

## qemu-web-desktop: Managing Virtual machines

This documentation assumes you already have installed and configured the service. Refer to the `INSTALL.md` and `CONFIGURE.md`.

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### Creating virtual machines

It is possible to create a VM from an ISO, just like you would boot physically. An empty disk is first created (here with size 10GB).

```
qemu-img create -f qcow2 machine1.qcow2 10G
```

Then you should boot from an ISO file (here indicated as `file.iso`)

```
qemu-system-x86_64 -m 4096 -smp 4 -hda machine1.qcow2 -name MySuperbVM -boot d -cdrom file.iso
```

and install the system on the prepared disk. If you can not start `qemu/kvm` with a message `Could not access KVM kernel module: Permission denied;`  
`qemu-system-x86_64: failed to initialize kvm: Permission denied,`  
execute the command `sudo /sbin/adduser $USER kvm`, then `logout/login`.

You may also convert an existing VDI/VMDK file (VirtualBox and VMWare formats - here `file.vmdk`) into QCOW2 for QEMU (here `machine1.qcow2`) with command:

```
qemu-img convert -f vmdk -O qcow2 file.vmdk machine1.qcow2
```

In case you have an OVA file for VirtualBox, extract it, and convert it afterwards to a QCOW2 file (optional as QWD can use the vmdk files).

```
tar -xvf file.ova
```

```
qemu-img convert -f vmdk -O qcow2 file.vmdk machine1.qcow2
```

Last, you may dump an existing physical disk (with a functional system - here from device `dev/sda`) into a QCOW2 format:

```
qemu-img convert -O qcow2 /dev/sda machine1.qcow2
```

The QCOW2 format allows to resize disks, for instance with (increase by +50GB):

```
qemu-img resize machine1.qcow2 +50G
```

If a VM file gets too large, you can (re)compress it with command:

```
qemu-img convert -O qcow2 -c image.qcow2 image_compressed.qcow2
```

### Adding virtual machines to the service

QWD is designed to run virtual machines with the host architecture, e.g. x86\_64 on Intel/AMD and aarch64 on ARM. This choice provides the best performance.

The easiest is to make use of the `qwdctl` tool (see below). Other options are activated by un-commenting sections in the file `/usr/share/qemu-web-desktop/html/desktop/index.html` (can be done with `sudo qwdctl edit web`).

Common virtual machine image file formats are supported (QCOW2, VDI, VMDK, RAW, VHD/VHDX, QED), as well as ISO live images.

:exclamation: In order for the clipboard copy-paste to properly work between the host and the sessions, the following packages should be installed in the virtual machines:

- `qemu-guest-agent spice-vdagent`

**Automatic configuration of virtual machines via `qwdctl`** The best way to manage virtual machines is to use the `qwdctl` tool. It is possible to add new VM's, disable (hide) VM's, re-enable hidden VM's, purge unused VM files.

Command	Description	Example
<code>qwdctl status</code>	List running sessions, enabled, disabled and orphan VM.	<code>qwdctl status</code>
<code>qwdctl enable VM</code>	Add or (re)enable a VM. The VM can be given as a full file path, a URL or a VM file already present in <code>/var/lib/qemu-web-desktop/machines/</code> .	<code>qwdctl enable /path/to/VM.qcow2</code> <code>qwdctl enable http://url/to/VM.qcow2</code> <code>qwdctl enable slax.iso</code>
<code>qwdctl disable VM</code>	Disable a VM. The VM name must match an active entry.	<code>qwdctl disable slax.iso</code>
<code>qwdctl purge</code>	Delete VM files that are not running, nor active. You may restrict the purge to a given name.	<code>qwdctl purge qwdctl</code> <code>qwdctl purge slax.iso</code> <code>qwdctl purge slax.iso --yes</code>

So, in short, to add a new VM and make it available, use:

```
sudo qwdctl enable /path/to/VM.ext "Description"
```

The VM file can be given as a ISO, QCOW2, VDI, VMDK, RAW, VHD/VHDX file, as well as a URL. The “Description” can be omitted, in which case the VM name is used as descriptor. The same command can be used to re-enable a VM that has been disabled. New VM file descriptors are stored in `/etc/qemu-web-desktop/config.d/*.ini`. The VM files are stored e.g. in `/var/lib/qemu-web-desktop/machines/`.

To disable (i.e. hide) a VM, use:

```
sudo qwdctl disable VM
```

where the VM must match an existing file e.g. in `/var/lib/qemu-web-desktop/machines/`. The VM file is not removed, it is only made inactive in the service landing page. It can be re-enabled with `qwdctl enable VM`.

Last, to clean VM files which are both not running and disabled, use:

```
sudo qwdctl purge
```

An optional VM argument allows to specify a starting name for removal, e.g. `qwdctl purge slax` removes `slax*`. The command requests for confirmation, but you may add the `--yes` for a fully automatic configuration. This allows to definitely remove leftover VM files (orphan).

**Semi-Automatic configuration of virtual machines via qwdctl** Each entry in the configuration file `/etc/qemu-web-desktop/machines.conf` (and `/etc/qemu-web-desktop/config.d/*.ini`) spans on 2 or 3 lines:

- `[name.ext]`
- `url=[URL to ISO, QCOW2, VDI, VMDK, RAW, VHD/VHDX virtual machine disk]` (optional if the file is already present)
- `description=[description to be shown in the login page]`

Images listed in the configuration file *without* a `url=` parameter are expected to be downloaded by hand and installed into `/var/lib/qemu-web-desktop/machines/` by the local administrator. In this case, just specify the `[name.ext]` and `[description]`.

Images with a `[url]` line are downloaded (requires a configured network connection). Add ISO or virtual machine files for your architecture, and comment the others with `;`.

You may edit this file manually, or with the command:

```
sudo -E qwdctl edit machines
```

You may set the **EDITOR** environment variable to select the text editor to use.

:warning: In case the machine list does not appear in the landing page, first refresh the landing page, or change the `machines_insert=no` to `machines_insert=yes` in `/usr/bin/qwdctl`.

Then actually launch (done automatically after `sudo qwdctl edit machines`):

```
sudo -E qwdctl download
```

or, to only update existing machines, use:

```
sudo -E qwdctl refresh
```

To list running sessions, use:

```
qwdctl status
```

To stop active sessions matching a given TOKEN, use (with caution):

```
sudo qwdctl stop TOKEN
```

The command `qwdctl` alone will display all possible options.

**Manual configuration of virtual machines** You may also do this by hand. Place any ISO, QCOW2, VDI, VMDK, RAW, VHD/VHDX, QED virtual machine file in e.g. `/var/lib/qemu-web-desktop/machines`.

```
ls /var/lib/qemu-web-desktop/machines
```

```
slax.iso  slitaz-rolling.iso  TinyCore-current.iso  machine1.qcow2 ...
```

Then create/edit the `/usr/share/qemu-web-desktop/html/machines.html` (link from `/var/lib/qemu-web-desktop/machines.html`) web page and add entries to reflect the VM files in `html/machines`:

```
<option value="slax.iso">Slax (Debian)</option>
<option value="TinyCore-current.iso">TinyCore Linux</option>
...
<option value="machine1.qcow2">My superb VM</option>
...
```

You can also comment/uncomment sections (e.g. GPU, user script, one-shot) at will in the main web page `/usr/share/qemu-web-desktop/html/desktop/index.html` (you may use `sudo qwdctl edit web` for this purpose). Defaults will then be used.

:+1: This project provides minimal ISO's for testing (for `x86_64` in `html/desktop/machines`):

- Slax a very compact Debian-based system (265 MB)
- TinyCore a very compact, old-style Linux (24 MB - yes)
- SliTaz a very compact, old-style Linux (54 MB - yes)

We also recommend other small linux systems for `x86_64`:

- <https://puppylinux-woof-ce.github.io/index.html> (small, comes as Debian and Slackware base)
- <https://www.porteus.org/> (small, SlackWare based)

- <https://archbang.org/> (Arch based)
- <https://www.bodhilinux.com/> (Ubuntu/Debian based)

and for **arm64**:

- <https://cdimage.debian.org/cdimage/release/current/arm64/iso-dvd/>
- <https://www.armbian.com/uefi-arm64/>
- <https://archlinuxarm.org/>

There exists some virtual machine repositories, for instance:

- <https://marketplace.opennebula.systems/appliance>
- <https://www.osboxes.org>

### Starting, sharing, stopping, re-connecting

The DARTS/qemu-web-desktop service allows to connect and re-connect to active sessions (except for one-shot sessions). Each session is by default a **copy** of the given VM, so that changes are not kept (this behaviour can be changed with the **snapshot\_use\_master=1** option). It is also possible to share the connection link for an active session, so that multiple users can see and interact on the same environment. Last, sessions can be ended either from the sessions themselves (find the ‘Shutdown’ item), or aborted with the ‘Stop’ button shown in the session information page.

All of these actions are possible when selecting the ‘Manage sessions’ button on the right of the service page, with proper credentials. Only your sessions will be listed.

### Starting sessions manually (command-line)

You can also manually start a session from the terminal with command:

```
qwdctl start VM ...
```

Additional arguments override the default configuration, such as:

<code>qwdctl start VM [option...]</code>	Description
<code>--snapshot_alloc_cpu=VALUE</code>	Number of CPU cores to use. Default: 1 (qemu equivalent: <code>-smp VALUE</code> )
<code>--snapshot_alloc_disk=VALUE</code>	Disk size to create for ISO's, in GB. Default: 10
<code>--snapshot_alloc_mem=VALUE</code>	Memory to allocate to session, in GB. Default: 4 (qemu equivalent: <code>-m VALUE*1024</code> )

<code>qwdctl start VM [option...]</code>	Description
<code>--snapshot_use_master=VALUE</code>	When 1, do NOT create a snapshot, so that all changes are written to the master VM (not for ISO's). Default: 0 (changes are lost)

A URL is shown. Open a browser to view the session.

```
$ qwdctl start /var/lib/qemu-web-desktop/machines/TinyCore-current.iso
http://localhost:6005/vnc.html?resize=scale&autoconnect=true&host=localhost&port=6005
```

:warning: All sessions are started in one-shot mode, i.e. closing the browser will end the session. Except when starting with the `--snapshot_use_master=1` option (not for ISO's), the session and the associated snapshot/qcow2 file will be lost. Copy the qcow2 file before ending the session. There is no support for GPU pass-through with this manual launch.

### Issues: missing QEMU Guest Agent

In some virtual machines or ISO's, you may get errors such as:

- Dependency failed for QEMU Guest Agent
- Time out waiting for device `/dev/virtio-ports/org.qemu.guest_agent.0`

In this case, try to boot the VM manually, and install the `qemu-guest-agent` and the `spice-vdagent` packages.