



Caleb Mellas
@caleb_mellas

Docker is something that has taken the devops world by storm the last few years. You'll probably need to learn it sooner rather than later. 😅

I've created a Docker Cheat Sheet to help you master all the most used Docker commands, and write your own Docker files!



7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

First off: What is docker?

Docker allows you to isolate an application's dependencies, configuration and code into lightweight, contained images.

Docker containers are built and started based on these images.

Image == class
Container == class instance

7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Why do we need docker?

It eliminates the common problem of "it worked on my machine", by providing a siloed environment that runs the same everywhere.

Docker containers can be packaged & shipped directly to production environments to simplify deploy pipelines.

7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Basic Docker Concepts

Here are some basic Docker terms you should know before we jump in.

Image

A docker image is a read-only template, or set of instructions used to create a container.

7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Container

A container is a lightweight, portable, and self-contained executable package that includes everything needed to run an application.

Dockerfile

A dockerfile is an instruction file for building a Docker image into a container.

7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Network

A docker network is primarily used to communicate between various docker containers and the outside world via the host machine where the Docker daemon is running.

7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Docker Compose

Docker compose is a tool for defining and running multi-container Docker applications, called services.

A YAML file is used to configure the services, that can be created/started/stopped with a single command.

7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Dockerfiles

Here are some common Dockerfile keywords:

- **FROM**: specifies the base image for the Dockerfile
- **RUN**: executes a command in a new layer on top of the image and commits the changes.
- **ADD/COPY**: copies files from the host to the container.

7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

- CMD: specifies the default command to run when starting a container from the image.
- ENTRYPOINT: configures the container to run as an executable.
- ENV: sets environment variables for the container.

7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

- **EXPOSE**: specifies the network ports that the container listens on at runtime.
- **VOLUME**: creates a mount point for a volume.
- **USER**: sets the user for the container.
- **WORKDIR**: sets the working directory for the container.

7:32 AM · Mar 23, 2023

1 Reply

Caleb Mellas
@caleb_mellas

Now let's see what docker commands look like in practice.

Let's look at a basic docker file for nodejs.

The comments throughout the file will walk you through each line/command and what they are doing.

```
● ● ● Dockerfile
# Pin node version for stability
# Pull an image from the docker hub repository
FROM node:19.4-alpine

# Set NODE_ENV
ENV NODE_ENV production

# Specify a working directory
WORKDIR /usr/src/app

# Copy only files required to install dependencies
COPY ./package.json /www

# Install only production dependencies
RUN npm ci --only=production

# Use non-root user
USER node

# Copy source code AFTER installing dependencies
COPY --chown=node:node ./src/ .

# Indicate an expected port
EXPOSE 3000

CMD [ "node", "index.js" ]
```

7:32 AM · Mar 23, 2023

1 Reply



Bash

```
# Pin node version for stability
# Pull an image from the docker hub repository
FROM node:19.4-alpine

# Set NODE_ENV
ENV NODE_ENV production

# Specify a working directory
WORKDIR /usr/src/app

# Copy only files required to install dependencies
COPY ./package.json /www

# Install only production dependencies
RUN npm ci --only=production

# Use non-root user
USER node

# Copy source code AFTER installing dependencies
COPY --chown=node:node ./src/ .

# Indicate an expected port
EXPOSE 3000

CMD [ "node", "index.js" ]
```

Caleb Mellas
@caleb_mellas

Thanks to Sid Palas for the helpful thread on docker files:



Sid Palas @sidpalas · Mar 10

This is a valid Dockerfile for a NodeJS application. It is also a pile of 💩!

We can improve:

- 🔒 Security
- 🚧 Build speed
- 👀 Clarity

Follow along as we go from 💩 to 💯!

(code in alt text)

```
FROM node
COPY . .
RUN npm install
CMD [ "node", "index.js" ]
```

7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Docker Container commands

Here are some helpful commands I use to interact with docker containers.

7:32 AM · Mar 23, 2023

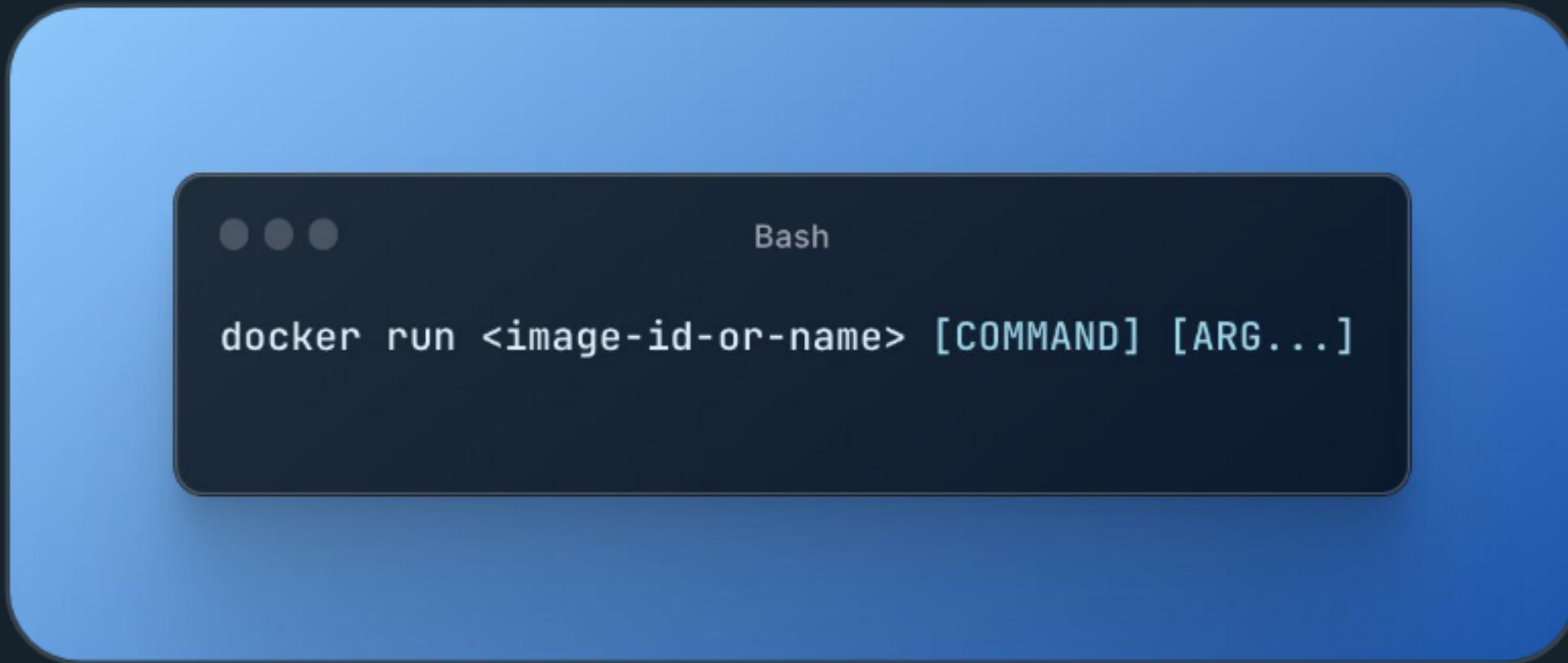
1 Reply

A circular profile picture of a man with glasses and a baseball cap, smiling.

Caleb Mellas
@caleb_mellas

Create and start a new container

You can specify the image to use, set environment variables, and map ports between the container and the host system.



7:32 AM · Mar 23, 2023

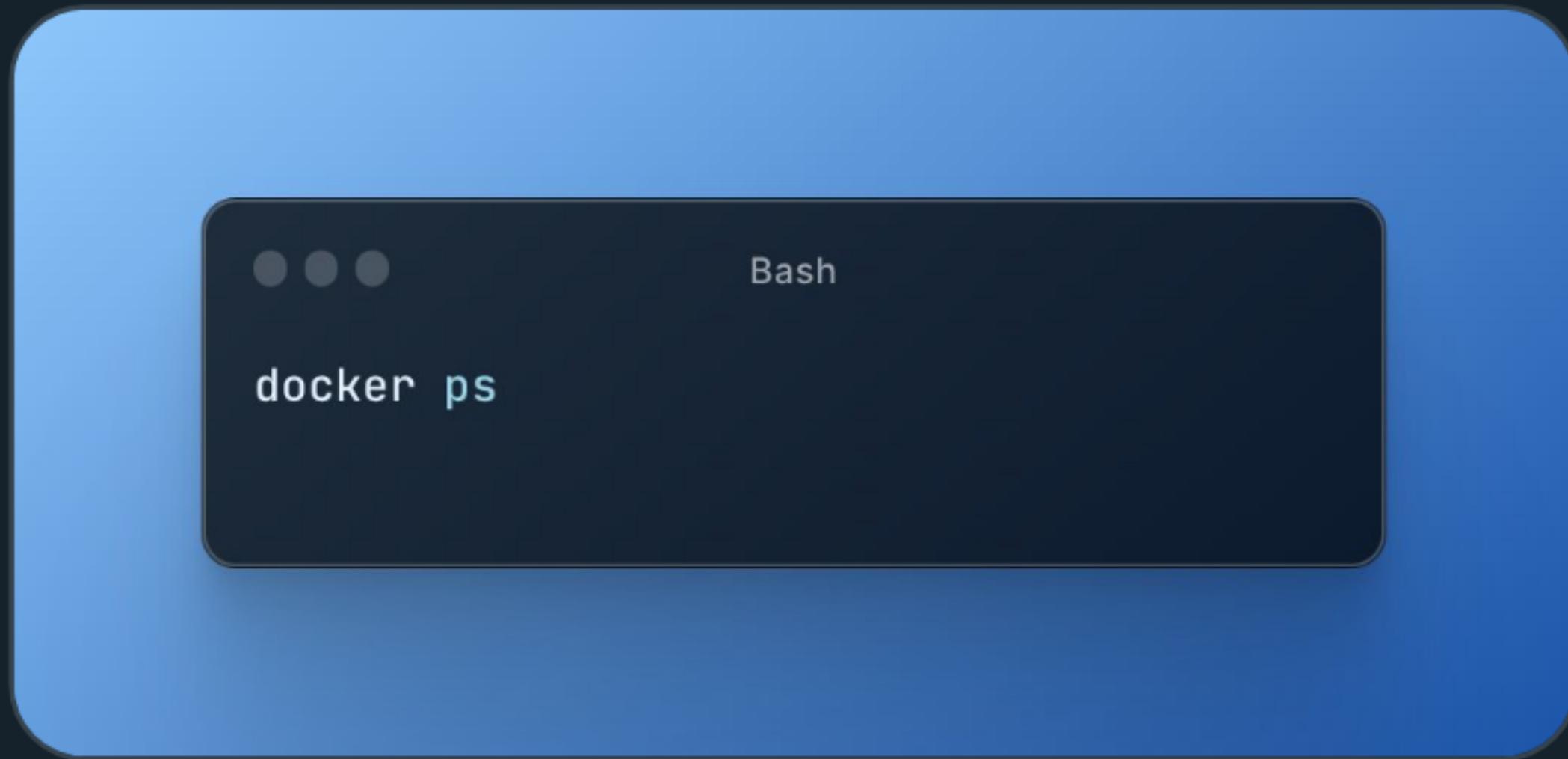
1 Reply

A circular profile picture of a man with glasses and a cap, identified as Caleb Mellas.

Caleb Mellas
@caleb_mellas

List all running docker containers

You can see details such as the container ID, image used, and port mappings.



7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

View logs for a running container



Bash

```
docker logs <container-id-or-name>
```

7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Stop a running container

You can specify the container ID or name to stop.

```
... Bash  
docker stop <container-name>
```

7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Remove a container



Bash

```
docker rm <container-name>
```

7:32 AM · Mar 23, 2023

1 Reply

A circular profile picture of a man with glasses and a cap, smiling.

Caleb Mellas
@caleb_mellas

Execute a command in a running container

Use this to execute a command in a running container, such as rolling back a migration, or copying a file.

```
... Bash  
docker exec -d <container-name> yarn knex migrate:rollback
```

7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Create an interactive shell on a running container



Bash

```
docker exec -it <container-name> sh
```

7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Docker-compose file

This file allows you to manage multi-container Docker applications.

It's used to run multiple containers as a single service.

- First you'll need to write a Dockerfile(s)
- Next create a docker-compose.yml file to build images based on those files

7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Here is an example docker-compose.yml file

```
● ● ●           Bash

version: "3.9"
services:

# name of your service
my-web-service:
  build:
    context: .
    dockerfile: ./services/my-web-service
  ports:
    - "8000:5000"

redis-worker:
  image: "redis:alpine"
  environment:
    - REDIS_CONNECTION_STRING=redis
    - REDIS_CONNECTION=redis
```

7:32 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Docker compose commands

Here are some helpful commands I use to interact with docker compose services (eg. running docker containers).

7:32 AM · Mar 23, 2023

1 Reply

A circular profile picture of a man with glasses and a cap, smiling.

Caleb Mellas
@caleb_mellas

Start docker services

Start any services (eg. containers) defined in your docker-compose.yml

```
● ● ●          Bash  
  
docker compose up <container-name>  
  
# add --build to build a fresh docker image  
# add -d to the container in the background  
# leave off container name to build all containers
```

7:32 AM · Mar 23, 2023

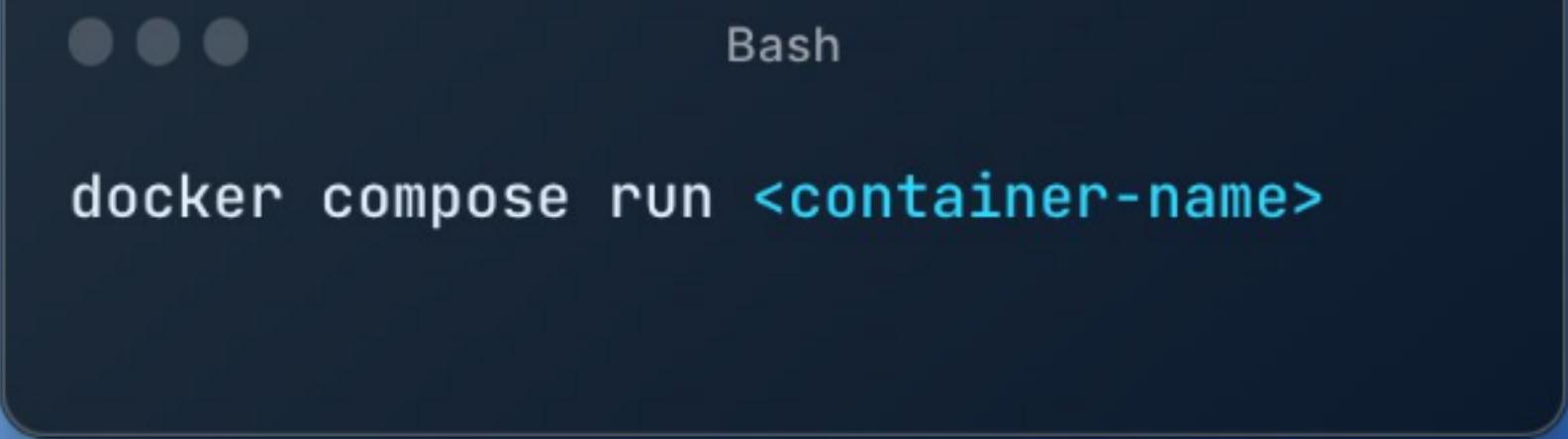
1 Reply

A circular profile picture of a man with glasses and a cap, identified as Caleb Mellas.

Caleb Mellas
@caleb_mellas

Run one-off docker services

Used to run tests or perform an administrative task such as removing or adding data to a data volume container.



A dark terminal window with a light blue header bar containing three dots and the word "Bash". Below the header, the command "docker compose run <container-name>" is displayed in white text.

7:40 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Restart a docker service



Bash

```
docker compose restart <container-name>
```

7:40 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Stop a running docker service



Bash

```
docker compose stop <container-name>
```

7:40 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Docker image commands

Here are some helpful commands I use to interact with docker images.

7:40 AM · Mar 23, 2023

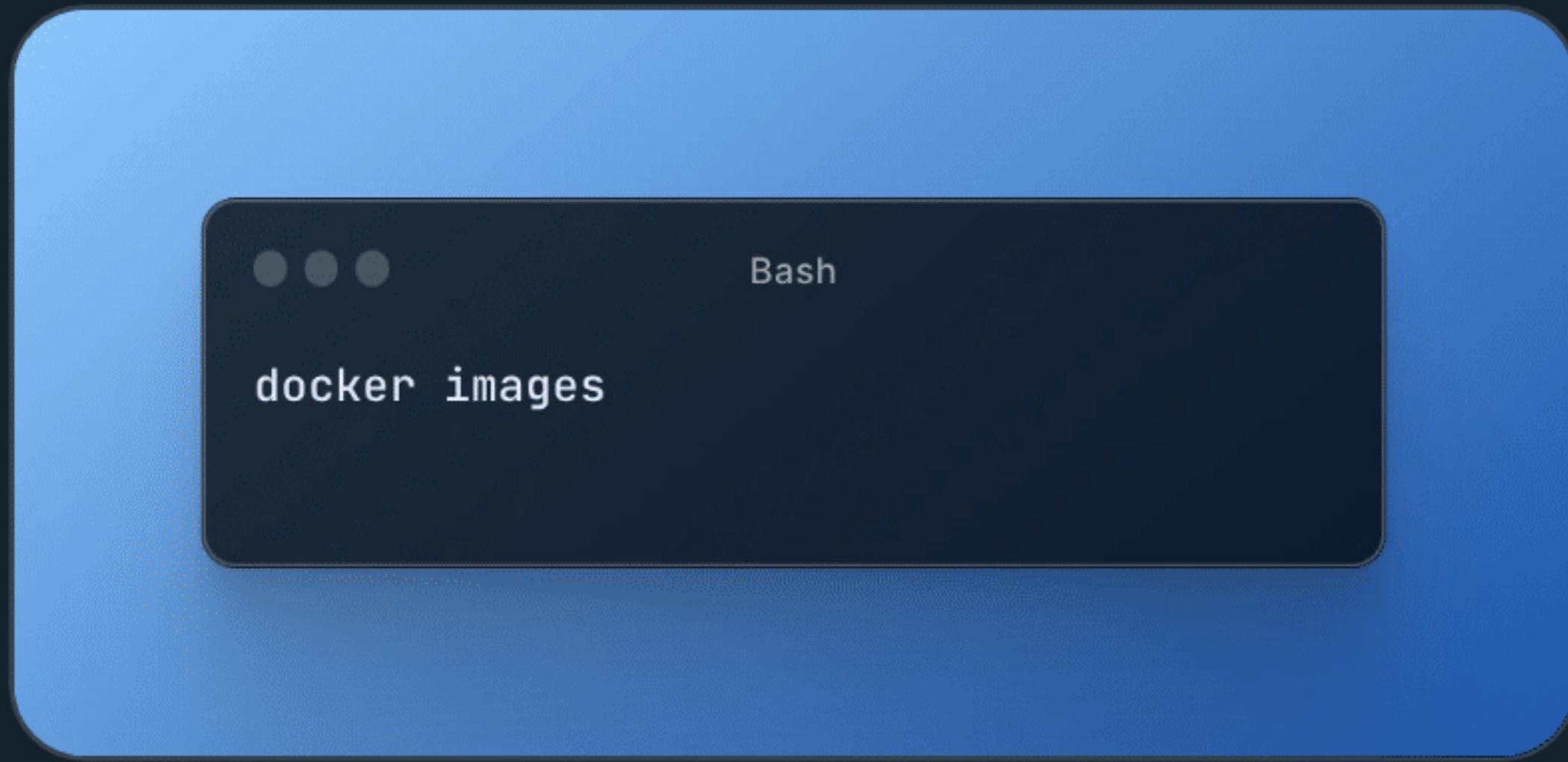
1 Reply

A circular profile picture of a man with glasses and a beard, wearing a cap and a dark shirt.

Caleb Mellas
@caleb_mellas

List all available docker images on the system

You can see details such as the image ID, creation date, and size.



7:40 AM · Mar 23, 2023

1 Reply

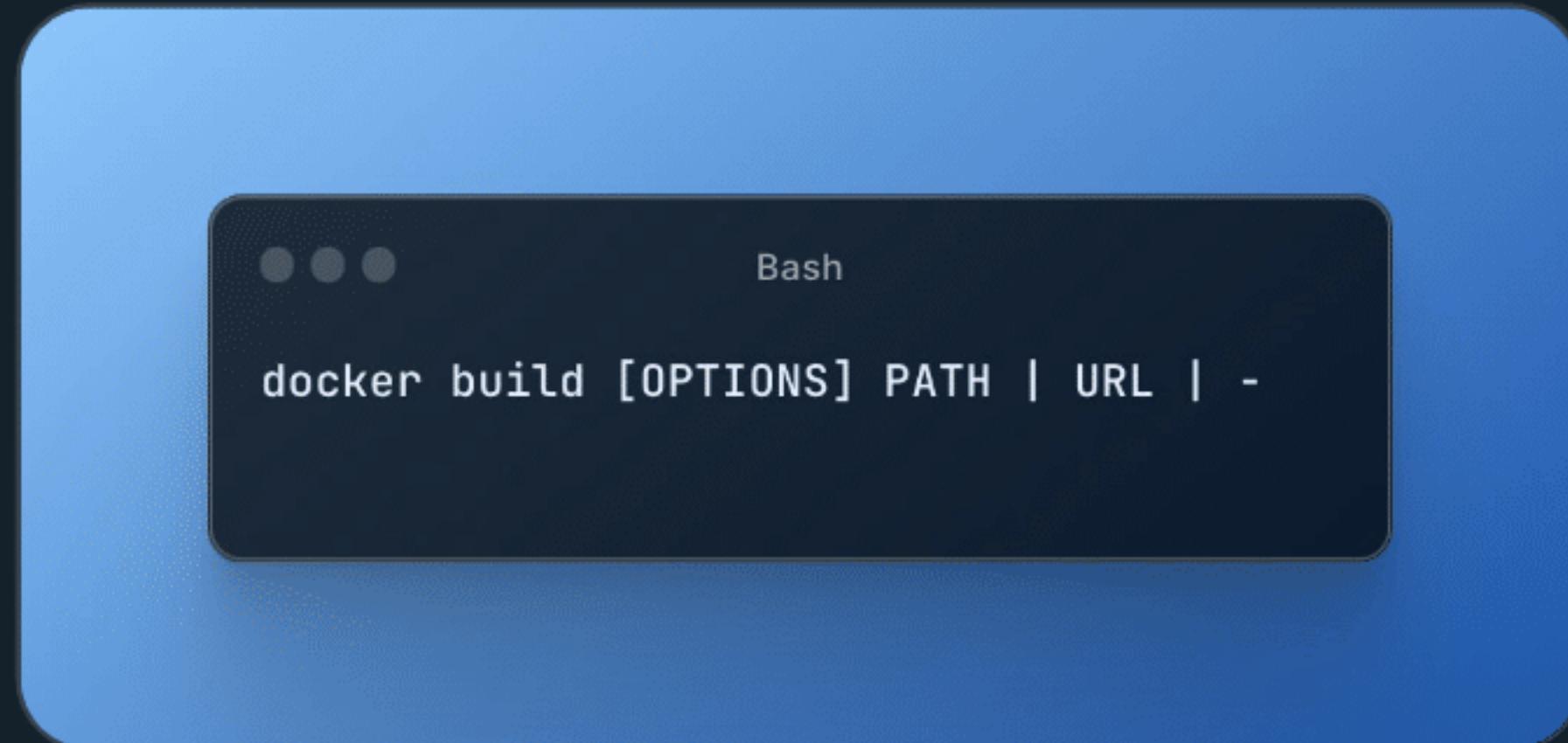


Caleb Mellas
@caleb_mellas

Build a new docker image

Build a new Docker image from a Dockerfile.

You can specify the location of the Dockerfile, set build arguments, and tag the resulting image.



7:40 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Remove a docker image

• • •

Bash

```
docker rmi <image-name-or-id>
```

7:40 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Docker network commands

Here are some helpful commands I use to interact with docker networks.

7:40 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

List all available docker networks

••• Bash
docker network ls

7:40 AM · Mar 23, 2023

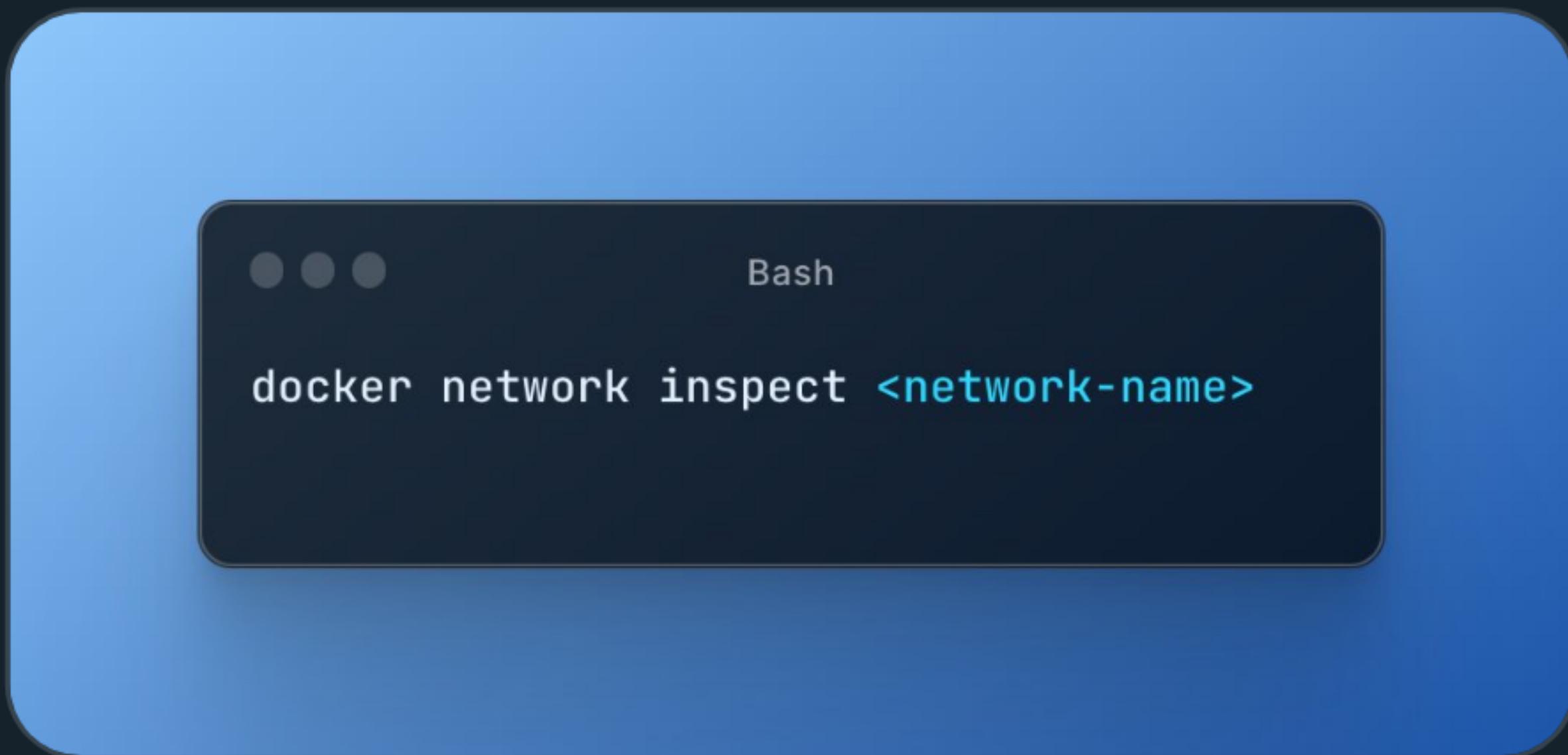
1 Reply



Caleb Mellas
@caleb_mellas

Inspect a docker network

Display detailed information on
one or more networks



7:40 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Create a docker network



Bash

```
docker network create <network-name>
```

7:40 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Connect a container to a network

```
... Bash  
docker network connect <network-name> <container-name>
```

7:40 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Disconnect a container from a network

• • •

Bash

```
docker network disconnect <network-name> <container-name>
```

7:40 AM · Mar 23, 2023

1 Reply



Caleb Mellas
@caleb_mellas

Was this helpful? Did you learn anything new?

See you in the comments



👉 Follow along as I share about leveling up in **#softwareengineering**, **#startups**, **#systemsdesign** and your **#leadership** **#softskills** 🎙

7:40 AM · Mar 23, 2023