Migrating Enterprise Databases to Google Cloud Platform

Course Duration: 40 Hours **Course code: MEDGCP**

1. Course Overview

This five-day course focuses on planning, designing, and executing enterprise database migrations to Google Cloud Platform (GCP). You will learn how to assess existing database environments, choose appropriate migration strategies, and use Google Cloud tools such as Database Migration Service (DMS), BigQuery, Cloud SQL, and AlloyDB. The course also covers performance optimization, security, and post-migration validation.

2. What you'll learn?

By the end of the course, you will be able to:

- Understand GCP database services and their use cases
- Assess on-premises databases for cloud migration readiness
- Select appropriate migration strategies (lift-and-shift, re-platforming, modernization)
- Use Google Cloud Database Migration Service (DMS)
- Migrate databases to Cloud SQL, AlloyDB, and BigQuery
- Implement secure and reliable data transfer methods
- Optimize database performance in GCP
- Validate and troubleshoot post-migration issues
- Automate database migration workflows

3. Target Audience

- Database administrators (DBAs)
- Cloud architects and engineers
- Data engineers and analysts

- IT professionals involved in cloud migration projects
- System integrators and DevOps engineers

4. Pre-Requisites

Before taking this course, you should have:

- Basic knowledge of relational databases (MySQL, PostgreSQL, Oracle, SQL Server)
- Understanding of cloud computing concepts
- Familiarity with networking fundamentals
- Basic command-line and scripting knowledge (Python, Bash, or similar)

5. Course content

Module 1: Course Introduction

- Course objectives and structure
- Overview of database migration concepts
- Introduction to GCP ecosystem

Module 2: Overview of Google Cloud Database Services

- Introduction to Cloud SQL
- Introduction to AlloyDB
- Overview of BigQuery
- Cloud Spanner basics
- Choosing the right database service

Module 3: Database Migration Fundamentals

- Types of database migrations
- Migration strategies (Lift & Shift, Re-platforming, Refactoring)
- Challenges in enterprise database migration
- Migration lifecycle phases

Module 4: Assessing Migration Readiness

- Database discovery and assessment
- Identifying dependencies and risks
- Total Cost of Ownership (TCO) analysis
- Tools for assessment (Database Migration Assessment tools)

Module 5: Migration Planning and Design

- Designing migration architecture
- Network connectivity (VPN, Interconnect)
- Data consistency and downtime planning
- Backup and rollback strategies

Module 6: Introduction to Google Cloud Database Migration Service (DMS)

- Overview of DMS architecture
- Supported source and destination databases
- Setting up DMS
- Migration job configuration

Module 7: Migrating to Cloud SQL

- Preparing source databases
- Schema and data migration
- Continuous replication setup
- Cutover strategies

Module 8: Migrating to AlloyDB

- AlloyDB architecture and benefits
- Migration tools and techniques
- Performance tuning during migration
- Validation and testing

Module 9: Migrating to BigQuery

- ETL vs ELT approaches
- Data transfer services
- Loading and transforming data
- Query optimization in BigQuery

Module 10: Data Transfer and Integration Tools

- Using Google Cloud Storage for migration
- Transfer Appliance overview
- Dataflow for transformation
- Third-party migration tools

Module 11: Security and Compliance

- Identity and Access Management (IAM)
- Data encryption (at rest and in transit)
- Compliance and governance
- Secure migration practices

Module 12: Performance Optimization

- Query performance tuning
- Indexing strategies
- Monitoring with Cloud Monitoring and Logging
- Cost optimization techniques

Module 13: Automation and Scripting

- Automating migrations using gcloud CLI
- Infrastructure as Code (Terraform basics)
- Scheduling and orchestration
- CI/CD integration for database deployments

Module 14: Testing and Validation

- Data validation techniques
- Functional testing
- Performance benchmarking
- Troubleshooting migration issues

Module 15: Post-Migration Activities

- Monitoring and maintenance
- Backup and disaster recovery setup
- Optimization after migration
- Decommissioning legacy systems