

EPAM University Programs
DevOps external course
Module 4 Linux & Bash Essentials
TASK 4.5

1. To discover files with active sticky bits, use the following version of the **find** command:

```
sudo find / -perm /6000 -type f -exec ls -ld {} \;>setuid.txt
```

Put into your report a fragment of setuid.txt file. Explain meaning of parameters of the above **find** command (hint: use find's man page).

```
bobrov@bobrov-VirtualBox:~$ cat setuid.txt
-rwsr-xr-x 1 root root 44664 6ep 22 2019 /bin/su
-rwsr-xr-x 1 root root 43088 6ep 5 19:23 /bin/mount
-rwsr-xr-x 1 root root 64424 4ep 28 2019 /bin/ping
-rwsr-xr-x 1 root root 26696 6ep 5 19:23 /bin/umount
-rwsr-xr-x 1 root root 30800 4ep 11 2016 /bin/fusermount
-rwsr-xr-x 1 root root 22528 4ep 28 2019 /usr/bin/arping
-rwsr-xr-x 1 root root 149080 4ep 31 19:18 /usr/bin/sudo
-rwxr-sr-x 1 root ssh 362640 6ep 4 2019 /usr/bin/ssh-agent
-rwsr-xr-x 1 root root 76496 6ep 22 2019 /usr/bin/chfn
-rwsr-xr-x 1 root root 59640 6ep 22 2019 /usr/bin/passwd
-rwsr-xr-x 1 root root 18448 4ep 28 2019 /usr/bin/traceroute6.iputils
-rwxr-sr-x 1 root mlocate 43088 6ep 1 2018 /usr/bin/mlocate
-rwsr-xr-x 1 root root 75824 6ep 22 2019 /usr/bin/gpasswd
-rwsr-xr-x 1 root root 44528 6ep 22 2019 /usr/bin/chsh
-rwxr-sr-x 1 root crontab 39352 4ep 16 2017 /usr/bin/crontab
-rwxr-sr-x 1 root shadow 22808 6ep 22 2019 /usr/bin/expiry
-rwxr-sr-x 1 root tty 14328 4ep 17 2018 /usr/bin/bsd-write
-rwsr-xr-x 1 root root 22520 6ep 27 2019 /usr/bin/pkexec
-rwxr-sr-x 1 root shadow 71816 6ep 22 2019 /usr/bin/chage
-rwsr-xr-x 1 root root 40344 6ep 22 2019 /usr/bin/newgrp
-rwxr-sr-x 1 root tty 30800 6ep 5 19:23 /usr/bin/wall
-rwsr-xr-x 1 root root 10232 6ep 28 2017 /usr/lib/eject/dmccrypt-get-device
-rwsr-sr-x 1 root root 10232 4ep 18 10:15 /usr/lib/xorg/Xorg.wrap
```

This command searches only files (**-type f**) with a permission mask of 6000 (**-perm /6000**) and then writes to a file (**>setuid.txt**) detailed information about the files found (**-exec ls -ld {} **).

2. Discovering soft and hard links.

Comment on results of these commands (place the output into your report):

cd — Command to go to the home directory.

mkdir test — Command to create directory with name “test”.

cd test — Command to go to the directory “test”.

touch test1.txt — Command to create empty file “test1.txt”.

echo “test1.txt” > test1.txt — Command to write text “test1.txt” to the file test1.txt.

ls -l — Command to displays full information in directory. We have one file with one link.

```
bobrov@bobrov-VirtualBox:~$ cd
bobrov@bobrov-VirtualBox:~$ mkdir test
bobrov@bobrov-VirtualBox:~$ cd test
bobrov@bobrov-VirtualBox:~/test$ touch test1.txt
bobrov@bobrov-VirtualBox:~/test$ echo "test1.txt" > test1.txt
bobrov@bobrov-VirtualBox:~/test$ ls -l
total 4
-rw-rw-r-- 1 bobrov bobrov 10 Kbi 19 02:20 test1.txt
```

(a hard link)

ln test1.txt test2.txt — Command to create a hard link test2.txt for the file test1.txt.

ls -l — Command to displays full information in directory. We have two files, each has two hard links.

echo “test2.txt” > test2.txt — Command to write text “test2.txt” to the link test2.txt.

cat test1.txt test2.txt — Command to show text from file test1.txt and hard link test2.txt. The text is the same.

rm test1.txt — Command to delete the file test1.txt.

ls -l — Command to displays full information in directory. We have one hard link test2.txt.

```
bobrov@bobrov-VirtualBox:~/test$ ln test1.txt test2.txt
bobrov@bobrov-VirtualBox:~/test$ ls -l
total 8
-rw-rw-r-- 2 bobrov bobrov 10 Kbi 19 02:20 test1.txt
-rw-rw-r-- 2 bobrov bobrov 10 Kbi 19 02:20 test2.txt
bobrov@bobrov-VirtualBox:~/test$ echo "test2.txt" > test2.txt
bobrov@bobrov-VirtualBox:~/test$ cat test1.txt test2.txt
test2.txt
test2.txt
bobrov@bobrov-VirtualBox:~/test$ rm test1.txt
bobrov@bobrov-VirtualBox:~/test$ ls -l
total 4
-rw-rw-r-- 1 bobrov bobrov 10 Kbi 19 02:22 test2.txt
```

(now a soft link)

ln -s test2.txt test3.txt – Command to create a soft link test3.txt for the file test2.txt.

ls -l – Command to displays full information in the directory. We have one file test2.txt and soft link test3.txt which refers to the file test2.txt.

rm test2.txt; ls -l – Commands to delete the file test2.txt and then to displays full information in the directory. We have one soft link test3.txt which refer to deleted file test2.txt.

```
bobrov@bobrov-VirtualBox:~/test$ ln -s test2.txt test3.txt
bobrov@bobrov-VirtualBox:~/test$ ls -l
total 4
-rw-rw-r-- 1 bobrov bobrov 10 Kbi 19 02:22 test2.txt
lrwxrwxrwx 1 bobrov bobrov  9 Kbi 19 02:24 test3.txt -> test2.txt
bobrov@bobrov-VirtualBox:~/test$ rm test2.txt; ls -l
total 0
lrwxrwxrwx 1 bobrov bobrov  9 Kbi 19 02:24 test3.txt -> test2.txt
```

3. I/O redirect.

Execute these commands; comment on the output.

Mount – command to display a list of all connected devices

```
root@bobrov-VirtualBox:~# mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
udev on /dev type devtmpfs (rw,nosuid,relatime,size=1991000k,nr_inodes=497750,mode=755)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,noexec,relatime,size=403072k,mode=755)
/dev/sda1 on / type ext4 (rw,relatime,errors=remount-ro)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,mode=755)
```

blkid – Command run with sudo to display the information contained in the /etc/blkid.tab file. list of all connected block device attributes at the time of system startup.

`sudo blkid -c /dev/null` – command to list of all connected block device attributes at present time.

```
bobrov@bobrov-VirtualBox:~$ sudo blkid
/dev/loop0: TYPE="squashfs"
/dev/loop1: TYPE="squashfs"
/dev/loop2: TYPE="squashfs"
/dev/loop3: TYPE="squashfs"
/dev/loop4: TYPE="squashfs"
/dev/loop5: TYPE="squashfs"
/dev/loop6: TYPE="squashfs"
/dev/loop7: TYPE="squashfs"
/dev/sda1: UUID="a532a8df-c97a-4cc2-bb53-44d66da3c5d5" TYPE="ext4" PARTUUID="5fa72479-01"
/dev/loop8: TYPE="squashfs"
/dev/loop9: TYPE="squashfs"
/dev/loop10: TYPE="squashfs"
/dev/loop12: TYPE="squashfs"
/dev/loop13: TYPE="squashfs"
/dev/loop14: TYPE="squashfs"
/dev/loop15: TYPE="squashfs"
bobrov@bobrov-VirtualBox:~$
```

mount | grep sda – the command filters the lists of all connected devices by the word sda.

```
root@bobrov-VirtualBox:~# mount | grep sda
/dev/sda1 on / type ext4 (rw,relatime,errors=remount-ro)
```

dmesg | grep sda – the command filters the list the kernel ring buffer by the word sda.

```
bobrov@bobrov-VirtualBox:~$ dmesg | grep sda
[ 1.940902] sd 2:0:0:0: [sda] 53400128 512-byte logical blocks: (27.3 GB/25.5 GiB)
[ 1.940915] sd 2:0:0:0: [sda] Write Protect is off
[ 1.940916] sd 2:0:0:0: [sda] Mode Sense: 00 3a 00 00
[ 1.940936] sd 2:0:0:0: [sda] Write cache: enabled, read cache: enabled, doesn't support DPO or FUA
[ 1.945252] sda: sda1
[ 1.945560] sd 2:0:0:0: [sda] Attached SCSI disk
[ 2.509506] EXT4-fs (sda1): mounted filesystem with ordered data mode. Opts: (null)
[ 2.938773] EXT4-fs (sda1): re-mounted. Opts: errors=remount-ro
bobrov@bobrov-VirtualBox:~$
```

sudo grep -R -e "root" /etc > root_entries.txt

– the command looks for lines with the word "root" in the /etc folder and all subfolders and writes them to a file root_entries.txt

```
bobrov@bobrov-VirtualBox:~$ cat root_entries.txt
/etc/grub.d/00_header:datarootdir="/usr/share"
/etc/grub.d/00_header:export TEXTDOMAINDIR="{datarootdir}/locale"
/etc/grub.d/00_header:if loadfont `make_system_path_relative_to_its_root "${GRUB_FONT}"` ; then
/etc/grub.d/00_header:    font=`make_system_path_relative_to_its_root "${font_path}"`"
/etc/grub.d/00_header:loadfont (\$root)`make_system_path_relative_to_its_root \$x`
/etc/grub.d/00_header:set theme=(\$root)`make_system_path_relative_to_its_root \$GRUB_THEME`
/etc/grub.d/00_header:background_image -m stretch `make_system_path_relative_to_its_root "\$GRUB_BACKGROUND"`
/etc/grub.d/20_memtest86+: MEMTESTPATH=$( make_system_path_relative_to_its_root "/boot/memtest86+.elf" )
/etc/grub.d/20_memtest86+: MEMTESTPATH=$( make_system_path_relative_to_its_root "/boot/memtest86+.bin" )
/etc/grub.d/20_memtest86+:# MEMTESTPATH=$( make_system_path_relative_to_its_root "/boot/memtest86+_multiboot.bin" )
/etc/grub.d/10_linux:datarootdir="/usr/share"
/etc/grub.d/10_linux:export TEXTDOMAINDIR="{datarootdir}/locale"
/etc/grub.d/10_linux:# loop-AES arranges things so that /dev/loop/X can be our root device, but
/etc/grub.d/10_linux:# btrfs may reside on multiple devices. We cannot pass them as value of root= parameter
/etc/grub.d/10_linux:    rootsubvol=`make_system_path_relative_to_its_root /`"
```