



Google Kubernetes Engine for Developers Essentials

Course description

In this comprehensive course, developers will gain the essential knowledge and practical skills required to effectively build, deploy, manage, and scale containerized applications on Google Kubernetes Engine (GKE). You will learn how to leverage GKE's powerful features to streamline your development workflows, ensure application reliability, and optimize resource utilization. This course covers everything from fundamental Kubernetes concepts and GKE architecture to advanced topics like persistent storage, networking, security, monitoring, and CI/CD integration, all with a strong focus on developer-centric operations.

- Course level: Intermediate
- Duration: 2 days

Activities

This course includes presentations, hands-on labs, demonstrations, and group exercises.

Course objectives

In this course, you will learn to:

- Summarize core Kubernetes concepts and their implementation within GKE

- Create and manage GKE clusters and node pools
- Deploy, update, and manage containerized applications using Kubernetes Deployments
- Expose applications using Kubernetes Services and Ingress controllers
- Manage application configuration and secrets securely
- Implement persistent storage solutions for stateful applications on GKE
- Configure networking policies and secure applications within GKE
- Monitor, log, and troubleshoot applications and GKE clusters using Google Cloud tools
- Integrate GKE into continuous integration and continuous deployment (CI/CD) pipelines
- Apply best practices for developing and operating applications on GKE

Intended audience

This course is intended for software developers and engineers who want to:

- Deploy and manage their applications on Google Cloud's managed Kubernetes service
- Improve their understanding of container orchestration and Kubernetes
- Migrate existing applications to GKE or develop new cloud-native applications
- Enhance their DevOps skills with a focus on containerized workloads
- Architects and technical leads seeking to understand GKE's capabilities for development teams

Prerequisites

We recommend that attendees of this course have:

- Basic understanding of containerization concepts (e.g., Docker)
- Familiarity with command-line tools and Linux environments
- Fundamental knowledge of Google Cloud Platform (GCP) services (e.g., IAM, Cloud Shell)
- Basic programming experience in any modern language (e.g., Python, Node.js, Go)

Course outline

Module 1: Introduction to GKE and Kubernetes Fundamentals

- Containerization revisited: Docker and its ecosystem

- Introduction to Kubernetes: Architecture and core components (Master, Nodes, Pods, Deployments)
- Why GKE? Benefits, managed services, and integration with GCP
- GKE Cluster types: Autopilot vs. Standard
- Creating and managing GKE clusters and node pools
- Demo: Setting up your first GKE cluster

Module 2: Deploying and Managing Applications

- Kubernetes YAML Manifests: Pods, Deployments, ReplicaSets
- Deploying stateless applications: web servers, APIs
- Managing application lifecycles: rollouts, rollbacks, updates
- Exposing applications: Services (ClusterIP, NodePort, LoadBalancer)
- Understanding Ingress for external HTTP(S) access
- Hands-on Lab: Deploying and Exposing a Sample Microservice Application

Module 3: Scaling, Resiliency, and Configuration

- Horizontal Pod Autoscaler (HPA) for automatic scaling
- Vertical Pod Autoscaler (VPA) for resource optimization
- Liveness and Readiness Probes for application health checks
- Managing application configuration with ConfigMaps
- Securing sensitive data with Kubernetes Secrets
- Hands-on Lab: Implementing Autoscaling and Managing Configuration with ConfigMaps and Secrets

Module 4: Persistent Storage for Stateful Applications

- Introduction to Persistent Volumes (PV) and Persistent Volume Claims (PVC)
- StorageClasses in GKE: types and provisioning
- Deploying stateful applications with StatefulSets
- Using persistent disks (e.g., pd-standard, pd-ssd) with GKE
- Hands-on Lab: Deploying a Database (e.g., MySQL) with Persistent Storage

Module 5: GKE Networking and Security Deep Dive

- Kubernetes networking model: Pod-to-Pod, Pod-to-Service communication
- Controlling network traffic with Network Policies
- Role-Based Access Control (RBAC) in Kubernetes

- GKE security features: Workload Identity, private clusters, security best practices
- Google Cloud Armor for DDoS protection and WAF
- Demo: Implementing Network Policies and RBAC for a Multi-tier Application

Module 6: Monitoring, Logging, and Troubleshooting

- Overview of Cloud Monitoring and Cloud Logging for GKE
- Collecting metrics and logs from GKE clusters and applications
- Creating custom dashboards and alerts
- Common troubleshooting strategies for Pods, Services, and Deployments
- Using kubectl commands for debugging (e.g., logs, describe, exec)
- Hands-on Lab: Monitoring Application Health and Troubleshooting Common Issues

Module 7: CI/CD Integration and Development Best Practices

- Integrating GKE with CI/CD pipelines: Cloud Build, GitLab CI, Jenkins X
- Helm charts for packaging and deploying applications
- Resource requests and limits for optimal scheduling
- Image management and vulnerability scanning with Artifact Registry
- Implementing GitOps principles with GKE
- Hands-on Lab: Automating Deployments to GKE using Cloud Build and Helm

Module 8: Advanced GKE Topics and Course Wrap-up

- GKE Autopilot: Benefits and considerations for developers
- Cost optimization strategies for GKE workloads
- Service Mesh with Anthos Service Mesh (overview)
- Extending Kubernetes with Custom Resources and Operators (brief)
- Next steps: Advanced GKE features and professional certifications
- Course summary and Q&A

Your course overview ends here.
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About CloudThat

Established in 2012, CloudThat is an award-winning company and the first in India to offer cloud training and consulting services for individuals and enterprises worldwide. Recently, it won Google Cloud's New Training Partner of the Year Award for 2025, becoming the first company in the world in 2025 to hold awards from all three major cloud giants: AWS, Microsoft, and Google. CloudThat notably won consecutive AWS Training Partner of the Year (APJ) awards in 2023 and 2024 and the Microsoft Training Services Partner of the Year Award in 2024, bringing its total award count to an impressive 12 awards in the last 8 years.

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