Operating System fundamentals

Local users and groups

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Inhoud

1. users and groups
2. super user access
3. managing local users
4. managing local groups
5. managing passwords

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Course text

- Chapter 10 Manage local users and groups
  - (RedHat chapter 6)
  - Describe User and Group Concepts
  - Gain Superuser Access
  - Manage Local User Accounts
  - Manage Local Group Accounts
  - Manage User Passwords

1

Users and groups

Users and groups

- every user has a unique number (user-id)
- users can be member of one or more groups
- there is at least one group of which the user is a member (the primary group)
- groups also have a unique number (group-id)

Users

- different types
  - root
    - userid = 0
    - homedir = /root
  - "normal" users
    - userid >= 1000 (depends on the system)
    - shell
    - homedir = /home/username
  - service accounts
    - userid < 1000
    - no shell in general
    - examples: mail, lp, syslog, backup, …

/etc/passwd

- username:password:userid:groupid:comment:homedir:shell

```
root:x:0:0:root:/root:/bin/bash
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
vbox:x:999:999:vbox,,,:/home/vbox:/bin/bash
donald:x:1005:1005:D.Trump,Puma Park,35,,Perth:/home/donald:/bin/bash
```

- password is now always x and is encrypted in /etc/shadow
  - ! or * means there is no password
  - SHA512 hashing (scramble data, one-way encryption)
  - https://nordpass.com/most-common-passwords-list

The “id” command

You can find out your user-id and the groups to which you belong with the “**id**” command:

```
$ id
UID=1000(student) GID=1000(student)
groups=1000(student),4(adm),20(dialout),24(cdrom),27(sudo),30(dip)
,46(plugdev),120(lpadmin),132(lxd),133(sambashare),994(ollama)
```

Groups

- users are members of groups
  - every user has a “primary group” (in /etc/passwd)
  - for normal users a separate group is created with the same name
- users are also added to other groups
  - wheel: if the user can execute sudo (see later)
  - cdrom: if the user can use the CD or DVD drive
  - lpadmin: if the user can administer the printer
  - ...

/etc/group

- groupname:x:groupId:userlist

```
adm:x:4:syslog,donald
sambashare:x:124:donald
vbox:x:999:donald
donald:x:1005:
```

- the primary group is indicated in /etc/passwd
- there used to be passwords for groups (now always x)

The “groups” command

You can find out the groups you belong to with the “**groups**” command:

```
$ groups
student adm dialout cdrom sudo dip plugdev lpadmin lxd sambashare
ollama
```

Exercise

- look at the information in /etc/passwd, /etc/group en /etc/shadow
- do this on the KdG server and on your own virtual machine
- to which groups does your login belong?

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Super user access

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The “su” command

You can change your identity with the “**su**” command:

- **su** kris -> change your identity to user “kris”
- su -> change your identity to user “root”
- **su –l** -> start a new shell with the environment of “root”
- su -l kris -> start a new shell with the environment of “kris”

You’ll need to enter the password of the new user

With the (3 identical) options **-**, **-l** or **--login** a new shell is started and thus also a new environment

Exercise (on virtual machine)

```
whoami
export var=Hello
echo ${var}
```

```
su
whoami
echo ${var}
Exit
```

With this command, the original enviroment is kept

```
su -
whoami
echo ${var}
exit
```

With this command - -l or --login, you get a new login environment

The “sudo” command

- It is not wise to allow root to log into the system
- Solution: disable root login
  - How is this accomplished?
  - The su command does not work anymore
- Give permission to certain users to temporarily execute commands as root
- This is done with the “sudo” command
- Everything is logged in /var/log/secure
  - execute “**tail -f** /var/log/secure” in a terminal and try to do sudo in another terminal
- It is also possible to start a shell using “**sudo -i**”

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Sudo access

How to give sudo access to a user?

- /etc/sudoers
  - global configuration
  - in redhat: all users of group “wheel” can use sudo
  - %wheel ALL=(ALL)   ALL
- /etc/sudoers.d
  - directory in which you can add configuration files
  - every separate file can give access to certain users or groups

Configure sudo with sudoers file

Configuration file: `/etc/sudoers`

```
## Allows people in group wheel to run all commands
%wheel          ALL=(ALL)  ALL
```

- ➔ % wheel is a group name, not a user

- ➔ ALL=(ALL:ALL)   ALL

  ALL = run the command on any host with this file

  ALL = run the command as any other user

  ALL = run the command as any other group on this system

  ALL = any command

Examples

- %wheel ALL=(ALL) ALL
  - everyone in group “wheel” can use sudo
  - from any machine
  - can assume any identity
  - can execute any command
- %games ALL=(operator) /bin/id
  - everyone in group “games” can use sudo
  - from any machine
  - can only assume the identity of “operator”
  - can only execute the command /bin/id
- ansible ALL=(ALL)NOPASSWD: ALL
  - the user “ansible” can use sudo
  - from any machine
  - can assume any identity
  - doen’t need to enter a password
  - can execute any command

Manage local users

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Adding users

- You can add a new user with the “**useradd**” command
- default values can be found in /etc/login.defs
- examples:
  - **useradd** trinity
  - useradd -d /home/neo -c "The One" -m -s /bin/bash neo
- No option to specify a password (why not?)
- a new group is created with the same name (primary group)

- you can set the password with “**passwd**”

Exercise

- create a user “neo” with default options
- create user “trinity” with useradd and set her home directory to /Users/trinity
  (option -d)
- show the last two lines of /etc/passwd, /etc/shadow en /etc/group
- set the password for trinity
- show the last two lines of /etc/shadow

Modify a user

Use “**usermod**” to modify a user

Options (use --help for a complete overview):

- `-aG` add user to secondary groups
- `-g` modify the users' primary group
- `-L` lock user account
- `-U` unlock user account
- `-c` add data to the comment field
- …

Remove a user

- User “**userdel**” to delete a user
- The home directory will stay intact
- Use the **-r** option to also delete the home directory
- The owner of all files previously owned by the user will be changed by the user-id

Manage local groups

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Adding groups

- You can add a group with “**groupadd**”
  - You can specify the group-id with **-g**
  - You can create a “system group” with **-r**

- Remark: adding a user to a group is done with:
  usermod -aG group username

Modifying groups

You can modify a group with “**groupmod**”

options:

- **-n** change the name of the group
- **-g** change the group-id

Removing groups

You can delete a group with “**groupdel**”

Primary and secondary groups

Every user has a primary group

- you can find it in /etc/passwd
- is used when a new file is created

A user can also belong to other (secondary) groups

- you can find them in /etc/group
- enables access to certain files, directories, and programs

On can temporarily change the primary group with the "**newgrp**" command

Exercise

- Create a new group “matrix”
- Change the primary group of neo and trinity to “matrix”
- Verify this with “id”
- Log in as neo and create a file, verify the primary group with ls -l
- Add neo to the “wheel” group
- Verify with “id”
- Log in again as neo and try to use sudo
- *Advanced: give trinity access to sudo, but make sure she can only use it to assume neo’s identity. Test it.*

Manage passwords

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The shadow file

- All passwords are in /etc/shadow
- These are all encrypted (with SHA256)
- /etc/shadow also contains other information about passwords
  - when does it expire?
  - when does the user get a notification to change it?
  - …

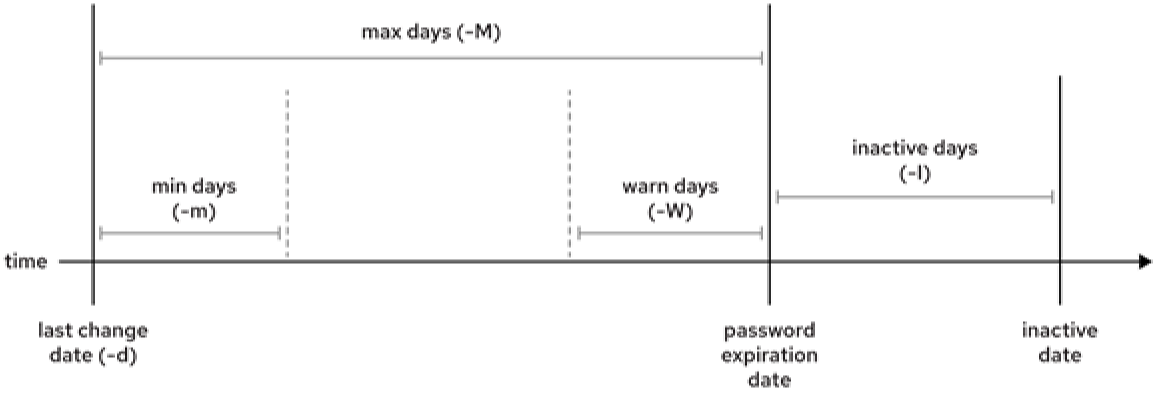
The shadow file

Fields in /etc/shadow:

- the user name
- the encrypted password
- The days from when the password was last changed,since 1970-01-01
- The minimum days since the last password change before the user can change it again.
- The maximum days without a password change before the password expires. An empty field means that the password never expires.
- The number of days ahead to warn the user that their password will expire.
- The number of days without activity, starting with the day the password expired, before the account is automatically locked.
- The day when the account expires in days since the epoch. An empty field means that the account never expires.
- The last field is typically empty and reserved for future use.

Change password properties

Use the “**chage**” command to change the properties of a password



```
[root@host ~]# chage -m 0 -M 90 -W 7 -I 14 sysadmin05
[root@host ~]# chage -d 0 USER # force password change
                                # at next login
```

Default settings

Default settings for account creation are set (by the administrator) in

```
/etc/login.defs

PASS_WARN_AGE 7
UID_MIN     1000


#FAIL_DELAY      3
```

# means commented out.

3 is the default value which the admin can change

Service accounts

There are specific accounts that are only meant to run a service

It should not be possible to login with those accounts, but there should be a password (to use the service)

-> set shell to “/sbin/nologin”

Exercises

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Exercises

- KdG server
  - Ex1001-ex1099
- VM Virtualbox
  - 10.1 till 10.12
- RedHat
  - ch06s02
  - ch06s04
  - ch06s06
  - ch06s08
  - ch06s10
  - ch06s11

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