Google BigQuery Fundamentals Training

Duration: **2 Day**

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The **Google BigQuery Fundamentals Training** course provides beginners with a practical introduction to **Google BigQuery architecture, data management, and essential analytical capabilities** within a cloud-based data warehouse environment.

The course introduces fundamental concepts such as **serverless data warehousing**, **columnar storage**, and the separation of storage and compute resources. Participants explore the **project, dataset, and table hierarchy**, create datasets, load data from **CSV and JSON files**, and write basic **SQL queries**.

The program also covers **data filtering, grouping, joining tables, creating views**, and working with public datasets. Participants learn to visualize query results and build simple reporting dashboards using **Looker Studio**.

Additional topics include **IAM access roles**, data security fundamentals, **BigQuery pricing models**, query cost estimation, and basic administrative operations through the **Google Cloud Console**.

Why Attend This Training?

Understand Serverless Data Warehousing

Explore **Google BigQuery's serverless architecture** and learn the principles of analyzing large datasets without setting up or maintaining infrastructure.

Perform Your First Data Loading and Querying Tasks

Gain practical experience in **loading CSV and JSON files**, creating tables, and executing **SQL queries** in BigQuery.

Understand BigQuery Costs

Learn how **storage and query costs** are calculated, explore different pricing options, and understand basic techniques for estimating costs before running queries.

Learning Approach

Participants complete practical exercises using **BigQuery Sandbox** or a dedicated **Google Cloud lab project**.

Hands-on activities include **creating datasets**, uploading sample **CSV files**, writing initial **SQL queries**, and transforming query results into charts using **Looker Studio**.

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Prerequisites

1. Prior Knowledge

No previous BigQuery or SQL experience is required. Basic computer skills and familiarity with **tables, rows, and columns** are sufficient.

2. Google Cloud Access

Hands-on exercises require an **instructor-provided lab project** or a **Google Cloud account with budget alerts configured**. A free trial account may also be used.

3. Computer and Internet Requirements

Participants need a **laptop**, a **modern web browser**, a **stable internet connection**, and access to **Google Cloud Shell**.

4. Recommended Preparation

Reviewing the relevant **BigQuery product documentation on Google Cloud** before the training may be helpful, but it is **not mandatory**.

Who Should Attend

The **Google BigQuery Fundamentals Training** course is suitable for individuals beginning their journey into cloud analytics and data warehousing, including:

- **Data Analysts**
- **Professionals New to Cloud Analytics**
- **Students**
- **IT Professionals**
- **Managers and Decision-Makers Involved in Data-Driven Processes**

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What You Will Learn

By the end of this training, participants will be able to:

- Explain **BigQuery architecture** and its scalable processing principles.
- Organize data by creating **datasets and tables**.
- Load data from **CSV and JSON files** into BigQuery tables.
- Write basic **SQL queries** and interpret their results.
- Analyze datasets using **grouping and joining operations**.
- Create basic visualization dashboards with **Looker Studio**.
- Manage dataset access using appropriate **IAM roles**.
- Apply fundamental techniques to estimate **query and storage costs**.

Training Outline

Day 1: BigQuery Architecture and Data Management

Day Objective: Understand BigQuery architecture, create datasets and tables, load data, and execute initial SQL queries.

Module 1: Data Warehousing Fundamentals

- Differences between **OLTP and OLAP**
- **Data warehouses, data lakes, and lakehouse** concepts
- **Columnar storage (Capacitor)**
- **Separation of storage and compute**
- **Serverless architecture** and the concept of **slots**
- Overview of **Dremel and Colossus**

Module 2: Projects, Datasets, and Tables

- **Project, dataset, and table hierarchy**
- **Dataset locations** and their immutability after creation
- Basic data types: **INT64, STRING, DATE, NUMERIC**
- **Native tables, external tables, and views**

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- **Table schemas** and descriptions
- Getting started with **BigQuery Sandbox**

Module 3: Loading Data into BigQuery

- Uploading **CSV and JSON files** through the Google Cloud Console
- Loading data from **Cloud Storage**
- **Automatic schema detection**
- Connecting **Google Sheets**
- Working with **public datasets**
- Identifying and interpreting **data loading errors**

Module 4: Writing Your First SQL Queries

- Using **SELECT, FROM, and WHERE**
- Sorting and limiting results with **ORDER BY** and **LIMIT**
- Aggregate functions: **COUNT, SUM, and AVG**
- Viewing and saving query results
- **Query history** and saved queries
- Understanding common **SQL query errors**

Day 2: Data Analysis, Visualization, and Administration

Day Objective: Analyze and visualize BigQuery data, manage access permissions, and understand cost estimation methods.

Module 1: Grouping and Joining Data

- **GROUP BY** and **HAVING**
- Basic **JOIN** operations
- Creating categories with **CASE WHEN**
- Introduction to **date functions**
- **Creating views**
- Saving query results as tables

Module 2: Data Visualization with Looker Studio

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- Connecting **BigQuery as a data source in Looker Studio**
- Creating **bar charts, line charts, pie charts, and tables**
- Applying **filters** and **date range controls**
- Sharing dashboards
- Exporting **BigQuery data to Google Sheets**
- Fundamental principles of effective **chart design**

Module 3: Access Management and Security

- **IAM roles:** dataViewer, dataEditor, and jobUser
- **Dataset-level access and sharing**
- Differences between **query execution permissions** and **table access permissions**
- Awareness of **sensitive data handling and masking**
- Monitoring activity using **Audit Logs**
- **Default encryption** and **Customer-Managed Encryption Keys (CMEK)**

Module 4: BigQuery Pricing and Next Steps

- **Storage and query pricing**
- **On-demand** and **capacity-based (Editions)** pricing models
- Estimating query costs using **Dry Run**
- **Free tier** and usage quotas
- Introduction to **Partitioning** and **Clustering**
- Overview of **BigQuery ML** and advanced learning topics