Data Warehousing with BigQuery: Storage Design, Query Optimization, and Administration

Category: AI, Data & Analytics | **Vendor:** Google Cloud

Duration: 24.00 hours (3 days) **19.5 CPD Hours** **Rating:** ⭐ 4.6 (5,878 reviews)

Course Information

Delivery Format: Instructor Led - Online

Course Overview

In this course, you learn about the internals of BigQuery and best practices for designing, optimizing, and administering your data warehouse. Through a combination of lectures, demos, and labs, you learn about BigQuery architecture and how to design optimal storage and schemas for data ingestion and changes. Next, you learn techniques to improve read performance, optimize queries, manage workloads, and use logging and monitoring tools. You also learn about the different pricing models. Finally, you learn various methods to secure data, automate workloads, and build machine learning models with BigQuery ML.

About This Course

In this course, you learn about the internals of BigQuery and best practices for designing, optimizing, and administering your data warehouse. Through a combination of lectures, demos, and labs, you learn about BigQuery architecture and how to design optimal storage and schemas for data ingestion and changes. Next, you learn techniques to improve read performance, optimize queries, manage workloads, and use logging and monitoring tools. You also learn about the different pricing models. Finally, you learn various methods to secure data, automate workloads, and build machine learning models with BigQuery ML.

Who Should Attend

Data analysts, data scientists, data engineers, and developers who perform work on a scale that requires advanced BigQuery internals knowledge to optimize performance.

Prerequisites & Entry Requirements

General Prerequisites:

Data Warehousing with BigQuery: Storage Design, Query Optimization, and Administration (DWBQ-SDQA)

Learning Outcomes

Upon successful completion of this course, participants will be able to:

- Describe BigQuery architecture fundamentals.
- Implement storage and schema design patterns to improve performance.
- Use DML and schedule data transfers to ingest data.
- Apply best practices to improve read efficiency and optimize query performance.
- Manage capacity and automate workloads.
- Understand patterns versus anti-patterns to optimize queries and improve read performance.
- Use logging and monitoring tools to understand and optimize usage patterns.
- Apply security best practices to govern data and resources.
- Build and deploy several categories of machine learning models with BigQuery ML.

Detailed Course Outline

Module 1 - BigQuery Architecture Fundamentals

Topics

- Introduction
- BigQuery Core Infrastructure
- BigQuery Storage
- BigQuery Query Processing
- BigQuery Data Shuffling

Objectives

- Explain the benefits of columnar storage.
- Understand how BigQuery processes data.
- Explore the basics of BigQuery’s shuffling service to improve query efficiency.

Activities

- Labs and demos

Module 2 - Storage and Schema Optimizations

Topics

- BigQuery Storage
- Partitioning and Clustering
- Nested and Repeated Fields
- ARRAY and STRUCT syntax
- Best Practices

Objectives

- Compare the performance of different schemas (snowflake, denormalized, and nested and repeated fields).
- Partition and cluster data for better performance
- Improve schema design using nested and repeated fields.
- Describe additional best practices such as table and partition expiration

Activities

- Labs and demos

Module 3 - Ingesting Data

Topics

- Data Ingestion Options
- Batch Ingestion
- Streaming Ingestion
- Legacy Streaming API

- BigQuery Storage Write API

- Query Materialization

- Query External Data Sources

- Data Transfer Service

Objectives

- Ingest batch and streaming data.

- Query external data sources.

- Schedule data transfers.

- Understand how to use Storage Write API.

Activities

- Labs and demos

Module 4 - Changing Data

Topics

- Managing Change in Data Warehouses

- Handling Slowly Changing Dimensions (SCD)

- DML statements

- DML Best Practices and Common Issues

Objectives

- Write DML statements.

- Address common DML performance problems and bottlenecks.

- Identify slowly changing dimensions (SCD) in your data and make updates.

Module 5 - Improving Read Performance

Topics

- BigQuery’s Cache
- Materialized Views
- BI Engine
- High Throughput Reads
- BigQuery Storage Read API

Objectives

- Explore BigQuery’s cache.
- Create materialized views.
- Work with BI Engine to accelerate your SQL queries.
- Use the Storage Read API for fast access to BigQuery-managed storage.
- Explain the caveats of using external data sources.

Activities

- Labs and demos

Module 6 - Optimizing and Troubleshooting Queries

Topics

- Simple Query Execution
- SELECTs and Aggregation
- JOINs and Skewed JOINs
- Filtering and Ordering
- Best Practices for Functions

Objectives

- Interpret BigQuery execution details and the query plan.
- Optimize query performance by using suggested methods for SQL statements and clauses.
- Demonstrate best practices for functions in business use cases.

Activities

- Labs and demos

Module 7 - Workload Management and Pricing

Topics

- BigQuery Slots
- Pricing Models and Estimates
- Slot Reservations
- Controlling Costs

Objectives

- Define a BigQuery slot.
- Explain pricing models and pricing estimations (BigQuery UI, bq dry_run, jobs API).
- Understand slot reservations, commitments, and assignments.
- Identify best practices to control costs.

Activities

- Demos

Module 8 - Logging and Monitoring

Topics

- Cloud Monitoring
- BigQuery Admin Panel
- Cloud Audit Logs
- INFORMATION_SCHEMA
- Query Path and Common Errors

Objectives

- Use Cloud Monitoring to view BigQuery metrics.
- Explore the BigQuery admin panel.
- Use Cloud Audit logs.
- Work with INFORMATION_SCHEMA tables to get insights for your BigQuery entities.

Activities

- Labs and demos

Module 9 - Security in BigQuery

Topics

- Secure Resources with IAM
- Authorized Views
- Secure Data with Classification
- Encryption
- Data Discovery and Governance

Objectives

- Explore data discovery using Data Catalog.
- Discuss data governance using DLP API and Data Catalog.
- Create IAM policies (e.g., authorized views) to secure resources.

- Secure data with classifications (e.g., row-level policies).

- Understand how BigQuery uses encryption.

Activities

- Labs and demos

Module 10 - Automating Workloads

Topics

- Scheduling Queries

- Scripting

- Stored Procedures

- Integration with Big Data Products

Objectives

- Schedule queries.

- Use scripting and stored procedures to build custom transformations.

- Describe how to integrate BigQuery workloads with other Google Cloud big data products.

Activities

- Demos

Module 11 - Machine Learning in BigQuery

Topics

- Introduction to BigQuery ML

- How to Make Predictions with BigQuery ML

- How to Build and Deploy a Recommendation System with BigQuery ML

- How to Build and Deploy a Demand Forecasting Solution with BigQuery ML

- Time-Series Models with BigQuery ML

- BigQuery ML Explainability

Objectives

- Describe some of the different applications of BigQuery ML.

- Build and deploy several categories of machine learning models with BigQuery ML.

- Use AutoML Tables to solve high-value business problems.

Activities

- Labs and demos, BigQuery Architecture Fundamentals, Storage and Schema Optimizations, Ingesting Data, Changing Data, Improving Read Performance, Optimizing and Troubleshooting Queries, Workload Management and Pricing, Logging and Monitoring, Security in BigQuery, Automating Workloads, Machine Learning in BigQuery

Skills You Will Learn:

- Describe BigQuery architecture fundamentals.
- Implement storage and schema design patterns to improve performance.
- Use DML and schedule data transfers to ingest data.
- Apply best practices to improve read efficiency and optimize query performance.
- Manage capacity and automate workloads.
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- Apply security best practices to govern data and resources.
- Build and deploy several categories of machine learning models with BigQuery ML.

Frequently Asked Questions

Q: What delivery options are available for Data Warehousing with BigQuery: Storage Design, Query Optimization, and Administration?

We offer multiple delivery formats:

- Live Instructor-Led Classroom Online (Virtual/Live Online)
- Traditional Instructor-Led Classroom Training (ILT)
- On-site delivery at your offices anywhere in United Kingdom
- Private dedicated courses customized for your team

Q: How many CPD hours does this course provide?

The 3-day Data Warehousing with BigQuery: Storage Design, Query Optimization, and Administration course provides up to 19.5 CPD hours of structured learning. CPD certificates can be provided upon request.

Q: What is the duration of the Data Warehousing with BigQuery: Storage Design, Query Optimization, and Administration training?

The training takes place over 3 day(s), with each day lasting approximately 24.00 hours including breaks for lunch and refreshments.

Q: Do you provide corporate training for Data Warehousing with BigQuery: Storage Design, Query Optimization, and Administration?

Yes, we provide corporate training, dedicated training, and closed classes for Data Warehousing with BigQuery: Storage Design, Query Optimization, and Administration. Training can take place anywhere in United Kingdom including London, Manchester, Birmingham, Edinburgh, or live online allowing teams from across United Kingdom or internationally to attend.

Q: What related terms do people search for?

Popular related searches include: Data Warehousing with BigQuery: Storage Design, Query Optimization, and Administration, Data Engineering, DWBQ-SDQA, Google Cloud, vILT, Data Warehousing with BigQuery

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Q: Why choose Nexus Human for Data Warehousing with BigQuery: Storage Design, Query Optimization, and Administration?

Nexus Human is recognized as one of the leading training providers. Our trainers have won multiple awards including:

- Small Firms Best Trainer Award
- National Training Partner of the Year (Ireland) - Multiple Years
- Global Top 30 Instructor Awards (2012, 2019, 2021)
- Tech Excellence Award Nominations
- Learning Performance Institute (LPI) External Training Provider Sponsor 2024

Q: Are there any discount codes available?

Yes! Use discount code **PENPAL5** when booking your Data Warehousing with BigQuery: Storage Design, Query Optimization, and Administration training. Please note that only one discount code can be used per booking and cannot be combined with other special offers.

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