

Ex0: Reptilian Setup

Overview

You will setup and build Reptilian, a pairing of the Android and Ubuntu user space environments sharing the Linux kernel. You'll then take a screenshot showing the Reptilian terminal and submit it through Canvas.

Instructions

This exercise is broken into three steps: installing VirtualBox, Importing Reptilian, and building a fresh kernel.

Software Setup

First, we need to get the virtual machine and terminal software set up. A virtual machine allows us to modify the kernel without the risk of damaging our computer if something goes wrong.

Downloads

1. Oracle VirtualBox (instructions below): <https://www.virtualbox.org/wiki/Downloads>
2. Reptilian VM Image: <http://www.cise.ufl.edu/research/reptilian/downloads/Reptilian-latest.ova>

Installation (Windows)

- 1) Install VirtualBox: <https://download.virtualbox.org/virtualbox/7.0.4/VirtualBox-7.0.4-154605-Win.exe>
- 2) Right click on the Reptilian VM image file, open the file with VirtualBox Manager, then import it with the default settings.
- 3) Later, you will run the **ssh** commands below on the host machine using Windows PowerShell, WSL2 (<https://docs.microsoft.com/en-us/windows/wsl/install-win10>), or git bash.

Installation (MacOS)

- 1) Install VirtualBox: <https://download.virtualbox.org/virtualbox/7.0.4/VirtualBox-7.0.4-154605-OSX.dmg>
- 2) Double-click on the Reptilian VM image file, then click "Finish".
- 3) Later, you will run the **ssh** commands below using terminal.

VirtualBox (both MacOS and Windows)

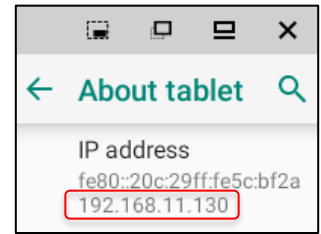
- 4) While the machine is turned off, in VirtualBox, go to Settings > Network, then in the drop-down menu choose "Bridged Adapter".
- 5) Start the VM. Then click Input > Mouse Integration to use the mouse within the Reptilian GUI.

This YouTube video explains the installation process (thanks to a previous student, Michel Gonzalez): <https://www.youtube.com/watch?v=wdONfNxK0Ok>

VM Command Line

To connect to the VM, you will need its IPv4 address. To get it, start the VM, open the start menu, and go to Settings → System → About Tablet → IP Address. With it, you can connect to the VM through SSH via a shell on the host computer (replace the numbers with your IP address):

```
finn@BMO:~$ ssh reptilian@192.168.11.130 Password is 'reptilian'
```



Building a Fresh Kernel

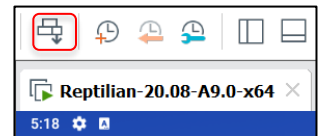
Once connected, change to the `/usr/rep/src` directory and clone the kernel repository:

```
reptilian@localhost$ cd /usr/rep/src
reptilian@localhost$ git clone https://github.com/uf-cise-os/reptilian-kernel.git
reptilian@localhost$ cd reptilian-kernel
```

Finally, build the kernel from source and install it into the operating system:

```
reptilian@localhost$ make
reptilian@localhost$ sudo make install; sudo make modules_install
```

Once the kernel is built / installed, take a snapshot, then reboot the VM. Make sure to properly shut down; otherwise, the kernel might not be properly written!



Submissions

You will submit the following **two** screenshots at the end of this exercise (**do not zip files**):

- One screenshot of a terminal window, connected via SSH, showing the kernel source directory (using `ls`)
- One screenshot after running the `sudo make modules_install` command

Example Screenshots

Here are some examples of what your screenshots should look like:

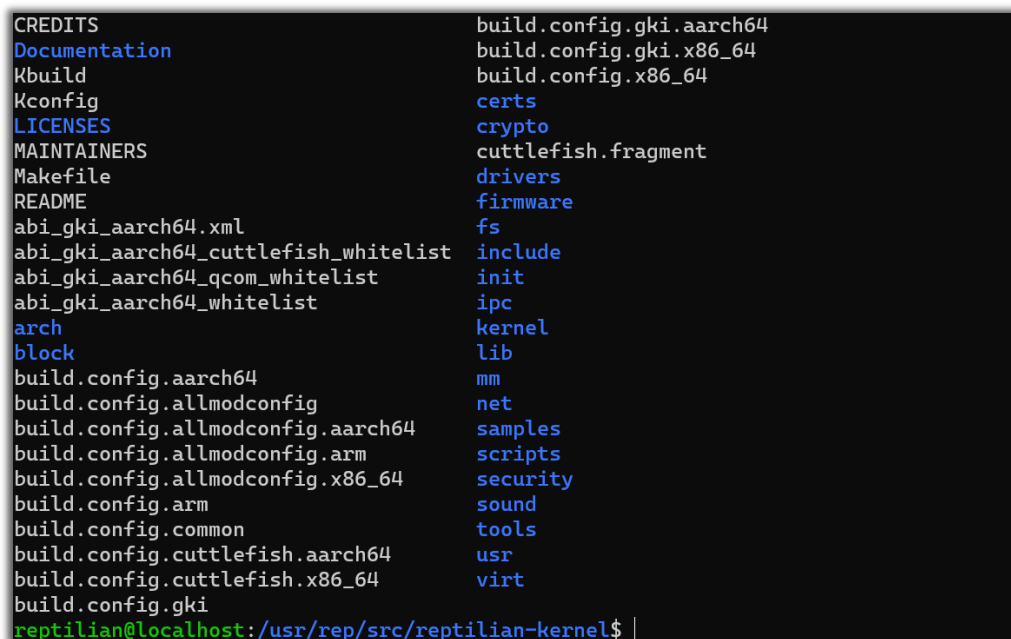


Figure 1. Screenshot showing the source in `/usr/rep/src/reptilian-kernel`

```
INSTALL net/sched/sch_qfq.ko
INSTALL net/sched/sch_red.ko
INSTALL net/sched/sch_sfb.ko
INSTALL net/sched/sch_sfq.ko
INSTALL net/sched/sch_tbf.ko
INSTALL net/sched/sch_teql.ko
INSTALL net/wireless/cfg80211.ko
INSTALL sound/ac97_bus.ko
INSTALL sound/core/oss/snd-mixer-oss.ko
INSTALL sound/core/oss/snd-pcm-oss.ko
INSTALL sound/core/seq/snd-seq-midi-event.ko
INSTALL sound/core/seq/snd-seq-midi.ko
INSTALL sound/core/seq/snd-seq.ko
INSTALL sound/core/snd-hrtimer.ko
INSTALL sound/core/snd-pcm.ko
INSTALL sound/core/snd-rawmidi.ko
INSTALL sound/core/snd-seq-device.ko
INSTALL sound/core/snd-timer.ko
INSTALL sound/core/snd.ko
INSTALL sound/pci/ac97/snd-ac97-codec.ko
INSTALL sound/pci/snd-ens1371.ko
INSTALL sound/soundcore.ko
DEPMOD 4.19.110-reptilian-x86_64+
make[1]: Leaving directory '/usr/rep/out/kernel'
reptilian@localhost:/usr/rep/src/reptilian-kernel$
```

Figure 2. Screenshot showing terminal after running `sudo make modules_install`