

# Raspberry Pi Set Up for Arena

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## Raspberry Pi Desktop Setup

1. Turn on main computer (password = Amira)
2. Open the app 'MQTT EXPLORER'
3. Select 'Local Broker' and hit 'connect'
4. Take a raspberry pi, determine its alphabetical letter and which IP address is associated with it. Note the last two numbers of the IP address.
5. Plug the long ethernet cable into the network switch at that number. (e.g. raspberry Pi 'S' has 29 as the last two numbers, so you'd plug the ethernet cable into port 29).
  - a. Tip: network switch has even ports on top row and odd ports on bottom row.
6. Plug the ethernet cable, power cable, HDMI cable, keyboard (USB) and mouse (USB) into the raspberry pi



7. When the raspberry pi has started up, you're welcomed to the raspberry pi desktop setup screen.
8. Click 'next'
9. Select:
  - a. Country = Sweden
  - b. Language = Swedish
  - c. Timezone = Stockholm
  - d. ✓ Use English Language
  - e. >Next

#### 10. Create User:


- a. Username: bombus
- b. Password bombus
- c. >next

#### 11. Select wifi: >SKIP

#### 12. Default browser: Chromium > next

#### 13. Update software >Skip >Restart

#### Connect to eduroam:

1. Top right corner double arrow button
2. Click eduroam
3. Type your username and password
4.  No CA certificate is required
5. >Connect
6. **Unplug** the ethernet cable now!

## Update and Upgrade

1. Open a terminal (top left corner 4<sup>th</sup> icon)
2. Type **sudo apt update**.
3. If you get error messages, try typing sudo apt update again or ensure you're definitely connected to the internet

Note if you get the below error, wait a second and try again. It just means there is something else using the package manager atm.

```
reading package lists... done E: could not get lock
/var/lib/apt/lists/lock. it is held by process 1542 (packagekitd)
N: be aware that removing the lock file is not a solution and may break
your system
E: unable to lock directory /var/lib/apt/lists
```

4. It's done when you see something like:

```
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done

327 packages can be upgraded. Run apt list -upgradable to see them.

bombus@raspberrypi:~$
```

5. Do a full upgrade:

```
sudo apt full-upgrade
```

Now wait for it to successfully upgrade, but periodically check if it has asked any questions.

if you encounter questions like environment (Y/I/N/O/D/Z) [DEFAULT=N] ?

or

```
do you want to continue [Y/n]?
```

write **Y** and hit enter.

6. It's done when you see `bombus@raspberrypi:~ S`
7. And reboot  
`sudo reboot`
8. Disconnect from eduroam and connect the ethernet cable!

## Static IP on Raspberry pi:

1. Open terminal on raspberry pi (top left corner 4<sup>th</sup> icon)
2. Write the following commands in the terminal. After each line, hit enter. Spelling, capitalisation and spaces all matter!
  - a. (note the `.30` because I did it with raspberry pi labeled "T". but raspberry pi "A" would be `.11`, "B" would be `.12`, "C" would be `.13`, "F" would be `.16` etc, see sheet for IP addresses)
 

```
sudo nmcli c mod "Wired connection 1" ipv4.addresses 192.168.22.30/24 ipv4.method manual
sudo nmcli con mod "Wired connection 1" ipv4.gateway 192.168.22.1
sudo nmcli con mod "Wired connection 1" ipv4.dns "8.8.8.8,8.8.4.4"
sudo nmcli c down "Wired connection 1" && sudo nmcli c up "Wired connection 1"
```
  - b. It should say
 

```
Connection 'Wired connection 1' successfully deactivated (D-Bus active
path: /org/freedesktop/NetworkManager/ActiveConnection/6)
Connection successfully activated (D-Bus active path:
/org/freedesktop/NetworkManager/ActiveConnection/7)
```
  - c. Ping the Network switch to confirm it is now connected. Type this in the terminal:
 

```
ping 192.168.22.1
```

 You'll see something like:
 

```
PING 192.168.22.1 (192.168.22.1) 56(84) bytes of data.
64 bytes from 192.168.22.1: icmp_seq=1 ttl=64 time=0.300 ms
```
  - d. then hit the keys ctrl+c to stop pinging
  - e. Try pinging the synology:
 

```
ping 192.168.22.2
```

 then ctrl+c to stop

## Mounting BEEDRIVE on raspberry pi

*So that it always automatically mounts on boot*

1. Open a terminal on raspberry pi
2. Create the mount point directory where the DRIVE will be accessed from  
`sudo mkdir -p /mnt/BEEDRIVE`
3. Create a file that stores the credentials securely  
`sudo mkdir -p /etc/samba`  
`sudo nano /etc/samba/credentials`

4. This opens an editor where you add these two lines:

```
username=RASPBERRYPI  
password=mc2"aEx%
```

5. Double check for typos or errors in the file
6. Save (ctrl+O), 'Enter', and exit (ctrl+X)
7. Secure the credentials file

```
sudo chmod 600 /etc/samba/credentials
```

8. Create a backup of the current /etc/fstab file (before modifying it)

```
sudo cp /etc/fstab /etc/fstab.bak
```

9. Add mount to to the etc/fstab file

```
sudo nano /etc/fstab
```

Add the following line on the 4<sup>th</sup> line of this document.

Note: you can not use the mouse to navigate. Use the arrow keys!

The following line should be just one a single line but it didn't fit in this document:

```
//192.168.22.2/BEEDRIVE /mnt/BEEDRIVE cifs  
credentials=/etc/samba/credentials,uid=1000,gid=1000 0 0
```

10. Save (ctrl+O), 'Enter', and exit (ctrl+X)
11. Reboot:

```
sudo reboot
```

12. Verify that it's working:

```
ls /mnt/BEEDRIVE
```

now you should see a list of folders like flightvr, RAWDATA and '#recycle'

13. The mount was successful, and the shared folder will automatically mount at reboot.

## Installing packages on Pi

1. Open the following file:  
BEEDRIVE/PiCommunication/RecordingScripts/Pi\_SetUp/Copy\_paste\_commands.txt
2. Now **disconnect the ethernet cable** and **connect to eduroam**
3. **Copy** the text in the file under the '**installing packages on Pi**' heading'
4. **Paste** the text into the terminal (right click; paste. Not ctrl+v)
5. Press 'enter'
6. Wait for all installs to complete.
7. It's done when you see **bombus@raspberrypi:~ S**
8. **Disconnect from eduroam and plug the ethernet cable back into the pi**

## Consistent Date & Time

*Note, the following red commands can also be copy-pasted from the file found at `mnt/BEEDRIVE/PiCommunication/RecordingScripts/Pi_SetUp/Copy_paste_commands.txt`.*

*Note: To 'paste' into a terminal, always use right-click>paste. Never use ctrl+v.*

1. Open the terminal
2. Ensure timesyncd is enabled and active

```
sudo systemctl enable systemd-timesyncd
sudo systemctl start systemd-timesyncd
```
3. Open the file

```
sudo nano /etc/systemd/timesyncd.conf
```
4. Find this line

```
#NTP=
```
5. Replace it with

```
NTP=192.168.22.2
```

 Save and exit file:
6. Ctrl+ O, 'enter', Ctrl+ X
7. Enable time sync at boot

```
sudo timedatectl set-ntp true
```
8. Add a scheduled manual sync:

```
sudo crontab -e
```
9. Type **1** and hit enter
10. In the document that opens, add this line at the bottom: (runs at every hour every day)

```
0 * * * * /usr/sbin/ntpdate -u 192.168.22.2
```
11. Ctrl+o, enter, ctrl+X
12. Verify that ntpdate works: (it should show the current date and time)

```
sudo /usr/sbin/ntpdate -u 192.168.22.2
```
13. Restart time sync service

```
sudo systemctl restart systemd-timesyncd
```
14. Verify it worked

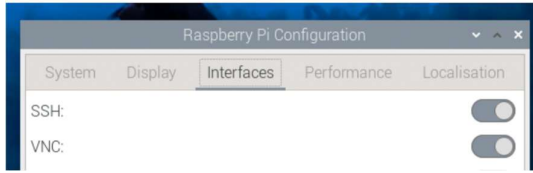
```
timedatectl status
```

It should say NTP service: active, and  
the Local time should match the current time.

## Remote access over network

Enabling SSH and VNC server on raspberry pi:

1. Click the top left raspberry icon>preferences -> raspberry pi configuration ->interfaces -> Turn on SSH and VNC



- 2.
3. Click OK

## Adding a watcher daemon that starts at boot on the raspberry pi

*Note, the following red commands can also be copy-pasted from the file found at `mnt/BEEDRIVE/PiCommunication/RecordingScripts/Pi_SetUp/Copy_paste_commands.txt`*

1. Open the terminal on the raspberry pi
2. Type `sudo cp /mnt/BEEDRIVE/PiCommunication/RecordingScripts/Pi_SetUp/systemd_for_watcher_service.txt /etc/systemd/system/watcher.service` as a single line and hit enter to create a systemd service file.
3. Make start\_watcher.sh executable:  
`chmod +x /mnt/BEEDRIVE/PiCommunication/RecordingScripts/start_watcher.sh`
4. After that, type `sudo systemctl daemon-reload` and hit enter.
5. Type `sudo systemctl enable watcher.service` and hit enter.
6. Reboot the computer `sudo reboot` to check that it works. When the pi has rebooted you should see an terminal window called 'python3' pop up. This is how you know it was successful.
7. On the main computer, see if the IP address appears under 'pi/status' in the MQTT manager app.
8. Send a 'start' signal from the main computer (publish raw 'start' in the pi/control channel). Check that the status of your newly set-up pi changed to 'recording'. If this is the case, the setup was completed successfully.
9. Click the internet button (top right arrows icon)
10. Advanced options>edit connections> eduroam> the little settings button at the bottom of that window>general
11. **untick** 'connect automatically with priority'
12. >Wi-Fi security > remove your username and password (and replace by space bar)
13. >save