Installation Guide: Debian 12 (No GUI), Apache, PostgreSQL, PHP and PHPpgAdmin on Qemu/KVM

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1. Introduction

This guide is intended for future students of the IUT, it explains how to install Debian 12 without a graphical interface, and how to install Apache, PostgreSQL, PHP and PhpPgAdmin on a virtual machine (VM) using Qemu/KVM. This tutorial is step-by-step and includes some screenshot.

Important Formatting Rules:

- Commands executed inside the VM will be written in **bold**
- Commands executed on the host (Linux) machine will not be bold
- Commands to be run as root (superuser) will start with #
- Commands to be run as a regular user will start with $

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2. Requirements

Before you start, make sure you have:

- A Linux computer (host machine for th VM)
- Access to the command line
- An internet connection
- The Debian 12 "netinst" ISO (already downloaded in /usr/local/images-ISO/)
- The Qemu/KVM installation and scripts provided (e.g., S2.03-lance-installation)

But If you're doing this on your personal computer:

You will need to install Qemu/KVM manually and download the correct Debian 12 "netinst" ISO image from the official Debian website.

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3. Launch the Debian Installer

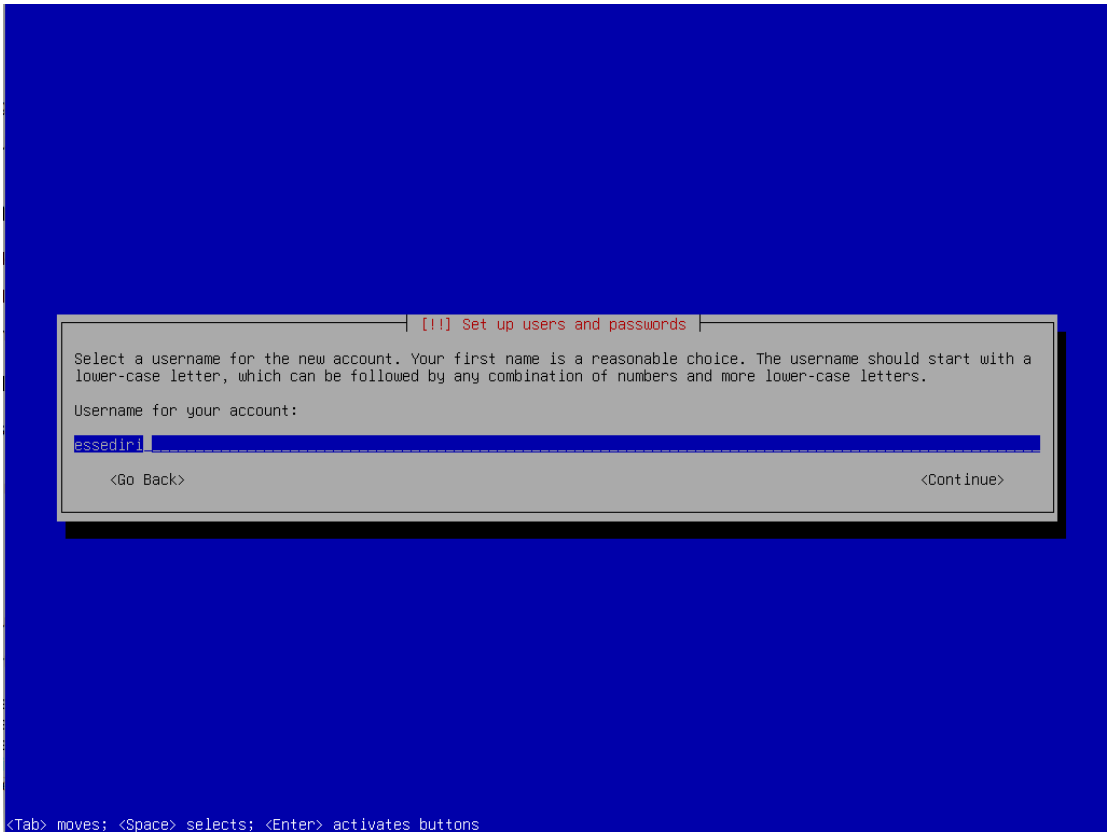
1. Open a terminal on your Linux station.
2. Run the installation script:

$ S2.03-lance-installation

3. Follow the installer instructions:

Debian Installation Steps

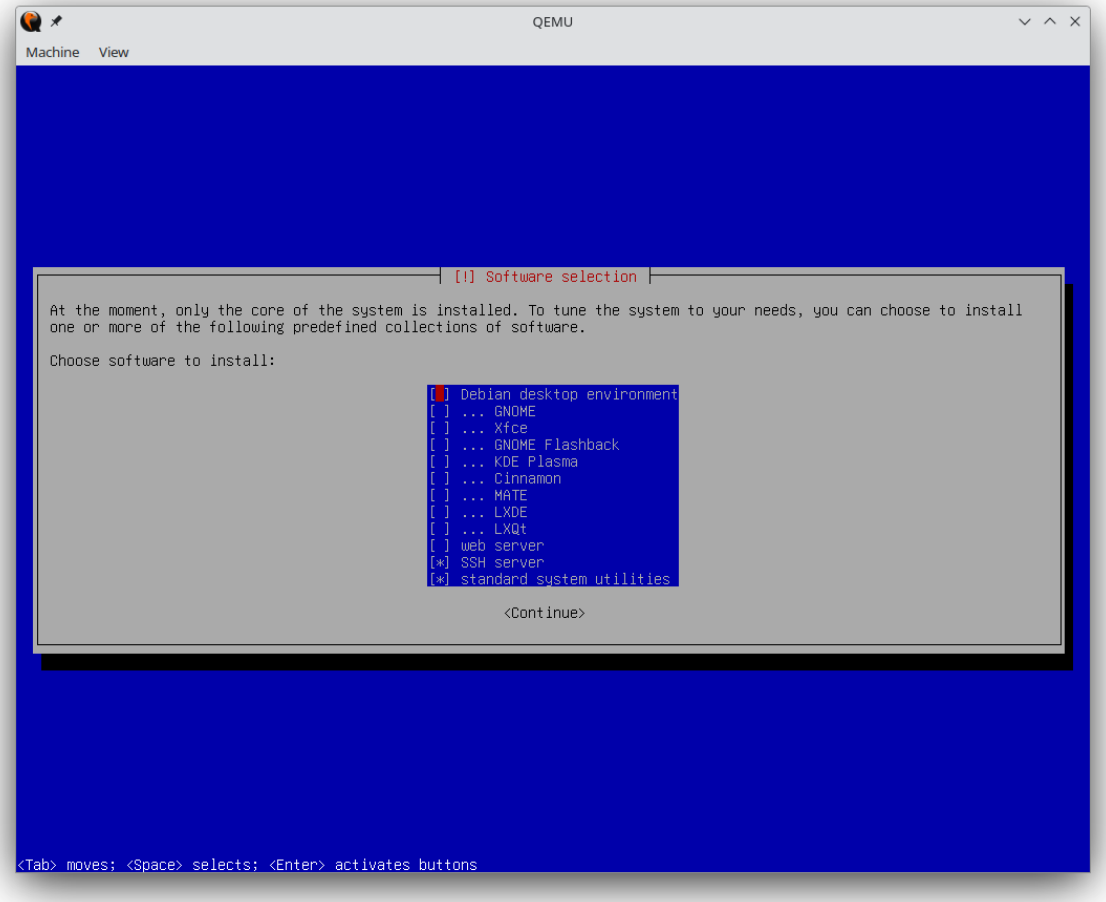
- Language: English
- Location: Other > Europe > France
- Locale: United States - en_US.UTF-8
- Keyboard: French
- Hostname: type server-your_login_UGA
- Domain name: leave it empty
- Set root password: type root and confirm
- Full name: type your full name
- Username: type your UGA login like in the screenshot



- User password: type etu and confirm
- Partitioning:
    - Choose Guided - use entire disk
    - Then All files in one partition

- Confirm and select Finish partitioning and write changes to disk

- Software selection:
  - Uncheck Debian desktop environment
  - Check SSH server
  - Leave standard system utilities checked
- Install GRUB on /dev/sda like as shown in the screenshot



Once installation is complete, log in as your UGA login with password « etu » and open the konsole.

To access a root console, use the command **$ sudo -i**. If sudo is not available on your system, you can instead type **$ su -** and enter the root user's password to log in as root.

You can now shut-down the VM

 # systemctl poweroff

4. Start the Virtual Machine

1. On your host machine, run:

S2.03-lance-machine-virtuelle

2. Log in with your user account.

3. Check the system: **$ cat /etc/fstab** just like the screenshot :

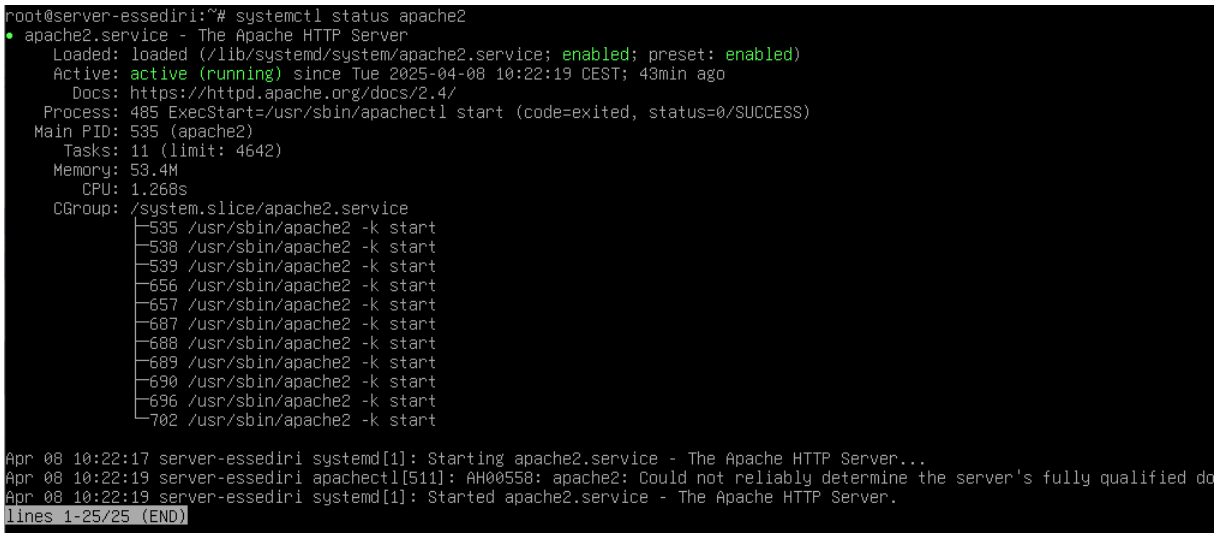
5. Install Apache

1. Update packages: **# apt update**

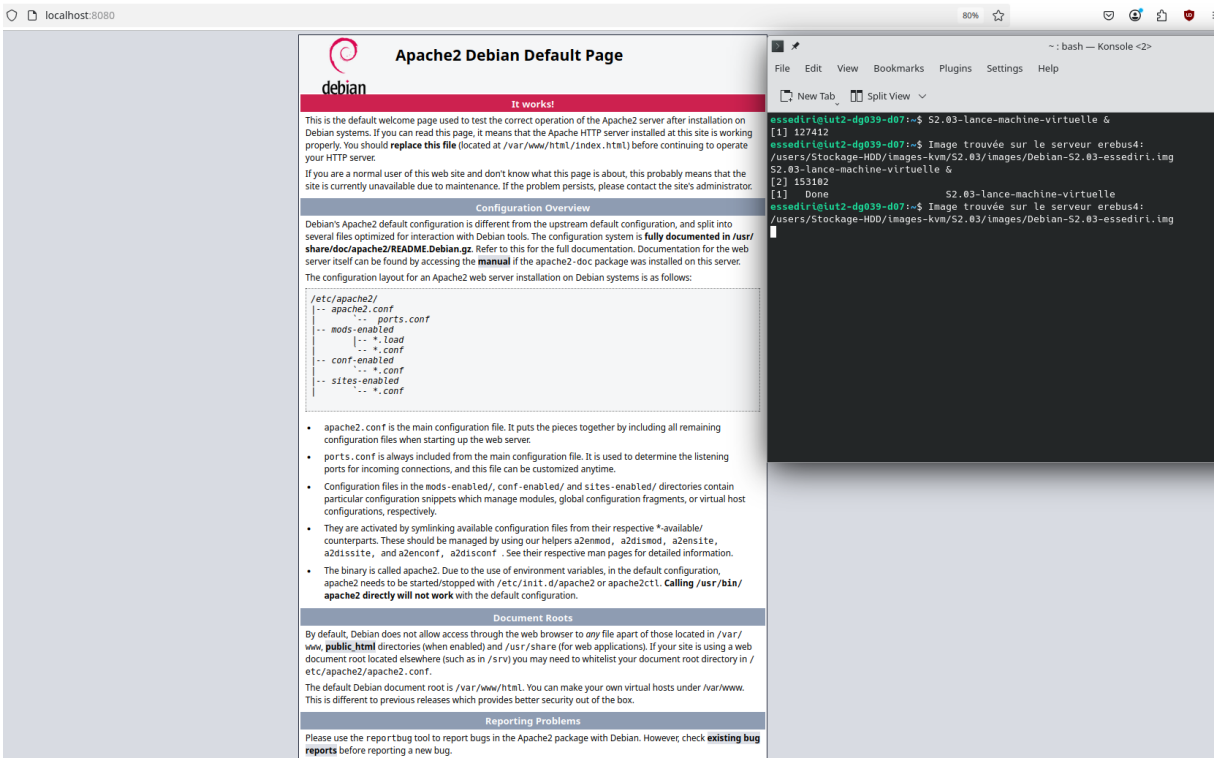
2. Install Apache: **# apt install apache2**

3. Start the service: **# systemctl start apache2**

4. Check Apache: **# systemctl status apache2**



5. On your host machine, open Firefox: Go to: http://localhost:8080 You should see the Apache default page. If you can't see the page like in the screenshot, you should restart from the step 5.



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6. Install PostgreSQL, set up a database, and connect to it from the host machine

1. On your VM: **# apt install postgresql**
2. Start PostgreSQL: **# systemctl start postgresql**
3. Check the state : **# systemctl status postgresql** (this command is also available for other thing like SSH)

```
root@server-essediri:~# systemctl status postgresql
● postgresql.service - PostgreSQL RDBMS
     Loaded: loaded (/lib/systemd/system/postgresql.service; enabled; preset: enabled)
     Active: active (exited) since Tue 2025-04-08 10:22:22 CEST; 44min ago
    Process: 596 ExecStart=/bin/true (code=exited, status=0/SUCCESS)
   Main PID: 596 (code=exited, status=0/SUCCESS)
        CPU: 1ms

Apr 08 10:22:22 server-essediri systemd[1]: Starting postgresql.service - PostgreSQL RDBMS...
Apr 08 10:22:22 server-essediri systemd[1]: Finished postgresql.service - PostgreSQL RDBMS.
root@server-essediri:~#
```

```
root@server-essediri:~# systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
     Loaded: loaded (/lib/systemd/system/ssh.service; enabled; preset: enabled)
     Active: active (running) since Tue 2025-04-08 10:22:18 CEST; 42min ago
       Docs: man:sshd(8)
             man:sshd_config(5)
    Process: 489 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
   Main PID: 514 (sshd)
      Tasks: 1 (limit: 4642)
     Memory: 6.6M
        CPU: 93ms
     CGroup: /system.slice/ssh.service
             └─514 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Apr 08 10:22:17 server-essediri systemd[1]: Starting ssh.service - OpenBSD Secure Shell server...
Apr 08 10:22:18 server-essediri sshd[514]: Server listening on 0.0.0.0 port 22.
Apr 08 10:22:18 server-essediri sshd[514]: Server listening on :: port 22.
Apr 08 10:22:18 server-essediri systemd[1]: Started ssh.service - OpenBSD Secure Shell server.
Apr 08 10:48:03 server-essediri sshd[899]: Accepted password for essediri from 10.0.2.2 port 49654 ssh2
Apr 08 10:48:03 server-essediri sshd[899]: pam_unix(sshd:session): session opened for user essediri(uid=1000) by (uid=0)
Apr 08 10:48:03 server-essediri sshd[899]: pam_env(sshd:session): deprecated reading of user environment enabled
Apr 08 10:48:03 server-essediri sshd[899]: pam_unix(sshd:session): session closed for user essediri
root@server-essediri:~# _
```

3. Switch to the postgres user: **# su - postgres**

4. List databases: **\l** (if you didn't have the same its normal)

```
postgres=# \l
                                                 List of databases
       Name        |  Owner   | Encoding |   Collate   |    Ctype    | ICU Locale | Locale Provider |   Access privileges
-------------------+----------+----------+-------------+-------------+------------+-----------------+-----------------------
 essediri_database | essediri | UTF8     | en_US.UTF-8 | en_US.UTF-8 |            | libc            |
 postgres          | postgres | UTF8     | en_US.UTF-8 | en_US.UTF-8 |            | libc            |
 template0         | postgres | UTF8     | en_US.UTF-8 | en_US.UTF-8 |            | libc            | =c/postgres          +
                   |          |          |             |             |            |                 | postgres=CTc/postgres
 template1         | postgres | UTF8     | en_US.UTF-8 | en_US.UTF-8 |            | libc            | =c/postgres          +
                   |          |          |             |             |            |                 | postgres=CTc/postgres
(4 rows)

postgres=#
```

5. Create a new user: **CREATE USER (login UGA) WITH password 'etu' ;**

6. Create a new database: **CREATE DATABASE (login UGA) ;**

7. Connect to the database: **$ psql your_login**

8. Create a table and insert data like in the screenshot :

```
postgres=# CREATE TABLE utilisateur(nom VARCHAR(50),grade VARCHAR(50));
CREATE TABLE
postgres=# \d utilisateur
                  Table "public.utilisateur"
 Column |         Type          | Collation | Nullable | Default
--------+-----------------------+-----------+----------+---------
 nom    | character varying(50) |           |          |
 grade  | character varying(50) |           |          |

postgres=# INSERT INTO utilisateur (nom) VALUES essediri;
ERROR:  syntax error at or near "essediri"
LINE 1: INSERT INTO utilisateur (nom) VALUES essediri;
                                             ^
postgres=# INSERT INTO utilisateur (nom) VALUES ('essediri');
INSERT 0 1
postgres=# SELECT * FROM utilisateur;
   nom    | grade
----------+-------
 essediri |
(1 row)

postgres=#
```

9. View pg_shadow table:

SELECT * FROM pg_shadow;

```
postgres=# SELECT * FROM pg_shadow;
 usename  | usesysid | usecreatedb | usesuper | userepl | usebypassrls |
       passwd                                                  | valuntil | useconfig
----------+----------+-------------+----------+---------+--------------+----------------------------------------------------------
----------------------------------------------------------------------------+----------+-----------
 postgres |       10 | t           | t        | t       | t            |
                                                                           |          |
 essediri |    16388 | t           | f        | f       | f            | SCRAM-SHA-256$4096:PxAQ8WGuMwCzrZI/Mk0rig==$jVBjH04otlJ
lneopDERHKsLWXMNlOQeTECDhxVg6iqU=:bczLZ5OAopbtzmGpLZbcK3zgmLmjIUeMIPjX6++FgkI= |          |
(2 rows)
```

10. Exit PostgreSQL:

\q

11. From your Linux station:

psql -h localhost postgres

```
essediri@iut2-dg039-d07:~$ psql -h localhost postgres
Password for user essediri:
psql (15.12 (Debian 15.12-0+deb12u2))
SSL connection (protocol: TLSv1.3, cipher: TLS_AES_256_GCM_SHA384, compression: off)
Type "help" for help.

postgres=>
```

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7. Install PHP

1. On your VM: **# apt install php-common libapache2-mod-php php-cli**
2. Create a test PHP file: **# echo "" | tee /var/www/html/info.php**
3. From the browser on your host: Go to: http://localhost:8080/info.php You should see PHP info.

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9. Install PhpPgAdmin

1. Add Backports to sources.list : **# nano /etc/apt/sources.list**
2. Add at the end of the files, write this sentence : http://deb.debian.org/debian bookworm-backports main
3. Make an update : **# apt update**
4. Install PhpPgAdmin: **# apt install phppgadmin/bookworm-backport**

5. Edit the file Connection.php and change:

case '14': return 'Postgres'; break;

to:

case '15': return 'Postgres'; break;

6. Restart Apache : **# systemctl restart apache2**
7. Go to: http://localhost:8080/phppgadmin

Congratulations, you can now use this to administrate your database !

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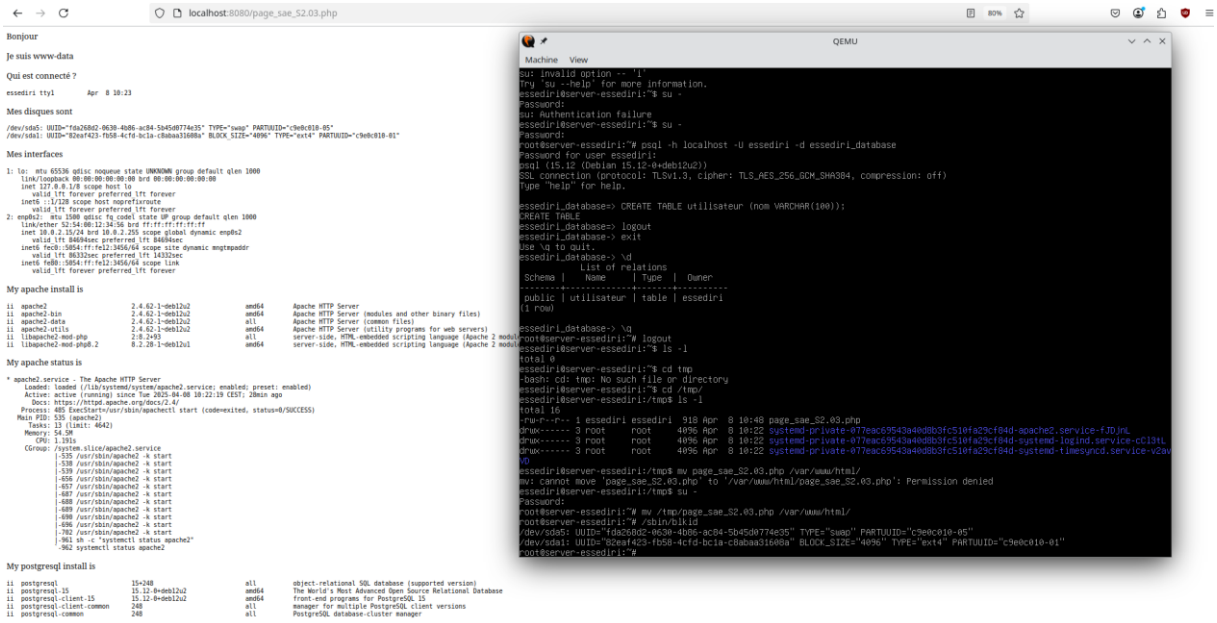
9. Additional Checks

1. Copy file page_sae_S2.03.php and check the page on your host machine :
   # cp /users/info/www/intranet/enseignements/S2.03/page_sae_S2.03.php /var/www/html/
2. Open http://localhost:8080/page_sae_S2.03.php



3. Check disk space: **$ df -h**

```
root@server-essediri:~# df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            1.9G     0  1.9G   0% /dev
tmpfs           392M  480K  392M   1% /run
/dev/sda1       3.0G  1.6G  1.2G  58% /
tmpfs           2.0G  1.1M  2.0G   1% /dev/shm
tmpfs           5.0M     0  5.0M   0% /run/lock
tmpfs           392M     0  392M   0% /run/user/1000
root@server-essediri:~#
```

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10. Security Analysis

- Keep your system up to date: **# apt update && apt upgrade**
- PostgreSQL: edit pg_hba.conf to restrict access

Use strong passwords and avoid running unnecessary services.

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11. Conclusion

You have successfully installed Debian 12, Apache, PostgreSQL, and PHP on a virtual machine without a graphical interface. You can now serve web pages and databases securely from your VM.