Containerisation using containers and Moby and Kubernetes Orchestration (5 Days)

By Dr. Vishwanath Rao

Note :

1. Training is not concentrated on Docker Desktop instead Rancher desktop is used
2. Moby dockerD is used instead on Google docker engine
3. Explains ContainerD engine for containerization.
4. Kubernetes is explained using Minikube and Rancher K3S

Pre Requisites

Proficiency with the Linux CLI. A broad understanding of Linux system administration.

Course Contents

Day 1

Introduction
* What can you use dockerD for?
* How dockerD fits into the development lifecycle
* How dockerD ensures consistency from development through UAT and staging, and on to production
* Example use cases of dockerD in the real world

The components of dockerD
* Underlying technology
* dockerD client and server
* Filesystem images
* Registries * Containers * Networking

Getting set up to start using dockerD
* Getting set up on Windows
* Trying out our first container
* Getting set up for production on Linux
* Tweaking your production environment for best performance

Container management
* Container naming
* Starting and stopping containers
* Attaching to a container
* Seeing what is happening in a container
* Running a process inside a container
* Daemonizing a container
* Automatic container restarts
* Deleting containers when we are finished with them

dockerD images and repositories
* dockerD images explained
* How dockerD images work
* Getting a list of images
* Searching for images on a repository * Pulling an image * Creating our own image
* Specify an image in a dockerD file
* Building dockerD file images
* Using the build cache for templating
* Viewing the image we have created
* Launching a container using our new image

Registries
* What is the dockerD hub?
* Pushing images to the dockerD hub
• Running your own internal dockerD registry
 * Testing the internal registry
dockerD Volumes Creating own volumes Using Volumes
dockerD Networks
Host network configuration Bridge network

Docker compose
- Start multiple services
- Linking containers
- Using networks
- Creating volumes
- Building local services

Introduction to Kubernetes
● Brief history of Deployment era
● Features of Containers
● Introduction to Kubernetes

● Working of Kubernetes (overview)
● Installation of Kubernetes

Kubernetes Architecture
● Understand Kubernetes Architecture
● What are Kubernetes objects?
● What are YAML files?
● Name, Namespaces, Labels & selectors , Annotations

Introduction to Pods and Services
● What are Pods?
● What are Replication Controllers?
● What is a Deployment?
● Introduction to Kube Services and its types
● Stateful and Demon sets
● Jobs
● Introduction to autoscaling
● The Horizontal Pod Autoscaler

Day 4
● The Kubernetes metrics registry
● Exposing metrics from your apps
● Installing and configuring Prometheus
● Understanding custom and external metrics adapters
● Tuning the Horizontal Pod Autoscaler

Introduction to Volumes
● What are volumes?
● Types of volumes
● Persistent volumes
● Introduction to secrets
● Taints and tolerations
Day 5

Ingress, Dashboard and Kubernetes best security practices
● What is Ingress
● What is a Kubernetes Dashboard? ● Setting up Kubernetes Dashboard
● Security practices for Kubernetes

Monitoring
● Introduction to Federation
● Kubernetes Monitoring

Security