Experiment – 2

NAME: Ronak Surve
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SUBJECT NAME AND CODE: CSL605 Cloud Computing

To study and implement Hosted Virtualization using VirtualBox& KVM.	
Learning Objective:	To make students familiar with virtualization softwares.
Learning Outcome:	Students will be able to implement Hosted Virtualization using VirtualBox& KVM.
Course Outcome:	**CSL605.1**
Program Outcome:	3.Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. 5.Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
Bloom's Taxonomy Level:	Analysis,Apply
Theory:	1.Explain Virtualization along with their types. Virtualization is the creation of a virtual version of something, such as a operating system, a server, a storage device, or network resources. It allows multiple systems to run on a single physical machine, by creating a layer of abstraction between the physical hardware and the software. There are several types of virtualization, including: 1. Server virtualization: This type of virtualization allows multiple virtual servers to run on a single physical server. Each virtual server can run its own operating system and applications, as if it were a separate physical machine. 2. Desktop virtualization: This type of virtualization allows multiple virtual desktops to run on a single physical machine. Each virtual desktop can have its own operating system, applications, and user settings, as if it were a separate physical machine. 3. Network virtualization: This type of virtualization allows multiple virtual networks to run on a single physical network. Each virtual network can have its own IP addresses, routing, and security policies, as if it were a separate physical network. 4. Storage virtualization: This type of virtualization allows multiple virtual

	storage devices to run on a single physical storage device. Each virtual storage device can have its own capacity, performance, and data protection policies, as if it were a separate physical storage device. 5. Application virtualization: This type of virtualization allows applications to run on a virtual environment, rather than directly on the host operating system. This allows multiple versions of an application or multiple applications to run on the same system without interfering with each other. 6. Hardware Virtualization: This type of virtualization allows multiple virtual machines to run on a single physical machine by creating virtual copies of the physical resources like CPU, memory, storage and network. These types of virtualization have different use cases and advantages, depending on the needs of the organization. They are widely used in data centers, cloud computing, and other IT environments to improve resource utilization, increase flexibility, and reduce costs.
Procedure	Creating and running Virtual machines inside hosted hypervisors like VirtualBox and KVM.
Steps	1. Download and install a virtualization software such as VMware, VirtualBox, or Hyper-V. 2. Create a new virtual machine using the virtualization software and select the operating system you want to install. 3. Allocate the necessary resources such as RAM and storage space to the virtual machine. 4. Insert the installation media (ISO file or DVD) for the operating system you want to install. 5. Start the virtual machine and begin the installation process as you would on a physical machine. 6. Once the installation is complete, you can configure the virtual machine settings and start using it.

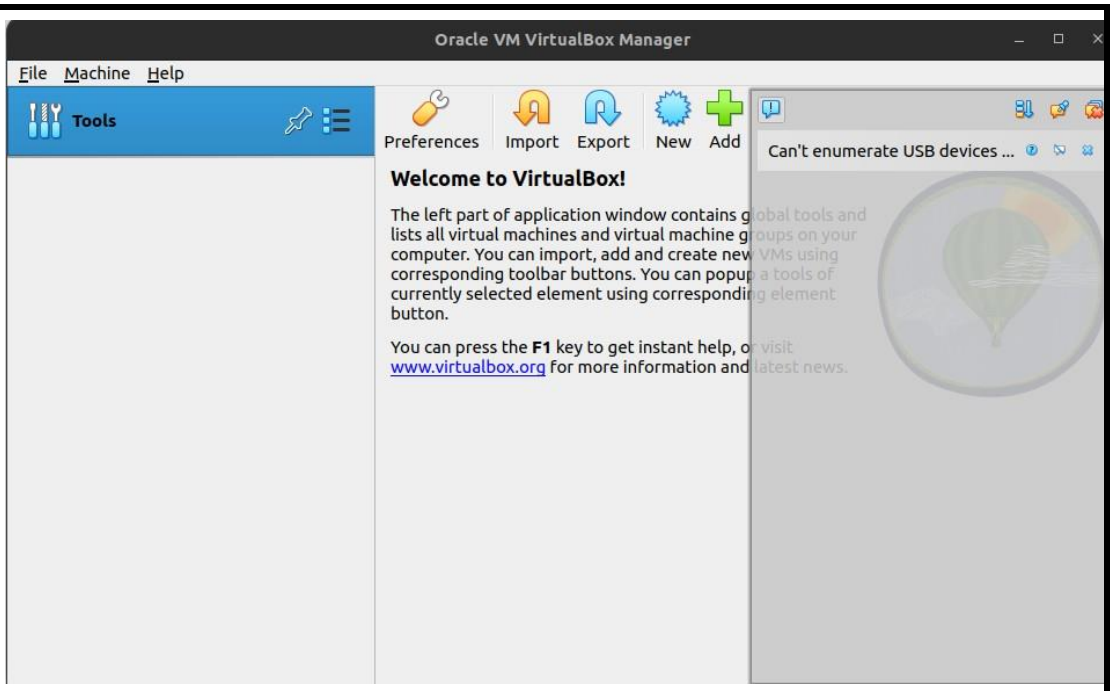
Outcome :

Installing VirtualBox

```
boris@HoneyBadger:~$ cd Downloads/
boris@HoneyBadger:~/Downloads$ sudo dpkg -i virtualbox-7.0_7.0.6-155176_Ubuntu_jammy_amd64.deb
[sudo] password for boris:
Selecting previously unselected package virtualbox-7.0.
(Reading database ... 271470 files and directories currently installed.)
Preparing to unpack virtualbox-7.0_7.0.6-155176_Ubuntu_jammy_amd64.deb ...
Unpacking virtualbox-7.0 (7.0.6-155176~Ubuntu~jammy) ...
dpkg: dependency problems prevent configuration of virtualbox-7.0:
 virtualbox-7.0 depends on libqt5help5 (>= 5.15.1); however:
  Package libqt5help5 is not installed.
 virtualbox-7.0 depends on libqt5opengl5 (>= 5.0.2); however:
  Package libqt5opengl5 is not installed.
 virtualbox-7.0 depends on libqt5x11extras5 (>= 5.6.0); however:
  Package libqt5x11extras5 is not installed.
 virtualbox-7.0 depends on libqt5xml5 (>= 5.0.2); however:
  Package libqt5xml5 is not installed.

dpkg: error processing package virtualbox-7.0 (--install):
 dependency problems - leaving unconfigured
Processing triggers for mailcap (3.70+nmu1ubuntu1) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu3) ...
Processing triggers for desktop-file-utils (0.26-1ubuntu3) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for shared-mime-info (2.1-2) ...
Errors were encountered while processing:
 virtualbox-7.0
boris@HoneyBadger:~/Downloads$ sudo apt -f install
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Correcting dependencies... Done
The following packages were automatically installed and are no longer required:
```

```
boris@HoneyBadger:~/Downloads$ sudo apt -f install
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Correcting dependencies... Done
The following packages were automatically installed and are no longer required:
  chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi i965-va-driver intel-media-va-driver libaacs0 libass9 libavcodec58 libavformat58 libavutil56 libbdplus0
  libbluray2 libbs2b0 libchromaprint1 libcodec2-1.0 libflashrom1 libflite1 libftdi1-2 libgme0 libgsm1 libgstreamer-plugins-bad1.0-0 libigdgmm12 liblilv-0-0
  libmfx1 libmysofa1 libnorm1 libnvidia-cfg1-515 libnvidia-common-515 libnvidia-decode-515 libnvidia-egl-wayland1 libnvidia-encode-515 libnvidia-extra-515
  libnvidia-fbc1-515 libnvidia-gl-515 libopenmpt0 libpgm-5.3-0 libpostproc55 librabbitmq4 librubberband2 libserd-0-0 libshine3 libsord-0-0 libsratom-0-0
  libsrt1.4-gnutls libswresample3 libswscale5 libudfread0 libva-drm2 libva-wayland2 libva-x11-2 libva2 libvdpau1 libvidstab1.1 libxnvctrl0 libxvidcore4
  libzmq5 libzvbi-common libzvbi0 mesa-va-drivers mesa-vdpau-drivers nvidia-compute-utils-515 nvidia-kernel-source-515 nvidia-settings
  nvidia-utils-515 pkg-config pocketsphinx-en-us screen-resolution-extra va-driver-all vdpau-driver-all xserver-xorg-video-nvidia-515
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  libqt5help5 libqt5opengl5 libqt5sql5 libqt5sql5-sqlite libqt5x11extras5 libqt5xml5
The following NEW packages will be installed:
  libqt5help5 libqt5opengl5 libqt5sql5 libqt5sql5-sqlite libqt5x11extras5 libqt5xml5
0 upgraded, 6 newly installed, 0 to remove and 56 not upgraded.
1 not fully installed or removed.
Need to get 626 kB of archives.
After this operation, 2,446 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 libqt5sql5 amd64 5.15.3+dfsg-2ubuntu0.2 [123 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 libqt5help5 amd64 5.15.3-1 [162 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 libqt5opengl5 amd64 5.15.3+dfsg-2ubuntu0.2 [153 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 libqt5x11extras5 amd64 5.15.3-1 [10.9 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 libqt5xml5 amd64 5.15.3+dfsg-2ubuntu0.2 [124 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 libqt5sql5-sqlite amd64 5.15.3+dfsg-2ubuntu0.2 [53.0 kB]
Fetched 626 kB in 3s (189 kB/s)
Selecting previously unselected package libqt5sql5:amd64.
(Reading database ... 272205 files and directories currently installed.)
Preparing to unpack .../0-libqt5sql5_5.15.3+dfsg-2ubuntu0.2_amd64.deb ...
Unpacking libqt5sql5:amd64 (5.15.3+dfsg-2ubuntu0.2) ...
Selecting previously unselected package libqt5help5:amd64.
Preparing to unpack .../1-libqt5help5_5.15.3-1_amd64.deb ...
Unpacking libqt5help5:amd64 (5.15.3-1) ...
Selecting previously unselected package libqt5opengl5:amd64.
Preparing to unpack .../2-libqt5opengl5_5.15.3+dfsg-2ubuntu0.2_amd64.deb ...
Unpacking libqt5opengl5:amd64 (5.15.3+dfsg-2ubuntu0.2) ...
Selecting previously unselected package libqt5x11extras5:amd64.
Preparing to unpack .../3-libqt5x11extras5_5.15.3-1_amd64.deb ...
Unpacking libqt5x11extras5:amd64 (5.15.3-1) ...
Selecting previously unselected package libqt5xml5:amd64.
Preparing to unpack .../4-libqt5xml5_5.15.3+dfsg-2ubuntu0.2_amd64.deb ...
Unpacking libqt5xml5:amd64 (5.15.3+dfsg-2ubuntu0.2) ...
Selecting previously unselected package libqt5sql5-sqlite:amd64.
Preparing to unpack .../5-libqt5sql5-sqlite_5.15.3+dfsg-2ubuntu0.2_amd64.deb ...
Unpacking libqt5sql5-sqlite:amd64 (5.15.3+dfsg-2ubuntu0.2) ...
Setting up libqt5x11extras5:amd64 (5.15.3-1) ...
Setting up libqt5sql5:amd64 (5.15.3+dfsg-2ubuntu0.2) ...
Setting up libqt5xml5:amd64 (5.15.3+dfsg-2ubuntu0.2) ...
Setting up libqt5opengl5:amd64 (5.15.3+dfsg-2ubuntu0.2) ...
Setting up libqt5sql5-sqlite:amd64 (5.15.3+dfsg-2ubuntu0.2) ...
Setting up libqt5help5:amd64 (5.15.3-1) ...
Setting up virtualbox-7.0 (7.0.6-155176~Ubuntu~jammy) ...
Adding group `vboxusers' (GID 140) ...
Done.
Processing triggers for libc-bin (2.35-0ubuntu3.1) ...
boris@HoneyBadger:~/Downloads$
```



Installing KVM

```
boris@HoneyBadger:~/Downloads$  sudo apt update
Ign:1 https://storage.googleapis.com/download.dartlang.org/linux/debian stable InRelease
Hit:2 https://dl.google.com/linux/chrome/deb stable InRelease
Hit:3 https://storage.googleapis.com/download.dartlang.org/linux/debian stable Release
Hit:4 http://in.archive.ubuntu.com/ubuntu jammy InRelease
Get:5 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu jammy-updates InRelease [114 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu jammy-backports InRelease [99.8 kB]
Get:9 http://security.ubuntu.com/ubuntu jammy-security/main amd64 DEP-11 Metadata [41.4 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [839 kB]
Get:11 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 DEP-11 Metadata [13.3 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu jammy-updates/main i386 Packages [418 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 DEP-11 Metadata [101 kB]
Get:14 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [793 kB]
Get:15 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe i386 Packages [566 kB]
Get:16 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 DEP-11 Metadata [265 kB]
Hit:17 https://download.sublimetext.com apt/stable/ InRelease
Get:18 http://in.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 DEP-11 Metadata [940 B]
Get:19 http://in.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 DEP-11 Metadata [12.4 kB
Fetched 3,375 kB in 6s (596 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
9 packages can be upgraded. Run 'apt list --upgradable' to see them.
W: https://download.sublimetext.com/apt/stable/InRelease: Key is stored in legacy trusted.gpg keyr
```

```
boris@HoneyBadger:~/Downloads$ sudo apt upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following packages were automatically installed and are no longer required:
  chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi i965-va-driver intel-media-va-driver libaacs0 libass9
  libchromaprint1 libcodec2-1.0 libflashrom1 libflite1 libftdi1-2 libgme0 libgsm1 libgstreamer-plugins-b
  libnvidia-common-515 libnvidia-decode-515 libnvidia-egl-wayland1 libnvidia-encode-515 libnvidia-extra-
  librabbitmq4 librubberband2 libserd-0-0 libshine3 libsord-0-0 libsratom-0-0 libsrt1.4-gnutls libswresa
  libvidstab1.1 libxnvctrl0 libxvidcore4 libzimg2 libzmq5 libzvbi-common libzvbi0 mesa-va-drivers mesa-v
  nvidia-utils-515 pkg-config pocketsphinx-en-us screen-resolution-extra va-driver-all vdpau-driver-all
Use 'sudo apt autoremove' to remove them.
#
# News about significant security updates, features and services will
# appear here to raise awareness and perhaps tease /r/Linux ;)
# Use 'pro config set apt_news=false' to hide this and future APT news.
#
The following packages have been kept back:
  gnome-remote-desktop linux-modules-nvidia-515-generic-hwe-22.04 nvidia-kernel-common-515 python3-softw
  ubuntu-advantage-tools update-notifier update-notifier-common
0 upgraded, 0 newly installed, 0 to remove and 9 not upgraded.
```

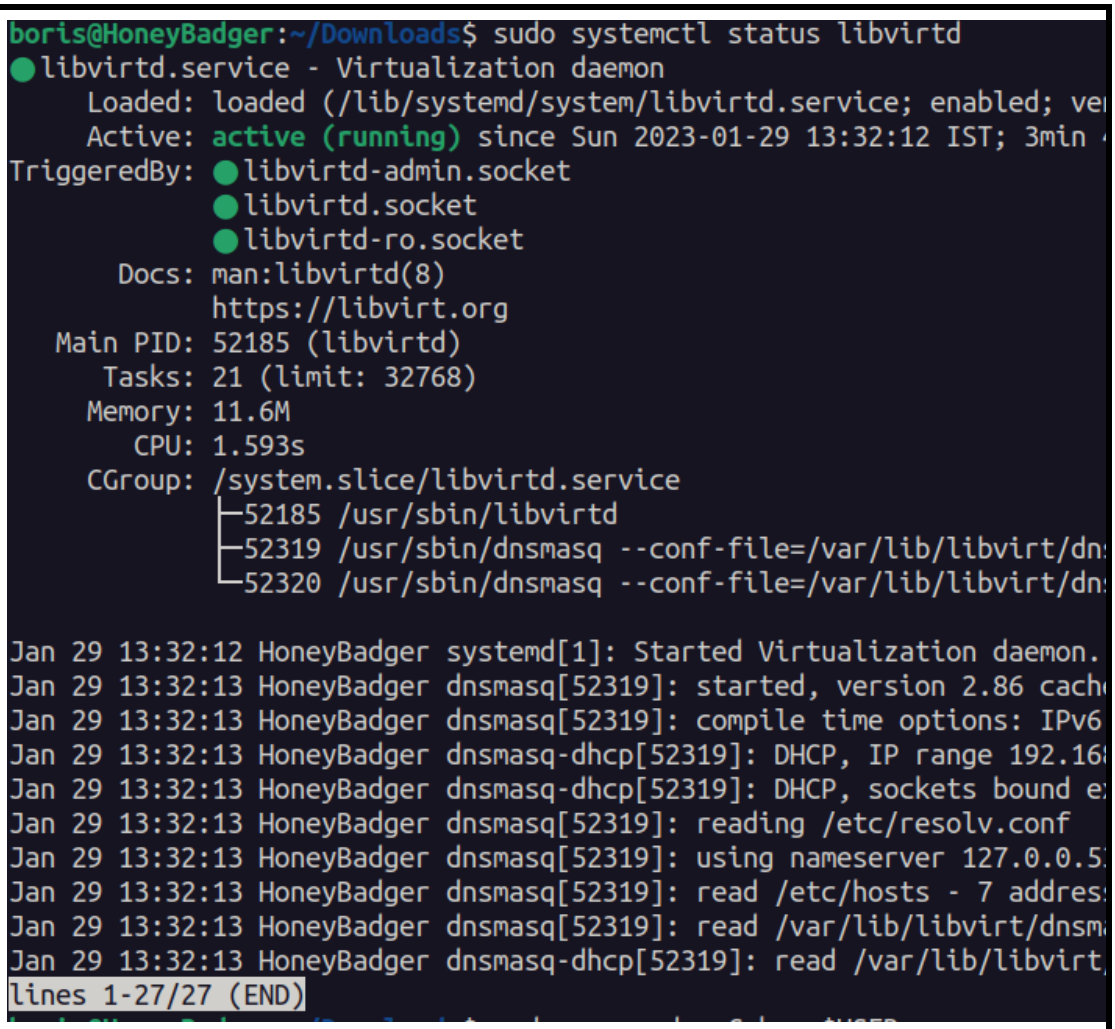
```
boris@HoneyBadger:~/Downloads$ sudo apt install cpu-checker
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi i965-va-driver intel-media-va
  libchromaprint1 libcodec2-1.0 libflashrom1 libflite1 libftdi1-2 libgme0 libgs
  libnvidia-common-515 libnvidia-decode-515 libnvidia-egl-wayland1 libnvidia-en
  librabbitmq4 librubberband2 libserd-0-0 libshine3 libsord-0-0 libsratom-0-0 li
  libvidstab1.1 libxnvctrl0 libxvidcore4 libzimg2 libzmq5 libzvbi-common libzvb
  nvidia-utils-515 pkg-config pocketsphinx-en-us screen-resolution-extra va-dri
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  msr-tools
The following NEW packages will be installed:
  cpu-checker msr-tools
0 upgraded, 2 newly installed, 0 to remove and 9 not upgraded.
Need to get 17.1 kB of archives.
After this operation, 67.6 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 msr-tools amd64 1.3-
Get:2 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 cpu-checker amd64 0.
Fetched 17.1 kB in 1s (19.2 kB/s)
Selecting previously unselected package msr-tools.
(Reading database ... 272631 files and directories currently installed.)
Preparing to unpack .../msr-tools_1.3-4_amd64.deb ...
Unpacking msr-tools (1.3-4) ...
Selecting previously unselected package cpu-checker.
Preparing to unpack .../cpu-checker_0.7-1.3build1_amd64.deb ...
Unpacking cpu-checker (0.7-1.3build1) ...
Setting up msr-tools (1.3-4) ...
Setting up cpu-checker (0.7-1.3build1) ...
Processing triggers for man-db (2.10.2-1) ...
```

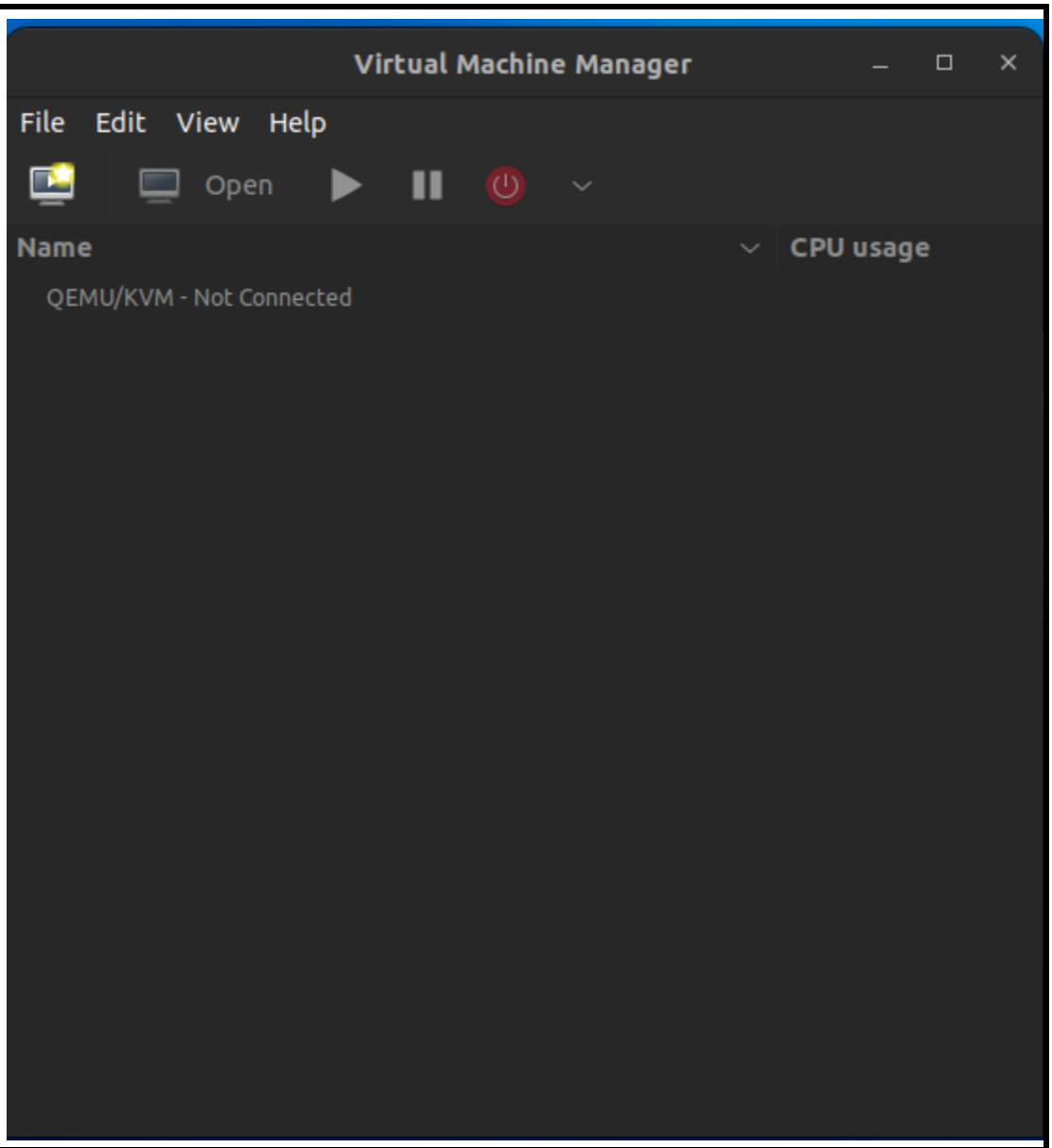
```
boris@HoneyBadger:~/Downloads$ kvm-ok
INFO: /dev/kvm exists
KVM acceleration can be used
```

```
boris@HoneyBadger:~/Downloads$ sudo apt install -y qemu-kvm virt-manager libvirt-daemon-system virtinst libvirt-clients
bridge-utils
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Note, selecting 'qemu-system-x86' instead of 'qemu-kvm'
The following packages were automatically installed and are no longer required:
  chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi libaacs0 libass9 libavcodec58 libavformat58 libavutil56 libbdplus0 libbluray2 libbs2b0 libchr
  libflite1 libftdi1-2 libgme0 libgsm1 libgstreamer-plugins-bad1.0-0 liblilv-0-0 libmfx1 libmysofa1 libnorm1 libnvidia-cfg1-515 libnvidia-comm
  libnvidia-egl-wayland1 libnvidia-encode-515 libnvidia-extra-515 libnvidia-fbc1-515 libnvidia-gl-515 libopenmpt0 libpgm-5.3-0 libpostproc55 li
  libshine3 libsord-0-0 libsratom-0-0 libsrt1.4-gnutls libswresample3 libswscale5 libudfread0 libva-drm2 libva-wayland2 libvdpau1 libvidstab1.1
  libzvbi-common libzvbi0 mesa-vdpau-drivers nvidia-compute-utils-515 nvidia-kernel-source-515 nvidia-settings nvidia-utils-515 pkg-config pock
  vdpau-driver-all xserver-xorg-video-nvidia-515
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  gir1.2-ayatanaappindicator3-0.1 gir1.2-gtk-vnc-2.0 gir1.2-libosinfo-1.0 gir1.2-libvirt-glib-1.0 gir1.2-spiceclientglib-2.0 gir1.2-spiceclient
  ipxe-qemu-256k-compat-efi-roms jq libburn4 libcacard0 libdaxctl1 libdecor-0-0 libdecor-0-plugin-1-cairo libfdt1 libgfapi0 libgfrpc0 libgfxdr0
  libgtk-vnc-2.0-0 libgvnc-1.0-0 libibverbs1 libiscsi7 libisoburn1 libisofs6 libjq1 libjte2 libndctl6 libnss-mymachines libosinfo-1.0-0 libphod
  libpmemobj1 librados2 librbd1 librdmacm1 libsdl2-2.0-0 libslirp0 libspice-client-glib-2.0-8 libspice-client-gtk-3.0-5 libspice-server1 libtpm
  libusbredirparser1 libvirglrenderer1 libvirt-daemon libvirt-daemon-config-network libvirt-daemon-config-nwfilter libvirt-daemon-driver-qemu l
  libvirt-glib-1.0-0 libvirt-glib-1.0-data libvirt0 libxml2-utils mdevctl osinfo-db ovmf python3-libvirt python3-libxml2 qemu-block-extra qemu-
  qemu-system-gui qemu-utils seabios spice-client-glib-usb-acl-helper swtpm swtpm-tools systemd-container virt-viewer xorriso
Suggested packages:
  libosinfo-l10n gstreamer1.0-libav gstreamer1.0-plugins-bad libvirt-login-shell libvirt-daemon-driver-storage-gluster libvirt-daemon-driver-st
  libvirt-daemon-driver-storage-rbd libvirt-daemon-driver-storage-zfs libvirt-daemon-driver-lxc libvirt-daemon-driver-vbox libvirt-daemon-drive
  pm-utils systemtap zfsutils samba vde2 debootstrap trousers python3-guestfs ssh-askpass python3-argcomplete xorriso-tcltk jigit cdck
The following NEW packages will be installed:
  gir1.2-ayatanaappindicator3-0.1 gir1.2-gtk-vnc-2.0 gir1.2-libosinfo-1.0 gir1.2-libvirt-glib-1.0 gir1.2-spiceclientglib-2.0 gir1.2-spiceclient
  ipxe-qemu-256k-compat-efi-roms jq libburn4 libcacard0 libdaxctl1 libdecor-0-0 libdecor-0-plugin-1-cairo libfdt1 libgfapi0 libgfrpc0 libgfxdr0
  libgtk-vnc-2.0-0 libgvnc-1.0-0 libibverbs1 libiscsi7 libisoburn1 libisofs6 libjq1 libjte2 libndctl6 libnss-mymachines libosinfo-1.0-0 libphod
  libpmemobj1 librados2 librbd1 librdmacm1 libsdl2-2.0-0 libslirp0 libspice-client-glib-2.0-8 libspice-client-gtk-3.0-5 libspice-server1 libtpm
  libusbredirparser1 libvirglrenderer1 libvirt-clients libvirt-daemon libvirt-daemon-config-network libvirt-daemon-config-nwfilter libvirt-daem
  libvirt-daemon-system-systemd libvirt-glib-1.0-0 libvirt-glib-1.0-data libvirt0 libxml2-utils mdevctl osinfo-db ovmf python3-libvirt python3-
  qemu-system-data qemu-system-gui qemu-system-x86 qemu-utils seabios spice-client-glib-usb-acl-helper swtpm swtpm-tools systemd-container virt
0 upgraded, 81 newly installed, 0 to remove and 9 not upgraded.
Need to get 43.6 MB of archives.
After this operation, 162 MB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 gir1.2-ayatanaappindicator3-0.1 amd64 0.5.90-7ubuntu2 [5,822 B]
Get:2 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 libgvnc-1.0-0 amd64 1.3.0-1ubuntu1 [67.7 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 libgtk-vnc-2.0-0 amd64 1.3.0-1ubuntu1 [30.8 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 gir1.2-gtk-vnc-2.0 amd64 1.3.0-1ubuntu1 [12.2 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 spice-client-glib-usb-acl-helper amd64 0.39-3ubuntu1 [11.8 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libcacard0 amd64 1:2.8.0-3build2 [38.0 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 libphodav-2.0-common all 2.5-1 [12.5 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 libphodav-2.0-0 amd64 2.5-1 [28.7 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libusbredirparser1 amd64 0.11.0-2build1 [15.9 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libusbredirhost1 amd64 0.11.0-2build1 [19.7 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 libspice-client-glib-2.0-8 amd64 0.39-3ubuntu1 [326 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 gir1.2-spiceclientglib-2.0 amd64 0.39-3ubuntu1 [14.3 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 libspice-client-gtk-3.0-5 amd64 0.39-3ubuntu1 [62.0 kB]
Get:14 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 gir1.2-spiceclientgtk-3.0 amd64 0.39-3ubuntu1 [5,610 B]
Get:15 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libibverbs1 amd64 39.0-1 [69.3 kB]
Get:16 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 ibverbs-providers amd64 39.0-1 [341 kB]
Get:17 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 ipxe-qemu all 1.21.1+git-20220113.fbbdc3926-0ubuntu1 [1,569 kB]
Get:18 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 ipxe-qemu-256k-compat-efi-roms all 1.0.0+git-20150424.a25a16d-0ubuntu4 [552 kB]
Get:19 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libjq1 amd64 1.6-2.1ubuntu3 [133 kB]
Get:20 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 jq amd64 1.6-2.1ubuntu3 [52.5 kB]
Get:21 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 libburn4 amd64 1.5.4-1 [162 kB]
Get:22 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libdaxctl1 amd64 72.1-1 [19.8 kB]
Get:23 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libdecor-0-0 amd64 0.1.0-3build1 [15.1 kB]
Get:24 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libdecor-0-plugin-1-cairo amd64 0.1.0-3build1 [20.4 kB]
Get:25 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libgfxdr0 amd64 10.1-1 [22.1 kB]
Get:26 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libglusterfs0 amd64 10.1-1 [288 kB]
Get:27 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libgfrpc0 amd64 10.1-1 [47.1 kB]
Get:28 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libgfapi0 amd64 10.1-1 [77.3 kB]
Get:29 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 libgovirt-common all 0.3.8-1 [19.7 kB]
Get:30 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 libgovirt2 amd64 0.3.8-1 [46.0 kB]
Get:31 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 librdmacm1 amd64 39.0-1 [71.2 kB]
Get:32 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libiscsi7 amd64 1.19.0-3build2 [70.6 kB]
Get:33 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 libjte2 amd64 1.22-3build1 [27.0 kB]
Get:34 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 libisofs6 amd64 1.5.4-1 [210 kB]
Get:35 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 libisoburn1 amd64 1.5.4-2 [402 kB]
Get:36 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libndctl6 amd64 72.1-1 [57.7 kB]
Get:37 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libpmem1 amd64 1.11.1-3build1 [81.4 kB]
Get:38 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libpmemobj1 amd64 1.11.1-3build1 [124 kB]
Get:39 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 librados2 amd64 17.2.0-0ubuntu0.22.04.2 [3,562 kB]
Get:40 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 librbd1 amd64 17.2.0-0ubuntu0.22.04.2 [3,539 kB]
Get:41 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libsdl2-2.0-0 amd64 2.0.20+dfsg-2ubuntu1.22.04.1 [582 kB]
Get:42 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libslirp0 amd64 4.6.1-1build1 [61.5 kB]
Get:43 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libspice-server1 amd64 0.15.0-2ubuntu4 [351 kB]
Get:44 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libtpms0 amd64 0.9.3-0ubuntu1 [384 kB]
Get:45 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 liburing2 amd64 2.1-2build1 [10.3 kB]
Get:46 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libvirglrenderer1 amd64 0.9.1-1~exp1ubuntu2 [188 kB]
Get:47 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libvirt0 amd64 8.0.0-1ubuntu7.4 [1,755 kB]
```

```
Setting up ipxe-qemu (1.21.1+git-20220113.fbbdc3926-0ubuntu1) ...
Setting up jq (1.6-2.1ubuntu3) ...
Setting up libdecor-0-0:amd64 (0.1.0-3build1) ...
Setting up libndctl6:amd64 (72.1-1) ...
Setting up ipxe-qemu-256k-compat-efi-roms (1.0.0+git-20150424.a25a16d-0ubuntu4) ...
Setting up libtpms0:amd64 (0.9.3-0ubuntu1) ...
Setting up libburn4:amd64 (1.5.4-1) ...
Setting up liburing2:amd64 (2.1-2build1) ...
Setting up libxml2-utils (2.9.13+dfsg-1ubuntu0.2) ...
Setting up libsdl2-2.0-0:amd64 (2.0.20+dfsg-2ubuntu1.22.04.1) ...
Setting up libvirt-daemon-config-nwfilter (8.0.0-1ubuntu7.4) ...
Setting up libpmem1:amd64 (1.11.1-3build1) ...
Setting up gir1.2-ayatanaappindicator3-0.1 (0.5.90-7ubuntu2) ...
Setting up libgtk-vnc-2.0-0:amd64 (1.3.0-1ubuntu1) ...
Setting up libgfxdr0:amd64 (10.1-1) ...
Setting up mdevctl (0.81-1) ...
Setting up libphodav-2.0-0:amd64 (2.5-1) ...
Setting up libisofs6:amd64 (1.5.4-1) ...
Setting up librdmacm1:amd64 (39.0-1) ...
Setting up librados2 (17.2.0-0ubuntu0.22.04.2) ...
Setting up qemu-system-common (1:6.2+dfsg-2ubuntu6.6) ...
Created symlink /etc/systemd/system/multi-user.target.wants/qemu-kvm.service → /lib/systemd/system/qemu-kvm.service.
Setting up python3-libvirt (8.0.0-1build1) ...
Setting up libvirt-clients (8.0.0-1ubuntu7.4) ...
Setting up gir1.2-libvirt-glib-1.0:amd64 (4.0.0-2) ...
Setting up qemu-system-x86 (1:6.2+dfsg-2ubuntu6.6) ...
Setting up libusbredirhost1:amd64 (0.11.0-2build1) ...
Setting up libosinfo-1.0-0:amd64 (1.8.0-1) ...
Setting up libnss-mymachines:amd64 (249.11-0ubuntu3.6) ...
First installation detected...
Checking NSS setup...
Setting up swtpm (0.6.3-0ubuntu3) ...
Setting up libpmemobj1:amd64 (1.11.1-3build1) ...
Setting up libdecor-0-plugin-1-cairo:amd64 (0.1.0-3build1) ...
Setting up libvirt-daemon-driver-qemu (8.0.0-1ubuntu7.4) ...
Setting up gir1.2-gtk-vnc-2.0:amd64 (1.3.0-1ubuntu1) ...
Setting up libisoburn1:amd64 (1.5.4-2) ...
Setting up librbd1 (17.2.0-0ubuntu0.22.04.2) ...
Setting up libvirt-daemon-system-systemd (8.0.0-1ubuntu7.4) ...
Setting up qemu-utils (1:6.2+dfsg-2ubuntu6.6) ...
Setting up libiscsi7:amd64 (1.19.0-3build2) ...
Setting up libvirt-daemon (8.0.0-1ubuntu7.4) ...
Setting up xorriso (1.5.4-2) ...
Setting up gir1.2-libosinfo-1.0:amd64 (1.8.0-1) ...
Setting up libspice-client-glib-2.0-8:amd64 (0.39-3ubuntu1) ...
Setting up libgfrpc0:amd64 (10.1-1) ...
Setting up virtinst (1:4.0.0-1) ...
Setting up gir1.2-spiceclientglib-2.0:amd64 (0.39-3ubuntu1) ...
Setting up qemu-system-gui (1:6.2+dfsg-2ubuntu6.6) ...
Setting up swtpm-tools (0.6.3-0ubuntu3) ...
Adding group `swtpm' (GID 142) ...
Done.
Warning: The home dir /var/lib/swtpm you specified can't be accessed: No such file or directory
Adding system user `swtpm' (UID 132) ...
Adding new user `swtpm' (UID 132) with group `swtpm' ...
Not creating home directory `/var/lib/swtpm'.
Setting up virt-manager (1:4.0.0-1) ...
Setting up libspice-client-gtk-3.0-5:amd64 (0.39-3ubuntu1) ...
Setting up libgfapi0:amd64 (10.1-1) ...
Setting up gir1.2-spiceclientgtk-3.0:amd64 (0.39-3ubuntu1) ...
Setting up virt-viewer (7.0-2build2) ...
Setting up libvirt-daemon-system (8.0.0-1ubuntu7.4) ...
Adding user libvirt-qemu to group libvirt-qemu
Enabling libvirt default network
Created symlink /etc/systemd/system/multi-user.target.wants/libvirtd.service → /lib/systemd/system/libvirtd.service.
Created symlink /etc/systemd/system/sockets.target.wants/virtlockd.socket → /lib/systemd/system/virtlockd.socket.
Created symlink /etc/systemd/system/sockets.target.wants/virtlogd.socket → /lib/systemd/system/virtlogd.socket.
Created symlink /etc/systemd/system/sockets.target.wants/libvirtd.socket → /lib/systemd/system/libvirtd.socket.
Created symlink /etc/systemd/system/sockets.target.wants/libvirtd-ro.socket → /lib/systemd/system/libvirtd-ro.socket.
Created symlink /etc/systemd/system/multi-user.target.wants/libvirt-guests.service → /lib/systemd/system/libvirt-guests.servic
virtlockd.service is a disabled or a static unit, not starting it.
virtlogd.service is a disabled or a static unit, not starting it.
Created symlink /etc/systemd/system/sockets.target.wants/libvirtd-admin.socket → /lib/systemd/system/libvirtd-admin.socket.
Created symlink /etc/systemd/system/sockets.target.wants/virtlockd-admin.socket → /lib/systemd/system/virtlockd-admin.socket.
Created symlink /etc/systemd/system/sockets.target.wants/virtlogd-admin.socket → /lib/systemd/system/virtlogd-admin.socket.
Setting up libvirt-daemon dnsmasq configuration.
Setting up qemu-block-extra (1:6.2+dfsg-2ubuntu6.6) ...
Created symlink /etc/systemd/system/multi-user.target.wants/run-qemu.mount → /lib/systemd/system/run-qemu.mount.
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu3) ...
Processing triggers for libglib2.0-0:amd64 (2.72.4-0ubuntu1) ...
Processing triggers for libc-bin (2.35-0ubuntu3.1) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for dbus (1.12.20-2ubuntu4.1) ...
Processing triggers for shared-mime-info (2.1-2) ...
Processing triggers for install-info (6.8-4build1) ...
Processing triggers for mailcap (3.70+nmu1ubuntu1) ...
Processing triggers for desktop-file-utils (0.26-1ubuntu3) ...
bridge-utils: command not found
boris@HoneyBadger:~/Downloads$
```

```
boris@HoneyBadger:~/Downloads$ sudo systemctl enable --now libvirtd
boris@HoneyBadger:~/Downloads$ sudo systemctl start libvirtd
```


boris@HoneyBadger:~/Downloads$ sudo systemctl status libvirtd
libvirtd.service - Virtualization daemon
Loaded: loaded (/lib/systemd/system/libvirtd.service; enabled; ve
Active: active (running) since Sun 2023-01-29 13:32:12 IST; 3min
TriggeredBy: libvirtd-admin.socket
libvirtd.socket
libvirtd-ro.socket
Docs: man:libvirtd(8)
https://libvirt.org
Main PID: 52185 (libvirtd)
Tasks: 21 (limit: 32768)
Memory: 11.6M
CPU: 1.593s
CGroup: /system.slice/libvirtd.service
├─52185 /usr/sbin/libvirtd
├─52319 /usr/sbin/dnsmasq --conf-file=/var/lib/libvirt/dn
└─52320 /usr/sbin/dnsmasq --conf-file=/var/lib/libvirt/dn
Jan 29 13:32:12 HoneyBadger systemd[1]: Started Virtualization daemon.
Jan 29 13:32:13 HoneyBadger dnsmasq[52319]: started, version 2.86 cach
Jan 29 13:32:13 HoneyBadger dnsmasq[52319]: compile time options: IPv6
Jan 29 13:32:13 HoneyBadger dnsmasq-dhcp[52319]: DHCP, IP range 192.16
Jan 29 13:32:13 HoneyBadger dnsmasq-dhcp[52319]: DHCP, sockets bound e
Jan 29 13:32:13 HoneyBadger dnsmasq[52319]: reading /etc/resolv.conf
Jan 29 13:32:13 HoneyBadger dnsmasq[52319]: using nameserver 127.0.0.5
Jan 29 13:32:13 HoneyBadger dnsmasq[52319]: read /etc/hosts - 7 addres
Jan 29 13:32:13 HoneyBadger dnsmasq[52319]: read /var/lib/libvirt/dnsm
Jan 29 13:32:13 HoneyBadger dnsmasq-dhcp[52319]: read /var/lib/libvirt
lines 1-27/27 (END)
boris@HoneyBadger:~/Downloads$ sudo usermod -aG kvm $USER
boris@HoneyBadger:~/Downloads$ sudo usermod -aG libvirt $USER

	
Conclusion :	Understanding and implementing Hosted Virtualization using VirtualBox& KVM
References:	Give References: 1.https://www.youtube.com/watch?v=rZhMeQjpcrw