ADMINISTERING MICROSOFT

AZURE SQL SOLUTIONS

DP-300T00-A

Duration: 4 days; Instructor-led | Virtual Instructor-led

WHAT WILL YOU LEARN

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.

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.

METHODOLOGY

This program will be conducted with interactive lectures, PowerPoint presentations, discussions, and practical exercises

COURSE CONTENTS

Module 1: Prepare to maintain SQL Server-based databases on Azure

Explore the role of a database administrator on Azure. Describe SQL Server-based offerings on Azure.

Learning objectives

At the end of this module, you will be able to:

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

Prerequisites

- Ability to navigate the Azure the portal.
- Understanding of the traditional Database Administration role.
- Experience with T-SQL programming language at a basic level.

Module 2: Prepare to maintain SQL Server-based databases on Azure

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- Experience with T-SQL programming language at a basic level.

Module 3: Deploy IaaS solutions with Azure SQL

Configure virtual machine sizing, storage, and networking options to ensure adequate performance for your database workloads. Choose and configure appropriate high availability options.

Learning objectives

After completing this module, you will be able to:

- Explore the basics of SQL Server in an Infrastructure as a Service (IaaS) offering
- Learn the available options for provisioning and deployment
- Deploy SQL Server into an Azure Virtual Machine

Prerequisites

- Familiarity with on-premises virtualization technologies, including: VMs, virtual networking, and virtual hard disks.
- Familiarity with network configuration, including TCP/IP, Domain Name System (DNS), virtual private networks (VPNs), firewalls, and encryption technologies.
- Ability to create an on-premises SQL Server database, including the configuration of data files and log files.

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- Experience creating and configuring resources using the Azure portal.

Module 4: Deploy PaaS solutions with Azure SQL
Provision and deploy Azure SQL Database and Azure SQL managed instance. Select the appropriate options when performing a migration to the SQL PaaS platform.

Learning objectives
After completing this module, you will be able to:
- Gain an understanding SQL Server in a Platform as a Service (PaaS) offering
- Understand PaaS provisioning and deployment options
- Understand elastic pools
- Examine Azure SQL Managed Instances
- Configure a template for PaaS deployment

Prerequisites
- Ability to create an on-premises SQL Server database, including the configuration of data files and log files.
- Experience creating and configuring resources using the Azure portal.

Module 5: Migrate SQL Server workloads to Azure SQL Database
You will explore different migration tools and migrate SQL Server databases to Azure SQL Database.

Learning objectives
In this module, you'll:
- Explore the advantages, capabilities, and migration possibilities offered by Azure SQL Database.
- Migrate databases using Azure SQL Migration extension for Azure Data Studio and tracking database migration activities.
- Use transactional replication as an online method to migrate to Azure SQL Database.
- Explore several other methods for migrating SQL Server databases to Azure SQL Database.

Prerequisites
- Experience in administering SQL Server databases.
- Knowledge of SQL Server editions and versions.
- Knowledge of basic T-SQL.

Module 6: Migrate SQL Server workloads to Azure SQL Managed Instance
You'll explore different migration tools and migrate SQL Server databases to Azure SQL Managed Instance.

Learning objectives
In this module, you'll:
- Explore the advantages, capabilities, and migration possibilities offered by Azure SQL Managed Instance.
- Learn how Log Replay Service works to migrate to Azure SQL Managed Instance.
- Understand how Managed Instance link feature works in a migration scenario.
- Load and move data to and from Azure SQL Managed Instance.
- Explore several other methods for migrating SQL Server databases to Azure SQL Database.

Prerequisites
- The following prerequisites should be completed:
- Experience in administering SQL Server databases.
- Knowledge of SQL Server editions and versions.
- Knowledge of basic T-SQL.

Module 7: Configure database authentication and authorization
Contrast authentication using Microsoft Entra ID, and SQL Server authentication. Implement various security principals and configure permissions.

Learning objectives
After completing this module, you will be able to:
- Learn about authentication options for Azure SQL
- Create various security principals
- Configure permissions within a SQL database
- Identify authentication and authorization failures

Prerequisites
- Ability to use tools for running queries against a Microsoft SQL database, either on-premises or cloud-based
- Understanding of why security is a crucial part of database system planning
- Ability to write code in the SQL language, particularly the Microsoft T-SQL dialect, at a basic level
- Experience creating and configuring resources using the Azure portal

Module 8: Protect data in-transit and at rest
Explore encryption options available within Azure SQL, including firewall rules, Always Encrypted, and Transport Layer Security. Understand how SQL Injection works.

Learning objectives
After completing this module, you will be able to:
- Understand the data encryption options available in the various platforms
- Implement object level encryption
- Understand the difference between database and server firewall rules for Azure SQL Database
- Explore Always Encrypted with secure enclaves

Prerequisites

- Ability to use tools for running queries against a Microsoft SQL database, either on-premises or cloud-based
- Understanding of why security is a crucial part of database system planning
- Ability to write code in the SQL language, particularly the Microsoft T-SQL dialect, at a basic level.
- Experience creating and configuring resources using the Azure portal

Module 9: Implement compliance controls for sensitive data

Explore data classification capabilities and degrees of confidentiality. Implement security options to maintain private data safe, including Azure SQL auditing, Microsoft Defender for SQL, row-level security, Dynamic Data Masking and Ledger.

Learning objectives

After completing this module, you will be able to:

- Plan and implement data classification in Azure SQL Database
- Understand and configure row-level security and dynamic data masking
- Understand the usage of Microsoft Defender for SQL
- Explore how Ledger works

Prerequisites

- Ability to write code in the SQL language, particular the Microsoft T-SQL dialect, at a basic level.
- Experience creating and configuring resources using the Azure portal.

Module 10: Describe performance monitoring

Compare Azure, and on-premises tools for monitoring and measuring performance. Determine critical metrics. Understand the purpose of a baseline for comparative analysis. Configure extended event sessions for tracing activities.

Learning objectives

After completing this module, you will be able to:

- Review potential performance issues.
- Identify critical Azure metrics.
- Learn how to collect metrics for an established baseline.
- Use extended events for performance analysis.
- Understand database watcher for Azure SQL Database and Azure SQL Managed Instance.

Prerequisites

- Experience creating and configuring resources using the Azure portal.
- Ability to use Windows Performance Monitor to monitor system components such as CPU, I/O, network traffic.

Module 11: Configure SQL Server resources for optimal performance

Choose the appropriate size and storage options for your Azure SQL databases. Configure server resources such as tempdb. Understand the usage of Resource Governor.

Learning objectives

After completing this module, you will be able to:

- Understand your options for configuration of Azure storage
- Learn how to configure TempDB data files in SQL Server
- Learn how to choose the right type of VM for SQL Server workloads
- Understand the use cases and configuration of Resource Governor in SQL Server

Prerequisites

- Ability to write code in the SQL language, particularly the Microsoft T-SQL dialect, at a basic level.
- Experience creating and configuring resources using the Azure portal.
- Knowledge of purpose of SQL Server system databases: master, tempdb, msdb
- Basic understanding of SQL Server file storage.

Module 12: Configure databases for optimal performance

Implement tasks for both IaaS and PaaS to maintain indexes, and statistics. Explore the automatic tuning features of Azure SQL Database. Control database-level configuration options. Explore Intelligent Query Processing.

Learning objectives

After completing this module, you will be able to:

- Understand database scoped configuration options
- Understand maintenance tasks related to indexing and statistics
- Understand the features of Intelligent Query Processing (IQP)
- Explore the automatic tuning feature in Azure

Prerequisites

- Ability to write code in the SQL language, particularly the Microsoft T-SQL dialect, at a basic level.
- Experience creating and configuring resources using the Azure portal.
- Basic understanding of structure and usage of SQL Server indexes.

Module 13: Explore query performance optimization

ead and understand various forms of execution plans. Compare estimated vs actual plans. Learn how and why plans are generated. Understand the purpose and benefits of the Query Store.

Learning objectives
After completing this module, you will be able to:

- Generate and save execution plans
- Compare the different types of execution plans
- Understand how and why query plans are generated
- Explain the purpose and benefits of the Query Store
- Investigate the available reports and data in the Query Store

Prerequisites

- Ability to use tools for running queries against a Microsoft SQL database, either on-premises on cloud-based.
- Ability to write code in the SQL language, particularly the Microsoft T-SQL dialect, at a basic level.
- Basic understanding of structure and usage of SQL Server indexes.
- Basic understanding of relational database concepts.

Module 14: Explore performance-based database design

Explore normalization for relational databases. Investigate the impact of proper datatype usage. Compare types of indexes.

Learning objectives
After completing this module, you will be able to:

- Explore normal forms and how they affect database design
- Choose appropriate datatypes for your data
- Evaluate appropriate index types

Prerequisites

- Ability to use tools for running queries against a Microsoft SQL database, either on-premises on cloud-based.
- Ability to write code in the SQL language, particularly the Microsoft T-SQL dialect, at a basic level.
- Basic understanding of structure and usage of SQL Server indexes.
- Basic understanding of relational database concepts.

Module 15: Evaluate performance improvements

Evaluate possible changes to indexes. Determine the impact of changes to queries and indexes. Explore Query Store hints.

Learning objectives
After completing this module, you will be able to:

- Determine when changing indexes or defining new ones can affect performance
- Evaluate wait statistics as an aid in finding areas for performance improvement
- Understand how query hints work, and when to use them

Prerequisites

- Ability to use tools for running queries against a Microsoft SQL database, either on-premises on cloud-based.
- Ability to write code in the SQL language, particularly the Microsoft T-SQL dialect, at a basic level.
- Basic understanding of structure and usage of SQL Server indexes.
- Basic understanding of relational database concepts.