

GC-AGKE

ARCHITECTING WITH GOOGLE KUBERNETES ENGINE



DURATION	LEVEL	TECHNOLOGY	DELIVERY METHOD	TRAINING CREDITS
3 Days	Intermediate	Google Cloud	VILT & ILT	NA

INTRODUCTION

In this course students learn how to deploy and manage containerised applications on Google Kubernetes Engine (GKE) and the other tools on Google Cloud.

This course features a combination of lectures, demos, and hands-on labs to help you explore and deploy solution elements - including infrastructure components like pods, containers, deployments, and services - along with networks and application services. You'll also learn how to deploy practical solutions, including security and access management, resource management, and resource monitoring.

AUDIENCE PROFILE

This course is intended for the following participants:

- Cloud Architects, Administrators, and SysOps/DevOps Personnel
- Individuals using Google Cloud to create new solutions or to integrate existing systems, application environments, and infrastructure with the Google Cloud.

PREREQUISITES

Completed Google Cloud Fundamentals: Core Infrastructure or have equivalent experience.

COURSE OBJECTIVES

This course teaches participants the following skills:

- Understand how software containers work.
- Understand the architecture of Kubernetes.
- Understand the architecture of Google Cloud.
- Understand how pod networking works in Google Kubernetes Engine.
- Create and manage Google Kubernetes Engine clusters using the Cloud Console and `gcloud/ kubectl` commands.
- Launch, roll back and expose jobs in Kubernetes.
- Manage access control using Kubernetes RBAC and Cloud IAM.
- Manage pod security policies and network policies.
- Use Secrets and ConfigMaps to isolate security credentials and configuration artifacts.
- Understand Google Cloud choices for managed storage services.
- Monitor applications running in Google Kubernetes Engine.

COURSE CONTENT

Lesson 1: Introduction to Google Cloud

Topics

- Use the Google Cloud Console.

- Use Cloud Shell.
- Define cloud computing.
- Identify Google Cloud compute services..

- Understand regions and zones
- Understand the cloud resource hierarchy.

- Administer your Google Cloud resources.

Objectives

- Identify Google Cloud services and their function.
- Choose the right Google Cloud services to create your own Cloud solution.

Activity

- 1 Lab.
- 1 Quiz.

Lesson 2: Containers and Kubernetes in Google Cloud

Topics

- Create a container using Cloud Build.
- Store a container in Container Registry.
- Understand the relationship between Kubernetes and Google Kubernetes Engine (GKE).
- Understand how to choose among Google Cloud Compute platforms.

Objectives

- Create a Container using Cloud Build.
- Store a Container in Container Registry.
- Compare and Contrast Kubernetes and GKE features.

Activities

- 1 Lab.
- 1 Quiz.

Lesson 3: Kubernetes Architecture

Topics

- Understand the architecture of Kubernetes: pods, namespaces.
- Understand the control-plane components of Kubernetes.
- Create container images using Google Cloud Build.
- Store container images in Google Container Registry.
- Create a Kubernetes Engine cluster.

Objectives

- Conceptualize the Kubernetes Architecture.

- Deploy a Kubernetes Cluster using GKE.
- Deploy Pods to a GKE Cluster.
- View and Manage Kubernetes Objects.
- Conceptualize the Migrate for Anthos process.

Activities

- 1 Lab.
- 1 Quiz.

Lesson 4: Kubernetes Operations

Topics

- Work with the kubectl command.
- Inspect the cluster and Pods.
- View a Pods console output.
- Sign in to a Pod interactively.

Objectives

- Work with the Kubectl Command.
- Inspect the Cluster and Pods.
- View a Pod's Console Output.
- Sign in to a Pod Interactively.

Activities

- 2 Labs.
- 1 Quiz.

Lesson 5: Deployment, Jobs, and Scaling

Topics

- Deployments.
- Ways to create deployments.
- Services and scaling.
- Updating deployments.
- Rolling updates.
- Blue/green deployments.
- Canary deployments.
- Managing deployments.
- Jobs and CronJobs.
- Parallel Jobs.
- CronJobs.
- Cluster scaling.
- Downscaling.
- Node pools.
- Controlling pod placement.
- Affinity and Anti-Affinity.

- Pod placement example.
- Taints and tolerations.
- Getting software into your cluster.

Objectives

- Create and Use Deployments.
- Create and Run Jobs and CronJobs.
- Scale Clusters Manually and Automatically.
- Configure Node and Pod Affinity.
- Get Software into your Cluster with Helm Charts and Kubernetes Marketplace.

Activities

- 3 Labs.
- 1 Quiz.

Lesson 6: GKE Networking

Topics

- Introduction.
- Pod networking.
- Services.
- Finding services.
- Service types and load balancers.
- How load balancers work.
- Ingress resource.
- Container-native load balancing.
- Network security.

Objectives

- Create Services to expose applications that are running within Pods.
- Use load balancers to expose Services to external clients.
- Create Ingress resources for HTTP(S) load balancing.
- Leverage container-native load balancing to improve Pod load balancing.
- Define Kubernetes network policies to allow and block traffic to Pods.

Activities

- 2 Labs.
- 1 Quiz.

Lesson 7: Persistent Data and Storage

Topics

- Volumes.
 - Volume types.
 - The PersistentVolume abstraction.
 - More on PersistentVolumes.
 - StatefulSets.
 - ConfigMaps.
 - Secrets.
- Objectives**
- Use Secrets to isolate security credentials.
 - Use ConfigMaps to isolate configuration artifacts.
 - Push out and roll back updates to Secrets and ConfigMaps.
 - Configure Persistent Storage Volumes for Kubernetes Pods.
 - Use StatefulSets to ensure that claims on persistent storage volumes persist across restarts.
- Activities**
- 2 Labs.
 - 1 Quiz.

Lesson 8: Access Control and Security in Kubernetes and Kubernetes Engine

Topics

- Understand Kubernetes authentication and authorisation.
- Define Kubernetes RBAC roles and role bindings for accessing resources in namespaces.
- Define Kubernetes RBAC cluster roles and cluster role bindings for accessing cluster-scoped resources.
- Define Kubernetes pod security policies.
- Understand the structure of IAM.

- Define IAM roles and policies for Kubernetes Engine cluster administration.
- Objectives**
- Define IAM roles and policies for GKE.
 - Define Kubernetes RBAC roles and role bindings.
 - Define Kubernetes pod security policies.

Activities

- 2 Labs.
- 1 Quiz.

Lesson 9: Logging and Monitoring

Topics

- Use Cloud Monitoring to monitor and manage availability and performance.
- Locate and inspect Kubernetes logs.
- Create probes for wellness checks on live applications.

Objectives

- Create forensic logs for systems monitoring.
- Monitor your system performance from different vantage points.
- Create probes for wellness checks on live applications.

Activities

- 2 Labs.
- 1 Quiz.

Lesson 10: Using Google Cloud Managed Storage Services from Kubernetes Applications

Topics

- Understand pros and cons for using a managed storage service versus self-managed containerised storage.

- Enable applications running in GKE to access Google Cloud storage services.
- Understand use cases for Cloud Storage, Cloud SQL, Cloud Spanner, Cloud Bigtable, Cloud Firestore, and BigQuery from within a Kubernetes application.

Objectives

- Understand use cases for Cloud Storage within a Kubernetes application.
- Understand use cases for Cloud SQL and Cloud Spanner within a Kubernetes application.
- Understand use cases for Datastore within a Kubernetes application.
- Understand use cases for Cloud Bigtable within a Kubernetes application.

Activities

- 1 Lab.
- 1 Quiz.

Lesson 11: Using CI/CD with Google Kubernetes Engine

Topics

- CI/CD overview
- CI/CD for Google Kubernetes Engine
- CI/CD Examples

Objectives

- Create a continuous delivery pipeline using Cloud Build and start it manually or automatically with a code change.
- Implement a canary deployment that hosts two versions of your application in production for release testing.

Activities

- 1 Lab.

ASSOCIATED CERTIFICATIONS & EXAM

There is no international certification linked to this course currently.