Raspberry Pi Set Up for Arena

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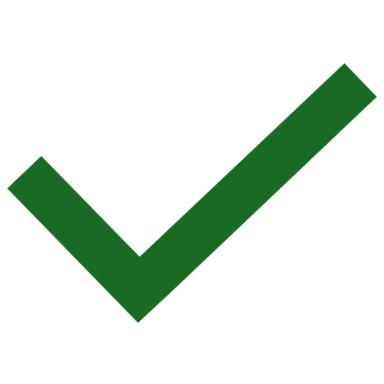
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## Raspberry Pi Desktop Setup

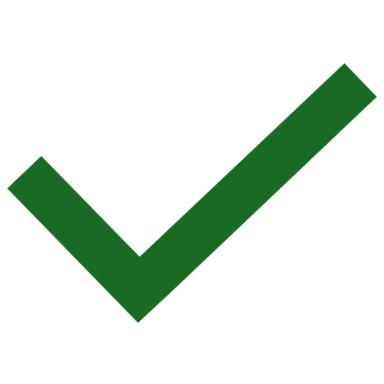
1. Turn on main computer (password = Amira)
2. Open the app ‘ MQTT EXPLORER’
3. Select ‘Local Broker’ and hit ‘connect’
4. Take a raspberry pi, determine its alphabetical letter and which IP address is associated with it. Note the last two numbers of the IP address.
5. Plug the long ethernet cable into 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).
   1. Tip: network switch has even ports on top rop and odd ports on bottom row.
6. Plug the ethernet cable, power cable, HDMI cable, keyboard (USB) and mouse (USB) into the raspberry pi

A close up of a device

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1. When the raspberry pi has started up, you’re welcomed top the raspberry pi desktop setup screen.
2. Click ‘next’
3. Select:
   1. Country = Seden
   2. Language = Swedish
   3. Timezone = Stockholm
   4.  Use English Language
   5. >Next
4. Create User:
   1. Username: bombus
   2. Pasword bombus
   3. >next
5. Select wifi: >SKIP
6. Default browser: Chromium > next
7. 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 4th 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

1. 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:~ S.**

1. 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.

1. It’s done when you see **bombus@raspberrypi:~ S**
2. And reboot

sudo reboot

1. Disconnect from eduroam and connect the ethernet cable!

## Static IP on Raspberry pi:

1. Open terminal on raspberry pi (top left corner 4th icon)
2. Write the following commands in the terminal. After each line, hit enter. Spelling, capitalisation and spaces all matter!
   1. (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"

* 1. 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)

* 1. 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

* 1. then hit the keys ctrl+c to stop pinging
  2. 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

1. Create a file that stores the credentials securely

sudo mkdir -p /etc/samba

sudo nano /etc/samba/credentials

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

username=RASPBERRYPI

password=mc2”aEx%

1. Double check for typos or errors in the file
2. Save (ctrl+O), ‘Enter’ ,and exit (ctrl+X)
3. Secure the credentials file

sudo chmod 600 /etc/samba/credentials

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

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

1. Add mount to to the etc/fstab file

sudo nano /etc/fstab

Add the following line on the 4th 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

1. Save (ctrl+O), ‘Enter’ ,and exit (ctrl+X)
2. Reboot:

sudo reboot

1. Verify that it’s working:

ls /mnt/BEEDRIVE

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

1. 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 ehternet 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

1. Open the file

sudo nano /etc/systemd/timesyncd.conf

1. Find this line

#NTP=

1. Replace it with

NTP=192.168.22.2 Save and exit file:

1. Ctrl+ O, ‘enter’, Ctrl+ X
2. Enable time sync at boot

sudo timedatectl set-ntp true

1. Add a scheduled manual sync:

sudo crontab -e

1. Type 1 and hit enter
2. 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

1. Ctrl+o, enter, ctrl+X
2. Verify that ntpdate works: (it should show the current date and time)

sudo /usr/sbin/ntpdate -u 192.168.22.2

1. Restart time sync service

sudo systemctl restart systemd-timesyncd

1. 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. A screenshot of a computer

   AI-generated content may be incorrect.
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/system**d**\_for\_watcher\_service.txt /etc/system**d**/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

1. After that, type sudo systemctl daemo’n-reload and hit enter.
2. Type sudo systemctl enable watcher.service and hit enter.
3. Reboot the computer sudo reboot to check that it works. When the pi has rebooted you should see anterminal window called ‘python3’ pop up. This is how you know it was successful.
4. On the main computer, see if the IP address appears under ‘pi/status’ in the MQTT manager app.
5. 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.
6. Click the internet button (top right arrows icon)
7. Advanced options>edit connections> eduroam> the little settings button at the bottom of that window>general
8. **untick** ‘connect automatically with priority’
9. >Wi-Fi security > remove your username and password (and replace by space bar)
10. >save