Guided Exercise: Managing Images

Learn to manage container images.

Outcomes

You should be able to manage images by performing common operations such as:

- Creating images
- Listing images
- Inspecting images
- Tagging images
- Removing images
- Searching images
- Pulling images
- Saving images
- Loading images

As the `student` user on the `workstation` machine, use the `lab` command to prepare your system for this exercise.

This command copies an example Containerfile that you use to build the `simple-server` image.

```
[student@workstation]$ lab start images-managing
```

Instructions

1. Verify that the `simple-server` image is not present on your machine.

   ```
   [student@workstation ~]$ podman image ls --format "{{.Repository}}"
   no output expected
   ```

   > **NOTE**
   >
   > You might see images from previous exercises if you did not run the `lab finish` scripts.

2. Build and run the `simple-server` image by using the `~/DO188/labs/images-managing/Containerfile` file.

   Change to the exercise directory and examine its contents.

   ```
   [student@workstation ~] cd ~/DO188/labs/images-managing
   no output expected
   ```

   Use the exercise Containerfile and the `podman build` command to create the image. Use the `-t` option to call the image `simple-server`.

   ```
   [student@workstation images-managing]$ podman build -f Containerfile -t \
     simple-server
   ...output omitted...
   Successfully tagged localhost/simple-server:latest
   87dc...fc02
   ```

   Use the `podman image ls` command to verify that the `simple-server` image is present.

   ```
   [student@workstation images-managing]$ podman image ls
   REPOSITORY                  TAG         IMAGE ID      CREATED         SIZE
   localhost/simple-server     latest      87dc46f07c8c  5 minutes ago   892 MB
   ...output omitted...
   ```

   Because you did not provide a server name and a tag to the `simple-server` image name, the image uses the `localhost` registry server and the `latest` tag by default.

   Create a container from the `simple-server` image and call it `http-server`. Use the `-d` option to run it in the background and the `-p` option to map your local host port 8080 to the container port 8000.

```
[student@workstation images-managing]$ podman run -d \
  -p 8080:8000 \
  --name http-server \
  simple-server
2b81..0207
```

Use a tool such as `curl` or a web browser to send a request to `http://localhost:8080/hello.html`.

```
[student@workstation images-managing]$ curl http://localhost:8080/hello.html
Hello from the container
```

3. Inspect the `simple-server` image to see which command it runs by default.

   Verify that `python -m http.server` is the default command for this image. This Python command comes from the `CMD` instruction in the exercise Containerfile.

```
[student@workstation images-managing]$ podman image inspect simple-server \
  --format="{{.Config.Cmd}}"
[/bin/sh -c python -m http.server]
```

4. Tag the `simple-server` image with the `0.1` tag and list the images to verify the result.

```
[student@workstation images-managing]$ podman image tag simple-server \
  simple-server:0.1
no output expected
```

   When you list the images in your machine you can see that `simple-server` shows for the `latest` tag, and also for the `0.1` tag. Verify that the `IMAGE ID` has the same value because both tags point to the same image.

```
[student@workstation images-managing]$ podman image ls
REPOSITORY                 TAG       IMAGE ID      CREATED        SIZE
localhost/simple-server    latest    87dc46f07c8c  10 minutes ago 892 MB
localhost/simple-server    0.1       87dc46f07c8c  10 minutes ago 892 MB
...output omitted...
```

5. Save the images asociated with the `simple-server` container.

   Use the `podman save` command to save the `simple-server` images to the `simple-server.tar` file.

```
[student@workstation images-managing]$ podman save -o simple-server.tar \
  localhost/simple-server
...output omitted...
Copying config 1467b1e77c done   |
Writing manifest to image destination
```

6. Remove the `simple-server` image completely from your system.

   Use the `podman image rm` command to remove the `simple-server`.

```
[student@workstation images-managing]$ podman image rm simple-server
Untagged: localhost/simple-server:latest
```

   The previous command only removed the `latest` tag because you did not specify the tag in the command and you have two tags pointing to the same image.

   Try to delete the `simple-server:0.1` tag to remove the `simple-server` image completely.

```
[student@workstation images-managing]$ podman image rm simple-server:0.1
Error: image used by 1bd7...250d: image is in use by a container: consider listing external containers and force-removing
image
```

   The error message indicates that you cannot remove an image that is currently being used by a container. Before removing the image you must stop and remove the container.

   Force the container and container image deletion.

```
[student@workstation images-managing]$ podman image rm -f simple-server:0.1
WARN[0010] StopSignal SIGTERM failed to stop container http-server in 10 seconds, resorting to SIGKILL
Untagged: localhost/simple-server:0.1
Deleted: 87dc...fc02
Deleted: 2318...7bbb
```

Verify that there are no images asociated with the `simple-server` container. Use the `--filter reference=simple-server` to only query images related to the `simple-server` container.

```
[student@workstation images-managing]$ podman image ls --filter \
  reference=simple-server
REPOSITORY  TAG         IMAGE ID    CREATED     SIZE
```

7. Restore the saved images for the `simple-server` container.

   Use the `podman load` command to restored the saved images.

```
[student@workstation images-managing]$ podman load -i simple-server.tar
Getting image source signatures
...output omitted...
Writing manifest to image destination
Loaded image: localhost/simple-server:latest
```

   Verify that the `simple-server` image is restored.

```
[student@workstation images-managing]$ podman image ls
REPOSITORY                 TAG       IMAGE ID      CREATED        SIZE
localhost/simple-server    latest    87dc46f07c8c  10 minutes ago 892 MB
...output omitted...
```

   Remove the `simple-server` image backup.

```
[student@workstation images-managing]$ rm simple-server.tar
REPOSITORY                 TAG       IMAGE ID      CREATED        SIZE
localhost/simple-server    latest    87dc46f07c8c  10 minutes ago 892 MB
...output omitted...
```

Finish

On the `workstation` machine, use the `lab` command to complete this exercise. This is important to ensure that resources from previous exercises do not impact upcoming exercises.

```
[student@workstation]$ lab finish images-managing
```