

## **KVM Virtualization**

Virtualization is the ability to have multiple Operating Systems running concurrently on the same hardware.

Let's say that you have the following hardware:

8 CPU's  
32GB RAM  
4TB hard disk space  
4 Network Interface Cards

You could install an Operating System of your choice and then from there install special software called a hypervisor. The hypervisor allows you to allocate resources from your actual computer to other 'computers'. The actual computer is known as the physical machine (abbreviated to PM) and these other computers which have resources allocated to them by the PM are called virtual machines (abbreviated to VM).

You can have as many VM's as your resources allow. So given the resources above we could create the following VM's:

### **VM1**

2 CPU's  
8GB RAM  
500GB hard disk space  
1 NIC

Running Red Hat Enterprise Linux with JBOSS Web Application Server.

Now we have to factor that we no longer have the resources associated with VM1 available to use on our PM

### **VM2**

1 CPU  
4GB RAM  
2TB hard disk space  
1 NIC

Running Scientific Linux with SAMBA performing the role of a file and print server.

The resources that we now have available in the PM are as follows:

5 CPU's  
20GB RAM  
1.5 TB hard disk space  
2 NIC's

So let's go ahead and allocate resources for our 3rd VM.

**VM3**

4CPU's  
16GB RAM  
1TB hard disk space  
1 NIC

Running Microsoft Windows Server 2013 with Microsoft SQL server as a database.

The remaining resources will now be used by the actual PM and we could re-appropriate resources as needed.

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If you're making use of one of the Enterprise Linux distributions then you can automatically take advantage of virtualization without needing any special software. That special software (called the hypervisor) is built into the kernel. Hence the term KVM which stands for Kernel Virtual Machines. So as soon as you start your system, it is virtualization aware. Having said that, it does come with hardware requirements though.

1. You must have a **64-bit CPU**
2. You need to have **hardware assisted virtualization** enabled in the BIOS

If you meet these requirements then you're good to go.

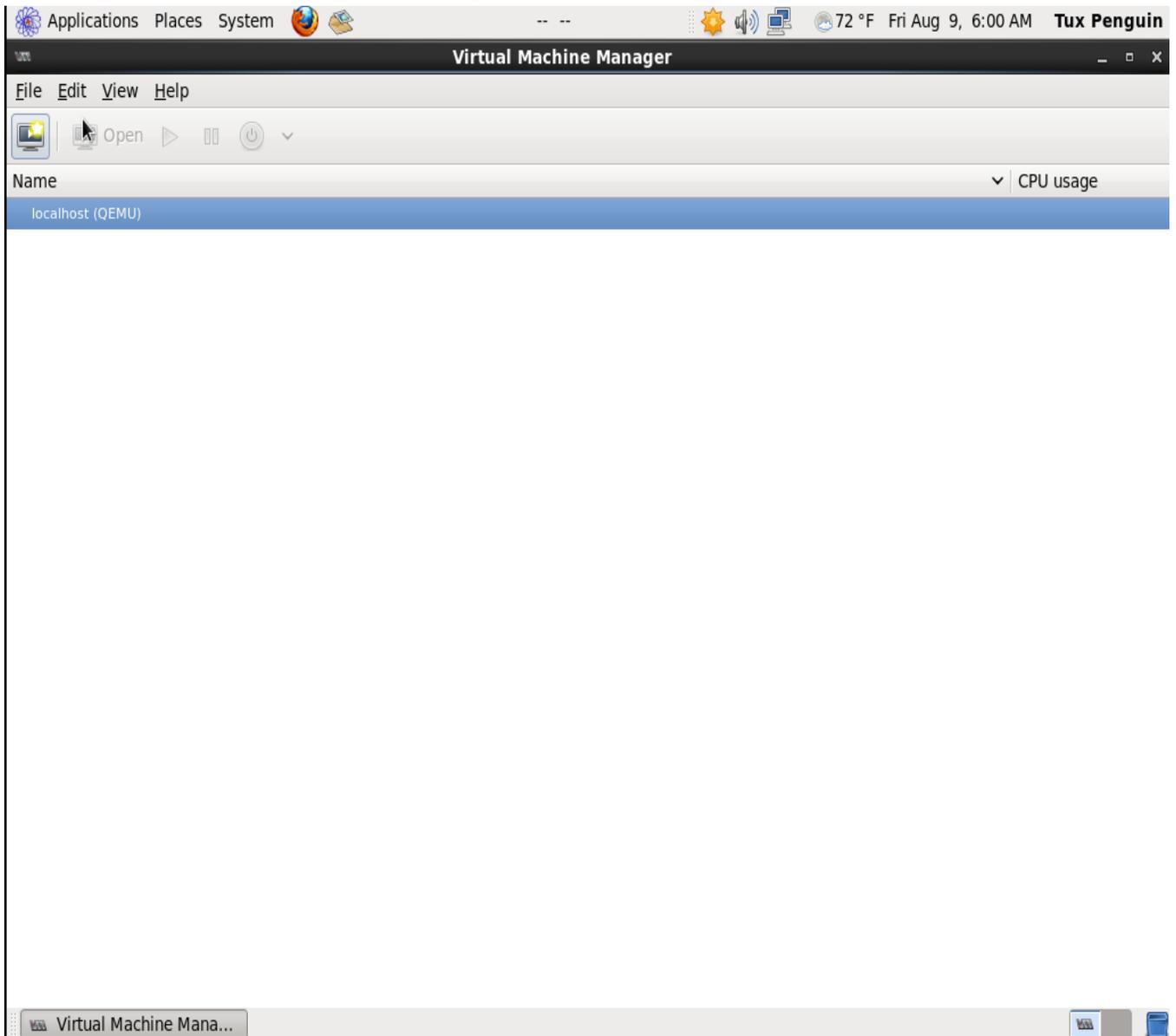
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### **Creating a virtual machine**

We can create a virtual machine by using the Virtual Machine Manager program which is found under **APPLICATIONS > SYSTEM TOOLS > VIRTUAL MACHINE MANAGER**

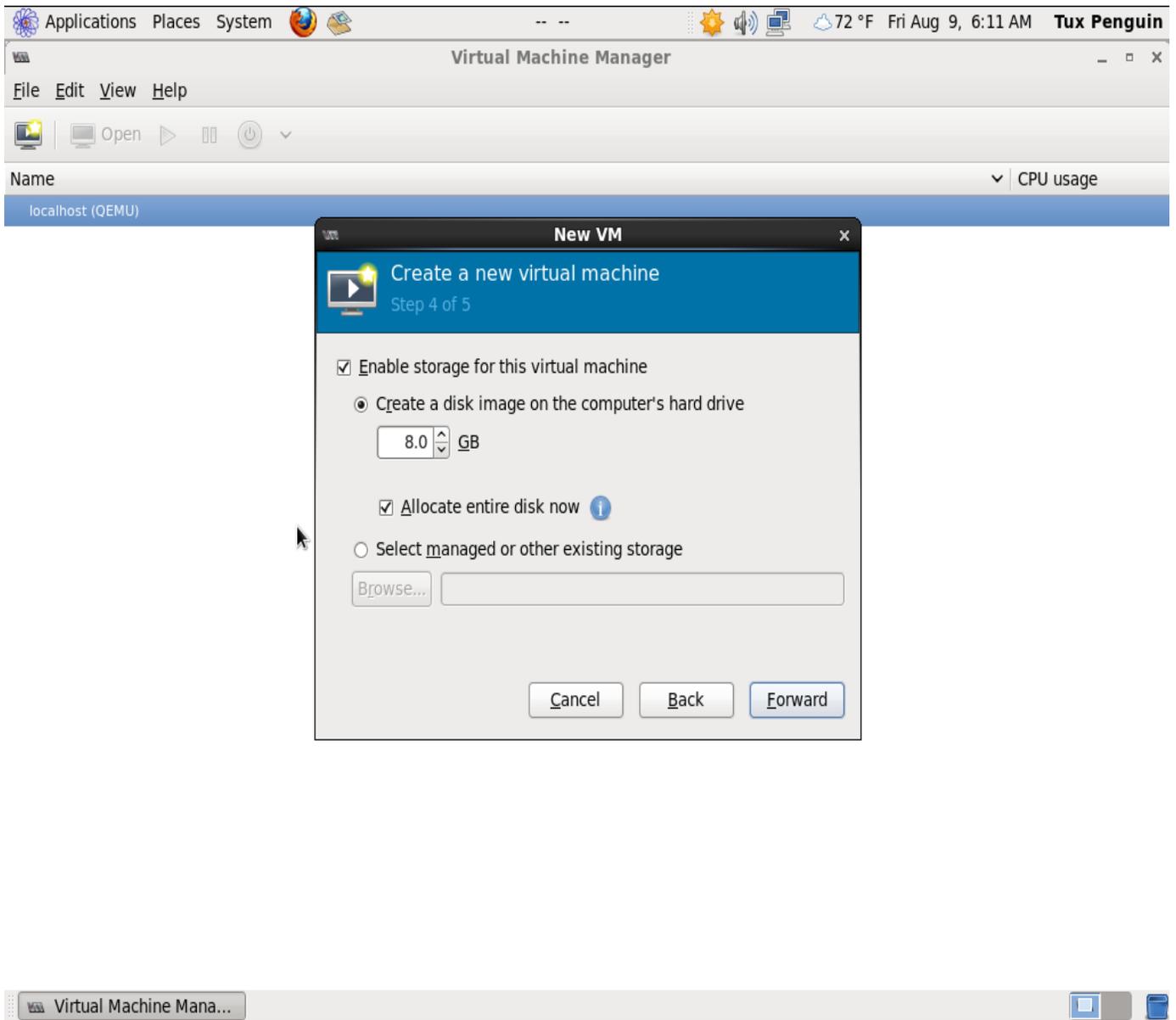
Alternatively you could also just hit **ALT + F2** and enter **virt-manager** in the dialog box.

To create a new VM click the icon directly below the **File** menu option.



When creating a new virtual machine you need to specify some information like the name of the VM and how you would like to go about installing it. As you can see, you have a few installation options available.

On the next screen you could explicitly define an operating system (the default options are generic). If you specify an operating system then KVM will automatically allocate the recommended hardware requirements for that VM. If you leave it on generic then you will have to manually specify this. We usually specify generic and that allows us to define the CPU and Memory for the VM. Then we specify the storage that you would like to allocate to the VM.



Finally we specify the networking and from there we boot the VM!

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Once your virtual machine is done installing you can change the hardware details. For some of these settings to be effective, a shutdown and start is required.

To change the hardware detail, open your VM inside the Virtual Machine Manager program and click **VIEW > DETAILS**

**!!! TIP !!!**

To return to your VM, click **VIEW > CONSOLE**

One of the tweaks which we would like to share with you has to do with the automatic start of virtual machines. By default, any VM which was running when your PM was shutdown will be automatically started when the PM starts up again.

If this behaviour doesn't suit you then you can explicitly set which VM's start automatically when the PM starts up.

In the **DETAILS** view, go to **BOOT OPTIONS** and select **Start virtual machine on host boot up**.

That's not all. We still now need to tell the PM that it must only start those VM's which are marked to automatically start.

To do this we need to (as root) open a file called **/etc/sysconfig/libvirt-guests**

Let's now hit **ALT + F2** and type **beesu gedit /etc/sysconfig/libvirt-guests**

This will open the **gedit** editor which is very similar to Microsoft Windows' Notepad program.

Find the line that reads:

**#ON\_BOOT=start**

and change it to:

**ON\_BOOT=ignore**

Then click **FILE > SAVE** then **FILE > EXIT**

## Activities

- Create a new virtual machine called MORDOR with the following specifications

256MB RAM

4GB hard disk

1 CPU

1 NIC

Perform a minimal install of Scientific Linux using the ISO provided to you and make sure that the virtual machine is always started when the PM boots up.