

## qemu-web-desktop: Installation

This documentation details how to install qemu-web-desktop. The Data Analysis Remote Treatment Service (DARTS) is an implementation of **qemu-web-desktop** at Synchrotron SOLEIL.

Table of contents:

1. Installation: The short story
2. Manual installation
3. Issues

### Installation: The short story

| System                        | Install                                                                                                                                                                                       | Quick configuration                                                                                                                          |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Debian/Ubuntu/Mint            | <code>sudo -E apt install qemu-web-desktop (deb)</code>                                                                                                                                       | <code>sudo -E qwdctl enable slax.iso</code>                                                                                                  |
| Arch/Endeavour/Manjaro        | <code>yay -S qemu-web-desktop (AUR)</code>                                                                                                                                                    | follow final steps see <a href="https://aur.archlinux.org/packages/qemu-web-desktop">https://aur.archlinux.org/packages/qemu-web-desktop</a> |
| Apple/Darwin/MacOS (homebrew) | Install Brew then use <code>make deps;</code><br><code>make install;</code><br>(no sudo).                                                                                                     | <code>qwdctl enable</code><br><code>debian-live-testing-arm64-gnome.iso</code><br>(no sudo)                                                  |
| RedHat/Fedora :warning:       | <code>sudo dnf install</code><br>make then use manual install.                                                                                                                                | :warning: <code>qwdctl start</code> VM works, but the web service is broken                                                                  |
| Manual Install                | <code>git clone https://gitlab.com/soleil-sdrta-Ereatment/soleil-software-prod</code><br><code>cd qemu-web-desktop;</code><br><code>sudo make deps;</code><br><code>sudo make install;</code> | <code>sudo -E qwdctl enable</code><br><code>qwdctl edit machines</code>                                                                      |

Then, if you are in a hurry:

1. Enable a virtual machine as listed by `qwdctl status`, for instance `sudo qwdctl enable slax.iso`.
2. Open the URL <http://localhost/qemu-web-desktop/>, enter a fake user ID (the authentication is inactivated at start), and click on Create. A VM should start.

It is recommended to follow the `CONFIGURE.md` notes (e.g. `sudo qwdctl edit config`). If you wish to use a GPU, have a look at `GPU.md`. To manage virtual machines, refer to `VIRTUAL_MACHINES.md`.

:warning: This service is currently only validated on `intel/amd64/x86_64` and `arm64/aarch64` architectures.

## Manual installation

**Hardware requirements** The service will launch virtual machines for which some memory and CPU (possibly GPU) are allocated. However, the QEMU memory and CPU management allows to redistribute the unused resources, so that in practice the total amount of requested CPU and memory can exceed the physical limitations. This relies on the assumption that not all sessions will use the full requested CPU and memory at the same time.

For most purposes a simple ‘gamer’ machine should suffice, with typically 4 GB memory per available core, to run most virtual machines. We have tested for instance the service on 64-core computers with 256 GB memory. Last, you may even run QWD from *inside* a running virtual machine, in case you wish to completely virtualize your infrastructure (performance may be lower still).

**Software requirements (dependencies):** Get the source code (or a release):

- `git clone https://gitlab.com/soleil-data-treatment/soleil-software-projects/qemu-web-desktop`
- :warning: if you just cloned the repository, make sure you collect the `html/desktop/machines` directory with LFS. Install it with `sudo apt install git-lfs` then, from the repo, `git-lfs install; git lfs pull`.
- you may alternatively get a release at `https://gitlab.com/soleil-data-treatment/soleil-software-projects/qemu-web-desktop/-/releases`
- `cd qemu-web-desktop`

The following dependencies are installed with:

- `sudo make deps` (no `sudo` under MacOS)
- **Debian-class** systems (Ubuntu/Mint...): `apache2 libapache2-mod-perl2 novnc websockify qemu-kvm bridge-utils qemu iptables dnsmasq libcgi-pm-perl liblist-moreutils-perl libsys-cpu-perl libsys-cpuload-perl libsys-meminfo-perl libnet-dns-perl libproc-background-perl libproc-processtable-perl libemail-valid-perl libnet-smtps-perl libmail-imapclient-perl libnet-ldap-perl libemail-valid-perl libjson-perl libwww-perl libguestfs-tools libapache2-mpm-itk libtext-qrcode-perl libnet-ssh2-perl wget` and on `arm64/aarch64` architectures `qemu-efi-aarch64` (EFI boot)

- **Arch-class** systems (Endeavour, Manjaro, Cauchy): `python-numpy`  
`python-setuptools` `apache` `mod_itk` `qemu-desktop` `bridge-utils`  
`qemu-img` `dnsmasq` `guestfs-tools` `perl-cgi` `perl-list-moreutils`  
`perl-sys-cpu` `perl-sys-meminfo` `perl-net-dns` `perl-proc-processtable`  
`perl-mail-imapclient` `perl-ldap` `perl-json` `perl-libwww` `mod_perl`  
`novnc` `websockify` `perl-proc-background` `perl-email-valid`  
`perl-net-smtps` `perl-text-qrcode` `perl-net-ssh2` `wget`
- **Fedora/RedHat-class** systems: `mod_perl` `novnc` `python3-websockify`  
`guestfs-tools` `perl-CGI` `perl-List-MoreUtils` `perl-Sys-CPU`  
`perl-Sys-MemInfo` `perl-Net-DNS` `perl-Proc-Simple` `perl-Proc-ProcessTable`  
`perl-Email-Valid` `perl-Net-SMTPS` `perl-Mail-IMAPClient` `perl-LDAP`  
`perl-JSON` `perl-libwww-perl` `perl-Text-QRCode` `perl-Net-SSH2`  
`perl-CPAN` `wget`
- **Apple/Silicon** systems: `apache2` `qemu` `perl` `python3` `python-setuptools`  
`grep` `wget` `gnu-sed` `nano` `cpanminus` (homebrew)

**Get the source code and install** Get the source code as above and `cd` `qemu-web-desktop`.

Then install QWD with:

- `sudo make install` (no `sudo` under MacOS)

In case the `make` command fails, have a look at the Makefile...

:warning: In case you manually install the software, and target directories are customized, make sure to edit the `qwdctl` file to change the filepath to match configuration files (at start).

**Test the service** It is possible to test that all works with:

```
cd qemu-web-desktop
make test
```

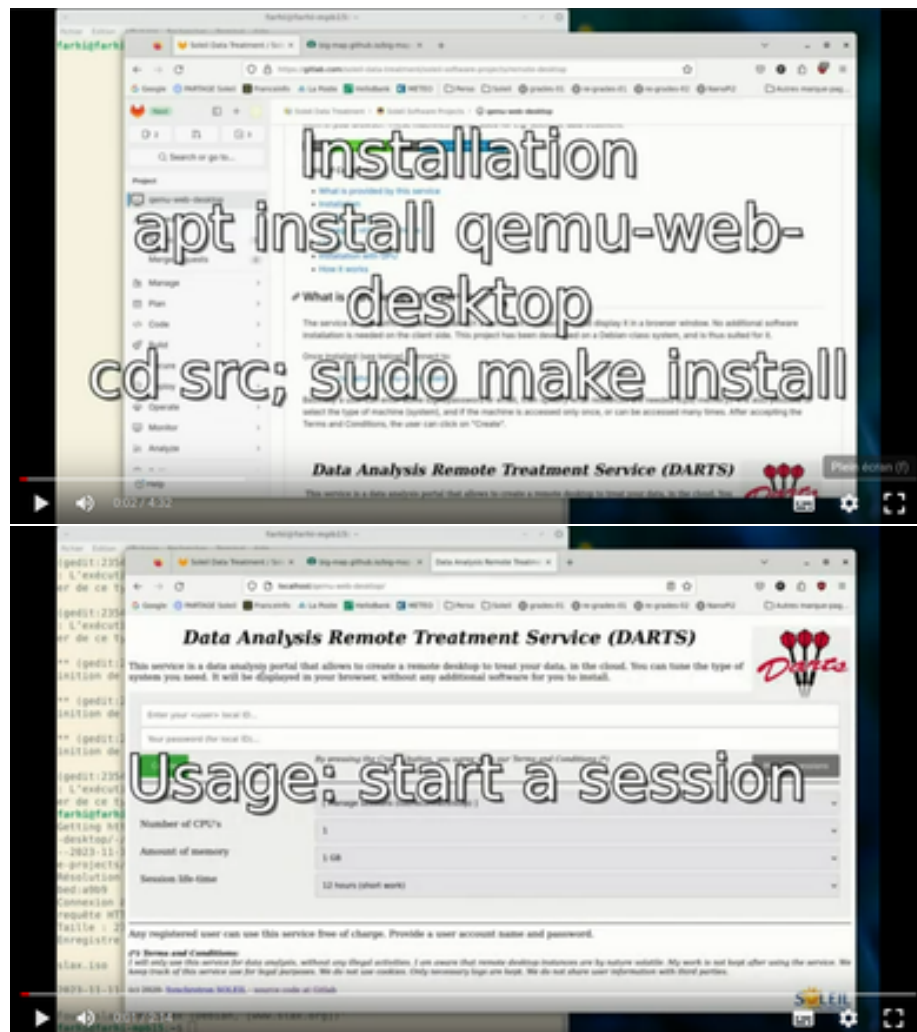
A URL will be displayed, and the session will then be closed after 30 seconds.

**Uninstall** To un-install, just do a:

- `sudo make uninstall`

or remove the distribution package (Debian, Redhat, Arch).

We have prepared two videos that demonstrate the semi-automatic procedure (Debian).



## Building a Debian package

To build a Debian package out of this repository or <https://salsa.debian.org/debian/qemu-web-desktop>, use:

```
sudo apt install git-buildpackage dh-apache2 dh-sysuser devscripts help2man pandoc
make deb
```

will create a `.deb` package in the directory level above.

## Building an Arch package

```
cd packaging/arch
```

```
makepkg -s  
# install  
pacman -U ./qemu-web-desktop*.zst
```

## Issues

Refer to the end of the CONFIGURE.md documentation.