**Week 1 DevOps training**

**Topics**

* What is Docker?

Docker enables developers to easily pack, ship, and run any application as a lightweight, portable, self-sufficient container, which can run virtually anywhere.

* How does Docker work?

When used on linux, Docker uses the resource isolation features of the [Linux kernel](https://en.wikipedia.org/wiki/Linux_kernel) (such as [cgroups](https://en.wikipedia.org/wiki/Cgroups" \o ") and kernel [namespaces](https://en.wikipedia.org/wiki/Linux_namespaces)) and a [union-capable file system](https://en.wikipedia.org/wiki/Union_mount) (such as [OverlayFS](https://en.wikipedia.org/wiki/OverlayFS" \o "OverlayFS))[[12]](https://en.wikipedia.org/wiki/Docker_(software)#cite_note-select-storage-driver-12) to allow containers to run within a single Linux instance

* Benefits of Docker

Eliminate the “it works on my machine”

Docker reduces deployment to seconds.

It is supported natively on multi-cloud platforms.

It ensures your applications and resources are isolated and segregated.

* Basic Commands of dockers

docker run

docker compose

docker build

docker exec

docker container prune

* Install docker on your machine

<Lab Work>

* What are docker images?

A Docker image contains application code, libraries, tools, dependencies and other files needed to make an application run

* What are docker containers?

A Docker container is a virtualized run-time environment where users can isolate applications from the underlying system

Images can exist without containers, whereas a container needs to run an image to exist.

* Create and build docker file

<Lab Work>

* What is docker compose

A tool/command for defining and running multi-container Docker application

* Docker volumes

Volumes are the preferred mechanism for persisting data generated by and used by Docker containers

* Docker swarm

Docker swarm is a container orchestration tool that is similar to kubernetes.

* Deploy Nginx

<Lab Work>

* What is Kubernetes

Kubernetes is an open-source container-orchestration system for automating computer application deployment, scaling, and management.

* Main features of kubernetes

Automated rollouts & rollback

Automated Scheduling

Horizontal Scaling & Load Balancing

* Basic Architecture of kubernetes (Master-node architecture, Pods, Ingress, Egress etc)

<Lab Work>

* How to use Kubernetes?

<Lab Work>

* Minikube installation

<Lab Work>

**Reference links:**

1. <https://www.youtube.com/playlist?list=PLhW3qG5bs-L8EU_Oocu6RkNPpYpaamtXX>
2. <https://youtu.be/wi-MGFhrad0>
3. https://hub.docker.com/

**Labs:**

1. Install Docker
2. Install minikube
3. Write docker file for LAMP & LEMP
4. Write docker file for docker-compose LAMP/LEMP
5. By using kubectl command start kubernetes dashboard and deploy some basic services (Any)