OS Fundaments
Access Control--Linux

Last Updated: 1/24/2023 12:37 PM

Instructions

Answer all questions directly in this document. You will upload this completed document as your homework assignment.

Overview

This lab will explore access control principles of file permissions, the root account, and the sudo system.

Setup

Start your Debian VM in graphical mode. If you are in text mode you can use the command startx to start the graphical UI.

Task 1—Exploring su

You will use the su command to switch users to another use. If you use su without specifying a user, the command will default to the root user.d

Steps

1) Login as student and open a terminal.
2) What is your current directory? ___
3) Use su to change to the root user. Enter the command
   `su`
4) Enter the password **Password1** when prompted.
5) What does you shell prompt say now? ____
6) You can use the command `whoami` to see what user is running the shell. Enter the command
   `whoami`
7) What user is the shell running as? ____
8) When you changed users did your current directory change? ___
9) Close the terminal.
10) Open the terminal again. I'll call this terminal 1.
    a) What user is the terminal using now? ____
    b) What does this tell you about the su command? ____
11) Open another terminal. I'll call this terminal 2.
    a) From terminal 2 switch to the user bilbo with the command
       `su bilbo`
    b) Bilbo's password is **password**
12) Use the whoami command to ensure you are running the terminal as bilbo.
13) *From terminal 1* use the whoami command?

a) Who is running terminal 1? ____
b) What does that tell you about the interaction between terminals and the `su` command? ____

14) You can use the exit command to exit a terminal shell. *From terminal 2* enter the command
`exit`
15) Now what user is running the shell in terminal 2? ____

Task—2 Exploring permissions

Now you will explore the basic UNIX file permissions structure.

Steps

1) Create a file from *terminal 1* with the command
`echo "Rush is the greatest band ever" > rush`
2) Now view the permissions for the file
`ls -l rush`
3) Answer the following questions
a) Who owns the file ? ____
b) What permissions does the user have for the file ? ____
c) What is the owner group for the file? ____
d) What permissions does the group have ? ____
e) What permissions do all others have? ____
4) Based on the answers above answer the following questions
a) Can the user bilbo read the file? ____
b) Can the user bilbo change the file ? ____
5) *From terminal 2* switch to the user bilbo
6) See if bilbo can read the contents of the file with the cat command
`cat rush`
a) Can bilbo read the file? ____
7) Now see if bilbo can change the file with the following command from *terminal 2*
`echo "They have made 20 studio albums" >> rush`
a) What was the result? ____
8) See if student can change the file with the following command from *terminal 1*
`echo "They have made 20 studio albums" >> rush`
a) Did you get an error this time? ____
9) See if the changes worked. *From terminal 2* enter the command
cat rush
a) Can bilbo see the changes? ____

Task 3—Changing permissions

In the previous task student created a file, you discovered that bilbo can read the file but not change the file. Now you will change the permissions on the file so bilbo can change the file's contents.

Steps

1) Use the chmod command to change the rush file's permissions. Most Linux distributions will create a group by the same name as the user when a new user is created and the only member of that group will be the user that was created. You can use that to your advantage to allow bilbo to edit the rush file. Now you will use the chmod command to add the write privilege to the group. From *terminal 1* (where student is logged in) Enter the following command
   `chmod g+w rush`
2) Verify the command worked buy checking the permissions with the command:
   `ls –l rush`
3) Now see if bilbo can edit the file. *From terminal 2* enter the following command:
   `echo "The first album was in 1974 the latest in 2012" >> rush`
   a) What was the result? ____ Why? ____
4) Now you will change the group for the rush file to bilbo so bilbo can change it. *From terminal 1* enter the command:
   `chgrp bilbo rush`
   a) What was the result? ____ Why? ____
5) From terminal 1 change to the root user:
   `su`
6) Now enter the command to change the group
   `chgrp bilbo rush`
7) Use the **ls** command to make sure the changes worked.
8) Exit the root user's shell
   `exit`
9) Now see if bilbo can change the file. From *terminal 2* enter the following command (hint use the up arrow to see previous commands):
   `echo "The first album was in 1974 the latest in 2012" >> rush`
   a) Did you get an error this time? ___
10) Confirm the change using the cat command.
11) From terminal 2 switch to the frodo user frodo's password is **password**.
    `su frodo`
12) See if Frodo can edit the file with the following command:
    `echo "The band members are Geddy, Neil, and Alex" >> rush`
    a) Can frodo edit the file? ____
13) *Thought Problem* (don't actually do the commands just think it through and express your ideas). What if you also wanted Frodo to be able to edit the file, what would you have to do? ____
14) Enter the command:
    `grep frodo /etc/group`
    a) This command lists all the lines in the the /etc/group file that contain the word frodo. Do you see anything that might solve the problem? ____
    b) Fix the problem. List the steps you used to give and verify both bilbo and frodo write access to the file rush. (Add lines if necessary)
       i) _____
       ii) _____
       iii) _____

iv) _____

15) Terminal 2 is currently running a shell as Frodo, exit that shell with the exit command:
`exit`
   a) What shell are you in now (hint look at the prompt or run the command whoami)? ___

16) use the exit command again
`exit`
   a) What shell are you in now? ___

Task 4 – Root powers with sudo

Now you will configure `sudo` to allow the user gandalf the ability to run programs as root.

Steps

1) From terminal 2 change to the user Gandalf (gandalf's password is password":
`su gandalf`
2) Try to execute the shutdown command using sudo by entering:
`sudo shutdown +10`
   a) What happened? ____
3) Now you will add gandalf to the /etc/sudoers file so he can run commands as root. *From terminal 1* change to the root user if you are not already root.
4) The /etc/sudoers file is edited by the `visudo` command. From terminal 1 Enter the command:
`sudo visudo`
5) Look in the top line of the nano editor. What file is actually being edited? ____
6) Since the sudoers file is used frequently the visudo command will make a copy of the file for you to edit. Once you are done editing the temporary file the actual file will be replaced with the edited file.
7) Use the arrow keys to scroll down the file until you find these lines

```
# User privilege specification

root    ALL=(ALL:ALL) ALL
```

this line gives the root user all root permissions via sudoers. That seems kind of obvious but you can easily add another line for another user. Add a new line that gives Gandalf all root permissions.
`gandalf    ALL=(ALL:ALL) ALL`
8) Save and exit nano
9) See if the changes worked. From terminal 2 enter the command:
`sudo shutdown +5`
10) Did the command work? _____
11) Now cancel the shutdown. Enter the command
`sudo shutdown -c`
12) Add student to the sudoers file so you can have root privileges when needed. Gandalf can now do this using sudo. From terminal 2 enter the command:
`sudo visudo`

Task 5 – Changing passwords

Keeping passwords secure for accounts that have root access is important. The longer the password is the better, length trumps complexity.

Steps

1) Change gandalf's password. From *terminal 2* (as Gandalf) enter the command:
   `passwd`
2) Enter gandalf's current password
   `password`
3) Enter and confirm gandalf's new password
   `None shall pass!`
4) Now change bilbo's password to **precious** enter the command
   `passwd bilbo`
5) What message did you get? ____
6) Now try it with sudo. Enter the command:
   `sudo passwd bilbo`
7) If prompted for gandalf's password enter it. Remember you changed it to **None shall pass!**
8) When you see the prompt "Enter new UNIX password:" enter
   `precious`
9) Enter **precious** again.
10) Remember these new passwords!

Wrap-up

Shut down your VMs and have a great day!

Deliverable

Upload this document with completed answers to canvas.

