Experiment-5

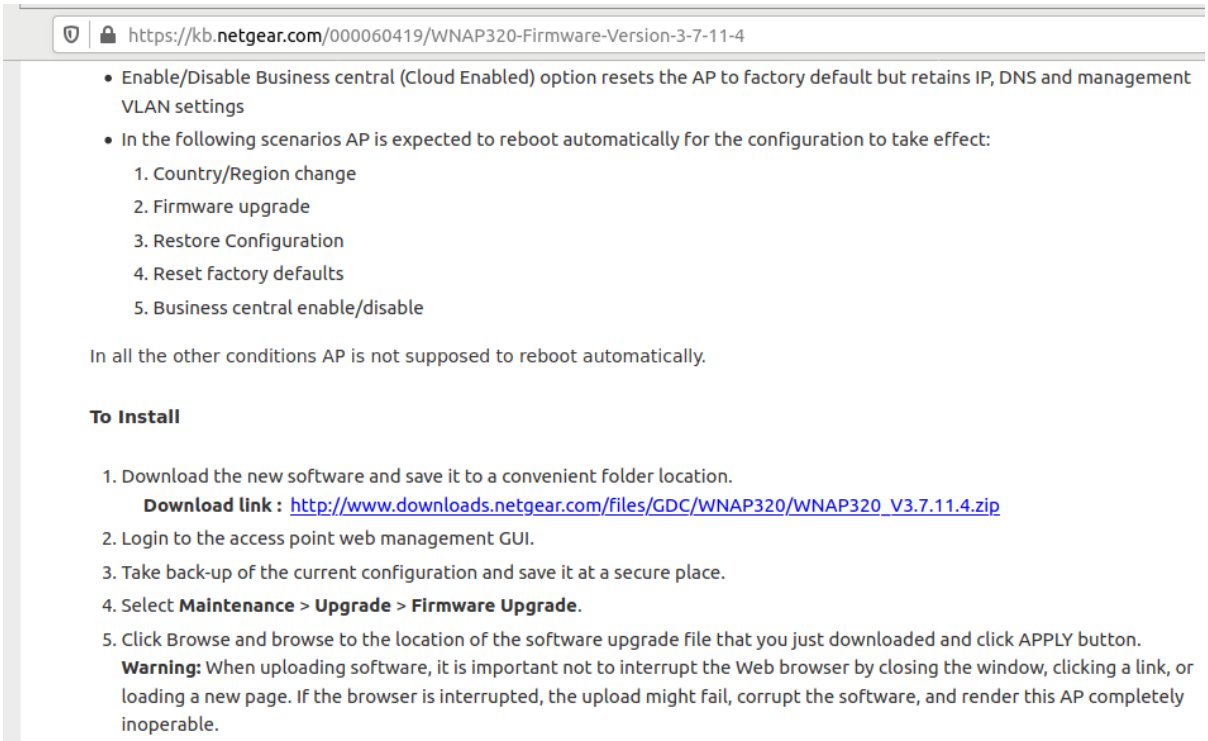
AIM: Emulation an IOT firmware using the Firmware emulator.

Step 1: First, we have to download the firmware name for that we have to visit the Netgear website.

Step 2: To download WNAP320-Firmware follow the below link.

- http://www.downloads.netgear.com/files/GDC/WNAP320/WNAP320_V3.7.11.4.zip

Step 3: In firmware WNAP320 we have to use the WNAP320-Firmware-Version-3-7-11-4 version.



Step 4: Open terminal & write ls/ cd tools/ ls firmware – analysis-toolkit Enter into cd tools for use of firmware analysis toolkit.

```
root@attifyos:/home/iot# ls
Arduino    Downloads  ghidra_scripts  package.json       sketchbook
bin        esp        go              package-lock.json  Templates
Desktop    esp32      Music           Pictures           tools
Documents  ex.txt     node_modules    Public             Videos
root@attifyos:/home/iot# cd tools/
root@attifyos:/home/iot/tools# ls
arduino                   gr-gsm              ook-decoder
baudrate                  gr-paint            openocd
bdaddr                    hackrf              qiling
bettercap                 inspectrum          radare2
buildroot-2019.02.9       jadx                rfcat_150225
burpsuite.jar             kalibrate-rtl       routersploit
create_ap                 killerbee           rtl_433
Cutter                    libbtbb-2018-12-R1  rtl-sdr
drivers                   libmpsse            scapy
dspectrumgui              liquid-dsp          spectrum_painter
dump1090                  LTE-Cell-Scanner    ubertooth-2018-12-R1
firmware-analysis-toolkit nmap                urh
ghidra_9.1.2_PUBLIC       node_modules
root@attifyos:/home/iot/tools# cd firmware-analysis-toolkit/
root@attifyos:/home/iot/tools/firmware-analysis-toolkit# ls
 binwalk      firmadyne     README.md  'WNAP320 Firmware Version 2.0.3.zip'
 fat.config   LICENSE       reset.py
```

Step 5: Enter into the firmware analysis toolkit we can show a list of directories in the firmware analysis toolkit. After that enters into fat.config file with the help of the cat command. After that,we can see sudo_password in fat.config

cat fat. Config

```
root@attifyos:/home/iot/tools# cd firmware-analysis-toolkit/
root@attifyos:/home/iot/tools/firmware-analysis-toolkit# ls
 binwalk      firmadyne     README.md  'WNAP320 Firmware Version 2.0.3.zip'
 fat.config   LICENSE       reset.py
 fat.py       qemu-builds   setup.sh
root@attifyos:/home/iot/tools/firmware-analysis-toolkit# cat fat.config
[DEFAULT]
sudo_password=attify
firmadyne_path=/home/iot/tools/firmware-analysis-toolkit/firmadyne
root@attifyos:/home/iot/tools/firmware-analysis-toolkit# ls
 binwalk      firmadyne     README.md  'WNAP320 Firmware Version 2.0.3.zip'
 fat.config   LICENSE       reset.py
 fat.py       qemu-builds   setup.sh
```

Step 6: Then enter into the ./fat.py file to see so many files are in the ./fat.py file. this file is used to gain the device to be accessible for all files & perform activities in the device.This fat creates an IP address to emulate the device.

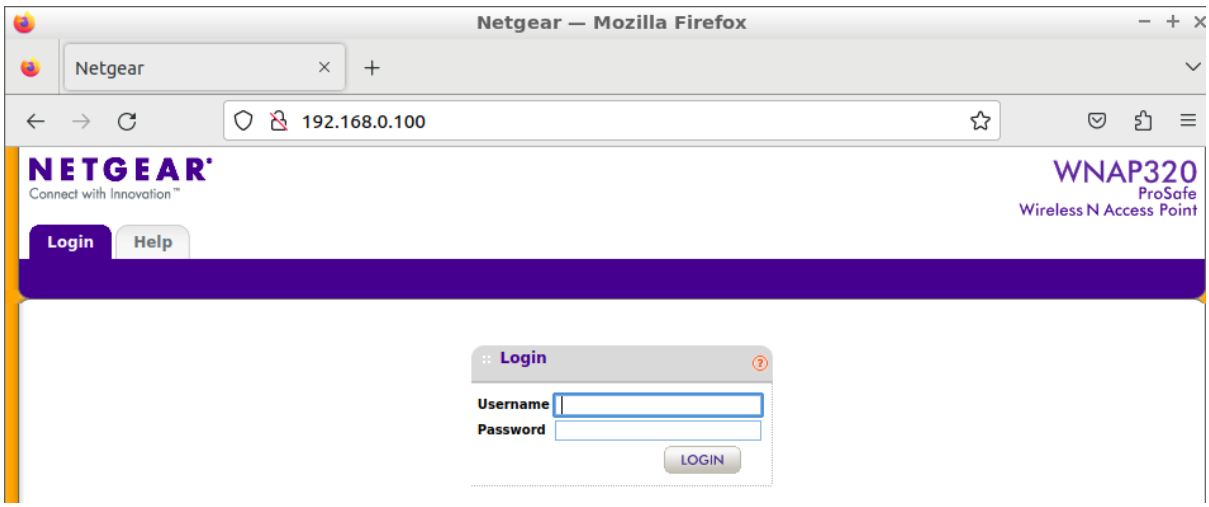
./fat.py 'file path'

```
root@attifyos:/home/iot/tools/firmware-analysis-toolkit# ./fat.py '/home/iot/Dow
nloads/rootfs.squashfs'

                                 __          _
                                / _|        | |
                               | |_    __ _  | |_
                               |  _|  / _` | | __|
                               | |   | (_| | | |_
                               |_|    \__,_|  \__|

                Welcome to the Firmware Analysis Toolkit - v0.3
    Offensive IoT Exploitation Training http://bit.do/offensiveiotexploitation
                  By Attify - https://attify.com  | @attifyme

[+] Firmware: rootfs.squashfs
[+] Extracting the firmware...
[+] Image ID: 11
[+] Identifying architecture...
[+] Architecture: mipseb
[+] Building QEMU disk image...
[+] Setting up the network connection, please standby...
```

Step 7: After performing fat create that is create an IP address to emulate IoT devices.

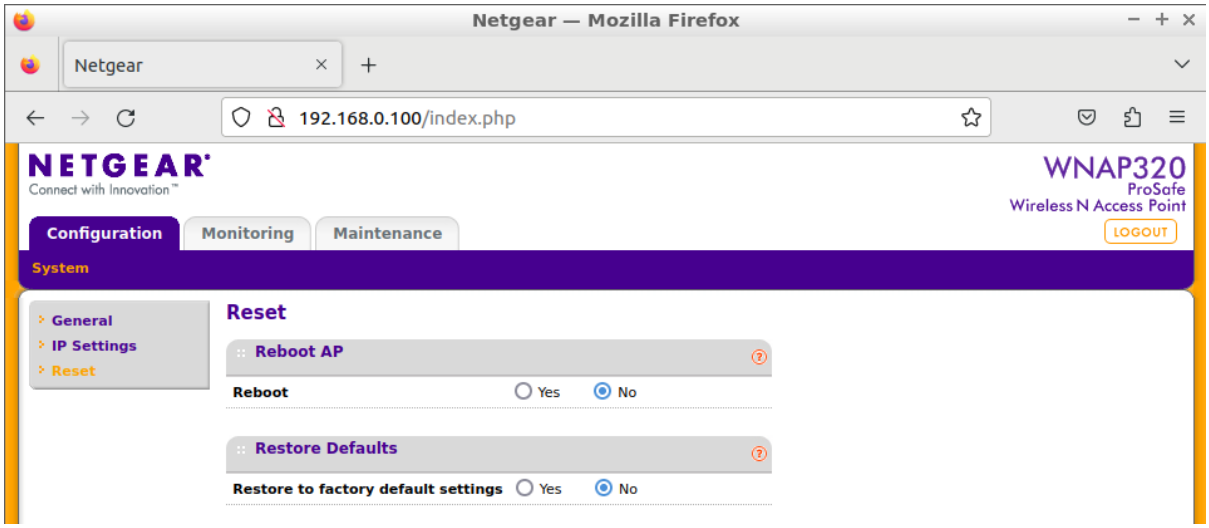
This IP address runs into a browser that can show a login page of the DIR-300 device.

After entering login credentials like Username & password. Username & password shows in emulating process use of FAT.



Step 8: After entering the Username & password we can redirect to the page of this device for emulating that's IoT device. we can access files & perform any activity on this device.

We can change or modify the data of this device.



- We can show the configuration, maintenance & monitoring section on this page. we can perform any activity, change, or modify a file in this section.

Conclusion: To perform emulation for an IOT device we can create a page of DIR 300 firmware with the use of a firmware analysis toolkit. This tool kit creates an IP address for DIR300. we can run this IP address on the browser. We can show the page of DIR 300 then enter Username & password which can show in the fat emulation process. Then perform any activity, change, or modify file in the IoT device. In this way, we can perform emulation of IoT device.