Dockers and Kubernetes Foundation
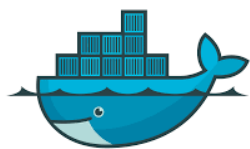
Duration
5 Days / 40 Hours

Who Should Attend
1. Software Developers
2. IT Professionals/Architects
3. IT Operations Engineers

Course Pre-Requisite
- Linux basic skills (like working files and directories)

Course Overview

Docker, once primarily known for revolutionizing application deployment, has evolved beyond mere app hosting. Today, it stands as the bedrock of modern software development, offering unparalleled versatility, especially in persistent data storage. Its ascent has significantly diminished the reliance on virtual machines, establishing Docker as the industry standard.

This comprehensive course dives into the fundamental aspects of Docker storage, demystifying concepts like configuring drivers, leveraging volumes, bind mounts, and optimizing cluster storage. Aspiring learners will grasp the nuances of harnessing Docker containers for seamless application deployment, scaling capabilities, and more.

Embark on your Docker journey by crafting and executing your maiden Docker container. Ascend further to grasp the intricacies of running containers in live production environments. You'll tackle critical orchestration challenges, mastering high availability, service discovery intricacies, and achieving reconciliation strategies to ensure optimal performance and stability.

Course Objectives

Upon completing this course, participants will be able to:
- Understand what Docker containers are
- Identify the benefits of using Docker containers
- Use Docker containers to deploy and scale applications
- Use Docker containers to manage Images and containers

- Perform debugging in Docker containers
- Work with Docker registries
- Run containers in production
- Solve problems of orchestration such as high availability, service discovery, and reconciliation
- Deploy and configure Kubernetes clusters
- Manage Pod's services and replication controller

Course Outline

Module 1: Understanding Docker
- What is Virtualization
- What are Containers
- Containerization and virtualization differences
- Case study: 100 developer environments
- Difference between Windows and Linux containers
- Docker ecosystem and components

Module 2: Installing Docker
- Installing Docker on Centos 7
- Install Docker on Windows 2016 server

Module 3: Containers on Ubuntu Docker host
- Deploy, login, exit container
- List, start, stop, restart containers
- Where containers are stored
- Working with container hostnames
- Working on multiple containers
- Container stats and inspect
- Container networking
- Deleting containers

Module 4: Containers on Win-2016 server Docker host
- Install Docker on win 2016 server
- Win container Deploy, Login, exit container
- List, Start, Stop, restart containers
- where containers are stored
- working with container hostnames
- working on multiple containers
- Container's inspection
- Deleting containers

Module 5: Docker Images
- Introduction to Docker Images
- Docker hub – create your account

- Explore and pull images from the docker hub
- Docker commit Build and Push Your own image
- Launch container using your own image
- Build Your own image using docker file
- Integrate docker hub accounts with GitHub account to build image

Module 6: Docker Networking
- Linux Docker host default Networking
- Linux container networking
- Docker host and container port mapping
- List, create, inspect, and remove new networks
- Launch container in the desired network
- Attach a container to two networks

Module 7: Docker Volumes
- Introduction to Docker volumes
- Launch a container with a volume attached
- Recovering volume

Module 8: Linked Containers
- Creating webapp container
- Creating MySQL DB container
- Connect web app with MySQL DB

Module 9: Docker Compose
- Creating Docker compose file (WordPress and DB)
- Docker compose operations

Module 10. Kubernetes architecture
- What is Kubernetes
- Master node Kubernetes components overview
- Minion node Kubernetes components overview
- Why Kubernetes

Module 11. Kubernetes cluster Install and configure (Hands-on lab by students)
- Deploy 4 virtual machines running centos7 OS
- SSH to VM1 and configure it Kubernetes master node
- SSH to VM2 and configure it Kubernetes Minion node-01
- Perform Kubernetes essential commands

Module 12. Create a manage POD, Deployment, and replication controller (Hands-on lab by students)
- POD creation, login, delete
- Launch PODS with CPU and memory reservation
- Launch PODS with volume
- Deployment creation, access deployment
- Expose deployment behind a load balancer

- Perform rolling updates for deployments
- Perform liveliness Probes on PODS
- Kubernetes services and endpoints
- Configmap
- Cronjob
- Taints and tolerations
- Helm charts (write your own and helm chart and deploy)
- Kubernetes secrets (security)
- Node affinity

Module 13. Cloud Managed Kubernetes service
- Azure Kubernetes service overview
- Azure Kubernetes service – Labs on deploying Kubernetes cluster
- Amazon Elastic Kubernetes service overview
- Amazon Elastic Kubernetes service – Labs on deploying Kubernetes cluster
- Google Kubernetes engine - overview
- Google Kubernetes engine – Labs on deploying Kubernetes cluster