# Installing and Configuring a SQL Server 2012 Failover Cluster

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Applies to:

- SQL Server 2012
- SQL Server 2014

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#### Introduction

The goal of this documentation is to provide a step-by-step procedure in configuring a 2-node Windows Server 2012 Failover Cluster that will host a SQL Server 2012 Failover Clustered Instance.

#### Assumptions

When using this guide, a few assumptions have been made

- Windows Server 2012 is installed on each server that you will cluster and join to the domain
- The disks (LUNs) that you want to use in the cluster are exposed to the servers that you will cluster and are configured appropriately as per <u>StarWind's High Availability Best Practices</u> <u>documentation</u>
- You have decided which quorum model will be used by the failover cluster. This document will use the disk witness as the quorum model.

#### **Cluster Configuration Details**

Prior to building your cluster, it is important to have all the details in place to make sure that installation and configuration will go smoothly. The following details will be used to build and configure a SQL Server 2012 Failover Clustered Instance.

Active Directory Domain Name: TESTDOMAIN.local

StarWind Server iSCSI SAN IP address: 10.0.0.200

Cluster Nodes: WS-CLUSTER3 & WS-CLUSTER4

Cluster Disks: Q:\, E:\, F:\ & H:\

Windows Server Failover Cluster Name and IP Address: WINCLUSTER2 & 172.16.0.211

SQL Server Failover Cluster Name and IP Address: SQLCLUSTER2 & 172.16.0.212

SQL Server Service Account: TESTDOMAIN\sqlservice

#### Connecting to the iSCSI Storage

Windows Server 2012 comes with iSCSI Initiator software that enables connection of a Windows host to an external iSCSI storage array like StarWind Software's iSCSI SAN using network adapters. You can launch the tool from the Server Manager dashboard, under Tools and select iSCSI Initiator.

**NOTE:** These steps have to be performed on both of the servers that will act as nodes in your failover cluster.

		Server M	Manager			- 0	×	Ĥ.
Server M	anager 🕨 Dash	board		• <u>©  </u>	Manage Tools	View	Help	L
				Clu	ster-Aware Updating			
	WELCOME TO SERV			Co	mponent Services			
ard	WELCOWE TO SERV	ER MANAGER		Co	mputer Management			
erver				De	fragment and Optimize Dri	ives		
ers		Carlos and	and the first state of the second	Eve	nt Viewer			
Storage Services D		Configu	re this local serve	er Fai	over Cluster Manager			
Storage Services 7	OLUCK START			iSC	SI Initiator			
	QUICK START	2 Add ro	les and features	Loc	al Security Policy			
		2 Add To	les anu reatures	OD	BC Data Sources (32-bit)			
		3 Add ot	her servers to manac	1e 00	BC Data Sources (64-bit)			
		5 7100 01		Per	formance Monitor			
	WHAT'S NEW	4 Create	a server group	Re	ource Monitor			
				Sec	urity Configuration Wizard	ł.		=
				Ser	vices			
				Sys	tem Configuration			
	LEARN MORE			Sys	tem Information			
				Tas	k Scheduler			
	POLES AND SERVER	GROUDS		Wi	ndows Firewall with Advan	ced Security		
	Roles: 1   Server group	s: 1   Servers total: 1		Wi	ndows Memory Diagnostic			
				Wi	ndows PowerShell			
	File and Sto	rage 1	Local Server	1 Wi	ndows PowerShell (x86)			
	Services		Locarberver	Wi	ndows PowerShell ISE			
	Manageabilit	у (	Manageability	Wi	ndows PowerShell ISE (x86)	)		
	Events		Events	Wi	ndows Server Backup			

You will get a message saying that the Microsoft iSCSI service is not running. Simply click **Yes** to continue.

Micros	oft iSCSI	×
The Microsoft iSCSI service is not running. iSCSI to function correctly. To start the ser automatically each time the computer res	The service is required to b vice now and have the servi tarts, click the Yes button.	e started for ice start
	Yes	No

To connect to the iSCSI target:

1. In the **iSCSI Initiator Properties** page, under the **Targets** tab, enter the IP address of the StarWind server iSCSI SAN on the **Target** field. Click **Quick Connect**. You should see a list of the iSCSI Targets that have been defined on your iSCSI SAN.

[arget:	10.0	0.0.200		Q	lick Connect
JISCOVE	red targets				Refresh
Name					Status
< conr	rect using a	dvanced options. st	III		,
< or	nect using a	dvanced options, se	m elect a target and then		Cognect
< lio conr fick Cor fio comp hen cli	nect using a nnect. pletely disco ck Disconne	dvanced options, se onnect a target, seli cct.	III elect a target and then ect the target and		Cognect Disconnect
< To conr dick Co To com then cli For targ select t	nect using a nnect. pletely disco ck Disconne get properti he target a	idvanced options, si onnect a target, sel ict. ies, induding config nd dick Properties.	III elect a target and then ect the target and uration of sessions,		Cognect Disconnect Properties

2. In the **Quick Connect** dialog box, select the target that you will use and click **Connect**. Click **Done** to go back to the **iSCSI Initiator Properties** page.

onnections made here o restore them will be n	will be added to the nade every time this	e list of Favorite Ta	waste and an		
Version of Bernets		s computer restart	irgels and an Is.	atte	mpt
iscovered gargets					
Name				Sta	~
ign.2008-08.com.stan	windsoftware:ad.te	stdomain.local-du	ster 1-h-drive	Ina	
ign.2008-08.com.stan	windsoftware:ad.te	stdomain.local-du	ster 1-q-drive	Ina	
ign.2008-08.com.star	windsoftware:ad.te	stdomain.local-du	ster 2-drives	Ina	Ξ
ign.2008-08.com.stan	windsoftware:ad.te	stdomain.local-clu	ster 2-q-drive	Ina	~
<	88			>	
rogress report There are multiple Tar using Quick Connect.	gets discovered.Ple	ase select a single	: Target for Lo	ogin	

3. Click OK to close the iSCSI Initiator Properties page.

Once the targets have been defined using the iSCSI Initiator tool, you can now bring the disks online, initialize them, and create new volumes using the **Disk Management** console.

#### Initializing and Formatting the Disks

After configuring the servers to connect to the iSCSI target, we can proceed to initialize and format the disks. We will use the **Disk Management** console to perform this task. You can launch the tool from the **Server Manager** dashboard, under **Tools** and select **Computer Management**.

**NOTE:** These steps have to be performed on both of the servers that will act as nodes in your failover cluster.

	Serv	ver Manager			- 0 ×
Server M	anager • Dashboard	- (	<u>)   </u>	<u>M</u> anage <u>Tools</u>	<u>V</u> iew <u>H</u> elp
			Clu	ister-Aware Updating	
ard	WELCOME TO SERVER MANAGER		6	mponent services	
10/01			0	mputer Management	
erver			De Eur	rragment and Optimize Dri	ives
ers	1 Confi	aure this local server	Eve Esc	ent viewer	
Storage Services ▷		5	isc	SI loitistor	
	QUICK START		loc	ral Security Believ	
	2 Add	d roles and features	00	IRC Data Sources (22-hit)	
			00	PC Data Sources (52-bit)	
	3 Add	d other servers to manage	Des	formance Monitor	
	WHAT'S NEW	ate a conver group	Per	rourse Monitor	
	4 Cre	ate a server group	Sec	source monitor	
			Ser	wicar	
			Ser	tem Configuration	
	LEARN MORE		Sur	tem loformation	
	-			k Schadular	
			100	adous Eiseuall with Advan	and Consults
	ROLES AND SERVER GROUPS		140	ndows Firewall with Advan	ced security
	Roles: 1   Server groups: 1   Servers total:	1	140	ndows Memory Diagnostic	
	= File and Storage	-	WI WI	ndows PowerShell (v96)	
	Services 1	Local Server	1 1	ndows PowerShell (X00)	
	Managashility	Managaability	WI WI	ndows PowerShell ISE	
	U Manageability	Manageability	W	ndows Powersneir ist (X80)	
	Events	Events	W	ndows Server Backup	

To initialize and format the drives:

1. From within Computer Management, expand the Storage section and select Disk Management.

*			Compu	uter N	Manageme	nt	
Eile Action View Help	X 🖆 🚅 🔍 🗉	3					
A Computer Management (Local	Volume		Lavout 1	Type	File System	Status	Actions
System Tools	C:)	FRE EN-US DV5 (D:)	Simple E Simple E	Basic	NTFS	Healthy (Boot, Page File, Crash Dump, Pr Healthy (Primary Partition)	Disk Manageme
<ul> <li>Event Viewer</li> <li>Shared Folders</li> <li>Local Users and Groups</li> <li>Performance</li> <li>Device Manager</li> <li>Storage</li> <li>Windows Server Backup</li> <li>Disk Management</li> <li>Services and Applications</li> </ul>	G System Reserv	ed	Simple E	Basic	NTFS	Healthy (System, Active, Primary Partition	n) More Actions
	<	10%	ш				
	Cal Disk 0 Basic 50.00 GB Online	System Reserve 350 MB NTFS Healthy (System,	d Active, Prir	(C 49.0 Hea	:) 66 GB NTFS althy (Boot, P	Page File, Crash Dump, Primary Partition	=
	Disk 1 Unknown 1.00 GB Offline	1.00 GB Unallocated					
	Disk 2     Unknown     4.00 GB     Not Initialized	4.00 GB					~

2. Right-click any of the disks that you want to configure and select **Online**. Once the disk is brought online, it is now marked as **Not Initialized**.

Disk 0		
Basic 50.00 GB Online	System Reserved 350 MB NTFS Healthy (System, Active, Prir	(C:) 49.66 GB NTFS Healthy (Boot, Page File, Crash Dump, Primary Partition
Disk 1     Unknown     1.00 GB		
Offline ①	Online	
Help	Properties	
Disk 2	Help	
Unknown 4.00 GB Not Initialized	4.00 GB Unallocated	
Unallocated	Primary partition	

3. To initialize, right-click on the disk and select **Initialize Disk**. The Initialize Disk dialog box will appear.

Disk 0		
Basic 50.00 GB Online	System Reserved 350 MB NTFS Healthy (System, Active, F	Prir 49.66 GB NTFS Healthy (Boot, Page File, Crash Dump, Primary Partition
Disk 1 Unknown		
1.00 GB	1 00 00	
1.00 GB Not Initialize	Initialize Disk	
1.00 GB Not Initialize	Initialize Disk Offline	
1.00 GB Not Initialize	Initialize Disk Offline Properties	
1.00 GB Not Initialize Disk 2 Unknown 4.00 GB	Initialize Disk Offline Properties Help	

4. In the **Initialize Disk** dialog box, make sure that the correct disk is selected for initialization and then choose whether to initialize the disk using the MBR or GPT partition styles. The most common partition style for disks used in SQL Server instances is **MBR**, which is selected by default. Click **OK** to select the MBR partition style.

	Initialize Disk	
You must initialize a disk be	efore Logical Disk Manager can acce	ess it.
Select disks:		
Disk 1		
Disk 2		
Use the following partition	style for the selected disks:	
MBR (Master Boot Rev	cord)	
O GPT (GUID Partition T	able)	
Note: The GPT partition st Windows.	yle is not recognized by all previous v	ersions of
Note: The GPT partition st Windows.	yle is not recognized by all previous v	ensions of

5. To create a disk partition, right-click on the unallocated space and select **New Simple Volume**.

<	ш	>
Basic	**/////////////////////////////////////	<u>^</u>
4.00 GB	4.00 GB	New Simple Volume
	onanoated	New Spanned Volume New Striped Volume
Basic         4.00 GB	New Mirrored Volume New RAID-5 Volume	
Online	00 GB 4.00 GB nline Unallocated	Properties
		Help
Disk 3 Basic 2.00 GB	2.00 GB	

6. In the Welcome to the New Simple Volume Wizard dialog box, click Next.

New Simple Volume Wizard
Welcome to the New Simple Volume Wizard
This wizard helps you create a simple volume on a disk.
A simple volume can only be on a single disk.
To continue, click Next.
< Back Next > Cancel

7. In the **Specify Volume Size** dialog box, enter the volume size and click **Next**.

New Sim	nple Volume Wizard
Specify Volume Size Choose a volume size that is betwee	en the maximum and minimum sizes.
Maximum disk space in MB: Minimum disk space in MB:	4093 8
Simple volume size in MB:	
	< Back Next > Cancel

8. In the **Assign Drive Letter or Path** dialog box, specify the drive letter you would like to use and click **Next**.

E	~	
c		
Blowse	had a second	
	· · · · · · · · · · · · · · · · · · ·	
	r. Browse	r. Browse

- 9. In the Format Partition dialog box,
  - Make sure that the file system selected is **NTFS**.
  - To follow Microsoft best practices on allocation unit size, select 64K.
  - In the **Volume label:** text box, enter the appropriate name.

Click Next

Format Partition To store data on this partition, yo	u must format it first.		
Choose whether you want to for	nat this volume, and if s	o, what settings you want t	o use.
O Do not format this volume			
<ul> <li>Format this volume with th</li> </ul>	e following settings:		
Ele system:	NTFS	~	
Allocation unit size:	64K	~	
Volume label:	SAN_DATA_E		
Perform a quick form	nat		
Enable file and folde	r compression		

10. In the **Completing the New Simple Volume Wizard** dialog box, review the settings you have made and click **Finish**.

Completing the New Simple Volume Wizard	
You have successfully completed the New Simple Volume Wizard. You selected the following settings:	
Volume type:     Simple Volume       Disk selected:     Disk 1       Volume size:     403 MB       Drive letter or path:     E:       File system:     NTFS       Allocation unit size:     65536       Volume label:     SAN_DATA_E       Oxiek format!     Yes	< = *
To close this wizard, click Finish.	

11. Repeat these steps on all of the disks that you want to configure as part of your Windows Server Failover Cluster.

#### Installing the .NET Framework 3.5

SQL Server 2012 requires both the Microsoft .NET Framework 3.5.1 and 4.0 as part of its prerequisite software. The .NET Framework 3.5.1 package is already a part of the Windows Server 2012 installation media while the .NET Framework 4.0 is included in the SQL Server 2012 installation media. However, there are issues when installing the .NET Framework 3.5.1 on Windows Server 2012 machines when using **the Server Manager** dashboard. <u>Microsoft KB article</u> <u>2734872</u> describes the issues you will encounter when installing the .NET Framework 3.5.1 on a Windows 8 or Windows Server 2012 machine.

To install the Microsoft .NET Framework 3.5.1 on a Windows Server 2012, we will be using the <u>Deployment Image Servicing and Management (DISM) Command-Line</u> tool.

**NOTE:** These steps have to be performed on both of the servers that will act as nodes in your failover cluster.

To install the Microsoft .NET Framework 3.5.1, open a command-line and type the command below.

dism /online /enable-feature /featurename:NetFX3 /all /Source:d:\sources\sxs /LimitAccess



#### Windows Failover Cluster Feature Installation

Windows Server Failover Clustering feature provides high availability and scalability in many server workloads. SQL Server 2012 takes advantage of this feature and its capabilities to support a failover clustered instance and the new SQL Server 2012 AlwaysOn Availability Group feature. Discussion of the new SQL Server 2012 AlwaysOn Availability Group feature is beyond the scope of this document. We will only be focusing on SQL Server failover clustered instances.

**NOTE:** These steps have to be performed on both of the servers that will act as nodes in your failover cluster.

To add the Failover Clustering feature:

1. Open the Server Manager dashboard and select Add roles and features. This will launch the Add Roles Features Wizard

Server Ma	anager • Dashboard	• ②	Manage	Tools View Hel
📰 Dashboard	WELCOME TO SERVER MANAGER			
Local Server     All Servers     File and Storage Services	1 Con	figure this local server		
	QUICK START	dd roles and features		
	WHAT'S NEW 4 C	reate a server group		
	LEARN MORE			Hide
	ROLES AND SERVER GROUPS Roles: 1 Server groups: 1 Servers tot	Local Server 1		
	Services     Manageability     Events     Performance     BPA results	Manageability     Events     Services     Performance     BPA results		

 Click Next until you reach the Select Features dialog box. Select the Failover Clustering checkbox. When prompted with the Add features that are required for Failover Clustering dialog box, click Add Features. Click Next.

Select features		DESTINATION SERV WCMSTAGESQL01.cmamdm.enterprise.c
Before You Begin Installation Type	Select one or more features to install on the selected server. Features	Description
Server Selection Server Roles Features Confirmation Results	>       .NET Framework 3.5 Features         >       INET Framework 4.5 Features (Installed)         >       Background Intelligent Transfer Service (BITS)         BitLocker Drive Encryption       BitLocker Network Unlock         BranchCache       Client for NFS         Data Center Bridging       Enhanced Storage         Image: Failover Clustering       Group Policy Management         Ink and Handwriting Services       Internet Printing Client         Heddress Management (IPAM) Server       Detaddresserver	Failover Clustering allows multiple servers to work together to provin high availability of server roles. Failover Clustering is often used f File Services, virtual machines, database applications, and mail applications.
	· · · · · · · · · · · · · · · · · · ·	

he lave	following tools are required to manage this feature, but do not e to be installed on the same server.
4	Remote Server Administration Tools
	▲ Feature Administration Tools
	⊿ Failover Clustering Tools
	[Tools] Failover Cluster Management Tools
	[Tools] Failover Cluster Module for Windows PowerShe
<	III >

3. Click Install to install the Failover Clustering feature.

#### Windows Server Failover Clustering Configuration

Once the Windows Server Failover Clustering Feature has been installed, we can proceed with configuring a Windows Server Failover Cluster. We will start with running the Failover Cluster Validation Wizard to make sure that our cluster configuration will be officially supported by Microsoft.

To configure Windows Failover Clustering,

1. Launch Failover Cluster Manager from within the Server Manager console.



2. Within Failover Cluster Manager, click the Validate Configuration... link.



3. In the Validate a Configuration Wizard dialog box, click Next.



4. In the Select Servers or a Cluster dialog box, add the following server names – WS-CLUSTER3 and WS-CLUSTER4. Click Next.

Select S	ervers or a Cluste	er .	
Before You Begin Select Servers or a Ouster	To validate a set of se To test an existing clus	rvers, add the names of all the servers. iter, add the name of the cluster or one of its nodes.	
Testing Options	Enter name:	1	Browse
Continuation Validation	Selected servers:	WS-CLUSTER3.TESTDOMAIN.local WS-CLUSTER4.TESTDOMAIN.local	Add
Summary			Remove

5. In the **Testing Options** dialog box, make sure that the option **Run all tests** (recommended) is selected. Click **Next**.



6. In the **Confirmation** dialog box, click **Next.** 

Ŵ.	Validate a Configuration	Wizard	
Confirme	ation		
Before You Begin Select Servers or a Duster	You are ready to start validation. Please confirm that the following settings are correct:		
Festing Options	Servers to Test		
See See See	WS-CLUSTER3.TESTDOMAIN.local		$\sim$
/ašdating	WS-CLUSTER4.TESTDOMAIN.local		
Summary	Tests Selected by the User	Category	
	List Fibre Channel Host Bus Adapters	Inventory	
	List iSCSI Host Bus Adapters	Inventory	
	List SAS Host Bus Adapters	Inventory	
	List BIOS Information	Inventory	~
	List Environment Variables	Inventori	
	To continue, click Next.		
	More about cluster validation tests		
		< Previous Next > (	Cancel

7. In the **Summary** dialog box, click **Finish** to create the Windows Server Failover Cluster.



8. In the Access Point for Administering the Cluster dialog box, enter the following details

- **Cluster Name:** WINCLUSTER2
- Address: 172.16.0.211

4		Cr	eate Cluster Wiza	rd							×
Access F	Point for Admir	niste <mark>r</mark> ing	the Cluster								
Before You Begin	Type the name ye	ou want to us	e when administering th	e cluster.							
Access Point for Administering the Cluster	Cluster Name:	WINCLU	JSTER2								
Confirmation	The NetBIOS	name is limit	ed to 15 characters. Or	ne or more IP	v4 ad	dresse	es cou	uld not	be c	onfigur	ed
Creating New Cluster	address.	. For each n	etwork to be used, mak	e sure the ne	etwork	( is see	ected	, and	men	type a	2
Summary			letworks	Address	8						
			172.16.0.0/16	172	33	16	<u>a</u> .	0	133	211	1
					_	_	_	_	_	_	_
				< Previor	us	N	ext >			Cancel	
						-					

9. In the **Confirmation** dialog box, click **Next**. This will create the Windows Server Failover Cluster using the servers as nodes of the cluster, add DNS and Active Directory entries for the cluster hostname.

19 19		Create Cluster Wizard	×
Confirma	ition		
Before You Begin Access Point for Administering the	You are ready to creat The wizard will create	e a cluster. your cluster with the following settings:	
Cluster	Cluster:	WINCLUSTER2	~
Continue New Cluster	Node:	WS-CLUSTERA TESTDOMAIN local	
Creating New Cluster	IP Address:	172.16.0.211	
			~
	Add all eligible stor	age to the cluster.	
	To continue, click Next	-	
		< Previous Next >	Cancel

10. In the **Summary** dialog box, verify that the configuration is successful.

		Create Cluster Wizard	×
Summary	·		
Before You Begin Access Point for Administering the Cluster	You have suc	cessfully completed the Create Cluster Wizard.	
Confirmation		Create Cluster	^
Creating New Cluster	(c)		
Summary	Cluster: Node: Node: Quorum: IP Address:	WINCLUSTER2 WS-CLUSTER3.TESTDOMAIN.local WS-CLUSTER4.TESTDOMAIN.local Node and Disk Majority (Cluster Disk 4) 172.16.0.211	~
	To view the report cre To close this wizard, c	ated by the wizard, click View Report. lick Finish.	View Report
			Enish

11. Verify that the cluster quorum configuration is using **Node and Disk Majority**, using the appropriate drive that you configured as the quorum disk.

	F	ailover Cluster Man	ager	
File Action View Help				
Failover Cluster Manager	Cluster WINCLUSTER2.TEST	OOMAIN.local		Actions WINCLUSTER2.TESTDOMAIN.Io
Modes	Summary of Cluster WINCLUSTER2     WINCLUSTER2 has 0 clustered roles and 2 nodes.     Name: WINCLUSTER2.TESTDOMAIN.local Networks: Cluster Network 1 Cluster Network			Configure Role     Validate Cluster     View Validation Report
⊿ 🤮 Storage ﷺ Disks 目 Pools	Current Host Server: WS-CLUSTE Quorum Configuration: Node and	R4 Subnets: I Disk Majority (Cluster I	3 IPv4 and 0 IPv6 Disk 4)	Add Node  Clore Connection
▷ Networks ☐ Cluster Events	Recent Cluster Events: None in the last hour			Reset Recent Events
	Configure     Navigate			View
	Roles     Nodes       Storage     Networks		Refresh     Properties     Help	
	Cluster Events			Name: WINCLUSTER2
	Cluster Core Resources     Name     Cluster Name	Status		Take Offline
	Name: WINCLUSTER2	<ul> <li>Online</li> <li>Online</li> </ul>	_	Show Critical Events  More Actions
	Storage Cluster Disk 4 Volume: (Q)	Online File System: NTFS	951 MB free of 1,021 MB	Properties           Help
			-	

#### SQL Server 2012 Failover Cluster Instance Installation - Install Primary (Initial) Cluster Node

Installing a SQL Server 2012 Failover Clustered Instance requires that you have the appropriate permissions in your Active Directory domain and that you have local Administrator rights to the machines that will act as nodes in your failover cluster. Configuring the appropriate permissions in Active Directory is beyond the scope of this document. For more information, refer to the document Failover Cluster Step-by-Step Guide: Configuring Accounts in Active Directory.

There are two options to install SQL Server 2012 Failover Clustered Instance. The first one is by using the integrated failover cluster install with the Add Node option and the second one is the Advanced/Enterprise installation option. The process outlined below will take into account the first option and will be installing a DEFAULT instance.

To install a SQL Server 2012 failover clustered instance,

- 1. Run **setup.exe** from the installation media to launch **SQL Server Installation Center**. Click on the **Installation** link on the left-hand side.
- Click on the New SQL Server Failover Cluster Installation link. This will run the SQL Server 2012 Setup wizard.



3. In the **Setup Support Rules** dialog box, validate that the checks return successful results and click **Next**.

1		SQL Server 2012 Setup		- <b></b> X
Setup Support Rules Setup Support Rules identify p corrected before Setup can con	roblem ntinue.	is that might occur when you install SQL Server Setup support file	s. Failures must be	
Setup Support Rules	Ope Hi Viev	ration completed. Passed: 8. Failed O. Warning O. Skipped O. de details << w detailed report		Re-run
		Rule Setup administrator Setup account privileges Restart computer Windows Management Instrumentation (WMI) service Consistency validation for SQL Server registry, keys Long path names to files on SQL Server installation media SQL Server Setup Product Incompatibility .NET 2.0 and .NET 3.5 Service Pack 1 update for Windows 2008	Status Passed Pa	
			OK	Cancel

4. In the **Product Key** dialog box, enter the product key that came with your installation media and click **Next**.

1	SQL Server 2012 Setup	x
<b>Product Key</b> Specify the edition of SQL Serv	er 2012 to install.	
Product Key License Terms Product Updates Install Setup Files	Validate this instance of SQL Server 2012 by entering the 25-character key from the Microsoft certificate of authenticity or product packaging. You can also specify a free edition of SQL Server, suc as Evaluation or Express. Evaluation has the largest set of SQL Server features, as documented in SQL Server Rost Soline, and is activated with a 180-day expiration. To upgrade from one edition to another, run the Edition Upgrade Wizard.  Specify a free edition:  Evaluation  Sec Bott Solition  Evaluation  Sec Bott Solition  S	h ¯
	< Back Next > Can	× :el

5. In the **License Terms** dialog box, click the I accept the license terms check box and click **Next.** 

1	SQL Server 2012 Setup
License Terms To install SQL Server 20 Product Key	12, you must accept the Microsoft Software License Terms.
License Terms Product Updates	MICROSOFT SOFTWARE LICENSE TERMS MICROSOFT SQL SERVER 2012 ENTERPRISE CORE
Install Setup Files	These license terms are an agreement between Microsoft Corporation (or based on where you live, one of its affiliates) and you. Please read them. They apply to the software named above, which includes the media on which you received it, if any. The terms also apply to any Microsoft <ul> <li>updates,</li> <li>supplements,</li> <li>Internet-based services, and</li> <li>or most services.</li> </ul>
	🐴 🎒 Copy Print
	I accept the license terms. Send feature usage data to Microsoft. Feature usage data includes information about your hardware configuration and how you use SQL Server and its components.
	See the Microsoft SQL Server 2012 Privacy Statement for more information.
	< Back Next > Cancel

6. In the **Product Updates** dialog box, you have the option to include SQL Server product updates like service packs and cumulative updates in the installation process. If your servers are connected to the Internet, the installation media will connect to Windows Update and check for available SQL Server 2012 updates. You can opt to install the detected updates as part of the installation process. Click **Next**.

1	SQL Server 2012	Setup	_ <b>_</b> ×
Product Updates Always install the latest update	s to enhance your SQL Server security and p	erformance.	
Product Key License Terms	☑ Include SQL Server product updates		
Product Lindates	Name	Size (MB)	More Information
Install Satur Files	SQL Server 2012 SP1 GDR Product Update	145	KB 2793634
instan setup rites	SQL Server 2012 SP1 GDR Setup Update	26	KB 2793634
	Read our privacy statement online		
	Learn more about SQL Server product upd	<u>ates</u>	
		< Back	Next > Cancel

7. In the **Setup Support Rules** dialog box, validate that the checks return successful results. If the checks returned a few warnings, make sure you fix them before proceeding with the installation. Click **Next**.

1	Install a SQL Server Failover Cluster	-	□ X
Setup Support Rules Setup Support Rules identify corrected before Setup can co	problems that might occur when you install SQL Server Setup support files. Failu	res must be	
Setup Support Rules Setup Role Feature Selection Feature Rules Disk Space Requirements	Operation completed. Passed: 18. Failed 0. Warning 4. Skipped 0. Hide details << <u>View detailed report</u>	[	Re-run
Error Reporting	Rule	Status	<u>^</u>
Ready to Install	Sustained State (ATL)	Passed	
Installation Progress	Cluster Node	Passed	
Complete	Windows Management Instrumentation (WMI) service (WS-CLUSTER3)	Passed	=
	Cluster Remote Access (WS-CLUSTER3)	Passed	
	Cluster service verification	Passed	
	Distributed Transaction Coordinator (MSDTC) installed (WS-CLUSTER3)	Passed	
	Ø Distributed Transaction Coordinator (MSDTC) service	Passed	
	Distributed Transaction Coordinator (MSDTC) clustered	Warning	
	Microsoft Cluster Service (MSCS) cluster verification errors	Passed	
	Microsoft Cluster Service (MSCS) cluster verification warnings	Passed	
	Remote registry service (WS-CLUSTER3)	Passed	~
	< Back Next >	Cancel	Help

8. In the Setup Role dialog box, select the SQL Server Feature Installation option and click Next.

1	Install a SQL Server Failover Cluster
<b>Setup Role</b> Click the SQL Server Feature In feature role to install a specific	stallation option to individually select which feature components to install, or click a configuration.
Setup Support Rules Setup Role Feature Selection Feature Rules Disk Space Requirements Error Reporting Cluster Installation Rules Ready to Install Installation Progress Complete	<ul> <li>QL Server Feature Installation Install SQL Server Database Engine Services, Analysis Services, Reporting Services, Integration Services, and other features.</li> <li>SQL Server BowerPrivot for SharePoint Install PowerPrivot for SharePoint on a new or existing SharePoint server to support PowerPrivot data access in the farm. Optionally, add the SQL Server relational database engine to use as the new farm's database server.</li> <li>Add SQL Server Database Belational Engine Services to this installation.</li> </ul>
	< <u>B</u> ack <u>N</u> ext > Cancel Help

9. In the Feature Selection dialog box, select the following components – Database Engine Services, SQL Server Replication, Client Tools Connectivity and Management Tools. Click Next.

**NOTE:** Data Quality Services is now a requirement when installing the Database Engine Services on a Failover Cluster when the installation media includes SQL Server 2012 Service Pack 1 as per <u>Microsoft KB article 2674817</u>.

Feature Selection Select the Enterprise features	to install.			
Setup Support Rules	Eeatures:		Feature description:	
Setup Role Feature Selection Feature Rules Instance Configuration Disk Space Requirements Cluster Resource Group	Instance Features         ♥ Database Engine Services         ♥ Database Engine Services         ♥ Data Quality Services         □ Analysis Services         □ Analysis Services         □ Analysis Services         □ Reporting Services - Native         Shared Features         □ Reporting Services - Add-in for SharePoint Produ         □ Data Quality Client         □ SQL Server Data Tools         ♥ Client Tools Backwards Compatibility            ■         Select All         Shared feature directory:		The configuration and operation of each instance feature of a SQL Server instance is isolated from other SQL Server instances. SQL Server instances can operate side-by- side on the same computer.	
Cluster Disk Selection Cluster Network Configuration Server Configuration Database Engine Configuration Error Reporting Cluster Installation Rules Ready to Install			Prerequisites for selected features: Already installed: - Microsoft .NET Framework 4.0 - Windows PowerShell 2.0 - Microsoft .NET Framework 3.5 To be installed from media: - Microsoft Visual Studio 2010 Shell	
Installation Progress Complete			oft SQL Server\	

10. In the **Feature Rules** dialog box, verify that all the rules have passed. If the rules returned a few warnings, make sure you fix them before proceeding with the installation. Click **Next**.

1	Install a SQL Server Failover Cluster	_ <b>_</b> X
Feature Rules Feature rules identify problems that	might block this setup operation based on the features selected.	
Setup Support Rules Op Setup Role Feature Selection Feature Rules H Instance Configuration Vice	eration completed. Passed: 4. Failed 0. Warning 0. Skipped 0. ide details << w detailed report	Re-run
Cluster Roserver Goroup Cluster Roserver Configuration Server Configuration Database Engine Configuration Error Reporting Cluster Installation Rules Ready to Install Installation Progress Complete	Rule Cluster supported for edition Prior Visual Studio 2010 instances requiring update. Product Update Language Compatibility Microsoft .NET Framework 3.5 is installed on Windows 8 or hig	Status Passed Passed Passed Passed Passed
	< Back Next >	Cancel Help

11. In the **Instance Configuration** dialog box, enter the following details:

- SQL Server Network Name: SQLCLUSTER2
- Instance ID: MSSQLSERVER

#### Click Next.

2	Install a SQI	L Server Failover Cluster			-
Instance Configuratio	'n				
Specify the name and instance	e ID for the instance of SQL Ser	ver. Instance ID becomes part of	f the installation path		
Setup Support Rules Setup Role	Specify a network name for your failover cluster on the	the new SQL Server failover clu: network.	ster. This will be the r	name used to ident	tify
Feature Selection	SQL Server Network Name:	SQLCLUSTER2			
Feature Rules Instance Configuration		-			
Disk Space Requirements	Default instance     Named instance	Meccu cepuep			
Cluster Resource Group	O Named instance:	MSSQLSERVER			
Cluster Disk Selection Cluster Network Configuration	Instance ID:	MSSQLSERVER			
Server Configuration Database Engine Configuration	Instance root directory:	C:\Program Files\Microsoft SC	QL Server\		
Error Reporting Cluster Installation Rules Ready to Install	SQL Server directory: Detected SQL Server instance	C:\Program Files\Microsoft SQ	(L Server\MSSQL11.M	ISSQLSERVER	
Installation Progress Complete	Instance Cluster	Network Name Features	Edition	Version	In
	<	ш			1
	*				

12. In the **Disk Space Requirements** dialog box, check that you have enough space on your local disks to install the SQL Server 2012 binaries. Click **Next**.

1	Install a SQL Server Failover Cluster
Disk Space Requirem	ents iny for the SQL Server features you selected.
Setup Support Rules Setup Role Feature Selection Feature Rules Instance Configuration <b>Disk Space Requirements</b> Cluster Resource Group Cluster Network Configuration Server Configuration Database Engine Configuration Error Reporting Cluster Installation Rules Ready to Install Installation Progress Complete	Disk Usage Summary:
	< <u>Back</u> <u>N</u> ext > Cancel Help

13. In the **Cluster Resource Group** dialog box, check the resources available on your Windows Server Failover Cluster. This tells you that a new Resource Group will be created on your cluster for the SQL Server instance. To specify the SQL Server cluster resource group name, you can either use the drop-down box to specify an existing group to use or type the name of a new group to create it. Accept all the defaults and click **Next**.

🖀 Install a SQL Server Failover Cluster 💶 🗖 🗙				
Cluster Resource Group	oup for you	r SQL Server failover cluster.		
Setup Support Rules Setup Role Feature Selection Feature Rules Instance Configuration	Specify a r failover clu or enter a r SQL Ser	ame for the SQL Server cluster r Ister resources will be placed. Yo new cluster resource group name ver cluster resource group name	esource group. The cluster resource group is where SQL Server w can choose to use an existing cluster resource group name to be created. ; SQL Server (MSSQLSERVER)	
Disk space Kequirements <b>Cluster Resource Group</b> Cluster Disk Selection Cluster Network Configuration Server Configuration Database Engine Configuration Error Reporting Cluster Installation Rules Ready to Install Installation Progress Complete	Qualified	Name     Available Storage     Cluster Group	Message The cluster group 'Available Storage' is reserved by Windows Fai The cluster group 'Cluster Group' is reserved by Windows Failov	
			< Back Next > Cancel Help	

14. In the **Cluster Disk Selection** dialog box, select the available disk groups that are on the cluster for SQL Server 2012 to use. Click **Next**.

1		Install a SQL S	erver Failover Cluster
Cluster Disk Selection Select shared cluster disk resou	irces for your S	QL Server failover	cluster.
Setup Support Rules Product Key License Terms Setup Role Feature Selection Feature Rules Instance Configuration	Specify the used as the Services con SAN_BA SAN_DA SAN_DA	shared disks to be default drive for al nfiguration pages. CKUP_H .TA_E GS_F	included in the SQL Server resource cluster group. The first drive will be I databases, but this can be changed on the Database Engine or Analysis
Disk Space Requirements Cluster Resource Group <b>Cluster Disk Selection</b> Cluster Network Configuration Server Configuration Database Engine Configuration Error Reporting Cluster Installation Rules Ready to Install Installation Progress Complete	Available sh Qualified	ared disks: Disk SAN_BACKUP_H SAN_DATA_E SAN_LOGS_F SAN_QUORUM	Message The disk resource 'SAN_QUORUM_Q' cannot be used because it is a cluste Refresh
			< Back Next > Cancel Help

- 15. In the **Cluster Network Configuration** dialog box, enter the virtual IP address that your SQL Server 2012 failover cluster will use.
  - IP Type: IPv4
  - Address: 172.16.0.212

Setup Support Rules	Spec	ify the ne	twork se	ttings for this faile	over cluster:		
Setup Role		IP Type	DHCP	Address	Subnet Mask	Subnet(s)	Network
Feature Bular	•	IPv4		172.16.0.212	255.255.0.0	172.16.0.0/16	LAN
Instance Configuration							
Disk Space Requirements							
Cluster Resource Group							
Cluster Disk Selection							
Cluster Network Configuration							
closter methorn comigatorion							
Server Configuration							
Server Configuration Database Engine Configuration							
Server Configuration Database Engine Configuration Error Reporting							
Server Configuration Database Engine Configuration Error Reporting Cluster Installation Rules							
Server Configuration Database Engine Configuration Error Reporting Cluster Installation Rules Ready to Install							
Server Configuration Database Engine Configuration Error Reporting Cluster Installation Rules Ready to Install Installation Progress							
Server Configuration Database Engine Configuration Error Reporting Cluster Installation Rules Ready to Install Installation Progress Complete							
Server Configuration Database Engine Configuration Error Reporting Cluster Installation Rules Ready to Install Installation Progress Complete							
Server Configuration Database Engine Configuration Error Reporting Cluster Installation Rules Ready to Install Installation Progress Complete							

- 16. In the **Server Configuration** dialog box, use the following credentials for the SQL Server service accounts in the **Service Accounts** tab. Make sure that both the SQL Server Agent and SQL Server Database Engine services have a **Startup Type** of **Manual**. The Windows Server Failover Cluster will take care of stopping and starting the service.
  - SQL Server Agent: TESTDOMAIN\sqlservice
  - SQL Server Database Engine: TESTDOMAIN\sqlservice

3	Install a SQL Server	Failover Cluster			-
Server Configuration Specify the service accounts an	d collation configuration.				
Setup Support Rules Setup Role Feature Selection	Service Accounts Collation	e a separate account for each	sQL Server serv	ice.	
Feature Rules	Service	Account Name	Password	Startup Typ	e
Instance Configuration	SQL Server Agent	TESTDOMAIN\sqlservice		Manual	~
Disk Space Requirements	SQL Server Database Engine	TESTDOMAIN\sqlservice		Manual	~
Cluster Resource Group	SQL Full-text Filter Daemon Launc.	. NT Service\MSSQLFDLa		Manual	
Cluster Disk Selection	SQL Server Browser	NT AUTHORITY LOCAL		Automatic	~
Database Engine Configuration Error Reporting Cluster Installation Rules Ready to Install Installation Progress Complete					
		< <u>B</u> ack <u>N</u> ext	> Can	cel H	elp

Click Next.

17. In the **Database Engine Configuration** dialog box, select **Windows Authentication Mode** in the **Server Authentication** tab. If you want to add the currently logged on user to be a part of the SQL Server administrators group, click the **Add Current User** button. Otherwise, you can add the appropriate domain accounts or security groups.

5	Install a SQL Server Failover Cluster	>
Database Engine Confi Specify Database Engine authe	guration ntication security mode, administrators and data directories.	
Setup Support Rules Setup Role Feature Selection Feature Rules Instance Configuration Disk Space Requirements Cluster Rosource Group Cluster Disk Selection Cluster Network Configuration Server Configuration Database Engine Configuration Error Reporting Cluster Installation Rules Ready to Install Installation Progress Complete	Server Configuration       Data Directories       FILESTREAM         Specify the authentication mode and administrators for the Database Er         Authentication Mode <ul> <li>Windows authentication mode</li> <li>Mixed Mode (SQL Server authentication and Windows authentication</li> <li>Specify the password for the SQL Server system administrator (sa) accord</li> <li>Enter password:</li> <li>Specify SQL Server administrators</li> </ul> Specify SQL Server administrators           TESTDOMAIN/administrator (Administrator)               Add Current User         Add         Remove	ngine. n) unt. SQL Server administrators have unrestricted access to the Database Engine.
	< <u>B</u> ack <u>N</u> ext >	Cancel Help

In the Data Directories tab, enter the following

- Data root directory: E:\
- User database directory: E:\SQLSERVER\MSSQL\Data
- User database log directory: F:\SQLSERVER\MSSQL\Data
- Temp DB directory: E:\SQLSERVER\MSSQL\Data
- Temp DB log directory: F:\SQLSERVER\MSSQL\Data
- Backup directory: H:\SQLSERVER\MSSQL\Backup

Setup Support Rules	Server Configuration Data Di	rectories FILESTREAM		
Setup Role Feature Selection	Data root directory:	E:\		
Feature Rules	System database directory:	E:\MSSQL11.MSSQLSERVER\MSSQL\Data		
Instance Configuration Disk Space Requirements	User database directory:	E:\SQLSERVER\MSSQL\Data		
Cluster Resource Group	User database log directory:	F:\SQLSERVER\MSSQL\Data		
Cluster Disk Selection	Temp DB directory:	E\SQLSERVER\MSSQL\Data F\SQLSERVER\MSSQL\Data		
Server Configuration	Temp DB log directory:			
Database Engine Configuration Error Reporting Cluster Installation Rules Ready to Install Installation Progress Complete	Backup directory:	H:\SQLSERVER\MSSQL\Backup		

**NOTE:** New in SQL Server 2012 is the option to store the **tempdb** database on a local drive instead of a clustered drive. Should you decide to do so, you will get prompted to make sure that all of the nodes in the cluster contain the same directory structure and that the SQL Server service account has read/write permissions on those folders.



Click Yes. Then, click Next.

18. In the Error and Usage Reporting dialog box, click Next.



19. In the **Cluster Installation Rules** dialog box, verify that all checks are successful. Click **Next**.

Cluster Installation Ru Setup is running rules to deter Help.	<b>Jles</b> rmine if th	e failover cluster installation operation will be blocke	d. For more information, click	
Setup Support Rules Setup Role Feature Selection Feature Rules Instance Configuration	Operat Hide <u>View d</u>	ion completed. Passed: 2, Failed 0, Warning 0, Ski details << etailed report	pped 0.	Re-run
Disk Space Requirements Cluster Resource Group Cluster Disk Selection Cluster Network Configuration Database Engine Configuration Error Reporting <b>Cluster Installation Rules</b> Ready to Install	R S C	ule AT32 File System luster Resource DLL Update Restart Check	Status Passed Passed	
Complete		< Back	Next > Cancel	Help

20. In the Ready to Install dialog box, verify that all configurations are correct. Click Next.

1	Install a SQL Server Failover Cluster	x
Ready to Install	nurer to ha installed	
Verify the side server zonz near	area to be instance.	
Setup Support Rules Product Key License Terms Setup Role Feature Selection Feature Rules Instance Configuration Disk Space Requirements Cluster Resource Group Cluster Disk Selection Cluster Network Configuration Server Configuration Database Engine Configuration Error Reporting Cluster Installation Rules <b>Ready to Install</b> Installation Progress Complete	Ready to install the SQL Server 2012 failover cluster: <ul> <li>Summary</li> <li>Edition: Enterprise Edition: Core-based Licensing</li> <li>Action: InstallFailoverCluster (Product Update)</li> <li>Prerequisites</li> <li>Already installed:                 <ul></ul></li></ul>	
	Cancel Help	

21. In the **Complete** dialog box, click **Close**. This concludes the installation of a SQL Server 2012 Failover Clustered Instance.

1	Install a SQL Server Failover Cli	uster		x
Complete Your SQL Server 2012 failover	cluster installation is complete with product updates.			
Setup Support Rules Setup Role Feature Selection Feature Rules Instance Configuration Disk Space Requirements Cluster Resource Group Cluster Disk Selection Cluster Network Configuration Server Configuration	Information about the Setup operation or possible of Feature Client Tools - Complete Client Tools Connectivity Management Tools - Basic Database Engine Services Full-Text and Semantic Extractions for Search SOL Server Replication Details:	next steps: Status Succeeded Succeeded Succeeded Succeeded Succeeded		
Database Engine Configuration Error Reporting Cluster Installation Rules Ready to Install Installation Progress Complete	Viewing Product Documentation for SQL S Only the components that you use to view and been installed. By default, the Help Viewer con SQL Server, you can use the Help Library Man your local computer. For more information, see <a href="http://go.microsoft.com/fwink/?/LinkID=22468">http://go.microsoft.com/fwink/?/LinkID=22468</a> /2/4633 Summary log file has been saved to the following lo CNProgram Files/Microsoft SQL Server/110/Setup B CLUSTER3_20130722_143146.txt	erver manage the documer monent uses the onlin ager component to do Use Microsoft Books 32 (http://go.microsoft scation: lootstrap\Log\2013072	ntation for SQL Ser te library. After insi wnload documenta . Online for SQL Se . com/fwlink/?Linkl 2. 143146\Summary	ver have talling tion to enver D=
			Close	Help

# SQL Server 2012 Failover Cluster Instance Installation - Install Secondary (Failover) Cluster Node

Now that you have a working failover cluster, we will make it highly available by adding nodes. Most of the steps outlined below are similar to the ones when installing a failover clustered instance. While all the steps are still included, some screenshots have been omitted for brevity.

To add a node to a SQL Server 2012 failover clustered instance,

- 1. Run **setup.exe** from the installation media to launch **SQL Server Installation Center**. Click on the **Installation** link on the left-hand side.
- 2. Click on the **Add node to a SQL Server failover cluster** link. This will run the SQL Server 2012 Setup wizard.



- 3. In the **Setup Support Rules** dialog box, validate that the checks return successful results and click **OK**. Click **Next** until you get to the **Cluster Node Configuration** dialog box.
- 4. In the **Cluster Node Configuration** dialog box, validate that the information on the existing SQL Server 2012 cluster is correct. Click **Next**.

8		Add a Fail	over	Cluster Node	_ <b>_</b> ×
Cluster Node Configur	r <b>ation</b> Server failover clu	ster.			
Setup Support Rules Cluster Node Configuration Cluster Network Configuration	SQL Server instance name:			SQLSERVER	
Service Accounts	Name of thi	Name of this node:		CLUSTER4	
Error Reporting Add Node Rules	Instance Name	Cluster Network Name	Features		Nodes
Add Node Progress	MSSQLSERVER		R2	SQLEngine, SQ	WS-CLUSTER3
Add Node Progress Complete					
				< Back	Next > Cancel Help

5. In the **Service Accounts** dialog box, verify that the information is the same as what you have used to configure the first node. Click **Next**.

Service Accounts Specify the service accounts a	nd collation configuration.						
Setup Support Rules	Microsoft recommends that you use a separate account for each SQL Server service.						
Cluster Node Configuration Cluster Network Configuration Service Accounts	Service	Account Name	Password Startup T		ype		
	SQL Full-text Filter Daemon Launcher	NT Service\MSSQLFDLaun		Manual			
Error Reporting	SOI Server Browser	NT AUTHORITY/LOCAL SE		Automatic	1.		
Add Node Rules	SOI Server Agent	TESTDOMAIN salsenice		Manual	-		

**NOTE:** If you used different service accounts for the SQL Server services, make sure you provided the correct credentials. If you noticed, the order of the services in this dialog box differs from when you are installing a failover clustered instance.

- 6. In the Error and Usage Reporting dialog box, click Next.
- 7. In the Add Node Rules dialog box, verify that all checks are successful and click Next.
- 8. In the **Ready to Add Node** dialog box, verify that all configurations are correct and click **Install**.
- 9. In the **Complete** dialog box, click **Close**. This concludes adding a node to a SQL Server 2012 Failover Cluster.
- 10. Reboot both nodes after completing the installation just to be sure that there are no pending reboot operations that may possibly be flagged as a warning.

#### About The Author



Edwin M Sarmiento is a Microsoft SQL Server MVP and Microsoft Certified Master from Ottawa, Canada specializing in high availability, disaster recovery and system infrastructures running on the Microsoft server technology stack - ranging from Active Directory to SharePoint and anything in between. He is very passionate about technology but has interests in music, professional and organizational development, leadership and management matters when not working with databases. He lives up to his primary mission statement – "*To help people grow and develop their full potential as God has planned for them.*"

He wants the whole world to know that the FILIPINO is a world-class citizen and brings JESUS CHRIST to the world.

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