RAS Challenge Start-Up Guide

Advanced Manufacturing And Research Center (AMRC)

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1 Introduction

In this document you will find an description of the setup procedure for the ROS components and virtual machine hosting software as part of the RAS challenge 2019. If you are new to using virtual machines this guide will allow you to start working with ROS-industrial from a mac or windows PC.

2 Virtual Machines

ROS requires a linux based OS to operate which, if you aren't running natively, requires that you to host a virtual machine. In this challenge we will be working with Ubuntu 16.04.

2.1 Installing Virtual Box

The software we will be using to host Ubuntu is *VirtualBox*. Follow the steps below to install the software, it may differ slightly between host operating systems but generally:

1. Head to *VirtualBox @https://www.virtualbox.org/wiki/Downloads*.
2. Under "VirtualBox 6.x.x platform packages", download the latest installer for your operating system.
3. Complete the installation procedure. "Next - Next - Next - Yes - Install - (Install?) - Finish".
4. Once complete you should see the window seen in Figure 1.

3 Setting Up ROS From the RAS Ubuntu 16.04 Image

Ubuntu 16.04 is specific version of Ubuntu that is compatible with a wide range of ROS-Industrial components. We will begin creating a virtual machine from

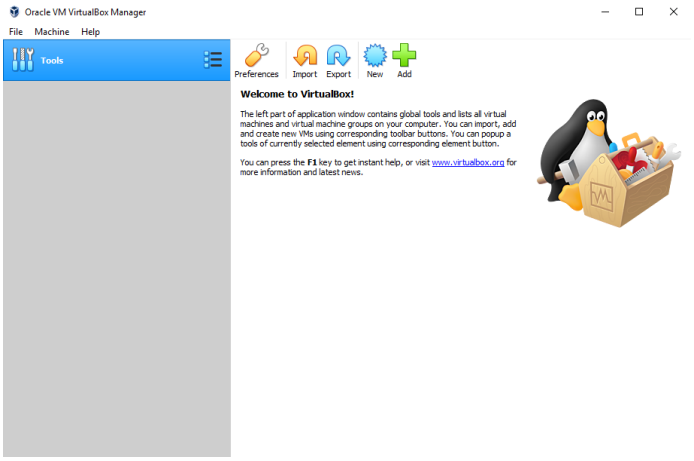

Figure 1: VirtualBox welcome screen.

our provided image, which has a number of packages already installed. We have provided images of pre-configured virtual machines at:
- *https://drive.google.com/a/sheffield.ac.uk/file/d/1wmwxf2nQohA7lffRzzeEAFUZG4kh0EIh/view?usp=sharing*
- *https://drive.google.com/a/sheffield.ac.uk/file/d/1FkDOCh6rjSaAjVqmdwi-kYqGF7fs4BOL/view?usp=sharing.*

1. The above links provide access to the *.vmdk* hard-disk file and the *.ova* exported VM.

2. From the VirtualBox welcome screen in Figure 1, select "file-import appliance".

3. In the new window, navigate to the location where you downloaded the ".rar" containing the ".ova" image file and select "Next".

4. In the new window, the settings of the imported VM as seen in Figure 2. Select import.

5. Once the device has completed importing, select the VM from the welcome page and hit "start".

It may be necessary to adjust some of the virtual machine settings to match some of the hardware settings of your computer. In the event you are unable to configure your imported machine, the virtual machine can be quickly created from standard Ubuntu image as seen in the next section.

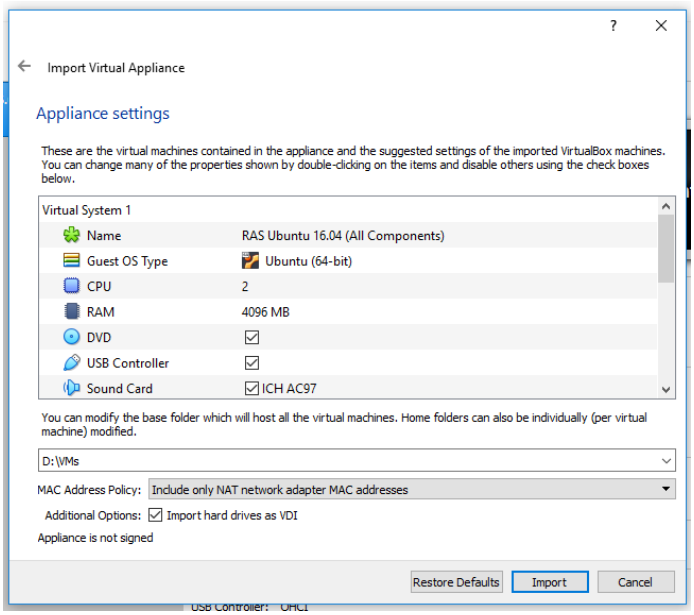

Figure 2: The settings associated with the newly imported Virtual Machine.

4 Setting up ROS from a blank/fresh Ubuntu 16.04 Image

If for some reason there is a problem with specific hardware compatibility. An alternative would be to install a fresh Ubuntu 16.04 image and follow:

1. Download a fresh Ubuntu ISO file from: *http://releases.ubuntu.com/16.04/ubuntu-16.04.6-desktop-amd64.iso*.
2. From VirtualBox we need to use this image to create a virtual machine from the "new" menu.
3. In the "Create new machine" window apply the settings seen in Figure 3.
4. Create a new hard-disk from the settings in Figure 4.
5. Insert the Ubuntu boot media for the first boot as seen in Figure 5.
6. With the current VM selected, select "Settings" and then "network-adapter 1" and change the adapter to "NAT Network" to create an initial network connection.
7. Move back to the main menu.
8. Press "start" and follow the Ubuntu install instructions until you reach the desktop.

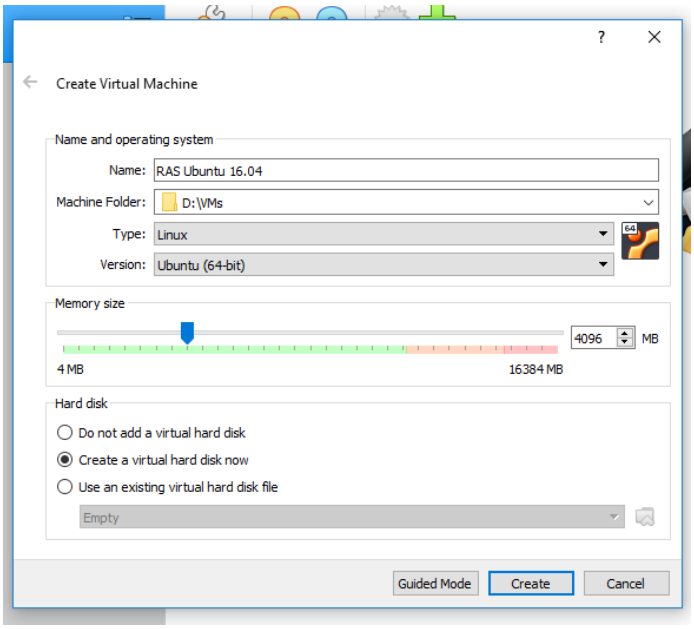

Figure 3: A new settings for a fresh VM definition.

4.1 Downloading the required ROS packages

Now the operating system is installed, we need to install some packages. A script is available at: *https://github.com/douthwja01/RAS-Challenge-2019/tree/master/ROS*. This script must be copied to the virtual machine and ran using the "sudo" command.

1. Navigate to the users home directory.
2. Copy the install script "ROSinstall.sh" to the users home directory.
3. Run "sudo chmod +x ROSinstall.sh" to make it executable.
4. Run "sudo bash ROSinstall.sh"

Once the script finishes running, all of the ROS-industrial components will have been installed and a "catkin workspace" will now exist in the home directory. Individual packages can now be imported and added to the " $/catkin_ws/src$" directory to begin defining your procedures.

If you find that something went wrong during the installation, please ensure you have defined a "NAT Network" network adapter and you have ran the script using the "sudo" command.

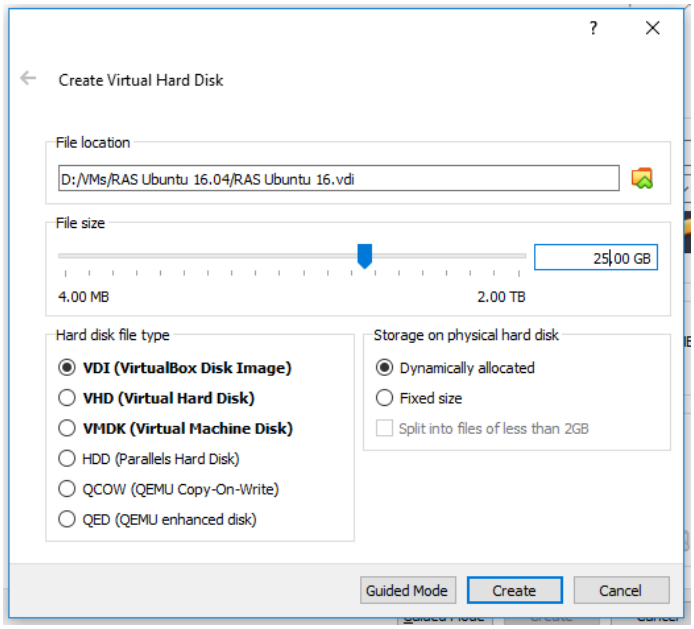

Figure 4: A new settings for initialising a blank hard-disk.

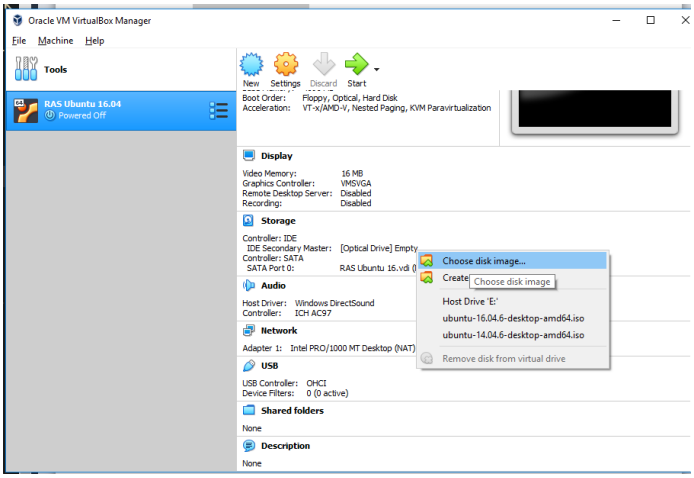

Figure 5: Add the Ubuntu iso for first boot of the VM.