

# Connecting to turtlebots - UBUNTU 22 with ARO singularity

Everything needs to be done on the local wifi

```
name: e210bot
pass: j6UsAC8a
```

## Remote connection to the robot

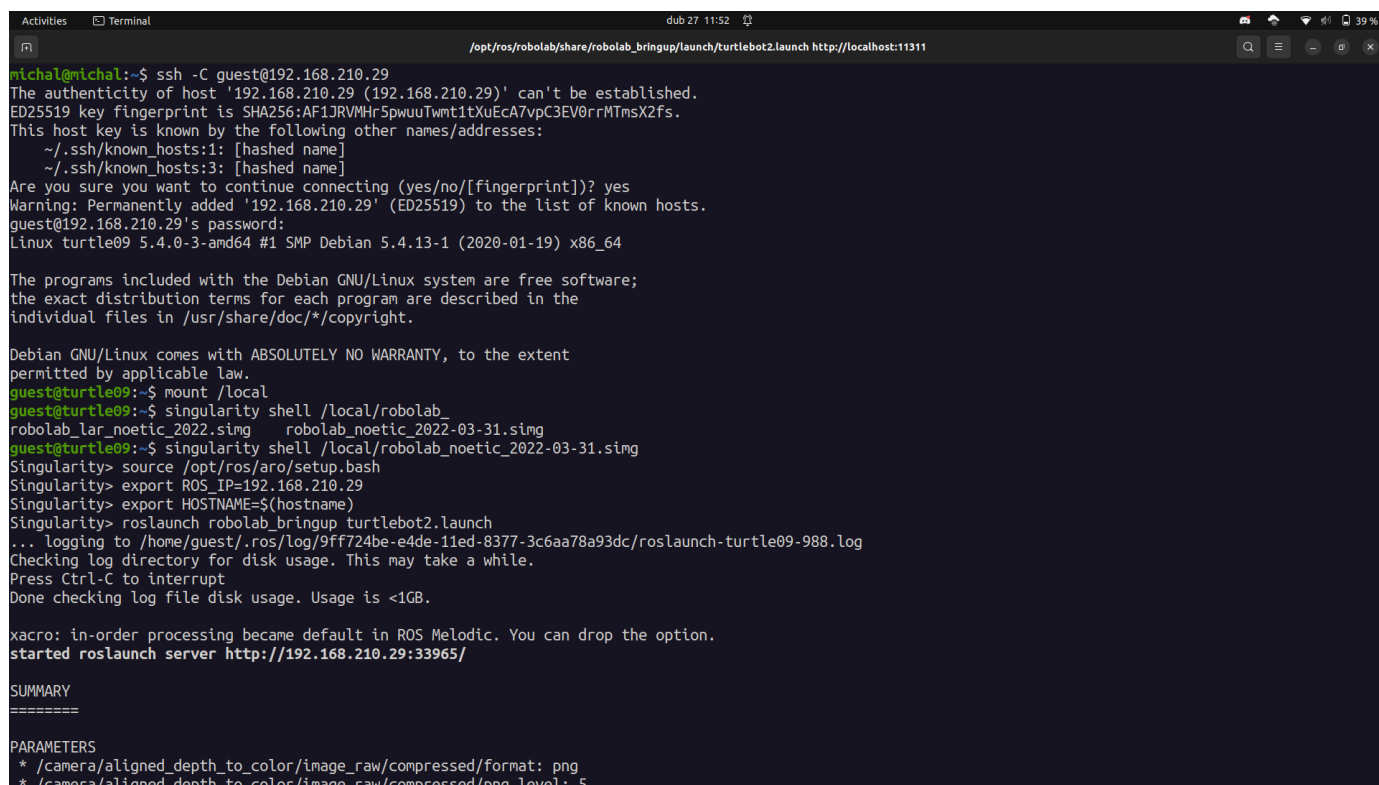
```
ssh -C guest@192.168.210.29 # pass = xxx
mount /local
singularity shell /local/robofab_noetic_2022-03-31.simg
source /opt/ros/aro/setup.bash
export ROS_IP=192.168.210.29
export HOSTNAME=$(hostname)
roslaunch robofab_bringup turtlebot2.launch # Or launch tmux, see note under
```

### UBUNTU 22 NOTE

Running the robot controller (keyboard control) locally seems not to work under this setup, but running it on the robot works:

```
tmux # Create two terminals inside tmux
# Window 0
source /opt/ros/aro/setup.bash
roslaunch robofab_bringup/turtlebot2.launch
# Window 1
source /opt/ros/aro/setup.bash
roslaunch teleop_twist_keyboard teleop_twist_keyboard.py cmd_vel:=/cmd_vel_mux/safety_controller
_repeat_rate:=10.0 _key_timeout:=1.0 _speed:=0.25 _turn:=0.5
```

## Output



```
Activities Terminal dub 27 11:52
/opt/ros/robofab/share/robofab_bringup/launch/turtlebot2.launch http://localhost:11311
michal@michal:~$ ssh -C guest@192.168.210.29
The authenticity of host '192.168.210.29 (192.168.210.29)' can't be established.
ED25519 key fingerprint is SHA256:AF1JRVmHr5pwuTwm1tXuEca7vpC3EV0rrMTmsX2fs.
This host key is known by the following other names/addresses:
 ~/.ssh/known_hosts:1: [hashed name]
 ~/.ssh/known_hosts:3: [hashed name]
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.210.29' (ED25519) to the list of known hosts.
guest@192.168.210.29's password:
Linux turtle09 5.4.0-3-amd64 #1 SMP Debian 5.4.13-1 (2020-01-19) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
guest@turtle09:~$ mount /local
guest@turtle09:~$ singularity shell /local/robofab_
robofab_lar_noetic_2022.simg robofab_noetic_2022-03-31.simg
guest@turtle09:~$ singularity shell /local/robofab_noetic_2022-03-31.simg
Singularity> source /opt/ros/aro/setup.bash
Singularity> export ROS_IP=192.168.210.29
Singularity> export HOSTNAME=$(hostname)
Singularity> roslaunch robofab_bringup turtlebot2.launch
... logging to /home/guest/.ros/log/9ff724be-e4de-11ed-8377-3c6aa78a93dc/roslaunch-turtle09-988.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

xacro: in-order processing became default in ROS Melodic. You can drop the option.
started roslaunch server http://192.168.210.29:33965/

SUMMARY
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PARAMETERS
* /camera/aligned_depth_to_color/image_raw/compressed/format: png
* /camera/aligned_depth_to_color/image_raw/compressed/png_level: 5
```

## Local session (RVIZ)

Start singularity on laptop, set `ROS_MASTER_URI` (since we want to connect to a remote ROS session) and run RVIZ to see outputs

```
source /opt/ros/aro/setup.bash
```

### UBUNTU 22 NOTE

`source /opt/ros/aro/setup.bash` overrides `LD_LIBRARY_PATH` variable and RVIZ won't start due to library conflicts. If `~/.bashrc` is modified accordingly to [ARO Forum](#), this issue can be resolved by invoking bash shell inside the singularity container again

```
bash
export ROS_MASTER_URI=http://192.168.210.29:11311
rviz
```

## Output

First call of `rviz` fails due to the `ROS_MASTER_URI` not being set.

```
Singularity> source /opt/ros/aro/setup.bash
Singularity> rviz
QStandardPaths: XDG_RUNTIME_DIR points to non-existing path '/run/user/1000', please create it with 0700 permissions.

(rviz:35423): dbind-WARNING **: 11:34:41.958: Couldn't connect to accessibility bus: Failed to connect to socket /run/user/1000/at-spi/bus_1: No such file or directory
QStandardPaths: XDG_RUNTIME_DIR points to non-existing path '/run/user/1000', please create it with 0700 permissions.
Qt: Session management error: None of the authentication protocols specified are supported
[ INFO] [1682588082.015693640]: rviz version 1.14.19
[ INFO] [1682588082.015721941]: compiled against Qt version 5.12.8
[ INFO] [1682588082.015727824]: compiled against OGRE version 1.9.0 (Ghadamon)
Singularity> export ROS_MASTER_URI=http://192.168.210.29:11311
Singularity> rviz
QStandardPaths: XDG_RUNTIME_DIR points to non-existing path '/run/user/1000', please create it with 0700 permissions.

(rviz:35515): dbind-WARNING **: 11:35:41.667: Couldn't connect to accessibility bus: Failed to connect to socket /run/user/1000/at-spi/bus_1: No such file or directory
QStandardPaths: XDG_RUNTIME_DIR points to non-existing path '/run/user/1000', please create it with 0700 permissions.
Qt: Session management error: None of the authentication protocols specified are supported
[ INFO] [1682588141.683781516]: rviz version 1.14.19
[ INFO] [1682588141.683801289]: compiled against Qt version 5.12.8
[ INFO] [1682588141.683805961]: compiled against OGRE version 1.9.0 (Ghadamon)
[ INFO] [1682588141.764906041]: Forcing OpenGL version 0.
[ INFO] [1682588141.963278644]: Stereo is NOT SUPPORTED
[ INFO] [1682588141.963325089]: OpenGL device: Mesa Intel(R) Xe Graphics (TGL GT2)
[ INFO] [1682588141.963339454]: OpenGL version: 4.6 (GLSL 4.6) limited to GLSL 1.4 on Mesa system.
```

To see data from camera, we need to

- Add topic by **Add -> Camera -> ... (select compressed)**
- Set frame **Global Options -> Fixed Frame -> camera\_color\_frame**

