

# **Lab Exercise 1- Docker Fundamental Commands**

## **Objective**

**Learn and practice the fundamental Docker CLI commands to:**

- **Manage images and containers**
- **Understand container lifecycle**
- **Build and run applications using Docker**

## **1. Setup**

### **Prerequisites**

- Docker installed on your system  
(Check using: docker --version)
- Internet access to pull images

## **2. Basic Docker Commands**

### **Step 1: Verify Installation**

```
docker --version
```

```
docker info
```

*Expected Output:* Docker version and system details.

```
C:\Users\HP>Docker --version
Docker version 28.3.2, build 578ccf6
```

```
C:\Users\HP>docker info
Client:
  Version: 28.3.2
  Context: desktop-linux
  Debug Mode: false
  Plugins:
    ai: Docker AI Agent - Ask Gordon (Docker Inc.)
      Version: v1.9.9
      Path: C:\Users\HP\.docker\cli-plugins\docker-ai.exe
    buildx: Docker Buildx (Docker Inc.)
      Version: v0.25.0-desktop.1
      Path: C:\Program Files\Docker\cli-plugins\docker-buildx.exe
    cloud: Docker Cloud (Docker Inc.)
      Version: v0.4.2
      Path: C:\Program Files\Docker\cli-plugins\docker-cloud.exe
    compose: Docker Compose (Docker Inc.)
      Version: v2.38.2-desktop.1
      Path: C:\Program Files\Docker\cli-plugins\docker-compose.exe
    debug: Get a shell into any image or container (Docker Inc.)
      Version: 0.0.41
      Path: C:\Program Files\Docker\cli-plugins\docker-debug.exe
    desktop: Docker Desktop commands (Docker Inc.)
      Version: v0.1.11
      Path: C:\Program Files\Docker\cli-plugins\docker-desktop.exe
    extension: Manages Docker extensions (Docker Inc.)
      Version: v0.2.29
      Path: C:\Program Files\Docker\cli-plugins\docker-extension.exe
    init: Creates Docker-related starter files for your project (Docker Inc.)
      Version: v1.4.0
      Path: C:\Program Files\Docker\cli-plugins\docker-init.exe
    mcp: Docker MCP Plugin (Docker Inc.)
      Version: v0.9.9
      Path: C:\Program Files\Docker\cli-plugins\docker-mcp.exe
    model: Docker Model Runner (EXPERIMENTAL) (Docker Inc.)
      Version: v0.1.33
      Path: C:\Program Files\Docker\cli-plugins\docker-model.exe
    sbom: View the packaged-based Software Bill Of Materials (SBOM) for an image (Anchore Inc.)
      Version: 0.6.0
      Path: C:\Program Files\Docker\cli-plugins\docker-sbom.exe
    scout: Docker Scout (Docker Inc.)
      Version: v1.18.2
      Path: C:\Users\HP\.docker\cli-plugins\docker-scout.exe
```

```
Server:
  Containers: 6
    Running: 0
    Paused: 0
    Stopped: 6
  Images: 7
  Server Version: 28.3.2
  Storage Driver: overlayfs
    driver-type: io.containerd.snapshotter.v1
  Logging Driver: json-file
  Cgroup Driver: cgroups
  Cgroup Version: 2
  Plugins:
    Volume: local
    Network: bridge host ipvlan macvlan null overlay
    Log: awslogs fluentd gcplogs gelf journald json-file local splunk syslog
  CDI spec directories:
    /etc/cdi
    /var/run/cdi
  Discovered Devices:
    cdi: docker.com/gpu=webgpu
  Swarm: inactive
  Runtimes: runc io.containerd.runc.v2 nvidia
  Default Runtime: runc
  Init Binary: docker-init
  containerd version: 05044ec0a9a75232cad458027ca83437aae3f4da
  runc version: v1.2.5-0-g59923ef
  init version: de40ad0
  Security Options:
    seccomp
      Profile: builtin
    cgroupns
  Kernel Version: 6.6.87.2-microsoft-standard-WSL2
  Operating System: Docker Desktop
  OSType: linux
  Architecture: x86_64
  CPUs: 16
  Total Memory: 7.592GiB
  Name: docker-desktop
  ID: 1334dc41-1861-4205-abca-170fd773399d
  Docker Root Dir: /var/lib/docker
  Debug Mode: false
  HTTP Proxy: http.docker.internal:3128
  HTTPS Proxy: https.docker.internal:3128
  No Proxy: hubproxy.docker.internal
  Labels:
    com.docker.desktop.address=npipe://\\.\pipe\docker_cli
  Experimental: false
  Insecure Registries:
    hubproxy.docker.internal:5555
    ::1/128
    127.0.0.0/8
  Live Restore Enabled: false

WARNING: DOCKER_INSECURE_NO_IPTABLES_RAW is set
```

## Step 2: Pull an Image from Docker Hub

```
docker pull ubuntu:latest
```

*Explanation:* Downloads the latest Ubuntu image from Docker Hub.

Check available images:

```
docker images
```

```
C:\Users\HP>docker pull ubuntu:latest
latest: Pulling from library/ubuntu
a3629ac5b9f4: Pull complete
Digest: sha256:cd1dba651b3080c3686ecf4e3c4220f026b521fb76978881737d24f200828b2b
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest
```

```
C:\Users\HP>docker images
REPOSITORY          TAG      IMAGE ID   CREATED        SIZE
ubuntu              latest   cd1dba651b30  5 days ago   117MB
nginx               latest   553f64aecdc3  2 months ago  225MB
demo_app_try        latest   61c28ae23713  2 months ago  80.1MB
sreyassharma/signed_images_jenkins  1.0.1    eba1c7c0314a  2 months ago  80.1MB
jasonish/suricata   latest   fc6cce7683d2  2 months ago  594MB
ghcr.io/zaproxy/zaproxy  stable   84d2459dc305  2 months ago  3.58GB
nginx-html-app      latest   d09021b70462  2 months ago  225MB
hello-world         latest   f7931603f70e   5 months ago  20.3kB
```

## Step 3: Run a Container

Run Ubuntu interactively:

```
docker run -it --name myubuntu ubuntu bash
```

Now you're inside a running container (prompt will change).

Exit:

```
exit
```

```
C:\Users\HP>docker run -it --name Shivangubuntu ubuntu bash
root@1a06f2e5bdaf:/# exit
exit
```

## Step 4: List Containers

- Show running containers:

```
docker ps
```

- Show all containers (including stopped):

```
docker ps -a
```

C:\Users\HP>docker ps						
CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
1a06f2e5bdaf	ubuntu	"bash"	About a minute ago	Exited (0) 57 seconds ago		Shivangubuntu
4790d53ba747	nginx:latest	"/docker-entrypoint..."	2 months ago	Exited (0) 2 months ago		affectionate_bardeen
d609690dd320	nginx-html-app:latest	"/docker-entrypoint..."	2 months ago	Exited (255) 8 weeks ago	80/tcp	loving_hopper
1e09c0349ab5	hello-world:latest	"/hello"	2 months ago	Exited (0) 2 months ago		crazy_meninsky
3c71cfcbb358d	nginx-html-app:latest	"/docker-entrypoint..."	2 months ago	Exited (255) 8 weeks ago	80/tcp	eager_golick
4b2b62e3715e	hello-world:latest	"/hello"	2 months ago	Exited (0) 2 months ago		charming_jones
8d41774da765	hello-world	"/hello"	2 months ago	Exited (0) 2 months ago		gallant_dubinsky

## Step 5: Start / Stop / Remove Containers

```
# Start a stopped container
```

```
docker start <container_id>
```

```
# Stop a running container
```

```
docker stop <container_id>
```

```
# Remove a container
```

```
docker rm <container_id>
```

*Tip:* Use docker ps -a to get container IDs.

```
C:\Users\HP>docker start 1a06f2e5bdaf  
1a06f2e5bdaf

C:\Users\HP>docker stop 1a06f2e5bdaf  
1a06f2e5bdaf

C:\Users\HP>docker rm 1a06f2e5bdaf  
1a06f2e5bdaf
```

## Step 6: Remove Images

```
docker rmi ubuntu:latest
```

*Note:* You must stop and remove all containers using that image first.

```
C:\Users\HP>docker rmi ubuntu:latest
Untagged: ubuntu:latest
Deleted: sha256:cd1dba651b3080c3686ecf4e3c4220f026b521fb76978881737d24f200828b2b
```

```
C:\Users\HP>docker images
REPOSITORY          TAG      IMAGE ID   CREATED    SIZE
nginx              latest   553f64aecdc3  2 months ago  225MB
demo_app_try       latest   61c28ae23713  2 months ago  80.1MB
sreyassharma/signed_images_jenkins  1.0.1    eba1c7c0314a  2 months ago  80.1MB
jasonish/suricata  latest   fc6cce7683d2  2 months ago  594MB
ghcr.io/zaproxy/zaproxy  stable   84d2459dc305  2 months ago  3.58GB
nginx-html-app     latest   d09021b70462  2 months ago  225MB
hello-world        latest   f7931603f70e   5 months ago  20.3kB
```