

EPAM University Programs
DevOps external course
Module 4 Linux & Bash Essentials
TASK 4.6

1. *User management*. Here we suppose there are at least two users, namely, root and guest.

(i) Create a new user *user*

groupadd user

useradd -g user -s /bin/bash -d /home/user -m user

passwd user

id user

ls -ld /home/user

(ii) Log in to the system as “user” (hint use **su**).

```
user@user-VirtualBox:~/test$ sudo groupadd demo
user@user-VirtualBox:~/test$ sudo useradd -g demo -s /bin/bash -d /home/demo -m demo
user@user-VirtualBox:~/test$ passwd demo
passwd: You may not view or modify password information for demo.
user@user-VirtualBox:~/test$ sudo passwd demo
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
user@user-VirtualBox:~/test$ id demo
uid=1002(demo) gid=1002(demo) groups=1002(demo)
user@user-VirtualBox:~/test$ ls -ld /home/demo/
drwxr-xr-x 2 demo demo 4096 kbi 23 23:51 /home/demo/
user@user-VirtualBox:~/test$ man su
user@user-VirtualBox:~/test$ su demo
Password:
demo@user-VirtualBox:/home/user/test$ who
user      :0                2020-04-14 23:42 (:0)
demo@user-VirtualBox:/home/user/test$ who
user      :0                2020-04-14 23:42 (:0)
demo@user-VirtualBox:/home/user/test$ whoami
demo
demo@user-VirtualBox:/home/user/test$
```

(ii) Edit **/etc/passwd** to prevent user *user* from logging in to the system.

```
user@user-VirtualBox:~/test$ su demo
Password:
su: Authentication failure
user@user-VirtualBox:~/test$ su demo
Password:
su: Authentication failure
user@user-VirtualBox:~/test$
```

2. Content of **/etc/passwd** and **/etc/group**.

(i) Look through **/etc/passwd** and **/etc/group** (hint: use **less** or **cat**).

```
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd/netif:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd/resolve:/usr/sbin/nologin
syslog:x:102:106:/:/home/syslog:/usr/sbin/nologin
messagebus:x:103:107:/:/nonexistent:/usr/sbin/nologin
_apt:x:104:65534:/:/nonexistent:/usr/sbin/nologin
uidd:x:105:111:/:/run/uidd:/usr/sbin/nologin
avahi-autoipd:x:106:112:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin/nologin
usbmux:x:107:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
dnsmasq:x:108:65534:dnsmasq,,,:/var/lib/misc:/usr/sbin/nologin
rtkit:x:109:114:RealtimeKit,,,:/proc:/usr/sbin/nologin
cups-pk-helper:x:110:116:user for cups-pk-helper service,,,:/home/cups-pk-helper:/usr/sbin/nologin
speech-dispatcher:x:111:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false
whoopsie:x:112:117:/:/nonexistent:/bin/false
kernoops:x:113:65534:Kernel Oops Tracking Daemon,,,:/usr/sbin/nologin
saned:x:114:119:/:/var/lib/saned:/usr/sbin/nologin
pulse:x:115:120:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
avahi:x:116:122:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/usr/sbin/nologin
colord:x:117:123:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
hplip:x:118:7:HPLIP system user,,,:/var/run/hplip:/bin/false
geoclue:x:119:124:/:/var/lib/geoclue:/usr/sbin/nologin
gnome-initial-setup:x:120:65534:/:/run/gnome-initial-setup:/bin/false
gdm:x:121:125:Gnome Display Manager:/var/lib/gdm3:/bin/false
user:x:1000:1000:user,,,:/home/user:/bin/bash
sshd:x:122:65534:/:/run/sshd:/usr/sbin/nologin
vboxadd:x:999:1:/:/var/run/vboxadd:/bin/false
vagrant:x:1001:1001:,,,:/home/vagrant:/bin/bash
lxd:x:123:65534:/:/var/lib/lxd:/bin/false
demo*:1002:1002:/:/home/demo:/bin/bash
user@user-VirtualBox:~/test$
```

```
crontab:x:105:
syslog:x:106:
messagebus:x:107:
netdev:x:108:
mlocate:x:109:
ssl-cert:x:110:
uucdd:x:111:
avahi-autoipd:x:112:
bluetooth:x:113:
rtkit:x:114:
ssh:x:115:
lpadmin:x:116:user
whoopsie:x:117:
scanner:x:118:saned
saned:x:119:
pulse:x:120:
pulse-access:x:121:
avahi:x:122:
colord:x:123:
geoclue:x:124:
gdm:x:125:
user:x:1000:
smbshare:x:126:user
vboxsf:x:999:
vagrant:x:1001:
lxd:x:127:user,vagrant
docker:x:998:user
microk8s:x:997:user
demo:x:1002:
user@user-VirtualBox:~/test$
```

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(ii) Get data from **/etc/passwd** and **/etc/group** about users: *root*, *guest*, *user* (hint: filter by **grep**).

```

user@user-VirtualBox:~/test$ cat /etc/passwd | grep root
root:x:0:0:root:/root:/bin/bash
user@user-VirtualBox:~/test$ cat /etc/passwd | grep guest
user@user-VirtualBox:~/test$ cat /etc/passwd | grep user
cups-pk-helper:x:110:116:user for cups-pk-helper service,,,:/home/cups-pk-helper:/usr/sbin/nologin
hplip:x:118:7:HPLIP system user,,,:/var/run/hplip:/bin/false
user:x:1000:1000:user,,,:/home/user:/bin/bash
user@user-VirtualBox:~/test$ cat /etc/passwd | grep demo
demo:*:1002:1002::/home/demo:/bin/bash
user@user-VirtualBox:~/test$ cat /etc/group | grep root
root:x:0:
user@user-VirtualBox:~/test$ cat /etc/group | grep user
adm:x:4:syslog,user
cdrom:x:24:user
sudo:x:27:user,vagrant
dip:x:30:user
plugdev:x:46:user
users:x:100:
lpadmin:x:116:user
user:x:1000:
sambashare:x:126:user
lxd:x:127:user,vagrant
docker:x:998:user
microk8s:x:997:user
user@user-VirtualBox:~/test$ cat /etc/group | grep demo
demo:x:1002:
user@user-VirtualBox:~/test$

```

(iii) Parse **/etc/passwd** and **/etc/group** with cut.

cut -f1 -d: /etc/passwd

```
_apt  
uidd  
avahi-autoipd  
usbmux  
dnsmasq  
rtkit  
cups-pk-helper  
speech-dispatcher  
whoopsie  
kernoops  
saned  
pulse  
avahi  
colord  
hplip  
geoclue  
gnome-initial-setup  
gdm  
user  
sshd  
vboxadd  
vagrant  
lxd  
demo  
user@user-VirtualBox:~/test$
```

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cut -f1,2 -d: /etc/passwd

```
_apt:x
uuidd:x
avahi-autoipd:x
usbmux:x
dnsmasq:x
rtkit:x
cups-pk-helper:x
speech-dispatcher:x
whoopsie:x
kernoops:x
saned:x
pulse:x
avahi:x
colord:x
hplip:x
geoclue:x
gnome-initial-setup:x
gdm:x
user:x
sshd:x
vboxadd:x
vagrant:x
lxd:x
demo:*
user@user-VirtualBox:~/test$
```

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cut -f1,7 -d: /etc/passwd

```
uidd:/usr/sbin/nologin
avahi-autoipd:/usr/sbin/nologin
usbmux:/usr/sbin/nologin
dnsmasq:/usr/sbin/nologin
rtkit:/usr/sbin/nologin
cups-pk-helper:/usr/sbin/nologin
speech-dispatcher:/bin/false
whoopsie:/bin/false
kernoops:/usr/sbin/nologin
saned:/usr/sbin/nologin
pulse:/usr/sbin/nologin
avahi:/usr/sbin/nologin
colord:/usr/sbin/nologin
hplip:/bin/false
geoclue:/usr/sbin/nologin
gnome-initial-setup:/bin/false
gdm:/bin/false
user:/bin/bash
sshd:/usr/sbin/nologin
vboxadd:/bin/false
vagrant:/bin/bash
lxd:/bin/false
demo:/bin/bash
user@user-VirtualBox:~/test$
```

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cut -f1 -d: /etc/group


```
avahi-autoipd
avahi
bluetooth
rtkit
ssh
lpadmin
whoopsie
scanner
sane
pulse
pulse-access
avahi
colord
geoclue
gdm
user
smbshare
vboxsf
vagrant
lxd
docker
microk8s
demo
user@user-VirtualBox:~/test$
```

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cut -f1,2 -d: /etc/group

```
netdev:x
mlocate:x
ssl-cert:x
uuid:x
avahi-autoipd:x
bluetooth:x
rtkit:x
ssh:x
lpadmin:x
whoopsie:x
scanner:x
saned:x
pulse:x
pulse-access:x
avahi:x
colord:x
geoclue:x
gdm:x
user:x
smbshare:x
vboxsf:x
vagrant:x
lxd:x
docker:x
microk8s:x
demo:x
user@user-VirtualBox:~/test$
```

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(iv) Try to call **less** on **/etc/shadow** and invoke
sudo less /etc/shadow

```
root!!:18352:0:99999:7:::
daemon*:18295:0:99999:7:::
bin*:18295:0:99999:7:::
sys*:18295:0:99999:7:::
sync*:18295:0:99999:7:::
games*:18295:0:99999:7:::
man*:18295:0:99999:7:::
lp*:18295:0:99999:7:::
mail*:18295:0:99999:7:::
news*:18295:0:99999:7:::
uucp*:18295:0:99999:7:::
proxy*:18295:0:99999:7:::
www-data*:18295:0:99999:7:::
backup*:18295:0:99999:7:::
list*:18295:0:99999:7:::
irc*:18295:0:99999:7:::
gnats*:18295:0:99999:7:::
nobody*:18295:0:99999:7:::
systemd-network*:18295:0:99999:7:::
systemd-resolve*:18295:0:99999:7:::
syslog*:18295:0:99999:7:::
messagebus*:18295:0:99999:7:::
_apt*:18295:0:99999:7:::
uuidd*:18295:0:99999:7:::
avahi-autoipd*:18295:0:99999:7:::
usbmux*:18295:0:99999:7:::
dnsmasq*:18295:0:99999:7:::
rtkit*:18295:0:99999:7:::
cups-pk-helper*:18295:0:99999:7:::
```

man -k shadow

man 5 shadow

Analyse content of **/etc/shadow** based on what you've found in **man 5 shadow**.

/etc/shadow is used to increase the security level of passwords by restricting all but highly privileged users' access to hashed password data. Typically, that data is kept in files owned by and accessible only by the [super user](#).

With a shadowed password scheme in use, the /etc/passwd file typically shows a character such as '*', or 'x' in the password field for each user instead of the hashed password, and /etc/shadow usually contains the following user information:

- User login name
- [salt](#) and hashed password OR a status exception value e.g.:
 - "\$id\$salt\$hashed", the printable form of a password hash as produced by [crypt \(C\)](#), where "\$id" is the algorithm used. Other Unix-like systems may have different values, like [NetBSD](#).

- Empty string – No password, the account has no password (reported by `passwd` on Solaris with "NP").^[6]
- "!", "*" – the account is password locked, user will be unable to log in via password authentication but other methods (e.g. ssh key, logging in as root) may be still allowed.^[7]
- "*LK*" – the account itself is locked, user will be unable to log in.^[7]
- "*NP*", "!!" – the password has never been set^[8]
- Days since [epoch](#) of last password change
- Days until change allowed
- Days before change required
- Days warning for expiration
- Days after no logins before account is locked
- Days since epoch when account expires
- Reserved and unused

3. Dealing with **chmod**.

(i) An executable script. Open your favorite editor and put these lines into a file

```
#!/bin/bash
```

```
echo "Drugs are bad MKAY?"
```

Give name "script.sh" to the script and call to

```
chmod +x script.sh
```

Then you are ready to execute the script:

```
./script.sh
```

```
user@user-VirtualBox:~/test$ touch script.sh
user@user-VirtualBox:~/test$ ls
root_entries.txt  script.sh  test3.txt
user@user-VirtualBox:~/test$ echo '#!/bin/bash' > script.sh
user@user-VirtualBox:~/test$ cat script.sh
#!/bin/bash
user@user-VirtualBox:~/test$ echo 'echo "Drugs are bad?"' >> script.sh
user@user-VirtualBox:~/test$ cat script.sh
#!/bin/bash
echo Drugs are bad?
user@user-VirtualBox:~/test$ chmod +x script.sh
user@user-VirtualBox:~/test$ ./script.sh
Drugs are bad?
user@user-VirtualBox:~/test$
```

(ii) Suppose, you have logged in to the system as *guest*. Create directory “testDir” in the **/tmp**; put some file into testDir and prohibit user *user* from visiting this directory (i.e. “testDir”).

```
demo@user-VirtualBox:/tmp$ cd testdir/
demo@user-VirtualBox:/tmp/testdir$ cd ..
demo@user-VirtualBox:/tmp$ exit
exit
user@user-VirtualBox:/tmp$ chmod o-x testdir/
user@user-VirtualBox:/tmp$ ls -ld /tmp/testdir
drwxr-xr-- 2 user user 4,0K kbi 24 01:51 testdir
user@user-VirtualBox:/tmp$ ls -ld /tmp
drwxrwxrwt 2 root root 4,0K kbi 14 23:39 .Test-unix
-rw----- 1 user user 500K kbi 20 17:03 tmpaddon
-rw-r--r-- 1 root root 26K kbi 14 23:56 vboxguest-Module.symvers
-r--r--r-- 1 gdm gdm 11 kbi 14 23:40 .X1024-lock
drwxrwxrwt 2 root root 4,0K kbi 14 23:42 .X11-unix
drwxrwxrwt 2 root root 4,0K kbi 14 23:39 .XIM-unix
user@user-VirtualBox:/tmp$ su demo
Password:
demo@user-VirtualBox:/tmp$ cd testdir/
bash: cd: testdir/: Permission denied
demo@user-VirtualBox:/tmp$
```

(iii) Test, if it possible to forbid an owner of some file to read to or write from this file.

```
user@user-VirtualBox:/tmp/testdir$ ls -lah
total 12K
drwxr-xr--  2 user user 4,0K kbi 24 01:51 .
drwxrwxrwt 20 root root 4,0K kbi 24 02:02 ..
-rwxr-xr-x  1 user user  32 kbi 24 01:51 script.sh
user@user-VirtualBox:/tmp/testdir$ chmod u-rw script.sh
user@user-VirtualBox:/tmp/testdir$ ls -lah
total 12K
drwxr-xr--  2 user user 4,0K kbi 24 01:51 .
drwxrwxrwt 20 root root 4,0K kbi 24 02:03 ..
---xr-xr-x  1 user user  32 kbi 24 01:51 script.sh
user@user-VirtualBox:/tmp/testdir$ cat script.sh
cat: script.sh: Permission denied
user@user-VirtualBox:/tmp/testdir$ echo 666 >> script.sh
bash: script.sh: Permission denied
user@user-VirtualBox:/tmp/testdir$
```

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```
user@user-VirtualBox:/tmp/testdir$ ls -lah
total 12K
drwxr-xr--  2 user user 4,0K kbi 24 01:51 .
drwxrwxrwt 20 root root 4,0K kbi 24 02:02 ..
-rwxr-xr-x  1 user user  32 kbi 24 01:51 script.sh
user@user-VirtualBox:/tmp/testdir$ chmod u-rw script.sh
user@user-VirtualBox:/tmp/testdir$ ls -lah
total 12K
drwxr-xr--  2 user user 4,0K kbi 24 01:51 .
drwxrwxrwt 20 root root 4,0K kbi 24 02:03 ..
---xr-xr-x  1 user user  32 kbi 24 01:51 script.sh
user@user-VirtualBox:/tmp/testdir$ cat script.sh
cat: script.sh: Permission denied
user@user-VirtualBox:/tmp/testdir$ echo 666 >> script.sh
bash: script.sh: Permission denied
user@user-VirtualBox:/tmp/testdir$
```

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