



Migrating Amazon Redshift Users to BigQuery

Course description

In this course, you will learn about the fundamental concepts, methods, and strategies for successfully migrating data warehouses, users, and workloads from Amazon Redshift to Google Cloud's BigQuery. You will gain a solid understanding of the architectural differences, key migration challenges, and the tools and services available to facilitate a smooth transition. Additionally, you will acquire practical insights into schema conversion, data transfer, SQL dialect translation, and post-migration optimization. By the end of the course, you will be equipped to plan, execute, and manage a comprehensive Redshift to BigQuery migration project within your organization.

- Course level: Advanced
- Duration: 2 days

Activities

This course includes presentations, architectural discussions, hands-on labs, demonstrations, and group exercises focused on real-world migration scenarios.

Course objectives

In this course, you will learn to:

- Summarize the key architectural and operational differences between Amazon Redshift and Google BigQuery
- Discuss appropriate strategies and methodologies for planning a Redshift to BigQuery migration
- Describe how to effectively migrate data schemas and historical data from Redshift to BigQuery
- Recognize the challenges in SQL query translation and apply best practices for optimizing queries in BigQuery
- Explain how to manage user access, security, and integrate BigQuery with existing applications and BI tools
- Evaluate and implement performance tuning and cost optimization strategies in BigQuery post-migration

Intended audience

This course is intended for technical professionals involved in data platform management, migration, or modernization:

- Data Engineers
- Solution Architects
- Database Administrators (DBAs)
- Cloud Architects
- Data Analysts familiar with Redshift
- Technical Project Managers overseeing data initiatives

Prerequisites

We recommend that attendees of this course have:

- Proficient understanding of SQL (ANSI SQL and Redshift-specific SQL)
- Basic familiarity with cloud data warehousing concepts
- Experience working with either Amazon Redshift or Google BigQuery
- Fundamental knowledge of data warehousing principles

Course outline

Module 1: Understanding Redshift and BigQuery Architectures

- Amazon Redshift: Architecture, concepts, and key features
- Google BigQuery: Architecture, concepts, and key features (storage, compute, slots)

- Core differences: Pricing models, elasticity, data types, indexing vs. partitioning/clustering
- Key motivators and benefits for migrating from Redshift to BigQuery
- Demo: Exploring Redshift and BigQuery environments

Module 2: Migration Planning and Assessment

- Discovery and inventory: Data volumes, schema complexity, query patterns, user base, dependent applications
- Readiness assessment: Identifying migration blockers and defining success metrics
- Migration strategies: Lift & shift, phased migration, re-architecting approach
- Migration tooling overview: Google Cloud Migration Center, partner solutions, custom scripts
- Cost estimation and financial considerations for the migration

Module 3: Data Schema Conversion and Ingestion

- Schema migration process: Data type mapping, constraints, partitioning, clustering considerations
- Handling identity columns, primary/foreign keys, and distribution keys in BigQuery
- Data ingestion methods:
 - BigQuery Data Transfer Service for Redshift (preview)
 - Google Cloud Storage Transfer Service
 - Using gsutil and bq command-line tools
 - Dataflow and custom ETL pipelines
- Strategies for initial full data load vs. continuous incremental synchronization
- Hands-on Lab: Migrating Sample Redshift Schema and Ingesting Data into BigQuery

Module 4: SQL Translation and Query Migration

- Deep dive into SQL dialect differences: Redshift SQL vs. BigQuery Standard SQL
- Translating common Redshift-specific functions, UDFs, and stored procedures
- Best practices for optimizing query performance in BigQuery (partitioning, clustering, wildcards, cost analysis)

- Techniques for handling complex joins, window functions, and subqueries
- Hands-on Lab: Translating and Optimizing Redshift Queries for BigQuery Performance

Module 5: Security, Access Management, and Governance

- Managing identity and access in BigQuery: Google Cloud IAM roles and permissions
- Implementing row-level and column-level security in BigQuery
- Data encryption at rest and in transit, Customer-Managed Encryption Keys (CMEK)
- Auditing, logging, and monitoring BigQuery usage with Cloud Logging and Cloud Monitoring
- Data governance and compliance considerations (GDPR, HIPAA, etc.)

Module 6: Application and BI Tool Integration

- Connecting popular Business Intelligence (BI) tools (Looker, Tableau, Power BI, Data Studio) to BigQuery
- Integrating BigQuery with custom applications using client libraries and APIs
- Migrating existing ETL/ELT pipelines to leverage BigQuery's capabilities (e.g., Dataflow, Cloud Composer)
- Strategies for minimizing downtime and ensuring business continuity during cutover
- Demo: Connecting a Popular BI Tool to BigQuery and Running Reports

Module 7: Performance Optimization and Cost Management

- Advanced BigQuery performance tuning techniques: Materialized views, caching, query plans
- Monitoring BigQuery resource utilization and identifying bottlenecks
- Cost management strategies: On-demand vs. flat-rate pricing, slot management, budget alerts
- Optimizing storage costs through lifecycle management and data archiving
- Hands-on Lab: Analyzing BigQuery Query Performance and Implementing Cost Optimization Strategies

Module 8: Post-Migration Operations and Advanced Topics

- Developing an operational runbook for BigQuery management
- Backup, recovery, and disaster recovery strategies for BigQuery

- Exploring advanced BigQuery features: BigQuery ML, BigQuery GIS, BigQuery Omni
- Continuous improvement: Monitoring, alerting, and ongoing performance tuning
- Course summary, Q&A, and additional resources for continued learning

Your course overview ends here.
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About CloudThat

Established in 2012, CloudThat is an award-winning company and the first in India to offer cloud training and consulting services for individuals and enterprises worldwide. Recently, it won Google Cloud's New Training Partner of the Year Award for 2025, becoming the first company in the world in 2025 to hold awards from all three major cloud giants: AWS, Microsoft, and Google. CloudThat notably won consecutive AWS Training Partner of the Year (APJ) awards in 2023 and 2024 and the Microsoft Training Services Partner of the Year Award in 2024, bringing its total award count to an impressive 12 awards in the last 8 years.

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To know more about our cloud certification training, email at sales@cloudthat.com or call us at [+91-8880002200](tel:+91-8880002200) or [+1-8555588830](tel:+1-8555588830) for those from outside India.