

# Qubes OS Cheatsheet

## Qubes Cheatsheet

*a summary of useful qubes commands*

version: 3.2

### 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

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

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

usage: `qubes-manager`

**qvm-block** - *Lists/attaches 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 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** - *Lists 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** - *Stops a vm*

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

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

qvm-shutdown --all - *shutdowns all non-nested VM's (no wait queue)*

qvm-shutdown --all --wait - *shutdowns all VM's (shutdown is queued by the --wait option and includes nested VM's, such as sys-net and sys-firewall. (Currently only tested on Qubes 4.0.)*

**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 or installs software in dom0*

usage: qubes-dom0-update [--enablerepo] [--disablerepo] [--clean] [--check-only] [--gui] [--action=\*<pkg list>]

or

usage: qubes-dom0-update

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qubes-dom0-update --check-only - *checks if new dom0 updates are available*

sudo qubes-dom0-update - *updates dom0*

sudo qubes-dom0-update --gui - *allows to update dom0 through a graphical window*

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sudo qubes-dom0-update --action=search <search-term> - *searches for package in dom0 repositories*

example:

sudo qubes-dom0-update --action=search qubes - *searches for all **qubes** package in dom0 repositories*

*NOTE: The tool excludes all templates (community and ITL) by default*

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sudo qubes-dom0-update --action=info <package-name> - *displays infos about the package*

example:

sudo qubes-dom0-update --action=info qubes-core-dom0 - *displays infos about the **qubes-core-dom0** package*

**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:

- qvm-\*
- qubes\*

2. Press 2x times TAB

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

**List installed Qubes OS packages** - *List all installed Qubes OS 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/ 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 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

## Install Qubes Windows Tools (QWT)

1. `sudo qubes-dom0-update --enablerepo=qubes-dom0-current-testing qubes-windows-tools` - *install the windows tools (QWT)*
2. `qvm-start <windows-vmname>` - *starts Windows VM*
3. open a cmd.exe or PowerShell and type `bcdedit /set testsigning on`
4. shutdown VM
5. `qvm-start <windows-vmname> --install-windows-tools` - *starts Windows VM and inserts Qubes Windows Tools installation CD*
6. double click on `qubes-tools-WIN7x64-<version>.exe` - *execute and install Qubes OS Windows Tools*
7. restart Windows VM

## Troubleshoot

**Application in VM does not start** - *How to get more information if applications in a VM refuse to 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 - *Attach a console to a VM*

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

---

*Why? Connect if GUI/qrexec 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 implmented the same for “user”)*

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

## AppVM Log files - *Log files in AppVMs*

`/var/log/qubes` - *log file directory*

log files per DomU VM:

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

## Get Qubes OS Version - *Get the Qubes OS release version*

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

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

## Get Xen Version - *Display the Xen version*

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

## Qubes OS / Xen Boot - *Qubes OS and Xen system/kernel messages*

`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*

*TIP: 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`

## Enlarge AppVMs 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

*NOTE: 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

### Installing the Template

`sudo qubes-dom0-update qubes-template-fedora-26` - installs the Fedora 26 template

`sudo qubes-dom0-update qubes-template-fedora-25` - installs the Fedora 25 template

`sudo qubes-dom0-update qubes-template-fedora-24` - installs the Fedora 24 template

`sudo qubes-dom0-update qubes-template-fedora-23` - installs the Fedora 23 template

### 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`

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

Qubes OS:

`sudo qubes-dom0-update qubes-template-fedora-26-minimal` - *installs the Fedora 26 minimal template*

`sudo qubes-dom0-update qubes-template-fedora-25-minimal` - *installs the Fedora 25 minimal template*

`sudo qubes-dom0-update qubes-template-fedora-24-minimal` - *installs the Fedora 24 minimal template*

`sudo qubes-dom0-update qubes-template-fedora-23-minimal` - *installs the Fedora 23 minimal template*

## **Debian** - *Debian template*

### **Installing the Template**

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

Qubes OS <= 3.1:

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

### **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 a Debian based OS focused on anonymity, privacy and security*

Whonix consists of two components:

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`

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

## **Archlinux** - *Archlinux template*

### **Installing the Template**

In Qubes OS 3.2:

`sudo qubes-dom0-update --enablerepo=qubes-templates-community qubes-template-archlinux`

or manually

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`



**Removing Templates** - *Which were installed using the package manager*

***Remove installed template***

```
@Dom0: sudo dnf remove [<template-package-name>]
```

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```
sudo dnf remove qubes-template-debian-8 - remove the Debian 8 VM and qubes-template-debian-8 package
```

***List all installed templates***

```
@Dom0: sudo dnf list installed qubes-template-*
```

## **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`

## **Qubes OS Directories**

**Dom0 (Qubes OS)** - *Qubes OS specific directories*

- `/var/log/qubes` - *Qubes OS VM log files*
- `/var/lib/qubes` - *Qubes OS VMs and other Qubes OS specific files*

## **Qubes OS Repositories**

- <http://yum.qubes-os.org> - *Browsable Fedora repositories*

## **Troubleshooting**

Launch Application Finder with Alt-F2 or F3, Qube Tools » Qube Manager Select Qube » Settings Check your advanced tab and devices tab for correct settings.