

## Differences between SQL Server Cluster and AlwaysOn

SQL Server Cluster and AlwaysOn are both high-availability solutions provided by Microsoft SQL Server, but they have distinct differences in terms of architecture, capabilities, and use cases. Here's a breakdown of the key differences between SQL Server Cluster and AlwaysOn:

### ### SQL Server Cluster:

#### 1. \*\*Single Instance vs. Multi-Instance:\*\*

- **SQL Server Cluster:** It is a traditional failover cluster instance (FCI) where a single instance of SQL Server is installed on shared storage. Failover involves moving the entire SQL Server instance from one node to another.

#### 2. \*\*Shared Storage Dependency:\*\*

- **SQL Server Cluster:** Relies on shared storage for the SQL Server database files. All nodes in the cluster share access to the same storage.

#### 3. \*\*Failover Impact:\*\*

- **SQL Server Cluster:** During failover, there is a brief interruption as the entire SQL Server instance moves to another node. Applications may experience downtime during this transition.

#### 4. \*\*Automatic Failover:\*\*

- **SQL Server Cluster:** Supports automatic failover, but the failover process involves stopping and starting the SQL Server service on the new node.

### ### AlwaysOn Availability Groups:

#### 1. \*\*Multi-Instance Availability:\*\*

- **AlwaysOn:** It allows the creation of multiple instances (replicas) of SQL Server databases, known as Availability Groups. Each replica can reside on a different node.

#### 2. \*\*No Shared Storage Requirement:\*\*

- **AlwaysOn:** Does not require shared storage. Each replica maintains its own local copy of the database. Data synchronization between replicas is achieved through log shipping.

#### 3. \*\*Granular Failover:\*\*

- **AlwaysOn:** Supports granular failover at the database level. Each database within an Availability Group can failover independently of others. This allows for more flexibility and reduced downtime for specific databases.

#### 4. \*\*Readable Secondaries:\*\*

- **AlwaysOn:** Allows read access to one or more secondary replicas, enabling offloading read-only workloads and improving overall performance.

5. **Automatic and Manual Failover:**

- **AlwaysOn:** Supports both automatic and manual failover. Automatic failover can be configured for certain conditions, while manual failover provides more control over the failover process.

6. **Integrated with Windows Clustering:**

- **AlwaysOn:** Utilizes Windows Server Failover Clustering for managing the underlying infrastructure but extends it with additional features for SQL Server high availability.

**Common Aspects:**

- **High Availability (HA):**

- Both solutions aim to provide high availability for SQL Server databases, ensuring minimal downtime in the event of a failure.

- **Windows Server Failover Clustering:**

- Both solutions utilize Windows Server Failover Clustering for managing the failover process and ensuring node availability.

In summary, while SQL Server Cluster is a traditional failover clustering solution with shared storage, AlwaysOn Availability Groups provide a more flexible and scalable approach with support for multiple replicas, no shared storage requirement, and granular database-level failover. The choice between them depends on specific business requirements and the level of high availability and flexibility needed for the SQL Server environment.