# Certified Kubernetes Application Developer: Application Design and Build

## Define, Build, and Modify Container Images

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# Certified Kubernetes Application Developer

**Application Design and Build**

Application Deployment

Application Observability and Maintenance

Application Environment, Configuration and Security

Services and Networking

# About this Course

**Define, Build and Modify Container Images**

**Understand Jobs and CronJobs**

**Understand Multi-container Pod Design Patterns**
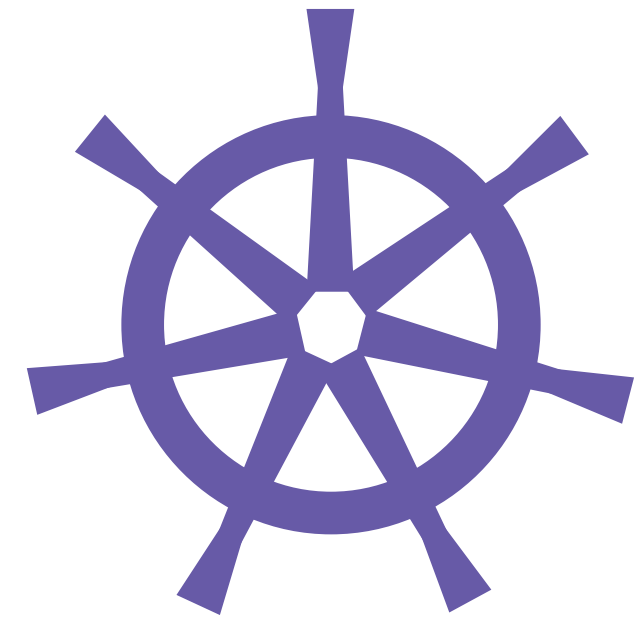
**Utilize Persistent and Ephemeral Volumes**

# Pre-requisites

**Cloud**
**Basic experience**

**Containers**
**Basic experience**

**Kubernetes**
**Basic experience**

# Suggested courses

**Containers and Kubernetes: The Big Picture**

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**Getting Started with Kubernetes**

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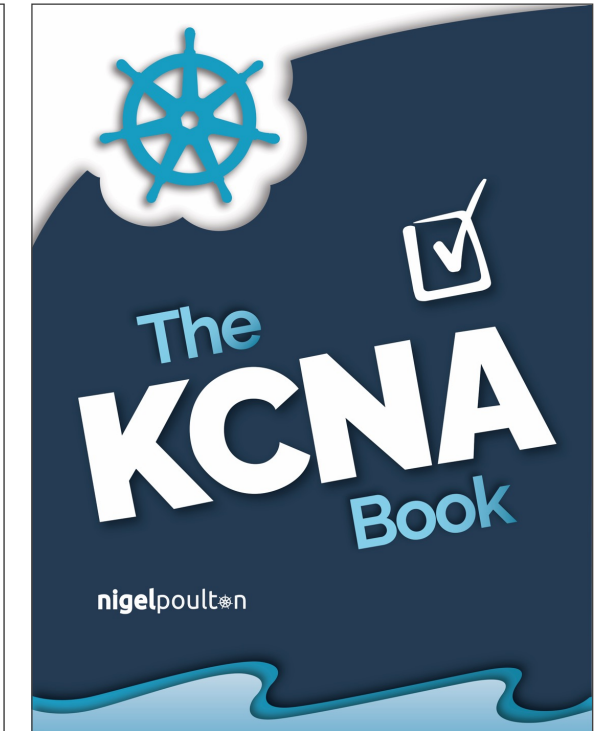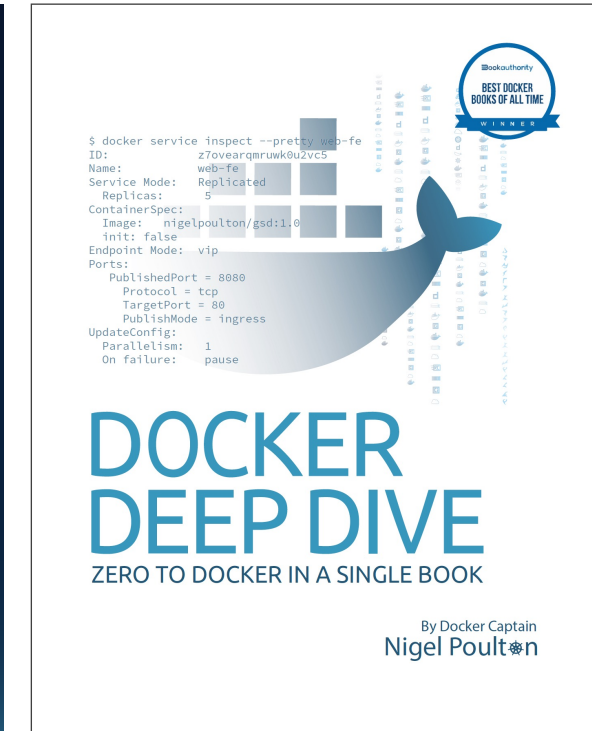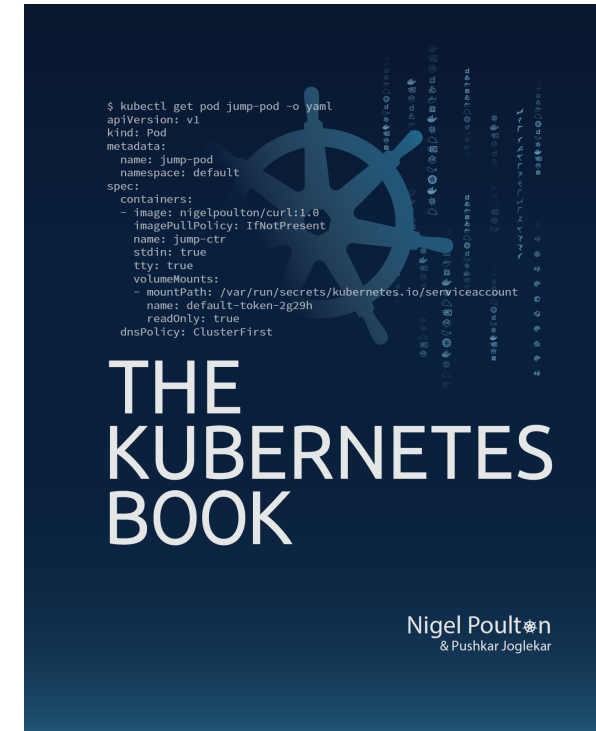@**nigel**poulton

@nigelpoulton

Docker and Kubernetes: The Big Picture

Getting Started with Docker

Getting Started with Kubernetes
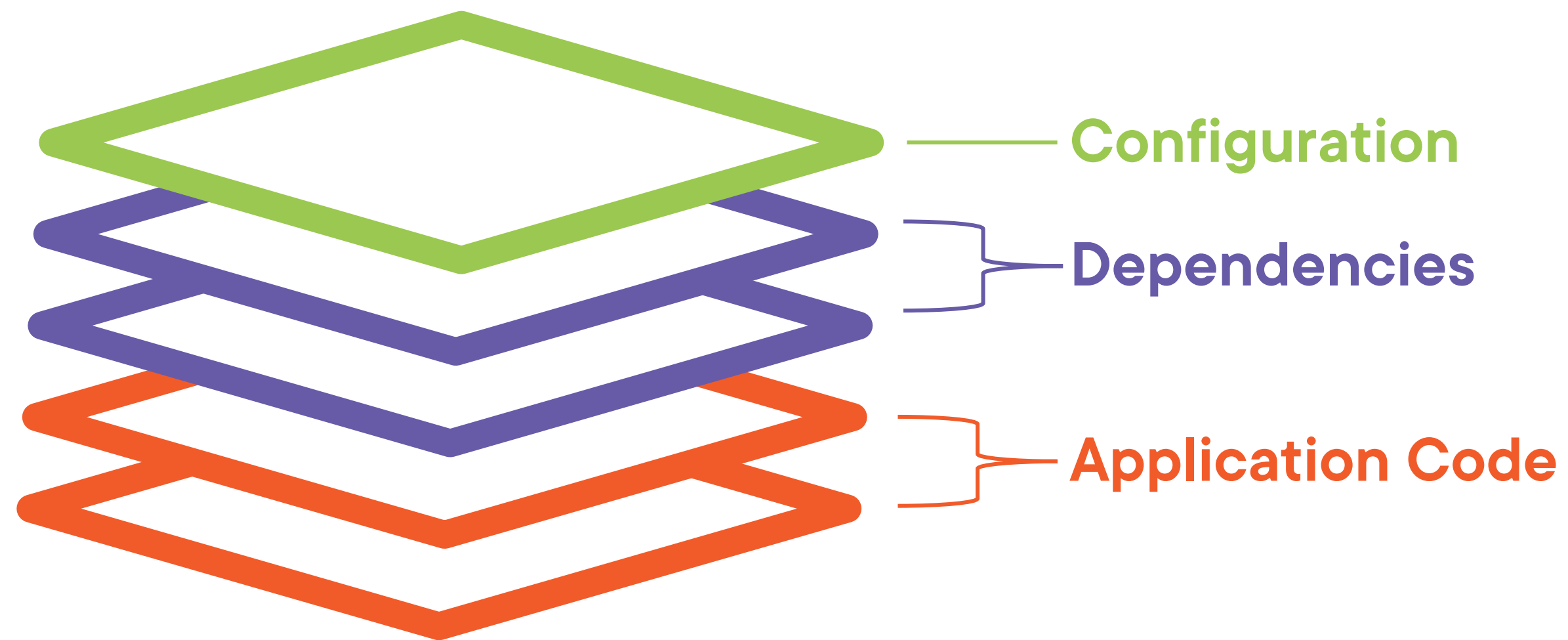
Docker Deep Dive...

# Agenda

**Define, Build and Modify Container Images**
- About Image Management
- Managing Images with Docker
- Managing Images with Other Tools
- Exam Scenarios
- Recap and Test Yourself

# About Image Management

Configuration

Dependencies

Application Code

```
FROM node:x.y.z-alpine          ◄ Base image

COPY . /src                     ◄ Copy app code into image at /src

RUN npm install                 ◄ Install dependencies

EXPOSE 8080                     ◄ Application port

ENTRYPOINT ["node", "./app.js"] ◄ Command to run the app
```

```
FROM node:x.y.z-alpine          ◄ Base image

COPY . /src                     ◄ App

RUN npm install                 ◄ Dependencies

EXPOSE 8080                     ◄ Config

ENTRYPOINT ["node", "./app.js"] ◄ Config
```
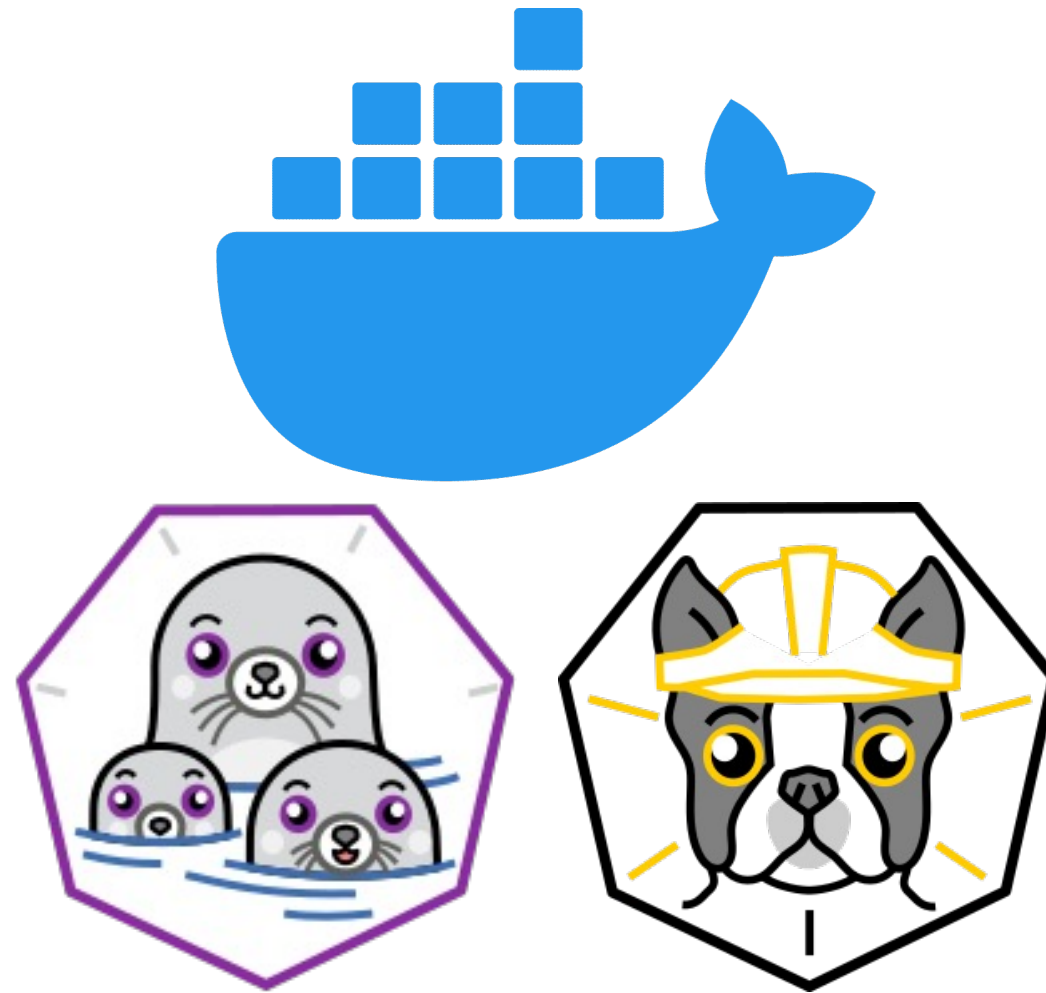
Dockerfile → → Image

Dockerfile
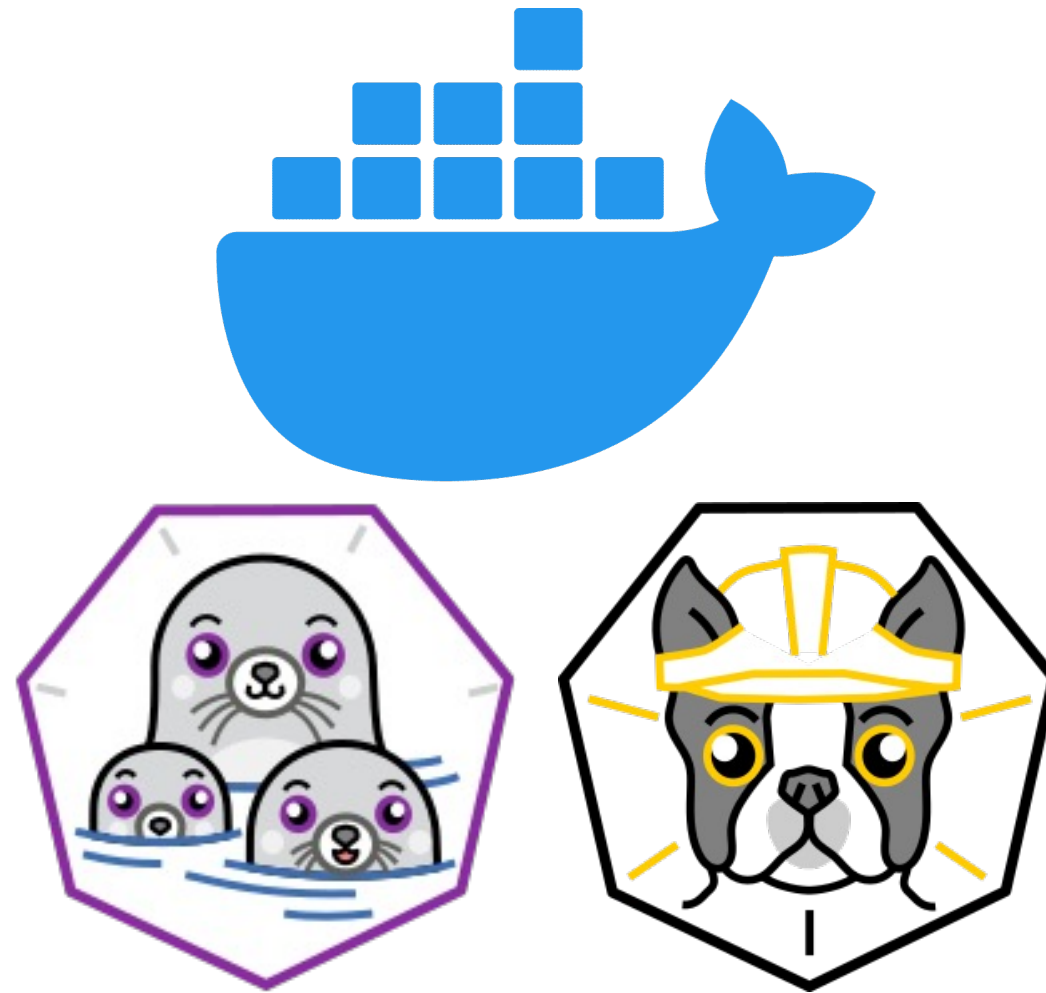
OCI Image

*OCI is the Open Containers Initiative (opencontainers.org)

App and deps → Dockerfile → Build tools → OCI Image

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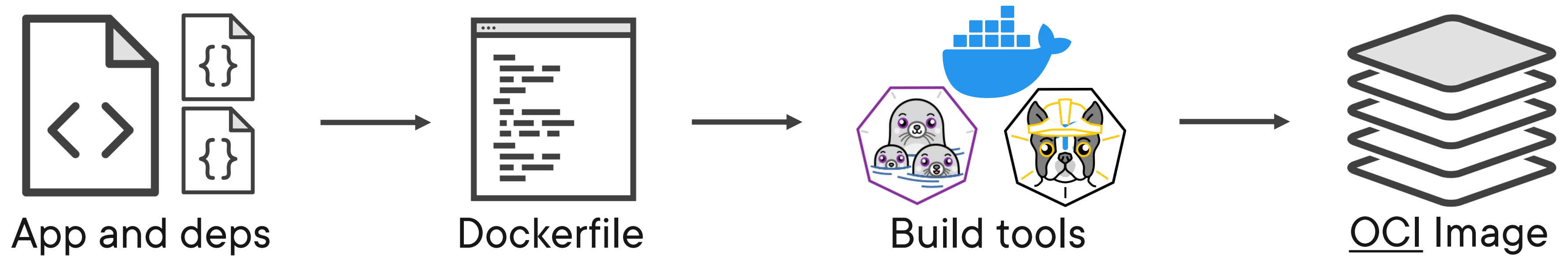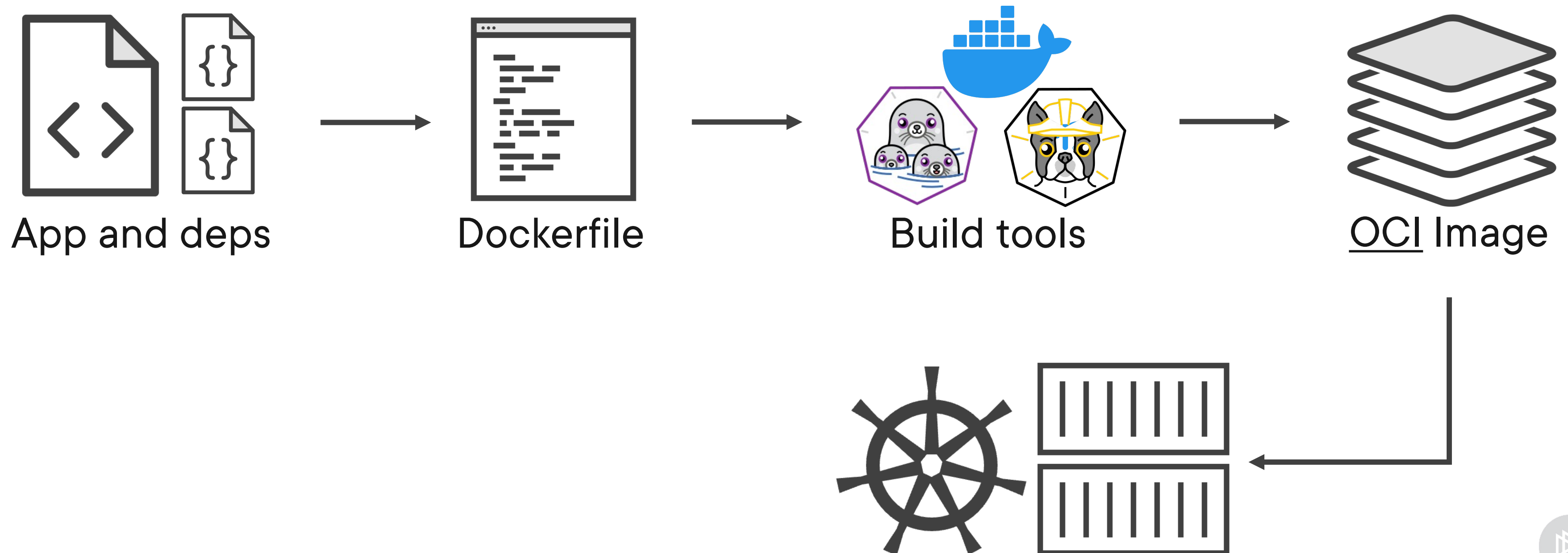
# Managing Images with Docker

The exam environment is Linux

# Getting Docker for Mac and PC

Docker Desktop

# Getting Docker for Linux

Install Docker on Ubuntu

# Up Next:
# Managing Images with Other Tools

# Managing Images with Other Tools

**Image management**
Creates and manages OCI images
Only does images

**Image and container management**
Creates and manages OCI images
Manages entire container lifecycle
Supports all Docker CLI commands

```
docker image ls      -->>      podman image ls

docker image build -t      -->>      podman image build -t
```

# buildah

**Image management**
Creates and manages OCI images
Only does images
Doesn't need a Dockerfile

# podman

**Image and container management**
Creates and manages OCI images
Manages entire container lifecycle
Supports all Docker CLI commands
Daemonless
Uses buildah for builds

# Up Next:
# Exam Scenarios

# Exam Scenarios

⚠ Be sure to complete this task in XYZ environment.
The command to connect is ABC...

**Task**

There's an application in the `/app` folder of your environment.

The application and all dependencies exist in that folder. However, the Dockerfile exists in the `/configs` folder.

Build the app into an OCI image with the tag `ckad:pluralsight`.

Task weight: 8%

⚠️ Be sure to complete this task in XYZ environment.
The command to connect is ABC...

## Task

There's an application in the `/app` folder of your environment.

The application and all dependencies exist in that folder. However, the Dockerfile exists in the `/configs` folder.

Build the app into an OCI image with the tag `ckad:pluralsight`.

Terminal: $

⚠️ Be sure to complete this task in XYZ environment.
The command to connect is ABC...

## Task

There's an application in the `/app` folder of your environment.

The application and all dependencies exist in that folder. However, the Dockerfile exists in the `/configs` folder.

Build the app into an OCI image with the tag `ckad:pluralsight`.

⚠️ Be sure to complete this task in XYZ environment.
The command to connect is ABC...

**Task**

You have a local image called `ckad:pluralsight` that you're trying to push to the `nigelpoulton` repository on Docker Hub.

However, the push is failing. Fix the problem with the image, but **do not** push it to Docker Hub.

⚠️ Be sure to complete this task in XYZ environment.
The command to connect is ABC...

**Task**

The system has a local image called `ckad:pluralsight`.

Convert this to an OCI archive in a tar file called `ckad.tar`.

# Up Next:
# Recap and Test Yourself

# Recap and Test Yourself
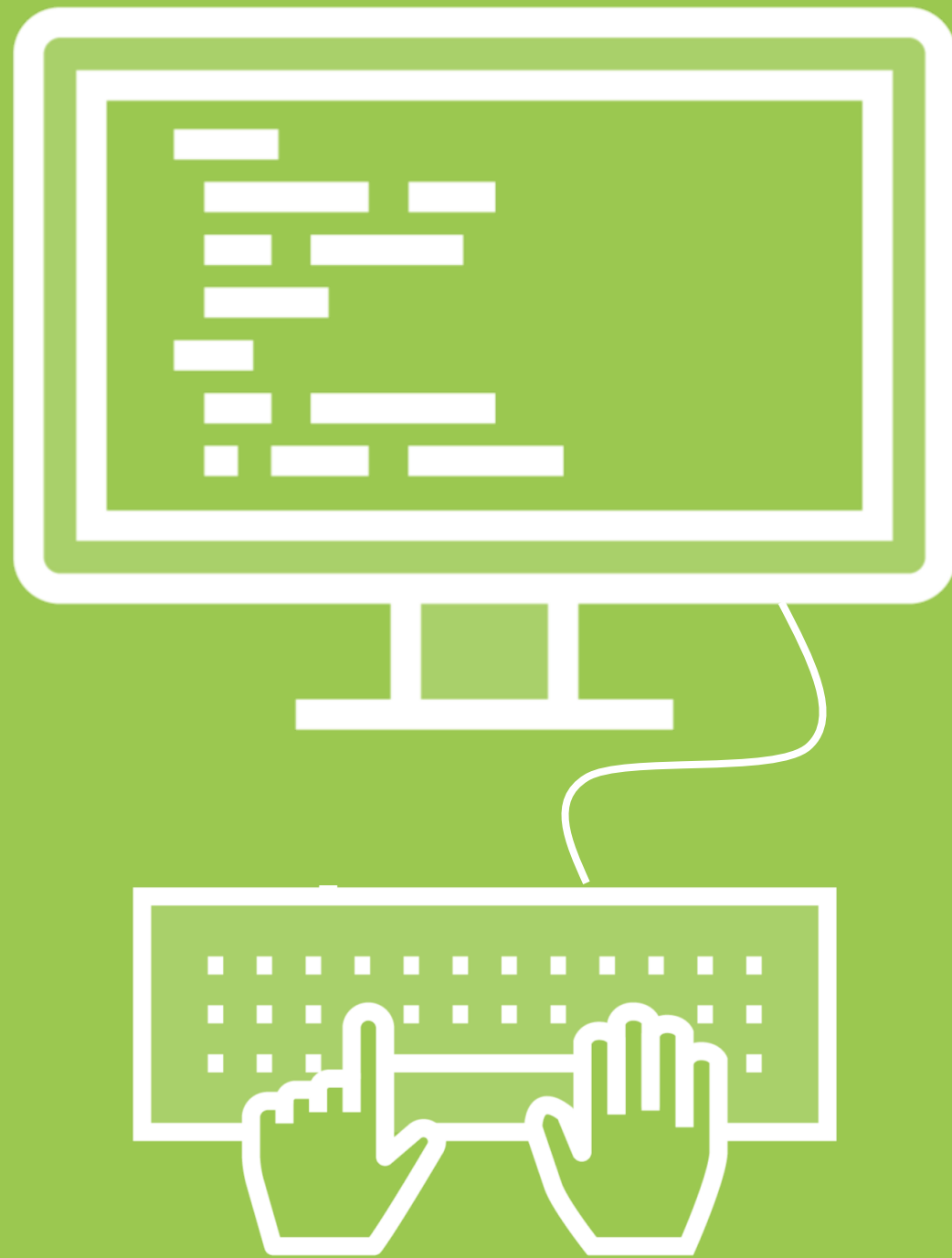
# Docker - Buildah - Podman

# Top Three Take-home Points

**Build images from Dockerfiles**

**Name and tag images**

**Save images as OCI archives**

GitHub Repo

https://github.com/nigelpoulton/ckad