Keysight Hacking Platform Getting Started

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1 Overview

The Keysight Hacking Platform is designed to have a development workflow similar to how firmware is developed in most Keysight products while yet at the same time being flexible enough that students can develop their own software / hardware for a Hackathon.

The KHP consists of:

- Raspberry Pi 3 with 2.8" capacitive touch screen shield
- Custom Yocto Linux image pre-loaded on the Raspberry Pi 3
- Fedora Linux Virtual Machine image with Qt Creator and the Yocto SDK pre-installed and configured with Qt Creator

The general workflow for creating applications using the KHP begins by creating the application in the Qt Creator program that is pre-installed in the virtual machine image. The application is then cross-compiled by Qt Creator using the Yocto SDK and is then sent over WiFi to the Raspberry Pi where the application is run and can be debugged remotely using Qt Creator.

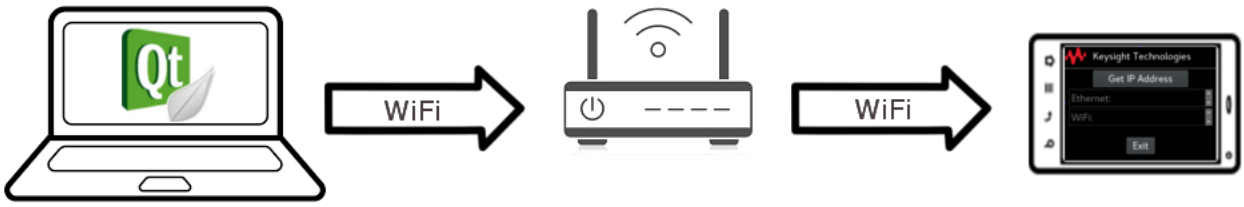

Figure 1: Qt App Deployment Workflow

2 Installing VirtualBox

To be able to use the pre-setup virtual machine image you must first install VirtualBox. Go to the subsection below for your OS and follow the directions.

2.1 Windows

Go to the VirtualBox download location VirtualBox Download and click the link for "Windows hosts." After downloading the installer run it and follow the prompts.

2.2 Mac

Go to the VirtualBox download location VirtualBox Download and click the link for "OS X hosts." After downloading the installer run it and follow the prompts.

2.3 Linux

VirtualBox is available in most Linux distributions package managers. Install VirtualBox through the package manager for your particular Linux distribution. If VirtualBox is not available in your Linux distribution's package manager, VirtualBox provides pre-build binaries for various Linux distributions. More information is available at this link: VirtualBox Linux Downloads.

3 Import the Virtual Machine

After installing VirtualBox, the next step is to import the virtual machine image into VirtualBox. After launching up VirtualBox, choose **Import Appliance...** from the file menu.

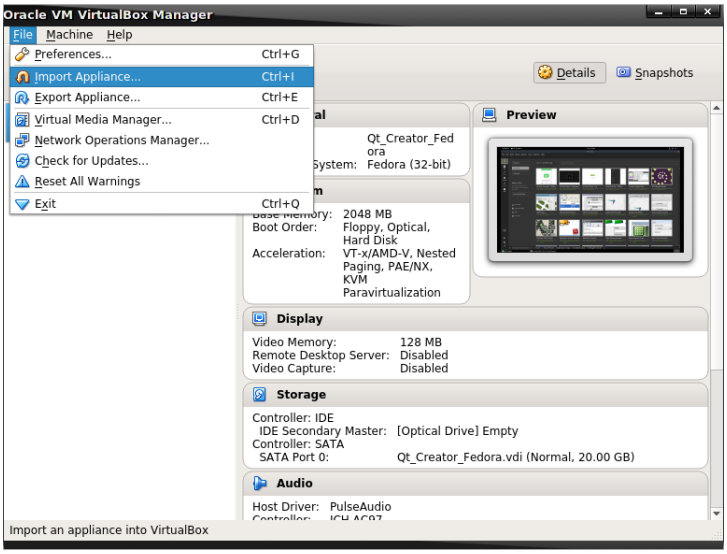

Figure 2: Import Virtual Machine

Navigate to the location of the virtual machine image (Qt_Creator_Fedora.ova) and then click next.

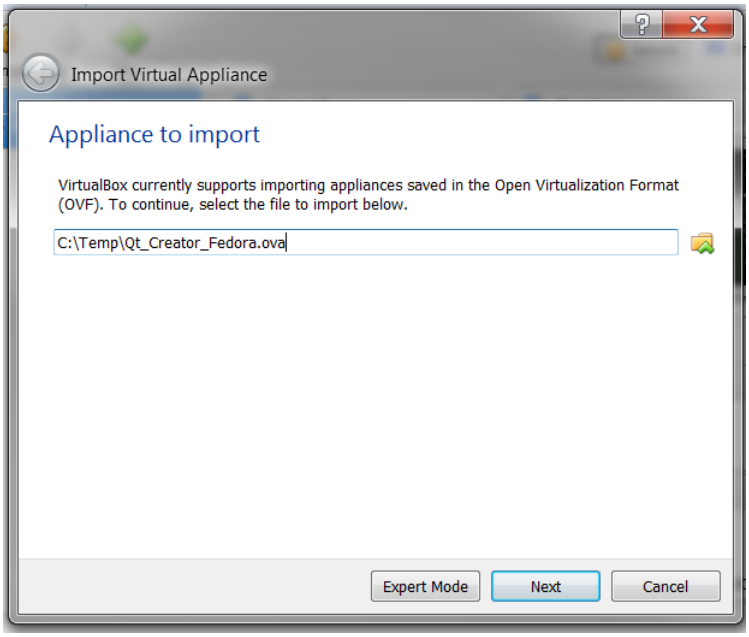

Figure 3: Locate the Virtual Machine

In the next screen that appears (Appliance settings) make sure to click the checkbox to reinitialize the MAC addresses of all the network cards.

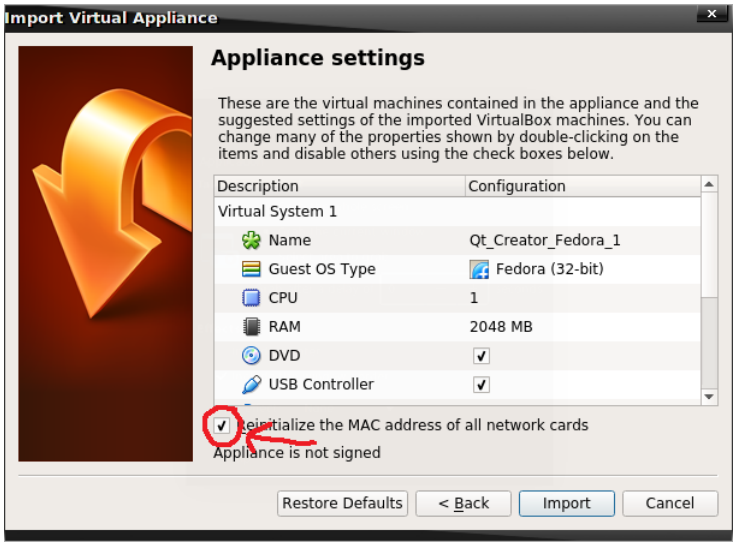

Figure 4: Import Virtual Machine Settings

After importing the virtual machine image, the main VirtualBox screen should appear similar to Figure 5. To start the virtual machine, highlight the **Qt_Creator_Fedora** virtual machine from the list and then click the start button.

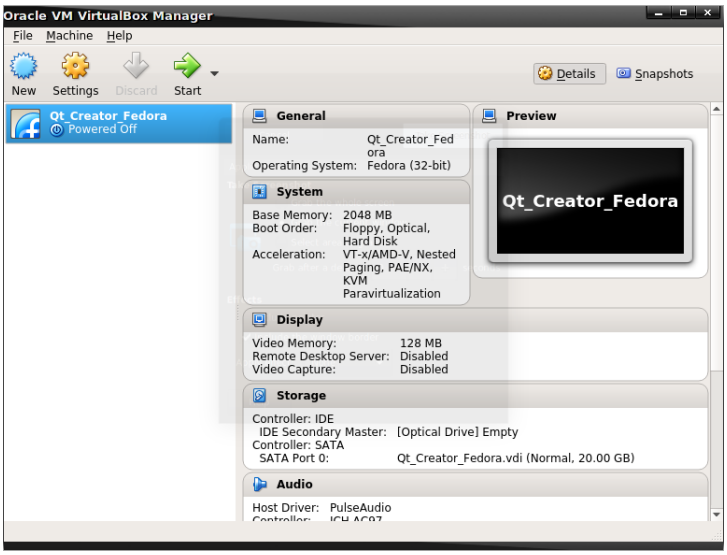

Figure 5: VirtualBox Main Window

4 Log into the Virtual Machine

After starting the virtual machine and waiting for it to boot, you will be presented with the login screen. Press **Enter** and enter "keysight" for the password.

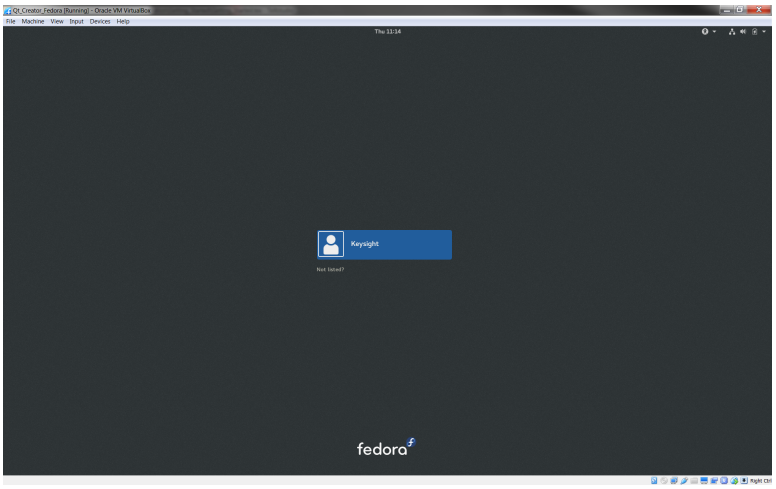

Figure 6: Virtual Machine Login (the password is: "keysight")

Next the desktop will appear. Double-click on the Qt Creator icon to start Qt Creator.

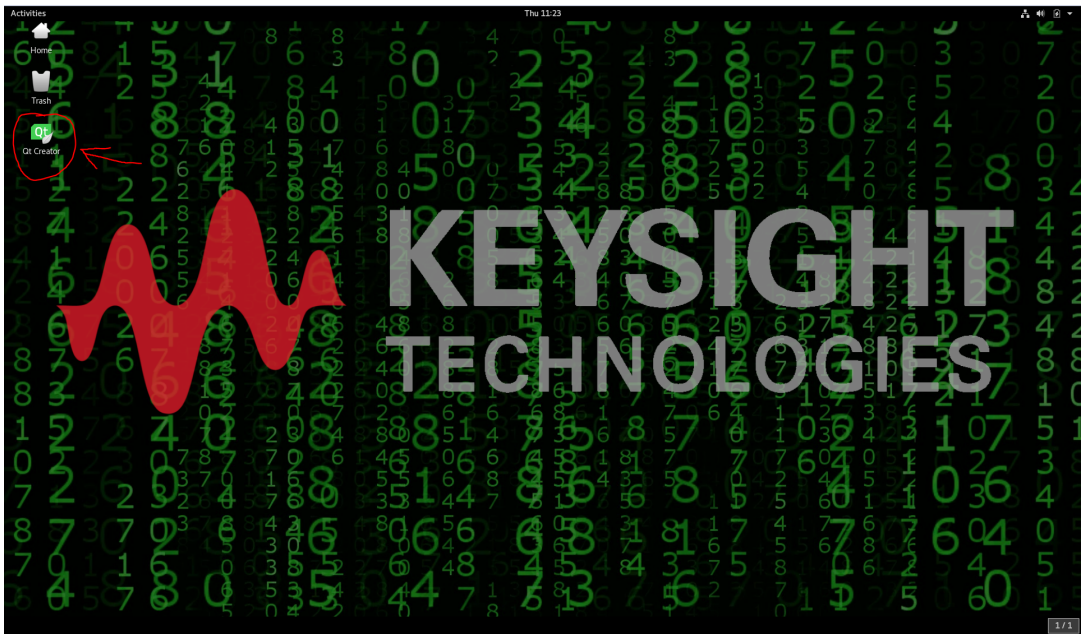

Figure 7: Virtual Machine Desktop

5 Connect the Raspberry Pi to Qt Creator

After starting Qt Creator, the first step is to connect the Raspberry Pi to Qt Creator. To do this first power on the Raspberry Pi and wait for the Keysight show IP program to start. Click the **Get IP Address** button to show the configured IP address for the ethernet and WiFi interfaces. Depending on how quickly the interface receives an IP address you may have to click the button a few times.

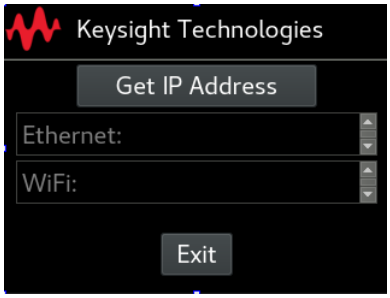

Figure 8: Keysight Show IP App

Write down the IP address of the interface you would like to use. In the Qt Creator program go to the **Tools** ⇒ **Options** dialog box. In the **Options** dialog box go to the **Devices** tab. In the **Host Name** field, enter the IP address of the Raspberry Pi.

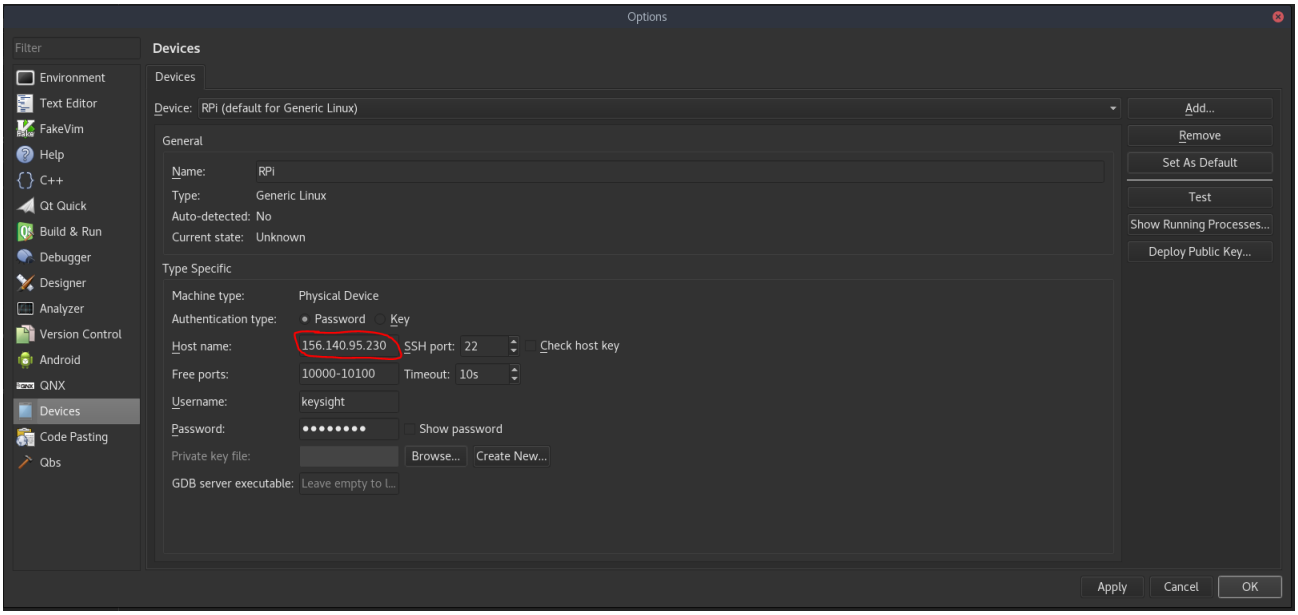

Figure 9: Qt Creator Device Options

After entering the IP address, click the **Test Button** on the right to make sure that Qt Creator can connect to the Raspberry Pi. You should see a dialog box similar to Figure 10.

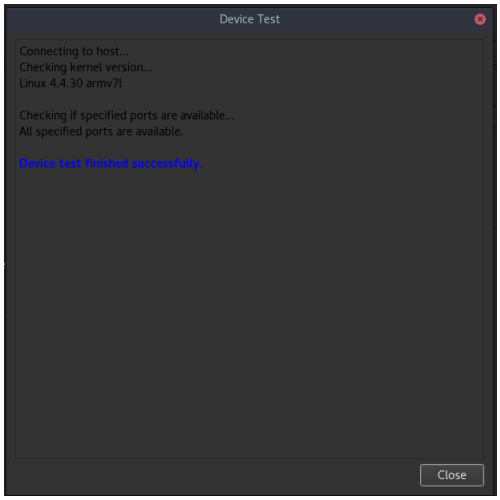

Figure 10: Device Test Passed Message

If the device passed the Raspberry Pi is connected to Qt Creator and ready for development. If it failed find a Keysight mentor and ask them to help you set up Qt Creator.