Training Course on Cloud-Native GIS Applications on Google Cloud Platform

Professional Development Training Course Outline

Category	GIS	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Training Course on Cloud-Native GIS Applications on Google Cloud Platform provides GIS professionals and developers with the essential skills to design, develop, and deploy **scalable, high-performance Geographic Information System (GIS) applications** leveraging the robust and **cloud-native services** offered by **Google Cloud Platform (GCP)**. Participants will gain hands-on experience with key GCP services, **geospatial data management**, and modern **cloud architectural patterns** to transform traditional GIS workflows into efficient, **distributed, and cost-effective solutions**. This course emphasizes **practical application** and **real-world case studies**, enabling learners to harness the full potential of cloud computing for advanced geospatial analysis and visualization.

In today's data-driven world, the demand for **real-time geospatial insights** and the ability to process **massive spatial datasets** necessitates a shift from on-premise infrastructure to **cloud-native architectures**. Google Cloud provides a powerful suite of tools and services, including **BigQuery GIS**, **Cloud Storage**, **Google Kubernetes Engine (GKE)**, and **Vertex AI**, that are ideally suited for building **resilient and agile GIS solutions**. This training will equip participants with the knowledge to **optimize geospatial workflows**, enhance **data collaboration**, and unlock new possibilities for **location intelligence** across various industries, from **urban planning** and **environmental monitoring** to **logistics** and **disaster management**.

Programme Curriculum

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Course Duration

5 days

Course Objectives

1. **Architect** and **deploy** scalable **Cloud-Native GIS solutions** on Google Cloud Platform.
2. Effectively manage and process **large-scale geospatial datasets** using **BigQuery GIS** and **Cloud Storage**.
3. Implement **serverless geospatial functions** with **Cloud Functions** and **Cloud Run** for event-driven GIS workflows.
4. Leverage **Google Kubernetes Engine (GKE)** for deploying and managing containerized **GIS microservices**.
5. Utilize **spatial SQL** and **Python** with **geospatial libraries** for advanced data manipulation and analysis.
6. Integrate **machine learning (ML)** capabilities, including **Vertex AI**, into GIS applications for predictive analytics and image classification.
7. Design and develop **interactive web GIS applications** using Google Maps Platform APIs and other front-end frameworks.
8. Implement **data governance** and **security best practices** for sensitive geospatial data on GCP.
9. Optimize **cost and performance** of GIS workloads in the cloud using GCP's monitoring and logging tools.
10. Explore and utilize **Cloud-Optimized GeoTIFF (COG)** and **GeoParquet** for efficient data access.
11. Understand **Continuous Integration/Continuous Deployment (CI/CD)** pipelines for automated GIS application deployment.
12. Build **real-time geospatial analytics** solutions using **Cloud Pub/Sub** and **Dataflow**.
13. Apply **DevOps principles** to manage the lifecycle of cloud-native GIS applications.

Organizational Benefits

- **Enhanced Scalability & Performance:** Leverage Google Cloud's elastic infrastructure to handle massive datasets and concurrent users, eliminating on-premise limitations.

- **Reduced Operational Costs:** Optimize resource utilization with pay-as-you-go pricing, serverless computing, and managed services, leading to significant cost savings.
- **Accelerated Innovation:** Empower teams to rapidly develop, deploy, and iterate on new geospatial applications and services, fostering faster time-to-market.
- **Improved Data Collaboration & Accessibility:** Centralize geospatial data in the cloud, enabling seamless collaboration across departments and remote teams.
- **Increased Data Security & Compliance:** Benefit from Google Cloud's robust security features, global compliance certifications, and built-in data governance tools.
- **Better Decision-Making:** Integrate advanced analytics and machine learning to derive deeper insights from spatial data, leading to more informed strategic decisions.
- **Future-Proofing Geospatial Infrastructure:** Adopt cutting-edge cloud-native technologies, ensuring long-term adaptability and competitiveness.

Target Audience

1. GIS Analysts and Specialists.
2. Geospatial Developers
3. Data Scientists.
4. Cloud Architects.
5. IT Professionals
6. Urban Planners and Environmental Scientists.
7. Researchers and Academics
8. Project Managers.

Course Modules

Module 1: Introduction to Cloud-Native GIS and Google Cloud Platform

- Understanding Cloud-Native Principles for GIS.
- Overview of Google Cloud Platform (GCP) Core Services for Geospatial.
- Setting up your GCP Project and IAM for GIS Workloads.
- Cloud Computing vs. Traditional GIS Infrastructure.
- **Case Study:** Migrating a traditional desktop GIS project to a GCP-based cloud environment.

Module 2: Geospatial Data Storage and Management on GCP

- Storing and managing vector data with BigQuery GIS.
- Handling raster data and imagery with Cloud Storage.
- Leveraging Cloud SQL for relational geospatial databases.
- Exploring Cloud Firestore and Cloud Spanner for specific geospatial use cases.
- **Case Study:** Optimizing storage for a large-scale satellite imagery archive using Cloud-Optimized GeoTIFF (COG) and Cloud Storage.

Module 3: Geospatial Data Processing and Analysis with BigQuery GIS

- Introduction to Spatial SQL in BigQuery.
- Performing advanced spatial queries, joins, and aggregations.
- Analyzing large-scale point, line, and polygon datasets.
- Integrating external data sources with BigQuery GIS.
- **Case Study:** Analyzing urban mobility patterns using anonymized GPS data in BigQuery GIS to identify congestion hotspots.

Module 4: Serverless and Containerized GIS Applications

- Developing event-driven geospatial functions with Cloud Functions.
- Deploying containerized GIS microservices with Cloud Run.
- Introduction to Google Kubernetes Engine (GKE) for orchestrating GIS applications.
- Building scalable APIs for geospatial data access.
- **Case Study:** Creating a serverless application to automatically process newly uploaded drone imagery (raster data) in Cloud Storage and extract features.

Module 5: Advanced Geospatial Analytics with Python and ML

- Using Python with geospatial libraries (e.g., GeoPandas, Rasterio) on GCP.
- Integrating Vertex AI for geospatial machine learning tasks.
- Performing image classification and object detection on satellite imagery.
- Building predictive models for environmental monitoring.
- **Case Study:** Developing an ML model on Vertex AI to predict flood risk based on terrain data and historical rainfall.

Module 6: Web GIS Development with Google Maps Platform

- Introduction to Google Maps Platform APIs (Maps JavaScript API, Geocoding API).
- Building interactive web maps and custom visualizations.
- Integrating geospatial data from GCP into web applications.
- Designing user-friendly interfaces for spatial exploration.
- **Case Study:** Developing a public-facing web portal for visualizing real-time public transit data integrated with Google Maps and GCP backend.

Module 7: Data Pipelines and Real-time Geospatial

- Building automated data pipelines with Cloud Dataflow for ETL of geospatial data.
- Implementing real-time geospatial analytics with Cloud Pub/Sub.
- Monitoring and logging GIS applications with Cloud Monitoring and Cloud Logging.
- Cost optimization strategies for cloud-native GIS workloads.
- **Case Study:** Setting up a real-time system to monitor and visualize wildfire spread using satellite alerts ingested via Cloud Pub/Sub and processed by Dataflow.

Module 8: DevOps, Security, and Advanced Topics

- Implementing CI/CD for cloud-native GIS applications.
- Security best practices for geospatial data on GCP (IAM, VPC, encryption).
- Exploring advanced geospatial formats like GeoParquet and Zarr.
- Disaster recovery and high availability for GIS systems.
- **Case Study:** Designing a secure and resilient cloud architecture for a critical infrastructure mapping system, including automated deployment and monitoring.

Training Methodology

- Instructor-Led Sessions
- Hands-on Labs.
- Case Study Analysis.
- Live Demonstrations
- Group Activities & Discussions.
- Q&A Sessions.
- Online Resources.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

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