

**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

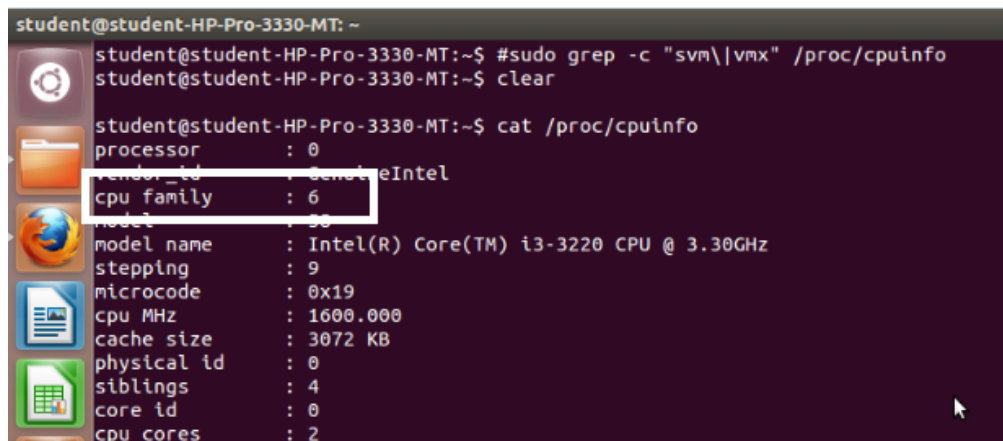
4. Run following command after logging back in as rait and you should see an empty list of virtual machines. This indicates that everything is working correctly.

`#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
```

```

cpu : yes
cpu_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
scp lm constant_tsc arch_perfmon pebs bts xtopology nonstop_tsc aperfmperf pni pclmulqdq d
pcid sse4_1 sse4_2 popcnt tsc_deadline_timer xsave avx f16c lah_f_lm arat epb xsaveopt pln
ase smep erms
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:
4
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

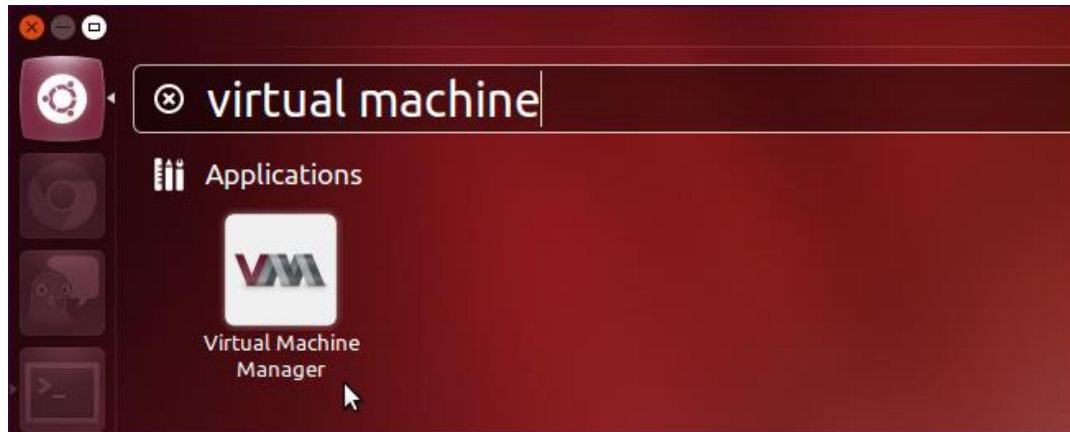
```

```

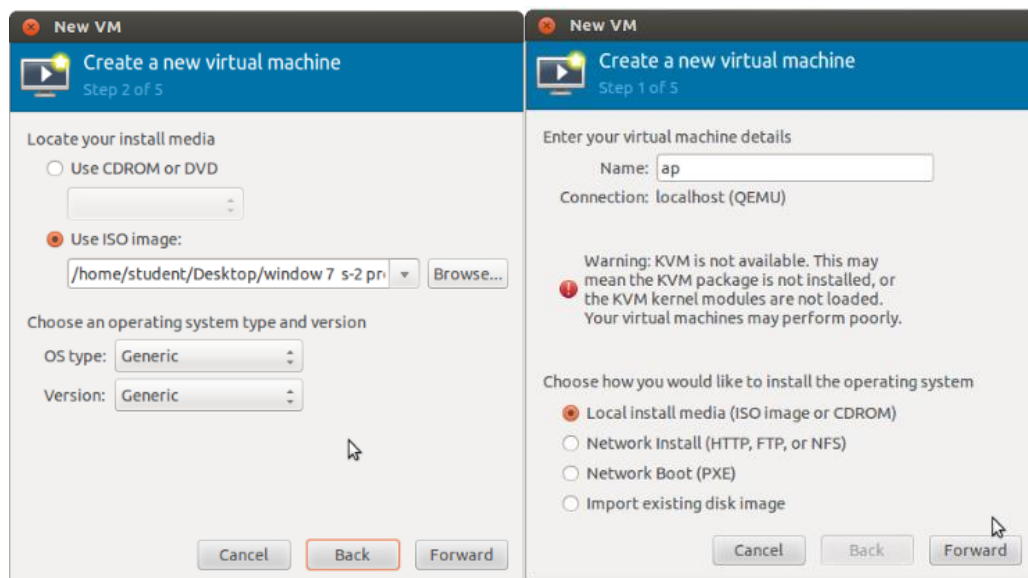
Hit http://in.archive.ubuntu.com precise/restricted TranslationIndex
Hit http://in.archive.ubuntu.com precise/universe TranslationIndex
Hit http://in.archive.ubuntu.com precise-backports/main Translation-en
Hit http://in.archive.ubuntu.com precise-backports/multiverse Translation-en
Hit http://in.archive.ubuntu.com 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-ixpe libaio1 libapparmor1 libbonoboui2-0 libbonoboui2-common libglade2-0
  libgnomecanvas2-common libgnomeui-0 libgnomeui-common libgtk-vnc-1.0-0 libgvnc-1.0-0 libnuma1 librados2 librbid1
  librsync1 libtcmalloc libtcmalloc4 libtcmalloc5 libtcmalloc6 libtcmalloc7 libtcmalloc8 libtcmalloc9 libtcmalloc10
  libtcmalloc11 libtcmalloc12 libtcmalloc13 libtcmalloc14 libtcmalloc15 libtcmalloc16 libtcmalloc17 libtcmalloc18
  libtcmalloc19 libtcmalloc20 libtcmalloc21 libtcmalloc22 libtcmalloc23 libtcmalloc24 libtcmalloc25 libtcmalloc26
  libtcmalloc27 libtcmalloc28 libtcmalloc29 libtcmalloc30 libtcmalloc31 libtcmalloc32 libtcmalloc33 libtcmalloc34
  libtcmalloc35 libtcmalloc36 libtcmalloc37 libtcmalloc38 libtcmalloc39 libtcmalloc40 libtcmalloc41 libtcmalloc42
  libtcmalloc43 libtcmalloc44 libtcmalloc45 libtcmalloc46 libtcmalloc47 libtcmalloc48 libtcmalloc49 libtcmalloc50
  libtcmalloc51 libtcmalloc52 libtcmalloc53 libtcmalloc54 libtcmalloc55 libtcmalloc56 libtcmalloc57 libtcmalloc58
  libtcmalloc59 libtcmalloc60 libtcmalloc61 libtcmalloc62 libtcmalloc63 libtcmalloc64 libtcmalloc65 libtcmalloc66
  libtcmalloc67 libtcmalloc68 libtcmalloc69 libtcmalloc70 libtcmalloc71 libtcmalloc72 libtcmalloc73 libtcmalloc74
  libtcmalloc75 libtcmalloc76 libtcmalloc77 libtcmalloc78 libtcmalloc79 libtcmalloc80 libtcmalloc81 libtcmalloc82
  libtcmalloc83 libtcmalloc84 libtcmalloc85 libtcmalloc86 libtcmalloc87 libtcmalloc88 libtcmalloc89 libtcmalloc90
  libtcmalloc91 libtcmalloc92 libtcmalloc93 libtcmalloc94 libtcmalloc95 libtcmalloc96 libtcmalloc97 libtcmalloc98
  libtcmalloc99 libtcmalloc100 libtcmalloc101 libtcmalloc102 libtcmalloc103 libtcmalloc104 libtcmalloc105
  libtcmalloc106 libtcmalloc107 libtcmalloc108 libtcmalloc109 libtcmalloc110 libtcmalloc111 libtcmalloc112
  libtcmalloc113 libtcmalloc114 libtcmalloc115 libtcmalloc116 libtcmalloc117 libtcmalloc118 libtcmalloc119
  libtcmalloc120 libtcmalloc121 libtcmalloc122 libtcmalloc123 libtcmalloc124 libtcmalloc125 libtcmalloc126
  libtcmalloc127 libtcmalloc128 libtcmalloc129 libtcmalloc130 libtcmalloc131 libtcmalloc132 libtcmalloc133
  libtcmalloc134 libtcmalloc135 libtcmalloc136 libtcmalloc137 libtcmalloc138 libtcmalloc139 libtcmalloc140
  libtcmalloc141 libtcmalloc142 libtcmalloc143 libtcmalloc144 libtcmalloc145 libtcmalloc146 libtcmalloc147
  libtcmalloc148 libtcmalloc149 libtcmalloc150 libtcmalloc151 libtcmalloc152 libtcmalloc153 libtcmalloc154
  libtcmalloc155 libtcmalloc156 libtcmalloc157 libtcmalloc158 libtcmalloc159 libtcmalloc160 libtcmalloc161
  libtcmalloc162 libtcmalloc163 libtcmalloc164 libtcmalloc165 libtcmalloc166 libtcmalloc167 libtcmalloc168
  libtcmalloc169 libtcmalloc170 libtcmalloc171 libtcmalloc172 libtcmalloc173 libtcmalloc174 libtcmalloc175
  libtcmalloc176 libtcmalloc177 libtcmalloc178 libtcmalloc179 libtcmalloc180 libtcmalloc181 libtcmalloc182
  libtcmalloc183 libtcmalloc184 libtcmalloc185 libtcmalloc186 libtcmalloc187 libtcmalloc188 libtcmalloc189
  libtcmalloc190 libtcmalloc191 libtcmalloc192 libtcmalloc193 libtcmalloc194 libtcmalloc195 libtcmalloc196
  libtcmalloc197 libtcmalloc198 libtcmalloc199 libtcmalloc200 libtcmalloc201 libtcmalloc202 libtcmalloc203
  libtcmalloc204 libtcmalloc205 libtcmalloc206 libtcmalloc207 libtcmalloc208 libtcmalloc209 libtcmalloc210
  libtcmalloc211 libtcmalloc212 libtcmalloc213 libtcmalloc214 libtcmalloc215 libtcmalloc216 libtcmalloc217
  libtcmalloc218 libtcmalloc219 libtcmalloc220 libtcmalloc221 libtcmalloc222 libtcmalloc223 libtcmalloc224
  libtcmalloc225 libtcmalloc226 libtcmalloc227 libtcmalloc228 libtcmalloc229 libtcmalloc230 libtcmalloc231
  libtcmalloc232 libtcmalloc233 libtcmalloc234 libtcmalloc235 libtcmalloc236 libtcmalloc237 libtcmalloc238
  libtcmalloc239 libtcmalloc240 libtcmalloc241 libtcmalloc242 libtcmalloc243 libtcmalloc244 libtcmalloc245
  libtcmalloc246 libtcmalloc247 libtcmalloc248 libtcmalloc249 libtcmalloc250 libtcmalloc251 libtcmalloc252
  libtcmalloc253 libtcmalloc254 libtcmalloc255 libtcmalloc256 libtcmalloc257 libtcmalloc258 libtcmalloc259
  libtcmalloc260 libtcmalloc261 libtcmalloc262 libtcmalloc263 libtcmalloc264 libtcmalloc265 libtcmalloc266
  libtcmalloc267 libtcmalloc268 libtcmalloc269 libtcmalloc270 libtcmalloc271 libtcmalloc272 libtcmalloc273
  libtcmalloc274 libtcmalloc275 libtcmalloc276 libtcmalloc277 libtcmalloc278 libtcmalloc279 libtcmalloc280
  libtcmalloc281 libtcmalloc282 libtcmalloc283 libtcmalloc284 libtcmalloc285 libtcmalloc286 libtcmalloc287
  libtcmalloc288 libtcmalloc289 libtcmalloc290 libtcmalloc291 libtcmalloc292 libtcmalloc293 libtcmalloc294
  libtcmalloc295 libtcmalloc296 libtcmalloc297 libtcmalloc298 libtcmalloc299 libtcmalloc300 libtcmalloc301
  libtcmalloc302 libtcmalloc303 libtcmalloc304 libtcmalloc305 libtcmalloc306 libtcmalloc307 libtcmalloc308
  libtcmalloc309 libtcmalloc310 libtcmalloc311 libtcmalloc312 libtcmalloc313 libtcmalloc314 libtcmalloc315
  libtcmalloc316 libtcmalloc317 libtcmalloc318 libtcmalloc319 libtcmalloc320 libtcmalloc321 libtcmalloc322
  libtcmalloc323 libtcmalloc324 libtcmalloc325 libtcmalloc326 libtcmalloc327 libtcmalloc328 libtcmalloc329
  libtcmalloc330 libtcmalloc331 libtcmalloc332 libtcmalloc333 libtcmalloc334 libtcmalloc335 libtcmalloc336
  libtcmalloc337 libtcmalloc338 libtcmalloc339 libtcmalloc340 libtcmalloc341 libtcmalloc342 libtcmalloc343
  libtcmalloc344 libtcmalloc345 libtcmalloc346 libtcmalloc347 libtcmalloc348 libtcmalloc349 libtcmalloc350
  libtcmalloc351 libtcmalloc352 libtcmalloc353 libtcmalloc354 libtcmalloc355 libtcmalloc356 libtcmalloc357
  libtcmalloc358 libtcmalloc359 libtcmalloc360 libtcmalloc361 libtcmalloc362 libtcmalloc363 libtcmalloc364
  libtcmalloc365 libtcmalloc366 libtcmalloc367 libtcmalloc368 libtcmalloc369 libtcmalloc370 libtcmalloc371
  libtcmalloc372 libtcmalloc373 libtcmalloc374 libtcmalloc375 libtcmalloc376 libtcmalloc377 libtcmalloc378
  libtcmalloc379 libtcmalloc380 libtcmalloc381 libtcmalloc382 libtcmalloc383 libtcmalloc384 libtcmalloc385
  libtcmalloc386 libtcmalloc387 libtcmalloc388 libtcmalloc389 libtcmalloc390 libtcmalloc391 libtcmalloc392
  libtcmalloc393 libtcmalloc394 libtcmalloc395 libtcmalloc396 libtcmalloc397 libtcmalloc398 libtcmalloc399
  libtcmalloc400 libtcmalloc401 libtcmalloc402 libtcmalloc403 libtcmalloc404 libtcmalloc405 libtcmalloc406
  libtcmalloc407 libtcmalloc408 libtcmalloc409 libtcmalloc410 libtcmalloc411 libtcmalloc412 libtcmalloc413
  libtcmalloc414 libtcmalloc415 libtcmalloc416 libtcmalloc417 libtcmalloc418 libtcmalloc419 libtcmalloc420
  libtcmalloc421 libtcmalloc422 libtcmalloc423 libtcmalloc424 libtcmalloc425 libtcmalloc426 libtcmalloc427
  libtcmalloc428 libtcmalloc429 libtcmalloc430 libtcmalloc431 libtcmalloc432 libtcmalloc433 libtcmalloc434
  libtcmalloc435 libtcmalloc436 libtcmalloc437 libtcmalloc438 libtcmalloc439 libtcmalloc440 libtcmalloc441
  libtcmalloc442 libtcmalloc443 libtcmalloc444 libtcmalloc445 libtcmalloc446 libtcmalloc447 libtcmalloc448
  libtcmalloc449 libtcmalloc450 libtcmalloc451 libtcmalloc452 libtcmalloc453 libtcmalloc454 libtcmalloc455
  libtcmalloc456 libtcmalloc457 libtcmalloc458 libtcmalloc459 libtcmalloc460 libtcmalloc461 libtcmalloc462
  libtcmalloc463 libtcmalloc464 libtcmalloc465 libtcmalloc466 libtcmalloc467 libtcmalloc468 libtcmalloc469
  libtcmalloc470 libtcmalloc471 libtcmalloc472 libtcmalloc473 libtcmalloc474 libtcmalloc475 libtcmalloc476
  libtcmalloc477 libtcmalloc478 libtcmalloc479 libtcmalloc480 libtcmalloc481 libtcmalloc482 libtcmalloc483
  libtcmalloc484 libtcmalloc485 libtcmalloc486 libtcmalloc487 libtcmalloc488 libtcmalloc489 libtcmalloc490
  libtcmalloc491 libtcmalloc492 libtcmalloc493 libtcmalloc494 libtcmalloc495 libtcmalloc496 libtcmalloc497
  libtcmalloc498 libtcmalloc499 libtcmalloc500 libtcmalloc501 libtcmalloc502 libtcmalloc503 libtcmalloc504
  libtcmalloc505 libtcmalloc506 libtcmalloc507 libtcmalloc508 libtcmalloc509 libtcmalloc510 libtcmalloc511
  libtcmalloc512 libtcmalloc513 libtcmalloc514 libtcmalloc515 libtcmalloc516 libtcmalloc517 libtcmalloc518
  libtcmalloc519 libtcmalloc520 libtcmalloc521 libtcmalloc522 libtcmalloc523 libtcmalloc524 libtcmalloc525
  libtcmalloc526 libtcmalloc527 libtcmalloc528 libtcmalloc529 libtcmalloc530 libtcmalloc531 libtcmalloc532
  libtcmalloc533 libtcmalloc
```

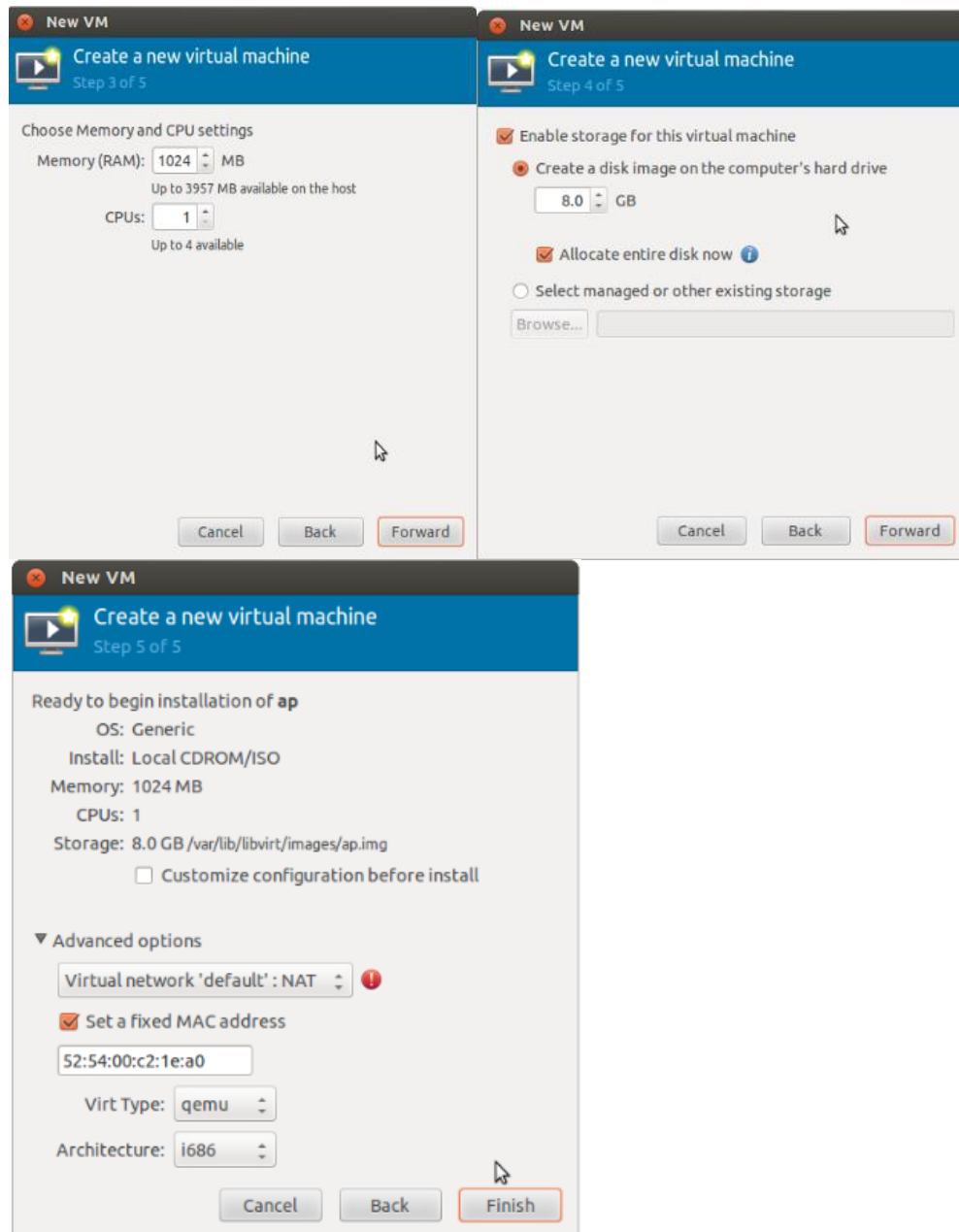
```
Setting up python-vte (1:0.28.2-3ubuntu2) ...
Setting up virtinst (0.600.1-1ubuntu3.3) ...
Setting up virt-manager (0.9.1-1ubuntu5.1) ...
Processing triggers for libc-bin ...
ldconfig deferred processing now taking place
student@student-HP-Pro-3330-MT:~$ virt-manager
student@student-HP-Pro-3330-MT:~$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

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

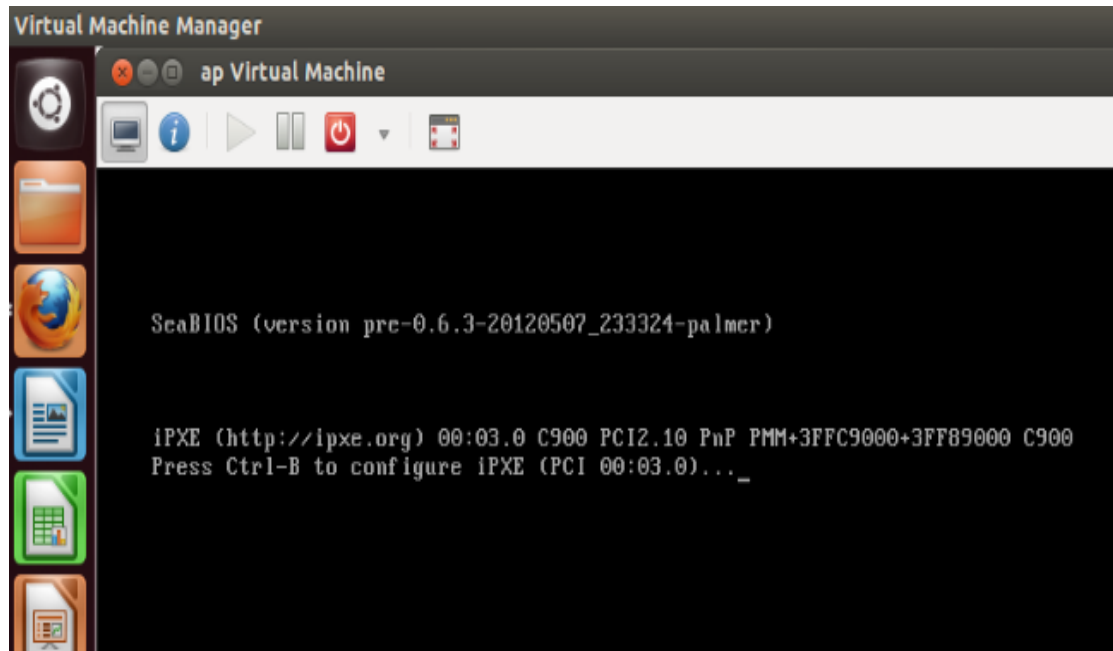


Step 6 : Create a new virtual machine as shown below

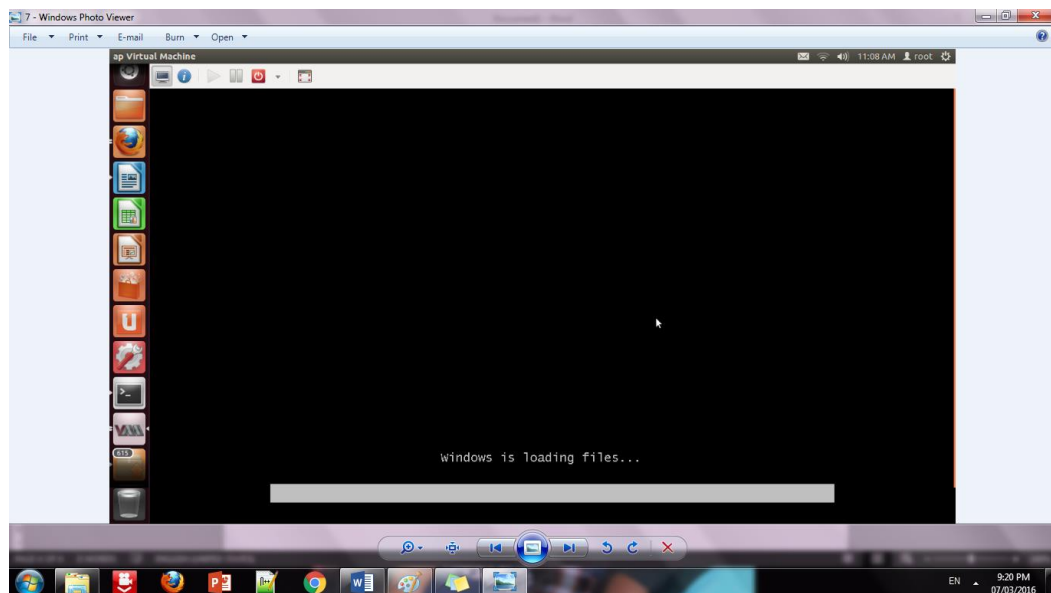




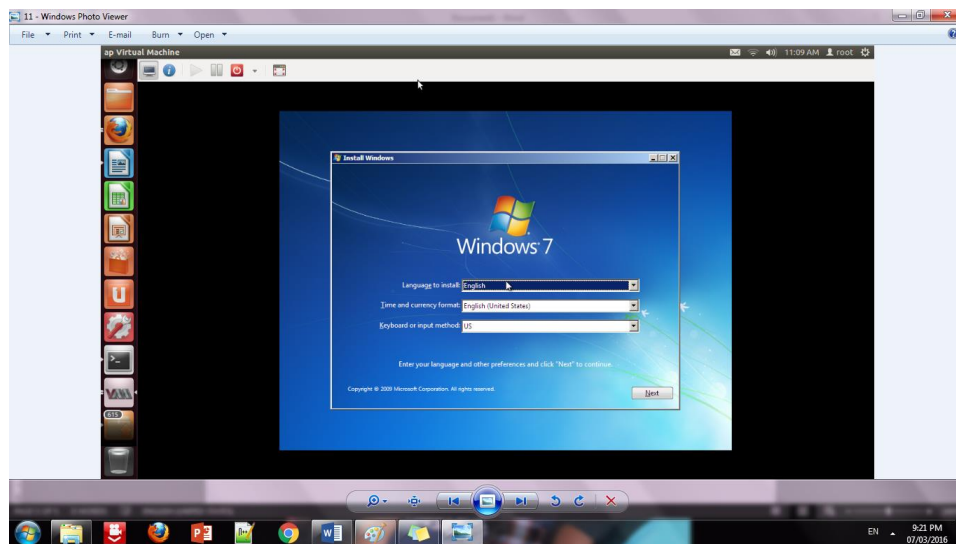
Step 7 : Install windows operating system on virtual machine



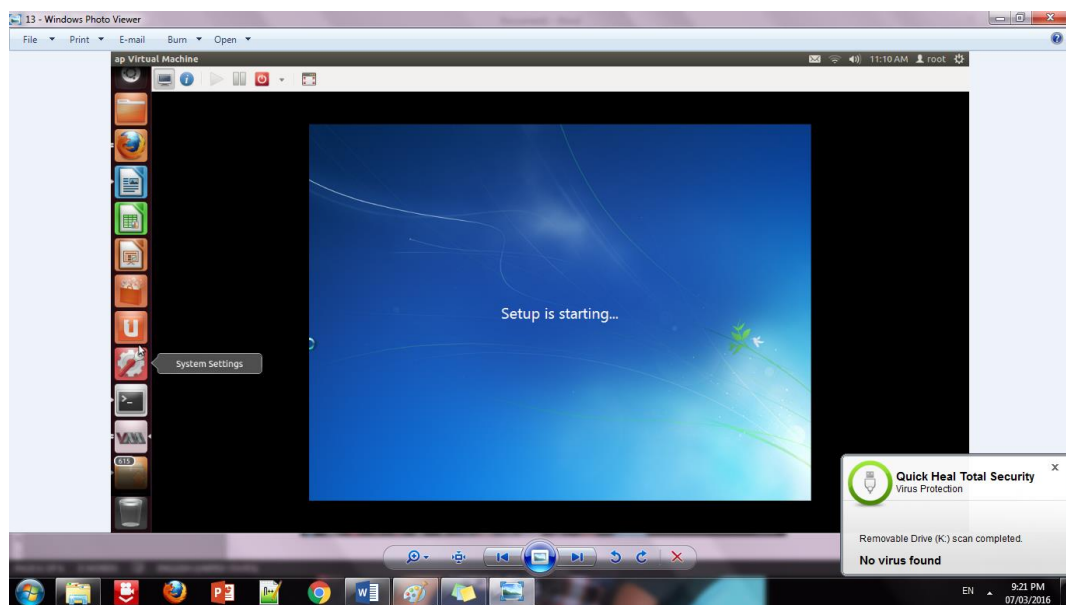
#### Step 8: Installation of windows on virtual machine



### 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.