

Day 1

Info - How many physical servers are required to support 1000 Operating System when no virtualization supported

- 1000 Physical servers are required
- Your organization has to procure 1000 servers
- we need a lab facility with power, network, , sound-proofed room
- servers are power hungry, they normally tend to consume more power(electricity)
- real-estate expenses
- if you need huge lab room, then the rental/lease cost for the lab facility will also be more
-

Info - Hypervisor Overview

- is virtualization software
- with virtualization software, we can run multiple Operating Systems in the laptop/desktop/workstation/server
- many OS can run simultaneously
- we are able to consolidate more physical servers with minimal number of physical servers
- this type of virtualization is called heavy-weight virtualization, the reason is each Virtual Machine must be allocated with dedicated hardware resources
 - CPU
 - Memory (RAM)
 - Storage (Hard Disk or SSDs)
 - Network Card
 - Graphics Card
- there are 2 types of virtualization software or hypervisors
 - type 1
 - is also called as Bare Metal Hypervisors
 - to create Virtual Machines(VM) we don't need to have a Host Operating System
 - Examples
 - VMware vCenter/vSphere
 - type 2
 - this type of hypervisor is installed in laptops/desktops/workstations
 - in laptops/desktops/workstations normally we will already one primary Operating system
 - it could be Windows/Linux/Mac
 - the Primary OS installed on the Laptop/Desktop/Mac is called Host Operating System
 - the virtualization software is installed on top of the Host OS
 - each Operating System that we install on top of the Hypervisor is called Guest Operating System
 - each Guest OS is installed within a Virtual Machine
 - each Virtual Machine(VM) represents one Operating System
 - Examples

- VMWare Workstation (supported in Linux/Windows)
- VMWare Fusion (supported in Mac OS-X)
- Oracle VirtualBox
- Parallels (supported in Mac OS-X)
- KVM - opensource hypervisor software supported in all Linux distributions
- Microsoft Hyper-V

Info - What is the minimal number of Physical servers required to host 1000 Virtual Machine on top of Hypervisor software ?

- 1 Physical server is enough to host 1000 Virtual Machines
- HyperThreading
 - each Physical CPU Core is capable of running 2 threads parallelly
 - hence each Physical CPU Core is treated/seen as 2/4/6 virtual/logical CPU Cores
- Server Configuration
 - Processor with atleast 512 CPU Cores (1024 virtual CPU Cores)
 - 1 TB or more RAM
 - 10 TB or more Storage (Hard Disk or Solid State Disks)

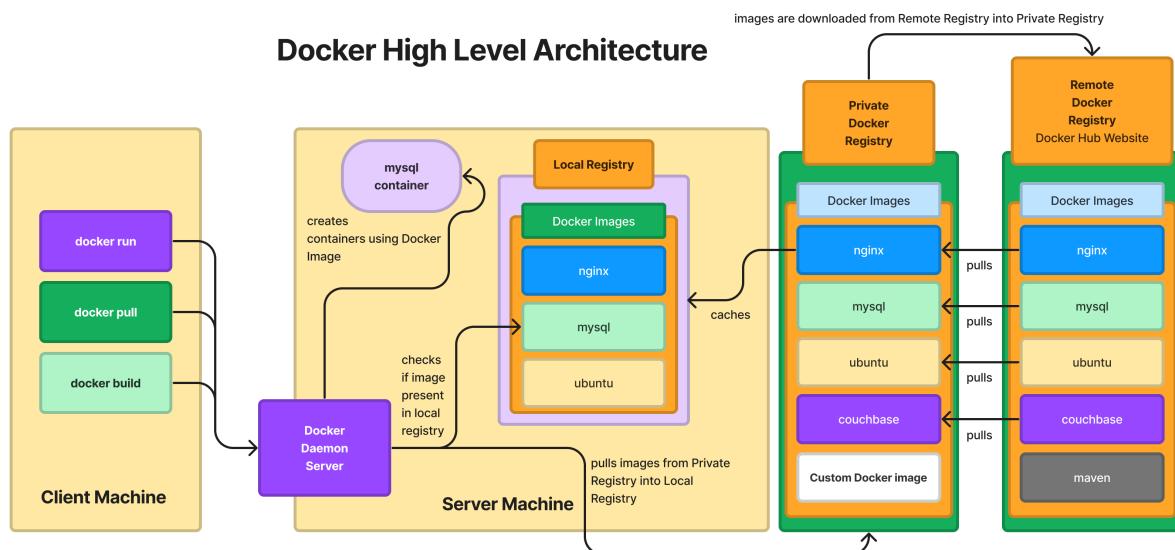
Info - Containerization

- is an application virtualization technology
- is called light-weight virtualization technology
 - because container's don't get their own dedicated hardware resources
 - all containers running in the same OS shares the Hardware resources from underlying OS
- each container represents a single application or a single application process
- container is not an Operating System
- container doesn't have OS Kernel
- containers will never be able to replace an Operating System
- containers will never be able to replace a virtual machine or Hypervisors softwares
- containers is not a replacement/alternate to Virtualization or Hypervisors of OS
- commons characteristics between a virtual machine and a container
 - containers get their own IP address just like virtual machines
 - containers has file system just like virtual machines
 - containers has their own network card (virtual) just like virtual machines
 - container has their own network stack just like virtual machines
 - containers has their own Port range (0-65535 ports) just like virtual machines
 - container represents a single application, while virtual represents a fully functional OS
- containers and hypervisors are complementing technology not competing

technology

- containers runs on top of some Operating System
- containers shares the Hardware resources from the underlying Operating System (Host or Guest OS)

Info - Docker High-Level Architecture



Info - What is Container Runtime?

- is a low-level software to manage containers and container images
- is not user-friendly, hence end-user like us generally won't use container runtimes
- examples
 - runC is a Container Runtime
 - CRI-O is a container runtime

Info - What is Container Engine?

- is a high-level software to manage containers and container images
- is user-friendly
- internally container engines depends on Container Runtime to manage containers and images
- examples
 - Docker is a Container Engine that depends on containerd which in turn depends on runC Container Runtime
 - Podman is a Container Engine that depends on CRI-O Container Runtime

Info - What is Docker Image?

- is a blueprint of a Container
- it has one application and all its dependent softwares, libraries, etc required to run the application

Info - What is a Docker Container?

- container is an instance of a Docker Image
- all the softwares and tools that are installed in the docker image are available in each container created from a Docker Image
- container gets a Private IP address
- containers also files/folders (file system)
- container has port-range (0-65535)
- container has virtual network cards (software defined network cards)

Info - What is Docker Registry

- Docker Registry it is a server that hosts multiple Docker Images
- Usually uses Sonatype Nexus or JFrog Artifactory
- Local Docker Registry is a just a folder on your system
- Remote & Private Registry, they are servers which could be powered by either Nexus or Artifactory

Info - Docker Overview

- Docker is a Container Engine
- follows Client/Server Architecture
- it comes in 2 flavours
 1. Docker Community Edition - Docker CE
 2. Docker Enterprise Edition - Docker EE
- Docker supports 3 types of Container Registries
 1. Local Docker Registry
 2. Private Docker Registry and
 3. Remote Docker Registry
- it is developed in Go lang by Docker Inc organization

Info - Docker Alternatives

- containerd
- Podman
- LXC

Info - Container Orchestration Platforms

- Container Orchestration Platforms helps managing your containerized application workloads
- they manage your applications
- they have inbuilt
 - application monitoring features (health check, readiness check, liveness check)
 - it can repair your application when it stops responding
 - it can scale up/down your application instances when the user traffic to application increases/decreases
 - it can help your rollout new application version without any downtime
 - self-healing
 - it supports load-balancers
 - it supports exposing your application to internal applications or to external world as services
 - it supports service discovery
 - it supports CI/CD (Google Kubernetes & Openshift supports this)
 - it supports serverless architecture (Google Kubernetes & Openshift supports this)
- Examples
 - Docker SWARM
 - Google Kubernetes
 - Red Hat Openshift

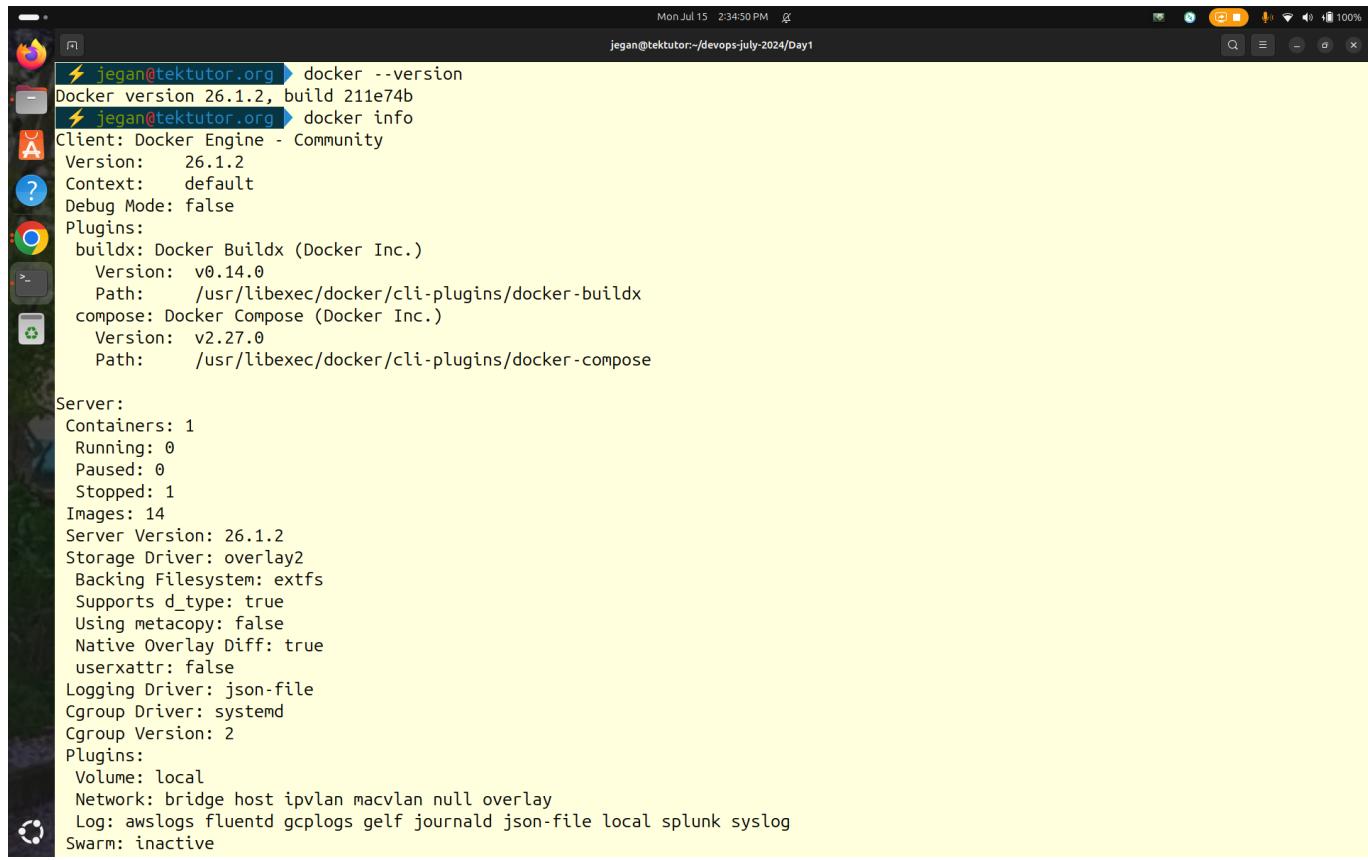
Lab - Finding docker version

```
docker --version
```

Finding more details about your docker setup

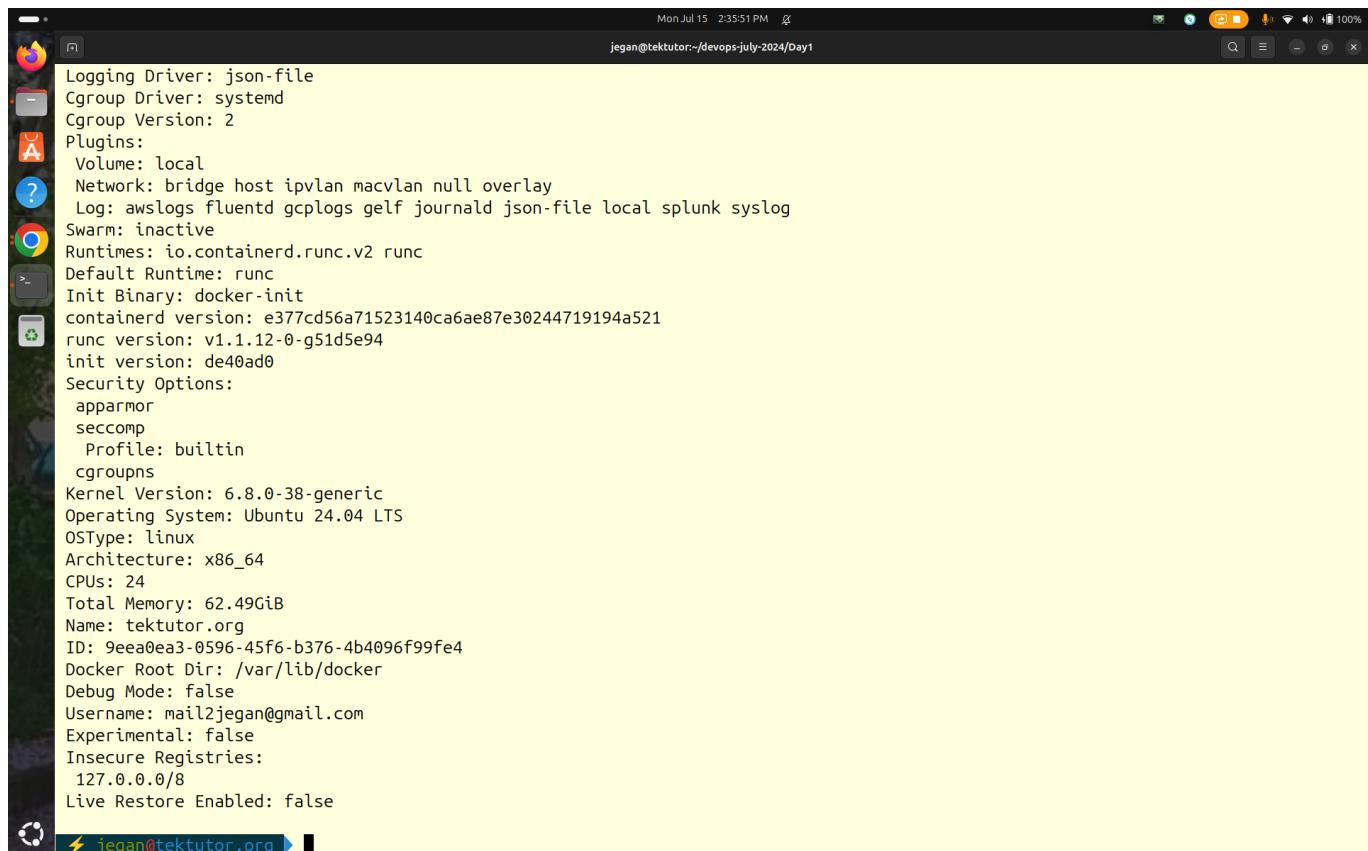
```
docker info
```

Expected output



```
jegan@tektutor.org ~ % docker --version
Docker version 26.1.2, build 211e74b
jegan@tektutor.org ~ % docker info
Client: Docker Engine - Community
  Version: 26.1.2
  Context: default
  Debug Mode: false
  Plugins:
    buildx: Docker Buildx (Docker Inc.)
      Version: v0.14.0
      Path: /usr/libexec/docker/cli-plugins/docker-buildx
    compose: Docker Compose (Docker Inc.)
      Version: v2.27.0
      Path: /usr/libexec/docker/cli-plugins/docker-compose

Server:
  Containers: 1
  Running: 0
  Paused: 0
  Stopped: 1
  Images: 14
  Server Version: 26.1.2
  Storage Driver: overlay2
    Backing Filesystem: extfs
    Supports d_type: true
    Using metacopy: false
    Native Overlay Diff: true
  userxattr: false
  Logging Driver: json-file
  Cgroup Driver: systemd
  Cgroup Version: 2
  Plugins:
    Volume: local
    Network: bridge host ipvlan macvlan null overlay
    Log: awslogs fluentd gcplogs gelf journald json-file local splunk syslog
  Swarm: inactive



```
jegan@tektutor.org ~ %
Logging Driver: json-file
Cgroup Driver: systemd
Cgroup Version: 2
Plugins:
 Volume: local
 Network: bridge host ipvlan macvlan null overlay
 Log: awslogs fluentd gcplogs gelf journald json-file local splunk syslog
Swarm: inactive
Runtimes: io.containerd.runc.v2 runc
Default Runtime: runc
Init Binary: docker-init
containerd version: e377cd56a71523140ca6ae87e30244719194a521
runc version: v1.1.12-0-g51d5e94
init version: de40ad0
Security Options:
 apparmor
 seccomp
 Profile: builtin
 cgroups
Kernel Version: 6.8.0-38-generic
Operating System: Ubuntu 24.04 LTS
OSType: linux
Architecture: x86_64
CPUs: 24
Total Memory: 62.49GiB
Name: tektutor.org
ID: 9eea0ea3-0596-45f6-b376-4b4096f99fe4
Docker Root Dir: /var/lib/docker
Debug Mode: false
Username: mail2jegan@gmail.com
Experimental: false
Insecure Registries:
 127.0.0.0/8
Live Restore Enabled: false
jegan@tektutor.org ~ %
```


```

Lab - Listing the docker images in the local Docker Registry

```
docker images
```

Expected output

A screenshot of a terminal window titled "jegan@tektutor.org ~ devops-july-2024/Day1". The window shows the output of the "docker images" command. The table lists various Docker images with their repository names, tags, image IDs, creation dates, and sizes.

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
hello	2.0	6c0cc2421dee	3 days ago	335MB
tektutor/hello	1.0	6c0cc2421dee	3 days ago	335MB
tektutor/hello	2.0	6c0cc2421dee	3 days ago	335MB
tektutor/nodejs	2.0	6c0cc2421dee	3 days ago	335MB
tektutor/nodejs	1.0	fb137bf412d8	3 days ago	333MB
tektutor/dotnet-weather-ms	1.0	51ff08e3e97d	3 days ago	221MB
tektutor/hello-python-ms	1.0	e49cae150e40	3 days ago	484MB
tektutor/python-hello	1.0	e49cae150e40	3 days ago	484MB
bitnami/nginx	latest	11ee024d142d	2 weeks ago	192MB
nginx	latest	fffffc90d343	3 weeks ago	188MB
ubuntu	latest	35a88802559d	5 weeks ago	78.1MB
hello-world	latest	d2c94e258dcf	14 months ago	13.3KB
ubuntu	16.04	b6f507652425	2 years ago	135MB

Lab - Downloading mysql docker image from Docker Hub Registry to Local Docker Registry

```
docker pull mysql:latest
```

Expected output

The screenshot shows a terminal window with the following command history:

```
jegan@tektutor.org ~$ docker images
REPOSITORY          TAG      IMAGE ID   CREATED        SIZE
hello               2.0      6c0cc2421dee  3 days ago   335MB
tektutor/hello      1.0      6c0cc2421dee  3 days ago   335MB
tektutor/hello      2.0      6c0cc2421dee  3 days ago   335MB
tektutor/nodejs     2.0      6c0cc2421dee  3 days ago   335MB
tektutor/nodejs     1.0      fb137bf412d8  3 days ago   333MB
tektutor/dotnet-weather-ms 1.0      51ff08e3e97d  3 days ago   221MB
tektutor/hello-python-ms 1.0      e49cae150e40  3 days ago   484MB
tektutor/python-hello 1.0      e49cae150e40  3 days ago   484MB
bitnami/nginx       latest   11ee024d142d  2 weeks ago  192MB
nginx               latest   ffffffc90d343  3 weeks ago  188MB
ubuntu              latest   35a88802559d  5 weeks ago  78.1MB
hello-world         latest   d2c94e258dcf  14 months ago 13.3KB
ubuntu              16.04   b6f507652425  2 years ago  135MB

jegan@tektutor.org ~$ docker pull mysql:latest
latest: Pulling from library/mysql
d9a40b27c30f: Pull complete
d948328c7651: Pull complete
c1e267313ede: Pull complete
7478f013875a: Pull complete
9221a2250289: Pull complete
d1f57baa52d5: Pull complete
35c3d30e8624: Pull complete
3d4d1dd0cc6: Pull complete
08bfe3f7d1c5: Pull complete
537e7daeee3: Pull complete
Digest: sha256:72a37ddc9f839cf84f1f6815fb31ba26f37f4c200b90e49607797480e3be446
Status: Downloaded newer image for mysql:latest
docker.io/library/mysql:latest

jegan@tektutor.org ~$ docker images | grep mysql
mysql              latest   5cde95de907d  13 days ago  586MB

jegan@tektutor.org ~$
```

Lab - Creating a container in foreground(interactive) mode

```
docker run -it --name c1 --hostname c1 ubuntu:16.04 /bin/bash
```

Expected output

```

jegan@tektutor.org ~ docker run -it --name c1 --hostname c1 ubuntu:16.04 /bin/bash
root@c1:/# hostname
c1
root@c1:/# hostname -i
172.17.0.2
root@c1:/# ls
bin dev home lib64 mnt proc run srv tmp var
boot etc lib media opt root sbin sys usr
root@c1:/# ifconfig
bash: ifconfig: command not found
root@c1:/# apt update && apt install -y net-tools iputils-ping
Get:1 http://security.ubuntu.com/ubuntu xenial-security InRelease [106 kB]
Get:2 http://archive.ubuntu.com/ubuntu xenial InRelease [247 kB]
Get:3 http://security.ubuntu.com/ubuntu xenial-security/main amd64 Packages [1150 kB]
Get:4 http://archive.ubuntu.com/ubuntu xenial-updates InRelease [106 kB]
Get:5 http://security.ubuntu.com/ubuntu xenial-security/restricted amd64 Packages [15.9 kB]
Get:6 http://security.ubuntu.com/ubuntu xenial-security/universe amd64 Packages [928 kB]
Get:7 http://security.ubuntu.com/ubuntu xenial-security/multiverse amd64 Packages [8820 B]
Get:8 http://archive.ubuntu.com/ubuntu xenial-backports InRelease [106 kB]
Get:9 http://archive.ubuntu.com/ubuntu xenial/main amd64 Packages [1558 kB]
Get:10 http://archive.ubuntu.com/ubuntu xenial/restricted amd64 Packages [14.1 kB]
Get:11 http://archive.ubuntu.com/ubuntu xenial/universe amd64 Packages [9827 kB]
Get:12 http://archive.ubuntu.com/ubuntu xenial/multiverse amd64 Packages [176 kB]
Get:13 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 Packages [1608 kB]
Get:14 http://archive.ubuntu.com/ubuntu xenial-updates/restricted amd64 Packages [16.4 kB]
Get:15 http://archive.ubuntu.com/ubuntu xenial-updates/universe amd64 Packages [1483 kB]
Get:16 http://archive.ubuntu.com/ubuntu xenial-updates/multiverse amd64 Packages [25.0 kB]
Get:17 http://archive.ubuntu.com/ubuntu xenial-backports/main amd64 Packages [11.3 kB]
Get:18 http://archive.ubuntu.com/ubuntu xenial-backports/universe amd64 Packages [12.9 kB]
Fetched 17.4 MB in 4s (3966 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
2 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree

```



```

Unpacking libffi6:amd64 (3.2.1-4) ...
Selecting previously unselected package libp11-kit0:amd64.
Preparing to unpack .../libp11-kit0_0.23.2-5~ubuntu16.04.2_amd64.deb ...
Unpacking libp11-kit0:amd64 (0.23.2-5~ubuntu16.04.2) ...
Selecting previously unselected package libtasn1-6:amd64.
Preparing to unpack .../libtasn1-6_4.7-3ubuntu0.16.04.3_amd64.deb ...
Unpacking libtasn1-6:amd64 (4.7-3ubuntu0.16.04.3) ...
Selecting previously unselected package libgnutls30:amd64.
Preparing to unpack .../libgnutls30_3.4.10-4ubuntu1.9_amd64.deb ...
Unpacking libgnutls30:amd64 (3.4.10-4ubuntu1.9) ...
Selecting previously unselected package libgnutls-openssl27:amd64.
Preparing to unpack .../libgnutls-openssl27_3.4.10-4ubuntu1.9_amd64.deb ...
Unpacking libgnutls-openssl27:amd64 (3.4.10-4ubuntu1.9) ...
Selecting previously unselected package iputils-ping.
Preparing to unpack .../iputils-ping_3%3a20121221-5ubuntu2_amd64.deb ...
Unpacking iputils-ping (3:20121221-5ubuntu2) ...
Selecting previously unselected package net-tools.
Preparing to unpack .../net-tools_1.60-26ubuntu1_amd64.deb ...
Unpacking net-tools (1.60-26ubuntu1) ...
Processing triggers for libc-bin (2.23-0ubuntu11.3) ...
Setting up libgmp10:amd64 (2:6.1.0+dfsg-2) ...
Setting up libnettle6:amd64 (3.2-1ubuntu0.16.04.2) ...
Setting up libhogweed4:amd64 (3.2-1ubuntu0.16.04.2) ...
Setting up libidn11:amd64 (1.32-3ubuntu1.2) ...
Setting up libffi6:amd64 (3.2.1-4) ...
Setting up libp11-kit0:amd64 (0.23.2-5~ubuntu16.04.2) ...
Setting up libtasn1-6:amd64 (4.7-3ubuntu0.16.04.3) ...
Setting up libgnutls30:amd64 (3.4.10-4ubuntu1.9) ...
Setting up libgnutls-openssl27:amd64 (3.4.10-4ubuntu1.9) ...
Setting up iputils-ping (3:20121221-5ubuntu2) ...
Setcap is not installed, falling back to setuid
Setting up net-tools (1.60-26ubuntu1) ...
Processing triggers for libc-bin (2.23-0ubuntu11.3) ...
root@c1:#

```

Finding the hostname from the container shell

hostname

Finding the IP address of the c1 container shell

```
hostname -i
```

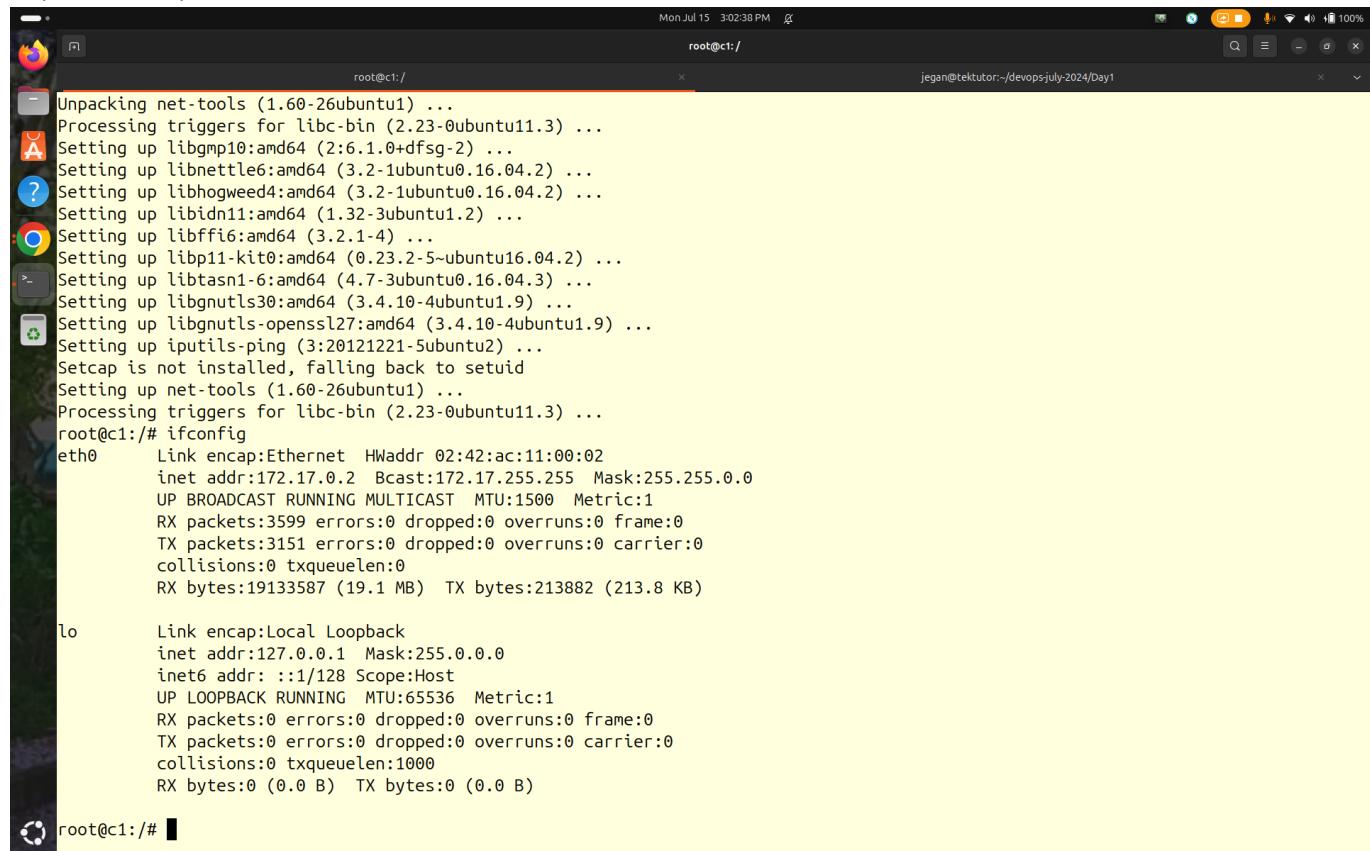
Listing the files/folders inside the container file system

```
ls -l
```

Installing softwares inside container using the container shell

```
apt update && apt install -y net-tools iutils-ping
```

Expected output



The screenshot shows a terminal window titled 'root@ct1:/'. The window has a dark theme with a light yellow background. It displays the following command and its output:

```
Mon Jul 15 3:02:38 PM jx
root@ct1:/
jegan@tektutor:~/devops-july-2024/Day1

Unpacking net-tools (1.60-26ubuntu1) ...
Processing triggers for libc-bin (2.23-0ubuntu11.3) ...
Setting up libgmp10:amd64 (2:6.1.0+dfsg-2) ...
Setting up libnettle6:amd64 (3.2-1ubuntu0.16.04.2) ...
Setting up libhogweed4:amd64 (3.2-1ubuntu0.16.04.2) ...
Setting up libidn11:amd64 (1.32-3ubuntu1.2) ...
Setting up libffigl:amd64 (3.2.1-4) ...
Setting up libp11-kit0:amd64 (0.23.2-5-ubuntu16.04.2) ...
Setting up libtasn1-6:amd64 (4.7-3ubuntu0.16.04.3) ...
Setting up libgnutls30:amd64 (3.4.10-4ubuntu1.9) ...
Setting up libgnutls-openssl27:amd64 (3.4.10-4ubuntu1.9) ...
Setting up iutils-ping (3:20121221-5ubuntu2) ...
Setcap is not installed, falling back to setuid
Setting up net-tools (1.60-26ubuntu1) ...
Processing triggers for libc-bin (2.23-0ubuntu11.3) ...
root@ct1:/# ifconfig
eth0      Link encap:Ethernet HWaddr 02:42:ac:11:00:02
          inet addr:172.17.0.2 Bcast:172.17.255.255 Mask:255.255.0.0
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:3599 errors:0 dropped:0 overruns:0 frame:0
          TX packets:3151 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:19133587 (19.1 MB) TX bytes:213882 (213.8 KB)

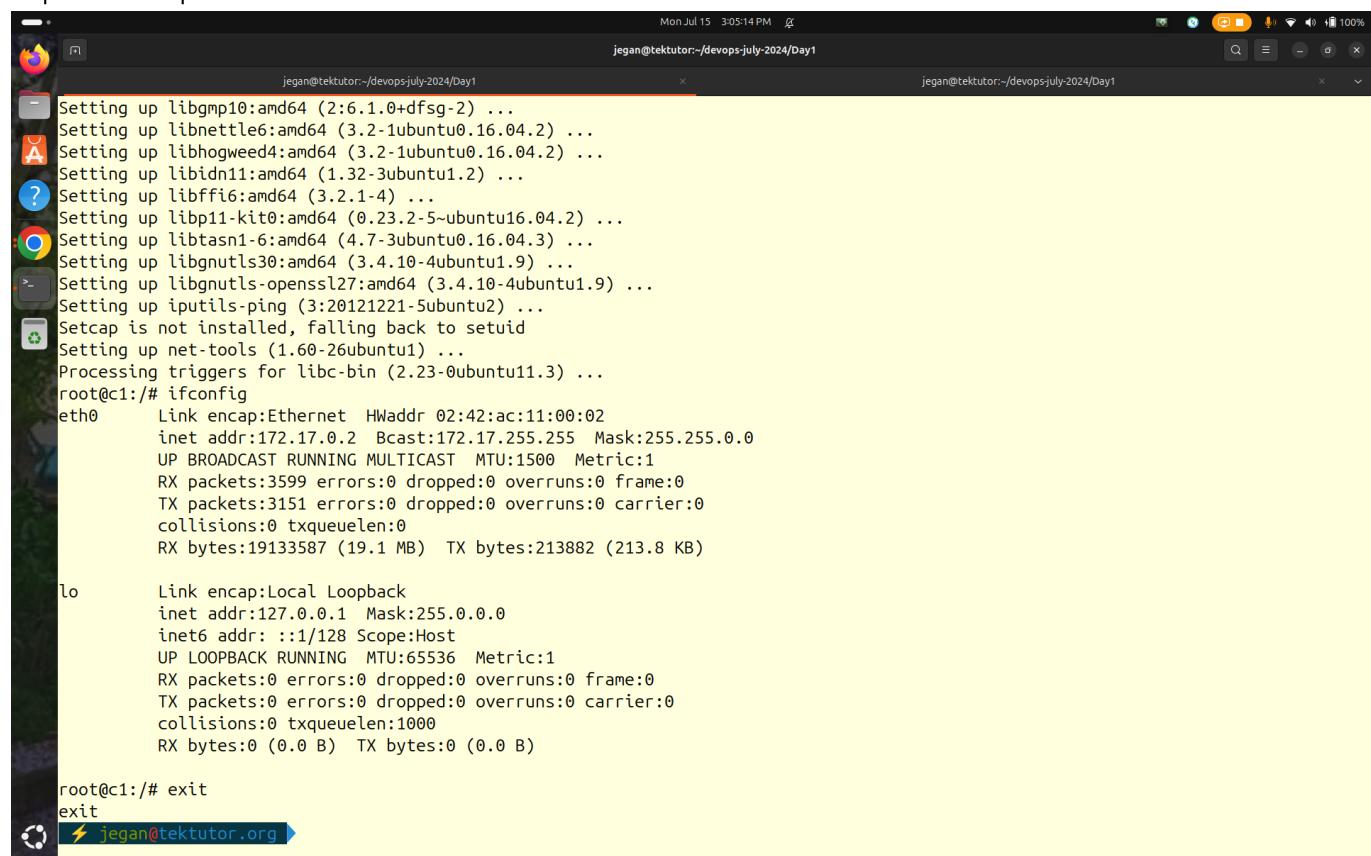
lo       Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:65536 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

root@ct1:/#
```

Coming out of the container shell

```
exit
```

Expected output



Mon Jul 15 3:05:14 PM jg
jegan@tektutor:~/devops-july-2024/Day1

```
Setting up libgmp10:amd64 (2:6.1.0+dfsg-2) ...
Setting up libnettle6:amd64 (3.2-1ubuntu0.16.04.2) ...
Setting up libhogweed4:amd64 (3.2-1ubuntu0.16.04.2) ...
Setting up libidn11:amd64 (1.32-3ubuntu1.2) ...
Setting up libffi6:amd64 (3.2.1-4) ...
Setting up libp11-kit0:amd64 (0.23.2-5~ubuntu16.04.2) ...
Setting up libtasn1-6:amd64 (4.7-3ubuntu0.16.04.3) ...
Setting up libgnutls30:amd64 (3.4.10-4ubuntu1.9) ...
Setting up libgnutls-openssl27:amd64 (3.4.10-4ubuntu1.9) ...
Setting up iputils-ping (3:20121221-5ubuntu2) ...
Setcap is not installed, falling back to setuid
Setting up net-tools (1.60-26ubuntu1) ...
Processing triggers for libc-bin (2.23-0ubuntu11.3) ...
root@c1:/# ifconfig
eth0      Link encap:Ethernet HWaddr 02:42:ac:11:00:02
          inet addr:172.17.0.2 Bcast:172.17.255.255 Mask:255.255.0.0
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:3599 errors:0 dropped:0 overruns:0 frame:0
          TX packets:3151 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:19133587 (19.1 MB)  TX bytes:213882 (213.8 KB)

lo       Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:65536 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

root@c1:/# exit
exit
jegan@tektutor.org ~
```

Lab - Listing the currently running containers

```
docker ps
```

Expected output

```
Mon Jul 15 3:08:17 PM PDT
jegan@tektutor:~/devops-july-2024/Day1
jegan@tektutor:~/devops-july-2024/Day1

Setting up libp11-kit0:amd64 (0.23.2-5ubuntu16.04.2) ...
Setting up libtasn1-6:amd64 (4.7-3ubuntu0.16.04.3) ...
Setting up libgnutls30:amd64 (3.4.10-4ubuntu1.9) ...
Setting up libgnutls-openssl127:amd64 (3.4.10-4ubuntu1.9) ...
Setting up iputils-ping (3:20121221-5ubuntu2) ...
Setcap is not installed, falling back to setuid
Setting up net-tools (1.60-26ubuntu1) ...
Processing triggers for libc-bin (2.23-0ubuntu11.3) ...
root@c1:/# ifconfig
eth0      Link encap:Ethernet HWaddr 02:42:ac:11:00:02
          inet addr:172.17.0.2 Bcast:172.17.255.255 Mask:255.255.0.0
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:3599 errors:0 dropped:0 overruns:0 frame:0
          TX packets:3151 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:19133587 (19.1 MB) TX bytes:213882 (213.8 KB)

lo       Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:65536 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

root@c1:/# exit
exit
jegan@tektutor.org ~ docker ps
CONTAINER ID   IMAGE    COMMAND   CREATED     STATUS      PORTS     NAMES
jegan@tektutor.org ~ docker ps -a
CONTAINER ID   IMAGE       COMMAND   CREATED     STATUS      PORTS     NAMES
fffffb4ffc033  ubuntu:16.04  "/bin/bash"  12 minutes ago  Exited (0) 3 minutes ago           c1
jegan@tektutor.org ~
```

Lab - Listing all containers

```
docker ps -a
```

Expected output

The screenshot shows a terminal window with two tabs. The left tab shows the output of running `ifconfig` on a host system, listing interfaces eth0 and lo with their respective statistics. The right tab shows the root shell of a Docker container named 'c1'. Inside the container, the user runs `docker ps` to list the running container, which is identified by its ID 'fffffb4ffc033' and name 'c1'. The user then exits the container shell.

```
Setting up libp11-kit0:amd64 (0.23.2-5ubuntu16.04.2) ...
Setting up libtasn1-6:amd64 (4.7-3ubuntu0.16.04.3) ...
Setting up libgnutls30:amd64 (3.4.10-4ubuntu1.9) ...
Setting up libgnutls-openssl27:amd64 (3.4.10-4ubuntu1.9) ...
Setting up iputils-ping (3:20121221-5ubuntu2) ...
Setcap is not installed, falling back to setuid
Setting up net-tools (1.60-26ubuntu1) ...
Processing triggers for libc-bin (2.23-0ubuntu11.3) ...
root@c1:/# ifconfig
eth0      Link encap:Ethernet HWaddr 02:42:ac:11:00:02
          inet addr:172.17.0.2 Bcast:172.17.255.255 Mask:255.255.0.0
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:3599 errors:0 dropped:0 overruns:0 frame:0
          TX packets:3151 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:19133587 (19.1 MB) TX bytes:213882 (213.8 KB)

lo       Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:65536 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

root@c1:/# exit
exit
jegan@tektutor.org ~ docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED            STATUS              PORTS               NAMES
jegan@tektutor.org ~ docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED            STATUS              PORTS               NAMES
fffffb4ffc033      ubuntu:16.04      "/bin/bash"        12 minutes ago   Exited (0) 3 minutes ago   c1
jegan@tektutor.org ~
```

Lab - Starting an existed container and getting inside its container shell

```
docker ps -a
docker start c1
docker exec -it c1 /bin/bash
ls
exit
```

Expected output

The screenshot shows a terminal window with two tabs. The left tab displays network interface statistics for 'eth0' and 'lo'. The right tab shows a root shell session. The root shell session includes commands like 'exit', 'docker ps', 'docker ps -a', 'docker start c1', 'ls', and 'exit'. The terminal window has a dark theme with light-colored text.

```
Mon Jul 15 3:09:12 PM PT
jegan@tektutor:~/devops-july-2024/Day1
jegan@tektutor:~/devops-july-2024/Day1

inet addr:172.17.0.2 Bcast:172.17.255.255 Mask:255.255.0.0
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:3599 errors:0 dropped:0 overruns:0 frame:0
TX packets:3151 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:19133587 (19.1 MB) TX bytes:213882 (213.8 KB)

Link encap:Local Loopback
inet addr:127.0.0.1 Mask:255.0.0.0
inet6 addr: ::1/128 Scope:Host
UP LOOPBACK RUNNING MTU:65536 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

root@c1:/# exit
exit
jegan@tektutor.org ~ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
jegan@tektutor.org ~ docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
fffffb4ffc033 ubuntu:16.04 "/bin/bash" 12 minutes ago Exited (0) 3 minutes ago
jegan@tektutor.org ~ docker start c1
c1
jegan@tektutor.org ~ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
fffffb4ffc033 ubuntu:16.04 "/bin/bash" 13 minutes ago Up 2 seconds
jegan@tektutor.org ~ docker exec -it c1 /bin/bash
root@c1:/# ls
bin boot dev etc home lib lib64 media mnt opt proc root run sbin srv sys tmp usr var
root@c1:/# exit
exit
jegan@tektutor.org ~
```

Lab - Deleting a running container

In order to delete a running container we must stop it before deleting it or use must force delete it

```
docker ps
docker rm c1
docker stop c1
docker rm c1
docker ps -a
```

Expected output

The screenshot shows a terminal window with two tabs. The left tab is titled 'jegan@tektutor:~/devops-july-2024/Day1' and the right tab is also titled 'jegan@tektutor:~/devops-july-2024/Day1'. The terminal displays the following sequence of commands:

```
jegan@tektutor.org ~ % docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
fffb4ffc033 ubuntu:16.04 "/bin/bash" 16 minutes ago Up 3 minutes c1

jegan@tektutor.org ~ % docker rm c1
Error response from daemon: cannot remove container "/c1": container is running: stop the container before removing or force remove
jegan@tektutor.org ~ % docker stop c1
c1
jegan@tektutor.org ~ % docker rm c1
c1

jegan@tektutor.org ~ % docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
jegan@tektutor.org ~ %
```

Lab - Coming out of container shell without using exit command

As soon as you execute the below command, you will be taken inside the container shell automatically as we created the container in foreground(interactive) mode using -it(interactive terminal) switch.

```
docker run -it --name c1 --hostname c1 ubuntu:16.04 /bin/bash
```

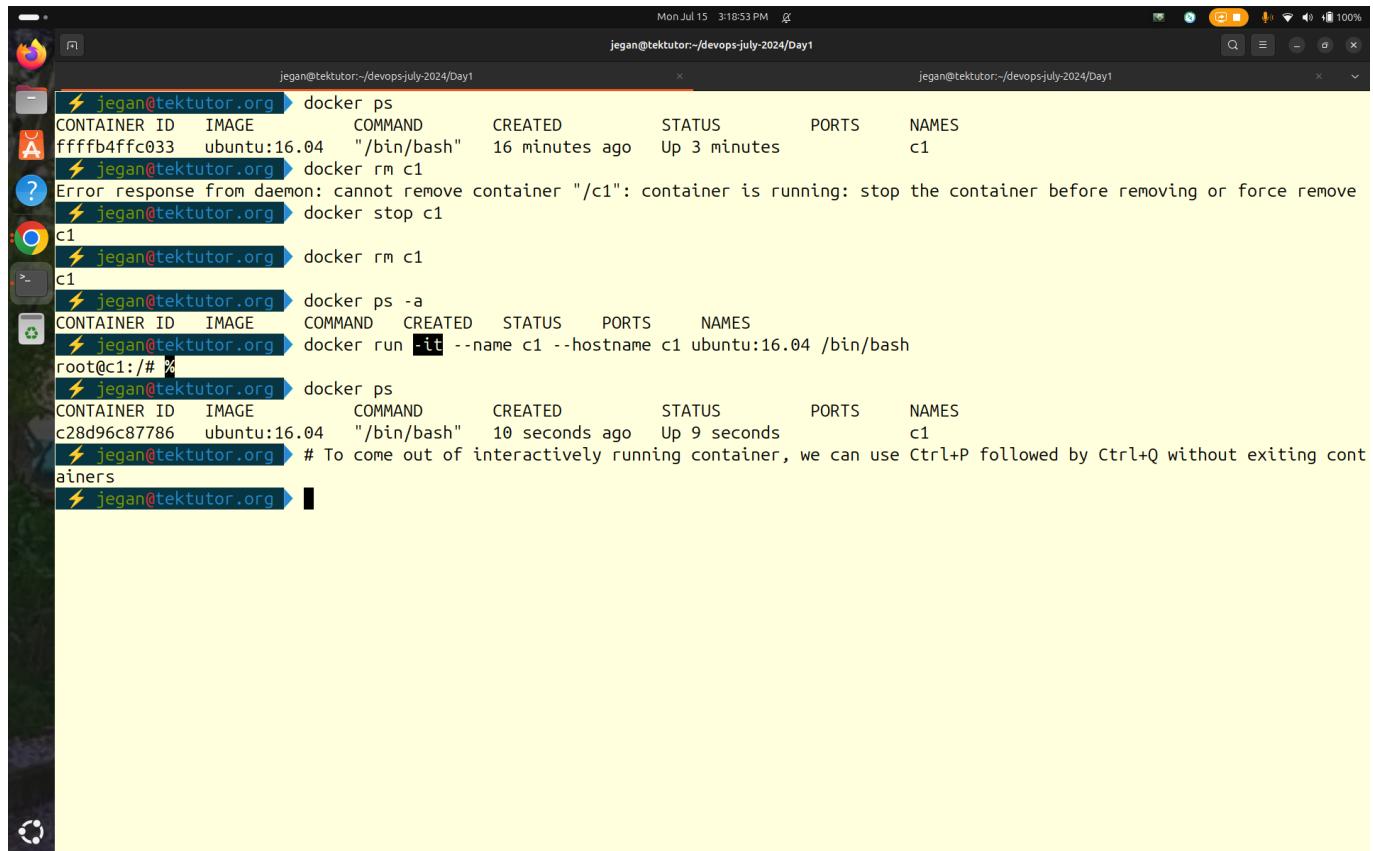
In order to come out of the container without terminating the container, we need using the shortcut keys Ctrl+P followed by Ctrl+Q.

```
Ctrl + P  
Ctrl + Q
```

You can list the containers to see the c1 container is still running while you came outside the conainter shell

```
docker ps
```

Expected output



```
jegan@tektutor.org ~$ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
fffffb4ffc033 ubuntu:16.04 "/bin/bash" 16 minutes ago Up 3 minutes c1

jegan@tektutor.org ~$ docker rm c1
Error response from daemon: cannot remove container "/c1": container is running: stop the container before removing or force remove

jegan@tektutor.org ~$ docker stop c1
c1

jegan@tektutor.org ~$ docker rm c1
c1

jegan@tektutor.org ~$ docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
jegan@tektutor.org ~$ docker run -it --name c1 --hostname c1 ubuntu:16.04 /bin/bash
root@c1:/# %

jegan@tektutor.org ~$ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
c28d96c87786 ubuntu:16.04 "/bin/bash" 10 seconds ago Up 9 seconds c1

jegan@tektutor.org ~$ # To come out of interactively running container, we can use Ctrl+P followed by Ctrl+Q without exiting containers

jegan@tektutor.org ~$
```

Lab - Creating a container and running it in the background mode

```
docker run -dit --name c2 --hostname c2 ubuntu:16.04 /bin/bash
docker ps
```

In order to get inside the container shell

```
docker exec -it c2 /bin/bash
ls -l
exit
```

Expected output

```

CONTAINER ID  IMAGE      COMMAND      CREATED     STATUS      PORTS     NAMES
c28d96c87786  ubuntu:16.04  "/bin/bash"  7 minutes ago  Up 7 minutes   c1
CONTAINER ID  IMAGE      COMMAND      CREATED     STATUS      PORTS     NAMES
031d5f08c7a4  ubuntu:16.04  "/bin/bash"  2 seconds ago  Up 1 second    c2
c28d96c87786  ubuntu:16.04  "/bin/bash"  7 minutes ago  Up 7 minutes   c1
root@c2:/# ls
bin  boot  dev  etc  home  lib  lib64  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr  var
root@c2:/# exit
exit
jegan@tektutor.org ~ 
CONTAINER ID  IMAGE      COMMAND      CREATED     STATUS      PORTS     NAMES
031d5f08c7a4  ubuntu:16.04  "/bin/bash"  21 seconds ago  Up 20 seconds   c2
c28d96c87786  ubuntu:16.04  "/bin/bash"  7 minutes ago  Up 7 minutes    c1
jegan@tektutor.org ~ 

```

Lab - Stopping and starting multiple containers with single command

```

docker ps
docker stop c1 c2
docker ps
docker ps -a
docker start c1 c2
docker ps

```

Expected output

Lab - Finding an IP address of a running container without getting inside the container shell

```

docker inspect c1
docker inspect c1 | grep IPA
docker inspect -f {{.NetworkSettings.IPAddress}} c1
docker inspect -f {{.NetworkSettings.IPAddress}} c2

```

Expected output

```

Mon Jul 15 3:27:19 PM ፳
jegan@tektutor:~/devops-july-2024/Day1
jegan@tektutor:~/devops-july-2024/Day1
jegan@tektutor:~/devops-july-2024/Day1

⚡ jegan@tektutor.org ➤ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
031df08c7a4 ubuntu:16.04 "/bin/bash" 2 minutes ago Up 1 second c2
c28d96c87786 ubuntu:16.04 "/bin/bash" 10 minutes ago Up 1 second c1
⚡ jegan@tektutor.org ➤ docker inspect c1
[{"Id": "c28d96c877862cc509cdd69a7ca833393e57692d6def1eaab1517b1321d50751", "Created": "2024-07-15T09:44:18.586120204Z", "Path": "/bin/bash", "Args": [], "State": {"Status": "running", "Running": true, "Paused": false, "Restarting": false, "OOMKilled": false, "Dead": false, "Pid": 18429, "ExitCode": 0, "Error": "", "StartedAt": "2024-07-15T09:54:38.185282977Z", "FinishedAt": "2024-07-15T09:54:25.124465824Z"}, "Image": "sha256:b6f50765242581c887ff1acc2511fa2d885c52d8fb3ac8c4bba131fd86567f2e", "ResolvConfPath": "/var/lib/docker/containers/c28d96c877862cc509cdd69a7ca833393e57692d6def1eaab1517b1321d50751/resolv.conf", "HostnamePath": "/var/lib/docker/containers/c28d96c877862cc509cdd69a7ca833393e57692d6def1eaab1517b1321d50751/hostname", "HostsPath": "/var/lib/docker/containers/c28d96c877862cc509cdd69a7ca833393e57692d6def1eaab1517b1321d50751/hosts", "LogPath": "/var/lib/docker/containers/c28d96c877862cc509cdd69a7ca833393e57692d6def1eaab1517b1321d50751/c28d96c877862cc509cd69a7ca833393e57692d6def1eaab1517b1321d50751-json.log", "Name": "/c1", "RestartCount": 0, "Driver": "overlay2", "Platform": "linux", "MountLabel": ""}, {"Labels": {}}, {"NetworkSettings": {"Bridge": "", "SandboxID": "0ce310fcc680bfa36ea5856bbc8167d43564388c184f4c57e0329452a57134e1", "SandboxKey": "/var/run/docker/netns/0ce310fcc680", "Ports": {}, "HairpinMode": false, "LinkLocalIPv6Address": "", "LinkLocalIPv6PrefixLen": 0, "SecondaryIPAddresses": null, "SecondaryIPv6Addresses": null, "EndpointID": "12dff679087062189100dceb6fcfd6ed1155d36cb6bbf8ff4cf3be6546208be50", "Gateway": "172.17.0.1", "GlobalIPv6Address": "", "GlobalIPv6PrefixLen": 0, "IPAddress": "172.17.0.2", "IPPrefixLen": 16, "IPv6Gateway": "", "MacAddress": "02:42:ac:11:00:02", "Networks": {"bridge": {"IPAMConfig": null, "Links": null, "Aliases": null, "MacAddress": "02:42:ac:11:00:02", "NetworkID": "960f7134627a2bb4eca282054d561e9efa1758bc3f79ad6d0634af56bd9a547", "EndpointID": "12dff679087062189100dceb6fcfd6ed1155d36cb6bbf8ff4cf3be6546208be50", "Gateway": "172.17.0.1", "IPAddress": "172.17.0.2", "IPPrefixLen": 16, "IPv6Gateway": "", "GlobalIPv6Address": "", "GlobalIPv6PrefixLen": 0, "DriverOpts": null}}}], "Mon Jul 15 3:29:18 PM ፳
jegan@tektutor:~/devops-july-2024/Day1
jegan@tektutor:~/devops-july-2024/Day1
jegan@tektutor:~/devops-july-2024/Day1

```

```
Mon Jul 15 3:27:28 PM PDT
jegan@tektutor:~/devops-july-2024/Day1

"LinkLocalIPv6Address": "",  
"LinkLocalIPv6PrefixLen": 0,  
"SecondaryIPAddresses": null,  
"SecondaryIPv6Addresses": null,  
"EndpointID": "12dff679087062189100dceb6fc6ed1155d36cb6bbf8ff4cf3be6546208be50",  
"Gateway": "172.17.0.1",  
"GlobalIPv6Address": "",  
"GlobalIPv6PrefixLen": 0,  
"IPAddress": "172.17.0.2",  
"IPPrefixLen": 16,  
"IPv6Gateway": "",  
"MacAddress": "02:42:ac:11:00:02",  
"Networks": {  
    "bridge": {  
        "IPAMConfig": null,  
        "Links": null,  
        "Aliases": null,  
        "MacAddress": "02:42:ac:11:00:02",  
        "NetworkID": "960f7134627a2bb4eca282054d561e9efa1758bc3f79ad6d0634af56bd9a547",  
        "EndpointID": "12dff679087062189100dceb6fc6ed1155d36cb6bbf8ff4cf3be6546208be50",  
        "Gateway": "172.17.0.1",  
        "IPAddress": "172.17.0.2",  
        "IPPrefixLen": 16,  
        "IPv6Gateway": "",  
        "GlobalIPv6Address": "",  
        "GlobalIPv6PrefixLen": 0,  
        "DriverOpts": null,  
        "DNSNames": null  
    }  
}  
}  
]  
jegan@tektutor.org ➔  
  
Mon Jul 15 3:28:40 PM PDT
jegan@tektutor:~/devops-july-2024/Day1
jegan@tektutor:~/devops-july-2024/Day1
jegan@tektutor:~/devops-july-2024/Day1

"EndpointID": "12dff679087062189100dceb6fc6ed1155d36cb6bbf8ff4cf3be6546208be50",  
"Gateway": "172.17.0.1",  
"GlobalIPv6Address": "",  
"GlobalIPv6PrefixLen": 0,  
"IPAddress": "172.17.0.2",  
"IPPrefixLen": 16,  
"IPv6Gateway": "",  
"MacAddress": "02:42:ac:11:00:02",  
"Networks": {  
    "bridge": {  
        "IPAMConfig": null,  
        "Links": null,  
        "Aliases": null,  
        "MacAddress": "02:42:ac:11:00:02",  
        "NetworkID": "960f7134627a2bb4eca282054d561e9efa1758bc3f79ad6d0634af56bd9a547",  
        "EndpointID": "12dff679087062189100dceb6fc6ed1155d36cb6bbf8ff4cf3be6546208be50",  
        "Gateway": "172.17.0.1",  
        "IPAddress": "172.17.0.2",  
        "IPPrefixLen": 16,  
        "IPv6Gateway": "",  
        "GlobalIPv6Address": "",  
        "GlobalIPv6PrefixLen": 0,  
        "DriverOpts": null,  
        "DNSNames": null  
    }  
}  
}  
]  
jegan@tektutor.org ➔ docker inspect -f {{.NetworkSettings.IPAddress}} c1  
172.17.0.2  
jegan@tektutor.org ➔ docker inspect -f {{.NetworkSettings.IPAddress}} c2  
172.17.0.3  
jegan@tektutor.org ➔
```

Lab - Extracting NetworkID of a container using inspect command

```
docker inspect -f {{.NetworkSettings.Networks.bridge.NetworkID}} c2
```

Expected output

Lab - Finding more details about a docker image using inspect`

```
docker images  
docker image inspect mysql:latest
```

Expected output

```
jegan@tektutor:~/devops-july-2024/Day1
```

```
[{"Id": "sha256:5cde95de907d193090219b5b825b60439321cca331fb63bad4e2441a4c9b5f7a", "RepoTags": ["mysql:latest"], "RepoDigests": ["mysql@sha256:72a37ddc9f839cf84f1f6815fb31ba26f37f4c200b90e49607797480e3be446"], "Parent": "", "Comment": "buildkit.dockerfile.v0", "Created": "2024-07-02T09:20:08Z", "DockerVersion": "", "Author": "", "Config": {"Hostname": "", "Domainname": "", "User": "", "AttachStdin": false, "AttachStdout": false, "AttachStderr": false, "ExposedPorts": {"3306/tcp": {}, "33060/tcp": {}}, "Tty": false, "OpenStdin": false, "StdinOnce": false, "Env": ["PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin", "GOSU_VERSION=1.17", "MYSQL_MAJOR=innovation", "MYSQL_VERSION=9.0.0-1.el9", "MYSQL_SHELL_VERSION=9.0.0-1.el9"], "Cmd": ["mysqld"], "ArgsEscaped": true, "Image": "", "Volumes": {}}}
```

Things to note

- each Docker Image has one or more layers
 - just like each Docker Image has an unique name and ID, docker layers also has an unique ID
 - the Docker layers are independent and they can be used in multiple Docker Images

Images for reuse

- this is how, docker image format helps in building a small footprint docker images

Lab - Deleting an image from local docker registry

```
docker images
docker rmi mysql:latest
docker images
```

Expected output

The screenshot shows a terminal window with the following session:

```
jegan@tektutor:~/devops-july-2024/Day1
jegan@tektutor:~/var/lib/docker/image/overlay2/layerdb/sha256/2606c15a4838dfb909dab29f47c601a797f657f51a35005bd06...
[jegan@tektutor ~] $ docker images
REPOSITORY          TAG      IMAGE ID      CREATED       SIZE
hello               2.0      6c0cc2421dee  3 days ago   335MB
tektutor/hello      1.0      6c0cc2421dee  3 days ago   335MB
tektutor/hello      2.0      6c0cc2421dee  3 days ago   335MB
tektutor/nodejs     2.0      6c0cc2421dee  3 days ago   335MB
tektutor/nodejs     1.0      fb137bf412d8  3 days ago   333MB
tektutor/dotnet-weather-ms 1.0      51ff08e3e97d  4 days ago   221MB
tektutor/hello-python-ms 1.0      e49cae150e40  4 days ago   484MB
tektutor/python-hello 1.0      e49cae150e40  4 days ago   484MB
mysql               latest   5cde95de907d  13 days ago  586MB
bitnami/nginx       latest   11ee024d142d  2 weeks ago  192MB
nginx               latest   ffffffc90d343  3 weeks ago  188MB
ubuntu              latest   35a88802559d  5 weeks ago  78.1MB
hello-world         latest   d2c94e258dc9  14 months ago 13.3kB
ubuntu              16.04   b6f507652425  2 years ago  135MB
[jegan@tektutor ~] $ docker rmi mysql:latest
Untagged: mysql:latest
Untagged: mysql@sha256:72a37ddc9f839cf84f1f6815fb31ba26f37f4c200b90e49607797480e3be446
Deleted: sha256:5cde95de907d193090219b5b825b60439321cca331fb63bad4e2441a4c9b5f7a
Deleted: sha256:87755ece0fc4afeae41690d51cdc7603a11fdf8c337386670891bc70a96d318e
Deleted: sha256:bb55ff86eb2f2323b1082cbecc287a00c5b555305a78beb6e1fadecd2edf6ee9
Deleted: sha256:6cfeeaa99c3d8f89374ee4fe1a6d92c2ef1dbe5e408f424967dbae13636ee4ea0
Deleted: sha256:53b04931a5b66d07980b83065347332b2a3451f01ccb8e2164c527e904133b1b
Deleted: sha256:9e5c79587cdad26d8f83eb1c17fa95c52fa7be00e69196672a796524eac43df3
Deleted: sha256:6828e70104255416c757dc4278d232b2798055dea72baae824d53df9c964e958
Deleted: sha256:988ef96e23f97606f691b80db04446b3b21268ccb0eff1010cef23ebfb82eb9d
Deleted: sha256:782a7515fa1a1c8bf955fb72fe5d3112e9dd447efb020b91a68860c0537b2bf0
Deleted: sha256:6247b710a5e69835fba492b845eb5157f69a8496792b8aed2c15d68e866ae65a
Deleted: sha256:2606c15a4838dfb909dab29f47c601a797f657f51a35005bd06d01da891d813c
[jegan@tektutor ~] $
```

```

Mon Jul 15 4:05:00 PM ⓘ
jegan@tektutor:~/devops-july-2024/Day1 x root@tektutor:/var/lib/docker/image/overlay2/layerdb/sha256/2606c15a483dfb909dab29f47c601a797f657f51a35005bd06...
? ⚡ jegan@tektutor.org ➔ docker rmi mysql:latest
Untagged: mysql:latest
Deleted: sha256:5cde95de907d193090219b5b825b60439321cca331fb63bad4e2441a4c9b5f7a
Deleted: sha256:87755ece0fc4afeae41690d51cdc7603a11fd8c337386670891bc70a96d318e
Deleted: sha256:bb5ff86eb2f2323b1082cbecc287a00c5b555305a78beb6e1fadec2edf6ee9
Deleted: sha256:6cfee99c3d8f89374ee4fe1a6d92c2ef1dbe5e408f424967dbae13636ee4ea0
Deleted: sha256:04931a5b66d07980b83065347332b2a3451f01ccb8e2164c527e904133b1b
Deleted: sha256:9e5c79587cdad26d8f83eb1c17fa95c52f7be00e69196672a796524eac43df3
Deleted: sha256:6828e70104255416c757dc4278d232b2798055dea72baae824d53df9c964e958
Deleted: sha256:988ef96e23f97606f691b890db04446b3b21268ccb0eff1010cef23ebfb82eb9d
Deleted: sha256:782a7515fa1a1c8bf955fb72fe5d3112e9dd447efb020b91a68860c0537b2bf0
Deleted: sha256:6247b710a5e9835fba492b845eb5157f69a8496792b8aed2c15d68e866ae65a
Deleted: sha256:2606c15a4838dfb909dab29f47c601a797f657f51a35005bd06d01da891d813c
⚡ jegan@tektutor.org ➔ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
hello 2.0 6c0cc2421dee 3 days ago 335MB
tektutor/hello 1.0 6c0cc2421dee 3 days ago 335MB
tektutor/nodejs 2.0 6c0cc2421dee 3 days ago 335MB
tektutor/nodejs 1.0 fb137bf412d8 3 days ago 333MB
tektutor/dotnet-weather-ms 1.0 51ff08e3e97d 4 days ago 221MB
tektutor/python-python-ms 1.0 e49cae150e40 4 days ago 484MB
tektutor/python-hello 1.0 e49cae150e40 4 days ago 484MB
bitnami/nginx latest 11ee024d142d 2 weeks ago 192MB
nginx latest fffffc90d343 3 weeks ago 188MB
ubuntu latest 35a88802559d 5 weeks ago 78.1MB
hello-world latest d2c94e258dcb 14 months ago 13.3kB
ubuntu 16.04 b6f507652425 2 years ago 135MB
Mon Jul 15 3:31:26 PM ⓘ
jegan@tektutor:~/devops-july-2024/Day1 x jegan@tektutor:~/devops-july-2024/Day1
[{"OnBuild": null, "Labels": {}}, {"NetworkSettings": {"Bridge": "", "SandboxID": "0ce310fcc680bfa36ea5856bbc8167d43564388c184f4c57e0329452a57134e1", "SandboxKey": "/var/run/docker/netns/0ce310fcc680", "Ports": {}, "HairpinMode": false, "LinkLocalIPv6Address": "", "LinkLocalIPv6PrefixLen": 0, "SecondaryIPAddresses": null, "SecondaryIPv6Addresses": null, "EndpointID": "12dff679087062189100dceb6fcde1155d36cb6bbf8ff4cf3be6546208be50", "Gateway": "172.17.0.1", "GlobalIPv6Address": "", "GlobalIPv6PrefixLen": 0, "IPAddress": "172.17.0.2", "IPPrefixLen": 16, "IPv6Gateway": "", "MacAddress": "02:42:ac:11:00:02", "Networks": {"bridge": {"IPAMConfig": null, "Links": null, "Aliases": null, "MacAddress": "02:42:ac:11:00:02", "EndpointID": "960f7134627a2bb4eca82054d561e9efa1758bc3f79ad6d0634af56bd9a547", "EndpointID": "12dff679087062189100dceb6fcde1155d36cb6bbf8ff4cf3be6546208be50", "Gateway": "172.17.0.1", "IPAddress": "172.17.0.2", "IPPrefixLen": 16, "IPv6Gateway": "", "GlobalIPv6Address": "", "GlobalIPv6PrefixLen": 0, "DriverOpts": null, "DNSNames": null}}, {"macvlan": {"IPAMConfig": null, "Links": null, "Aliases": null, "MacAddress": "02:42:ac:11:00:03", "EndpointID": "960f7134627a2bb4eca82054d561e9efa1758bc3f79ad6d0634af56bd9a547", "Gateway": "172.17.0.1", "IPAddress": "172.17.0.3", "IPPrefixLen": 16, "IPv6Gateway": "", "GlobalIPv6Address": "", "GlobalIPv6PrefixLen": 0, "DriverOpts": null, "DNSNames": null}}, {"host": {"IPAMConfig": null, "Links": null, "Aliases": null, "MacAddress": "02:42:ac:11:00:04", "EndpointID": "960f7134627a2bb4eca82054d561e9efa1758bc3f79ad6d0634af56bd9a547", "Gateway": "172.17.0.1", "IPAddress": "172.17.0.4", "IPPrefixLen": 16, "IPv6Gateway": "", "GlobalIPv6Address": "", "GlobalIPv6PrefixLen": 0, "DriverOpts": null, "DNSNames": null}}}], ⚡ jegan@tektutor.org ➔ docker inspect -f {{.NetworkSettings.IPAddress}} c1
172.17.0.2
⚡ jegan@tektutor.org ➔ docker inspect -f {{.NetworkSettings.IPAddress}} c2
172.17.0.3
⚡ jegan@tektutor.org ➔ docker inspect -f {{.NetworkSettings.Networks.bridge.NetworkID}} c2
960f7134627a2bb4eca82054d561e9efa1758bc3f79ad6d0634af56bd9a547
⚡ jegan@tektutor.org ➔

```

```

jegan@tektutor.org ~ % docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
hello           2.0      6c0cc2421dee  3 days ago   335MB
tektutor/hello  1.0      6c0cc2421dee  3 days ago   335MB
tektutor/nodejs 2.0      6c0cc2421dee  3 days ago   335MB
tektutor/nodejs 1.0      fb137bf412d8  3 days ago   333MB
tektutor/dotnet-weather-ms 1.0      51ff08e3e97d  3 days ago   221MB
tektutor/hello-python-ms  1.0      e49cae150e40  3 days ago   484MB
tektutor/python-hello   1.0      e49cae150e40  3 days ago   484MB
bitnami/nginx       latest    fffffc90d343  2 weeks ago  192MB
nginx            latest    fffffc90d343  3 weeks ago  188MB
ubuntu            latest    35a88802559d  5 weeks ago  78.1MB
hello-world        latest    d2c94e258dcb  14 months ago 13.3kB
ubuntu            16.04    b6f507652425  2 years ago  135MB

jegan@tektutor.org ~ % docker pull mysql:latest
latest: Pulling from library/mysql
d9a40b27c30f: Pull complete
d948328c7651: Pull complete
c1e267313ede: Pull complete
7478f013875a: Pull complete
9221a2250289: Pull complete
d1f57baa52d5: Pull complete
35c3d30e8624: Pull complete
3d4d1dd0cca6: Pull complete
08bfe3f7d1c5: Pull complete
537e7daeeea3: Pull complete
Digest: sha256:72a37ddc9f839cf84f1f6815fb31ba26f37f4c200b90e49607797480e3be446
Status: Downloaded newer image for mysql:latest
docker.io/library/mysql:latest
jegan@tektutor.org ~ % docker images | grep mysql
mysql           latest    5cde95de907d  13 days ago  586MB
jegan@tektutor.org ~ %

```

Lab - Checking the status of docker server service

```
sudo systemctl status docker
```

Expected output

```

jegan@tektutor.org ~ % sudo systemctl status docker
Mon Jul 15 06:47:37 2024 4:12:41 PM IST
jegan@tektutor.org ~ % docker.service - Docker Application Container Engine
   Loaded: loaded (/usr/lib/systemd/system/docker.service; enabled; preset: enabled)
     Active: active (running) since Mon 2024-07-15 06:47:37 IST; 9h ago
   TriggeredBy: ● docker.socket
     Docs: https://docs.docker.com
       Main PID: 3173 (dockerd)
         Tasks: 30
           Memory: 792.4M (peak: 880.4M)
             CPU: 17.970s
           CGroup: /system.slice/docker.service
                     └─3173 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock

Jul 15 06:47:37 tektutor.org dockerd[3173]: time="2024-07-15T06:47:37.812087196+05:30" level=info msg="API >
Jul 15 06:47:37 tektutor.org systemd[1]: Started docker.service - Docker Application Container Engine.
Jul 15 15:04:24 tektutor.org dockerd[3173]: time="2024-07-15T15:04:24.540704407+05:30" level=info msg="igno>
Jul 15 15:04:24 tektutor.org dockerd[3173]: time="2024-07-15T15:04:24.546100442+05:30" level=warning msg="f>
Jul 15 15:12:41 tektutor.org dockerd[3173]: time="2024-07-15T15:12:41.505620066+05:30" level=info msg="igno>
Jul 15 15:12:41 tektutor.org dockerd[3173]: time="2024-07-15T15:12:41.511256274+05:30" level=warning msg="f>
Jul 15 15:24:25 tektutor.org dockerd[3173]: time="2024-07-15T15:24:25.130335889+05:30" level=info msg="igno>
Jul 15 15:24:25 tektutor.org dockerd[3173]: time="2024-07-15T15:24:25.130364661+05:30" level=info msg="igno>
Jul 15 15:24:25 tektutor.org dockerd[3173]: time="2024-07-15T15:24:25.135295932+05:30" level=warning msg="f>
Jul 15 15:24:25 tektutor.org dockerd[3173]: time="2024-07-15T15:24:25.135297968+05:30" level=warning msg="f>

jegan@tektutor.org ~ %

```

Lab - Renaming a container

```
docker ps
docker rename c1 container-1
docker rename c2 container-2
docker ps
```

Expected output

The screenshot shows a terminal window titled 'jegan@tektutor:~/devops-july-2024/Day1'. It displays the command history and the output of the 'docker ps' command twice. The first 'docker ps' command shows two containers: 'c1' and 'c2'. The second 'docker ps' command shows the containers renamed to 'container-1' and 'container-2' respectively. The terminal window is set against a dark background with a light yellow sidebar.

```
jegan@tektutor:~/devops-july-2024/Day1
CONTAINER ID   IMAGE      COMMAND      CREATED     STATUS      PORTS     NAMES
031d5f08c7a4   ubuntu:16.04 "/bin/bash"  About an hour ago   Up About an hour
c28d96c87786   ubuntu:16.04 "/bin/bash"  About an hour ago   Up About an hour
jegan@tektutor:~/devops-july-2024/Day1
jegan@tektutor:~/devops-july-2024/Day1
CONTAINER ID   IMAGE      COMMAND      CREATED     STATUS      PORTS     NAMES
031d5f08c7a4   ubuntu:16.04 "/bin/bash"  About an hour ago   Up About an hour
c28d96c87786   ubuntu:16.04 "/bin/bash"  About an hour ago   Up About an hour
```

Lab - Creating mysql db server container

```
docker run -d --name db1 --hostname db1 -e MYSQL_ROOT_PASSWORD=root@123
mysql:latest
docker ps
```

Get inside the mysql container shell

```
docker exec -it db1 /bin/sh
```

Connect to the mysql server using mysql client, when prompts for password type 'root@123' without quotes

```
mysql -u root -p
SHOW DATABASES;
```

```

CREATE DATABASE tektutor;
USE tektutor;
CREATE TABLE training ( id INT NOT NULL, name VARCHAR(250) NOT NULL,
duration VARCHAR(250) NOT NULL, PRIMARY KEY(id) );

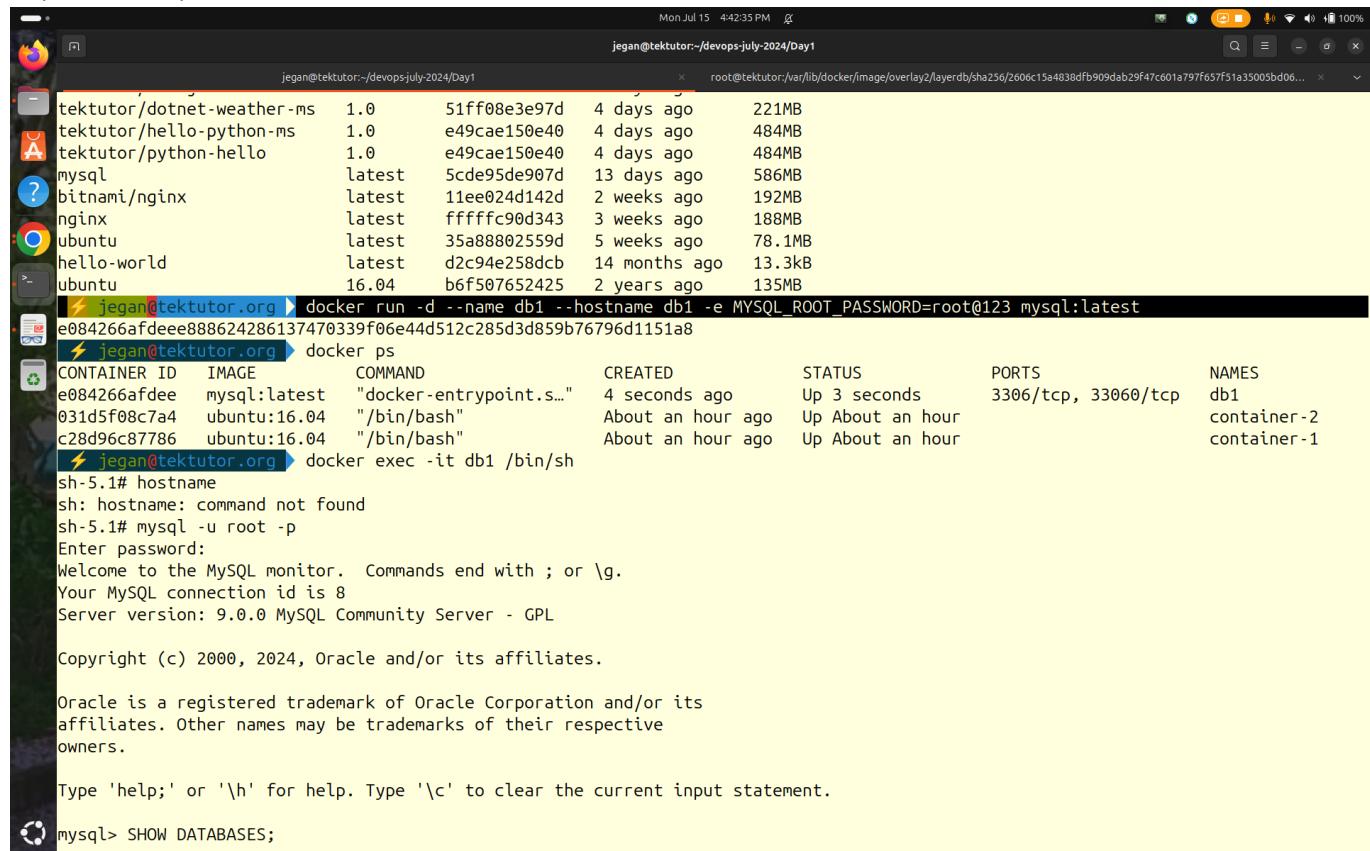
DESCRIBE TABLE training;

INSERT INTO training VALUES ( 1, "DevOps", "5 Days" );
INSERT INTO training VALUES ( 2, "Developing Golang Microservices", "5
Days" );
INSERT INTO training VALUES ( 3, "Developing Windows Device Drivers", "5
Days" );

SELECT * FROM training;
exit
exit

```

Expected output



The screenshot shows a terminal window with the following content:

```

Mon Jul 15 4:42:35 PM UTC
jegan@tektutor:~/devops-july-2024/Day1
jegan@tektutor:~/var/lib/docker/image/overlay2/layerdb/sha256/2606c15a4838dfb909dab29f47c601a737f657f51a35005bd06...
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
e084266afdee mysql:latest "docker-entrypoint.s..." 4 seconds ago Up 3 seconds 3306/tcp, 33060/tcp db1
031d5f08c7a4 ubuntu:16.04 "/bin/bash" About an hour ago Up About an hour container-2
c28d96c87786 ubuntu:16.04 "/bin/bash" About an hour ago Up About an hour container-1
sh-5.1# hostname
sh: hostname: command not found
sh-5.1# mysql -u root -p
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 9.0.0 MySQL Community Server - GPL

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> SHOW DATABASES;

```

```
Mon Jul 15 4:42:51 PM PDT
jegan@tektutor:~/devops-july-2024/Day1
root@tektutor:/var/lib/docker/image/overlay2/layerdb/sha256/2606c15a4838dfb909dab29f47c601a797f657f51a35005bd06... x v

mysql> SHOW DATABASES;
+-----+
| Database      |
+-----+
| information_schema |
| mysql          |
| performance_schema |
| sys            |
+-----+
4 rows in set (0.01 sec)

mysql> CREATE DATABASE tektutor;
Query OK, 1 row affected (0.01 sec)

mysql> SHOW DATABASES;
+-----+
| Database      |
+-----+
| information_schema |
| mysql          |
| performance_schema |
| sys            |
| tektutor       |
+-----+
5 rows in set (0.00 sec)

mysql> USE tektutor;
Database changed
mysql> SHOW TABLES;
Empty set (0.00 sec)

mysql> CREATE TABLE training ( id INT NOT NULL, name VARCHAR(250) NOT NULL, duration VARCHAR(250) NOT NULL, PRIMARY KEY(id) );
Query OK, 0 rows affected (0.01 sec)

Mon Jul 15 4:43:01 PM PDT
jegan@tektutor:~/devops-july-2024/Day1
root@tektutor:/var/lib/docker/image/overlay2/layerdb/sha256/2606c15a4838dfb909dab29f47c601a797f657f51a35005bd06... x v

Empty set (0.00 sec)

mysql> CREATE TABLE training ( id INT NOT NULL, name VARCHAR(250) NOT NULL, duration VARCHAR(250) NOT NULL, PRIMARY KEY(id) );
Query OK, 0 rows affected (0.01 sec)

mysql> DESCRIBE TABLE training;
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| id | select_type | table   | partitions | type    | possible_keys | key     | key_len | ref    | rows   | filtered | Extra   |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 1  | SIMPLE     | training | NULL      | ALL     | NULL        | NULL    | NULL   | NULL    | 1      | 100.00  | NULL    |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
1 row in set, 1 warning (0.01 sec)

mysql> INSERT INTO training VALUES ( 1, "DevOps", "5 Days" );
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO training VALUES ( 2, "Developing Golang Microservices", "5 Days" );
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO training VALUES ( 3, "Developing Windows Device Drivers", "5 Days" );
Query OK, 1 row affected (0.01 sec)

mysql> SELECT * FROM training;
+-----+-----+-----+
| id | name           | duration |
+-----+-----+-----+
| 1  | DevOps         | 5 Days   |
| 2  | Developing Golang Microservices | 5 Days   |
| 3  | Developing Windows Device Drivers | 5 Days   |
+-----+-----+-----+
3 rows in set (0.00 sec)

mysql> exit
Bye
sh-5.1# exit
```

```

Mon Jul 15 4:43:08 PM
jegan@tektutor:~/devops-july-2024/Day1
root@tektutor:/var/lib/docker/image/overlay2/layerdb/sha256/2606c15a4838dfb909dab29f47c601a797f657f51a35005bd06... x v

+-----+
| 1 | SIMPLE      | training | NULL      | ALL    | NULL      | NULL | NULL | 1 | 100.00 | NULL |
+-----+
1 row in set, 1 warning (0.01 sec)

mysql> INSERT INTO training VALUES ( 1, "DevOps", "5 Days" );
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO training VALUES ( 2, "Developing Golang Microservices", "5 Days" );
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO training VALUES ( 3, "Developing Windows Device Drivers", "5 Days" );
Query OK, 1 row affected (0.01 sec)

mysql> SELECT * FROM training;
+-----+
| id | name           | duration |
+-----+
| 1  | DevOps          | 5 Days   |
| 2  | Developing Golang Microservices | 5 Days   |
| 3  | Developing Windows Device Drivers | 5 Days   |
+-----+
3 rows in set (0.00 sec)

mysql> exit
Bye
sh-5.1# exit
exit
jegan@tektutor.org ➤ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
e084266afdee mysql:latest "docker-entrypoint.s..." 2 minutes ago Up 2 minutes 3306/tcp, 33060/tcp db1
031d5f08c7a4 ubuntu:16.04 "/bin/bash" About an hour ago Up About an hour
c28d96c87786 ubuntu:16.04 "/bin/bash" About an hour ago Up About an hour
jegan@tektutor.org ➤

Mon Jul 15 4:46:07 PM
jegan@tektutor:~/devops-july-2024/Day1
root@tektutor:/var/lib/docker/image/overlay2/layerdb/sha256/2606c15a4838dfb909dab29f47c601a797f657f51a35005bd06... x v

mysql> INSERT INTO training VALUES ( 2, "Developing Golang Microservices", "5 Days" );
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO training VALUES ( 3, "Developing Windows Device Drivers", "5 Days" );
Query OK, 1 row affected (0.01 sec)

mysql> SELECT * FROM training;
+-----+
| id | name           | duration |
+-----+
| 1  | DevOps          | 5 Days   |
| 2  | Developing Golang Microservices | 5 Days   |
| 3  | Developing Windows Device Drivers | 5 Days   |
+-----+
3 rows in set (0.00 sec)

mysql> exit
Bye
sh-5.1# exit
exit
jegan@tektutor.org ➤ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
e084266afdee mysql:latest "docker-entrypoint.s..." 2 minutes ago Up 2 minutes 3306/tcp, 33060/tcp db1
031d5f08c7a4 ubuntu:16.04 "/bin/bash" About an hour ago Up About an hour
c28d96c87786 ubuntu:16.04 "/bin/bash" About an hour ago Up About an hour
jegan@tektutor.org ➤ docker inspect -f {{.NetworkSettings.IPAddress}} db1
\172.17.0.4
jegan@tektutor.org ➤ # MySQL Login Credentials
jegan@tektutor.org ➤ # DB Server IP - 172.17.0.4
jegan@tektutor.org ➤ # DB Port - 3306
jegan@tektutor.org ➤ # Username - root
jegan@tektutor.org ➤ # Password - root@123
jegan@tektutor.org ➤

```

Lab - Using an external storage volume to save database, tables and records

When prompts for password, type 'root@123' without quotes

```
mkdir -p /tmp/mysql
ls -lha
docker run -d --name db1 --hostname db1 -v /tmp/mysql:/var/lib/mysql
mysql:latest
docker ps
docker exec -it db1 bash
mysql -u root -p
SHOW DATABASES;
CREATE DATABASE tektutor;
USE tektutor;
CREATE TABLE training ( id INT NOT NULL, name VARCHAR(250) NOT NULL,
duration VARCHAR(250) NOT NULL, PRIMARY KEY(id) );

DESCRIBE TABLE training;

INSERT INTO training VALUES ( 1, "DevOps", "5 Days" );
INSERT INTO training VALUES ( 2, "Developing Golang Microservices", "5
Days" );
INSERT INTO training VALUES ( 3, "Developing Windows Device Drivers", "5
Days" );

SELECT * FROM training;
exit
exit
```

Come out of the db1 container and delete the db1 container

```
docker rm -f db1
```

Create a new container mounting the same path /tmp/mysql

```
docker run -d --name db1 --hostname db1 -v /tmp/mysql:/var/lib/mysql
mysql:latest
docker exec -it db1 bash
mysql -u root -p
SHOW DATABASES;
USE tektutor;
SHOW TABLES;
SELECT * FROM training;
exit
exit
```

Expected output

Mon Jul 15 5:28:12 PM jegan@tektutor:/tmp/mysql/jegan

jegan@tektutor:~

```
⚡ jegan@tektutor.org ➤ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS
 NAMES
c0545e1d81b8 mysql:latest "docker-entrypoint.s..." About a minute ago Up About a minute 3306/tcp, 33
060/tcp db1
031d5f08c7a4 ubuntu:16.04 "/bin/bash"
container-2
c28d96c87786 ubuntu:16.04 "/bin/bash"
container-1
```

⚡ jegan@tektutor.org ➤ docker exec -it db1 bash

```
bash-5.1# mysql -u root -p
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 9.0.0 MySQL Community Server - GPL

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.
```

```
mysql> SHOW DATABASES;
+-----+
| Database |
+-----+
| information_schema |
```

Mon Jul 15 5:28:49 PM jegan@tektutor:/tmp/mysql/jegan

jegan@tektutor:~

```
⚡ jegan@tektutor.org ➤ docker exec -it db1 bash
bash-5.1# mysql -u root -p
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 9.0.0 MySQL Community Server - GPL

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.
```

```
mysql> SHOW DATABASES;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| sys |
+-----+
4 rows in set (0.01 sec)
```

```
mysql> CREATE DATABASE tektutor;
Query OK, 1 row affected (0.00 sec)
```

```
Mon Jul 15 5:28:32 PM JST
jegan@tektutor:/tmp/mysql
root@tektutor:/tmp/mysql/tektutor

mysql> CREATE DATABASE tektutor;
Query OK, 1 row affected (0.00 sec)

mysql> USE tektutor;
Database changed
mysql> CREATE TABLE training ( id INT NOT NULL, name VARCHAR(250) NOT NULL, duration VARCHAR(250) NOT NULL, PRIMARY KEY(id) );
Query OK, 0 rows affected (0.02 sec)

mysql> INSERT INTO training VALUES ( 1, "DevOps" , "5 Days" );
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO training VALUES ( 2, "Developing Golang Microservices" , "5 Days" );
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO training VALUES ( 3, "Developing Windows Device Drivers" , "5 Days" );
Query OK, 1 row affected (0.01 sec)

mysql> SELECT * FROM training;
+----+-----+-----+
| id | name           | duration |
+----+-----+-----+
| 1  | DevOps          | 5 Days   |
| 2  | Developing Golang Microservices | 5 Days   |
| 3  | Developing Windows Device Drivers | 5 Days   |
+----+-----+-----+
3 rows in set (0.00 sec)
```

```
Mon Jul 15 5:28:42 PM JST
jegan@tektutor:/tmp/mysql
root@tektutor:/tmp/mysql/tektutor

mysql> exit
Bye
bash-5.1# exit
exit
jegan@tektutor.org ~ ➤ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
c0545e1d81b8 mysql:latest "docker-entrypoint.s..." 5 minutes ago Up 5 minutes 3306/tcp, 33060/tcp db1
031d5f08c7a4 ubuntu:16.04 "/bin/bash" 2 hours ago Up 2 hours
container-2
c28d96c87786 ubuntu:16.04 "/bin/bash" 2 hours ago Up 2 hours
container-1
jegan@tektutor.org ~ ➤ docker rm -f db1
db1
jegan@tektutor.org ~ ➤ docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
031d5f08c7a4 ubuntu:16.04 "/bin/bash" 2 hours ago Up 2 hours
c28d96c87786 ubuntu:16.04 "/bin/bash" 2 hours ago Up 2 hours
jegan@tektutor.org ~ ➤ docker run -d --name db1 --hostname db1 -e MYSQL_ROOT_PASSWORD=root@123 -v /tmp/mysql:/var/lib/mysql mysql:latest
2290d1e4863c619153e2c6bcfc4e1fa54dbcc033bb61ad9dc54b41943ec2476a
jegan@tektutor.org ~ ➤ docker exec -it db1 bash
bash-5.1# mysql -u root -p
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 9.0.0 MySQL Community Server - GPL
```

```
Mon Jul 15 5:28:51 PM jagan@tektutor:/tmp/mysql
jagan@tektutor:/tmp/mysql
root@tektutor:/tmp/mysql/tektutor

jagan@tektutor.org ~ docker exec -it db1 bash
bash-5.1# mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 9.0.0 MySQL Community Server - GPL

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> SHO
-> ;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL se
rver version for the right syntax to use near 'SHO' at line 1
mysql> SHOWDATABASES;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL se
rver version for the right syntax to use near 'SHOWDATABASES' at line 1
mysql> SHOW DATABASES;
+-----+
| Database      |
+-----+
| information_schema |
| mysql          |
| performance_schema |
5 rows in set (0.01 sec)
```

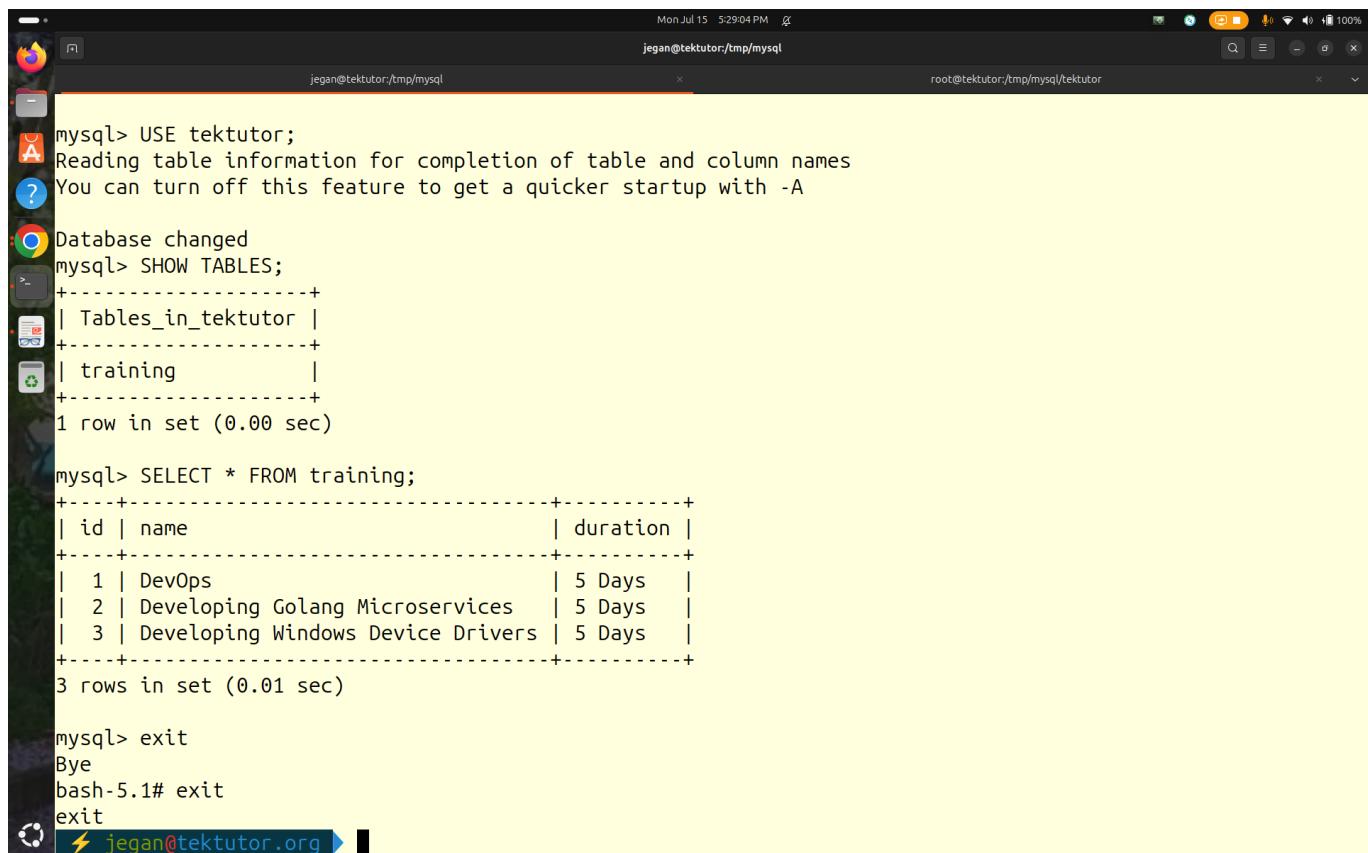
```
Mon Jul 15 5:28:58 PM jagan@tektutor:/tmp/mysql
jagan@tektutor:/tmp/mysql
root@tektutor:/tmp/mysql/tektutor

mysql> SHOW DATABASES;
+-----+
| Database      |
+-----+
| information_schema |
| mysql          |
| performance_schema |
| sys            |
| tektutor       |
+-----+
5 rows in set (0.01 sec)

mysql> USE tektutor;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> SHOW TABLES;
+-----+
| Tables_in_tektutor |
+-----+
| training          |
+-----+
1 row in set (0.00 sec)

mysql> SELECT * FROM training;
+----+-----+-----+
| id | name           | duration |
+----+-----+-----+
```



```
mysql> USE tektutor;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> SHOW TABLES;
+-----+
| Tables_in_tektutor |
+-----+
| training           |
+-----+
1 row in set (0.00 sec)

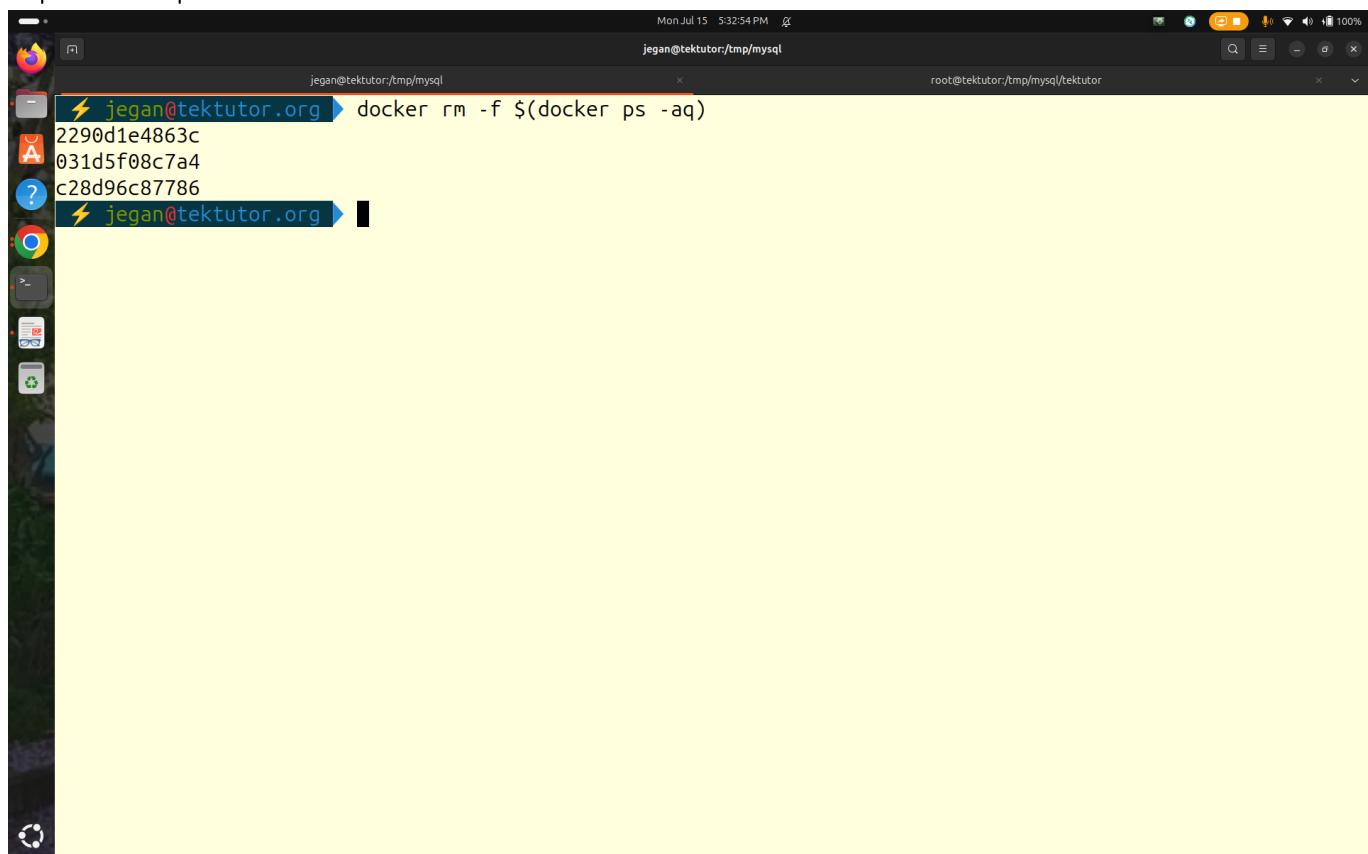
mysql> SELECT * FROM training;
+----+-----+-----+
| id | name            | duration |
+----+-----+-----+
| 1  | DevOps          | 5 Days   |
| 2  | Developing Golang Microservices | 5 Days   |
| 3  | Developing Windows Device Drivers | 5 Days   |
+----+-----+-----+
3 rows in set (0.01 sec)

mysql> exit
Bye
bash-5.1# exit
exit
jegan@tektutor.org
```

Lab - Deleting all containers without calling out their names

```
docker rm -f $(docker ps -aq)
```

Expected output



```
jegan@tektutor:/tmp/mysql
jegan@tektutor:/tmp/mysql$ docker rm -f $(docker ps -aq)
2290d1e4863c
031d5f08c7a4
c28d96c87786
jegan@tektutor:/tmp/mysql$
```

Lab - Port forwarding to expose the container services to remote machines

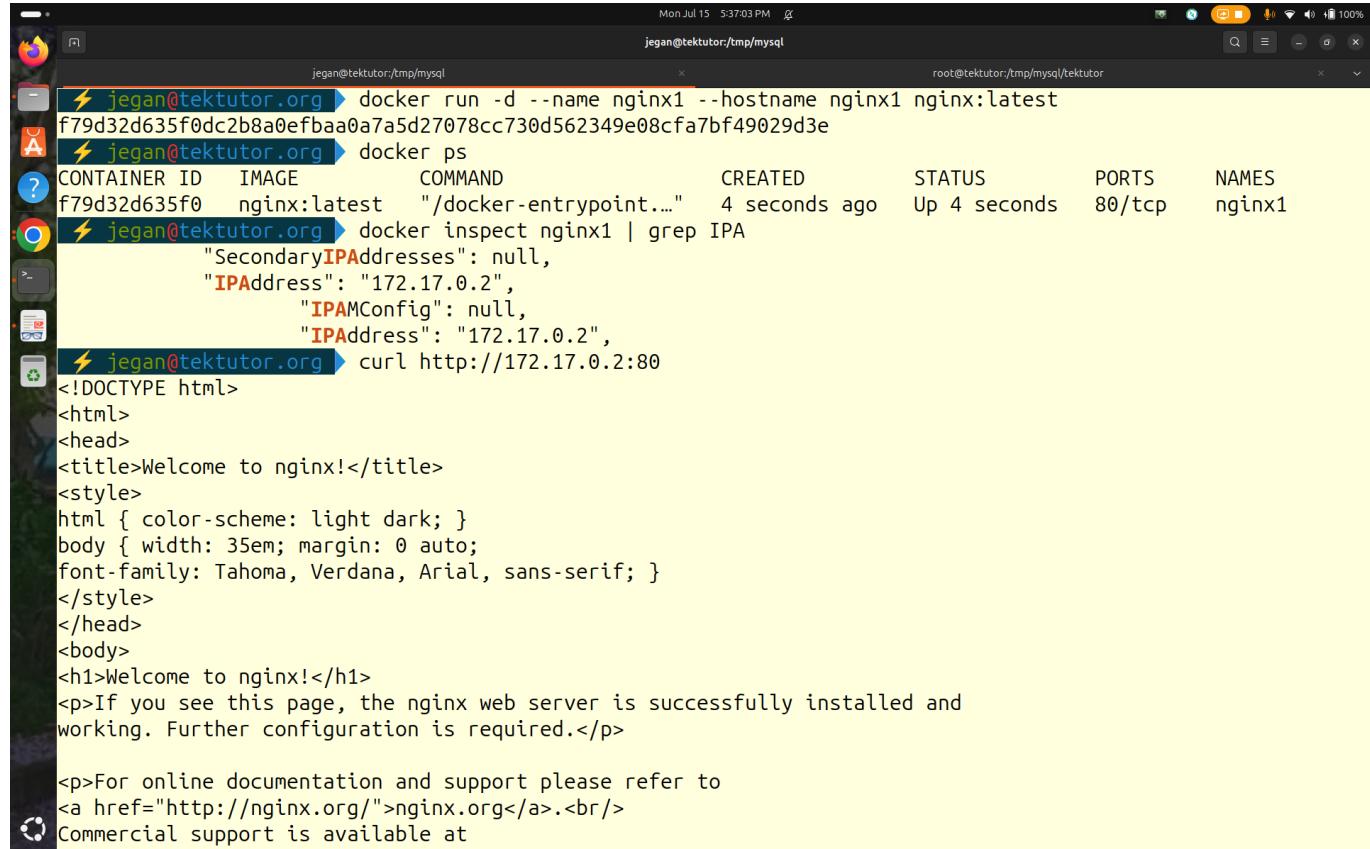
```
docker run -d --name nginx1 --hostname nginx1 nginx:latest
docker ps
docker inspect nginx1 | grep IPA
curl http://172.17.0.2:80
docker rm -f nginx1
```

As you noticed in the above command, the nginx1 container is assigned with a Private IP Address, hence it is accessible only on the machine where the container is running.

In order to make it accessible from remote machines, we use port-forwarding

```
docker run -d --name nginx1 --hostname nginx1 -p 8080:80 nginx:latest
docker ps
ifconfig
curl http://192.168.1.104:8080
```

Expected output



The screenshot shows a terminal window with the following session:

```
jegan@tektutor:/tmp/mysql$ docker run -d --name nginx1 --hostname nginx1 nginx:latest
jegan@tektutor:/tmp/mysql$ docker ps
CONTAINER ID        IMAGE       COMMAND       CREATED          STATUS          PORTS     NAMES
f79d32d635f0        nginx:latest "/docker-entrypoint...."   4 seconds ago   Up 4 seconds   80/tcp    nginx1
jegan@tektutor:/tmp/mysql$ docker inspect nginx1 | grep IPA
  "SecondaryIPAddresses": null,
  "IPAddress": "172.17.0.2",
  "IPAMConfig": null,
  "IPAddress": "172.17.0.2",
jegan@tektutor:/tmp/mysql$ curl http://172.17.0.2:80
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
html { color-scheme: light dark; }
body { width: 35em; margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif; }
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>
<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/support/">nginx.com</a>.
</p>
```

```
Mon Jul 15 5:41:08 PM PT
jegan@tektutor:/tmp/mysql
root@tektutor:/tmp/mysql/tektutor

[jegan@tektutor.org ~] docker rm -f nginx1
nginx1
[jegan@tektutor.org ~] docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
[jegan@tektutor.org ~] docker run -d --name nginx1 --hostname nginx1 -p 8080:80 nginx:latest
55cc4d198ebcf1cef4494b8c706cf6b7171c39d1eac446dab02fa8b7306c5cde
[jegan@tektutor.org ~] docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS
NAMES
55cc4d198ebc nginx:latest "/docker-entrypoint..." 2 seconds ago Up 1 second 0.0.0.0:8080->80/tcp, :
::8080->80/tcp nginx1
[jegan@tektutor.org ~] ifconfig
br-35ea588a1017: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    inet 192.168.49.1 netmask 255.255.255.0 broadcast 192.168.49.255
        ether 02:42:6f:12:d1:a3 txqueuelen 0 (Ethernet)
            RX packets 0 bytes 0 (0.0 B)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 0 bytes 0 (0.0 B)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

crc: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    inet 192.168.130.1 netmask 255.255.255.0 broadcast 192.168.130.255
        ether 52:54:00:fd:be:d0 txqueuelen 1000 (Ethernet)
            RX packets 0 bytes 0 (0.0 B)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 0 bytes 0 (0.0 B)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

docker0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
[jegan@tektutor.org ~] jegan@tektutor:/tmp/mysql
root@tektutor:/tmp/mysql/tektutor

[jegan@tektutor.org ~] docker0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 172.17.0.1 netmask 255.255.0.0 broadcast 172.17.255.255
    inet6 fe80::42:87ff:fe8a:553d prefixlen 64 scopeid 0x20<link>
        ether 02:42:87:8a:55:3d txqueuelen 0 (Ethernet)
            RX packets 3158 bytes 170945 (170.9 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 4052 bytes 19216324 (19.2 MB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

enp0s31f6: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether 08:92:04:3e:f8:c3 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 19 memory 0x96100000-96120000

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
        loop txqueuelen 1000 (Local Loopback)
            RX packets 30254 bytes 6782205 (6.7 MB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 30254 bytes 6782205 (6.7 MB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

veth9039cae: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet6 fe80::38a2:e3ff:fe55:8fbe prefixlen 64 scopeid 0x20<link>
        ether 3a:a2:e3:55:8f:be txqueuelen 0 (Ethernet)
```

```

Mon Jul 15 5:41:23 PM JST
jegan@tektutor:/tmp/mysql
root@tektutor:/tmp/mysql/tektutor

IX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

A veth9039cae: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
inet6 fe80::38a2:e3ff:fe55:8fbe prefixlen 64 scopeid 0x20<link>
ether 3a:a2:e3:55:8f:be txqueuelen 0 (Ethernet)
RX packets 0 bytes 0 (0.0 B)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 37 bytes 5482 (5.4 KB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

virbr0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
inet 192.168.122.1 netmask 255.255.255.0 broadcast 192.168.122.255
ether 52:54:00:e8:86:d8 txqueuelen 1000 (Ethernet)
RX packets 0 bytes 0 (0.0 B)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 0 bytes 0 (0.0 B)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlp0s20f3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
inet 192.168.1.104 netmask 255.255.255.0 broadcast 192.168.1.255
inet6 fe80::3715:e0b9:5c36:36ba prefixlen 64 scopeid 0x20<link>
ether a0:80:69:39:18:9f txqueuelen 1000 (Ethernet)
RX packets 2245428 bytes 1572591501 (1.5 GB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 3382856 bytes 1259013636 (1.2 GB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

⚡ jegan@tektutor.org ➤ curl http://192.168.1.104:8080
<!DOCTYPE html>
<html>

Mon Jul 15 5:41:30 PM JST
jegan@tektutor:/tmp/mysql
root@tektutor:/tmp/mysql/tektutor

⚡ jegan@tektutor.org ➤ curl http://192.168.1.104:8080
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
html { color-scheme: light dark; }
body { width: 35em; margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif; }
</style>
</head>
<body>
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<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
⚡ jegan@tektutor.org ➤ docker ps
CONTAINER ID        IMAGE               COMMAND                  CREATED             STATUS              PORTS
NAMES
55cc4d198ebc      nginx:latest      "/docker-entrypoint...."   22 seconds ago    Up 22 seconds     0.0.0.0:8080->80/tcp

```

The screenshot shows a terminal window with two tabs. The left tab, titled 'jegan@tektutor:/tmp/mysql', displays the Nginx default configuration file. The right tab, titled 'root@tektutor:/tmp/mysql/tektutor', shows the output of the 'docker ps' command.

```
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
html { color-scheme: light dark; }
body { width: 35em; margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif; }
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Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>
<p><em>Thank you for using nginx.</em></p>
</body>
</html>
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS
55cc4d198ebc	nginx:latest	"/docker-entrypoint...."	22 seconds ago	Up 22 seconds	0.0.0.0:8080->80/tcp
,	::::8080->80/tcp	nginx1			

Request to share your Day1 feedback at the below URL

<https://survey.zohopublic.com/zs/JCDHaM>