Training: Google Cloud
# Application Development with Cloud Run

Google Cloud

## TRAINING GOALS:

This course introduces you to fundamentals, practices, capabilities and tools applicable to modern cloud-native application development using Google Cloud Run. Through a combination of lectures, hands-on labs, and supplemental materials, you will learn how to design, implement, deploy, secure, manage, and scale applications on Google Cloud using Cloud Run

What you'll learn

- Gain detailed understanding of Cloud Run, Google Cloud's fully managed compute platform for deploying and scaling containerized applications quickly and securely.
- Write and migrate code your way using your favorite languages (Go, Python, Java, Ruby, Node.js, and more).
- Secure service to service communication based on service identities and grant applications only the permissions they need.
- Learn how to build highly available applications with low end-user latency, globally.
- Learn how to connect to, and persist data in the managed database offerings on Google Cloud.
- Understand how abstracting away all infrastructure management creates a simple developer experience.

Who this course is for:

- Cloud developers, API developers, customers and partners

## CONSPECT:

- Introducing Application Development with Cloud Run
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- Understanding Cloud Run
  - You can use any language, any library and any binary. Cloud Run expects your app (in a container image) to listen on a port and respond to HTTP requests.
  - Use a docker repository on Artifact Registry to store your images: Cloud Run only deploys from there.
  - Cloud Run uses autoscaling to handle all incoming requests



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ul. Tatarska 5, 30-103 Kraków, tel.: (12) 298 47 77
ul. Postępu 18B, 02-676 Warszawa, tel.: (22) 417 41 70
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- Pay for use pricing model
- No background tasks: Container lifetime is only guaranteed while handling requests
- There is no persistent storage: Store data downstream
- Cloud Run is portable (containers and Knative)

- Building Container Images
  - The contents of a container image (deep dive)
  - There are two ways to build container images - Buildpacks (hands-off) - Docker (you're in control)
  - Cloud Run supports both source-based and a container image based workflow
  - The most important considerations of building a secure container image
- Building Container Images
  - Container lifecycle - Idle vs serving - Shutdown lifecycle hook
  - Cold starts - Min instances
  - Container readiness
  - The service resource and what it describes
  - Configuring memory limits and CPU allocation
  - Deploying a new revision
  - Traffic steering (tagging, gradual rollouts)
- Configuring Service Identity and Authorization
  - Cloud IAM
  - Cloud Run
- Serving Requests
  - Custom Domains
  - Global Load Balancer - URL Map - Frontend - Backend services
  - Benefits and drawbacks of GLB over custom domain
  - Types of GLB Backends
  - Multi-region load balancing
  - Multi-regional applications challenges
  - Cloud CDN
- Using Inbound and Outbound Access Control
  - Ingress settings
  - Cloud Armor
  - Using Cloud IAM to protect services
  - VPC, VPC Access Connector
  - Egress settings
- Persisting Data
  - Understanding why you need to store data externally when running a workload on Cloud



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Run.

- Connect with Cloud SQL from Cloud Run - Understand how it works (managed Cloud SQL Proxy)
- Managing concurrency as a way to safeguard performance (understand why and when)
- Connecting with Memorystore
- VPC Connector - Challenges with scaling Memorystore (throughput)
- Briefly introduce Cloud Storage, Firestore and Cloud Spanner, while reinforcing how the client libraries use the built-in service account to connect
- Multi-region data storage (and what Spanner and Firestore can do for you)

- Implementing Service-to-Service Communication
  - Understanding Cloud Pub/Sub - Understanding topics, push subscriptions
  - -Idempotency (Handling retries and at-least-once invocation)
  - Event ID, design for resume, or use a lease
  - Handling undeliverable messages
  - How to asynchronously schedule a background task on a different service
  - Cloud Tasks, and when to choose it over Cloud Pub/Sub
  - Benefits of using Pub/Sub to pass messages over making sync RPC requests
  - Learn about services in Google Cloud with a built-in integration to push events to Pub/Sub (Cloud Build, Artifact Registry, Cloud Storage, IOT Core, BigQuery)
  - Cloud Scheduler to invoke services on a schedule.
  - CloudEvents
  - EventArc, and how to consume Audit logs
  - What to expect now, and how EventArc will develop over time
- Orchestrating and Automating Serverless Workflows
  - Conceptual overview of Cloud Workflows
  - Invoking and passing parameters
  - Understand steps and jumps
  - Defining, using and passing values with variables
  - Using the switch statement to add logic
  - Workflow visualization
  - Calling HTTPS endpoints
  - Calling an authenticated Cloud Run service
  - Example: polling API for completion

## REQUIREMENTS:

- Familiarity with Linux commands and command line interface.



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- Basic understanding of Google Cloud.
- Basic understanding of networking.
- Basic understanding of one or more programming languages like Go, Python, Java, Ruby, or Node.js.
- Basic understanding of shell scripts, YAML, JSON, HTTP, and TLS.

## Difficulty level



## CERTIFICATE:

The participants will obtain certificates signed by Google Cloud Platform.

## TRAINER:

Authorized Google Cloud Platform Trainer



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