

KVM on server with libvirt

This is a work in progress, 20201015

Location of Files

Just a note, the files created by virsh and virt-install are stored in **/etc/libvirt/qemu/**. However, they should not be hand-edited; only edit with virsh.

Install and Configure

First, verify you have the required hardware virtualization support in your CPU:

```
#Verify the hvm support
egrep --color 'vmx|svm' /proc/cpuinfo
```

You should see either vmx or svm in the output.

Now, install the basic packages needed, a couple of utilities, but not all the extra crud.

```
apt install -y --no-install-recommends qemu-kvm libvirt-clients libvirt-
daemon-system bridge-utils libguestfs-tools genisoimage virtinst libosinfo-
bin virt-top
reboot # brings libraries online
```

Verify system is working ok

Commands are of the form: `virsh --connect qemu:///system command` where *command* is any of the commands accepted by virsh.

```
sudo su # become root user
virsh --connect qemu:///system list --all
```

The `--connect qemu:///system` is the connection used, which is not the default. To set that to the default, run the following one time. This will become the “norm” on the next login:

```
echo "# set default uri for libvirt" >> ~/.profile
echo "export LIBVIRT_DEFAULT_URI='qemu:///system'" >> ~/.profile
```

Defining Network

Setting up bridges

For your network, you need bridges for the outside world.

Simple

This is a basic setup that will work for a single interface as per the Debian documentation. It sets up one bridge off of eth0 and gives it a static IP.

[interfaces](#)

```
auto lo
iface lo inet loopback

# The primary network interface
auto eth0

#make sure we don't get addresses on our raw device
iface eth0 inet manual
iface eth0 inet6 manual

#set up bridge and give it a static ip
auto br0
iface br0 inet static
    address 192.168.1.2
    netmask 255.255.255.0
    network 192.168.1.0
    broadcast 192.168.1.255
    gateway 192.168.1.1
    bridge_ports eth0
    bridge_stp off
    bridge_fd 0
    bridge_maxwait 0
    dns-nameservers 8.8.8.8
```

Real World

I'm hoping, if you're reading this article, you know how to set up bonding and vlans. The following is a more real world scenario and sets up three bridges, br_lan, br_dmz and br_wan for LAN, DMZ and public interface respectively. br_wan and br_dmz are set to dummy IP's with a netmask of 255.255.255.255, meaning they can't respond to anything but themselves. br_lan gets its IP from DHCP, so only the LAN interface can be accessed on the hypervisor. Modify it as you want.

[interfaces](#)

```
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

iface eth0 inet manual
iface eth0 inet6 manual

iface eth1 inet manual
iface eth1 inet6 manual

auto bond0
iface bond0 inet manual
    bond-mode 4
    bond-miimon 100
    bond_xit_hash_policy layer2+3
    bond_lacp_rate slow
    slaves eth0 eth1

iface bond0.10 inet manual
    vlan-raw-device bond0.10

iface bond0.20 inet manual
    vlan-raw-device bond0.20

iface bond0.30 inet manual
    vlan-raw-device bond0.30

# the public interface on vlan 10
auto br_wan
iface br_wan inet static
    address 192.168.1.13
    netmask 255.255.255.255
    bridge_ports bond0.10
    bridge_stp off
    bridge_fd 0
    bridge_maxwait 0

# the DMZ on vlan 20
auto br_dmz
iface br_dmz inet static
    address 192.168.1.12
    netmask 255.255.255.255
    bridge_ports bond0.20
    bridge_stp off
    bridge_fd 0
```

```
bridge_maxwait 0

# the private (LAN) interface on vlan 30
auto br_lan
iface br_lan inet dhcp
    bridge_ports bond0.30
    bridge_stp off
    bridge_fd 0
    bridge_maxwait 0
```

Adding network to virt-lib

In order to use a network with vir-lib, you need to define it. The best way is to create a few XML files, then use virsh to define them into the system.

One at a time

Create one XML file per interface as follows:

[br_wan.xml](#)

```
<network>
  <name>br_wan</name>
  <forward mode="bridge"/>
  <bridge name="br_wan"/>
</network>
```

Then, import it into the system with virsh, then set it to autostart on boot

```
# import the network xml file
virsh net-define --file br_wan.xml
# set to autostart on boot
virsh net-autostart br_wan
```

Lazy Approach

I'm lazy, so I just created all three, then imported them all at one time.

[br_wan.xml](#)

```
<network>
  <name>br_wan</name>
  <forward mode="bridge"/>
  <bridge name="br_wan"/>
</network>
```

```
</network>
```

br_dmz.xml

```
<network>
  <name>br_dmz</name>
  <forward mode="bridge"/>
  <bridge name="br_dmz"/>
</network>
```

br_lan.xml

```
<network>
  <name>br_lan</name>
  <forward mode="bridge"/>
  <bridge name="br_lan"/>
</network>
```

And imported them all at once.

```
for interface in `ls *.xml` ; do virsh net-define --file $interface ; done
for interface in `ls *.xml` ; do virsh net-autostart $interface ; done
virsh net-start $interface ; done
virsh net-list
```

After the last command, you should see your three interfaces defined. That means you can now use them.

Using Storage

In our example, we are going to use LVM2 to grab a piece of the disk for a new virtual. You can also use a file (File Backed Device, or FBD) by running *fallocate*, or set up access to an iSCSI. *virt-install* will, by default, create an FBD in its default location, so if you're happy with that, ignore this whole section.

File Backed Device

By default, libvirt uses File Backed Devices (FBD's) from a pool defined internally. You can manually override this by defining a new pool, or by creating a file in your location using *fallocate*. For example, to create a 10G file in */srv/images* named *test.disk*, you would use:

```
fallocate -l 10G /srv/images/test.disk
```

and use that when you create the virtual. However, it is better (easier) if you define a pool (or use the

default). I have not researched this; see *man virt-install*.

LVM2

Just create an LV the way you always do.

```
lvcreate -L 10G -n test.disk vg0
```

iSCSI

Ok, if you're using iSCSI, I'm guessing you know how to set it up. Just make sure it is available, then use the correct path when you create the image.

Doing the Install

You can probably create a virtual by manually creating the XML file, but why do that when *virt-install* is your friend. Sure, there are a bunch of parameters, but they are very, very well documented, and will create your system for you rapidly

This example creates a virtual installing the opnSense firewall/router.

```
virt-install \
  --hvm \
  --connect qemu:///system \
  --name router-a \
  --memory 4096 \
  --vcpus 4 \
  --disk path=/dev/vg0/router-a.disk0,bus=scsi \
  --graphics vnc,port=5901 \
  --noautoconsole \
  --cdrom /media/xen-store/OPNsense-20.1-OpenSSL-dvd-amd64.iso \
  --os-variant freebsd11.1 \
  --metadata uuid=d9510e01-e461-461f-9aa8-3cee223cb4a0,name=router-a, \
  a,title=router-a,description='Primary Router' \
  --boot hd,cdrom,menu=on \
  --network bridge=br_wan,mac=00:16:3e:bd:26:70 \
  --network bridge=br_dmz,mac=00:16:3e:bd:26:71 \
  --network bridge=br_lan,mac=00:16:3e:bd:26:72
```

Other usefull options are

- `-dry-run` # don't really do it
- `-controller virtio-scsi` # this is specific to KVM, but faster there
- `osinfo-query os` # this shows the OS's available for the `-os-variant` flag

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