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Xen: How to Convert An Image-Based Guest To An LVM-Based Guest

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This short article explains how you can move/convert a Xen guest that uses disk images to LVM volumes. Virtual machines that use disk images are very slow and heavy on disk IO, therefore it's often better to use LVM. Also, LVM-based guests are easier to back up (using **LVM snapshots**).

I do not issue any guarantee that this will work for you!

1 Preliminary Note

To use LVM-based guests, you need a volume group that has some free space that is not allocated to any logical volume. In this example, I use the volume group */dev/vg0* with a size of approx. 465GB...

```
vgdisplay
```

```
server1:~# vgdisplay
  --- Volume group ---
  VG Name               vg0
  System ID
  Format                lvm2
  Metadata Areas        1
  Metadata Sequence No  3
  VG Access             read/write
  VG Status             resizable
```

```
  MAX LV                0
  Cur LV                2
  Open LV               2
  Max PV                0
  Cur PV                1
  Act PV                1
  VG Size               465.28 GB
  PE Size               4.00 MB
  Total PE              119112
  Alloc PE / Size       59842 / 233.76 GB
  Free  PE / Size       59270 / 231.52 GB
  VG UUID               gnUCYV-mYXj-qxpM-PEat-tdXS-wumf-6FK3rA

  server1:~#
```

... that contains the logical volume */dev/vg0/root* with a size of approx. 232GB and the logical volume */dev/vg0/swap_1* (about 1GB) - the rest is not allocated and can be used for Xen guests:

```
lvdisplay
```

```
server1:~# lvdisplay
  --- Logical volume ---
  LV Name                /dev/vg0/root
  VG Name                vg0
  LV UUID                kMYrHg-d0ox-yc6y-1eNR-lB2R-yMIn-WFgzSZ
  LV Write Access        read/write
  LV Status              available
  # open                 1
  LV Size                232.83 GB
  Current LE             59604
  Segments               1
  Allocation             inherit
```

```
  Read ahead sectors     auto
  - currently set to     256
  Block device           254:0

  --- Logical volume ---
  LV Name                /dev/vg0/swap_1
  VG Name                vg0
  LV UUID                SUI0uq-iTsy-7EnZ-INNz-gjvu-tqLD-rGSegE
  LV Write Access        read/write
  LV Status              available
  # open                 2
  LV Size                952.00 MB
  Current LE             238
  Segments               1
  Allocation             inherit
  Read ahead sectors     auto
  - currently set to     256
  Block device           254:1

  server1:~#
```

I have an image-based Xen guest called *xen1.example.com* that I created using the following command:

```
xen-create-image --hostname=xen1.example.com --size=4Gb --swap=256Mb --ip=192.168.0.101 --memory=128Mb --arch=amd64 --role=udev
```

This is its Xen configuration file:

```
vi /etc/xen/xen1.example.com.cfg
```

```
#
```

```
# Configuration file for the Xen instance xen1.example.com, created
# by xen-tools 3.9 on Mon Mar  9 19:22:40 2009.
#


#
#  Kernel + memory size
#
kernel      = '/boot/vmlinuz-2.6.26-1-xen-amd64'
ramdisk     = '/boot/initrd.img-2.6.26-1-xen-amd64'
memory      = '128'

#
#  Disk device(s).
#
root        = '/dev/xvda2 ro'
disk        = [
                'file:/home/xen/domains/xen1.example.com/swap.img,xvda1,w',
                'file:/home/xen/domains/xen1.example.com/disk.img,xvda2,w',
              ]



#
#  Hostname
#
name        = 'xen1.example.com'

#
#  Networking
#
vif         = [ 'ip=192.168.0.101,mac=00:16:3E:F2:DC:FA' ]

#
#  Behaviour
```

```
#
on_poweroff = 'destroy'
on_reboot   = 'restart'
on_crash    = 'restart'
```

As you see, the guest is using two disk images, */home/xen/domains/xen1.example.com/disk.img* (4GB) and */home/xen/domains/xen1.example.com/swap.img* (256MB).

We need the exact image sizes so that we can create logical volumes of the same size. If you don't remember the exact disk and swap sizes anymore, you can go to the directory where the images are stored...

```
cd /home/xen/domains/xen1.example.com
```

... and run the following command - it will show the image sizes in human-readable format:

```
ls -lh
```

2 Converting The Images To LVM

Before we convert the images, we must shut down the guest:

```
xm shutdown xen1.example.com
```

Then we create logical volumes of the same size as the disk images, e.g. as follows:

```
lvcreate -L4G -n xen1_root vg0

lvcreate -L256M -n xen1_swap vg0
```

This creates the logical volumes */dev/vg0/xen1_root* (4GB) and */dev/vg0/xen1_swap* (256MB):

```
lvdisplay
```

```
server1:~# lvdisplay
  --- Logical volume ---
  LV Name                /dev/vg0/root
  VG Name                vg0
  LV UUID                kMYrHg-d0ox-yc6y-1eNR-lB2R-yMIn-WFgzSZ
  LV Write Access        read/write
  LV Status              available
  # open                 1
  LV Size                232.83 GB
  Current LE             59604
  Segments               1
  Allocation             inherit
  Read ahead sectors     auto
  - currently set to     256
  Block device           254:0

  --- Logical volume ---
  LV Name                /dev/vg0/swap_1
  VG Name                vg0
  LV UUID                SUI0uq-iTsy-7EnZ-INNz-gjvu-tqLD-rGSegE
  LV Write Access        read/write
  LV Status              available
  # open                 1
  LV Size                952.00 MB
  Current LE             238
  Segments               1
  Allocation             inherit
  Read ahead sectors     auto
```

```
  - currently set to     256
  Block device           254:1

  --- Logical volume ---
  LV Name                /dev/vg0/xen1_root
  VG Name                vg0
  LV UUID                MQzhrS-OpOt-2IbY-BozD-l5vN-3doB-GRtyMc
  LV Write Access        read/write
  LV Status              available
  # open                 0
  LV Size                4.00 GB
  Current LE             1024
  Segments               1
  Allocation             inherit
  Read ahead sectors     auto
  - currently set to     256
  Block device           254:2

  --- Logical volume ---
  LV Name                /dev/vg0/xen1_swap
  VG Name                vg0
  LV UUID                GHwsIT-a0sj-M72J-OVof-Ydju-Sexf-Ex824b
  LV Write Access        read/write
  LV Status              available
  # open                 0
  LV Size                256.00 MB
  Current LE             64
  Segments               1
  Allocation             inherit
  Read ahead sectors     auto
  - currently set to     256
  Block device           254:3
```

```
server1:~#
```

Now we can convert the images as follows:

```
dd if=/home/xen/domains/xen1.example.com/disk.img of=/dev/vg0/xen1_root

dd if=/home/xen/domains/xen1.example.com/swap.img of=/dev/vg0/xen1_swap
```

(This can take a lot of time, depending on how big the images are.)

Afterwards, we must open */etc/xen/xen1.example.com.cfg*...

```
vi /etc/xen/xen1.example.com.cfg
```

... and change...

```
[...]
disk       = [
               'file:/home/xen/domains/xen1.example.com/swap.img,xvda1,w',
               'file:/home/xen/domains/xen1.example.com/disk.img,xvda2,w',
             ]
[...]
```

... to ...

```
[...]
disk       = [
               'phy:/dev/vg0/xen1_swap,xvda1,w',
```

```
            'phy:/dev/vg0/xen1_root,xvda2,w',
        ]
[...]
```

You can now start the guest again:

```
xm create /etc/xen/xen1.example.com.cfg
```

If everything goes well, you can delete the disk images:

```
rm -f /home/xen/domains/xen1.example.com/disk.img

rm -f /home/xen/domains/xen1.example.com/swap.img
```

3 Links

- Xen: **http://www.xen.org/**