Rev 4B Instructions 8/23/2021 Quick Start for MAC and Windows users

Quick Start Basic Image:

If you have received permission to download the **"Basic Image"** and these **instructions** please place in a folder on your computer example **Download==>Raspberry Pi Image.**

Requirements and setup:

Raspberry Pi2, Pi3 or Pi4 computer
32GB MicroSD card Class 10 or better – Use a good quality card.
Network connection for the Pi
Network connection for UDMP or UNVR with Protect 1.18.1 and 1.19.0
HikVision Cameras that work – **Please stop here if you do not have one of these 2 cameras. I have tried others with no luck!**
A. **DS-2DE4A425IW-DE** 4MP 25x PTZ Zoom Darkfighter Auto Tracking IP Camera
B. **DS-2DE3304W-DE** 3MP PTZ 4X Zoom
Network connection to desktop computer MAC in this example below. I will also try to show Windows 10 Tools for this use case.
Your Unifi account access to the UniFi equipment.
All devices must be on the same network, Subnet and VLAN example: UDMP 192.168.1.1 , Pi4B 192.168.1.34 , Hikvision PZT camera: 192.168.1.65

Tools on PC required:

PuTTy to SSH into the Raspberry Pi ==> https://www.chiark.greenend.org.uk/~sgtatham/putty/
Raspberry Pi Imager to place “Basic Image” onto a 32GB Micro SD card for your computer ==> https://downloads.raspberrypi.org/imager/imager_latest.exe

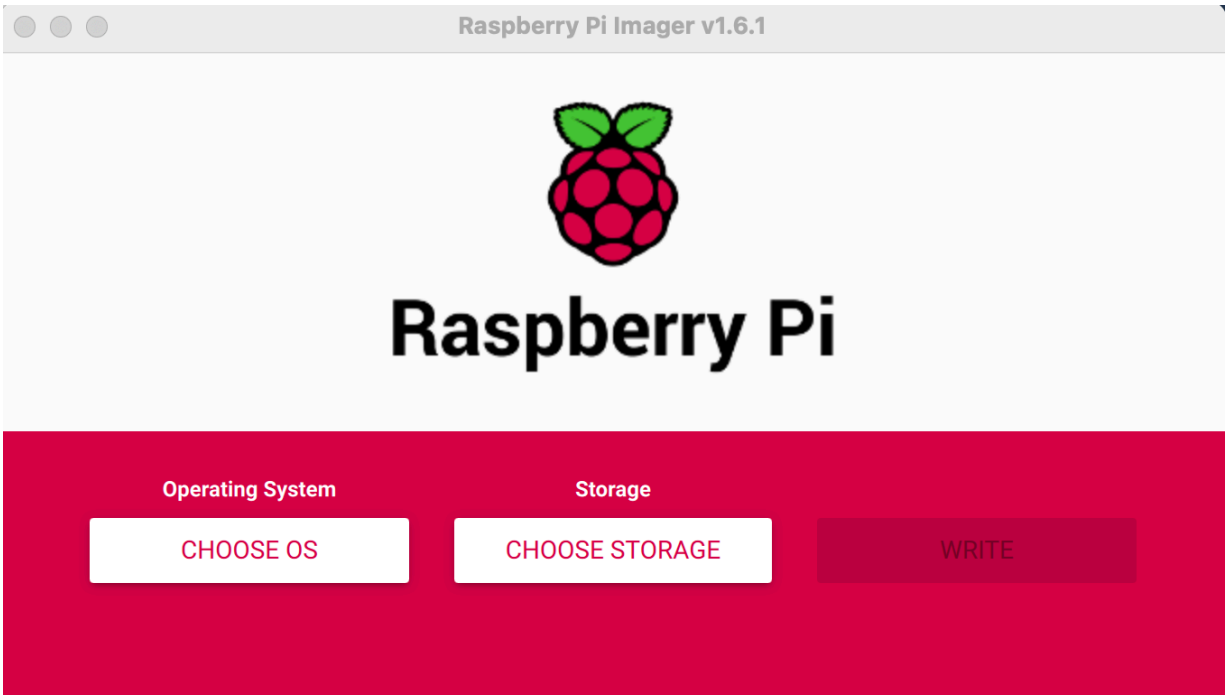
Tools on MAC required:

VSSH to SSH into the Raspberry Pi ==> Go to the APPS Store https://insmac.org/macosx/224-vssh.html
Raspberry Pi Imager to place “Basic Image” onto a 32GB Micro SD card for your computer ==> https://www.raspberrypi.org/software/

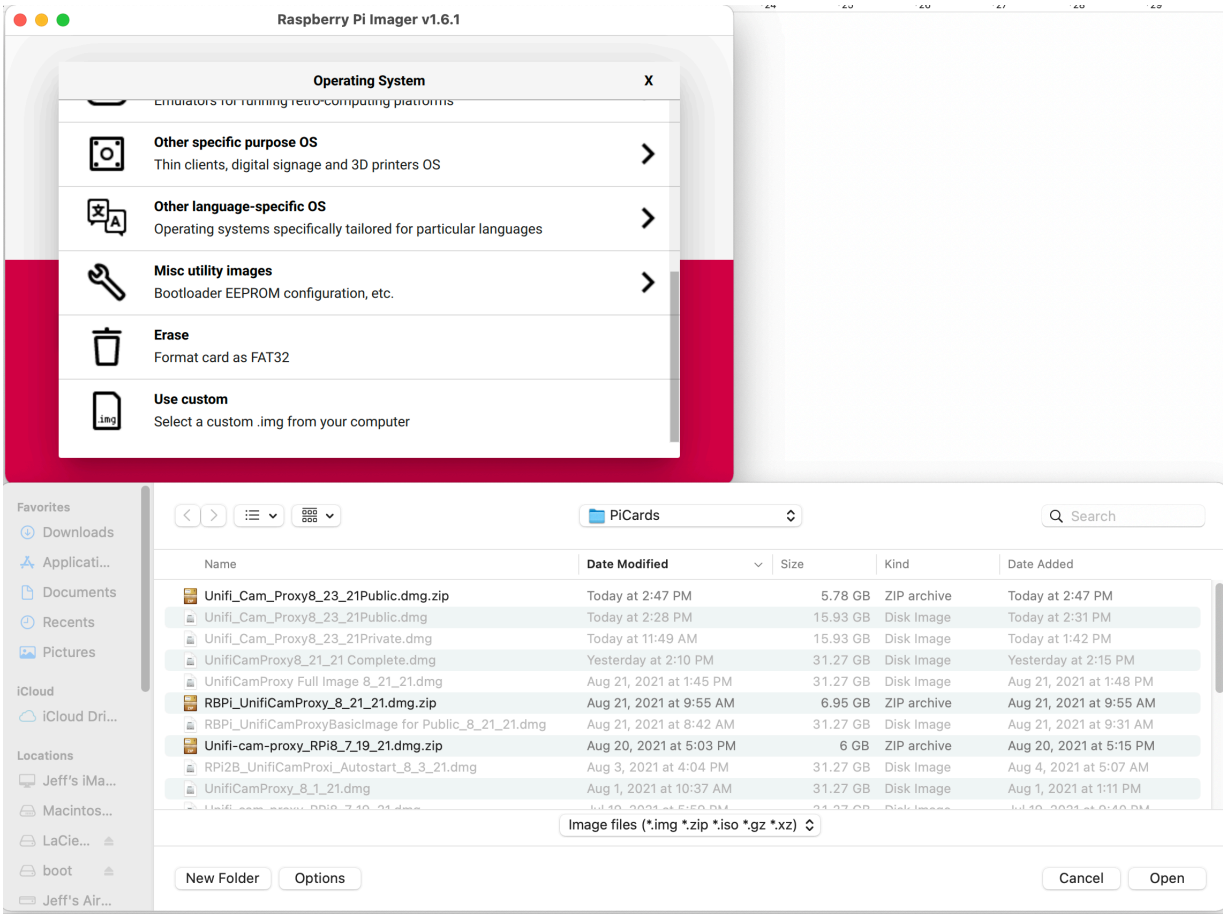
Unifi-Cam-Proxy program by **Keshav Varma** and all credit goes to the author:
https://github.com/keshavdv/unifi-cam-proxy

For Quick Start Basic Image:

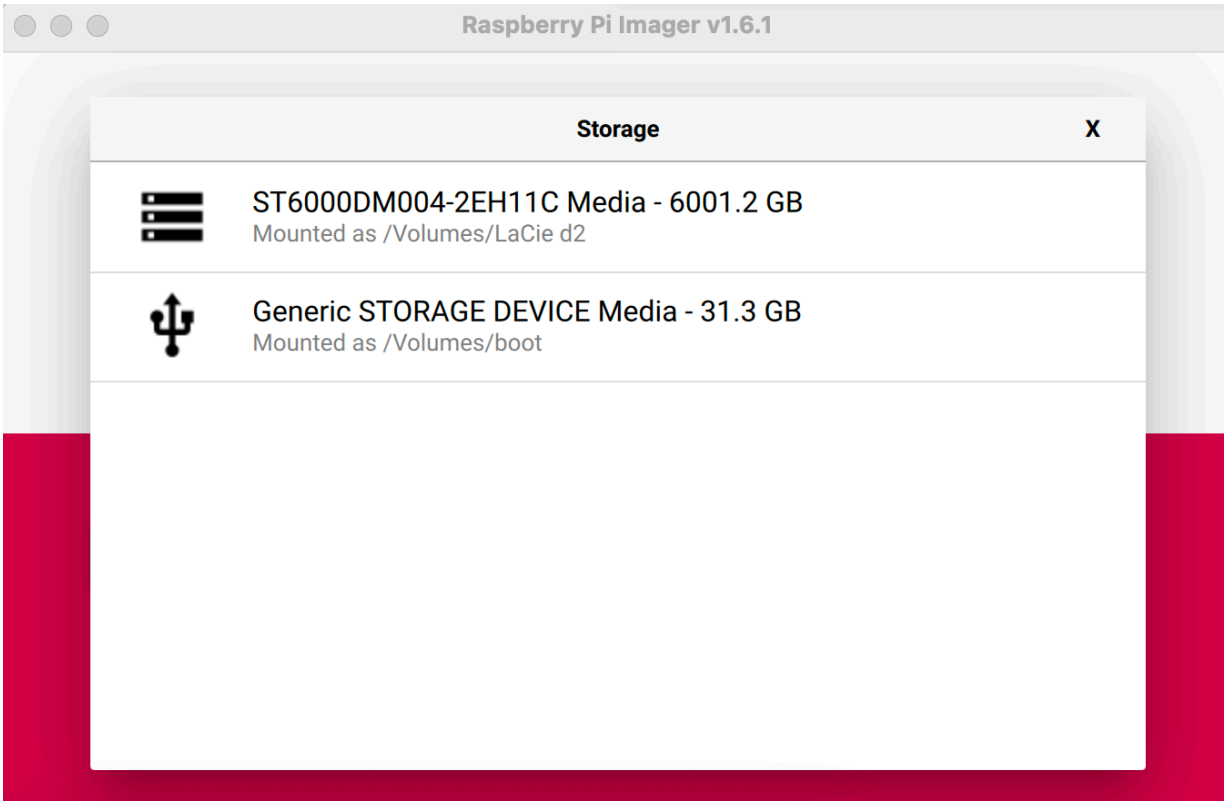
1. Start Raspberry Pi Imager v1.6.1 (or greater)



2. Burn the “Basic Image” provided to you.
 – Click Operating System / Choose O/S
 – Scroll down to “Use custom”
 – Navigate to the folder you downloaded the “Basic Image” name : **Unifi_Cam_Proxy8_23_21Public.dmg.zip**
 – Place your clean new 32GB into the PC/MAC to start image
 –



- Click Storage and choose the 32GB Card

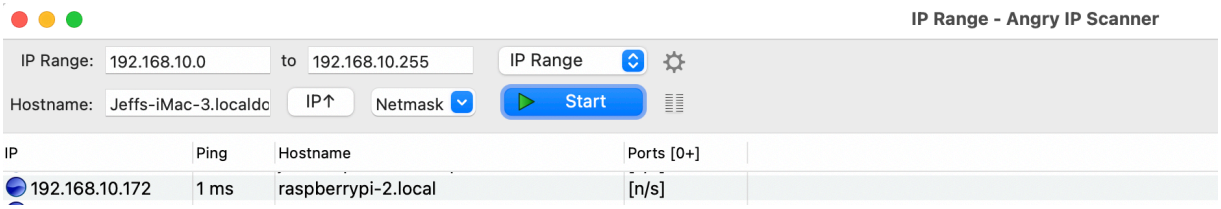


– Click Write / Choose YES / Type your OS password and click OK.

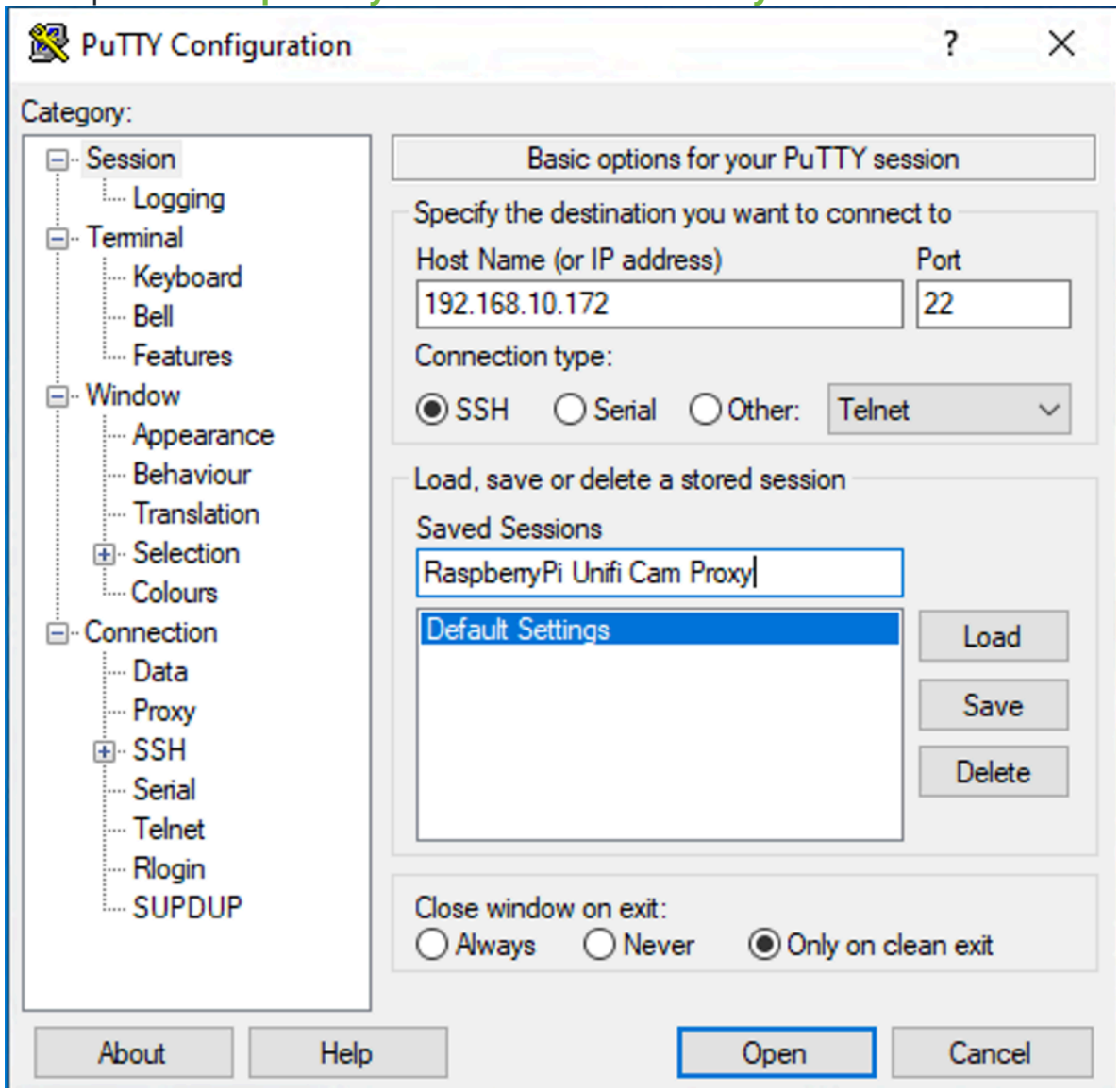
Wait about 20 min to write to the card. Eject card when finished.

3. Place your Basic Image card in to your Raspberry Pi / Connect Network cable / Connect Power / Wait 2 min

– Use utilities like Angry IP Scanner to find your Raspberry Pi IP address for example 192.168.10.172



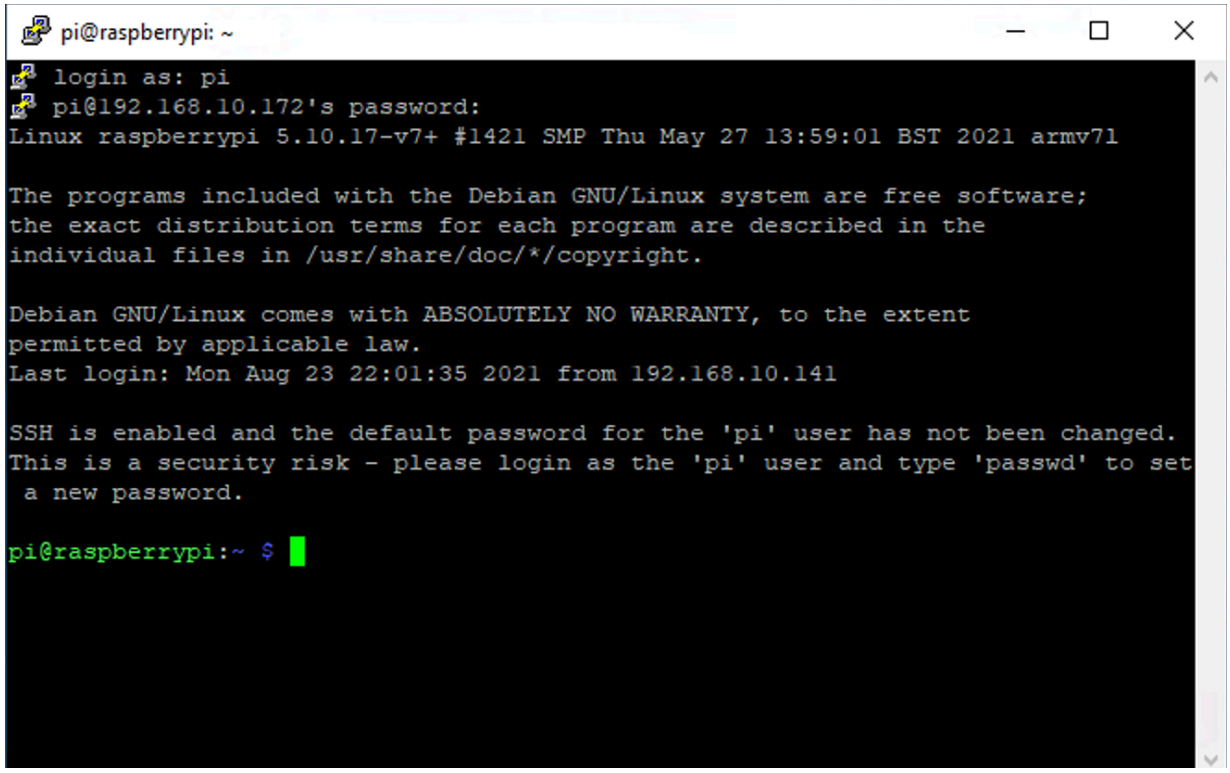
4. Start PuTTy (or vssh on MAC) to SSH into the Raspberry Pi
- Type the RBPi IP address example: 192.168.10.172
- Name your SSH Session in the “Saved Session Box” example: **RaspberryPi Unifi Cam Proxy** and click SAVE



- Load your PuTTy SSH session by clicking the saved session : RaspberryPi Unifi Cam Proxy
- Click Open
- The session will ask for user: **pi** and Password:

raspberry

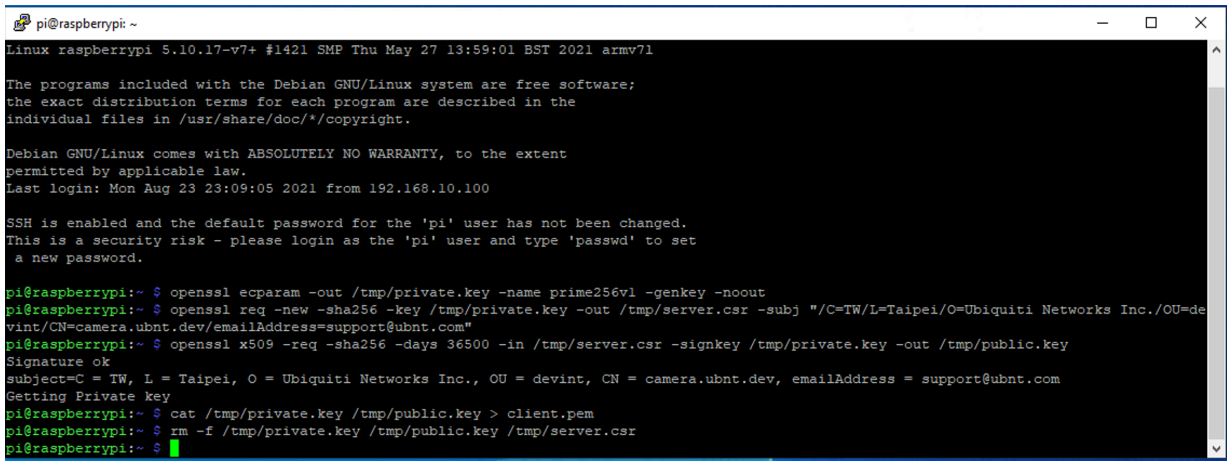
- Change user and password for security in the future



5. Create your own client certificate via cutting and pasting the following into the pi@raspberrypi: (prompt):

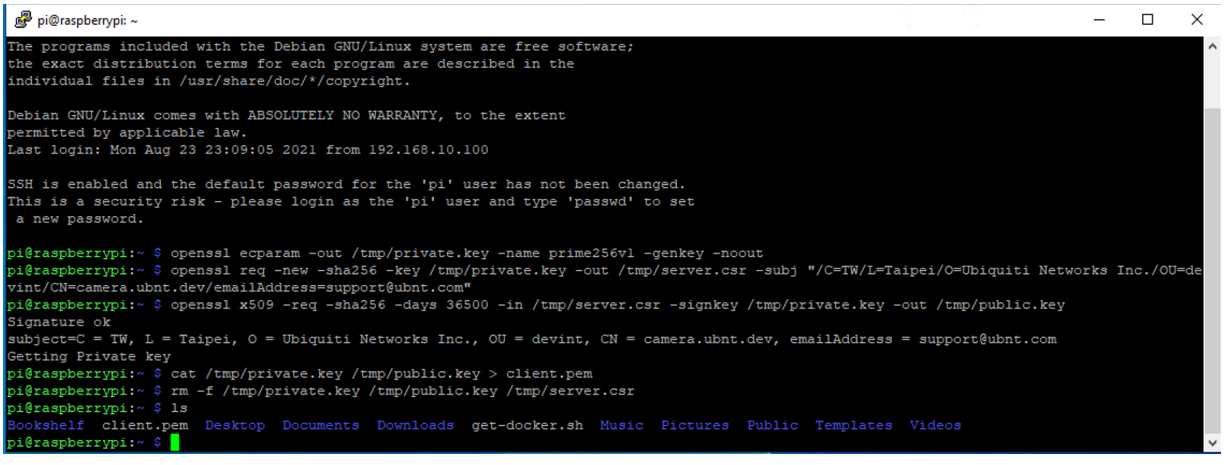
```
openssl ecparam -out /tmp/private.key -name prime256v1
-genkey -noout
openssl req -new -sha256 -key /tmp/private.key -out /
tmp/server.csr -subj "/C=TW/L=Taipei/O=Ubiquiti
Networks Inc./OU=devint/CN=camera.ubnt.dev/
emailAddress=support@ubnt.com"
openssl x509 -req -sha256 -days 36500 -in /tmp/
server.csr -signkey /tmp/private.key -out /tmp/
public.key
cat /tmp/private.key /tmp/public.key > client.pem
rm -f /tmp/private.key /tmp/public.key /tmp/server.csr
```

Hit enter and you will see:



Your own personal client certificate will be created on the RBPi root called client.pem.

You can view the results by typing LS at the prompt. See below.



6. Type : sudo reboot

– wait about 2 min
– start a new Putty session, log in with user and password.

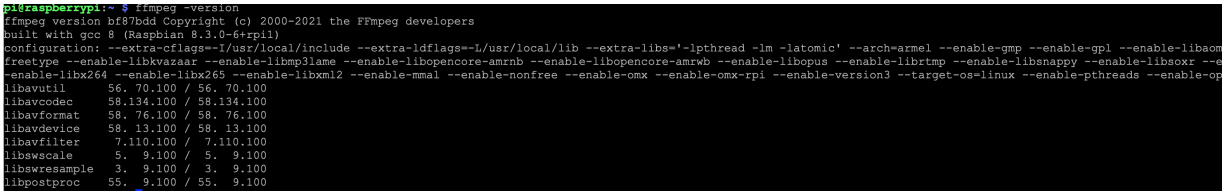
Test your results to make sure your are ready.

Check Version of Unifi-cam-proxy:
unifi-cam-proxy –version (-minus,minus,version)
Should show 0.1.4 or higher

FFMPEG Version Check if you have problems:

ffmpeg —version (-minus,minus,version)

Should be greater than 4.1.6.1 ==> or something like this:



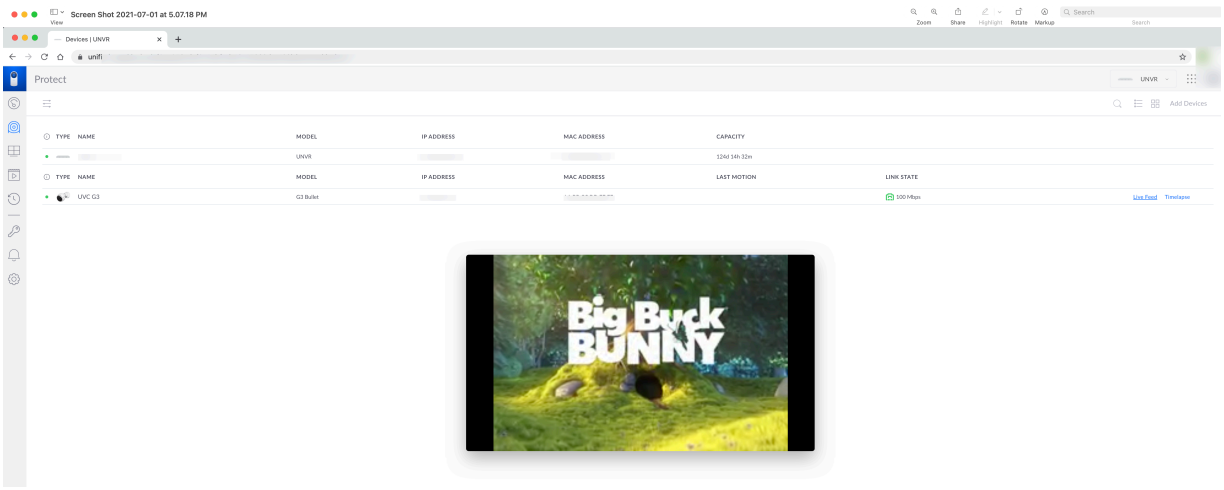
Test the Big Buck Bunny Video
Tested on Unifi Protect 1.18.1 and 1.19.0 on UNVR and UDMP

<u>See This:</u>

https://lindevs.com/install-ffmpeg-on-raspberry-pi/

192.168.XX.YYY is the IP address of of your UNVR or

UDMP ABC3f3nAFPX123FISpZmFSJ8XYZKWHoK is your Token you generated. zsTGLfSbOIX5klS3yGiedYDQYhXoQ95H **unifi-cam-proxy --host 192.168.XX.YYY --cert client.pem --token ABQQQQQQQQQQQQQQQQQQQQQK rtsp -s rtsp://wowzaec2demo.streamlock.net/vod/mp4:BigBuckBunny_175k.mov**



Make new Token on UDMP: iPabkhlk95zuIlu02b4E8ka8O9Cb0eJw
Mine on UDMP: **unifi-cam-proxy --host 192.168.10.1 --cert client.pem --token** iPabkhlk95zuIlu02b4E8ka8O9Cb0eJw **rtsp -s rtsp://wowzaec2demo.streamlock.net/vod/mp4:BigBuckBunny_175k.mov won't work on UDMP 1.19.0**

Make new Token on UNVR: VruHE7Zk516ErKaQcuRfDivmHL4TMKuN
Mine on UNVR: **unifi-cam-proxy --host 192.168.10.157 --cert client.pem --token** VruHE7Zk516ErKaQcuRfDivmHL4TMKuN **rtsp -s rtsp://wowzaec2demo.streamlock.net/vod/mp4:BigBuckBunny_175k.mov won't work on UDMP 1.19.0**

After this code is running on your Pi4B go to the Unifi Protect under interface

A camera UVC3G with IP address of 192.168.1.10 will be running the Bunny movie. Click Live Feed to see it.

Control+Z to stop the Bunny Video.

You are ready to run your one Unifi Cam Proxy for your camera.

For my Hikvision camera I can run these two types of command lines in the Putty command line prompt:

unifi-cam-proxy -H 192.168.10.153 -i 192.168.10.34 -c client.pem -t 123zlvnKnAGVe6AblXmfDOWE1wDABCD hikvision -u admin -p 9Wodda!

-or

unifi-cam-proxy -H 192.168.10.153 --mac 4c:f5:dc:4d:7d:24 -i 192.168.10.34 -c client.pem -t XXXXXZWzfFJp9WoCtxJh3OgFho9qYI hikvision -u admin -p XXXXondaA

Place your own:
UDMP or UNVR IP address: 192.168.10.153
Camera IP Address: 192.168.10.34
Camera MAC Address: 4c:f5:dc:4d:7d:24
Created

Install Raspberry Pi OS from scratch and unifi-cam-proxy steps:

1. Install clean new RBPi Buster O/S on 32GB card from a MAC or PC.
   Go to Youtube link for help: https://www.youtube.com/watch?v=O_0w5EvEmD4

2. Once the image is complete copy the SSH file I provided onto the root directory of the RBPi card.
   Just drag and drop in onto the card. Viewing the card directory you will see the SSH file.
   This step eliminates steps 4 and 5 below of connecting a keyboard, mouse and monitor to the PBPi to set SSH.

3. Install your new card into RBPi computer.

4. Connect RBPi 4B to monitor, mouse keyboard and power. (Skip to step 6 if you copied **SSH file to card**)

5. Boot Pi ==> Configure Pi ==> Go to Raspberry Pi Configuration ==> Interfaces ==> SSH enabled

Reboot. Wait a for the RBPi to complete boot on your network.

Record your Pi4B IP address to connect remotely through Putty on your PC or VSSH on your MAC

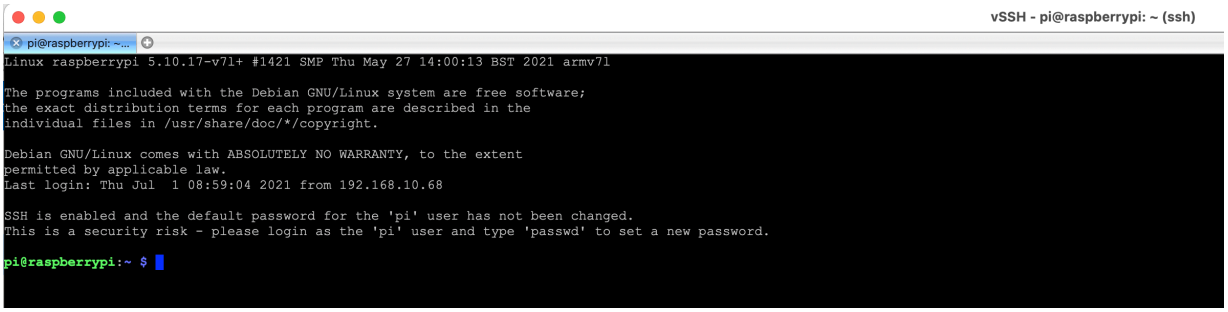
6. Connect remotely via VSSH on MAC. Connect to the correct IP address of the new Raspberry Pi4B on your network.

Use tools like Angry IP Scanner to find the Pi4B on your network.

A connected Pi4B boot should look like this on your remote SSH (MAC/PC) session.

From here you can **cut and paste actions** in the command line.

Commands are listed in green font from here on.



6. Update/upgrade your Raspberry Pi4B OS (will take a while).

Run these 3 commands via SSH. Note this will take a while:

```
sudo apt update
sudo apt full-upgrade
sudo reboot
```

```
pi@raspberrypi:~ $ sudo apt update
Get:1 http://archive.raspberrypi.org/debian buster InRelease [32.6 kB]
Get:2 http://raspbian.raspberrypi.org/raspbian buster InRelease [15.0 kB]
Get:3 http://archive.raspberrypi.org/debian buster/main armhf Packages [375 kB]
Fetched 422 kB in 3s (135 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
2 packages can be upgraded. Run 'apt list --upgradable' to see them.
pi@raspberrypi:~ $ sudo apt full-upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following package was automatically installed and is no longer required:
  python-colorzero
Use 'sudo apt autoremove' to remove it.
The following packages will be upgraded:
  wolfram-engine wolframscript
2 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Need to get 617 MB of archives.
After this operation, 29.9 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.raspberrypi.org/debian buster/main armhf wolframscript armhf 1.5.0+2021042353 [1,686 kB]
Get:2 http://archive.raspberrypi.org/debian buster/main armhf wolfram-engine armhf 12.2.0+2021041101 [615 MB]
Fetched 617 MB in 1min 19s (7,775 kB/s)
Reading changelogs... Done
Preconfiguring packages ...
(Reading database ... 163977 files and directories currently installed.)
Preparing to unpack .../wolframscript_1.5.0+2021042353_armhf.deb ...
Unpacking wolframscript (1.5.0+2021042353) over (1.4.0+2020081702) ...
Preparing to unpack .../wolfram-engine_12.2.0+2021041101_armhf.deb ...
wolfram-eula license has already been accepted
Unpacking wolfram-engine (12.2.0+2021041101) over (12.1.1+2020081901) ...
Setting up wolframscript (1.5.0+2021042353) ...
Setting up wolfram-engine (12.2.0+2021041101) ...
Processing triggers for mime-support (3.62) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for gnome-menus (3.31.4-3) ...
Processing triggers for man-db (2.8.5-2) ...
Processing triggers for shared-mime-info (1.10-1) ...
Processing triggers for desktop-file-utils (0.23-4) ...
pi@raspberrypi:~ $
```

7. Install Python 3.7 via SSH command: With new RBPi O/S you can skip this step. Python 3.7.3 is included

sudo apt install python3

Check Python version

python3 --version

Should show: Python 3.7.3

8. Set Pi to default to Python 3.7.3 With new RBPi O/S you can skip this step. Python 3.7.3 is included

See example: https://www.youtube.com/watch?v=_DI0jgnrDVc

sudo nano ~/.bashrc (move cursor to bottom of code to paste command at the bottom)

Paste: alias python='/usr/bin/python3' Ctl O , ENTER then Ctl X

Run: source ~/.bashrc
python --version

9. Install FFMPEG :

Solution B: See web page below
https://snapcraft.io/install/ffmpeg/raspbian

First:

```
sudo apt update
sudo apt install snapd
sudo reboot
```

Second:

```
sudo snap install core
sudo reboot
```

Third:

```
sudo snap install ffmpeg –classic (-minus,-minus,clasic)
```

Forth - Check version:

```
ffmpeg -version  (-minus, version)
```

Standard Version installed:

```
ffmpeg version 4.1.6-1~deb10u1+rpt2 Copyright
    (c) 2000-2020 the FFmpeg developers
built with gcc 8 (Raspbian 8.3.0-6+rpi1)
```

See this:

https://lindevs.com/install-ffmpeg-on-raspberry-pi/

Un-Install FFMPEG:
sudo apt purge –autoremove -y ffmpeg (- , - , autoremove)

You can upgrade FFMPEG to most current version:
See: **https://ffmpeg.org/download.html**

Get the FFMPEG AP:
git clone https://git.ffmpeg.org/ffmpeg.git ffmpeg

10. Install netcat **sudo apt-get install mplayer netcat**

You have successfully generated a RBPi “basic image” for the Unifi-Cam-Proxy install.
Contains:
- Up to date RBPi O/S
- Python 3
- SSH turned on for remote installs and run through tools like Mac VSSH or PC Putty.
- ffmpeg
- Netcat

Basic Unifi_Cam_Proxy Image Complete (Steps 1-10)

_____

If you were given permission to download the most current “basic-image” (about 6GB) through Drop-Box:
- Download “basic-image” to your computer.
- Download these instructions .PDF
- Go to step 1 and follow directions to burn “basic-image” to the 32GB card.

Use tour new image downloaded and burned or created in steps 1-10.
Place card with new “basic image” into a RBPi computer and complete steps 11-20:

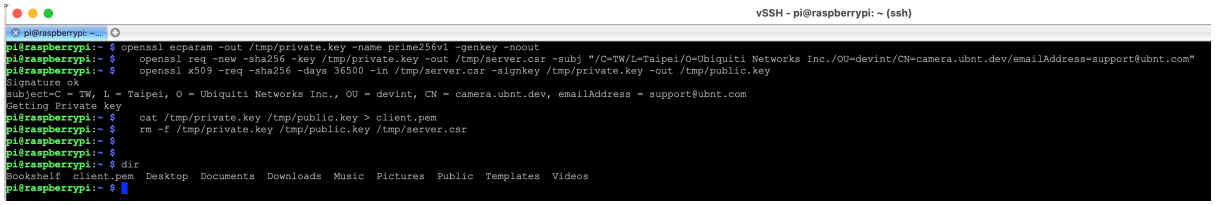
_____

11. Generate client certificate on the Pi root directory by running command **(Cut and paste all of this command in to the command line below and press enter on the last line to run)**

```
openssl ecparam -out /tmp/private.key -name prime256v1 -genkey -noout
openssl req -new -sha256 -key /tmp/private.key -out /tmp/server.csr -subj "/C=TW/L=Taipei/O=Ubiquiti Networks Inc./OU=devint/CN=camera.ubnt.dev/emailAddress=support@ubnt.com"
openssl x509 -req -sha256 -days 36500 -in /tmp/server.csr -signkey /tmp/private.key -out /tmp/public.key
cat /tmp/private.key /tmp/public.key > client.pem
rm -f /tmp/private.key /tmp/public.key /tmp/server.csr
```

```
   dir or ls
```

After these commands run type **DIR** and you see that a **client.pem** file is generated on the Pi4B



12. Generate a token to be used on the UDMP or UNVR. (Not needed **right now** for final Unifi_Cam_Proxy compile)

This is different directions than listed on unifi-cam-proxy Github page.

sudo reboot before step 13

Do an update prior to unify-cm-proxy install:

```
sudo apt update
   sudo apt full-upgrade
   sudo reboot
```

Go to Unifi Protect user interface on your computer (you must have login rights).

A. On the Protect UI, Click Devices (**upper left corner icon**) Then click 'Add Devices' in the **upper right corner** then click Find More Devices **bottom left corner**.

There will be a “pop-up box” selection of Unifi cameras.

Select 'G3 Micro'.
Select 'Continue on Web' and type in a random string for the SSID and Password fields and click 'Generate QR Code'

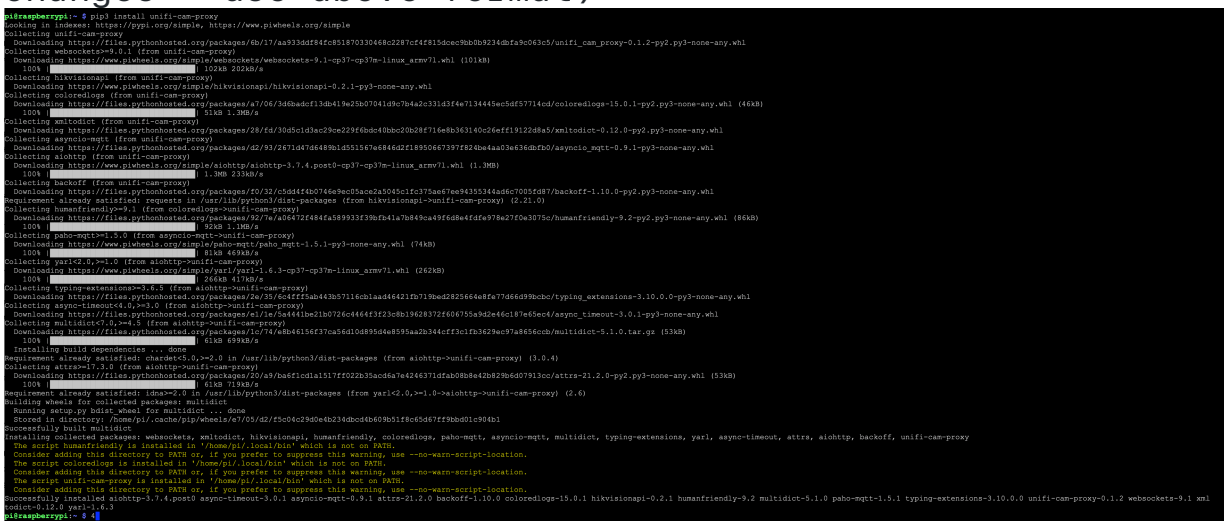
B. With the AP **De-Barcoder** loaded on your phone scan the barcode.
Raw data will appear on the screen
Click Copy to pasteboard button
From your phone email the content to your desktop computer.
Open your desktop computer email.
Copy the second to last line of characters that look something like this: ABC3fQQQQQQQQQQQQ8XYZKWHoK
Record this list of characters for use later as your Token.

13. Now you are ready to install Unifi-Cam-Proxy on your Raspberry Pi 4B

9-6-21: Pre released changes use:

pip3 install git+https://github.com/keshavdv/unifi-cam-proxy.git

pip3 install unifi-cam-proxy (This will install UniFi-cam-proxy but does bot include any of the most recent changes - use above format)



Above looks like a successful install.

Reboot RBPi:

sudo reboot

Unifi-Cam-Proxy Updates and Version Check if you have problems:

On occasion the Proxy firmware is updated.

If you want or need to update your current version run this command:

pip3 install --upgrade unifi-cam-proxy

then **sudo reboot**

Check Version of Unifi-cam-proxy:

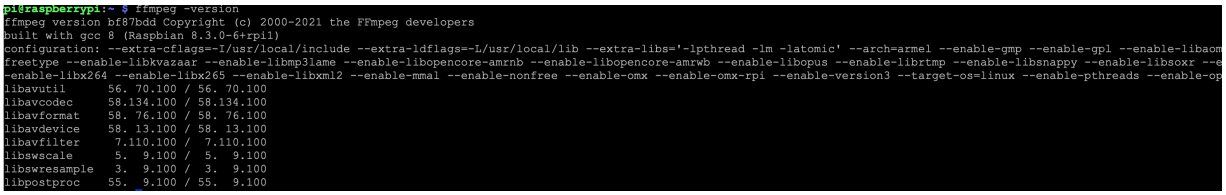
unified-cam-proxy –version (-minus,minus,version)

Should show 0.1.4 or higher

FFMPEG Version Check if you have problems:

ffmpeg -version

Should be greater than 4.1.6.1 ==> or something like this:



Run:

 # RTSP stream

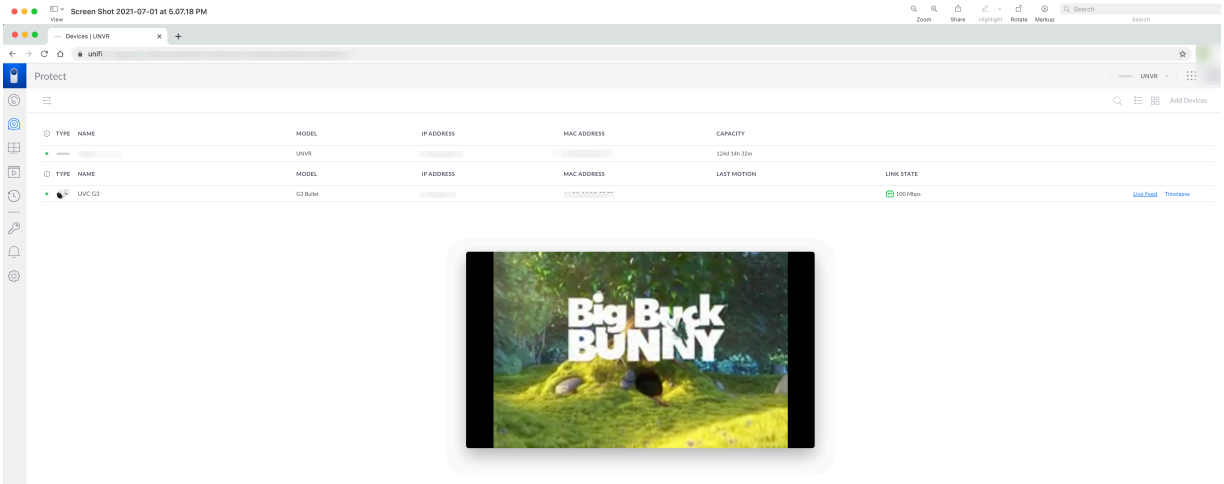
After this you can run the BigBuckBunny test or your specific camera command line

from here. OPTIONAL
Pi4B must be running the unify-cam-proxy at all times on your camera network to serve the proxy tokens for your non-Unifi cameras.

14. **Test your Pi4B OS and unify-cam-proxy install with BigBuckBunny video.**
192.168.XX.YYY is the IP address of of your UNVR or UDMP
ABC3f3nAFPX123FlSpZmFSJ8XYZKWHoK is your Token you generated. zsTGLfSbOIX5klS3yGiedYDQYhXoQ95H
unifi-cam-proxy --host 192.168.XX.YYY --cert client.pem --token ABQQQQQQQQQQQQQQQQQQQQQK rtsp -s rtsp://wowzaec2demo.streamlock.net/vod/mp4:BigBuckBunny_175k.mov

After this code is running on your Pi4B go to the Unifi Protect under interface

A camera UVC3G with IP address of 192.168.1.10 will be running the Bunny movie. Click Live Feed to see it.



Control+Z to stop the Bunny Video.

15. Run the HiKVision camera (other commands for your specific camera)
192.168.19.163 is the IP address of your UNVR or UDMP
192.168.19.94 is the IP address of your camera
user name of camera: admin
Password of camera: 9Wodda!

unifi-cam-proxy -H 192.168.19.163 -i 192.168.19.64 -c client.pem -t 1234lvnKnAGVe6AblXmfDOWE1wD4ABCD hikvision -u admin -p 9Wodda!

Open up the UDMP user interface to view Live Stream for the new camera added.

16. From power off:

unifi-cam-proxy -H 192.168.10.153 -i 192.168.10.64 -c client.pem -t 123zlvnKnAGVe6AblXmfDOWE1wDABCD hikvision -u admin -p 9Wodda!

If you get command line fail - generate a new token goto step 10.

unifi-cam-proxy -H 192.168.10.153 -i 192.168.10.64 -c client.pem -t 123xSH3OGqS9ABCi9QhE1a9vm333Yz8R hikvision -u admin -p 9Wodda!

Run: source ~/.bashrc

17. Run python --version

Run update for current Unifi Proxi software:
pip3 install --upgrade unifi-cam-proxy
sudo reboot

18. Backup your card to an image file
OPTIONAL

Example for help: https://www.youtube.com/watch?v=Nc3YyANoOeQ

Pull card from Pi. Plug card into adapter. Plug into MAC. Once card sees BOOT image use Disk Utility Tools to find out what DRIVE # it is IE: 4
Change the drive number below from 1 to drive number of BOOT disk. This process to create an image will take some time.

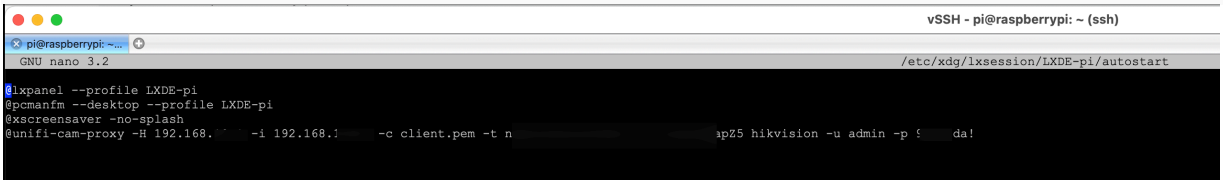
Run this command in the MAC terminal:
sudo dd if=/dev/disk4 of=~/Desktop/PiSDCardBackup.dmg

19. Burn new card with IMAGE backup. Use Etcher 2

20 Auto Run Unifi-Cam-Proxi when your Pi boots.
OPTIONAL

Example for help: http?s://www.youtube.com/watch?v=RFyqi5Utcqw

Boot Pi
Run : sudo nano /etc/xdg/lxsession/LXDE-pi/autostart
Add on the last line you command line for to run your Unifi-Cam-Proxy command:
@unifi-cam-proxy -H 192.168.XX.Y -i 192.168.XX.ZZ -c client.pem -t nQQQQQQQQQQQQQQQQQQpZ5 hikvision -u admin -p PPPPPa!
Control-O / Control-Z (Updates your lxsession boot file
Sudo Reboot



21. Add Docker to Raspberry Pi Image:

See https://phoenixnap.com/kb/docker-on-raspberry-pi

Make sure image is updated:

```
sudo apt-get update && sudo apt-get upgrade

curl -fsSL https://get.docker.com -o get-
docker.sh

sudo sh get-docker.sh

Add a root:

sudo usermod -aG docker pi

docker version

docker info
```

File Backup Version Dates:

8-23-21 Made Pi image for backup called:
Unifi_Cam_Proxy8_23_21Private
Unifi_Cam_Proxy8_23_21Public

Private version includes my Private .PEM Keys
Public Version the .PEM key is removed.
Unifi-Cam-Proxy Version 0.1.4
FFMPEG :ffmpeg version 4.1.6-1~deb10u1+rpt2
Copyright (c) 2000-2020 the FFmpeg developers
built with gcc 8 (Raspbian 8.3.0-6+rpi1)
Notes: All Hikvision cameras work great!
Runs the Big Buck Bunny Video
Tested on Unifi Protect 1.18.1 and 1.19.0 on UNVR and UDMP

Camera Tested: