

SQL Server HA: Always On & Failover Clustering

Learn to implement and manage SQL Server high availability using Always On Availability Groups and Windows Server Failover Clustering.

4 Days

32 HOURS

11

MODULES

70

TOPICS

29

HANDS-ON LABS

COURSE OVERVIEW

The Microsoft SQL High Availability with Replication course is designed to equip learners with the knowledge and skills necessary to implement and manage high availability and disaster recovery solutions in Microsoft SQL Server environments. The course covers a wide range of topics from the basics of High availability concepts and terminology to the implementation of advanced features like Always on Availability Groups and Windows Server Failover Clustering. Students will learn how to address various causes of downtime, plan for disaster recovery, and understand key objectives such as Recovery Time Objective (RTO), Recovery Point Objective (RPO), and Recovery Level Objective (RLO). The course includes both theoretical lessons and practical labs, allowing learners to gain hands-on experience with SQL Server's high availability features such as Log shipping, Database mirroring, and replication strategies like transactional and merge replication. By the end of the course, participants will have a solid understanding of how to ensure SQL Server instances are highly available, how to monitor and troubleshoot availability groups, and how to maintain system performance. This knowledge is invaluable for database professionals looking to enhance their skill sets and ensure the stability and reliability of their organization's data infrastructure.

WHO THIS COURSE IS FOR

The Microsoft SQL High Availability with Replication course is designed for IT professionals focused on database and server management.

Database Administrators

IT Infrastructure Engineers

Systems Administrators

SQL Server Database Developers

Disaster Recovery Specialists

Data Architects

IT Consultants specializing in Microsoft technologies

Technical Support & Maintenance Personnel

Business Intelligence Professionals

Database Managers

IT Professionals preparing for Microsoft Certification exams related to SQL Server

Cloud Solutions Architects working with SQL on cloud platforms

What You Will Learn

- Explain high-availability concepts and terminology such as RTO, RPO and RLO
- Configure Windows Server Failover Clustering and quorum settings
- Implement SQL Server Failover Cluster Instances
- Configure Always On Availability Groups, replicas and listeners
- Monitor Availability Groups using the Dashboard and extended events
- Perform maintenance tasks including DBCC checks and replica changes
- Apply transactional and merge replication techniques
- Analyse performance using DMVs and Performance Monitor counters

COURSE SYLLABUS

11 Modules, 70 Topics

01

Introduction

This module provides an overview of the course and its objectives.

LESSONS

Course Introduction

02

Always-On and High-Availability Concepts and Terminology

This module introduces key concepts and terminology used in high-availability systems.

TOPICS

- Concepts and Terminology
- Table of Availability
- High Availability
- Causes of Downtime
- Planned Downtime
- Unplanned Downtime
- Disaster Recovery
- Recovery Time Objective (RTO)
- Recovery Point Objective (RPO)
- Recovery Level Objective (RLO)
- Storage Area Networks (SAN)

SQL SERVER EDITION CHANGES

- SQL Server 2012
- SQL Server 2014
- SQL Server 2016

Always-On and High-Availability Concepts and Terminology (continued)

LEGACY SOLUTIONS

- Failover Cluster Instances
- Log Shipping and Typical Configuration
- Monitor Server
- Replication
- Database Mirroring and Terminology
- Introduction to Always On
- Table of Always On Comparison
- Principal
- Mirror
- Witness
- Database Snapshots
- Limitations of Legacy Solutions

03

9 Labs

Windows Server 2016 Failover Clustering

This module covers failover clustering, a critical feature of Always On High Availability.

TOPICS

- Understanding Failover Clustering in Windows Server 2016
- Stateful High-Availability Solution

FEATURES OF FAILOVER CLUSTERING

- Supported in both Standard and Datacenter editions
- Hardware and software prerequisites
- Shared Storage

QUORUM CONFIGURATIONS

- Node Majority
- Node and Disk Majority
- Node and File Share Majority
- No Majority

CLUSTER NETWORK BEST PRACTICES

- Connection to nodes and shared storage
- Private network for internal cluster communication
- Public network for client connections
- Cluster Aware Updating
- Virtual Machine Failover Clustering
- Preferred Owners, Failover, and Failback
- Cluster Resources and Dependencies
- Heartbeat Mechanism

04

4 Labs

SQL 2016 Failover Cluster Instances

This module transitions from general failover clustering to SQL-specific clustering.

TOPICS

- Understanding Failover Cluster Instances (FCI)
- How FCIs Appear to Clients

05**5 Labs**

SQL 2016 Always-On Availability Groups

This module focuses on availability groups and their enhancements in SQL Server 2016.

AVAILABILITY GROUPS AND REPLICAS

Primary Replica · Secondary Replicas · Availability Group Listener

AVAILABILITY MODES

Synchronous Commit Mode · Asynchronous Commit Mode

FAILOVER MODES

Automatic Failover (with no data loss) · Manual Failover

06**3 Labs**

The Dashboard

This module demonstrates managing AlwaysOn High Availability Groups using the Dashboard.

LESSONS

Introduction to the Dashboard · Viewing Logs · Using Replication with Logins · Using Partially Contained Databases

07**2 Labs**

Active Secondary Availability Group Actions

This module covers actions related to active secondary SQL within availability groups.

LESSONS

Reporting with Secondary Replicas · Configuring Readable Secondaries · Read-Only Routing and Load Balancing · Backups with Secondary Replicas

08**2 Labs**

Maintenance

This module explores maintenance tasks for AlwaysOn High Availability Groups.

LESSONS

DBCC Checks · Adding and Removing Databases and Replicas

09

4 Labs

Monitoring and Troubleshooting Availability Groups

This module teaches monitoring and troubleshooting skills for clusters and availability groups.

LESSONS

Dashboard in Depth · Events and Policy-Based Management

10

Replication

This module introduces replication techniques.

LESSONS

Transactional Replication · Merge Replication

11

Performance Monitoring

This module covers tools and techniques for monitoring performance.

LESSONS

Using DMVs · Dashboard Metrics · Performance Monitor Counters

Practise What You Learn

#	MODULE	ACTIVITY
03	Windows Server 2016 Failover Clustering	■ Set up iSCSI Server ■ Install iSCSI VMs ■ Add Servers to Server Manager for Easy Management ■ Add the Windows Cluster Feature to SQL1, SQL2, and SQL3 ■ Create iSCSI Initiators for Shared Storage ■ Create a Windows Cluster ■ Add a Clustered Service ■ Test Failover of a Windows Service ■ Examine Quorum Settings
04	SQL 2016 Failover Cluster Instances	■ Create a Configuration File Using the Advanced Cluster Preparation Wizard ■ Complete the SQL Cluster Installation on SQL1 ■ Install Clusters on SQL2 and SQL3 ■ Test the SQL Cluster
05	SQL 2016 Always-On Availability Groups	■ Create a SQL Instance for the Availability Group ■ Enable the AlwaysOn Availability Group Feature ■ Set Up Availability Groups ■ Use the Availability Group Wizard ■ Work with SSMS and Availability Groups
06	The Dashboard	■ Explore the Dashboard ■ Replicate Logins and Jobs ■ Configure Contained or Partially Contained Databases
07	Active Secondary Availability Group Actions	■ Configure a Read-Only Secondary Replica ■ Perform Database Backups Using Secondary Replicas
08	Maintenance	■ Add and Remove Databases ■ Add and Remove Replicas
09	Monitoring and Troubleshooting Availability Groups	■ Use Dashboard Wizards ■ Create Extended Event Sessions ■ Use T-SQL for Management Tasks ■ Implement Policy-Based Management

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

FLEXIBLE DELIVERY

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Live Online Classes (ILO)

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