

# KVM

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## Installation

Install all the required for the installation of Qemu, KVM hypervisor, and Libvirt

```
# apt install qemu-system libvirt-daemon-system qemu-utils virt-manager
```

- `qemu-system`: is an open source virtualizer that provides hardware emulation for the KVM hypervisor. It acts as a virtual machine monitor together with the KVM kernel modules, and emulates the hardware for a full system such as a PC and its associated peripherals.
- `virt-manager`: Virt-Manager is a graphical user interface (GUI) tool for managing virtual machines through `libvirt-daemon`.
- `libvirt-daemon-system`: provides API libraries that enables GUI apps such as `virt-manager` to communicate with `libvirtd` daemon, a system service `libvirtd` , and a `virsh` CLI tool
- `qemu-utils`: Various utilities e.g. for manipulating disk images
- `virtinst`: Allows to create Virtual Machines (VMs) from the command-line.

Verify that the virtualization daemon, `libvirtd-daemon`, is operating before moving on. Execute the command to achieve this.

```
# systemctl status libvirtd
```

Output:

```
● libvirtd.service - Virtualization daemon
   Loaded: loaded (/lib/systemd/system/libvirtd.service; enabled; preset:
enabled)
   Active: active (running) since Sun 2023-08-06 10:57:02 CEST; 1min 30s
ago
  TriggeredBy: ● libvirtd-ro.socket
               ● libvirtd-admin.socket
               ● libvirtd.socket
     Docs: man:libvirtd(8)
           https://libvirt.org
  Main PID: 7999 (libvirtd)
    Tasks: 19 (limit: 32768)
  Memory: 15.7M
     CPU: 188ms
  CGroup: /system.slice/libvirtd.service
          └─7999 /usr/sbin/libvirtd --timeout 120
Aug 06 10:57:02 pcwerkkamer systemd[1]: Starting libvirtd.service -
Virtualization daemon...
Aug 06 10:57:02 pcwerkkamer systemd[1]: Started libvirtd.service -
Virtualization daemon.
```

Check if libvirtd service will start automatically at boot time.

```
# systemctl is-enabled libvirtd
```

Output:  
enabled

If disabled run the following command to have it boot automatically:

```
# systemctl enable --now libvirtd
```

Use the following command to determine whether the KVM modules are loaded:

```
$ lsmod | grep -i kvm
kvm_intel          380928  0
kvm                1142784  1 kvm_intel
irqbypass         16384   1 kvm
```

## Configuration

### User privileges

In order to manage virtual machines as a regular user, that user needs to be added to the libvirt group:

```
# usermod -aG libvirt,kvm USERNAME
```

### User-specific and system-wide VMs

By default, if virsh is run as a normal user it will connect to libvirt using `qemu:/session URI string`. This URI allows virsh to manage only the set of VMs belonging to this particular user. To manage the system set of VMs (i.e., VMs belonging to root) virsh should be run as root or with `qemu:/system URI`:

```
$ virsh --connect qemu:///system list --all
```

To avoid having to use the `-connect` flag on every command, the URI string can be set in the `LIBVIRT_DEFAULT_URI` environment variable:

```
$ export LIBVIRT_DEFAULT_URI='qemu:///system'
```

## Libvirt default network

If you use libvirt to manage your VMs, libvirt provides a NATed bridged network named “default” that allows the host to communicate with the guests. This network is available only for the system

domains (that is VMs created by root or using the “qemu:system” connection URI). VMs using this network end up in 192.168.122.1/24 and DHCP is provided to them via dnsmasq. This network is not automatically started. To start it use:

```
virsh --connect=qemu:///system net-start default
```

To make the default network start automatically use:

```
virsh --connect=qemu:///system net-autostart default
```

## Change XML configuration

Extract the xml from an existing qcow2 image by:

```
virsh dumpxml Windows-11 > Windows-11.xml
```

Edit and modify the tags in the XML file. Undefine the XML config from the old vm to prevent an error because of a duplicate UUID:

```
virsh undefine --nvram Windows-11  
or  
virsh undefine Windows-11
```

Import / define the new XML file:

```
virsh define Windows-11.xml
```

Of course you will have to stop and start the vm for the changes to take effect:

```
virsh destroy name_of_vm  
virsh start name_of_vm
```

## Error Access ISO files, etc.

Directory, that libvirt is using for storing/reading ISO and qcow2 files needs to be readable by libvirt-qemu user. In case of an error opening an ISO or image file, the “libvirt-qemu” user does not have access to the file or the directories holding the files. The “libvirt-qemu” user needs **“r+x”** permissions **all the way up the path**. You can check if unix permissions are correct by running a shell under user “libvirt-qemu” and see if you can ls along the path all the way up to the files:

```
$ sudo su -s /bin/bash libvirt-qemu
```

If you can't ls with an account that does have access yields a result with a permission line that contains a dot such as drwxrwxr-x. meaning extended ACL permissions.

## Fix 1:

Put the iso or image into one of the pool directories of libvirt manager. E.g. /var/lib/libvirt/images Or any other paths that have full r others rights.

## Convert VirtualBox to KVM

```
qemu-img convert -f vdi -o qcow2 virtualbox-name.vdi kvm-name.qcow2
```

## Shrink KVM qcow2 image

```
qemu-img convert -o qcow2 source.qcow2 shrunk.qcow2
```

## Links

- <https://wiki.debian.org/KVM#Installation>

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<https://wiki.oscardegroot.nl/> - HomeWiki

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