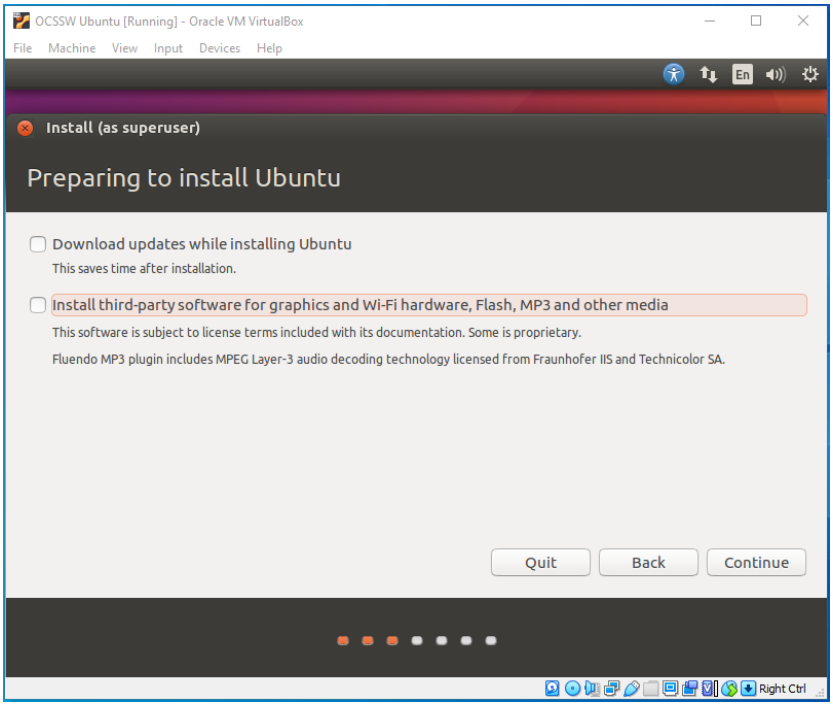
Our virtual machine has been created and we are now ready to mount our operating system to it. Click Settings then go to Storage. Under the IDE controller, it will say empty as there is now operating system currently installed. Go to Attributes, click the disk and load your Ubuntu .iso file. Then click OK.

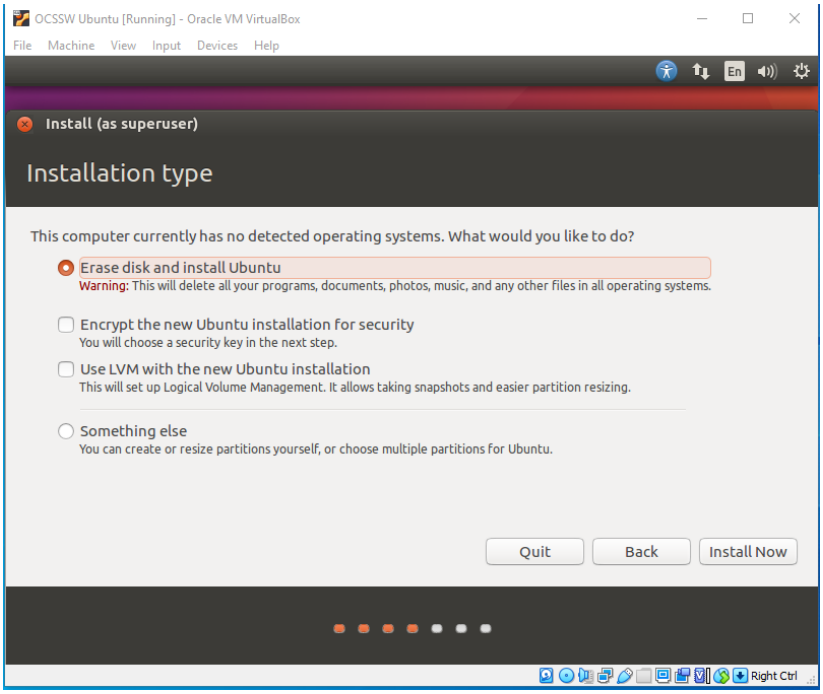


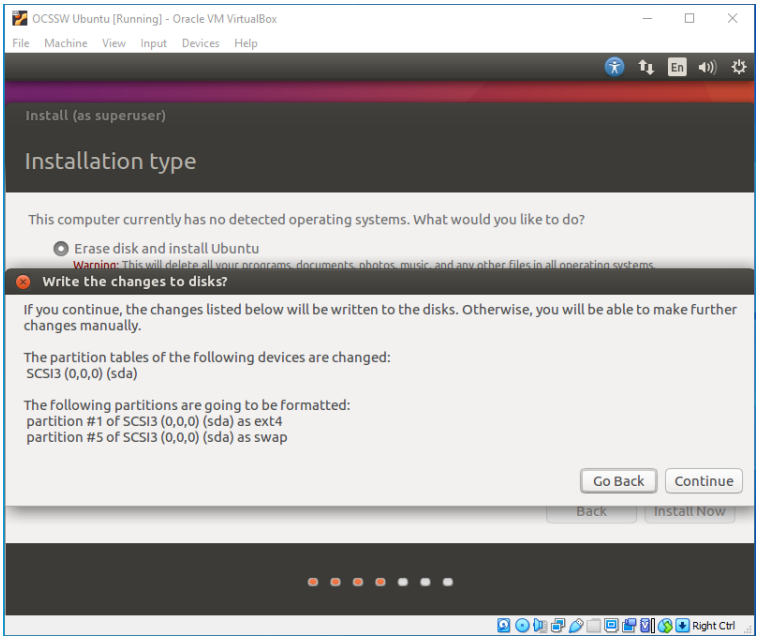
We can now install Ubuntu onto our virtual machine. Click Start and the Virtual Machine will now start in a new window. Click Install Ubuntu to begin the installation process.



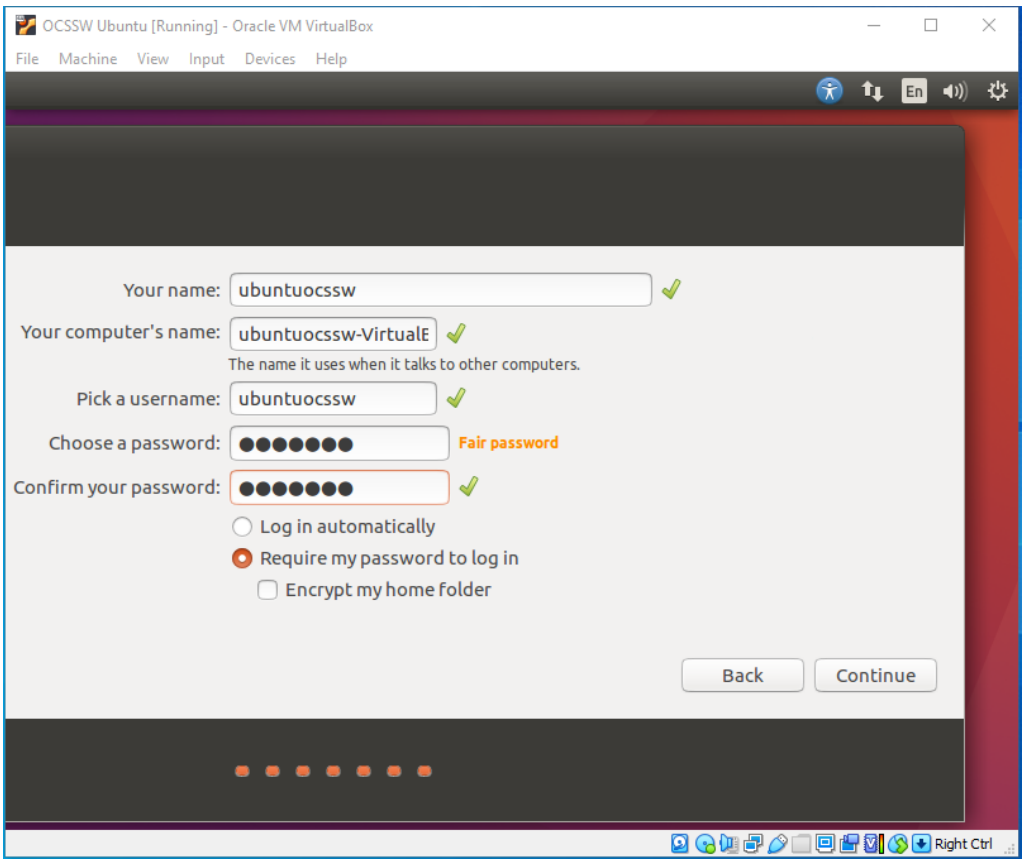
We will not be installing updates since we are using an older version of Ubuntu for the purposes of this exercise. Click Continue. It will then ask you to erase the hard drive and perform a clean install of Ubuntu. Since our hard drive is dedicated to this virtual machine, we will go through with this process.


OCSSW Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
En
Install (as superuser)
Preparing to install Ubuntu
Download updates while installing Ubuntu
This saves time after installation.
Install third-party software for graphics and Wi-Fi hardware, Flash, MP3 and other media
This software is subject to license terms included with its documentation. Some is proprietary.
Fluendo MP3 plugin includes MPEG Layer-3 audio decoding technology licensed from Fraunhofer IIS and Technicolor SA.
Quit
Back
Continue
Right Ctrl

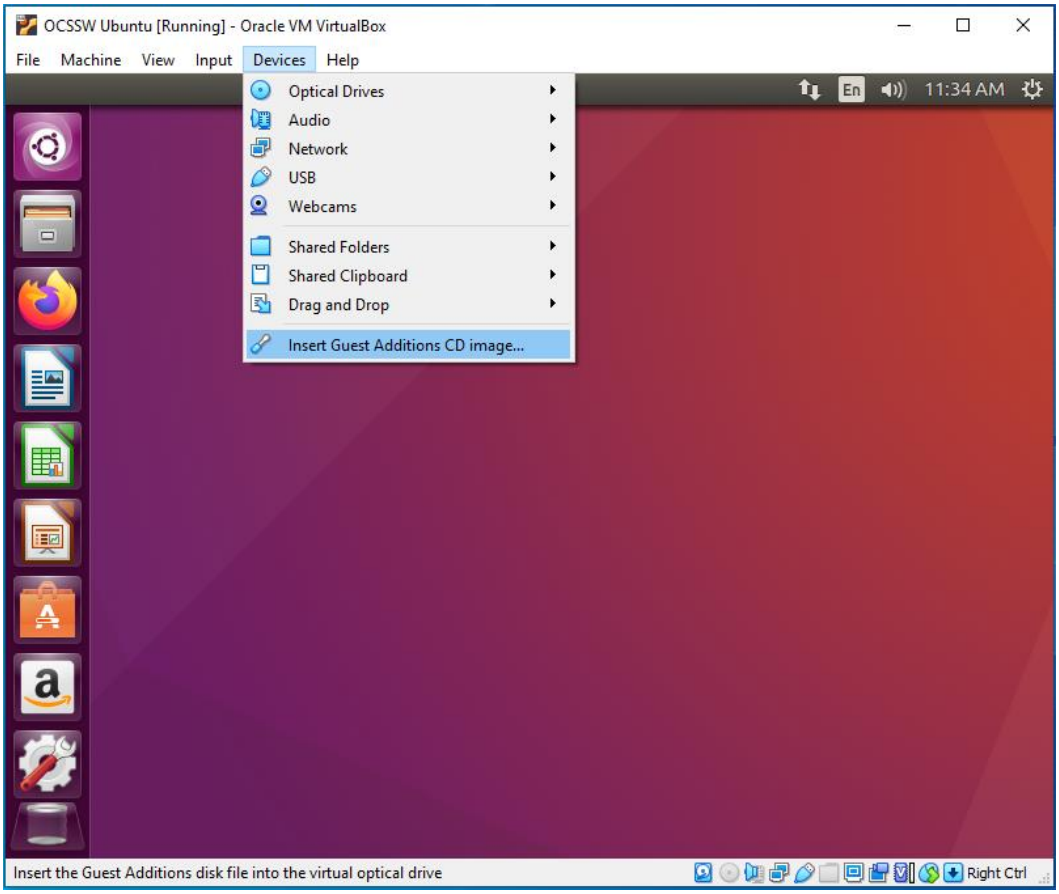

OCSSW Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
En
Install (as superuser)
Installation type
This computer currently has no detected operating systems. What would you like to do?
Erase disk and install Ubuntu
Warning: This will delete all your programs, documents, photos, music, and any other files in all operating systems.
Encrypt the new Ubuntu installation for security
You will choose a security key in the next step.
Use LVM with the new Ubuntu installation
This will set up Logical Volume Management. It allows taking snapshots and easier partition resizing.
Something else
You can create or resize partitions yourself, or choose multiple partitions for Ubuntu.
Quit
Back
Install Now
Right Ctrl



During the installation process, it will prompt you to create a username and password. Be sure to remember your password as this is how you will log in to your virtual machine as well as to provide verification when installing a package using root privledges.



After the system reboots, the last step we need to take is to install Guest Additions. Guest Additions allow the user to utilize PC-like functions with the virtual machine such as copy and pasting and full screen capabilities. Ubuntu already comes with a Guest Additions disk image that can be accessed by clicking Devices, then “Insert Guest Additions CD image”. Follow the steps to install the Guest Additions and be sure to reboot your system afterwards.



Installing Packages in Ubuntu:

Note: the “$” symbol is for reference only and denotes the beginning of a new command. You do not need to retype this symbol when working within the Ubuntu Terminal as it is already shown in the command line interface.

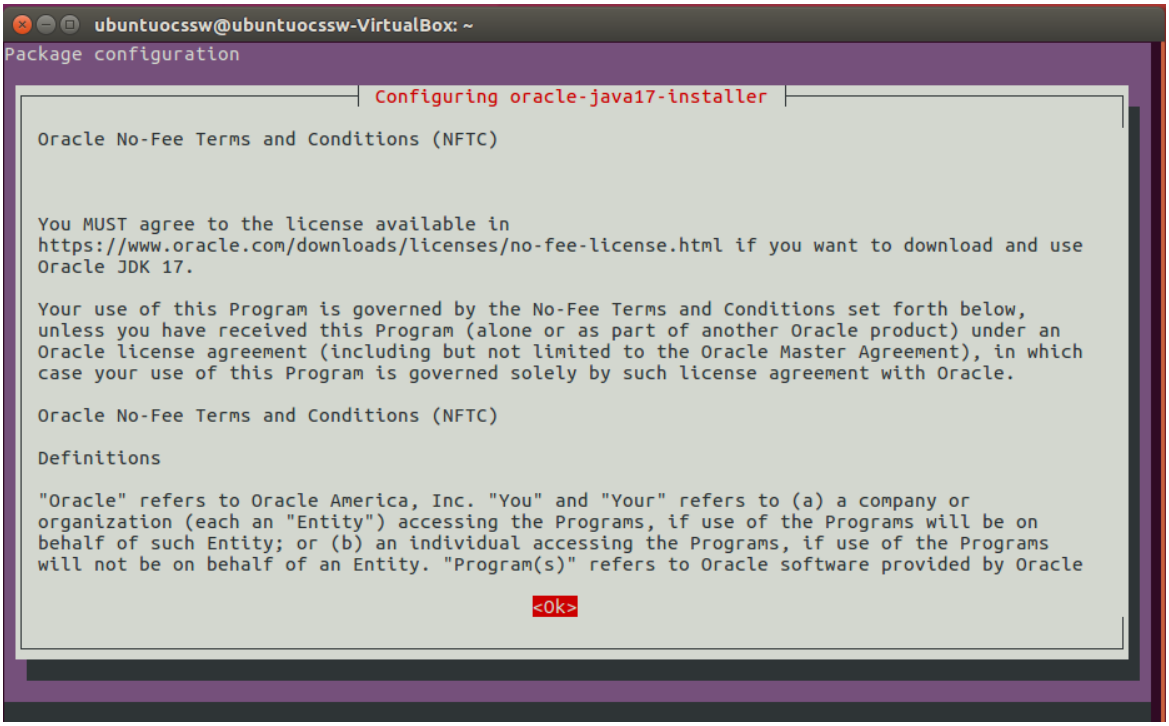
After Installation of Ubuntu and VirtualBox is complete, we need to install programs and applications in our Ubuntu environment via the Terminal (Ubuntu’s version of a Command Line Interface, similar to Command Prompt on Windows). Terminal can be accessed by searching for the application in the Ubuntu app manager or through the Ctrl+Alt+T key binding.

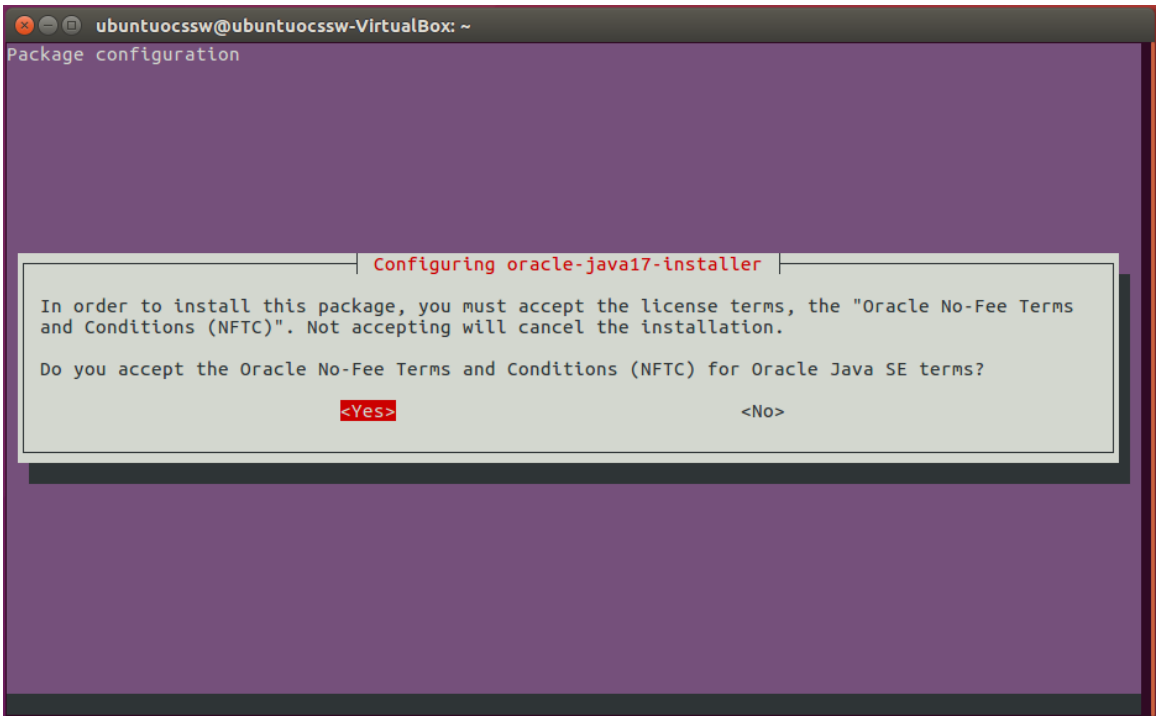
Before we can start entering commands, make sure you have root privileges on your virtual machine by typing in the following command:

```
$ sudo adduser <user> sudo
```

We are now ready to install packages to our Virtual Machine. We need to install and configure the following programs and packages:

- Java 17 (the version from Oracle)
    - `$ sudo add-apt-repository ppa:linuxuprising/java`
    - `$ sudo apt update`
    - `$ sudo apt install oracle-java17-installer --install-recommends`
    - `# A prompt will appear asking you to accept the terms and conditions. Confirm by pressing <OK>. The licensing agreement will also need to be accepted as well in order to use Java. Confirm by pressing <Yes>.`





- Git
  - `# Git is needed to install Requests`
  - `$ sudo apt install git`
  - `$ sudo apt update`
- cURL
  - `# cURL is needed to install OCSSW`
  - `$ sudo apt instal curl`
  - `$ sudo apt update`

Configuring and Installing Python 3.6:

By default, Ubuntu 16.04 comes preconfigured with Python 2.7 and Python 3.5. However, OCSSW requires Python 3.6 and there are some steps that need to be undertaken in order to ensure everything runs smoothly. The first step is to install Python 3.6 itself by using the following commands:

```
# This adds Python 3.6 to your Linux Environment
$ sudo add-apt-repository ppa:deadsnakes/ppa
$ sudo apt update
$ sudo apt install python3.6
```

We will then install pip, a package manager needed to install Python programs (Requests is the one we will be using for OCSSW):

```
#This will install pip in addition to updating it (necessary to
install Requests)
$ sudo apt install python3-pip
$ python3.6 -m pip install --upgrade pip
```

Since Python 2.7 is preconfigured as the default, we will need to change this by using the following commands:

```
# This will change the default Python 3 installation to Python 3.6
$ sudo update-alternatives --install /usr/bin/python3 python3
/usr/bin/python3.5 1
$ sudo update-alternatives --install /usr/bin/python3 python3
/usr/bin/python3.6 2

#This will change the default Python installation to Python 3.6
$ sudo update-alternatives --install /usr/bin/python python
/usr/bin/python3.5 1
$ sudo update-alternatives --install /usr/bin/python python
/usr/bin/python3.6 2
```

After configuring the default Python installations, we will now move on to installing Requests, a program needed for configuring and installing OCSSW. Requests are installed with the following commands:

```
# This will install Python pip
$ python -m pip install requests
$ git clone git://github.com/psf/requests.git
$ cd requests
$ python -m pip install .
$ cd
```

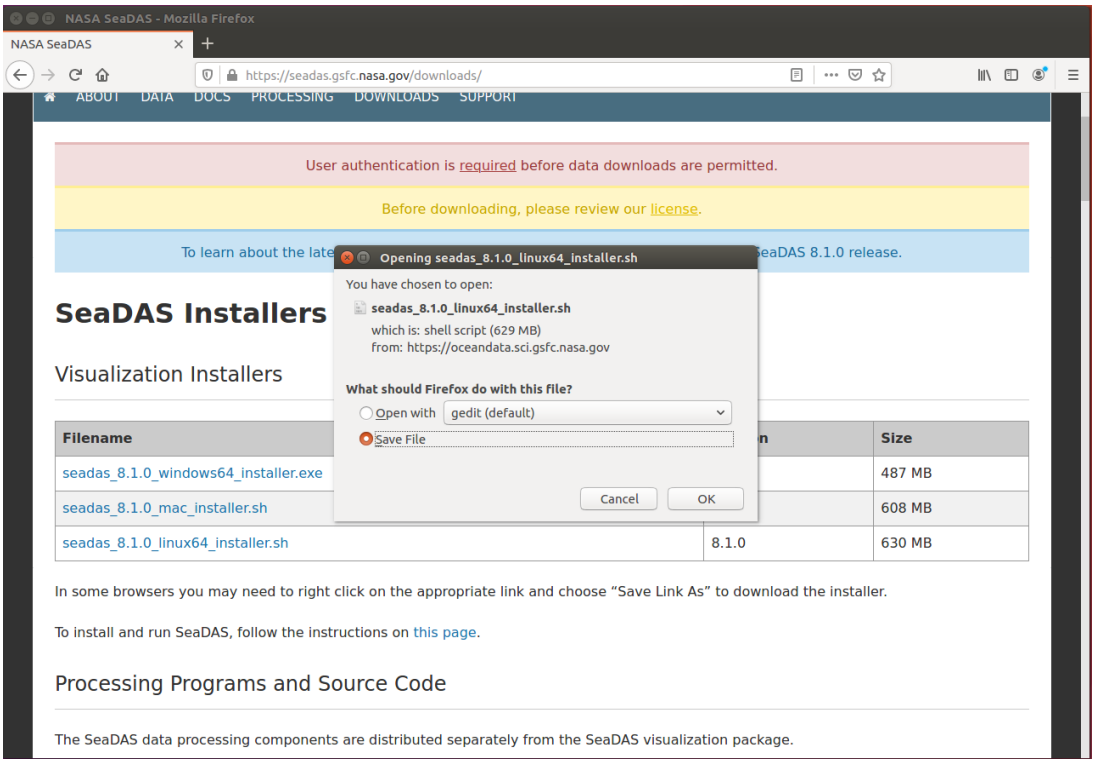
Now we need to configure requests in Python itself:

```
# This will take us into the python editor
$ python
>>> import requests
# This step requires you to input your NASA Earthdata user account
information
>>> r = requests.get('https://urs.earthdata.nasa.gov',
auth=('username', 'password'))
>>> r.status_code
200
>>> r.headers['content-type']
'application/json; charset=utf8'
>>> r.encoding
```

```
'utf-8'
>>> r.text
'{"type":"User"...'
>>> r.json()
{'private_gists': 419, 'total_private_repos': 77, ...}
>>> exit()
```

Installing SeaDAS and OCSSW:

We are now ready to install SeaDAS and OCSSW. As with all of the packages we installed on Ubuntu, we will install SeaDAS via the terminal. Go to the SeaDAS website within Ubuntu (https://seadas.gsfc.nasa.gov/downloads) and download the Linux version of SeaDAS.



Then move the SeaDAS installation file from your downloads folder to your home folder. Then go back to the terminal and type the following command:

```
# This is dependent on what version of SeaDAS you are using, in this case we will be using 8.1.0. Below is the sample template for a program name
$ sh seadas_{version}_linux_installer.sh

# Example for SeaDAS 8.1.0
$ sh seadas_8.1.0_linux64_installer.sh
```

The SeaDAS installation program will appear and guide you through the process of installing the program. Refer to our PowerPoint presentation on how to install SeaDAS on your computer, the steps are similar for Linux. After SeaDAS has been loaded, we can now move on to configuring OCSSW. Refer to our presentation on how to configure OCSSW for SeaDAS for MacOS. The process is the same.

Now you are ready to process OCSSW data for our exercise! If you are facing any difficulties during this process, make sure to verify all of your programs are installed correctly and make sure all of the programs are up to date using the commands specified.