Application Containerization And Orchestration Lab

Lab Instructor – Dr. Hitesh Kumar Sharma

Submitted By – Swati Pal

SAP ID – 500097368

Enrolment no. – R2142211342

Batch – DevOps B4

EXPERIMENT-1

Performing CRUD Operation on Containers

Objective: Performing CRUD Operation on Containers

Tools required: Docker Configuration

Pre-requisites: Ubuntu Configuration, Docker

Steps to be followed:

1. Pulling a Docker image
2. Creating a new container
3. Stopping the container
4. Listing all the containers
5. Deleting the container
6. Removing the image

Step 1: Pulling a Docker image

1.1 Open the terminal and pull an image using the command:

"docker pull nginx"

```
C:\Users\91983>docker pull nginx
Using default tag: latest
latest: Pulling from library/nginx
a378f10b3218: Pull complete
4dfff0708538: Pull complete
2135e49ace4b: Pull complete
c843f6b280ce: Pull complete
6f35ab6f1400: Pull complete
6c538b49fa4a: Pull complete
d57731fb9008: Pull complete
Digest: sha256:b4af4f8b6470febf45dc10f564551af682a802eda1743055a7dfc8332dffa595
Status: Downloaded newer image for nginx:latest
docker.io/library/nginx:latest

What's Next?
  View a summary of image vulnerabilities and recommendations → docker scout quickview nginx
```

1.2 List all the docker images to check the newly pulled *nginx* image:

" docker images "

```
C:\Users\91983>docker images
REPOSITORY                                        TAG
              IMAGE ID       CREATED         SIZE
nginx                                             latest
              bc649bab30d1   12 days ago     187MB
hubproxy.docker.internal:5555/docker/desktop-kubernetes   kubernetes-v1.27.2-cni-v1.2.0-critools-v1.27.0-cri-dockerd-v0.
3.2-1-debian   c763812a4530   4 months ago    418MB
registry.k8s.io/kube-apiserver                    v1.27.2
              c5b13e4f7806   5 months ago    121MB
```

Step 2: Creating a new container

2.1 Create a new container from the *nginx* image:

" docker run -dt -p 81:81 nginx "

```
C:\Users\91983>docker run -dt -p 81:80 nginx
59cd250204ed1959ef82e7fca5c39c20c0c2859aa20e30bce93abd00d9c8cf45
```

2.2 List all the running containers to check the newly created container. You can find various details like port of container, it's time of creation and ID.

" docker ps "

```
C:\Users\91983>docker ps
CONTAINER ID   IMAGE                  COMMAND                  CREATED         STATUS         PORTS
  NAMES
59cd250204ed   nginx                  "/docker-entrypoint.…"   8 seconds ago   Up 6 seconds   0.0.0.0:81->80/tcp
  competent_boyd
8dde08a8dba4   165df46c1bb9           "kube-scheduler --au…"   15 minutes ago   Up 15 minutes
  k8s_kube-scheduler_kube-scheduler-docker-desktop_kube-system_42b55bbd22a41e1e397a84692d259b1e_7
6451c043a73b   registry.k8s.io/pause:3.9   "/pause"                 15 minutes ago   Up 15 minutes
  k8s_POD_kube-scheduler-docker-desktop_kube-system_42b55bbd22a41e1e397a84692d259b1e_7
```

Step 3: Stopping the container

3.1 Use the following command to stop the running container. ***(***You can also us the container ID to stop the container: *" docker stop CONTAINER_ID "****)***

" docker stop CONTAINER_NAME "

```
C:\Users\91983>docker stop 59cd250204ed
59cd250204ed
```

Note: Replace CONTAINER_NAME with the name of the newly created container. The container name may differ from the one shown in the image below.

3.2 Use the following command to list all the running containers and verify if the container has stopped running:

" docker ps "

```
C:\Users\91983>docker ps
CONTAINER ID   IMAGE                     COMMAND                  CREATED         STATUS         PORTS     NAMES
8dde08a8dba4   165df46c1bb9              "kube-scheduler --au…"   19 minutes ago   Up 19 minutes            k8s_kube-
scheduler_kube-scheduler-docker-desktop_kube-system_42b55bbd22a41e1e397a84692d259b1e_7
6451c043a73b   registry.k8s.io/pause:3.9   "/pause"                 19 minutes ago   Up 19 minutes            k8s_POD_k
ube-scheduler-docker-desktop_kube-system_42b55bbd22a41e1e397a84692d259b1e_7
```

3.3 You can start the container again and check the running containers. ***(***You can also us the container ID to start the container: *sudo docker start CONTAINER_ID****)***

" docker start CONTAINER_NAME " or " docker start CONTAINER_ID "

```
C:\Users\91983>docker start 59cd250204ed
59cd250204ed
```

```
C:\Users\91983>docker ps
CONTAINER ID   IMAGE                     COMMAND                  CREATED         STATUS         PORTS
  NAMES
59cd250204ed   nginx                     "/docker-entrypoint.…"   9 minutes ago    Up 4 seconds    0.0.0.0:81->80/tcp
  competent_boyd
8dde08a8dba4   165df46c1bb9              "kube-scheduler --au…"   24 minutes ago   Up 24 minutes
  k8s_kube-scheduler_kube-scheduler-docker-desktop_kube-system_42b55bbd22a41e1e397a84692d259b1e_7
6451c043a73b   registry.k8s.io/pause:3.9   "/pause"                 24 minutes ago   Up 24 minutes
  k8s_POD_kube-scheduler-docker-desktop_kube-system_42b55bbd22a41e1e397a84692d259b1e_7
```

3.4 To start the container in interactive mode, use the –i and –t options.

*“ **docker run -it --name=Test_1 nginx** “*

```
C:\Users\91983>docker run -it --name=Test_1 nginx
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Sourcing /docker-entrypoint.d/15-local-resolvers.envsh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2023/10/24 13:42:40 [notice] 1#1: using the "epoll" event method
2023/10/24 13:42:40 [notice] 1#1: nginx/1.25.2
2023/10/24 13:42:40 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2023/10/24 13:42:40 [notice] 1#1: OS: Linux 5.10.102.1-microsoft-standard-WSL2
2023/10/24 13:42:40 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2023/10/24 13:42:40 [notice] 1#1: start worker processes
2023/10/24 13:42:40 [notice] 1#1: start worker process 29
2023/10/24 13:42:40 [notice] 1#1: start worker process 30
2023/10/24 13:42:40 [notice] 1#1: start worker process 31
2023/10/24 13:42:40 [notice] 1#1: start worker process 32
2023/10/24 13:42:40 [notice] 1#1: start worker process 33
2023/10/24 13:42:40 [notice] 1#1: start worker process 34
2023/10/24 13:42:40 [notice] 1#1: start worker process 35
2023/10/24 13:42:40 [notice] 1#1: start worker process 36
```

Step 4: Listing all the containers

4.1 Use the below command to list all the containers started and the once which are stopped:

“ docker ps -a “

```
C:\Users\91983>docker ps -a
CONTAINER ID   IMAGE                     COMMAND                  CREATED         STATUS         PORTS
  NAMES
2f8e93a9c8fc   dc245db8c2fa              "kube-apiserver --ad…"   13 seconds ago   Up 12 seconds
  k8s_kube-apiserver_kube-apiserver-docker-desktop_kube-system_8b71cd624d40d0ffecf5822890467a47_104
03ed1b222b30   nginx                     "/docker-entrypoint.…"   2 minutes ago    Up 2 minutes   80/tcp
  Test_1
59cd250204ed   nginx                     "/docker-entrypoint.…"   14 minutes ago   Up 5 minutes   0.0.0.0:81->80/tcp
  competent_boyd
8dde08a8dba4   165df46c1bb9              "kube-scheduler --au…"   29 minutes ago   Up 29 minutes
  k8s_kube-scheduler_kube-scheduler-docker-desktop_kube-system_42b55bbd22a41e1e397a84692d259b1e_7
6451c043a73b   registry.k8s.io/pause:3.9   "/pause"                 29 minutes ago   Up 29 minutes
  k8s_POD_kube-scheduler-docker-desktop_kube-system_42b55bbd22a41e1e397a84692d259b1e_7
39cc4e421382   registry.k8s.io/pause:3.9   "/pause"                 29 minutes ago   Up 29 minutes
  k8s_POD_kube-controller-manager-docker-desktop_kube-system_861008677140df5bf14684241a098812_7
```

4.2 To list the containers by their ID, use the below command

" docker ps -aq "

```
C:\Users\91983>docker ps -aq
03ed1b222b30
59cd250204ed
8dde08a8dba4
6451c043a73b
39cc4e421382
```

4.3 To list the total file size of each container, use the below command:

" docker ps -s "

```
C:\Users\91983>docker ps -s
CONTAINER ID   IMAGE                     COMMAND                  CREATED         STATUS         PORTS
  NAMES                                                                                          SIZE
03ed1b222b30   nginx                     "/docker-entrypoint.…"   5 minutes ago   Up 5 minutes    80/tcp
  Test_1                                                                                         1.09kB (virtual 187M
B)
59cd250204ed   nginx                     "/docker-entrypoint.…"   16 minutes ago  Up 7 minutes    0.0.0.0:81->80/tcp
  competent_boyd                                                                                 1.09kB (virtual 187M
B)
8dde08a8dba4   165df46c1bb9              "kube-scheduler --au…"   32 minutes ago  Up 32 minutes
  k8s_kube-scheduler_kube-scheduler-docker-desktop_kube-system_42b55bbd22a41e1e397a84692d259b1e_7   0B (virtual 50.7MB)
6451c043a73b   registry.k8s.io/pause:3.9 "/pause"                  32 minutes ago  Up 32 minutes
  k8s_POD_kube-scheduler-docker-desktop_kube-system_42b55bbd22a41e1e397a84692d259b1e_7              0B (virtual 744kB)
39cc4e421382   registry.k8s.io/pause:3.9 "/pause"                  32 minutes ago  Up 32 minutes
  k8s_POD_kube-controller-manager-docker-desktop_kube-system_861008677140df5bf14684241a098812_7    0B (virtual 744kB)
```

4.4 To list the latest created containers, use the following command:

" docker ps -l "

```
C:\Users\91983>docker ps -l
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
```

Step 5: Deleting the container

5.1 Stop the running container and remove it using the following commands:

" docker stop CONTAINER_NAME "

```
C:\Users\91983>docker stop Test_1
Test_1

C:\Users\91983>docker ps
CONTAINER ID   IMAGE                     COMMAND                  CREATED          STATUS          PORTS
  NAMES
59cd250204ed   nginx                     "/docker-entrypoint.…"   20 minutes ago   Up 11 minutes   0.0.0.0:81->80/tcp
  competent_boyd
8dde08a8dba4   165df46c1bb9              "kube-scheduler --au…"   36 minutes ago   Up 36 minutes
  k8s_kube-scheduler_kube-scheduler-docker-desktop_kube-system_42b55bbd22a41e1e397a84692d259b1e_7
6451c043a73b   registry.k8s.io/pause:3.9   "/pause"                 36 minutes ago   Up 36 minutes
  k8s_POD_kube-scheduler-docker-desktop_kube-system_42b55bbd22a41e1e397a84692d259b1e_7
39cc4e421382   registry.k8s.io/pause:3.9   "/pause"                 36 minutes ago   Up 36 minutes
  k8s_POD_kube-controller-manager-docker-desktop_kube-system_861008677140df5bf14684241a098812_7
```

" docker container rm CONTAINER_NAME "

```
C:\Users\91983>docker container rm Test_1
Test_1
```

Step 6: Removing the image

6.1 Remove the image using the command:

" docker image rm nginx "

```
C:\Users\91983>docker image rm nginx
Untagged: nginx:latest
Untagged: nginx@sha256:b4af4f8b6470febf45dc10f564551af682a802eda1743055a7dfc8332dffa595
Deleted: sha256:bc649bab30d150c10a84031a7f54c99a8c31069c7bc324a7899d7125d59cc973
Deleted: sha256:c6f480996a203ed077606cce624f944b041449833e2db3f7d19fe22974fb965b
Deleted: sha256:e4347a01432c5f4350b041632f5703c3dd47de2ec68547b9339d11ea44708389
Deleted: sha256:9d40098fc19fdfff9c74fd3c2c0ff49bfda7d9d04b5d7806d0843d32055d769a
Deleted: sha256:165ae0ef2ddd33b6d5a7f206633b9b0c30cd94ff18a4ed5c3aeb59bf28388526
Deleted: sha256:06dabb44ac4d1f0b5544255e944f15a939178d77aff60a5b296e38bd8743efeb
Deleted: sha256:ee220599571f649e0fb74b40db1615a4c9c1355ac912f9e70087b695617af352
Deleted: sha256:cb4596cc145400fb1f2aa56d41516b39a366ecdee7bf3f9191116444aacd8c90
```