

OPS235

Creating Virtual Machines (VMs)



OPS235

Creating Virtual Machines (VMs)



What is a Virtual Machine?

According to the definition of a Virtual Machine in Wikipedia (https://en.wikipedia.org/wiki/Virtual_machine):

*"A **virtual machine** (VM) is an **emulation** of a computer system...*

*... Some virtual machines, such as **QEMU**, are designed to also emulate different architectures and allow execution of software applications and operating systems written for another CPU or architecture. Operating-system-level virtualization allows the resources of a computer to be partitioned via the kernel's support for multiple isolated user space instances, which are usually called containers and may look and feel like real machines to the end users"*



Reasons to Use a Virtual Machine

Virtual machines are not the future... they have existed for at least 2 decades.

One of the first uses of VMs were to create other OS environments in order **to have programmers compile, run and test software** without have to use multiple machines, or restart with multiple boot menus.

Other uses of VMs have evolved to include: **Network simulation** (connecting VM's of various operating system types), **penetration testing** (for Internet security), or to simply **learn how to use another operating system** without having to reboot the computer.

Reasons to Use a Virtual Machine

In our OPS235 course, we will be creating 3 VMs in lab2:

centos1: Gnome Desktop (Centos7)

centos2: Command Line Interface only (Centos7)

centos3: Command Line Interface only (Centos7)

You will be using the same Centos7 Full Install DVD or file image to install these machines. You will be installing a virtualisation program called **KVM** to create and install those VMs.

Preparing to Install KVM

There are a few steps that you must perform prior to actually creating and installing your VMs which include:

- Running a software update (`yum update`)
- Installing the KVM virtualization software
(`yum install qemu-kvm qemu-img virt-manager libvirt libvirt-python \ python-virtinst libvirt-client virt-install virt-viewer bridge-utils`)
- Starting the virtualisation service (`systemctl start libvirtd`)
- Removing `firewalld` and installing `iptables`
(`systemctl disable firewalld` , `systemctl stop firewalld` ,
`yum install iptables-services` , `systemctl enable iptables` ,
`systemctl start iptables`)

KVM Virtual Machine Manager

If you are using a solid state drive for this course, you will have already installed c7host as a virtual machine using VMware Workstation 12 Pro, and you will host 3 VMs within your host virtual machine (referred to as "nesting VMs")

If you are using a SATA removable drive, this lab will be the first time you will be using a virtual machine manager application.

Regardless of what media you are using, you will need to follow the instructions in lab2 to install and run KVM.

KVM Virtual Machine Manager

The **KVM** Virtual Machine Manager is the graphical program to create, install and manage your VMs.

It is recommended to launch the Virtual Machine Manager from the menu (**Applications -> System -> Virtual Machine Manager**) as opposed to running from command line: **virt-manager**

You will be prompted to enter the root password in order to run this application.

If you experience problems, it is recommend to restart your c7host and run the the virtual machine manager.

Creating a new VM

Follow the instructions to create all 3 virtual machines.

Read instructions CAREFULLY!

If you make a mistake, you can force the VM off by selecting in the virtual machine manager window (**Virtual Machine -> Shutdown -> Force Off**). Then close the empty VM window, **right click** on the virtual machine in the virtual machine manager main window, and select **DELETE**.

You can then **re-install** the VM correctly.

Sometimes there may be an installation error when installing the VMs via a network install. **If this happens, shutdown and remove the VM, and re-install.**

Post Install Tasks for Each VM

You need to follow many of the same post installation tasks for your VMs as you did with your c7host machine which might include:

- Turn off screen saver (centos1 VM only)
- Test Internet connection (all VMs)
- Disable SELinux (all VMs)
- Perform a software update

The next set of notes will be showing how to manage your VMs including:

- Starting / Stopping VMs via command line
- Backing up VMs

Warning!

You MUST use the same regular user username that you created for your **c7host** for your centos1 and centos2 that you create! The centos3 VM has a username and password already created.

If you do not follow those instructions, your shell script will not work correctly until you make those fixes.

Instead of removing and creating those VMs, you can use the following commands to create new usernames and passwords if you are logged into the VM as root:

```
adduser -m [correct username]  
passwd [correct username]
```

DNS Configuration

- In order to setup DNS, the Linux sysadmin will customize name server settings in a configuration file called `/etc/named.conf`.
- What name servers actually store are **zone records** (along with a few other things).
- Each **zone** record links to a file that has entries that describe the machines & services available in the zone, and the name servers for zones in sub-domains.