Microservices and Containerization: Manage OCIR and Push and Pull Images Using Docker CLI

Lab 02-1 Practices

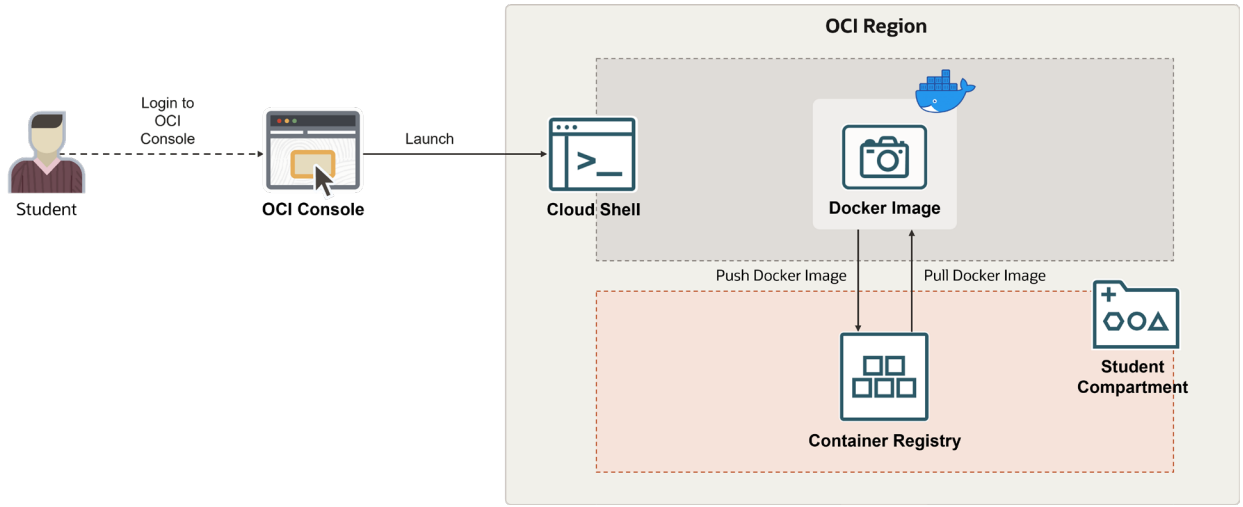
Estimated Time: 30 minutes

Get Started

Overview

The development to production workflow can be made simpler with the help of an Oracle-managed registry. For developers, Container Registry makes it simple to store, share, and manage container images (such as Docker images).

In this lab, you will create a Container Registry and will also perform some basic operations such as push and pull a Docker image.



In this lab, you'll:

a. Create an Auth Token.

b. Create a new Container Repository.

c. Sign in to Oracle Cloud Infrastructure Registry (OCIR) from the Cloud Shell.

d. Tag the Docker image.

e. Push the tagged Docker image to OCIR Repository.

f. Verify if the image has been pushed.

g. Pull the image from OCIR Repository.

For more information on Oracle Cloud Infrastructure Registry (OCIR), see the [OCI Container Registry Documentation.]

Prerequisites

- You must complete the following lab to use the same Docker image "`oci_sample_webapp_<userID>`" to perform tasks for this practice:
  - *Create Docker image for a web application using Dockerfile (Lab01-1).*

Assumptions

- You are signed in to your Oracle Cloud Infrastructure account using your credentials.
- You will replace the *<userID>* placeholder with your Firstname.
- You will replace the `<tenancy-namespace>` and `<username>` values from the info given in the Profile menu.
- `<tenancy-namespace>` is the auto-generated Object Storage namespace string of the tenancy that owns the repository to which you want to push the image (as shown on the **Tenancy Information** page). For example, the namespace of the oracletenancy tenancy might be `ansh81vru1zp`. Note that for some older tenancies, the namespace string might be the same as the tenancy name in all lower-case letters (for example, `oracletenancy`). Note also that your user must have access to the tenancy.

Identity and Access Management Policies

Add the following policies in the user compartment

User Group Policies

```
Allow group <group_name> to manage repos in compartment <compartment_name>
```

Create an Auth Token

Create an auth token to use with Oracle Cloud Infrastructure Registry (OCIR).

Tasks

1. In the top-right corner of the OCI Console, open the **Profile** menu, and then click **User Settings**.
2. On the **Auth Tokens** page, click **Generate Token**.

   Note: Each user can only have two auth tokens at a time.
3. Enter **IAD-DOP-LAB02-1-AT-01**, as a friendly description for the auth token.
4. Click **Generate Token**. The new auth token is displayed. Here's a sample of how an auth token looks like: `R5kwpS-xxxxx(()51r]]`. It'll be different in your case.

   Note: Copy the auth token to a notepad because you won't see the auth token again in the Console. You'll need this auth token later in this and other labs.

   For example,
   `R5kwpS-xxxxx(()51r]]`
5. Click **Close**.

Create a New Container Repository

Create an empty repository in a compartment and give it a name that's unique across all compartments in the tenancy. Having created the new repository, you can push an image to the repository using the Docker CLI.

Tasks

1. Check if you can access Oracle Cloud Infrastructure Registry (OCIR):

    a. In the Console, open the navigation menu and click **Developer Services.** Under **Containers & Artifacts**, click **Container Registry**.

    b. Select your `<Compartment Name>` from List scope on the left menu.

    c. Review the repositories that already exist. This lab assumes that no repositories have been created yet.

2. Click **Create Repository**.

3. Select your `<Compartment Name>` to create a new repository.

4. Enter a name for the new repository: `<region-key>-dop-lab02-1-ocir-1/oci_sample_webapp_<userID>`

    Where,

    - `<region-key>` is the key for the Oracle Cloud Infrastructure Registry region you're using. For example, `iad` is the region key for `US EAST` (Ashburn) region. See the Availability by Region topic in the Oracle Cloud Infrastructure documentation.
    - Replace `<userID>` with your Firstname.

    For example, `iad-dop-lab02-1-ocir-1/oci_sample_webapp_mahendra`

5. Select the **Private** option to limit access to the new repository.

6. Click **Create Repository**.

Sign In to OCIR from the Cloud Shell

Once you have generated the auth token and created a new repository, sign in to Oracle Cloud Infrastructure Registry (OCIR) from Docker CLI in the cloud shell.

Tasks

1. Open **Cloud Shell**.

   Note: The OCI CLI running in the Cloud Shell will execute commands against the region selected in the Console's region selection menu when the Cloud Shell was started.

2. In the Cloud Shell, log in to OCIR by entering:

   ```
   $ docker login <region-key>.ocir.io
   ```

   For example,

   ```
   $ docker login iad.ocir.io
   ```

3. When prompted for a username, enter your username in the format

   ```
   <tenancy-namespace>/<username>
   ```

   where `<tenancy-namespace>` is the auto-generated **Object Storage namespace string** of the tenancy that owns the repository to which you want to push the image (as shown on the **Tenancy Information** page). For example, the namespace of the oracletenancy tenancy might be `ansh81vru1zp`. Note that for some older tenancies, the namespace string might be the same as the tenancy name in all lower-case letters (for example, `oracletenancy`).

   For example, `oracletenancy/mahendra@acme.com` OR `ansh81vru1zp/mahendra@acme.com`

   If your tenancy is federated with Oracle Identity Cloud Service, use the format `<tenancy-namespace>/oracleidentitycloudservice/<username>`.

   Enter the auth token **IAD-DOP-LAB02-1-AT-01** (random string) you copied earlier as the password.

   For example,
   `R5kwpS-xxxxx(()51r]]`

   Note: When you enter or paste the password, you'll not see masked characters. Press Enter on your keyboard to continue and you should see the "`Login Succeeded`" message on the screen.

Tag the Docker Image

A tag identifies the Oracle Cloud Infrastructure Registry (OCIR) region, tenancy, and repository to which you want to push the image.

This task requires the Docker image `oci_sample_webapp_<userID>:<tag>`, which you created earlier in the lab on *Microservice and Container Orchestration: Create Docker image for a web application using Dockerfile* (Lab01-1).

Tasks

1. In the Cloud Shell, run the following command to attach a tag to the image that you're going to push to OCIR repository:

   ```
   $ docker tag oci_sample_webapp_mahendra:1.0
   <region-key>.ocir.io/<tenancy-namespace>/<repo-name>:<tag>
   ```

   Where,

   - `<region-key>` is the key for the Oracle Cloud Infrastructure Registry region you're using. For example, `iad` is the region key for `US EAST` (Ashburn) region. See the Availability by Region topic in the Oracle Cloud Infrastructure documentation.
   - `ocir.io` is the Oracle Cloud Infrastructure Registry name.
   - *`<tenancy-namespace>`* is the auto-generated Object Storage namespace string of the tenancy (as shown on the Tenancy Information page) to which you want to push the image, for example, `oracletenancy`.
   - *`<repo-name>`* is the name of the target repository to which you want to push the image (for example, `iad-dop-lab02-1-ocir-1/oci_sample_webapp_Mahendra`).
   - *`<tag>`* is an image tag you want to give the image in Oracle Cloud Infrastructure Registry (for example, latest).

   For example,

   ```
   $ docker tag oci_sample_webapp_Mahendra:1.0
   iad.ocir.io/oracletenancy/iad-dop-lab02-1-ocir-
   1/oci_sample_webapp_mahendra:latest
   ```

2. Validate if the new image with the tag is listed.

   ```
   $ docker images
   ```

   Note: Although two tagged images will be shown `(1.0 and latest)`, both are based on the same base image with the same `IMAGE_ID`.

Push the Tagged Docker Image to OCIR Repository

After assigning a tag to the image, you use the Docker CLI to push it to Oracle Cloud Infrastructure Registry repository.

Tasks

1. In the Cloud Shell, run the following command to push the tagged Docker image to OCIR repository:

   ```
   $ docker push <region-key>.ocir.io/<tenancy-namespace>/<repo-name>:<tag>
   ```

   For example,

   ```
   $ docker push iad.ocir.io/oracletenancy/iad-dop-lab02-1-ocir-1/oci_sample_webapp_mahendra:latest
   ```

   You will see the different layers of the image are pushed in turn and it prints the sha256 digest along with the size of the image on the screen.

Verify if the Image Has Been Pushed

Verify if the image has been pushed successfully to the OCIR repository.

Tasks

1. Go back to the OCIR Service page and select your `<Compartment Name>` from List scope on the left menu.
2. You'll see the private repository `iad-dop-lab02-1-ocir-1/oci_sample_webapp_<userID>` that you created.
3. Click the name of the repository that contains the image you just pushed. You'll see:
   - An image with the tag `latest`.
   - A summary page that shows you the details about the repository, including who created it and when, its size, and whether it's a public or a private repository.
4. Click the image tag `latest`.

   On the Summary page, you'll see the image size, when it was pushed and by which user, image sha256 digest, and the number of times the image has been pulled.

Pull the Image from OCIR Repository

Perform pull operation after deleting the existing images from the local docker repository. You will pull the same image that was previously pushed to the OCIR repository.

Tasks

1. Delete the existing images from the local docker repository.

   a. In the Cloud Shell, list all the images.

   ```
   $ docker images
   ```

   b. Run `docker rmi` command to delete the tagged image and the original image you created earlier.

   ```
   $ docker rmi oci_sample_webapp_mahendra:1.0
   ```

   Output: `Untagged: oci_sample_webapp_mahendra:1.0`

   ```
   $ docker rmi iad.ocir.io/oracletenancy/iad-dop-lab02-1-ocir-1/oci_sample_webapp_mahendra:latest
   ```

   This command will first untag the image and delete the image by deleting all the associated layers.

2. Verify if the images are deleted.

   ```
   $ docker images
   ```

3. Switch to the OCI Console. From the OCIR page, select the repository and the image tag that needs to be pulled.

4. Click the **Actions** menu on the image summary page and select **Copy pull command** from the drop-down list. The command you copy includes the fully qualified path to the image's location in Container Registry in the following format:

   <region-key>.ocir.io/*<tenancy-namespace>*/*<repo-name>*:*<tag>*

5. Execute the copied command in the Cloud Shell to pull the image to the local repository.

   For example,

   ```
   $ docker pull iad.ocir.io/oracletenancy/iad-dop-lab02-1-ocir-1/oci_sample_webapp_mahendra:latest
   ```

6. Verify the pulled image from OCIR repository.

```
$ docker images
```

You should see the pulled image listed within the local repository.

Important Note: Do not delete any artifacts and resources created in this lab because they will be required in the upcoming labs.

Congratulations! you have successfully pushed and pulled an image from the OCIR repository.