

SQL Server 2012 – Step-by-Step – Create the AlwaysOn Availability Group

Brief

The object of this guide is to outline the steps involved in creating a Windows Server 2012 Failover Cluster specifically for use with a SQL Server 2012 Instance utilizing the Always On Availability Group feature. This will be a wizard install and so will not cover any pre-staged elements; it will also not cover Cluster Shared Storage for Failover Clusters, or SQL Server 2012 Clusters.

Assumptions

The installation steps assume the following:

1. Two identical virtual machines with Windows Server 2012 R2 installed
2. Administrative Accounts have been created
 1. Domain Administrator to perform install
 2. SQL Server Account
 3. SQL Agent Account
3. Storage has been allocated and assigned as follows:
 1. 2 disks for SQL Database storage – 1 drive per server, for Always On AG
 2. Both disks should be assigned the same drive letter on both machines
4. IP Address reserved for AG Listener
5. Temporary File Share accessible by SQL Service Account and both Servers
6. Failover Cluster Feature is installed on both machines

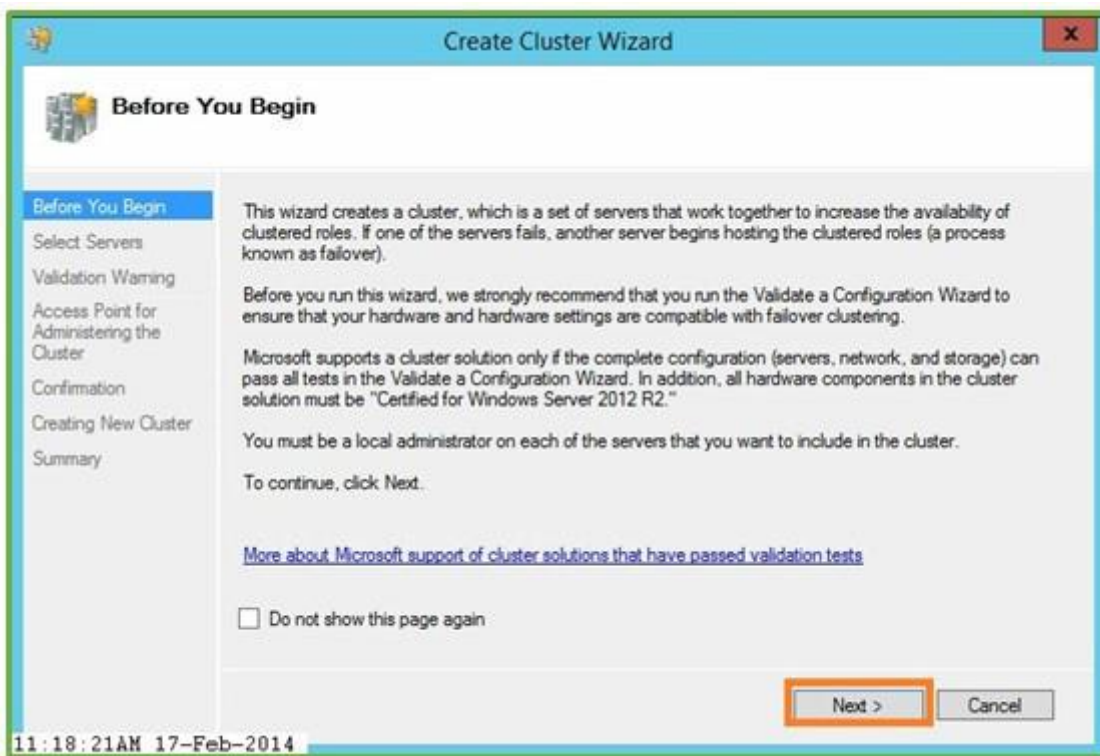
Windows Server 2012 R2 Failover Cluster Installation

In **Server Manager**, Select **Tools, Failover Cluster Manager**.

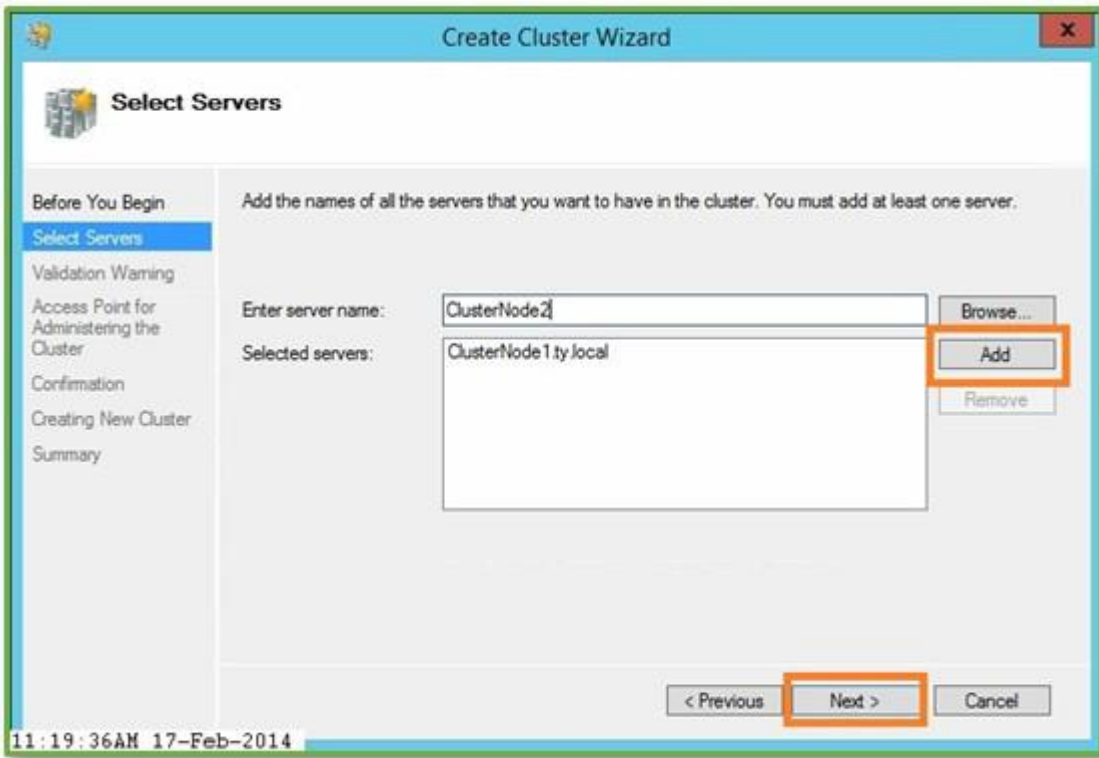
In **Failover Cluster Manager** select **Create Cluster**.



On the Default Screen click **Next**.



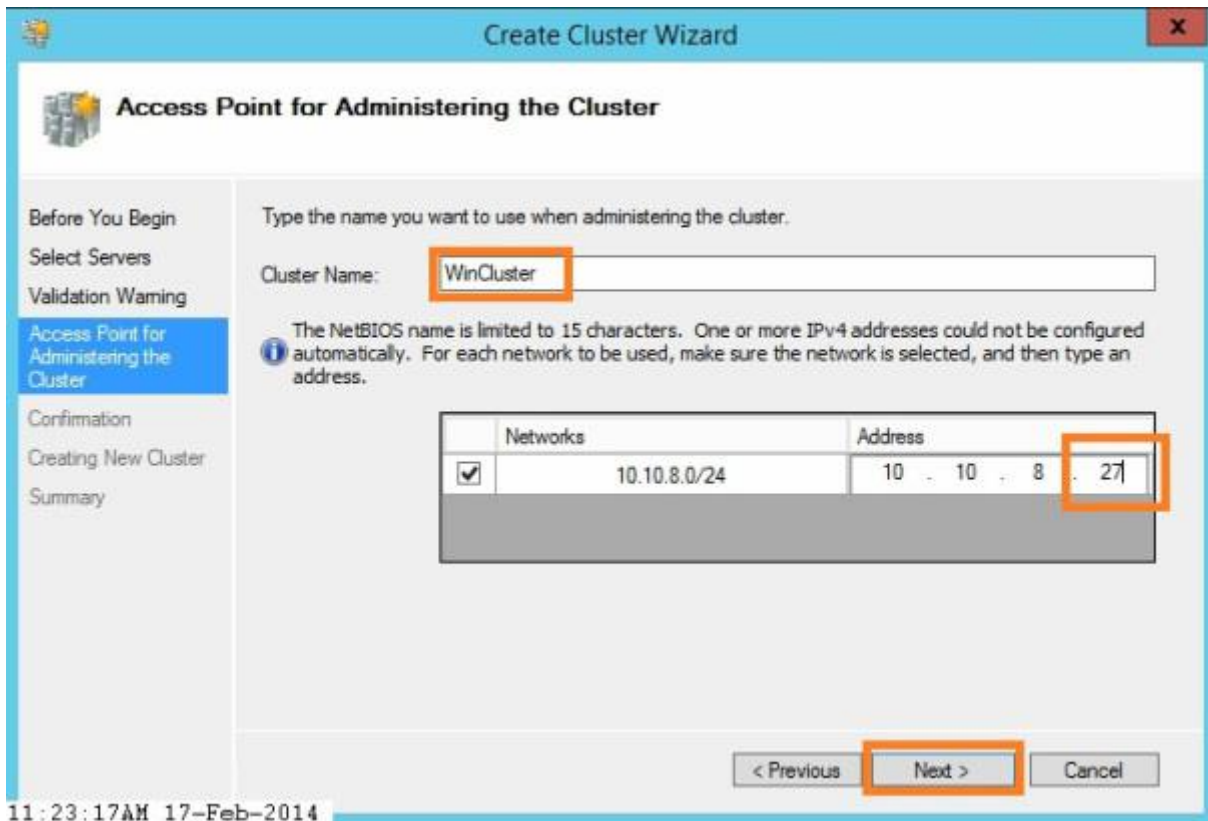
Enter the **Server Name** for both Servers to be added to the Cluster and Click **Add**.



If this is for a production environment select **Yes**, otherwise select **No**. The report can also be run on-demand from the Main page of the Failover Cluster Manager. Click **Next**.

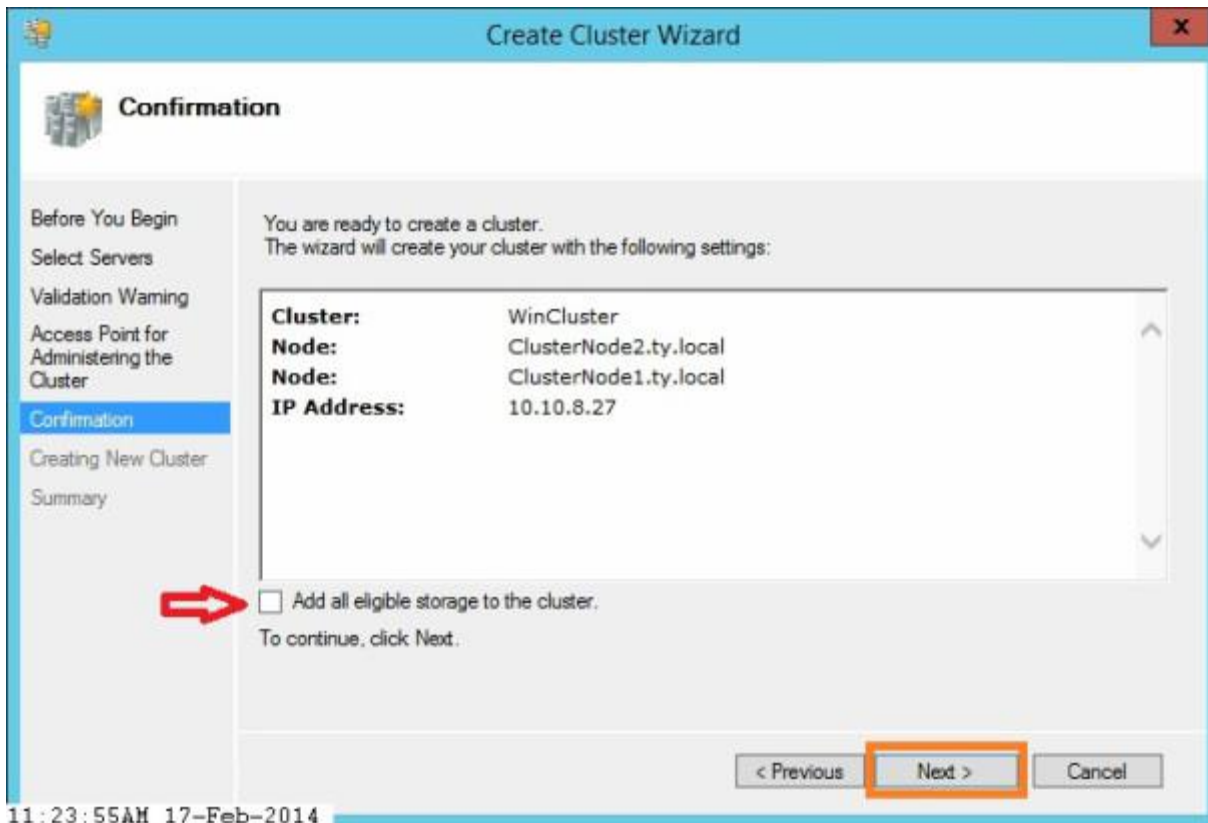


Enter a **Cluster Name***. This will be the name of the computer object created in Active Directory. Enter the **IP Address** reserved for the Windows Cluster Name Object.



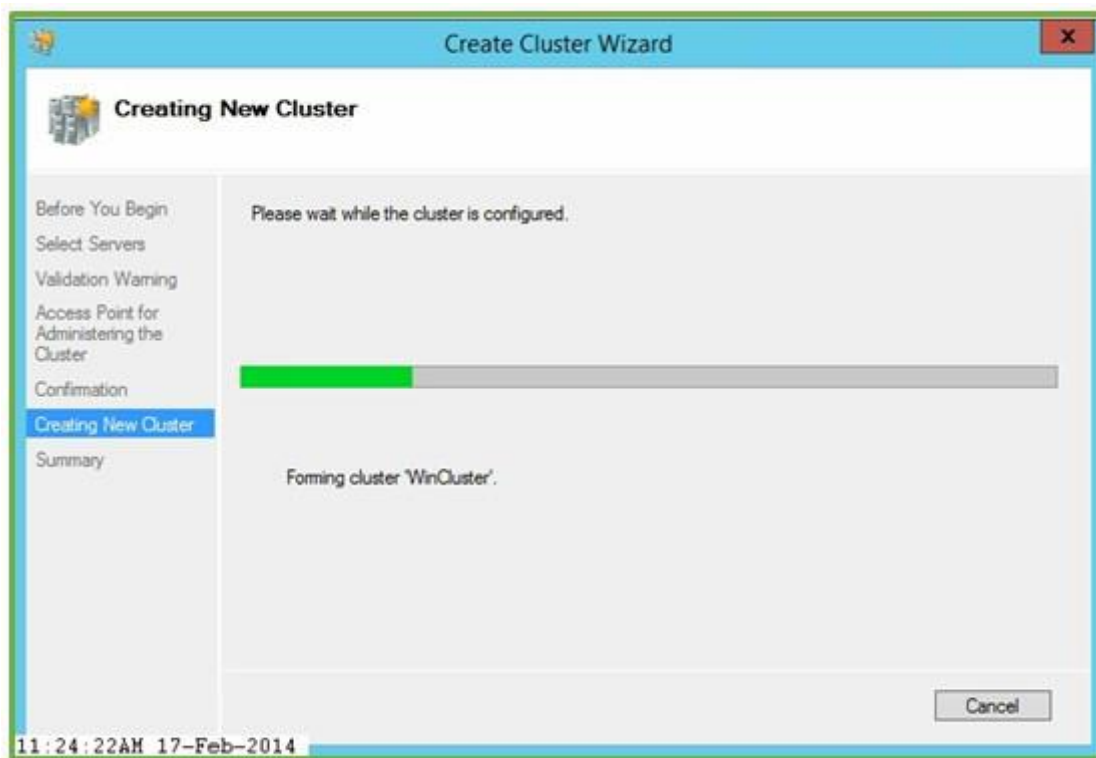
If the Cluster Name Object needs to be created in an AD container (OU) that is different from the **Computers OU, enter the fully qualified name for the object. For example, **CN=WinCluster,OU=ClusterObjects, DN=ty, DN=local**.*

Verify the information for the cluster. In this exercise, no **Storage*** will be added to the cluster so **Uncheck** the “Add all eligible storage to the cluster” selection box (Red Arrow). Click **Next**.



**The Always On Availability Group does not use a Cluster Shared Volume. Instead it uses a drive on each server with the same drive letter (i.e. G:\).*

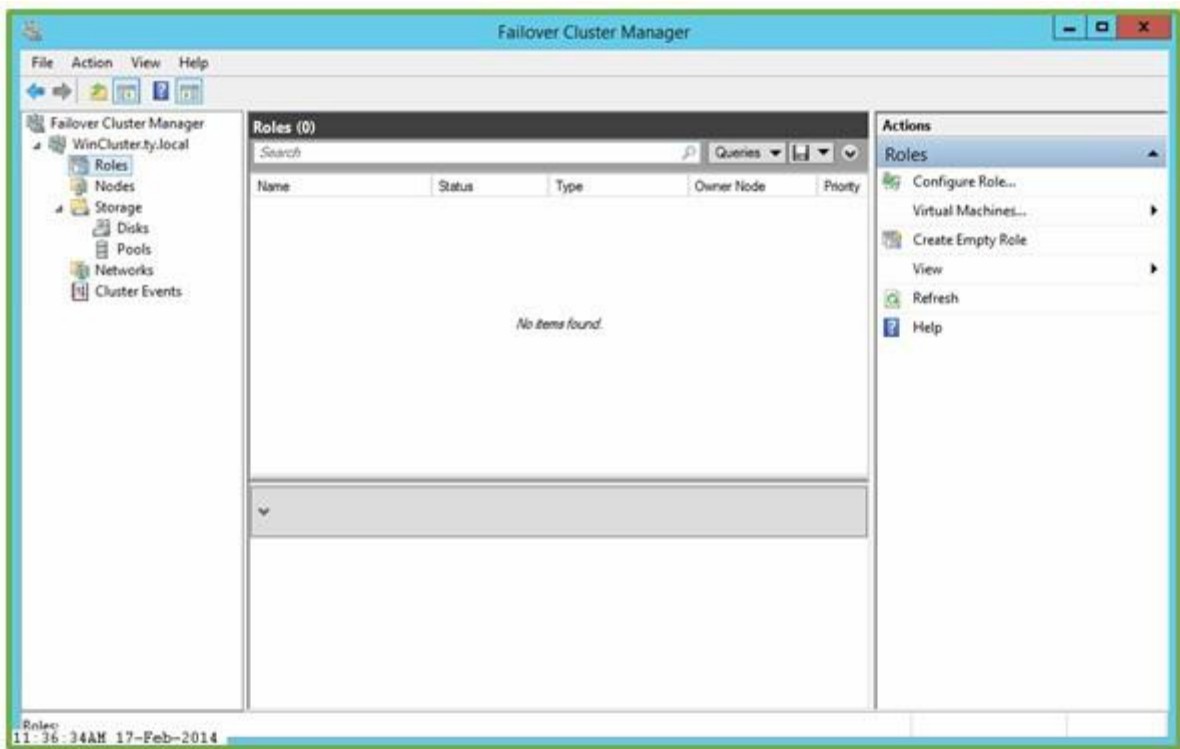
The Cluster Creation operation runs.



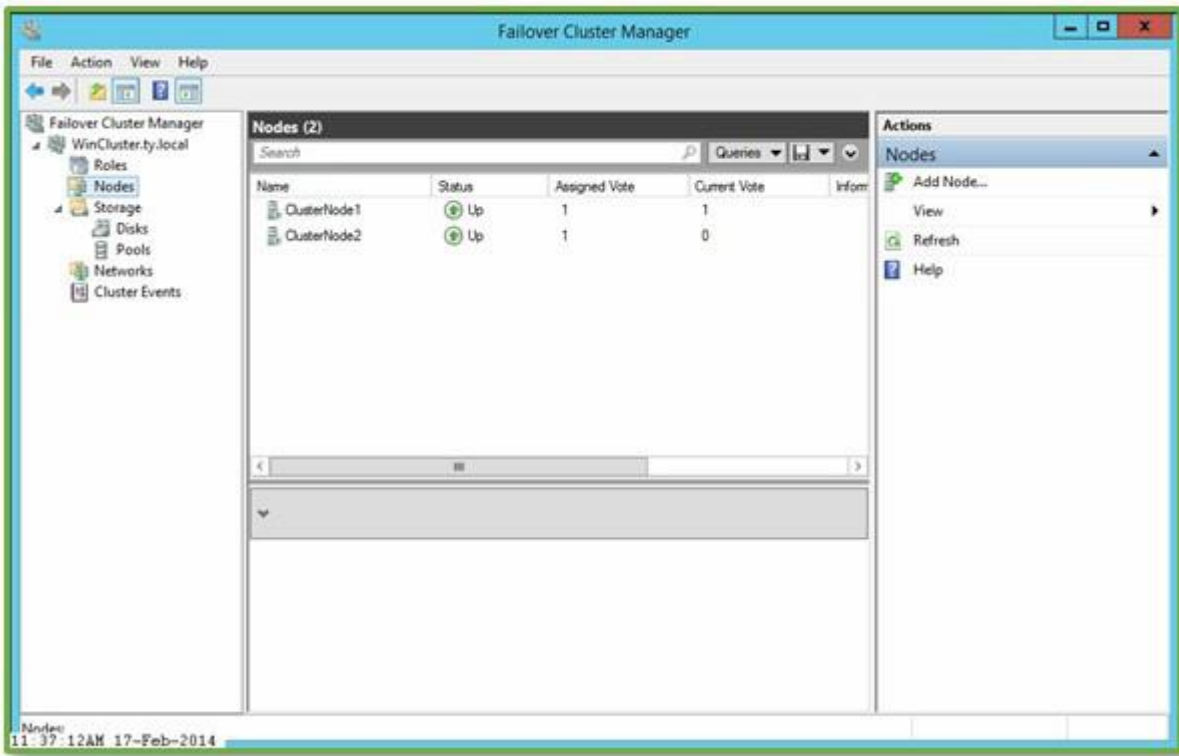
The Summary page appears when the creation process completes. Click **Finish**.



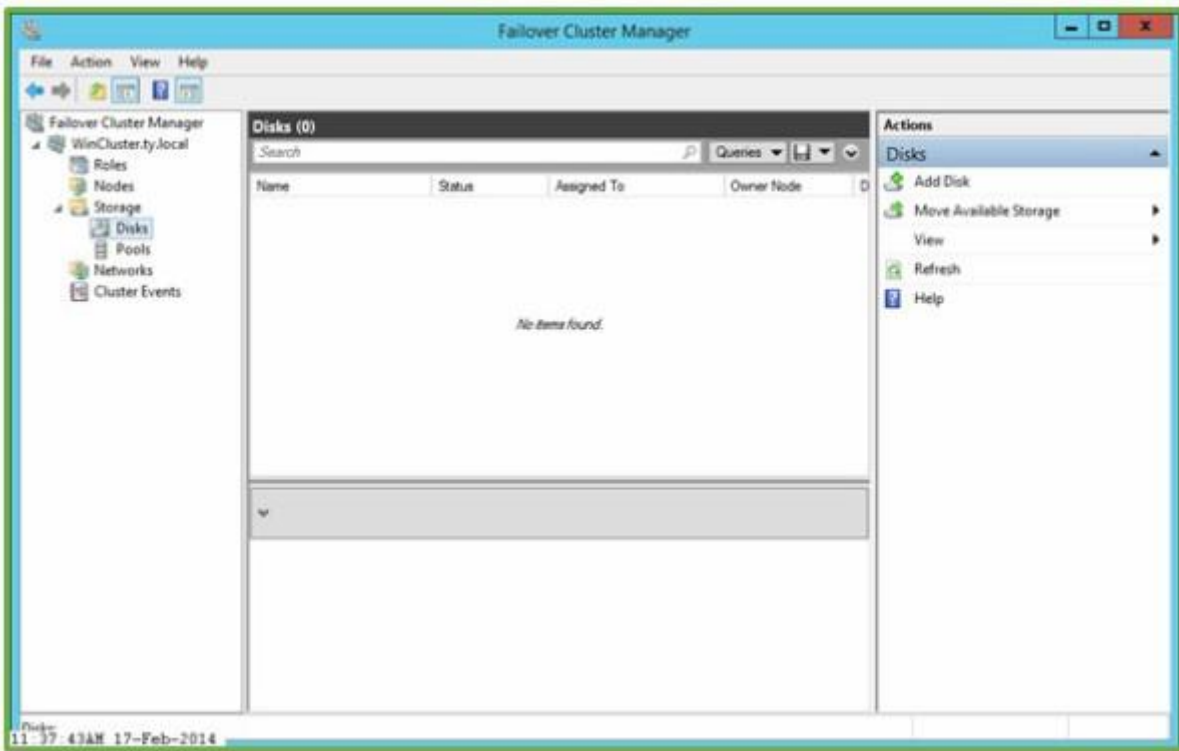
The **Roles** window will be empty. This is correct.



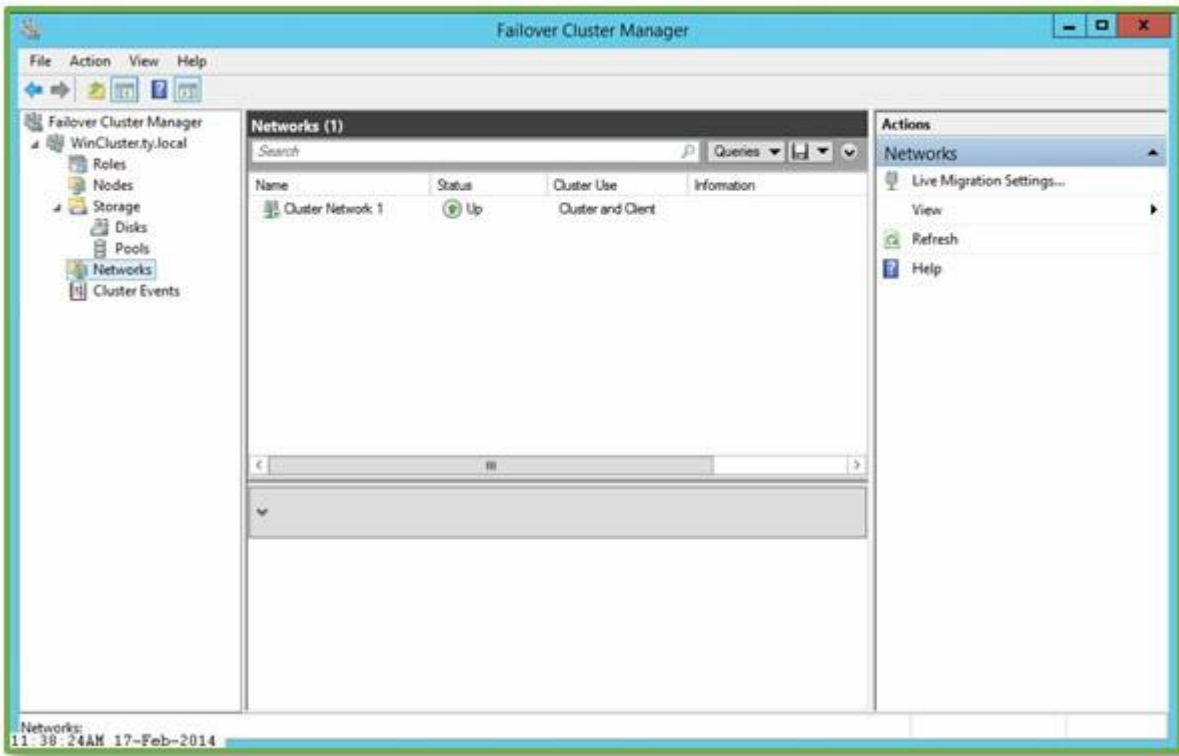
The **Nodes** window will show both servers participating in the Cluster.



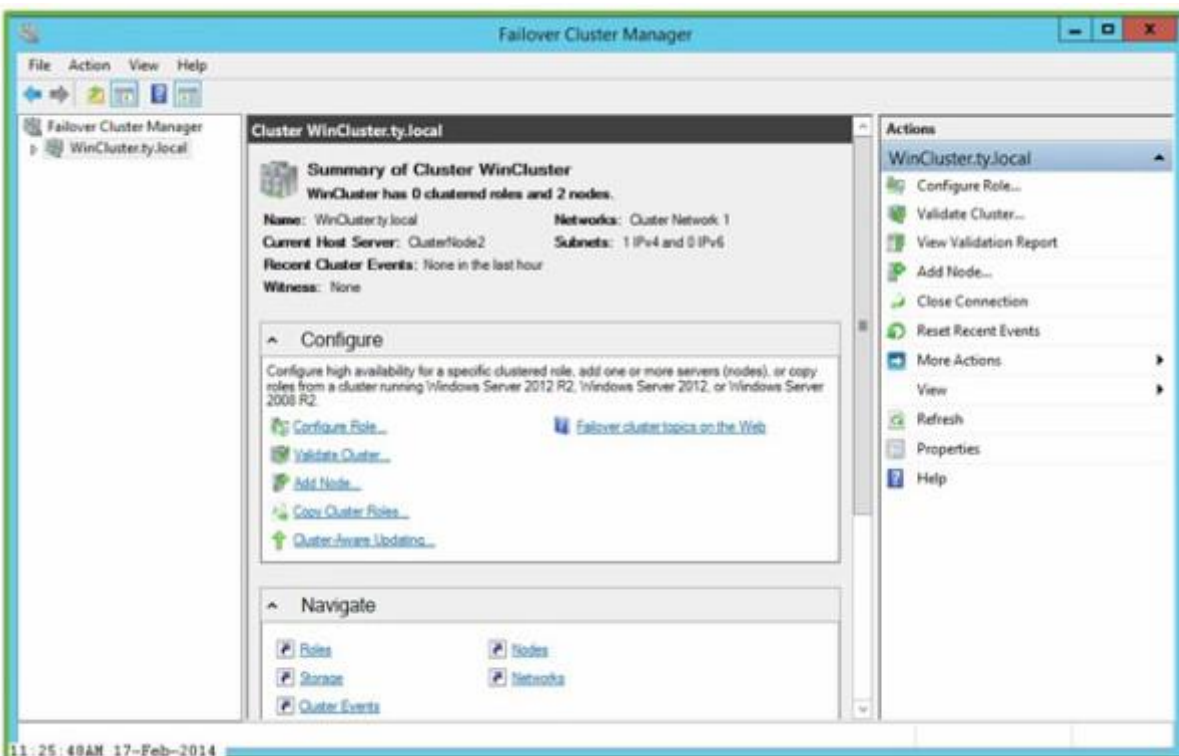
The **Disks** window will be empty. No **Shared Volumes** will participate in the cluster at this time.



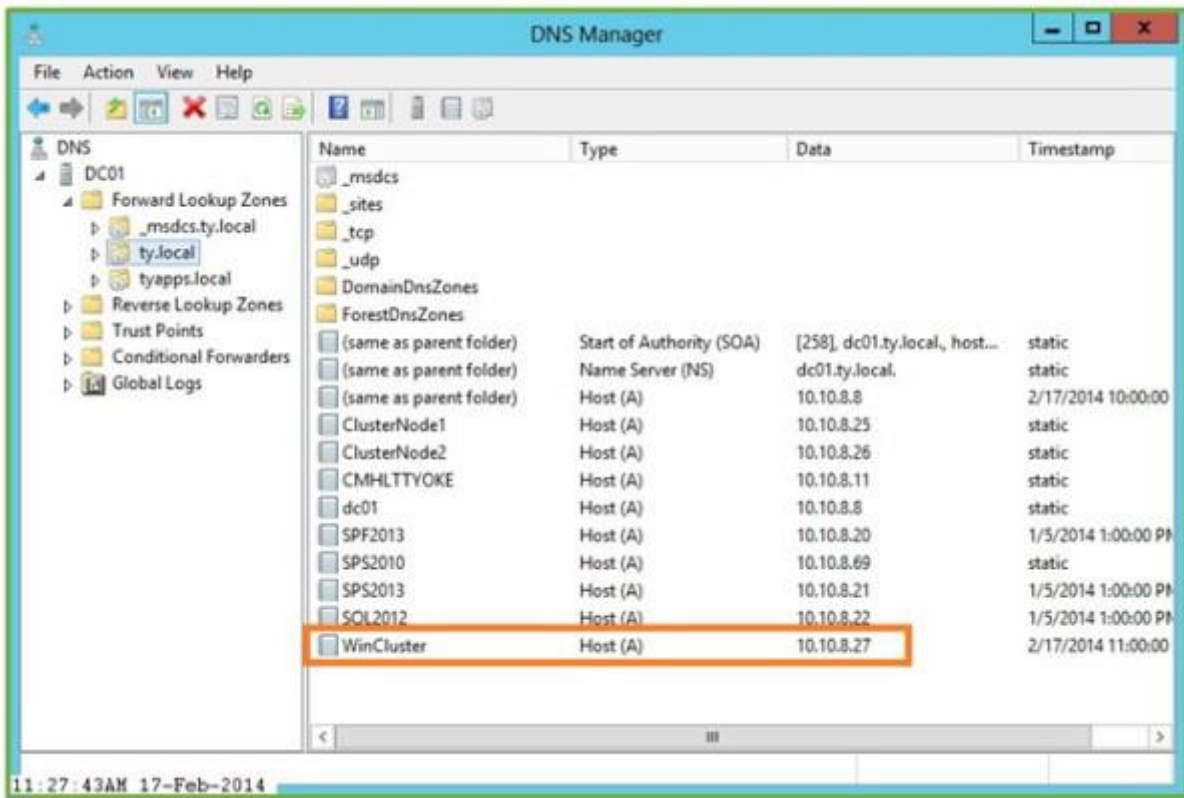
The **Networks** window will show the one configured IP Address. If more network cards/IP Addresses were configured for this Virtual Machine, more networks could have been added for redundancy and/or performance.



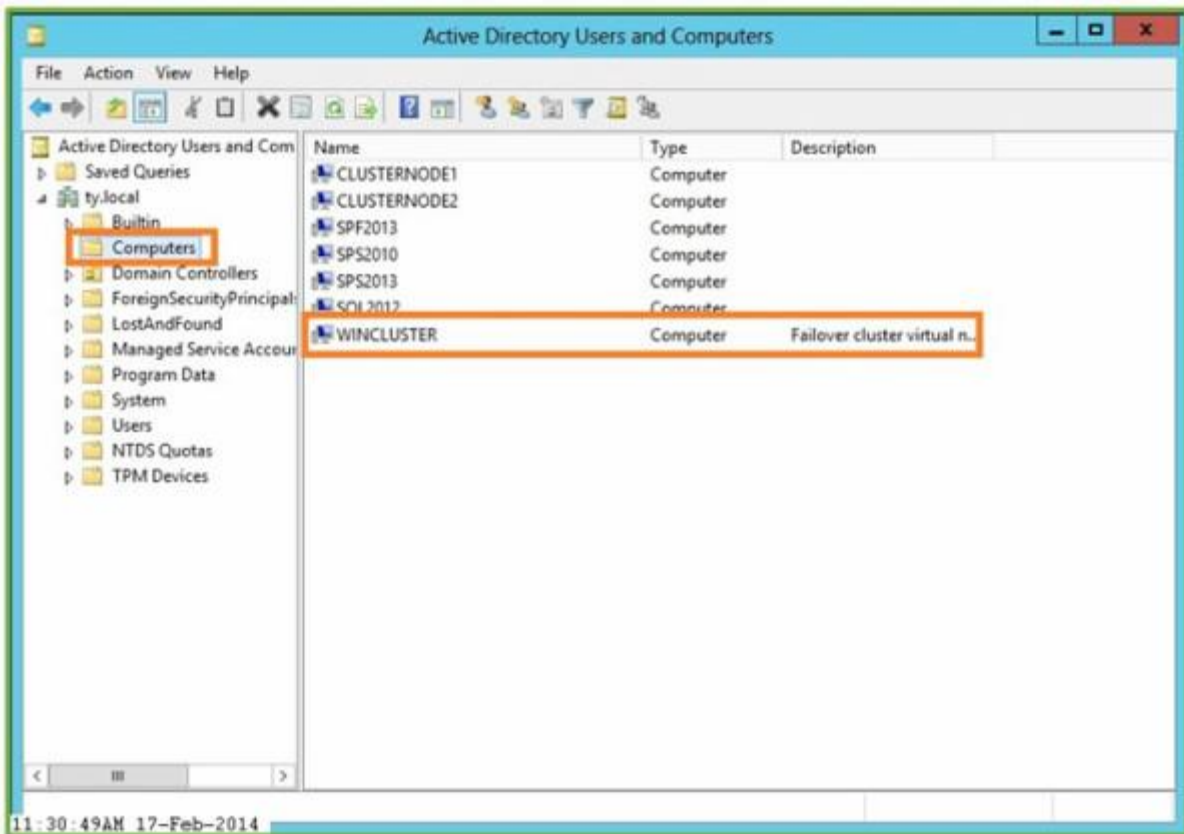
The **Failover Cluster Summary Window**.



The **Failover Cluster** preparation process creates a **DNS entry** using the Cluster Name Object's Name.



Based on the installation screens above, the **Cluster Name Object** was created in the default **Computers OU** in Active Directory.

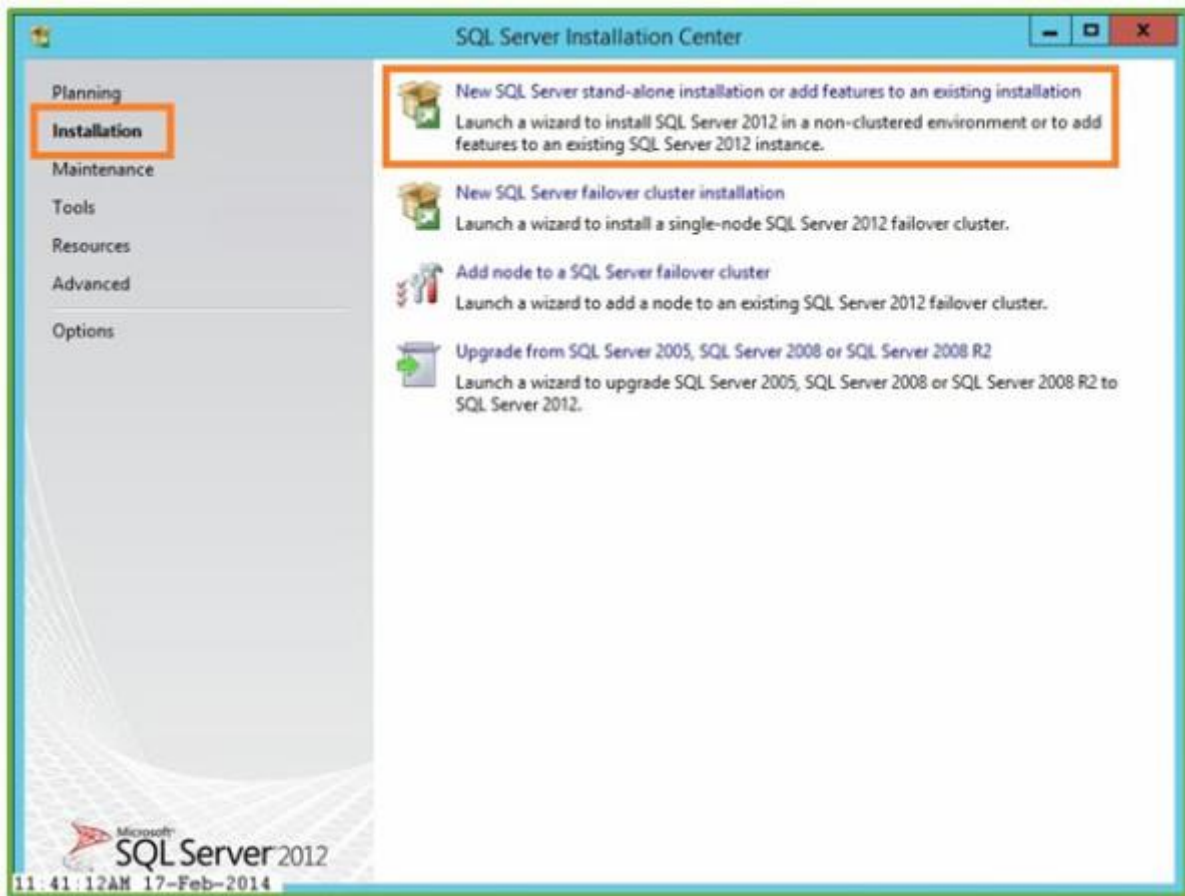


SQL Server 2012 Availability Group Configuration

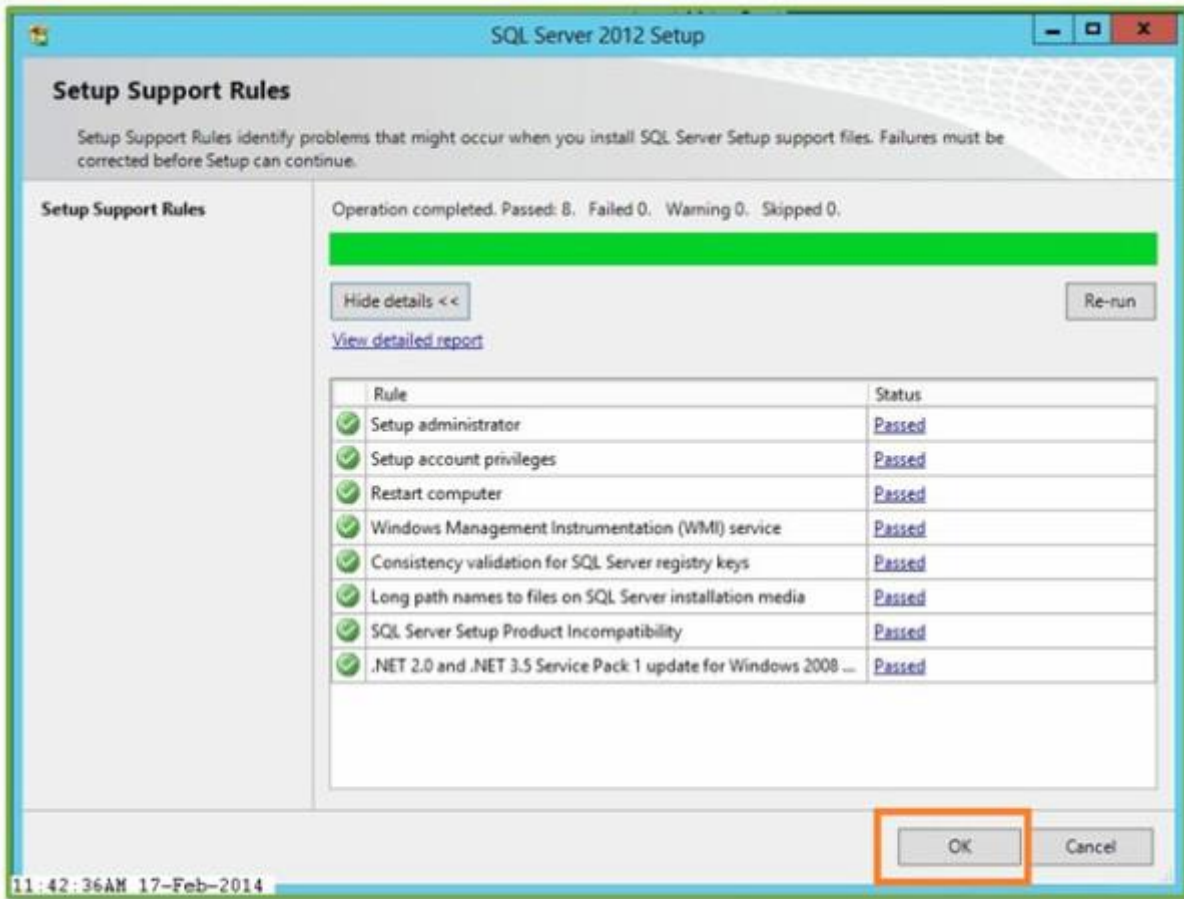
In this series of steps, a very basic SQL Server 2012 installation will be performed with a **Named Instance**, and an **Always On Availability Group** will be created.

Run **Setup** from the SQL Server 2012 Installation Media, File share, ISO, etc.

Select **Installation**, then “**New SQL Server stand-alone installation...**”



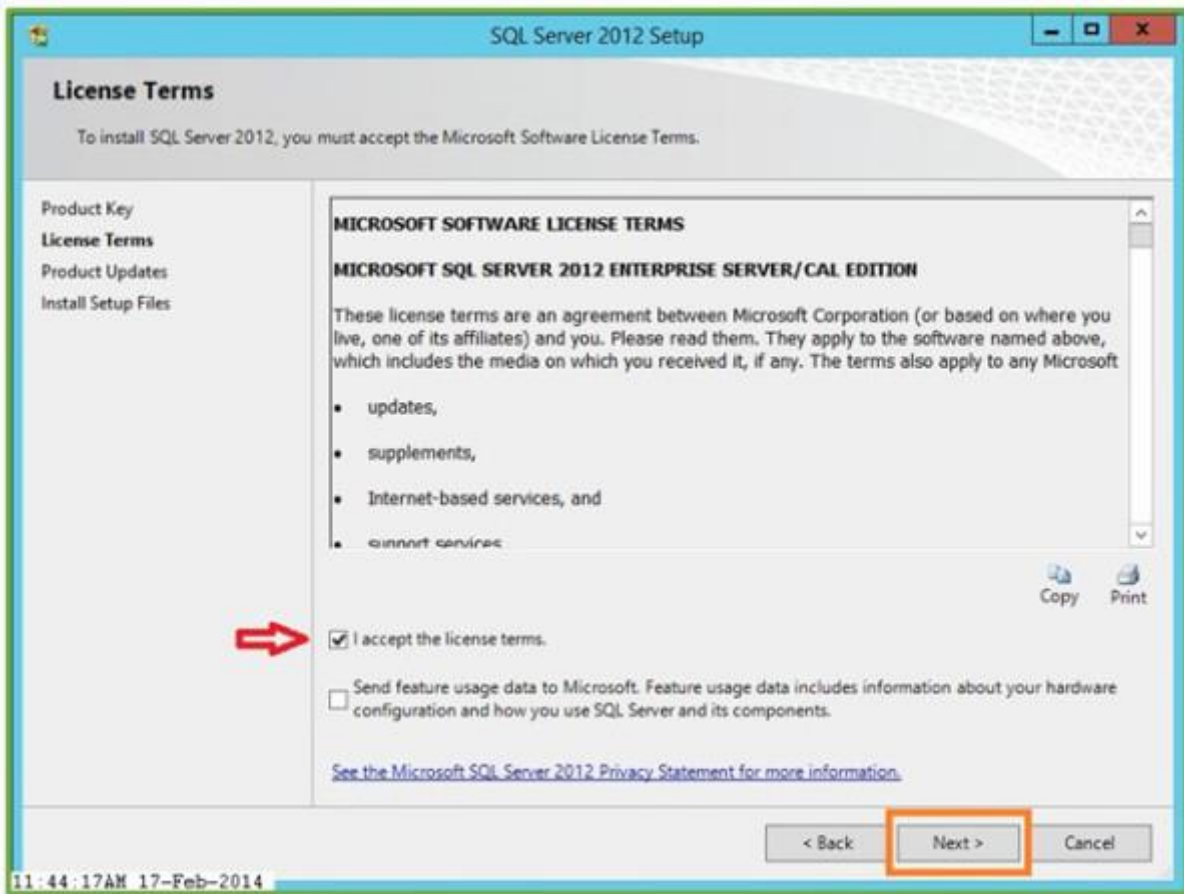
Setup Support Rules Checker will run. Click **OK**.



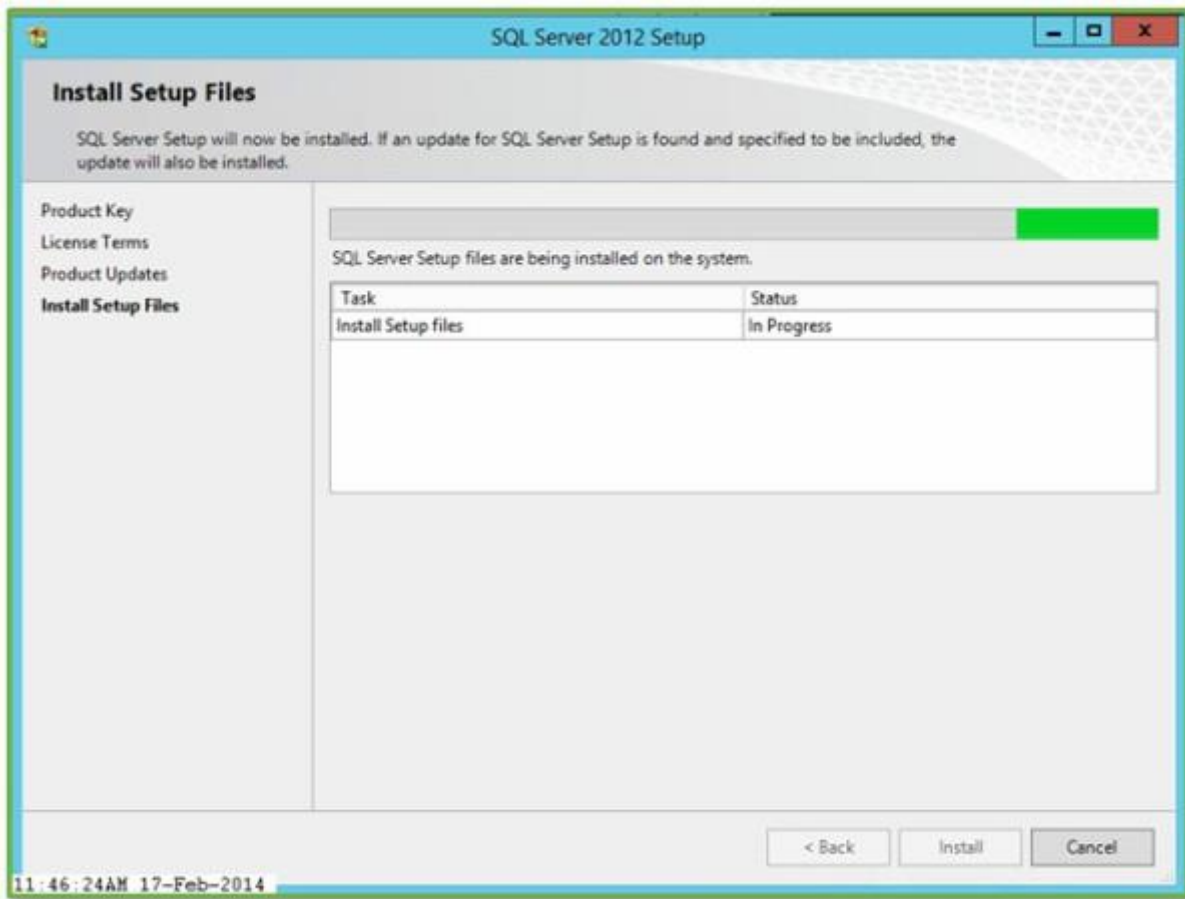
The product is pre-pidded so just Click **Next**.



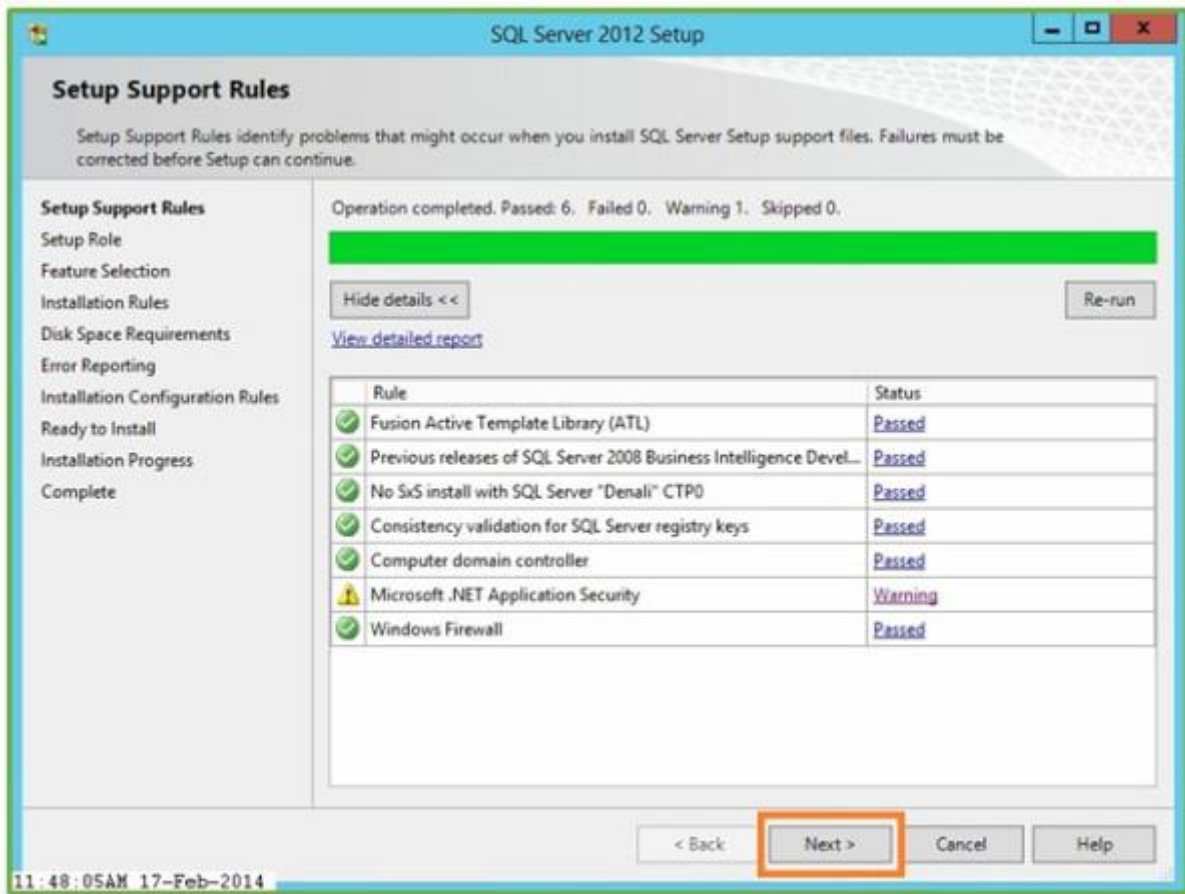
Accept the license terms and Click **Next**.



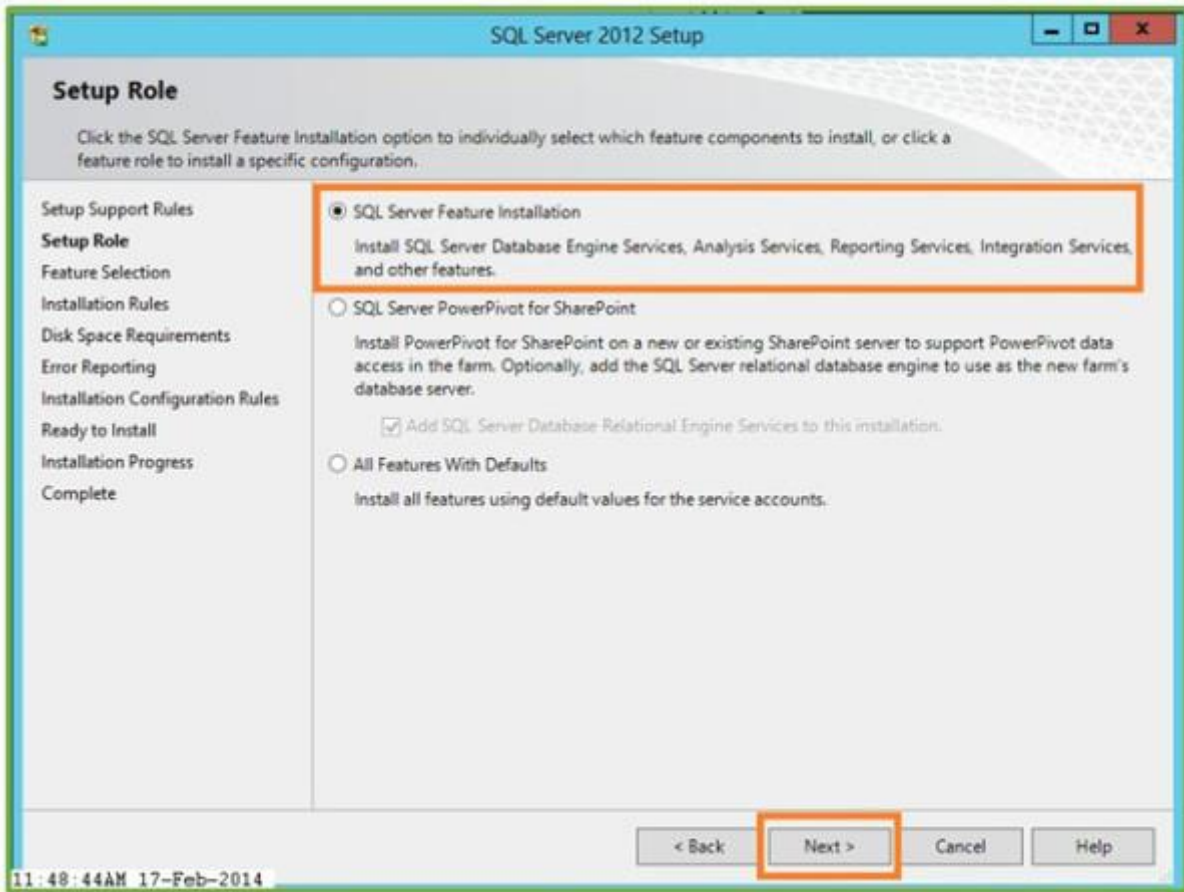
Click **Install** to run the Installer Setup Files Installer.



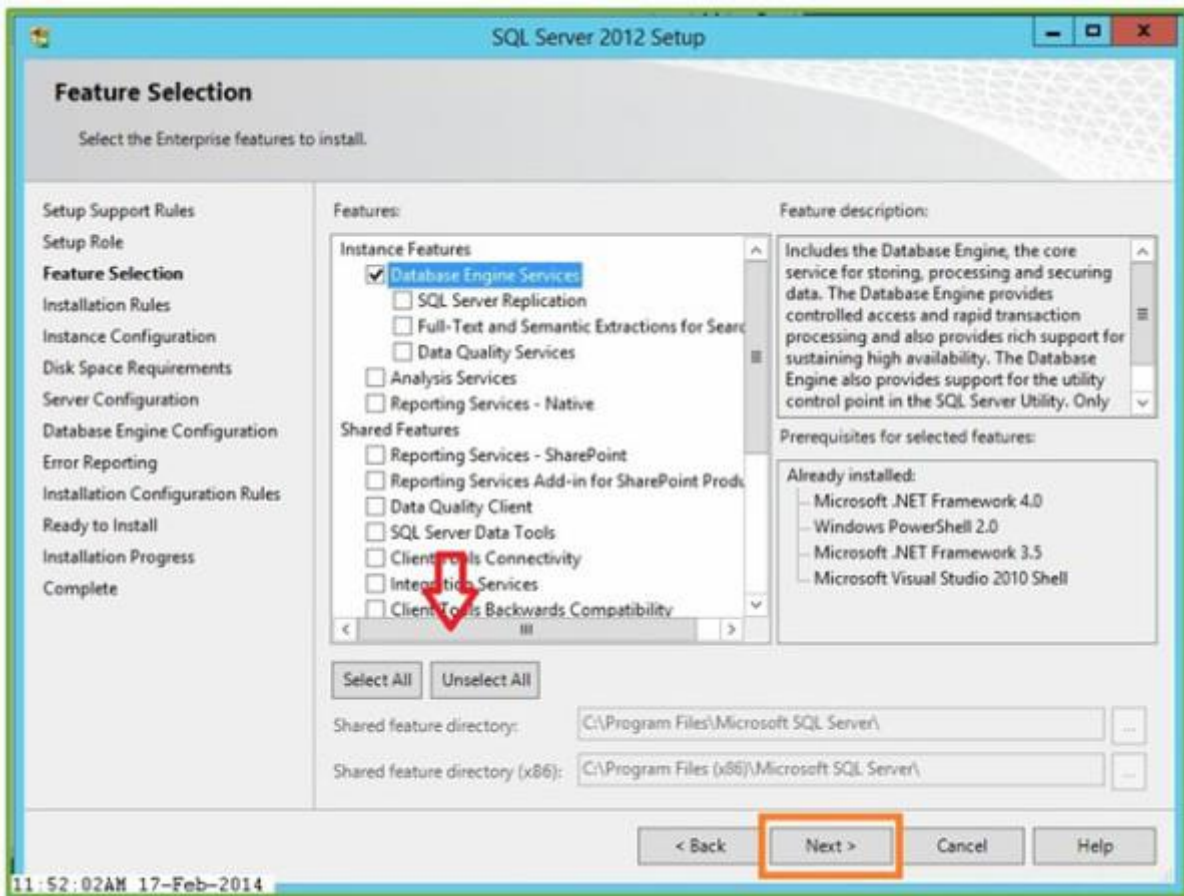
The Setup Support Rules Checker will run. Click **Next**.



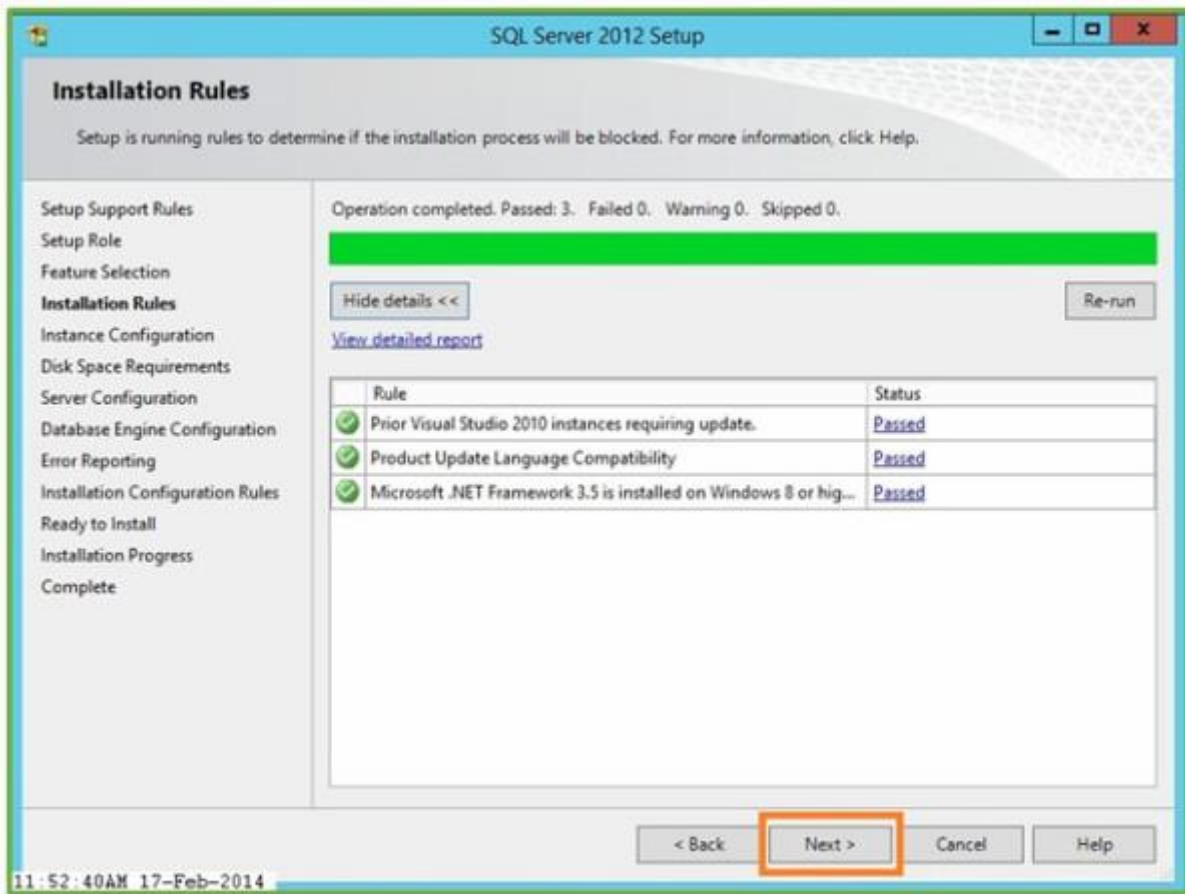
Select **SQL Server Feature Installation** and Click **Next**.



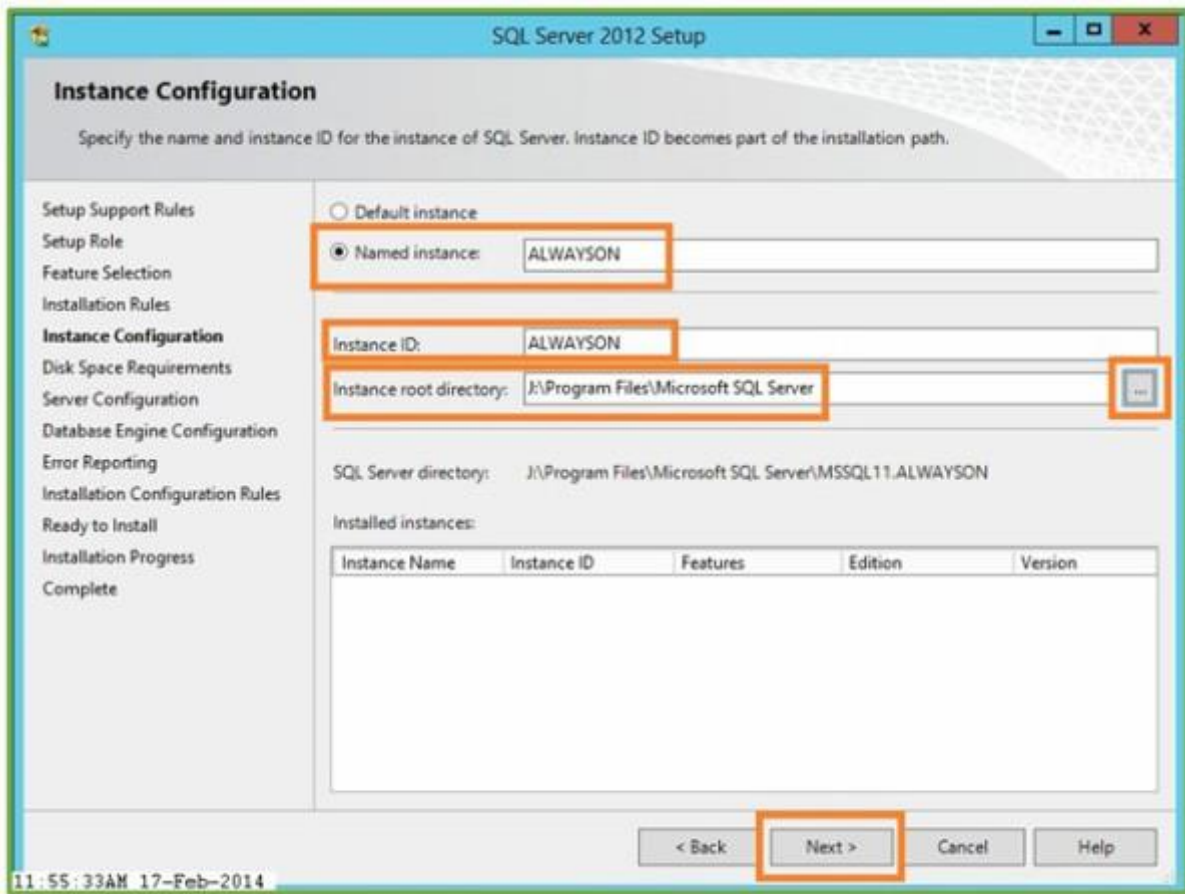
Select **Database Engine Services**, then scroll down and select **Management Tools**, then click **Next**.



More Rules will be checked. Click **Next**.

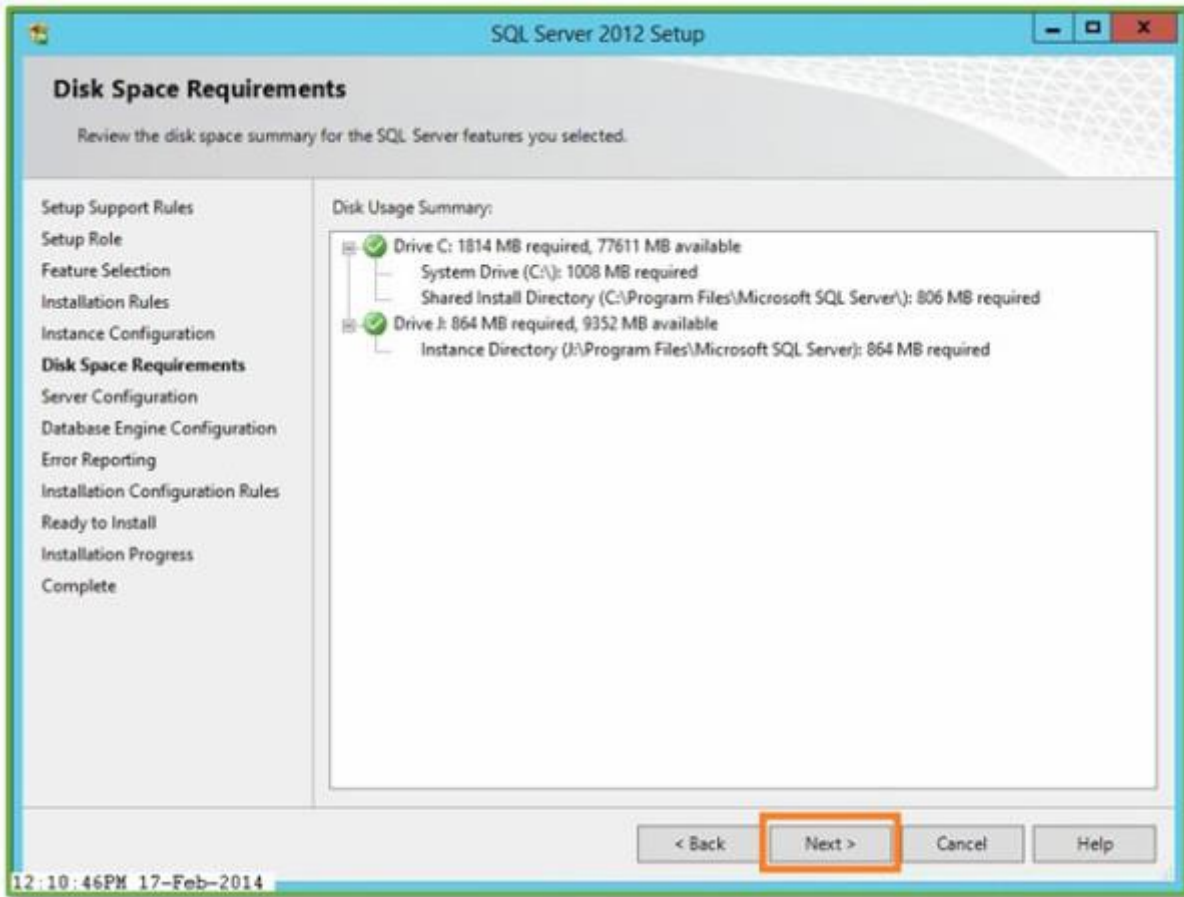


Enter a **Name** for the Named Instance that the Databases and Availability Group will use. The Name is automatically entered in the Instance ID: text box. Enter the path where the database files will be stored*. Click **Next**.

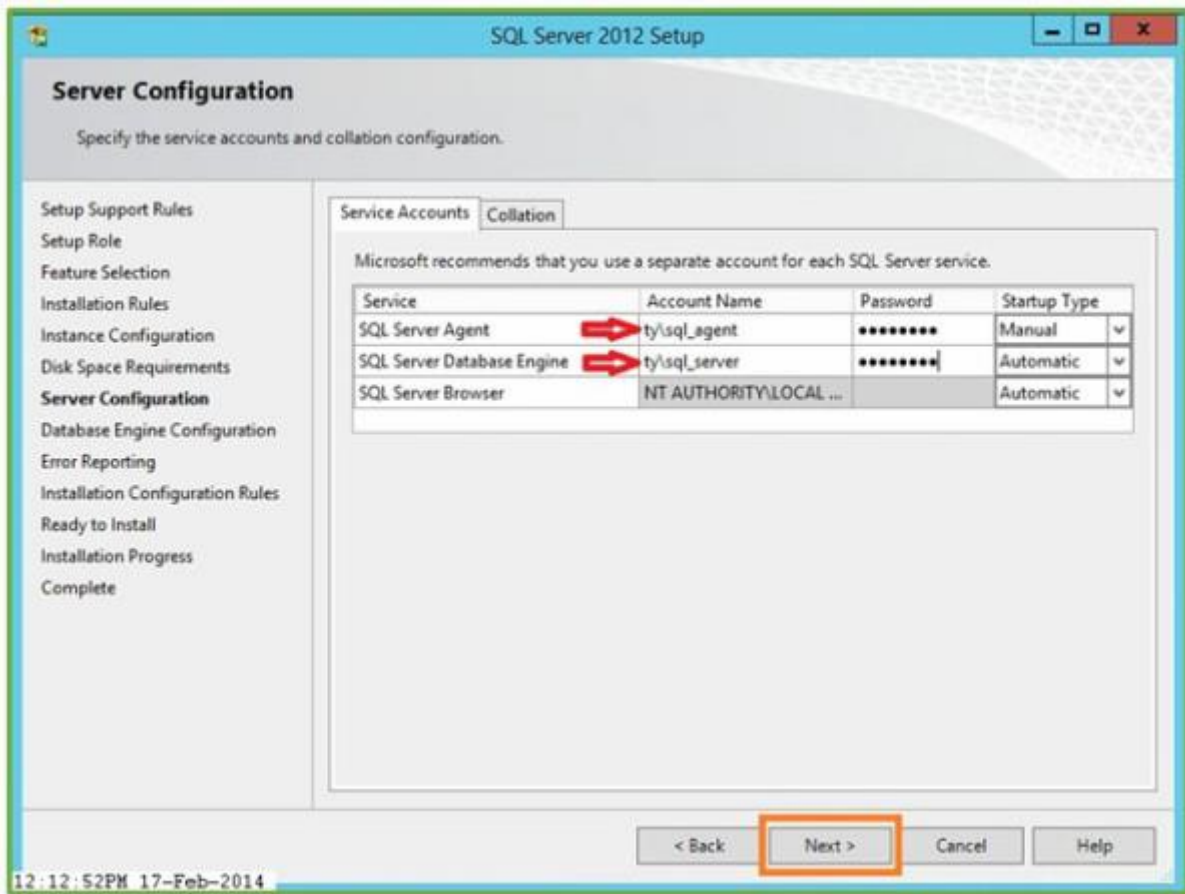


**Use the browse button or type in the drive letter created in the Failover Cluster Installation section. This is the drive with the same drive letter on both Servers.*

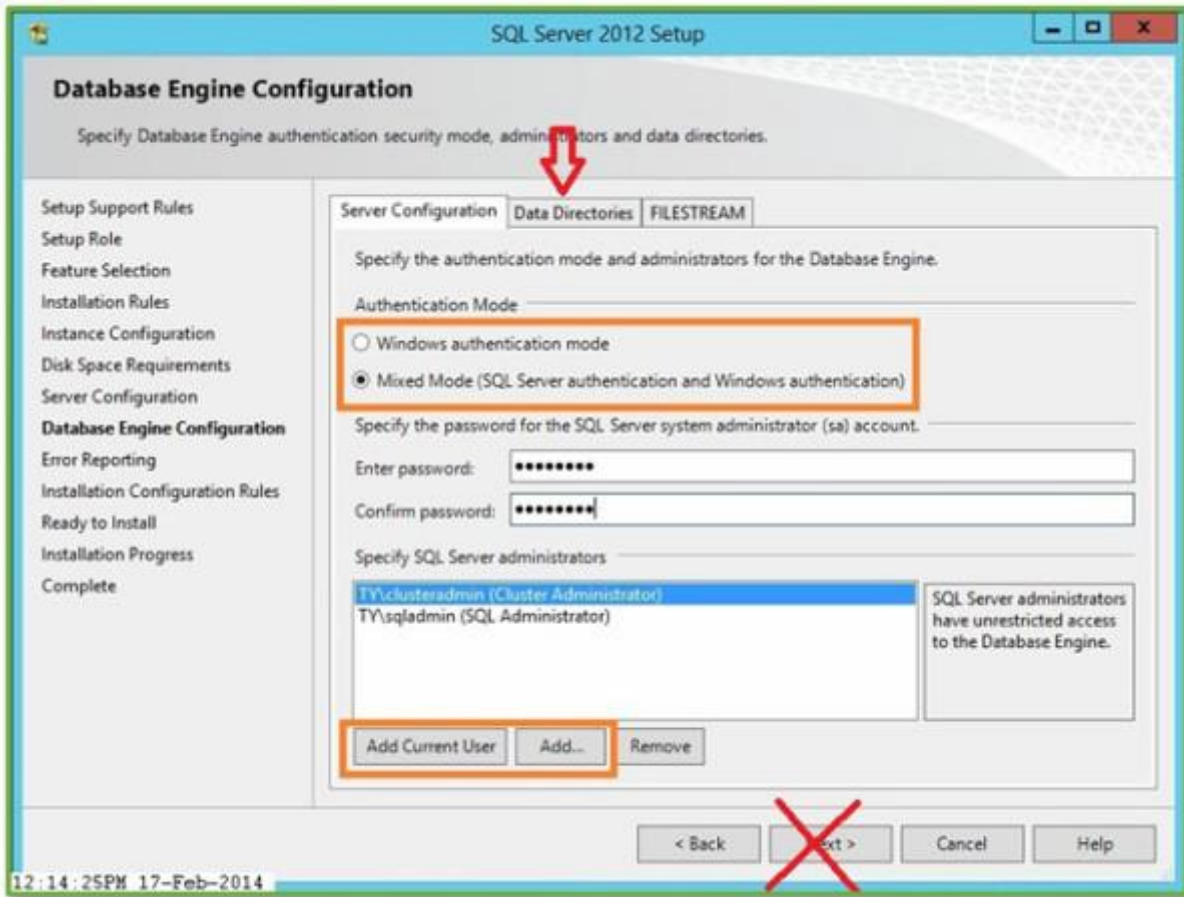
Verify Disk Space Requirements and Click **Next**.



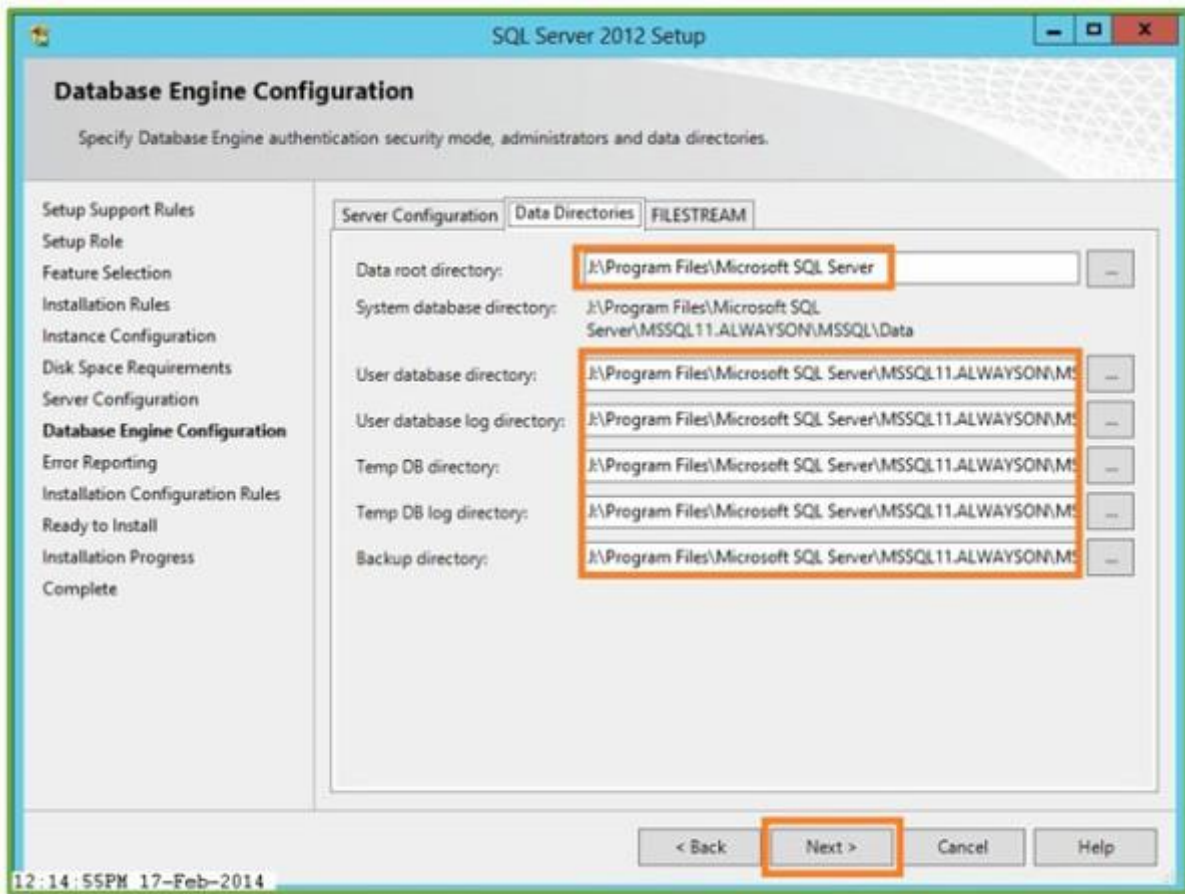
Accept defaults, or enter a SQL Server Agent domain account/password and SQL Server Database Engine domain account/password. Click **Next**.



Select **Authentication Mode** and **Add Users** as SQL Server Instance Administrators. Click the **Data Directories** tab before clicking Next.



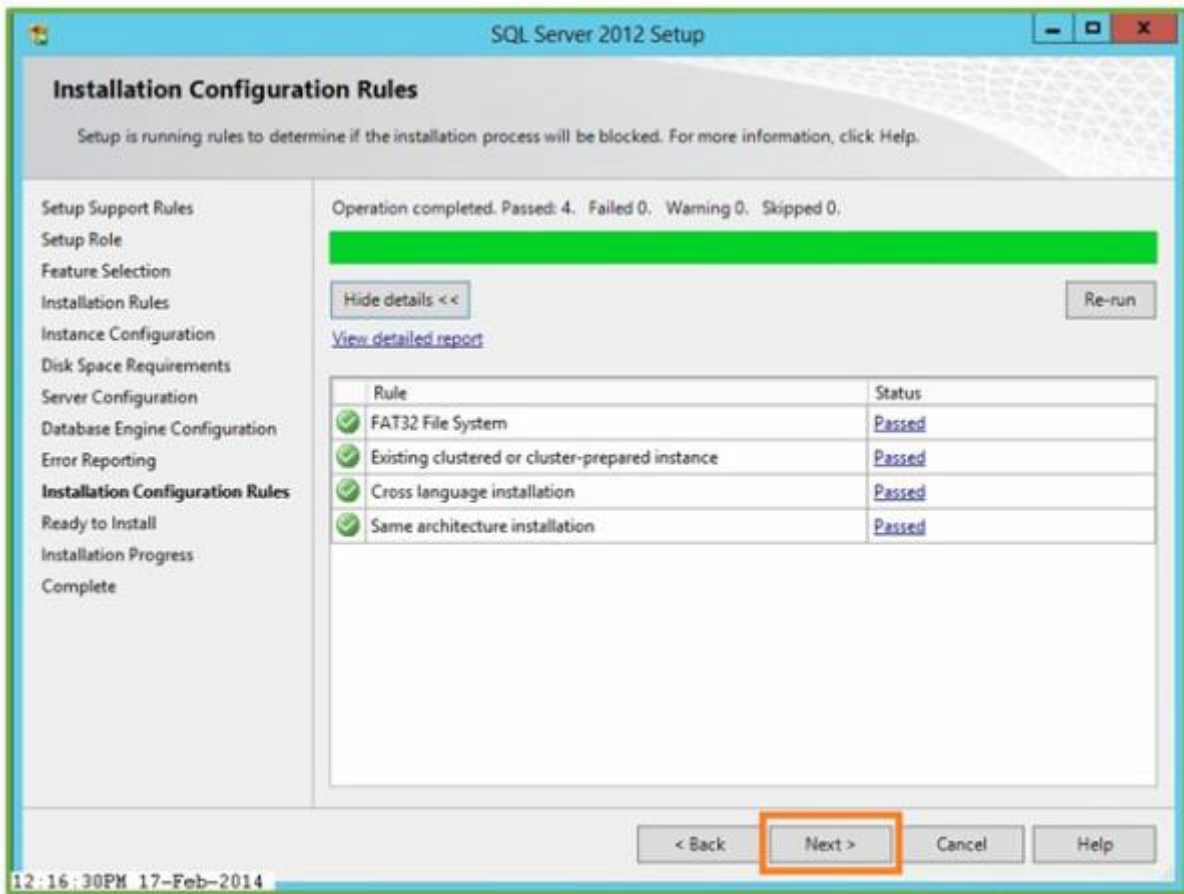
Verify that the **Data Directories** are correct. Click **Next**.



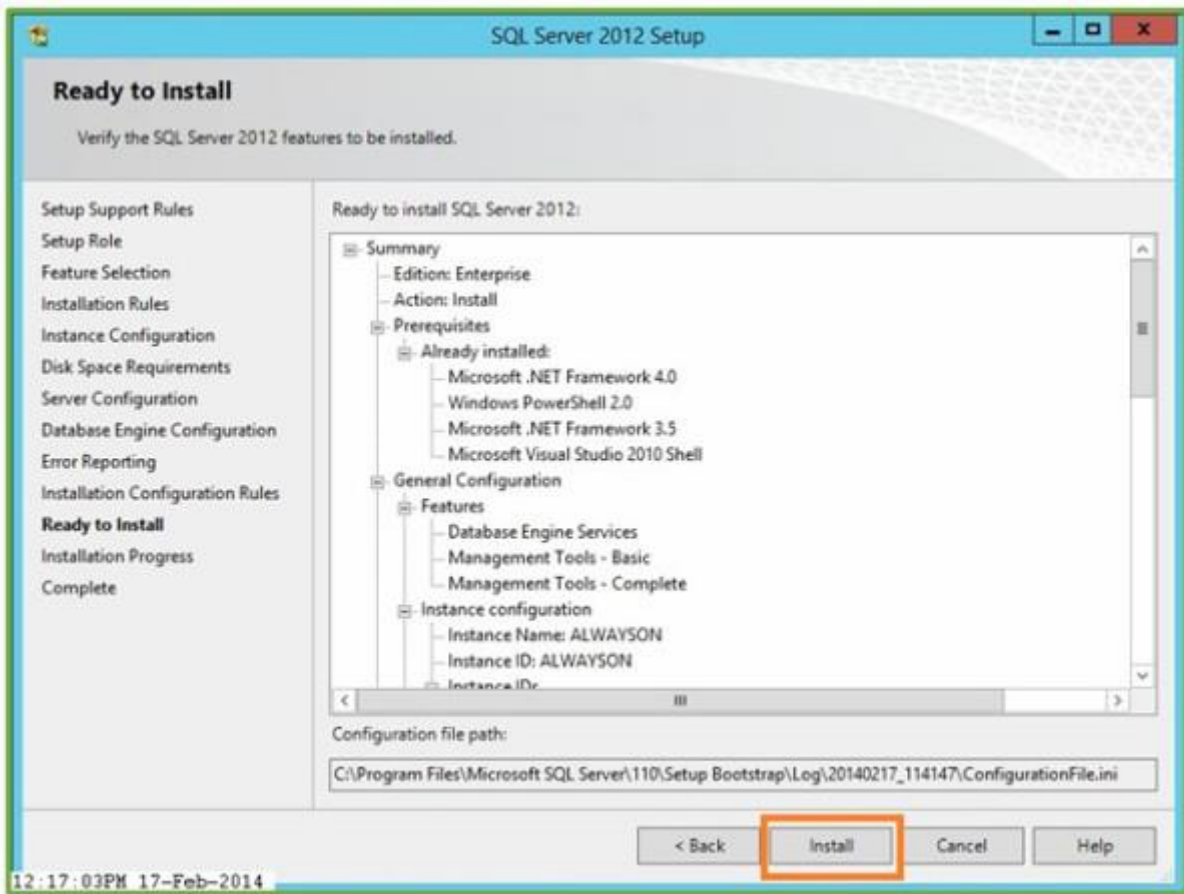
Click Next.



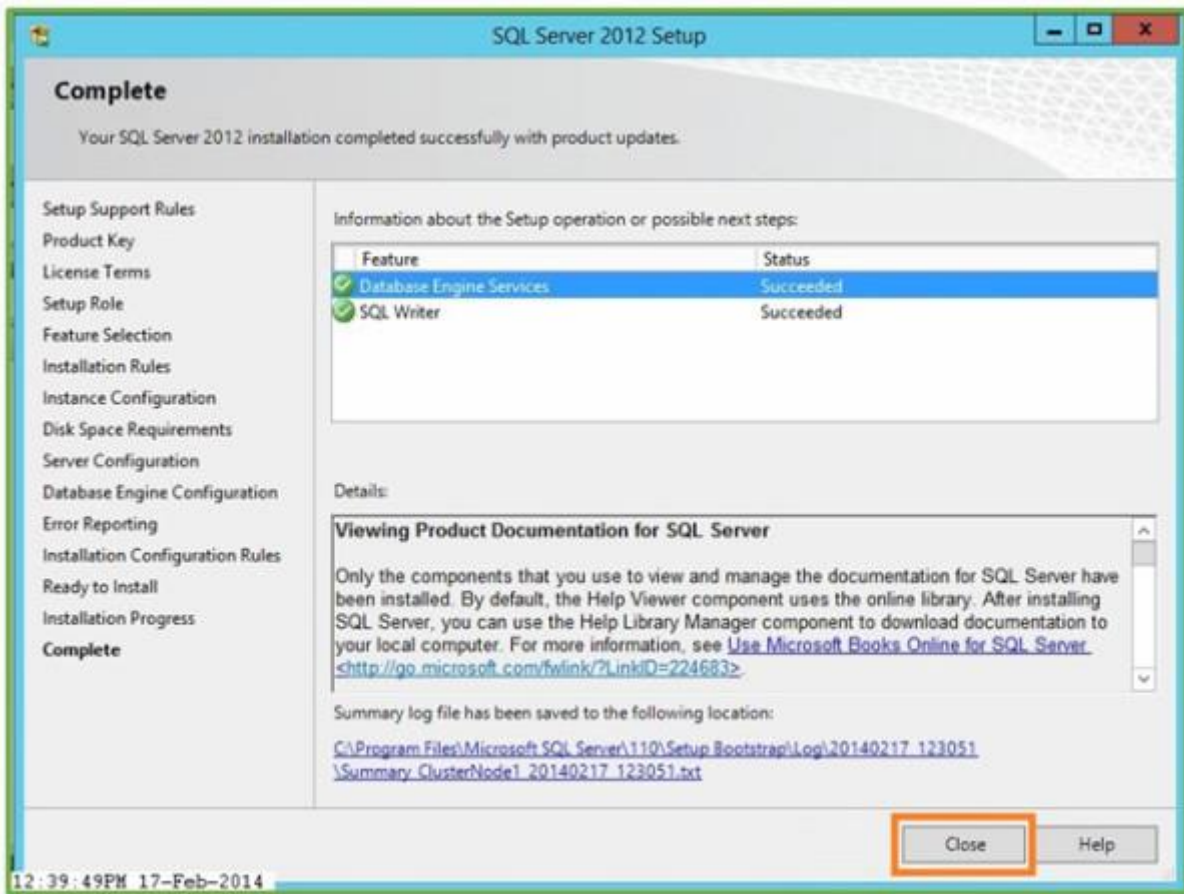
More Rules will be checked. Click **Next**.



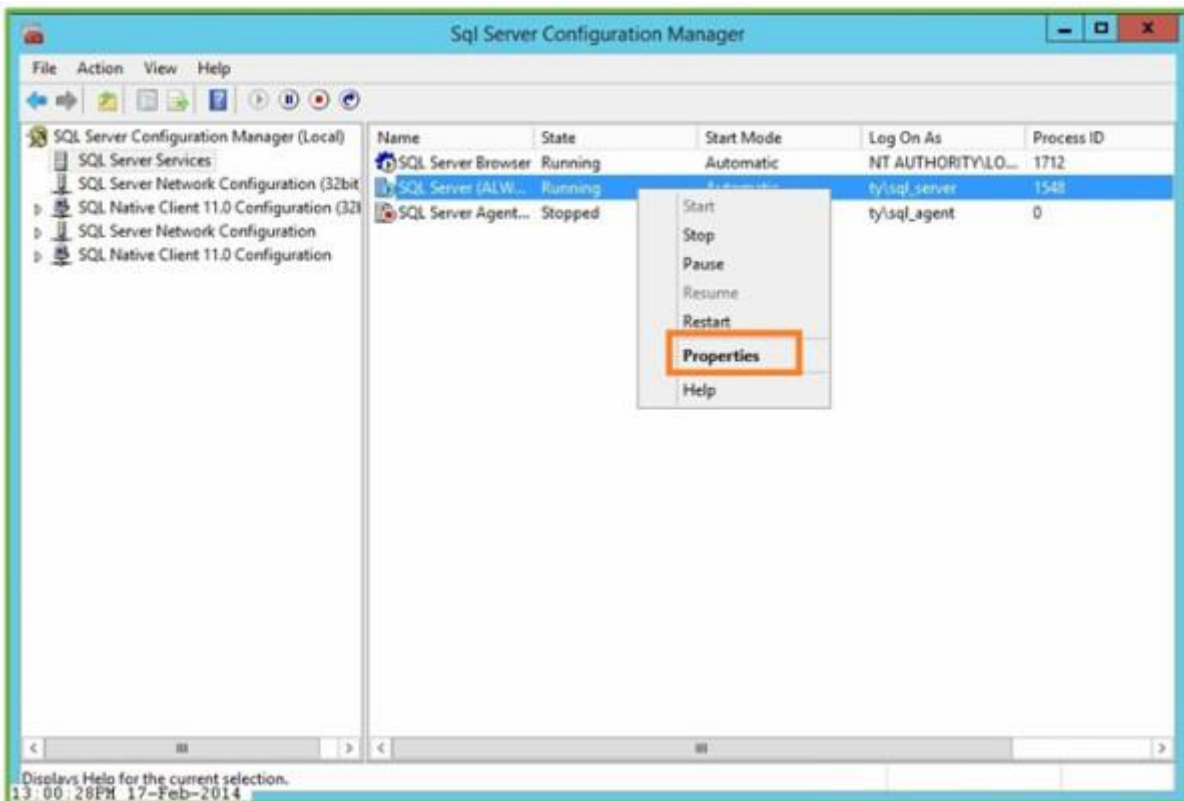
Installation Summary details will be shown. Click **Install**.



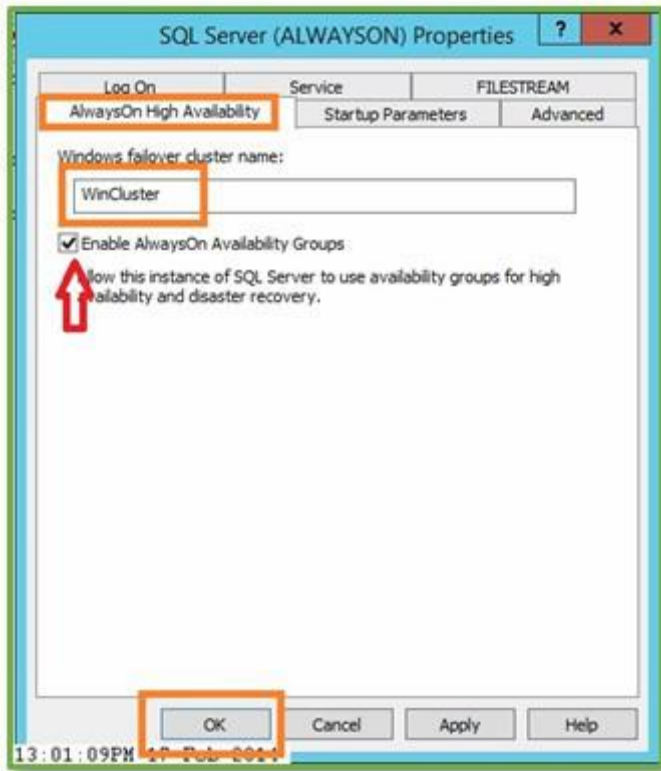
The Installation Summary Page will appear. Click **Close**. At this point the SQL Server 2012 installation is complete on the first Server. **Repeat these steps exactly on the second server in the cluster.**



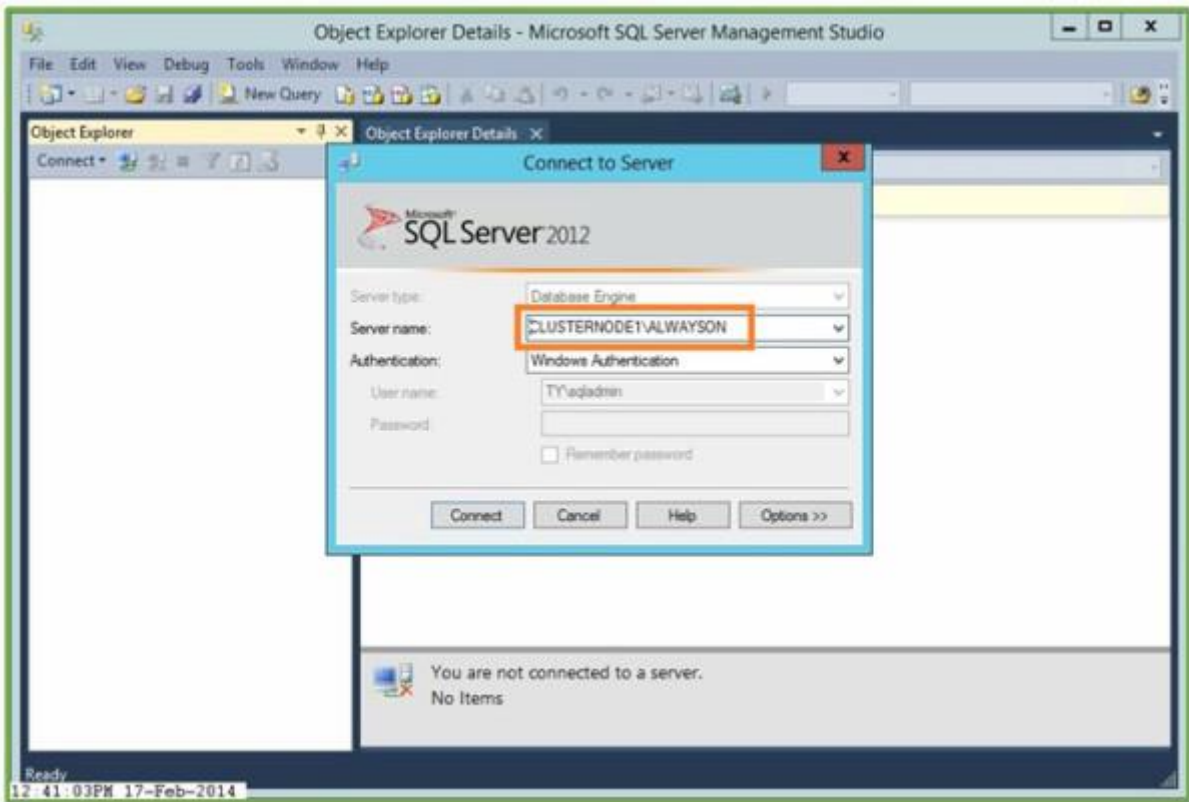
Open the **SQL Server Configuration Manager**. Click **SQL Server Services** in the Left Pane, and then Right-Click the **SQL Server Database Instance Service**. Select **Properties**.



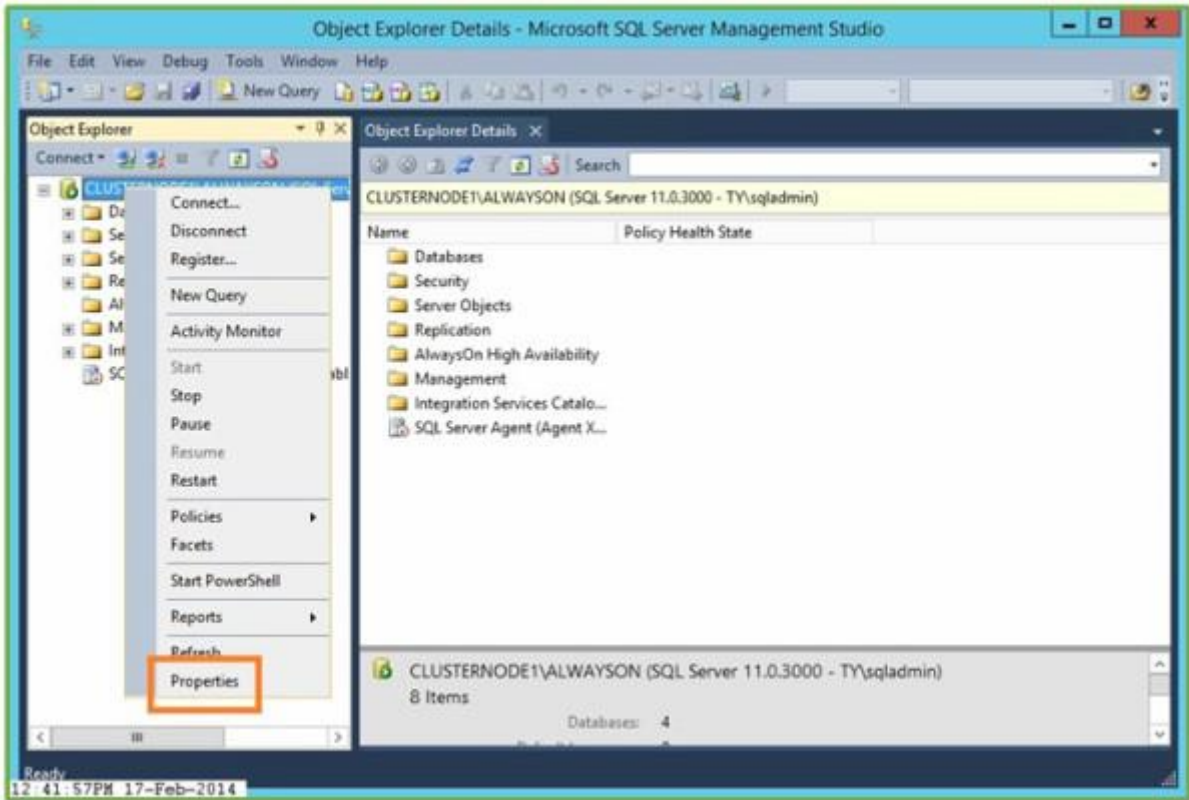
Select the **AlwaysOn High Availability Tab**. The **Windows Failover Cluster Name:** text box should already be populated with the **Failover Cluster Name:** if not, enter the Cluster Name. Select the “**Enable AlwaysOn Availability Groups**” check box to enable the feature. Click **OK** and then *Restart* the **SQL Server Database Instance Service**.



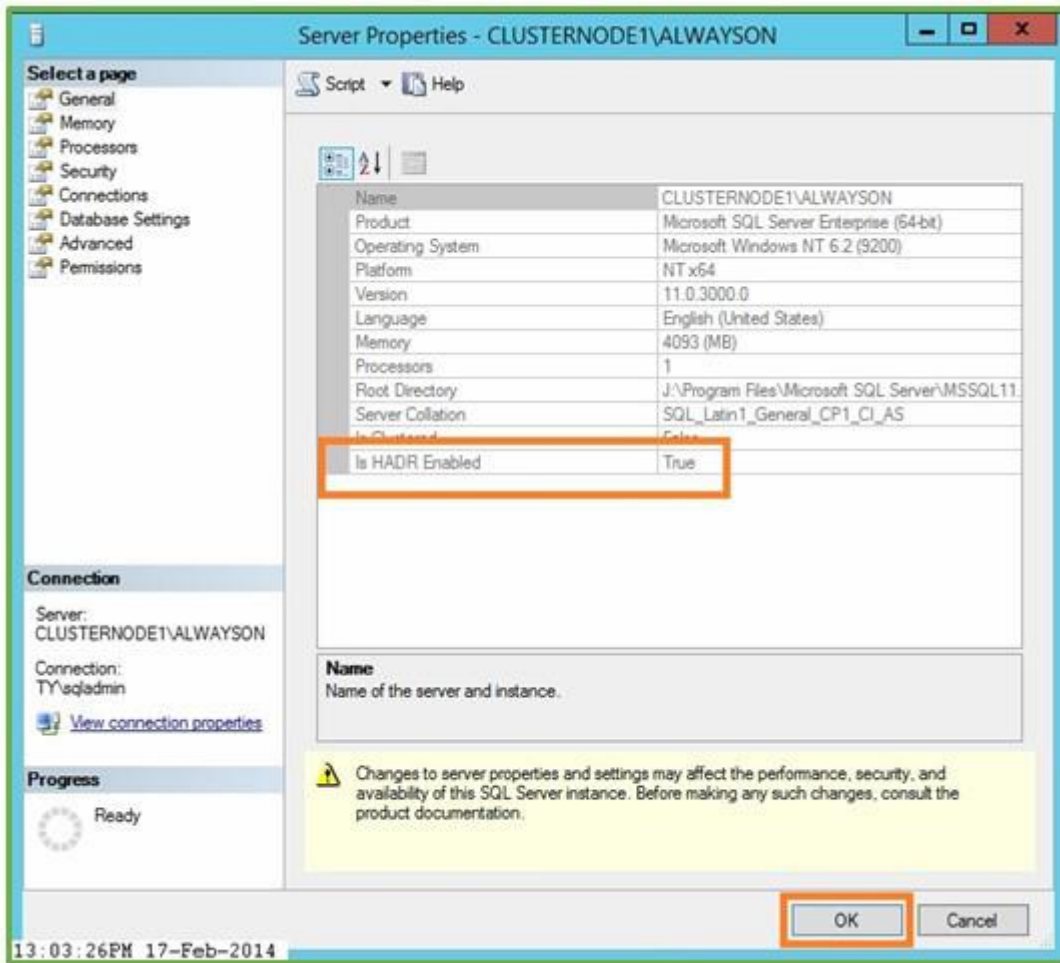
Open **SQL Server Management Studio** and Sign in to the Always On Instance.



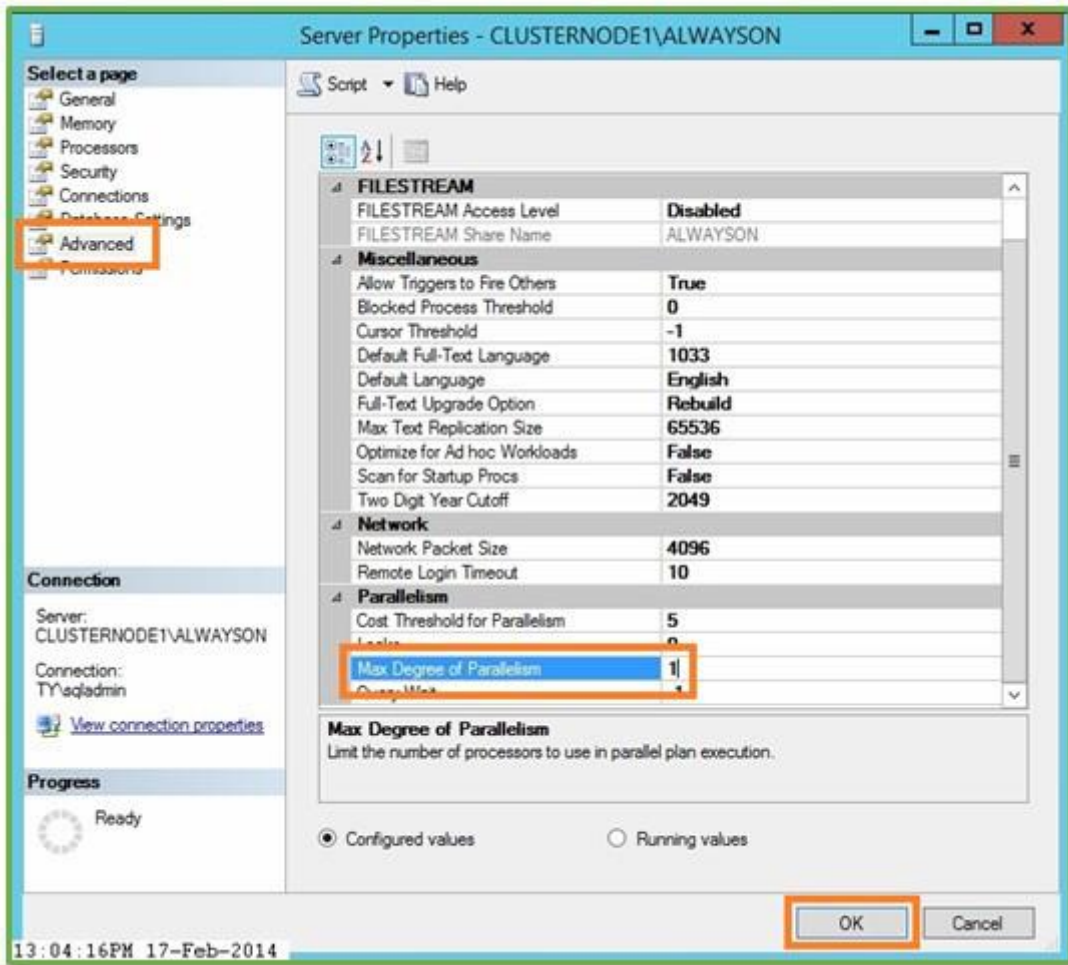
Right-Click the **Server Name/Instance** and Select **Properties**.



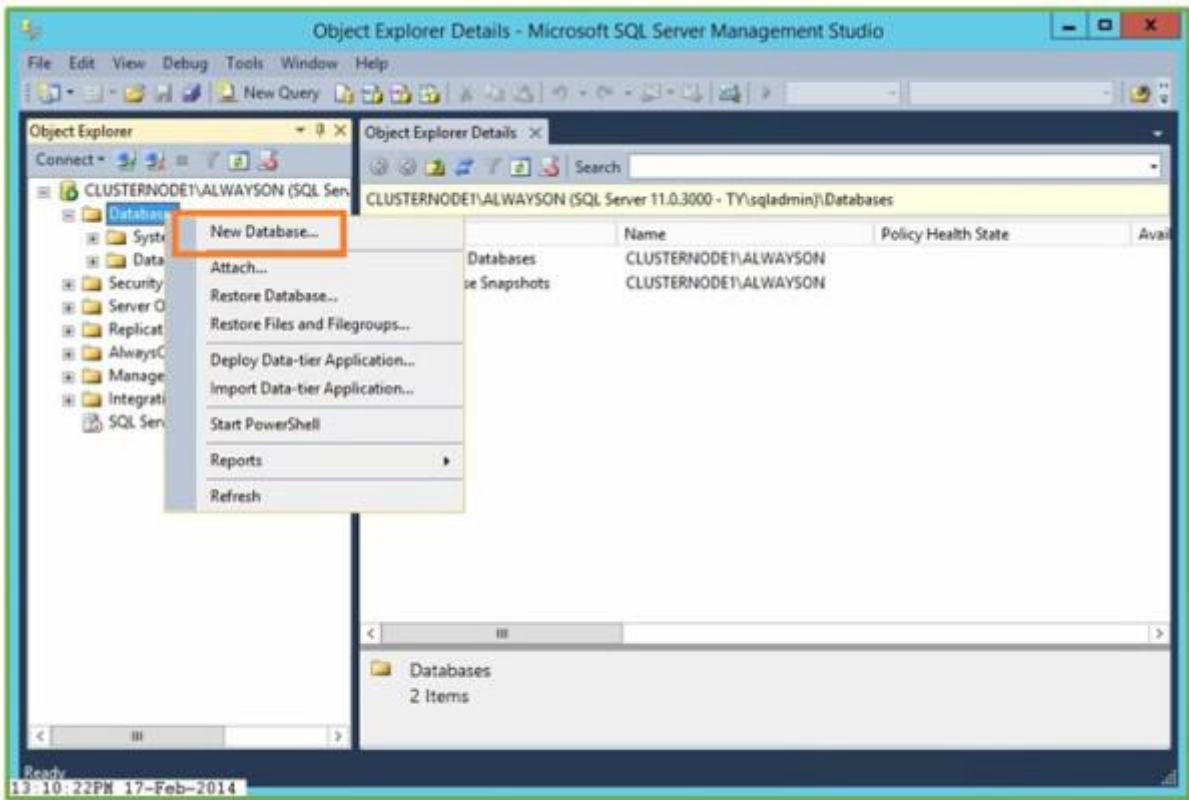
Verify the state of the “**Is HADR Enabled**” property is equal to **True**.



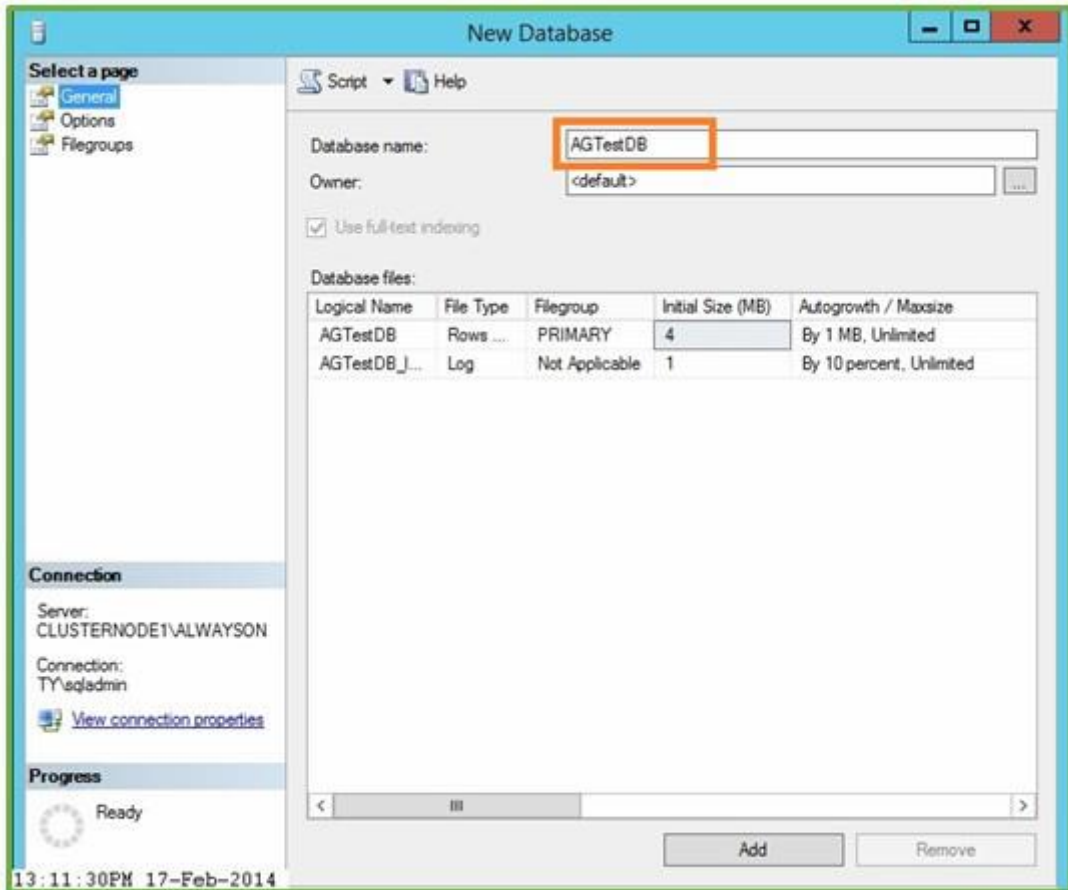
If SharePoint will be used with this Instance, Select Advanced and set **Max Degree of Parallelism** to “1.”



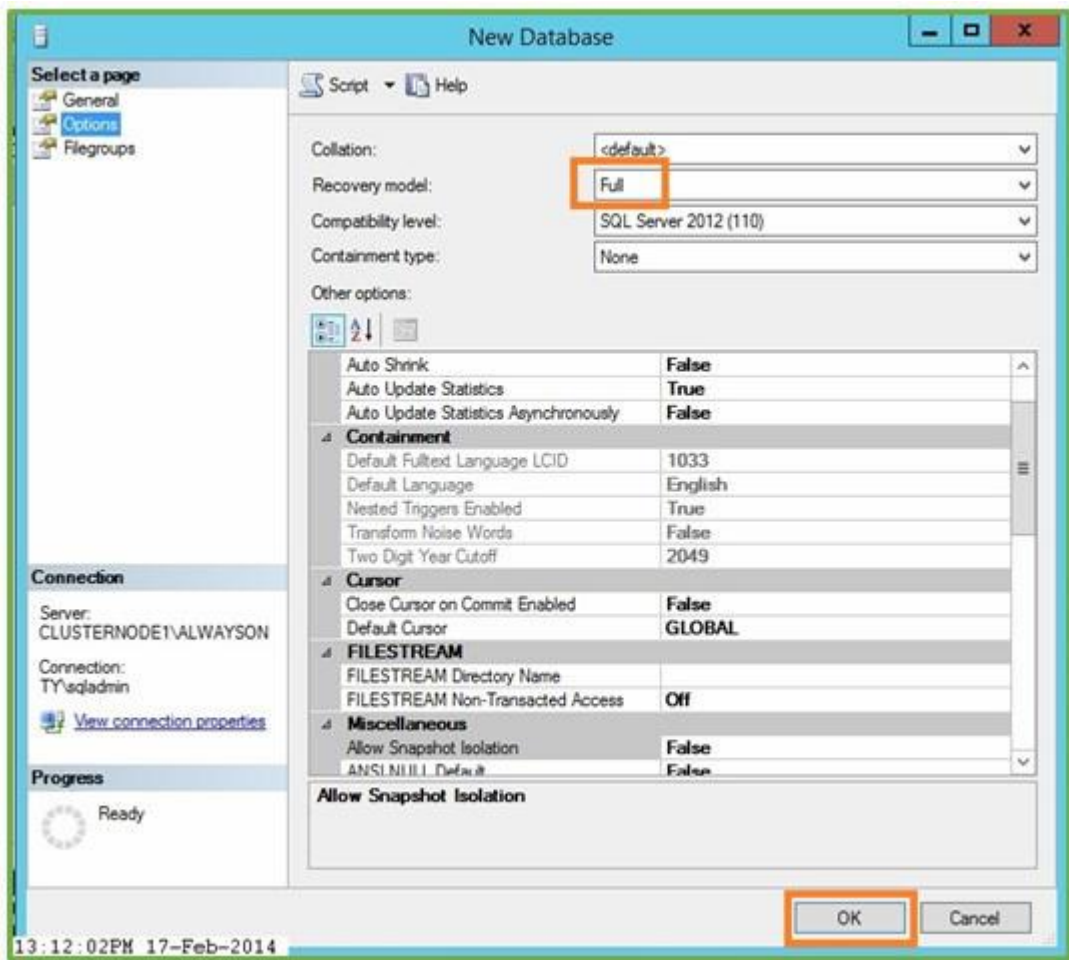
Create a **New Database** for the purpose of the initial setup by right-clicking the **Databases** folder and selecting **New Database...**



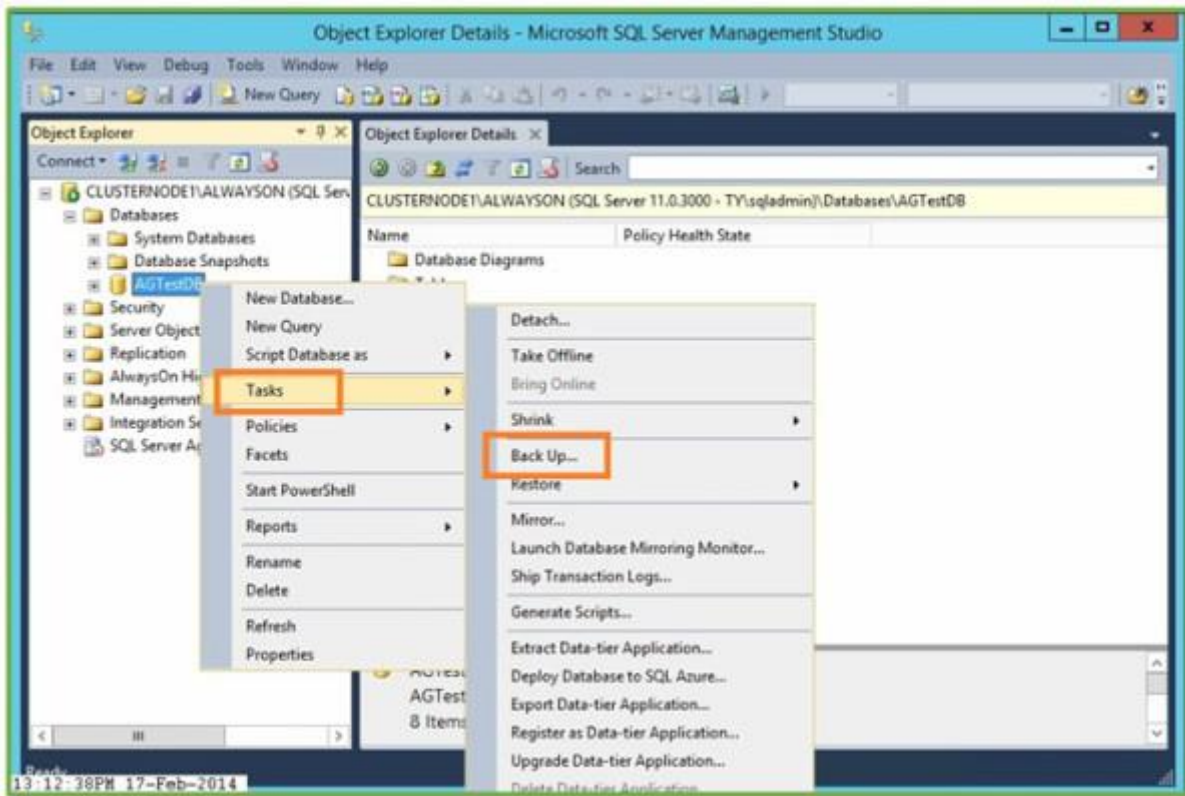
Enter a **Database Name**. Then Select **Options** in the left pane.



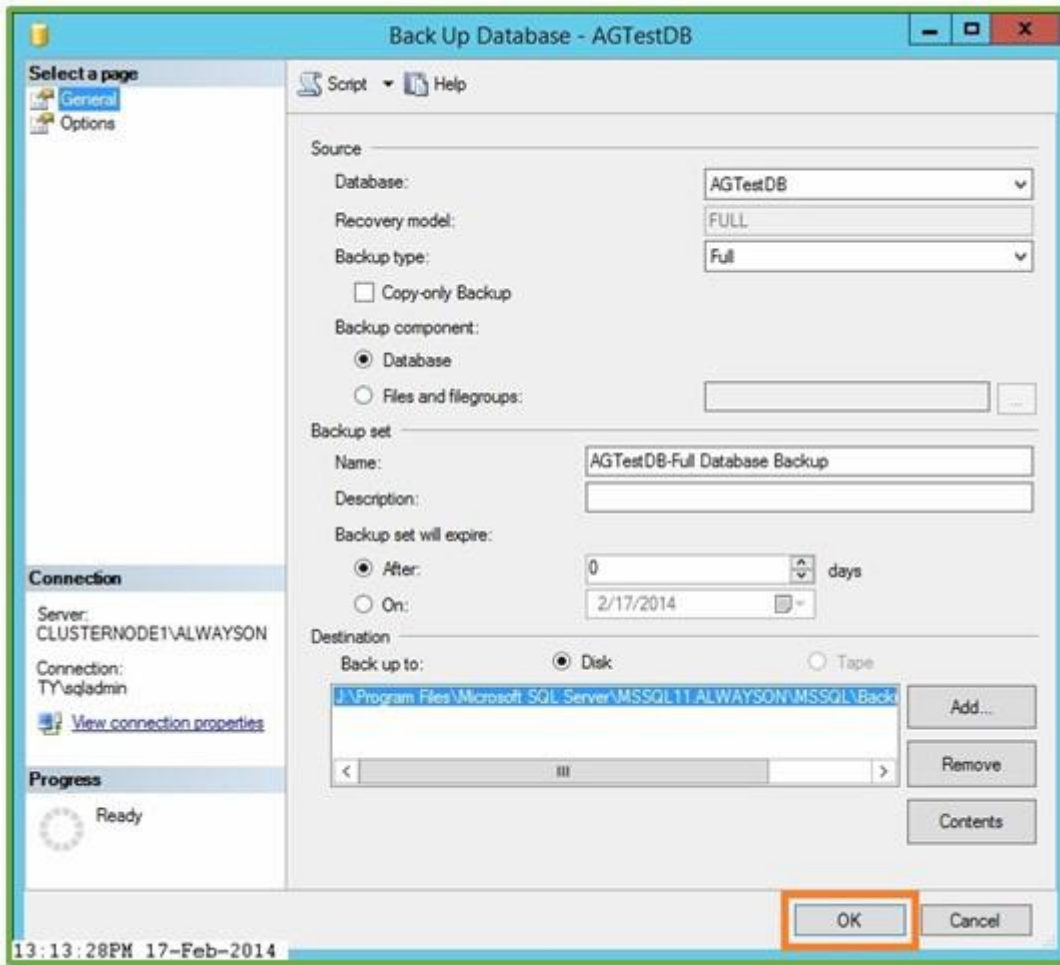
Ensure the **Recovery Model** is equal to **Full**. This is an Availability Group requirement. Click **OK**.



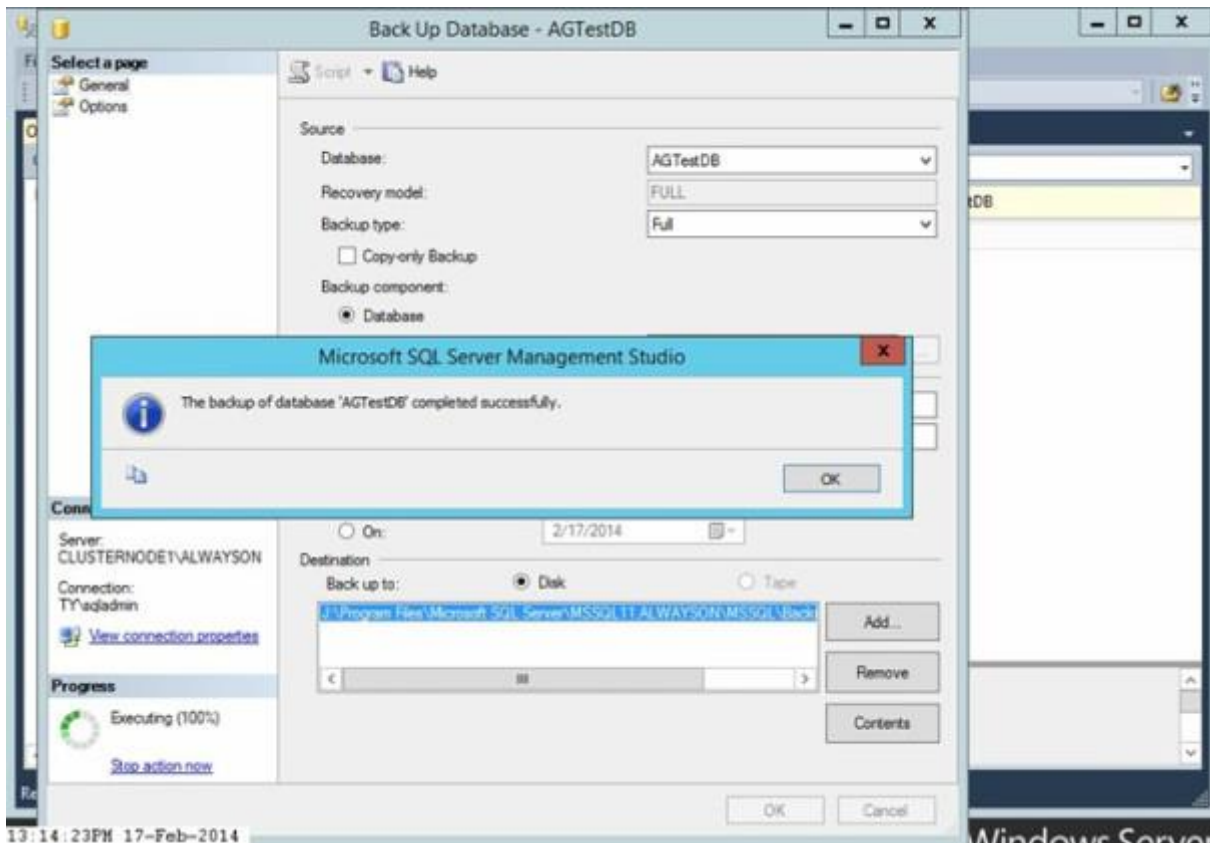
Another Requirement is an initial **Database Backup**. Right-click the **Database**, Select **Tasks**, Select **Back Up...**



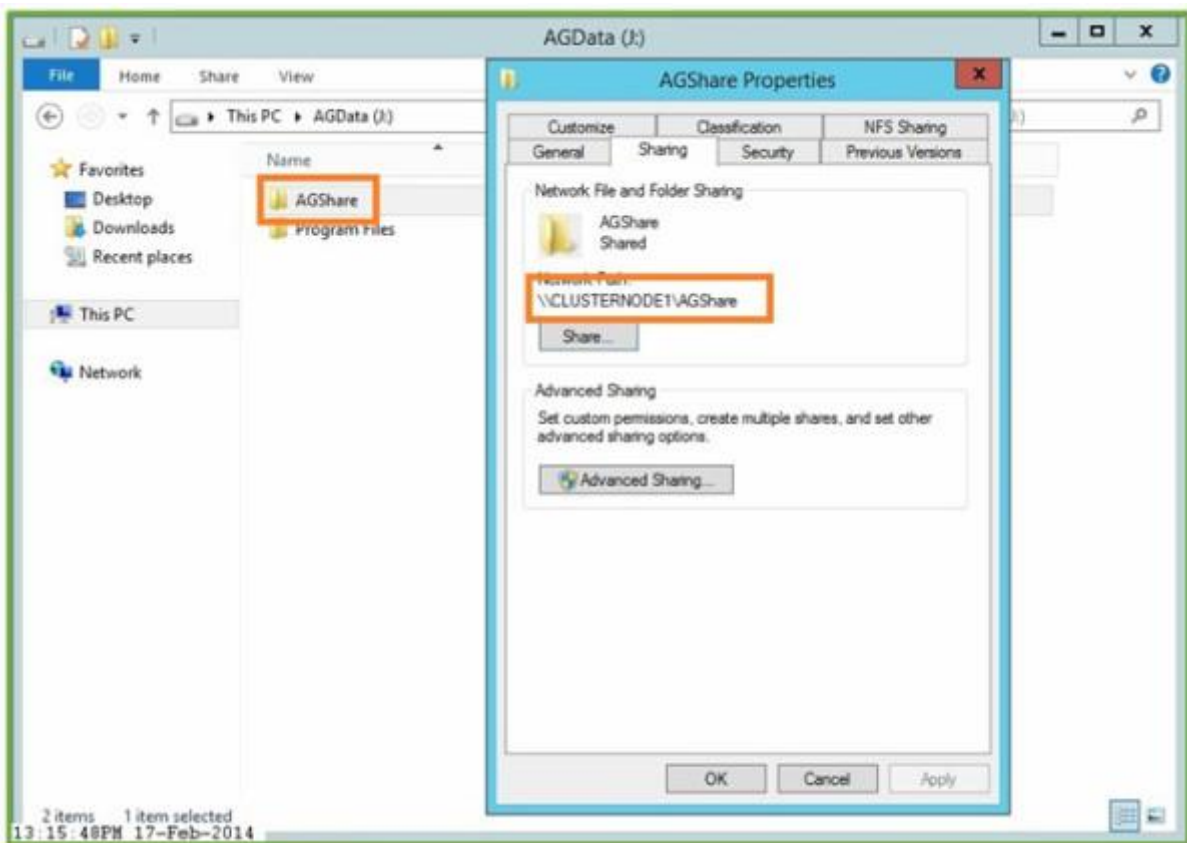
Accept the defaults and Click **OK**.



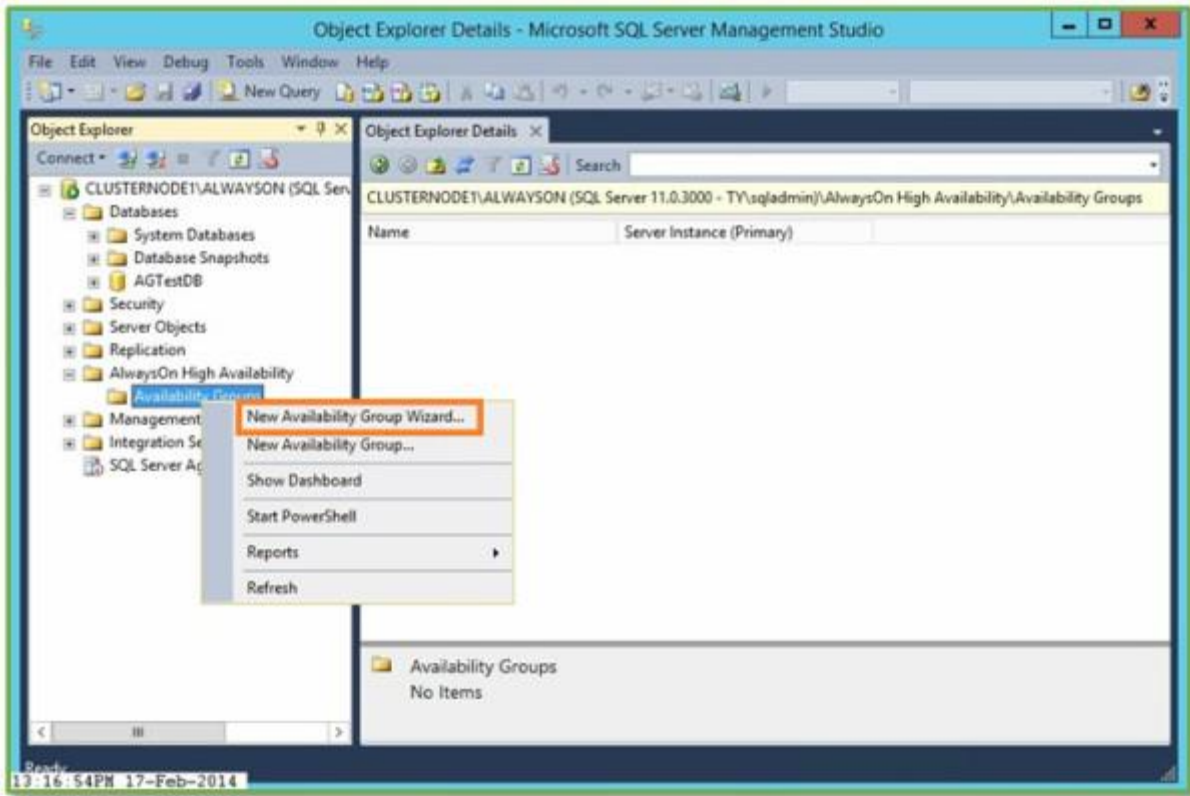
Click **OK**. The Database backup is complete.



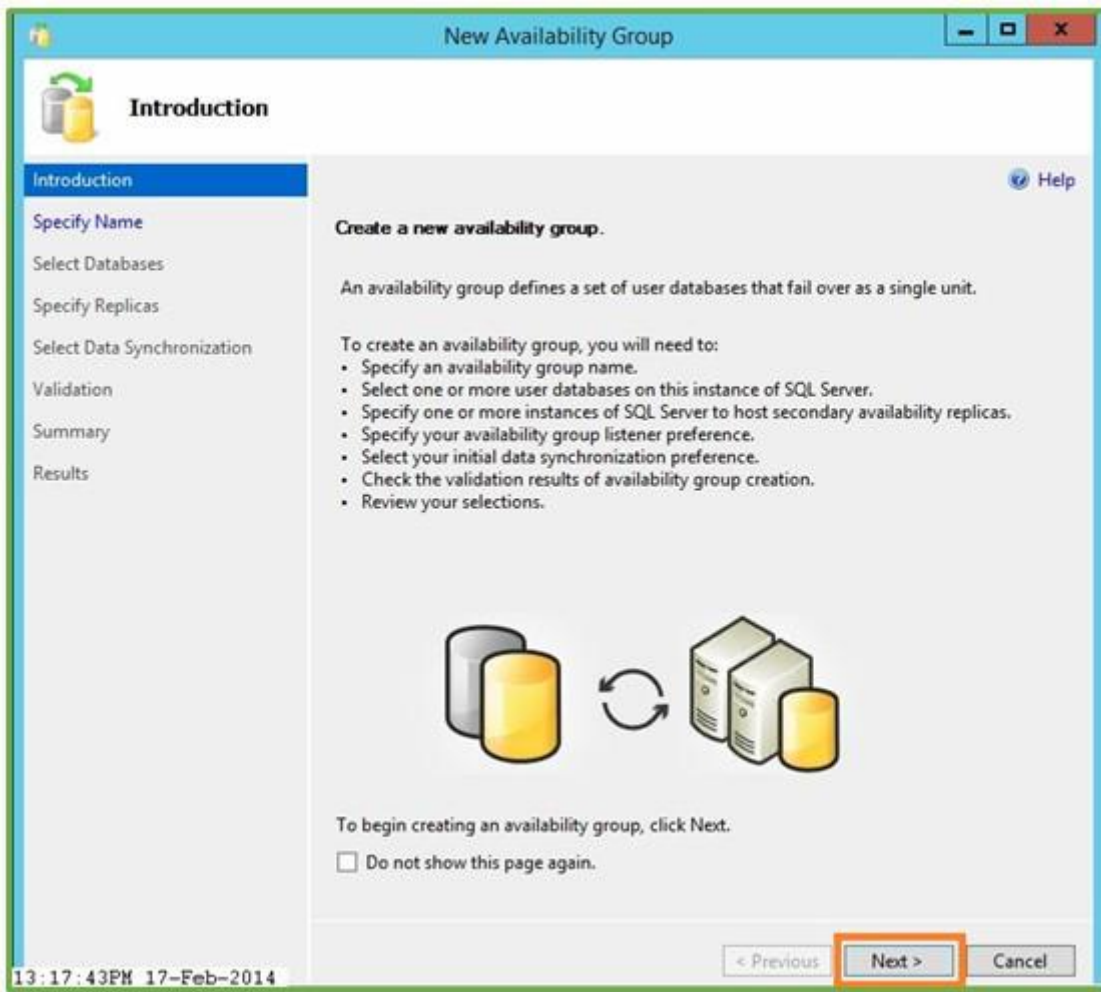
Create a **File Share** that both **Servers** and the **SQL Server Service Account** can read/write from/to.



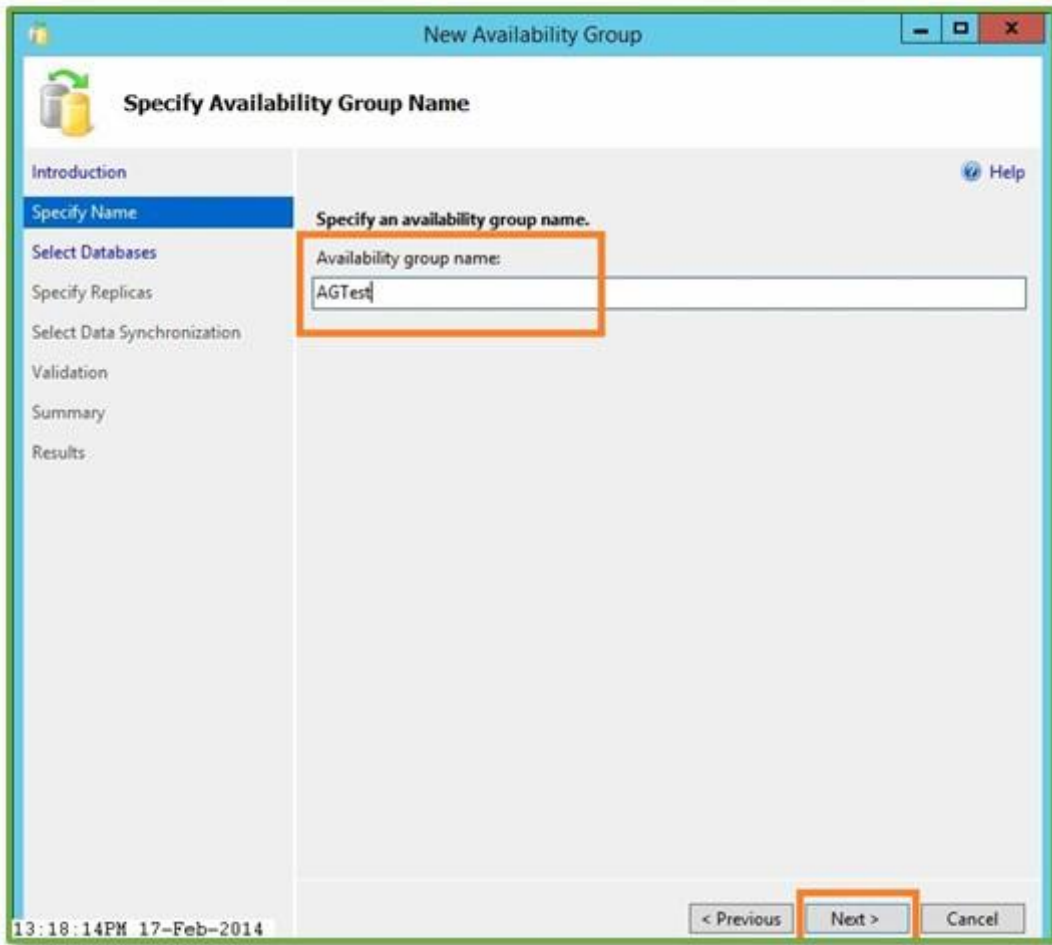
Expand **AlwaysOn High Availability**, right-click **Availability Groups**, and Select **New Availability Group Wizard...**



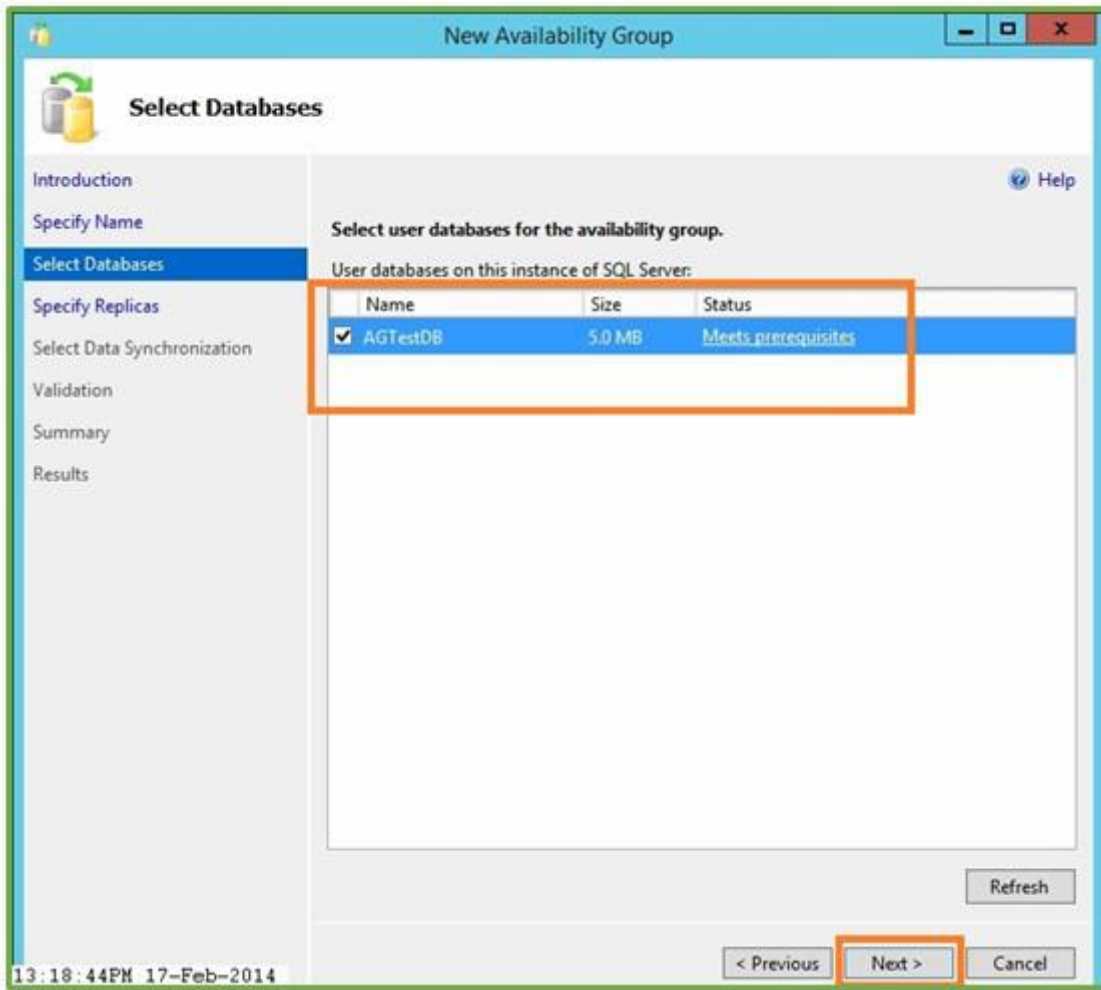
The Availability Group Wizard will Start. Click **Next**.



Enter a **Name** for the **Availability Group**. This is a SQL Management Studio Name Only. Click **Next**.

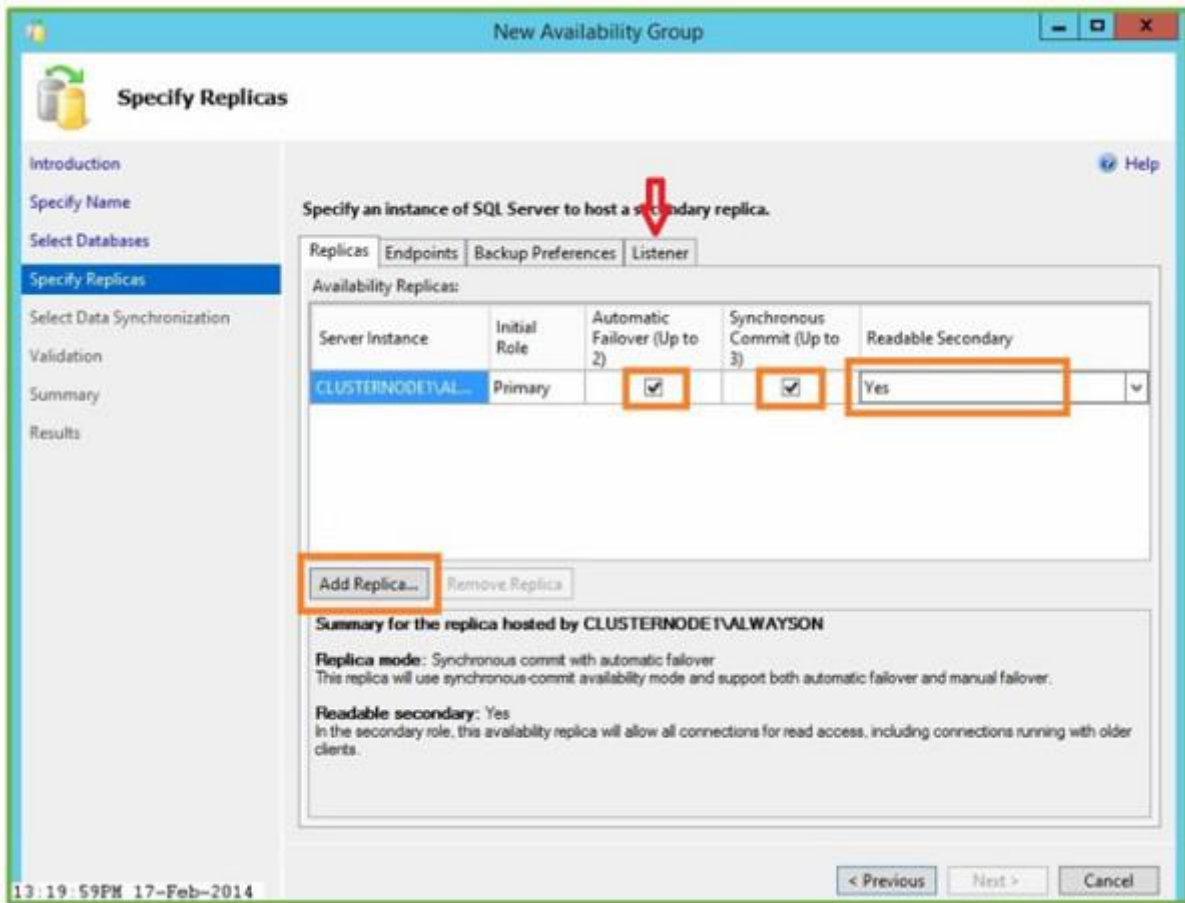


Select **Databases** to add to the **Availability Group**. The previously created Database appears, is selected by default, and Meets Prerequisites. Click **Next**.



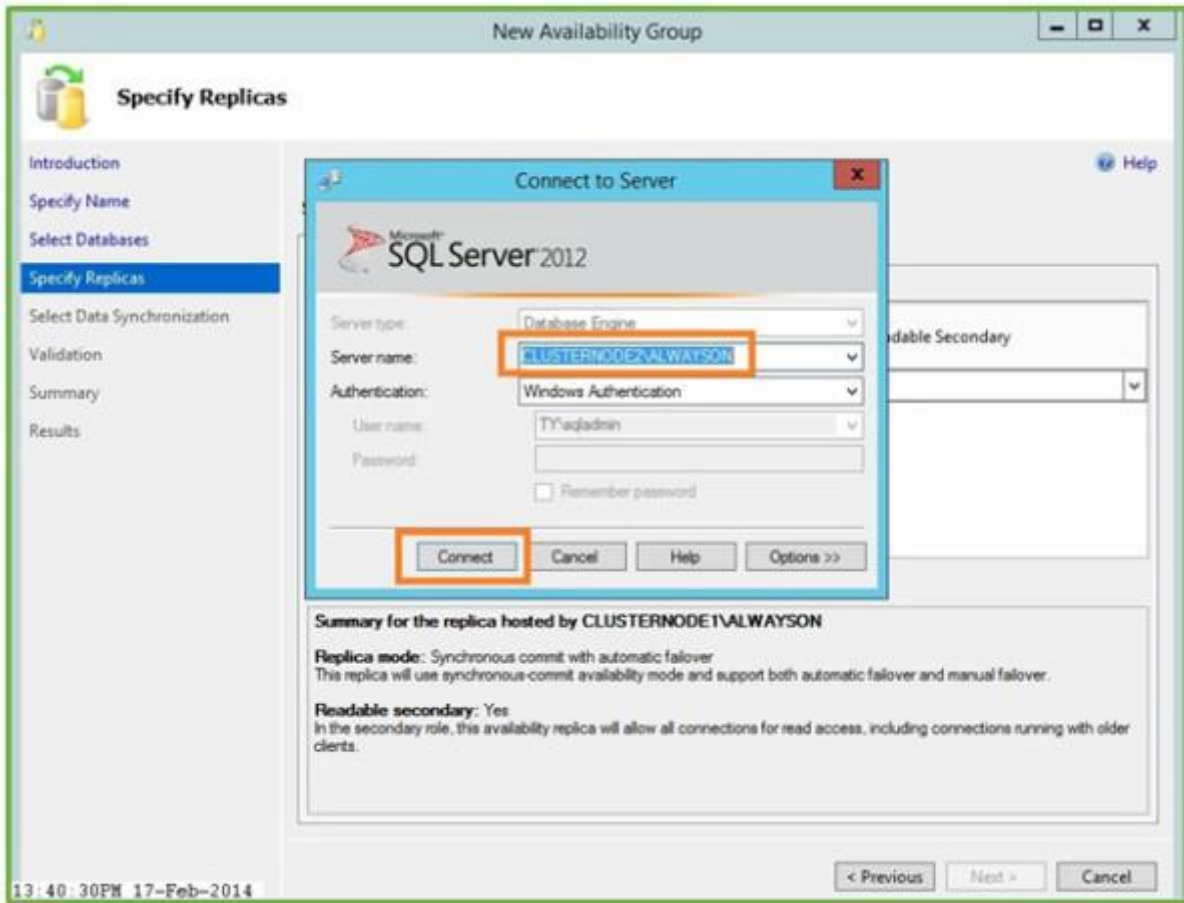
The Primary replica appears on the **Specify Replicas** page, **Replicas** tab. Select **Automatic Failover***, **Synchronous commit**, and whether to allow the **Secondary Replica to be Readable** while not the active replica.

Select **Add Replica** and **add the Secondary Replica** (the following screenshot) from the second server. Then Click **Listener**.

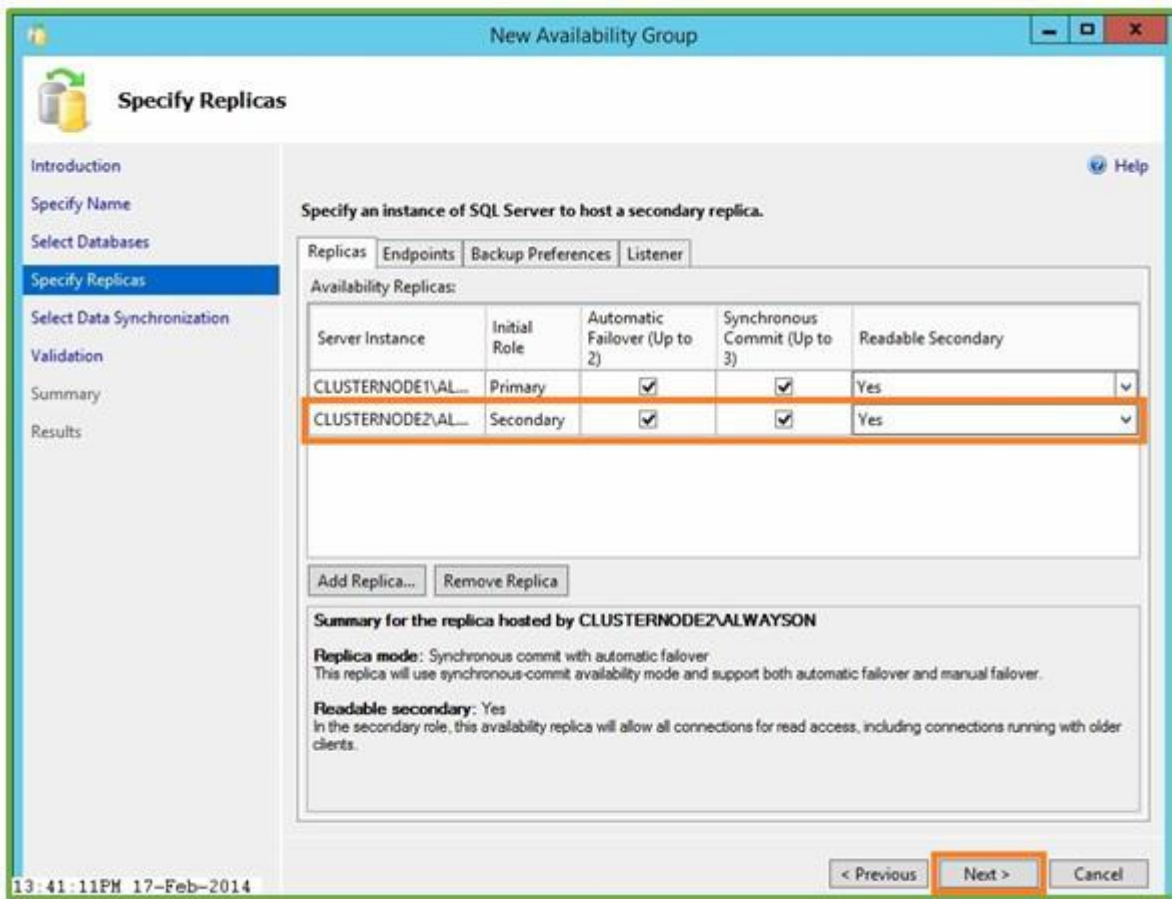


**Automatic Failover only works when the Availability Group is NOT installed as an instance in a SQL Cluster. If the Instance is installed into a SQL Cluster the Availability Group will have to be manually failed over.*

Adding the Second Instance as the Secondary Replica to the Availability Group. Enter the Server/Instance and click **Connect**.



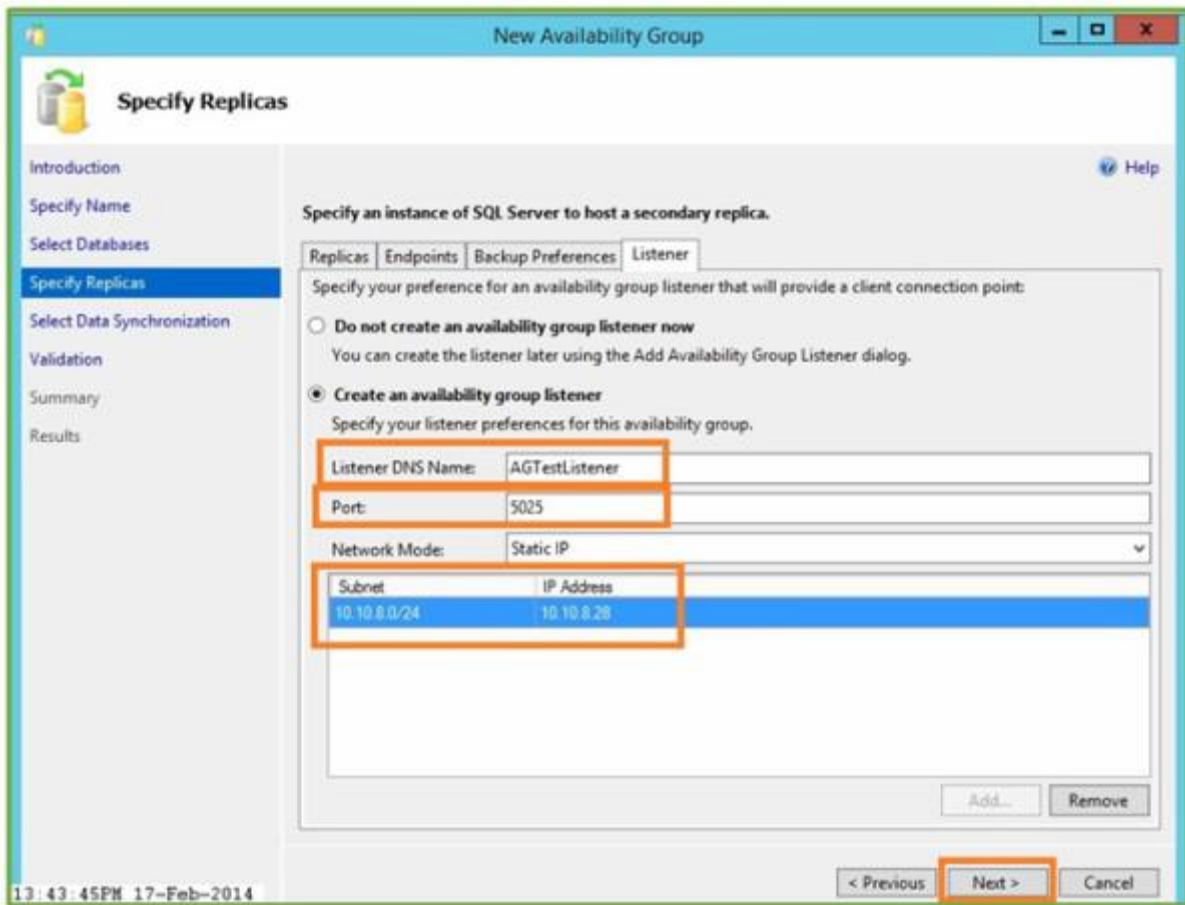
The **Secondary Replica** is listed. Make the same selections as before for the additional options. Click **Next**.



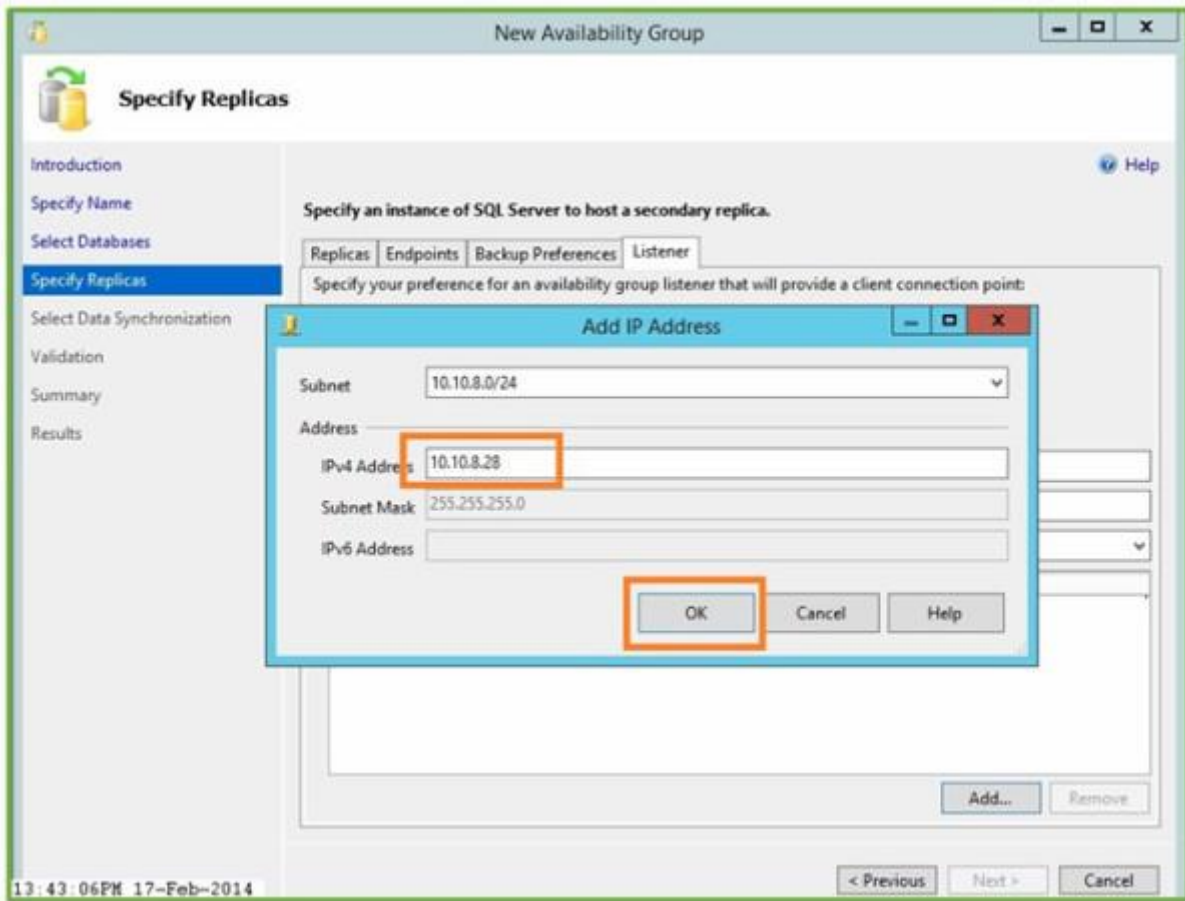
On the Listener Tab select “**Create an availability group listener.**” Enter a **Name** in the **Listener DNS Name:** text box. As the name suggests, this will be the name created as a **DNS Host for the Availability group**. This is also the name that will be created as a **Computer Object in the same AD Container as the Server Failover Cluster Name Object**.

Enter a **Port**. *Endpoints (Endpoints Tab) use port 5022*. Typically I put the listener on 5023, 5024, or 5025. Before clicking Next, click on **Add** (the following screen shot) and enter the **IP Address** for use with the Listener Name.

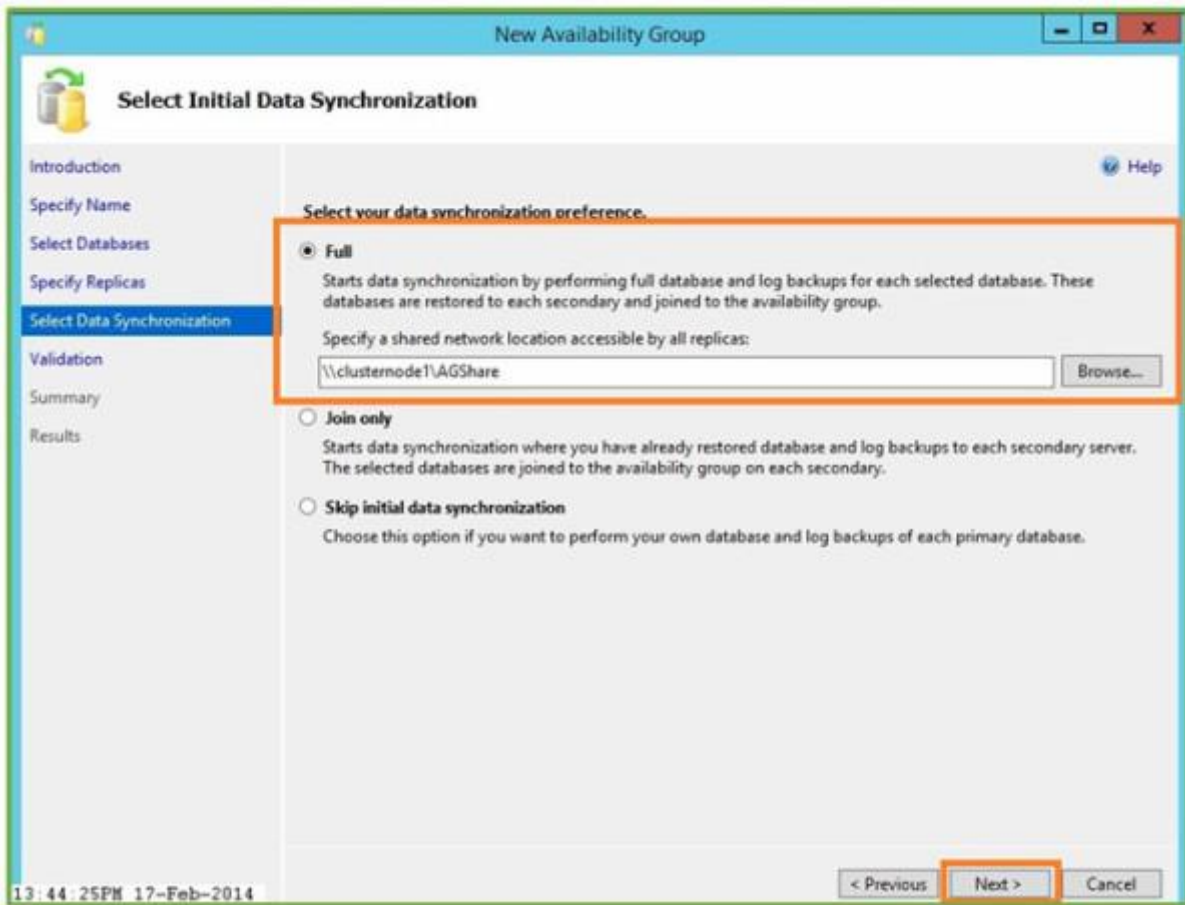
Click **Next**.



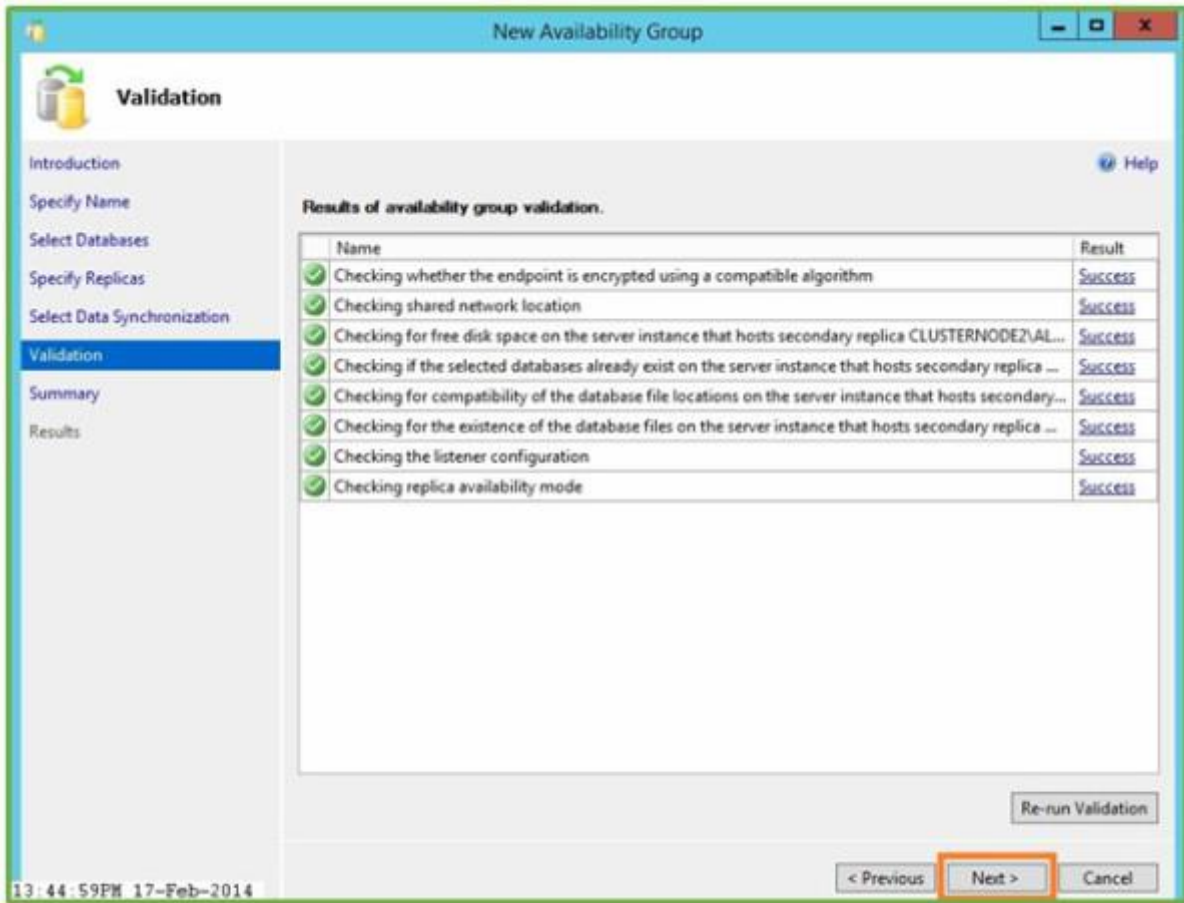
Adding the **IP Address** for the listener. Click **OK** to complete.



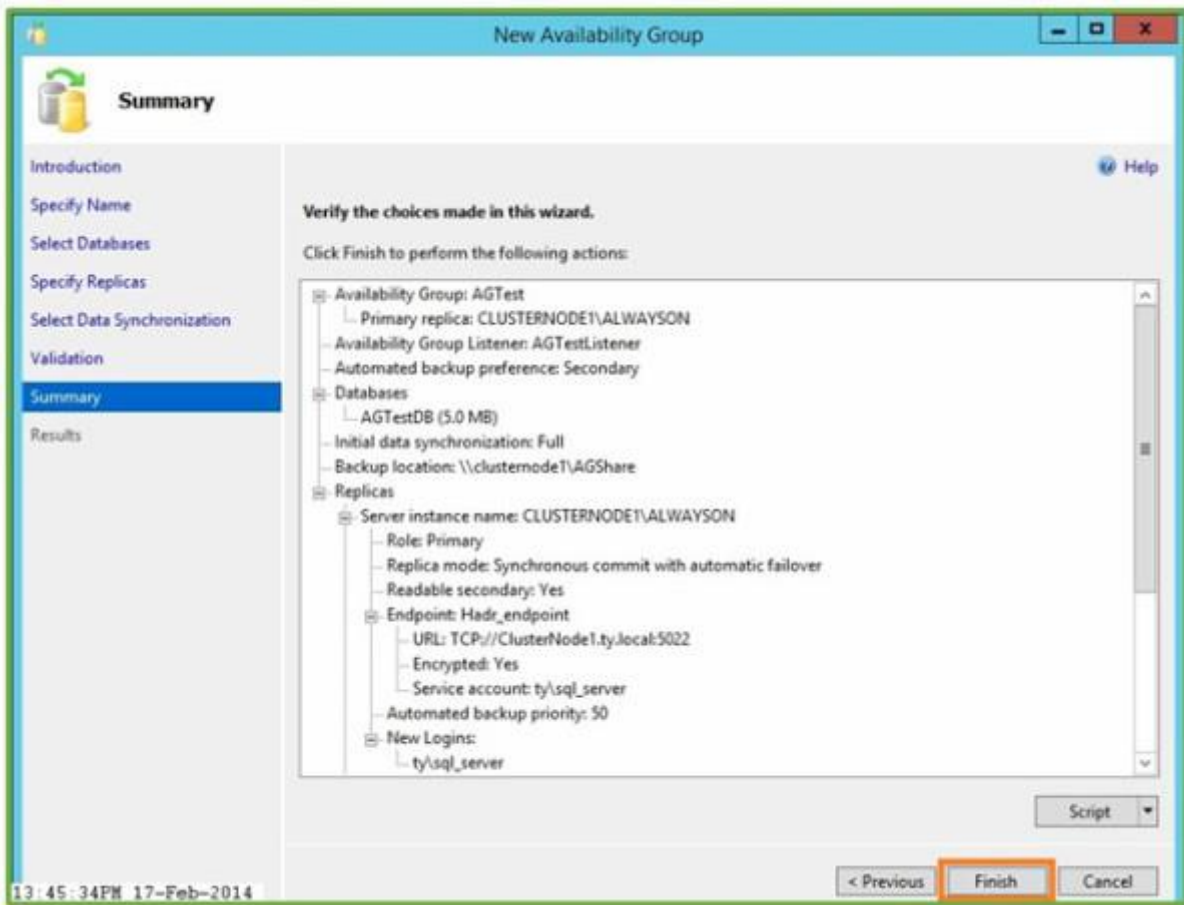
Select **Full** for **Initial Data Synchronization** and enter the **UNC Path** to the AG Shared Folder created previously. Use this option to have the **Availability Group creation wizard** create an initial database **backup** to the share, **restore** the database to the Secondary Replica, and **synchronize** the two replicated databases. To perform the steps manually select either **Join Only**, or **Skip**. Click **Next**.



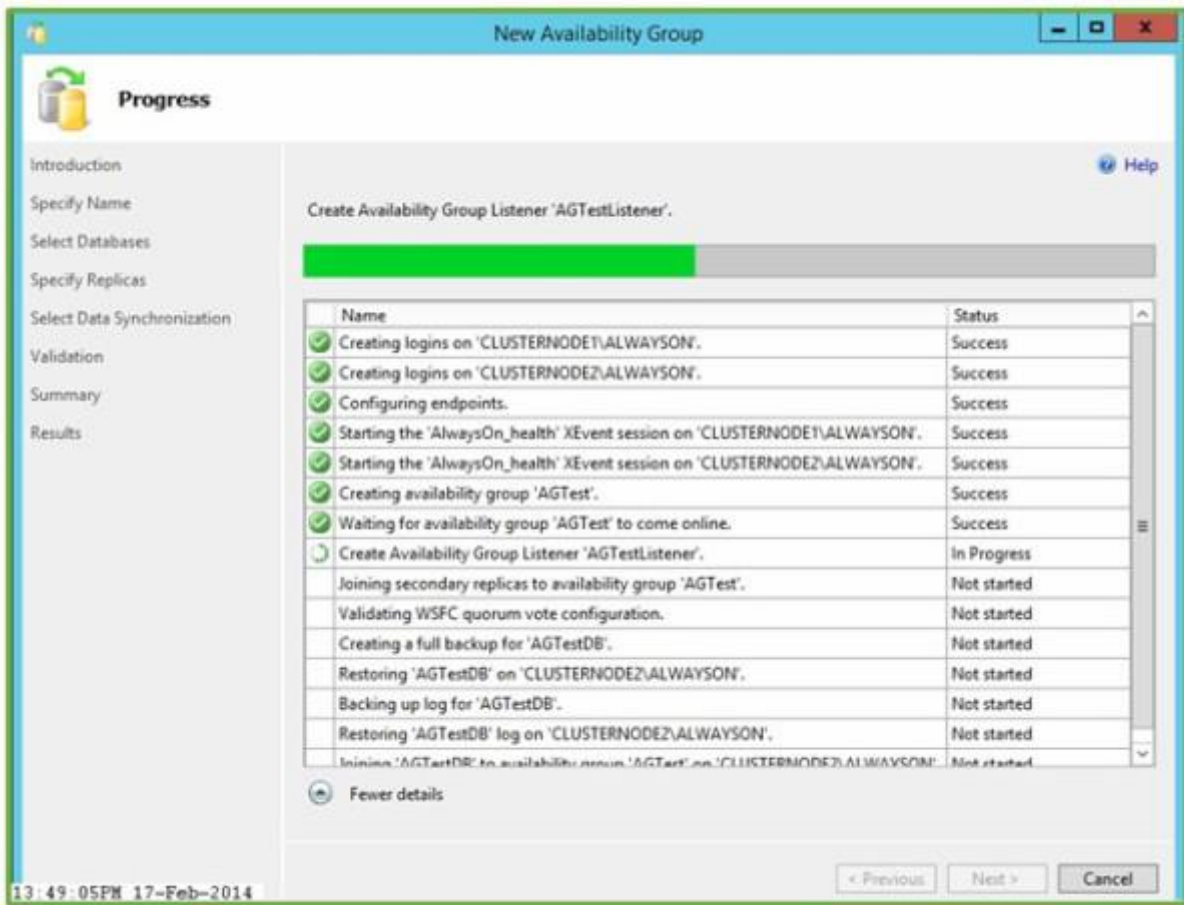
The **Wizard** will **Validate** the selected options. Click **Next**.



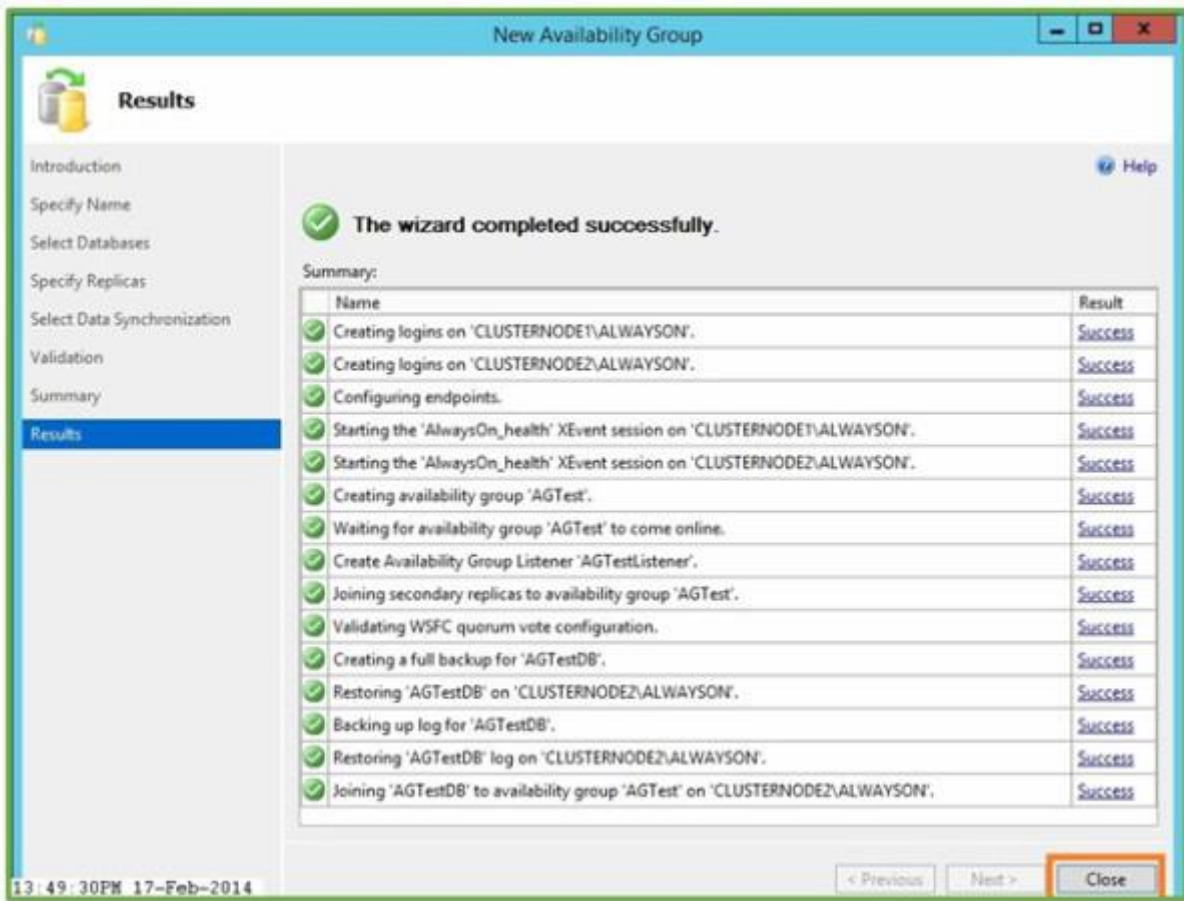
Summary of selected options. Click **Finish** to create the **Availability Group**.



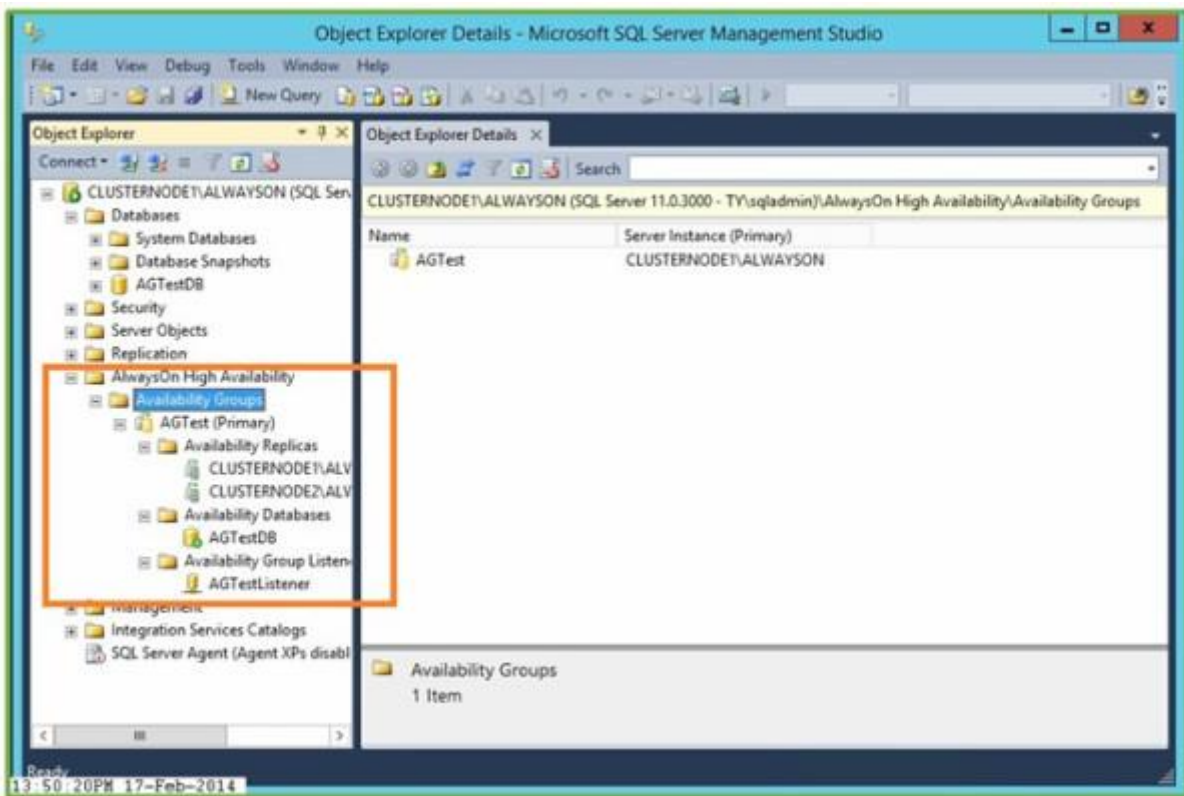
The Availability Group creation Progress Page.



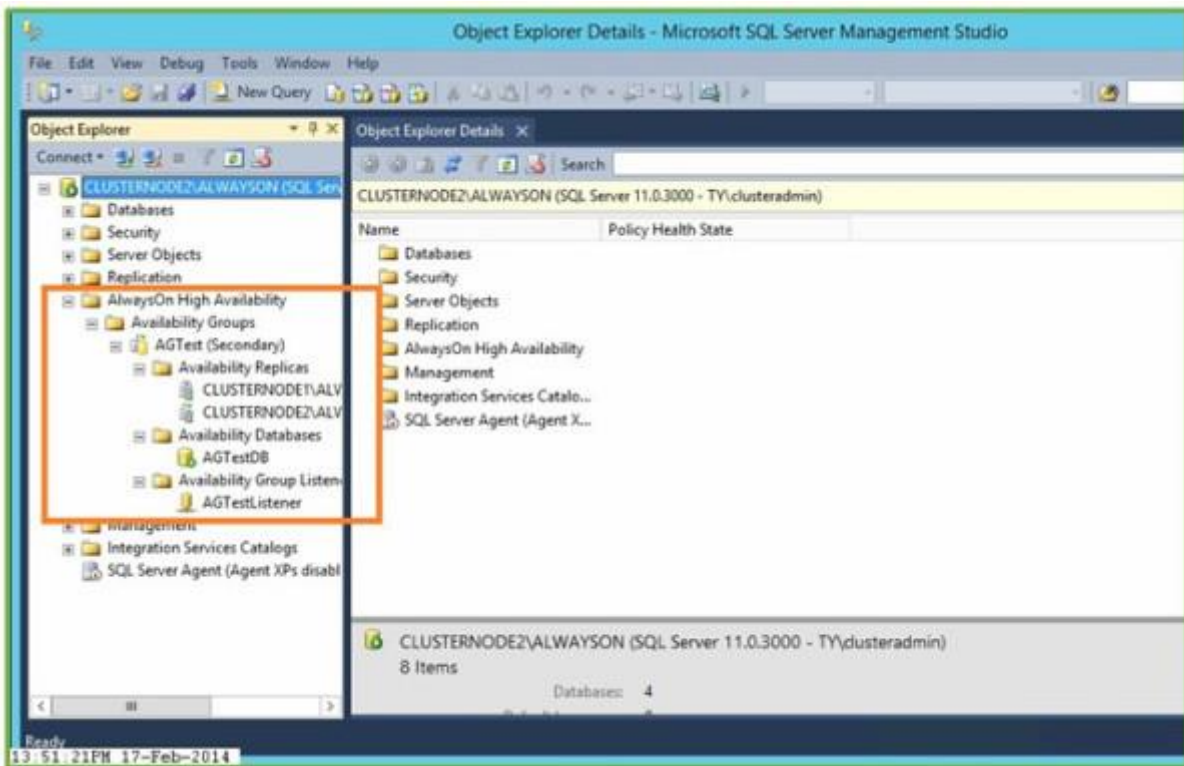
The Availability Group creation Results Page. Click **Close**. The Availability Group has been created.



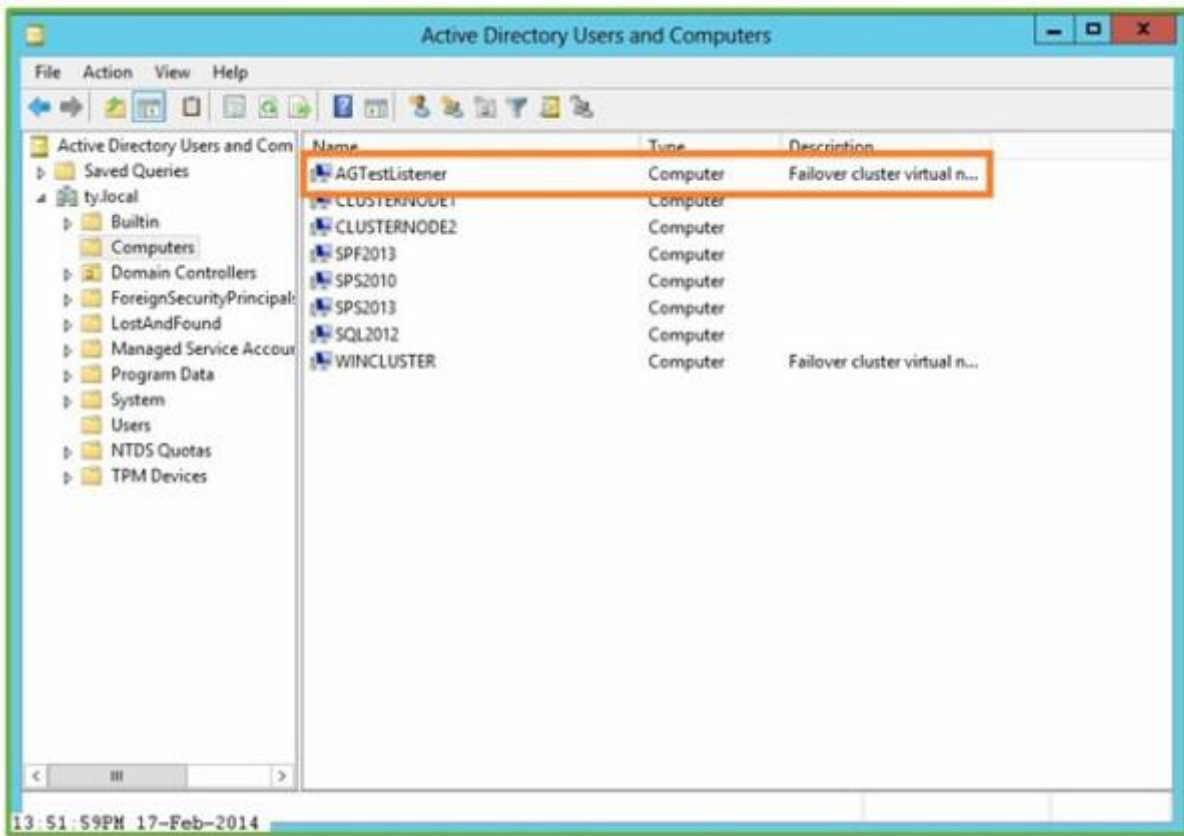
Verify the Components of the Availability Group Primary Replica.



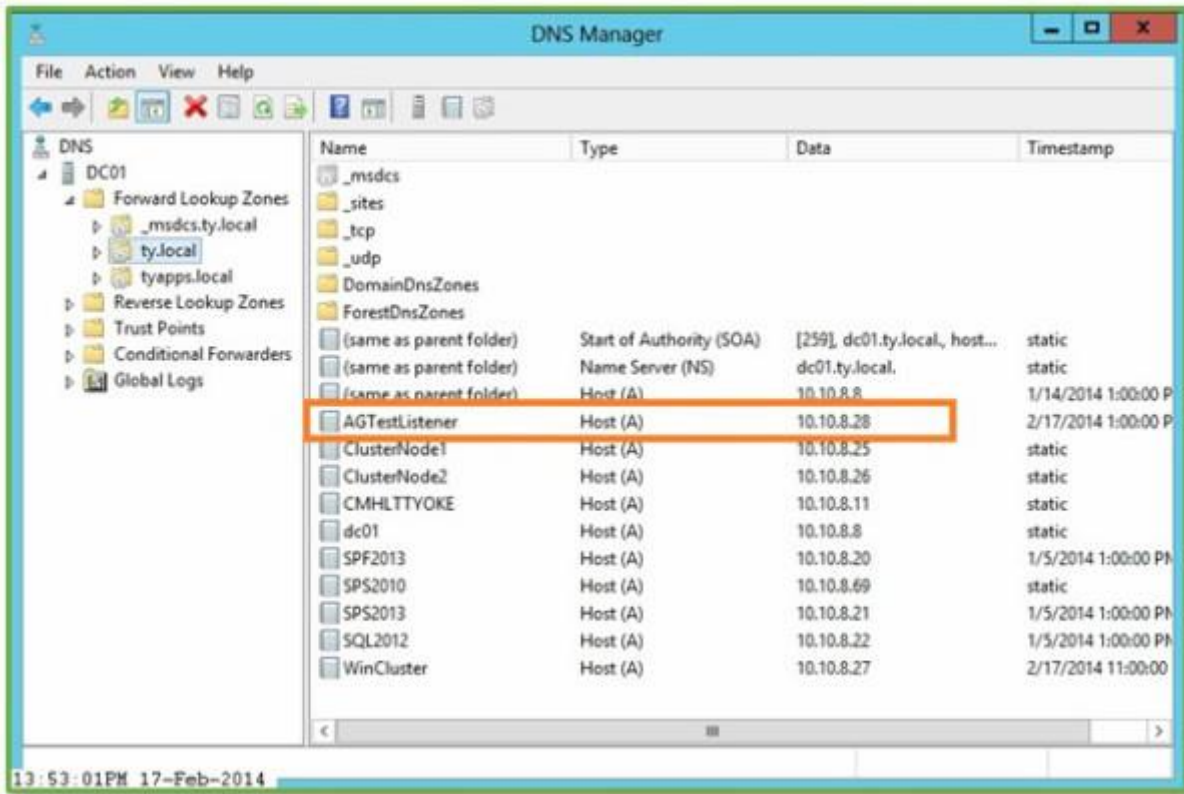
Verify the Components of the Availability Group Secondary Replica.



The Listener Computer Name Object.



The Listener DNS Host Entry.



The Availability Group Creation Wizard also creates the Failover Cluster Role.

