

Docker Certified Associate

Duration: 5 Days

Skill Level: Beginners on container technology

Hands-On Format: This hands-on class is approximately 80/20 lab to lecture ratio, combining engaging lecture, demos, group activities and discussions with comprehensive machine-based practical programming labs and project work.

Domain 1: Orchestration

- Complete the setup of a swarm mode cluster, with managers and worker nodes
- Describe and demonstrate how to extend the instructions to run individual containers into running services under swarm.
- Describe the importance of quorum in a swarm cluster.
- Describe the difference between running a container and running a service.
- Interpret the output of "docker inspect" commands.
- Convert an application deployment into a stack file using a YAML compose file with "docker stack deploy"
- Manipulate a running stack of services.
- Describe and demonstrate orchestration activities.
- Increase the number of replicas.
- Add networks, publish ports.
- Mount volumes.
- Describe and demonstrate how to run replicated and global services.
- Apply node labels to demonstrate placement of tasks.
- Describe and demonstrate how to use templates with "docker service create".
- Identify the steps needed to troubleshoot a service not deploying.
- Describe how to deploy containerized workloads as Kubernetes pods and deployments.
- Describe how to provide configuration to Kubernetes pods using configMaps and secrets.

Domain 2: Image Creation, Management, and Registry

- Describe the use of Dockerfile.
- Describe options, such as add, copy, volumes, expose, entry point.
- Identify and display the main parts of a Dockerfile.
- Describe and demonstrate how to create an efficient image via a Dockerfile.
- Describe and demonstrate how to use CLI commands to manage images, such as list, delete, prune, rmi.
- Describe and demonstrate how to inspect images and report specific attributes using filter and format
- Describe and demonstrate how to tag an image.
- Describe and demonstrate how to apply a file to create a Docker image.
- Describe and demonstrate how to display layers of a Docker image
- Describe and demonstrate how to modify an image to a single layer.
- Describe and demonstrate registry functions.
- Deploy a registry.
- Log into a registry.

- Utilize search in a registry.
- Push an image to a registry.
- Sign an image in a registry.
- Pull and delete images from a registry.

Domain 3: Installation and Configuration

- Describe sizing requirements for installation.
- Describe and demonstrate the setup of repo, selection of a storage driver, and installation of the Docker engine on multiple platforms
- Describe and demonstrate how to set up swarm, configure managers, add nodes, and setup the backup schedule.
- Describe and demonstrate how to create and manage user and teams.
- Describe and demonstrate how to configure the Docker daemon to start on boot.
- Describe and demonstrate how to use certificate-based client-server authentication to ensure a Docker daemon has the rights to access images on a registry.
- Describe the use of namespaces, cgroups, and certificate configuration.
- Describe and interpret errors to troubleshoot installation issues without assistance

Domain 4: Networking

- Describe the Container Network Model and how it interfaces with the Docker engine and Network.
- Describe the different types and use cases for the built-in network drivers.
- Describe and demonstrate how to create a Docker bridge network for developers to use for their containers.
- Describe and demonstrate how to publish a port so that an application is accessible externally.
- Identify which IP and port a container is externally accessible on.
- Compare and contrast “host” and “ingress” publishing modes.
- Describe and demonstrate how to configure Docker to use external DNS.
- Describe and demonstrate how to use Docker to load balance.
- Describe and demonstrate how to deploy a service on a Docker overlay network.
- Describe and demonstrate how to troubleshoot container and engine logs to resolve connectivity issues between containers.
- Describe how to route traffic to Kubernetes pods using ClusterIP and NodePort services.
- Describe the Kubernetes’ container network model.

Domain 5: Security

- Describe security administration and tasks.
- Describe the process of signing an image.
- Describe default engine security.
- Describe swarm default security.
- Kubernetes RBAC
- Kubernetes Network Policy
- Managing Capabilities of Containers

Domain 6: Storage and Volumes

- Identify the correct graph drivers to uses with various operating systems.
- Describe and demonstrate how to configure devicemapper.
- Compare and contrast object and block storage and when they should be used.
- Describe how an application is composed of layers and where these layers reside on the filesystem.
- Describe the use of volumes are used with Docker for persistent storage.
- Describe and demonstrate how storage can be used across cluster nodes.
- Describe how to provision persistent storage to a Kubernetes pod using persistentVolumes.
- Describe the relationship between container storage interface drivers, storageClass, persistentVolumeClaim and volume objects in Kubernetes.