Containers & Reproducible Builds

Overview

- For code to really work, it must be reproducible.
- We have learned about virtual environments, which goes a long way towards giving reproducible builds.
- But for even greater reproducibility (and deployability), containers are the tool of choice.
- A container is a minimal virtual operating system, complete with all the software needed to run the desired application.
- Because they pack everything together, they are truly identical to run regardless of host.
- Docker is a common standard and tool for containers, and we will use it to build and run Linux containers with Python code.

Objectives

- Launch Docker containers and access/execute programs on them
- Create/customize a Dockerfile to build a basic custom container

Virtualization

- Process by which the hardware elements of a computer—processors, memory, storage is divided into multiple virtual computers.
- These computers are called virtual machines (VMs)
- Each VM is now an independent computer.
- Types of Virtualization
    - Desktop virtualization
    - Operating system virtualization
    - Server virtualization

Hypervisor

- A hypervisor makes virtualization possible.
- It takes physical resources and divides them up so that virtual environments can use them.
- It is software that sits in between the virtual environments and the operating system or the physical hardware.

Container

- A software package that packages an application, it’s dependencies configuration, libraries needed to run it.
- This makes sure that an will run reliably on different computing environments.
    - Different OS, HW, Storage, Network, Security policies etc.
- Containers are lightweight and use less resources than VMs.

Docker

- Docker is a platform for building, running and managing containers.
- https://www.docker.com/resources/what-container
- https://docs.docker.com/get-started/overview/

What is …

- Linux - an open source operating system.

- Ubuntu - is a Linux operating system (a distribution of Linux)

- vi (Visual Editor) - is the default editor that comes with Linux/Unix
    - Command Mode - every character typed is a command that does something to the text file being edited
    - Insert Mode - every character typed is added to the text in the file