qemu-web-desktop

qemu-web-desktop is a remote desktop service that launches virtual machines in the cloud, and displays them in your browser. These machines can be used for e.g. scientific data treatment. The Data Analysis Remote Treatment Service (DARTS) is an implementation of `qemu-web-desktop` at Synchrotron SOLEIL.

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Description

The service allows launch a remote virtual machine, and display it in a browser window. No additional software installation is needed on the client side. This project has been developed on a Debian-class system, and is thus suited for it, but should install on basically any Linux system. Each session usually starts from the same state, all further modifications are made within snapshots, and thus not permanent.

Once installed (see INSTALL.md), connect to e.g.:

- http://localhost/qemu-web-desktop

Basically a user can enter some login/password or email. The user can click on "Create". It is also possible to select the type of machine (system), and what resources are needed (cpu, memory).

When authentication is successful, a virtual machine is launched and can be displayed in the browser window.

Just click the link, and you will access the virtual machine remote desktop. Use full screen, adapt screen resolution and keyboard layout, and you'll be good to go !

From the service landing page (login, machine specifications), you may also access a monitoring page to list running sessions.

Features

- Supports all common virtual machine formats (VDI, VMDK, VHD, VHDX, QCOW2, RAW), as well as ISO live images, for `x86_64` and `aarch64`

(arm64) host servers. See the VIRTUAL_MACHINES.md page about ways to manage running sessions (add/enable/disable/modify).
- Supports authentication using local, SMTP, IMAP, LDAP and email (or no authentication). Supports MFA via LDAP and email. See CONFIGURE.md.
- Checks the server load to avoid DoS. See "customize" section in CONFIGURE.md.
- The browser can be closed and re-connected later while the session is still running. The connection information can also be shared to allow multiple users to collaborate. It is important to remember the session URL. :warning: Beware: all users will have mouse/keyboard control, so that friendly collaboration rules must be set in place.
- No need to install anything on the client side.
- The rendering of the web service is responsive design. It adapts to the browser window size.
- Can monitor running sessions.
- Can mount host volumes.
- Automatically clean-up sessions that have passed their life-time.
- Can optionally assign physical GPU to sessions (see GPU.md).
- Can optionally insert and execute scripts in the virtual machine boot process.
- Can optionally distribute the sessions work-load over a farm of servers.

Credits

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- Farhi, E., (2023). DARTS: The Data Analysis Remote Treatment Service. Journal of Open Source Software, 8(90), 5562, https://doi.org/10.21105/joss.05562
- https://gitlab.com/soleil-data-treatment/soleil-software-projects/remote-desktop

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We have benefited from the following web resources.

Debian/Ubuntu documentation

- https://doc.ubuntu-fr.org/vfio (in French)
- https://alpha.lordran.net/posts/2018/05/12/vfio/ (in French)
- https://passthroughpo.st/gpu-debian/

- https://wiki.debian.org/VGAPassthrough
- https://davidyat.es/2016/09/08/gpu-passthrough/
- https://heiko-sieger.info/low-end-kvm-virtual-machine/

Other documentation

- https://mathiashueber.com/windows-virtual-machine-gpu-passthrough-ubuntu/
- https://wiki.archlinux.org/index.php/PCI_passthrough_via_OVMF
- https://neg-serg.github.io/2017/06/pci-pass/ (ARCH linux)
- https://wiki.gentoo.org/wiki/GPU_passthrough_with_libvirt_qemu_kvm (Gentoo)
- https://medium.com/@calerogers/gpu-virtualization-with-kvm-qemu-63ca98a6a172

VirtualBox documentation

- https://docs.oracle.com/en/virtualization/virtualbox/6.0/admin/pcipassthrough.html