

Microsoft Azure Database Administrator

Description

The Azure Database Administrator implements and manages the operational aspects of cloud-native and hybrid data platform solutions built on Microsoft Azure data services and Microsoft SQL Server. The Azure Database Administrator uses a variety of methods and tools to perform day-to-day operations, including applying knowledge of using T-SQL for administrative management purposes.

Skills measured

- Plan and implement data platform resources
- Implement a secure environment
- Monitor and optimize operational resources
- Optimize query performance
- Perform automation of tasks
- Plan and implement a High Availability and Disaster Recovery (HADR) environment
- Perform administration by using T-SQL

Plan and Implement Data Platform Resources

Deploy resources by using manual methods

- deploy database offerings on selected platforms
- configure customized deployment templates
- apply patches and updates for hybrid and IaaS deployment

Recommend an appropriate database offering based on specific requirements

- evaluate requirements for the deployment
- evaluate the functional benefits/impact of possible database offerings
- evaluate the scalability of the possible database offering
- evaluate the HA/DR of the possible database offering
- evaluate the security aspects of the possible database offering

Configure resources for scale and performance

- configure Azure SQL database/elastic pools for scale and performance

- configure Azure SQL managed instances for scale and performance
- configure SQL Server in Azure VMs for scale and performance
- calculate resource requirements
- evaluate database partitioning techniques, such as database sharding

Evaluate a strategy for moving to Azure

- evaluate requirements for the migration
- evaluate offline or online migration strategies
- evaluate requirements for the upgrade
- evaluate offline or online upgrade strategies

Implement a migration or upgrade strategy for moving to Azure

- implement an online migration strategy
- implement an offline migration strategy
- implement an online upgrade strategy
- implement an offline upgrade strategy

Implement a Secure Environment

Configure database authentication by using platform and database tools

- configure Azure AD authentication
- create users from Azure AD identities
- configure security principals

Configure database authorization by using platform and database tools

- configure database and object-level permissions using graphical tools
- apply principle of least privilege for all securables

Implement security for data at rest

- implement Transparent Data Encryption (TDE)
- implement object-level encryption
- implement Dynamic Data Masking
- implement Azure Key Vault and disk encryption for Azure VMs

Implement security for data in transit

- configure SQL DB and database-level firewall rules
- implement Always Encrypted
- configure Azure Data Gateway

Implement compliance controls for sensitive data

- apply a data classification strategy
- configure server and database audits
- implement data change tracking
- perform vulnerability assessment

Monitor and Optimize Operational Resources

Monitor activity and performance

- prepare an operational performance baseline
- determine sources for performance metrics
- interpret performance metrics
- assess database performance by using Azure SQL Database Intelligent Performance
- configure and monitor activity and performance at the infrastructure, server, service, and database levels

Implement performance-related maintenance tasks

- implement index maintenance tasks
- implement statistics maintenance tasks
- configure database auto-tuning
- automate database maintenance tasks
 - Azure SQL agent jobs, Azure automation, SQL server agent jobs
- manage storage capacity

Identify performance-related issues

- configure Query Store to collect performance data
- identify sessions that cause blocking
- assess growth/fragmentation of databases and logs
- assess performance-related database configuration parameters
 - including AutoClose, AutoShrink, AutoGrowth

Configure resources for optimal performance

- configure storage and infrastructure resources
 - optimize IOPS, throughput, and latency
 - optimize tempdb performance
 - optimize data and log files for performance
- configure server and service account settings for performance
- configure Resource Governor for performance

Configure a user database for optimal performance

- implement database-scoped configuration
- configure compute resources for scaling
- configure Intelligent Query Processing (IQP)

Optimize Query Performance

Review query plans

- determine the appropriate type of execution plan
 - live Query Statistics, Actual Execution Plan, Estimated Execution Plan, Showplan
- identify problem areas in execution plans
- extract query plans from the QueryStore

Evaluate performance improvements

- determine the appropriate Dynamic Management Views (DMVs) to gather query performance information
- identify performance issues using DMVs
- identify and implement index changes for queries
- recommend query construct modifications based on resource usage
- assess the use of hints for query performance

Review database table and index design

- identify data quality issues with duplication of data
- identify normal form of database
- assess index design for performance
- validate data types defined for columns
- recommend table and index storage including filegroups
- evaluate table partitioning strategy
- evaluate the use of compression for tables and indexes

Perform Automation of Tasks

Create scheduled tasks

- manage schedules for regular maintenance jobs
- configure multi-server automation
- configure notifications for task success/failure/non-completion

Evaluate and implement an alert and notification strategy

- create event notifications based on metrics
- create event notifications for Azure resources
- create alerts for server configuration changes
- create tasks that respond to event notifications

Manage and automate tasks in Azure

- perform automated deployment methods for resources
- automate Backups
- automate performance tuning and patching
- implement policies by using automated evaluation modes

Plan and Implement a High Availability and Disaster Recovery (HADR) Environment

- recommend HADR strategy based on RPO/RTO requirements
- evaluate HADR for hybrid deployments
- evaluate Azure-specific HADR solutions
- identify resources for HADR solutions

Test an HADR strategy by using platform, OS and database tools

- test HA by using failover
- test DR by using failover or restore

Perform backup and restore a database by using database tools

- perform a database backup with options
- perform a database restore with options
- perform a database restore to a point in time
- configure long-term backup retention

Configure DR by using platform and database tools

- configure replication
- configure Azure Site Recovery for a database offering

Configure HA using platform, OS and database tools

- create an Availability Group

- integrate a database into an Availability Group
- configure quorum options for a Windows Server Failover Cluster
- configure an Availability Group listener

Perform Administration by Using T-SQL

Examine system health

- evaluate database health using DMVs
- evaluate server health using DMVs
- perform database consistency checks by using DBCC

Monitor database configuration by using T-SQL

- assess proper database autogrowth configuration
- report on database freespace
- review database configuration options

Perform backup and restore a database by using T-SQL

- prepare databases for AlwaysOn Availability Groups
- perform transaction log backup
- perform restore of user databases
- perform database backups with options

Manage authentication by using T-SQL

- manage certificates
- manage security principals

Manage authorization by using T-SQL

- configure permissions for users to access database objects
- configure permissions by using custom roles

Optional prerequisites

- Microsoft Certified: Azure Fundamentals