Gone Clustering

in **60** Minutes

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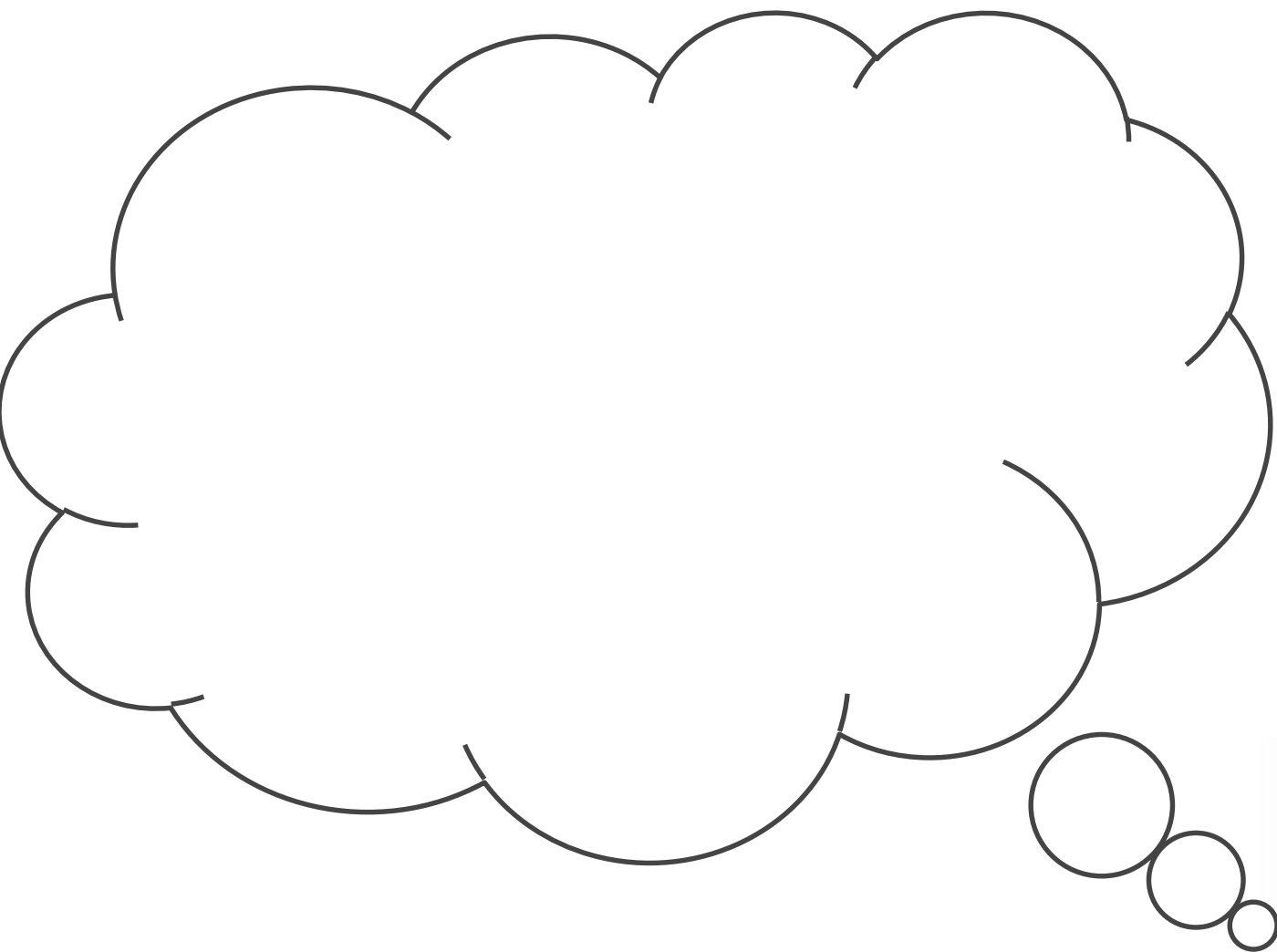
How many of you
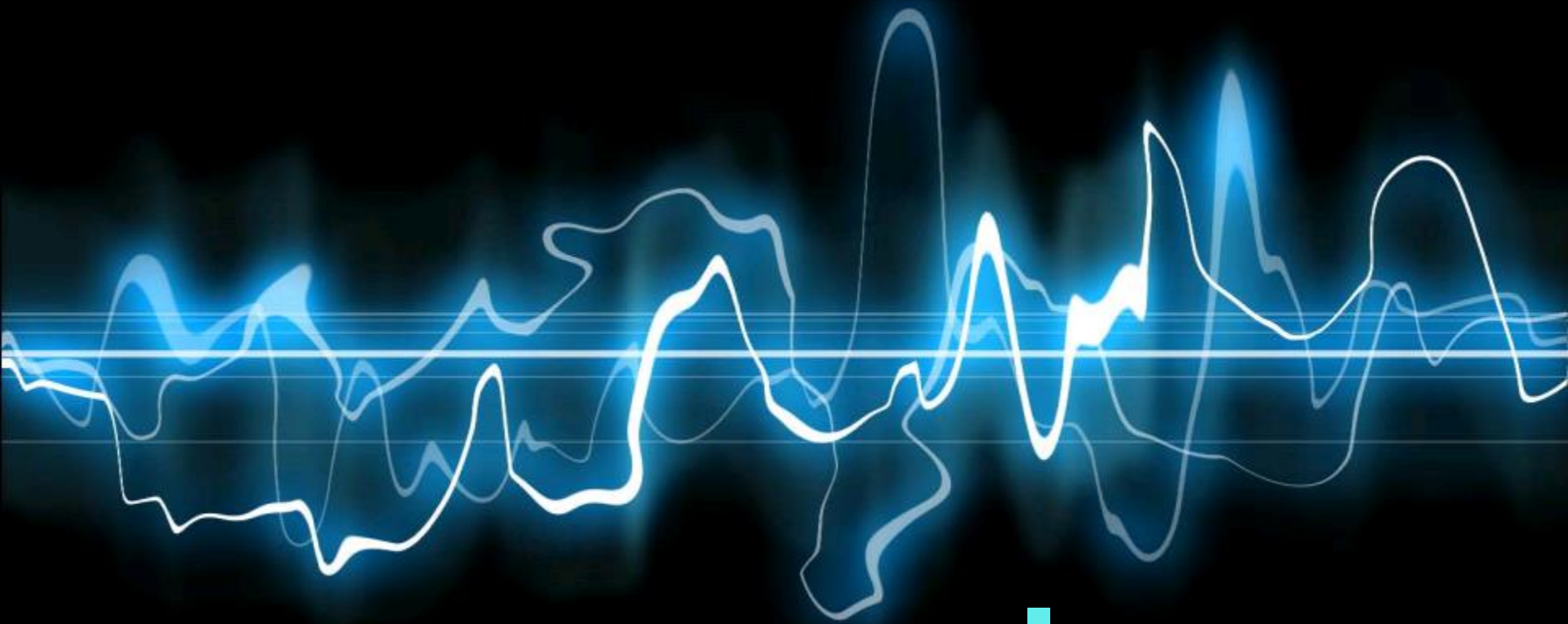have some background with

failover
clustering

How many of you
DO NOT

clustering

I can't blame them

I felt the same way

I **DON'T** have to be intimidated

I **DON'T** have to be intimidated

I actually know a
few things

the **SECRET** to understanding understanding the complex is to start with what we **already know**

WHAT is HIGH AVAILABILITY

"the **GOAL** of high availability is to keep applications, systems, and services **readily available**"

ONE

key takeaway in
this session

Failover Clustering

is

SIMPLE

stop service

stop service
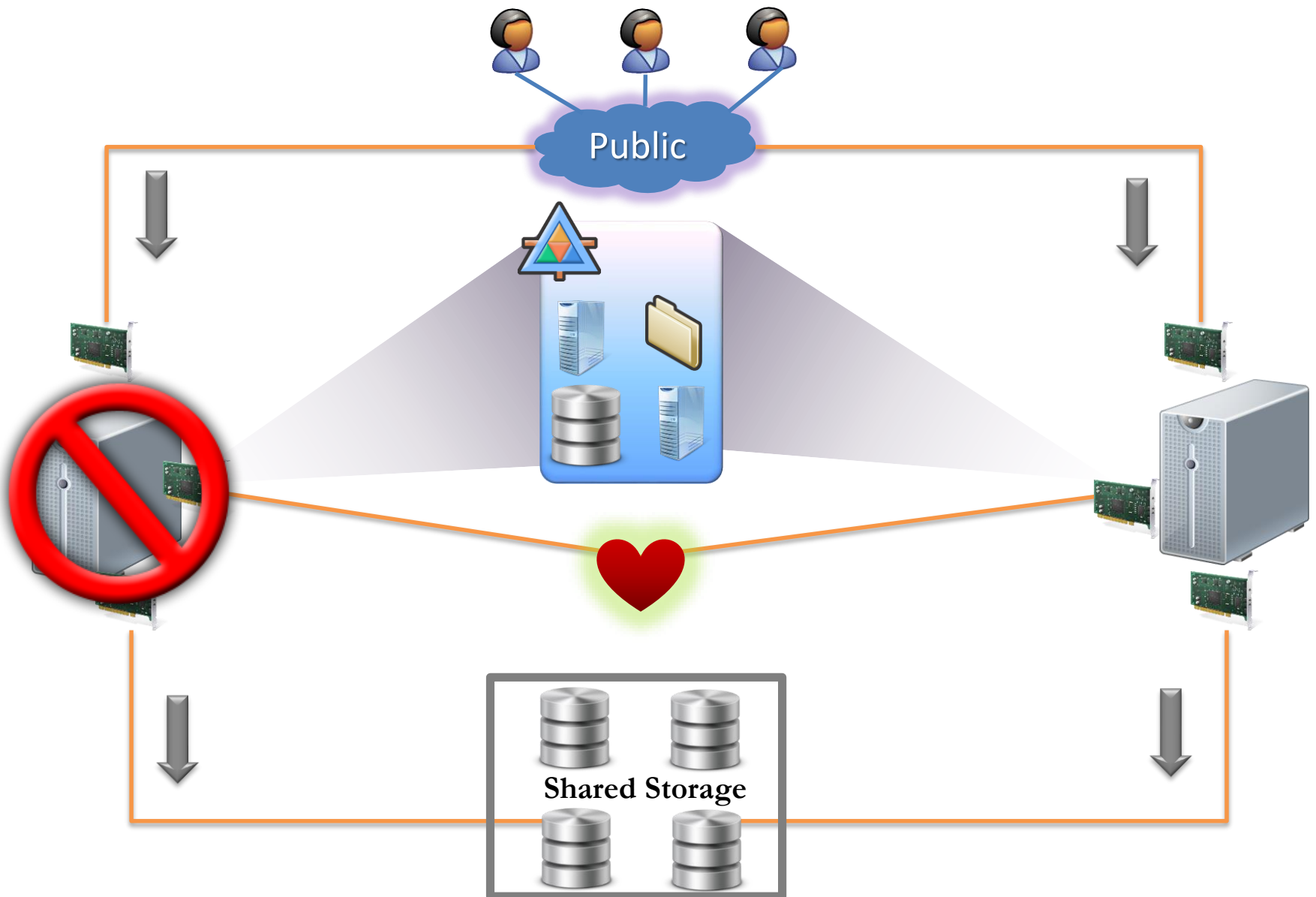
wait

stop service

wait

start service

failover clustering

how it works

Public

Shared Storage

a group of computers and storage devices that work together and that you can access as a single system

cluster

a group of computers and storage devices that work together and that you can access as a single system

cluster

a group of computers and storage devices that **work together** and that you can access as a single system

cluster

a group of computers and storage devices that work together and that you can access as a **single system**

cluster

definitions

Node

a server that is a member of a cluster

Resource

a hardware, service or an entity that is hosted on a cluster

basic building block in a cluster

Resource

physical resource

storage

network

server nodes

Resource

virtual resource

Resource

virtual server name

virtual computer object

virtual IP address

```
Autoconfiguration Enabled . . . . . : Yes
IP Address. . . . . . . . . . . . . : 192.168.1.114
Subnet Mask . . . . . . . . . . . . : 255.255.255.0
Default Gateway . . . . . . . . . . : 192.168.1.1
```

Resource group

a combination of resources that are managed as **a UNIT**

Resource group

Services and Applications

Resource group

Roles

Failover

moving a clustered resource from one node to another

Dependencies

reliance of a resource on another resource

Quorum

*the minimum number of members of a deliberative assembly necessary to conduct the business of that group

Quorum

"majority vote wins"

Hardware Requirements

Hardware Requirements

Microsoft

Failover Cluster Validation Report

Node:	WS-CLUSTER1.TESTDOMAIN.local	Validated
Node:	WS-CLUSTER2.TESTDOMAIN.local	Validated
Started	4/29/2013 8:58:37 PM	
Completed	4/29/2013 9:01:17 PM	

The Validate a Configuration Wizard must be run after any change is made to the configuration of the cluster or hardware. ____ ____rmation, see http://go.microsoft.com/fwlink/p/?LinkId=226879.

Results by Category

Name	Result Summary	Description
Inventory	✓	Success
Network	✓	Success
Storage	✓	Success
System Configuration	✓	Success

Cluster Preparation Checklist

Hostname	Windows Version/Edition	Physical/Virtual	CPU	RAM	DOMAIN	Role
CLUSTERNODE1	Windows Server 2008 R2 Enterprise (Full Version)	Virtual	2CPU 2.54GHz	1GB	TESTDOMAIN.local	Cluster Node 1
CLUSTERNODE2	Windows Server 2008 R2 Enterprise (Full Version)	Virtual	2CPU 2.54GHz	1GB	TESTDOMAIN.local	Cluster Node 2
WINCLUSTER	N/A	N/A	N/A	N/A	N/A	Virtual Server Name (Windows)

Servers | Network | Storage | Cluster Services | Service Accounts

A1: Hostname

	Hostname	Network	IP	Subnet	Gateway	Primary DNS	Secondary DNS
1	**Hostname**	**Network**	**IP**	**Subnet**	**Gateway**	**Primary DNS**	**Secondary DNS**
2	CLUSTERNODE1	Public	172.16.0. 141	255.255.0.0	172.16.0.1	172.16.0.100	192.168.0.100
3		Heartbeat	10.0.0.141	255.255.255.0			
4		iSCSI	197.160.0.141	255.255.255.128			
5	CLUSTERNODE2	Public	172.16.0. 142	255.255.0.0	172.16.0.1	172.16.0.100	192.168.0.100
6		Heartbeat	10.0.0.142	255.255.255.0			
7		iSCSI	197.160.0.142	255.255.255.128			
8	WINCLUSTER	Public	172.16.0.150	255.255.0.0			
9							
10							

Tabs: Servers | Network | Storage | Cluster Services | Service Accounts

A1: Storage Name

Storage Name	Purpose	Volume	Path	Size
Quorum	Cluster Witness Disk	Quorum	Q:\	1 GB
MSDTC	MSDTC Disk	MSDTC	M:\	1 GB
DATA	SQL Server Data Disk	DATA	E:\	500 GB
LOG	SQL Server Log Disk	LOG	F:\	300 GB
BACKUPS	SQL Server Backup Disk	Backup	E:\Mountpoints\Backups	1 TB

Servers / Network / Storage / Cluster Services / Service Accounts

A1 | Application

	Application	Software	Virtual Server Name	Virtual IP Address
1	**Application**	**Software**	**Virtual Server Name**	**Virtual IP Address**
2	SQL Server	SQL Server 2008 R2 Standard Edition x64	SQLCLUST	172.16.0.150
3	MSDTC	N/A	DTC-CLUST	172.16.0.140
4				
5				
6				
7				
8				
9				
10				

Servers | Network | Storage | **Cluster Services** | Service Accounts

Domain Account	Password	Purpose
TESTDOMAIN\sqlservice	*******	SQL Server service account
TESTDOMAIN\sqlagent	*******	SQL Server Agent service account

Servers / Network / Storage / Cluster Services / **Service Accounts**

Creating a Windows Failover Cluster

demo

Install SQL Server 2008 on a Windows Server 2008 Cluster Part 1 - Mozilla Firefox

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Problem

In a previous tip on SQL Server 2008 Installation Process, we have seen how different SQL Server 2008 installation is from its previous versions. Now, we have another challenge to face: installing SQL Server 2008 on a Windows Server 2008 Cluster. Windows Server 2008 has a lot of differences from its previous versions and one of them is the clustering feature. How do I go about building a clustered SQL Server 2008 running on Windows Server 2008?

Solution

There have been a lot of changes regarding clustering between Windows Server 2003 and Windows Server 2008. It took quite a lot of effort for us to build a cluster in Windows Server 2003 - from making sure that the server hardware for all nodes are cluster-compatible to creating resource groups. Microsoft has redefined clustering with Windows Server 2008, making it simpler and easier to implement. Now that both SQL Server 2008 and Windows Server 2008 are out in the market for quite some time, it would be a must to prepare ourselves to be able to setup and deploy a clustered environment running both. Installing SQL Server on a stand-alone server or member server in the domain is pretty straight-forward. Dealing with clustering is a totally different story. The goal of this series of tips is to be able to help DBAs who may be charged with installing SQL Server on a Windows Server 2008 cluster.

SQL Server 2012 Failover Cluster Initial Installation

CLUSTERNODE1 **CLUSTERNODE2** **CLUSTERNODE3**

Database Engine Configuration

Specify Database Engine authentication security mode, administrators and data directories.

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
Database Engine Configuratic
Error Reporting
Cluster Installation Rules
Ready to Install
Installation Progress
Complete

Server Configuration	⚠ Data Directories	FILESTREAM

Data root directory: `M:\`

System database directory: M:\MSSQL11.MSSQLSERVER\MSSQL\Data

User database directory: `M:\MSSQL\Data`

User database log directory: `L:\MSSQL\LOG`

Temp DB directory: `D:\MSSQL\Data`

Temp DB log directory: `D:\MSSQL\Data`

Install a SQL Server Failover Cluster

You have specified a local directory D:\MSSQL\Data as the tempdb data or log directory for a SQL Server cluster. To avoid possible failures during a failover, you must make sure that the same directory exists on each cluster node and grant read/write permission to SQL server service.

[Yes]　[No]

⚠ You have specified a local directory D:\MSSQL\Data as the tempdb data or log directory for a SQL Serve...
⚠ You have specified a local directory D:\MSSQL\Data as the tempdb data or log directory for a SQL Serve...
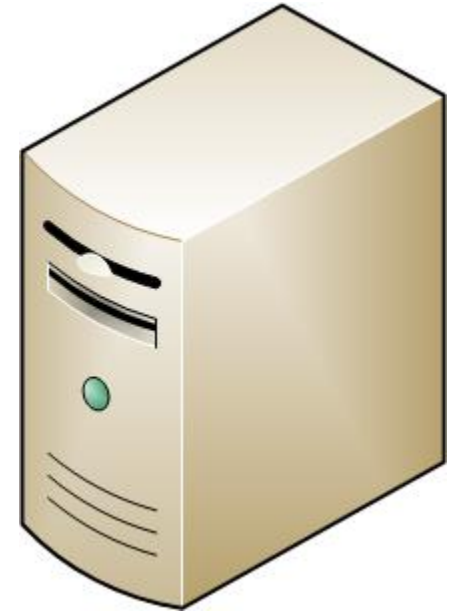
< Back　　Next >　　Cancel　　Help

CLUSTERNODE1   **CLUSTERNODE2**   **CLUSTERNODE3**

Cluster Network Configuration

Specify additional IP addresses that are available and valid on the current node and subnet (previously-configured SQL Server failover cluster IP addresses are shown read-only and dimmed).

Setup Support Rules

Cluster Node Configuration

Cluster Network Configuration

Service Accounts

Error Reporting

Add Node Rules

Ready to Add Node

Add Node Progress

Complete

Specify the network settings for this failover cluster:

☑	IP Type	DHCP	Address	Subnet Mask	Subnet(s)	Network
☑	IPv4	☐	192.168.0.113	255.255.255.0	192.168.0.0/24	LAN_DC2
☑	IPv4	☐	172.16.0.113	255.255.0.0	172.16.0.0/16	LAN_DC1

Add a Failover Cluster Node

? SQL Server Setup detected that there are multiple subnets. Because of this, Setup sets the IP address resource dependency using an OR relationship for SQL Server multi-subnet failover clustering, so failover to other nodes does not happen until all the network cards fail on the node that owns the failover cluster. This may impact multi-homed cluster configurations on a subnet when client connections become unavailable. Do you want to proceed with SQL Server multi-subnet failover cluster configuration?

[Yes]   [No]

[Refresh]

⚠ SQL Server Setup detected that there are multiple subnets. Because of this, Setup sets the IP address resour...
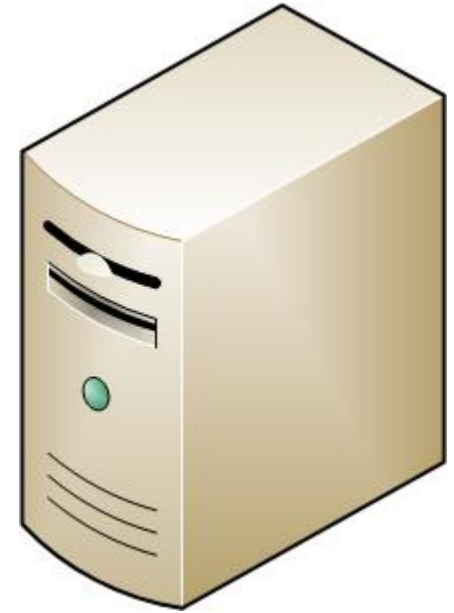
[< Back]   [Next >]   [Cancel]   [Help]

CLUSTERNODE1 **CLUSTERNODE2** **CLUSTERNODE3**

CLUSTERNODE1   **CLUSTERNODE2**   **CLUSTERNODE3**

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Problem
In a previous tip on SQL Server 2008 Installation Process, we have seen how different SQL Server 2008 installation is from its previous versions. Now, we have another challenge to face: installing SQL Server 2008 on a Windows Server 2008 Cluster. Windows Server 2008 has a lot of differences from its previous versions and one of them is the clustering feature. How do I go about building a clustered SQL Server 2008 running on Windows Server 2008?

Solution
To continue this series on Installing SQL Server 2008 on a Windows Server 2008 Cluster, we will look at installing SQL Server 2008 in a failover cluster. In Part 1, we have completed the installation of the Application Server role in both of the servers that we will be using as part of our cluster. Part 2 walked you through the installation of the Failover Cluster Feature, validating the servers that will be a part of the cluster, and creating the cluster. In this tip, we will proceed to install SQL Server 2008 in a clustered Windows Server 2008 environment.

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CLUSTERNODE1   **CLUSTERNODE2**   **CLUSTERNODE3**

CLUSTERNODE1   **CLUSTERNODE2**   **CLUSTERNODE3**

③

CLUSTERNODE1　　**CLUSTERNODE2**　　**CLUSTERNODE3**

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Problem

In a previous tip on SQL Server 2008 Installation Process, we have seen how different SQL Server 2008 installation is from its previous versions. Now, we have another challenge to face: installing SQL Server 2008 on a Windows Server 2008 Cluster. Windows Server 2008 has a lot of differences from its previous versions and one of them is the clustering feature. How do I go about building a clustered SQL Server 2008 running on Windows Server 2008?

Solution

To continue this series on Installing SQL Server 2008 on a Windows Server 2008 Cluster, we will look at adding a node in a SQL Server 2008 failover cluster.

- Part 1 we completed the installation of the Application Server role in both of the servers that we will be using as part of our cluster.
- Part 2 walked you through the installation of the Failover Cluster Feature, validating the servers that will be a part of the cluster, and creating the cluster.
- Part 3 completed with a working SQL Server 2008 failover cluster running on a single node.
- In this tip, we will proceed to add a node in a SQL Server 2008 failover cluster and apply the latest cumulative

1 more thing…

Next Steps

Questions

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