



TRAINING OFFERING

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Administering Microsoft Azure SQL Solutions

CODE:

MCS_DP-300T00

LENGTH:

32 Hours (4 days)

Description

This course provides students with the knowledge and skills to administer 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.

Objectives

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

Audience

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.

Prerequisites

Successful Azure Database Administrators start this role with professional experience in database management and technical knowledge of cloud technologies.

Specifically:

Working with, maintaining, and developing with SQL Server
Experience with Azure, such as deploying and managing resources

At a minimum, you should know the information in the following online training before attending the course:

AZ-900 Azure Fundamentals
DP-900 Azure Data Fundamentals

Programme

Module 1: Introduction to Azure Database Administration

This module explores the role of a database administrator in the world of Azure SQL. It also provides some foundational information relevant to the overall content. This includes a review of the various SQL Server-based options (SQL Server in a VM, SQL Managed Instance, and Azure SQL Database).

Lessons

Prepare to maintain SQL databases on Azure

After completing this module, students will be able to:

Understand the role of Azure Database Administrator as it fits in with other data platform roles
Be able to describe the key differences between the SQL Server-based database options
Describe other features for Azure SQL platforms available

Module 2: Plan and Implement Data Platform Resources

This module introduces methods for deploying data platform resources in Azure SQL. You will learn about options for both upgrading and migrating existing SQL databases to Azure. You will learn how to set up Azure resources to host SQL Server on a Virtual Machine, a SQL Managed Instance, and SQL Database. You will learn how to determine which options are best based on specific requirements including the High Availability and Disaster Recovery (HADR) needs. They will learn to calculate resource requirements and understand hybrid approaches.

Lessons

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

Lab : Provision SQL Server on an Azure Virtual Machine

Explore the Azure Portal

Deploy a SQL Server on an Azure Virtual Machine

Connect to SQL Server on an Azure Virtual Machine

Lab : Provision an Azure SQL Database

Create a Virtual Network

Deploy an Azure SQL Database

Connect to an Azure SQL Database using Azure Data Studio

Query an Azure SQL Database using SQL Notebook

After completing this module, students will be able to:

Explore the basics of SQL Server in an Infrastructure as a Service (IaaS) offering

Understand PaaS provisioning and deployment options Evaluate migration scenarios to SQL Managed Instance and SQL Database

Evaluate and implement a strategy for moving a database to Azure

Module 3: Implement a Secure Environment for a Database Service

This module explores the practices of securing your SQL Server Database as well as an Azure SQL database. This includes a review of the various SQL Server-based options as well as the various Azure options for securing Azure SQL Database. Students will learn why security is crucial when working with databases, and explain authentication options for Azure SQL Database.

Lessons

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

Lab : Configure a server-based firewall rule using the Azure portal

Configure Azure SQL Database firewall rules

Validate access

Lab : Authorize Access to Azure SQL Database with Azure Active Directory

Create users

Manage access to database objects

Validate access

Lab : Enable Microsoft Defender for SQL and Data Classification

Enable Microsoft Defender for Azure SQL Database

Configure Data Classification for Azure SQL Database

Implement compliance controls for sensitive data After completing this module, students will be able to:

Understand the differences between Windows, SQL Server and Azure Active Directory Authentication

Describe and configure both data-at-rest encryption solutions as well as data-in-transit encryption

Implement a data sensitivity solution

Module 4: Monitor and Optimize Operational Resources

This module will teach you about resource optimization for your databases created using either IaaS or PaaS services. The module also covers monitoring server and hardware resources. It will familiarize you with the various tools available for monitoring performance and establishing a baseline. You will learn how to interpret performance metrics for the most critical resources. You will also learn how to troubleshoot database performance using Azure SQL Insights.

Lessons

Describe performance monitoring Configure SQL Server resources for optimal performance

Lab : Isolate performance problems through monitoring

Review CPU utilization in Azure portal

Identify high CPU queries

Lab : Detect and correct fragmentation issues

Investigate index fragmentation

Rebuild fragmented indexes

Validate performance improvements

Configure databases for optimal performance After completing this module, students will be able to:

Monitor activity and compare to a baseline Identify major causes of performance problems

Configure resources for optimal performance Configure a user database for optimal performance

Module 5: Optimize Query Performance

Query execution plans are potentially the most important aspect of database performance. Improving bad plans is certainly an area where a small amount of effort can bring huge improvements. While hardware issues can limit query performance, improving hardware usually yields performance improvements in the 10-20% range, at most. More commonly database administrators encounter queries that are not optimized, have stale or missing statistics, have missing indexes, or poor database design choices that lead to the database engine doing more work than is necessary to return results for a given query. Improving the plans can sometimes yield performance improvements in the 100-200% range or even more, meaning that after improving a plan with better indexes or statistics, a query could run twice or three times as fast! This module provides details on how to analyze individual query performance and determine where improvements can be made.

Lessons

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

Lab : Identify database design issues

Examine the query and identify the problem

Identify ways to fix the warning message

Improve the code

Lab : Identify and resolve blocking issues

Run blocked queries report

Enable Read Commit Snapshot isolation level

Evaluate performance improvements

Lab : Isolate problem areas in poorly performing queries in a SQL Database

Generate actual execution plan

Resolve a suboptimal query plan

Use Query Store to detect and handle regression

Examine Top Resource Consuming Queries report

Force a better execution plan

Use query hints to impact performance

After completing this module, students will be able to:

Analyze query plans and identify problem areas

Evaluate potential query improvements using Query Store Review table and index design

Determine whether query or design changes have had a positive effect

Module 6: Automate database tasks

A common goal for database administrators in many environments is to automate as many of their repetitive tasks. This can be as simple as using scripting to automate a backup process, and as complex as building a fully automated alerting system. This module provides details of automating tasks to simplify the DBA's job. Methods include scheduling tasks for regular maintenance jobs, as well as how to use elastic jobs and Azure Automation runbooks.

Lessons

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

Lab : Deploy an automation runbook to automatically rebuild indexes

Create an Automation Account

Connect to an existing Azure SQL Database

Configure Automation Account assets

Create a PowerShell runbook

Create a schedule for a runbook

Lab : Deploy Azure SQL Database using an Azure Resource Manager template

Explore Azure Resource Manager template

Lab : Create a CPU status alert for a SQL Server

Create an alert when a CPU exceeds an average of 80 percent

After completing this module, students will be able to:

Deploy resources using automated deployment scripts Create scheduled tasks Create notifications and alerts

Configure automation for PaaS services

Module 7: Plan and Implement a High Availability and Disaster Recovery Solution

Data must be available when the business needs it. That means the solutions hosting the data must be designed with availability and recoverability in mind. Suppose you work for a company that sells widgets both in stores and online. Your main application uses a highly transactional database for orders. What would happen if the server or platform hosting the transactional database had a problem that made it unavailable or inaccessible for some reason? What impact would it have on the business? If the right solution is put in place, the database would come online in a reasonable timeframe with minimal effort, thus allowing business to continue with little-to-no impact. This module and its associated lab cover configuring, testing, and managing a solution for high availability and disaster recovery (HADR) in Azure, for both Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS) deployments. This module will not only cover basic requirements, but also the various options available to achieve HADR.

Lessons

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

PaaS Platform and Database Tools for HADR Database Backup and Recovery

Lab : Backup to URL and Restore from URL

Create a credential

Backup to URL

Validate backup through Azure CLI and Storage Explorer

Restore from URL

Lab : Configure geo-replication for Azure SQL Database

Enable geo-replication

Failover to a secondary region

After completing this module, students will be able to:

The difference between recovery time and recovery point objectives

The available HADR options for both IaaS and PaaS

The considerations for planning and configuring HADR solutions including how backup and restore fit

The factors that comprise a HADR strategy How to configure a high availability solution via a hands-on lab

Additional Information

[This training is also available as onsite training. Please contact us to find out more.](#)