### 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: <a href="https://www.virtualbox.org/wiki/Downloads">https://www.virtualbox.org/wiki/Downloads</a>. 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: <u>https://releases.ubuntu.com/16.04.7/</u>. 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.

		?	×
← Create Virtua	Machine		
Name and o	perating system		
Please choose a machine and sel name you choos	descriptive name and destination fold act the type of operating system you e will be used throughout VirtualBox t	ler for the new vii intend to install o o identify this ma	tual n it. The thine.
Name:	OCSSW Ubuntu		
Machine Folder:	C:\Users\test_ocssw\VirtualBox	VMs	$\sim$
Type:	Linux	•	- 54
Version:	Ubuntu (64-bit)	•	
	Expert Mode	Next C	ancel

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.

	?	×
<ul> <li>Create Virtual Hard Disk</li> </ul>		
Hard disk file type		
Please choose the type of file that you would like to use for the hard disk. If you do not need to use it with other virtualization can leave this setting unchanged.	ne new virtu n software y	al ′ou
VDI (VirtualBox Disk Image)		
O VHD (Virtual Hard Disk)		
O VMDK (Virtual Machine Disk)		
Expert Mode Next	Can	cel

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.

	?	$\times$
← Create Virtual Hard Disk		
Storage on physical hard disk		
Please choose whether the new virtual hard disk file should gro (dynamically allocated) or if it should be created at its maximum size).	w as it is u size (fixe	used d
A <b>dynamically allocated</b> hard disk file will only use space on hard disk as it fills up (up to a maximum <b>fixed size</b> ), although i again automatically when space on it is freed.	your phy t will not s	sical hrink
A <b>fixed size</b> hard disk file may take longer to create on some s often faster to use.	ystems b	ut is
Oynamically allocated		
○ Fixed size		
Next	Car	ncel

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.

	?	×
← Create Virtual Hard Disk		
File location and size		
Please type the name of the new virtual hard disk file into the on the folder icon to select a different folder to create the file i	oox below (	or click
C:\Users\test_ocssw\VirtualBox VMs\OCSSW Ubuntu\OCSSW U	Jbuntu.vdi	
Select the size of the virtual hard disk in megabytes. This size is amount of file data that a virtual machine will be able to store o	s the limit o on the hard	on the I disk.
	25	.00 GB
4.00 MB 2.00 TB		
Create	Can	cel



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.

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	General	Storage				
	System	Storage Devices	Attributes			
	Display	Controller: IDE	Optical Drive: IDE Secon	Jary Device 0 🔻		Choose/Create a Virtual Optical Disk
$\mathbf{D}$	Storage	Controller: SATA	Information			Choose a disk file
	Audio	OCSSW Ubuntu.vdi	Type: Size:			ubuntu-16.04.7-desktop-amd64.iso
	Network		Location: Attached to:		0	Remove Disk from Virtual Drive
	Serial Ports					
	USB					
	Shared Folders					
	User Interface					
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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.

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File Machine View Input	Devices Help				
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English	•				
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Galego					
Hrvatski					
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Kurdî	Try Ubuntu Install Ubuntu				
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Lietuviškai	Very see the Ulbricht without making apprehances to your computer, dire	o o telu u	From		
Magyar	this CD.	eccly	rrom		
Nederlands					
Norsk bokmål	Or if you're ready, you can install Ubuntu alongside (or instead of) you	r curi	rent		
NOFSK NYNOFSK	operating system. This shouldn't take too long.				
Polski					
	You may wish to read the release notes.				
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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.

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File Machine View Input Devices Heln			-	-	
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🛞 Install (as superuser)					
Preparing to install Ubuntu					
Download updates while installing Ubwatu					
This saves time after installation					
Install third-party software for graphics and Wi-Fi hardware, Flash, MP3 and other media	3				
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 Tech	nicol	or SA.			
Quit Back			Cont	inue	
	0 🖞	200	• 🔇	Right C	trl
🜠 OCSSW Ubuntu [Running] - Oracle VM VirtualBox		_		)	<
File Machine View Input Devices Help	_		_		
	1	tı	En	<b>(</b> ))	ψ
😣 Install (as superuser)					
Jackallation turne					
Installation type					
This computer currently has no detected operating systems. What would you like to do?					
<ul> <li>Erase disk and install Ubuntu</li> <li>Warning: This will delete all your programs, documents, photos, music, and any other files in all operating</li> </ul>	syste	ms.			
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.					
You can create or resize partitions yourself, or choose multiple partitions for Ubuntu.					
Quit Back		Ins	stall I	Now	J



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.

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File Machine View Input	Devices Help						
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	(						
Your name:	ubuntuocssw	] ♥					
Your computer's name:	ubuntuocssw-VirtualE 🖌						
	The name it uses when it talks to other computers.						
Pick a username:	ubuntuocssw						
Choose a password:	Fair password						
Confirm your password:	•••••••						
	Log in automatically						
	Require my password to log in						
	Encrypt my home folder						
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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)
  - o \$ sudo add-apt-repository ppa:linuxuprising/java
  - \$ sudo apt update
  - \$ sudo apt install oracle-java17-installer --installrecommends
  - # 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>.



😕 🖻 💿 ubuntuocssw@ubuntuocssw-VirtualBox: ~
Package configuration
Configuring oracle-java17-installer
In order to install this package, you must accept the license terms, the "Oracle No-Fee Terms and Conditions (NFTC)". Not accepting will cancel the installation.
Do you accept the Oracle No-Fee Terms and Conditions (NFTC) for Oracle Java SE terms?
<yes> <no></no></yes>

- Git
  - # Git is needed to install Requests
  - \$ sudo apt install git
  - \$ sudo apt update
- cURL
  - 0 # 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/python3.6 1
$ sudo update-alternatives --install /usr/bin/python3 python3.6
#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 (<u>https://seadas.gsfc.nasa.gov/downloads</u>) and download the Linux version of SeaDAS.

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In some browsers you may need to right click on the appropriate link and choose "Save Link As" to download the installer. To install and run SeaDAS, follow the instructions on this page. Processing Programs and Source Code																		
	To install and run SeaDAS, follow the instructions on this page. Processing Programs and Source Code The SeaDAS data processing components are distributed separately from the SeaDAS visualization package.										_							

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 <u>PowerPoint presentation</u> 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 <u>presentation</u> 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.