

Data Engineering on Google Cloud

Cursusduur: 4 Dagen Cursuscode: GO5975 Trainingsmethode: Maatwerk

Beschrijving:

Get hands-on experience designing and building data processing systems on Google Cloud.

This course uses lectures, demos, and hands-on labs to show you how to design data processing systems, build end-to-end data pipelines, and analyze data.

This course covers structured, unstructured, and streaming data.

It is a combination of four sequences: Introduction to Data Engineering on Google Cloud Build Data Lakes and Data Warehouses with Google Cloud Build Batch Data Pipelines on Google Cloud Build Streaming Data Pipelines on Google Cloud

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Maatwerk

Global Knowledge biedt zowel standaard- als maatwerkcursussen die zijn afgestemd op uw wensen en die als besloten cursus op uw eigen locatie of onze locatie gevolgd kunnen worden.

Doelgroep:

Data engineers Database administrators System administrators

Doelstelling:

- In this course participants will learn:
- Design scalable data processing systems in Google Cloud.
- Differentiate data architectures and implement data lakehouse and pipeline concepts.
- Build and manage robust streaming and batch data pipelines.
- Utilize AI/ML tools to optimize performance and gain process and data insights.

Vereiste kennis en vaardigheden:

- Understanding of data engineering principles, including ETL/ELT processes, data modeling, and common data formats (Avro, Parquet, JSON).
- Familiarity with data architecture concepts, specifically Data Warehouses and Data Lakes.
- Proficiency in SQL for data querying.
- Proficiency in a common programming language (Python recommended).
- Familiarity with using Command Line Interfaces (CLI).
- Familiarity with core Google Cloud concepts and services (Compute, Storage, and Identity management).

Examens en certificering

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Vervolg cursussen:

No recommendation

Cursusinhoud:

Sequence 1: Introduction to Data Engineering on Google Cloud

Module 1: Data Engineering Tasks and Components

- Explain the role of a data engineer.
- Understand the differences between a data source and a data sink.
- Explain the different types of data formats.
- Explain the storage solution options on Google Cloud.
- Learn about the metadata management options on Google Cloud.
- Understand how to share datasets with ease using Analytics Hub.
- Understand how to load data into BigQuery using the Google Cloud console or the gcloud CLI.

Module 2: Data replication and migration

- Explain the baseline Google Cloud data replication and migration architecture.
- Understand the options and use cases for the gcloud command-line tool.
- Explain the functionality and use cases for Storage Transfer Service.
- Explain the functionality and use cases for Transfer Appliance.
- Understand the features and deployment of Datastream.

Module 3: The extract and load data pipeline pattern

- Explain the baseline extract and load architecture diagram.
- Understand the options of the bq command line tool.
- Explain the functionality and use cases for the BigQuery Data Transfer Service.
- Explain the functionality and use cases for BigLake as a non-extract-load pattern.
- Lab: BigLake: Qwik Star

Module 4: The extract, load, and transform data pipeline pattern

- Explain the baseline extract, load, and transform architecture diagram.
- Understand a common ELT pipeline on Google Cloud.
- Learn about BigQuery's SQL scripting and scheduling capabilities.
- Explain the functionality and use cases for Dataform.
- Lab: Create and Execute a SQL Workflow in Dataform

Module 5: The extract, transform, and load data pipeline pattern

Module 7: Introduction to modern data engineering and Google Cloud

- Compare and contrast data lake, data warehouse, and data lakehouse architectures.
- Evaluate the benefits of the lakehouse approach
- Lab: Using BigQuery to Do Analysis

Module 8: Building a data lakehouse with Cloud Storage, open formats, and BigQuery

- Discuss data storage options, including Cloud Storage for files, open table formats like Apache Iceberg, BigQuery for analytic data, and AlloyDB for operational data.
- Understand the role of AlloyDB for operational data use cases.
- Lab: Federated Query with BigQuery

Module 9: Modernizing Data Warehouses with BigQuery and BigLake

- Explain why BigQuery is a scalable data warehousing solution on Google Cloud.
- Discuss the core concepts of BigQuery.
- Understand BigLake's role in creating a unified lakehouse architecture and its integration with BigQuery for external data.
- Learn how BigQuery natively interacts with Apache Iceberg tables via BigLake.
- Lab: Querying External Data and Iceberg Tables

Module 10: Advanced lakehouse patterns and data governance

- Implement robust data governance and security practices across the unified data platform, including sensitive data protection and metadata management.
- Explore advanced analytics and machine learning directly on lakehouse data.

Module 11: Labs and best practices

- Reinforce the core principles of Google Cloud's data platform.
- Lab: Getting Started with BigQuery ML
- Lab: Vector Search with BigQuery

Sequence 3: Build Batch Data Pipelines on Google Cloud

Module 12: When to choose batch data pipelines

- Explain the critical role of a data engineer in developing and maintaining batch data

Module 14: Control Data Quality in Batch Data Pipelines

- Develop data validation rules and cleansing logic to ensure data quality within batch pipelines.
- Implement strategies for managing schema evolution and performing data deduplication in large datasets.
- Lab: Validate Data Quality in a Batch Pipeline with Serverless for Apache Spark (optional)

Module 15: Orchestrate and Monitor Batch Data Pipelines

- Orchestrate complex batch data pipeline workflows for efficient scheduling and lineage tracking.
- Implement robust error handling, monitoring, and observability for batch data pipelines.
- Lab: Building Batch Pipelines in Cloud Data Fusion

Sequence 4: Build Streaming Data Pipelines on Google Cloud

Module 16: Concept of streaming data pipelines

- Introduce the sequence learning objectives, and the scenario that will be used to bring hands on learning to building streaming data pipelines.
- Describe the concept of streaming data pipelines, challenges associated with it, and the role of these pipelines within the data engineering process.

Module 17: Streaming use cases and reference architectures

- Understand various streaming use cases and their applications, including Streaming ETL, Streaming AI/ML, Streaming Application, and Reverse ETL.
- Identify and describe common sample architectures for streaming data, including Streaming ETL, Streaming AI/ML, Streaming Application, and Reverse ETL.

Module 18: Product deep dives

- Pub/Sub and Managed Service for Apache Kafka: Define messaging concepts, know when to use Pub/Sub or Managed Service for Apache Kafka.
- Dataflow: Describe the service and challenges with streaming data, build and deploy a streaming pipeline.
- BigQuery: Explore various data ingestion

- Explain the baseline extract, transform, and load architecture diagram.
- Learn about the GUI tools on Google Cloud used for ETL data pipelines.
- Explain batch data processing using Dataproc.
- Learn to use Dataproc Serverless for Spark for ETL.
- Explain streaming data processing options.
- Explain the role Bigtable plays in data pipelines.
- Lab: Use Dataproc Serverless for Spark to Load BigQuery
- Lab: Creating a Streaming Data Pipeline for a Real-Time Dashboard with Dataflow

Module 6: Automation techniques

- Explain the automation patterns and options available for pipelines.
- Learn about Cloud Scheduler and workflows.
- Learn about Cloud Composer.
- Learn about Cloud Run functions.
- Explain the functionality and automation use cases for Eventarc.
- Lab: Use Cloud Run Functions to Load BigQuery

Sequence 2: Build Data Lakes and Data Warehouses with Google Cloud

- pipelines.
- Describe the core components and typical lifecycle of batch data pipelines from ingestion to downstream consumption.
- Analyze common challenges in batch data processing, such as data volume, quality, complexity, and reliability, and identify key Google Cloud services that can address them.

Module 13: Design and Build Scalable Batch Data Pipelines

- Design scalable batch data pipelines for high-volume data ingestion and transformation.
- Optimize batch jobs for high throughput and cost-efficiency using various resource management and performance tuning techniques.
- Lab: Build a Simple Batch Data Pipeline with Serverless for Apache Spark (optional)
- Lab: Build a Simple Batch Data Pipeline with Dataflow Job Builder UI (optional)

methods, use BigQuery continuous queries, BigQuery ETL, and reverse ETL, configure Pub/Sub to BigQuery streaming, architecting BigQuery streaming pipelines.

■ Bigtable: Describe the big picture of data movement and interaction, establish a streaming pipeline from Dataflow to Bigtable, analyze the Bigtable continuous data stream for trends using BigQuery, synchronize the trends analysis back into the user-facing application.

- Lab: Stream data with pipelines - Esports use case (optional)
- Lab: Use Apache Beam and Bigtable to enrich esports downloadable content (DLC) data
- Lab: Stream e-sports data with Pub/Sub and BigQuery
- Lab: Monitor e-sports chat with Streamlit

Module 19: Key takeaways

Extra informatie:

Official course book provided to participants.

Nadere informatie:

Neem voor nadere informatie of boekingen contact op met onze Customer Service Desk 030 - 60 89 444

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