Lab Summary: Docker and IBM Cloud Container Registry

Objective

Documented actions taken to:

- Pull and run Docker images
- Build custom Docker images
- Push images to IBM Cloud Container Registry (ICR)

Environment Setup and Verification

- Verified Docker CLI installation: `docker --version`
- Verified IBM Cloud CLI installation: `ibmcloud version`
- Navigated to project directory: `/home/project`
- Cloned lab repository: `git clone https://github.com/ibm-developer-skills-network/CC201.git`
- Changed to working directory: `cd CC201/labs/1_ContainersAndDocker/`
- Confirmed necessary lab files: `ls`
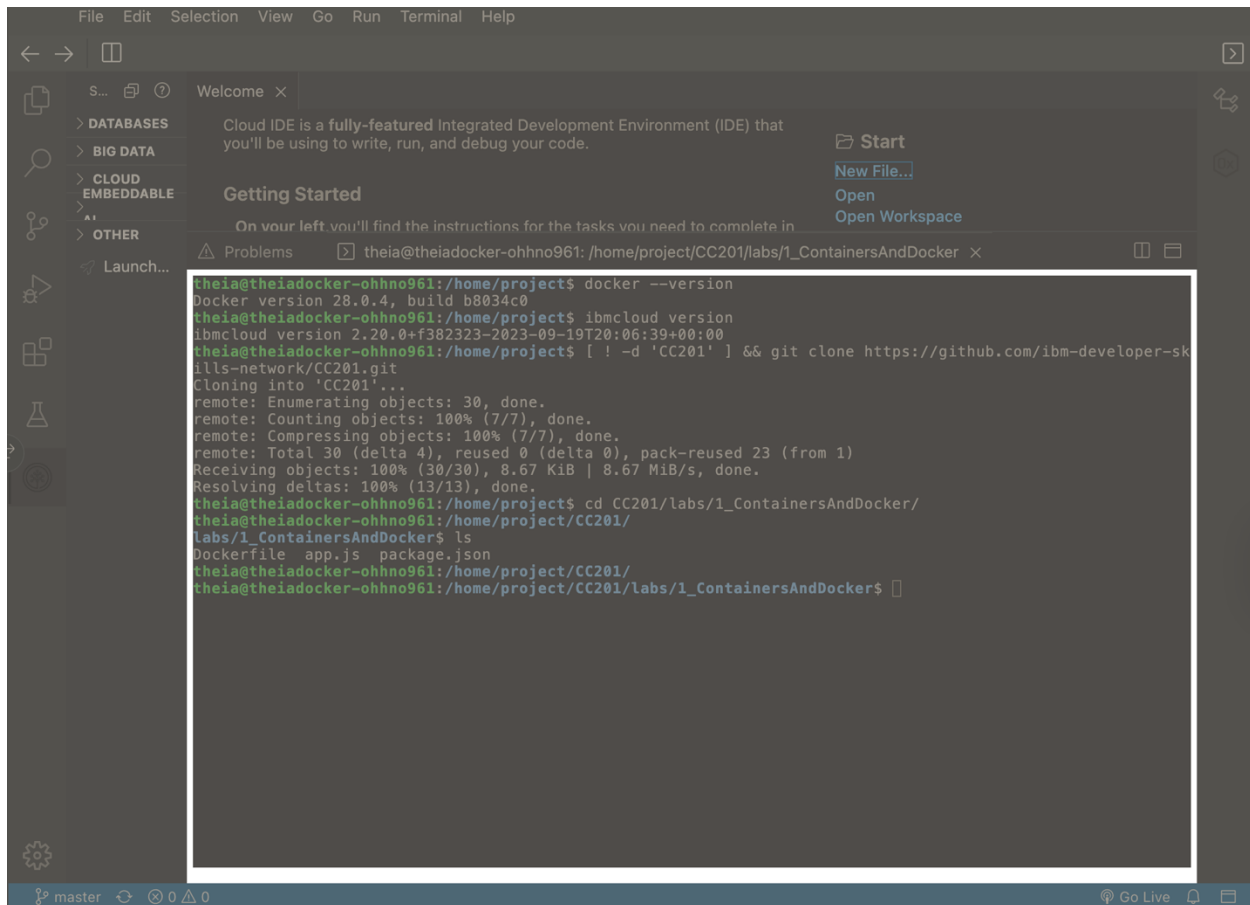
Pulled and Ran Public Docker Image

- Checked local images: `docker images`
- Pulled test image: `docker pull hello-world`
- Ran container: `docker run hello-world`
- Verified container execution: `docker ps -a`
- Removed container after execution: `docker container rm <container_id>`
- Verified removal: `docker ps -a`

```
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker$ docker imag
es
REPOSITORY    TAG        IMAGE ID    CREATED    SIZE
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker$ docker pull
 hello-world
Using default tag: latest
latest: Pulling from library/hello-world
c1ec31eb5944: Pull complete
Digest: sha256:e2fc4e5012d16e7fe466f5291c476431beaa1f9b90a5c2125b493ed28e2aba57
Status: Downloaded newer image for hello-world:latest
docker.io/library/hello-world:latest
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker$ 
```

Built Custom Docker Image

- Verified presence of `Dockerfile`, `app.js`, and `package.json`
- Built image from Dockerfile: `docker build . -t myimage:v1`
- Confirmed build success: `docker images`

```
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker$ docker imag
es
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
hello-world   latest    d2c94e258dcb   2 years ago    13.3kB
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker$ 
```

```
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker$ docker run
hello-world

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
 $ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
 https://hub.docker.com/

For more examples and ideas, visit:
 https://docs.docker.com/get-started/

theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker$
```

```
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker$ docker ps -
a
CONTAINER ID    IMAGE          COMMAND       CREATED         STATUS                     P
ORTS      NAMES
bd166ebdcfe5    hello-world    "/hello"      26 seconds ago  Exited (0) 25 seconds ago
          condescending_benz
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker$
```

```
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker$ docker cont
ainer rm bd166ebdcfe5
bd166ebdcfe5
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker$
```

```
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker$ docker ps -
a
CONTAINER ID    IMAGE      COMMAND     CREATED     STATUS     PORTS     NAMES
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker$
```

File   Edit   Selection   View   Go   Run   Terminal   Help

EXPLORER   Welcome   Dockerfile ✕

> OPEN EDITORS   CC201 > labs > 1_ContainersAndDocker > Dockerfile
∨ PROJECT
  ∨ .theia   1   FROM node:9.4.0-alpine
      settings.json   2   COPY app.js .
  ∨ CC201   3   COPY package.json .
    ∨ labs   4   RUN npm install &&\
      ∨ 1_ContainersAnd...   5   apk update &&\
          app.js   6   apk upgrade
          Dockerfile   7   EXPOSE 8080
          package.json   8   CMD node app.js
      > 2_I...   Follow link (cmd + click)   9
      > 3_K8sScaleAndU...
        .gitignore
        LICENSE
        README.md

> theia@theiadocker-ohhno961: /home/project/CC201/labs/1_Cont

```
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_Contai
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_Contai
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_Contai
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_Contai
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_Contai
nersAndDocker$
```

> NPM SCRIPTS

master ↻ ⊗ 0 ⚠ 0   Go Live   Ln 9, Col 1   LF   UTF-8   Spaces: 4   Docker

```
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_Contai
nersAndDocker$ docker build . -t myimage:v1
[+] Building 9.6s (9/9) FINISHED                        docker:default
 => [internal] load build definition from Dockerfile               0.0s
 => => transferring dockerfile: 180B                               0.0s
 => [internal] load metadata for docker.io/library/node:9.4.0-alpi  1.1s
 => [internal] load .dockerignore                                 0.0s
 => => transferring context: 2B                                   0.0s
 => [1/4] FROM docker.io/library/node:9.4.0-alpine@sha256:359a2efa  4.0s
 => => resolve docker.io/library/node:9.4.0-alpine@sha256:359a2efa  0.0s
 => => sha256:359a2efa481b9edeff9ca120128f89387ce13daf 951B / 951B  0.0s
 => => sha256:b5f94997f35f4d1ba6221656d90dbe1d9f0c 4.94kB / 4.94kB  0.0s
 => => sha256:605ce1bd3f3164f2949a30501cc596f52a72 1.99MB / 1.99MB  1.3s
 => => sha256:fe58b30348fe37cda551e7f3a63375c469 19.70MB / 19.70MB  1.6s
 => => sha256:46ef8987ccbdd5d2e0127b7eccca7b618fd9 1.02MB / 1.02MB  1.2s
 => => extracting sha256:605ce1bd3f3164f2949a30501cc596f52a72de05d  0.1s
 => => extracting sha256:fe58b30348fe37cda551e7f3a63375c46977493a4  2.1s
 => => extracting sha256:46ef8987ccbdd5d2e0127b7eccca7b618fd9b17f6  0.0s
 => [internal] load build context                                 0.0s
 => => transferring context: 573B                                 0.0s
 => [2/4] COPY app.js .                                           1.0s
 => [3/4] COPY package.json .                                     0.0s
 => [4/4] RUN npm install &&    apk update &&    apk upgrade       3.0s
 => exporting to image                                            0.3s
 => => exporting layers                                           0.3s
 => => writing image sha256:1cd14338ffeeea349a1ab603e8a2b79b5fb3b3  0.0s
 => => naming to docker.io/library/myimage:v1                      0.0s

 1 warning found (use docker --debug to expand):
 - JSONArgsRecommended: JSON arguments recommended for CMD to prevent uni
ntended behavior related to OS signals (line 8)
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$
```

```
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$ docker images
REPOSITORY      TAG        IMAGE ID        CREATED          SIZE
myimage         v1         1cd14338ffee    18 seconds ago   77.8MB
hello-world     latest     d2c94e258dcb    2 years ago      13.3kB
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$
```

Ran Custom Container

- Launched container: `docker run -dp 8080:8080 myimage:v1`
- Verified service response: `curl localhost:8080`
- Stopped container: `docker stop $(docker ps -q)`
- Verified container shutdown: `docker ps`

```
theia@theiadocker-ohhno961: /home/project/CC201/labs/1_ContainersAndDocke

theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$ docker run -dp 8080:8080 myimage:v1
15aeb41da2f861fb0b7963f35638c6eaf34fea459eac919a5b21bd8dc6a230cf
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$

theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$ curl localhost:8080
Hello world from 15aeb41da2f8! Your app is up and running!
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$

theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$ docker stop $(docker ps -q)
15aeb41da2f8
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$ docker ps
CONTAINER ID    IMAGE      COMMAND     CREATED     STATUS      PORTS       NAMES
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$
```

Pushed Image to IBM Cloud Container Registry

- Verified cloud account context: `ibmcloud target`
- Checked available namespaces: `ibmcloud cr namespaces`
- Set target region: `ibmcloud cr region-set us-south`
- Authenticated Docker to IBM Cloud: `ibmcloud cr login`
- Set namespace variable: `export MY_NAMESPACE=sn-labs-$USERNAME`
- Tagged image: `docker tag myimage:v1 us.icr.io/$MY_NAMESPACE/hello-world:1`
- Pushed image to ICR: `docker push us.icr.io/$MY_NAMESPACE/hello-world:1`
- Verified image in ICR: `ibmcloud cr images`

```
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$ ibmcloud target


API endpoint:        https://cloud.ibm.com
Region:              us-south
User:                ServiceId-33172f6a-015f-4511-8b0e-30a431ac60c8 (sn-lab
s-ohhno961)
Account:             QuickLabs - IBM Skills Network (f672382e1b43496b83f7a8
2fd31a59e8)
Resource group:      No resource group targeted, use 'ibmcloud target -g RE
SOURCE_GROUP'
CF API endpoint:
Org:
Space:
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$ ibmcloud cr namespaces
Listing namespaces for account 'QuickLabs - IBM Skills Network' in regist
ry 'us.icr.io'...

Namespace
sn-labs-ohhno961
sn-labsassets

OK
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$
```

```
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$ ibmcloud cr region-set us-south
The region is set to 'us-south', the registry is 'us.icr.io'.

OK
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$ ibmcloud cr login
Logging 'docker' in to 'us.icr.io'...
Logged in to 'us.icr.io'.

OK
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$
```

```
ok
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$ export MY_NAMESPACE=sn-labs-$USERNAME
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$ docker tag myimage:v1 us.icr.io/$MY_NAMESPACE/hello-world:1
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$ z
```

```
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$ docker push us.icr.io/$MY_NAMESPACE/hello-world:1
The push refers to repository [us.icr.io/sn-labs-ohhno961/hello-world]
545eb6bdb08b: Pushed
03eafc56af8f: Pushed
56428abd51f3: Pushed
0804854a4553: Pushed
6bd4a62f5178: Pushed
9dfa40a0da3b: Pushed
1: digest: sha256:9c3fe60d68ff3606bab96ef7b95db4c51adcbe5d3117b877ed05c91
5071ab653 size: 1576
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$
```

```
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$ ibmcloud cr images
Listing images...

Repository
Tag
    Digest          Namespace           Created         Size        Security
status
us.icr.io/sn-labs-ohhno961/hello-world
1
    9c3fe60d68ff    sn-labs-ohhno961    8 minutes ago   28 MB       -
us.icr.io/sn-labsassets/categories-watson-nlp-runtime
latest
    6b01b1e5527b    sn-labsassets       2 years ago     3.1 GB      -
us.icr.io/sn-labsassets/classification-watson-nlp-runtime
latest
    dbd407898549    sn-labsassets       2 years ago     4.0 GB      -
us.icr.io/sn-labsassets/concepts-watson-nlp-runtime
latest
    1e4741f10569    sn-labsassets       2 years ago     3.2 GB      -
us.icr.io/sn-labsassets/custom-watson-nlp-runtime
latest
    f6513e19a33d    sn-labsassets       2 years ago     6.5 GB      -
us.icr.io/sn-labsassets/detag-watson-nlp-runtime
latest
    38916c2119fc    sn-labsassets       2 years ago     2.7 GB      -
us.icr.io/sn-labsassets/emotion-watson-nlp-runtime
latest
    1c9de1d27318    sn-labsassets       2 years ago     4.0 GB      -
us.icr.io/sn-labsassets/entity-mentions-bert-watson-nlp-runtime
latest
    57d92957214f    sn-labsassets       2 years ago     3.8 GB      -
us.icr.io/sn-labsassets/entity-mentions-bilstm-watson-nlp-runtime
```

```
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$ ibmcloud cr images --restrict $MY_NAMESPACE
Listing images...

Repository                                      Tag     Digest          Namespace
        Created         Size    Security status
us.icr.io/sn-labs-ohhno961/hello-world  1       9c3fe60d68ff    sn-labs-ohh
no961   8 minutes ago   28 MB   -

OK
theia@theiadocker-ohhno961:/home/project/CC201/labs/1_ContainersAndDocker
$
```

Final Notes

- All actions were performed within a temporary IBM Cloud lab environment, not tied to personal accounts.
- The image push showed successful confirmation (`Pushed` or `Layer already exists`).
- No errors encountered requiring session reset or environment cleanup.