DevOps Phase -2: KUBERNETES & PYHTON

## Introduction to Docker & Kubernetes

* Understanding Container Runtime Environments.
* Working with YAML files for creating manifests.
* Deploying Docker and understanding Docker components like Engine, Networks, Images & Registries.
* Creating custom container images with Dockerfile
* Why Kubernetes & Understanding Kubernetes architecture and Components.
* Understanding the Kubernetes Component Connectivity.
* Studying significance of API-Server, ETCD, Kube-Scheduler, Controllers, Kubelet & Kube-Proxy.
* Understanding Kubernetes High Availability.

**Deploying & Managing Kubernetes using KOPS**

* What is Kubernetes Operations (KOPS)?
* Deploying Kubernetes Production Grade Kubernetes Cluster with on AWS with KOPS.
* Understanding components of KOPS.
* Scaling the Kubernetes Cluster using KOPS.
* Manipulating KOPS configuration for reducing the bill.
* Accessing Kubernetes cluster with Kubeconfig
* Running Kubernetes basic cluster commands.

**Working with Kubernetes POD’s & Deployments**

* Running Kubectl Commands vs. Deploying Manifests
* Overview about POD, Deployment, ReplicaSet, Service & Namespaces.
* Deploying, Managing & Troubleshooting PODs.
* Deep dive through POD, POD Components, POD-Sidecar, kube-scheduler life cycle.
* Managing PODs with EXEC, port-forwarding, POD Metadata & POD Environment variables.
* Disadvantages of running PODS and Intro to Deployments.
* Deep dive with Deployments, Replica Set & Replication Controller.
* Differences and use cases of Replica Set & Daemonset.

**Creating and Integrating Kubernetes Services**

* Understating Kubernetes Service and its importance.
* Deep dive on Kubernetes Services and understanding Traffic Flow.
* Creating ClusterIP, NodePort, LoadBalancer & Headless Service.
* Understanding & Creating Liveness & Readiness Probes.
* Understanding and Creating Ingress Controllers and Ingress Services.
* Configure AWS LoadBalancer with Ingress controllers.

**Kubernetes Advance Scheduling**

* Understanding Labels & Annotations
* Configuring Labels & Annotations at Node & PODs.
* Understanding how Taints and Tolerations work.
* Configuring Node Taints and POD Tolerations.
* Understanding and Configuring Node Affinity.
* Understanding and Configuring POD Affinity.

**Storage with Kubernetes**

* Understanding Kubernetes Persistence and Non-Persistent Storage.
* Creating non-persistent volumes - emptydir, gitrepo & host-path.
* Deep dive in to Kubernetes Persistence Volumes (PV).
* Creating Persistent Volume Claims (PVC) with Persistence Volumes.
* Understanding Kubernetes Storage Classes and Dynamic Volume Provisioning.

**Kubernetes ConfigMaps & Secrets**

* Passing command-line variables containers.
* Setting environment variables for containers.
* Intro to ConfigMaps.
* Decoupling configuration with ConfigMap
* Working with sensitive data in Kubernetes.
* Creating and using Secrets in Kubernetes.

**Securing Kubernetes Cluster**

* How authentication works in Kubernetes.
* Deepdive in to Kubernetes Namespaces.
* Configuring user access to the cluster.
* Creating and working with service accounts.
* Understanding RBAC in Kubernetes.
* Creating Role and Role Bindings.
* Creating ClusterRoles and ClusterRoleBindings.
* Understanding Blue-Green Deployments & Rolling Updates.

**Troubleshooting & Updating Kubernetes Cluster**

* Working with logs in Kubernetes.
* Working with Master and Worker Node Failure.
* Find and retrieve information about the cluster components.
* Performing Rolling Update with KUBECTL with no downtime & challenges with KUBECTL rolling updates.
* Performing Rolling Update with KUBECTL with no downtime & challenges with KUBECTL rolling updates.
* Running KUBECTL cheat sheet commands.

**Monitoring & Logging & Cluster Maintenance**

* Monitoring Cluster Components.
* Working with Logs and application logs.
* Performing cluster upgrade.
* Backup and Restore of Cluster.

**Working with Azure Kubernetes Services(AKS)**

* Understanding Azure AKS Architecture
* Deploying Azure AKS Cluster
* Understanding Node Pools, Scaling and Upgrading.
* AKS Cluster Access and Azure RBAC
* CI & CD Deployment with Azure DevOps.

**Working with AWS Elastic Kubernetes Services(EKS)**

* Understanding AWS EKS Architecture
* Deploying workloads on EKS Cluster.
* RBAC on AWS EKS.

**Additional Kubernetes Applications**

* Helm Package Manager
* Jenkins Integration
* Kubernetes Certified Administration(CKA) Certification Details.

Python Programming for DevOps Engineers

**Installing & Configuring Python**

* Installing Python for the Lab.
* Which IDE I need to use?
* Using IPython for Practice.
* Running your first python code.
* Understanding print and pretty print modules.
* Getting help in python.
* AWS Boto3 Module installation for Python Practice.

**Python Data structures**

* Declaring variables in Python.
* Understanding different data types in python with examples.
* Working with Python Strings and manipulating them.
* Working with Python Lists and Intro to List Comprehension.
* Manipulating lists with List Methods.
* Python Sets and Tuples.
* Python Dictionaries and accessing data inside dicts.
* Retrieve information from AWS and create Strings, List, Dicts.

**Python Operators**

* Overview of Python Operators.
* Arithmetic operators in Python
* Comparison operators
* Logical operators
* Assignment operators
* Special operators
  + Identity operators
  + Membership operators

**Python Conditions & Loops**

* If Conditions in Python
* Testing IF conditions on AWS with Boto3
* Loops with FOR & WHILE
* Testing FOR & WHILE with Boto3
* Control loops with Break & Continue & Pass
* List Comprehensions with AWS Boto3.

**Python Functions**

* Purpose of Functions?
* Why functions are called first class?
* Creating functions with parameters.
* Using Functions to retrieve data from AWS using Boto3.

**Exceptions in Python**

* Built-in Error in Python
* Raising Exceptions in Python
* Python Debugger

**Python Classes & Inheritance**

* What are Python Classes & Methods
* Understanding Python Magic Methods
* How python inheritance works?

**My Other Courses**

AWS Curriculum:

[https://docs.google.com/document/d/1ujIRC6sSulxagSw7LbA1mSUiDs2BoZ6v85Ypmg68JEI/edit?usp=sharing](https://docs.google.com/document/d/1ujIRC6sSulxagSw7LbA1mSUiDs2BoZ6v85Ypmg68JEI/edit?usp=sharing" \t "_blank)

Azure Curriculum:

[https://drive.google.com/file/d/1gCNbDbEGTLCQwlSH4PvXQPaf5FL8Ycj3/view?usp=sharing](https://drive.google.com/file/d/1gCNbDbEGTLCQwlSH4PvXQPaf5FL8Ycj3/view?usp=sharing" \t "_blank)

DevOps Curriculum:

[https://drive.google.com/file/d/1H92BoC4nVKrv3crN1J2yy0zE8ZlEorEj/view?usp=sharing](https://drive.google.com/file/d/1H92BoC4nVKrv3crN1J2yy0zE8ZlEorEj/view?usp=sharing" \t "_blank)

My YouTube Channel:

<https://www.youtube.com/user/sreeharshav/>