



## 55246: SQL 2016 AlwaysOn High Availability

Microsoft - Data & AI

- **Nível:** Avançado
  - **Duração:** 21h
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### Sobre o curso

This three-day instructor-led course is designed for database administrators and Windows engineers to familiarize them with the concepts in SQL AlwaysOn and High Availability. The course utilizes SQL 2016, but explains the differences from SQL 2012- SQL 2014.

At course completion, students will be able to:

- Understand AlwaysOn High Availability
  - Employ Server 2016 Failover Clustering
  - Deploy SQL Failover Clusters
  - Work with Availability Groups
  - Perform maintenance
  - Monitor and Troubleshoot Availability Groups
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### Destinatários

Experienced DBAs, Windows Server pros, team leads

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### Pré-requisitos

Before attending this course, students must have:

- Experience as SQL DBA
  - Experience as Windows IT PRO
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# Metodologia

Lab intense course

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## Programa

- Introduction
- AlwaysOn And High Availability Concepts And Terminology
- Windows Server 2016 Failover Clustering
- Sql 2016 Failover Cluster Instances
- The Dashboard
- Active Secondary Availability Group Actions
- Maintenance
- Monitoring And Troubleshooting Availability Groups

### **Introduction**

This module explains the course and objectives.

Lessons

- Course introduction

### **AlwaysOn And High Availability Concepts And Terminology**

This module will introduce the participants to the concepts and terminology used in the course.

Lessons

- 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)
- Edition Changes from SQL 2012

- SQL Server 2014 Changes
- SQL Server 2016 Changes
- Legacy Solutions prior to Always On
- Failover Cluster Instances
- Log Shipping
- A Typical Log Shipping Configuration
- Monitor Server
- Replication
- Database Mirroring
- Database Mirroring Terminology
- Principle
- Mirror
- Witness (red box in image above)
- Database Snapshots
- Limitations of legacy solutions:
- What do we mean by Always On?
- Table of Always On Comparison

## **Windows Server 2016 Failover Clustering**

Failover clustering is covered in this module and is a critical feature of AlwaysOn High Availability.

### Lessons

- Understanding Failover Clustering in Server 2016
- Statefull High Availability Solution
- Supported in both Standard and Datacenter
- Servers should run similar hardware
- Should run same edition
- Hyper-V best with datacenter
- Certified for Windows server logo
- Shared Storage
- Quorums
- Node Majority
- Node and Disk Majority configuration:
- Node and File Share Majority
- No Majority
- Configuration
- Cluster Networks Best Practices
- Connection to nodes to shared storage
- Private network for internal cluster

- Public network for client connections
- Cluster Aware Updating
- Virtual Machine Failover Clustering
- Preferred Owners
- Failover Failback
- Resources
- Dependences
- Heartbeat

Lab : Set up iSCSI Server

Lab : Install the iSCSI VMS

Lab : Add Servers to Server Manager for Ease of Management

Lab : Add the Windows Cluster Feature to SQL1, SQL2 And SQL3

Lab : Create the iSCSI Initiators to add the shared storage

Lab : Create the Windows ClusterLab : Add a Clustered Service

Lab : Test The Failover Of The Windows Service

Lab : Delete RoleLab : Examine the Quorum Settings

### **SQL 2016 Failover Cluster Instances**

In this module we move from the generic failover clustering to the specifics involving SQL.

Lessons

- Failover Cluster Instance
- As A FCI Appears To A Client

Lab : Create A Configuration File By Running The Advanced Cluster Preparation Wizard

Lab : Complete The SQL Cluster Installation On SQL1

Lab : Install The Cluster On SQL2 And SQL3

Lab : Test the SQL Cluster

### **SQL 2016 AlwaysOn Availability Groups**

Within the failover clusters of SQL are the concept of Availability groups and their enhancements with the release of SQL 2016 which is the focus of this module.

## Lessons

- Availability Groups and Replicas
- Primary Replica
- Secondary Replicas
- Availability Group Listener
- Availability Mode
- Synchronous Commit Mode
- Asynchronous Commit Mode
- Failover Modes
- Automatic Failover Without Data Loss
- Automatic Failover Requirements:
- Manual
- Manual Failover Requirements
- Common Topologies

Lab : Create a SQL Instance For The Availability Group

Lab : Enable the SQL Server AlwaysOn Availability Group Feature

Lab : Set Up For Availability Groups  
Lab : The Availability Group Wizard

Lab : SSMS and Availability Groups

## The Dashboard

Managing AlwaysOn High Availability groups with SQL 2016 is accomplished with the Dashboard. This module will demonstrate the skills necessary for the accomplishment of the management tasks.

## Lessons

- The Dashboard
- How to view logs
- Using replication with Logins
- Using partially contained databases

Lab : The Dashboard

Lab : Replicating Logins and Jobs

Lab : Contained or Partially Contained Databases

## **Active Secondary Availability Group Actions**

Within Availability groups you may have Active secondary SQL which is covered and demonstrated in this module.

### Lessons

- Reporting with Secondary Replicas
- Configuring a Readable secondary
- Read-Only Routing
- Load Balancing
- Lab: Configure a Read-Only Secondary
- Database Backups with Secondary
- Steps of Backup Using secondary
- Backup Preference Options

Lab : Database Backup Using Secondary Replica

Lab : Configure a Read-Only secondary

## **Maintenance**

In this module you explore maintenance procedures for AlwaysOn High Availability Groups.

### Lessons

- DBCC Checks
- Database Adding and Removing

Lab : Add a Database

Lab : Remove a DatabaseLab : Add a Replica

Lab : Remove a Replica

## **Monitoring And Troubleshooting Availability Groups**

In this the final module you will learn how to monitor the clusters and Availability groups and various common troubleshooting procedures.

### Lessons

- The Dashboard in Depth

- Events
- Policy Based Management for Availability Groups

Lab : Dashboard Wizards

Lab : Create an Extended Event Session

Lab : Using T-SQL

Lab : Policy based management for Availability Groups

Lab : Observe a Policy In Action

Lab : Create Three Conditions To Be Used In The RTO And RPO Policies

Lab : Create Two Policies RTO and RPO

Lab : Test The Policies

Lab : Change Endpoint Owner

- Migrating Settings by using Windows Easy Transfer
- Configuring a Reference Image of Windows 7
- Configuring a Reference Image