Containers in Linux

Introduction to Containers

Container is a light weight software which contains the code and all its dependencies so that the application runs quickly and reliably to one another.

Container is a combination of two kernel features:

CGroups + Namespace => Container

- Cgroups (Limits resource usage)
- Namespace (Isolate the process from one another)

Virtualization and Containerization

Both technologies isolate their application libraries and runtime resources from the host operating system or hypervisor and vice versa.

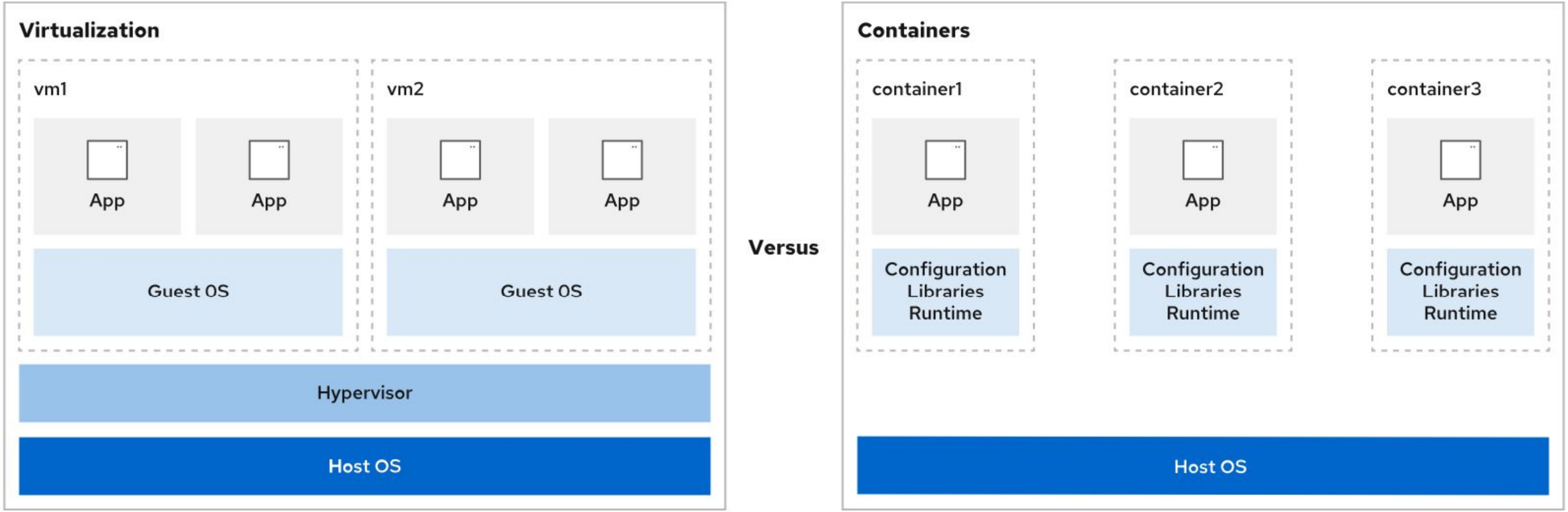


Figure 16.1: Comparison between virtualization and containerization

Advantages of Containers

- Containers are lightweight
  - less num of cpu/OS processes
  - less storage space (From 10MB onwards)
  - requires less memory to run
- Faster to deploy
- Quickly scale out multiple instances
- We can deploy higher num of instances in a system (1:400 C) compared to the virtual machines (1:40 VM)

Container consists

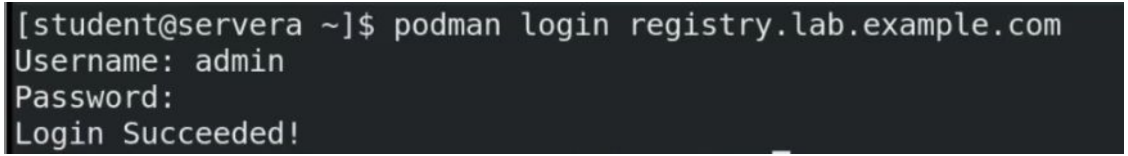
Container contains the following:

- Runtime Binaries (eg: OS commands, Java, Python, DotNet, MySQL)
- User code (.py .java .html .css .js .sql)
- Dependent code packages required to run the code

When we archive all these files packaged to form a container image

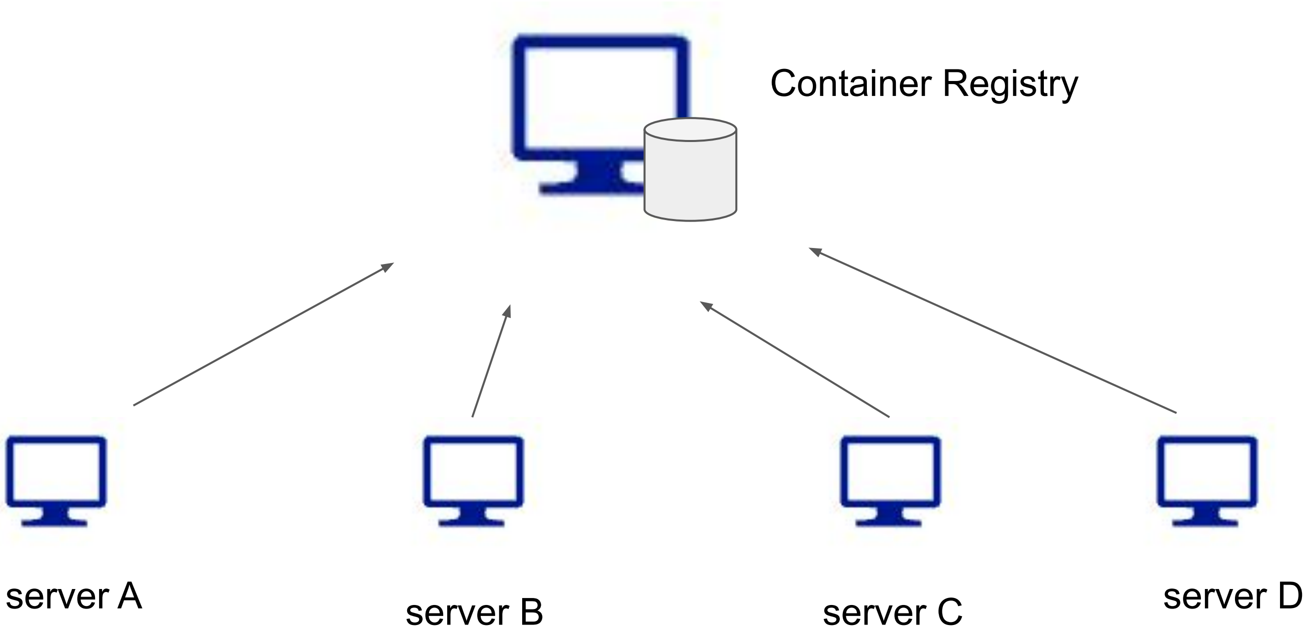
Container image will be stored in a centralized repository or hub called registry

Container registry



```
[student@servera ~]$ podman login registry.lab.example.com
Username: admin
Password:
Login Succeeded!
```

Registry is a centralized storage repository to store the Container images



Container Registry

server A

server B

server C

server D

Difference between an Image and Container

Container Image

- Just a package which contains source codes and runtime environment

  (Idle - Like a VM Image or ISO file which won’t consume cpu or memory)

Container

- Running instance of a Container image which consumes Memory and CPU

Container management tools

Red Hat Enterprise Linux provides a set of container tools that you can use to run containers in a single server.

- podman manages containers (start/stop) and container images.
- skopeo inspects, copies, deletes, and signs images.
- buildah creates container images.

Demo

- Install the container-tools package
- podman
- registry login
- Download the container Image from registry
- Verify the downloaded Images
- Launch container
- Working with the container