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## X server with sound inside an OpenVZ / Proxmox container

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Generally when using X-based applications inside an OpenVZ or Proxmox container, the host node will run the X server and the container will use X forwarding through SSH to run the application. An article at the Open VZ Wiki explains this in more detail.

However, I wanted to have an X server inside the container itself. Moreover, it should also have support for sound (ALSA). The reason behind this is to have a container capable of running FreeSWITCH (a high performance VoIP switch similar to Asterisk) with the Skypiax trunk (for Skype connectivity) fully independent.

There are various methods of implementing the X server inside an OpenVZ or Proxmox container, especially if no direct video output is required. However, there is very little information available on how to enable sound inside an OpenVZ or Proxmox container. This article will explain how to do this.

### Preparing the host node

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The host node requires the proper sound modules installed. For example, on a server that does not require actual output through attached speakers, *snd\_dummy* is sufficient. Enter the following command to load the *snd\_dummy* module:

```
modprobe snd_dummy
```

You can verify if everything went well with:

```
lsmod | grep snd
```

Which will display an output similar to:

```
snd_dummy      23168 0
snd_pcm        97288 1 snd_dummy
snd_timer      35464 1 snd_pcm
snd            79784 3 snd_dummy,snd_pcm,snd_timer
soundcore      18208 1 snd
snd_page_alloc 19984 1 snd_pcm
```

If this is the case, then you'd want to make sure the *snd\_dummy* will be loaded at boot time. Simply issue the following command:

```
echo "snd_dummy" >> /etc/modules
```

## Preparing the container

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### Setting device privileges

The next step is preparing the OpenVZ or Proxmox container. By default, the container does not have access privileges to the sound device, so this needs to be setup from the host node (assuming "100" is the actual container ID):

```
vzctl set 100 --devices c:116:all:rw --devices c:4:all:rw --save
```

### Cloning the sound devices

The following step involves recreating the */dev/snd* layout from the host node in the container. Let's first see what the layout looks like on the host node:

```
ls -la /dev/snd
```

This will give an output similar to:

```
crw-rw---- 1 root audio 116, 6 2009-08-14 20:42 controlC0
crw-rw---- 1 root audio 116, 5 2009-08-14 20:42 pcmC0D0c
crw-rw---- 1 root audio 116, 4 2009-08-14 20:42 pcmC0D0p
crw-rw---- 1 root audio 116, 3 2009-08-14 20:42 seq
crw-rw---- 1 root audio 116, 2 2009-08-14 20:42 timer
```

It is important that the same device IDs are being recreated in the container. I.e., the device ID for *seq* is 116,3 in the above example.

Enter the container and start and issue the following commands, depending on the output given on the host node:

```
vzctl enter 100
rm -r /dev/snd
mkdir /dev/snd
mknod /dev/snd/controlC0 c 116 6
mknod /dev/snd/pcmC0D0c c 116 5
mknod /dev/snd/pcmC0D0p c 116 4
mknod /dev/snd/seq c 116 3
mknod /dev/snd/timer c 116 2
chmod 660 /dev/snd/*
chown :audio /dev/snd/*
```

At this point you have cloned copy of the host node's sound devices and are ready to be used.

Please note that the application that wishes to use the sound devices require the proper privileges. The easiest method is to add the UID to the *audio* group. For example, if Skype runs under uid "*skype*", issue this command:

```
adduser skype audio
```

## Installing Xorg Server

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There are various X server variants that can be installed in the container, especially if no video output is required. The most popular one is undoubtedly *Xvfb*.

I have opted for using the Xorg Server with a dummy video, mouse and keyboard driver instead (as this was dedicated server without any of these devices). This section details how I have installed it on Debian-based distributions.

### Prior to installation

First step, inside a container, is to soft-link *TTY1* to *TTY0*:

```
rm /dev/tty0
ln -s /dev/tty1 /dev/tty0
```

**Note:** this assumes you are accessing the container using *vzctl*, not *SSH* !

If *nscd* is installed, remove this first:

```
aptitude remove nscd
```

## Download and install packages

Next we install the required packages for Xorg and some device drivers, including ALSA for sound support:

```
aptitude -R install xorg xserver-xorg-video-dummy xserver- \
xorg-input-kbd xserver-xorg-input-mouse alsa-base linux-sound-base \
libaudiofile0 dbus udev-
```

## Edit the configuration

The last step is configuring Xorg, by editing the `/etc/X11/xorg.conf` file as following:

Section "InputDevice"

Identifier "Dummy Input"

Driver "void"

EndSection

Section "Device"

Identifier "Dummy Video"

Driver "dummy"

EndSection

Section "Monitor"

Identifier "Configured Monitor"

EndSection

Section "Screen"

Identifier "Default Screen"

Monitor "Configured Monitor"

Device "Dummy Video"

EndSection

Section "ServerLayout"

Identifier "Default Layout"

Screen "Default Screen"

InputDevice "Dummy Input"

EndSection

You can now start X instances using:

```
/usr/bin/X :<DISPLAY#>
```

where *<DISPLAY#>* is the display to be used (without the brackets, or omit entirely for default settings). X-based applications will now be able to run on any of these displays. For example, to run Skype (for Skypiax) on a specific display and under UID "skype":

```
su skype -c "echo secret:password | DISPLAY=:1 /usr/bin/skype --pipelogin 2>>skype_errors.log  
&"
```

## Remote access using Nomachine NX

Even though you are using a virtual framebuffer (such as with Xvfb) or dummy video driver, you will still be able to do visual tasks on the server. One method is to use an X forwarding tunnel (ssh -X). I prefer to use Nomachine's NX server instead.

To install the Nomachine NX server on a Debian-based distribution, issue the following command:

```
wget http://64.34.161.181/download/3.3.0/Linux/nxclient_3.3.0-6_i386.deb  
wget http://64.34.161.181/download/3.3.0/Linux/nxnode_3.3.0-17_i386.deb  
wget http://64.34.161.181/download/3.3.0/Linux/FE/nxserver_3.3.0-22_i386.deb  
dpkg -i nxclient_3.3.0-6_i386.deb  
dpkg -i nxnode_3.3.0-17_i386.deb  
dpkg -i nxserver_3.3.0-22_i386.deb
```

This assumes you are running a 32-bits version of Linux and the versions listed above are still correct. Please verify this at [Nomachine's website](#) and change as appropriate before issuing the command.

Now you are ready to connect to your Xorg server using Nomachine's NX Client and do visual tasks (ie., browse the internet if a browser is installed).

```
vzctl set 105 --devices c:116:all:rw --devices c:4:all:rw --save
```

### Posted by Myatu

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I tried to run the X server:

```
xf86OpenConsole: Cannot open /dev/tty0 (No such file or directory)
```

```
ls -l tty*
```

```
crw-rw-rw- 1 root tty 5, 0 Nov 12 12:07 tty
lrwxrwxrwx 1 root root 9 Apr 21 15:38 tty0 -> /dev/tty1
```

But there is no tty1.

- *Zoobab*

I added it with:

```
mknod tty1 c 4 1
```

then tried to start the X:

Fatal server error:

```
xf86OpenConsole: Cannot open virtual console 7 (No such file or directory)
```

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