Microsoft - Implement scalable database solutions using Azure SQL

Course Number: DP-300T00

Duration: 4 days

Course Description

This course provides students with the knowledge and skills to create a SQL Server database infrastructure for cloud, on-premises and hybrid relational databases and who work with the Microsoft PaaS relational database offerings. Additionally, it will be of use to individuals who develop applications that deliver content from SQL-based relational databases.

Audience Profile

The audience for this course is data professionals managing data and databases who want to learn about administering the data platform technologies that are available on Microsoft Azure. This course is also valuable for data architects and application developers who need to understand what technologies are available for the data platform with Azure and how to work with those technologies through applications.

Skills Gained

- Plan, deploy and configure Azure SQL offerings
- Monitor database performance and tune a database and queries for optimum performance
- Plan and configure a High Availability Solution

Prerequisites

In addition to their professional experience, students who take this training should have technical knowledge equivalent to the following courses:

- AZ-900T00 Microsoft Azure Fundamentals
- DP-900T00 Microsoft Azure Data Fundamentals

Course Details

Outline

- Deploy IaaS solutions with Azure SQL
  - Explain IaaS options to deploy SQL Server in Azure
  - Understand hybrid scenarios
  - Explore performance and security
  - Explain high availability and disaster recovery options
  - Exercise: Provision a SQL Server on an Azure Virtual Machine
  - Module assessment
- Deploy PaaS solutions with Azure SQL
  - Explain PaaS options for deploying SQL Server in Azure
  - Explore single SQL database
  - Deploy SQL database elastic pool
  - Understand SQL database hyperscale
  - Examine SQL managed instance
  - Exercise: Deploy an Azure SQL Database
  - Module assessment
- Migrate SQL Server workloads to Azure SQL Database
  - Choose the right Azure SQL Database feature
  - Use Azure Database Migration Service to migrate to Azure SQL Database
  - Migrate to Azure SQL Database using BACPAC
  - Use an online method to migrate to Azure SQL Database
  - Move data to Azure SQL Database
  - Exercise - Migrate a SQL Server database to Azure SQL Database
  - Module assessment
- Migrate SQL Server workloads to Azure SQL Managed Instance
  - Evaluate migration scenarios
  - Migrate using Azure Arc
  - Use Log Replay Service (LRS) to migrate

    - Migrate using Managed Instance link
    - Move data to SQL Managed Instance
    - Exercise - Migrate a SQL Server database to Azure SQL Managed Instance
    - Module assessment
- Configure database authentication and authorization
    - Describe authentication and identities
    - Describe Security Principals
    - Describe database and object permissions
    - Identify authentication and authorization failures
    - Exercise: Authorize Access to Azure SQL Database with Microsoft Entra ID
    - Module assessment
- Protect data in-transit and at rest
    - Explore Transparent Data Encryption
    - Configure server and database firewall rules
    - Explain object encryption and secure enclaves
    - Enable encrypted connections
    - Describe SQL injection
    - Understand Azure Key Vault
    - Exercise: Configure a server-based firewall rule using the Azure portal
    - Module assessment
- Implement compliance controls for sensitive data
    - Explore data classification
    - Explore server and database audit
    - Implement Dynamic Data Masking
    - Implement Row Level security
    - Understand Microsoft Defender for SQL
    - Explore Ledger
    - Implement Microsoft Purview
    - Exercise: Enable Microsoft Defender for SQL and Data Classification
    - Module assessment
- Describe performance monitoring
    - Describe performance monitoring tools

    - Describe critical performance metrics
    - Establish baseline metrics
    - Explore extended events
    - Describe database watcher (preview)
    - Explore Query Performance Insight
    - Exercise: Isolate problems with monitoring
    - Module assessment
- Configure SQL Server resources for optimal performance
    - Explain how to optimize Azure storage for SQL Server virtual machines
    - Describe virtual machine resizing
    - Optimize database storage
    - Control SQL Server resources
    - Module assessment
- Configure databases for optimal performance
    - Explore database maintenance checks
    - Describe database scoped configuration options
    - Describe automatic tuning
    - Describe intelligent query processing
    - Exercise: Detect and correct fragmentation issues
    - Module assessment
- Explore query performance optimization
    - Understand query plans
    - Explain estimated and actual query plans
    - Describe dynamic management views and functions
    - Explore Query Store
    - Identify problematic query plans
    - Describe blocking and locking
    - Exercise: Identify and resolve blocking issues
    - Module assessment
- Explore performance-based database design
    - Describe normalization
    - Choose appropriate data types

    - Design indexes
    - Exercise: Identify database design issues
    - Module assessment
- Evaluate performance improvements
    - Describe wait statistics
    - Tune and maintain indexes
    - Understand query hints
    - Explore performance scenarios
    - Exercise: Isolate problem areas in poorly performing queries
    - Module assessment
- Automate database deployment
    - Describe deployment models in Azure
    - Automate deployment by using Azure Resource Manager templates and Bicep
    - Automate deployment by using PowerShell
    - Automate deployment by using Azure CLI
    - Exercise: Deploy an Azure SQL Database using an Azure Resource Manager template
    - Module assessment
- Create and manage SQL Agent jobs
    - Create a SQL Server maintenance plan
    - Describe task status notifications
    - Knowledge check
    - Exercise: Create a CPU status alert for a SQL Server
- Manage Azure PaaS tasks using automation
    - Explore Elastic jobs
    - Understand Azure Automation
    - Build an automation runbook
    - Automate database workflows by using Logic Apps
    - Monitor automated tasks
    - Exercise: Deploy an automation runbook to automatically rebuild indexes
    - Module assessment
- Describe high availability and disaster recovery strategies

    - Describe recovery time objective and recovery point objective
    - Explore high availability and disaster recovery options
    - Describe Azure high availability and disaster recovery features for Azure Virtual Machines
    - Describe high availability and disaster recovery for PaaS deployments
    - Explore high availability and disaster recovery solution for IaaS
    - Describe hybrid solutions
    - Module assessment
- Explore IaaS and PaaS solutions for high availability and disaster recovery
    - Describe failover clusters in Windows Server
    - Configure Always-on availability groups
    - Describe active geo-replication for Azure SQL Database
    - Explore auto-failover groups for Azure SQL Database and Azure SQL Managed Instance
    - Monitor availability
    - Exercise: Configure geo replication for Azure SQL Database
    - Module assessment
- Back up and restore databases
    - Back up and restore SQL Server running on Azure virtual machines
    - Back up a SQL Server virtual machine
    - Back up and restore a database for SQL Database and SQL Managed Instance
    - Exercise: Backup to URL
    - Module assessment

Plan and Implement Data Platform Resources

- Deploy IaaS solutions with Azure SQL
- Deploy PaaS solutions with Azure SQL
- Evaluate strategies for migrating to Azure SQL
- Migrate SQL workloads to Azure SQL Databases
- Migrate SQL workloads to Azure Managed Instances

Implement a Secure Environment for a Database Service

- Configure database authentication and authorization
- Protect data in-transit and at rest

- Implement compliance controls for sensitive data

Monitor and Optimize Operational Resources

- Describe performance monitoring
- Configure SQL Server resources for optimal performance
- Configure databases for optimal performance

Optimize Query Performance

- Explore query performance optimization
- Explore performance-based database design
- Evaluate performance improvements

Automate database tasks

- Automate deployment of database resources
- Create and manage SQL Agent jobs
- Manage Azure PaaS tasks using automation

Plan and Implement a High Availability and Disaster Recovery Solution

- High Availability and Disaster Recovery Strategies
- IaaS Platform and Database Tools for HADR
- PaaS Platform and Database Tools for HADR
- Database Backup and Recovery