

Lab 0: Setting Up a Virtual Machine *

EECS C106A Fall 2021

Goals

By the end of this lab you should be able to:

- Set up a virtual machine using VMWare
 - Be ready to complete Labs 1 and 2
-

Contents

1	What is a Virtual Machine?	1
2	Installing the VM with VMWare	2
2.1	Installation	2
2.2	Importing	2
2.3	Usage and Tips	2
3	Installing the VM with VirtualBox	3
4	If you are running Ubuntu 16.04 natively	3
5	Now What?	3

1 What is a Virtual Machine?

EECS C106A tends to be a very popular class, but we usually have more students than lab computers in the first few weeks of class as enrollment settles. Additionally, due to different circumstances, not all students are able to complete labs in-person for the first few weeks. As such, we are providing a virtual machine that supports completion of Labs 1 and 2.

We are providing this virtual machine (VM) because the Robotic Operating System (ROS) only works on Linux machines. Instead of asking you to toss out your Windows or MacOS computer, instead, we'll ask you to download this "Virtual Machine", which allows you to take a small chunk of your computer's processing power and memory to emulate a separate machine, isolated from the rest of the processes on your computer. This new "virtual" machine can then be running any operating system and processes you want, without interacting with the rest of your computer. Here, we will use it to run an instance of Ubuntu 16.04 so that you can use ROS even if you don't have a Linux computer.

Please note that even if you are running Linux, we use Ubuntu 16.04 in this class for software compatibility. If you are running anything other than Ubuntu 16.04, we encourage you to either download the VM or dual boot. We will not support debugging on any version other than Ubuntu 16.04.

*Adapted for regular use by Jaeyun Stella Seo, Fall 2021. Developed by Grant Wang, Fall 2019.

For this class we will be using VMware to create our VM. VMware takes “images” of a virtual machine and creates an instance of the machine for you to use. When you create a virtual machine, you can stop and start the same VM with the same files still saved on it; however, the files you create and save on it will not be shared across multiple instances of the VM. The image that we are providing has Ubuntu 16.04 with ROS Kinetic and the Baxter SDK pre-installed for you. Please be aware that if you delete a VM, you also delete any files you have saved on it. **We highly recommend you use some sort of version control such as GitHub just in case you accidentally delete your VM (just make sure your repo is private!).**

We are providing three options to complete the labs: install the VM with VMware, install the VM with Virtualbox, or install ROS and Baxter SDK if you’re running Ubuntu 16.04 natively.

2 Installing the VM with VMWare

2.1 Installation

All Berkeley students get a free copy of VMware through software agreements. [You can see the instructions to download VMware through the Berkeley agreement using this link.](#)

We recommend the following:

- For Macs: VMWare Fusion 11. You can [find the usage guide here.](#)
- For Windows: VMWare Workstation 15. You can [find the usage guide here.](#)

2.2 Importing

[You can find the image of the VM here.](#)

The importing instructions depend on what operating system your native machine runs.

- If you are running MacOS, [follow these instructions.](#)
- If you are running Windows, [follow these instructions.](#)

It is likely you will encounter the following error:

The import failed because D:64-bit 16.04.5 eeecs106a.ova did not pass OVF specification conformance or virtual hardware compliance checks.

Click Retry to relax OVF specification and virtual hardware compliance checks and try the import again, or click Cancel to cancel the import. If you retry the import, you might not be able to use the virtual machine in VMware Workstation.

If you encounter this error, just click retry.

2.3 Usage and Tips

The Ubuntu login password is: eeecs106a. Do NOT click “upgrade” if it asks you to. This is because we need to remain on Ubuntu 16.04!

For good performance, the following settings are recommended in the settings menu.

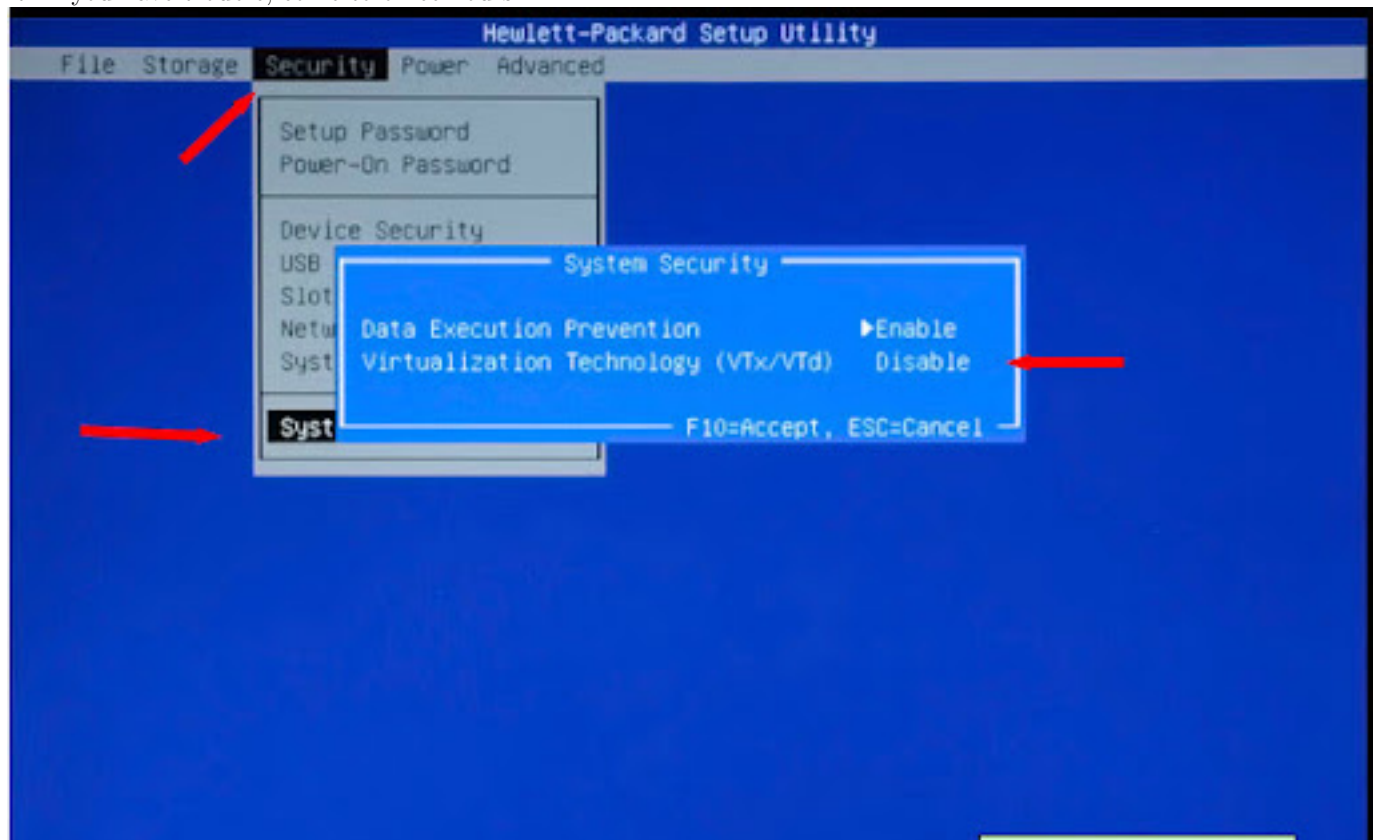
- Allocate half the number of processor cores you have (e.g. I have a Macbook Pro with 4 cores, I allocate 2 cores – at least 2 cores is recommended)
- Allocate half the amount of RAM your computer has (4+ GB is recommended)
- Keep Accelerated 3D Graphics on for good simulator performance

You may get an error about virtualization not being enabled:

This virtual machine is configured for 64-bit guest operation systems. However, 64-bit operation is not possible. This host supports Intel VT-x, but Intel VT-x is disabled. Intel VT-x might be disabled if it has been disabled in the BIOS/firmware settings or the host has been power-cycled since changing this setting. (1) Verify that BIOS/firmware settings enable Intel VT-x and disable ‘trusted execution’. (2) Power-cycle the host if either of these BIOS/firmware settings have been changed. (3) Power-cycle the host if you have not done so since installing VMware Workstation (4) Update the host’s BIOS/firmware to the latest version.

You need to enable it in your BIOS settings. This is unique to each computer and you will have to Google around for this. For example on my HP Desktop, I enter the [BIOS](#) spamming ESC when my computer first boots and then

pressing F10 to enter BIOS Setup. Then I navigate to Security → System Security → Virtualization Technology Enable to enable virtualization. Different PC manufacturers have different ways of doing this, so try googling around for it. If you have trouble, come to office hours!



3 Installing the VM with VirtualBox

VirtualBox only allows you to allocate at most 256MB for graphics. If you need to run simulations at any point, we recommend VMware.

- File → import appliance → navigate to .ova file → keep appliance settings as is
- Ubuntu login password: `eeecs106a`
- General tips similar to VMware, see above

4 If you are running Ubuntu 16.04 natively

If you are running Ubuntu 16.04 natively, please [install ROS with these instructions](#) and [procure the Baxter SDK with these instructions](#).

You can find some bash scripts to help install ROS from Valmik, a long-time TA, [on his GitHub here](#).

5 Now What?

Now you are ready to complete Labs 1 and 2 at the same pace as the rest of the class. If you are a waitlisted student or otherwise unable to get checked off in the lab section, please come to Lab Office Hours to get checked off for these labs. See you there!