

Microsoft SQL Server Database Administration 2017/2019

Course Overview

- This is 100% hands-on course; students will learn SQL Server database administration.
- Helps to prepare 70-462/70-764 Microsoft exams.
- We will discuss all the concepts with our on-premises data center
- This course will cover in-depth **high availability features and performance tuning**.
- 100% placement assistance with placement team.

Target Participants

- Working people, Students, IT Professionals

Learning Formats

- Online interactive and video based training

Our Trainer (s)

This course is delivered by **SQL Server expert and SME Mr. Kareem Syed**. He has hands on working experience on various SQL Server versions and recent cloud platforms. Having 14+years hand on experience he is technical consultant for some of the MNCs.

Topic 1: Starting with SQL Server

- Responsibilities of Database Administrator
- Types of DBAs
- History of SQL Server -versions
- What is new in SQL Server 2014, 2016, 2017 and 2019 for Administrators?
- Tools and components of SQL Server
- SQL Server Services
 - o Instance–aware Services
 - o Instance–unaware Services
 - o Start & Stopping Services
- Instances
 - o Advantages of Instances
 - o Types
 - Default Instance
 - Named Instances
- Requirements
 - o Hardware
 - o Software
- Installing SQL Server
 - o Pre – installation steps
 - o Installations
 - o Viewing installation process with LOG files.
 - o Adding or removing components.
- **Troubleshooting SQL Server installation common issues and FAQs**

Topic 2: Configuring SQL Server

- Why configuration?
 - o Advantages
 - o Main Configuration Features
 - o Configuring Various Services.
 - o Backup folders.
 - o Configuring data file and log file paths.
 - o Configuring ErrorLogs
 - o Patching SQL Server
 - o Remote connections
 - o TempDB Configurations
 - o Memory configuration
 - o Configuring max worker threads
 - o Configuring DAC
 - o Configuring service accounts
- **Case Study**
 - o Patching issues
 - o Connectivity issues
 - o How to rollback service packs

Topic 3: Working with Databases

- Working with databases.
 - o System Defined databases
 - o Moving system databases
 - o Handling TempDB database.
- Database Architecture.
 - o Data Files
 - o Log Files
 - o Filegroups
 - o Extents
 - o Pages –types
 - o Page architecture
- o Tracking free space
- Transaction Log file architecture and common issues
- Data file architecture.
- Creating Databases.
- Adding files, Filegroups.
- Database States
- **Case Study**
 - o Recovering suspect database
 - o Moving system databases
 - o Troubleshooting TempDB issues
 - o Log file full – how to solve the problem.
 - o Rebuilding system databases

Topic 4: Implementing Security.

- Security in SQL Server
- Security Enhancements
- Types of Authentications
 - Windows Authentication
 - Mixed Mode Authentication
- Creating SQL logins and testing logins
- Creating logins from windows users and groups
- Server roles and Auditing features
- Orphan Users
- Resolving orphan users.
- Working with
 - o User defined roles
 - o Contained databases
 - o Auditing
 - o Policy based management
- Understanding database roles, custom and application roles. Understanding permissions.
- Encryption and decryption.
- Working with certificates and schemas.
- Security catalog views and stored procedures.

- **Case Study**
 - o Connecting to instance without login credentials
 - o Resolving orphan users

Topic 5: Backup and Restoration

- Understanding Transaction Log file.
- Understanding checkpoints & Lazy writer. Truncating log file.
- Recovery Models
 - o Full
 - o Bulk Logged
 - o Simple
- Setting recovery model.
- Database Backups
 - o Full
 - o Differential
 - o Transaction Log
 - o File or Filegroups
 - o Copy-only, Mirrored, Split, Tail Log backups
- Performing Restoration
- Backup system databases.
- Compressions
 - o Row Compression
 - o Page Compression
- o Data Partitions
- o Table Compression via T-SQL
- o Compressing Backups
- Viewing complete details of backup process.

Case Study

- o Recovering a crashed database.
- o Common backup and restore issues.

Topic 6: Automating Administrative Tasks

- Working with Database Mail.
 - o Mail architecture.
 - o Configuring Profiles and Accounts
 - o Sending Mail
- Configuring linked servers.
- Implementing Automation
 - o Configuring SQL Server Agent.
 - o Creating Operators, Alerts, Jobs
 - o Managing jobs and resolving errors.
 - o Monitoring jobs.
 - o Auto alert when jobs are enabled, disabled or failed.
- o Database Snapshots.

Case Study

- o Configuring TempDB growth alerts
- o Configuring T.Log growth alerts

Topic 7: High Availability

- Introduction to High Availability.
- Types of HA features in SQL Server.
- **Working with Log Shipping**
 - Features
 - Log Shipping Architecture
 - Jobs
 - Requirements to implement Log Shipping. Configuring Log Shipping.
 - Monitoring Log Shipping.
 - Manually Performing Fail Over. Transferring logins.
 - Log shipping tables and stored procedures.
 - **Handling out of sync issues**



- **Working with Database Mirroring**

- o Advantages
- o Architecture
- o Operating Modes
- o Servers involved in Mirroring
- o Requirements for Mirroring
- o Configuring
- o Monitoring
- ? Using Mirroring Monitor
- ? Using System Monitor
- ? Using Profiler
- ? Using System views and SPs.
- o Mirroring Fail Over
- o Mirroring system tables and stored procedures.
- o **Case Study**
 - ? Handling suspect issues
 - ? How to patch mirrored instances
 - ? How to move mirrored database files

Topic 8: Replication

- Replication and advantages
- New features 2014/2016/2017/2019
- Replication Entities
- Replication Architecture.
- Replication Agents.
- Types of Replications
 - o Snapshot Replication
 - o Transactional Replication
 - o Merge Replication
 - o Peer to Peer Replication
- Configuring Replication
 - o Snapshot Replication
 - o Transactional Replication
 - o Merge
 - Peer to peer replication.
- Managing replication.
- Monitoring and Tuning Replication
- **Case Study**
 - o Troubleshooting Primary Key violation error in Transactional Replication
 - o Troubleshooting T. Log file growth issues.
 - o Troubleshooting out of sync/ latency issues

Topic 9: SQL Server Performance Tuning

- What is database maintenance and performance tuning
- SQL Server Architecture
 - o Layers of SQL Server architecture
 - o Protocol Layer
 - o Relational engine
 - o Storage Engine
 - o Buffer Cache
- o What is Lock and Latch
- o SQL Server background processes
- o Page Life Expectancy
- Execution Plan Basics
 - o How plans are generated
 - o Estimated execution plans
 - o Actual execution plans
 - o Check information about execution plans
 - o When the plans are recompiled
 - o Plan life time
 - o How to remove execution plans
 - o Events causing plans to remove from buffer cache
- Working with indexes

- o Table Scan
 - o Index
 - o Types of Index
 - ? Clustered
 - ? NonClustered
 - o Index Management
 - ? Index Fragmentation
 - ? Index Reorganizing
 - ? Index Rebuilding
- Statistics
 - o Statistics basics
 - o How the statistics are created
 - o How to check statistics
 - o What is stale statistics?
 - o How to update
 - o Incremental Statistics in SQL Server 2014
 - o Patching to clear statistics bugs
 - o Table Partitioning
- Transactions and Locks
- Isolation Levels
- Blocking and deadlocks in SQL Server
- Tools
 - o Profiler, DTA, Activity Monitor
- **Case Study**
 - Troubleshooting slowly running queries Using DTA

Topic 10: Clustering SQL Server

- Introduction to cluster environment & features.
- Overview of Windows Clustering.
- How SQL Server supports clustering.
- Requirements
- Installing and configuring SQL Server clustering.
- Testing Failover
- Applying service packs and hot fixes.
- Active Passive and Active - Active Cluster
- Adding virtual disks
- Troubleshooting cluster issues

Topic 11: Implementing Always On

- Introduction to SQL Server Always On (HA/DR) features
- Limitations of existing features
- Always on benefits
- Always on architecture
- Pre Requisites to configure AO
- Configuring Always On
- Always On Availability Groups
- Availability Group Failover
- Configuring Listener
- Monitoring AO
- Adding databases and replicas
- New enhancements in 2014/2016/2017/2019
- Resource Governor IO enhancements
- **Regular issues and FAQs**

Troubleshooting Covered in the program

- CPU Issues, Memory Issues and IO Issues
- Regular Wait tasks
- Log file full Issue
- Database Suspect issue
- Backup failures
- Troubleshooting Replication Issues
- Troubleshooting Log shipping and Mirroring issues
- Troubleshooting Clustering
- Always On Troubleshooting Issues
- Troubleshooting Slow Running Queries