Installing & Using
KVM with Virtual Machine Manager

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Abstract: There are many different hypervisors and virtualization software available for use. One commonly use hypervisor in the Linux system called KVM (Kernel-based Virtual Machine) is becoming popular and more dependent for virtualization. There are several different virtualization software that use KVM, however, for demonstration purpose, KVM will be installed with a virtualization software known as Virtual Machine Manager on a Fedora system.

Keywords: KVM, Virtual Machine Manager, Virtualization, Hypervisor

Introduction: Virtualization is becoming highly demanding within any working field – simply because of the many benefits using virtual machines bring to the organization. Virtual machines are used for many different reasons. According to an article, virtual machine helps maximize its flexibility and minimize the resources needed to implement a working laboratory” (De Luna, et al, 2013). Virtual machines help save money on buying equipment, energy consumption, flexibility, reliability, and the ability to perform tests on operating systems without affecting the actual and physical host, and many more benefits. Virtual machines and hypervisors are great powerful tools commonly used in today’s computer world.

Discussion: How to Install KVM and Virtual Machine Manager

KVM is an open-source hypervisor that operates under the Linux kernel, which means it can only operate under the Linux operating system. The hypervisor performs as a layer between the virtualized guest operating system and the physical hardware (Irfan, 2008). Libvirt is a toolkit that provides complex features for virtual machines such as storage, networking, and USB/PCI, etc. (Hammel, 2011). There are two common virtualization emulators: paravirtualization and full virtualization. Paravirtualization uses a part of the system’s resources while full virtualization uses all of the system’s resources.

In this demonstration, Fedora 17 is the host operating system that KVM and Virtual Machine Manager installations are installed on. To install KVM, open the Terminal then log in as root before proceeding. Once root is successfully logged in, type in the following command without the quotes: "yum install kv". Confirm the installation by typing “y” when the prompt “Is this ok [y/d/N]:” appears. That command will install KVM into the Fedora system. The next step is to install the Virtual Machine Manager along with other virtualization libraries and packages. Type in the command: “yum install virt-manager libvirt libvirt-python python-virinst”. Confirm the installation by typing in “y”. Next, type in the command: “yum install libvirt-daemon-kvm”. Confirm the final installation package by typing “y”.

The three commands should installed KVM, Virtual Machine Manager, and the necessary components to utilizing virtualization with Fedora. The next step is to type in the Terminal “virt-manager” then a new window of Virtual Machine Manager should appear. The Virtual Machine Manager is a GUI so creating and installing a new virtual machine will be simple. The steps to create a new virtual machine are as follow: Click on File -> New Virtual Machine. Choose the desired media provided from the menu to install the operating system. From there, the user can customize the operating system to his/her needs.

Screenshots:
Research: Comparison of KVM with Virtual Machine Manager to Other Hypervisors and Virtual Machine Software

KVM (Kernel-based Virtual Machine) is a Linux kernel hypervisor that contains virtualization extensions for Intel or AMD processors. It delivers the core virtualization infrastructure and processor definite modules. Virtual Machine Manager is a desktop user interface for managing virtual machines that is dependent on KVM. Virtual Machine Manager
delivers many functions, “such as live migration that allows for load balancing between cluster
nodes, monitoring CPU, memory and I/O operation enabling to detect problematic nodes, use of
local and networks storages, and many tools for efficient management” (KVM Management
Tools).

KVM provides the functionality of virtual machines configuration with either a GUI
software or command line; whereas VMWare Workstation, VMWare Player, or VirtualBox is
only accessible with a GUI. There are several open-source hypervisors and virtualization
software for Windows and Linux such as XEN, QEMU, VirtualBox, PearPC, Oracle VM Server
Virtualization Software, User-Mode Linux, Proxmox VE, and VMWare Vsphere. Meanwhile,
there are proprietary hypervisors and virtualization software such as Parallels Workstation,
Microsoft Hyper-V, IBM PowerVM, RTS Real Time Hypervisor, and Citrix XenServer. Of
course there major advantages and disadvantages of each hypervisor and software that are free
versus proprietary. There are limitations as to what one hypervisor can do, while another cannot.
The same applies to virtualization software.

KVM is a fast growing hypervisor due its rapid improvement in virtualization, thus
many organizations that have Linux hosts used KVM as their hypervisors. Foley, who compared
the different hypervisors stated in his article that KVM “is now a mature hypervisor and is
probably the most widely deployed open source hypervisor in an open source environment
(Foley, 2014).” KVM can be hard to configure, but it is very powerful once a user gets a hang of
its configuration. Many guest operating systems can run on KVM without lacking performance
while many other hypervisors cannot support many virtual machines running at once without
slowing or freezing. Because network between virtual machines is a huge factor when it comes
to performance, KVM can schedule and manage the physical resources among the virtual
machines to make sure the kernel is not overload.

Conclusion:

KVM is becoming a popular hypervisor in the Linux virtualization environment. Because
it is open source and supports newer technology, the product attracts many computer enthusiasts.
Along with KVM, there are different virtualization software that are dependent of KVM. One in
which is Virtual Machine Manager. Virtual Machine Manager provides a GUI for users to easily
configure and manage their virtual machines if they do not wish to configure their virtual
machines via command line. KVM and Virtual Machine Manager are flexible and reliable when
working in a Linux virtualization environment. The best part about KVM and Virtual Machine is
the ability to maintain agility, flexibility, and extensibility by using open source solutions since
they are open source tools.


