

Node-RED on UniPi Axon

Step-by-step guide

The following manual will guide you through the process of powering up your UniPi Axon controller. Before the start, please check the device for any damage that occurred during shipment, or any other visible defect.

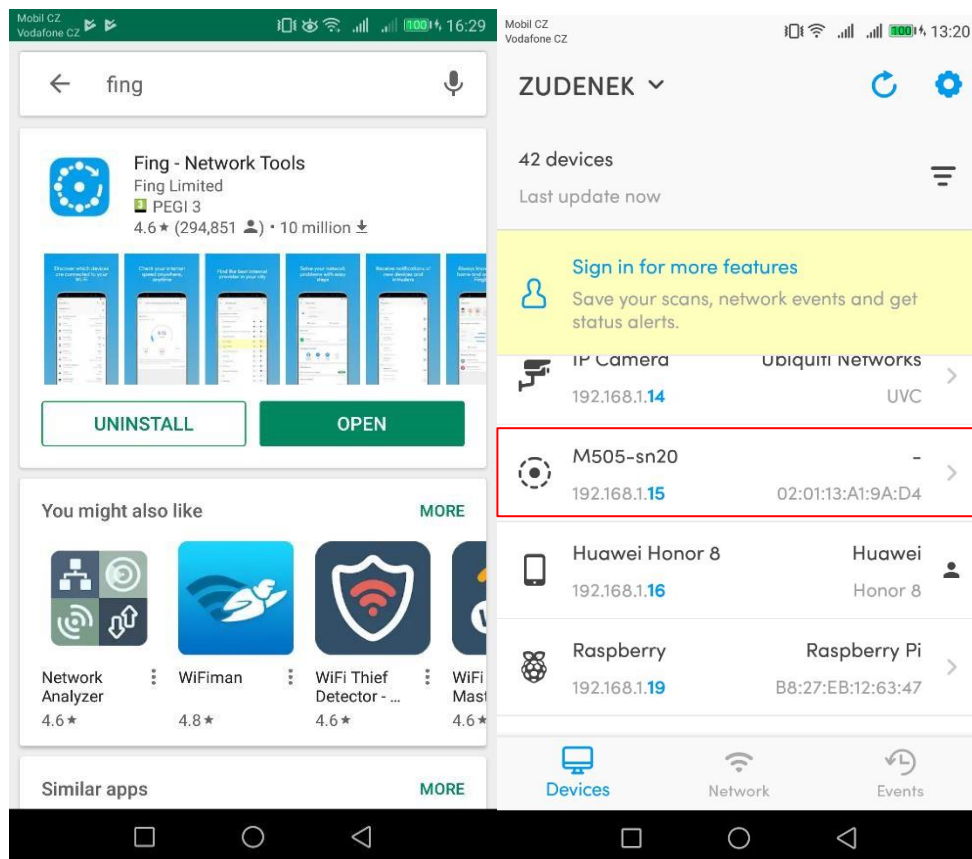
Powering up

Power the device up and connect it to your computer according to the instruction leaflet included in the package.

Detecting the UniPi Axon IP address

Now, it is necessary to detect the controller's IP address. You can find it by multiple methods

- ✦ Probably the easiest and fastest way is to use a smartphone with the **Fing** app installed (it is possible to use other similar applications). The app is available on Google Play for Android phones, or App Store for iOS



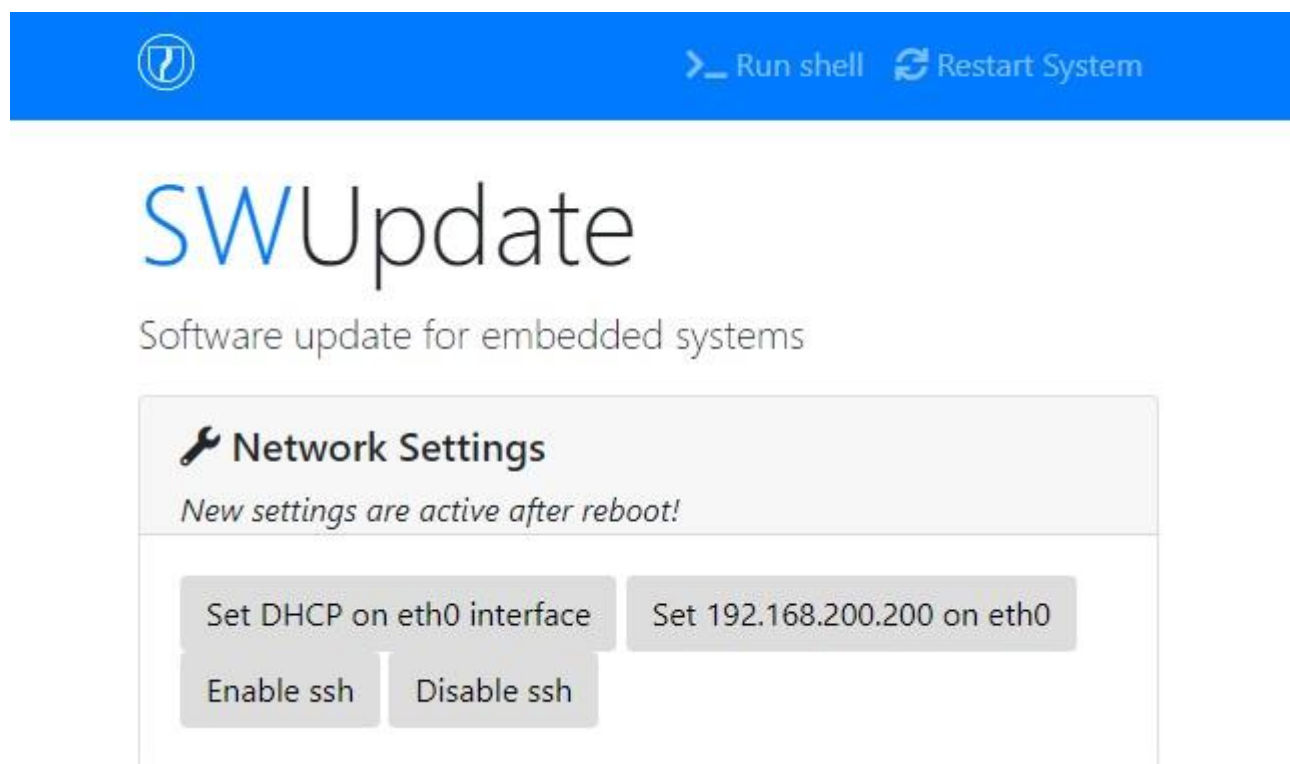
- ✦ using Windows IP address lookup tools or any other IP address lookup tool

Enabling the SSH & disabling Mervis

The next step requires the controller to be set into service mode by following steps

- Hold down the small recessed button on top of the Axon device case using a thin-enough tool. The button can be found next to the USB port labels on the upper side of the device.
- Power up the controller while holding the button down.
- Wait until the device finishes booting into the UniPi service mode. This is indicated by the two rows of LEDs flashing in an alternating fashion.
- Use a device with a web browser to connect to the UniPi Axon via Ethernet LAN or Wi-Fi. The process is slightly different between the two options:
- Ethernet LAN: The interface will be accessible on IP address 192.168.200.200. The device will also attempt to acquire an additional dynamic IP address via DHCP, if DHCP is available.
- Wi-Fi: The UniPi Axon service mode will create a Wi-Fi access point with SSID “UNIPICONFIG” and password “unipi.technology”. The interface will be accessible on IP addresses 192.168.200.200 and 192.168.201.1

If all steps were done correctly, the following interface will be accessible on Axon's IP address



Servisní mód zařízení AXON ve webovém prohlížeči

In this interface, follow these steps

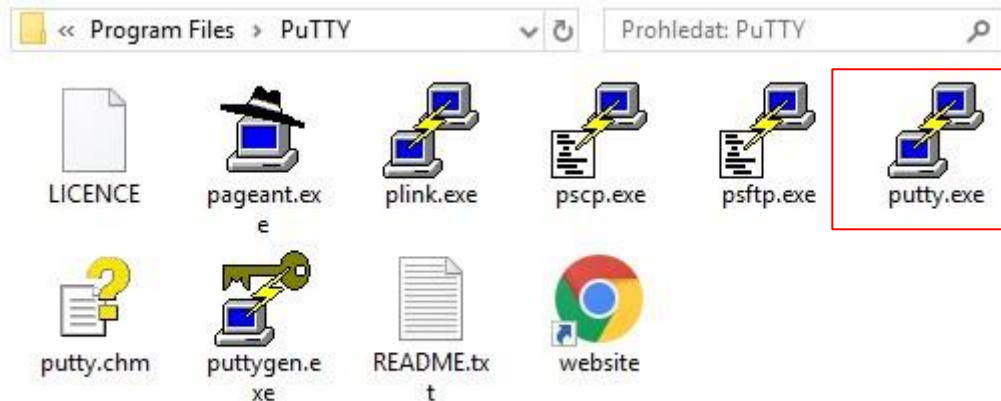
1. click on **Enable SSH**
2. click on **Disable Mervis runtime**
3. click on **Restart system**

The controller will then reboot. After that, you can proceed to the next step

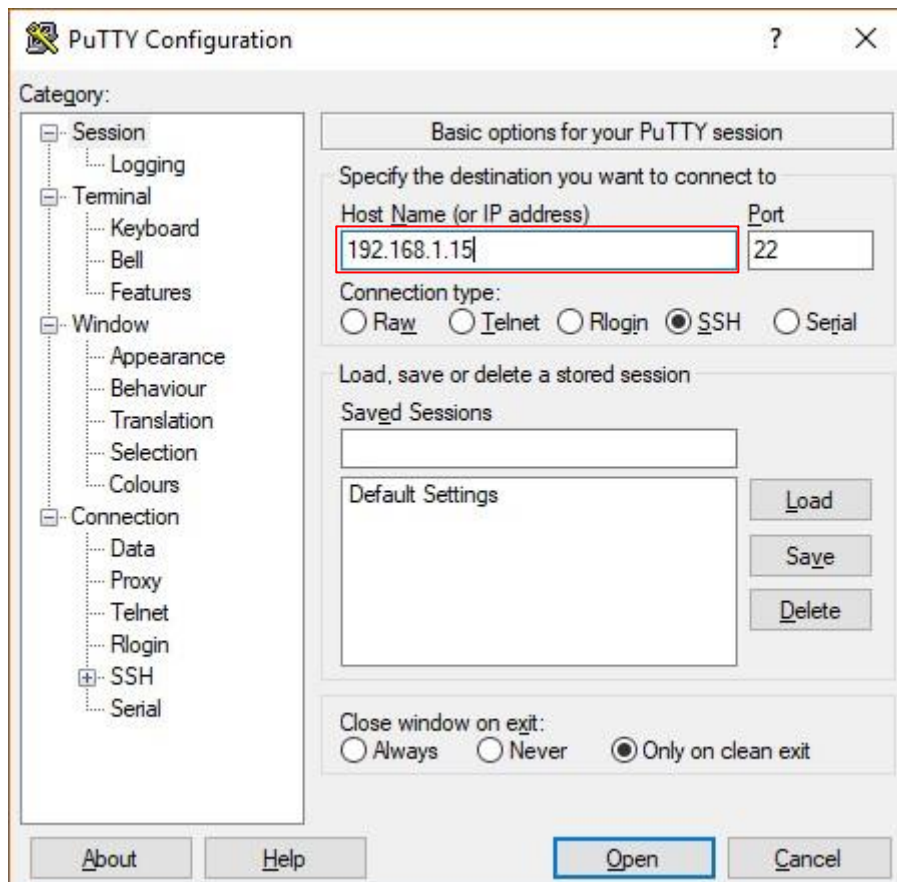
Communication through the SSH using PuTTY

Once the controller's IP address is found, you can communicate with it through an SSH connection. For this purpose the PuTTY program is needed – while other SSH programs can be used, PuTTY is the most suitable for Windows). The program can be downloaded [here](#).

After the download, install the application following the installer instructions. With the program installed, click on the *putty.exe* file to launch it (the default path is *C:\Program Files\PuTTY.*)

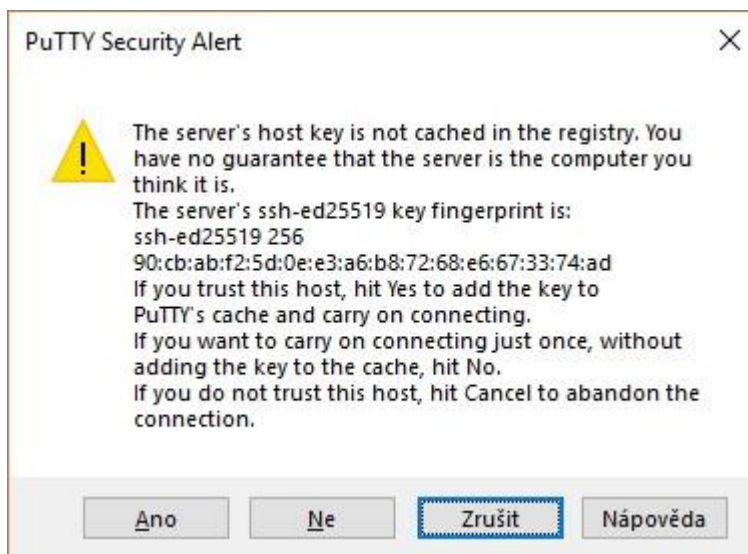


When launched, the following window is displayed. Enter the controller's IP address to the *Host Name* tab, then click on *Open*.



Spuštění programu putty.exe a vyplnění IP adresy

A PuTTY Security Alert window will appear. Select „Yes“ option and continue.



U následujícího okna zvolíme možnost „Ano“

After clicking Yes, an SSH terminal command prompt will open.

Note: The login has a set timeout, after which the login will not be possible! If the time runs out, restart PuTTY and repeat the login.

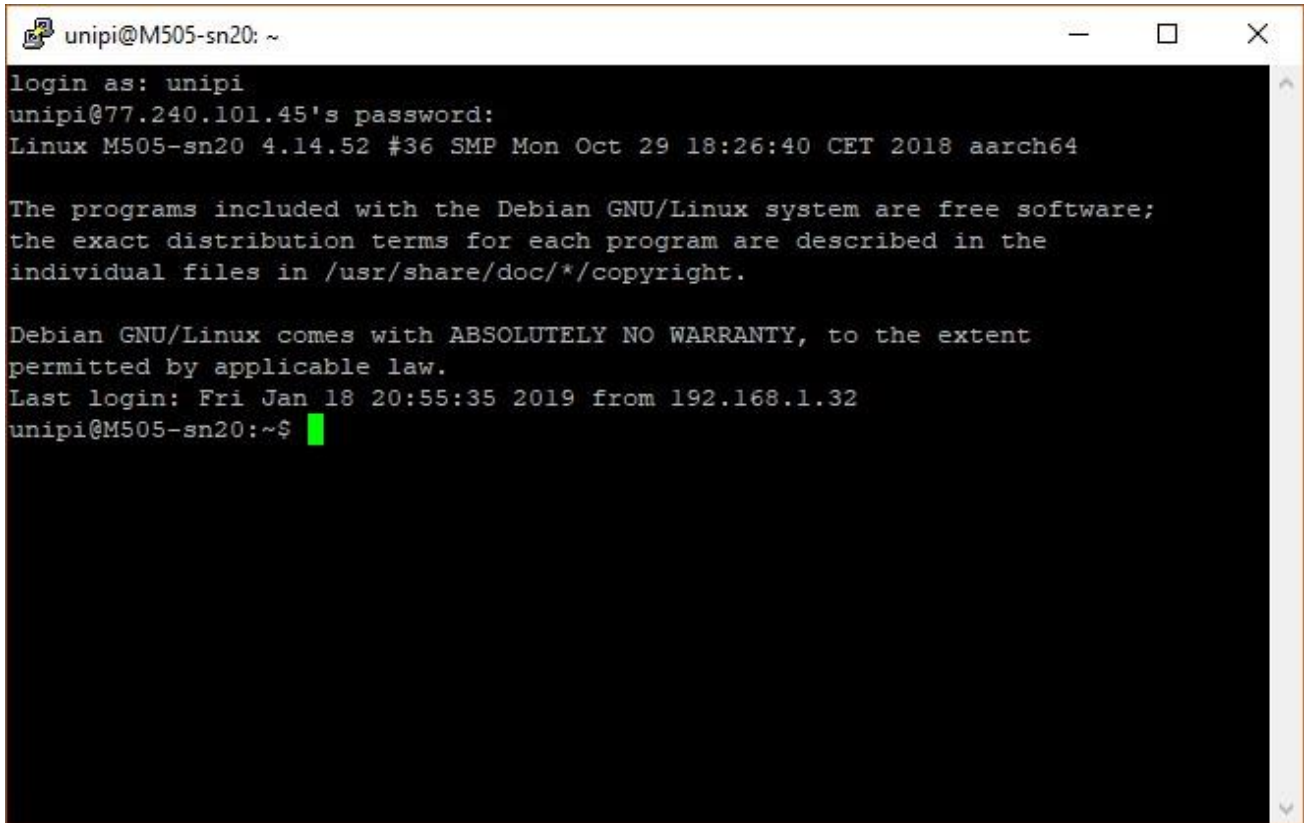
Enter the following login:

Login: **unipi**

Password: **unipi.technology**

Note: The password text is written as invisible – if the cursor is not moving during the password insertion, it is not an error!

Upon successful login, this screen will appear:



```
unipi@M505-sn20: ~
login as: unipi
unipi@77.240.101.45's password:
Linux M505-sn20 4.14.52 #36 SMP Mon Oct 29 18:26:40 CET 2018 aarch64

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.
Last login: Fri Jan 18 20:55:35 2019 from 192.168.1.32
unipi@M505-sn20:~$
```

Successfully logged into the SSH

With the SSH running, the controller is ready for the upload of remaining parts of the Node-RED setup.

EVOK installation

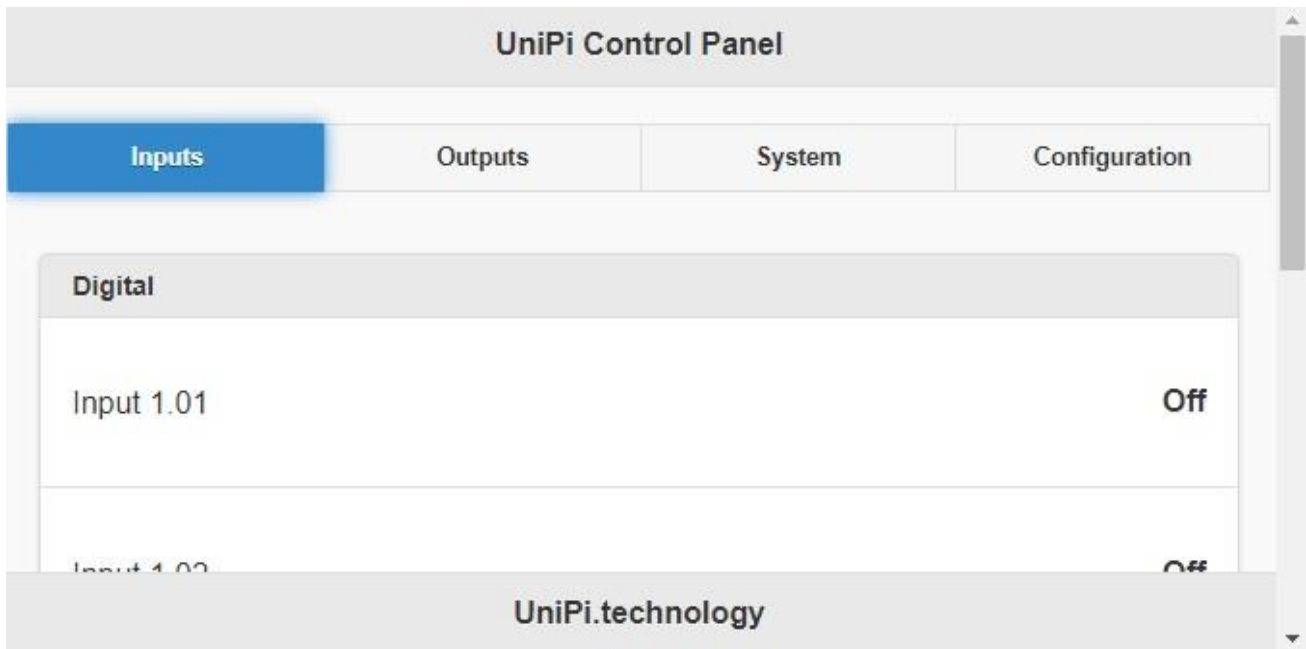
The EVOK install is described in detail on [this link](#). The link contains a brief description of EVOK and the install guide.

For the purpose of this guide, only several commands will be needed to be inserted into the SSH terminal. Bear in mind that it is recommended to paste commands by lines. It is also possible to run several blocks at once, but we strongly recommend to perform the procedure one step at a time.

It is worth noting that if the UniPian image was used, the EVOK is already contained within it and it is not needed to install it again. It is, however, necessary to check if the latest version is used. All you need to do is to use following commands:

- ✦ `sudo su`
- ✦ `apt-get install evok`
- ✦ `apt-get update`
- ✦ `reboot`

If everything was done correctly, you can now open a web browser and insert the IP address of your controller. The EVOK user interface will open.



Ukázka EVOKu ve webovém prohlížeči

Installation of Node-RED

Now, it is time to install the Node-RED itself. To use Node-RED, **the latest EVOK release is required (2.0.7g or higher)**.

The installation is again performed through the SSH terminal. Insert the first command

✦ `sudo apt-get install build-essential`

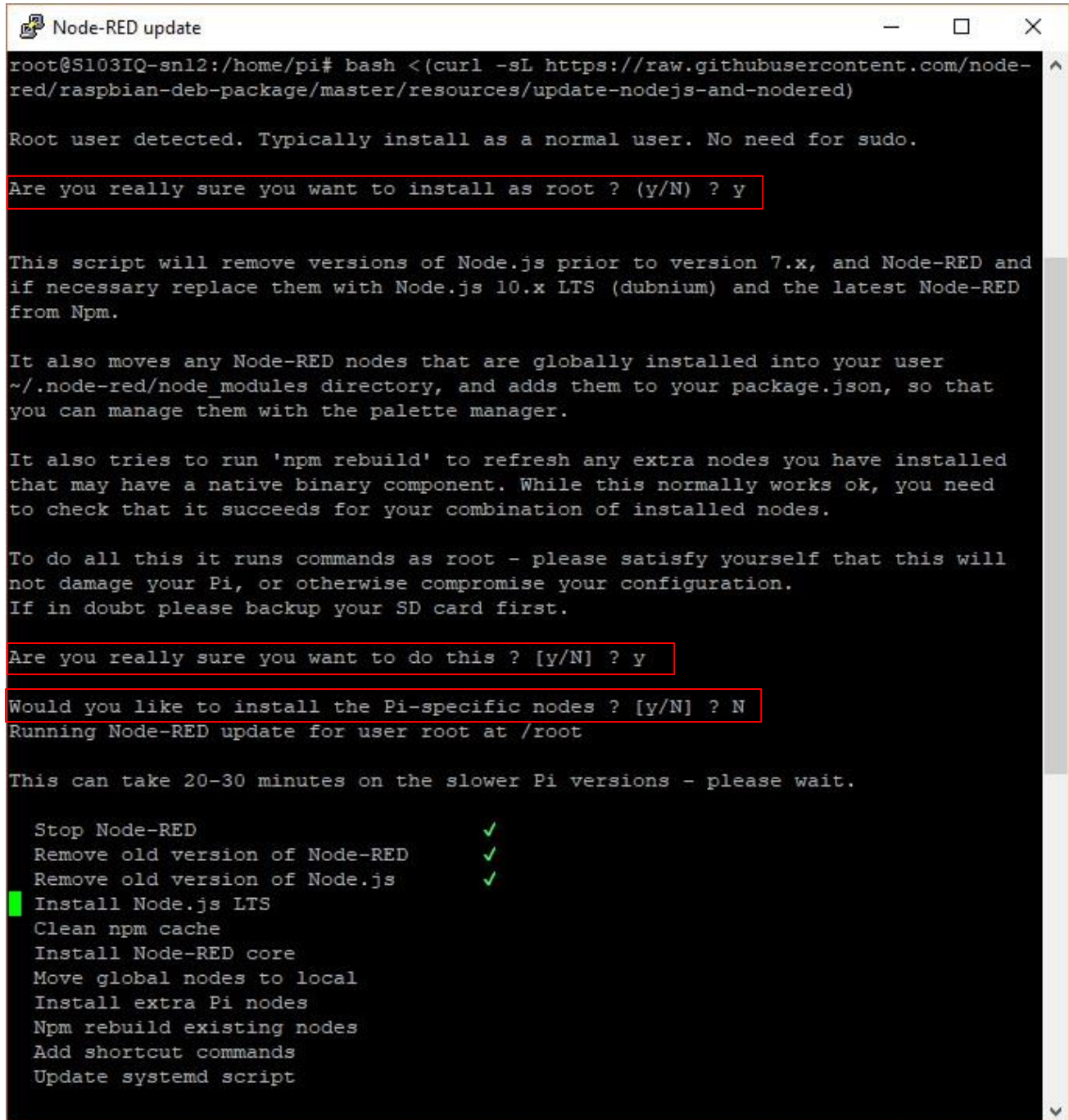
The installation should run without any further input. Upon its completion, insert the following command:

✦ `bash <(curl -sL https://raw.githubusercontent.com/node-red/raspbian-debpackage/master/resources/update-nodejs-and-nodered)`

To finish the install, three questions will appear.

1. Are you really sure you want to install as root? [y/N]?
2. Are you really sure you want to do this? [y/N]?
3. Would you like to install the Pi-specific nodes? [y/N]?

Answer them in the following order – **Y, Y, N** (check the following screenshot for reference)



```
root@S103IQ-snl2:/home/pi# bash <(curl -sL https://raw.githubusercontent.com/node-red/raspbian-deb-package/master/resources/update-nodejs-and-nodered)

Root user detected. Typically install as a normal user. No need for sudo.

Are you really sure you want to install as root ? (y/N) ? y

This script will remove versions of Node.js prior to version 7.x, and Node-RED and if necessary replace them with Node.js 10.x LTS (dubnium) and the latest Node-RED from Npm.

It also moves any Node-RED nodes that are globally installed into your user ~/.node-red/node_modules directory, and adds them to your package.json, so that you can manage them with the palette manager.

It also tries to run 'npm rebuild' to refresh any extra nodes you have installed that may have a native binary component. While this normally works ok, you need to check that it succeeds for your combination of installed nodes.

To do all this it runs commands as root - please satisfy yourself that this will not damage your Pi, or otherwise compromise your configuration.
If in doubt please backup your SD card first.

Are you really sure you want to do this ? [y/N] ? y

Would you like to install the Pi-specific nodes ? [y/N] ? N
Running Node-RED update for user root at /root

This can take 20-30 minutes on the slower Pi versions - please wait.

  Stop Node-RED                ✓
  Remove old version of Node-RED ✓
  Remove old version of Node.js ✓
  Install Node.js LTS
  Clean npm cache
  Install Node-RED core
  Move global nodes to local
  Install extra Pi nodes
  Npm rebuild existing nodes
  Add shortcut commands
  Update systemd script
```

Instalace Node-RED

All steps must be marked with the green tick in order to complete the install. When all steps are marked as completed, the Node-RED is successfully installed.

By default, **node-red** command must be used each time to run Node-RED. In order to make things easier, enter a one additional command to the SSH terminal:

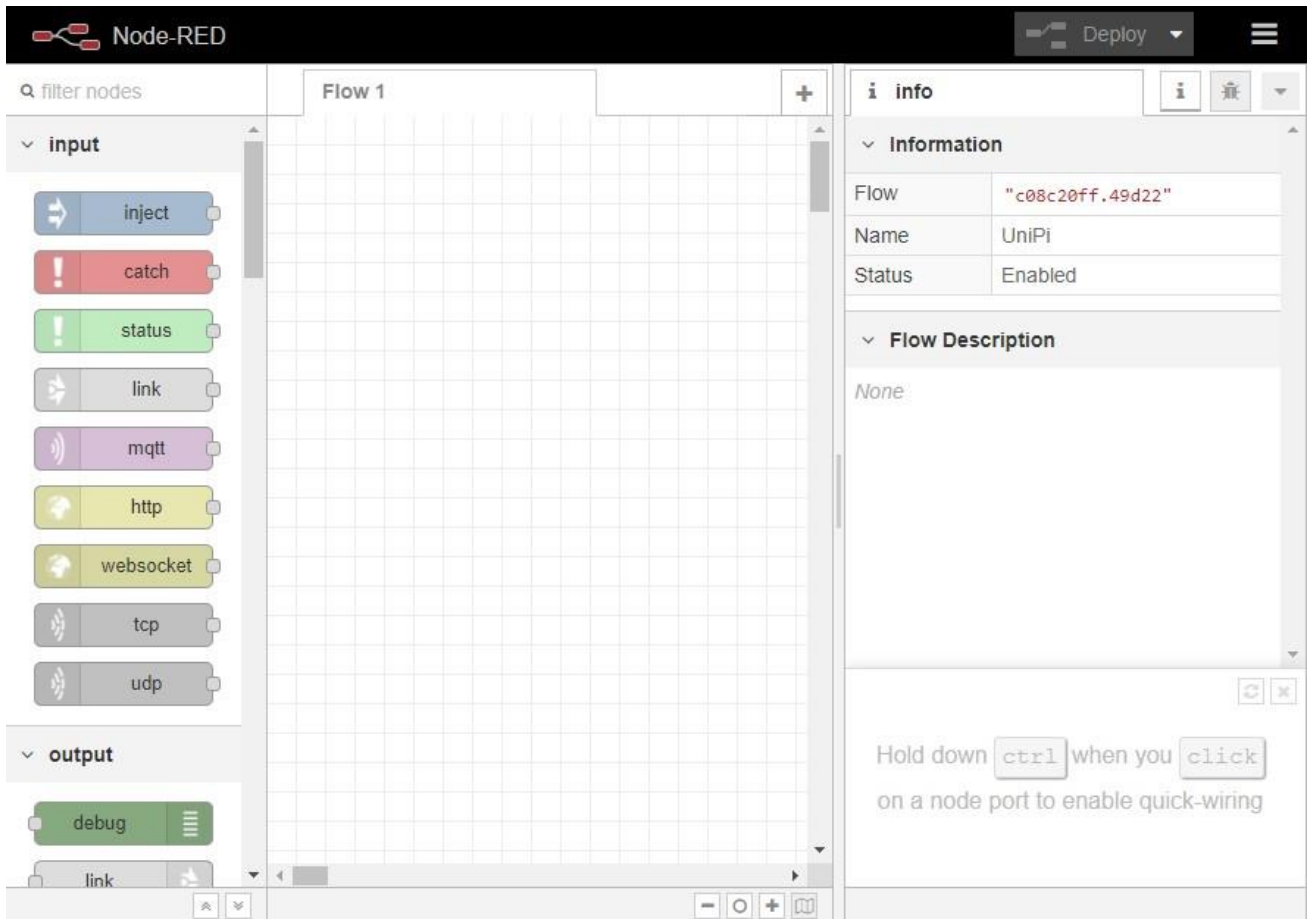
✦ **sudo systemctl enable nodered.service**

This command will set Node-RED to launch on device startup.

You can now enter the Node-RED user interface. All you need to do is to open a web browser, enter the controller's IP address and place a :1880 suffix.



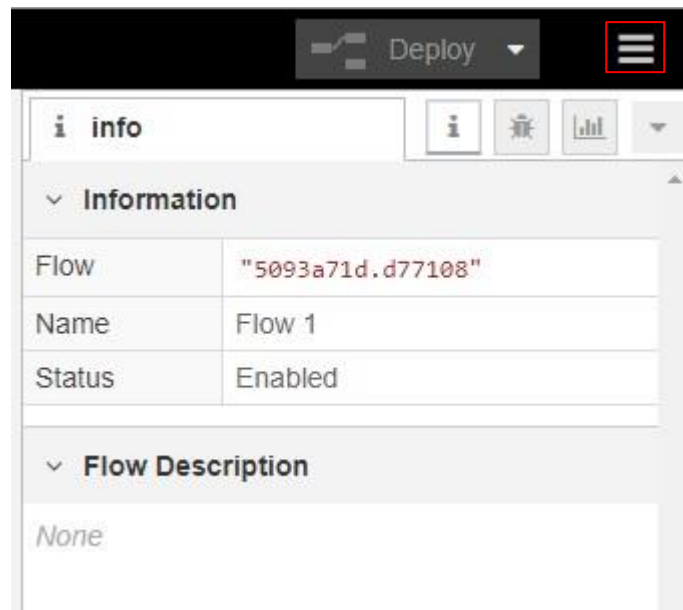
A following user interface will load



Prostředí Node-RED

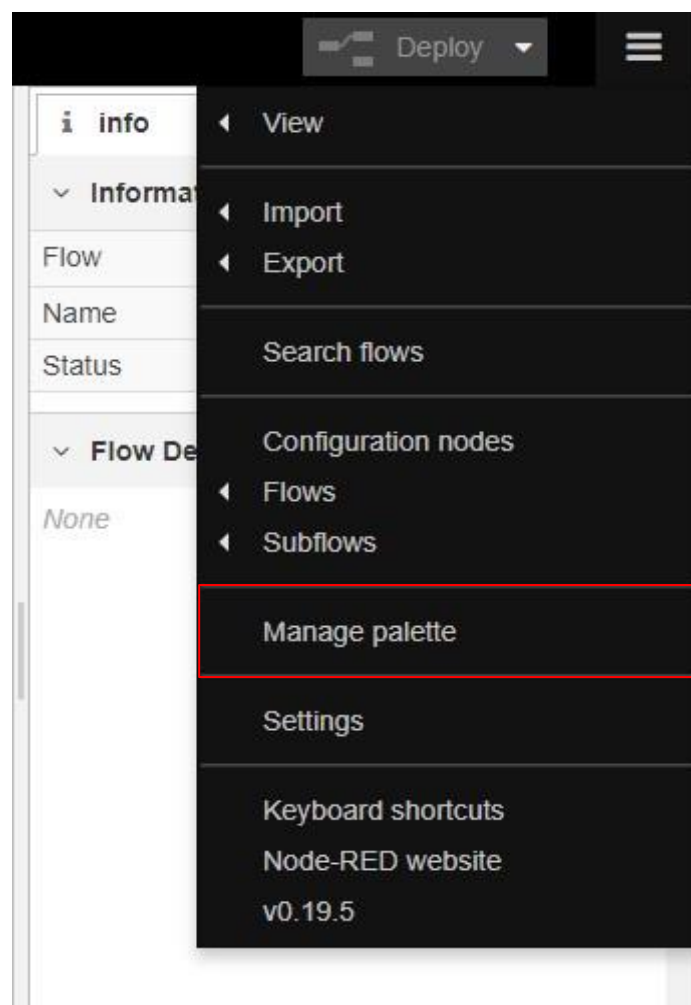
Preparing the Node-RED

With the Node-RED functional, you will need to install nodes required for communication with the controller (nodes are displayed in the left tab). First, click on MENU on the right upper corner of your screen



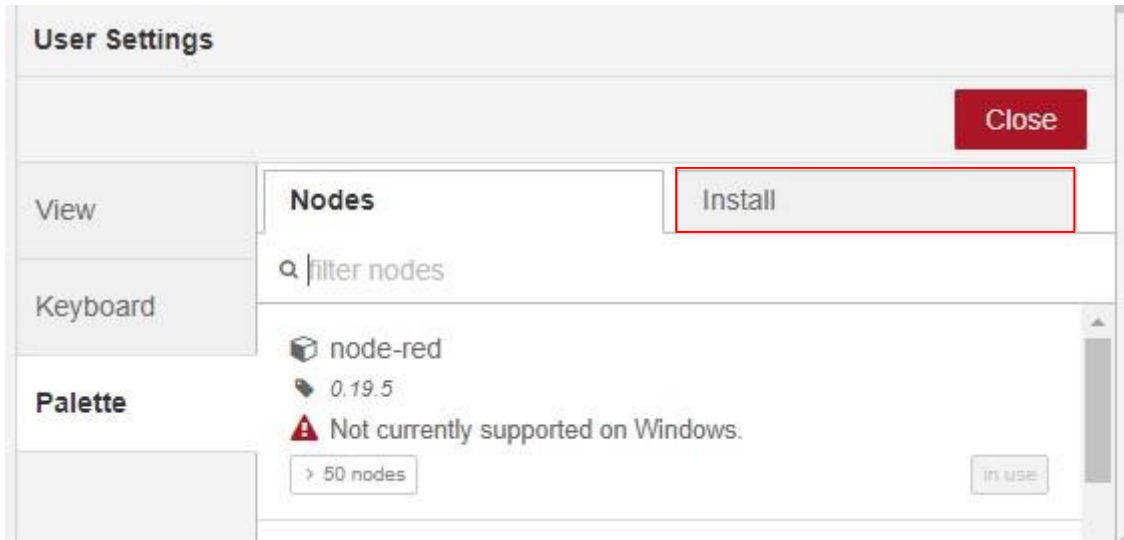
Klikneme na „MENU“ (označeno červeným obdélníkem)

A following menu will appear



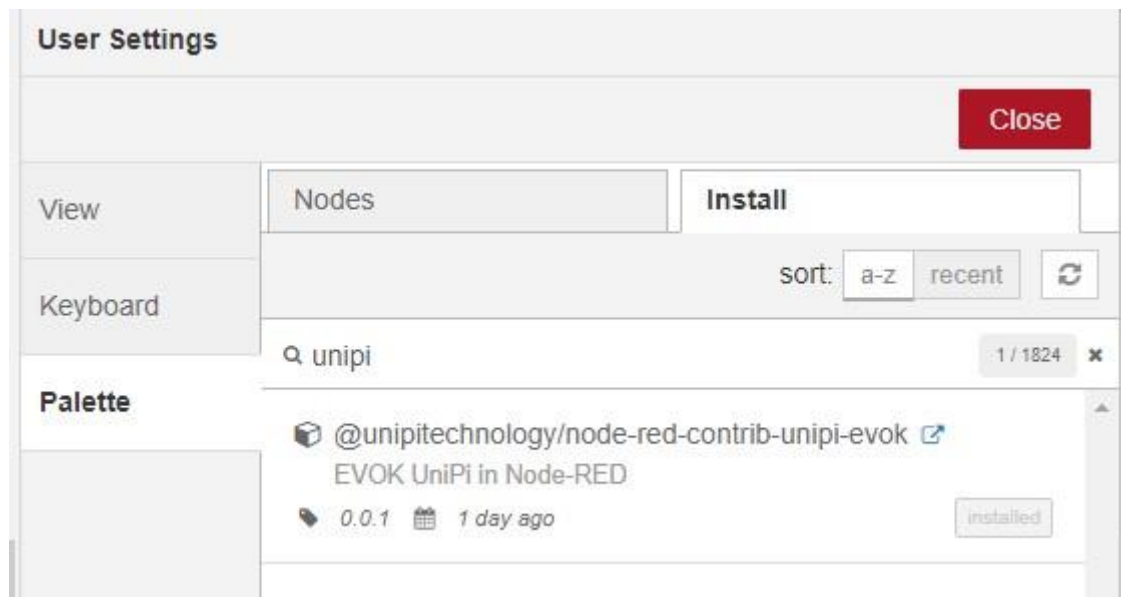
Klikneme na „Manage palette“

Click on *Manage Palette*. A following list of nodes will appear. Click on *Install*.

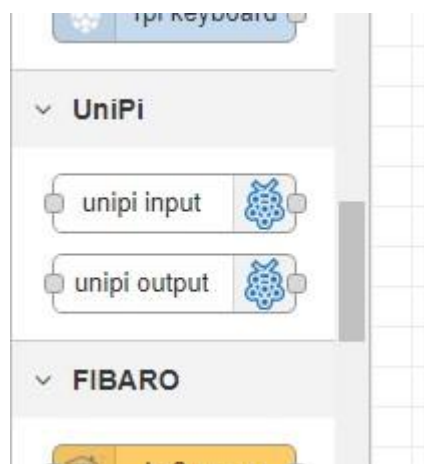


You can now install new nodes into Node-RED. You will specifically require two packages. The first one is [@unipitechnology/node-red-contrib-unipi-evok](#). Enter **unipi** search word to find the package. Then click *Install*





Two new nodes appeared in the list of available nodes:

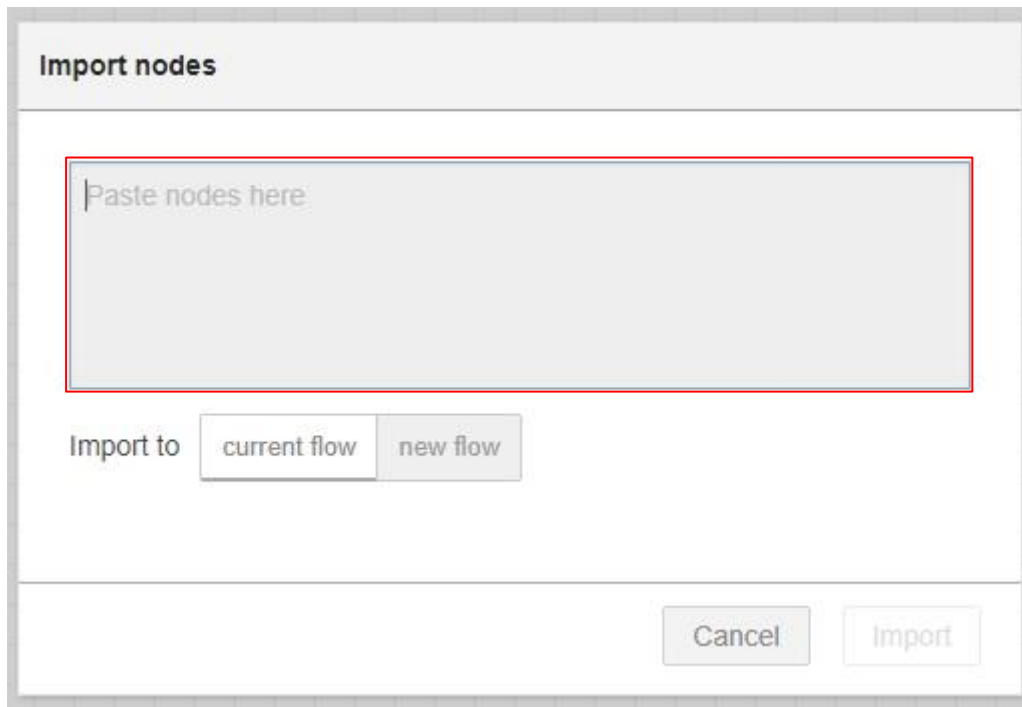


Doinstalované nody v seznamu nodů

Now, install the [node-red-dashboard](#) by following the exact same instructions.

Node-RED demonstration and its import

To understand the connection between UniPi and Node-RED, a demonstration was created. Its import is very easy – click on *Menu*, hover the cursor over *Import* and click on *Clipboard*.



Node-RED clipboard for pasting the text file

Now just copy and paste the content of the [flow pro navod verze 1.0.json](#) file added to this manual and click on *Import*.

With the import finished, open the user interface webpage by inserting the IP address and adding [/ui](#) as a suffix



Entering the interface's IP address

When loaded, the page should look like the following screenshot:

Boiler controller

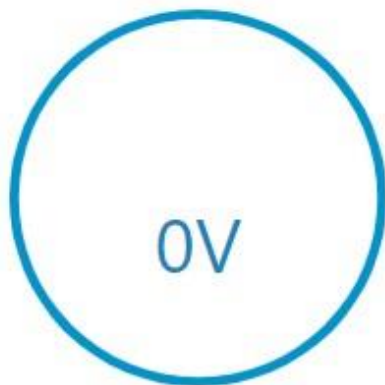
This thermostat is designed for controlling a boiler according to the set and the measured temperature. Measuring the temperature is done by a OneWire sensor and the actual temperature is compared with the set temperature by user. According to the result, the state of the relay is set or reset.

Set temp  **22°C**

Act temp **20.15°C**

Boiler controller **heat ON**


Analog input




Direct / Software switch

The input is a button. The first press of the button switches relay to the ON state, the second press of the button switches relay to the OFF state.

switch 1 

switch 2 

switch 3 

switch 4 

Analog control

Output 2.01 

Output 2.02 

Output 2.03 

Output 2.04 