

# Qubes OS Cheatsheet

## Qubes Cheatsheet

*a summary of useful qubes commands*

version: 3.1

### Mini Glossary

- Xen - *Hypervisor*
- VM - *Virtual Machine*
- Qube - *Qubes OS specific alias for VM*
- Dom0 - *Privileged Xen VM (runs Qubes Manager)*
- DomU - *Normal Xen VM*
- QWT - *Qubes Windows Tools*
- PV - *Paravirtualized VM*
- HVM - *Hardware Virtual Machine*
- HVM + PV drivers - *HVM with PV drivers (Windows + QWT)*
- GUI - *Graphical User Interface*

### VM Management

*!:* All commands are executed in Dom0 terminal (Konsole, Terminal, Xterm etc.)

**qubes-manager** - *Graphical VM Manager*

usage: **qubes-manager**

**qvm-block** - *list/set VM PCI devices*

usage:

- **qvm-block -l** [options]
- **qvm-block -a** [options] <device> <vm-name>
- **qvm-block -d** [options] <device>
- **qvm-block -d** [options] <vm-name>

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**qvm-block -A** personal dom0:/home/user/extradisks/data.img - *attaches an additional storage for the personal-vm*

**qvm-clone** - *clones an existing VM by copying all its disk files*

usage: **qvm-clone** [options] <existing-vm-name> <new-clone-vm-name>

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**qvm-clone** fedora-23 fedora-23-dev - *create a clone of fedora-23 called fedora-23-dev*

**qvm-firewall** - *manage VM's firewall rules*

usage: **qvm-firewall -l** [-n] <vm-name>

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**qvm-firewall -l** personal - *displays the firewall settings for the personal-vm*

**qvm-firewall -l -n** fedora-23 - *displays the firewall settings for the personal-vm with port numbers*

**qvm-ls** - *list VMs and various information about their state*

usage: qvm-ls [options] <vm-name>

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qvm-ls - *lists all vms*

qvm-ls -n - *show network addresses assigned to VMs*

qvm-ls -d - *show VM disk utilization statistics*

**qvm-prefs** - *list/set various per-VM properties*

usage:

- qvm-prefs -l [options] <vm-name>
- qvm-prefs -s [options] <vm-name> <property> [...]

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qvm-prefs win7-copy - *lists the preferences of the win7-copy*

qvm-prefs win7-copy -s mac 00:16:3E:5E:6C:05 - *sets a new mac for the network card*

qvm-prefs lab-win7 -s qrexec\_installed true - *sets the qrexec to installed*

qvm-prefs lab-win7 -s qrexec\_timeout 120 - *usefull for windows hvm based vms*

qvm-prefs lab-win7 -s default\_user joanna - *sets the login user to joanna*

**qvm-run** - *runs a specific command on a vm*

usage: qvm-run [options] [<vm-name>] [<cmd>]

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qvm-run personal xterm - *runs xterm on personal*

qvm-run personal xterm --pass-io - *runs xterm and passes all sdtin/stdout/stderr to the terminal*

qvm-run personal "sudo dnf update" --pass-io --nogui - *pass a **dnf update** command directly to the VM*

**qvm-start** - *starts a vm*

usage: qvm-start [options] <vm-name>

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qvm-start personal - *starts the personal-vm*

qvm-start ubuntu --cdrom personal:/home/user/Downloads/ubuntu-14.04.iso - *starts the ubuntu-vm with the ubuntu installation CD*

**qvm-shutdown** - *shutdowns a vm*

usage: qvm-shutdown [options] <vm-name>

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qvm-shutdown personal - *shutdowns the personal-vm*

qvm-shutdown --all - *shutdowns all VM's*

**qvm-kill** - *kills a VM - same as pulling out the power cord - immediate shutdown*

usage: qvm-kill [options] <vm-name>

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qvm-kill personal - *pull the power cord for the personal-vm - immediate shutdown*

**qvm-trim-template** - *trims the disk space of a template*

usage: qvm-trim-template <template-name>

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qvm-trim-template debian-8 - *helpful after upgrading or removing many packages/files in the template*

**qvm-sync-appmenus** - *updates desktop file templates for given StandaloneVM or TemplateVM*

usage: qvm-sync-appmenus [options] <vm-name>

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qvm-sync-appmenus archlinux-template - *useful for custom .desktop files or distributions not using dnf*

## Dom0

**qubes-dom0-update** - *updates software in dom0*

usage: qubes-dom0-update [--clean][--check-only][--gui] [<yum opts>][<pkg list>]

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sudo qubes-dom0-update - *updates dom0*

sudo qubes-dom0-update --enablerepo=qubes-dom0-current-testing qubes-windows-tools - *install the windows tools (QWT)*

sudo qubes-dom0-update kernel-3.19\* - *install the official Fedora kernel-3.19\* with Xen support*

**qubes-hcl-report** - *generates a report about the system hardware information*

usage: qubes-hcl-report [-s] [<vm-name>]

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qubes-hcl-report - *prints the hardware information on the console (terminal)*

qubes-hcl-report personal - *sends the hardware information to the personal-vm under /home/user*

qubes-hcl-report -s - *prints the hardware information on the console (terminal) and generates more detailed report*

qubes-hcl-report -s personal - *sends the detailed hardware information report to the personal-vm*

**Note:** qubes-hcl-report -s [<vm-name>] generates a more detailed report. This report can contain sensitive information. Please do not upload the report if you do not want to share those information.

**virsh** - *management user tool for libvirt (hypervisor abstraction)*

usage: virsh -c xen:/// <command> [<vm-name>]

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virsh -c xen:/// list - *list running VM's with additional information*

virsh -c xen:/// list --all - *list all VM's with additional information*

virsh -c xen:/// dominfo personal - *lists status of personal VM*

**xl** - *Xen management tool, based on LibXenlight*

usage: xl <subcommand> [<args>]

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xl top - *Monitor host and domains in realtime*

## DomU

**qvm-copy-to-vm** - *Copy file from one VM to another VM*

usage: qvm-copy-to-vm <vm-name> <file> [<file+>] - *file can be a single file or a folder*

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qvm-copy-to-vm work Documents - *copy the Documents folder to the work VM*

qvm-copy-to-vm personal text.txt - *copy the text.txt file to the personal VM*

## Example

- Open a terminal in AppVM A (e. g. your personal vm)
- Let's assume we want to copy the Documents folder to AppVM B (e. g. your work VM)
- The command would be: qvm-copy-to-vm work Documents

**qvm-open-in-vm** - Opens file in another VM

usage: qvm-open-in-vm <vm-name> <file> - *file* can only be a single file

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qvm-open-in-vm personal document.pdf - *opens document.pdf in the personal VM*

qvm-copy-to-vm personal download.zip - *opens download.zip in the personal VM*

## DomU and Dom0

### List Qubes commands

1. Enter in console:
2. qvm-\*
3. qubes\*
4. Press two times TAB

Output: List of qvm-\* or qubes\* commands.

### List installed qubes packages Fedora Dom0

In VM or Dom0: rpm -qa \\*qubes-\\* - *list (qubes-) installed packages*

### Files/Folders from and to Dom0

#### Move Dom0 -> VM

#### Qubes 3.1+ - Windows + Linux

dom0 console: qvm-move-to-vm <vm-name> <file> [<file+>] - *file* can be a single file or a folder

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qvm-move-to-vm work screenshot-qubes-gui.png - *moves screenshot-qubes-gui.png to the personal VM into the /home/user/QubesIncoming/dom0 folder*

qvm-move-to-vm personal \*.png - *moves all .png to the personal VM into the /home/user/QubesIncoming/dom0 folder*

qvm-move-to-vm work Pictures/ - *moves the Pictures folder and it's content to the personal VM into the /home/user/QubesIncoming/dom0 folder*

#### Copy Dom0 -> VM

#### Qubes 3.1+ - Windows + Linux

dom0 console: qvm-copy-to-vm <vm-name> <file> [<file+>] - *file* can be a single file or a folder

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qvm-copy-to-vm personal screenshot-qubes-gui.png - *copies screenshot-qubes-gui.png to the personal VM in the /home/user/QubesIncoming/dom0 folder*

qvm-copy-to-vm personal \*.png - *copies all .png to the personal VM in the /home/user/QubesIncoming/dom0 folder*

qvm-copy-to-vm work Pictures/ - *copies the Pictures folder and it's content to the personal VM in the /home/user/QubesIncoming/dom0 folder*

#### Qubes < 3.1 - Linux only

```
cat /path/to/file_in_dom0 |  
qvm-run --pass-io <dst_domain>  
'cat > /path/to/file_name_in_appvm'
```

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```
@dom0 Pictures]$ cat my-screenshot.png |  
qvm-run --pass-io personal  
'cat > /home/user/my-screenshot.png'
```

## VM -> Dom0

```
qvm-run --pass-io <src_domain>
'cat /path/to/file_in_src_domain' >
/path/to/file_name_in_dom0
```

## Copy text between VM A and B

On VM A (*source*):

1. CTRL+C
2. CTRL+SHIFT+C

On VM B (*destination*):

3. CTRL+SHIFT+V
4. CTRL+V

## Troubleshoot

**Application in VM does not start** `qvm-run personal "command" --pass-io` - *pass command directly to the VM. Returns an error message command fails.*

`qvm-run personal "xterm" --pass-io` - *pass **xterm** command directly to the VM. Returns an error message or starts xterm.*

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`qvm-run <vmname> "command" --pass-io --nogui` - *pass command to VM without using the GUI*

`qvm-run personal "ls" --pass-io --nogui` - *pass **ls** command directly to the VM. Returns error or output.*

**Console in VM** `virsh -c xen:/// console <vmname>` - *opens console in*

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*Why? Connect if GUI/grexec does not work for any reason. This way you can restart/investigate a failed service.*

- In Dom0 terminal: `virsh -c xen:/// console personal`
- username: **root** without a password

*(and when #1130 would be implemented the same for “user”)*

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In console mode press CTRL + ^ + ] on keyboard to escape from console mode.

**DomU Log files** `/var/log/qubes` - *log file directory*

log files per DomU VM:

- `guid.<vmname>.log` - *graphical information*
- `pacat.<vmname>.log` - *sound information*
- `grexec.<vmname>.log` - *inter VM communication information*
- `qubesdb.<vmname>.log` - *qubesdb information*

**Get Qubes OS Version** `cat /etc/qubes-release` - *prints Qubes release in human readable form*

`rpm -qa \*qubes-release\*` - *prints exact Qubes release number*

**Get Xen Version** `xl info | grep xen_version` - *prints the Xen version*

**Qubes / Xen Boot** `dmesg` - *prints error, warning and informational messages about device drivers and the kernel during the boot process as well as when we connect a hardware to the system on the fly.*

`xl dmesg` - *prints error, warning and informational messages created during Xen's boot process*

*!:* use `dmesg` and `xl dmesg` in combination with `less`, `cat`, `tail` or `head`.

## Grow disk

**qvm-grow-private** - *increase private storage capacity of a specified VM*

usage: `qvm-grow-private <vm-name> <size>`

### Example

- In dom0 terminal: `qvm-grow-private personal 40GB`
- In the personal VM: `sudo resize2fs /dev/xvdb`

## AppVMs and TMPFS

Enlarge /tmp if you run out of space on the default ~200MB

`sudo mount -o remount,size=1024M /tmp - enlarge the space to 1024MB`

## Inter VM Networking

- *Does not expose services to the outside world!*

Make sure:

- Both VMs are connected to the same firewall VM
- Qubes IP addresses are assigned to both VMs
- Both VMs are started

In Firewall VM terminal:

```
$ sudo iptables -I FORWARD 2 -s <IP address of A> -d <IP address of B> -j ACCEPT
```

- The connection will be unidirectional A -> B
- Optional: Bidirectional A <-> B

In Firewall VM terminal:

```
$ sudo iptables -I FORWARD 2 -s <IP address of B> -d <IP address of A> -j ACCEPT
```

- Check your settings (e. g. using ping)
- Persist your settings:

Assume:

IP of A: 10.137.2.10

IP of B: 10.137.2.11

In Firewall VM terminal:

```
$ sudo bash
```

```
# echo "iptables -I FORWARD 2 -s 10.137.2.10 -d 10.137.2.11 -j ACCEPT" >> /rw/config/qubes_firewall_user_script
```

```
# chmod +x /rw/config/qubes_firewall_user_script
```

for bidirectional access:

```
# echo "iptables -I FORWARD 2 -s 10.137.2.10 -d 10.137.2.11 -j ACCEPT" >> /rw/config/qubes_firewall_user_script
```

## Add USB Wifi card to sys-net VM \* - *attach a USB Wifi card to sys-net VM*

The bus and device number can be different than shown in this example:

1. `qvm-pci -l sys-net - list all attached pci devices of sys-net`
2. `lsusb - e. g. Bus 003 Device 003: ID 148f:2870 Ralink Technology, Corp. RT2870 Wireless Adapter`
3. `readlink /sys/bus/usb/devices/003 - Important Bus 003 -> 003`
4. The result of readlink: `../../../../devices/pci-0/pci0000:00/0000:00:12.2/usb3 - Important 00:12.2`
5. `qvm-pci -a sys-net 00:12.2 - attach USB device 00:12.2 to sys-net`
6. `qvm-pci -l sys-ne - check if device 00:12.2 is`

## Templates

**Fedora** - *Fedora template specific*

### Updating, Searching & Installing Packages

Fedora > 21

- installing packages: `dnf install <package-name>`
- search for a package: `dnf search <package-or-word>`
- updating template: `dnf update`

Fedora <= 21

- installing packages: `yum install <package-name>`
- search for a package: `yum search <package-or-word>`
- updating template: `yum update`

### Repositories

*NOTE: Does not work anymore under fedora 23*

Repositories: Start Menu >> Template:Fedora 21 >> Package Sources >> Enable third party repositories

Start Menu >> Template:Fedora 21 >> Package Sources >> Enable RPMFusion - ENABLE RPMFusion, (already covers RPMFusion signing keys)

**Fedora Minimal** - *Fedora minimal template*

`sudo qubes-dom0-update qubes-template-fedora-21-minimal` - *installs the fedora-21-minimal template*

**Debian** - *Debian templates*

### Installing the Template

- `sudo qubes-dom0-update qubes-template-debian-7` - *Debian 7 “Wheezy”*
- `sudo qubes-dom0-update qubes-template-debian-8` - *Debian 8 “Jessie”*

### Updating, Searching & Installing Packages

- installing packages: `apt-get install <package-name>`
- search for a package: `apt-cache search <package-or-word>`
- updating template:
  1. `apt-get update`
  2. `apt-get dist-upgrade`

**Qubes OS + Whonix** - *Whonix is an debian based OS focused on anonymity, privacy and security*

Whonix has two parts:

1. Whonix-Gateway (uses TOR for all connections to the outside world)
2. Whonix-Workstation (for application)

### Install Whonix

Whonix-Gateway TemplateVM Binary Install @Dom0:

`sudo qubes-dom0-update --enablerepo=qubes-templates-community qubes-template-whonix-gw-experimental`

Whonix-Workstation TemplateVM Binary Install @Dom0:

1. `export UPDATES_MAX_BYTES=$(( 4 * 1024 ** 3 ))`
2. `sudo qubes-dom0-update --enablerepo=qubes-templates-community qubes-template-whonix-ws`

### Next Steps

1. Create a Whonix-gateway ProxyVM, through Qubes VM Manager
2. Create a Whonix-workstation AppVM, through Qubes VM Manager
3. Update your Whonix-Gateway and Whonix-Workstation TemplateVMs (how to -> see debian)
4. (Re)Start Whonix-Gateway ProxyVM
5. Start Whonix-Workstation AppVM

## Installing the Template

Use the following instructions: [Archlinux Template](#)

## Updating, Searching & Installing Packages

- installing packages: `pacman -S <package-name> [<package-name-2>...<package-name-n>]`
- search for a package: `pacman -Ss <package-or-word>`
- updating template: `pacman -Syyu`

## Create VM from VMware or VirtualBox images

1. Download the image in an AppVM
2. Install `qemu-img` tools - *e. g. `dnf install qemu-img` for fedora*
3. Convert the image to a raw format:
  - VMware: `qemu-img convert ReactOS.vmdk -O raw reactos.img`
  - VirtualBox: `qemu-img convert ReactOS.vdi -O raw reactos.img`