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[Step-By-Step Tutorial/Guide] Raspberry Pi with UniFi Controller and Pi-hole from scratch (headless)

139 462 534k

This is a step-by-step tutorial for anyone looking for a straight forward installation of both the UniFi Controller and Pi-hole (Advertisement Blocking DNS server) without needing to hook up the Raspberry Pi to a monitor with a keyboard and mouse (= headless). You don't have to install both if you only wish to use one.

If you still have questions or if I forgot to explain some part you're stuck at, please post here so I can add this to the tutorial.

Dutch version: https://gathering.tweakers.net/forum/list_messages/1873125

Changes and Notes

>> 12 Nov 2021 : Updated to work with the new Raspberry Pi OS 11, Bullseye!

>> NOTE: The 64-bit version of Raspberry Pi OS does not work with the UniFi controller. The Mongo DB version that is required by UniFi is too old to work on 64-bit. Install the 32-bit version of Raspberry Pi OS instead.

>> 17 Apr 2022 : Changed the installation method from Rufus to 'Raspberry Pi Imager' (there is no default password for the 'pi' user anymore).

>> 30 Apr 2022 : Changed the default to stable version 7.1.61

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0. What you will physically need

- Raspberry Pi 3 model B(+) or Pi 4 with a MicroSD card of atleast 4GB

- Ethernet cable to connect it to an existing network or use WiFi (set the SSID/Password in Step 2)

- capability to connect the MicroSD card to a computer via a card reader

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1. Download the necessary tools

1. Raspberry Pi Imager

https://www.raspberrypi.com/software/

Direct: https://downloads.raspberrypi.org/imager/imager_latest.exe

2. Advanced IP Scanner to figure out the assigned IP address of your Raspberry Pi.

http://www.advanced-ip-scanner.com

Direct: http://www.advanced-ip-scanner.com/download/Advanced_IP_Scanner_2.5.3850.exe

3. If you are not using Windows 10 or 11, you can use PuTTY instead of the command prompt to connect to your Raspberry Pi.

https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html

Direct: https://the.earth.li/~sgtatham/putty/latest/w64/putty-64bit-0.76-installer.msi

4. If you are having issues with the partitions on your MicroSD card, I recommend using MiniTool Partition Wizard. This program makes it very easy to start from scratch by removing every partition on your MicroSD and creating a new Fat32 partition.

https://www.partitionwizard.com/free-partition-manager.html

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2. Install Raspbian on the MicroSD

Open up '**Raspberry Pi Imager**' (*imager_x.x.x.exe*) to configure and install Raspbian.

1. Start by clicking on '**Choose OS**' and click on '**Raspberry Pi-OS (other)**' and choose '**Raspberry Pi OS Lite (32-bit)**'.
2. Click on '**Choose Storage**' and **click on your SD-card**.
3. Do not click on Write yet. **Click on the Settings icon** on the bottom right.
    a. Select '**Enable-SSH**'
    b. Select '**Set username and password**' and **add your password** to the 'password' field.
4. Click on **Write**, **accept the warning** and wait until you see the '**you can now remove the SD card from the reader**' message.

The MicroSD is ready now, **insert it into your raspberry pi**, **connect an ethernet cable** and **turn on** the Raspberry Pi.

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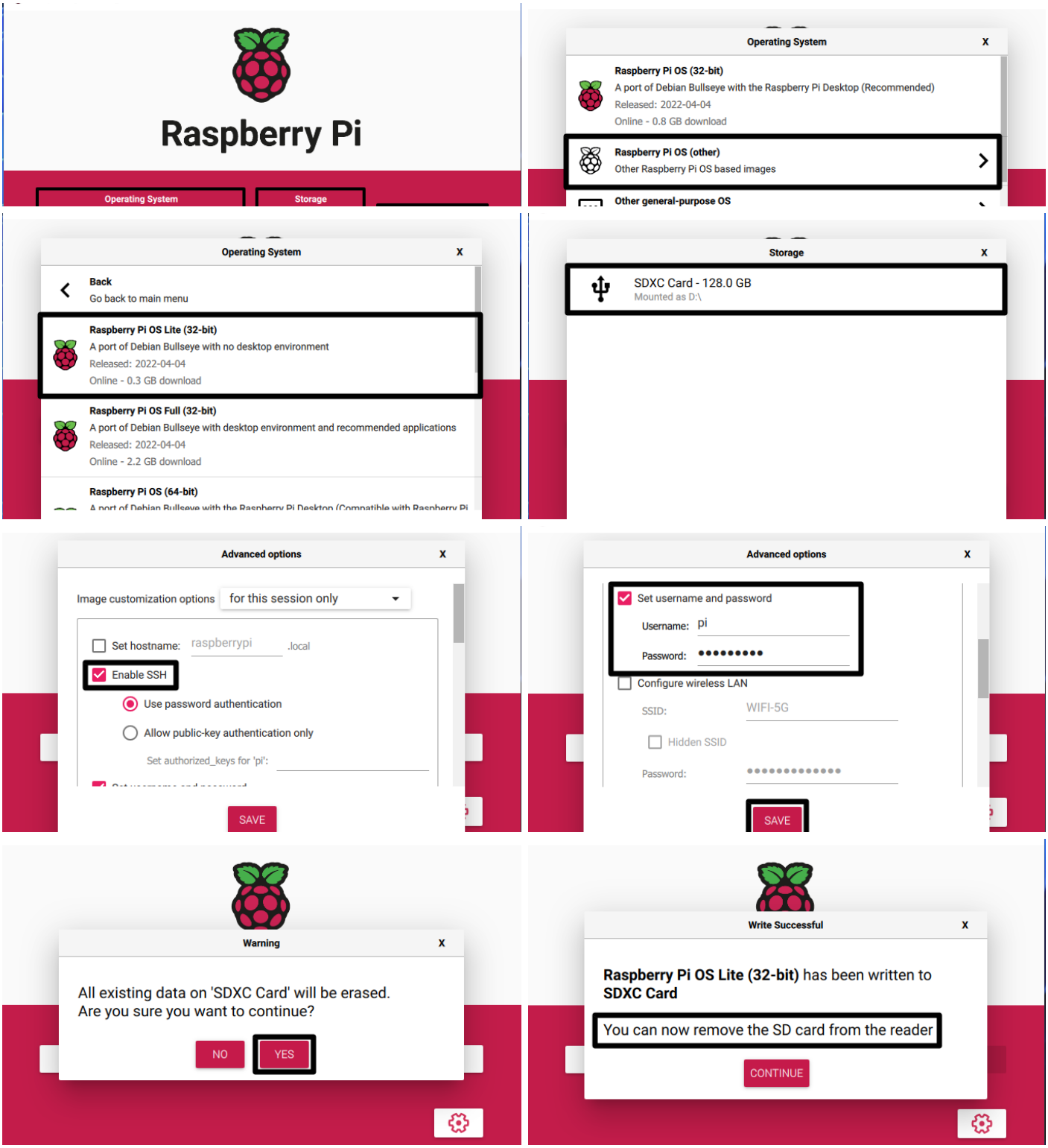
(click on the images to see the full image)



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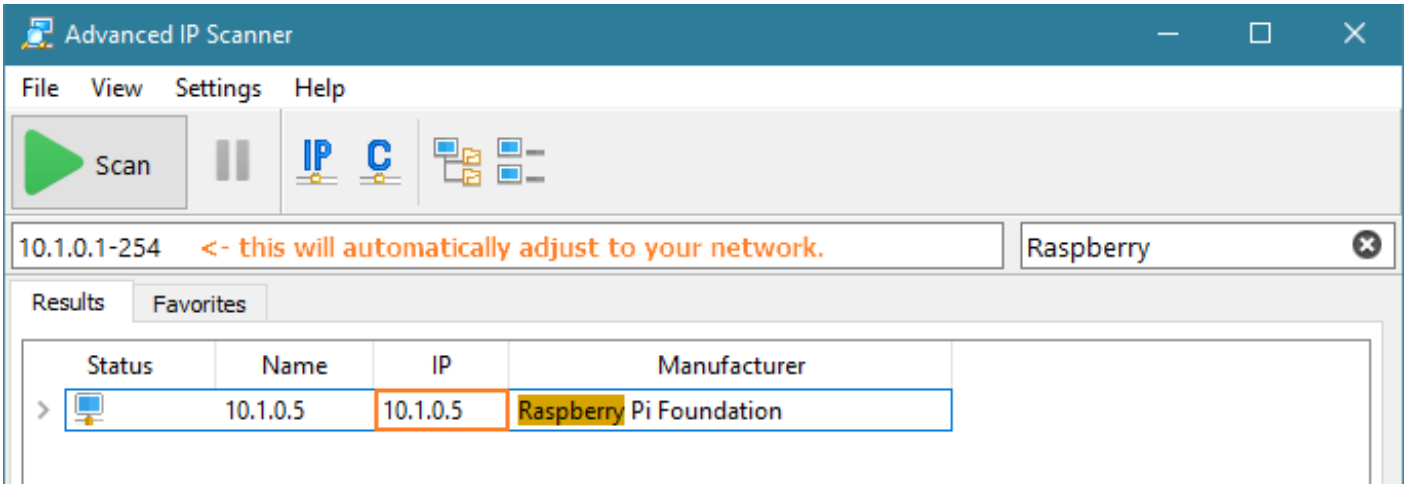
3. Lookup the IP address

If you're using Advanced IP Scanner, you can simply press SCAN and wait until the Raspberry Pi shows up.



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4. Login via SSH

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1. Open up the command prompt (search for **cmd** in start or in the dedicated search box)

***Tip**: You should be able to paste commands by right-mouse clicking into the command prompt.*

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2. Login with the SSH command

***Note**: change the IP address with the IP address of your Raspberry Pi (obtained in step '3. Lookup the IP address')*

***Note**: If you have changed your username in Step 2, change "pi" to your username instead.*

```
ssh 10.1.0.5 -l pi
```

.

3. As we have not defined an SSH key, it will ask if we trust the host.

Type: yes and press enter.

```
The authenticity of host '10.1.0.5 (10.1.0.5)' can't be established.
ECDSA key fingerprint is SHA256:XXX. Are you sure you want to continue connecting (yes/no)?   yes
```

.

4. Enter your password and press enter

Tip: When typing in your password, you will not see any characters being displayed, simply type it and enter.

Note: This is the password that you entered in Step '2. Install Raspbian on the MicroSD' -> substep: 3b

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Use the script to save time (or skip this part if you wish to do every step manually)

By running the following line of code, every necessary command will automatically run for you. You choose which version of UniFi to install.

You can view the script by looking on my Github page: https://github.com/SmokingCrop/UniFi/blob/master/install-unifi-pihole-English.sh

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To install the **UniFi controller** and **Pi Hole**, copy/paste/run the following line of code:

```
wget "https://github.com/SmokingCrop/UniFi/raw/master/install-unifi-pihole-English.sh" -O install-unifi
```

.

To **only** install the **UniFi controller**, copy/paste/run the following line of code:

```
wget "https://github.com/SmokingCrop/UniFi/raw/master/install-unifi-pihole-English.sh" -O install-unifi
```

.

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5. Add the Raspbian Stretch sources.list for MongoDB compatability

As the UniFi controller uses an old MongoDB version, it's necessary to add the old Raspbian Stretch sources.list. Otherwise the UniFi controller will not work with the latest Raspbian OS.

```
echo 'deb http://archive.raspbian.org/raspbian stretch main contrib non-free rpi' | sudo tee /etc/apt/s
```

.

6. Download and install updates

To make sure you have all the latest updates and to clean up any unused/old ones, execute the following command:

```
sudo apt update && sudo apt full-upgrade -y && sudo apt autoremove -y && sudo apt-get autoclean -y
```

.

7. Install Java 8

The default available Java version from Oracle is too old to make the 6.X UniFi controller work. Instead of doing multiple extra commands to upgrade this version, we're just going to install OpenJDK. It also requires the 'jsvc' and 'libcommons-daemon-java' packages.

```
sudo apt install openjdk-8-jre-headless jsvc libcommons-daemon-java -y
```

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8. Install haveged

In order to fix the slow start-up of the UniFi controller, we have to install **haveged**. The reason for the slow start-up is the lack of user interaction (no mouse movements) causing issues with the mechanisms for 'harvesting randomness'.

```
sudo apt install haveged -y
```

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9. Install MongoDB

The UniFi controller uses MongoDB. You can skip this, but then the installation of the UniFi controller will notice on its first try that it is missing and will install it anyways and then try to install UniFi again. So it's better to just install it already.

```
sudo apt install mongodb-server mongodb-clients -y
```

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10. Install the UniFi Controller

I'll show two ways of installing the UniFi Controller.

Method A: manually installing the Controller by using the download link on the website/update blog.

- Easily install any Controller version you want, whenever you want. As soon as the blog comes out.
- If you're not using the script, it'll take more commands to update your Controller in the future

(**I personally prefer method A**)

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Method B: Setting up the repository so you can install and update with the apt command.

- Once it is setup, you can install/update the Controller like any other program with apt.
- When a new Controller version is out, it takes like a week before you'll be able to install it.
- It's recommended to still go the blog of the update to know if any changes will affect your setup!

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10.1 Install the UniFi Controller with *method A*

1. Use the link with the wget command to download the Controller installation package.

```
wget https://dl.ui.com/unifi/7.1.61/unifi_sysvinit_all.deb
```

.

2. Install UniFi and its dependencies.

```
sudo dpkg -i unifi_sysvinit_all.deb; sudo apt install -f -y
```

.

Go to your UniFi Controller via the IP address and port:

E.g: https://10.1.0.5:8443

You'll want to set a reserved (fixed) IP address in the UniFi Controller for the Raspberry Pi.

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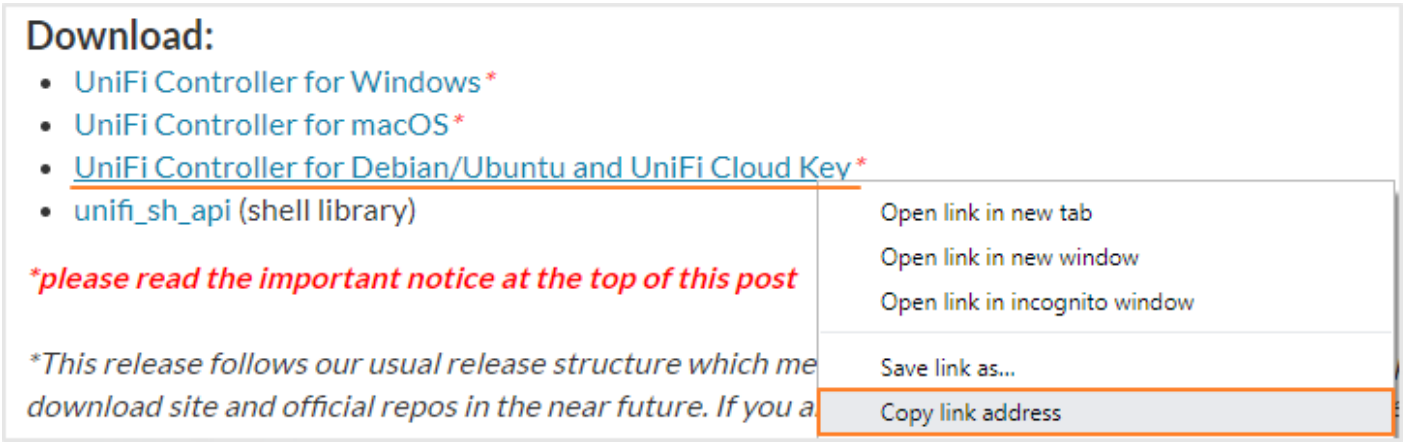
You can go to the (beta) releases page and copy the Debian download link at the bottom of the posts ("UniFi Network Application for Debian/Ubuntu and UniFi Cloud Key") if you want a different version than the one used in this tutorial.

https://community.ui.com/releases?q=Network+Application

https://www.ui.com/download/unifi/



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10.2 Install the UniFi Controller with *method B*

1. Install apt-transport-https in order to be able to use the 'deb' lines over HTTPS in the /etc/apt/sources.list

```
sudo apt install apt-transport-https -y
```

.

2. Add a new source to the list of sources from which packages can be obtained with '*apt*'

```
echo 'deb https://www.ui.com/downloads/unifi/debian stable ubiquiti' | sudo tee /etc/apt/sources.list.d
```

.

3. Add the GPG keys

```
sudo wget -O /etc/apt/trusted.gpg.d/unifi-repo.gpg https://dl.ui.com/unifi/unifi-repo.gpg
```

.

4. Update the packages after adding the new source and Install the UniFi package

```
sudo apt update && sudo apt install unifi -y
```

.

Go to your UniFi Controller via the IP address and port:

E.g: https://10.1.0.5:8443

You'll want to set a reserved (fixed) IP address in the UniFi Controller for the Raspberry Pi.

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11. Install Pi-hole

Execute the following command and configure Pi-hole

```
curl -sSL https://install.pi-hole.net | bash
> Choose an interface: (*) eth0  (= ethernet cable)
> Choose your DNS provider: Custom 1.1.1.1, 8.8.8.8 (= fast cloudflare dns & basic Google dns)  or any
> Choose your adblocking providers: leave them all enabled
> IPv4 and/or IPv6: both
> PiHole wants to set a static IP. Let it do its thing. I guess they haven't heard of DHCP reservation/
> Install the Web admin interface and the web se
```

Change the password used to log into the web admin interface

```
pi@raspberrypi:~ $ pihole -a -p
Enter New Password (Blank for no password):
Confirm Password:
[✓] New password set
```

Go to your Pi Hole web admin interface via the IP address and /admin:

E.g: http://10.1.0.5/admin

--I'm only able to write 10 000 characters per post. Check the accepted answer below--

Accepted solution

SmokingCrop

3 years ago

11. Updating the UniFi Controller and Pi-hole with future updates

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Before Upgrading, please take a minute to take a back-up of your UniFi controller.

There is always a chance that something goes wrong while updating your UniFi controller!

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11.1 Updating the UniFi Controller with *method A*

I've also made a simple script for updating your system, Controller and Pihole in one go (If you have used Method A to install the controller).

Simply enter ./update.sh in the future to use the script again without having to redownload it.

```
wget "https://github.com/SmokingCrop/UniFi/raw/master/update-unifi-pihole-English.sh" -O update.sh && c
```

or keep following the tutorial:

In order to update the UniFi Controller manually you can use the following commands:

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1. Remove the old downloaded UniFi Controller package

```
rm unifi_sysvinit_all.deb
```

.

2. Download the new UniFi Controller package, adjust the link below for the version you want to install.

```
wget https://dl.ubnt.com/unifi/x.x.xx/unifi_sysvinit_all.deb
```

.

3. Upgrade the UniFi Controller.

```
sudo dpkg -i unifi_sysvinit_all.deb
```

.

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11.2 Updating the UniFi Controller with *method B*

Updating is easy but it may not be available right away, in that case, you will need to wait a few days longer before you can update (usually about a week after they have released the blog).

Simply execute the following commands. This will also upgrade your other programs.

```
sudo apt update; sudo apt upgrade -y
```

.

.

11.3 Updating Pihole

It's very easy to update Pihole with the following command:

```
pihole -up
```

31

Responses (462)

Sort by Newest Oldest

oli538

4 years ago

Great Tutorial! Thanks!If I may suggest an improvement; it just lacks the explanation on how/where to change the settings in the Unifi controller in order to force all clients to use Pi-Hole.PS: It is fortunately quite easy to find; I used this one. Of the two options I gave all network devices the IP address of my Raspberri Pi as DNS Server.

2

ben_r_

4 years ago

Awesome job man! Thanks for putting this together! This will help a lot of people!

1

SmokingCrop

4 years ago

I've added an install-script and an upgrade-script to the tutorial for people who do not wish to copy/paste all the commands.I've tested both and they worked flawlessly on my Pi.

All you'll have to do with the script is:1. copy/paste the line of commands to download and run the script2. enter a new password for your raspberry pi3. enter the (stable) unifi controller version you wish to install4. press enter a couple of times for the initial configuration of pi-hole5. enter a new password for the pi-hole web interface

Check the install script here on Onedrive: https://1drv.ms/u/s!AtK94tegQTvMiu92g9EVSXSQz6SJrQ

Check the upgrade script here on Onedrive: https://1drv.ms/u/s!AtK94tegQTvMiu8giMwtcnKuh9nYrg

1

J

joaocmfcm

4 years ago

Really nice guide! Thank you. Worked as a charm

1

L

luobod

4 years ago

Great man make things simple!

I'm new to linux, great I found this post.

1

J

johlun

3 years ago

This worked like a charm.

I have one question however.

I set up the controller with a backup and now it doesn't work with "Cloud access".

Any idea what I need to do?

It only says "connecting" but nothing happens and I can't see it at "unifi.ubnt.com" when I log in.

2

ramsesii

3 years ago

Wow!

This is great! Thank you very much!

I've set this up and it works like a charm.

I have one question: when I want to make a reboot or shutdown the combination, what is the best and safest way?

Should I log in with ssh and give a command reboot or halt?

Thanks.

2

J

Jarvl

3 years ago

> *@johlun wrote:*
> *This worked like a charm.*
>
> *I have one question however.*
>
> *I set up the controller with a backup and now it doesn't work with "Cloud access".*
>
> *Any idea what I need to do?*
>
> *It only says "connecting" but nothing happens and I can't see it at "unifi.ubnt.com" when I log in.*

This happened to me too. I realized that the controller I installed the backup from was still running on my computer.

After closing the old controller I was able to access the new controller on my Raspberry Pi via cloud access with no problems.

2

T

trugeek

3 years ago

Great guide, thanks!

After instalation completed, I am unable to access the Unifi controller.. How do I access this? I also wonder how I access remotely. Sorry, noob question. And VERY new to linux.

Thanks in advance!!

2

SmokingCrop

3 years ago

"Should I log in with ssh and give a command reboot or halt?"

I usually just login with ssh and "sudo reboot now" and both the controller & Pi hole will start up again without problems.

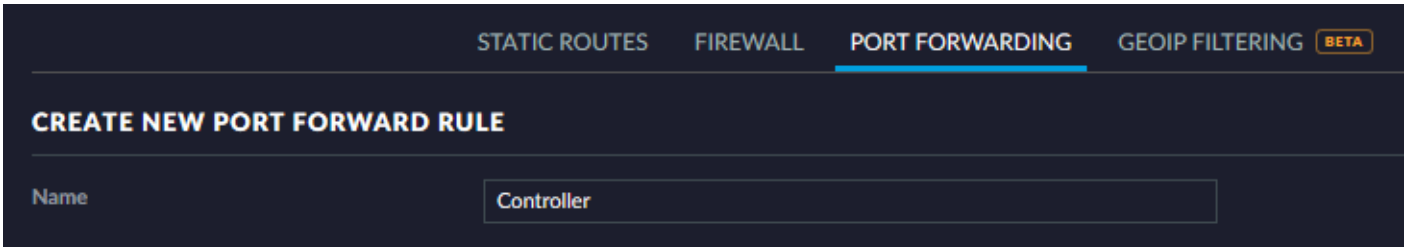
"After instalation completed, I am unable to access the Unifi controller.. How do I access this? I also wonder how I access remotely. Sorry, noob question. And VERY new to linux.

Thanks in advance!!"

You should be able to go to the IP address with the port 8443 in your web browser.like: https://192.168.0.2:8443

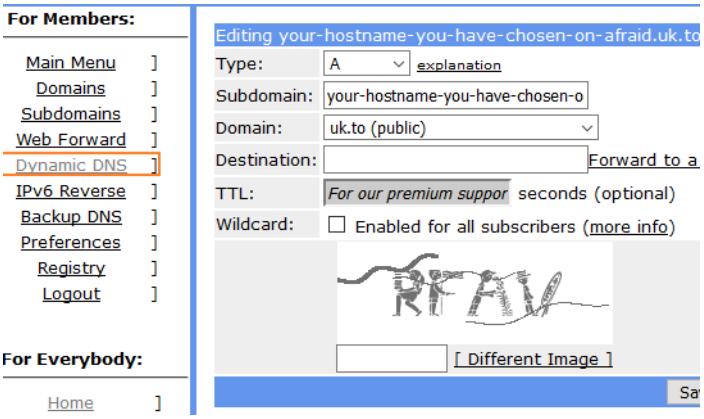
If you want to access it from outside the network, you could setup cloud access.https://help.ubnt.com/hc/en-us/articles/115012240067-UniFi-How-to-Enable-Cloud-Access-for-Remote-Management

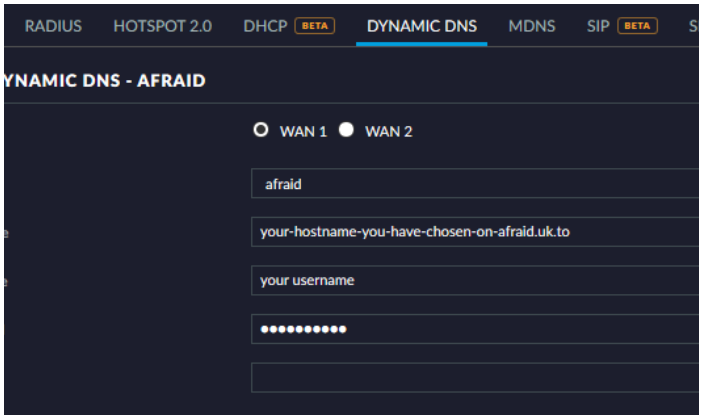
or setup a port forwarding rule in your USG via the controller.You'll have to port-forward the 8443 port to the IP address of the controller.



After that you'll need to know your WAN IP address.You can easily find this by using a website like this one:https://whatismyipaddress.com/You can then use this IP address to access your controller.example: https://123.123.123.123:8443if you changed the "Port" to something else like: 20000 then you'll have to do: https://123.123.123.123:20000

If you have a dynamic WAN IP address like most people do (which means it can change), you should probably setup a DDNS.You can set this up in the settings of the controller -> services -> Dynamic DNS.You'll need an account on a website like "afraid": https://freedns.afraid.org/dynamic/





When the DDNS is setup, you can go to your controller by doing:

https://hostname.domain: port

example: https://your-hostname-you-have-chosen-on-afraid.uk.to:20000

0 will work because everytime your WAN IP changes, the "your-hostname-you-have-chosen-on-afraid.uk.to" will change to the new IP address.

itskv

3 years ago

Has anyone tried the Pi with the PoE module?

0

SmokingCrop

3 years ago

> *@itskv wrote:*
> *Has anyone tried the Pi with the PoE module?*

No, but It should work fine. There was an initial problem with it but they've recalled those bad ones.

0

M

mlasham

3 years ago

awesome, however after following the instructions the server does not work. checking the log file I see a bunch of java errors:

```
[2018-12-19 00:31:07,670] <UniFi> ERROR system - [exec] error, rc=141, cmdline=[/usr/lib/jvm/jdk-8-orac
/jre/bin/java, -Dfile.encoding=UTF-8, -Djava.awt.headless=true, -Dapple.awt.UIElement=true, -Xmx1024M,
emoryError, -XX:+CrashOnOutOfMemoryError, -XX:ErrorFile=/usr/lib/unifi/logs/hs_err_pid%p.log, -jar, /us
ce.jar, start]
```

any ideas please?

0

I

itskv

3 years ago

I just installed the PoE hat, and works perfect!

0

SmokingCrop

3 years ago

> *@mlasham wrote:*
> *awesome, however after following the instructions the server does not work. checking the log file I see a bunch of java errors:*
>
> ```
> [2018-12-19 00:31:07,670] <UniFi> ERROR system - [exec] error, rc=141, cmdline=[/usr/lib/jvm/jdk-8-c
> /jre/bin/java, -Dfile.encoding=UTF-8, -Djava.awt.headless=true, -Dapple.awt.UIElement=true, -Xmx1024
> emoryError, -XX:+CrashOnOutOfMemoryError, -XX:ErrorFile=/usr/lib/unifi/logs/hs_err_pid%p.log, -jar,
> ce.jar, start]
> ```
>
> *any ideas please?*

Hmm, honestly don't really know why a Java error would occur.Haven't had an error yet after installing it a couple of times over the months with different versions etc.Maybe try a clean install again, maybe some bug? I don't know.

0

ramsesii

3 years ago

> *@SmokingCrop wrote:*
> *Updating Pi-hole is very simple*
>
> ```
> pihole -up
> ```

I confirm that this works as a charm, too. The new version of Pi-Hole was just released and I had no problems updating it with this command. It was done in less than a minute.

Thank you again, this Controller + Pi-Hole are a super couple!

0

J johlun
3 years ago

> *@itskv wrote:*
> *Has anyone tried the Pi with the PoE module?*

Yes, I've been running it for about a week now and it work perfectly. One less cord 😀

0

ramsesii
3 years ago

> *@johlun wrote:*
> > *@itskv wrote:*
> > *Has anyone tried the Pi with the PoE module?*
> >
> > *Yes, I've been running it for about a week now and it work perfectly. One less cord 😀*

Is it 24V or 48V?

Edgerouter X could push 24V from it's port 5 I guess?

0

SmokingCrop
3 years ago

> *@ramsesii wrote:*
> > *@johlun wrote:*
> > > *@itskv wrote:*
> > > *Has anyone tried the Pi with the PoE module?*
> > >
> > > *Yes, I've been running it for about a week now and it work perfectly. One less cord 😀*

> *Is it 24V or 48V?*
>
> *Edgerouter X could push 24V from it's port 5 I guess?*

You need 802.3af PoE / 37–57V DC according to the specs. So I don't think passive 24V PoE will do the trick.

https://www.raspberrypi.org/products/poe-hat/

"This product:

- Shall only be powered using 802.3af-compliant power sourcing equipment;"

https://help.ubnt.com/hc/en-us/articles/115000263008--UniFi-Understanding-PoE-and-How-UniFi-Devices-are-Powered

2

T

Torbenan

3 years ago

A quick comment on SSH. It does not seem to be supported by Windows 10 any more - use Putty

0

Page 1 2 3 4 ... 24

Your Response

Write your response here ...

Comment