

Architecting with Google Kubernetes Engine

The best course to learn how to deploy and manage containerized applications on Google Kubernetes Engine (GKE)

2 jours / 14h

Learning outcomes

- Create and manage workloads in Google Kubernetes Engine.
- Explain how pod networking works in Google Kubernetes Engine.
- Define and work with different Kubernetes storage abstractions.
- Describe and manage authentication, authorization, and security in Google Kubernetes Engine.
- Monitor applications running in Google Kubernetes Engine.
- Explore Google Cloud managed storage services options.
- Configure CI/CD pipelines for Google Kubernetes Engine.

Target audience

- 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 Google Cloud.

Prerequisites

Completed "[Getting Started with Google Kubernetes Engine](#)" or have equivalent experience

Course Outline

Module 01: Workloads: Deployments and Jobs

Topics

- Creating deployments.
- Inspecting deployments.
- Updating deployments.
- Adopting other deployment strategies.
- Using Jobs and Cronjobs
- Cluster scaling.
- Controlling Pod placement with labels and affinity rules.
- Controlling Pod placement with taints and tolerations.
- Getting software into your cluster.

Objectives

- Define, configure, inspect, manage, and update Deployments.
- Define what Jobs and CronJobs are in GKE, and explore relevant use cases. Create and run Jobs.
- Explain how to scale clusters manually and automatically.
- Configure node and pod affinity.

Activities

- Quiz
- (Lab) Creating Google Kubernetes Engine Deployments

Module 02 : Google Kubernetes Engine Networking

Topics

- Pod networking
- Kubernetes Services
- Service type and load balancers
- Ingress
- Container-native load balancing

- Network policies

Objectives

- Explore Kubernetes networking, including Pod and cluster networking.
- Create services to expose to applications running within Pods.
- Configure load balancers to expose services to external clients. Explore container-native load balancing in GKE.
- Configure Google Kubernetes Engine networking.

Activities

- Quiz
- (Lab) Configuring Google Kubernetes Engine (GKE) Networking

Module 03: Persistent Data and Storage

Topics

- Volumes
- Ephemeral volumes
- Durable volumes
- Statefulsets
- Configmaps
- Secrets

Objectives

- Define and work with Kubernetes storage abstractions.
- Run and maintain sets of pods using StatefulSets.
- Use ConfigMaps to decouple configuration from Pods.
- Manage and store sensitive access and authentication data.
- Configure persistent storage for Google Kubernetes Engine.

Activities

- Quiz
- (Lab) Configuring Persistent Storage for Google Kubernetes Engine

Module 04: Access Control and Security in Kubernetes and Google Kubernetes Engine

Topics

- Explore Kubernetes authentication and authorization.

- Define Kubernetes RBAC and how it works with IAM to secure GKE clusters.
- Configure Workload Identity to access Google Cloud services from within GKE.
- Secure GKE with Pod Security Standards and Pod Security Admission.
- Implement Role-Based Access Control with GKE.

Objectives

- Authentication and authorization
- Kubernetes role-based access control
- Workload Identity
- Kubernetes control plane security
- Pod security

Activities

- Quiz
- (Lab) Securing Google Kubernetes Engine with Cloud IAM and Pod Security Admission

Module 05 : Google Kubernetes Engine Logging and Monitoring

Topics

- Cloud Observability
- Cloud Logging
- Cloud Monitoring
- Inspecting logs with the kubectl command
- Inspecting logs with Cloud Logging and logging agents

Objectives

- Identify the tools included in the Google Cloud Observability .
- Configure the Google Cloud operations suite to monitor and manage the availability and performance.
- Inspect logs using the kubectl command.
- Inspect Kubernetes logs using Google Cloud Observability.
- Configure GKE-native Monitoring and Logging.

Activities

- Quiz
- Lab: Configuring GKE-Native Monitoring and Logging

Module 06: Using Google Cloud Managed Storage Services with Google Kubernetes Engine

Topics

- Using Google Cloud services.
- Using Cloud Storage.
- Using Google Cloud databases
- Using Cloud SQL and SQL Auth Proxy.
- Comparing storage options.

Objectives

- Contrast managed storage services with self-managed storage.
- Identify use cases for Cloud Storage for Kubernetes applications.
- Compare the range of Google Cloud managed database services.
- Explore Cloud SQL Auth Proxy and how it connects to Cloud SQL from within GKE.
- Use Cloud SQL with Google Kubernetes Engine.

Activities

- Quiz
- (Lab) Using Cloud SQL with Google Kubernetes Engine and Workload Identity

Module 07: Using CI/CD with Google Kubernetes Engine

Topics

- What is CI/CD?
- CI/CD pipeline construction
- CI/CD tools available in Google Cloud
- Best practices for using CI/CD on Google Cloud

Objectives

- Define continuous integration and continuous delivery and identify why it is important.
- Examine CI/CD pipelines and how they can optimize app releases.
- Explore first-party and third-party CI/CD tools supported by Google Cloud.
- Explore Google's best practices for a GKE CI/CD pipeline.

Activities

- Quiz