

Virtual machine installation guide

In this explanation, we're going to install a virtual machine with no graphical interface and several applications running on it.

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1/ Installing the machine

For begin the installation we go search ISO image on internet.

(<https://www.debian.org/>)

Then install it using the command :

```
lance_qemu="qemu-system-x86_64 -machine q35 -cpu host -m 4G -enable-kvm  
-device VGA,xres=1024,yres=768 -display gtk,zoom-to-fit=off -drive $drive -device  
e1000,netdev=net0 -netdev user,id=net0,hostfwd=tcp::  
2222-:22,hostfwd=tcp::4443-:443,hostfwd=tcp::8080-:80,hostfwd=tcp::5432-:5432":
```

Explanation of the main elements of the command :

-lance_qemu=: This is a variable that stores the QEMU command.

-qemu-system-x86_64: This is the name of the QEMU executable for virtualization of x86_64 systems.

-machine q35: This specifies that QEMU must use the Q35 machine model. The Q35 machine model is an emulated hardware platform for x86 machines.

-cpu host: This tells QEMU to emulate the host machine's processor.

-m 4G: This sets the amount of RAM allocated to the virtual machine to 4 GB.

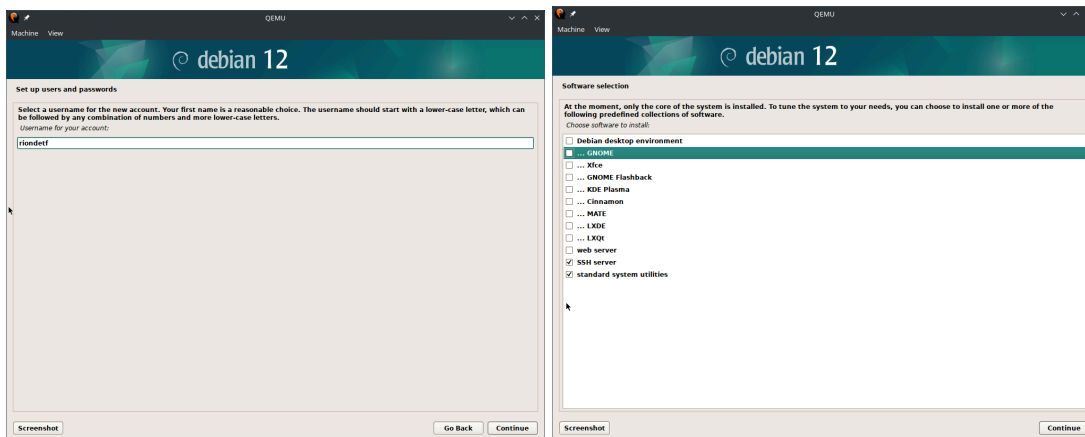
-enable-kvm: Enables KVM (Kernel-based Virtual Machine) support for hardware acceleration.

In short, this command line launches QEMU with the specified configuration to create a virtual machine with a specific screen resolution, 4 GB memory allocation, host machine CPU emulation and hardware acceleration enabled.

Next, you need to choose a configuration for your machine. Here is an example of a simple configuration, but feel free to do it differently :

- Language : English
- Location : other/Europe/France
- Locales : United States, en_US.UTF-8
- Keyboard : French
- Hostname: use server-"your username".
- Root Password: a simple password is recommended, like "root".
- User Account - Full Name: your full name, for example
- User Name: enter your user name

- User Password: enter a simple password.
- Partition disks : Guided - use entire disk
- Partition disks : All files in one partition
- Partition disks : Yes
- Software Selection: check that “Debian desktop” is unchecked and that “ssh server” is checked.
- Install GRUB : Yes
- Device for boot loader : /dev/sda
-



To finish the installation, “reboot” the virtual machine by typing poweroff from the console. Your machine should look like this, with a user for me called “riondetf”.

```

Machine View
QEMU

Debian GNU/Linux 12 riondetf tty1
riondetf login: etu
Password:
#
Login incorrect
riondetf login: riondetf
Password:
Linux riondetf 6.1.0-18-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.1.76-1 (2024-02-01) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
riondetf@riondetf:~$ cat /etc/fstab
# /etc/fstab: static file system information.
#
# Use 'blkid' to print the universally unique identifier for a
# device; this may be used with UUID= as a more robust way to name devices
# that works even if disks are added and removed. See fstab(5).
#
# system generates mount units based on this file, see systemd.mount(5).
# Please run 'systemctl daemon-reload' after making changes here.
#
# <file system> <mount point> <type> <options> <dump> <pass>
# / was on /dev/sda1 during installation
UUID=5d161e1f-a6c3-42c7-b410-4b12f15b1599 / ext4 errors=remount-ro 0 1
# swap was on /dev/sda5 during installation
UUID=c2b546-3f4e-4de1-8e4a-bff6409b7778 none swap sw 0 0
/dev/sr0 /media/cdrom udf,iso9660 user,noauto 0 0
riondetf@riondetf:~$ _

```

2/ Install apache

Then, if you want to use this machine as a server, you'll need to install apache. First of all, you need to log on to the machine as superuser with the command :

```
su -
```

And type the root password you entered during configuration.
To install it, type the command :

```
apt install apache2
```

then answer each choice with "yes". You can see the status of apache by typing `systemctl status apache2` and start it with `systemctl start apache2`. To check that you have completed the above steps correctly, write :

```
telnet localhost 80
```

and once connected, a few seconds later write :

```
HEAD / HTTP/1.0
```

Remember to note the / with a space on each side, as this is to indicate the root. If you get this response: `HTTP/1.1 200 OK`, then everything is working correctly. You can now try typing `http://localhost:8080` in the host machine's browser and look at the page that tells you everything is working properly.


```
Machine View
UNIT                                LOAD    ACTIVE SUB    DESCRIPTION
proc-sys-fs-binfmt_misc.automount loaded active running Arbitrary Ex
sys-devices-pci0000:00-0000:00:02-0-net-ens82.device loaded active plugged 8254EM Giga
sys-devices-pci0000:00-0000:00:1f-2-ata1-host0-target0:0:0-0:0:0:0-block-sda-sda1.device loaded active plugged QEMU_HARDDISK
sys-devices-pci0000:00-0000:00:1f-2-ata1-host0-target0:0:0-0:0:0:0-block-sda-sda2.device loaded active plugged QEMU_HARDDISK
sys-devices-pci0000:00-0000:00:1f-2-ata1-host0-target0:0:0-0:0:0:0-block-sda-sda5.device loaded active plugged QEMU_HARDDISK
sys-devices-pci0000:00-0000:00:1f-2-ata1-host0-target0:0:0-0:0:0:0-block-sda-sda6.device loaded active plugged QEMU_HARDDISK
sys-devices-pci0000:00-0000:00:1f-2-ata3-host2-target2:0:0-2:0:0:0-block-sr0.device loaded active plugged QEMU_DVD-ROM
sys-devices-platform-serial8250-tty-ttyS1.device loaded active plugged /sys/devices
sys-devices-platform-serial8250-tty-ttyS2.device loaded active plugged /sys/devices
sys-devices-platform-serial8250-tty-ttyS3.device loaded active plugged /sys/devices
sys-devices-pnp0-00:03-tty-tyt00.device loaded active plugged /sys/devices
sys-module-configfs.device loaded active plugged /sys/module/
sys-module-fuse.device loaded active plugged /sys/module/
sys-subsystem-net-devices-ens82.device loaded active plugged 8254EM Giga
-.mount loaded active mounted Root Mount
dev-hugepages.mount loaded active mounted Huge Pages M
dev-mqueue.mount loaded active mounted POSIX Messag
proc-sys-fs-binfmt_misc.mount loaded active mounted Arbitrary Ex
run-credentials-systemd-v2dsysctl.service.mount loaded active mounted /run/credenti
run-credentials-systemd-v2dsysusers.service.mount loaded active mounted /run/credenti
run-credentials-systemd-v2dtmpfiles.v2dsetup.service.mount loaded active mounted /run/credenti
run-credentials-systemd-v2dtmpfiles.v2dsetup.v2ddev.service.mount loaded active mounted /run/credenti
run-user-1000.mount loaded active mounted /run/user/100
sys-fs-fuse-connections.mount loaded active mounted FUSE Control
sys-kernel-config.mount loaded active mounted Kernel Conf
sys-kernel-debug.mount loaded active mounted Kernel Debug
sys-kernel-tracing.mount loaded active mounted Kernel Trac
systemd-ask-password-console.path loaded active waiting Dispatch Pass
systemd-ask-password-wall.path loaded active waiting Forward Pass
init.scope loaded active running System and S
session-1.scope loaded active running Session 1 of
session-3.scope loaded active running Session 3 of
apparmor.service loaded active exited Load Apparm
console-setup.service loaded active exited Set console f
cron.service loaded active running Regular back
dbus.service loaded active running D-Bus System
getty@tty1.service loaded active running Getty on tty
ifup@ens82.service loaded active exited Ifup for ens
ifup@pnp0.service loaded active exited Helper for s
keyboard-setup.service loaded active exited Set the cons
kmod-static-nodes.service loaded active exited Create List
networkd.service loaded active exited Raise netwo
ssh.service loaded active running OpenSSH Secur
systemd-binfmt.service loaded active exited Set up additi
systemd-journald-flush.service loaded active exited Flush Journal
systemd-journald.service loaded active running Journal Serv
lines 1-47
```

systemctl ssh :

```
Machine View
UNIT                                LOAD    ACTIVE SUB    DESCRIPTION
proc-sys-fs-binfmt_misc.automount loaded active running Arbitrary Ex
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sys-devices-pci0000:00-0000:00:1f-2-ata1-host0-target0:0:0-0:0:0:0-block-sda-sda1.device loaded active plugged QEMU_HARDDISK
sys-devices-pci0000:00-0000:00:1f-2-ata1-host0-target0:0:0-0:0:0:0-block-sda-sda2.device loaded active plugged QEMU_HARDDISK
sys-devices-pci0000:00-0000:00:1f-2-ata1-host0-target0:0:0-0:0:0:0-block-sda-sda5.device loaded active plugged QEMU_HARDDISK
sys-devices-pci0000:00-0000:00:1f-2-ata1-host0-target0:0:0-0:0:0:0-block-sda-sda6.device loaded active plugged QEMU_HARDDISK
sys-devices-pci0000:00-0000:00:1f-2-ata3-host2-target2:0:0-2:0:0:0-block-sr0.device loaded active plugged QEMU_DVD-ROM
sys-devices-platform-serial8250-tty-ttyS1.device loaded active plugged /sys/devices
sys-devices-platform-serial8250-tty-ttyS2.device loaded active plugged /sys/devices
sys-devices-platform-serial8250-tty-ttyS3.device loaded active plugged /sys/devices
sys-devices-pnp0-00:03-tty-tyt00.device loaded active plugged /sys/devices
sys-module-configfs.device loaded active plugged /sys/module/
sys-module-fuse.device loaded active plugged /sys/module/
sys-subsystem-net-devices-ens82.device loaded active plugged 8254EM Giga
-.mount loaded active mounted Root Mount
dev-hugepages.mount loaded active mounted Huge Pages M
dev-mqueue.mount loaded active mounted POSIX Messag
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run-credentials-systemd-v2dsysctl.service.mount loaded active mounted /run/credenti
run-credentials-systemd-v2dsysusers.service.mount loaded active mounted /run/credenti
run-credentials-systemd-v2dtmpfiles.v2dsetup.service.mount loaded active mounted /run/credenti
run-credentials-systemd-v2dtmpfiles.v2dsetup.v2ddev.service.mount loaded active mounted /run/credenti
run-user-1000.mount loaded active mounted /run/user/100
sys-fs-fuse-connections.mount loaded active mounted FUSE Control
sys-kernel-config.mount loaded active mounted Kernel Conf
sys-kernel-debug.mount loaded active mounted Kernel Debug
sys-kernel-tracing.mount loaded active mounted Kernel Trac
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ifup@pnp0.service loaded active exited Helper for s
keyboard-setup.service loaded active exited Set the cons
kmod-static-nodes.service loaded active exited Create List
networkd.service loaded active exited Raise netwo
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systemd-binfmt.service loaded active exited Set up additi
systemd-journald-flush.service loaded active exited Flush Journal
systemd-journald.service loaded active running Journal Serv
systemd-logind.service loaded active running User Login M
lines 1-47
```

3 /Install postgresql

Put yourself in administrator mode and write as usual:

```
su -
```

```
apt install postgresql
```

You'll still need to answer “yes” to all the questions. Once this is done, you can log in by writing :

```
su - postgresql
```

and display the base tables with `psql -l`.

```
root@serveur-riondetf:~# su - postgres
postgres@serveur-riondetf:~$ psql -l
```

Name	Owner	Encoding	Collate	Ctype	ICU Locale	Locale Provider	Access privileges
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

(3 rows)

Now it's up to you to enter the tables you want to create your database, but first don't forget to create a new user:

```
CREATE USER "votre nom d'utilisateur"
```

```
CREATE DATABASE "nom_base" OWNER "nom_role";
```

```
postgres@serveur-riondetf:~$ psql -l
```

Name	Owner	Encoding	Collate	Ctype	ICU Locale	Locale Provider	Access privileges
mabase	riondetf	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)

```
CREATE TABLE matable (  
    prenom      varchar(80),  
    age         int,  
);
```

```
INSERT INTO matable (prenom, age) VALUES ('flavien', 19);
```

To access postgres on the host machine, go to the main folder with :

```
cd /etc/postgresql/15/main/
```

Then modify the pg_hba.conf file by writing :

```
nano pg_hba.conf
```

In this file, add the line in IPv4:

```
host all all 0.0.0.0/0 scram-sha-256
```

And edit a second file

```
nano postgresql.conf
```

Then look for a first line containing listen_addresses and remove the # in front of it, then replace after equal with "*" .

And a second line password_encryption = scram-sha-256 where you must also remove the # in front.

Create your password with :

```
\password "user name"
```

You can now connect to the host machine by writing this command:

```
psql -h localhost -U riondetf -d "you'r base"
```



```

mabase=# \password riondetf
Enter new password for user "riondetf":
Enter it again:
mabase=#
riondetf@pc-dg-033-15:~$ psql -h localhost -U riondetf -d mabase
Password for user riondetf:
psql (15.6 (Debian 15.6-0+deb12u1))
SSL connection (protocol: TLSv1.3, cipher: TLS_AES_256_GCM_SHA384, compression: off)
Type "help" for help.

mabase=> 

```

You can then look in the databases on the virtual machine to find the lines of pg_shodow that contain the encrypted password you entered.

```

riondetf | 16388 | f | f | f | f | SCRAM-SHA-256$4096:d/ArSRqJo8nS2scd8fJ7JA== $0ykw0LK862K
38PPAauLF90H/xFDQpa09QszXXDMen8=:wNIB7h7pw7HyEGqPKRv7ZvMy/8n83BonVDQT51xQSDc= |
(2 rows)

```

4/ Install php

Put yourself in administrator mode with the command `su -`.

Install php: `apt install php`

Create a file in the `/var/www/html` directory:

```
cd /var/www/html, pour se déplacer vers une destination
```

```
touch info.php, for create the file
```

```
nano info.php, for open the file
```

then write these lines:

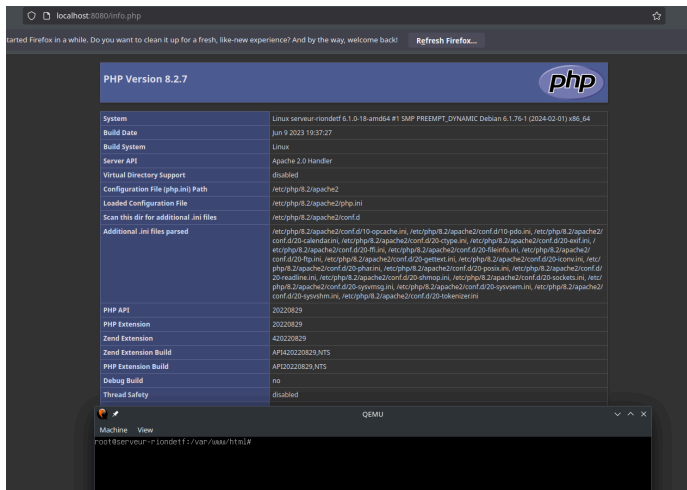
```

<?php
phpinfo();
phpinfo(INFO_MODULES);

```

```
?>
```

On the host machine, go to: <http://localhost:8080/info.php> and you can see on the page that the server is running.



5/ Install phppgadmin

Finally, we'll look at how to install phppgadmin.

```
su -
```

```
apt install phppgadmin
```

Now we need to find the Connection.php file and modify it with this command:

```
find / -name Connection.php
```

Once the file is found, change the line :

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

at

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

Now you can go and look at your tables on the host machine in the browser as shown below:

The screenshot shows the phpPgAdmin web interface in a browser window. The address bar shows 'localhost:8080/phppgadmin/'. A notification at the top says 'It looks like you haven't started Firefox in a while. Do you want to clean it up for a fresh, like-new experience? And by the way, welcome back!'. The interface has a sidebar on the left with a tree view showing 'Serveurs' > 'PostgreSQL' > 'mabase' > 'postgres'. The main area displays the results of a SQL query: 'select * from matable;'. The results are shown in a table with two columns: 'nom' and 'age'. There is one row with the value 'flavien' in the 'nom' column and '19' in the 'age' column. Below the table, it says '1 ligne(s)'. At the bottom of the main area, there are links: 'Éditer SQL', 'Étendre', 'Télécharger', and 'Rafraîchir'.

The virtual machine according to the browser :

The screenshot shows a web browser window with the address 'localhost:8080/page_sae_52.03.php'. The page content is as follows:

Bonjour

Je suis www-data

Qui est connecté ?

riondetf tty1 May 28 09:28

Mes disques sont

```
/dev/sda5: UUID="c21b5446-3f48-4de1-8eda-bff6409b7778" TYPE="swap" PARTUUID="cba363b9-05"
/dev/sdal: UUID="5d181ef1-a663-42c7-b41b-4a512f3b1998" BLOCK_SIZE="4096" TYPE="ext4" PARTUUID="cba363b9-01"
```

Mes interfaces

```
1: lo: mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enp0s2: mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 52:54:00:12:34:56 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic enp0s2
        valid_lft 84987sec preferred_lft 84987sec
    inet6 fe80::5054:ff:fe12:3456/64 scope site dynamic mngtmpaddr
        valid_lft 86367sec preferred_lft 14367sec
    inet6 fe80::5054:ff:fe12:3456/64 scope link
        valid_lft forever preferred_lft forever
```

My apache install is

ii	apache2	2.4.59-1-deb12u1	amd64	Apache HTTP Server
ii	apache2-bin	2.4.59-1-deb12u1	amd64	Apache HTTP Server (modules and other binary files)
ii	apache2-data	2.4.59-1-deb12u1	all	Apache HTTP Server (common files)
ii	apache2-utils	2.4.59-1-deb12u1	amd64	Apache HTTP Server (utility programs for web servers)
ii	libapache2-mod-php8.2	8.2.18-1-deb12u1	amd64	server-side, HTML-embedded scripting language (Apache 2 module)

My apache status is

```
* apache2.service - The Apache HTTP Server
Loaded: loaded (/lib/systemd/system/apache2.service; enabled; preset: enabled)
Active: active (running) since Tue 2024-05-28 09:20:02 CEST; 23min ago
Docs: https://httpd.apache.org/docs/2.4/
Process: 405 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
Main PID: 496 (apache2)
Tasks: 0 (Limit: 4645)
Memory: 34.9M
CPU: 248ms
CGroup: /system.slice/apache2.service
        └─496 /usr/sbin/apache2 -k start
        └─498 /usr/sbin/apache2 -k start
        └─499 /usr/sbin/apache2 -k start
        └─500 /usr/sbin/apache2 -k start
        └─501 /usr/sbin/apache2 -k start
        └─502 /usr/sbin/apache2 -k start
        └─974 sh -c 'systemctl status apache2'
        └─975 systemctl status apache2
```

The remaining space on the machine with df -h :

```
riondetf@serveur-riondetf:~$ 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  1.3G  56% /
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
```

Then, for safety reasons, always perform these two commands regularly:

```
root@serveur-riondetf:~# apt update_
root@serveur-riondetf:~# apt upgrade_
```