



Migrating Snowflake Users to BigQuery

Course description

In this course, you will learn about the fundamental concepts, methods, and strategies for migrating user identities, authentication mechanisms, and authorization policies from Snowflake to Google BigQuery. You will gain a solid understanding of the architectural differences between Snowflake's and BigQuery's security models, including Identity and Access Management (IAM), role-based access control (RBAC), and data access policies. Additionally, you will learn about practical insights into planning, executing, and validating a user migration, addressing challenges such as translating complex role hierarchies, handling various authentication methods, and ensuring data security and compliance in the new BigQuery environment. By the end of the course, you will be able to develop a comprehensive migration plan and discuss implementation strategies for a successful transition of user access to BigQuery.

- Course level: Advanced
- Duration: 2 days

Activities

This course includes presentations, hands-on labs, architectural design exercises, demonstrations, and group discussions.

Course objectives

In this course, you will learn to:

- Summarize the architectural differences in user management, authentication, and authorization between Snowflake and BigQuery.
- Discuss appropriate migration strategies for various user types and access patterns from Snowflake to BigQuery.
- Describe how to migrate and configure identity providers (IdPs) and authentication mechanisms for BigQuery users.
- Recognize the types of authorization challenges encountered when translating Snowflake roles and grants to BigQuery IAM and data access policies, and identify their solutions.
- Explain implementation, testing, and project planning considerations for migrating user access to BigQuery, including security, governance, and auditing.

Intended audience

This course is intended for professionals with a strong background in data warehousing and cloud security, involved in cloud migration projects:

- Data Architects
- Cloud Engineers
- Data Platform Administrators
- Security Architects
- DevOps Engineers
- Project Managers overseeing cloud migrations

Prerequisites

We recommend that attendees of this course have:

- Strong understanding of SQL and data warehousing concepts.
- Familiarity with Snowflake's user management, roles, and access control.
- Basic knowledge of Google Cloud Platform (GCP) and BigQuery concepts.
- Experience with Identity and Access Management (IAM) principles in cloud environments.
- Understanding of Single Sign-On (SSO) and Identity Provider (IdP) concepts (e.g., SAML, OAuth).

Course outline

Module 1: Understanding Snowflake User and Access Management

- Snowflake User and Role Hierarchy
- Authentication mechanisms in Snowflake (username/password, SSO, OAuth)
- Granting privileges on Snowflake objects (databases, schemas, tables, warehouses)
- Security integrations and network policies in Snowflake
- Demo: Reviewing an existing Snowflake user and role setup with granted privileges.

Module 2: BigQuery IAM Fundamentals and Migration Strategy

- Introduction to Google Cloud IAM: Principals, Roles, Policies
- BigQuery-specific IAM roles (e.g., BigQuery Data Editor, BigQuery User)
- Dataset, table, and routine-level access control in BigQuery
- Comparing Snowflake's RBAC with BigQuery's resource-based IAM
- Migration approaches: Lift-and-shift, Phased, or Hybrid user migration
- Use case for class: Designing an initial migration strategy for an enterprise analytics team.

Module 3: Migrating Identity and Authentication

- Mapping Snowflake user identities to Google Cloud identities (Google accounts, service accounts, Cloud Identity/Workspace).
- Configuring Identity Providers (IdPs) for Google Cloud (e.g., Okta, Azure AD, Google Workspace as IdP).
- Implementing federated identity for BigQuery access via SSO.
- Handling native Snowflake users: creating corresponding GCP identities.
- Advanced IAM policies for multi-project and organizational access.
- Hands-on Lab: Setting up a custom BigQuery IAM role and integrating Google Cloud Identity for federated access.

Module 4: Translating Authorization and Access Control Policies

- Granular access controls in BigQuery: Dataset, table, and view-level permissions.
- Translating Snowflake roles and inherited privileges to BigQuery IAM custom roles and policies.
- Implementing Row-Level Security (RLS) in BigQuery to mirror Snowflake's secure views or RLS.
- Implementing Column-Level Security (CLS) in BigQuery using data masking and policy tags.
- Managing shared datasets and cross-project access for BigQuery users.

- Hands-on Lab: Translating a complex Snowflake role with specific table and column grants into BigQuery IAM custom roles, RLS, and CLS policies.

Module 5: Data Security, Governance, and Auditing in BigQuery

- BigQuery encryption at rest and in transit.
- Network security for BigQuery (VPC Service Controls, Private Service Connect).
- Best practices for BigQuery data governance and data catalog integration.
- Monitoring user activity and access patterns using BigQuery audit logs and Cloud Logging.
- Integrating with Google Cloud Security Command Center for security posture management.
- Compliance considerations (GDPR, HIPAA, etc.) for user access in BigQuery.

Module 6: User Onboarding, Testing, and Post-Migration Validation

- Defining a user onboarding strategy for BigQuery post-migration.
- Developing a comprehensive testing plan for user access and permissions.
- Validating query performance and user experience post-migration.
- Monitoring for unauthorized access attempts and security incidents.
- Strategies for rollback and contingency planning.
- Demo: Using BigQuery audit logs and Cloud Monitoring to validate user access and identify potential issues.

Module 7: Advanced Topics and Automation for BigQuery IAM

- Infrastructure as Code (IaC) for BigQuery IAM and access policies (e.g., Terraform, Cloud Deployment Manager).
- Automating user provisioning and de-provisioning workflows.
- Managing complex access patterns, dynamic roles, and attribute-based access control (ABAC) with custom solutions.
- Best practices for least privilege in BigQuery environments.
- Hands-on Lab: Capstone - Automating BigQuery IAM role and policy creation using Terraform.

Module 8: Course Wrap-up

- Key takeaways and best practices for Snowflake to BigQuery user migration.

- Next steps and additional resources for advanced BigQuery security and governance.
- Course summary and Q&A.

Your course overview ends here.
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