

Exp No: 9	Installation of KVM and Creation of VMs
Date:	

Aim

To install KVM in Linux and create a virtual machine.

Procedure

1. Switch to root user in linux terminal
2. Check for ls modules and retrieve IP address

```

root@tce-VirtualBox:~# sudo -s
root@tce-VirtualBox:~# lsb_release -a
No LSB modules are available.
Distributor ID: Ubuntu
Description:    Ubuntu 18.04 LTS
Release:        18.04
Codename:       bionic
root@tce-VirtualBox:~# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defau
lt qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP g
roup default qlen 1000
    link/ether 08:00:27:36:91:16 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 85488sec preferred_lft 85488sec
    inet6 fe80::c088:56e4:549a:8682/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@tce-VirtualBox:~#

root@tce-VirtualBox:~# ip a | more
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defau
lt qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP g
roup default qlen 1000
    link/ether 08:00:27:36:91:16 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 85429sec preferred_lft 85429sec
    inet6 fe80::c088:56e4:549a:8682/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@tce-VirtualBox:~#

root@tce-VirtualBox:~# uname -a
Linux tce-VirtualBox 4.15.0-20-generic #21-Ubuntu SMP Tue Apr 24 06:16:15 UTC 2
018 x86_64 x86_64 x86_64 GNU/Linux
root@tce-VirtualBox:~#

```

3. Check free memory and process running

```

root@tce-VirtualBox:~# free -m
              total        used        free      shared  buff/cache   available
Mem:           985        708          66           4          210         137
Swap:          472          449           23

root@tce-VirtualBox:~# top
top - 11:53:41 up 21 min,  1 user,  load average: 0.00, 1.46, 2.84
Tasks: 216 total,  2 running, 184 sleeping,  0 stopped,  0 zombie
%Cpu(s): 24.7 us,  2.3 sy,  0.0 ni, 72.3 id,  0.7 wa,  0.0 hi,  0.0 st,  0.0 st
KiB Mem : 1009124 total,  66664 free,  726360 used,  216100 buff/cache
KiB Swap: 483800 total,  23756 free,  460044 used.  139960 avail Mem

   PID USER      PR  NI    VIRT    RES    SHR  S  %CPU  %MEM     TIME+ COMMAND
 1862 tce       20   0 2971920 245840 52384 D 21.8 24.4   0:52.61 gnome-shell
1687 tce       20   0 347128 21576  6148 S  3.6  2.1   0:06.76 Xorg
2689 tce       20   0 801208 35936 26964 S  1.0  3.6   0:01.23 gnome-term+
2793 root       20   0  51296   3988   3260 R  0.7  0.4   0:00.11 top
    1 root       20   0 225688   5948  3648 S  0.3  0.6   0:04.99 systemd
    2 root       20   0      0      0      0 S  0.0  0.0   0:00.00 kthreadd
    4 root       0 -20      0      0      0 I  0.0  0.0   0:00.00 kworker/0:
    5 root       20   0      0      0      0 I  0.0  0.0   0:00.45 kworker/u2+
    6 root       0 -20      0      0      0 I  0.0  0.0   0:00.00 mm_percpu_+
    7 root       20   0      0      0      0 S  0.0  0.0   0:00.63 ksoftirqd/0
    8 root       20   0      0      0      0 R  0.0  0.0   0:01.20 rcu_sched
    9 root       20   0      0      0      0 I  0.0  0.0   0:00.00 rcu_bh
   10 root       rt   0      0      0      0 S  0.0  0.0   0:00.00 migration/0
   11 root       rt   0      0      0      0 S  0.0  0.0   0:00.01 watchdog/0
   12 root       20   0      0      0      0 S  0.0  0.0   0:00.00 cpuhp/0
   13 root       20   0      0      0      0 S  0.0  0.0   0:00.00 kdevtmpfs

```

4. Start installing KVM. Update the system

```

root@tce-VirtualBox:~# apt-get update
Hit:1 http://in.archive.ubuntu.com/ubuntu bionic InRelease
Get:2 http://in.archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:4 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [2,567 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu bionic-updates/main i386 Packages [1,472 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu bionic-updates/main Translation-en [480 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 DEP-11 Meta data [296 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu bionic-updates/restricted amd64 Packages [752 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu bionic-updates/restricted Translation-en [103 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe i386 Packages [1,607 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [1,809 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe Translation-en [392 kB]
Get:14 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 DEP-11 Metadata [301 kB]
Get:15 http://in.archive.ubuntu.com/ubuntu bionic-updates/multiverse amd64 DEP-11 Metadata [2,464 B]
Get:16 http://in.archive.ubuntu.com/ubuntu bionic-backports/universe amd64 DEP-11 Metadata [9,272 B]

```

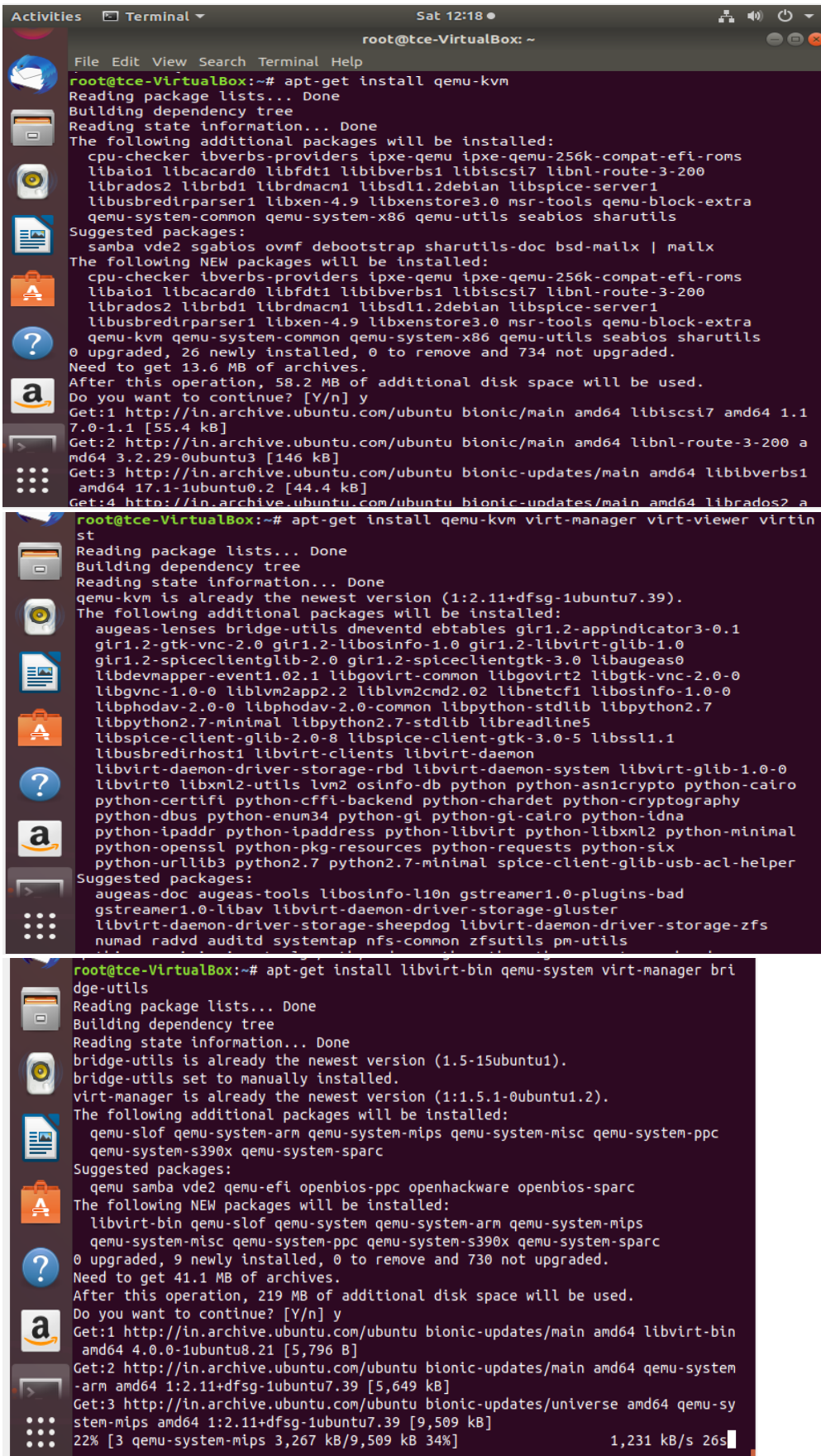
5. Install net-tools and check netstat

```

root@tce-VirtualBox:~# apt-cache search net-tools
iproute2 - networking and traffic control tools
net-tools - NET-3 networking toolkit
atm-tools - Base programs for ATM in Linux, the net-tools for ATM
ddnet-tools - Tools for DDNet
root@tce-VirtualBox:~# apt-get install net-tools
Reading package lists... Done
Building dependency tree
Reading state information... Done
net-tools is already the newest version (1.60+git20161116.90da8a0-1ubuntu1).
0 upgraded, 0 newly installed, 0 to remove and 734 not upgraded.
root@tce-VirtualBox:~# netstat -ntlp
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
PID/Program name
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN
307/systemd-resolve
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN
2329/cupsd
tcp6       0      0 :::22                  :::*                    LISTEN
2329/cupsd
root@tce-VirtualBox:~#

```

6. Install qemu-kvm, virt-manager, virt-viewer, virtinst, libvirt-bin, qemu-system, bridge-utils

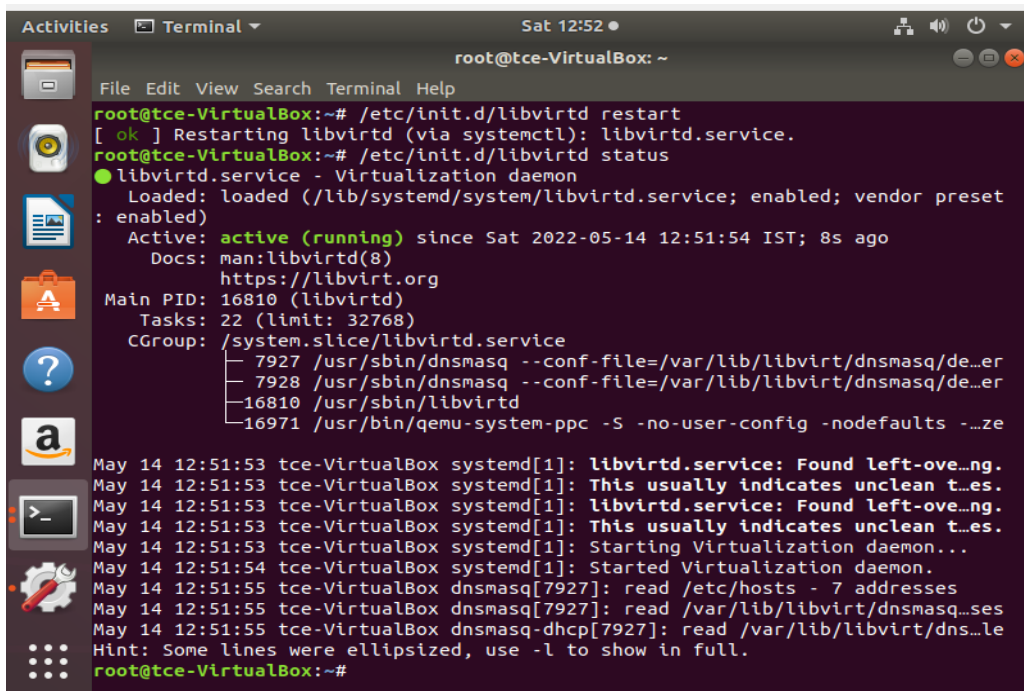


```

root@tce-VirtualBox:~# apt-get install qemu-kvm
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  cpu-checker ibverbs-providers ipxe-qemu ipxe-qemu-256k-compatible-efi-roms
  libaio1 libcacard0 libfdt1 libibverbs1 libiscsi7 libnl-route-3-200
  librados2 librbd1 librdmacm1 libsd1.2debian libspice-server1
  libusbredirparser1 libxen-4.9 libxenstore3.0 msr-tools qemu-block-extra
  qemu-system-common qemu-system-x86 qemu-utils seabios sharutils
Suggested packages:
  samba vde2 sgabios ovmf debootstrap sharutils-doc bsd-mailx | mailx
The following NEW packages will be installed:
  cpu-checker ibverbs-providers ipxe-qemu ipxe-qemu-256k-compatible-efi-roms
  libaio1 libcacard0 libfdt1 libibverbs1 libiscsi7 libnl-route-3-200
  librados2 librbd1 librdmacm1 libsd1.2debian libspice-server1
  libusbredirparser1 libxen-4.9 libxenstore3.0 msr-tools qemu-block-extra
  qemu-kvm qemu-system-common qemu-system-x86 qemu-utils seabios sharutils
0 upgraded, 26 newly installed, 0 to remove and 734 not upgraded.
Need to get 13.6 MB of archives.
After this operation, 58.2 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libiscsi7 amd64 1.1
7.0-1.1 [55.4 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libnl-route-3-200 a
md64 3.2.29-0ubuntu3 [146 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 libibverbs1
amd64 17.1-1ubuntu0.2 [44.4 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 librados2 a
md64 17.1-1ubuntu0.2 [44.4 kB]
root@tce-VirtualBox:~# apt-get install qemu-kvm virt-manager virt-viewer virtin
st
Reading package lists... Done
Building dependency tree
Reading state information... Done
qemu-kvm is already the newest version (1:2.11+dfsg-1ubuntu7.39).
The following additional packages will be installed:
  augeas-lenses bridge-utils dmeventd ebttables gir1.2-appindicator3-0.1
  gir1.2-gtk-vnc-2.0 gir1.2-libosinfo-1.0 gir1.2-libvirt-glib-1.0
  gir1.2-spiceclientglib-2.0 gir1.2-spiceclientgtk-3.0 libaugeas0
  libdevmapper-event1.02.1 libgovirt-common libgovirt2 libgtk-vnc-2.0-0
  libgvnc-1.0-0 liblvm2app2.2 liblvm2cmd2.02 libnetcf1 libosinfo-1.0-0
  libphodav-2.0-0 libphodav-2.0-common libpython-stdlib libpython2.7
  libpython2.7-minimal libpython2.7-stdlib libreadline5
  libspice-client-glib-2.0-8 libspice-client-gtk-3.0-5 libssl1.1
  libusbredirhost1 libvirt-clients libvirt-daemon
  libvirt-daemon-driver-storage-rbd libvirt-daemon-system libvirt-glib-1.0-0
  libvirt0 libxml2-utils lvm2 osinfo-db python python-asn1crypto python-cairo
  python-certifi python-cffi-backend python-chardet python-cryptography
  python-dbus python-enum34 python-gi python-gi-cairo python-idna
  python-ipaddr python-ipaddress python-libvirt python-libxml2 python-minimal
  python-openssl python-pkg-resources python-requests python-six
  python-urllib3 python2.7 python2.7-minimal spice-client-glib-usb-acl-helper
Suggested packages:
  augeas-doc augeas-tools libosinfo-l10n gstreamer1.0-plugins-bad
  gstreamer1.0-libav libvirt-daemon-driver-storage-gluster
  libvirt-daemon-driver-storage-sheepdog libvirt-daemon-driver-storage-zfs
  numad radvd auditd systemtap nfs-common zfsutils pm-utils
root@tce-VirtualBox:~# apt-get install libvirt-bin qemu-system virt-manager bri
dge-utils
Reading package lists... Done
Building dependency tree
Reading state information... Done
bridge-utils is already the newest version (1.5-15ubuntu1).
bridge-utils set to manually installed.
virt-manager is already the newest version (1:1.5.1-0ubuntu1.2).
The following additional packages will be installed:
  qemu-slof qemu-system-arm qemu-system-mips qemu-system-misc qemu-system-ppc
  qemu-system-s390x qemu-system-sparc
Suggested packages:
  qemu samba vde2 qemu-efi openbios-ppc openhackware openbios-sparc
The following NEW packages will be installed:
  libvirt-bin qemu-slof qemu-system qemu-system-arm qemu-system-mips
  qemu-system-misc qemu-system-ppc qemu-system-s390x qemu-system-sparc
0 upgraded, 9 newly installed, 0 to remove and 730 not upgraded.
Need to get 41.1 MB of archives.
After this operation, 219 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 libvirt-bin
amd64 4.0.0-1ubuntu8.21 [5,796 B]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 qemu-system
-arm amd64 1:2.11+dfsg-1ubuntu7.39 [5,649 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 qemu-sy
stem-mips amd64 1:2.11+dfsg-1ubuntu7.39 [9,509 kB]
22% [3 qemu-system-mips 3,267 kB/9,509 kB 34%] 1,231 kB/s 26s

```

7. Restart the system and check status



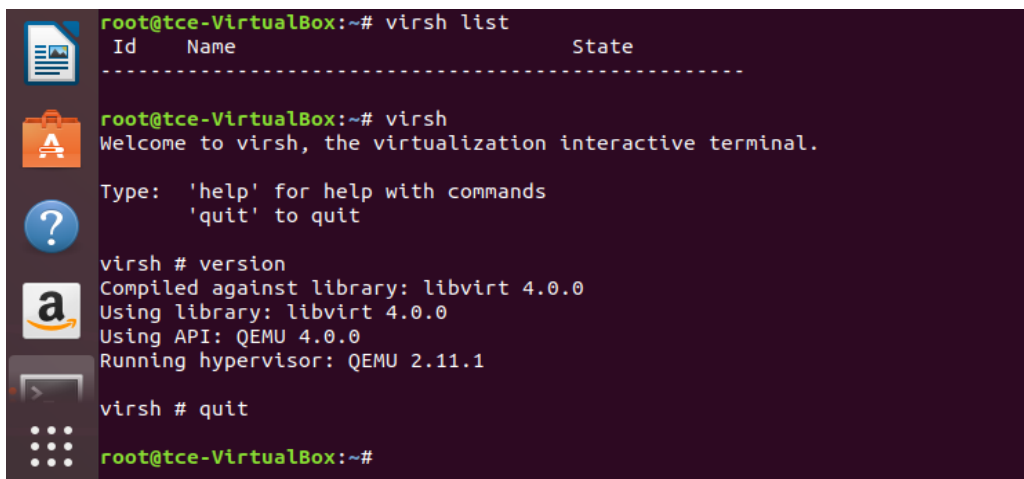
```

root@tce-VirtualBox:~# /etc/init.d/libvirtd restart
[ ok ] Restarting libvirtd (via systemctl): libvirtd.service.
root@tce-VirtualBox:~# /etc/init.d/libvirtd status
● libvirtd.service - Virtualization daemon
   Loaded: loaded (/lib/systemd/system/libvirtd.service; enabled; vendor preset: enabled)
   Active: active (running) since Sat 2022-05-14 12:51:54 IST; 8s ago
     Docs: man:libvirtd(8)
           https://libvirt.org
   Main PID: 16810 (libvirtd)
      Tasks: 22 (limit: 32768)
    CGroup: /system.slice/libvirtd.service
            └─ 7927 /usr/sbin/dnsmasq --conf-file=/var/lib/libvirt/dnsmasq/de...er
               7928 /usr/sbin/dnsmasq --conf-file=/var/lib/libvirt/dnsmasq/de...er
               16810 /usr/sbin/libvirtd
               16971 /usr/bin/qemu-system-ppc -S -no-user-config -nodefaults -...ze

May 14 12:51:53 tce-VirtualBox systemd[1]: libvirtd.service: Found left-over files. This usually indicates unclean shutdown.
May 14 12:51:53 tce-VirtualBox systemd[1]: This usually indicates unclean shutdown.
May 14 12:51:53 tce-VirtualBox systemd[1]: libvirtd.service: Found left-over files. This usually indicates unclean shutdown.
May 14 12:51:53 tce-VirtualBox systemd[1]: This usually indicates unclean shutdown.
May 14 12:51:53 tce-VirtualBox systemd[1]: Starting Virtualization daemon...
May 14 12:51:54 tce-VirtualBox systemd[1]: Started Virtualization daemon.
May 14 12:51:55 tce-VirtualBox dnsmasq[7927]: read /etc/hosts - 7 addresses
May 14 12:51:55 tce-VirtualBox dnsmasq[7927]: read /var/lib/libvirt/dnsmasq/de...ses
May 14 12:51:55 tce-VirtualBox dnsmasq-dhcp[7927]: read /var/lib/libvirt/dnsmasq/de...le
Hint: Some lines were ellipsized, use -l to show in full.
root@tce-VirtualBox:~#

```

8. virsh-list



```

root@tce-VirtualBox:~# virsh list
 Id      Name                                     State
-----
root@tce-VirtualBox:~# virsh
Welcome to virsh, the virtualization interactive terminal.

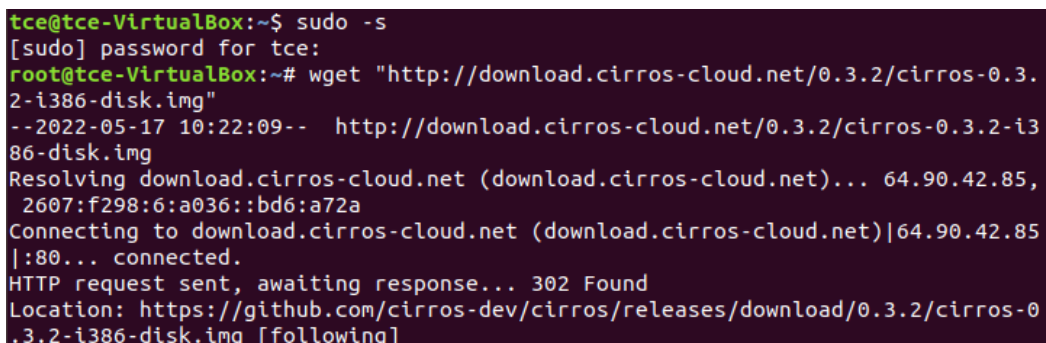
Type: 'help' for help with commands
      'quit' to quit

virsh # version
Compiled against library: libvirt 4.0.0
Using library: libvirt 4.0.0
Using API: QEMU 4.0.0
Running hypervisor: QEMU 2.11.1

virsh # quit
root@tce-VirtualBox:~#

```

9. Download "http://download.cirros-cloud.net/0.3.2/cirros-0.3.2-i386-disk.img"

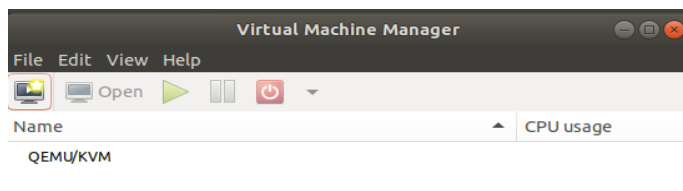


```

tce@tce-VirtualBox:~$ sudo -s
[sudo] password for tce:
root@tce-VirtualBox:~# wget "http://download.cirros-cloud.net/0.3.2/cirros-0.3.2-i386-disk.img"
--2022-05-17 10:22:09--  http://download.cirros-cloud.net/0.3.2/cirros-0.3.2-i386-disk.img
Resolving download.cirros-cloud.net (download.cirros-cloud.net)... 64.90.42.85, 2607:f298:6:a036::bd6:a72a
Connecting to download.cirros-cloud.net (download.cirros-cloud.net)|64.90.42.85|:80... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://github.com/cirros-dev/cirros/releases/download/0.3.2/cirros-0.3.2-i386-disk.img [following]

```

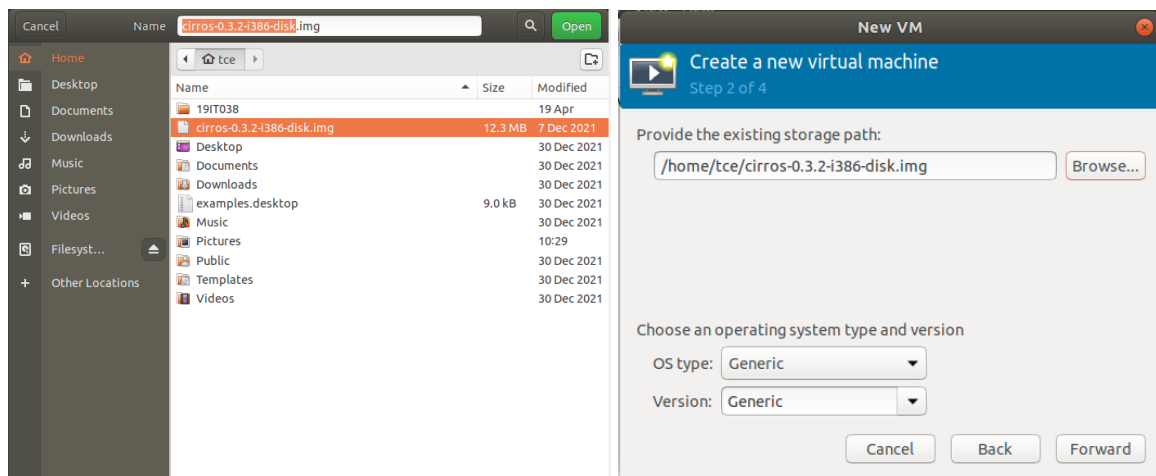
10. Open virt-manager



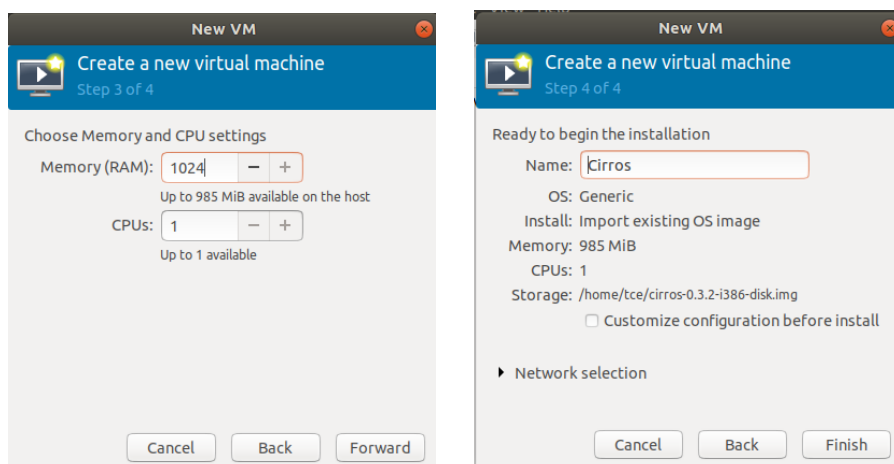
11. Create new virtual machine -> import existing disk image

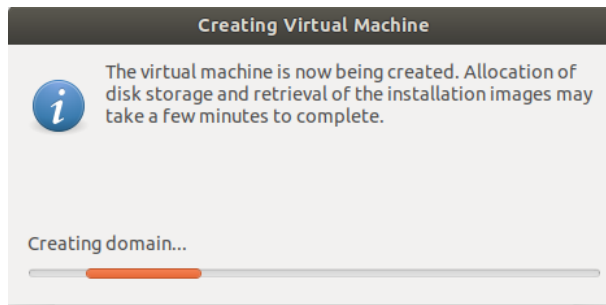


12. Choose the cirros disk image



13. Memory RAM = 1024MB , CPUs = 1, Set name to “cirros”





14. Boot VM

```
File Virtual Machine View Send Key

[ 11.064325] EISA: Detected 0 cards.
[ 11.131090] cpufreq-nforce2: No nForce2 chipset.
[ 11.161833] cpuidle: using governor ladder
[ 11.194757] cpuidle: using governor menu
[ 11.210632] EFI Variables Facility v0.08 2004-May-17
[ 11.322791] TCP cubic registered
[ 11.348690] NET: Registered protocol family 10
[ 11.522277] NET: Registered protocol family 17
[ 11.547259] Registering the dns_resolver key type
[ 11.578452] Using IPI No-Shortcut mode
[ 11.658090] registered taskstats version 1
[ 11.842133] Freeing initrd memory: 3120k freed
[ 12.429283] Magic number: 6:367:622
[ 12.433895] rtc_cmos 00:01: setting system clock to 2022-05-14 07:38:36 UTC (
1652513916)
[ 12.439094] powernow-k8: Processor cpuid 663 not supported
[ 12.456867] BIOS EDD facility v0.16 2004-Jun-25, 0 devices found
[ 12.483325] EDD information not available.
[ 12.575990] Freeing unused kernel memory: 748k freed
[ 12.721604] Write protecting the kernel text: 5856k
[ 12.726037] Write protecting the kernel read-only data: 2392k
[ 12.730059] NX-protecting the kernel data: 5408k

further output written to /dev/ttyS0
-

login as 'cirros' user. default password: 'cubswin:~'. use 'sudo' for root.
cirros login: cirros
Password:
$ sudo
usage: sudo [-D level] -h | -K | -k | -U
usage: sudo -v [-AknS] [-D level] [-g groupname:#gid] [-p prompt] [-u user
name:#uid]
usage: sudo -l[!] [-AknS] [-D level] [-g groupname:#gid] [-p prompt] [-U user
name] [-u user name:#uid] [-g groupname:#gid] [command]
usage: sudo [-AbEHknPS] [-C fd] [-D level] [-g groupname:#gid] [-p prompt] [-u
user name:#uid] [-g groupname:#gid] [VAR=value] [-i|-s] [<command>]
usage: sudo -e [-AknS] [-C fd] [-D level] [-g groupname:#gid] [-p prompt] [-u
user name:#uid] file ...
$
```

Result

Thus, KVM is installed in Linux, and virtual machine is created.