

Cloud-Native CI/CD in Kubernetes with Tekton - Setup

Creating pipelines with custom Kubernetes resources

Version 3.3 – 10/14/22

Brent Laster, Lead Instructor - Tech Skills Transformations LLC

IMPORTANT SETUP INSTRUCTIONS – PLEASE COMPLETE BEFORE THE CLASS.

ALSO, IT IS HIGHLY RECOMMENDED TO PRINT A COPY OF THE CLASS LABS TO HAVE WITH YOU IF YOU PREFER TO WORK FROM A PAPER COPY. THE LABS ARE SIGNIFICANT.

You can print a copy by downloading the PDF at

<https://github.com/skilldocs/tekton2/blob/main/tekton-labs.pdf>

Hello and thank you for registering for this workshop. In order to be able to work through the labs and effectively understand the material, you will need to get your system setup following the instructions below.

Note: This workshop assumes you have a working knowledge of Kubernetes. This is a prerequisite for success in this workshop.

You may choose to setup your laptop environment either by running the application VirtualBox and a preconfigured virtual machine (VM) with all of the applications already installed and setup on it or by installing and configuring the applications yourself directly on your system. Instructions for the VirtualBox approach are below under the heading **"Option B: VirtualBox Option."** Instructions for the self-configured approach are below under the heading **"Option A: Manual setup"**.

While the VirtualBox Option is the simplest in terms of steps required and is the recommended approach, there are times when students may run into issues with running VirtualBox on their systems. For that case, or if you prefer not to run VirtualBox, you may install the applications separately on your laptop and run them there.

NOTE: Because environments vary, there is not a guarantee that all labs will work without issues in if you are using the manual (non-VM) environment.

For either option, it is important that you verify you can get to and use a Kubernetes environment on your laptop prior to the workshop. At a minimum, you should be able to run the following commands and see appropriate output.

```
"kubectl get ns"
```

```
"tkn"
```

After setting up the environment, follow the pre-req steps at the bottom of the document under "Startup - to do before first lab" to be ready for the workshop.

Option A: Manual setup

1. Install a version of [Git](#). (If you are installing on a Windows system, it is recommended to also install the Git Bash Shell for Windows.)
2. Install [Docker](#) (any edition is fine). (Note on Windows or Mac, you may need to install the [Docker desktop](#).)

3. Clone down the workshop git repository below to your system.

```
$ git clone https://github.com/skillrepos/tekton-intro
```

4. If you are using [kind](#) there is a script in the repo named “**create-kind-cluster-with-registry.sh**” which *may* handle steps 5 – 8 for you below in terms of setting up a cluster with a registry on your machine. If you have kind installed, you can try running it and see. If it doesn’t work, then you will need to do steps 5-7.

5. Install and run a Kubernetes cluster using any package/application you want such as [minikube](#), [kind](#), etc. You only need a single node for your Kubernetes instance as a minimum. The workshop was designed for Kubernetes version 1.22 – 1.24, though other versions may work. Some scripts will not work with 1.25.

6. Install the Kubernetes command line tool, [kubectl](#).

7. Set up a local registry that can be reached on localhost:5000. (optional but if you don’t do this, in lab 3, not everything will work and you will need to use the “no-registry” branch per the lab instructions)

8. There is a script in the tekton-intro repo that you just cloned down named “**setup-no-vm.sh**”. You can try just running this and it *may* setup the necessary Tekton pieces for you. If it all works, then you can skip steps 9-11. If it doesn’t work, you will need to follow up on the individual pieces that failed with the appropriate steps in 9-11 below.

9. If the script in step 8 did not do it, install v 0.40.2 [Tekton](#) core pieces in your cluster.

10. If the script in step 8 did not do it, install the [Tekton dashboard](#) in your cluster.

11. If the script in step 8 did not do it, install version v0.21.0 of the [Tekton Triggers](#).

12. Install the [Tekton CLI](#).

13. Make sure that you can run the “tkn” command line application from a terminal session.

14. Ensure you have access to a text editor that you are comfortable with and know how to use and that you can access easily.

15. Install [meld](#) for your platform if running MacOS or Linux and you don't already have it. Meld is a visual diffing and merging tool that we will be using in some labs. You can install a different tool if you prefer or, if you have to, rely on standard OS tools like diff and using an editor to merge.

16. When you are done, you should have a namespace in your cluster for "tekton-pipelines" with the various kubernetes resources for each application running in them. Also, you will have a “tekpipe” ns and a “roar” ns.

You should now be setup for the class!

Option B: VirtualBox Option

Hello and thank you for registering for this session. In order to be able to work through the labs and effectively understand the material, it will be to your advantage to get your system setup following the instructions below.

1. You must have a system that can support virtualization and run Virtualbox without problems. Download and install Virtualbox on your system and verify that it runs correctly. Note that some systems may require special access or BIOS settings to support virtualization. Please ensure that you have sorted out any issues with this prior to the start of the first online session. Virtualbox can be obtained and installed from <http://www.virtualbox.org>

2. The class uses a VirtualBox VM with all of the applications installed and configured that we will need. You can download the virtual image from the location noted on the course's landing page. Note that this file is about 4 gig in size, so it may take some time to download (more on a slow connection). It is not recommended to try to download this while you are using a VPN connection as that will greatly slow down the download.

Checksums to check your file downloaded:

MD5 Checksum: 58630f1add66a14d54c2193ec70d365c

SHA-1 Checksum: 2a75558f6bb2af839f26cc47630fe6c13918c5e1

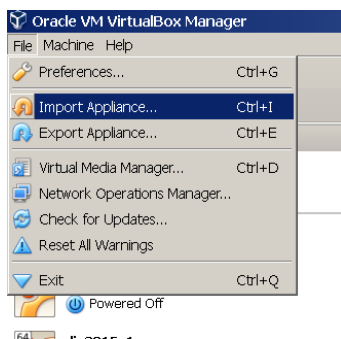
SHA-256 Checksum: 23e8fcbe8fc6f84636cc0fd9325c908677fc92884ca3ea1cd1db553a4199f54f

SHA-512 Checksum:

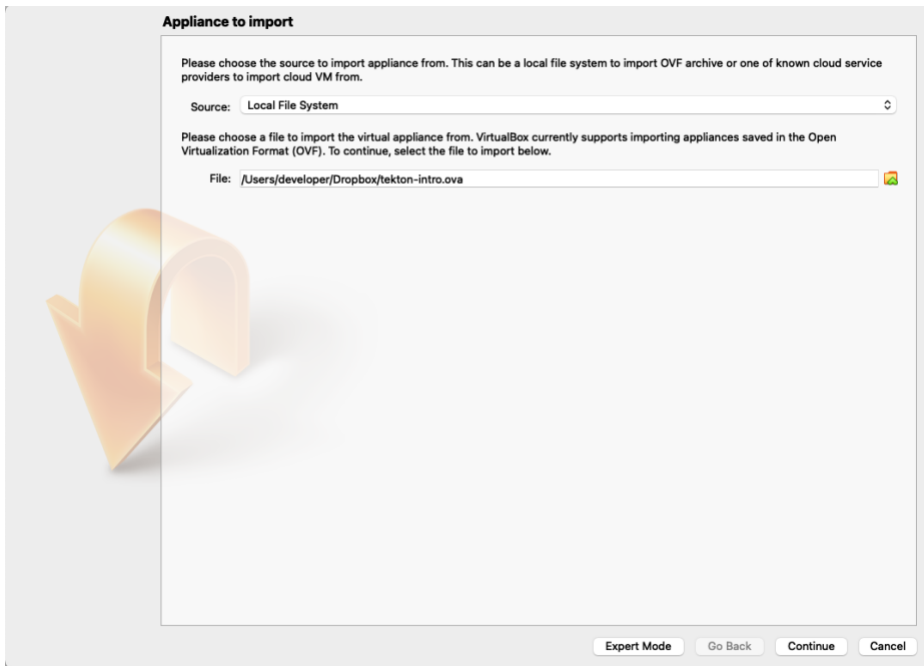
05046e43f0259e53d3948235ce94e36a488903f875e83de1894a0cdf73d79e523a2f5b0e0391394ca72a7430611563fdf52dbaacadad67a545b02fa095a2a9ec5

3. Once you have VirtualBox installed and the image downloaded and are ready to proceed, do the steps below to import the appliance.

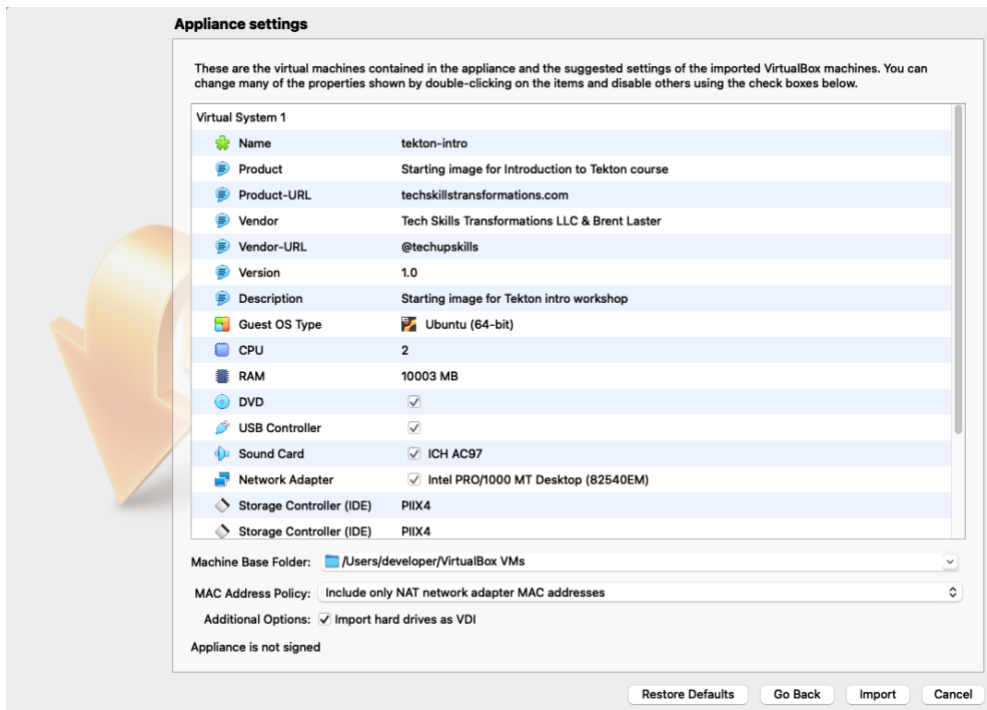
- a. Open **VirtualBox** on your system.
- b. From the **File** menu, select **"Import Appliance..."**.



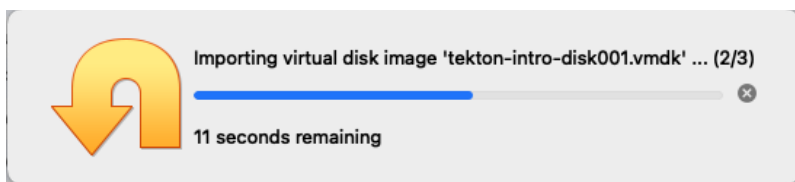
c. From there, you can type in (or browse to, using the folder icon) the path of the **tekton-introV4.ova** file. Then click **Next**.



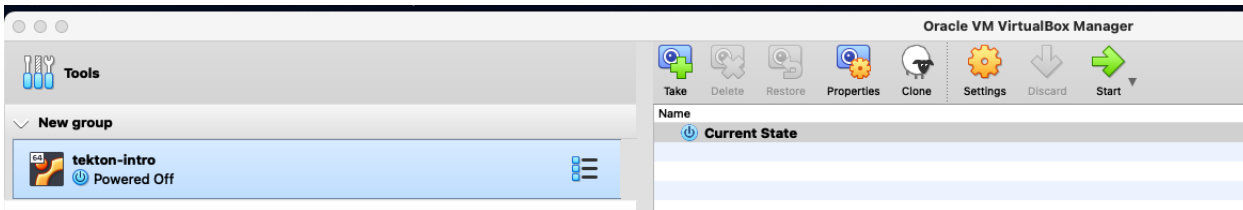
- On the next screen, if given the option, click the box to reinitialize the MAC addresses. You can just accept the rest of the **Appliance Settings** and then click the **Import** button.



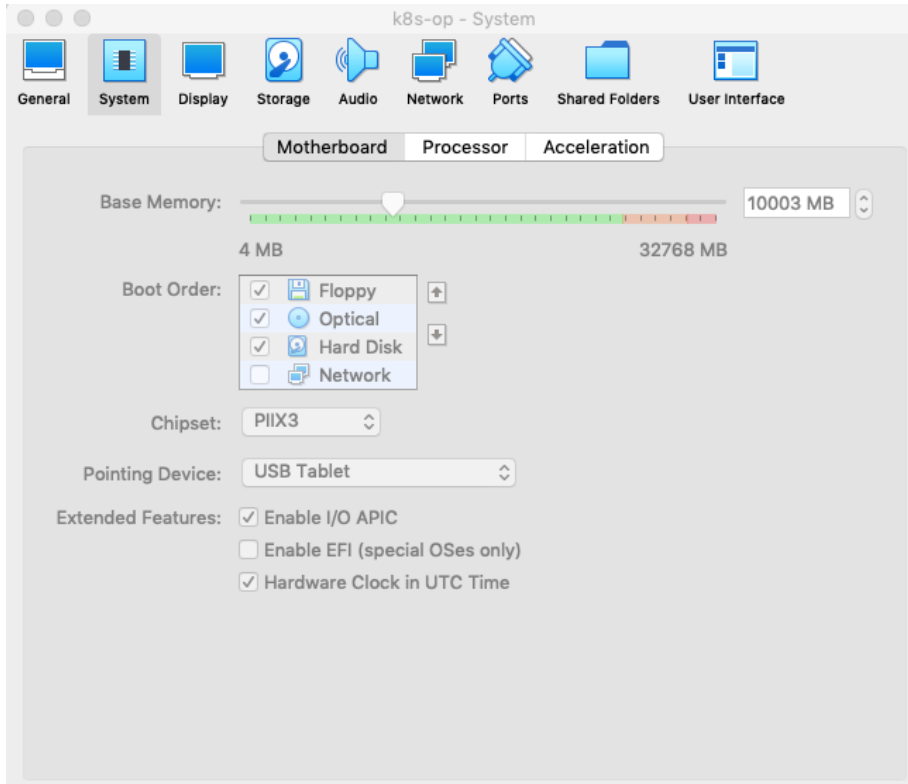
- You will get a pop-up box for the “license” info. Just click the **Agree** button. Your system will then start processing the import. This may take a while.



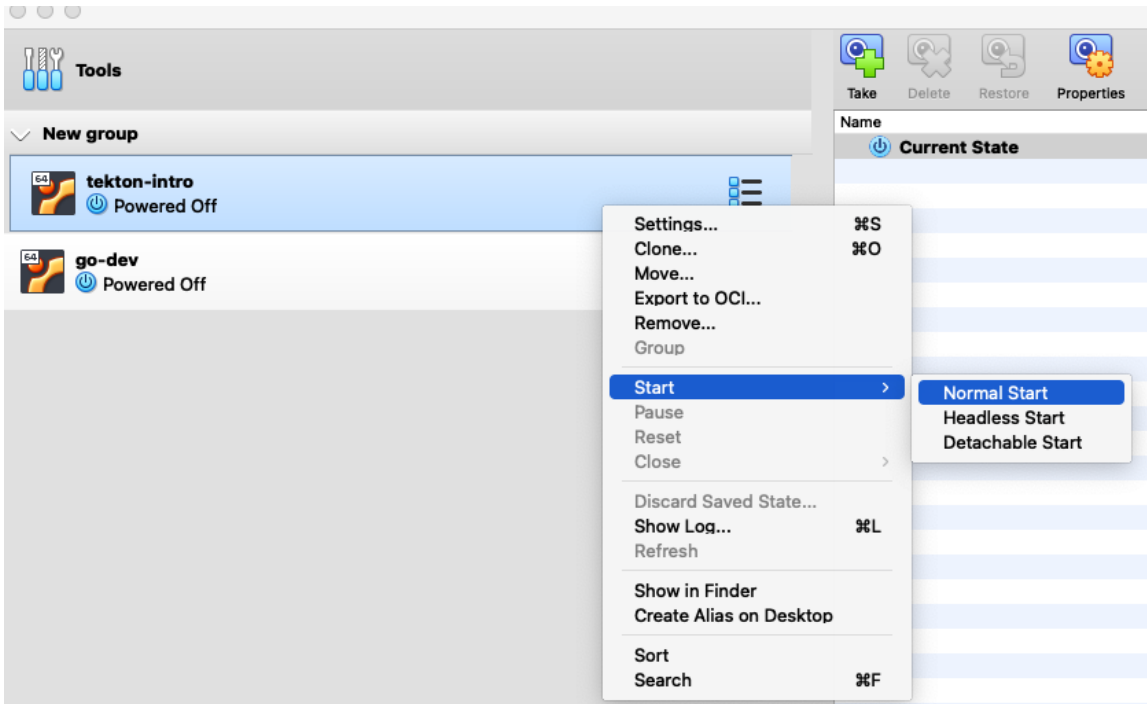
6. After the import is finished, you should have a VM listed in VirtualBox named **k8s-op**



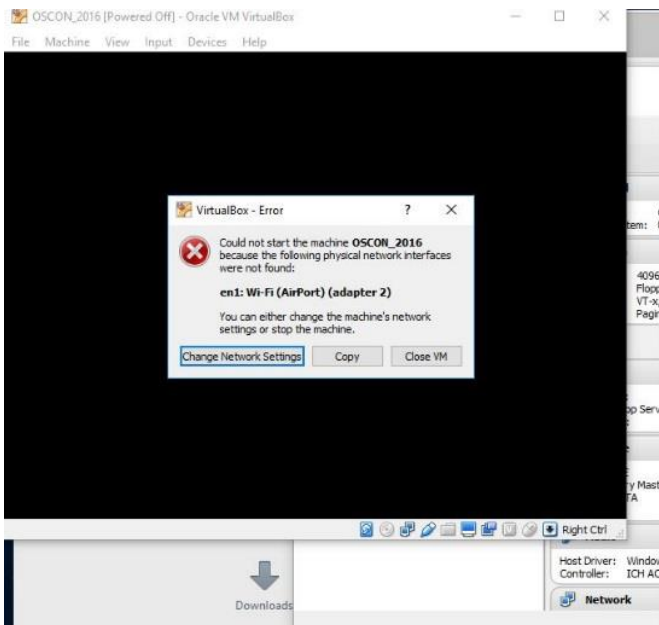
7. **(OPTIONAL)** At this point, depending on the settings of your physical system, you can adjust the amount of memory for the image if you need/want. You can do this by clicking on the **Settings** icon in the menu bar, then **System** in the pop-up box for the settings. Then you can adjust the amount of memory for the virtual machine with the slider.



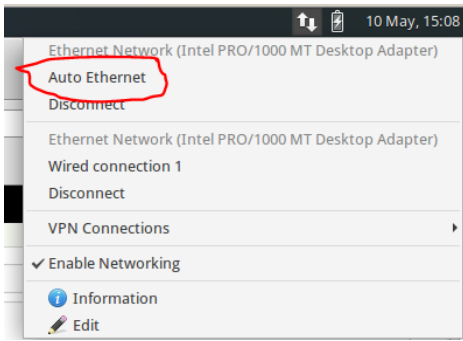
8. At this point, you can start up the virtual image by right-clicking on the image name and then selecting **Normal Start**.



9. You may receive an error about network adapters here similar to the one below.



If so, just click on the option given to “Change Network Settings”. Then click on “Ok” in the network settings. (After the system starts, you can also enable enable “**Auto Ethernet**” in the networking menu (click on double errors in upper-right corner) but that is probably not necessary).

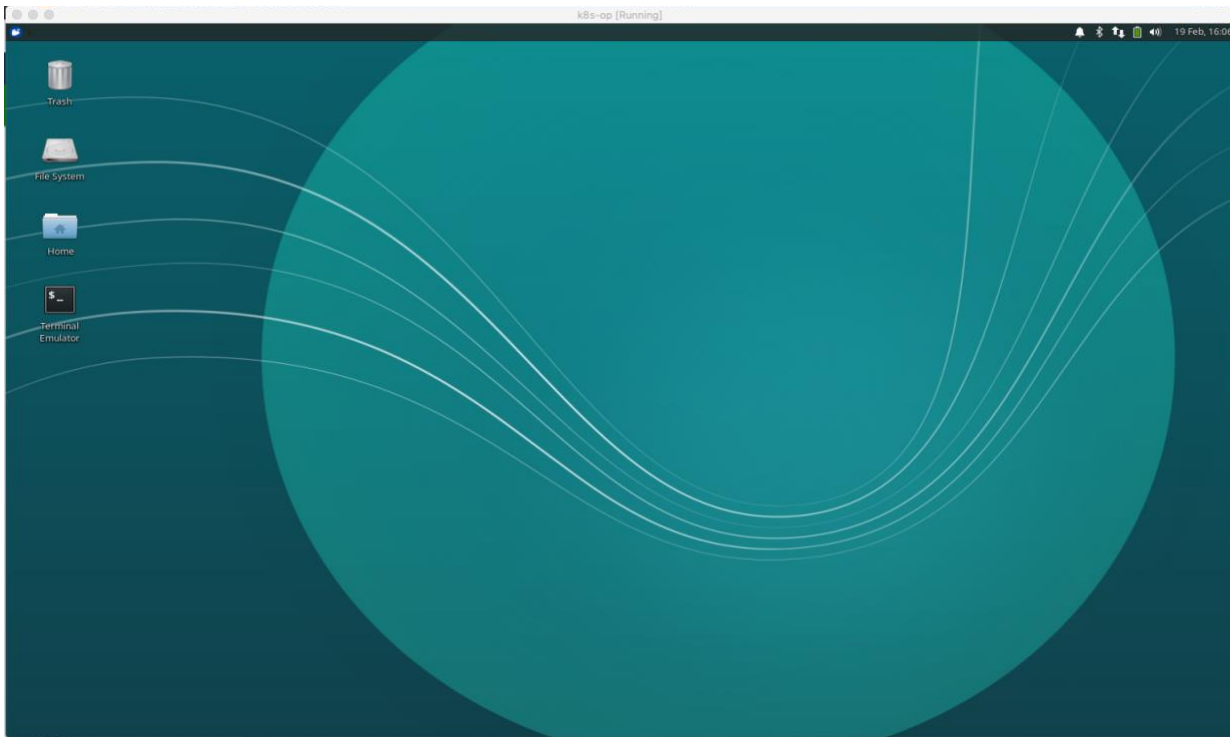


10. If you get a warning dialog that pops up like the one below, it is due to a missing shared directory. (You can see that if you click the Details – not required.) This is not important for using the VM and you can just click OK to proceed and ignore the warning.

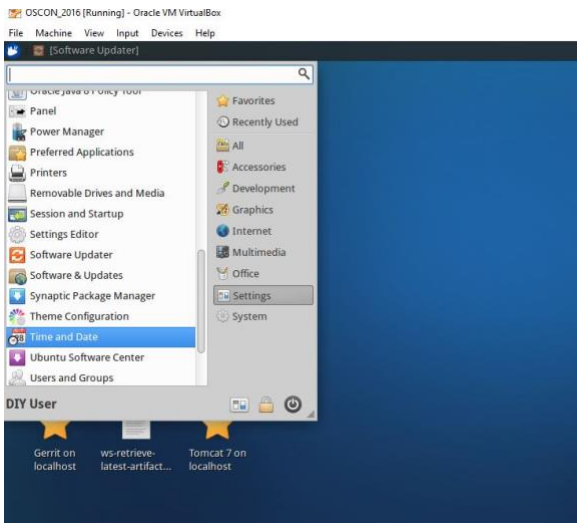


11. It may take several minutes for the desktop to appear. If, after several minutes, you don't see the desktop, try switching to full screen mode (Host key + F) or access the menu item for it through the View menu. On most systems, the Host key here will be the right Ctrl key. (Note: Windows 10 seems to have issues if you try to switch to scaled mode. If on a Windows 10 system, you may want to avoid that setting. If you do go into scaled mode and the screen seems to disappear, try using the Host key + F to switch out. Or the menu may still be accessible, although hidden, at the very top of the screen.)

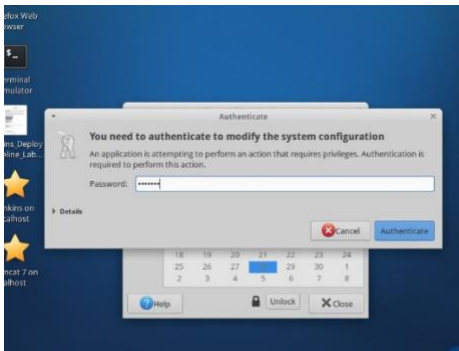
12. After starting up the VM, you should see the desktop of the VM.



13. If you are on Windows and get a Windows firewall dialog, you can click both boxes and tell Windows to “Allow access”.
14. If you are given an option to upgrade ubuntu, just decline that.
15. If you have messages at the top of the screen about “Auto capture keyboard” and “mouse pointer integration” you can just click the x on the far right of the messages to dismiss those.
16. Verify that you have internet connectivity from the VM. Open up a terminal session from the VM’s desktop and type something like “ping google.com” to make sure you get a response.
17. Login is diyuser3, diyuser3 if you need it.
18. Optionally, if you are not in the Eastern time zone - you can change the system to have the correct date/time. To do this:
 - a. Click on the mouse icon in the upper left corner of the screen.
 - b. In the drop down menu, select “Settings” on the right-hand side.
 - c. In the left-hand side, select “Time and Date”.



d. The Time and Date Settings dialog will pop up. In order to change this, you need to click on the “Unlock” button on the bottom and then authenticate to unlock it. The password to use here is “diyuser3”.

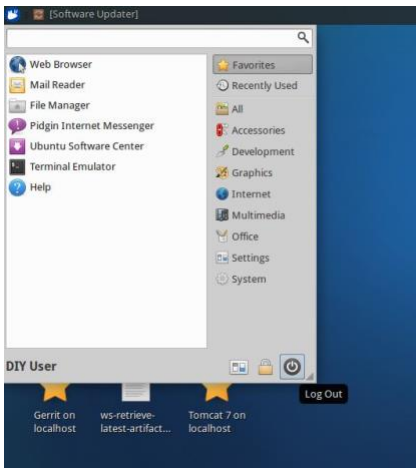


e. Click on the “Time zone” selection at the top and then find a city that is in the timezone where you are (probably prefixed by America/ if you’re in the US). Select it and close the “Time zone” choosing dialog.



f. Back on the main “Time and Date” settings dialog, the time should have changed to reflect the timezone you selected.

g. Select the Lock button to lock the settings again and then the close button. To persist the date/time changes, you just need to logout and log back in. To log out select the mouse icon again in the upper left corner, then click on the “Power” button.



19. After logging out, you can log back in with user=diyuser3 and password=diyuser3. Confirm that your date and time are set as expected.