Module 4: Administering SQL Server Databases

Maintenance, backup, monitoring and security for SQL Server databases

Module 4 Objectives

Understand the core responsibilities of a SQL Server database administrator

Perform basic maintenance tasks to keep databases healthy

Configure and test backup and restore strategies

Manage logins, users, roles and permissions for security

Roles in SQL Server Administration

Database administrators manage installation, configuration and maintenance

Developers and DBAs cooperate on deployment of database changes

Operators monitor jobs, backups and alerts

Security administrators manage logins, roles and access rights

Database Maintenance Tasks

- Rebuild or reorganise indexes to reduce fragmentation
- Update statistics to help the optimiser choose good query plans
- Clean up old data or logs as part of housekeeping
- Use maintenance plans or custom scripts for regular tasks

Backup and Restore Basics

- Full backups capture the entire database at a point in time
- Differential backups store changes since the last full backup
- Transaction log backups enable point-in-time recovery for full or bulk-logged recovery models
- Regularly test restore procedures to ensure backups are usable

Monitoring Performance and Activity

- Activity Monitor in SSMS shows expensive queries and active sessions
- Dynamic Management Views (DMVs) expose live health and performance data
- Performance counters can be watched with tools like Performance Monitor
- Use monitoring to detect blocking, long-running queries and resource bottlenecks

Checking Database Integrity

- DBCC CHECKDB verifies logical and physical consistency of the database
- Run integrity checks regularly as part of maintenance
- Investigate and resolve reported corruption issues promptly
- Consider impact on performance when scheduling CHECKDB on large databases

Security Fundamentals: Logins and Users

- Logins provide access to the SQL Server instance
- Database users map to logins inside each database
- Fixed server roles and database roles support role-based security
- Use least privilege: grant only the permissions that are needed

Managing Permissions

- GRANT, DENY and REVOKE control access to database objects
- Use roles to simplify permission management for groups of users
- Avoid granting direct permissions to individual users when possible
- Regularly review permissions to ensure they remain appropriate

Tools for Administration

- SQL Server Management Studio (SSMS) for most administration tasks
- SQL Server Agent for scheduling jobs and automating processes
- Maintenance plans for GUI-driven configuration of common tasks
- Command-line tools such as sqlcmd and PowerShell for scripting