Robot Management Application

Installation Guide

04/10/2018

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Overview

This installation guide will go over what to install and configure in order get RMA (Robot Management Application) installed and running for debugging as well as deployment.

This guide assumes that the user will at least be familiar with installing applications in their respective operating system of choice and be able to use command line and terminal applications.

RMA is built upon the following technologies

- VirtualBox
    - It is used to host an Ubuntu virtual machine
- Ubuntu 14.04
    - This version of Ubuntu is chosen to install ROS as it is the version supported by the robots Jackal and Husky
- ROS (Robot Operating System)
    - The main application that is used to interface with robots and seniors
- MEAN (MongoDB, Express, Angular, Node)
    - This is used to build the front-end
- Nginx
    - The webserver that is chosen to serve the website
- PM2
    - A process manager that runs the server.js file need to connect the website to the database

Perquisites

To install RMA, the following requirements must be met

- Host Operating System: Any modern Operating System capable of running VirtualBox
- User Capabilities: Ability to install programs in an Operating System of their choice

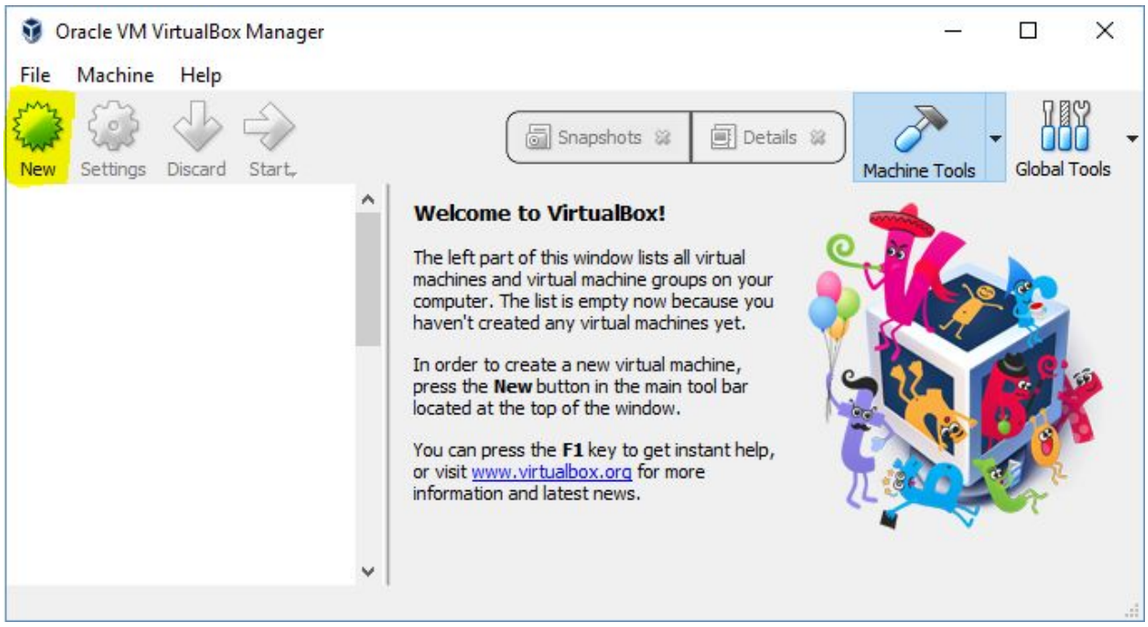
Installing VirtualBox

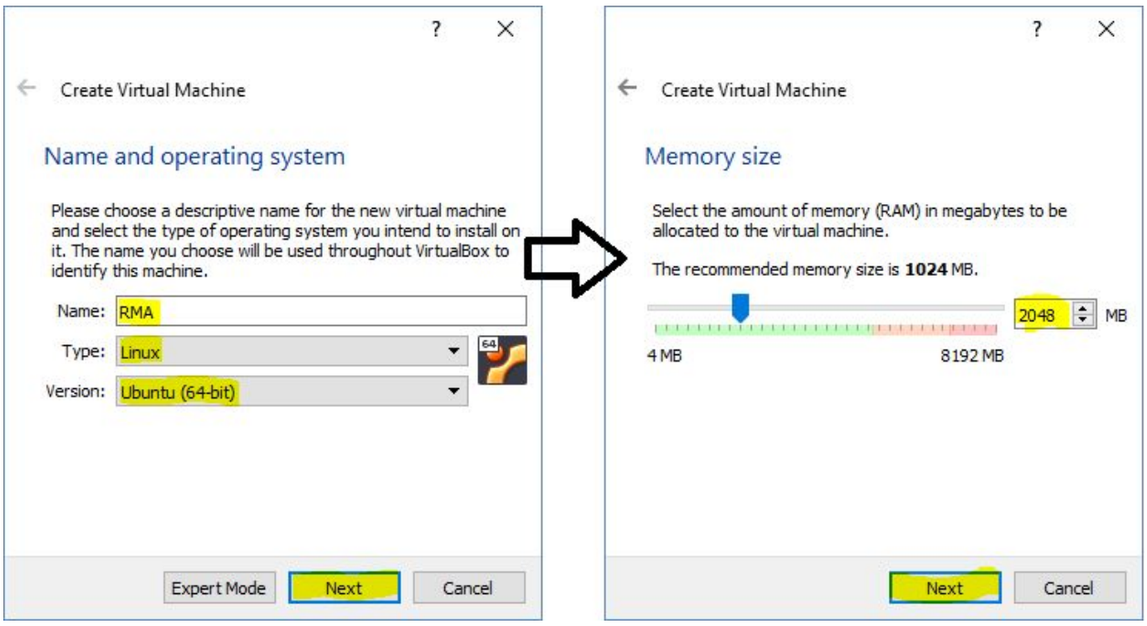
The latest version of VirtualBox is available here for download.
https://www.virtualbox.org/wiki/Downloads

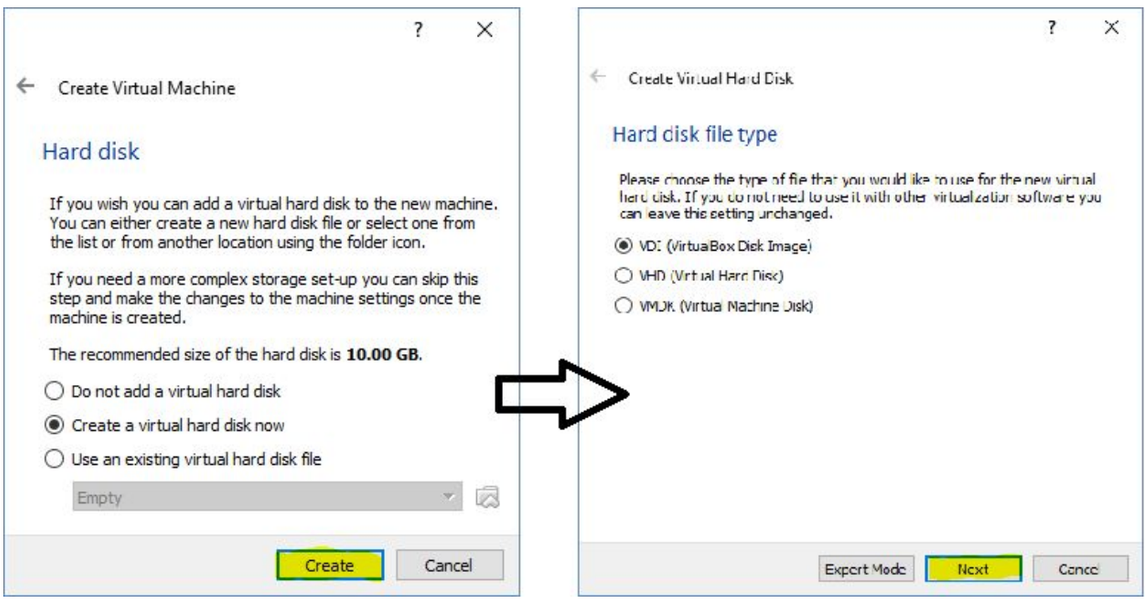
Download the version that is appropriate for your operating system and install.

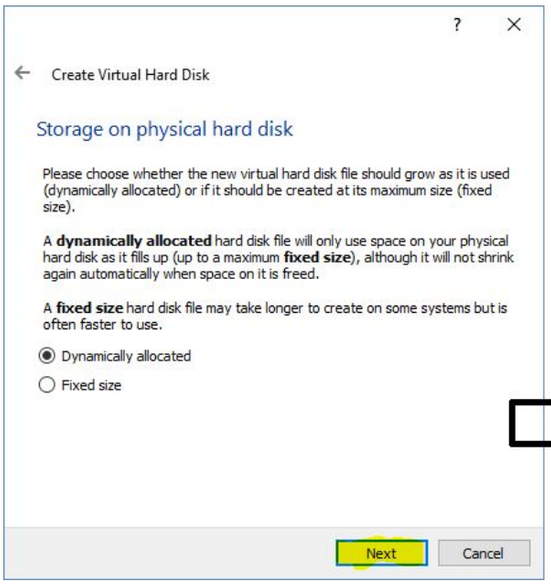
Configuring VirtualBox

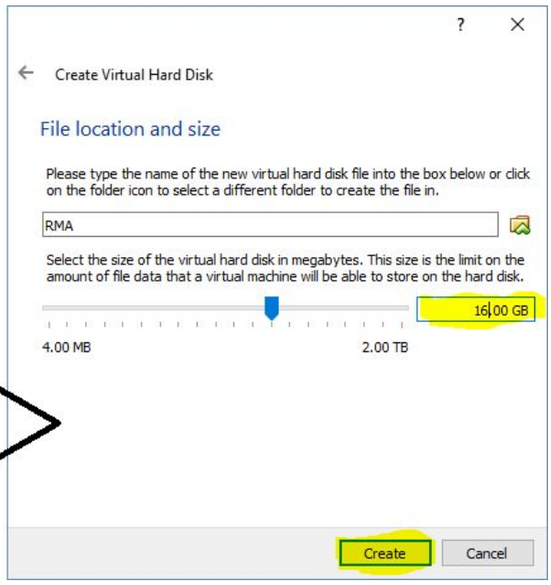
Figure 1: What VirtualBox looks like

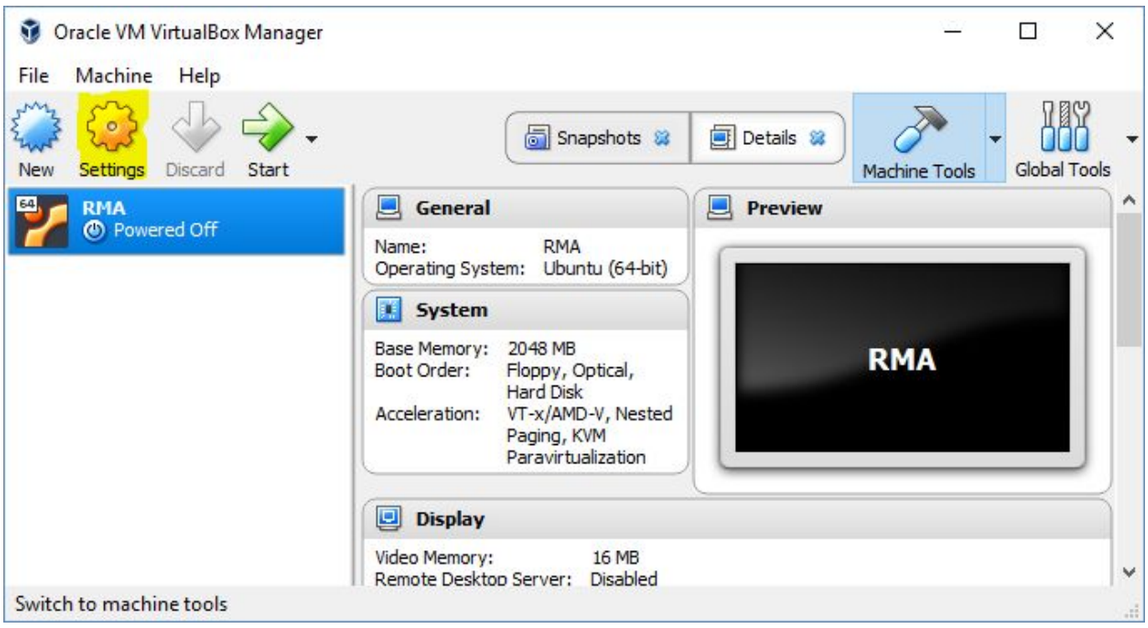







Create Virtual Hard Disk
Storage on physical hard disk
Please choose whether the new virtual hard disk file should grow as it is used (dynamically allocated) or if it should be created at its maximum size (fixed size).
A dynamically allocated hard disk file will only use space on your physical hard disk as it fills up (up to a maximum fixed size), although it will not shrink again automatically when space on it is freed.
A fixed size hard disk file may take longer to create on some systems but is often faster to use.
Dynamically allocated
Fixed size
Next
Cancel


Create Virtual Hard Disk
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.
RMA
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.
16.00 GB
4.00 MB
2.00 TB
Create
Cancel


Oracle VM VirtualBox Manager
File
Machine
Help
New
Settings
Discard
Start
Snapshots
Details
Machine Tools
Global Tools
RMA
Powered Off
General
Name: RMA
Operating System: Ubuntu (64-bit)
System
Base Memory: 2048 MB
Boot Order: Floppy, Optical, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging, KVM Paravirtualization
Preview
RMA
Display
Video Memory: 16 MB
Remote Desktop Server: Disabled
Switch to machine tools

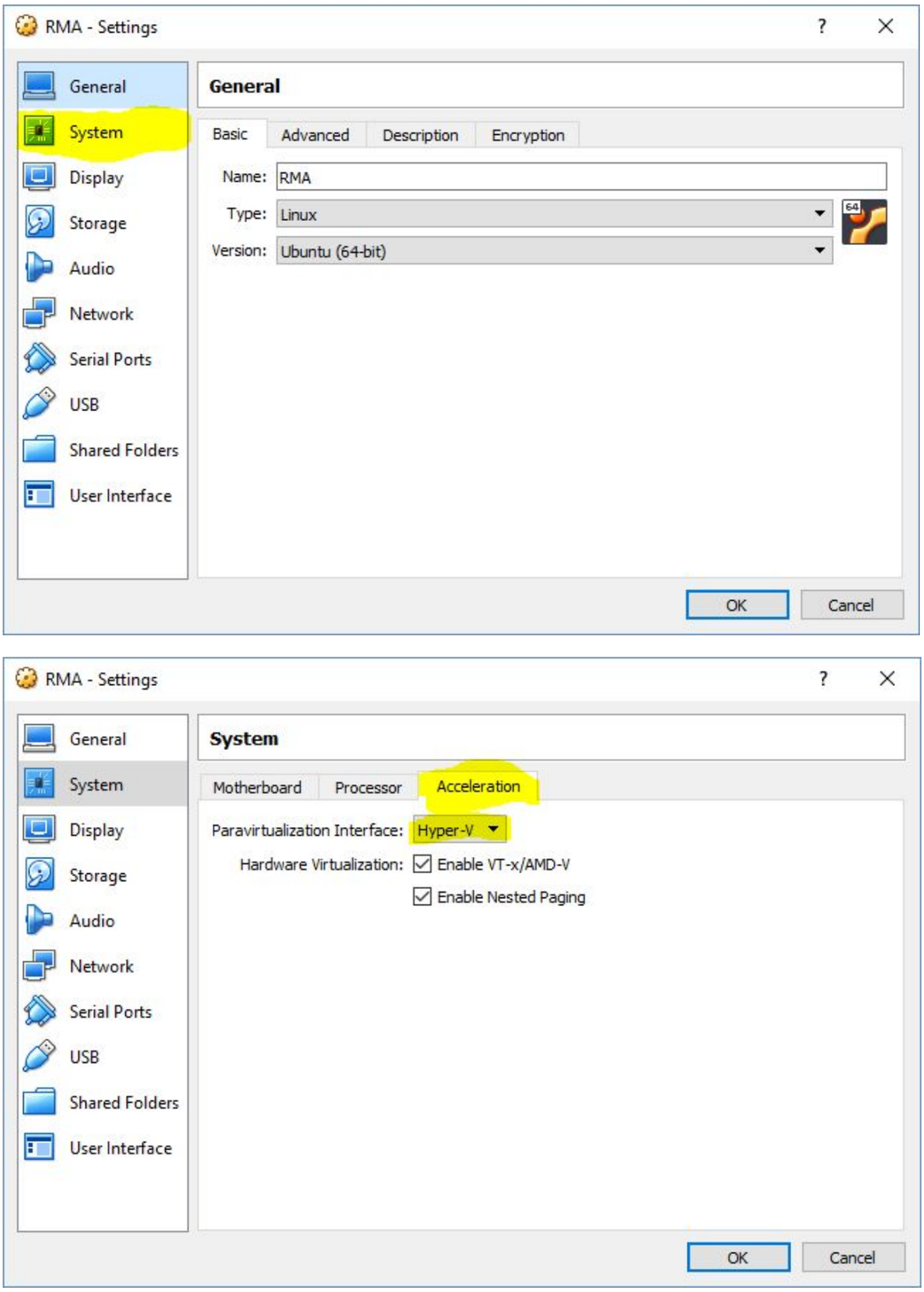


Figure 2: Change the paravirtualization to KVM

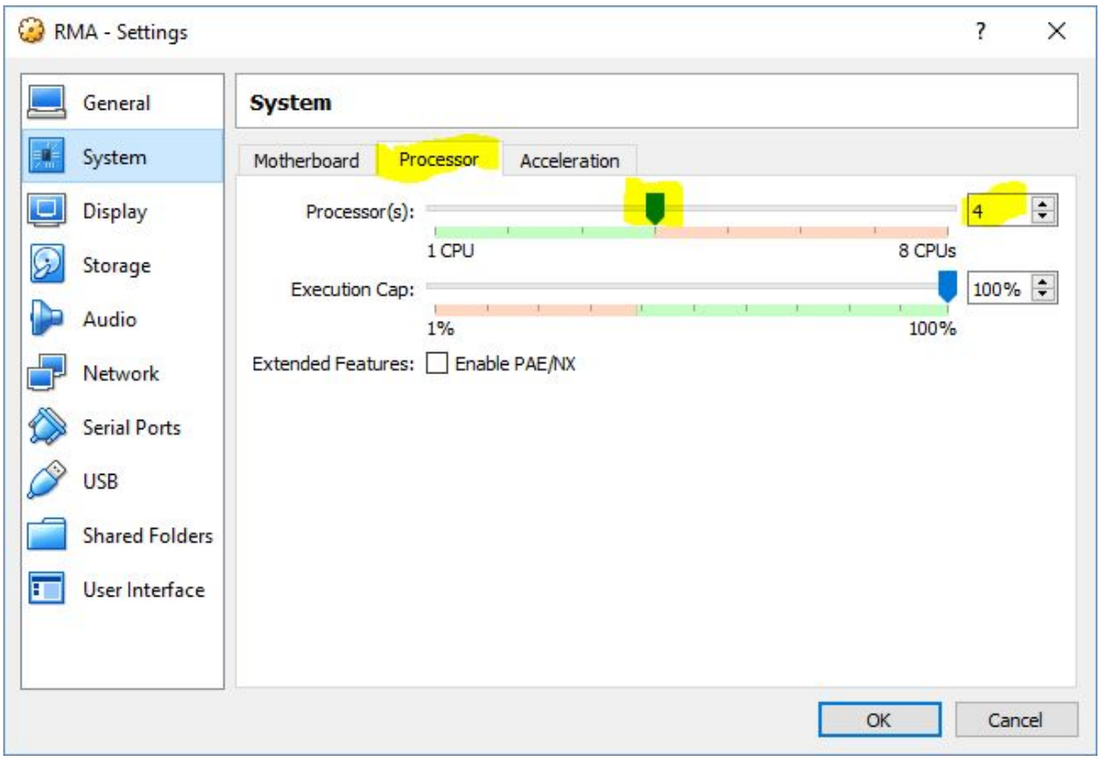


Figure 3: Choose the highest number of CPUs available in the green zone.

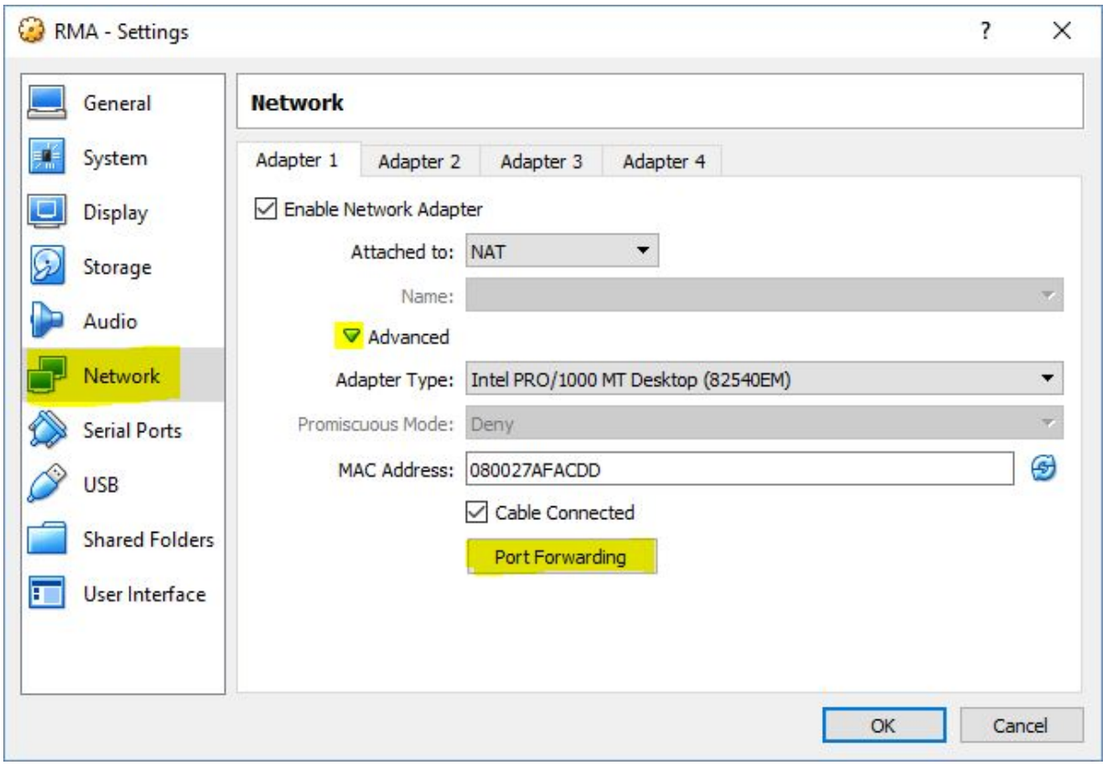


Figure 4: Click Networking, then Advanced then Port Forwarding

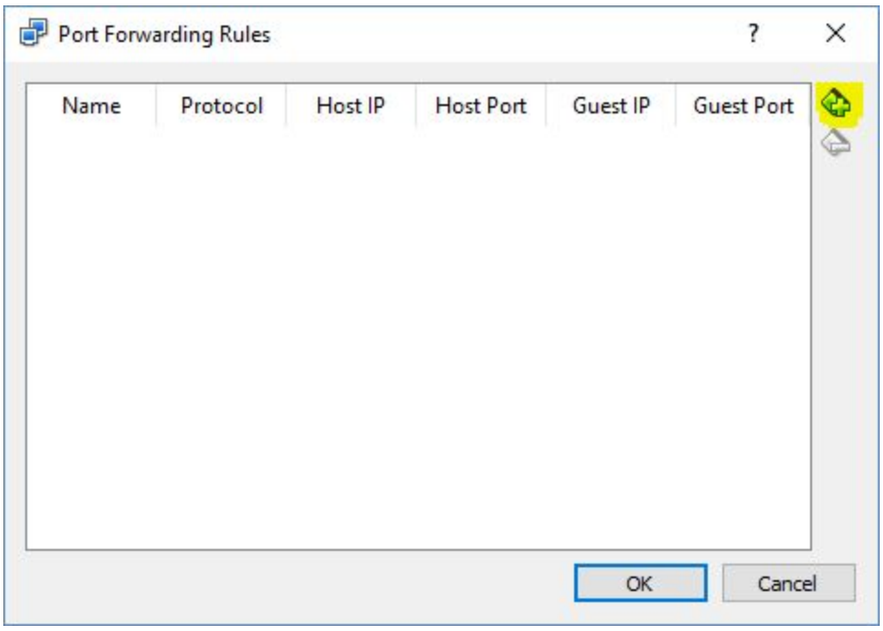


Figure 5: Click on the + sign to add a new rule

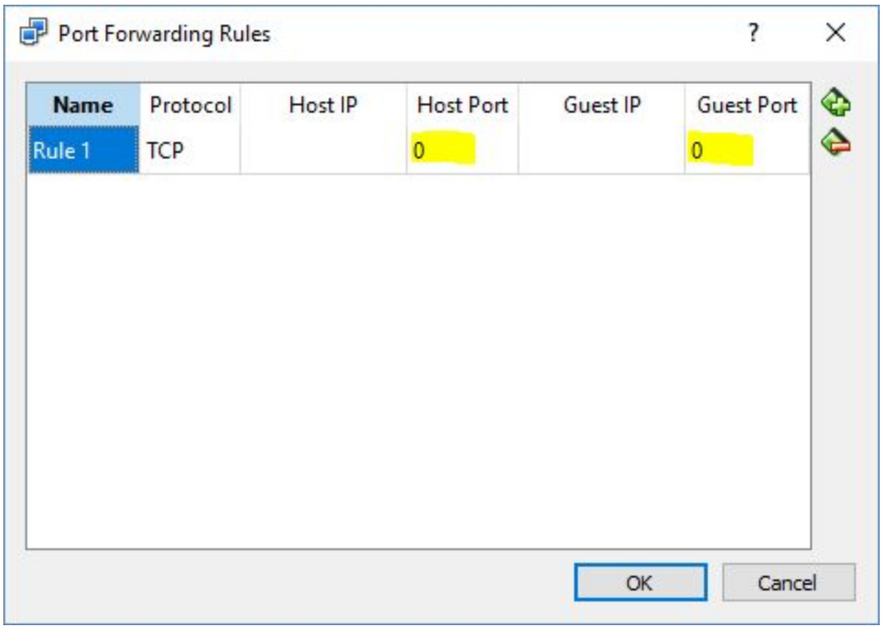


Figure 6: It will look like this

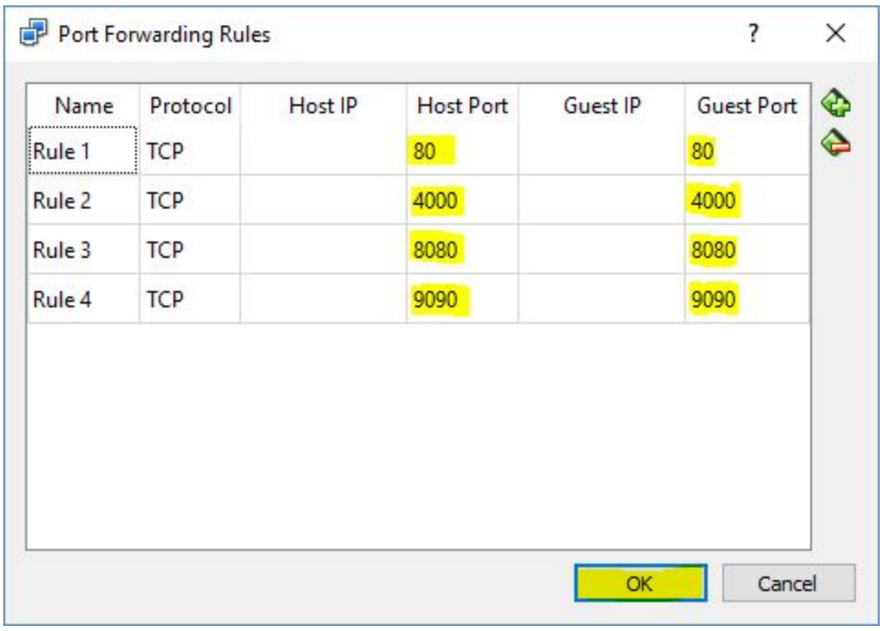


Figure 7: Fill in the following information then press Ok

Installing Ubuntu 14.04

There a few options for downloading Ubuntu:

- DDL: http://mirror.pnl.gov/releases/trusty/ubuntu-14.04.5-desktop-amd64.iso
- Torrent: http://releases.ubuntu.com/14.04/ubuntu-14.04.5-desktop-amd64.iso.torrent

Pick the option that is most suitable.

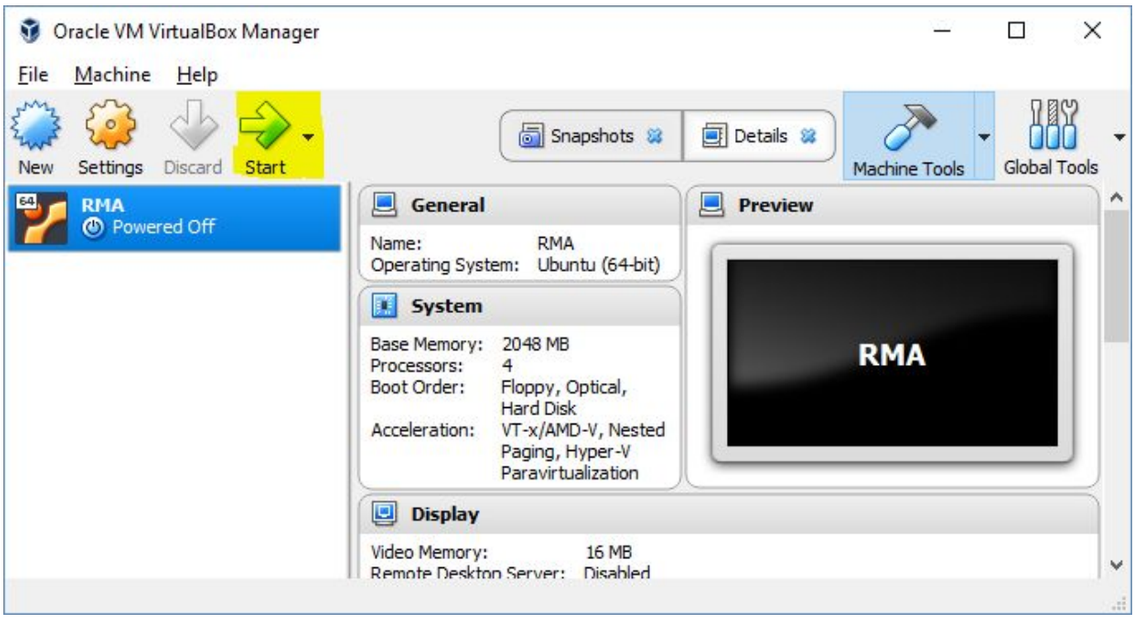


Figure 8: Select Start

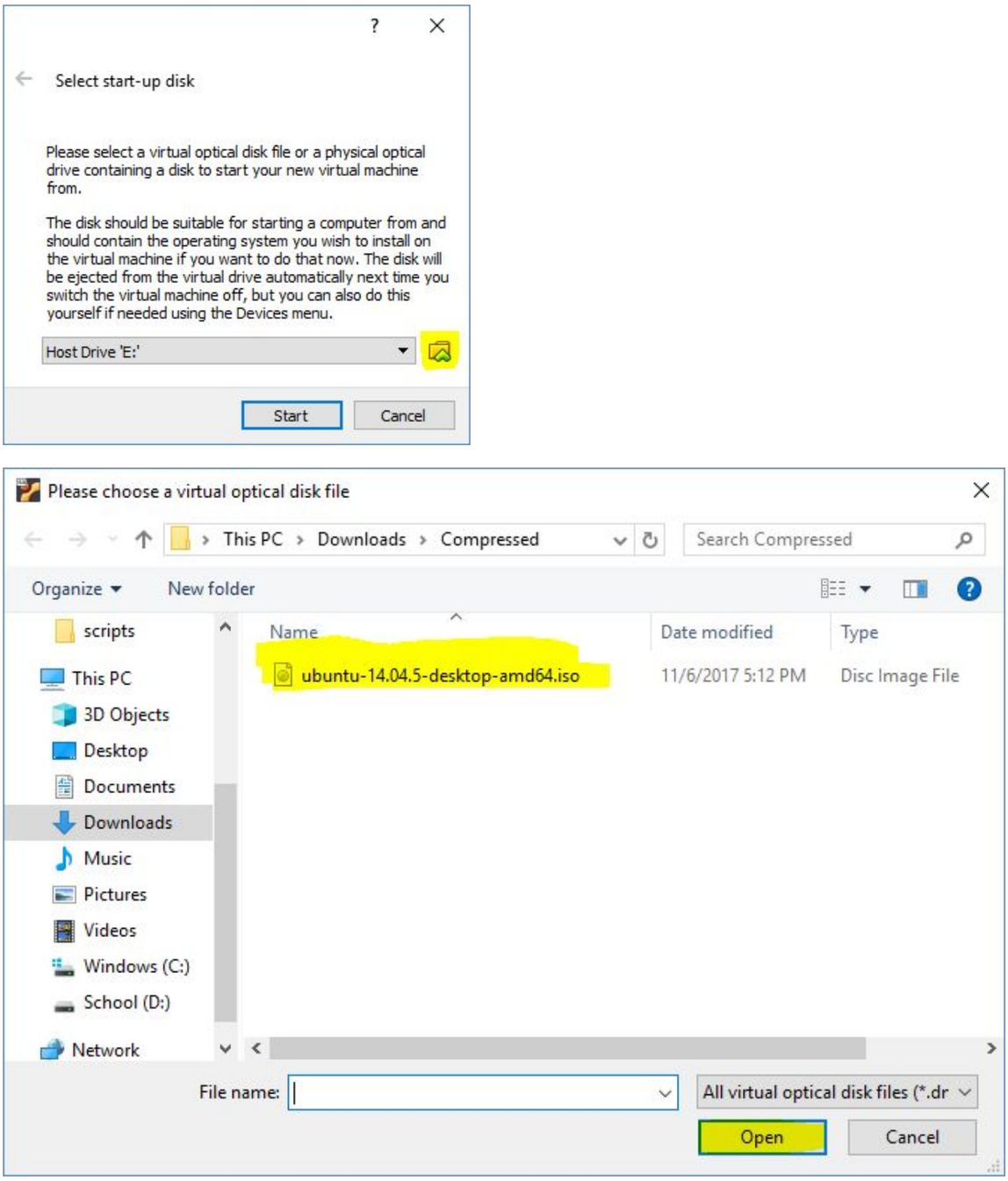
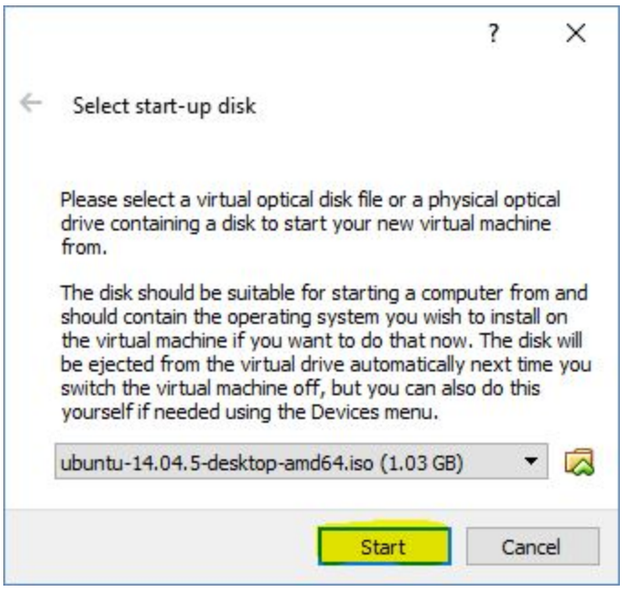
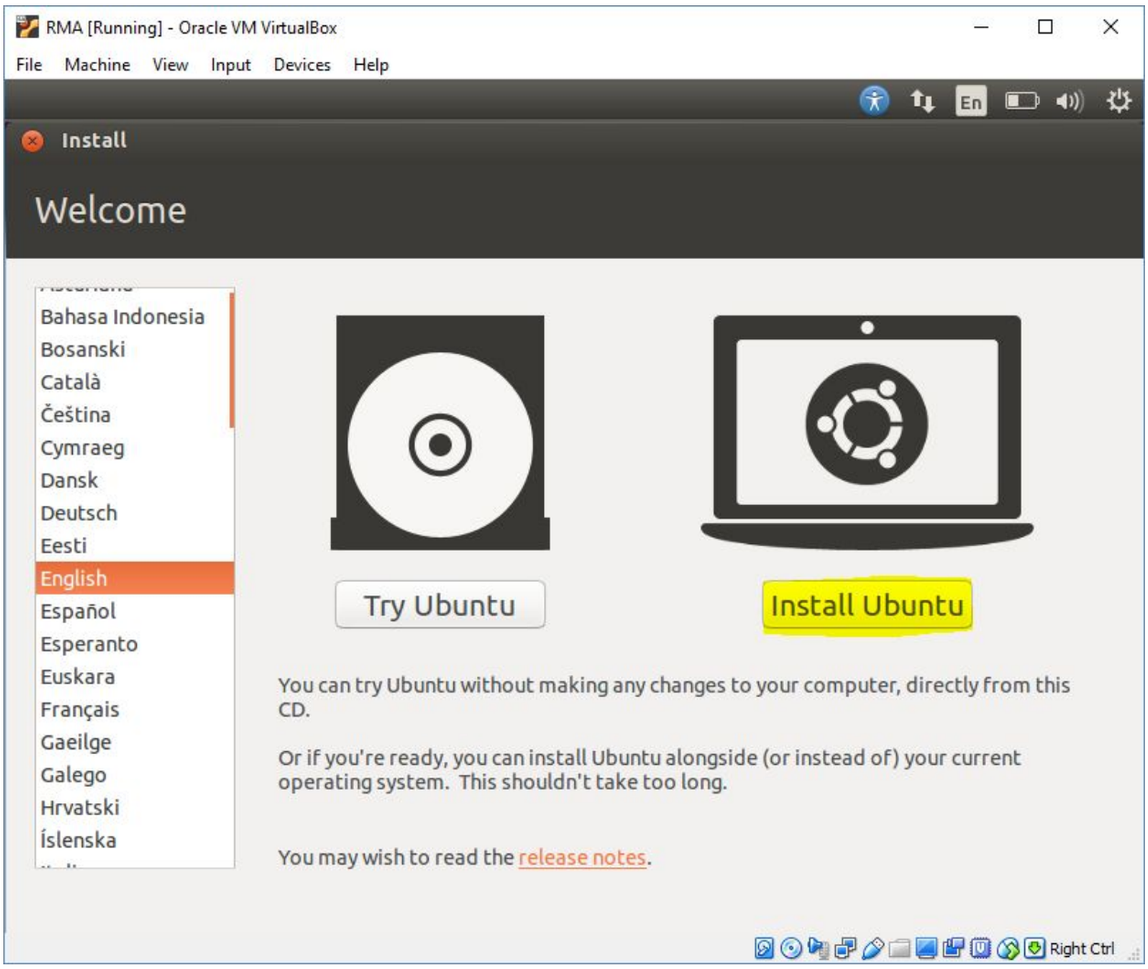
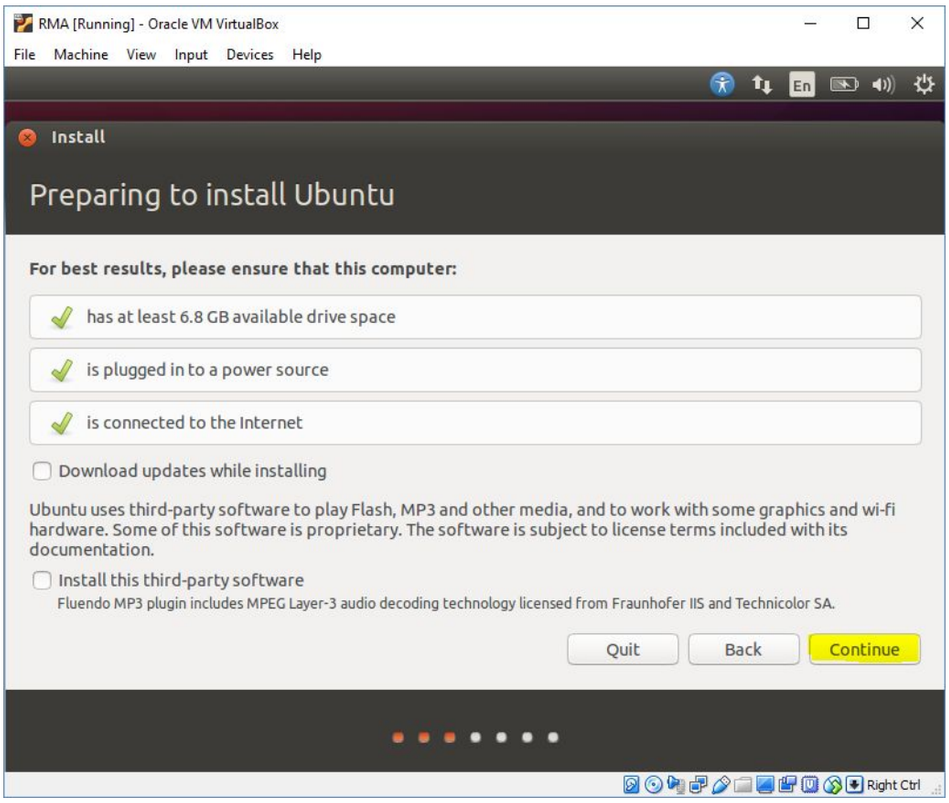
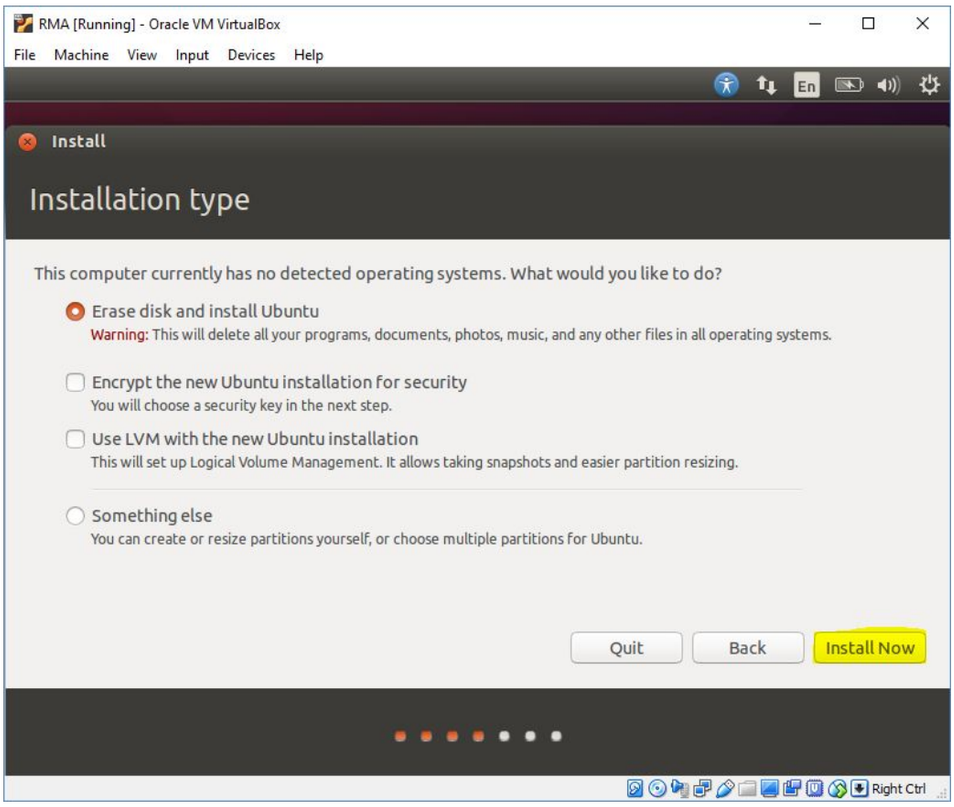


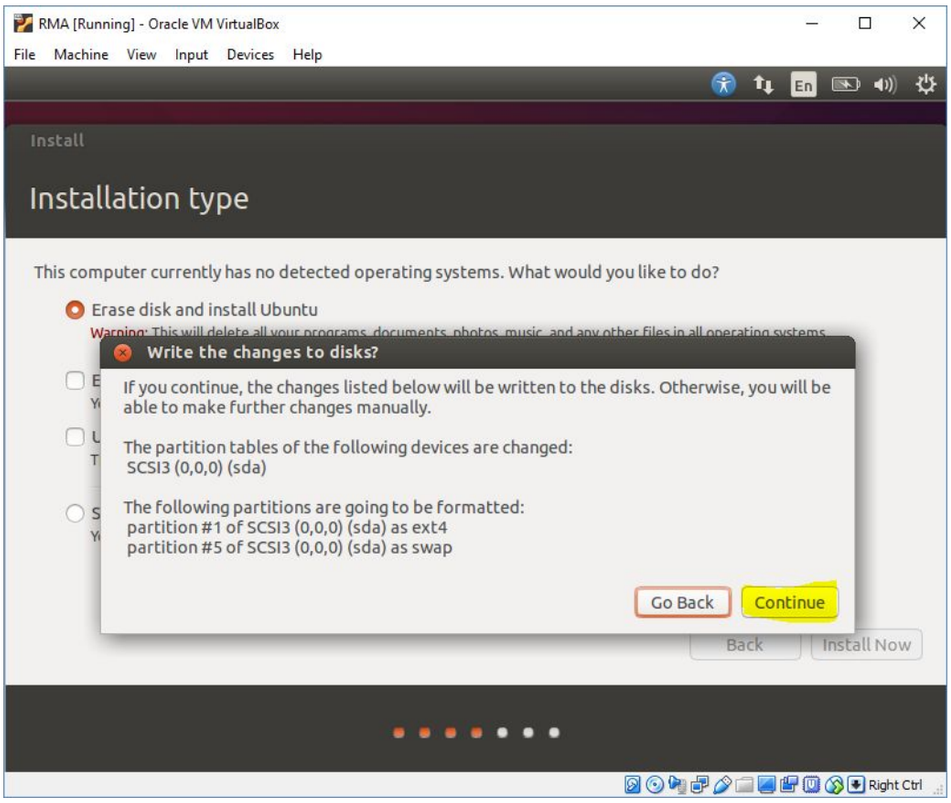
Figure 9: Navigate to where Ubuntu is downloaded

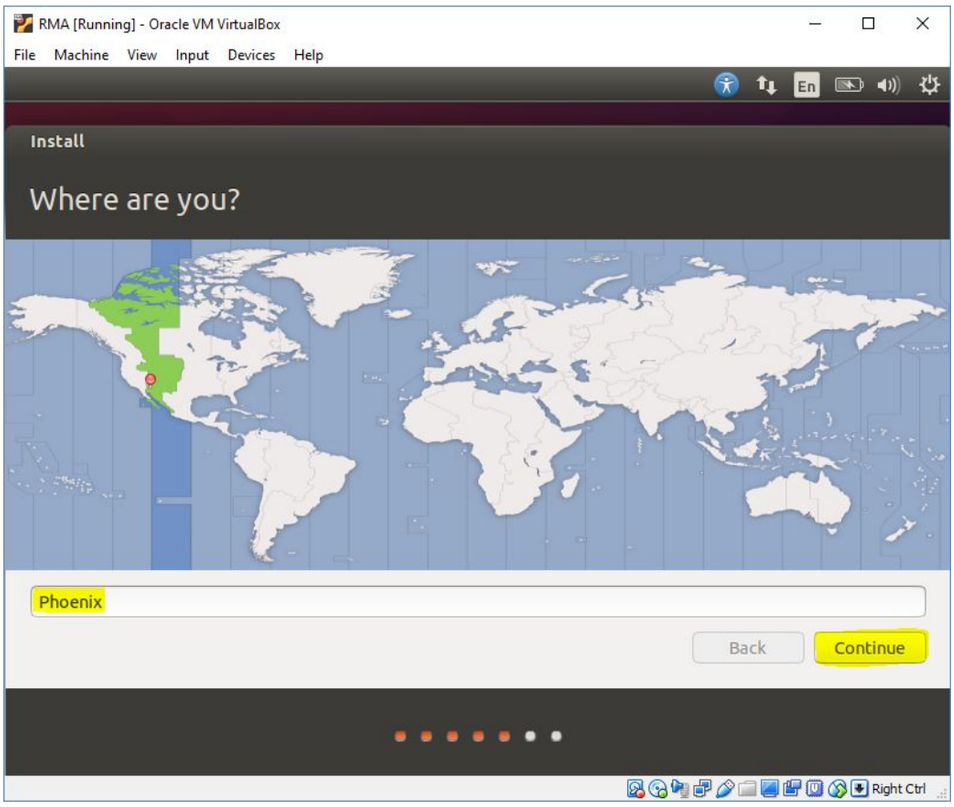

Select start-up disk
Please select a virtual optical disk file or a physical optical drive containing a disk to start your new virtual machine from.
The disk should be suitable for starting a computer from and should contain the operating system you wish to install on the virtual machine if you want to do that now. The disk will be ejected from the virtual drive automatically next time you switch the virtual machine off, but you can also do this yourself if needed using the Devices menu.
ubuntu-14.04.5-desktop-amd64.iso (1.03 GB)
Start
Cancel

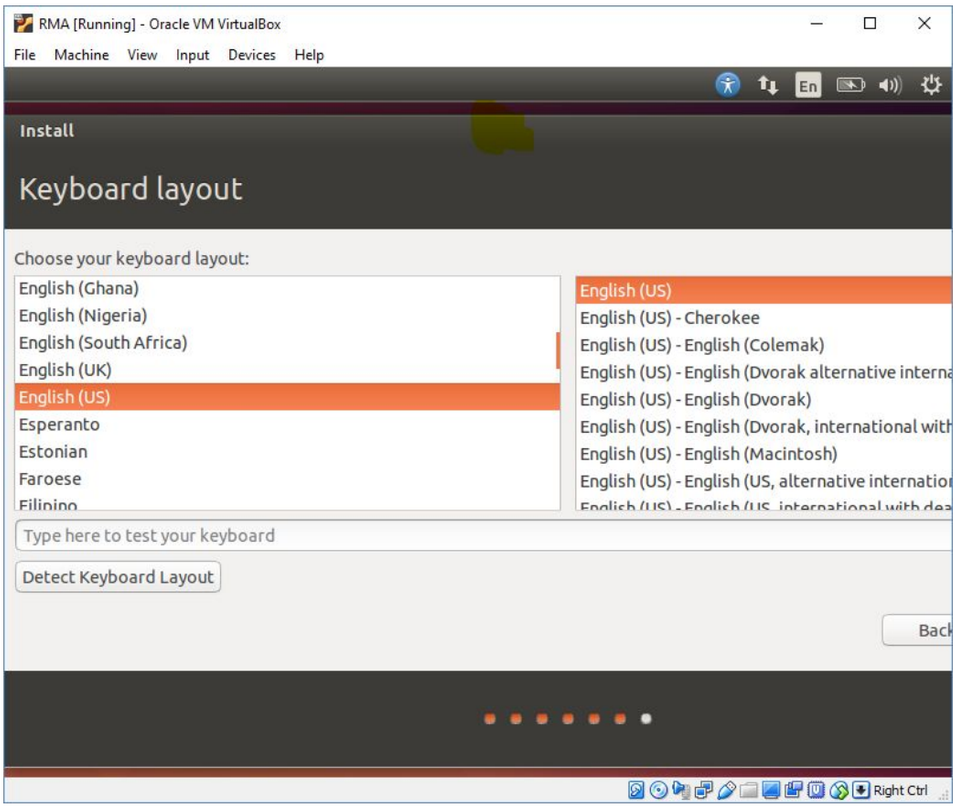

RMA [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Install
Welcome
Bahasa Indonesia
Bosanski
Català
Čeština
Cymraeg
Dansk
Deutsch
Eesti
English
Español
Esperanto
Euskara
Français
Gaeilge
Galego
Hrvatski
Íslenska
Try Ubuntu
Install Ubuntu
You can try Ubuntu without making any changes to your computer, directly from this CD.
Or if you're ready, you can install Ubuntu alongside (or instead of) your current operating system. This shouldn't take too long.
You may wish to read the release notes.
Right Ctrl

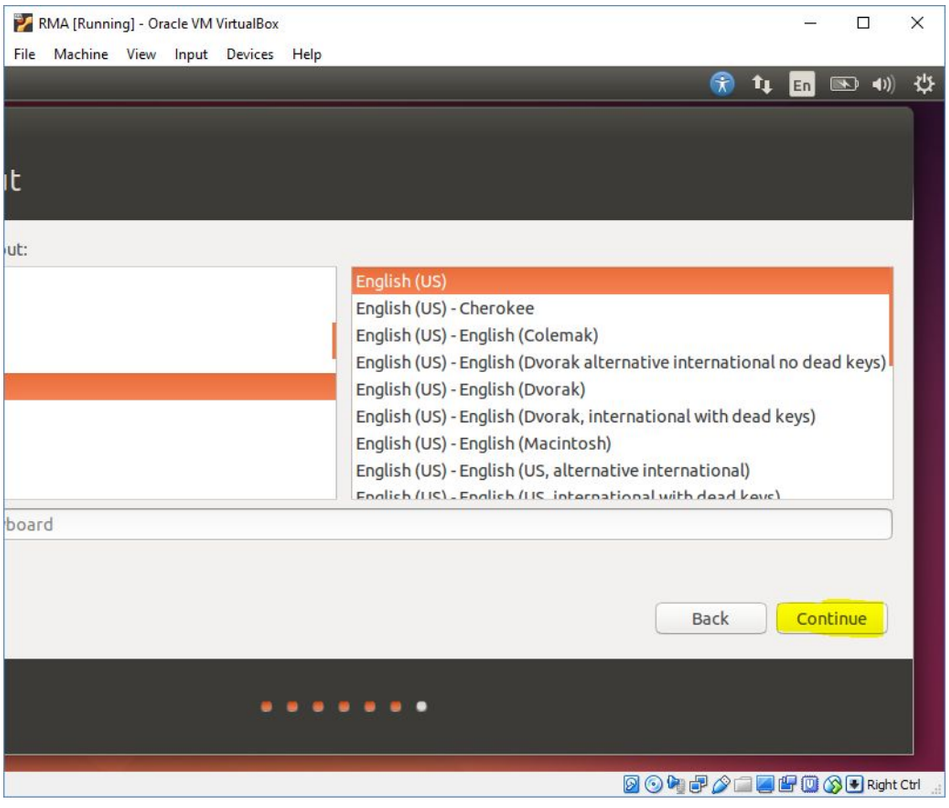

RMA [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
En
Install
Preparing to install Ubuntu
For best results, please ensure that this computer:
has at least 6.8 GB available drive space
is plugged in to a power source
is connected to the Internet
Download updates while installing
Ubuntu uses third-party software to play Flash, MP3 and other media, and to work with some graphics and wi-fi hardware. Some of this software is proprietary. The software is subject to license terms included with its documentation.
Install this third-party software
Fluendo MP3 plugin includes MPEG Layer-3 audio decoding technology licensed from Fraunhofer IIS and Technicolor SA.
Quit
Back
Continue
Right Ctrl

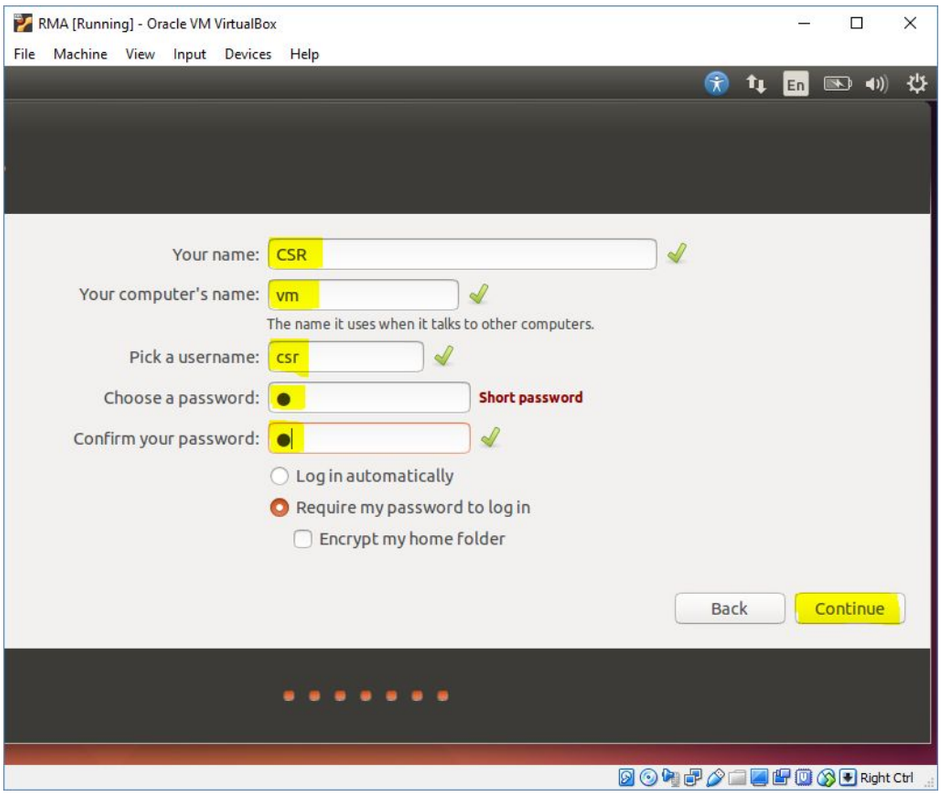

RMA [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
En
Install
Installation type
This computer currently has no detected operating systems. What would you like to do?
Erase disk and install Ubuntu
Warning: This will delete all your programs, documents, photos, music, and any other 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

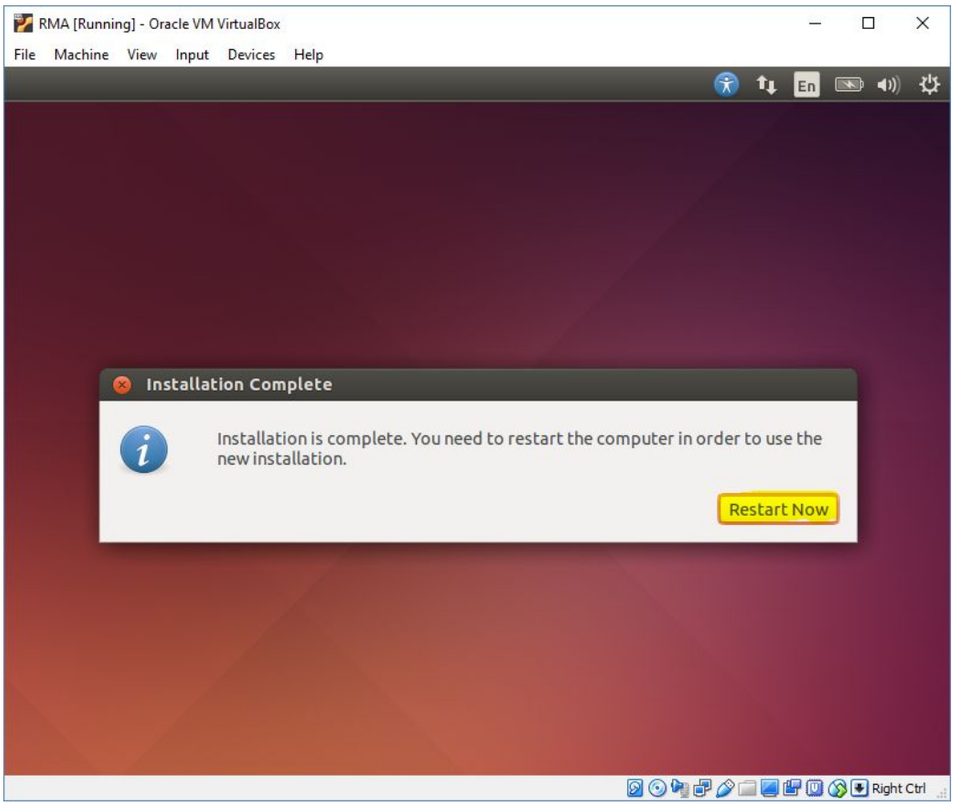

RMA [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
En
Install
Installation type
This computer currently has no detected operating systems. What would you like to do?
Erase disk and install Ubuntu
Warning: This will delete all your programs, documents, photos, music, and any other files in all operating systems.
Write the changes to disks?
If you continue, the changes listed below will be written to the disks. Otherwise, you will be able to make further changes manually.
The partition tables of the following devices are changed:
SCSI3 (0,0,0) (sda)
The following partitions are going to be formatted:
partition #1 of SCSI3 (0,0,0) (sda) as ext4
partition #5 of SCSI3 (0,0,0) (sda) as swap
Go Back
Continue
Back
Install Now
Right Ctrl


RMA [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
En
Install
Where are you?
Phoenix
Back
Continue
Right Ctrl


RMA [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Install
Keyboard layout
Choose your keyboard layout:
English (Ghana)
English (Nigeria)
English (South Africa)
English (UK)
English (US)
Esperanto
Estonian
Faroese
Filipino
English (US)
English (US) - Cherokee
English (US) - English (Colemak)
English (US) - English (Dvorak alternative interna
English (US) - English (Dvorak)
English (US) - English (Dvorak, international with
English (US) - English (Macintosh)
English (US) - English (US, alternative internatio
Type here to test your keyboard
Detect Keyboard Layout
Back
Right Ctrl

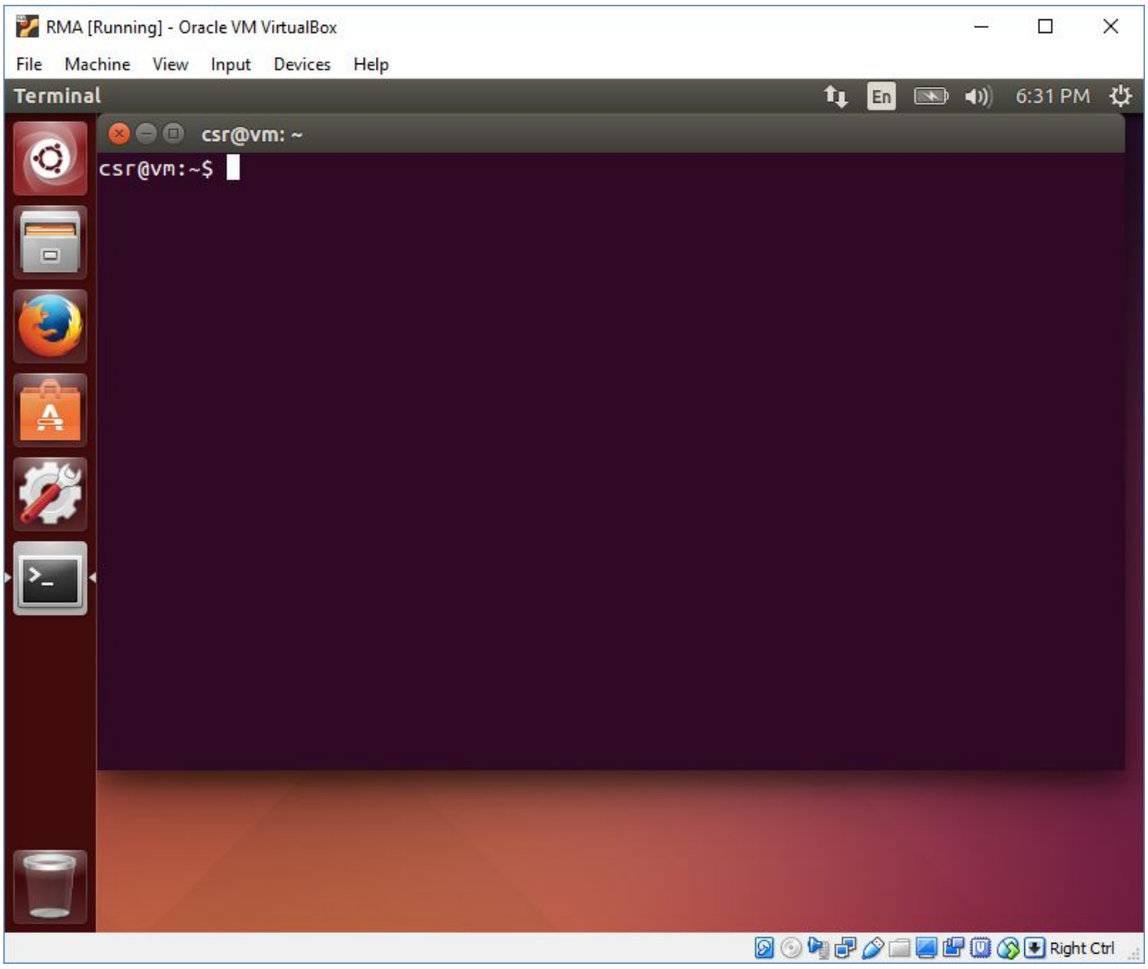

RMA [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
English (US)
English (US) - Cherokee
English (US) - English (Colemak)
English (US) - English (Dvorak alternative international no dead keys)
English (US) - English (Dvorak)
English (US) - English (Dvorak, international with dead keys)
English (US) - English (Macintosh)
English (US) - English (US, alternative international)
Back
Continue
Right Ctrl


RMA [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
En
Your name: CSR
Your computer's name: vm
The name it uses when it talks to other computers.
Pick a username: csr
Choose a password:
Short password
Confirm your password:
Log in automatically
Require my password to log in
Encrypt my home folder
Back
Continue
Right Ctrl


RMA [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
En
Installation Complete
Installation is complete. You need to restart the computer in order to use the new installation.
Restart Now
Right Ctrl

Terminal

To open a terminal window, press CTRL + ALT + T. It will look something like this

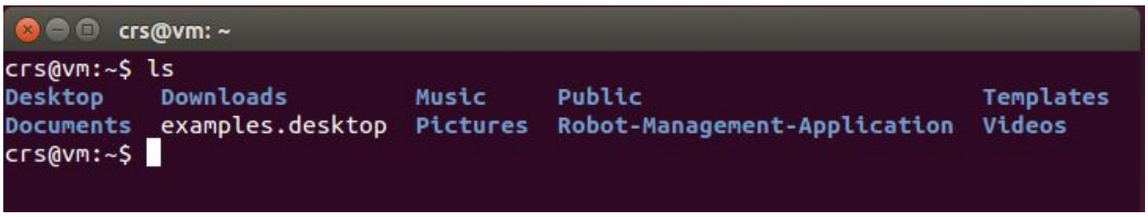


Installing git

To install git, first update the package repository.
`sudo apt-get update`
Then install by typing
`sudo apt-get install git`
And when prompted insert your password.

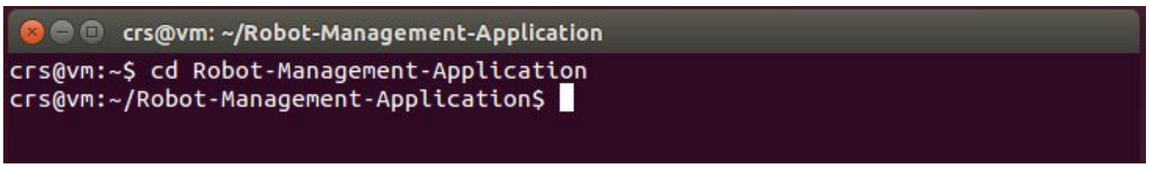
Cloning the project

You can clone the project by typing:
`git clone https://github.com/[username]/Robot-Management-Application.git`
replace `[username]` with the GitHub username this project is currently hosted by
So, if the user name is `crs`, then the command would look like:
`git clone https://github.com/crs/Robot-Management-Application.git`
You will be prompted for your GitHub username and password.
Type `ls` to list all the files and folders currently in your home directory.



Change directory to Robot-Management-Application folder

`cd Robot-Management-Application`

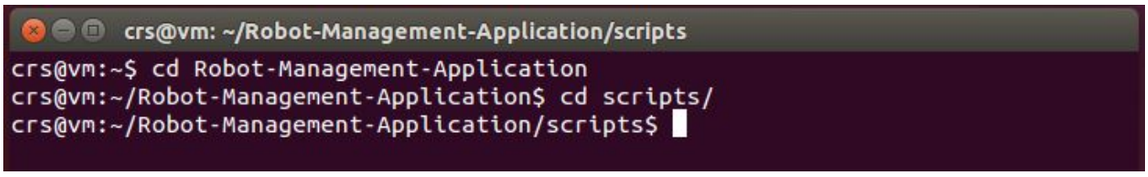


Installing project dependencies

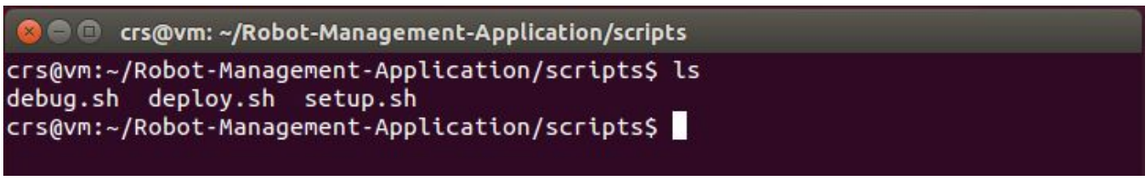
Installation scripts have been provided to automate the installation and configuration of the project and all its dependencies.

Now change directory to the scripts folder

`cd scripts`



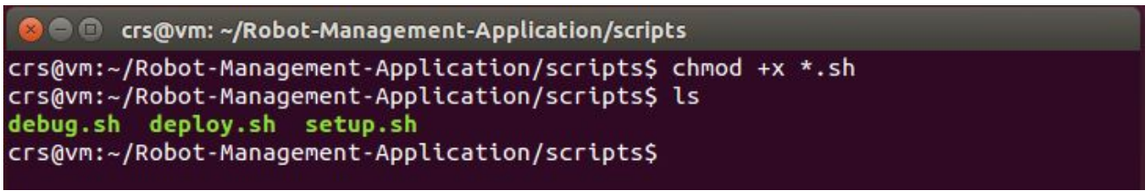
Type `ls` to view the contents



As you can see there are three .sh files, these are bash scripts.

However, they are not executable yet. To make them executable type:

`chmod +x *.sh`



You can see that the text is green which means that they are executable.

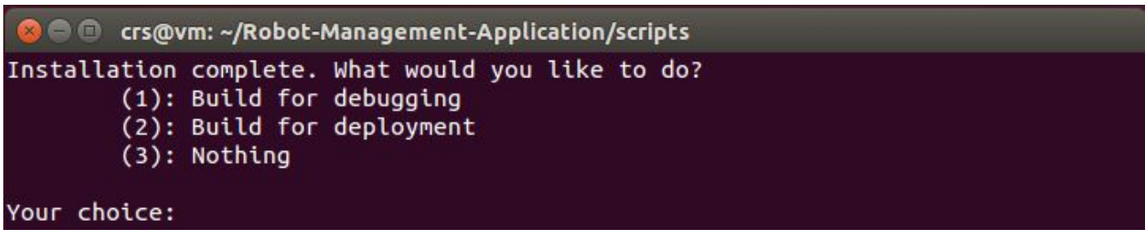
To begin installation type:

`./setup.sh`

You may be prompted for your password.

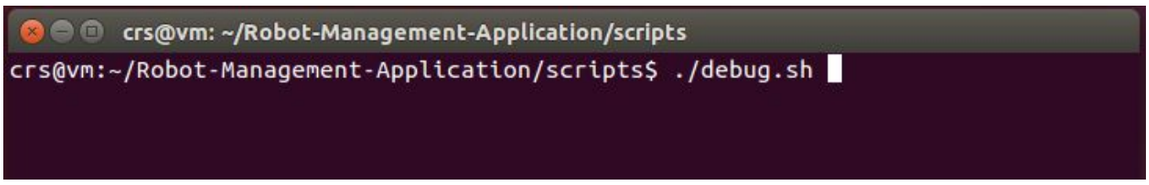
Debugging / Building for Production

Once the installation completes. You will be greeted with a message like this:



At this point simply insert the number corresponding to the task you would like to accomplish.
To build a version for debugging, type `1` into the terminal and press `ENTER`.

If you would like to test any changes and you have already completed the setup you can simply run debug.sh.
Note: The website is available at `http://localhost:4200`.



Similarly, run `./deploy.sh` when you are ready for production.