Exploring AlwaysOn Failover Cluster Instances
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Estimated time to complete lab is 45 minutes

The availability of data is an important issue for many organizations, as a database being unavailable would significantly affect their ability to service customers or their ability to carry out day-to-day processes. The Always On features in SQL Server 2014 are designed to ensure the database is still available, even when the primary server goes down.

The scenario:
You have many customers spread around the world, so there is no time when it is convenient to do server maintenance or repairs. However, such maintenance must still be done. Furthermore, sometimes the server unavoidably goes down, causing issues across the business. Your data management team are excited to hear about Always On, and ask you to implement it for their main data warehouse.

NOTE: this scenario breaks SQL Server 2014 Management Studio if an existing non-cluster SQL instance is already installed. DO NOT complete this scenario on SQLONE, instead use the SQLFOUR virtual machine.

As part of the SQL Server AlwaysOn offering, AlwaysOn Failover Cluster Instances leverages Windows Server Failover Clustering (WSFC) functionality to provide local high availability through redundancy at the server-instance level—a failover cluster instance (FCI). An FCI is a single instance of SQL Server that is installed across Windows Server Failover Clustering (WSFC) nodes and, possibly, across multiple subnets. On the network, an FCI appears to be an instance of SQL Server running on a single computer, but the FCI provides failover from one WSFC node to another if the current node becomes unavailable.

Connect to SQLFOUR computer
1. Click on SQLFOUR button on right side of the screen to connect to the SQLFOUR computer. If you see the following in the lower right corner of the screen, you can jump to step 5 below to set your screen resolution.

2. Click Send Ctrl-Alt-Del for SQLFOUR computer and then click Switch user.
3. Click Send Ctrl-Alt-Del for SQLFOUR computer again and then click Other user.

4. Log on to SQLFOUR computer as labuser with password pass@word1

Note, if you have a monitor that supports a larger screen resolution than 1024 x 768, you can change the screen resolution for the lab to go as high as 1920 x 1080. By going to a higher screen resolution, it will be easier to use SQL Server Management Studio.

5. Right click on the desktop and click on Screen resolution.

6. Select 1366 x 786 (a good minimum screen size for using SSMS) and click OK.

7. Click Keep Changes.

8. Resize the client hollaunchpad online window for the lab to fit your screen resolution.

Preparing the SQL servers for a Failover Cluster Instance (FCI)
You decide to extend Contoso’s WSFC to add Failover Cluster Instances for their OLTP databases. You will start by preparing the SQL servers for a Failover Cluster Instance (FCI)

1. Open the Windows start screen and type cmd into the screen, then right-click on Command Prompt from the list of search results this produces and select Run as administrator
NOTE: If you do not run as administrator, you will not be able to complete this scenario

2. Enter the following command into the command to go to the SQL Server 2014 media for running setup.

```
    cd "C:\SQLMEDIA\SQL Server 2014 RTM"
```

3. Enter the following command and press ENTER again

```
    Setup.exe
```
4. From the **SQL Server Installation Center** click on **Advanced**

5. Click on **Advanced cluster preparation**

```
NOTE: this may take a few seconds for the setup to prepare
```

6. Click **Run**
7. Click **Next** for the **Prepare Failover Cluster Rules** page.

8. In the box **Specify a free edition** select **Evaluation** and then click **Next**.
9. Place a tick in **I accept the license terms**

10. Click **Next**

11. Place a tick in **Use Microsoft Update to check for updates (recommended)**

**NOTE: If you don’t see this screen go to the next step**

12. Click **Next**
13. Select the following **Features**:

   **Database Engine Services:**
   
   a. SQL Server Replication
   
   b. Full-Test and Semantic...
   
   c. Data Quality Services

14. Click **Next**

15. Select the **Default instance**

16. Ensure the Instance ID: is **MSSQLSERVER**
17. Click **Next**

18. For the Service **SQL Server Agent** enter the Account Name `contoso\sqlserveragent` and the password **Password1**.

19. For the Service **SQL Server Database Engine** enter the Account Name `contoso\sqlservice` and the password **Password1**.

20. Click **Next**
21. Click **Install**

*NOTE: This will take approx. 15-30 mins. You can skip ahead to step 23 to perform the cluster instance installation for SQLFIVE.*

22. Click **Close** and if prompted **Restart** the Server
23. Repeat the above steps (1-20) on server SQLFIVE, but do not close the connection to SQLFOUR, you will be using it again shortly.

**Configure the server for the Failover Cluster Instance (FCI)**

1. Return to the SQLFOUR virtual machine.
2. You should still have the CMD window open as Administrator. Enter the following command and press ENTER.

```
Setup.exe
```
3. From the SQL Server Installation Center click on **Advanced**
4. Click on **Advanced cluster completion**
5. If you get a Security warning click **Run**
6. Review Report details and then click **Next**

7. In **SQL Server instance name** enter **MSSQLSERVER** if it’s not already entered

8. In **SQL Server Network Name** enter **SQLProdFCI**

9. Click **Next**

10. Ignore the warnings and click **Next**
11. Ensure **Cluster Disk 2** is selected and then click **Next**

12. Check the box next to **IPv4/Cluster Network 2** and then under **Address** enter **192.168.1.211**

13. Click **Next**
14. Leave the **Collation** on **SQL-Latin1-General_CP1_CI_AS**

![Server Configuration](image)

15. Click **Next**

16. Ensure **Authentication Mode** is set to **Windows authentication** mode

17. Click on **Add Current User**
18. Click **Next**

19. Verify the features to be installed and then click **Install**
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20. Click Close

NOTE: this will take approx. 5 mins

Check the Failover cluster is working. First, create a database called ContosoSalesDB that you can use for testing

1. Open SQL Server 2014 Management Studio from the Windows Start screen and in the connection box, enter SQLPRODFCI as the server name

2. Ensure Windows Authentication is selected and then click Connect
3. Select File then Open and then File...

4. Browse to C:\SQLSCRIPTS\E2 and select E2A-3-#1

5. Click Open

6. Click Execute

7. When the script has completed close SQL Server 2014 Management Studio

**Test by creating a connection to the database from SQLONE**

1. Login to the SQLONE virtual machine as contoso\labuser with the password pass@word1 by clicking on SQLONE in the VM selector pane at the right of your screen.

2. Open SQL Server Development Tools for Visual Studio 2013 from Windows Start

3. Select SQL Server Object Explorer from View menu
4. In the **SQL Server Object Explorer**, right click on **SQL Server** and select **Add SQL Server**.

5. Enter `SQLPRODFCI` as the server name and select **Windows Authentication** then click **Connect**.
6. In the **SQL Server Object Explorer** a node for **SQLPRODFCI** will appear under the **SQL Server** node. Expand this node and the **Databases** node to see you can connect (there is a list of databases present shows we can query the server.)
Verify database connectivity after failover to SQLFIVE

1. Go back to SQLFOUR

2. Right click on Start and select Shut Down or Sign Out > Restart
3. Select **Other (Planned)** and click **Continue**

*Note: This will force a failover to SQLFIVE.*

**Verify connectivity**

4. Go back to **SQLONE**

5. In the Visual Studio **SQL Server Object Explorer**, right-click on the **SQLPRODFCI node** and select **Refresh**.
This connection can refresh, even the SQLFOUR (the host computer) is not available – failover has been successful.


**This lab is complete**

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