Running Virtual Machines with KVM

How to run Virtual Machines on Linux Systems

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What is KVM?

- QEMU is a generic and open source machine emulator and virtualizer.
- KVM (Kernel-based Virtual Machine), is a hypervisor built into the Linux kernel.
- QEMU can run OSes and programs made for one machine (e.g. an ARM board) on a different machine (e.g. your x86 PC)
- QEMU can use other hypervisors like KVM to use CPU extensions
- Libvirt is collection of software that provides a convenient way to manage virtual machines and other virtualization functionality

Alternatives

- Virtual Box
- Vagrant (with using Virtual Box, but also KVM)
- VMware
- XEN
- Ubuntu Multipass
- Proxmox (is also using KVM)
- Parallels Workstation (MacOS)
- HyperV Windows

Requirements

- KVM requires that the virtual machine host's processor has virtualization support (named VT-x for Intel processors and AMD-V for AMD processors).
- Runs on a Linux based system

What tools can you use

- qemu-* - Use qemu directly, but less options, or use Libvirt
- virt-install - Install virtual machines from the commandline
- virsh - Managing virtual machines from the commandline
- virt-manager - Managing virtual machines with an UI (also remote)
- GNOME Boxes — Simple GNOME 3 application to access remote or virtual systems
- Ansible community.libvirt.virt

Howto create a virtual machine

```
qemu-system-x86_64 -cdrom iso_image -boot order=d
    -drive file=disk_image,format=raw
```

Howto create a virtual machine

```
virt-install
  --connect qemu:///system
  --virt-type=kvm
  --name Manjaro
  --ram=2048
  --vcpus 2
  --os-type linux
  --os-variant archlinux
  --cdrom=./isos/manjaro-xfce-20.2.1-minimal-210103-linux5
  --disk size=50
  --network network=default
  --graphics spice
  --vga virtio -display sdl,gl=on
```

Hoow to create a virtual machine

```
sudo virt-install \
  --connect qemu:///system                     \
  --os-type linux                              \
  --os-variant generic                         \
  --name k3os                                  \
  --vcpus 2                                     \
  --memory 2048                                \
  --disk k3os.qcow,size=10                     \
  --network network=default                    \
  --graphics none                              \
  --console=pty,target_type=serial             \
  --cdrom ./k3os-amd64.iso
```

Control VirtualMachines with VMs

Using **virsh**

Start with

```
virsh -c qemu:///system
```

Within **virsh**

```
start {name}
shutdown
suspend
resume
undefine
```

Connect to the VM

```
virt-viewer -c qemu:///system manjaro
```

Demo

Links

- Qemu Wiki
- Libvirt Wiki
- manjaro-kvm-virtmanager
- virsh-commands-cheatsheet
- Libvirt-api
- how-to-mount-vm-virtual-disk-on-kvm-hypervisor

Questions?

Thank you!