User Management

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Lectures

1. System administration introduction
2. Operating System installation
3. **User management**
4. Application management
5. System monitoring
6. Filesystem Maintenance
7. Network services
8. Security and Protection
9. Introduction to Public Cloud

Outline

1. Introduction
   - Goals
2. System Databases
3. User disabling and deletion
4. Login process
5. Permissions and protections

Goals

Knowledge

- Knowledge about the system databases
- File and Directory permissions and protections
  - SetUID/SetGID bits

Abilities

- User management tasks
  - User creation and deleting
  - Group creation, user assignment, and group deletion

Commands and Files

- `chmod`, `chown`, `id`, `useradd`, `userdel`, `umask`
- `/etc/passwd`, `/etc/group`, `/etc/shadow`

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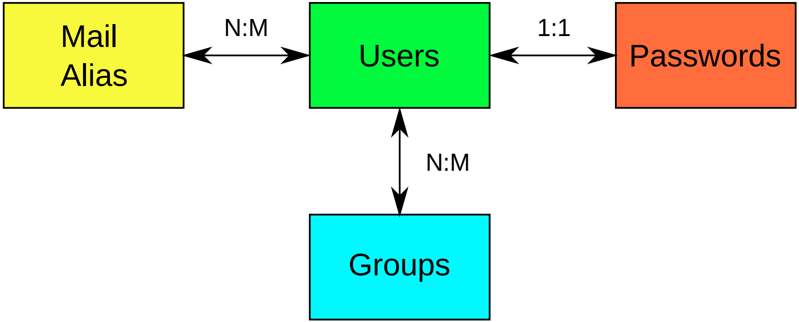
System Databases

- `/etc/passwd`
- `/etc/group`
- `/etc/shadow`
- `/etc/aliases`



/etc/passwd

- Must be readable by all the users

Format

`username:passwd:uid:gid:real_name:homedir:shell`

```
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
news:x:9:13:news:/etc/news:/bin/false
nobody:x:99:99:Nobody:/:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
rserral:x:1000:1000:René Serral, D6-111, rene.serral@upc.edu:/home/rserral:/bin/zsh
```

More about users

Specific purpose users

- `root`
    - UID 0 (the username does not matter)
- `ftp`
    - Anonymous FTP access (without password)
- `www-data`
    - User to run the Web Server

System users

- Used to run services without superuser privileges
- Without shell — neither password
- Set of privileges to allow performing the tasks

/etc/group

- A group may have lots of users
- Each user has a main group (/etc/passwd)
- Each group has a member list

Format

```
groupname:passwd:gid:username,username,...
```

```
root:x:0:root
bin:x:1:root,bin,daemon
daemon:x:2:root,bin,daemon
sys:x:3:root,bin,adm
adm:x:4:root,adm,daemon
tty:x:5:
disk:x:6:root
lp:x:7:daemon,lp
mem:x:8:
kmem:x:9:
```

```
wheel:x:10:root
Mail:x:12:mail
news:x:13:news
uucp:x:14:uucp
man:x:15:
games:x:20:
ftp:x:50:
nobody:x:99:
users:x:100:rserral
rserral:x:1000:
```

More about groups

Groups with special meaning — configuration dependent

- `sudo` (or `wheel`): User groups with administration privileges
- `nobody`: Special group for NFS — used to demote privileges
- `users`: Normally all users belong to it
- `disk`: Allows users on this group to manage disks

Purpose of groups

- Provide a neat way of easily give permissions to users
- Normally configured by the distribution – **read the manual**

/etc/shadow

- Only accessible by root
  - Hashed Password
  - Password expiration policy

Format

`username:passwd:password expiration policy`

- `passwd`: change user's password
- `chage`: allows to change password expiration policy
  - Max/Min time between password changes
  - Account expiration date

```
root:$1$iVKd84gQ$IV7vHG0CHdIGGnYnNs00E/:12260:0:99999:7:::
bin:*:12260:0:99999:7:::
daemon:*:12260:0:99999:7:::
...
rserral:$1$jGmk47hy$6Lkk.QYrMI67qPqvhTCdS.:12262::99999::::
```

/etc/aliases

- E-mail alias data base
  - Allows E-mail redirection
  - For the pseudo-users
    - → to administrator
    - → to programs
    - → to the “outside”

```
# Basic system aliases -- these MUST be present.
mailer-daemon:  postmaster
postmaster:   root

# General redirections for pseudo accounts.
bin:   root
webmaster:  root
support:  postmaster

# Person who should get root e-mail
root:   rserral, rene.serral@upc.edu
```

Exercise

Individually

- Detail the user creation process
- Modification of the data bases
- Directory creation
- Default files
- . . .

In group

- Gather the notes and discuss
- Make the pseudo-code for the `useradd` command

User Management – Basic commands

User Management

- `useradd` (`adduser`) `userdel`
- `usermod` — To modify all the fields except the username
- `passwd`
- `newusers`
- `vipw`

Group Management

- `groupadd` `groupdel`
- `groupmod`
- `gpasswd` (`passwd -g`)
- `newgrp`, `sg`
- `vigr`

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2 System Databases

3 User disabling and deletion
- Disabling
- User deletion
- User management policies

4 Login process

5 Permissions and protections

Disabling

Temporarily disable an user

→ We must avoid the user access to the system

1. Password invalidation
   - Insert an invalid character (*)
   - It allows to recover the original password afterward
2. Invalidate the shell
   - Change it with another (`/bin/false`, `/bin/nologin`)
   - Informs the user it has been disabled
   - If the user tries to login the administrator is informed

User deletion

Once we are sure the user account is not needed anymore. . .

1. Disable the account (Password invalidation)
2. Check that the user is not working on the system
3. Backup the user's data
4. Delete the user's data
5. Delete the user from the system databases
   - `/etc/shadow`
   - `/etc/passwd`
   - `/etc/group`
6. Add e-mail redirection
   - `/etc/aliases`

User management policies

- UIDs Assignment
  - Do NOT recycle UIDs
- username Assignment
  - Store additional information, Office and phone number
- Home organization `/home`
  - Flat
    - All the users located at (`/home/...`)
  - Hierarchical, creating different directory levels
    - Based on departments... floors... offices... (`/home/ac/user`)
    - ...in several disks

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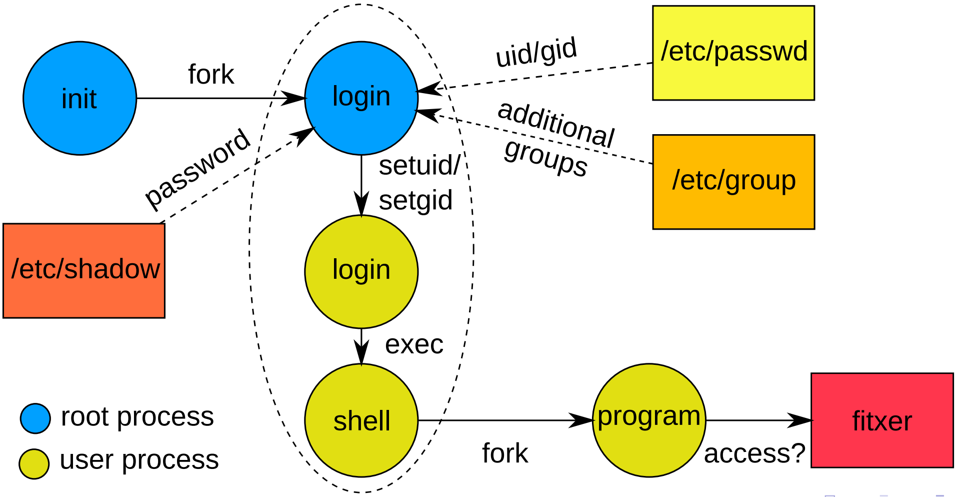
Login process



Privilege escalation

Performed through `setuid/setgid` calls

- Working as `root` is dangerous — and mostly unneeded
  - It's better to have an admin user and escalate privileges when needed
- `su` *`[user] [-c command]`*
  - Allows changing the user (by default `root`)
- `sudo` *`[command]`*
  - Allows executing a command as another user
  - Admin can restrict which commands can be executed by each user

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Permissions and protections

(-,d) rwx rwx rwx *owner* *group*

- 3 types of permissions
  - Read, write and execution (`rwx`)
  - Regular files. . .
  - Directories. . .
- 3 areas of application
  - Owner, group, others (`ugo`)
- Commands:
  - `chown`: to change a file owner
  - `chgrp`: to change a file group
  - `chmod`: to change permissions
- Set-UID/Set-GID Bits(`s`)
- Sticky Bit (`t`) only directories

Permissions and protections

	Files	**Directories**
r	Read the contents	List the contents
w	Write/Modify file contents	Create/Delete files
x	Run	Access the directory
SetUID	Runs with owner’s UID	No effects
SetGID	Runs with owner’s GID	File creation with the same group as the directory owner
Sticky Bit	No effects	Only the file owners can erase them

Exercise – In group

- Assign the MINIMUM protections for the file and dir

```
$ ls -l ./dirdades/dades.txt
-rw-rw-r-- 1 aso01 aso01 9778 Nov 28 18:10 ./dirdades/dades.txt
```

- Can only be modified by the owner: `-w- --- ---`
- Readable only by its group: `--- r-- ---` + dir `--- --x ---`
- Only deletable by its owner: dir → `-wx --- ---`
- Only the owner can run `ls` in the directory: dir → r-**x** --- ---
- `ls -l` requires `x` as well because it reads data on the i-node of the file

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- Only deletable by its owner: dir → `-wx --- ---`
- Only the owner can run `ls` in the directory: dir → `r-`**`x`** `--- ---`
- `ls -l` requires `x` as well because it reads data on the i-node of the file

```
$ ls -l ./dirdades/dades.txt
drwx--x--- 1 aso01 aso01 1024 Nov 28 18:11 .
-rw-r----- 1 aso01 aso01 9778 Nov 28 18:11 ./dirdades/dades.txt
```

Default permissions

During file/directory creation. . .

- Owner is determined by current user and group
  - `id` informs about current user/group
  - `newgrp` allows changing the current group
- Permissions are determined by `umask`: user mask
  - Indicates which permissions **DO NOT** belong by default to the file or directory

```
022: rwx r-x r-x
027: rwx r-x ---
```

Homework

Application installation mechanisms

- Software distribution formats
  - tar, gz, rpm, deb, zip. . .