

Console Mode

- Launching the virtual machine: Run `./launch_ubuntu_ARM.sh -display none -vmpath [path to store VM files]`
Default path: `openpilotricardo/tools/emu`
To make it simpler run the following:
`./launch_ubuntu_ARM.sh`
- This will open the console with login options. Enter username and password to log-in
- Shutdown the VM using:
`Sudo shutdown -h now`

Remote Desktop Mode

- Launching the virtual machine using VNC: Run `./launch_ubuntu_ARM.sh -display vga`
You will see a terminal indicating:
`Display mode: vga`
`VNC server running on 127.0.0.1:5900`
- Launch the Remote Desktop Viewer. Click the "Connect" option on top left corner and then fill the following fields:
 - Protocol: VNC
 - Host: 127.0.0.1:5900 and press "Connect"

SSH Mode

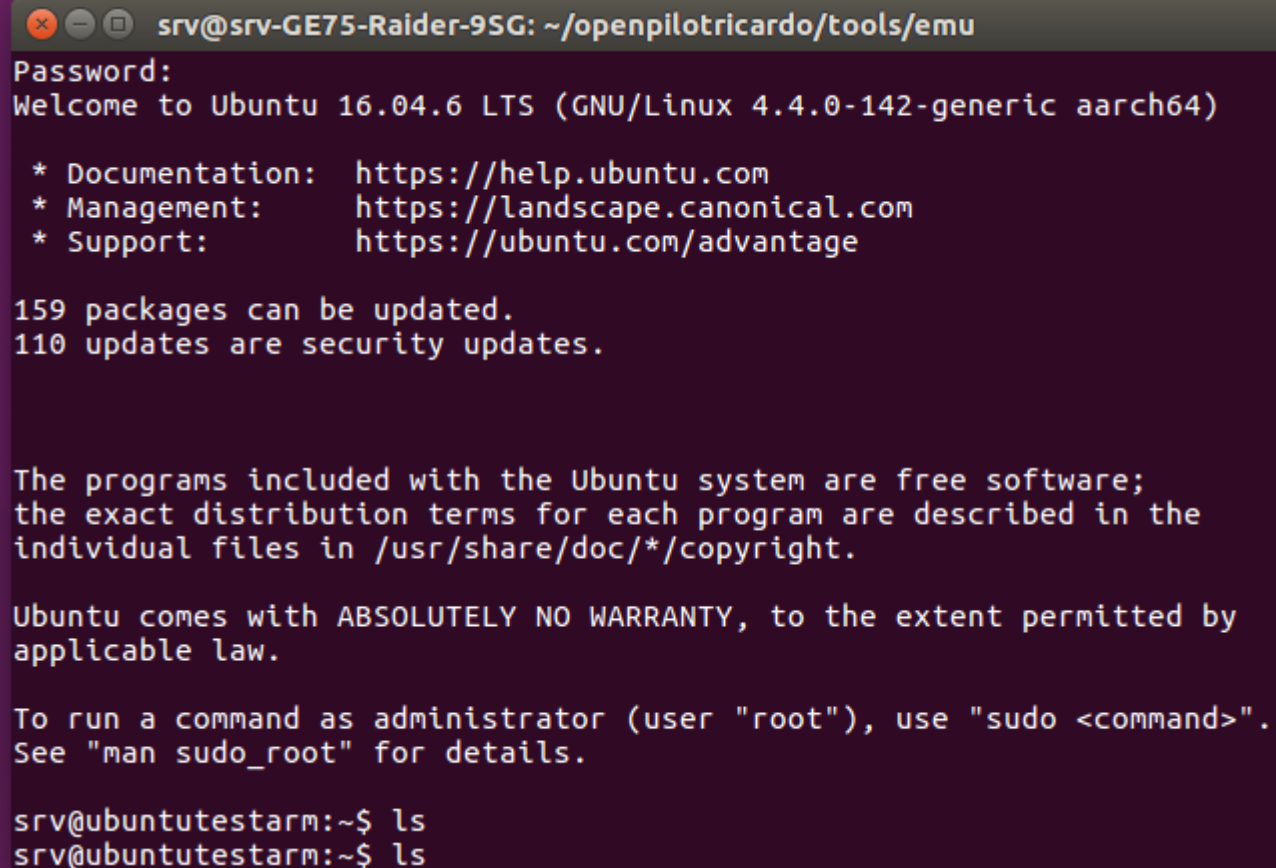
- Start the VM in console mode
- Open a terminal in host machine and run:
`Ssh localhost -p 2222`
Enter login details
- After successful login, you should see the QEMU shell, with pointer at:
`username@ubuntuARM:~$`
- Copy a file from host to guest (virtual machine)
`scp -P 2222 libcereal_shared.so username@localhost:/home/username/`

CONSOLE MODE

Step1:

```
cd openpilotricardo/tools/emu  
./launch_ubuntu_ARM.sh
```

Step2: Enter login details: ubuntu username and password. You will see the following on successful log-in

A terminal window with a dark background and light-colored text. The window title bar shows the user 'srv' on a machine named 'srv-GE75-Raider-9SG' in the directory '~/openpilotricardo/tools/emu'. The terminal output shows a password prompt, a welcome message for Ubuntu 16.04.6 LTS, system information (GNU/Linux 4.4.0-142-generic aarch64), links for documentation, management, and support, update notifications (159 packages can be updated, 110 are security updates), a disclaimer about free software and warranty, and instructions on using 'sudo'. At the bottom, the prompt changes to 'srv@ubuntutestarm:~\$' and the command 'ls' is entered twice.

```
srv@srv-GE75-Raider-9SG: ~/openpilotricardo/tools/emu  
Password:  
Welcome to Ubuntu 16.04.6 LTS (GNU/Linux 4.4.0-142-generic aarch64)  
  
* Documentation:  https://help.ubuntu.com  
* Management:    https://landscape.canonical.com  
* Support:        https://ubuntu.com/advantage  
  
159 packages can be updated.  
110 updates are security updates.  
  
The programs included with the Ubuntu system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/copyright.  
  
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by  
applicable law.  
  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
  
srv@ubuntutestarm:~$ ls  
srv@ubuntutestarm:~$ ls
```

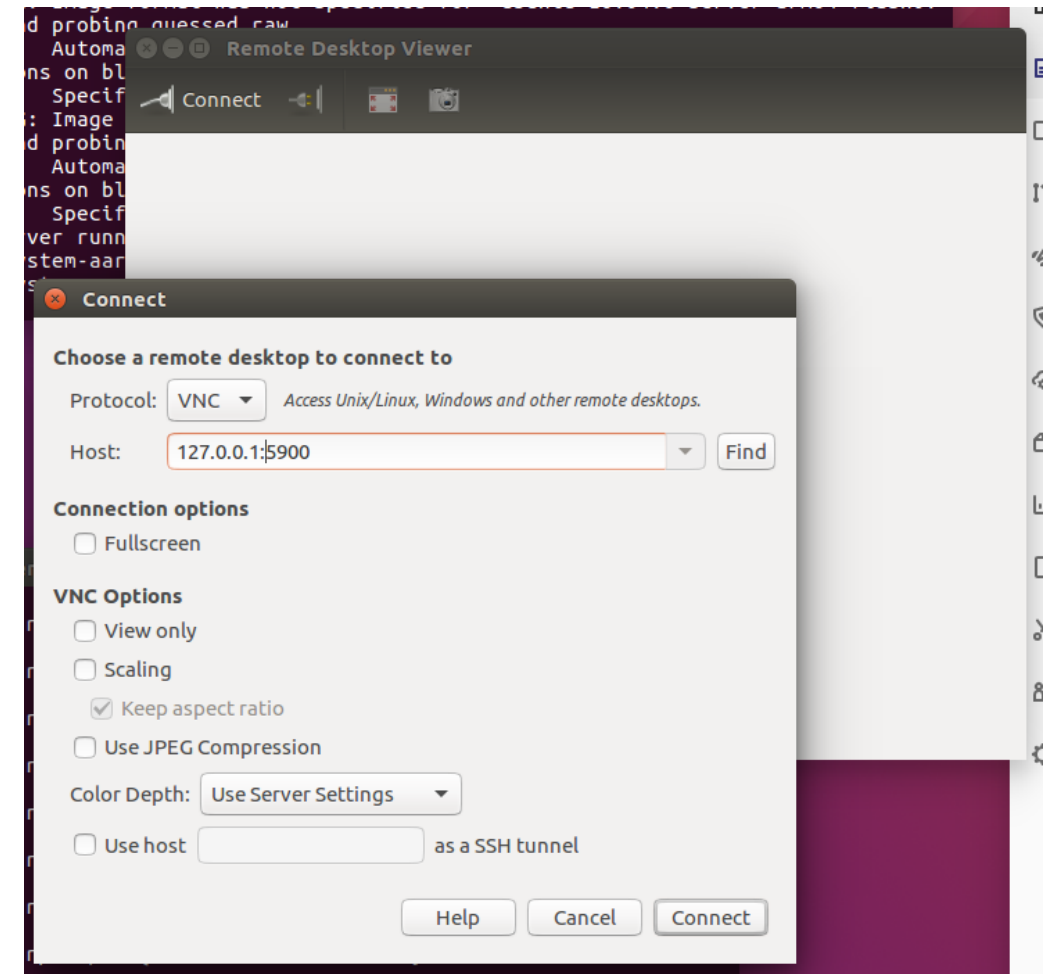
REMOTE DESKTOP MODE

Step1:

```
cd openpilotricardo/tools/emu  
./launch_ubuntu_ARM.sh -display vga
```

```
srv@srv-GE75-Raider-9SG: ~/openpilotricardo/tools/emu  
+ iso=ubuntu-16.04.6-server-arm64.iso  
+ flash0=ubuntu-16.04.6-server-arm64-flash0.img  
+ flash1=ubuntu-16.04.6-server-arm64-flash1.img  
+ qemu-system-aarch64_5.0 -cpu cortex-a57 -device virtio-blk-device,drive=hd0 -drive if=none,file=ubuntu-16.04.6-server-arm64.img.snapshot.qcow2,id=hd0 -m 4G -machine virt -pflash ubuntu-16.04.6-server-arm64-flash0.img -pflash ubuntu-16.04.6-server-arm64-flash1.img -smp 4 -device virtio-net-device,netdev=hostnet0,mac=3c:a0:67:3e:fe:72 -netdev user,id=hostnet0,hostfwd=tcp::2222-:22 -device usb-ehci -device usb-kbd -device usb-mouse -usb -device usb-tablet -device cirrus-vga -vga std  
WARNING: Image format was not specified for 'ubuntu-16.04.6-server-arm64-flash0.img' and probing guessed raw.  
Automatically detecting the format is dangerous for raw images, write operations on block 0 will be restricted.  
Specify the 'raw' format explicitly to remove the restrictions.  
WARNING: Image format was not specified for 'ubuntu-16.04.6-server-arm64-flash1.img' and probing guessed raw.  
Automatically detecting the format is dangerous for raw images, write operations on block 0 will be restricted.  
Specify the 'raw' format explicitly to remove the restrictions.  
VNC server running on 127.0.0.1:5900  
qemu-system-aarch64_5.0: warning: guest updated active QH  
qemu-system-aarch64_5.0: warning: guest updated active QH  
█
```

Step2: Launch Remote Desktop Viewer



After successful log-in, you will see the graphical interface of the VM

SSH Mode

Step1: Run VM in Console Mode/Remote Desktop Mode (follow steps in above slides)

```
seba@incluit: ~/OS Images
[ OK ] Started LSB: Speech Dispatcher.
[ OK ] Started LSB: Set the CPU Frequency Scaling governor to "ondemand".
[ OK ] Started LSB: automatic crash report generation.
[ OK ] Started LSB: daemon to balance interrupts for SMP systems.
[ OK ] Started Light Display Manager.
[ OK ] Started LSB: Start xrdp and sesman daemons.
[ OK ] Started Virtualization daemon.
Starting Suspend Active Libvirt Guests...
[ OK ] Started Suspend Active Libvirt Guests.
[ OK ] Reached target Multi-User System.
[ OK ] Reached target Graphical Interface.
Starting Update UTMP about System Runlevel Changes...
[ OK ] Started Update UTMP about System Runlevel Changes.

Ubuntu 16.04.6 LTS ubuntuARM ttyAMA0

Ubuntu 16.04.6 LTS ubuntuARM ttyAMA0

ubuntuARM login: seba
Password:
Last login: Wed Aug  5 00:15:54 -03 2020 from 10.0.2.2 on pts/8
Welcome to Ubuntu 16.04.6 LTS (GNU/Linux 4.4.0-186-generic aarch64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

 * Are you ready for Kubernetes 1.19? It's nearly here! Try RC3 with
   sudo snap install microk8s --channel=1.19/candidate --classic
   https://www.microk8s.io/ has docs and details.

4 packages can be updated.
0 updates are security updates.

New release '18.04.4 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

seba@ubuntuARM:~$
```

Step2: In host machine new terminal
Ssh localhost -p 2222

```
seba@ubuntuARM: ~
seba@incluit:~$ ssh localhost -p 2222
seba@localhost's password:
Welcome to Ubuntu 16.04.6 LTS (GNU/Linux 4.4.0-186-generic aarch64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

 * Are you ready for Kubernetes 1.19? It's nearly here! Try RC3 with
   sudo snap install microk8s --channel=1.19/candidate --classic
   https://www.microk8s.io/ has docs and details.

4 packages can be updated.
0 updates are security updates.

New release '18.04.4 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Wed Aug  5 11:26:26 2020 from 10.0.2.2
seba@ubuntuARM:~$
```