Azure Cloud Database Administration and Management

Course Description: This program builds practical proficiency in deploying, configuring, securing, and optimizing cloud-based database services across Azure. Participants gain hands-on expertise with Azure SQL, PostgreSQL, MySQL, Cosmos DB, and DocumentDB, focusing on performance tuning, high availability, backup and disaster recovery, and enterprise-scale security.

Duration: 5 Days

Audience: Database administrators, cloud architects, and data engineers

Prerequisites: Basic SQL knowledge, familiarity with cloud concepts

Learning Objectives:

- Deploy and configure Azure database services (SQL, PostgreSQL, MySQL, Cosmos DB, DocumentDB)
- Implement enterprise-grade security, authentication, and compliance controls
- Optimize performance and scalability through tuning and monitoring
- Design and manage HA/DR strategies across services
- Apply real-world administration practices in enterprise scenarios

Content Coverage

Day 1 – Azure PostgreSQL Administration

Module 1: Flexible Server Architecture

- Architecture overview
- Single vs Flexible Server comparison

- Deployment options (portal, CLI, ARM templates)
- Scaling compute & storage
- Lab: Provision a Flexible Server instance

Module 2: Versioning & Extensions

- Supported PostgreSQL versions
- Upgrade strategies
- Common extensions (pg_stat_statements, PostGIS)
- Lab: Enable and use pg_stat_statements

Module 3: Server Setup & Parameter Tuning

- Initial provisioning & configuration
- work_mem, shared_buffers tuning
- Autovacuum configuration
- Lab: Tune parameters for workload optimization

Module 4: Security & Access Control

- Role-based access management
- SSL/TLS enforcement
- Network security (VNet integration, firewall rules)
- Lab: Configure SSL and role-based access

Module 5: High Availability & Backup

- Geo-redundant backups
- PITR (Point-in-time restore)
- HA architecture options

- Lab: Perform PITR and simulate failover

Module 6: Monitoring & Performance

- Query performance insights
- Azure Monitor integration
- Alerts & metrics
- Lab: Monitor queries using pg_stat_statements

Day 2 – Azure SQL Administration

Module 1: Deployment Models & Service Tiers

- Azure SQL Database vs Managed Instance vs SQL Server VM
- DTU vs vCore models
- Lab: Deploy Azure SQL Database

Module 2: Architecture & Provisioning

- Components & hierarchy
- Provisioning best practices
- Lab: Configure SQL Managed Instance

Module 3: Authentication & Security

- Azure AD SQL Authentication
- Firewall rules & private endpoints
- Lab: Configure Azure AD authentication

Module 4: Data Protection

- Transparent Data Encryption (TDE)

- Always Encrypted
- Dynamic Data Masking
- Lab: Implement Always Encrypted

Module 5: Auditing & Threat Detection

- SQL Auditing policies
- Defender for SQL integration
- Lab: Configure auditing & threat detection

Module 6: High Availability & DR

- Geo-replication & failover groups
- Backup & restore strategies
- Lab: Configure failover groups

Module 7: Performance & Monitoring

- Query Store & Intelligent Query Processing
- Azure Monitor & Log Analytics
- Alerts & automation
- Lab: Analyze performance with Query Store

Day 3 – Azure MySQL Administration

Module 1: Deployment Models

- Single Server vs Flexible Server
- Pricing tiers & compute models
- Lab: Deploy Flexible Server

Module 2: Provisioning & Configuration

- Initial setup
- Scaling compute & storage
- Lab: Configure server parameters

Module 3: Security & Authentication

- SSL enforcement
- Firewall rules
- Azure AD authentication
- Lab: Configure SSL and AD authentication

Module 4: Backup & High Availability

- Automated backups
- PITR
- HA architecture options
- Lab: Perform PITR

Module 5: Performance Optimization

- Indexing strategies
- Query tuning
- Caching mechanisms
- Lab: Optimize queries with indexes

Module 6: Monitoring & Alerts

- Metrics with Azure Monitor
- Log Analytics integration

- Lab: Configure alerts for performance

Day 4 – Azure Cosmos DB Administration

Module 1: Multi-Model Overview

- SQL, MongoDB, Cassandra, Table, Gremlin APIs
- Use cases & selection criteria
- Lab: Deploy Cosmos DB with SQL API

Module 2: Partitioning & Provisioning

- Partition keys
- Throughput models (manual vs autoscale)
- Global distribution
- Lab: Configure partitioning & throughput

Module 3: Security & Compliance

- Role-based access control
- Encryption at rest & in transit
- Lab: Configure RBAC and encryption

Module 4: High Availability & Performance

- SLA guarantees
- Request units (RUs) optimization
- Lab: Optimize RU consumption

Module 5: Monitoring & Diagnostics

- Metrics & alerts

- Query performance insights
- Lab: Monitor queries with Azure Monitor

Day 5 – Azure DocumentDB Administration

Module 1: Schema-less Design

- Collections & documents
- Indexing strategies
- Lab: Create schema-less collections

Module 2: Querying & Data Management

- SQL-like query language
- CRUD operations
- Consistency models
- Lab: Query documents with SQL API

Module 3: Performance Optimization

- Partitioning strategies
- Index tuning
- Lab: Optimize queries with indexing

Module 4: Monitoring & Maintenance

- Metrics & alerts
- Backup & restore
- Lab: Configure monitoring & perform backup