OPS235

Creating Virtual Machines (VMs)

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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... 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)
- learning 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 KMV to create and install those VMs.

Preparing to Install KVM

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

- Configuring c7host VM (if you have an SSD) to support "nested VMs".

- Running a software update (yum update) on c7host.

- Installing the KVM virtualization sofware
  (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

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

You will need to follow the instructions in lab2 to install and run the KVM application to created these virtual machines.

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.

Warning!

You MUST use the same regular user username that you created for your c7host for your centos1 and centos2 VMs 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]

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 Firewalld / Install and run iptables
- 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
- Managing VMs via Shell Scripting