

SERVICES, SERVERS, CLIENTS AND SERVICES MANAGEMENT

1- What is a service?

A **service** provides some functionality to clients such as access to files stored in a remote computer, access to web pages, access to databases, send or receive mails, run commands in remote computers, store files in remote computers, print documents on local and remote printers and so on.

2- What is a server?

A **server** is a process that provides services to other computer programs, the clients, running in the same computer or in other computers connected through the network.

3- What is a client?

A **client** is a process that requests access to a service offered by a server.

4- Main features of a server

The main features of a server are the following:

- Its usual state is interruptible sleeping (S). It changes to running state (R) when it receives a request from a client and upon fulfilling the task requested by the client goes back to the interruptible sleeping state (S).
- It runs in the background.
- Most of the time (but not always) a server starts during the system startup (or boot) process and it is terminated during the system shutdown process.
- Usually, It is owned by the root user but sometimes is owned by a system user.
- The Typical nice value for most servers is 0 (normal priority). Its nice value can be changed.
- Servers need resources such as:
 - % CPU time
 - % RAM memory
 - Access to hard drive, network, printer, files,...
- Users (usually root) can send signals to servers
- Information about a server can be displayed using typical commands such as **ps** or **top** or using special command such as **systemctl** or **service**.

5- Nomenclature

- When we **start** a service, a server (i.e., a process) starts running on the system.
- When we **stop** a service, a server (i.e., a process) is terminated. Therefore, the server process will no longer exist on the system.
- When we **restart** a service, the server that is currently providing is terminated and a new one is started that provides the same service. Therefore, the PID of the server changes because a new process is started.
- When we **enable** a service, a server that provides a service starts automatically during the system boot process.
- When we **disable** a service, a server that provides a service is configured to prevent it from automatically starting during the system boot process.

6- What is systemd?

- **systemd** is the **init system and service manager** used by most modern Linux distributions.
- **systemd** is the first program that runs when Linux boots, and it is responsible for starting, stopping, and managing everything else.
- **systemd** is the program that manages services. That means that it:
 - starts services
 - stop services
 - restart services
 - manage service dependencies
 - enables services
 - disables services
 - track the state of services

7- Services management tools

Linux provides a command-line tool called **systemctl** to control **systemd**. With the help of **systemctl** any user with **root** privileges can:

- **start** a server properly.
- **stop** a server properly.
- **restart** a server properly.
- **enable** a service
- **disable** a service
- Display the **status** of a service. The typical **status** displayed by the service management commands are the following:
 - *loaded, active, running* -> The service works fine. The server program is running and currently providing a service.
 - *loaded, inactive, dead* -> The service was stopped. The server program was terminated and it is not providing the service.
 - *loaded, failed, failed* -> The system recognize the service but something is wrong and the server was not started and it has never provided any service.
 - *loaded, active, exited* -> The service works fine but the server was terminated when it fulfilled a client request. The server is ready to start and provide a service again at any moment.

8- Some typical servers

- **apache2**: It is a Web server. A client (firefox, chrome,...) can gain access to a web pages stored in the computer where Apache is running.
- **mysqld**: It is Database server. A client can gain access to a database stored in the computer where MySQL is running.
- **cupsd**: Local and network printer server for Linux.
- **sshd**: It is a secure server to run commands on remote servers and transfer files (or directories) between 2 computers through the network.
- **bind**: A DNS server
- **isc-dhcp-server**: A DHCP server.
- **smbd** and **nmbd**: Both servers working together provide a service for sharing folders, files and printers over a network.