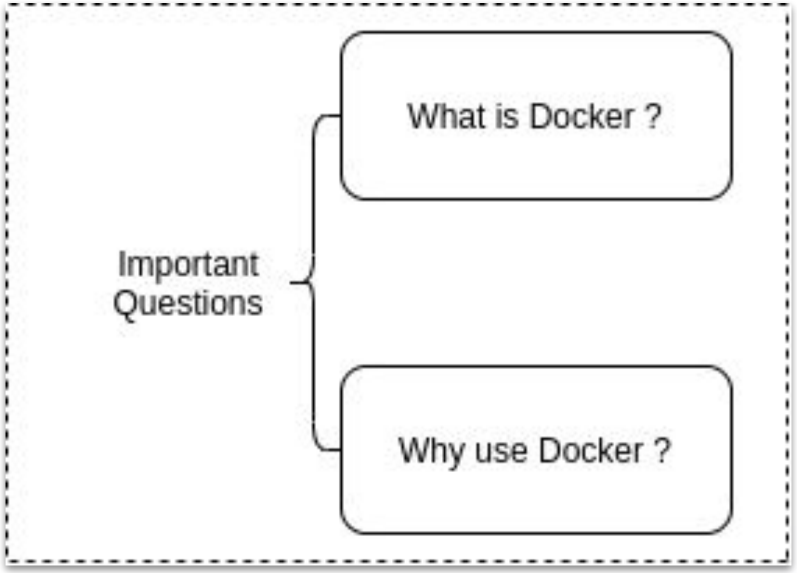
sourcemind

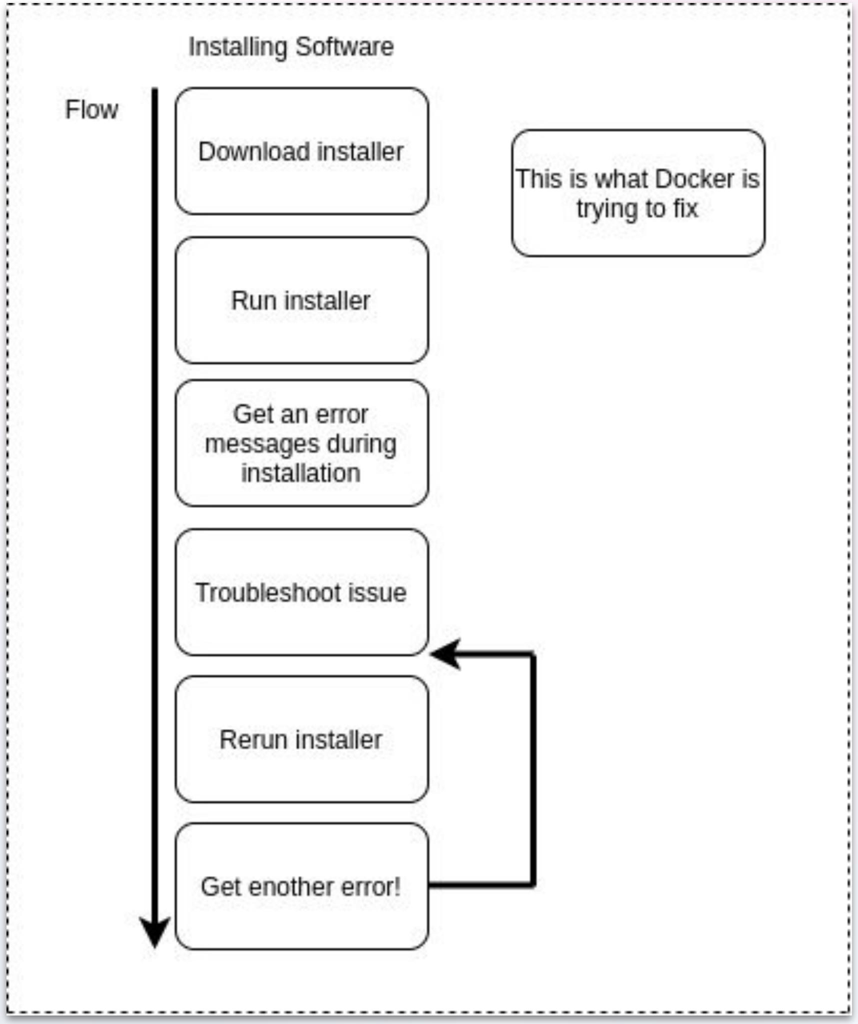
Docker Basics & Building Custom Images

Artur Davtyan
DevOps Engineer
Webb Fontaine Armenia

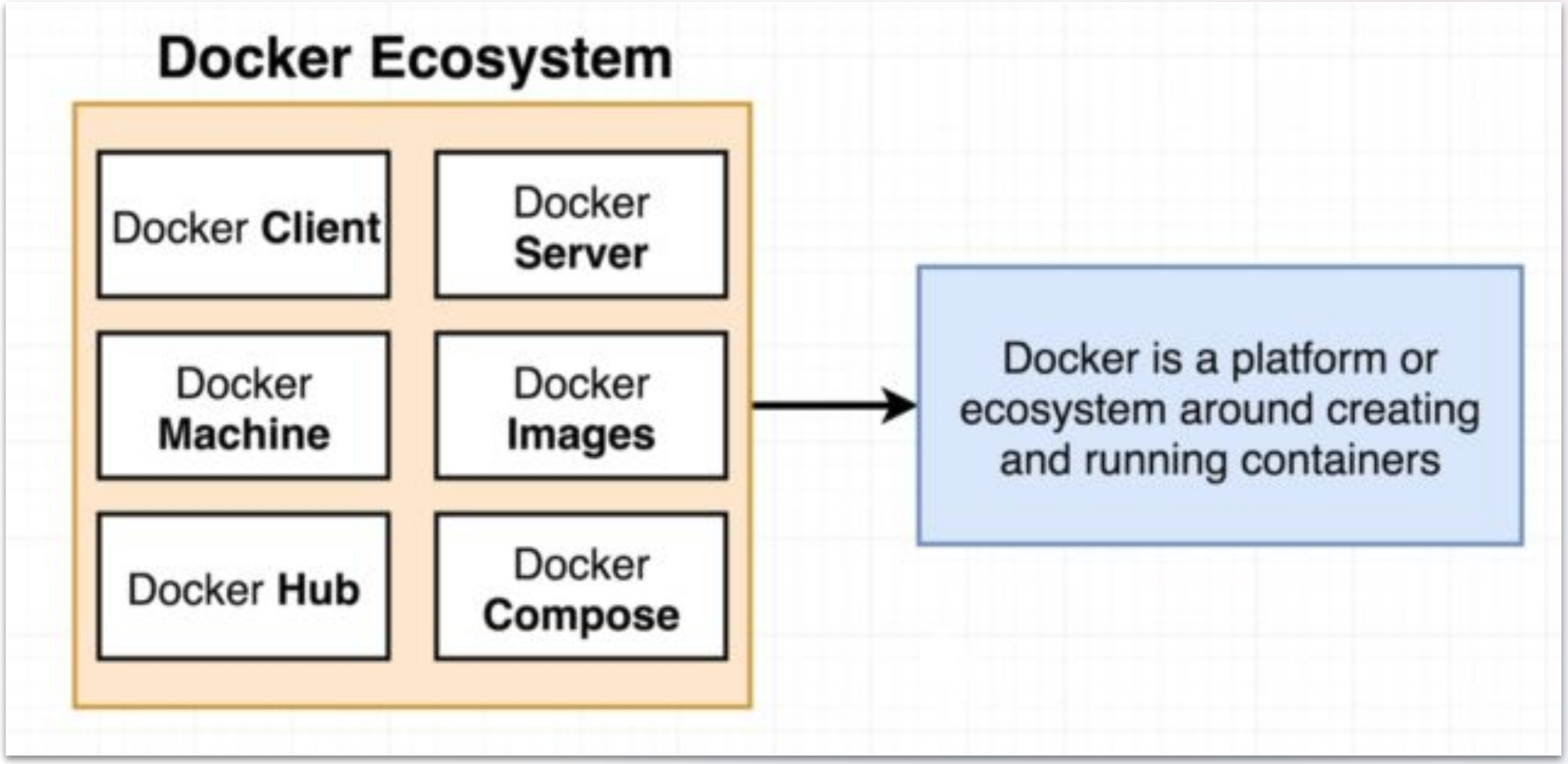
sourcemind

Why use Docker ?





What is Docker ?



Docker Ecosystem

Docker Client

Docker Server

Docker Machine

Docker Images

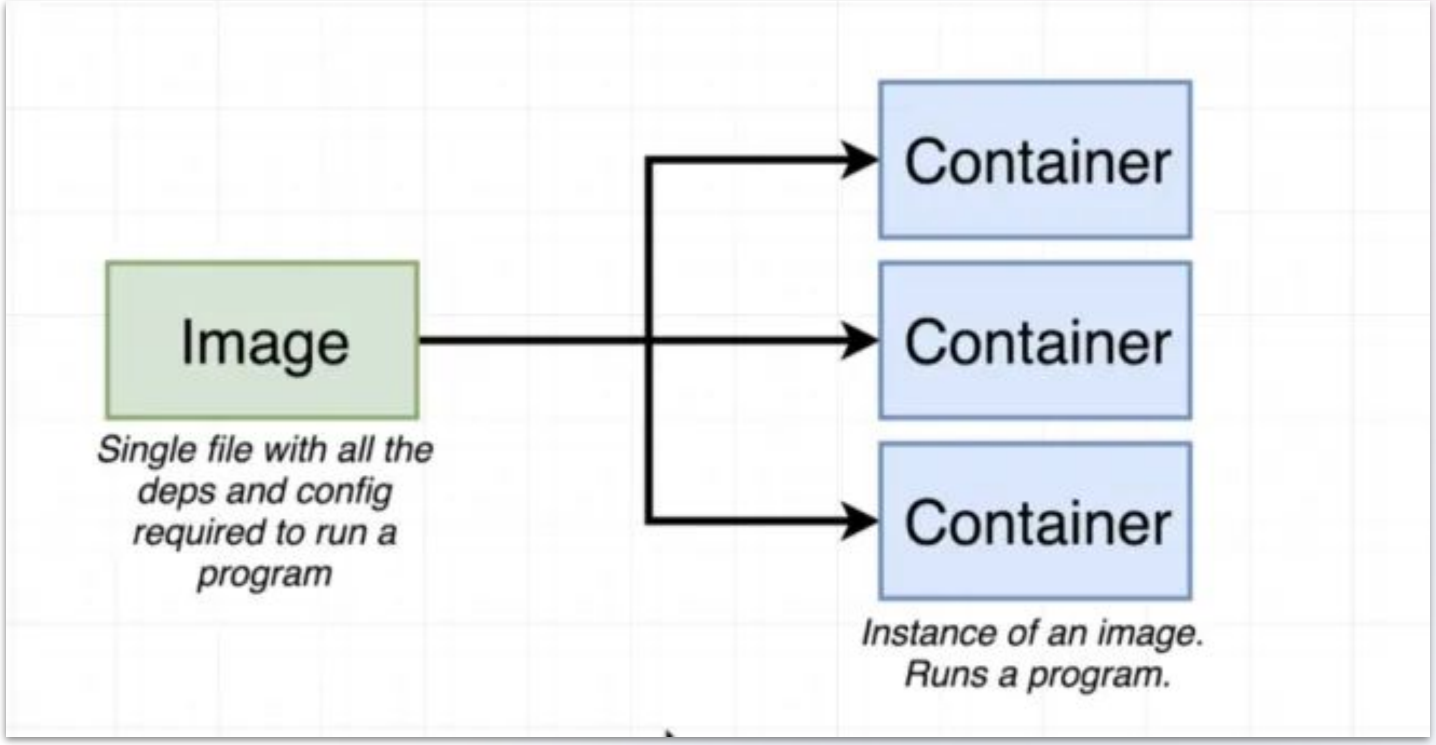
Docker Hub

Docker Compose

Docker is a platform or ecosystem around creating and running containers

sourcemind

What is Docker ?



Single file with all the deps and config required to run a program

Instance of an image. Runs a program.

Docker install

Install using the repository

- Set up the repository

    -
      ```
      sudo apt-get update
      ```

    -
      ```
      sudo apt-get install apt-transport-https ca-certificates curl gnupg lsb-release
      ```
- Add Docker’s official GPG key

    -
      ```
      curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /usr/share/keyrings/docker-archive-keyring.gpg
      ```
- Use the following command to set up the **stable** repository

    -
      ```
      echo "deb [arch=amd64 signed-by=/usr/share/keyrings/docker-archive-keyring.gpg] \ https://download.docker.com/linux/ubuntu $(lsb_release -cs) stable" | sudo tee \ /etc/apt/sources.list.d/docker.list > /dev/null
      ```
- Install Docker engine

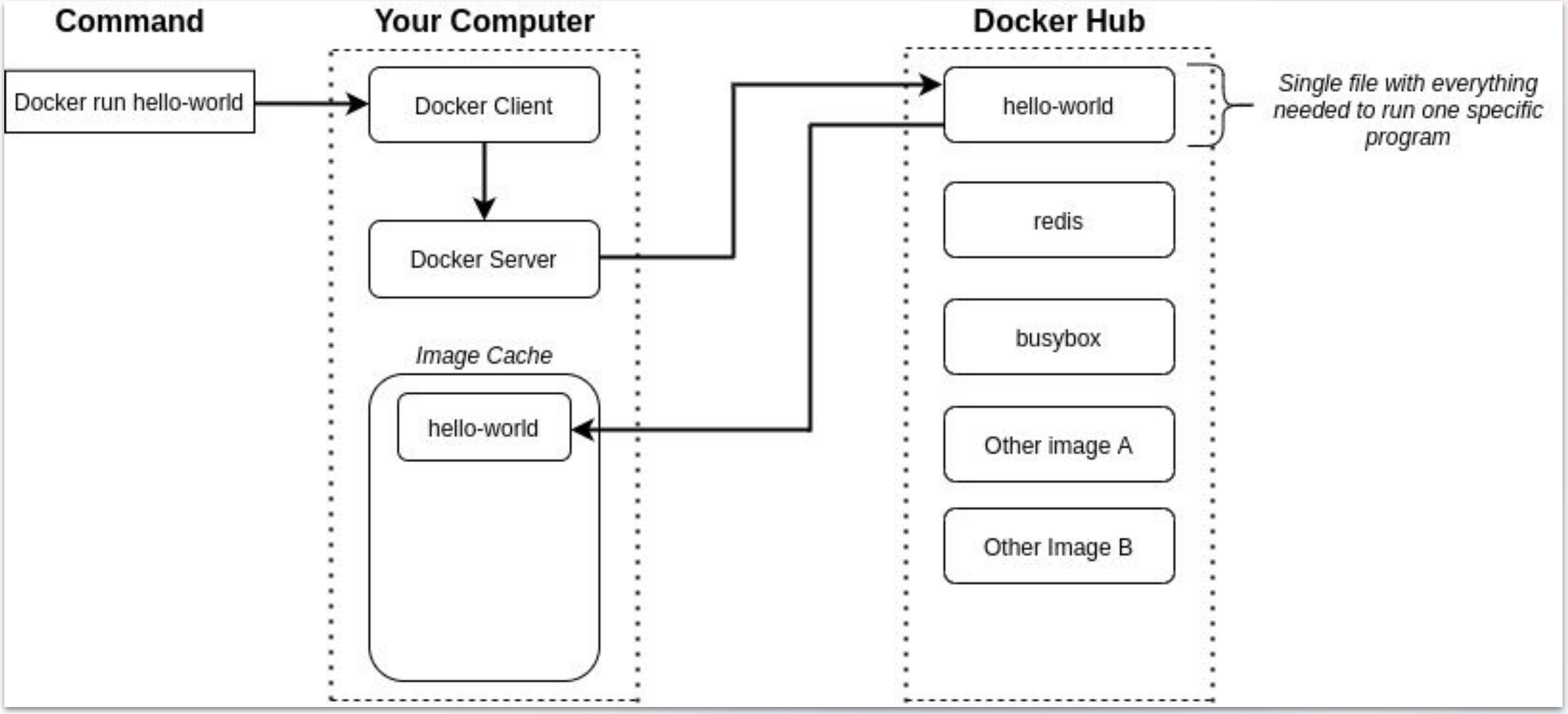
    -
      ```
      sudo apt-get update
      ```

    -
      ```
      sudo apt-get install docker-ce docker-ce-cli containerd.io
      ```
- Verify that Docker Engine is installed correctly by running the **hello-world** image.

    -
      ```
      sudo docker run hello-world
      ```

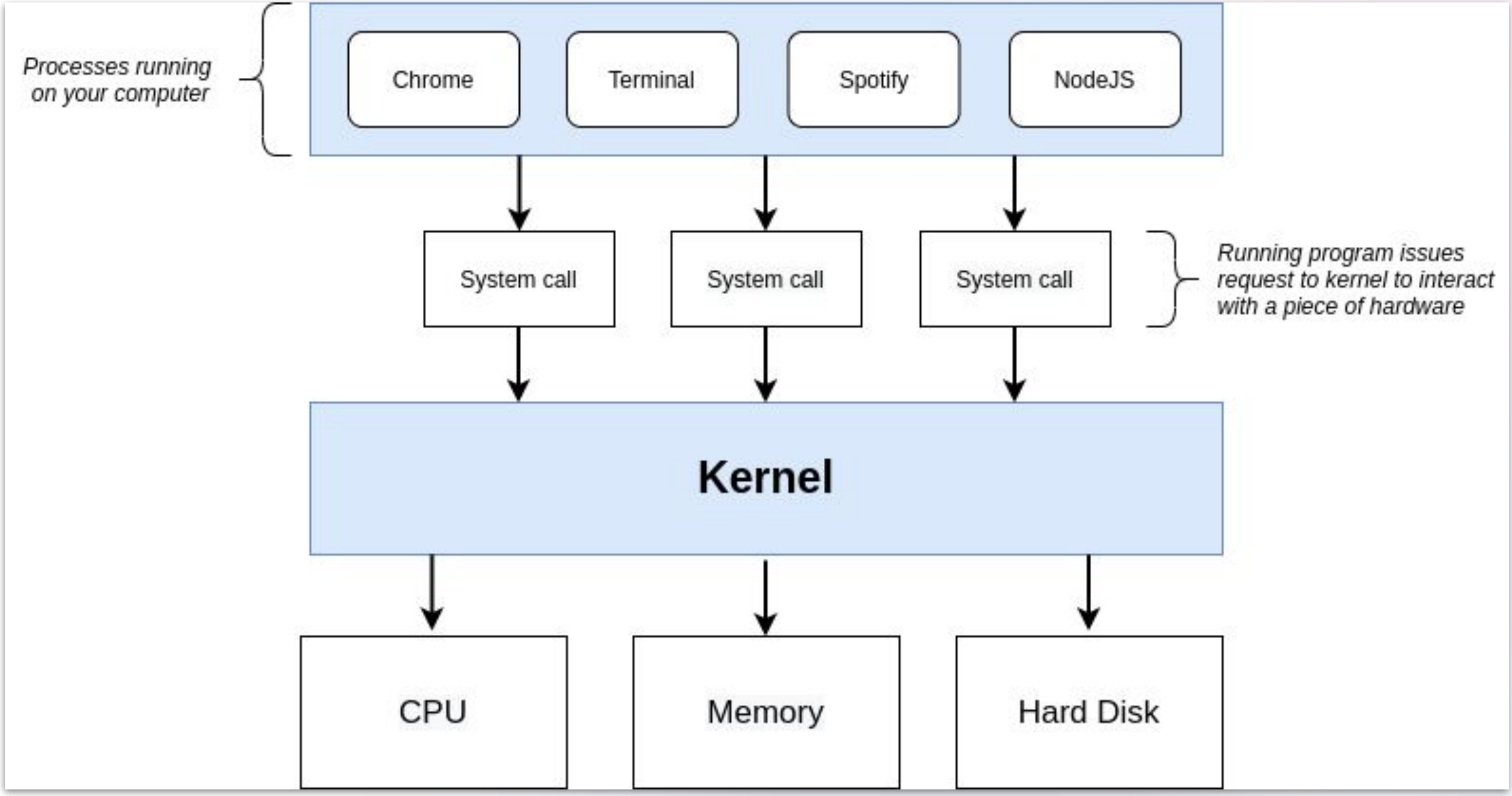
https://docs.docker.com/engine/install/ubuntu/

Process of docker run hello-world command



sourcemind

Quick overview of processes OS(Linux)

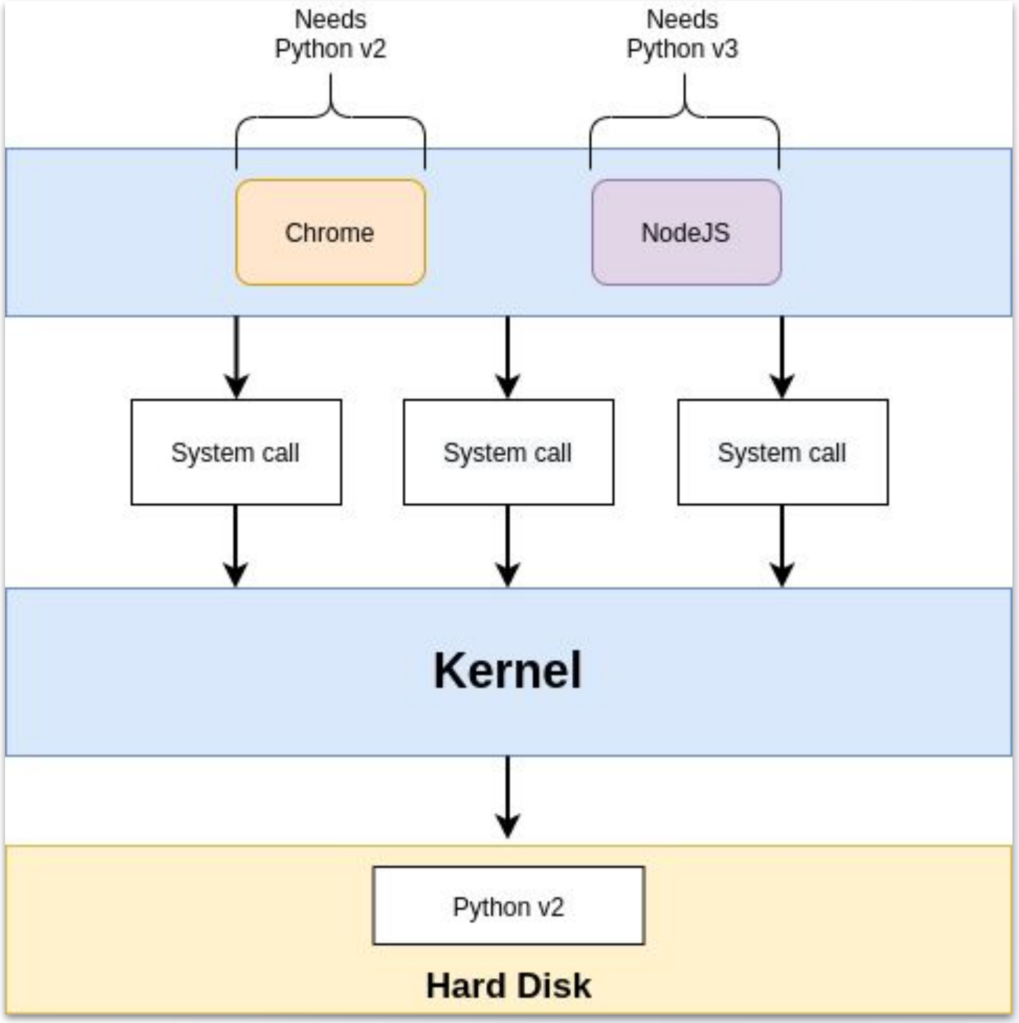


Processes running on your computer

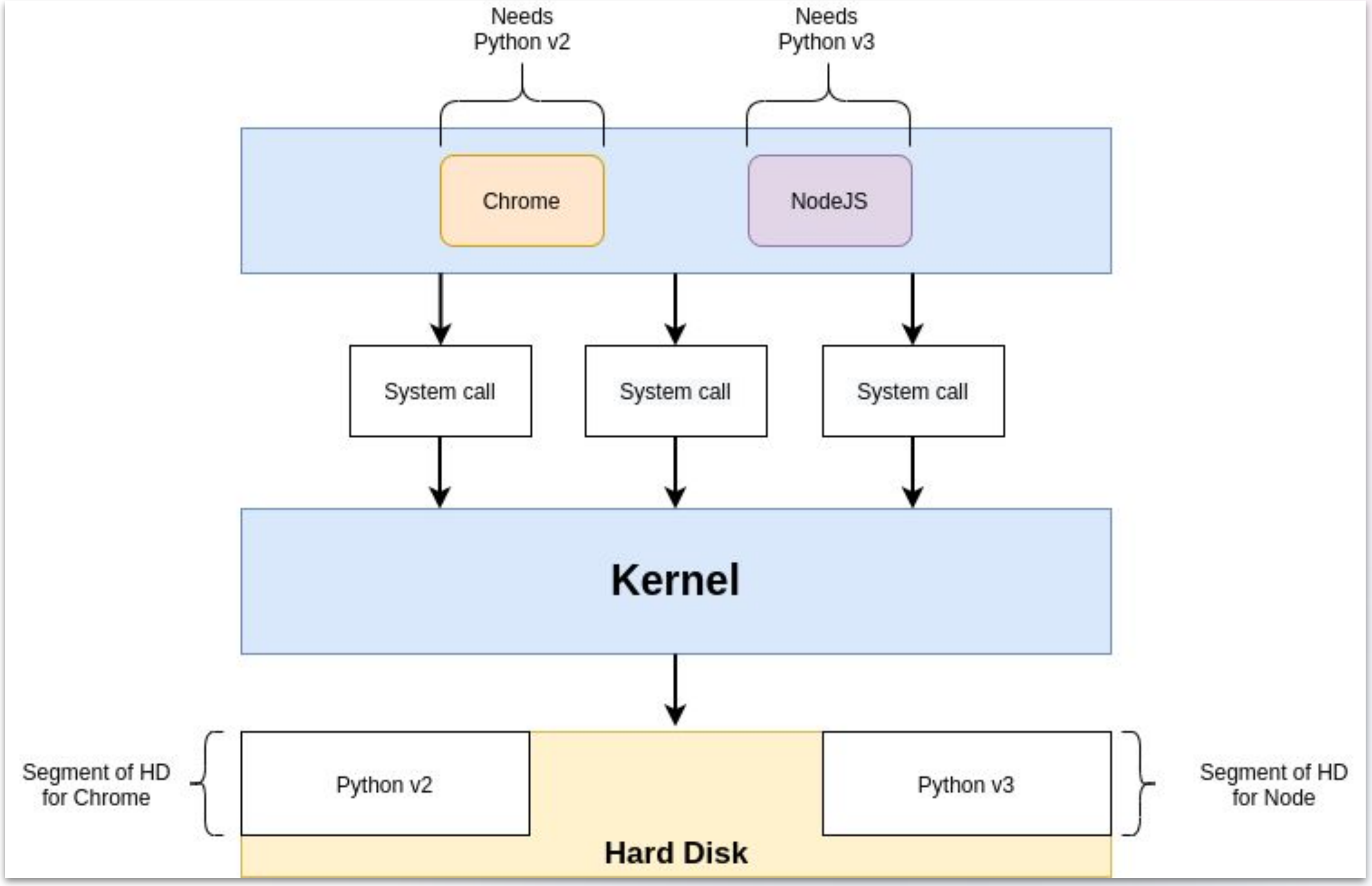
Running program issues request to kernel to interact with a piece of hardware

sourcemind

Quick overview of processes OS(Linux)

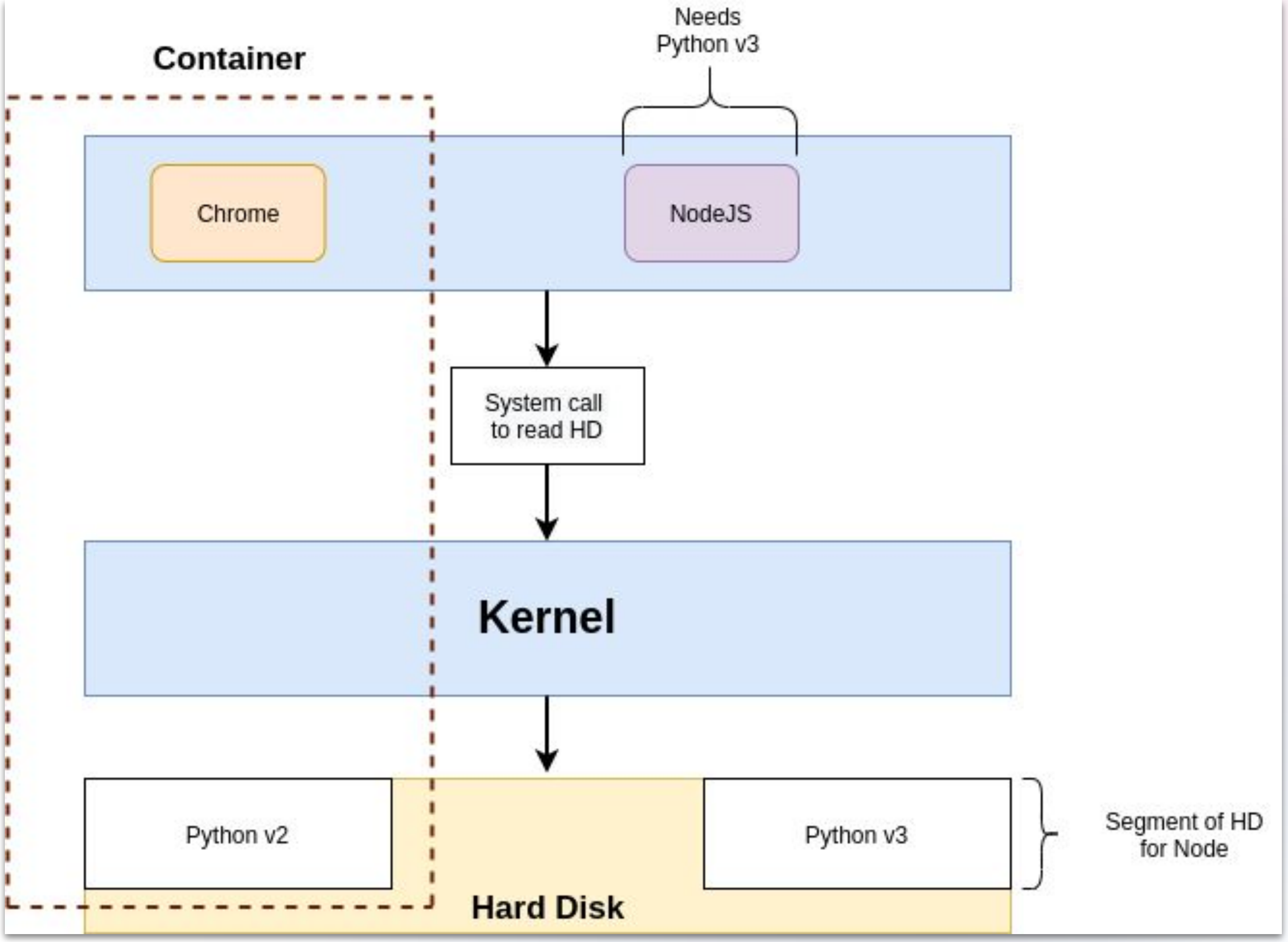


Quick overview of processes OS(Linux)



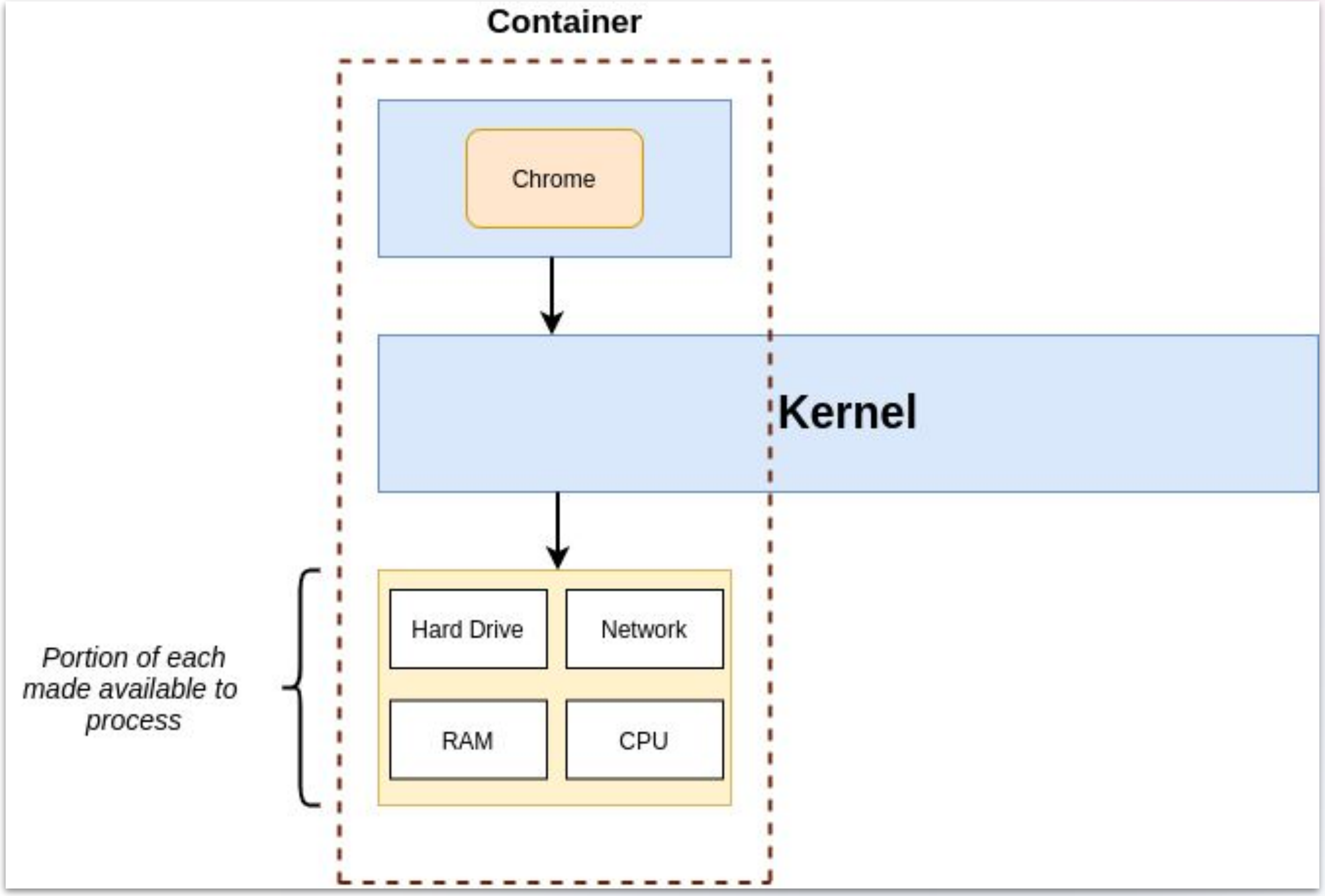
sourcemind

What is Container ?



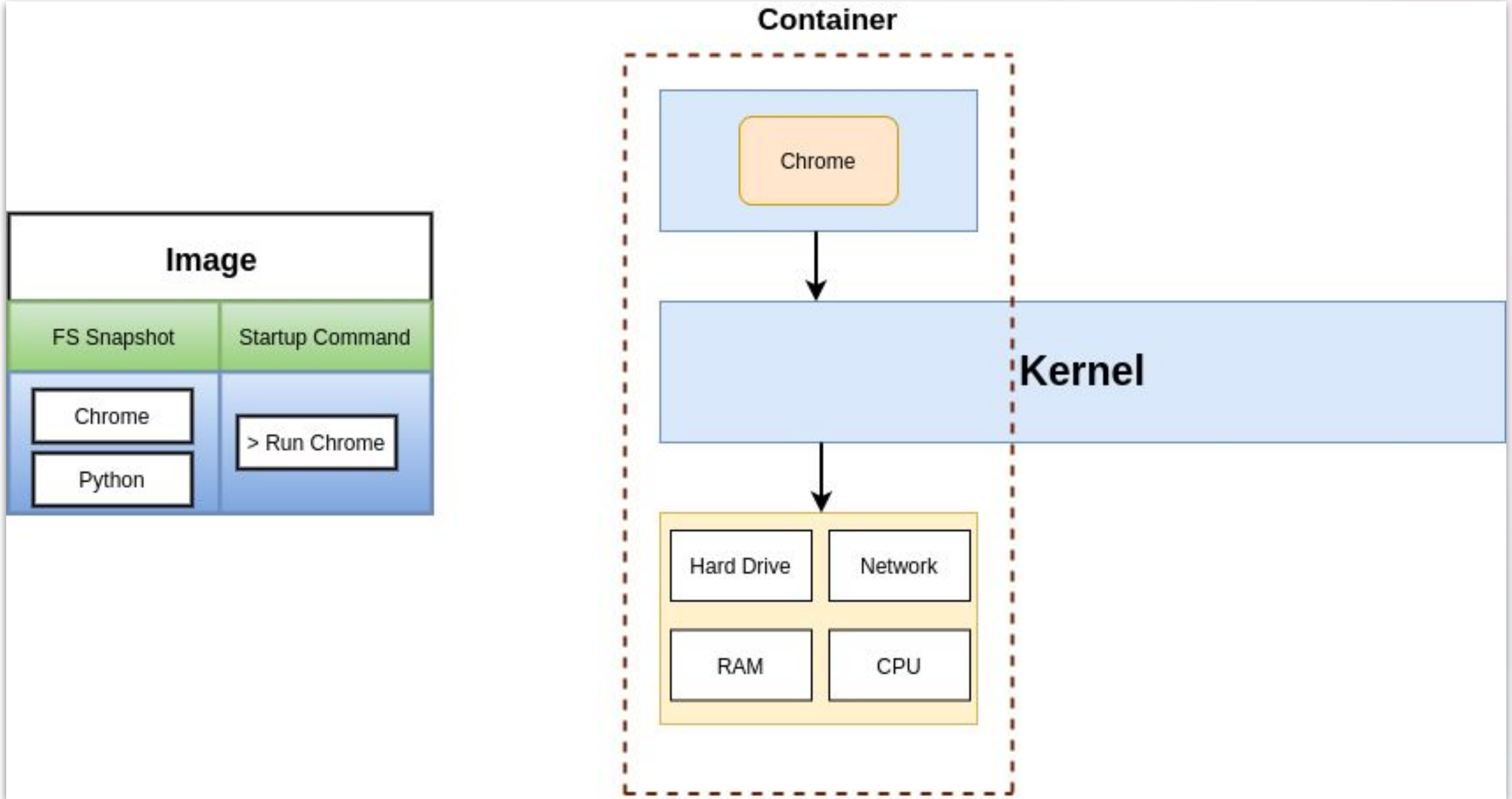
sourcemind

What is Container ?



sourcemind

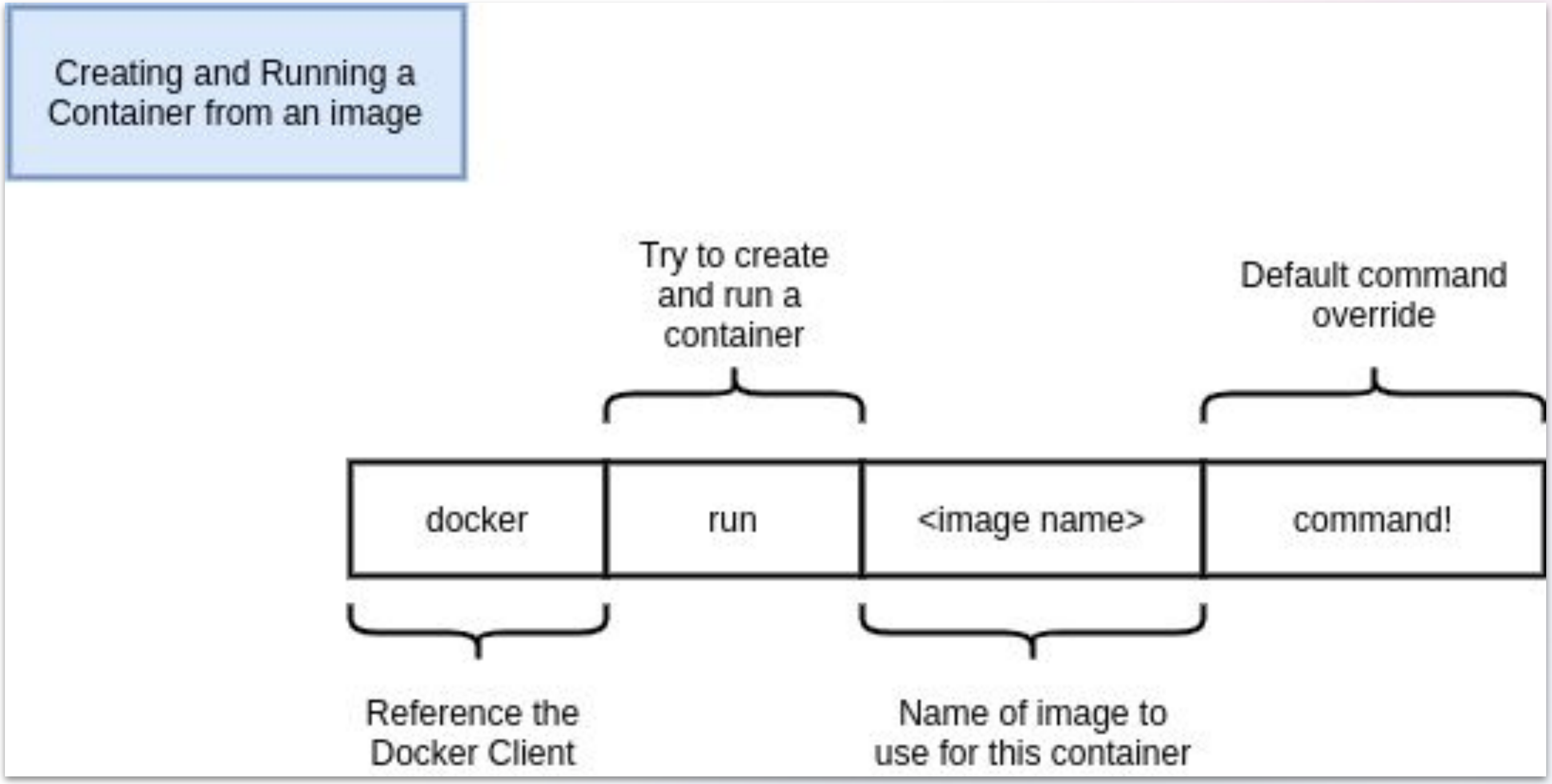
How image create Container



sourcemind

Manipulating Containers with the Docker Client

Overriding Default Commands



Creating and Running a Container from an image

Try to create and run a container

Default command override

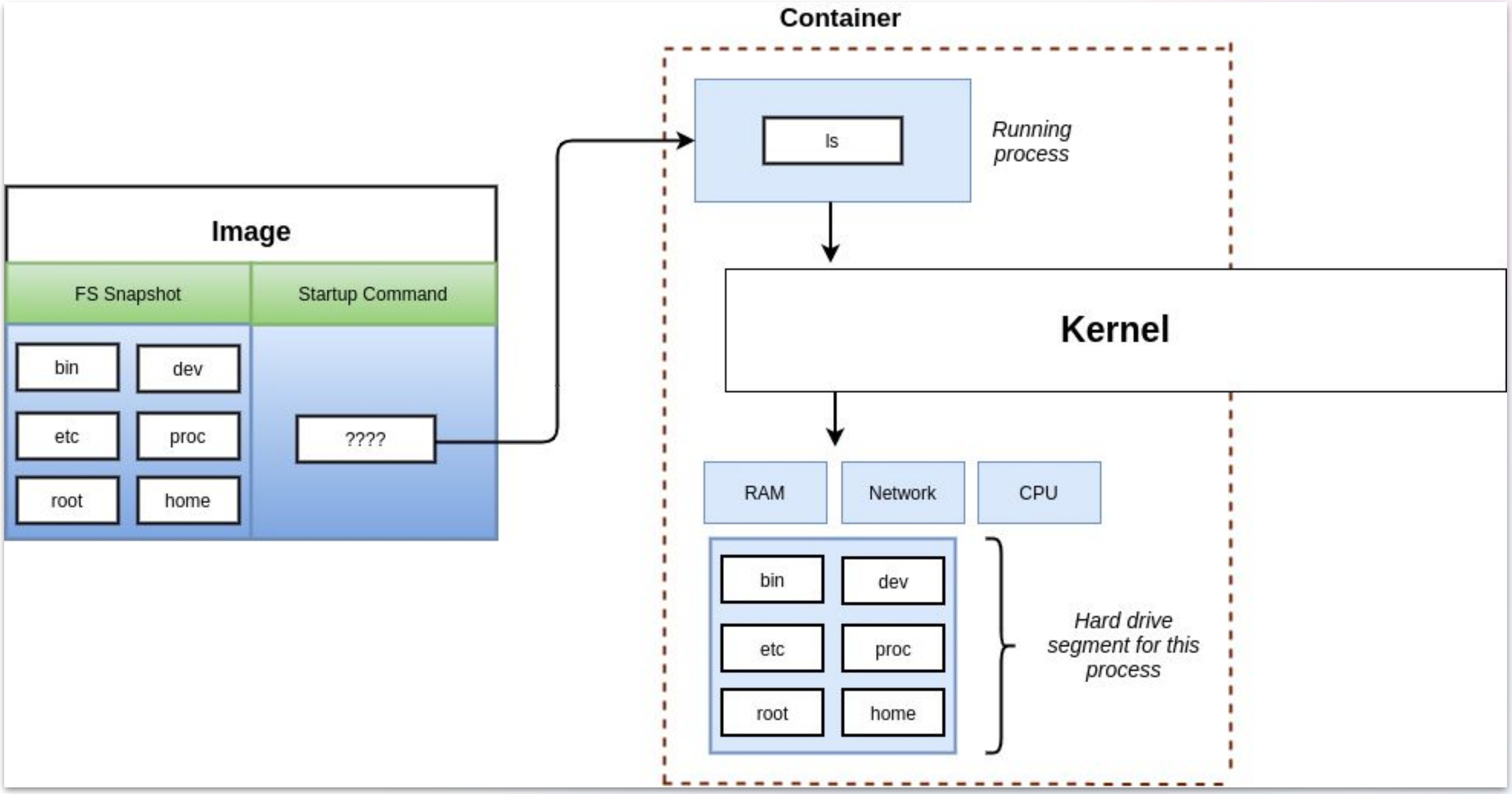
docker	run	<image name>	command!

Reference the Docker Client

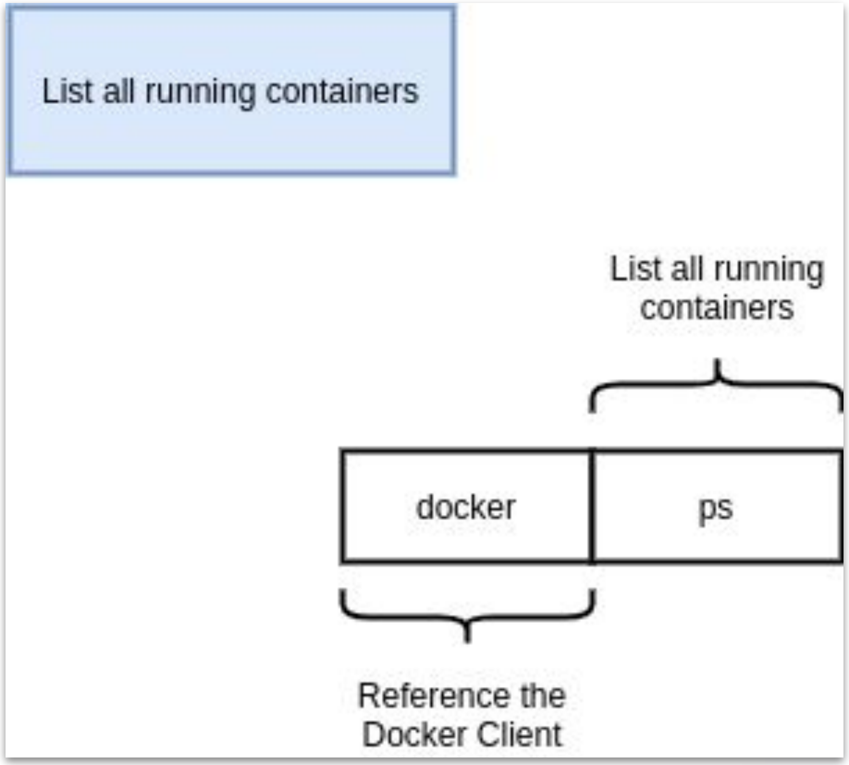
Name of image to use for this container

sourcemind

Overriding Default Commands



Overriding Default Commands



List all running containers

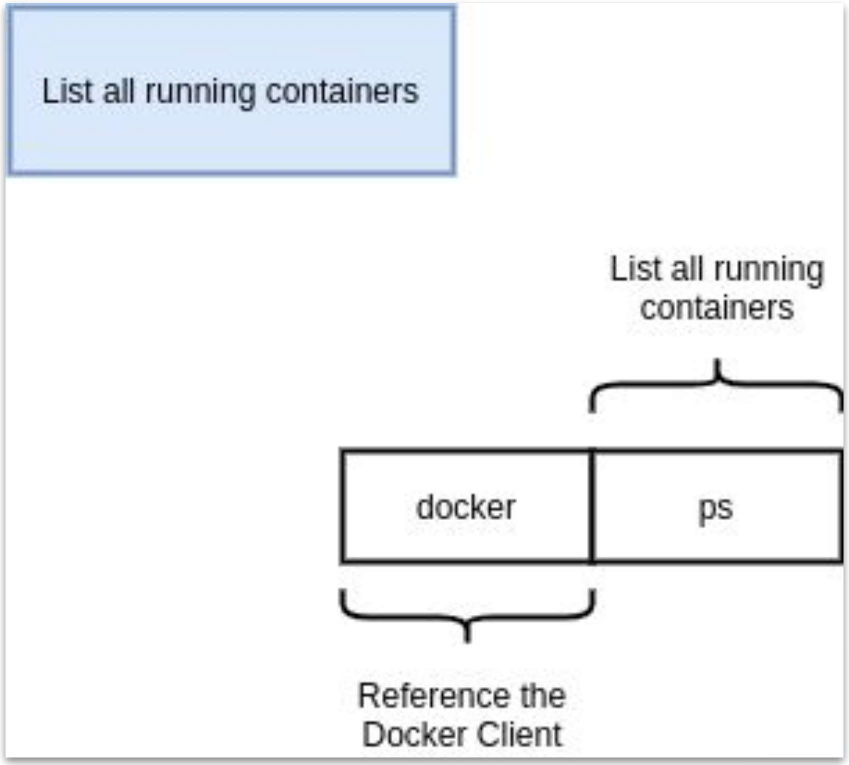
List all running containers

docker

ps

Reference the Docker Client

Overriding Default Commands

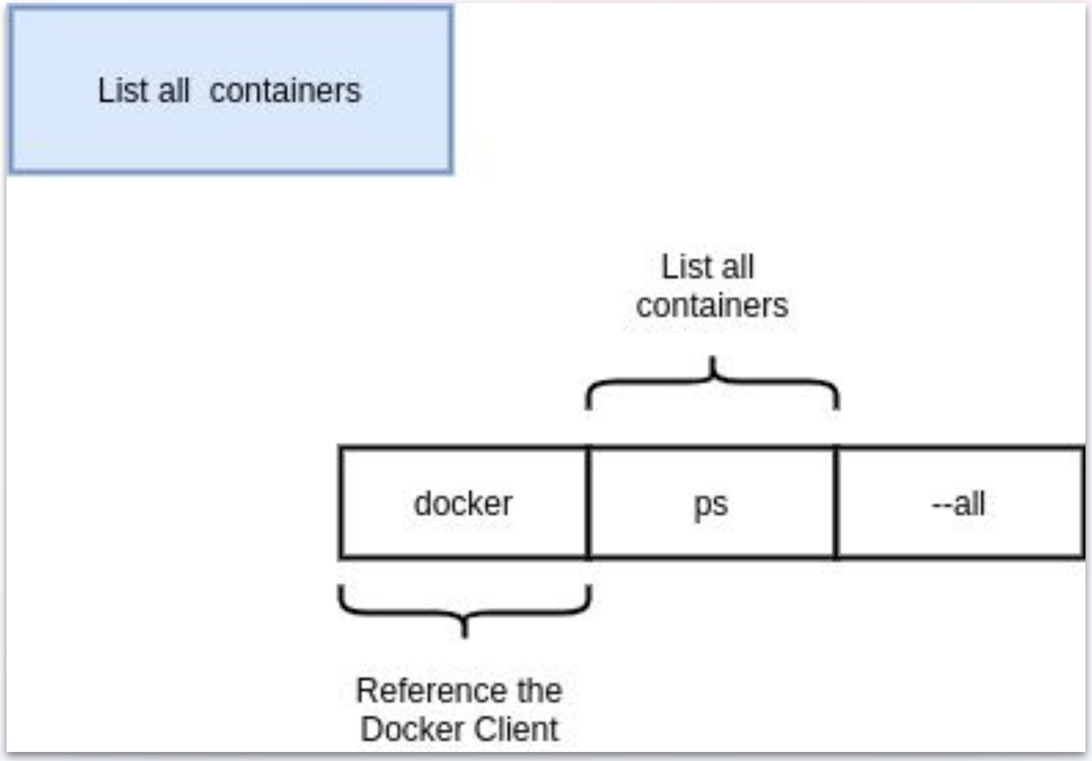


List all running containers

List all running containers

docker | ps

Reference the Docker Client



List all containers

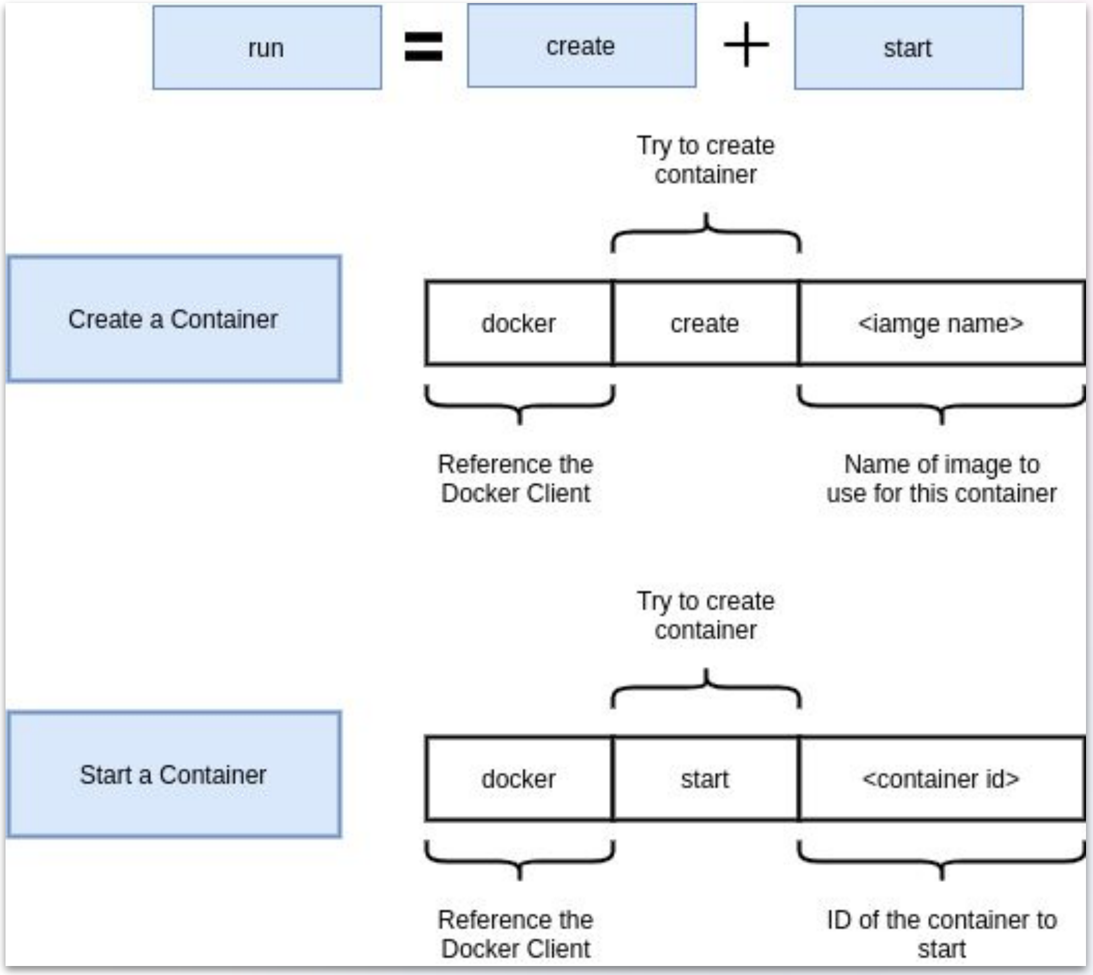
List all containers

docker | ps | --all

Reference the Docker Client

sourcemind

Overriding Default Commands



sourcemind

Overriding Default Commands

Removing stopped Containers

```
$ docker system prune
```

Removing one Container

```
$ docker rm <container id>/<container name>
```

Removing running Container

```
$ docker rm -f <container id>/<container name>
```

Retrieving log Outputs

```
$ docker logs <container id>/<container name>
```

Stopping Containers

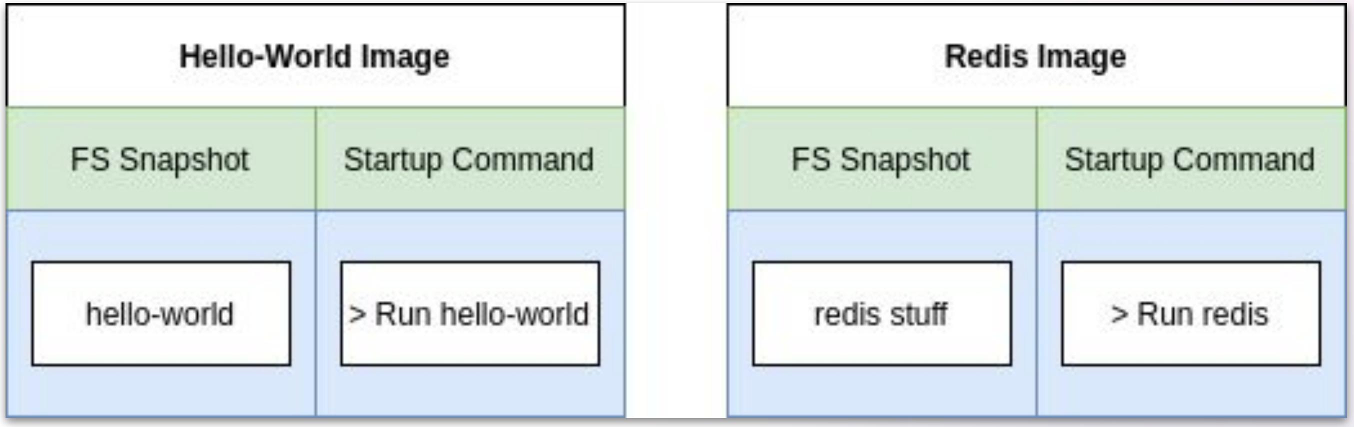
```
$ docker stop <container id>/<container name>
```

Killing Containers

```
$ docker kill <container id>/<container name>
```

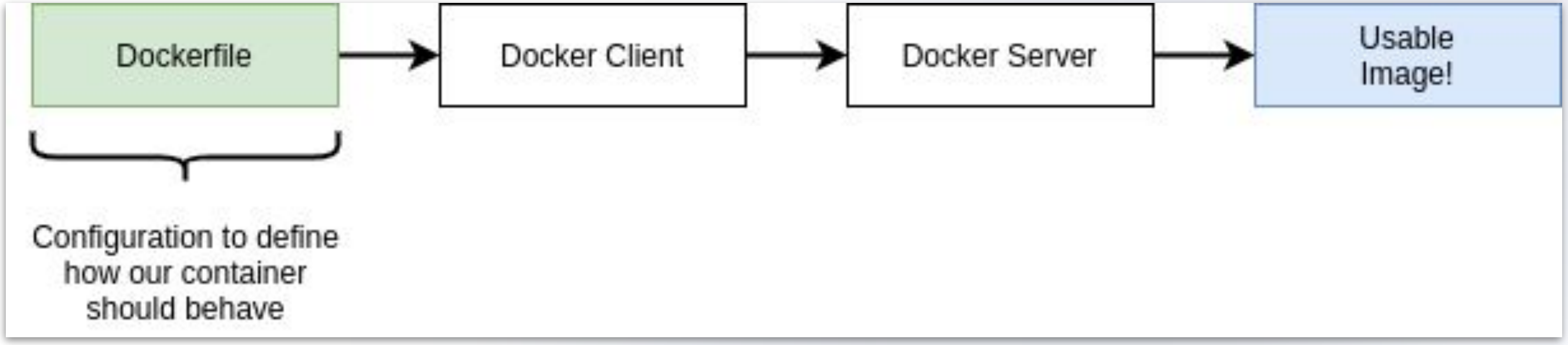
Build Custom Images

Flow of creating Custom Image



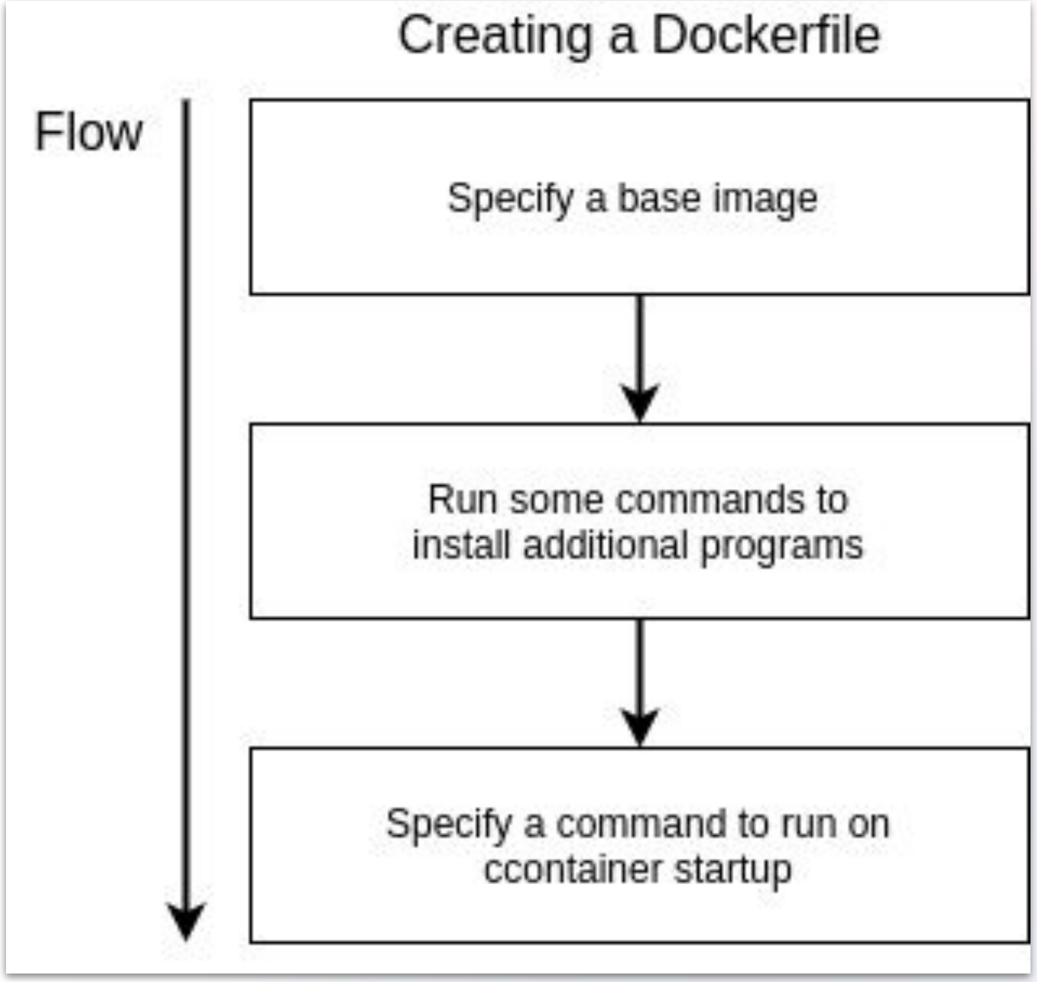
Hello-World Image	
FS Snapshot	Startup Command
hello-world	> Run hello-world

Redis Image	
FS Snapshot	Startup Command
redis stuff	> Run redis



Configuration to define how our container should behave

Flow of creating a DockerFile



Creating a Dockerfile

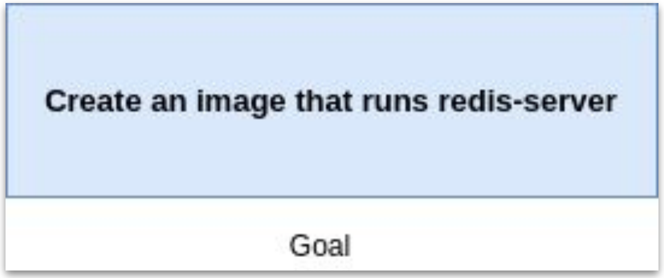
Flow

Specify a base image

Run some commands to install additional programs

Specify a command to run on ccontainer startup

Building a DockerFile



Create an image that runs redis-server

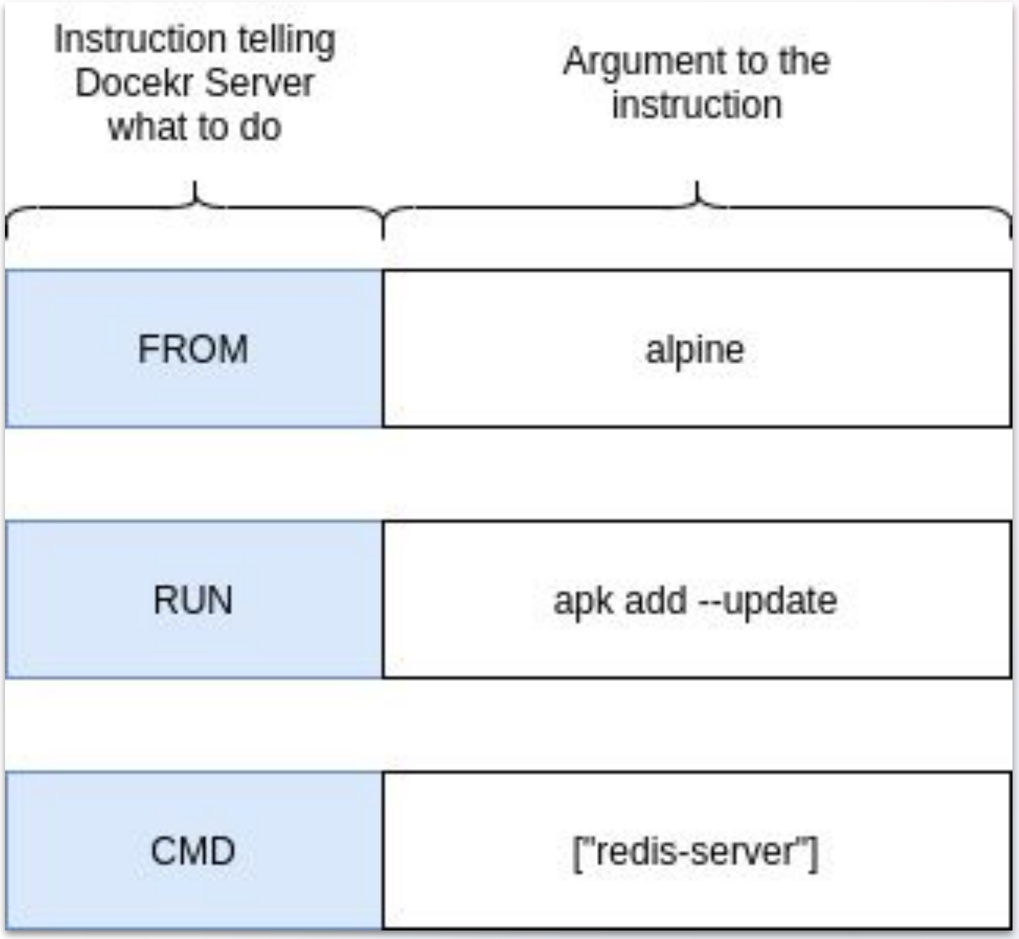
Goal

Use an existing docker image as a base

Download and install a dependency

Tell the image what to do when it start as a container

DockerFile Teardown



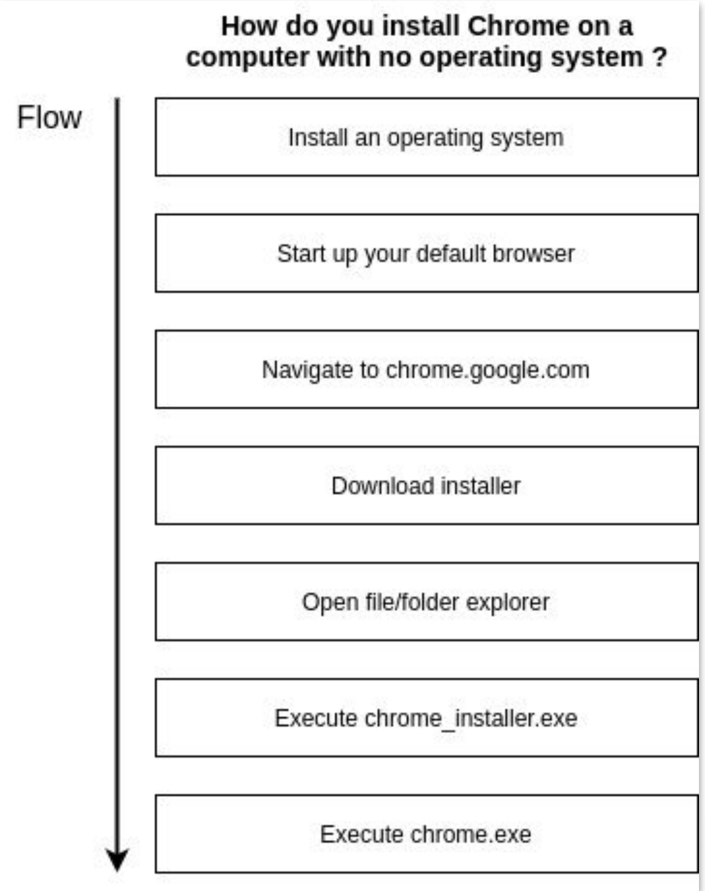
Instruction telling Docekr Server what to do	Argument to the instruction
FROM	alpine
RUN	apk add --update
CMD	["redis-server"]

What’s Base image

Imagine we have task to install Chrome with no OS in the computer

What’s Base image

Imagine we have task to install Chrome with no OS in the computer



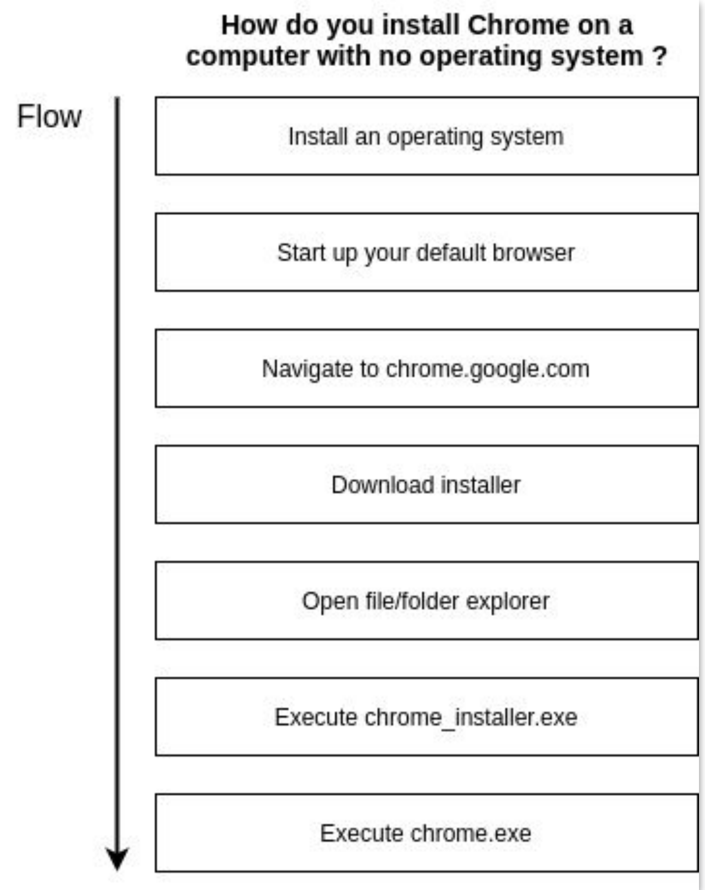
How do you install Chrome on a computer with no operating system ?

Flow

- Install an operating system
- Start up your default browser
- Navigate to chrome.google.com
- Download installer
- Open file/folder explorer
- Execute chrome_installer.exe
- Execute chrome.exe

What’s Base image

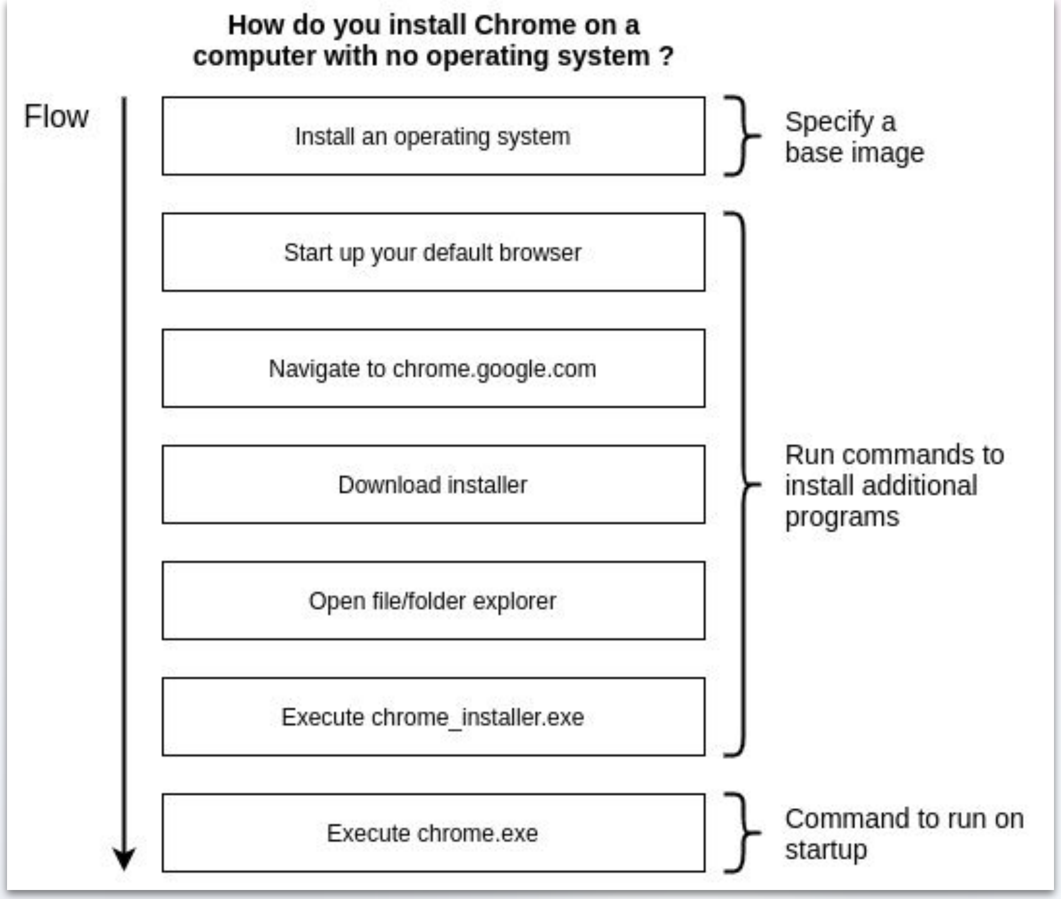
Imagine we have task to install Chrome with no OS in the computer



How do you install Chrome on a computer with no operating system ?

Flow

- Install an operating system
- Start up your default browser
- Navigate to chrome.google.com
- Download installer
- Open file/folder explorer
- Execute chrome_installer.exe
- Execute chrome.exe



How do you install Chrome on a computer with no operating system ?

Flow

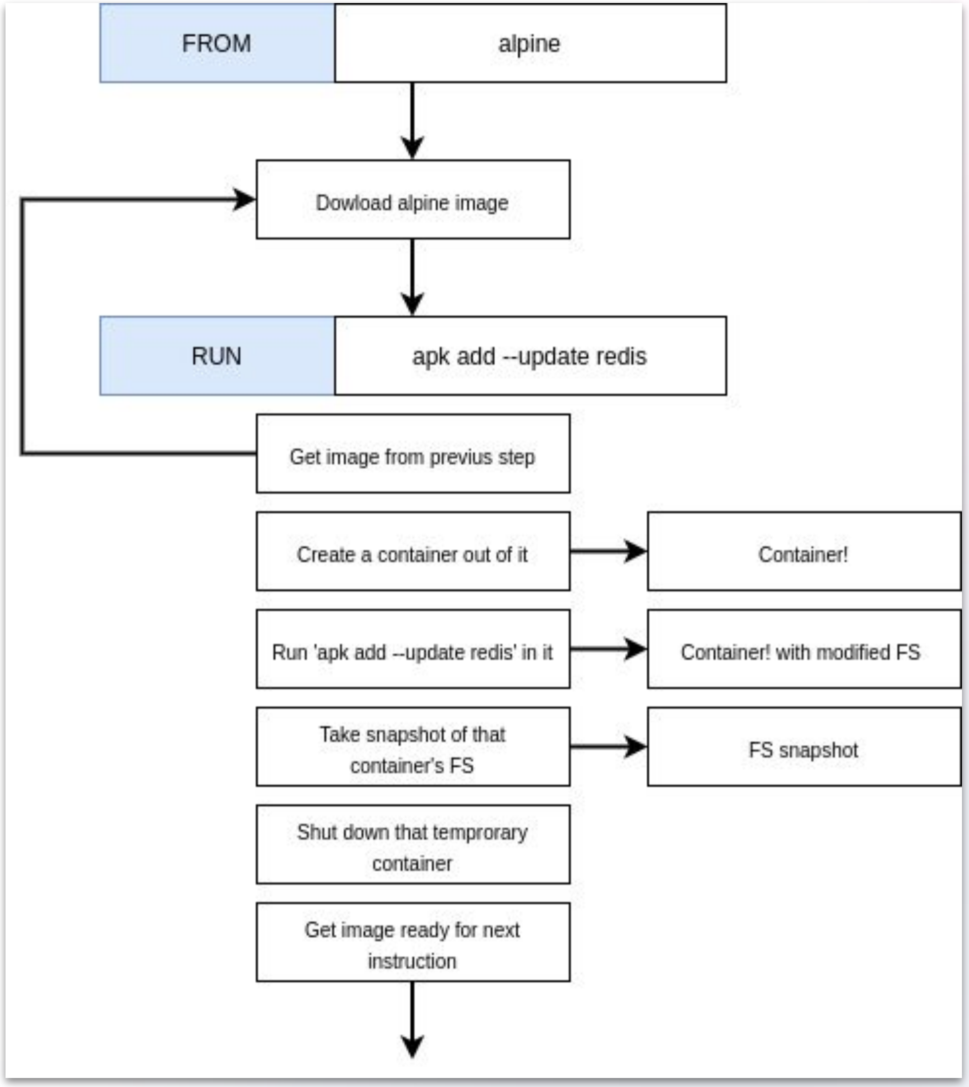
- Install an operating system
- Start up your default browser
- Navigate to chrome.google.com
- Download installer
- Open file/folder explorer
- Execute chrome_installer.exe
- Execute chrome.exe

Specify a base image

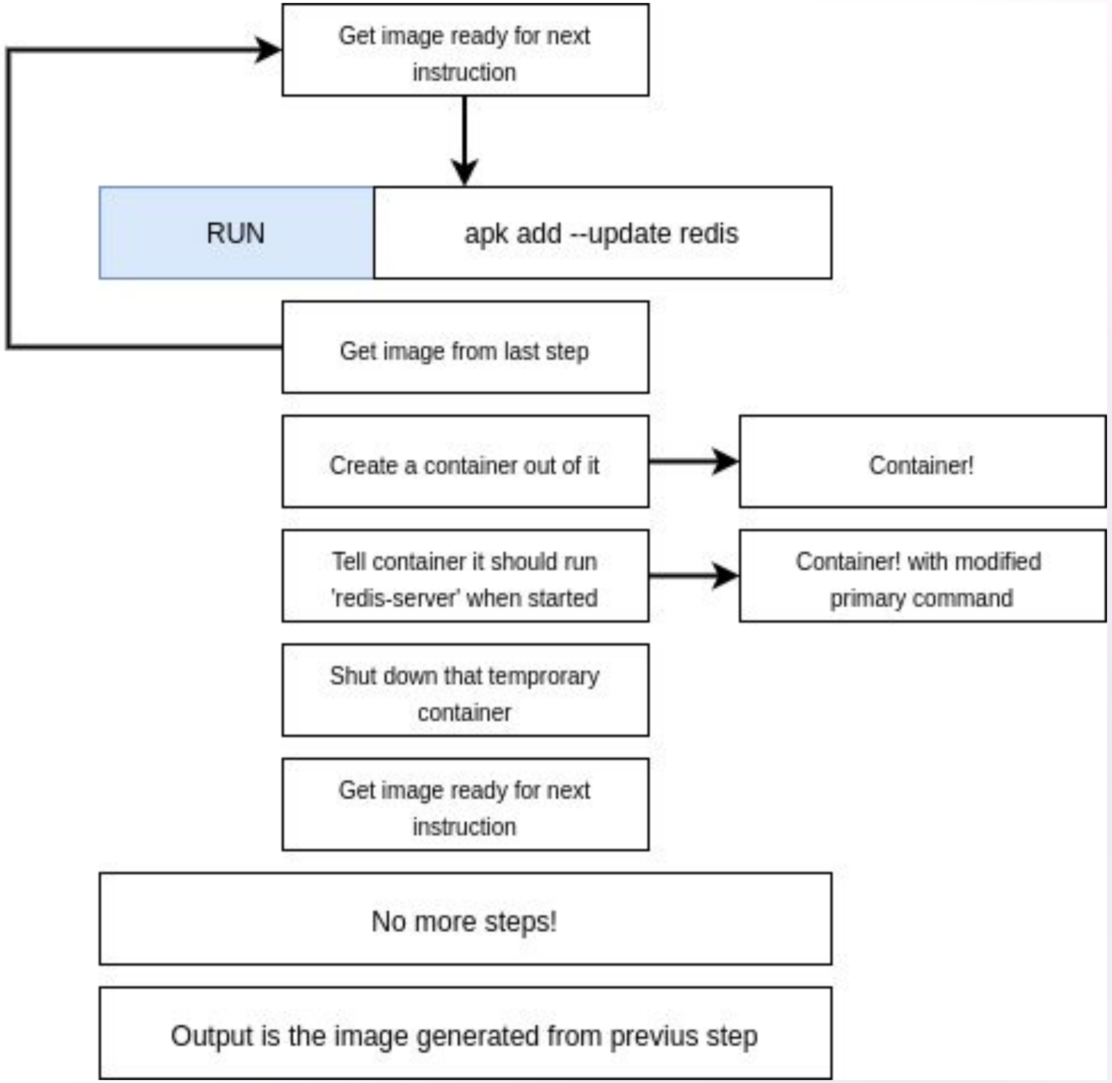
Run commands to install additional programs

Command to run on startup

A brief Recap


FROM
alpine
Dowload alpine image
RUN
apk add --update redis
Get image from previus step
Create a container out of it
Container!
Run 'apk add --update redis' in it
Container! with modified FS
Take snapshot of that container's FS
FS snapshot
Shut down that temprorary container
Get image ready for next instruction

A brief Recap



Get image ready for next instruction

RUN

apk add --update redis

Get image from last step

Create a container out of it

Container!

Tell container it should run 'redis-server' when started

Container! with modified primary command

Shut down that temprorary container

Get image ready for next instruction

No more steps!

Output is the image generated from previus step

Rebuilds with cache

Example one

FROM	alpine
RUN	apk add --update redis
RUN	apk add --update curl
CMD	["redis-server"]

Example two

FROM	alpine
RUN	apk add --update curl
RUN	apk add --update redis
CMD	["redis-server"]

Building a DockerFile

Practical Work

Approximate Duration: 15 minutes

Objectives:

Create custom image from Dockerfile

sourcemind

Thank you for your attention !

Q&A