Day 1

1. What is the cloud?
2. Cloud Computing Architecture
3. Cloud Computing Terminology
4. Manage services with the Azure portal
5. Monitoring
    1. Logs
    2. Alerts
    3. Query Log - Kusto query language
6. Azure Security
        1. RBAC
        2. Manage Access
        3. Lock
7. Docker Fundamentals
    1. Introduction to Docker
    2. Why Docker?
    3. What Problems Docker Solve?
    4. Docker Architecture
    5. Terminologies

6. Installation
7. Pull Docker Image from Docker Hub and Run it locally
8. Build Docker Image locally, Test and Push it to Docker Hub
9. Essential Commands Overview

8. Kubernetes Fundamentals
9. Kubernetes Architecture
10. Create Azure AKS Cluster
    1. Introduction to Azure AKS Cluster
    2. Create AKS Cluster
    3. Explore AKS Cluster using kubectl and Azure Mgmt Console
    4. Setup Azure CLI
    5. Deploy Sample Application and Test

Day 2

11. Kubernetes Pods

a. Create a Pod, Understand about it and delete pod

12. Load Balancer Service

. Create Pod and LoadBalancer Service and Test

a. Interact with pods, logs, connect to pod and cleanup

13. Kubernetes ReplicaSets

. Create ReplicaSet and Test it

a. Expose ReplicaSet as Service, Test Scalability & High Availability

14. Kubernetes Deployments

. Create Deployment, Expose with a Service, Scale Up and Down Replicas

a. Understand how to Update Deployments in Kubernetes

b. Understand how to rollback deployments in Kubernetes

c. Understand how to pause and resume deployments in kubernetes

15. Services in Kubernetes

. Services Demo with Cluster IP and Load Balancer Services

16. Kubernetes Fundamentals with YAML

. YAML Basics

a. Create Pod Definition using YAML

b. Create Load Balancer Service using YAML

c. Create ReplicaSet and LoadBalancer Service with YAML and Test

d. Create Deployment and LoadBalancer Service with YAML and Test

e. Create Backend Application k8s Deployment and Service

f. Create frontend application k8s deployment and service and test

17. Helm Chart

. Introduction

a. How to create, install and manage?

18. AKS Storage - Azure Disks

. Introduction

a. Create Storage class Kubernetes Manifest

b. Create Persistent Volume Claim Manifest, Deploy SC, PVC and Test

c. Create ConfigMap Kubernetes Manifest

d. Create MySQL Kubernetes Deployment Manifest

e. Create MySQL Kubernetes Cluster IP Service, Deploy, Test and CleanUp

f. Use AKS provisioned Storage Class instead of Custom Storage Class

g. Create User Management Web Application (UWB) k8s Deployment Manifest

h. Create UWB k8s Service, Deploy, Test and CleanUp

Day 3

19. AKS Storage - Azure MySQL Database

a. Introduction

b. Create Azure MYSQL Database

c. Create k8s External Name Service, Deploy and Test mysql connection

d. Review UWB App k8s Manifests, Deploy, Test and CleanUp

20. Kubernetes Secrets

. Implement Kubernetes Secrets

21. AKS Storage - Azure Files

. Azure Files Introduction

a. Review k8s manifests for Azure Files - Storage Class and PVC

b. Deploy App, Upload Static Files, Test and CleanUp

22. Ingress - Basics

. Introduction

a. Create Static Public IP in Azure dedicated for Ingress

b. Install Ingress

c. Create k8s Ingress Manifest, Review k8s App Manifests and Deploy

d. Deploy k8s Ingress and App manifests, Test and CleanUp

23. Ingress - Context Path based Routing

. Ingress Context Path based Routing Introduction

a. Review CPR k8s manifests

b. Deploy k8s CPR Ingress, App manifests, Test and CleanUp

24. Azure DNS Zones - Delegate a DNS Domain to Azure DNS

. Azure DNS Zones Introduction

a. Create DNS Zone in Azure, Change Nameservers at DomaiN Registrar

25. Ingress - ExternalDNS for Azure DNS on AKS

. ExternalDNS Introduction

a. Review ExternalDNS k8s Manifests

b. Create Managed Service Identity to allow access to DNS Zones

c. Deploy ExternalDNS, Review & Deploy Apps, Test and CleanUp

26. Ingress - Domain Name based Routing

. Ingress Domain Named based Routing Introduction

a. Review k8s DNR Manifests, Deploy, Test and CleanUp

27. Kubernetes Namespaces

. Introduction

a. Implement Namespaces with kubectl - Imperative

b. Namespaces Limit Range Introduction

c. Namespaces Limit Range Implementation

Day 4

28. Azure AKS Virtual Nodes

a. Understand what is Virtual Kubelet and Azure Container Instances ACI

b. Create AKS Cluster with Virtual Nodes Add On Enabled and Verify the same

c. Deploy Sample App on Azure Virtual Nodes, Scale the App and Clean-Up

29. Azure Container Registry for Azure AKS

. Introduction

a. Azure ACR & AKS Integration

b. Create ACR and Build and Run Docker Image Locally

c. Attach ACR to AKS Cluster, Deploy Sample App Test and Clean Up

d. Pull ACR Images with Service Principal Introduction

e. Create ACR and Build and Run Docker Image Locally

f. Create Azure Service Principal and Kubernetes Secret

g. Review k8s manifests, Deploy, Test and CleanUp

h. Schedule on Virtual Nodes by pulling using SP and test

30. Configuration of multiple nodes

31. Enable auto/manual scaling in AKS

32. Azure DevOps - Build Docker Image and Push to Azure Container Registry

. Introduction to Azure DevOps Build Pipeline & Azure Container Registry

a. Create a Local Repository, Check-In Files and Push to Remote Github Repo

b. Create ACR, Azure DevOps Organization and Project

c. Create a Build Pipleline to Build and Push Docker Image to ACR

d. Make changes to index.html to V2, commit and push changes

e. Understand Namespaces in Azure Container Registry using Azure DevOps Pipeline

f. Review Docker Build and Push Pipeline code on a high level

33. Azure DevOps - Build Docker Image, Push to ACR and Deploy to Azure AKS

. Deploy to AKS

a. Create Pre-built pipeline named Deploy to AKS

b. Review Build and Deploy Stage Logs, Kubernetes Pods Access Application

c. Deploy New Version of Application and review Pipeline stages Build, Deploy

d. Review Pipeline code for Build and Deploy Stages

e. Clean-Up Kubernetes App1 Workloads

34. Azure DevOps - Create Pieplines from scratch using Starter Pipeline

. Introduction to Azure Starter Pipelines and Pipeline Key Concepts

a. Create Semi customized Pipeline for Build, Push Docker Image to ACR

b. Create using Starter Pipeline for Build, Push Docker Image to ACR

Day 5

35. Azure DevOps - Release Pipelines

a. Introduction

b. Create k8s Namespaces and Service Connections to k8s Namespaces

c. Create Release Pipeline with Dev Stage and Map Artifacts from CI Build

d. Verify Image name in k8s manifest and Check-In new code

e. Change the Docker Image tag to Build.SourceVersion and test

f. Create QA, Staging and Prod Stages in Release Pipelines

g. Check-In new code, review entire Build and Release Pipelines

36. Azure AKS - HTTP Application Routing Add On

. Introduction

a. Enable HTTP Application Routing AddOn on AKS Cluster

b. Deploy Sample Application with Ingress Service and Test

c. Clean Up Apps and Disable the Add-On

37. Provision Azure AKS Cluster with Terraform

. Terraform Basics Introduction

a. Install Pre-requisistes, Terraform, AZ CLI, set Azure Subscription

b. Understand Terraform Providers and Terraform Init Command

c. Understand Terraform plan, validate and apply commands

d. Make changes and apply like add tags, modify resource group

e. Understand Terraform refresh command in combination with tfstate files

f. Understand terraform show, providers and destroy commands

g. Introduction to Terraform Language Basics

h. Understand Terraform Language Syntax

i. Understand Terraform Input Variables

j. Understand Terraform Output Values

k. Deploy Terraform manifests and Verify

l. Migrate Terraform Local State to Azure Storage Account

m. Provision Azure AKS Cluster Introduction

n. Create SSH Keys, Windows Admin & Password

o. Create Log Analytics Workspace and Azure AD Group Terraform Resources

p. Create AKS Cluster Manifest

q. Create Outputs, Provision AKS Cluster and Verify Outputs

r. Verify Access using default AKS Admin

s. Create Windows and Linux Nodepools

t. Deploy Sample Apps, test and execute terraform destroy

u. Provision AKS Cluster with Custom VNET

v. Verify the cluster, nodepools and deploy sample apps, test and destroy

Day 6 (Half Day)

38. Using Terraform & Azure DevOps Provision Azure AKS cluster

a. Introduction to provisioning Azure AKS Cluster using Terraform and Azure

b. Install Azure DevOps Terraform Plugins in Azure DevOps Organization

c. Setup Github repository local and remote

d. Create Service Connection, Fix AD Permissions, Create SSH Key

e. Create Pipeline with Terraform Validate Stage

f. Introduction to Deploy Dev AKS Cluster Deployment Job in Stage 2 of Pip

g. Write Pipeline code to Provision Dev AKS Cluster

h. Verify Dev AKS Cluster Provisioning is successful using Azure DevOps Pipeline

i. Create QA envionment related Pipeline code and Provision QA environment

j. Verify QA Environment

k. Add new nodepool, check-in code, monitor pipeline and verify cahnges

l. Clean-Up

39. Azure AKS Autoscaling - Cluster Autoscaler

. Introduction to Cluster Autoscaler

a. Create AKS Cluster with Autoscaling enabled using Azure AKS CLI

b. Deploy Sample Application to Test cluster autoscaler and Clean-Up

40. Azure AKS Autoscaling - Horizontal Pod Autoscaler

. Introduction

a. Create HPA imperatively and also review HPA Declarative k8s manifest

b. Generate load to demonstrate HPA in action and CleanUp