

Experiment No.: 01**Title: Installation and Configuration of Virtualization using KVM**

Objectives: From this experiment, the student will be able to,

- Understand the concepts of virtualization.
- Understand KVM architecture and its configuration.

Hardware / Software Required: Ubuntu operating system, open-source software KVM, Internet.

Theory:

Virtualization is software that separates physical infrastructures to create various dedicated resources. It is the fundamental technology that powers cloud computing.

The technology behind virtualization is known as a virtual machine monitor (VMM) or virtual manager, which separates compute environments from the actual physical infrastructure.

Virtualization makes servers, workstations, storage and other systems independent of the physical hardware layer. This is done by installing a Hypervisor on top of the hardware layer, where the systems are then installed.

There are three areas of IT where virtualization is making headroads, network virtualization, storage virtualization and server virtualization:

- Network virtualization is a method of combining the available resources in a network by splitting up the available bandwidth into channels, each of which is independent from the others, and each of which can be assigned (or reassigned) to a particular server or device in real time. The idea is that virtualization disguises the true complexity of the network by separating it into manageable parts, much like your partitioned hard drive makes it easier to manage your files.
- Storage virtualization is the pooling of physical storage from multiple network storage devices into what appears to be a single storage device that is managed from a central console. Storage virtualization is commonly used in storage area networks (SANs).
- Server virtualization is the masking of server resources (including the number and identity of individual physical servers, processors, and operating systems) from server users. The intention is to spare the user from having to understand and manage complicated details of server resources while increasing resource sharing and utilization and maintaining the capacity to expand later.

Virtualization can be viewed as part of an overall trend in enterprise IT that includes autonomic computing, a scenario in which the IT environment will be able to manage itself based on perceived activity, and utility computing, in which computer processing power is seen as a utility that clients can pay for only as needed. The usual goal of virtualization is to centralize administrative tasks while improving scalability and workloads.

Procedure:

Installation Steps :

1. `#sudo grep -c "svm\|vmx" /proc/cpuinfo`
2. `#sudo apt-get install qemu-kvm libvirt-bin bridge-utils virt-manager`
3. `#sudo adduser rait`
`#sudo adduser rait libvirt`

After running this command, log out and log back in as rait

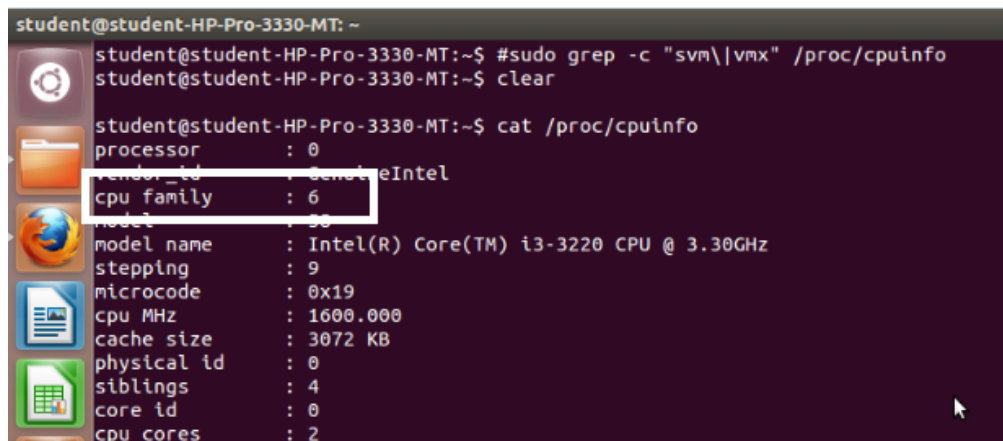
4. Run following command after logging back in as rait and you should see an empty list of virtual machines. This indicates that everything is working correctly.

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

5. Open Virtual Machine Manager application and Create Virtual Machine
`#virt-manager`

SNAPSHOTS

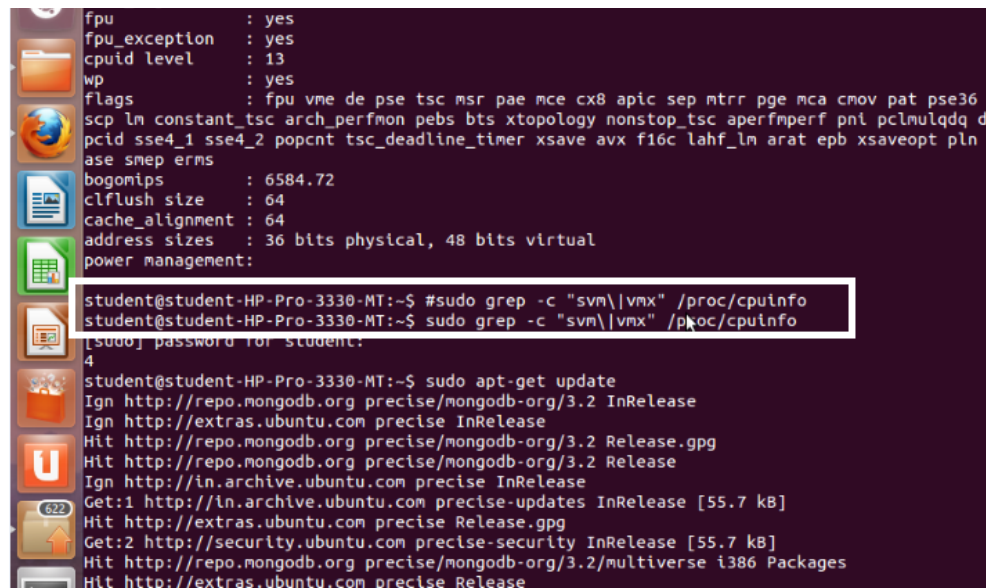
Step 1 : `#sudo grep -c "svm\|vmx" /proc/cpuinfo`



```
student@student-HP-Pro-3330-MT: ~
student@student-HP-Pro-3330-MT:~$ #sudo grep -c "svm\|vmx" /proc/cpuinfo
student@student-HP-Pro-3330-MT:~$ clear

student@student-HP-Pro-3330-MT:~$ cat /proc/cpuinfo
processor       : 0
vendor_id      : GenuineIntel
cpu family     : 6
model          : 58
model name     : Intel(R) Core(TM) i3-3220 CPU @ 3.30GHz
stepping      : 9
microcode     : 0x19
cpu MHz        : 1600.000
cache size    : 3072 KB
physical id    : 0
siblings       : 4
core id        : 0
cpu cores      : 2
```

Step 2 : #sudo apt-get install qemu-kvm libvirt-bin bridge-utils virt-manager

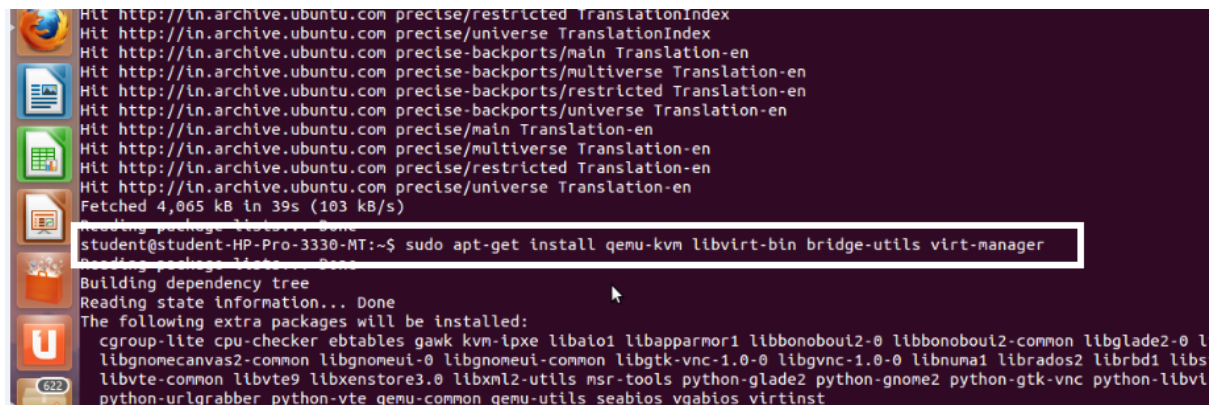


```
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush sse1_1 sse4_2 popcnt tsc_deadline_timer xsave avx f16c lahfh_lm arat epb xsaveopt pln
bogomips : 6584.72
clflush size : 64
cache_alignment : 64
address sizes : 36 bits physical, 48 bits virtual
power management:

student@student-HP-Pro-3330-MT:~$ sudo grep -c "svm|vmx" /proc/cpuinfo
student@student-HP-Pro-3330-MT:~$ sudo grep -c "svm|vmx" /proc/cpuinfo
[sudo] password for student:
student@student-HP-Pro-3330-MT:~$ sudo apt-get update
Ign http://repo.mongodb.org precise/mongodb-org/3.2 InRelease
Ign http://extras.ubuntu.com precise InRelease
Hit http://repo.mongodb.org precise/mongodb-org/3.2 Release.gpg
Hit http://repo.mongodb.org precise/mongodb-org/3.2 Release
Ign http://in.archive.ubuntu.com precise InRelease
Get:1 http://in.archive.ubuntu.com precise-updates InRelease [55.7 kB]
Hit http://extras.ubuntu.com precise Release.gpg
Get:2 http://security.ubuntu.com precise-security InRelease [55.7 kB]
Hit http://repo.mongodb.org precise/mongodb-org/3.2/multiverse i386 Packages
Hit http://extras.ubuntu.com precise Release
```

Step 3 : #sudoadduserairat

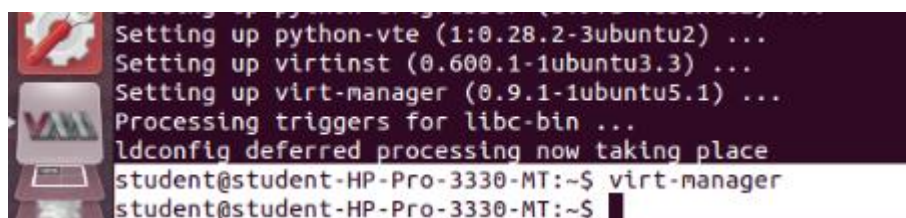
After running this command, log out and log back in as rait



```
Hit http://in.archive.ubuntu.com precise/restricted TranslationIndex
Hit http://in.archive.ubuntu.com precise/universe TranslationIndex
Hit http://in.archive.ubuntu.com precise-backports/main Translation-en
Hit http://in.archive.ubuntu.com precise-backports/multiverse Translation-en
Hit http://in.archive.ubuntu.com precise-backports/restricted Translation-en
Hit http://in.archive.ubuntu.com precise-backports/universe Translation-en
Hit http://in.archive.ubuntu.com precise/main Translation-en
Hit http://in.archive.ubuntu.com precise/multiverse Translation-en
Hit http://in.archive.ubuntu.com precise/restricted Translation-en
Hit http://in.archive.ubuntu.com precise/universe Translation-en
Fetched 4,065 kB in 39s (103 kB/s)
Reading package lists... Done
student@student-HP-Pro-3330-MT:~$ sudo apt-get install qemu-kvm libvirt-bin bridge-utils virt-manager
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following extra packages will be installed:
  cgroup-lite cpu-checker ebttables gawk kvm-iptables libaio1 libapparmor1 libbonoboui2-0 libbonoboui2-common libglade2-0 l
  libgnomecanvas2-common libgnomeui-0 libgnomeui-common libgtk-vnc-1.0-0 libgvnc-1.0-0 libnuma1 librados2 librbd1 libs
  libvte-common libvte9 libxenstore3.0 libxml2-utils msr-tools python-glade2 python-gnome2 python-gtk-vnc python-libv
  python-urlgrabber python-vte qemu-common qemu-utils seabios vgabios virtinst
Building dependency tree
Reading state information... Done
The following extra packages will be installed:
  cgroup-lite cpu-checker ebttables gawk kvm-iptables libaio1 libapparmor1 libbonoboui2-0 libbonoboui2-common libglade2-0 l
  libgnomecanvas2-common libgnomeui-0 libgnomeui-common libgtk-vnc-1.0-0 libgvnc-1.0-0 libnuma1 librados2 librbd1 libs
  libvte-common libvte9 libxenstore3.0 libxml2-utils msr-tools python-glade2 python-gnome2 python-gtk-vnc python-libv
  python-urlgrabber python-vte qemu-common qemu-utils seabios vgabios virtinst
```

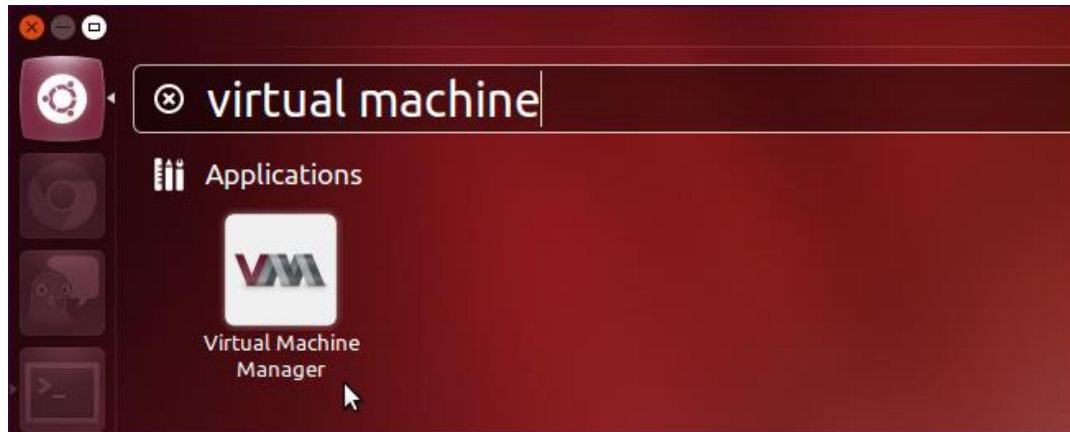
Step 4 : #sudoadduserairatlibvirtd

After running this command, log out and log back in as rait

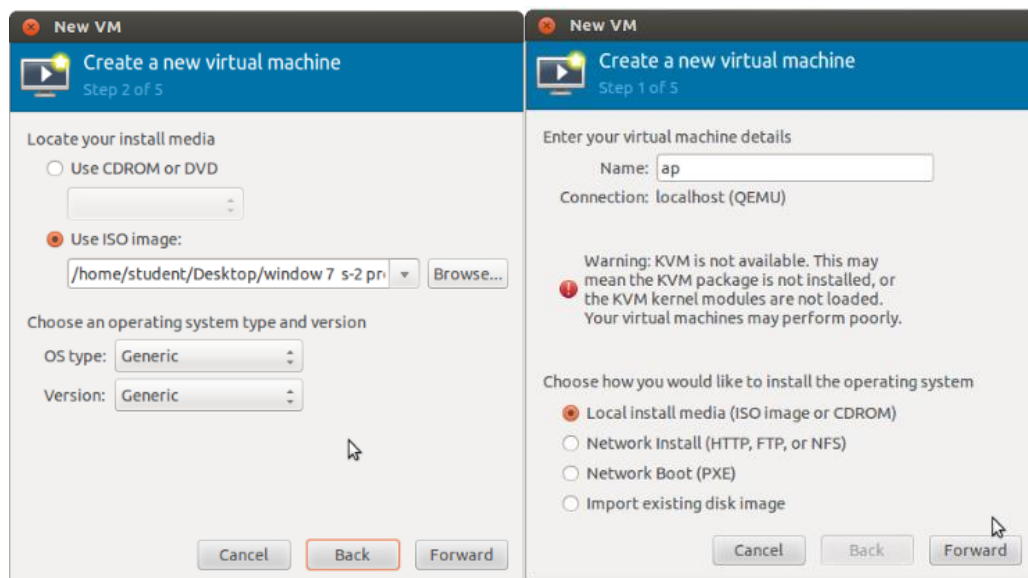


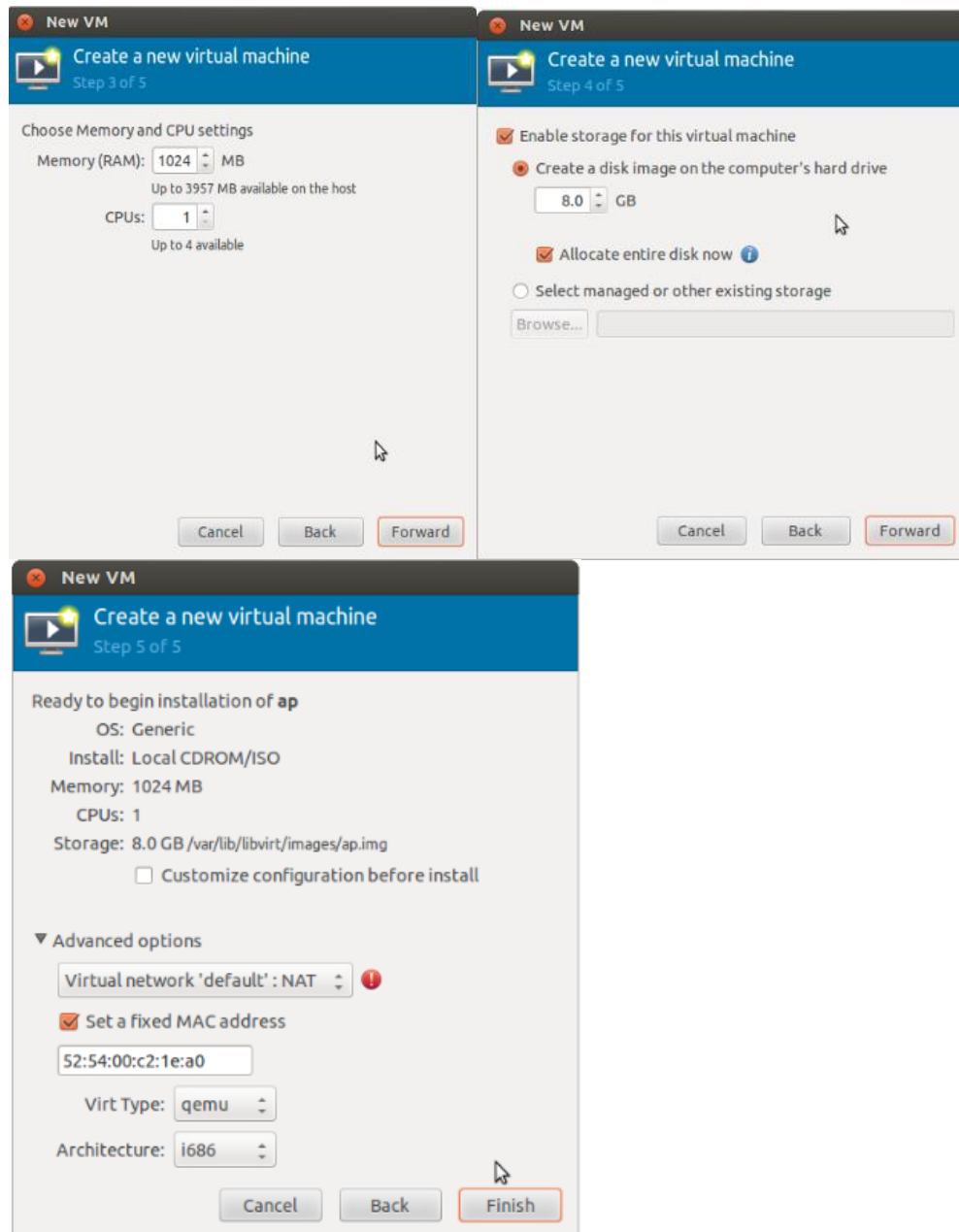
```
Setting up python-vte (1:0.28.2-3ubuntu2) ...
Setting up virtinst (0.600.1-1ubuntu3.3) ...
Setting up virt-manager (0.9.1-1ubuntu5.1) ...
Processing triggers for libc-bin ...
ldconfig deferred processing now taking place
student@student-HP-Pro-3330-MT:~$ virt-manager
student@student-HP-Pro-3330-MT:~$
```

Step 5 : Open Virtual Machine Manager application and Create Virtual Machine
#virt-manager as shown below

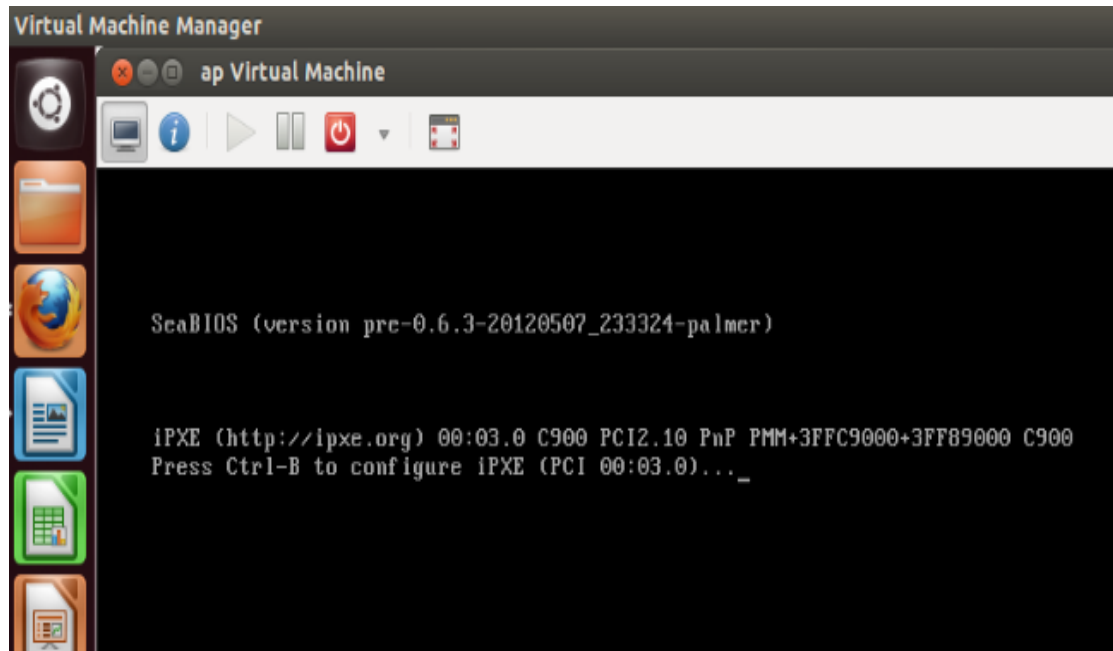


Step 6 : Create a new virtual machine as shown below

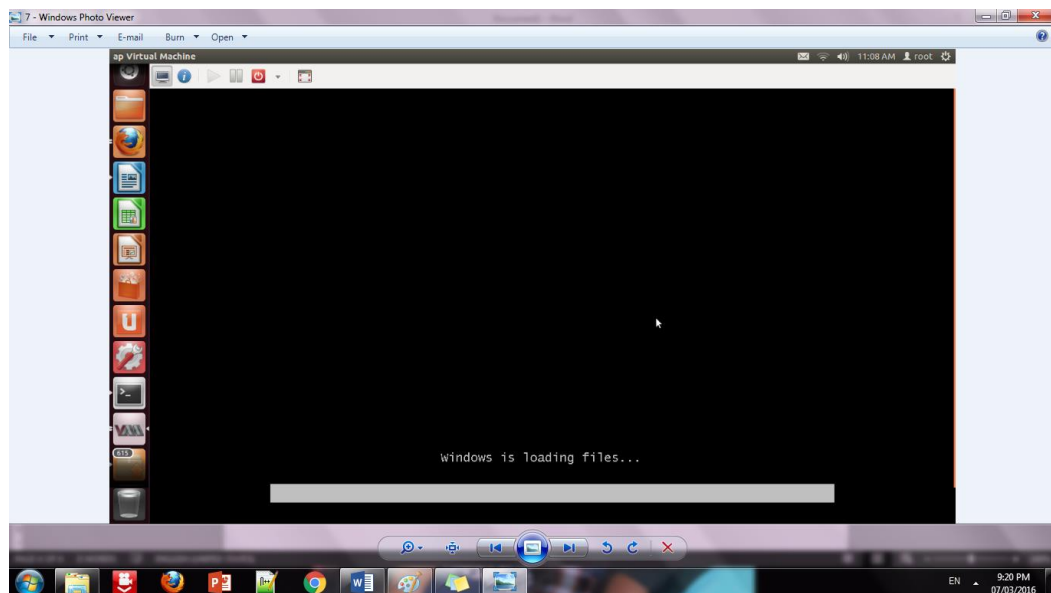




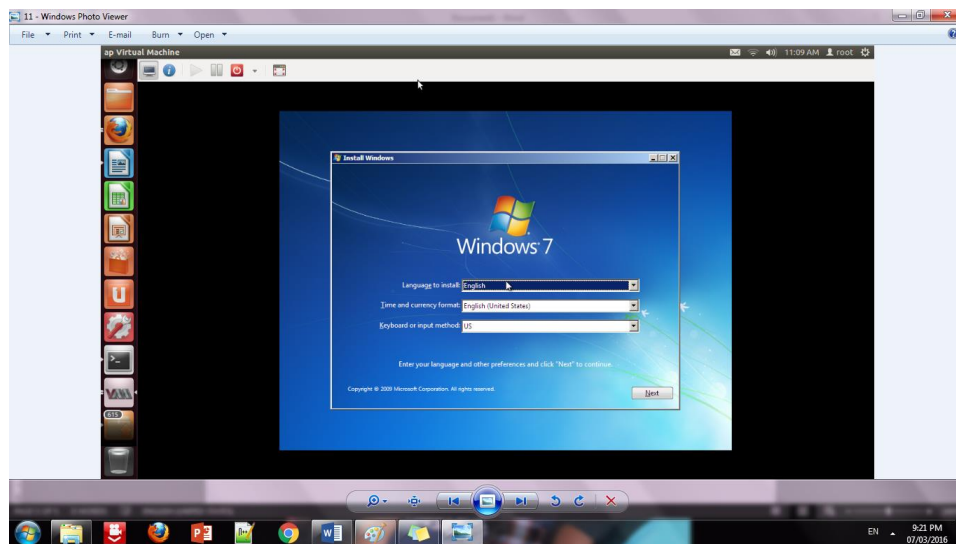
Step 7 : Install windows operating system on virtual machine



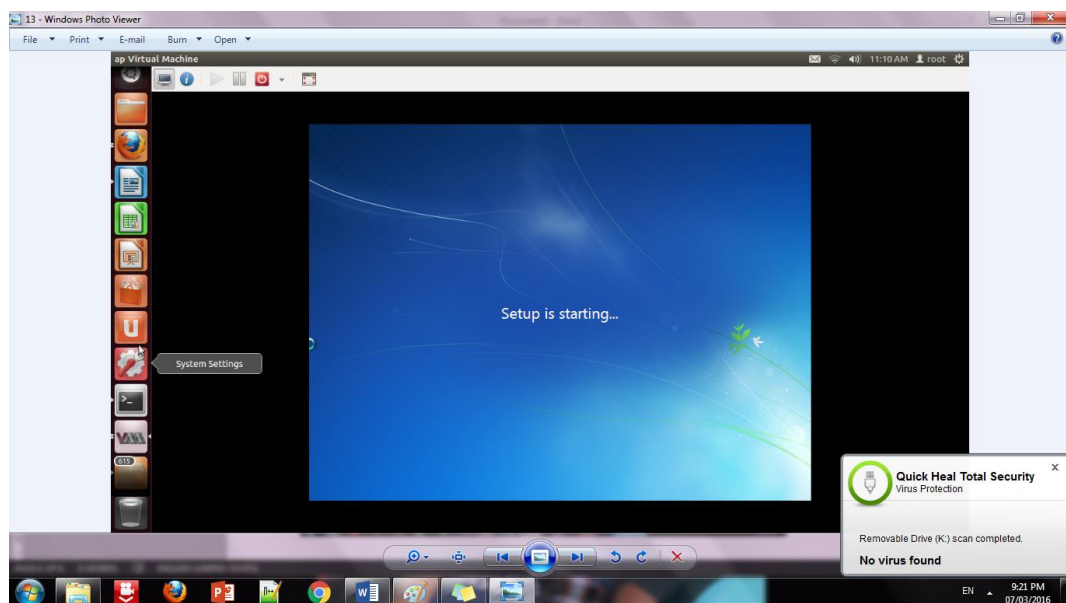
Step 8: Installation of windows on virtual machine



Step 9: Installation of windows 7 on virtual machine



Step 10: Initialization of windows on virtual machine



Conclusion:

Installation and configuration of KVM have been done successfully onto Ubuntu and users added. Like this we can create as many virtual machines as possible on OS and can install any windows onto it.