Audio qube

neowutran ⋮ 190-242 minutes ⋮ 9/15/2024

August 31, 2023, 10:33am 1

An audio qube acts as a secure handler for potentially malicious audio devices, preventing them from coming into contact with dom0
(which could otherwise be fatal to the security of the whole system).
It thereby mitigates some of the security risks of using USB devices and Bluetooth devices.
Nonetheless, we strongly recommend carefully reading the security warning on USB input devices devices before proceeding.

With an audio qube, many kinds of devices can be used (that previously were either unsafe or impossible to use in dom0):

- Jack
- HDMI/DisplayPort/…
- USB audio devices
- Bluetooth

Manual setup

In this section, we will explain how to manually set up an audio qube.
A lot of alternatives configurations are also possible.

Creating the qubes

1. Create a template named ‘audio-template’ – You can clone ‘fedora-XX’ template (or a fedora minimal template) for that –
2. Then create an appvm named ‘audio-app’ and mark it as a disposablevm template
3. Finally, create a disposablevm named ‘sys-audio’

Note: By making “sys-audio” disposable, volume configuration will not be persistent.

See below, some screenshot of this configuration

- Result of `qvm-prefs audio-app`
- Result of `qvm-prefs audio-template`
- Result of `qvm-prefs sys-audio`

Installing the required packages

In ‘audio-template’, install the required packages:

```
sudo dnf install -y pipewire-qubes qubes-audio-daemon pavucontrol qubes-core-admin-client qubes-usb-proxy alsa-utils
```

Optional package, software to configure sound effect, like noise cancellation:

```
sudo dnf install easyeffects
```

If you want to be able to use Bluetooth devices, you also need to install the following packages:

```
sudo dnf install -y blueman
```

- Note for `debian-12-minimal` templates

And the required drivers for your Bluetooth hardware, for example, some hardware will need this package:

```
sudo dnf install -y linux-firmware
```

If you want to have a systray to control the sound, you can install this package

```
sudo dnf install -y pasystray
```

Configuring PCI passthrough

Then we need to passthrough the PCI devices we want to ‘sys-audio’.
It needs to be configured as HVM, without memory balancing.

Configuring sys-audio as the default audiovm

In dom0 execute the following command:

```
qubes-prefs default_audiovm sys-audio
```

Testing sound

Note: qubes that were running before the moment the audiovm has started will not have sound. See Troubleshooting section.

Now you can check that sound can be played in ‘sys-audio’ by executing the following command in ‘sys-audio’.

```
aplay /usr/share/sounds/alsa/Noise.wav
```

In the screenshot below, I passed my audio jack device to
'sys-audio'. The name of these devices are different on every hardware.

Note: You could permanently assign a usb device to a qube using the dom0 command `qvm-device`. Example : `qvm-device usb attach --persistent sys-audio sys-usb-1:2-6`

You can check what hardware is available using 'pavucontrol':

See the 'Troubleshooting' part if you have trouble with USB audio devices.

Bluetooth configuration

Nothing specific to QubesOS to configure your Bluetooth device, so the
explanation will be minimal.

1. In 'sys-audio' launch 'blueman-manager'
2. Pair with your Bluetooth hardware
3. Activate the audio profiles

When you configure a Bluetooth device, the configuration files are stored as root in `/var/lib/bluetooth`. If you want the device to be permanently known by the audiovm (even after reboot), you need to either copy this folder to the template qube, or have any other means of deploying back the configuration that have been saved to `/var/lib/bluetooth`

Configuring services

Add the custom service 'audiovm' using QubesManager for your audio qube.

Adding this service will launch at startup the following command:

```
qvm-start-daemon --all --watch
```

Bluetooth service

Additionally, if you intend to use bluetooth services, you probably want to also enable "blueman" service

Configuring policy

Finally, we need to create a policy file to allow the required communications between
'sys-audio' and the other qubes.
In dom0, create the file '/etc/qubes/policy.d/50-sys-audio.policy' with the
following content:

```
admin.Events          *   sys-audio     @adminvm                allow
target=dom0
```

```
admin.Events          +domain-stopped    sys-audio     @tag:audiovm-sys-
audio                allow   target=dom0
admin.Events          +domain-shutdown   sys-audio     @tag:audiovm-sys-
audio                allow   target=dom0
admin.Events          +domain-start      sys-audio     @tag:audiovm-sys-
audio                allow   target=dom0
admin.Events          +connection-established      sys-audio
@tag:audiovm-sys-audio                allow   target=dom0

admin.vm.CurrentState *   sys-audio     @adminvm                allow
target=dom0
admin.vm.List         *   sys-audio     @adminvm                allow
target=dom0

admin.vm.property.Get               +audiovm      sys-audio
@tag:audiovm-sys-audio  allow   target=dom0
admin.vm.property.Get               +xid          sys-audio
@tag:audiovm-sys-audio  allow   target=dom0
admin.vm.feature.CheckWithTemplate  +audio        sys-audio
@tag:audiovm-sys-audio  allow   target=dom0
admin.vm.feature.CheckWithTemplate  +audio-model  sys-audio
@tag:audiovm-sys-audio  allow   target=dom0
admin.vm.feature.CheckWithTemplate  +supported-service.pipewire sys-audio
@tag:audiovm-sys-audio allow target=dom0
admin.vm.feature.CheckWithTemplate  +audio-low-latency sys-audio
@tag:audiovm-sys-audio allow target=dom0
admin.vm.property.Get               +stubdom_xid  sys-audio
@tag:audiovm-sys-audio  allow   target=dom0

admin.vm.property.GetAll * sys-audio   @tag:audiovm-sys-audio  deny
notify=no
```

Once this is done, you can restart your ‘sys-audio’ qube.
If everything has been configured correctly, you should see the active qube configured to use ‘sys-audio’ in the ‘pavucontrol’ interface of ‘sys-audio’.

Disabling audio for qubes that doesn’t need it

You should disable the audiovm for qubes that doesn’t need it.
For example “sys-net” “sys-firewall” and others qubes that will never need audio.

Case 1: Most of your qubes need to have audio

By default, configure all qubes to use ‘sys-audio’ as the audiovm

```
qubes-prefs default_audiovm sys-audio
```

Then remove the audiovm from the qubes that doesn't need audio

```
qvm-prefs sys-net audiovm ''
...
```

Case 2: Most of your qubes doesn't need to have audio

By default, configure all qubes to use nothing as the audiovm

```
qubes-prefs default_audiovm ''
```

Then add the audiovm for the qubes that need audio

```
qvm-prefs sys-net audiovm 'sys-audio'
...
```

Important note:

Most user will never encounter such a case, but for people that have a LOT of qubes running, it is important to properly configure the audiovm property, it need to be empty for qubes that will never use audio

There is a maximum of ~19 qubes that can be running simultaneously without using audio (but with a audiovm configured). After that number, when a new qube is created, sys-audio will stop working. (xenstore quota issue, audiovm - Argument list too long - no sound for new qubes · Issue #8966 · QubesOS/qubes-issues · GitHub)

Microphone note:

You have to attach the device named "dom0:mic" to the qube you want to be able to record your microphone input

Shortcuts

In your desktop environment, you can configure shortcuts.
Turn up the volume:

```
qvm-run sys-audio 'amixer sset Master 2%+'
```

Turn down the volume:

```
qvm-run sys-audio 'amixer sset Master 2%-'
```

Toggle the audio between muted and un-muted

```
qvm-run sys-audio 'amixer sset Master toggle'
```

Additional technical information

In ‘sys-audio’, the system needs to find all the qubes of the system (and that is configured to use ‘sys-audio’ as an audiovm) and create the communication channel to receive the audio information from those qubes. The software responsible for that can be launched manually like that:

```
qvm-start-daemon --all --watch
```

In any qube, you can find the XID of your configured audio VM with this command:

```
qubesdb-read -w /qubes-audio-domain-xid
```

In any qube, pulseaudio is responsible for trying to send the audio stream to the audiovm.
It is done with a specific pulseaudio module ‘vchan-sink’.
Depending on some specific configurations, you could create (or any other reason), you could want to manually configure this module to define the audiovm to try to use. This is done with the ‘domid’ parameter of the module.
For example, in the file ‘/etc/pulse/qubes-default.pa’:

```
load-module module-vchan-sink domid=XID_OF_THE_AUDIO_QUBE
```

For pulseaudio setup: In any qube, to start pulseaudio with the ‘vchan – *’ modules, run:

```
start-pulseaudio-with-vchan
```

For pipewire setup: In any qube, to start pipewire with the ‘vchan – *’ modules, run:

```
systemctl --user restart pipewire
```

You can have multiple audiovm. You can configure each qubes to use a specific audiovm:

```
qvm-prefs QUBE_NAME audiovm
```

```
qvm-prefs QUBE_NAME audiovm MYAUDIOVM
```

Special cases of non-linux HVM.

Support have been added by the QubesOS team, so no additional configuration is needed. I haven't yet personnally tested it. If it doesn't work, the old way of doing that is below

▸ Old way of doing that

Troubleshooting

USB devices

Some USB audio controller cannot be passed from a USB qube to an audio qube.
In those cases, the audio qube need to also be a USB qube to have direct
access to the PCI USB controller.
For example, this is the case for the Sennheiser GSX 1XXX.

No sound in qubes started before audiovm

This issue is that the vchan modules of the pulseaudio/pipewire daemon running in the already started qubes are
not using the correct audiovm xid (ID of the xen vm).

If you are using pulseaudio: In standard setup, restarting the pulseaudio daemon is enough. Kill the pulseaudio process and run "start-pulseaudio-with-vchan".

If you are using pipewire (pipewire will be the default soon if not already the case):
`systemctl --user restart pipewire`

In special configuration, you may need to manually set the "domid" parameter of
the vchan modules.

Salt

A community effort to have this configuration done by a salt script is available here: qusal/salt/sys-audio at main · ben-grande/qusal · GitHub

▸ Links

augsch August 31, 2023, 11:15am 2

Many thanks to this detailed and comprehensive guide!

One more question, is the part of "Special cases of non-linux HVM" upstreamable? That would benefit

every user of audio vm.

If some people try it and confirm that it work as expected, someone could send a pull request

oijawyuh August 31, 2023, 6:54pm 4

Thanks for this guide. I have 4.1. I got to this:
`qvm-prefs default_audiovm sys-audio`
and I got in response:

```
usage: qvm-prefs [--verbose] [--quiet] [--help] [--help-properties]
                 [--hide-default] [--get] [--set] [--default]
                 VMNAME [PROPERTY] [VALUE]
qvm-prefs: error: no such domain: 'default_audiovm'
```

What did I do wrong?

ludovic August 31, 2023, 7:02pm 5

wrong command, re-read the guide…

oijawyuh August 31, 2023, 7:09pm 6

My bad. Thank you. I've never used qubes-prefs before.

oijawyuh August 31, 2023, 7:11pm 7

Another question: is bluetooth a PCI device that needs to be attached to sys-audio?
I only have one audio device in the "Available devices" list in sys-audio Settings. And I attached connected it to sys-audio.

it is usually a USB device with a weird name. Forgot to add the screenshot

These are my available devices. I have USB for USB-C and USB 3.2. All 3 USBs are assigned to sys-usb. Would you be able to recognize Bluetooth?

usb device showing up once you started your sys-usb, not pci device

oijawyuh August 31, 2023, 9:25pm 11

Thanks. Do I need to connect bluetooth via the Devices Manager on every boot?

You could permanently assign it to the audiovm.
My example, in dom0:
`qvm-devices usb attach --persistant sys-audio sys-usb-1:2-6`

oijawyuh August 31, 2023, 9:57pm 13

Thanks! I will test.
You may have had some typos. Here's what I will try:
`qvm-device usb attach --persistent sys-audio sys-usb-1:2-6`

indeed, it is getting late
ofcourse you need to adjust this part “sys-usb-1:2-6”

tempmail August 31, 2023, 10:49pm 15

I think xen.xml will be overwritten on at least kernel update (I am absolutely not sure in which cases this happens, but it does happen), so maybe it would be a good idea to add this notice to OP.

neowutran September 1, 2023, 6:56am 16

xen.xml can be overwritten, Stubdom-linux-rootfs too, qvm_start_daemon too

oijawyuh September 1, 2023, 12:17pm 17

I followed all the steps. Here’s a quick feedback.

I opted for the:

Because I don’t know how to patch source code.

It works! Bluetooth audio works. It has two options: high quality listening mode, and low quality headset mode.

But sys-audio does not boot on start despite having chosen this option. And I couldn’t figure out how to get the mic from the bluetooth device (headset mode) to be the main mic for the computer.

oijawyuh September 1, 2023, 12:18pm 18

One more thing. Bluetooth device name changed from 4:10 to 2:10, so the persistent attached failed me once so far.

neowutran September 2, 2023, 3:30pm 19

I don’t know how to easily do that (aka: without custom code).

You could have a script in dom0 that scan usb devices / hook the usb qubes event, and automatically attach them to sys-audio when they are detected.
Around 10 lines of bash should be enough to write a dumb implementation of that.

apsynote September 15, 2023, 7:08pm 20

First of all, thank you for this great guide, @neowutran.

I wanted to know if anyone here had a similar issue. I have gone through all of the steps in the guide successfully up to the “Configuring policy” step with policy file created and audio vm rebooted. The only deifference from the guide is that I’ve applied the steps to my `sys-usb` qube instead of creating a new `sys-audio` qube. I have the sound working in my `sys-usb` qube and all of the other qubes use it as their audio vm, but when I try to play back any sound in any qube besides `sys-usb` I get the following:

```
$ aplay /usr/share/sounds/alsa/Noise.wav
ALSA lib confmisc.c:855:(parse_card) cannot find card '0'
ALSA lib conf.c:5181:(_snd_config_evaluate) function snd_func_card_inum
returned error: No such file or directory
```

```
ALSA lib confmisc.c:422:(snd_func_concat) error evaluating strings
ALSA lib conf.c:5181:(_snd_config_evaluate) function snd_func_concat
returned error: No such file or directory
ALSA lib confmisc.c:1334:(snd_func_refer) error evaluating name
ALSA lib conf.c:5181:(_snd_config_evaluate) function snd_func_refer
returned error: No such file or directory
ALSA lib conf.c:5704:(snd_config_expand) Evaluate error: No such file or
directory
ALSA lib pcm.c:2666:(snd_pcm_open_noupdate) Unknown PCM default
aplay: main:834: audio open error: No such file or directory
```

Or if I try to play back some video, for example, it gets stuck until I mute it.

apsynote September 16, 2023, 1:21pm 21

Eh, nevermind. Everything works well except for my fedora-based dvms (where the ALSA logs come from). Maybe I just messed up the template or something.

Removing the conflicting package `pipewire-pulseaudio` can be accomplished very easily in a single step by running the `dnf install` command with the extra flag `--allowerasing`.

neowutran September 26, 2023, 10:06am 23

Hi,

following your comment i modified the list of packages to install. Using pipewire instead of pulseaudio for sys-audio

Another feedback: on my Fedora 38 template I couldn't find pulseaudio daemon or the `start-pulseaudio-with-vchan` command. Instead the pipewire daemon is running.

To restart pipewire when needed I ran this command: `systemctl --user restart pipewire`

neowutran September 26, 2023, 4:02pm 25

Thanks, added a note about pulseaudio/pipewire setup difference. Can probably be improved

Thanks! This looks great, and I look forward to trying it. Is an audio-vm qube officially suggested as a best practice? I ask because it is not the default and I don't want to make my qubes use even more complicated if troubleshooting arises later. The use cases you mentioned, though, sound tempting

fjdh October 20, 2023, 6:34pm 27

Thanks for starting this. Running 4.2-rc4 atm, I followed the guide and got no errors but the audio isn't actually forwarding or arriving at sys-audio (not using the dispvm), and I'm at a loss how to debug this. Sound playback inside sys-audio works fine, but in the domU from which I'm hoping to send the audio I don't see any streams if I open pavucontrol; nor do I see anything incoming in the playback section in sys-audio.

Any clues?

neowutran October 20, 2023, 6:52pm 28

in dom0 what is the result of `qubes-prefs default_audiovm` ? in dom0 what is the output of `qvm-features sys-audio` ? in sys-audio what is the output of `ps -ef | grep qvm-start-daemon` ? What have you done for the `Configuring policy` part ?

SteveC October 20, 2023, 7:22pm 29

Also make sure that qvm-prefs shows sys-audio (not dom0) as the audiovm.

(One trap that sometimes gets people is that sys-audio is marked as its own audiovm so you can't shut it down…so obviously you want to unset that, if it happens to be that way.)

fjdh October 20, 2023, 8:13pm 30

Okay, made decent progress. I had tried your "recommended way" of creating the policy in dom0 but forgot to apply the patches you mentioned. Didn't have time for that atm so for now I switched to the non recommended way of setting the policy. Now at least the streams are showing up in sys-audio playback.

Main remaining problems now are that the pipewire service doesn't always seem to automatically start in the source VMs and that the watch daemon in sys-audio isn't always picking up on new VMs starting (especially when pipewire service isn't running from the start, I guess).

neowutran October 22, 2023, 2:37pm 31

This is a community guide, not an officially endorsed doc or anything like that.
QubesOS core team are creating and improving the software required to have a audiovm and guivm (and this guide is using their work).
In the futur QubesOS will maybe/probably recommend to use a audiovm & guivm if feasible.

Currently this guide is a community best effort based on a WIP, it still work quite well but expect to have troubleshooting to do

I tried this today but ran into some trouble when testing the sound in sys-audio.
Executing the command I got the message:

```
audio open error: host is down
```

Journalctl gives me lots of error messages referring to pipewire:

```
Nov 15 10:10:33 sys-audio pipewire[567]: mod.qubes-audio: org.qubes-
os.audio-domain-xid not specified, and no /qubes-audio-domain-xid entry
in QubesDB
Nov 15 10:10:33 sys-audio pipewire[567]: pw.conf: 0x648c3bd241d0: could
not load mandatory module "libpipewire-module-qubes": No such file or
directory
Nov 15 10:10:33 sys-audio pipewire[567]: default: failed to create
context: No such file or directory
Nov 15 10:10:33 sys-audio systemd[556]: pipewire.service: Main process
exited, code=exited, status=254/n/a
Nov 15 10:10:33 sys-audio systemd[556]: pipewire.service: Failed with
```

```
result 'exit-code'.
```

I looked at the pipewire-pulse.service and it says it is running.

```
[user@sys-audio ~]$ systemctl --user status pipewire-pulse.service
● pipewire-pulse.service - PipeWire PulseAudio
     Loaded: loaded (/usr/lib/systemd/user/pipewire-pulse.service;
disabled; preset: disabled)
    Drop-In: /usr/lib/systemd/user/service.d
             └─10-timeout-abort.conf
     Active: active (running) since Wed 2023-11-15 10:11:21 CET; 6h ago
TriggeredBy: ● pipewire-pulse.socket
   Main PID: 914 (pipewire-pulse)
```

Do I have to have other services enabled? I am not so sure what is wrong because this is not the first sys-audio guide I tried. I got further before but unfortunately the sound is not working with sys-audio so far.

Any help how to find out what's wrong is welcome.

Also I would like to patch the source code but haven't done this in ages. I do need the qubes builder and build the package myself including the patch, don't I? Or is this merged already?

For now I have copied the rules from the non recommended way.

MsKeygen November 16, 2023, 10:28am 33

Hello, I would like to ask if anyone else is having issues with the microphone side of using this? I do have audio working in pipewire but I could not get pulseaudio to work. While using pipewire passing my microphone(dom0 audio input) into a vm does not reliably work and constantly cuts in an out every half second or so with 3-4 seconds of delay. Im lost on how I would debug and fix this issue, any help to fix this issue would be appreciated.

neowutran November 18, 2023, 11:05am 34

some weeks ago a patch have been added to solve this, in your audiovm can you try to execute `grep low_latency /usr/lib/python3.11/site-packages/qubesadmin/tools/qvm_start_daemon.py`
(just to be sure you are up-to-date)

MsKeygen November 18, 2023, 3:18pm 35

Hi, I executed that command in my audiovm and got back

```
low_latency = not vm.features.check_with_template(
low_latency = vm.features.check_with_template(
'audio-low-latency', low_latency)
if low_latency:
```

neowutran November 24, 2023, 7:50am 36

Hi, I tested i on a slower computer and I have the same issue as you. Should check if there is a github issue already created for this, and if not, create a new issue on github

fiddler

November 24, 2023, 5:56pm 37

Thanks for the guide!

I've got it mostly working on 4.2 RC4 with the unrecommend policies on a sys-audio I also use as sys-usb. If I start a vm sound works and the vm shows up in pulse audio controller. However, if I have to restart the vm, for example to update the vm, sound won't work and I get this error.

If I restart my entire qubes system audio will work again for all my vm's the first time I boot them.

I've tried to restart pipewire with

```
systemctl --user restart pipewire
```

and restarting the daemon with

```
qvm-start-daemon --all
```

Those commands seem to kill sound for all my vm's though.

Anyone else have this issue? For now I'm just restarting my entire qubes system to get sound back periodically.

For what it's worth, this is working for me with Debian instead of Fedora on a virgin Qubes 4.2 rc5.

I still don't know about the "host is down" problem with Fedora. It could be that I messed something up in the past because I've tried other guides before this one (but basically this was the same version, 4.2 with the latest updates).

I didn't check mic or bluetooth yet.

I didn't have the time figuring out the exact steps patching qubes-core-admin-client, though.

dro212 December 3, 2023, 9:18am 39

Can someone clarify, and possibly update the guide.

The file to change in the "recommended way" is this file => '/usr/lib/python3.11/site-packages/qubesadmin/tools/qvm_start_daemon.py'

And, this file is located in the sys-audio qubes TEMPLATE (since it's disposable)

neowutran December 3, 2023, 9:30am 40

> The file to change in the “recommended way” is this file => ‘/usr/lib/python3.11/site-packages/qubesadmin/tools/qvm_start_daemon.py’

correct

> And, this file is located in the sys-audio qubes TEMPLATE (since it’s disposable)

Correct, you need to modify this file in your “audio-template” qube

> Can someone clarify, and possibly update the guide.

Updated to clarify

dro212 December 3, 2023, 11:28am 41

Is it possible to disable the default audiovm for sys-usb / firewall / net? I get a notification that I can’t restart sys-audio because it’s being used by sys-net etc.

dro212 December 3, 2023, 11:33am 42

Using the individual qube assignment above and setting it to “NONE” worked for me.

tempmail December 3, 2023, 3:29pm 43

```
[user@dom0 ~]$ qvm-prefs sys-net audiovm ''
```

tempmail December 25, 2023, 3:41pm 44

Out of the blue, totally new property might prevent you from hearing sound from sys-audio.

> admin.vm.property.Get **+stubdom_xid** sys-audio @tag:audiovm-sys-audio allow target=dom0

neowutran December 26, 2023, 8:51am 45

Updated the “non recommended way”

marff December 26, 2023, 10:39am 46

I’m stuck at Testing sound, I can’t start sys-audio: `start failed: internal error: unable to reset pci device... 3: no flr, pm reset or bus reset available. see /var/log...`
In the log:
`... the kernel doesn't support reset from sysfs for pci device ...`

I must say, I passed only one device to the sys-audio: `audio device: interl corporation...`
I don’t know what else to pass, because there’s no devices with name “audio” in them and I don’t know how to determine them. `qvm-pci` don’t really tell me much.
When I passed this audio device to sys-audio and it failed, I stopped getting audio in dom0 and `aplay -l` didn’t show any audio devices. So I’m kinda sure it’s the only audio device I have, but not sure as I also have audio jack in my laptop.

augsch December 26, 2023, 11:24am 47

You should set the “no-strict-reset” attribute of your audio device via Qubes Manager. In “Settings” of sys-audio, switch to “Devices” page and you’ll see the “no-strict-reset” button.

tempmail December 26, 2023, 2:07pm 48

Upon applying your patches, I’m getting this error

```
Dec 26 09:04:45 dom0 qubesd[72401]:   File "/usr/share/qubes/templates/
libvirt/xen.xml", line 190, in block "devices"
Dec 26 09:04:45 dom0 qubesd[72401]:     cmdline="-machine xenfv,max-ram-
below-4g=2G -qubes-audio:audiovm_xid={{ audiovm_xid }}"
Dec 26 09:04:45 dom0 qubesd[72401]: jinja2.exceptions.UndefinedError:
'audiovm_xid' is undefined
```

Is it because I have in the same line 2GB patch?

tempmail December 26, 2023, 2:11pm 49

This is how looks the code in xen.xml I understood it:

```
{% endblock %}
    <os>
        {% block os %}
{% if vm.audiovm %}
 {% set audiovm_xid = vm.audiovm.xid %}
{% else %}
 {% set audiovm_xid = 0 %}
{% endif %}
            {% if vm.virt_mode == 'hvm' %}
```

tempmail December 26, 2023, 2:38pm 50

Also:

```
 {% else %}
                        cmdline="-net lwip,client_ip={{ vm.ip -}}
                            ,server_ip={{ vm.dns[1] -}}
                            ,dns={{ vm.dns[0] -}}
                            ,gw={{ vm.netvm.gateway -}}
                            ,netmask={{ vm.netmask }} -machine xenfv,max-
ram-below-4g=2G -qubes-audio:audiovm_xid={{ audiovm_xid }}"
                    {% endif %}
```

This is how it looks in stubroots:

```
# add audiodev conf to cmdline and run pulseaudio
audio_model=$(echo "$dm_args" | sed -n '/^-soundhw/ {n;p}')
# Extract network parameters and remove them from dm_args
audio_args=$(echo "$dm_args" | sed -n '/^-qubes-audio:/p')
dm_args=$(echo "$dm_args" | sed '/^-qubes-audio:/d')

get_audio_arg() {
    echo "$audio_args" | sed -n 's/^.*[:,]'$1'=\([^,]\+\).*$/\1/p'
}

if [ -n "$audio_model" ] ; then
    model_args=
```

and also

```
pulseaudio --use-pid-file=no --daemonize=no --exit-idle-time=-1 --
disable-shm=yes -n \
        -L "module-native-protocol-unix auth-anonymous=1 socket=/tmp/
pa.sock" \
        -L "module-vchan-sink domid=$(get_audio_arg 'audiovm_xid')" &
fi
```

Do I have a typo somewhere I can't see it, or…?

marff December 26, 2023, 5:10pm 51

Thank you.
It works now.

augsch December 27, 2023, 12:37am 52

Well I remember there are two lines that both read {% if vm.virt_mode == 'hvm' %}. You'll need to add new lines above the second appearance of that line.

fjdh December 27, 2023, 7:15am 53

the watch daemon in the sys-audio qube almost never picks up new qubes starting (in the application stream overview), unless it's been restarted very recently. (Running 4.2, been an issue since I tried RC3/4).
Also a bit sad that so much of the configuration (explained by neowutran) still has to be done manually in dom0 before this works at all.

tempmail December 27, 2023, 11:11am 54

Thanks, but unfortunately the same result…

Here's where I put it now, according to your tip

```
    </features>

    {% block clock %}

{% if vm.audiovm %}
 {% set audiovm_xid = vm.audiovm.xid %}
{% else %}
 {% set audiovm_xid = 0 %}
{% endif %}

        {% if vm.virt_mode == 'hvm' %}
```

tempmail December 27, 2023, 12:50pm 55

New post because of those accessing via email.

It's definitely about xen.xml. Because I left stubdoms with given patches, but reverted xen.xml to original state and now I can start sys-audio, or any other qube, which wasn't possible when xen.xml patch as given was applied.

So, the syntax in `cmdline` line maybe, when there are other arguments, after `,netmask=...`?

augsch December 27, 2023, 3:09pm 56

Sorry that my memory turned out to be wrong. There are actually 3 appearances of `{% if vm.virt_mode == 'hvm' %}`. The local variable `audiovm_xid` only has effect while in its block. So instead of `{% block os %}` or `{% block clock %}`, you'll need to find the line `{% block devices %}` and scroll **down** until you see `{% if vm.virt_mode == 'hvm' %}`, that's where `audiovm_xid` should be set, because it will be used in `cmdline=...`.

@neowutran could you please update the instructions to make it clearer? Thanks!

@tempmail Also I think that using this workaround together with the 4gb patch will make it easy to mess up with commas and dashes. So I'd make cmdline look like this:

```
cmdline="-net lwip,client_ip={{ vm.ip -}}
                          ,server_ip={{ vm.dns[1] -}}
                          ,dns={{ vm.dns[0] -}}
                          ,gw={{ vm.netvm.gateway -}}
                          ,qubes-audio:audiovm_xid={{ audiovm_xid -}}
                          ,netmask={{ vm.netmask }} -machine xenfv,max-
ram-below-4g=2G"
```

tempmail December 27, 2023, 8:22pm 57

Thanks @augsch
Finally, I was able to start sys-audio after your findings.

Unfortunately, I cannot start win qubes. Now it gives me error:

> Dec 27 15:17:57 dom0 libvirtd[1808]: internal error: libxenlight failed to create new domain ‘win10’
> Dec 27 15:17:57 dom0 qubesd[72401]: vm.win10: Start failed: internal error: libxenlight failed to create new domain ‘win10’

When I manually set domid (sys-audio’s xid) in stubdoms, no problem with any of these. So, this guide isn’t accurate for all.

neowutran December 28, 2023, 4:12pm 58

updated the instructions

tempmail December 28, 2023, 4:36pm 59

Also, in my xen.xml, there are 3 occurencies of `cmdline =`

```
            {% if vm.virt_mode == 'hvm' %}
                <!-- server_ip is the address of stubdomain. It hosts
it's own DNS server. -->

{% if vm.audiovm %}
 {% set audiovm_xid = vm.audiovm.xid %}
{% else %}
 {% set audiovm_xid = 0 %}
{% endif %}

                    <emulator
                    {% if vm.features.check_with_template('linux-
stubdom', True) %}
                        type="stubdom-linux"
                    {% else %}
                        type="stubdom"
                    {% endif %}
                    {% if vm.netvm %}
                      {% if vm.features.check_with_template('linux-
stubdom', True) %}
                        cmdline="-qubes-net:client_ip={{ vm.ip -}}
                            ,dns_0={{ vm.dns[0] -}}
                            ,dns_1={{ vm.dns[1] -}}
                            ,gw={{ vm.netvm.gateway -}}
                            ,qubes-audio:audiovm_xid={{ audiovm_xid }}
                            ,netmask={{ vm.netmask }} -machine xenfv,max-
ram-below-4g=2G"
                      {% else %}
                        cmdline="-net lwip,client_ip={{ vm.ip -}}
                            ,server_ip={{ vm.dns[1] -}}
```

```
                            ,dns={{ vm.dns[0] -}}
                            ,gw={{ vm.netvm.gateway -}}
                            ,qubes-audio:audiovm_xid={{ audiovm_xid }}
                            ,netmask={{ vm.netmask }} -machine xenfv,max-
ram-below-4g=2G"
                      {% endif %}
                      {% else %}
                        cmdline="-machine xenfv,max-ram-below-4g=2G
                            ,qubes-audio:audiovm_xid={{ audiovm_xid }}"
                    {% endif %}
                    {% if vm.stubdom_mem %}
                        memory="{{ vm.stubdom_mem * 1024 -}}"
                    {% endif %}
                    {% if vm.features.check_with_template('audio-model',
False)
                    or vm.features.check_with_template('stubdom-qrexec',
False) %}
                        kernel="/usr/libexec/xen/boot/qemu-stubdom-linux-
full-kernel"
                        ramdisk="/usr/libexec/xen/boot/qemu-stubdom-
linux-full-rootfs"
                    {% endif %}
                    />
```

Still not working, though. Any additional hint appreciated.

neowutran December 28, 2023, 5:00pm 60

at the end of every cmdline you should have

```
 -qubes-audio:audiovm_xid={{ audiovm_xid }}
```

so

```
{% if vm.netvm %}
                      {% if vm.features.check_with_template('linux-
stubdom', True) %}
                        cmdline="-qubes-net:client_ip={{ vm.ip -}}
                            ,dns_0={{ vm.dns[0] -}}
                            ,dns_1={{ vm.dns[1] -}}
                            ,gw={{ vm.netvm.gateway -}}
                            ,qubes-audio:audiovm_xid={{ audiovm_xid }}
                            ,netmask={{ vm.netmask }} -machine xenfv,max-
ram-below-4g=2G  -qubes-audio:audiovm_xid={{ audiovm_xid }}"
                      {% else %}
```

```
                        cmdline="-net lwip,client_ip={{ vm.ip -}}
                            ,server_ip={{ vm.dns[1] -}}
                            ,dns={{ vm.dns[0] -}}
                            ,gw={{ vm.netvm.gateway -}}
                            ,qubes-audio:audiovm_xid={{ audiovm_xid }}
                            ,netmask={{ vm.netmask }} -machine xenfv,max-
ram-below-4g=2G  -qubes-audio:audiovm_xid={{ audiovm_xid }}"
                       {% endif %}
                       {% else %}
                         cmdline="-machine xenfv,max-ram-below-4g=2G -
qubes-audio:audiovm_xid={{ audiovm_xid }}"
                     {% endif %}
```

Zeno January 5, 2024, 1:11pm 61

I'm missing visual feedback, is there any relevant package I can use to show current status(percentage/muted) and on key-binded press for up/down/mute?

Good guide, thank you.

fsflover January 5, 2024, 1:13pm 62

augsch January 5, 2024, 2:32pm 63

If you just want to make sure up/down/mute work as expected, you can press those keybindings while running pavucontrol inside sys-audio.

You can install the `pasystray` package in sys-audio, it'll at least show muted/unmuted status and you can open Volume Control through this tray icon.

Zeno January 6, 2024, 5:43pm 65

@fsflover
Thanks, didn't see that.

Thanks, I'm aware. I want to be able to see current status.

Thanks. Tried that, but I see the icon as white square, similar to sys-net.

It looks fine for me on default Qubes OS 4.2 setup with Xfce, seems to be a KDE issue.

will this configuration allow you to attach bluetooth headphones to a standaloneVM? More specifically, an android VM?

Hi, I could not get pipewire installed. It says 'no match for argument: pipwire-qubes'

I tried to add audio devices to the VM but now sound doesnt work at all. My output device is missing from pulseaudio. Any recommendations on how i can fix this?

neowutran January 12, 2024, 7:20am 69

I don't really understand what you are trying to do.

What is an “android VM” ? What OS does it really run ? how do you install packages on it ? and then you need to find how to install the qubes os packages on it. But you really should not try to make it an audiovm, or, you could, but be ready to suffer a bit

The standard way would be to create an audiovm following this guide (no standalone, no ‘android vm’), nothing related to an “android vm”. Once everything work correctly, setup your “android vm” (nothing related to audio), and install the required qubesos packages on your “android vm” so it can communicate and integrate with qubesos tools

Zeno January 12, 2024, 9:29am 70

From boot to boot, PulseAudio configuration(within sys-audio) is missing completely, printing “No cards available for the configuration”. Meaning I don’t have sound and I can’t enable it.

Is there any command to re-enable it?

Was this bug after the in place upgrade from 4.1 to 4.2?

cumpsd January 13, 2024, 12:00am 73

Did you ever solve this? I’m also getting this:

```
Jan 13 00:56:30 sys-audio pipewire[1724]: mod.qubes-audio: org.qubes-
os.audio-domain-xid not specified, and no /qubes-audio-domain-xid entry
in QubesDB
Jan 13 00:56:30 sys-audio pipewire[1724]: pw.conf: 0x58c6705941e0: could
not load mandatory module "libpipewire-module-qubes": No such file or
directory
Jan 13 00:56:30 sys-audio pipewire[1724]: default: failed to create
context: No such file or directory
Jan 13 00:56:30 sys-audio systemd[661]: pipewire.service: Main process
exited, code=exited, status=254/n/a
```

cumpsd January 13, 2024, 12:06am 74

To answer my own question, this happens when sys-audio has no ‘audiovm’ property set, this fixes it:

```
qvm-prefs sys-audio audiovm sys-audio
```

Zeno January 14, 2024, 12:41pm 75

Didn’t upgrade. Fresh install.

SteveC January 14, 2024, 7:42pm 76

If you do this, though, you can’t shut sys-audio down (if you ever need to do so) because it is being used as an audio qube by sys-audio. Just something to watch out for.

cumpsd January 14, 2024, 8:01pm 77

Yeah, I know. You can shell into it and do `sudo shutdown -h now` though. A bit of a trade off, I chose to get rid of that error

SteveC January 14, 2024, 8:06pm 78

Yes, it's much better than it not working at all!

That said, I was one of those people who couldn't get sys-audio to work *at all* in 4.1 (before someone consolidated the eight zillion posts including comments that started out with, "oh I forgot to tell you to try…", all into one clean thread). I might give it another go after upgrading to 4.2. (Laptop in progress, desktop comes later.)

cumpsd January 14, 2024, 8:07pm 79

I'm not fully there yet either. I got USB speakers and a USB microphone and just got now got it all connected tot sys-audio and showing up in volume control. Up to today the microphone only worked inside sys-audio until I figured out I had to attach dom0:mic to the qube that needed the microphone… Now it sees it, and it records stuff, but it is stuttering all the time

SteveC January 14, 2024, 8:21pm 80

I'd be happy if it would just play audio over my speakers. I think I saw somewhere that HDMI might not work. (And I have to use HDMI; this mini has no audio jack at all–next one will have it; I'm tired of losing audio when the screens shut off after ten minutes).

cumpsd January 14, 2024, 8:30pm 81

I bought Pebble Pro USB speakers because of this. I also have HDMI sound and only dom0 can control that in my case. So I switched to USB via sys-usb to sys-audio to make it work.

SteveC January 14, 2024, 8:43pm 82

That's probably the entire reason I could never get it to work before.

Yeesh, there must have been twenty back-and-forths between enmus and myself! Unfortunately, my speakers don't work through USB. I suppose I could get some that do work (and find another use for these). I'm actually having to split my HDMI signal (with yet another small box that clutters my desktop) to get these to work.

Zeno January 20, 2024, 3:02pm 83

If I want to rename the qube `sys-audio` to `my_sys-audio`, what needs to be changed?

- default_audiovm to my_sys-audio
- Policy filename to 50-my_sys-audio
- Policy itself, every `sys-audio` to `my_sys-audio`

What else?

Tezeria January 20, 2024, 3:15pm 84

If I'm not mistaken, if you just renaming `sys-audio` to `my_sys-audio`, everything is done automatically. You don't have to change anything else.

Zeno January 20, 2024, 3:19pm 85

Audio from other qubes doesn't work.

Changing back:

- Qube name (my_sys-audio → sys-audio)
- Policy itself, every `my_sys-audio` to `sys-audio`

Brings audio back to live.

Tezeria January 20, 2024, 3:43pm 86

I just try to rename my `sys-audio` to `sys-audio-1` , JUST rename. All was ok for me. I reboot, all was ok too. I revert to `sys-audio` and all was ok for me…
I just renamed without touching dom0 or any other qubes. I looked in `qubes-prefs` in dom0 and in a few qubes with `qvm-prefs` and everything had been modified automatically…

Zeno January 20, 2024, 3:52pm 87

You check `qvm-prefs` for `audiovm` or something else too?

`audiovm` changes apply automatically, yes, but I have no audio afterwards.

Tezeria January 20, 2024, 3:56pm 88

Just `qvm-prefs` for 3 4 qubes and `qubes-prefs` in dom0

Zeno January 21, 2024, 7:04pm 89

Turns out Qubes don't like underscores.
Thanks for trying to help.

By the way, are you sure you have renamed the working audio qube? Policies don't change automatically as qube's `properties`.

I had set up sys-audio, but I couldn't manage to get it to work and now I can't hear any sound when I attach USB audio. I would like to give up and try again later in the day, but what can I do to restore this setting? In the meantime.

> qubes-prefs default_audiovm

I'm thinking that if I assign the original qube that is not sys-audio here, it will revert back to the original…

I was able to get it back to normal when I deleted the policy and also deleted the default_aucdiovm item, referring to this article. This may be too challenging for me now, so I may need to buy a new one that can output audio via HDMI.

SteveC January 22, 2024, 7:14pm 92

I found myself unable to get sys-audio working at all and I suspect it is because I *AM* using HDMI to get my sound. (I have yet to buy and try USB speakers.)

So be careful switching to HDMI

neowutran January 22, 2024, 7:24pm 93

From my understanding, HDMI audio will only work if your gpu contains an audio device and a vga device. In that case you can passthrough the audio part of the GPU to sys-audio, and you will have sound through HDMI. Nvidia and Amd seems to work correctly. It seems that for Intel there is only 1 device that is used for vga+audio. In that case you can't have HDMI sound in sys-audio unless you do a gpu passthrough

Glad to see you got it working!

And sorry for the very late answer: I only got this to work with Debian and not Fedora. Of course, like you I tried setting sys-audio as audiovm to sys-audio but that didn't work for me back then.

What didn't work for me with Debian was the so called "recommended way", applying the patch. After that my sys-audio stopped working and there were some error messages. I changed back to the "non recommended way" and this is working.

Thanks, I gave up on HDMI actually because I didn't have enough ports. On the other hand, I was getting sound out of the speakers via BT, but after a few days it stopped working and I couldn't even get sound out the same way. Now I am using the USB speaker I have been using to produce sound. This is still not inconvenient.

But I would like to try the audio-app again. In the very first step, I created an audio-app, and when I created it, sys-audio (I think) was automatically selected as the template, but when I checked the settings after creating the audio-app, the template changed to debian-12-xfce and there is a triangular alert mark next to it. I think it should be sys-audio here, how should I review the settings?

When I checked the error message, I found an item in the Application shown in App Menu column where Thunar was not installed, and when I moved this item to the I should have read the English message a little more carefully…

Also, if anyone is reading this, please let me know, in the audio-template

> sudo apt install pipewire-qubesqubes-audio-daemon pavucontrol qubes-core-admin-client
> When I run qubes-usb-proxy alsa-utils

I get an error saying pipewire-qubesqubes-audio-daemon, this is not found. qubesqubes, I get the same error when I change it to qubes. I think it's probably because I'm trying to install with the debian template, but can I use another pipewire instead?

Thanks for making this great guide! I have tried to get an audio vm working but unfortunately I just can't get it to work. I've had some successes, sometimes, but then it stops working again and I can't reproduce it working anymore.

I've followed your steps of making the three qubes (`sys-audio`, `audio-template` and `audio-qube`). I've compated all with `qvm-prefs` so I'm convinced they're set up right. I've gotten the sound test to work in `sys-audio` too, but that's where I get stuck. I've added the policies, patched the python file, and then reboot my machine, but then there is no sound anymore, not even in `sys-audio`. That's when I started to fiddle with the global/local preference for `audiovm` and reboot `sys-audio` where at one point it worked for a short while. Unfortunately I wasn't able to figure out what got it to work, but I had to restore everything back to normal so that at least I have sound again.

What I found interesting is that at the times `sys-audio` had sound, it showed it's audio sync (via tray icon menu settings) to be `Qubes Virtual Audio Sink`. When it wasn't working, something like `Dummy Output` showed up here.

I tried to automate the creation of the VMs with Salt while I was setting everything up, when I found out there already exists a salt state for `sys-audio` (can be executed by `sudo qubesctl state.sls qvm.sys-audio`). This seems to set up something something similar, but only `sys-audio` is created. It leaves me with the same non working situation anyways. Is this supposed to be the 'official' way as intended by the Qubes devs?

Anyone have any idea how I would be able to proceed next? Any logs I can produce to enable somebody to help me further?

Any help is appreciated!

The correct command is `qvm-device` (without `s`).

Otherwise it's working well, with a Scarlett Solo sound card and bluetooth headset!

It's not necessary to install all `linux-firmware` (almost 200mb). You can simply run `sudo dnf install linux-firmware` and see which package you need (in my case it was only `atheros-firmware`).

What should be the audiovm for `sys-audio`? If `sys-audio` itself, then we can't stop this qube because it says `sys-audio` is still running as it depends on itself.

neowutran February 19, 2024, 4:38pm 100

fixed the "qvm-devices"

And for the sys-audio audiovm, you choose (read the posts around this one) :

Thanks!

Also, any ways to run the same XFCE applet than the one by default in dom0 instead of pasystray?

tgtgamer February 25, 2024, 2:25pm 102

I seem to be stuck at the same point, just without the sound issues in sys-audio.

From Clean install, I get to the point where it says:

> Once this is done, you can restart your 'sys-audio' qube.
> If everything has been configured correctly, you should see the active qube configured to use 'sys-audio' in the 'pavucontrol' interface of 'sys-audio'.

I'm following the "Recommended way", and am super confused.

Playing audio out from the USB Audio device works fine in sys-audio.
Each of the (not sys-audio) volume control have "dummy output" listed.

I've tried running `pactl load-module module-vchan-sink` as per other forum guides within one of my `Personal` qubes, which gives me the `Failure: no such entity` error.

Have I missed something?

(p.s. while I do seem to be having issues, thank you @neowutran for this well-written guide)

You can also check the Salt scripts from Qusal, it's working out of the box:

neowutran February 25, 2024, 4:28pm 104

what is the confusing thing ?

tgtgamer February 25, 2024, 4:51pm 105

My main confusion is the fact that I end uo with this dummy output after getting to this step.

Ive tried restarting the device, checking for errors in the logs, manually configuing the xid then restarting pipewire, just cant seem to get it to work.

Whats more frustrating is, (ive got nothing on the device so i can), i did a blank reinstall of the latest Qubes, and out of the box the default Dom0 behaves exactly as you describe and how id expect, letting me output to devices as expected, i just cant output to my UBS headset.

I think the key thing im struggling to figure out is how to debug what went wrong, and correct it. Getting stuck with "Dummy Output", no obvious errors or clear guidance on debugging is not fun. I dont expect you to baby us by any means, but at the same time a "if you get dummy outputs only, check youve done x step correctly" would be extremely helpful - (more helpful would be an official guide, but hey, lets do one step at a time)

P.s. did spent the entirety of yesterday and today debugging this before posting - used about 10 different threads and asked a few different AI's (not that i expected much from them)

neowutran February 25, 2024, 5:02pm 106

Getting "dummy output" on other qubes means the communication between the qubes and audiovm is not working.
If you only modified things mentioned in the guide, I would guess you did something wrong at the step "Configuring Services" or "Configuring policy".

Re-read those steps.
Additionally:

Check that you use the same audiovm name as me: "sys-audio"

I mention the path "/usr/lib/python3.11/site-packages/qubesadmin/tools/qvm_start_daemon.py", it will be "/usr/lib/python3.12/site-packages/…" in more recent template, check the python version used on your system.

To debug, you probably want to see the output of "qvm-start-daemon" in sys-audio.
In sys-audio, kill the existing process "qvm-start-daemon", and launch it manually

```
qvm-start-daemon --all --watch
```

You will get some informations on stdout

I was able to follow the guide up until **Disabling audio for qubes that doesn't need it** however, I don't understand how to get the other qubes to use the sys-audio. They all have the sys-audio as their audiovm but they don't seem to detect any audio sources. for the Policy I copied the entire document you linked on git-hub I wasn't sure if I should have done that or needed to update all lines by hand.

- sys-audio qvm-start-daemon --all --watch Results
- Linux Personal Qube pavucontrol Response

The error message you have indicate that the policy file have not be setup correctly.
In **dom0**, can you check the content of '/etc/qubes/policy.d/50-sys-audio.policy' ?
`sudo cat /etc/qubes/policy.d/50-sys-audio.policy`

tgtgamer March 11, 2024, 10:06pm 109

I think I'm getting the same error now (sorry for the delay, been otherwise occupied and only now getting back round to this)

Outputs:

```
[user@sys-audio ~]$ qvm-start-daemon --all --watch
Another GUI daemon process (with PID 1109) is already running
[user@sys-audio ~]$
```

```
user@personal:~$ qubesdb-read -w /qubes-audio-domain-xid
21
user@personal:~$ load-module module-vchan-sink domid=21
bash: load-module: command not found
user@personal:~$ pavucontrol

(pavucontrol:10097): Gdk-CRITICAL **: 22:00:32.352: gdk_atom_intern:
assertion 'atom_name != NULL' failed

(pavucontrol:10097): Gdk-CRITICAL **: 22:00:32.353: gdk_atom_intern:
assertion 'atom_name != NULL' failed
```

policy:

```
admin.Events                          *
sys-audio       @adminvm              allow   target=dom0
admin.Events                          +domain-stopped
sys-audio       @tag:audiovm-sys-audio allow   target=dom0
admin.Events                          +domain-shutdown
sys-audio       @tag:audiovm-sys-audio allow   target=dom0
admin.Events                          +domain-start
sys-audio       @tag:audiovm-sys-audio allow   target=dom0
```

```
admin.Events                              +connection-established
sys-audio       @tag:audiovm-sys-audio    allow   target=dom0

admin.vm.CurrentState                     *
sys-audio       @adminvm                  allow   target=dom0
admin.vm.CurrentState                     *
sys-audio       @tag:audiovm-sys-audio    allow   target=dom0
admin.vm.List                             *
sys-audio       @adminvm                  allow   target=dom0
admin.vm.List                             *
sys-audio       @tag:audiovm-sys-audio    allow   target=dom0

admin.vm.property.Get                     +audiovm
sys-audio       @tag:audiovm-sys-audio    allow   target=dom0
admin.vm.property.Get                     +xid
sys-audio       @tag:audiovm-sys-audio    allow   target=dom0
admin.vm.feature.CheckWithTemplate        +audio
sys-audio       @tag:audiovm-sys-audio    allow   target=dom0
admin.vm.feature.CheckWithTemplate        +audio-model
sys-audio       @tag:audiovm-sys-audio    allow   target=dom0
admin.vm.feature.CheckWithTemplate        +supported-service.pipewire
sys-audio       @tag:audiovm-sys-audio    allow   target=dom0
admin.vm.feature.CheckWithTemplate        +audio-low-latency
sys-audio       @tag:audiovm-sys-audio    allow   target=dom0
admin.vm.property.Get                     +stubdom_xid
sys-audio       @tag:audiovm-sys-audio    allow   target=dom0
```

The only thing I can see personally is that I've spaced mine more than the one in your code to make it easier for me to read, but could this be causing a problem?

SHYdonnie March 11, 2024, 10:15pm 110

I wasn't sure how to create the policy so I just copied it pasted into a document and moved it to dom0 maybe I need to give it permissions or the formatting was create wrong? Random S**** · GitHub

neowutran March 11, 2024, 10:17pm 111

Seems to be some copy paste error ? `target=dom050` should be `target=dom0`

neowutran March 11, 2024, 10:24pm 112

Can you show the content of "/usr/lib/python3.12/site-packages/qubesadmin/tools/qvm_start_daemon.py" in you "sys-audio" ?

Also, in your sys-audio, kill the running qvm-start-daemon process

```
sudo kill 1109
```

and restart it manually

```
qvm-start-daemon --all --watch
```

You will see interesting things

SHYdonnie March 11, 2024, 10:55pm 113

Thank you so much! I re pasted and I updated the permissions (Its still not owned/in group root I dotn know if that matters) it fixed it. Now I am attempting to use the windows fix to pass audio to Nobara. I'm curious when you say attach the Mic to the Qube you want to record in does that mean it wont work in the sys-audio qube and I will need to change it each time I want to record in a different qube?

SHYdonnie March 11, 2024, 11:40pm 114

Could you give a little more detail on what you mean by this? I tried rerunning the exact same bash script and replacing `stubdom-linux-rootfs` with `stubdom-linux-full-rootfs` but that doesn't seem to work it just opens the same init file.

I also noticed you mentioned these files could be overwritten by Xen updates is there a way to prevent that or make the process quicker next time? I assume it will just break if that happens and I will stop getting audio?

UPDATE:
After implementing the HVM portion I get the following error when attempting to start sys-net

```
[Dom0] Error starting Qube!

Start failed: internal error: libenlight failed to create new domain

'sys-net', see /var/log/libvirt/libxi/libxl-driver.log for details
```

I had to add qubes.skip_autostart to be able to get into qubes OS as it disabled my usb mouse and keyboard

tgtgamer March 12, 2024, 3:03pm 115

So I got this error one:

```
[user@sys-audio ~]$ qvm-start-daemon --all --watch
sys-audio: Starting AUDIO
Loopback vchan connection not supported
libvchan_client_init_async_finish: Resource temporarily unavailable
^Casyncio: Loop <_UnixSelectorEventLoop running=False closed=True
debug=False> that handles pid 8809 is closed
Exception ignored in: <function BaseSubprocessTransport.__del__ at
0x7b5edcb3d440>
Traceback (most recent call last):
```

```
  File "/usr/lib64/python3.11/asyncio/base_subprocess.py", line 126, in
__del__
    self.close()
  File "/usr/lib64/python3.11/asyncio/base_subprocess.py", line 104, in
close
    proto.pipe.close()
  File "/usr/lib64/python3.11/asyncio/unix_events.py", line 566, in close
    self._close(None)
  File "/usr/lib64/python3.11/asyncio/unix_events.py", line 590, in
_close
    self._loop.call_soon(self._call_connection_lost, exc)
  File "/usr/lib64/python3.11/asyncio/base_events.py", line 762, in
call_soon
    self._check_closed()
  File "/usr/lib64/python3.11/asyncio/base_events.py", line 520, in
_check_closed
    raise RuntimeError('Event loop is closed')
RuntimeError: Event loop is close
```

I also get a lot of this message when it is working:

```
personal: Starting AUDIO
Connection to qube established, connecting to PulseAudio daemon

Connection established.
Stream successfully created.
Buffer metrics: maxlength=4194304, tlength=25580, prebuf=22056,
minreq=3528
Using sample spec 's16le 2ch 44100Hz', channel map 'front-left,front-
right'.
Connected to device alsa_output.pci-0000_00_07.0.analog-surround-51 (430,
not suspended).
Stream successfully created.
Buffer metrics: maxlength=4194304, tlength=44100, prebuf=4294967295,
minreq=4294967295
Using sample spec 's16le 2ch 44100Hz', channel map 'front-left,front-
right'.
Connected to device alsa_input.usb-Astro_Gaming_Astro_A50-00.mono-chat
(341, not suspended).
Stream drain
tream drain
Stream started.
Cork requested and playback vchan empty. Draining playback stream.
Playback vchan empty and playback stream drained. Corking playback
stream.
Stream uncork
Stream drain
```

```
Stream uncork
Stream uncork
Stream uncork
Stream uncork
Stream uncork
Stream uncork
Stream uncork
Stream uncork
Stream uncork
Stream uncork
Stream uncork
Stream uncork
Stream uncork
Stream uncork
...
Stream uncork
Stream uncork
Stream started.
Stream underrun.
Stream started.
```

The error means you messed up either the file “/usr/share/qubes/templates/libvirt/xen.xml” in dom0
or you incorrectly patched the stubdom init file.
So check the guide and the content of thoses files.

And if you need help, paste the content of thoses files

The error message you have is weird. Do you have any special configuration ? what are you using as template for sys-audio ?

added a screenshot in the guide

tgtgamer March 12, 2024, 7:29pm 119

I followed your guide, so nothing special.
Using Fedora as per the advice in your guide, Fedora-38-xfce is the one I cloned.
Is there any specific things you would like me to check?

I did have audio outputting for a period today, then when I paused the media playing audio, it never recovered. Just got the “Stream uncork” message constantly.

- Result qvm-prefs audio-app
- Result qvm-prefs audio-template
- Result qvm-prefs sys-audio

Only things unique to my setup will be the PCI devices, and USB devices I’m connecting. Anything else should be standard as per the guide

I assume when you say your home directory you mean my users’ directory inside the home folder? (I tried in the /Home/ directory as well). When I run the bash script you mention it creates 3 stubdom folders

annd copies my user files twice and it opens a blank init file even though the real init file is 3 levels down. I have checked my syntax multiple times I'm not sure if I am doing something wrong.

Delete all thoses "stubroot" folder and run the script only once.
(You probably tried to run it 3 times. (mkdir stubroot … cd stubroot … mkdir stubroot …).
Also, show xen.xml file, it need to be modified

etaz March 15, 2024, 7:09am 122

Thanks for the great guide!
Can an audio vm be reverted by just typing `qubes-prefs default_audiovm dom0` (or `qvm-prefs qube audiovm` respectivelly) and deleting audio policies, not using patched version?

It's been on my todo list for months now, and I don't have a testing system atm.

Also: Do you know good resources to read more about audio security?

- How relevant is this in practice?
- What vulnerabilities does `dom0` have in terms of audio, when using *no* audio qube?
- Does `pulseaudio-qubes`/ `pipewire-qubes` do some sort of sanitizing and filtering, before forwarding the audio stream to `dom0`?

  > Can an audio vm be reverted by just typing `qubes-prefs default_audiovm dom0` (or `qvm-prefs qube audiovm` respectivelly)

Yes, you can configure each qubes to use your preferred audiovm.

> Also: Do you know good resources to read more about audio security?

If dom0 get owned, you loose everything. So you want dom0 to be as small as possible. So ideally, dom0 should only be here to manage the qubes, and nothing else. (So for specifically, audio, you don't want dom0 to handle USB devices, bluetooth systems, etc…)

> Does `pulseaudio-qubes`/ `pipewire-qubes` do some sort of sanitizing and filtering, before forwarding the audio stream to `dom0`

yes, Audio virtualization | Qubes OS

etaz March 16, 2024, 3:23pm 124

Appreciated - somehow I missed that linked article.

It seems that to get the mic that is handled by the sound card to be assignable to other qubes, the following Python code needs to be modified. dom0: /usr/lib/python3.11/site-packages/qubesguidaemon/mic.py It contains comments that indicate it is currently coded to assume dom0 audiovm. But, it looks like it is structured to be able to enumerate multiple mics. I am not knowledgeable enough in Python or the Qubes API to attempt this.

boondocks March 26, 2024, 12:51pm 126

Now I feel stupid. After using the qusal tools I have a functioning disposable audio qube and the mic is

assignable. So please disregard my previous post.

When starting sys-audio I get the error `Denied: admin.vm.list form sys-audio to dom0`

I can use the aplay Noise.wav command to play noise on sys-audio but audio doesn't work on other vms

I get an error in the sys audio terminal when executing `qvm-start-daemon --all --watch`

Here is my qvm_start-daemon.py file on audio-template qube

this error seems to indicate an error in the policy file "50-sys-audio.policy", can you paste your policy file ?

Here you go. I tried to paste directly from you poist but maybe it got messed up in transport. I even gave it 777 permissions as well as the qvm_start_daemon.py hoping it would help.

Update: I see its blank sorry here is the new one.

50-sys-audio.log (1.6 KB)

Well, if the policy file is empty, that is indeed the issue

Its working now thank you

Davex April 14, 2024, 10:28pm 132

with the last update now its broken, i have this problem
qrexec-policy-agent
denied: admin.vm.property.GetAll
denied admin.vm.property.GetAll from sys-audio to sys-audio

Davex April 14, 2024, 11:24pm 133

well i fixed this problem editing the policy file and adding this:
admin.vm.property.GetAll * sys-audio @tag:audiovm-sys-audio allow target=dom0

it dont make me confortable using * its possible to limit it?

> well i fixed this problem editing the policy file and adding this:
> admin.vm.property.GetAll * sys-audio @tag:audiovm-sys-audio allow target=dom0
>
> it dont make me confortable using * its possible to limit it?

Yes, the recent update replaced 'qvm_start_daemon.py' in our audio-template qube. All you have to do is reapply the patch to the template and audio should work again. Let me know if you run into any trouble reverting back to the recommended way.

With many thanks to @neowutran for the awesome guide. I would like to add few of my personal Tweaks:

If you are not happy about the error while trying to turn of sys-audio when no other VM is using it

`sys-audio: Shutdown error: There are running VMs using this VM as AudioVM: sys-audio:`

You could modify `/usr/lib/python3.11/site-packages/qubes/ext/audio.py` (originally a part of qubes-core-admin repository) and change `attached_vms` method of AUDIO class line 29-30 from:

In 4.2

```
            if getattr(domain, 'audiovm', None) and domain.audiovm == vm:
                yield domain
```

to

```
            if getattr(domain, 'audiovm', None) and domain.audiovm == vm
\
                    and domain != vm:
                yield domain
```

Reboot. Problem solved. I personally use the below workaround since I find it more elegant.

My favourite workaround is to set `audiovm` pref of `sys-audio` to dom0 in case dom0 provides PCI Audio Interface to it and to `sys-usb` if sys-usb provides an external USB audio interface to it. As it is the logical way to set the dependencies.

```
qvm-prefs sys-audio audiovm dom0
```

if you want your new `sys-audio` interface to appear in SERVICE tab of the Appmenu

Check the `Provides Network` in the Advanced Settings of `sys-audio`. Then add the following services in Services Tab: `network-manager`, `qubes-firewall`, `qubes-network`, `qubes-updates-proxy` and `qubes-update-check`. Finally un-check them all to be like this:

The above dirty hack is a workaround of the well known bug of Qubes resetting `servicevm` feature of VMs after each reboot based on `provides_network` pref of VMs. But it works well in the end:

Consideration for DAW users who want to use Qubes for any reason

Since Qubes inner-vm Audio Virtualisation is currently only 44.1KHz 16bit Stereo Sink/Source (Audio CD-Quality from Early 90s) and it is highly unlikely for it to receive anything better than 48KHz 16bit Stereo, you can not rely on Qubes inner VM Audio Virtualisation for your main line of work. But you can use the guide provided on the beginning of the thread with minor tweaks to have an independent DAW qube which might act as `sys-audio` as well for studio monitoring purposes. Just skip the disposable template part. Use XFCE templates for DAW qube. Install Ardour/LMMS/Reaper/… in that template. Allocate tones of RAM (4 or 6GB) and a couple of cores to sys-audio. And do your DAW work inside it. The DAW+sys-audio qube will not be as safe and secure as the disposable sys-audio. But it will have

some security benefits. E.g. it could be network-less. And there is always physical gain knob and Phantom power switch to turn-off the input.

tombert April 22, 2024, 4:28pm 136

Hello, thanks for the instructions. I am new to qubes os and tried to follow all steps. Everything works and looks the same until i want to start sys-audio for testing sound. My sys-audio qube is just not starting. Under qubes domains it shows sys-audio in red colour, like other qubes when starting, but it never get started.
do you have an idea what could be the issue?
i also don´t know which kind of log would be helpful for the solution

apparatus April 24, 2024, 10:49am 137

What devices did you attach to your sys-audio?
You can run this command in dom0 terminal:

```
journalctl -f -n0
```

Then start sys-audio and check the command output in dom0 terminal to see the errors.
You can copy from dom0 to other qubes like this:
How to copy from dom0 | Qubes OS

If anyone for any reason has decided to avoid a dedicated template for `sys-audio` and installed `pasystray` or `volumeicon` in the template, you will end up with multiple volume controls in systray per each VM based on that template. Something similar to the bug Marek reported 2 days ago:

Only the one which belongs to `sys-audio` is useful and the rest are useless. These systray volume controls are automatically launched via:
for pasystray: `/etc/xdg/autostart/pasystray.desktop`
for volumecontrol: `/etc/xdg/autostart/volumeicon.desktop`

There are multiple workarounds to solve the issue. One would be adding a `Hidden=true` to those .desktop files in `/etc/xdg/autostart` and copy the original desktop files without hidden tag to `/home/user/.config/autostart` of `sys-audio`. The disadvantage of this method is that it is going to be overwritten in template whenever `pasystray` (or volumeicon) receives and update.

The other workaround would be to have the .desktop with `Hidden=true` tag in `/home/user/.config/autiostart` of all AppVMs based on template (and the template itself so the new AppVMs would inherite it). But not inside `sys-audio`.

otter2 April 30, 2024, 5:10am 139

You still can shut down audio qube via audio qube's terminal. Also @cumpsd.

otter2 April 30, 2024, 5:20am 140

My sys-audio also doesn't boot on start. Have you found a solution?

Solved

Do you have USB devices attached persistently to it?

otter2 April 30, 2024, 7:00am 142

If you are replying to me than yes I do.

This issue is going to be solved forever very soon:

I've updated the script, since it was error-prone and with updated script you don't need to specify the attached USB devices:

Disable sys-audio autostart.
Run these commands in dom0:

```
sudo mkdir /etc/libvirt/hooks/
cat << 'EOF' | sudo tee /etc/libvirt/hooks/libxl >/dev/null
#!/bin/bash
guest_name="$1"
libvirt_operation="$2"
timeout=60
guest_to_start_on_usb="sys-audio"

if [ "$guest_name" = "sys-usb" ] && [ "$libvirt_operation" = "started" ];
then
    (
        exec 0</dev/null
        exec 1>/dev/null
        exec 2>/dev/null
        guest_attached_usb_list=$(qvm-usb list "$guest_to_start_on_usb" |
awk '{ print $1 }')
        for i in $(seq 1 $timeout);
        do
            if qvm-ls --running $guest_name | grep -q Running; then
                present_usb_list=$(qvm-usb list | grep -w
"$guest_to_start_on_usb" | awk '{ print $1 }')
                if  [ "$guest_attached_usb_list" = "$present_usb_list" ];
then
                    qvm-start --skip-if-running -q $guest_to_start_on_usb
                    break
                fi
            fi
            sleep 1
        done
    ) & disown
fi
EOF
sudo chmod +x /etc/libvirt/hooks/libxl
```

Reboot.

Related issue:
Require sys-usb to start before starting qubes with persistently attached USB devices · Issue #7498 · QubesOS/qubes-issues · GitHub

tombert April 30, 2024, 12:38pm 146

I attached the only device, which i think is related to audio.
It is the device which produces an error.
Here is output of the command:

> Apr 30 14:32:19 dom0 qubesd[2333]: vm.sys-audio: Starting sys-audio
> Apr 30 14:32:19 dom0 systemd[1]: Stopped target sound.target - Sound Card.
> Apr 30 14:32:20 dom0 rtkit-daemon[4184]: Successfully made thread 5771 of process 4172 (/usr/bin/pulseaudio) owned by ‘1000’ RT at priority 5.
> Apr 30 14:32:20 dom0 kernel: pciback 0000:00:1f.3: xen_pciback: seizing device
> Apr 30 14:32:20 dom0 kernel: xen: registering gsi 22 triggering 0 polarity 1
> Apr 30 14:32:20 dom0 kernel: Already setup the GSI :22
> Apr 30 14:32:20 dom0 lvm[1640]: No longer monitoring thin pool qubes_dom0-vm–pool-tpool.
> Apr 30 14:32:20 dom0 lvm[1640]: Monitoring thin pool qubes_dom0-vm–pool-tpool.
> Apr 30 14:32:21 dom0 lvm[1640]: No longer monitoring thin pool qubes_dom0-vm–pool-tpool.
> Apr 30 14:32:21 dom0 lvm[1640]: Monitoring thin pool qubes_dom0-vm–pool-tpool.
> Apr 30 14:32:21 dom0 libvirtd[2003]: Interner Fehler: PCI-Gerät 0000:00:1f.3 kann nicht zurückgesetzt werden: Kein FLR, PM Reset oder Bus-Reset verfügbar
> Apr 30 14:32:21 dom0 libvirtd[2003]: Zurücksetzen von PCI-Gerät fehlgeschlagen: Interner Fehler: PCI-Gerät 0000:00:1f.3 kann nicht zurückgesetzt werden: Kein FLR, PM Reset oder Bus-Reset verfügbar
> Apr 30 14:32:21 dom0 qubesd[2333]: vm.sys-audio: Start failed: Interner Fehler: PCI-Gerät 0000:00:1f.3 kann nicht zurückgesetzt werden: Kein FLR, PM Reset oder Bus-Reset verfügbar
> Apr 30 14:32:21 dom0 qubesd[2333]: unhandled exception while calling src=b’dom0’ meth=b’admin.vm.Start’ dest=b’sys-audio’ arg=b’’ len(untrusted_payload)=0
> Apr 30 14:32:21 dom0 qubesd[2333]: Traceback (most recent call last):
> Apr 30 14:32:21 dom0 qubesd[2333]: File “/usr/lib/python3.11/site-packages/qubes/vm/qubesvm.py”, line 1205, in start
> Apr 30 14:32:21 dom0 qubesd[2333]: self.libvirt_domain.createWithFlags(
> Apr 30 14:32:21 dom0 qubesd[2333]: File “/usr/lib/python3.11/site-packages/qubes/app.py”, line 103, in wrapper
> Apr 30 14:32:21 dom0 qubesd[2333]: return attr(*args, **kwargs)
> Apr 30 14:32:21 dom0 qubesd[2333]: ^^^^^^^^^^^^^^^^^^^^
> Apr 30 14:32:21 dom0 qubesd[2333]: File “/usr/lib64/python3.11/site-packages/libvirt.py”, line 1409, in createWithFlags
> Apr 30 14:32:21 dom0 qubesd[2333]: raise libvirtError(‘virDomainCreateWithFlags() failed’)
> Apr 30 14:32:21 dom0 qubesd[2333]: libvirt.libvirtError: Interner Fehler: PCI-Gerät 0000:00:1f.3 kann nicht zurückgesetzt werden: Kein FLR, PM Reset oder Bus-Reset verfügbar

Apr 30 14:32:21 dom0 qubesd[2333]: During handling of the above exception, another exception occurred:
Apr 30 14:32:21 dom0 qubesd[2333]: Traceback (most recent call last):
Apr 30 14:32:21 dom0 qubesd[2333]: File “/usr/lib/python3.11/site-packages/qubes/api/**init**.py”, line 297, in respond
Apr 30 14:32:21 dom0 qubesd[2333]: response = await self.mgmt.execute(
Apr 30 14:32:21 dom0 qubesd[2333]: ^^^^^^^^^^^^^^^^^^^^^^^^
Apr 30 14:32:21 dom0 qubesd[2333]: File “/usr/lib/python3.11/site-packages/qubes/api/admin.py”, line 864, in vm_start
Apr 30 14:32:21 dom0 qubesd[2333]: await self.dest.start()
Apr 30 14:32:21 dom0 qubesd[2333]: File “/usr/lib/python3.11/site-packages/qubes/vm/dispvm.py”, line 253, in start
Apr 30 14:32:21 dom0 qubesd[2333]: await super().start(**kwargs)
Apr 30 14:32:21 dom0 qubesd[2333]: File “/usr/lib/python3.11/site-packages/qubes/vm/qubesvm.py”, line 1222, in start
Apr 30 14:32:21 dom0 qubesd[2333]: await self.fire_event_async(‘domain-start-failed’,
Apr 30 14:32:21 dom0 qubesd[2333]: File “/usr/lib/python3.11/site-packages/qubes/events.py”, line 227, in fire_event_async
Apr 30 14:32:21 dom0 qubesd[2333]: sync_effects, async_effects = self._fire_event(event,
Apr 30 14:32:21 dom0 qubesd[2333]: ^^^^^^^^^^^^^^^^^^^^^^
Apr 30 14:32:21 dom0 qubesd[2333]: File “/usr/lib/python3.11/site-packages/qubes/events.py”, line 164, in _fire_event
Apr 30 14:32:21 dom0 qubesd[2333]: effect = func(self, event, **kwargs)
Apr 30 14:32:21 dom0 qubesd[2333]: ^^^^^^^^^^^^^^^^^^^^^^^^^^
Apr 30 14:32:21 dom0 qubesd[2333]: File “/usr/lib/python3.11/site-packages/qubes/api/admin.py”, line 70, in vm_handler
Apr 30 14:32:21 dom0 qubesd[2333]: self.send_event(subject, event, **kwargs)
Apr 30 14:32:21 dom0 qubesd[2333]: File “/usr/lib/python3.11/site-packages/qubes/api/**init**.py”, line 374, in send_event
Apr 30 14:32:21 dom0 qubesd[2333]: self.transport.write(‘{}\0{}\0’.format(k, str(v)).encode(‘ascii’))
Apr 30 14:32:21 dom0 qubesd[2333]: ^^
Apr 30 14:32:21 dom0 qubesd[2333]: UnicodeEncodeError: ‘ascii’ codec can’t encode character ‘\xe4’ in position 31: ordinal not in range(128)
Apr 30 14:32:21 dom0 qubes-app-menu[5759]: Got empty response from qubesd. See journalctl in dom0 for details.
Apr 30 14:32:28 dom0 qrexec-policy-daemon[2337]: qrexec: qubes.NotifyUpdates+: mail → @adminvm: allowed to dom0
Apr 30 14:32:28 dom0 audit: BPF prog-id=63 op=LOAD
Apr 30 14:32:28 dom0 audit: BPF prog-id=64 op=LOAD
Apr 30 14:32:28 dom0 kernel: audit: type=1334 audit(1714480348.948:376): prog-id=63 op=LOAD
Apr 30 14:32:28 dom0 kernel: audit: type=1334 audit(1714480348.948:377): prog-id=64 op=LOAD
Apr 30 14:32:28 dom0 kernel: audit: type=1334 audit(1714480348.949:378): prog-id=65 op=LOAD
Apr 30 14:32:28 dom0 audit: BPF prog-id=65 op=LOAD
Apr 30 14:32:28 dom0 systemd[1]: Starting systemd-hostnamed.service - Hostname

Service…
Apr 30 14:32:29 dom0 systemd[1]: Started systemd-hostnamed.service - Hostname Service.
Apr 30 14:32:29 dom0 audit[1]: SERVICE_START pid=1 uid=0 auid=4294967295 ses=4294967295 msg='unit=systemd-hostnamed comm="systemd" exe="/usr/lib/systemd/systemd" hostname=? addr=? terminal=? res=success'
Apr 30 14:32:29 dom0 kernel: audit: type=1130 audit(1714480349.000:379): pid=1 uid=0 auid=4294967295 ses=4294967295 msg='unit=systemd-hostnamed comm="systemd" exe="/usr/lib/systemd/systemd" hostname=? addr=? terminal=? res=success'
Apr 30 14:32:59 dom0 systemd[1]: systemd-hostnamed.service: Deactivated successfully.
Apr 30 14:32:59 dom0 audit[1]: SERVICE_STOP pid=1 uid=0 auid=4294967295 ses=4294967295 msg='unit=systemd-hostnamed comm="systemd" exe="/usr/lib/systemd/systemd" hostname=? addr=? terminal=? res=success'
Apr 30 14:32:59 dom0 kernel: audit: type=1131 audit(1714480379.007:380): pid=1 uid=0 auid=4294967295 ses=4294967295 msg='unit=systemd-hostnamed comm="systemd" exe="/usr/lib/systemd/systemd" hostname=? addr=? terminal=? res=success'
Apr 30 14:32:59 dom0 audit: BPF prog-id=65 op=UNLOAD
Apr 30 14:32:59 dom0 audit: BPF prog-id=64 op=UNLOAD
Apr 30 14:32:59 dom0 audit: BPF prog-id=63 op=UNLOAD
Apr 30 14:32:59 dom0 kernel: audit: type=1334 audit(1714480379.068:381): prog-id=65 op=UNLOAD
Apr 30 14:32:59 dom0 kernel: audit: type=1334 audit(1714480379.068:382): prog-id=64 op=UNLOAD
Apr 30 14:32:59 dom0 kernel: audit: type=1334 audit(1714480379.068:383): prog-id=63 op=UNLOAD

Try to use no-strict-reset for your PCI device:

@neowutran Is there any way to make this solution compatible with switching keyboard layouts on 4.2? If audiovm enabled I need to press switch shortcut multiple times for the layout to switch. Imagine the frustration during writing something when you need to switch layouts multiple time or sometimes it takes a huge delay to switch.

Layout switches in dom0 just fine, but I guess something is wrong with RPC policies because audiovm just suppresses some layout change events for some reason.

Sorry I am not familiar with that part, I never need to switch keyboard layout so I didn't tested it.

check with the RPC policy file, I have not allowed the layout change event in my proposed policy configuration

I understand, but could you please consider testing it on your end and seeing if it works? That is not really a niche case and your guide is the best I could find.

I also tried to allow property get and set on +keyboard_layout, but the issue still persists making using a keyboard on qubes with audiovm enabled almost unbearable.

The only solution for me after multiple hours of tinkering was to return to dom0 hdmi audio and ask for help.

Can you give me the exact command / gui / shortcut / … you use to change the keyboard layout and that

trigger the issue you are having.

I will test that when I have some free time, but want to be sure to test the correct thing

Do you use USB keyboard with sys-usb?
And when you start sys-audio qube then layout switching is being unreliable?

Sorry I missed part of the directions. Please ignore.

I see this patch is still pending, was it ever sent as a PR? Or is there something blocking it being added officially? This guide has been helping many people for a long time so it would be nice to make it easier for more people to use.

I did sent a pull request last year.

Currently, there is quite a lot of activities on this subject by the QubesOS team: Dynamic audiovm switching · Issue #8975 · QubesOS/qubes-issues · GitHub

I did not sent a pull request for the the last ~5 lines of modification still currently required. Will do maybe later.

> This guide has been helping many people for a long time so it would be nice to make it easier for more people to use.

Most of this guide could be automated with a bash script / Salt script. But currently, I don't really want to try to understand how Salt work

vicent May 23, 2024, 7:26pm 156

Thanks for this guide. I've tried to follow it step by step but I've some problems to get it working. In the sys-audio qube when I test that sound works via `aplay` I get the error:

```
$ aplay /usr/share/sounds/alsa/Noise.wav
ALSA lib pulse.c:242:(pulse_connect) PulseAudio: Unable to connect:
Connection refused
```

The status of pulseaudio service is:

```
● pulseaudio.service - Sound Service
     Loaded: loaded (/usr/lib/systemd/user/pulseaudio.service; disabled;
preset: disabled)
    Drop-In: /usr/lib/systemd/user/service.d
             └─10-timeout-abort.conf
             /usr/lib/systemd/user/pulseaudio.service.d
             └─30_qubes.conf
     Active: activating (start-pre) since Thu 2024-05-23 20:11:40 CEST;
15s ago
TriggeredBy: ● pulseaudio.socket
  Cntrl PID: 1116 (qubesdb-read)
      Tasks: 1 (limit: 381)
```

```
     Memory: 212.0K
        CPU: 10ms
     CGroup: /user.slice/user-1000.slice/user@1000.service/session.slice/
pulseaudio.service
             └─1116 /usr/bin/qubesdb-read -w /qubes-audio-domain-xid

May 23 20:11:40 sys-audio systemd[623]: Failed to start
pulseaudio.service - Sound Service.
May 23 20:11:40 sys-audio systemd[623]: pulseaudio.service: Scheduled
restart job, restart counter is at 29.
May 23 20:11:40 sys-audio systemd[623]: Starting pulseaudio.service -
Sound Service...
```

but when I try to start it, after a few seconds, I get the error:

```
systemctl --user start pulseaudio.service
Job for pulseaudio.service failed because a timeout was exceeded.
See "systemctl --user status pulseaudio.service" and "journalctl --user -
xeu pulseaudio.service" for details.
```

Running `pulseaudio -v` outputs the error:

```
I: [pulseaudio] module.c: Loaded "module-filter-apply" (index: #19;
argument: "").
W: [pulseaudio] cli-command.c: stat('/etc/pulse/default.pa.d'): No such
file or directory
I: [pulseaudio] main.c: Daemon startup complete.
E: [pulseaudio] bluez5-util.c: GetManagedObjects() failed:
org.freedesktop.DBus.Error.NameHasNoOwner: Could not activate remote peer
'org.bluez': unit failed
I: [pulseaudio] module-suspend-on-idle.c: Sink
alsa_output.pci-0000_00_07.0.hdmi-stereo idle for too long, suspending
...
I: [alsa-sink-HDMI 0] alsa-sink.c: Device suspended...
I: [pulseaudio] main.c: Got signal SIGINT.
I: [pulseaudio] main.c: Exiting.
I: [pulseaudio] main.c: Daemon shutdown initiated.
```

With `journalctl` I can see that pulseaudio is restarting continuously:

```
May 23 21:02:26 sys-audio systemd[623]: Failed to start
pulseaudio.service - Sound Service.
May 23 21:02:27 sys-audio systemd[623]: pulseaudio.service: Scheduled
restart job, restart counter is at 57.
May 23 21:02:27 sys-audio systemd[623]: Starting pulseaudio.service -
```

```
Sound Service...
May 23 21:03:12 sys-audio systemd[623]: pulseaudio.service: start-pre
operation timed out. Terminating.
May 23 21:03:12 sys-audio systemd[623]: pulseaudio.service: Failed with
result 'timeout'.
May 23 21:03:12 sys-audio systemd[623]: Failed to start
pulseaudio.service - Sound Service.
May 23 21:03:12 sys-audio systemd[623]: pulseaudio.service: Scheduled
restart job, restart counter is at 58.
May 23 21:03:12 sys-audio systemd[623]: Starting pulseaudio.service -
Sound Service...
```

I don't know how to fix these problems. Help would be really appreciated.

Could be related to recent change in how audio work. Need to update the guide it you confirm the following things solve your issue.

In your sys-audio vm:

```
qubesdb-write '/qubes-audio-domain-xid' 1
systemctl --user restart pipewire
```

Does it work now ?
If it work, try to set the audiovm of sys-audio as itself.
In dom0

```
qvm-prefs sys-audio audiovm sys-audio
```

vicent May 24, 2024, 6:47am 158

It helped but not fixed completely the problem. After restarting pipewire I tried to play again the test sound. Now the pulseaudio is started but no sound is played:

```
$ aplay /usr/share/sounds/alsa/Noise.wav
Playing WAVE  '/usr/share/sounds/alsa/Noise.wav' : Signed 16 bit Little
Endian, Rated 48000 Hz, Mono
```

and the prompt is not returned.

Do the other part of the guide too. Especially the "configure service" part

vicent May 24, 2024, 2:55pm 160

I've already done the full guide, but still I'm not able to make it work. Currently the sound test fails and in pavucontrol I only see my Nvidia card (HDMI) and vchan. No analog duplex. But I've two attached devices: Intel Corporation Comet Lake PCH cAVS and NVIDIA Corporation.

Anyway I will repeat the full process if it makes easier for you to help me.

tombert May 24, 2024, 5:09pm 161

It's me again, and probably with a stupid question, but i just don't know how to solve it.
After the last problem i followed all steps, the test sounds works. after sys-audio has started, the next qube starting shows an error

> Blockquote
> Denied: admin.vm.property.GetAll

In the guide it says that some files need to be patched, in one of it, there is a comment with:

> Don't use GetAll qubes policy request for audiovm

I just do not know how i don't use GetAll - since this is the problem, i guess.

maybe someone can help me?
thanks a lot in advance for help

zdeneka May 28, 2024, 8:41am 162

Followed the new tutorial and still can't get it to work properly. The audio works in the sys-audio qube just fine, but doesn't work in any other qube. Still can't figure out what I'm doing wrong or whether it has something to do with my hardware.

Edit: Since only sys-audio works, I created a dedicated qube for audio which works out fine.

vicent May 29, 2024, 7:28pm 163

Hi again. I've not been able to make the sys-audio thing to work using a fedora template so I've repeated the process from scratch but now using a debian-12 template. The result is not yet good enough but I've made some progress. Currently I can attach an appVM to sys-audio via `qvm-prefs` command and get audio working in that appVM but something is wrong with the hardware detection. I have two audio cards, attached to sys-audio:

```
$ qvm-device pci ls sys-audio
BACKEND:DEVID  DESCRIPTION                                          USED
BY
dom0:00_1f.3   Audio device: Intel Corporation Comet Lake PCH cAVS  sys-
audio (no-strict-reset=True)
dom0:01_00.1   Audio device: NVIDIA Corporation                     sys-
audio (no-strict-reset=True)
```

When I run `pavucontrol` in the appVM I see no audio cards in the configuration tab, the only input device is Qubes Virtual Audio Source and the only output device is Qubes Virtual Audio Sink. Running alsamixer, the sound cards are not detected.

In sys-audio `pavucontrol` starts but works badly (I cannot move from one tab to a different one). Running alsmixer both sound cards are detected.

How can I fix those problems? TIA

> (I cannot move from one tab to a different one).

Like, it is very slow ? does sys-audio consume a lot of CPU or anything similar ?

In the “configuring policy” part of the guide, in the “recommended way” there is a patch for the file “qvm_start_daemon.py” that solve this issue

vicent May 30, 2024, 6:05pm 166

Well, I don’t understand what happened yesterday but today everything works just fine . It seems I made too many changes and the system had to be restarted.

> Like, it is very slow ? does sys-audio consume a lot of CPU or anything similar ?

No, no very slow. Simply non responsive, It was stuck in the Playback tab and I was totally unable to change to a different one. I don’t know about CPU usage cause I cannot reproduce the problem.

Anyway, thanks a lot for your great guide and for your valuable help.

tombert June 8, 2024, 3:02pm 168

Thanks a lot for answering all question - finally it works how expected!

XMachina June 28, 2024, 7:35am 169

I just started using bluetooth (because now I can, thanks!), but I *cannot* figure out why cairo-dock is listed as required for bluetooth. This is an application dock, like on MacOS. I have also removed it and used bluetooth with no difference.

On another note, I’m pretty sure that with pipewire, the `libspa-0.2-bluetooth` is required. Mine wouldn’t connect and gave a “br-connection-profile-unavailable” error, and I diagnosed it to be this package that was necessary, and installing it fixed everything. Given my inexperience, I’ll wait for confirmation, but if someone will confirm I’ll add it to the guide.

It was required for bluetooth to work with pipewire in debian-12-minimal:

XMachina June 30, 2024, 5:11am 171

I’ll go ahead and change the dock, and I’ll add a note for debian-12-minimal for the other package.

ymy July 1, 2024, 7:52pm 172

i notice after some time it becomes out of sync, music kind of “stutters”/glitches?
its especially noticeable with USB headset listening to SIP phone clients (lin phone), audio is scrambled and delayed. even more when system was suspended.

is there a way to get it back to sync? right now i restart my system once a day as mitigation and it works most of the time till the evening…

Note, I should edit the guide to go back to patching the source code: Sys-audio drops qubes on restart - #2 by neowutran
Should also open a github issue ticket to better understand this issue, I expect it to be a cache issue.

For the issue mentionned by @ymy and here: [sys-audio] Audio cutting in and out making audio unusable
If you can, try to check the cpu consumption of sys-audio and dom0, run “top” and check what are some of the most CPU hungry process.

Don’t have much time currently to do that properly, I have the new FFXIV extension to farm

ymy

July 2, 2024, 8:33pm 174

in the attached screenshot the sys-usb has patched the bluetooth card with a bluetooth speaker connected to sys-audio and i listen to nts.live (internet radio) in a firefox (“socialmedia” vm) when everything works. (is “in sync”)

▸ Screenshot (click)

when i have the same behavior i will do another screenshot

You always had this issue, or is it something recent ?
if you don’t open pavucontrol, do you still have the same issue ?
Can you try that : ?

```
Audio is scratchy [Need someone to comment if this is still usefull]

It may be a power-saving issue with the sound card.
In the “audio-template” and/or "dom0", create the file ‘/etc/
modprobe.d/50-snd.conf’ with the following content:

options snd_hda_intel power_save=0
```

And can you try to apply that too ? :

And maybe check “dmesg” and “journalctl -xe” in dom0 & sys-audio to see if you find some idea/ suspicious things

I think there could be some useful info in `~/.xsession-errors` in sys-audio and in the test qube as well.

ymy July 3, 2024, 5:15pm 177

thanks for the leads where to find logs and mitigation options, i will try them all.

but yesterday there were a lot of updates from qubes and fedora repos, and today there is no occurrence of said behavior. i am optimistic and will put the laptop to sleep and see were i will be tomorrow.

Switching keyboard layouts becomes terribly unreliable after following this tutorial.

Maybe there’s something wrong with the policies, maybe it somehow severely restricts the important things? I don’t even need to set sys-audio as the default audiovm in dom0 to get this unpleasant side

effect.

Just create a qube named sys-audio, enable the audiovm service in settings and set those policies from the guide. Once the qube is started, the delicate universal balance will be disturbed and the user's mental health will be jeopardized after every attempt to change the layout while writing. Sometimes it changes, sometimes it doesn't, sometimes with a delay - unreliable.

And dom0 accurately records the fact of changing the layout. This is very easy to understand if you enable the 'Keyboard layouts' widget on the xfce panel - it always visually changes the layout correctly after clicking on the widget/key combination. It's in the qube itself that can't realize that the layout has changed. '/usr/bin/qubesdb-read /keyboard-layout' in appvm doesn't always display what dom0 displays.

ymy July 4, 2024, 12:41pm 179

ok on my end the problem now seems to be linphone (sip client app) specific

▸ read more... (not relevant)

nokke July 4, 2024, 1:56pm 180

Thanks for correlating this - I was having the same problems with keyboard layout changes recently and didn't know what was causing it, but the timeline would make sense if it's since I introduced sys-audio.

Shutting down sys-audio doesn't help, though.

Try completely removing the policy file at '/etc/qubes/policy.d/50-sys-audio.policy' (don't forget to copy it somewhere beforehand to restore later) and reboot the system to see if the layout switching works as it should.

In my case shutting down sys-audio does the trick, but sometimes it requires some time after it shut down. No idea what's wrong about it.

ymy July 12, 2024, 12:38pm 182

▸ ignore post

I was using a debian based sys-audio qube for a while (Qubes version 4.2.1)
If anyone wants one based on fedora, this guide works for me (listening to audio on a bluetooth headset currently):
https://github.com/GammaSQ/qubes-doc/blob/sys-audio-setup/user/advanced-topics/audio-isolation.md

Added an optional package, nice to configure noise cancellation etc…

For the keyboard layout issue, just tested with
"setxkbmap fr" → "setxkbmap us" → "setxkbmap fr" … No issue
But
"setxkbmap -layout fr,us -option grp:win_space_toggle" then using the keymap to switch layout, and that way it seems I have the issue described by nokke / qubinator.

But since I never use keyboard layout switch, didn't motivated myself to investigate it yet

Same here. After having the policy in place keyboard switching becomes barely usable. Removing policy

(sometime it requires reboot on top) helps to get the switching back to normal.

Some observations:

- The switching in Dom0 is not affected by this issue
- The switching sometimes somehow works, but requires 3-5 seconds to propagate. May sound really weird, but changing the focus to another VM manually, also helps sometimes to make it work.
- The issue persists for both USB and laptop built-in keyboards.

Any ideas on how to troubleshoot it? Ready to try and test.

I don't know how to fix the issue, but you can at least stop the layout change from breaking by patching the `/usr/lib/python3.11/site-packages/qubesadmin/tools/qvm_start_daemon.py` in dom0.
Create patch file in dom0 with this content:

```
296,297c296,297
<         if new_property != current_property:
<             self.current_vm.keyboard_layout = new_property
---
> #         if new_property != current_property:
>         self.current_vm.keyboard_layout = new_property
```

And apply the patch with the name `patchfile`:

```
sudo patch /usr/lib/python3.11/site-packages/qubesadmin/tools/
qvm_start_daemon.py patchfile
```

The layout switch delay will remain but it won't break the layout switching.

At least now there is an easy way to reproduce the problem. There must be some issue with the policies file, perhaps the problem with the layout is just a symptom of a larger issue that is not so noticeable. There are mentions of keyboard layout issues in this thread from May 2, so it has been around for some time.

Perhaps it is difficult for people for whom English is a second or third language to draw attention to the problem on the English forum.

Same for me. Delay seems to be different every time.

@neowutran thanks for the guide. I have a Salt formula based on the same policy.

Audio qube is debian based. Audio clients can be Debian or Fedora based, depends on specific package names to include other distributions such as Archlinux, Gentoo etc.

It works with Bluetooth, advanced audio processing (Easyeffects), USB, Jack and built-in audio of course.

(
Some log for the delay for the keyboard layout change

```
qvm_start_daemon.py(305):             self.current_vm.keyboard_layout =
new_property
 --- modulename: base, funcname: __setattr__
base.py(358):         if key.startswith('_') or key in
self._local_properties():
 --- modulename: base, funcname: _local_properties
base.py(348):         if "_local_properties_set" not in cls.__dict__:
base.py(355):         return cls._local_properties_set
base.py(360):         if value is qubesadmin.DEFAULT:
base.py(371):             if isinstance(value, qubesadmin.vm.QubesVM):
base.py(373):             if value is None:
base.py(375):             try:
base.py(376):                 self.qubesd_call(
base.py(377):                     self._method_dest,
base.py(378):                     self._method_prefix + 'Set',
base.py(379):                     key,
base.py(380):                     str(value).encode('utf-8'))
base.py(376):                 self.qubesd_call(
 --- modulename: base, funcname: qubesd_call
base.py(72):         if dest is None:
base.py(75):         if self.app:
base.py(76):             return self.app.qubesd_call(dest, method, arg,
payload,
base.py(77):                 payload_stream)
base.py(76):             return self.app.qubesd_call(dest, method, arg,
payload,
 --- modulename: app, funcname: qubesd_call
app.py(753):         if payload_stream:
app.py(771):         try:
app.py(772):             client_socket = socket.socket(socket.AF_UNIX,
socket.SOCK_STREAM)
 --- modulename: socket, funcname: __init__
socket.py(225):         if fileno is None:
socket.py(226):             if family == -1:
socket.py(228):             if type == -1:
socket.py(230):             if proto == -1:
socket.py(231):                 proto = 0
socket.py(232):         _socket.socket.__init__(self, family, type,
proto, fileno)
socket.py(233):         self._io_refs = 0
socket.py(234):         self._closed = False
app.py(773):
client_socket.connect(qubesadmin.config.QUBESD_SOCKET)
app.py(778):         call_header = '{}+{} dom0 name {}\0'.format(method,
```

```
arg or '', dest)
app.py(779):         client_socket.sendall(call_header.encode('ascii'))
app.py(780):         if payload is not None:
app.py(781):             client_socket.sendall(payload)
app.py(783):         client_socket.shutdown(socket.SHUT_WR)
app.py(785):         return_data = client_socket.makefile('rb').read()
```

it take a lot of time here

```
return_data = client_socket.makefile('rb').read()
```

for the api call

```
call_header = '{}+{} dom0 name {}\0'.format(method, arg or '', dest)
```

→

```
admin.vm.property.Set+keyboard_layout dom0 name dom0
```

Need to check what does the API do when it receive this event, probably the file “qubes/api/admin.py”

)

Thank you, if you need anything to apply and test, please let me know. The guide is awesome and I’d like to continue using sys-audio, but keyboard switching is another everyday necessity…

asdfvb July 21, 2024, 6:43pm 191

I am using Thinkpad T16, how to identify bluetooth controller.

Check the output of the `lsusb` command in your sys-usb and `lspci` command in your dom0.

Mirai July 29, 2024, 10:51am 193

I don’t want to have a dozen templates, is there any issue when installing these packages:

```
sudo dnf install -y pipewire-qubes qubes-audio-daemon pavucontrol qubes-
core-admin-client qubes-usb-proxy alsa-utils
```

in your default template that you use for web browsing, you vpn qube etc…?

Also how can I activate pipewire in my qubes?
Currently I have to start it manually

```
systemctl --user restart pipewire
```

I am not sure how the service tab in qubes settings work, but can I add pipewire there?

unman July 29, 2024, 12:52pm 194

If you install packages in to your default template then you increase
the attack surface of all qubes using that template.
Some of these packages should already be installed in a vanilla template.

I never presume to speak for the Qubes team.
When I comment in the Forum I speak for myself.

Mirai July 29, 2024, 1:05pm 195

The only reason I am against having a dozen templates, is that there is no update cache.

Can I still set this up? The linked files are all removed from github

unman July 29, 2024, 3:33pm 196

I have salt in GitHub - unman/shaker, and packaged from here
That's an rpm that installs the state files and then runs an install,
setting up a caching proxy. **Read the notes as it will make changes to your templates.**
If you need help with the install, let me know in a separate thread.

I never presume to speak for the Qubes team.
When I comment in the Forum I speak for myself.

qqubes July 29, 2024, 3:59pm 197

I have a USB bluetooth adapter that I want to use to attach my headphones/earbuds.

However, `blueman` can only connect to my bluetooth devices when it is run from my `sys-usb` qube. When I run `blueman` in the `sys-audio` qube it cannot connect.

Does this mean that the USB devices section of the troubleshooting applies?

If yes, how do I make an audio qube that is also a USB qube? I guess look up how to make a USB qube and then follow the above instructions?

you should passthrough the usb device corresponding to the bluetooth system.
You can do that with the GUI, or by command line something like that

```
qvm-usb attach --persistent sys-audio sys-usb:X-Y
```

Mirai July 30, 2024, 1:57am 199

is it normal behavior that I have to execute:

```
systemctl --user restart pipewire
```

In every VM in order for sys-audio to work?

It should work without restarting the service manually.
Maybe you have both pulseaudio and pipewire installed in your templates and it's causing this issue?
What's the output of this command in the qube with this issue?

```
dnf list installed | grep -e pipewire -e pulse
```

qqubes July 30, 2024, 1:00pm 201

Yes, I did attach `sys-audio` to the bluetooth device in the GUI.

Still, when I run blueman in sys-audio, it sees my bluetooth devices, but it fails to connect with them.

Mirai July 30, 2024, 1:13pm 202

Following stuff installed (32 and 64bit versions) :

pipewire
pipewire-alsa
pipewire-gstreamer
pipewire-libs
pipewire-pulseaudio
pipewire-qubes
pipewire-utils
pulseaudio-libs
pulseaudio-libs-glib2
vlc-plugin-pipewire
wine-pulsaudio
xfce4-pulseaduio-plugin

In that case, the easiest way is to merge the sys-audio and sys-usb qubes (or else it will probably require extensive debugging), at least for the controller that manage your bluetooth system. If you use a non minimal template for the sys-audio, add the needed pci device in the list of pci devices passthrough.

Did you start the qube after sys-audio is started?
What's the output of this command in the qube after it starts and sound is not working?

```
systemctl --user status wireplumber pipewire.service pipewire.socket
pipewire-pulse.service pipewire-pulse.socket | cat
```

nokke July 31, 2024, 2:56am 205

If I restart sys-audio (which happens frequently), client qubes don't connect to the new sys-audio (it's disposable), so I also have to restart them.

Is this normal, and is there a way to get a connection back without restarting a client qube?

Yes, or at least it was an like this before:

It seems that dynamic audiovm switching was implemented:

But I don't know if it's working right now or not.

Mirai July 31, 2024, 1:38pm 207

I just noticed that it's the same issue I had before switching to sys-audio.

Audio works fine for most VMs but after using certain VMs for a while it stops working.
(Even after complete system reboot)

I seems to me that there is no audio device
Even restarting pipewire doesn't help anymore

EDIT
After restarting all the services and socket you mentioned I am able to see a dummy output device in pavucontrol in the VM but the Qube does not show up in pavucontrol of sys-audio

EDIT2
well now the dummy device stays after restarting the Qube and mpv doesn't complain anymore that there is no jack. (still only the dummy device is visible in pacucontrol)

Mirai July 31, 2024, 2:12pm 208

Output of the freshly started Qube with no working audio (audiovm is set correctly)

```
● pipewire-pulse.socket - PipeWire PulseAudio
     Loaded: loaded (/usr/lib/systemd/user/pipewire-pulse.socket;
enabled; preset: enabled)
     Active: active (listening) since Wed 2024-07-31 15:48:39 CEST; 8s
ago
   Triggers: ● pipewire-pulse.service
     Listen: /run/user/1000/pulse/native (Stream)
     CGroup: /user.slice/user-1000.slice/user@1000.service/app.slice/
pipewire-pulse.socket

Jul 31 15:48:39 mpv-qube systemd[816]: Listening on pipewire-pulse.socket
- PipeWire PulseAudio.

○ pipewire-pulse.service - PipeWire PulseAudio
     Loaded: loaded (/usr/lib/systemd/user/pipewire-pulse.service;
disabled; preset: disabled)
    Drop-In: /usr/lib/systemd/user/service.d
             └─10-timeout-abort.conf
     Active: inactive (dead)
TriggeredBy: ● pipewire-pulse.socket
```

```
● pipewire.socket - PipeWire Multimedia System Sockets
     Loaded: loaded (/usr/lib/systemd/user/pipewire.socket; enabled;
preset: enabled)
     Active: active (running) since Wed 2024-07-31 15:48:39 CEST; 8s ago
   Triggers: ● pipewire.service
     Listen: /run/user/1000/pipewire-0 (Stream)
             /run/user/1000/pipewire-0-manager (Stream)
     CGroup: /user.slice/user-1000.slice/user@1000.service/app.slice/
pipewire.socket

Jul 31 15:48:39 mpv-qube systemd[816]: Listening on pipewire.socket -
PipeWire Multimedia System Sockets.

● pipewire.service - PipeWire Multimedia Service
     Loaded: loaded (/usr/lib/systemd/user/pipewire.service; enabled;
preset: enabled)
    Drop-In: /usr/lib/systemd/user/service.d
             └─10-timeout-abort.conf
     Active: active (running) since Wed 2024-07-31 15:48:39 CEST; 8s ago
TriggeredBy: ● pipewire.socket
   Main PID: 835 (pipewire)
      Tasks: 2 (limit: 856)
     Memory: 4.5M (peak: 4.7M swap: 728.0K swap peak: 768.0K)
        CPU: 20ms
     CGroup: /user.slice/user-1000.slice/user@1000.service/session.slice/
pipewire.service
             └─835 /usr/bin/pipewire

Jul 31 15:48:39 mpv-qube systemd[816]: Started pipewire.service -
PipeWire Multimedia Service.

● wireplumber.service - Multimedia Service Session Manager
     Loaded: loaded (/usr/lib/systemd/user/wireplumber.service; enabled;
preset: enabled)
    Drop-In: /usr/lib/systemd/user/service.d
             └─10-timeout-abort.conf
     Active: active (running) since Wed 2024-07-31 15:48:39 CEST; 8s ago
   Main PID: 836 (wireplumber)
      Tasks: 6 (limit: 856)
     Memory: 6.2M (peak: 6.5M swap: 1.3M swap peak: 1.4M)
        CPU: 44ms
     CGroup: /user.slice/user-1000.slice/user@1000.service/session.slice/
wireplumber.service
             └─836 /usr/bin/wireplumber

Jul 31 15:48:39 mpv-qube systemd[816]: Started wireplumber.service -
Multimedia Service Session Manager.
```

```
Jul 31 15:48:39 mpv-qube wireplumber[836]: wp-device: SPA handle
'api.libcamera.enum.manager' could not be loaded; is it installed?
Jul 31 15:48:39 mpv-qube wireplumber[836]: s-monitors-libcamera:
PipeWire's libcamera SPA plugin is missing or broken. Some camera types
may not be supported.
Jul 31 15:48:40 mpv-qube wireplumber[836]: default: Failed to get
percentage from UPower: org.freedesktop.DBus.Error.NameHasNoOwner
Jul 31 15:48:40 mpv-qube wireplumber[836]: spa.bluez5: BlueZ system
service is not available
```

You have an issue with your audio device in sys-audio. Maybe some issue with driver/firmware.
Check the journalctl in your sys-audio to see if there are any errors related to it.
What's your audio device?

Mirai August 2, 2024, 3:01am 210

Audio works fine inside sys-audio, and for almost all other qubes as well.

It's more like this xen bug:

I have disabled the audiovm by default.

It's just that, sometimes some qubes don't wan't to play audio anymore…
In the affected Qube the only audio device visible is the dummy one and inside sys-audio the affected Qube doesn't even show up in pavucontrol. (While other Qubes play audio just fine). I had the same issue before sys-audio.

Mirai August 2, 2024, 4:46am 211

I really don't get it. Renamed (Cloned) the affected VM 3 times and now audio works again…
I have changed NOTHING not even a system reboot.

With the VM that now have a working audio, restart it. Do you still have working audio in this VM ?

Mirai August 2, 2024, 11:21am 213

Well not anymore. I restarted it a couple times before and it kept working. But now a few hours later, it doesn't work anymore. (Done nothing more than playing Noise.wav with mpv)

```
qubesdb-read -w /qubes-audio-domain-xid
```

Is configured correctly (The same as other working Qubes)

EDIT:

restarting pipewire in sys-audio and the affected Qube did not help. But now after restarting sys-audio, audio started working again in the affected Qube. Why??? (a couple days ago this didn't help)

Mirai August 2, 2024, 9:57pm 214

Started the ex problematic Qube again and surprise no audio.
But after restarting the audiovm, audio worked again. No clue at all what's wrong here
This is behaving so weird that the root cause might be a hardware issue (No I don't have Intel)

EDIT

Lost audio again (wanted to watch something). I am slowly loosing my mind

I have no idea what is going on with your system :')
If I had the same issue I would try to:

- in priority, check if you have any resources issue, OOM, unexpected huge cpu consumption, in general or in your sys-audio or other vm …
- in sys-audio, run qvm-start-daemon manually with verbose mode
- check journalctl logs of sys-audio and the problematic vm

QmanQtwo August 27, 2024, 5:57am 217

I'd like to share some things that have restored my sanity while solving the sound crackling / pw-top xruns / pipewire debug messages of "Client too slow!" errors…

My specific issue was that audio was fine-in-the-beginning-but-quickly-ramps-up-crackling-until-pure-robot-voices…
I found pw-top ERRs were skyrocketing, and found this to explain it:

api.alsa.headroom was the next target, and indeed it's handled by wireplumber…

There's a section, in /usr/share/wireplumber/main.lua.d/50-alsa-config.lua that defines what'll happen if wireplumber detects it's running in a VM:

```
  -- These properties override node defaults when running in a virtual
machine.
  -- The rules below still override those.
  ["vm.node.defaults"] = {
    ["api.alsa.period-size"] = 256,
    ["api.alsa.headroom"] = 8192,
  },
```

Guess what wireplumber detects, even when sys-audio is a HVM with PCI passthroughs?
Yup, a vm. You can verify this settings' value with:
`wpctl status` (to get the number of your default/primary Sink)
`wpctl inspect ##` (sink number)

What does api.alsa.headroom do?
https://pipewire.pages.freedesktop.org/wireplumber/daemon/configuration/alsa.html

> This adds extra delay between the hardware pointers and software pointers. In most cases this can be set to 0. For very bad devices or emulated devices (like in a VM) it might be necessary to increase the headroom value.

So how do we set it?
Well, the wireplumber version in the debian-12-minimum template is `$(wireplumber -v)` [0.4.13] NOT the v5.5 that the current documentation is at, and there was a lua → SPA-JSON change to the formatting.
So we need to find the default configuration files that this version uses, and they're located at:
`/usr/share/wireplumber/main.lua.d/`

They load in order of 01-whatever.lua to 90-enable-all.lua,
starting from /usr/share/wireplumber [shipped defaults]
then /etc/wireplumber [system wide settings]
then ~/.config/wireplumber [user settings]
With the latest read overriding the previous.

This can be set in the app-vm or template, by creating a .lua file in the above location of your choice (I've found that, aside from packages, all the audio modification I've needed to make can be done in the app-vm itself - making it quicker to Salt + deploy + test)

In my case, the crackling issues disappeared when I set api.alsa.headroom to 0, with the following file

```
/home/user/.config/wireplumber/main.lua.d/89-headroom.lua:
  file.managed:
    - mode: '0644'
    - user: user
    - group: user
    - makedirs: True
    - contents: |
        alsa_monitor.properties = {
          ["vm.node.defaults"] = {
           ["api.alsa.headroom"] = 0,
          },
        }
```

Which seems counterintuitive at first, but the issue was data not getting to the right place at the right time - I thought the hardware needed a bigger buffer (quantum in pipewire terms), but it was being choked instead.

Now Easyeffects is running with plenty of audio modifications smooth as can be, and while I didn't notice this at first, there's no audio delay in daily videos as well! I do notice xruns or crackling but it's sanely coming from large spikes in disk or CPU usage, whew.

You can set headroom, default volume, how profiles are loaded from pci and usb devices, and suspend in the same file, combining 40-device-defaults.lua and 50-alsa-config.lua modifications.
In Wireplumber, Devices are the hardware, and Nodes(Sinks) are the interface to that hardware.

```
/home/user/.config/wireplumber/main.lua.d/89-combined.lua:
  file.managed:
    - mode: '0644'
    - user: user
```

```
    - group: user
    - makedirs: True
    - contents: |
        device_defaults.properties = {
          ["default-volume"] = 1.0,
          ["default-input-volume"] = 1.0,
        }
        alsa_monitor.enabled = true
        alsa_monitor.properties = {
          -- These properties override node defaults when running in a
virtual machine.
          -- The rules below still override those.
          ["vm.node.defaults"] = {
           ["api.alsa.headroom"] = 0,
          },
        }
        alsa_monitor.rules = {
          {
            matches = {
              {
                { "device.name", "matches", "alsa_card.pci*" },
              },
            },
            apply_properties = {
              ["api.alsa.use-acp"] = true,
              ["api.alsa.use-ucm"] = true,
              ["api.acp.auto-profile"] = false,
              ["api.acp.auto-port"] = false,
            },
          },
          {
            matches = {
              {
                { "device.name", "matches", "alsa_card.usb*" },
              },
            },
            apply_properties = {
              ["api.alsa.use-acp"] = true,
              ["api.alsa.use-ucm"] = true,
              ["api.acp.auto-profile"] = false,
              ["api.acp.auto-port"] = false,
            },
          },
          {
            matches = {
              {
                -- Matches all sources.
                { "node.name", "matches", "alsa_input.*" },
```

```
              },
              {
                -- Matches all sinks.
                { "node.name", "matches", "alsa_output.*" },
              },
            },
            apply_properties = {
              ["api.alsa.headroom"]      = 0,
              ["session.suspend-timeout-seconds"] = 0,  -- 0 disables
suspend
            },
          },
        }
```

I believe the bulk of settings to change can be found in /usr/share/wireplumber/main.lua.d/50-alsa-config.lua and inserted under the last apply_properties section.
Hope this helps someone else

neowutran August 28, 2024, 8:00pm 218

Nice finding !

If others people confirm that it solved this issue they had (I don't personally have the issue mentioned, but probably because I use a fedora template instead of a debian one), it should be integrated in the guide.

For fedora template, wireplumber is in version 5.5 and different default values, value reported is 512 or 256

small extract from my system:

```
    api.alsa.headroom = "512"
    api.alsa.period-num = "64"
    api.alsa.period-size = "512"
```

will there be any efforts to make sys-audio a default qube that comes with sys-usb, sys-net etc…

neowutran August 29, 2024, 5:28am 220

Since it is the QubesOS teams that make most of the work to have a working sys-audio, yes probably, but not now.
If you want to speed up the process there are multiple things that can be done. At least the following things:

- 1. Solve all the known issues:
  - Keyboard layout switching issue
  - Autoreconnect to audio vm when audio vm is restarted
  - … ?
- 2. Convert the current community guide to an official guide (check if you can improve it, review

it, pull request …)
- 3. Review + improve + pull request of the Salts files to automate installation of sys-audio
- 4. Eventually, a new option in the QubesOS installer to apply the sys-audio salts

Good to hear (and thanks for the great guide)!

In theory, is it possible that sys-audio makes your VMs more unique, therefore more fingerprintable? I hope not, just wondering as a half amateur Q user.

fsflover August 30, 2024, 9:13pm 222

More unique for which attacker? You mean for websites or for local users? If it's the former, then I find it unlikely. Do websites have access to the audio system?
If it's the latter, then Qubes doesn't try to prevent such fingerprinting.

Websites. And I don't know. Do they? They can play audio for sure. I'm also not sure about the scenario when audio is disabled by default. Can a website see that you don't have any audio in your OS? In my mind this can be unique, but I maybe wrong as all of these are just my speculations.

marsupial September 5, 2024, 11:37am 224

Hi,

My bluetooth device is a Network controller: Intel Corporation Wi-Fi 6 AX201** that includes Bluetooth functionality, the Intel AX201 is known to be a combo card that supports both Wi-Fi 6 and Bluetooth 5.x.

When restarting the sys-audio cube i have following error:

Start failed: Requested operation is not valid: PCI device 0000:00:14.3 is in use by driver xenlight, domain sys-net, see /var/log/libvirt/libxl/libxl-driver.log for details

A restart of other qubes does not fix the problem.

apparatus September 5, 2024, 12:56pm 225

I think the AX201 consists of two devices:

- PCI Wireless controller that you should attach to sys-net for WiFi to work
- USB Bluetooth adapter that you should attach from sys-usb to sys-audio for bluetooth to work in sys-audio (or attach the PCI USB controller to which the USB Bluetooth adapter is connected to to the sys-audio instead of sys-usb)

So you don't need to attach PCI Wireless controller to sys-audio for bluetooth to work there.

marsupial September 5, 2024, 5:52pm 226

These are all my devices (excluding my audio ones):

```
00:00.0 Host bridge: Intel Corporation 11th Gen Core Processor Host
Bridge/DRAM Registers
00:01.0 PCI bridge: Intel Corporation 11th Gen Core Processor PCIe
Controller #1
```

```
00:02.0 VGA compatible controller: Intel Corporation Tiger Lake-H GT1
[UHD Graphics]
00:04.0 Signal processing controller: Intel Corporation Tiger Lake-H
Dynamic Tuning Processor Participant
00:05.0 PCI bridge: Intel Corporation Tiger Lake-H PCI Express Root Port
#0
00:06.0 PCI bridge: Intel Corporation Tiger Lake-H PCI Express Root Port
#2
00:07.0 PCI bridge: Intel Corporation Tiger Lake-H GNA Scoring
Accelerator module
00:08.0 Signal processing controller: Intel Corporation Tiger Lake-H
Gaussian Mixture Model
00:0d.0 USB controller: Intel Corporation Tiger Lake-H USB 3.1 xHCI Host
Controller
00:0d.2 USB controller: Intel Corporation Tiger Lake-H NHI #0
00:0d.3 USB controller: Intel Corporation Tiger Lake-H NHI #1
00:0e.0 USB controller: Intel Corporation Tiger Lake-H xHCI Host
Controller
00:14.0 USB controller: Intel Corporation Tiger Lake-H USB 3.2 xHCI Host
Controller
00:14.2 RAM memory: Intel Corporation Tiger Lake-H Shared SRAM
00:14.3 Network controller: Intel Corporation Wi-Fi 6 AX201
00:15.0 Serial bus controller: Intel Corporation Tiger Lake-H Serial IO
I2C Controller #0
00:15.1 Serial bus controller: Intel Corporation Tiger Lake-H Serial IO
I2C Controller #1
00:16.0 Communication controller: Intel Corporation Tiger Lake-H
Management Engine Interface
00:17.0 SATA controller: Intel Corporation Tiger Lake-H SATA AHCI
Controller
00:1c.0 PCI bridge: Intel Corporation Tiger Lake-H PCI Express Root Port
#9
00:1d.0 PCI bridge: Intel Corporation Tiger Lake-H PCI Express Root Port
#11
00:1f.0 ISA bridge: Intel Corporation HM570 LPC/eSPI Controller
00:1f.3 SMBus: Intel Corporation Tiger Lake-H SMBus Controller
00:1f.4 SMBus: Intel Corporation Tiger Lake-H SPI Controller
01:00.0 VGA compatible controller: NVIDIA Corporation GA104M [GeForce RTX
3080 Mobile / Max-Q 8GB/16GB]
02:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe
SSD Controller PM9A1/PM9A3/980PRO
52:00.0 Ethernet controller: Realtek Semiconductor Co., Ltd. RTL8125
2.5GbE Controller
```

marsupial September 5, 2024, 5:53pm 227

These are my devices, excluding my audio ones:

```
00:00.0 Host bridge: Intel Corporation 11th Gen Core Processor Host
Bridge/DRAM Registers
00:01.0 PCI bridge: Intel Corporation 11th Gen Core Processor PCIe
Controller #1
00:02.0 VGA compatible controller: Intel Corporation Tiger Lake-H GT1
[UHD Graphics]
00:04.0 Signal processing controller: Intel Corporation Tiger Lake-H
Dynamic Tuning Processor Participant
00:05.0 PCI bridge: Intel Corporation Tiger Lake-H PCI Express Root Port
#0
00:06.0 PCI bridge: Intel Corporation Tiger Lake-H PCI Express Root Port
#2
00:07.0 PCI bridge: Intel Corporation Tiger Lake-H GNA Scoring
Accelerator module
00:08.0 Signal processing controller: Intel Corporation Tiger Lake-H
Gaussian Mixture Model
00:0d.0 USB controller: Intel Corporation Tiger Lake-H USB 3.1 xHCI Host
Controller
00:0d.2 USB controller: Intel Corporation Tiger Lake-H NHI #0
00:0d.3 USB controller: Intel Corporation Tiger Lake-H NHI #1
00:0e.0 USB controller: Intel Corporation Tiger Lake-H xHCI Host
Controller
00:14.0 USB controller: Intel Corporation Tiger Lake-H USB 3.2 xHCI Host
Controller
00:14.2 RAM memory: Intel Corporation Tiger Lake-H Shared SRAM
00:14.3 Network controller: Intel Corporation Wi-Fi 6 AX201
00:15.0 Serial bus controller: Intel Corporation Tiger Lake-H Serial IO
I2C Controller #0
00:15.1 Serial bus controller: Intel Corporation Tiger Lake-H Serial IO
I2C Controller #1
00:16.0 Communication controller: Intel Corporation Tiger Lake-H
Management Engine Interface
00:17.0 SATA controller: Intel Corporation Tiger Lake-H SATA AHCI
Controller
00:1c.0 PCI bridge: Intel Corporation Tiger Lake-H PCI Express Root Port
#9
00:1d.0 PCI bridge: Intel Corporation Tiger Lake-H PCI Express Root Port
#11
00:1f.0 ISA bridge: Intel Corporation HM570 LPC/eSPI Controller
00:1f.3 SMBus: Intel Corporation Tiger Lake-H SMBus Controller
00:1f.4 SMBus: Intel Corporation Tiger Lake-H SPI Controller
01:00.0 VGA compatible controller: NVIDIA Corporation GA104M [GeForce RTX
3080 Mobile / Max-Q 8GB/16GB]
02:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe
SSD Controller PM9A1/PM9A3/980PRO
```

```
52:00.0 Ethernet controller: Realtek Semiconductor Co., Ltd. RTL8125
2.5GbE Controller
```

apparatus September 5, 2024, 6:11pm 228

What's the output of this command in sys-usb?

```
lsusb
```

marsupial September 5, 2024, 6:29pm 229

```
user@sys-usb:~$ lsusb
Bus 005 Device 002: ID 0bda:0411 Realtek Semiconductor Corp. Hub
Bus 005 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 004 Device 004: ID 048d:c968 Integrated Technology Express, Inc. ITE
Device(8258)
Bus 004 Device 003: ID 04f2:b67d Chicony Electronics Co., Ltd Integrated
Camera
Bus 004 Device 002: ID 1050:0407 Yubico.com Yubikey 4/5 OTP+U2F+CCID
Bus 004 Device 006: ID 8087:0026 Intel Corp. AX201 Bluetooth
Bus 004 Device 009: ID 31e3:1312 Wooting Wooting 60HE (ARM)
Bus 004 Device 007: ID 1532:007b Razer USA, Ltd RC30-0305 Gaming Mouse
Dongle [Viper Ultimate (Wireless)]
Bus 004 Device 005: ID 0bda:5411 Realtek Semiconductor Corp. RTS5411 Hub
Bus 004 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 003 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 002: ID 0627:0001 Adomax Technology Co., Ltd QEMU Tablet
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
user@sys-usb:~$
```

apparatus September 5, 2024, 6:31pm 230

This is your USB Bluetooth adapter from AX201.

marsupial September 5, 2024, 6:39pm 231

Thanks! Interesting tough, I don't see any mention of bluetooth in the connected devices under the sys-usb qube…

Connected devices:

```
00:0d.0 USB controller: Intel Corporation Tiger Lake-H Thunderbolt 4 USB
Controller
00:0d.2 USB controller: Intel Corporation Tiger Lake-H Thunderbolt 4 NHI
```

```
#0
00:0d.3 USB controller: Intel Corporation Tiger Lake-H Thunderbolt 4 NHI
#1
00:14.0 USB controller: Intel Corporation Tiger Lake-H USB 3.2 Gen 2x1
XHCI Host Controller
```

apparatus September 5, 2024, 6:51pm 232

You need to install blueman and configure the bluetooth in the sys-usb for it to work there:

I have installed and started the bluetooth service in the sys-usb template but nothing really changes…

The availlable devices I can to add to sys-audio are:

```
00:00.0 Host bridge: Intel Corporation 11th Gen Core Processor Host
Bridge/DRAM Registers
00:01.0 PCI bridge: Intel Corporation 11th Gen Core Processor PCIe
Controller #1
00:02.0 VGA compatible controller: Intel Corporation TigerLake-H GT1 [UHD
Graphics]
00:04.0 Signal processing controller: Intel Corporation TigerLake-LP
Dynamic Tuning Processor Participant
00:06.0 PCI bridge: Intel Corporation 11th Gen Core Processor PCIe
Controller #0
00:07.0 PCI bridge: Intel Corporation Tiger Lake-H Thunderbolt 4 PCI
Express Root Port #0
00:07.2 PCI bridge: Intel Corporation Tiger Lake-H Thunderbolt 4 PCI
Express Root Port #2
00:0a.0 Signal processing controller: Intel Corporation Tigerlake
Telemetry Aggregator Driver
00:0d.0 USB controller: Intel Corporation Tiger Lake-H Thunderbolt 4 USB
Controller
00:0d.2 USB controller: Intel Corporation Tiger Lake-H Thunderbolt 4 NHI
#0
00:0d.3 USB controller: Intel Corporation Tiger Lake-H Thunderbolt 4 NHI
#1
00:14.0 USB controller: Intel Corporation Tiger Lake-H USB 3.2 Gen 2x1
xHCI Host Controller
00:14.2 RAM memory: Intel Corporation Tiger Lake-H Shared SRAM
00:14.3 Network controller: Intel Corporation Tiger Lake PCH CNVi WiFi
00:15.0 Serial bus controller: Intel Corporation Tiger Lake-H Serial IO
I2C Controller #0
00:15.1 Serial bus controller: Intel Corporation Tiger Lake-H Serial IO
I2C Controller #1
00:15.2 Serial bus controller: Intel Corporation
00:16.0 Communication controller: Intel Corporation Tiger Lake-H
Management Engine Interface
00:17.0 SATA controller: Intel Corporation Tiger Lake SATA AHCI
```

```
Controller
00:1d.0 PCI bridge: Intel Corporation Tiger Lake-H PCI Express Root Port
#9
00:1d.6 PCI bridge: Intel Corporation
00:1f.0 ISA bridge: Intel Corporation HM570 LPC/eSPI Controller
00:1f.4 SMBus: Intel Corporation Tiger Lake-H SMBus Controller
00:1f.5 Serial bus controller: Intel Corporation Tiger Lake-H SPI
Controller
01:00.0 VGA compatible controller: NVIDIA Corporation GA104M [GeForce RTX
3080 Mobile / Max-Q 8GB/16GB]
02:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe
SSD Controller PM9A1/PM9A3/980PRO
5c:00.0 Ethernet controller: Realtek Semiconductor Co., Ltd.
RTL8111/8168/8411 PCI Express Gigabit Ethernet Controller
```

sys-usb qube: **lsusb -t**

```
user@sys-usb:~$ lsusb -t
/:  Bus 05.Port 1: Dev 1, Class=root_hub, Driver=xhci_hcd/8p, 20000M/x2
    |__ Port 5: Dev 2, If 0, Class=Hub, Driver=hub/2p, 5000M
/:  Bus 04.Port 1: Dev 1, Class=root_hub, Driver=xhci_hcd/16p, 480M
    |__ Port 3: Dev 2, If 2, Class=Chip/SmartCard, Driver=, 12M
    |__ Port 3: Dev 2, If 0, Class=Human Interface Device, Driver=usbhid,
12M
    |__ Port 3: Dev 2, If 1, Class=Human Interface Device, Driver=usbhid,
12M
    |__ Port 6: Dev 3, If 0, Class=Video, Driver=uvcvideo, 480M
    |__ Port 6: Dev 3, If 1, Class=Video, Driver=uvcvideo, 480M
    |__ Port 9: Dev 4, If 0, Class=Human Interface Device, Driver=usbhid,
12M
    |__ Port 10: Dev 5, If 0, Class=Hub, Driver=hub/2p, 480M
        |__ Port 1: Dev 7, If 0, Class=Human Interface Device,
Driver=usbhid, 12M
        |__ Port 1: Dev 7, If 1, Class=Human Interface Device,
Driver=usbhid, 12M
        |__ Port 1: Dev 7, If 2, Class=Human Interface Device,
Driver=usbhid, 12M
        |__ Port 2: Dev 8, If 4, Class=Human Interface Device,
Driver=usbhid, 12M
        |__ Port 2: Dev 8, If 2, Class=Human Interface Device,
Driver=usbhid, 12M
        |__ Port 2: Dev 8, If 0, Class=Human Interface Device,
Driver=usbhid, 12M
        |__ Port 2: Dev 8, If 5, Class=Human Interface Device,
Driver=usbhid, 12M
        |__ Port 2: Dev 8, If 3, Class=Human Interface Device,
Driver=usbhid, 12M
```

```
        |__ Port 2: Dev 8, If 1, Class=Human Interface Device,
Driver=usbhid, 12M
    |__ Port 14: Dev 6, If 0, Class=Wireless, Driver=btusb, 12M
    |__ Port 14: Dev 6, If 1, Class=Wireless, Driver=btusb, 12M
/:  Bus 03.Port 1: Dev 1, Class=root_hub, Driver=xhci_hcd/4p, 10000M
/:  Bus 02.Port 1: Dev 1, Class=root_hub, Driver=xhci_hcd/1p, 480M
/:  Bus 01.Port 1: Dev 1, Class=root_hub, Driver=ehci-pci/6p, 480M
    |__ Port 1: Dev 2, If 0, Class=Human Interface Device, Driver=usbhid,
480M
```

```
user@sys-usb:~$ lsusb
Bus 005 Device 002: ID 0bda:0411 Realtek Semiconductor Corp. Hub
Bus 005 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 004 Device 004: ID 048d:c968 Integrated Technology Express, Inc. ITE
Device(8258)
Bus 004 Device 003: ID 04f2:b67d Chicony Electronics Co., Ltd Integrated
Camera
Bus 004 Device 002: ID 1050:0407 Yubico.com Yubikey 4/5 OTP+U2F+CCID
Bus 004 Device 006: ID 8087:0026 Intel Corp. AX201 Bluetooth
Bus 004 Device 008: ID 31e3:1312 Wooting Wooting 60HE (ARM)
Bus 004 Device 007: ID 1532:007b Razer USA, Ltd RC30-0305 Gaming Mouse
Dongle [Viper Ultimate (Wireless)]
Bus 004 Device 005: ID 0bda:5411 Realtek Semiconductor Corp. RTS5411 Hub
Bus 004 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 003 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 002: ID 0627:0001 Adomax Technology Co., Ltd QEMU Tablet
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
```

When I add a USB device that is allready in use by sys-usb, I get:

When I move the USB device from sys-usb to sys-audio, I have no usb devices anymore…

Am I missing something?

apparatus September 5, 2024, 9:03pm 234

Attach this **USB device** not **PCI USB Controller** from sys-usb to sys-audio:

```
Bus 004 Device 006: ID 8087:0026 Intel Corp. AX201 Bluetooth
```

Use Qubes Devices widget in system tray for this, not qube's Settings → Devices tab.
Then you can use blueman-manager in sys-audio to pair with your Bluetooth devices.

marsupial September 6, 2024, 8:00am 235

Thanks for helping, sadly enough that is not an option between my devices…

This is what I have:

```
[x@dom0 ~]$ qvm-usb
BACKEND:DEVID   DESCRIPTION
USED BY
sys-usb:4-10.1  1532:007b_Razer_Razer_Viper_Ultimate_Dongle
sys-usb:4-10.2  31e3:1312_Wooting_Wooting_60HE__ARM__A02B2315W052H36407
sys-usb:4-14    8087:0026_8087_0026
sys-usb:4-3     1050:0407_Yubico_YubiKey_OTP+FIDO+CCID_0020637187
sys-usb:4-6     04f2:b67d_Sonix_Technology_Co.__Ltd._Integrated_Camera
sys-usb:4-9     048d:c968_ITE_Tech._Inc._ITE_Device_8258_
disp4018 (identity=0000:0000::'?''*''*''*''*''*')


[x@dom0 ~]$ lsusb
[x@dom0 ~]$ qvm-pci
BACKEND:DEVID  DESCRIPTION
USED BY
dom0:00_00.0   Host bridge: Intel Corporation 11th Gen Core Processor
Host Bridge/DRAM Registers
dom0:00_01.0   PCI bridge: Intel Corporation 11th Gen Core Processor PCIe
Controller #1
dom0:00_02.0   VGA compatible controller: Intel Corporation TigerLake-H
GT1 [UHD Graphics]
dom0:00_04.0   Signal processing controller: Intel Corporation TigerLake-
LP Dynamic Tuning Processor Participant
dom0:00_06.0   PCI bridge: Intel Corporation 11th Gen Core Processor PCIe
Controller #0
dom0:00_07.0   PCI bridge: Intel Corporation Tiger Lake-H Thunderbolt 4
PCI Express Root Port #0
dom0:00_07.2   PCI bridge: Intel Corporation Tiger Lake-H Thunderbolt 4
PCI Express Root Port #2
dom0:00_0a.0   Signal processing controller: Intel Corporation Tigerlake
Telemetry Aggregator Driver
dom0:00_0d.0   USB controller: Intel Corporation Tiger Lake-H Thunderbolt
4 USB Controller                                    sys-usb (no-strict-
reset=True)
dom0:00_0d.2   USB controller: Intel Corporation Tiger Lake-H Thunderbolt
4 NHI #0                                            sys-usb (no-strict-
reset=True)
dom0:00_0d.3   USB controller: Intel Corporation Tiger Lake-H Thunderbolt
4 NHI #1                                            sys-usb (no-strict-
reset=True)
dom0:00_14.0   USB controller: Intel Corporation Tiger Lake-H USB 3.2 Gen
2x1 xHCI Host Controller                            sys-usb (no-strict-
reset=True)
dom0:00_14.2   RAM memory: Intel Corporation Tiger Lake-H Shared SRAM
```

```
dom0:00_14.3   Network controller: Intel Corporation Tiger Lake PCH CNVi
WiFi                                                    sys-net
dom0:00_15.0   Serial bus controller: Intel Corporation Tiger Lake-H
Serial IO I2C Controller #0
dom0:00_15.1   Serial bus controller: Intel Corporation Tiger Lake-H
Serial IO I2C Controller #1
dom0:00_15.2   Serial bus controller: Intel Corporation
dom0:00_16.0   Communication controller: Intel Corporation Tiger Lake-H
Management Engine Interface
dom0:00_17.0   SATA controller: Intel Corporation Tiger Lake SATA AHCI
Controller
dom0:00_1d.0   PCI bridge: Intel Corporation Tiger Lake-H PCI Express
Root Port #9
dom0:00_1d.6   PCI bridge: Intel Corporation
dom0:00_1f.0   ISA bridge: Intel Corporation HM570 LPC/eSPI Controller
dom0:00_1f.3   Audio device: Intel Corporation Tiger Lake-H HD Audio
Controller                                               sys-audio (no-
strict-reset=True)
dom0:00_1f.4   SMBus: Intel Corporation Tiger Lake-H SMBus Controller
dom0:00_1f.5   Serial bus controller: Intel Corporation Tiger Lake-H SPI
Controller
dom0:01_00.0   VGA compatible controller: NVIDIA Corporation GA104M
[GeForce RTX 3080 Mobile / Max-Q 8GB/16GB]
dom0:01_00.1   Audio device: NVIDIA Corporation GA104 High Definition
Audio Controller                                        sys-audio (no-
strict-reset=True)
dom0:02_00.0   Non-Volatile memory controller: Samsung Electronics Co Ltd
NVMe SSD Controller PM9A1/PM9A3/980PRO
dom0:5c_00.0   Ethernet controller: Realtek Semiconductor Co., Ltd.
RTL8111/8168/8411 PCI Express Gigabit Ethernet Controller  sys-net
[x@dom0 ~]$
```

I think I will just the blueman-manager from sys-usb since replacing the usb controller with Bluetooth functionality from sys-usb to sys-audio also replaces all the other devices on my usb controller

apparatus September 6, 2024, 8:23am 236

What problem do you have with attaching USB Bluetooth adapter from sys-usb to sys-audio?
`sys-usb:4-14 8087:0026_8087_0026` - is your USB Bluetooth adapter.
You can do this using Qubes Devices widget in system tray or by running this command in dom0 terminal:

```
qvm-usb attach sys-audo sys-usb:4-14
```

marsupial September 6, 2024, 8:30am 237

I've tried attaching 4-14 and 4-9 but none of those devices show up in lsusb within sys-audio qube…

blueman-manager does not recognize any bluetooth device as well

apparatus September 6, 2024, 8:32am 238

Are you able to attach any USB device to any qube at all?

solene September 10, 2024, 2:15pm 239

@neowutran it worked perfectly for me, thanks! I did not expect the recording to be passed as well from a bluetooth headsets

I just need to figure why the bluetooth applet does not start automatically now

apparatus September 10, 2024, 2:21pm 240

Did you enable `blueman` service in the sys-audio Settings → Services?

solene September 10, 2024, 2:29pm 241

I enabled the service `bluetooth`

glockmane September 12, 2024, 8:31pm 242

Followed the complete guide passing 00:1f.3 Audio Device but it won't get recognized, in Volume Control App from sys-audio I only see Dummy Output as Output Device… AX210 Bluetooth Device works…

Edit:

I think problem is IOMMU Groups, there are other devices in the same group which I don't want to pass (like Ethernet)… I think using ACS Override would not be a good idea either… Am I right?

neowutran September 15, 2024, 7:02am 243

You could need to configure the device in the Volume Control App. And the result of the command "sudo dmesg" could be usefull to understand if there is any issue. also did you installed the required driver for AX210 ?

neowutran September 15, 2024, 7:05am 244

Added this part in the guide

neowutran September 15, 2024, 9:21am 245

Regarding the post "Audio qube - #217 by QmanQtwo", can other peoples confirm that it solved their issues by commenting, and if it solved the issue for Debian template or Fedora template ?

csnyder

September 17, 2024, 1:41am 246

I am so excited about this post. Thank you, @neowutran !

I am having some issues that in part - but don't fully - resemble the challenges others have had.

So far I've been able to set up the three qubes with the same parameters from the qvm-prefs

screenshots.

However, my sys-audio devices was different - only one audio device instead of two (it's a Purism Librem 14). Did I do this correctly?

I did it in debian b/c for some reason fedora wasn't creating disposable qubes for me. When I run this:

```
sudo apt install -y pipewire-qubes qubes-audio-daemon pavucontrol qubes-core-admin-client qubes-usb-proxy alsa-utils
```

I get the error messages:

```
The following information may help to resolve the situation:

The following packages have unmet dependencies:
 pipewire-alsa : Conflicts: pulseaudio but 16.1+dfsg1-2+b1 is to be installed
 pipewire-audio : Conflicts: pulseaudio but 16.1+dfsg1-2+b1 is to be installed
E: Error, pkgProblemResolver::Resolve generated breaks, this may be caused by held packages.
```

Do I need to worry about this?

And then, if I try to start sys-audio, I get this error message:

```
Start failed: Requested operation is not valid: PCI device 0000:00:14.0 is in use by driver xenlight, domain sys-usb, see /var/log/libvirt/libxl/libxl-driver.log for details
```

Any suggested next steps? Many thanks.

apparatus September 17, 2024, 6:15pm 247

Yes, you need to remove `pulseaudio` before installing `pipewire`.

You have the same PCI USB controller 00:14.0 attached to both sys-audio and sys-usb. You can't attach the same PCI device to the multiple qubes simultaneously.
You need to remove this controller from sys-usb or shutdown sys-usb before starting sys-audio.

glockmane September 19, 2024, 10:29am 248

There is nothing to configure, no Audio device… Also AX210 is WiFi & Bluetooth… Bluetooth works in Audio Qube… I guess it is my IOMMU groups and could only be fixed with ACS Override, which I do not want cause it could introduce attack surface… So no Audio Qube for my Hardware

solene September 19, 2024, 10:37am 249

My sys-audio sometimes start after some other qube using sys-audio as their audiovm, so they don't have sound until I restart them.

How do people handle that? I don't think there is a dependency tree on audiovm when starting the qubes.

vicent September 21, 2024, 6:32pm 250

My `audio-template` is also debian based. I've installed both `pulseaudio` and `pipewire`. You say that `pulseaudio` must be removed before installing `pipewire`. But if I try to do it:

```
# apt remove pulseaudio
...
The following packages will be REMOVED:
  pulseaudio pulseausio-module-bluetooth qubes-audio-daemon
0 upgraded, 0 newly installed, 3 to remove and 0 not upgraded.
After this operation, 7038 kB disk space will be freed.
Do you want to continue? [Y/n]
```

So it is trying to remove `qubes-audio-daemon` which is a required package. Now I'm confused. Which packages should I install in `audio-template`?

apparatus September 21, 2024, 6:55pm 251

I guess it's a bug in the debian dependencies.
Based on this:

> Does this affect in any way non Dom0 AudioVMs that have the package `qubes-audio-daemon` installed? Pulseaudio is still referenced in that package requirement.

`pulseaudio-daemon` is provided by `pulseaudio` but also by `pipewire-pulseaudio`.

Audio underruns in dom0 soon after uncorking stream · Issue #8955 · QubesOS/qubes-issues · GitHub

The `qubes-audio-daemon` package shouldn't be a dependent on `pulseaudio` package.
At least it's not like this for fedora:

```
$ dnf repoquery --requires qubes-audio-daemon
/usr/bin/sh
libc.so.6(GLIBC_2.38)(64bit)
libconfig
libglib-2.0.so.0()(64bit)
libpulse-mainloop-glib.so.0()(64bit)
libpulse-mainloop-glib.so.0(PULSE_0)(64bit)
libpulse.so.0()(64bit)
libpulse.so.0(PULSE_0)(64bit)
libqubesdb.so()(64bit)
libvchan-xen.so.1()(64bit)
pulseaudio-daemon
```

```
pulseaudio-libs
python3-pydbus
qubes-utils >= 3.1.0
rtld(GNU_HASH)
```

But for some reason it's a dependence for debian:

```
$ apt info qubes-audio-daemon
Package: qubes-audio-daemon
Version: 4.2.8-1+deb12u1
Priority: optional
Section: admin
Source: qubes-gui-daemon
Maintainer: Marek Marczykowski-Górecki <marmarek@invisiblethingslab.com>
Installed-Size: 60.4 kB
Depends: pulseaudio, libc6 (>= 2.34), libglib2.0-0 (>= 2.31.8), libpulse-
mainloop-glib0 (>= 0.99.1), libpulse0 (>= 0.99.1), libvchan-xen1 (>=
4.2.0)
Breaks: qubes-gui-daemon-pulseaudio (<< 4.1.21~)
Replaces: qubes-gui-daemon-pulseaudio (<< 4.1.21~)
```

I guess this should be reported on the github.

vicent September 22, 2024, 8:04am 252

Thanks for your answer. I've reported a bug as you suggested.

Mirai October 8, 2024, 7:01pm 253

Just want to report back that it works a lot more reliably with a USB soundcard (I don't think I will ever use my integrated ever again even tho switching audiovms back and forth helps sometimes).

SteveC October 13, 2024, 4:31pm 254

Well, after a ton of struggle last year…then giving up…I decided to revisit this.

One thing I changed in my hardware was to use a USB speaker rather than pulling the audio out of a HDMI splitter (my hardware has no audio jack). It's entirely possible the reason I failed last time was trying to run it through HDMI.

Anyhow, I now have it working. A banner day!!!

One thing that may be missing from the instructions (I couldn't find it) was having to set a tag for sys-audio: `qvm-tags sys-audio add audiovm-sys-audio`.

Without this, the policy won't work because it's looking for that tag. (I actually realized this before I tried running for the first time!)

solene October 13, 2024, 4:44pm 255

My sys-audio does not have this tag.

neowutran October 13, 2024, 6:17pm 256

Weird, you should have this tag. But you should not have to set it manually. I think

solene October 13, 2024, 7:22pm 257

if that help

```
$ qvm-tags sys-audio
audiovm-dom0
created-by-dom0
guivm-dom0
```

neowutran October 13, 2024, 7:26pm 258

Thanks, and nevermind, i just confused myself, the tag just indicate that you configured sys-audio to use dom0 as it's audiovm

solene October 13, 2024, 7:32pm 259

I did not change anything I never use qvm-tags, except to change the guivm (it's a script to switch between dom0 and sys-gui-vnc)

neowutran October 13, 2024, 7:37pm 260

The tag is automatically modified when you run `qvm-prefs sys-audio audiovm dom0`. The tag just mirror the value of qvm-prefs so it can be used in the policy file

SteveC October 14, 2024, 5:15am 261

At the moment my sys-audio qube has as its audio vm "None" (and it works, at least for playing audio).

If I understand you correctly, I should *not* set this tag (though it seems harmless at the moment).

neowutran October 14, 2024, 6:49am 262

You most probably got hit by the bug described here: Audio qube - #73 by cumpsd
But I currently don't have time to check that or send a pull request

SteveC October 14, 2024, 4:57pm 263

There doesn't seem to be any issue at all on my system. So I don't know what that bug is about.

I was looking over the policy file given in the original instructions, and saw a lot of references to that tag, so I was surprised to not see the tag getting set anywhere. Apparently it doesn't matter.

SteveC October 15, 2024, 3:53am 264

> OK I do have a real issue, now.
>
> an unnamed disposable (disp1234) will connect to sys audio so long as its dvm template has

(via qvm-prefs) audiovm set to sys-audio.

A *named* disposable, on the other hand, will not. I set the named disposable's audiovm, and it didn't work, so I tried setting both its audiovm and its dvm template's audiovm, and it still doesn't work.

Or maybe not. Today I started my music player qube…and it wouldn't connect to sys-audio. I tried several times, no improvement. I had to shutdown other clients (a web browser qube), restart sys-audio and then the music player qube. Then it connected. Then it turned out a named disposable I started right after that connected as well.

So there's something "glitchy" going on but I don't know what.

tempmail October 15, 2024, 11:32pm 265

Set (/delay) those qubes to start(up) after sys-audio.

solene October 16, 2024, 6:45am 266

Is there a delay setting somewhere for qubes startup order that I missed, or should I write my own script?

SteveC October 16, 2024, 5:45pm 267

A couple of possible answers.

In my case, the ONLY qubes set to start automatically are sys-usb and (I just added) sys-audio. So there's not much order-dependency there. If I start (say) a browser qube, it will take care of firing up sys-net-wifi and sys-firewall-wifi. Of course that makes the browser qube slow to start the very first time because it must start the other two qubes first. On the other hand, they (and the cacher) will generally start up anyway once dom0 decides to check for updates; so if I wait ten minutes (easy if you have to do something else for a while) your browser qube will start up a lot faster.

It's also possible to have a script start a bunch of qubes. How to do this is described here: How to have VM start on boot in the background? - General Discussion - Qubes OS Forum (qubes-os.org)
In essence you can put a script in ~/.config/autostart and it will execute when you log in. You can write qvm-start commands in it with delays and/or wait options; it won't run until after you log in (that avoids the hassle of having to wait for autostart qubes to start up before you get a login screen). I'm probably going to set this up again, actually (for reasons having nothing to do with sys-audio).

tempmail October 16, 2024, 10:28pm 268

System Tools → Session and Startup and add there any custom thing and kindly ask it to sleep until suits you, haha?

SteveC October 19, 2024, 9:44pm 269

Well, I just got rid of it.

It works, I get sound out (a huge improvement over the previoius), but it does me no good if I start a new VM and it doesn't connect to sys-audio for whatever reason (in spite of having `audiovm` set to `sys-audio` in `qvm-prefs`). This behavior happens after sys-audio has been running for a while (at most a few hours).

At which point, I have to shut down every VM that is open and using it (including, very likely a browser with multiple tabs open), then restart sys-audio, then restart everything including the VM that failed to connect.

It’s not worth it.