

SQL Server 2008 Cluster Configuration

Ying Fan
Support Engineer
Customer Service & Support
Asia Pacific & Greater China Region

Welcome!

Agenda

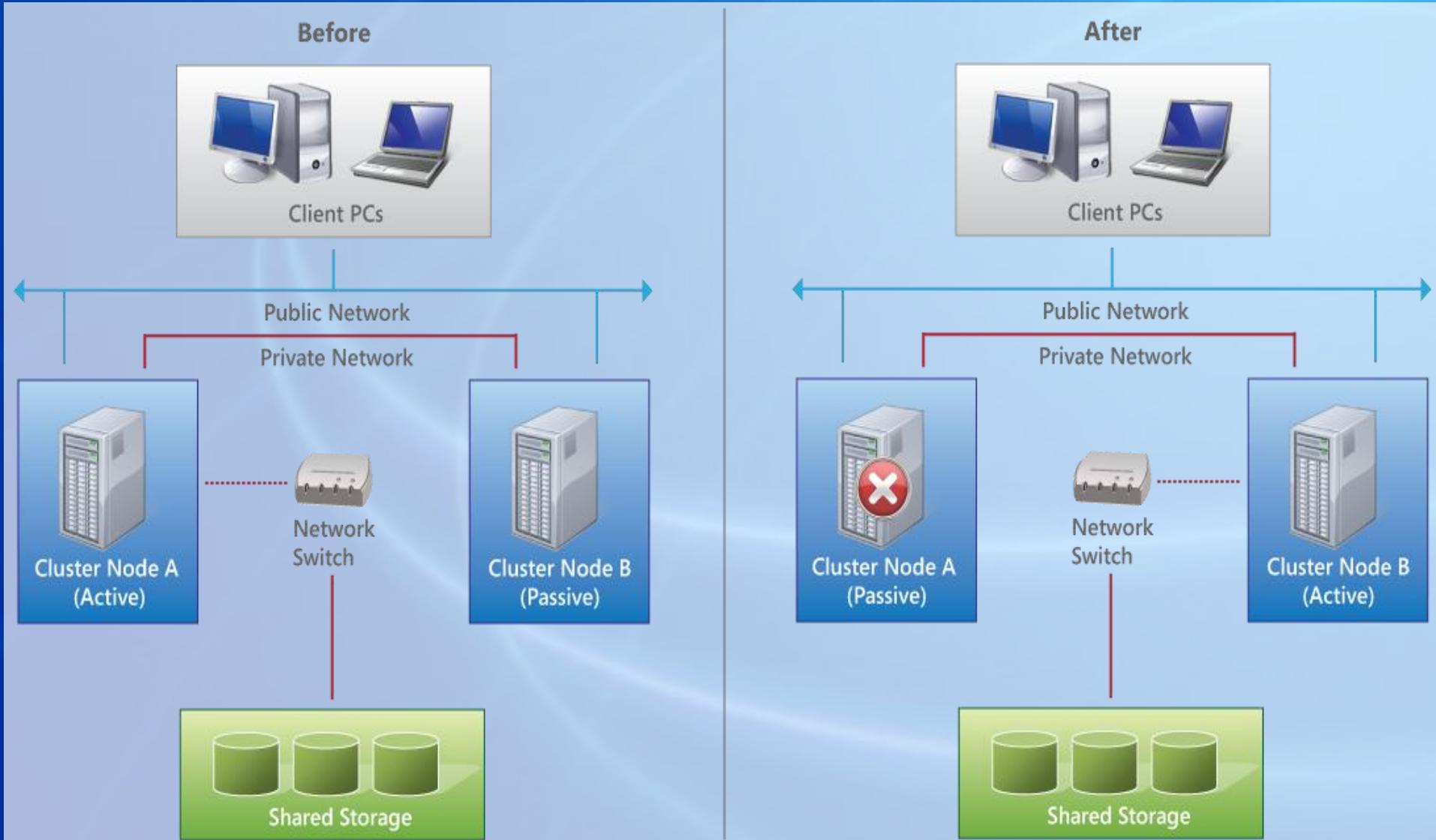
- Cluster Foundations
- SQL Server 2008 Cluster Enhancements
- SQL Cluster Installation/Maintainance
- SQL Cluster Installation tips
- Post Installation Tips
- Cluster Basic Troubleshooting

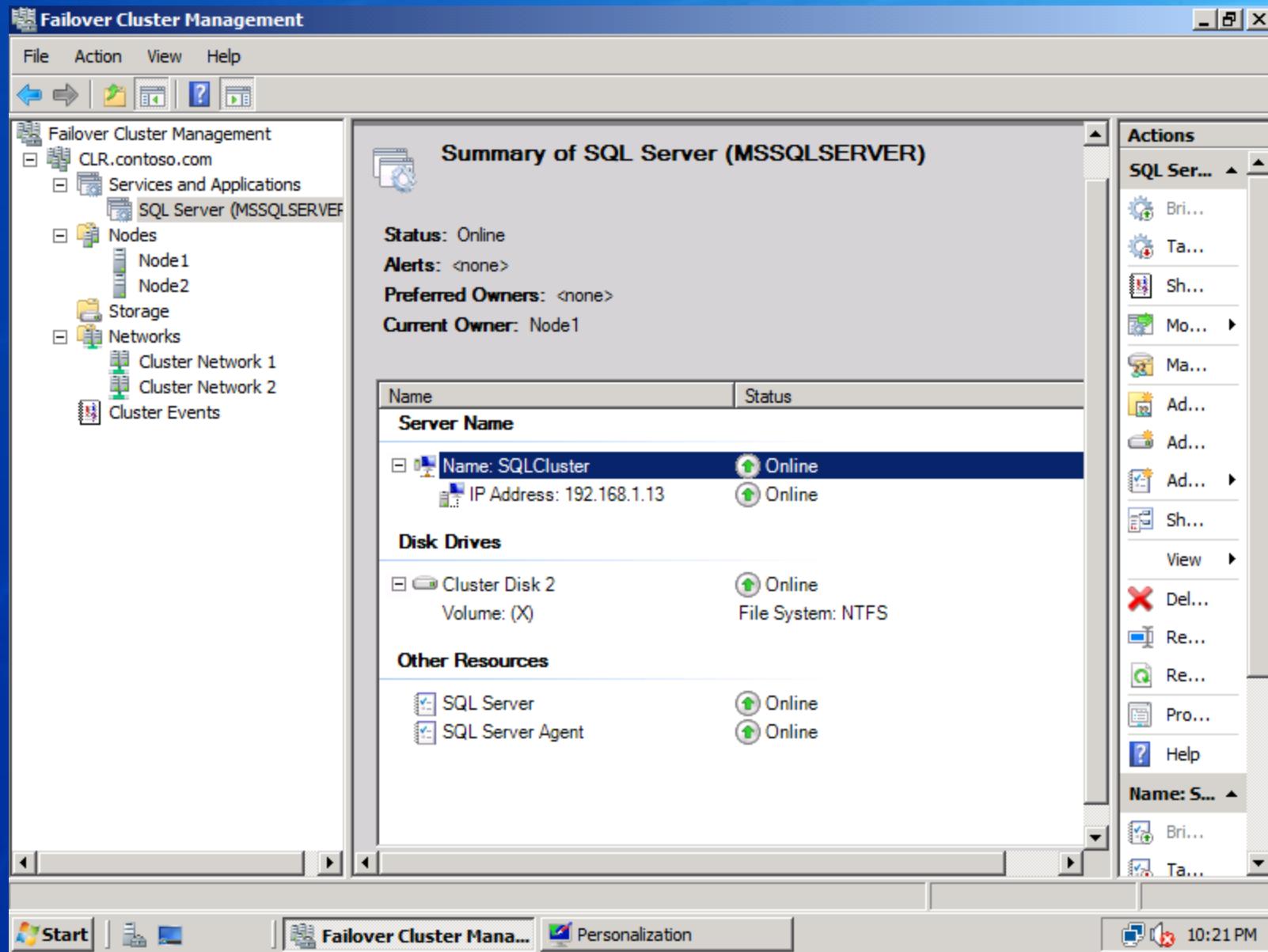
Cluster Foundations

- Server Cluster
- Virtual Server
- Virtual IP
- Nodes
- Resource
- Group
- Dependencies
- Shared Disk
- Failover
- Quorum Drive
- Heartbeat

Cluster Foundations

- LookAlive Check (every 5 sec)
- IsAliveCheck: select @@servername
(every 60 seconds)

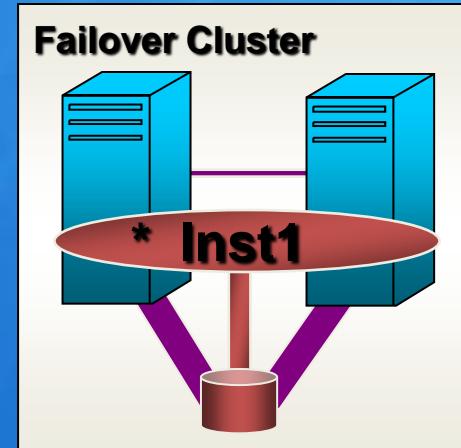




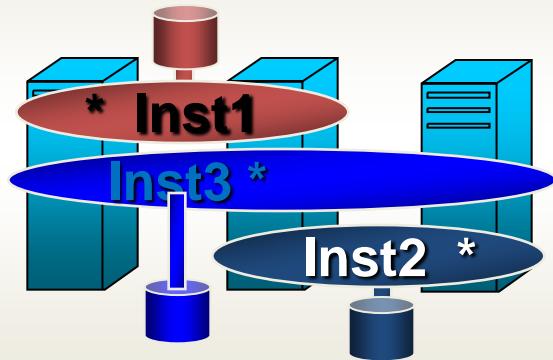
SQL Server 2008 Failover Cluster Topology

Supports many scenarios:

- Single Instance (replaces active/passive)
- Multiple Instance (replaces active/active)
- Multiple Active Nodes
- N+1
- N+M



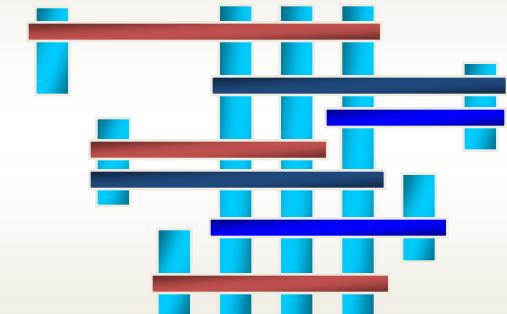
Multiple Active Nodes



N+1: N Active, 1 Inactive Nodes



N+M: N Active, M Inactive Nodes



SQL Server 2008 Cluster Enhance

- No HCL
- iSCSI Support
- IP V6 Support
- DHCP Support
- Service SIDs
- Supported number of cluster nodes

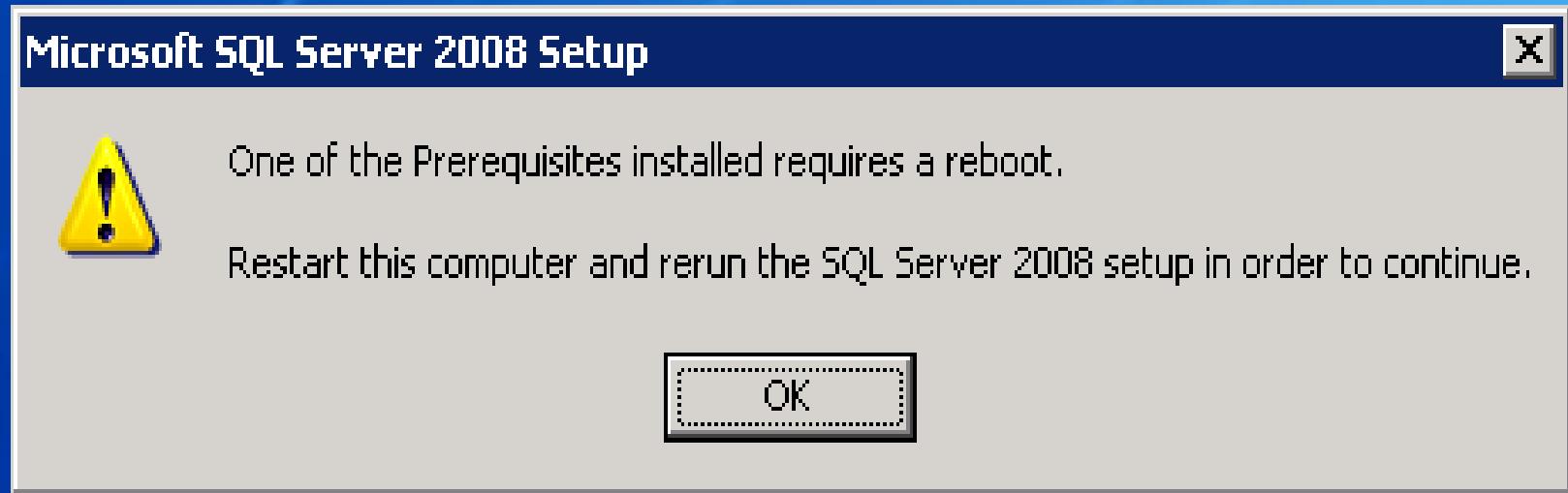
What We Don't Support

- Installation on Windows Server 2008 Server Core
- Separate subnets for cluster nodes

SQL Server 2008 Cluster Installation

- Integrated Installation
 - ❑ Create and configure a single-node SQL Server 2008 failover clustering instance.
 - ❑ Run Add Node operation on each additional cluster node.
- Advanced/Enterprise Installation
 - ❑ Prepare
 - ❑ On all the nodes that are going to be in the SQL Server cluster, run setup and use “Prepare” option
 - ❑ These prepared instances will not be usable until the installation process is “completed” in Complete phase.
 - ❑ Complete
 - ❑ On one of the prepared nodes, run setup and use “Complete” option
 - ❑ SQL Server setup will form the SQL Server failover cluster and join all the prepared nodes for the selected instance as a cluster

Integrated Installation-step by step



Insert the SQL Server installation media,
and from the root folder, double-click Setup.exe.

Integrated Installation-step by step

 SQL Server Installation Center

Planning
Installation
Maintenance
Tools
Resources
Advanced
Options

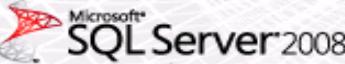
New SQL Server stand-alone installation or add features to an existing installation
Launch a wizard to install SQL Server 2008 in a non-clustered environment or to add features to an existing SQL Server 2008 instance.

New SQL Server failover cluster installation
Launch a wizard to install a single-node SQL Server 2008 failover cluster.

Add node to a SQL Server Failover cluster
Launch a wizard to add a node to an existing SQL Server 2008 failover cluster.

Upgrade from SQL Server 2000 or SQL Server 2005
Launch a wizard to upgrade SQL Server 2000 or SQL Server 2005 to SQL Server 2008. Before you upgrade, you should run the Upgrade Advisor to detect potential problems.

Search for product updates
Search Microsoft Update for SQL Server 2008 product updates.



Integ step

System Configuration Check Report for Microsoft SQL Server 2008 Setup - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Favorites

Address D:\Program Files\Microsoft SQL Server\100\Setup Bootstrap\Log\20090113_124802\SystemConfigurationCheck_Report.htm Go Links

Microsoft SQL Server 2008 Setup - System Configuration Check Report

Computer Name(s): SQLPOD076-09
Report Date/Time: 1/13/2009 12:48 PM
Saved to Directory: D:\Program Files\Microsoft SQL Server\100\Setup Bootstrap\Log\20090113_124802\SystemConfigurationCheck_Report.htm

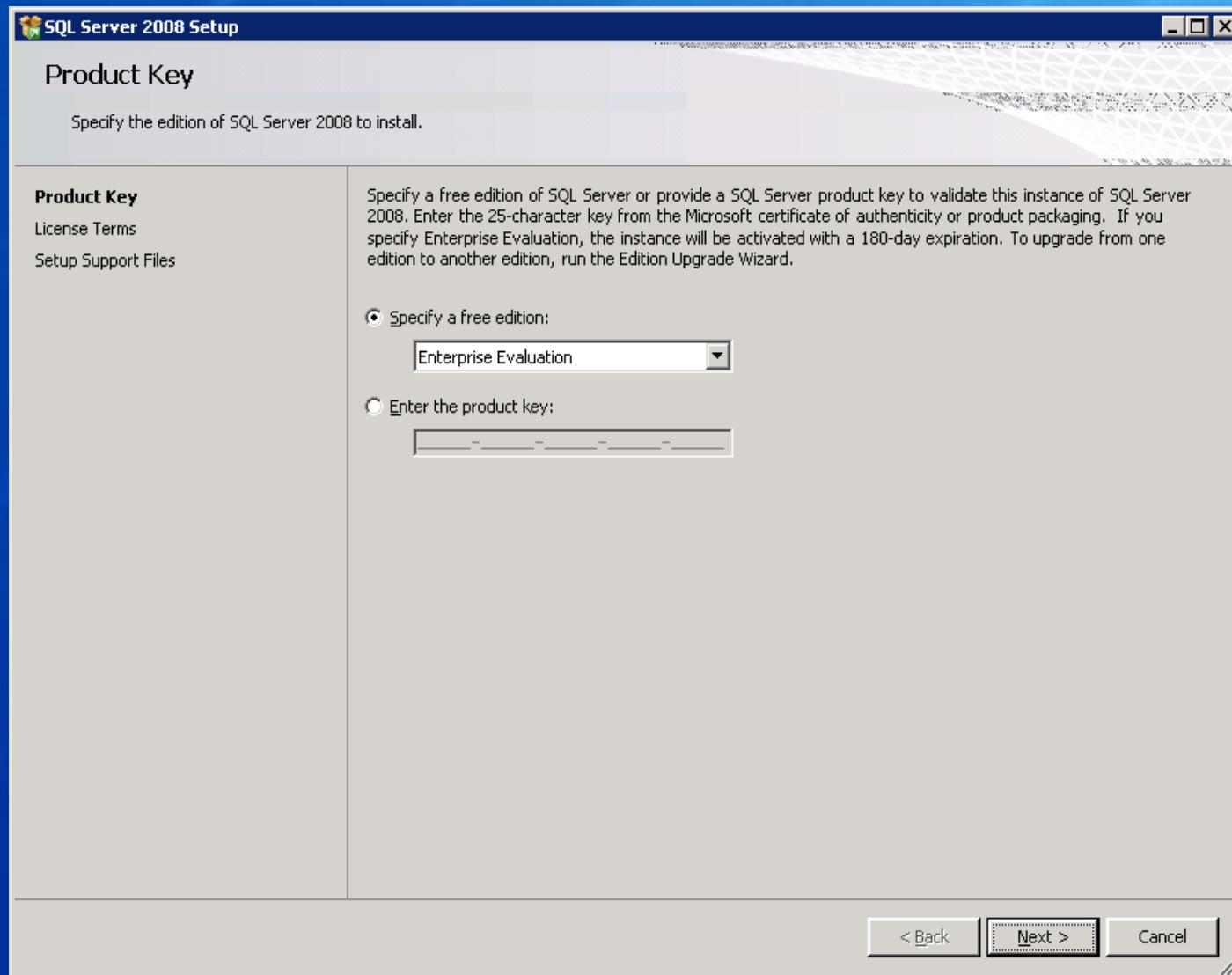
Rule Name	Rule Description	Result	Message/Corrective Action
GlobalRules: SQL Server 2008 Setup configuration checks for rules group 'GlobalRules'			
AclPermissionsFacet	Checks if the SQL Server registry keys are consistent.	Passed	SQL Server registry keys are consistent and can support SQL Server installation or upgrade.
MediaPathLength	Checks whether the SQL Server installation media is too long.	Passed	The SQL Server installation media is not too long.
OsVersionCheck	Checks whether the computer meets minimum operating system version requirements.	Passed	The operating system version meets the minimum requirements for this product.
RebootRequiredCheck	Checks if a pending computer restart is required. A pending restart can cause Setup to fail.	Passed	The computer does not require a restart.
ThreadHasAdminPrivilegeCheck	Checks whether the account running SQL Server Setup has administrator rights on the computer.	Passed	The account running SQL Server Setup has administrator rights on the computer.
WmiServiceStateCheck	Checks whether the WMI service is started and running on the computer.	Passed	The Windows Management Instrumentation (WMI) service is running.

Rules Documentation: <http://go.microsoft.com/fwlink/?LinkId=94001>
Community: <http://msdn2.microsoft.com/en-us/sql/aa336317.aspx>
Setup Help File: [http://msdn2.microsoft.com/en-us/library/bb500469\(SQL.100\).aspx](http://msdn2.microsoft.com/en-us/library/bb500469(SQL.100).aspx)

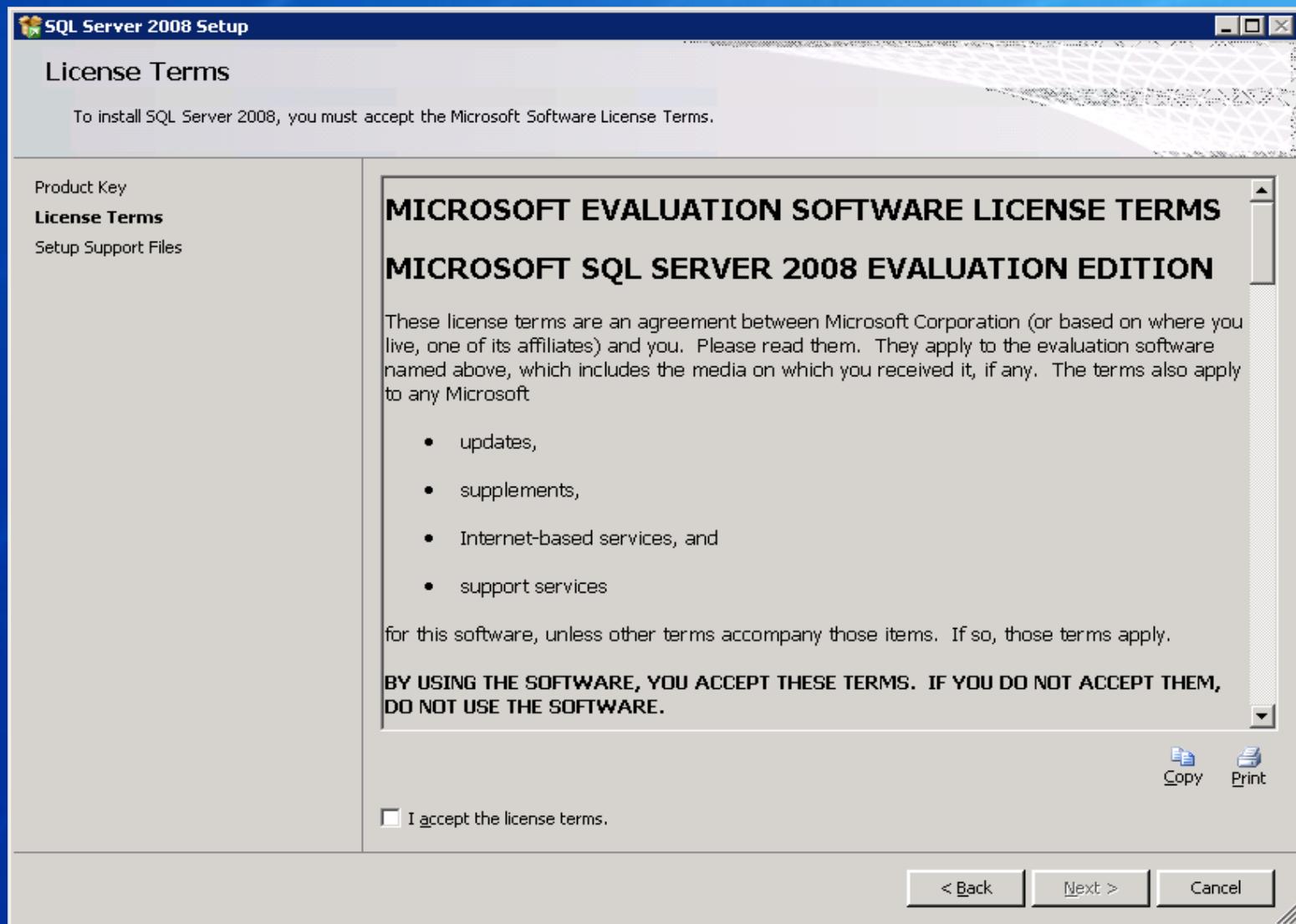
Done My Computer



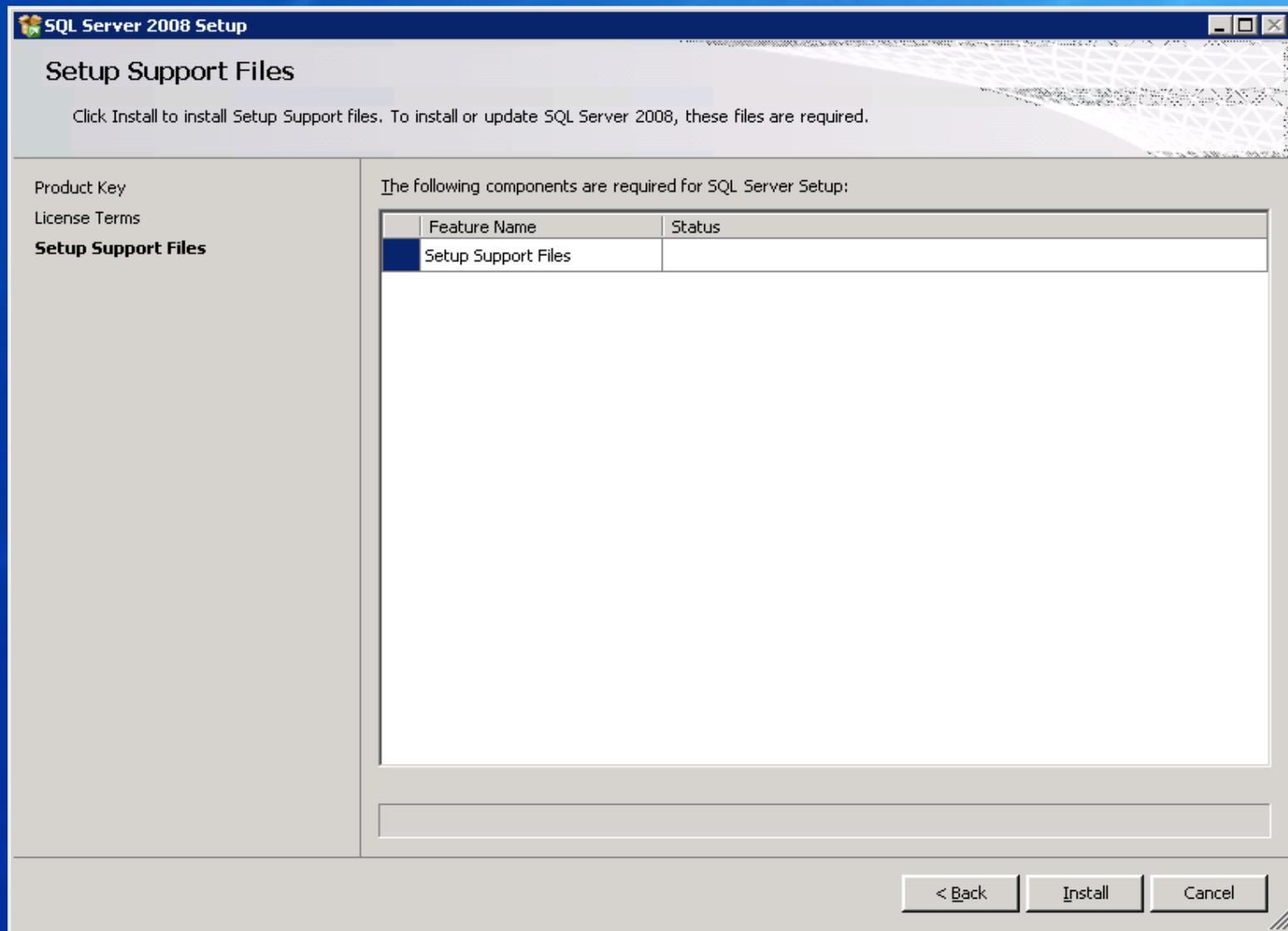
Integrated Installation-step by step



Integrated Installation-step by step



Integrated Installation-step by step



Integrated Installation-step by step

Install a SQL Server Failover Cluster

Setup Support Rules

Setup Support Rules identify problems that might occur when you install SQL Server Setup support files. Failures must be corrected before Setup can continue.

Setup Support Rules

- Feature Selection
- Disk Space Requirements
- Error and Usage Reporting
- Cluster Installation Rules
- Ready to Install
- Installation Progress
- Complete

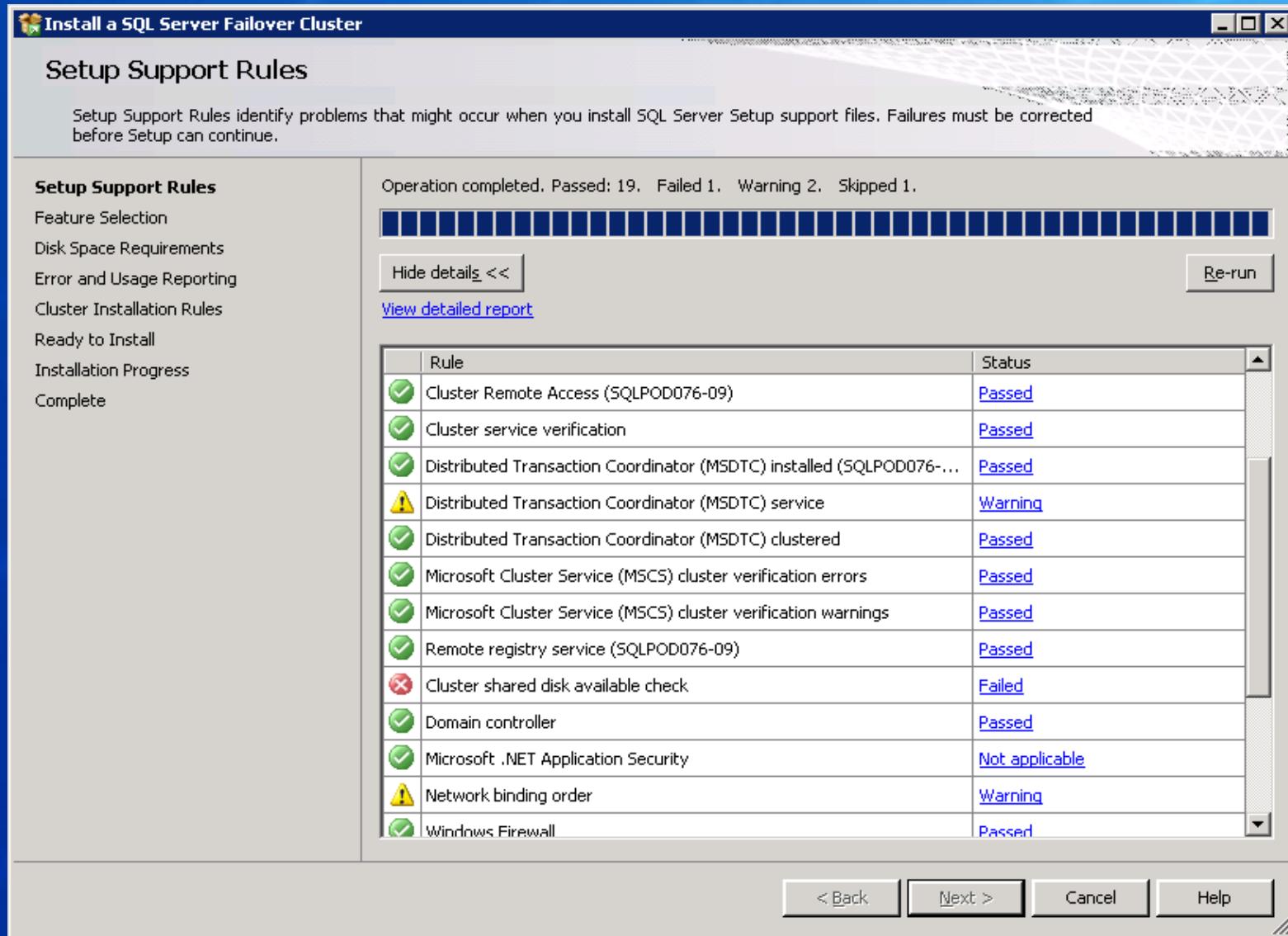
Operation completed. Passed: 19. Failed 1. Warning 2. Skipped 1.

Hide details << Re-run

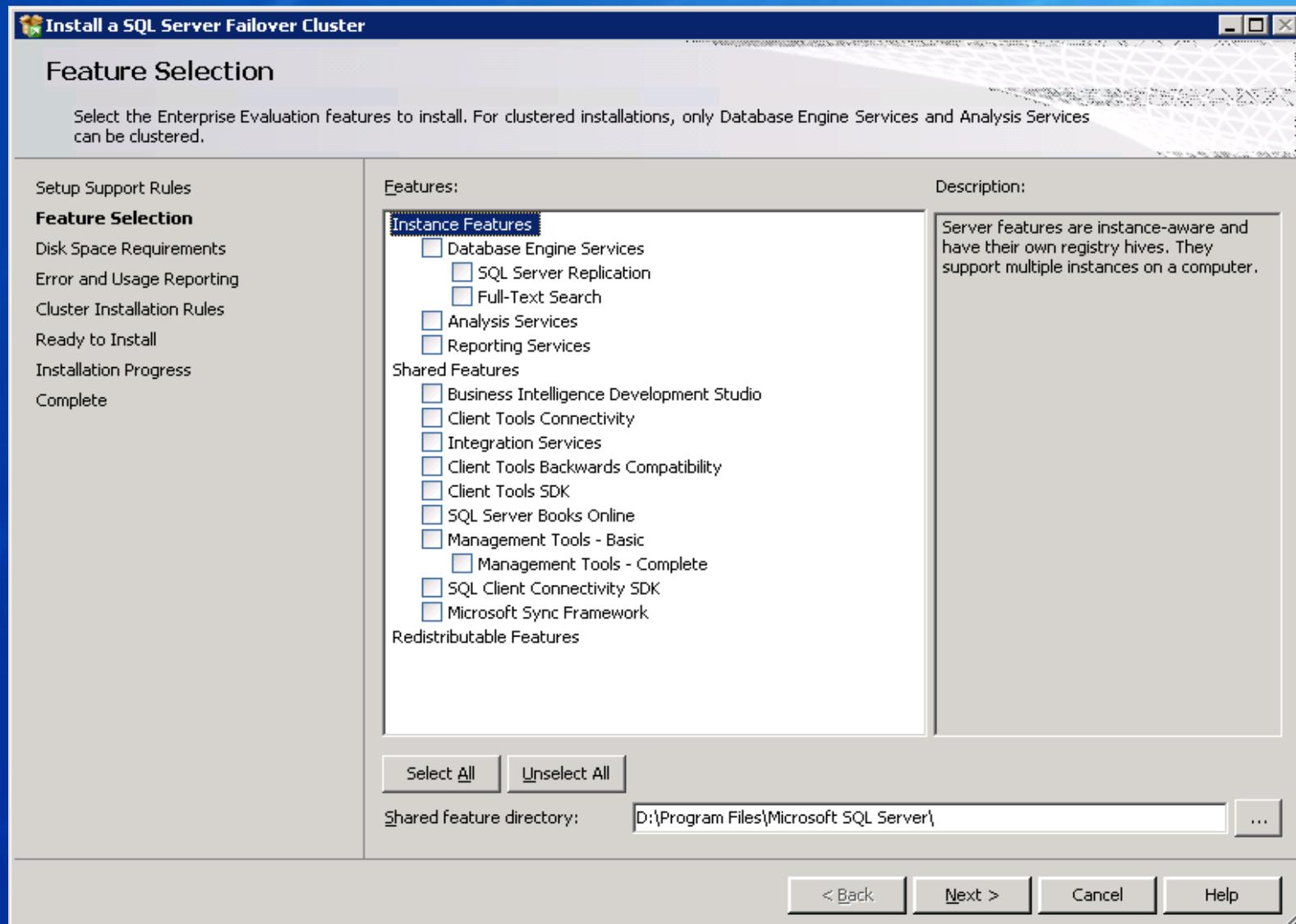
[View detailed report](#)

Rule	Status
Cluster Remote Access (SQLPOD076-09)	Passed
Cluster service verification	Passed
Distributed Transaction Coordinator (MSDTC) installed (SQLPOD076-...)	Passed
Distributed Transaction Coordinator (MSDTC) service	Warning
Distributed Transaction Coordinator (MSDTC) clustered	Passed
Microsoft Cluster Service (MSCS) cluster verification errors	Passed
Microsoft Cluster Service (MSCS) cluster verification warnings	Passed
Remote registry service (SQLPOD076-09)	Passed
Cluster shared disk available check	Failed
Domain controller	Passed
Microsoft .NET Application Security	Not applicable
Network binding order	Warning
Windows Firewall	Passed

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Integrated Installation-step by step



Integrated Installation-step by step

 **Install a SQL Server Failover Cluster**

Instance Configuration

Specify the name and instance ID for the SQL Server instance.

Setup Support Rules
Feature Selection
Instance Configuration
Disk Space Requirements
Cluster Resource Group
Cluster Disk Selection
Cluster Network Configuration
Cluster Security Policy
Server Configuration
Database Engine Configuration
Analysis Services Configuration
Reporting Services Configuration
Error and Usage Reporting
Cluster Installation Rules
Ready to Install
Installation Progress
Complete

Specify a network name for the new SQL Server failover cluster. This will be the name used to identify your failover cluster on the network.

SQL Server Network Name:

Default instance
 Named instance:

Instance ID:

Instance root directory:

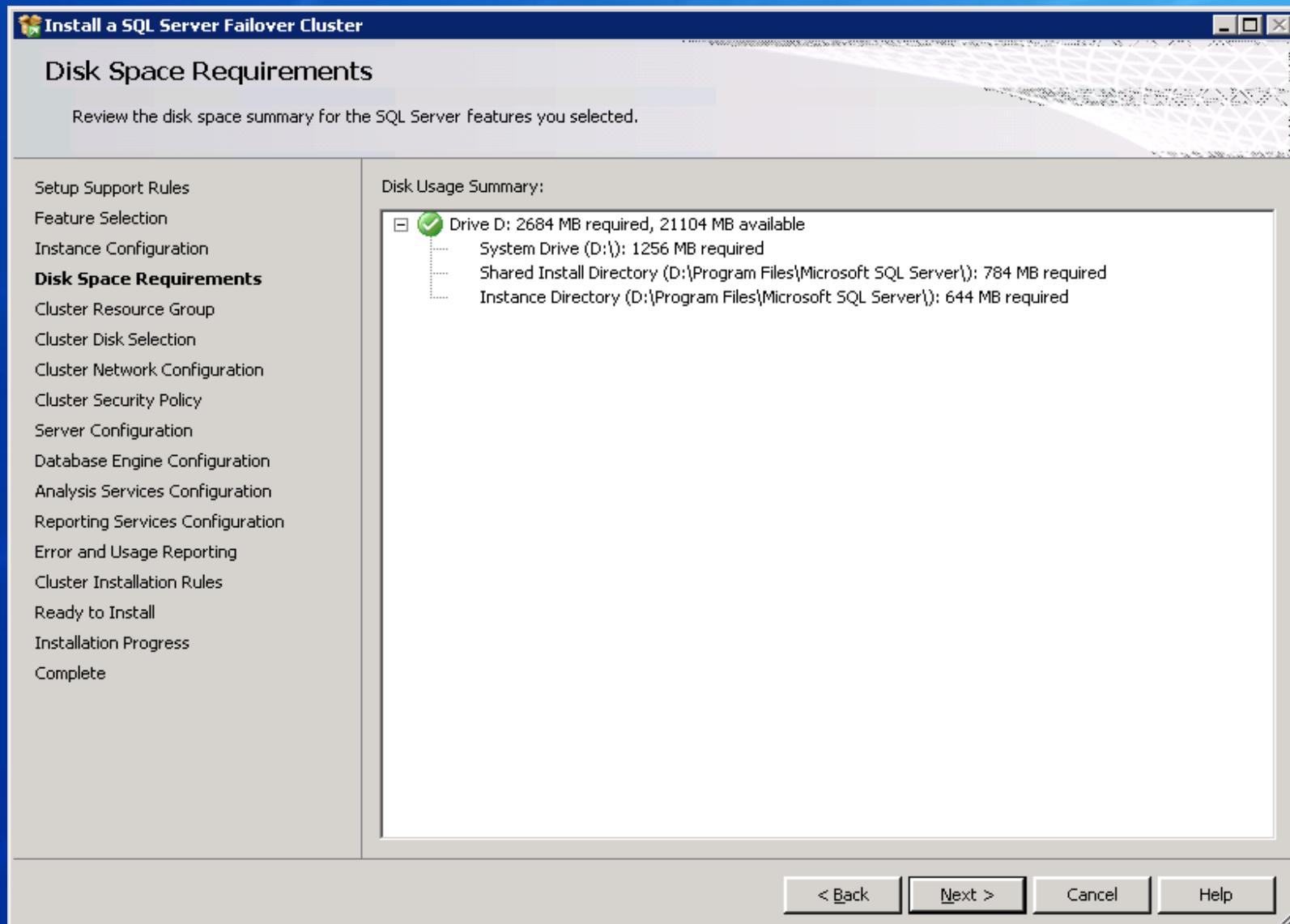
SQL Server directory: D:\Program Files\Microsoft SQL Server\MSSQL10.MSSQLSERVER
Analysis Services directory: D:\Program Files\Microsoft SQL Server\MSAS10.MSSQLSERVER
Reporting Services directory: D:\Program Files\Microsoft SQL Server\MSRS10.MSSQLSERVER

Detected SQL Server instances and features on this computer:

Instance	Cluster Network Name	Features	Edition	Version	Instance ID

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Integrated Installation-step by step



Integrated Installation-step by step

 **Install a SQL Server Failover Cluster**

Cluster Resource Group

Create a new cluster resource group for your SQL Server Failover cluster.

Setup Support Rules
Feature Selection
Instance Configuration
Disk Space Requirements
Cluster Resource Group
Cluster Disk Selection
Cluster Network Configuration
Cluster Security Policy
Server Configuration
Database Engine Configuration
Analysis Services Configuration
Reporting Services Configuration
Error and Usage Reporting
Cluster Installation Rules
Ready to Install
Installation Progress
Complete

Specify a name for the SQL Server cluster resource group. The cluster resource group is where SQL Server Failover cluster resources will be placed. You can choose to use an existing cluster resource group name or enter a new cluster resource group name to be created.

SQL Server cluster resource group name:

Qualified	Name	Message
	Group 4	The cluster group 'Group 4' is not owned by the local node. Move th...
	Group 2	The cluster group 'Group 2' is not owned by the local node. Move th...
	Cluster Group	The cluster group 'Cluster Group' is not owned by the local node. M...
	Group 1	The cluster group 'Group 1' is not owned by the local node. Move th...
	Group 0	
	Group 3	The cluster group 'Group 3' is not owned by the local node. Move th...

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Integrated Installation-step by step

Install a SQL Server Failover Cluster

Cluster Disk Selection

Select shared cluster disk resources for your SQL Server failover cluster.

Setup Support Rules
Feature Selection
Instance Configuration
Disk Space Requirements
Cluster Resource Group
Cluster Disk Selection
Cluster Network Configuration
Cluster Security Policy
Server Configuration
Database Engine Configuration
Analysis Services Configuration
Reporting Services Configuration
Error and Usage Reporting
Cluster Installation Rules
Ready to Install
Installation Progress
Complete

Specify the shared disks to be included in the SQL Server resource cluster group. The first drive will be used as the default drive for all databases, but this can be changed on the Database Engine or Analysis Services configuration pages.

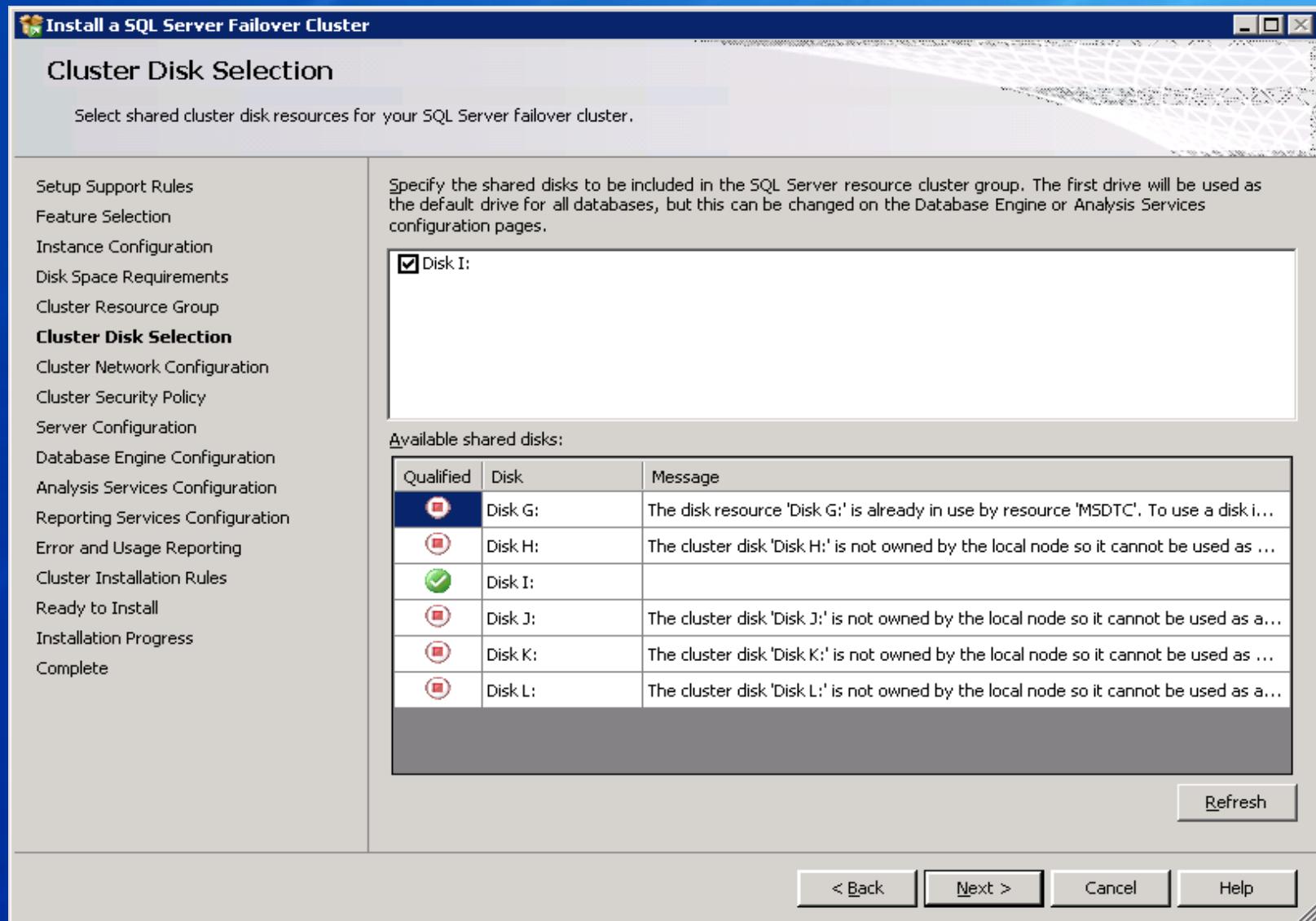
Disk I:

Available shared disks:

Qualified	Disk	Message
✗	Disk G:	The disk resource 'Disk G:' is already in use by resource 'MSDTC'. To use a disk i...
✗	Disk H:	The cluster disk 'Disk H:' is not owned by the local node so it cannot be used as ...
✓	Disk I:	
✗	Disk J:	The cluster disk 'Disk J:' is not owned by the local node so it cannot be used as a...
✗	Disk K:	The cluster disk 'Disk K:' is not owned by the local node so it cannot be used as a...
✗	Disk L:	The cluster disk 'Disk L:' is not owned by the local node so it cannot be used as a...

Refresh

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Integrated Installation-step by step

Install a SQL Server Failover Cluster

Cluster Network Configuration

Select network resources for your SQL Server failover cluster.

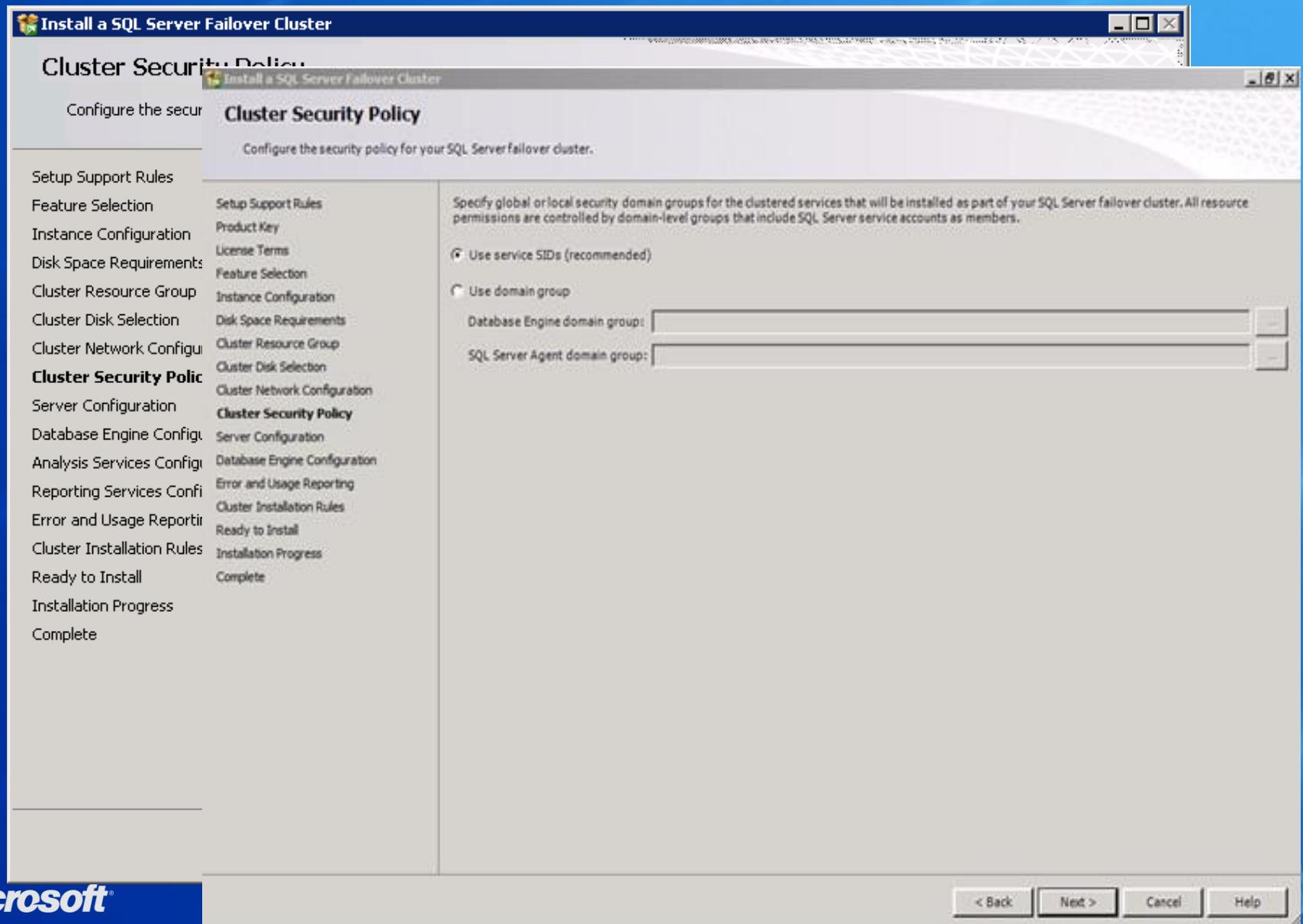
Specify the network settings for this failover cluster:

IP Type	Address	Subnet Mask	Network
IPv4		255.255.254.0	Local Area Conn...
IPv4		255.255.255.0	Local Area Conn...

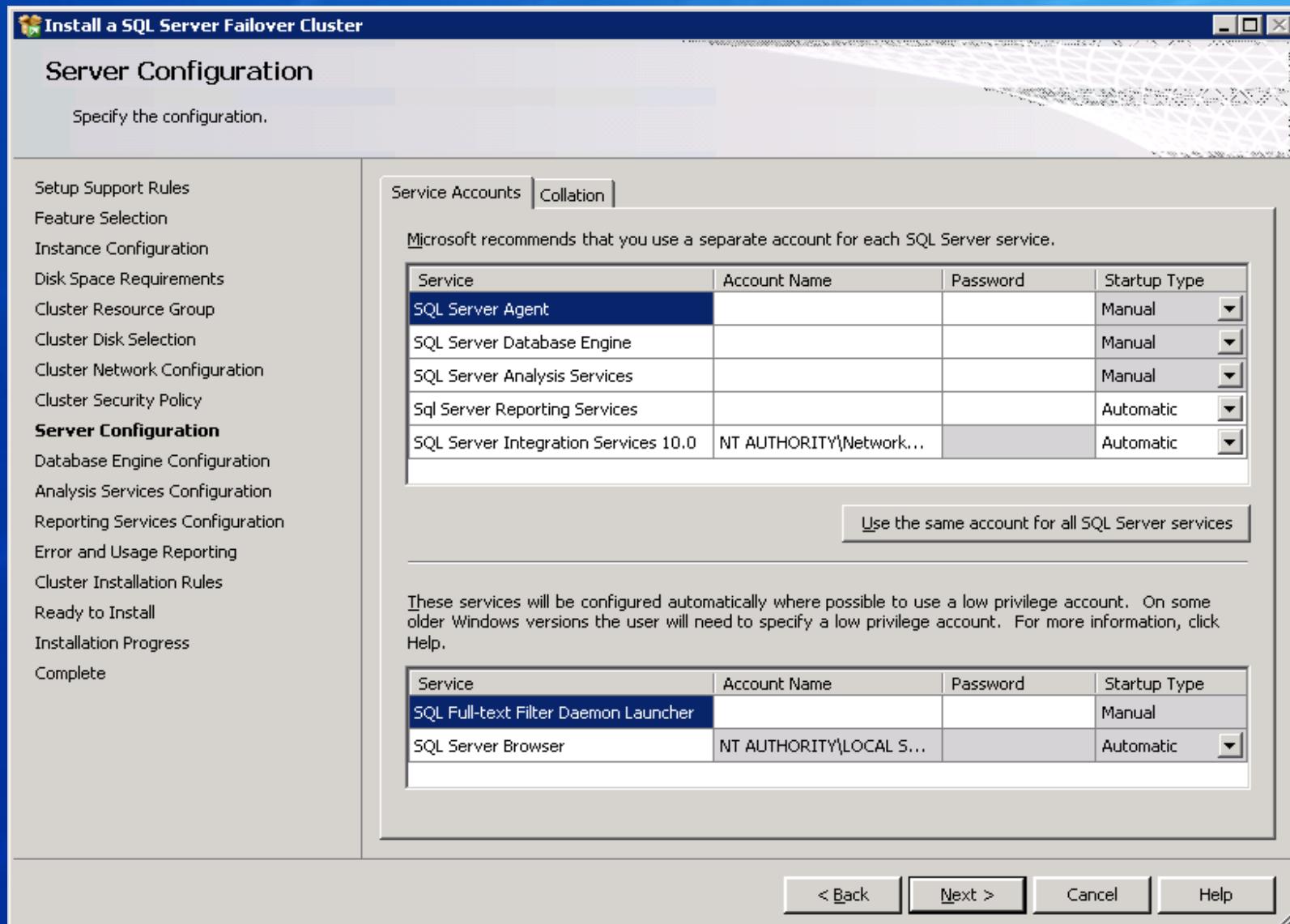
Refresh

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Integrated Installation-step by step



Integrated Installation-step by step



Integrated Installation-step by step

 **Install a SQL Server Failover Cluster**

Database Engine Configuration

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

Setup Support Rules
Feature Selection
Instance Configuration
Disk Space Requirements
Cluster Resource Group
Cluster Disk Selection
Cluster Network Configuration
Cluster Security Policy
Server Configuration
Database Engine Configuration
Analysis Services Configuration
Reporting Services Configuration
Error and Usage Reporting
Cluster Installation Rules
Ready to Install
Installation Progress
Complete

Account Provisioning | Data Directories | FILESTREAM | **Account Provisioning**

Specify the authentication mode and administrators for the Database Engine.

Authentication Mode

Windows authentication mode
 Mixed Mode (SQL Server authentication and Windows authentication)

Built-in SQL Server system administrator account

Enter password: _____
Confirm password: _____

Specify SQL Server administrators

Add Current User | Add... | Remove

SQL Server administrators have unrestricted access to the Database Engine.

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Integrated Installation-step by step

Install a SQL Server Failover Cluster

Server Configuration

Specify the configuration.

Setup Support Rules
Feature Selection
Instance Configuration
Disk Space Requirements
Cluster Resource Group
Cluster Disk Selection
Cluster Network Configuration
Cluster Security Policy
Server Configuration
Database Engine Configuration
Analysis Services Configuration
Reporting Services Configuration
Error and Usage Reporting
Cluster Installation Rules
Ready to Install
Installation Progress
Complete

Service Accounts Collation

Database Engine:
SQL_Latin1_General_CP1_CI_AS

Latin1-General, case-insensitive, accent-sensitive, kanatype-insensitive, width-insensitive
for Unicode Data, SQL Server Sort Order 52 on Code Page 1252 for non-Unicode Data

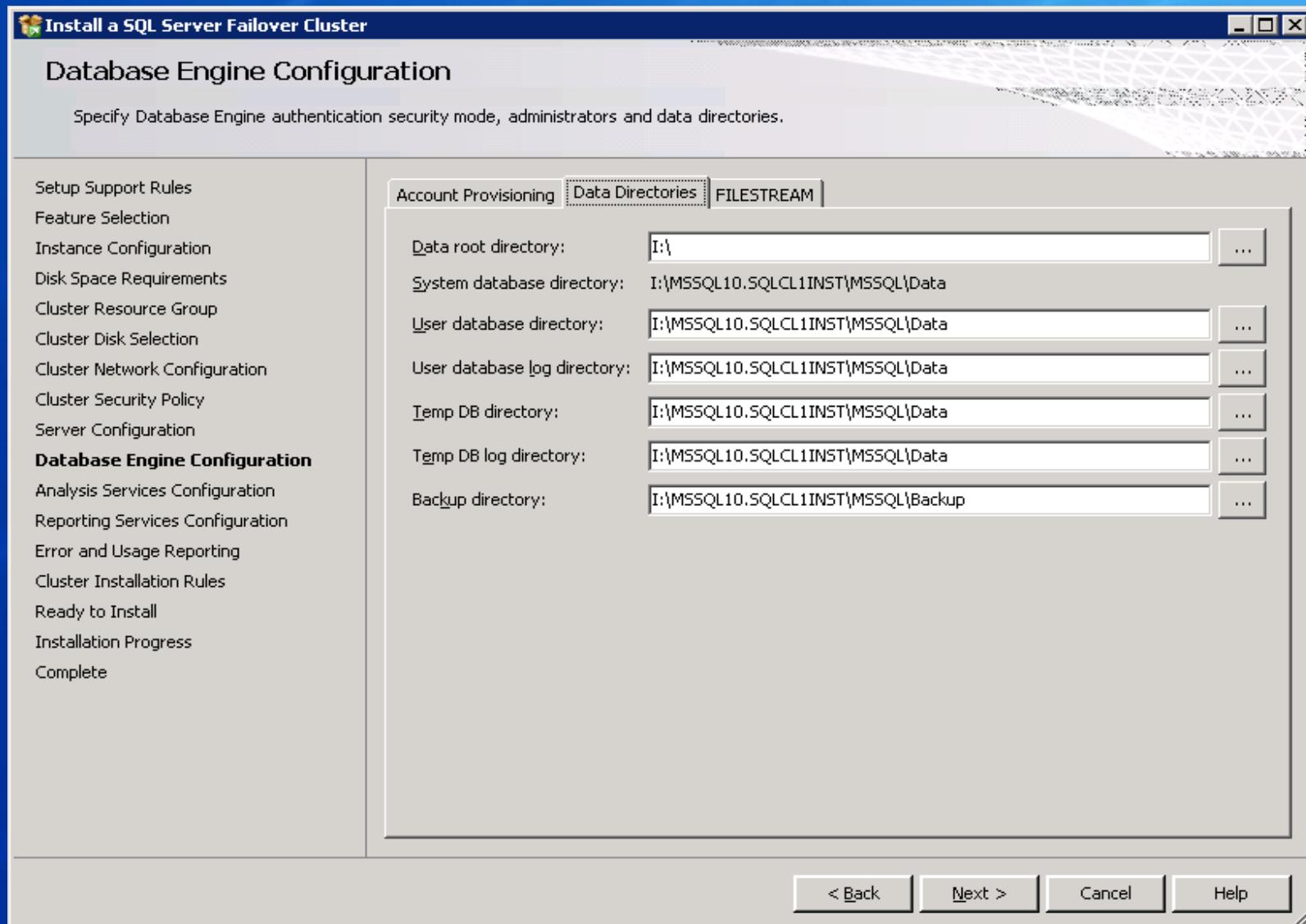
Analysis Services:
Latin1_General_CI_AS

Latin1-General, case-insensitive, accent-sensitive, kanatype-insensitive, width-insensitive

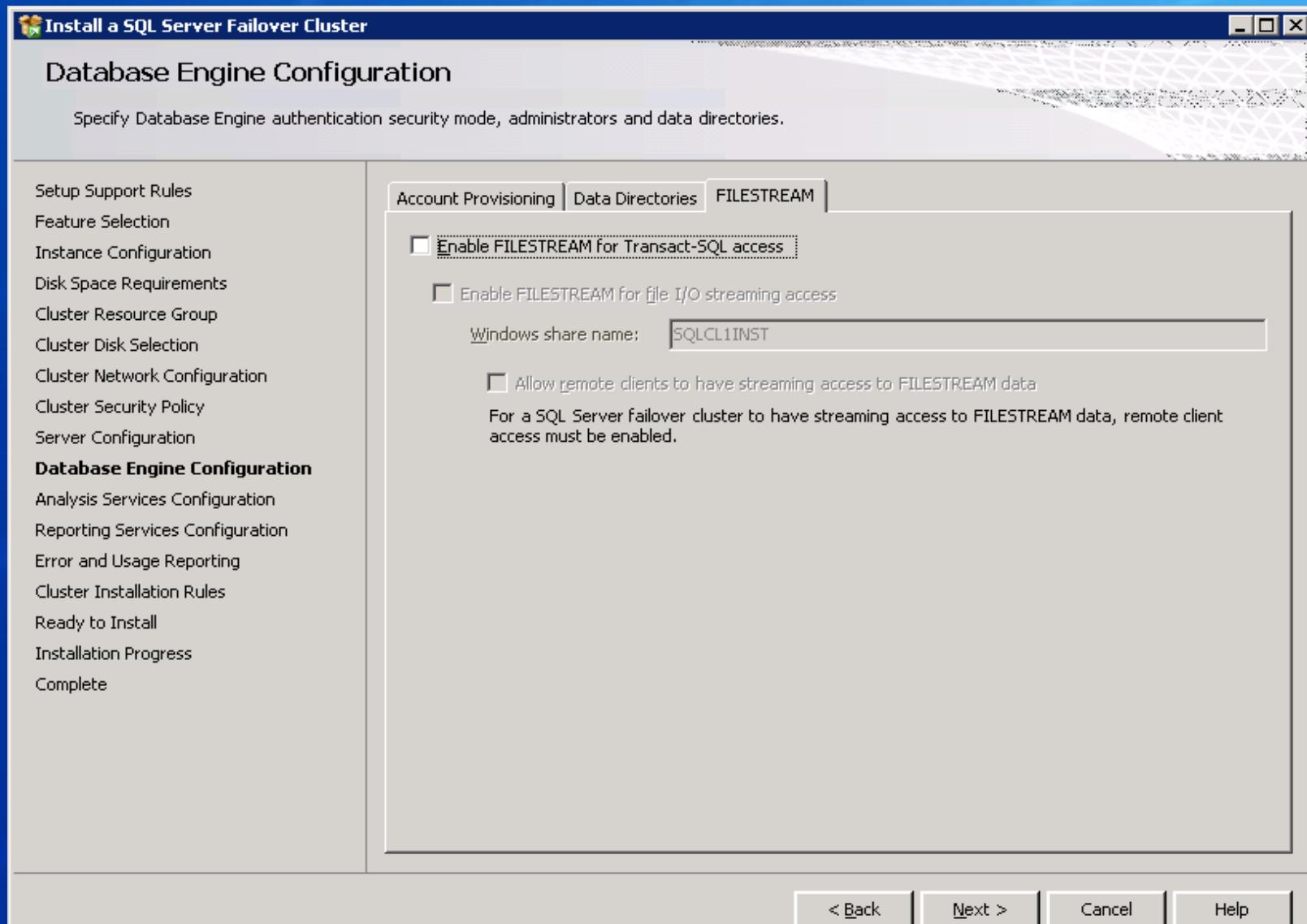
Warning: The Database Engine and Analysis Services collations are not the same.

< Back Cancel Help

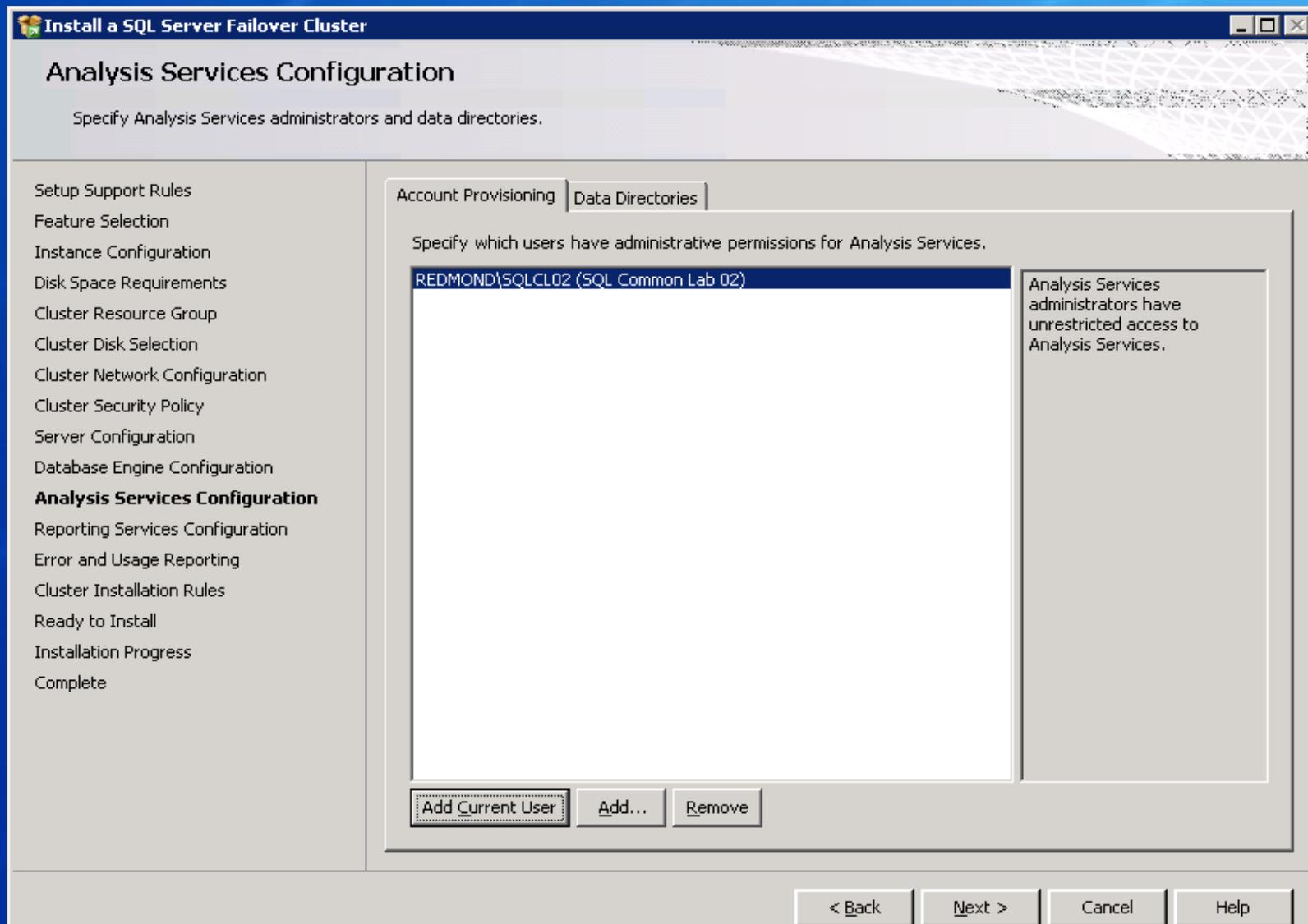
Integrated Installation-step by step



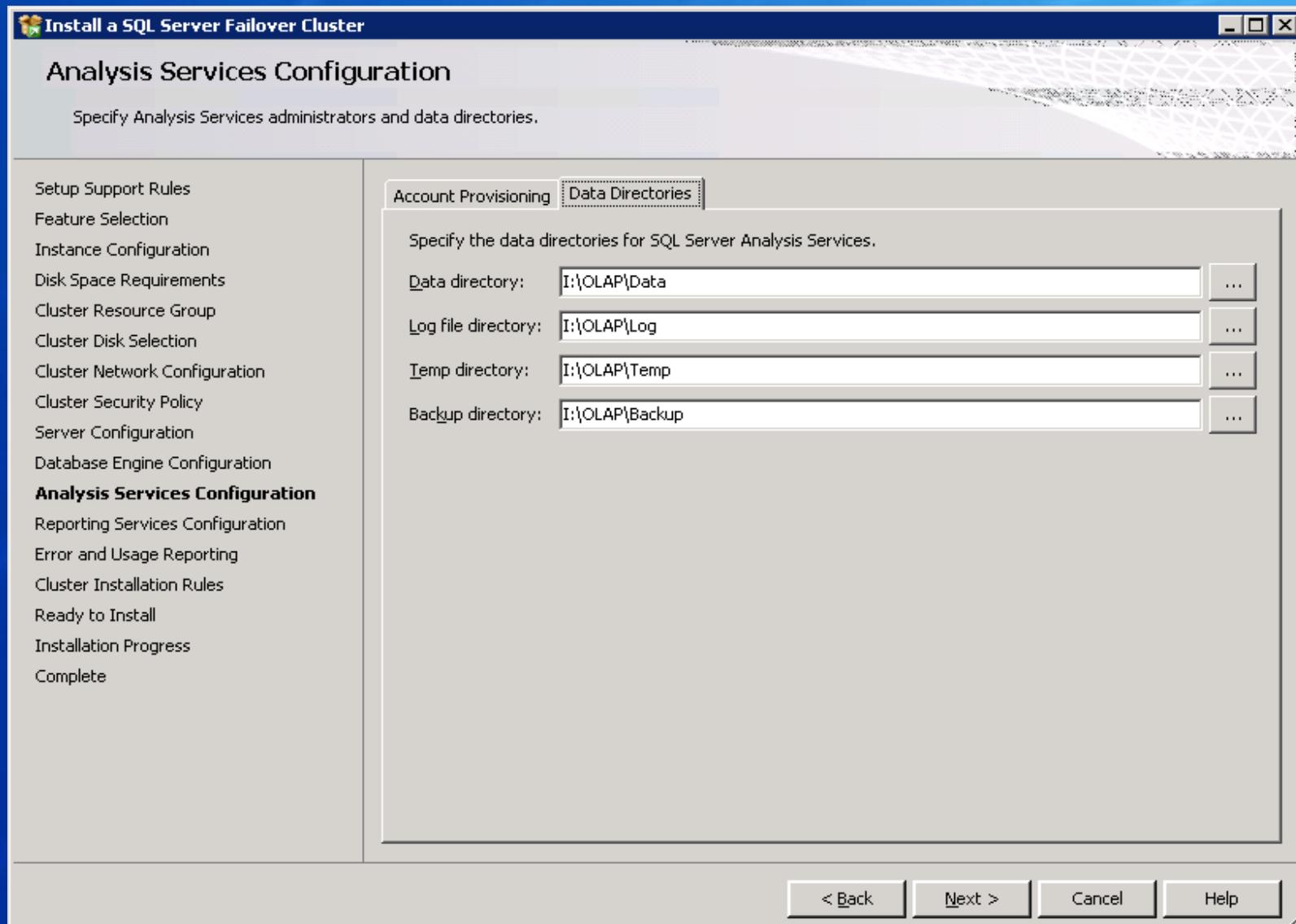
Integrated Installation-step by step



Integrated Installation-step by step



Integrated Installation-step by step



Integrated Installation-step by step

 **Install a SQL Server Failover Cluster**

Reporting Services Configuration

Specify the Reporting Services configuration mode.

Setup Support Rules

Feature Selection

Instance Configuration

Disk Space Requirements

Cluster Resource Group

Cluster Disk Selection

Cluster Network Configuration

Cluster Security Policy

Server Configuration

Database Engine Configuration

Analysis Services Configuration

Reporting Services Configuration

Error and Usage Reporting

Cluster Installation Rules

Ready to Install

Installation Progress

Complete

Install the native mode default configuration.

Setup will install the report server and configure it in Native mode to use the default values. The report server is usable as soon as Setup is finished.

Install the SharePoint integrated mode default configuration.

Setup will create the report server database in SharePoint integrated mode and configure the report server to use the default values. However, integrated operations will not be supported until a minimal installation of a SharePoint product or technology is deployed on the report server computer and the Reporting Services Add-in for SharePoint Technologies is installed and configured on the instance of the SharePoint product or technology you are using.

Install, but do not configure the report server.

Setup will install, but will not configure, the report server software. After installation is finished, you can use the Reporting Services Configuration tool to set options that are required to run the report server.

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Integrated Installation-step by step

 **Install a SQL Server Failover Cluster**

Error and Usage Reporting

Help Microsoft improve SQL Server features and services.

Setup Support Rules
Feature Selection
Instance Configuration
Disk Space Requirements
Cluster Resource Group
Cluster Disk Selection
Cluster Network Configuration
Cluster Security Policy
Server Configuration
Database Engine Configuration
Analysis Services Configuration
Reporting Services Configuration
Error and Usage Reporting
Cluster Installation Rules
Ready to Install
Installation Progress
Complete

Specify the information that you would like to automatically send to Microsoft to improve future releases of SQL Server. These settings are optional. Microsoft treats this information as confidential. Microsoft may provide updates through Microsoft Update to modify feature usage data. These updates might be downloaded and installed on your machine automatically, depending on your Automatic Update settings.

[View the Microsoft policy for SQL Server privacy and data collection.](#)
[Read more about Microsoft Update and Automatic Update.](#)

Send Windows and SQL Server Error Reports to Microsoft or your corporate report server. This setting only applies to services that run without user interaction.

Send feature usage data to Microsoft. Feature usage data includes information about your hardware configuration and how you use Microsoft software and services.

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Integrated Installation-step by step

 **Install a SQL Server Failover Cluster**

Cluster Installation Rules

Setup is running rules to determine if the failover cluster installation operation will be blocked. For more information, click Help.

Setup Support Rules
Feature Selection
Instance Configuration
Disk Space Requirements
Cluster Resource Group
Cluster Disk Selection
Cluster Network Configuration
Cluster Security Policy
Server Configuration
Database Engine Configuration
Analysis Services Configuration
Reporting Services Configuration
Error and Usage Reporting
Cluster Installation Rules
Ready to Install
Installation Progress
Complete

Operation completed. Passed: 8. Failed 0. Warning 0. Skipped 0.



Show details >> [View detailed report](#) Re-run

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Integrated Installation-step by step

Install a SQL Server Failover Cluster

Ready to Install

Verify the SQL Server 2008 features to be installed.

Setup Support Rules
Feature Selection
Instance Configuration
Disk Space Requirements
Cluster Resource Group
Cluster Disk Selection
Cluster Network Configuration
Cluster Security Policy
Server Configuration
Database Engine Configuration
Analysis Services Configuration
Reporting Services Configuration
Error and Usage Reporting
Cluster Installation Rules
Ready to Install
Installation Progress
Complete

Ready to install the SQL Server 2008 failover cluster:

Summary

- ... Edition: Enterprise Evaluation
- ... Action: InstallFailoverCluster

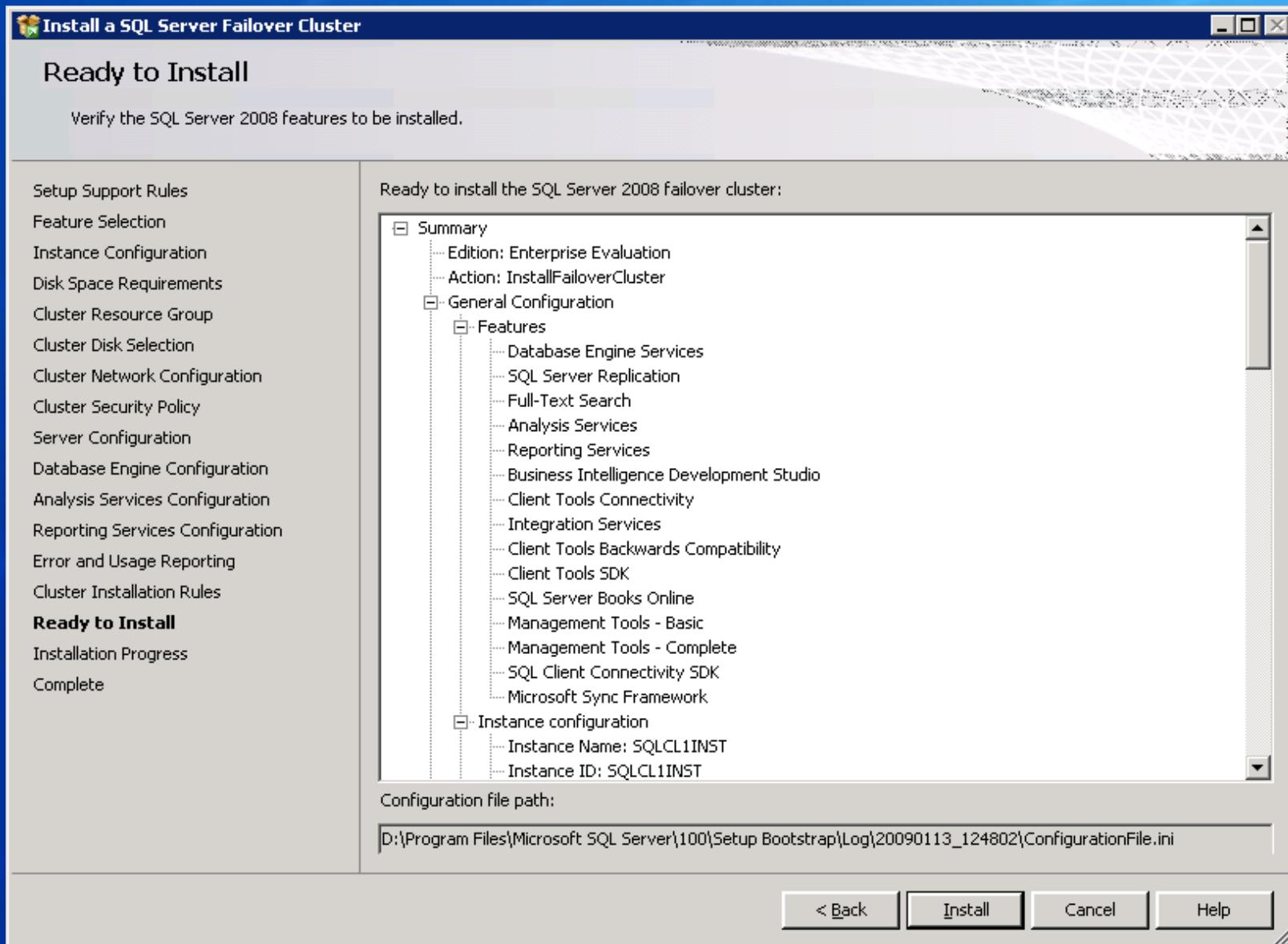
General Configuration

- Features
 - Database Engine Services
 - SQL Server Replication
 - Full-Text Search
 - Analysis Services
 - Reporting Services
 - Business Intelligence Development Studio
 - Client Tools Connectivity
 - Integration Services
 - Client Tools Backwards Compatibility
 - Client Tools SDK
 - SQL Server Books Online
 - Management Tools - Basic
 - Management Tools - Complete
 - SQL Client Connectivity SDK
 - Microsoft Sync Framework
- Instance configuration
 - Instance Name: SQLCL1INST
 - Instance ID: SQLCL1INST

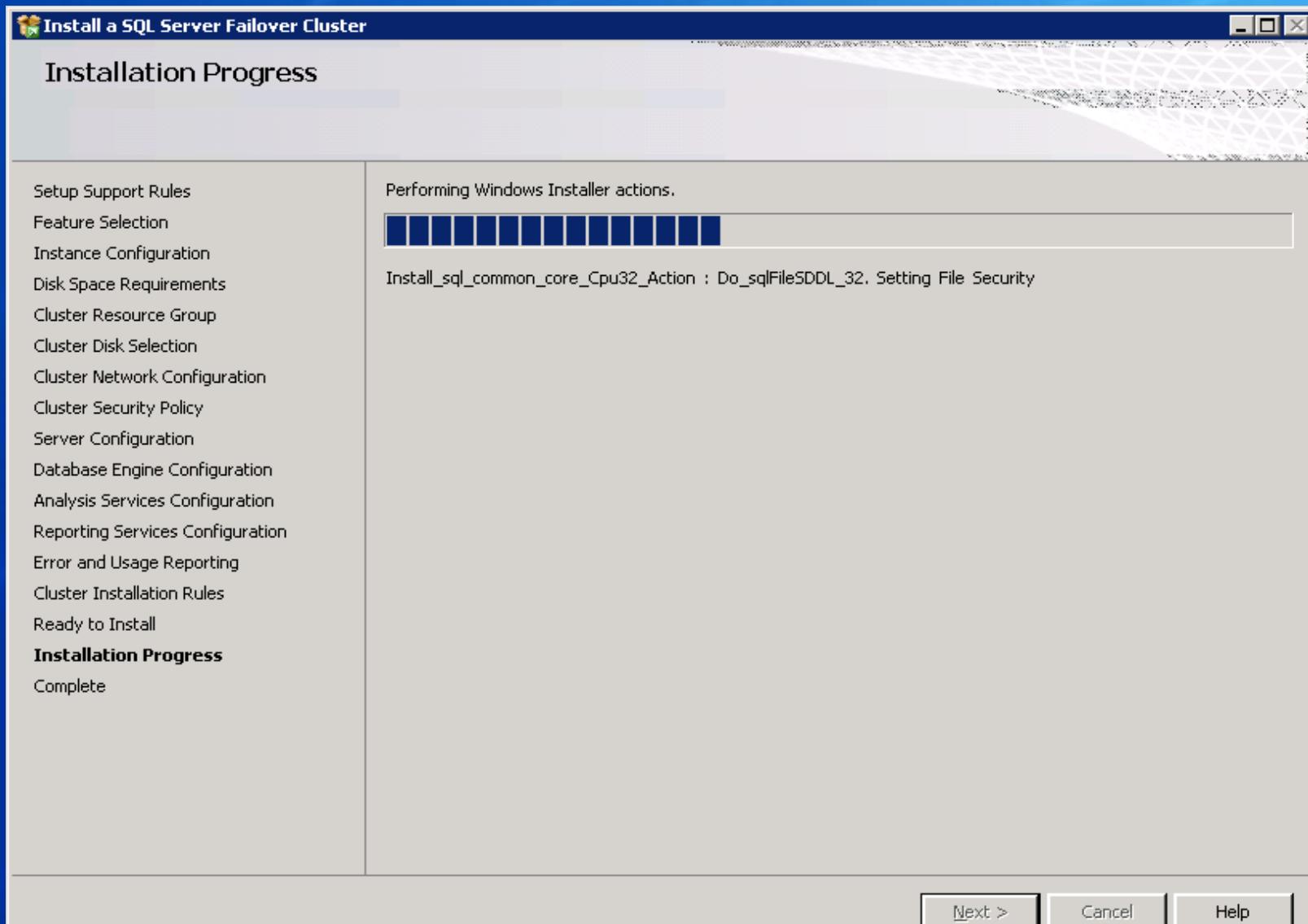
Configuration file path:

D:\Program Files\Microsoft SQL Server\100\Setup Bootstrap\Log\20090113_124802\ConfigurationFile.ini

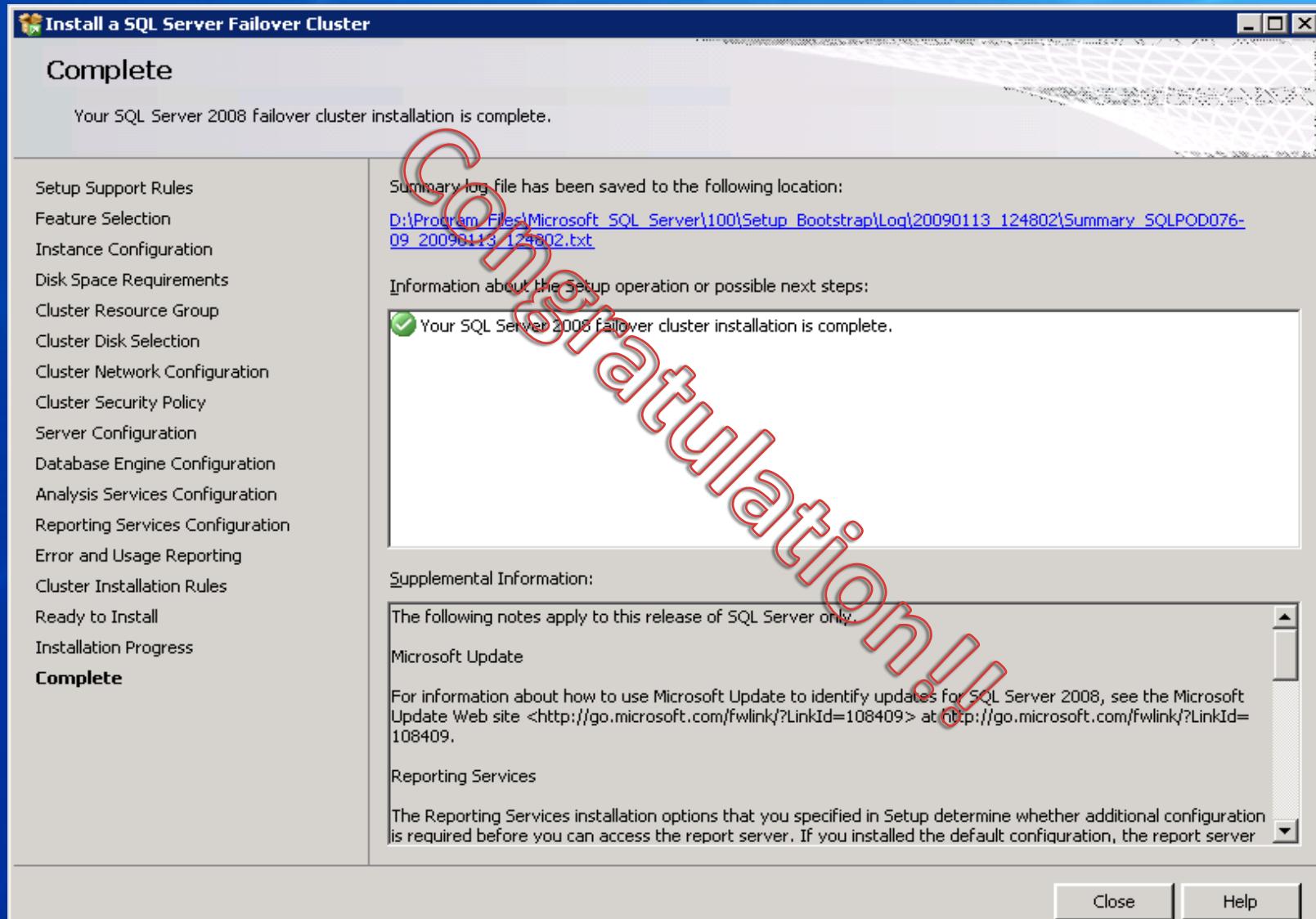
< Back **Install** Cancel Help



Integrated Installation-step by step



Integrated Installation-step by step



Post Installation Tips

- Verify connectivity and name resolution
 - By default, Windows Server 2008 has firewall ON and clients will not be able to connect to SQL Server. Configure the firewall for clients to access the SQL Server.
- Verify SQL resource group failover
- Run cluster related TSQL queries

```
select * from sys.dm_os_cluster_nodes
select * from sys.dm_io_cluster_shared_drives
select serverproperty('ComputerNamePhysicalNetBios')
select serverproperty(' IsClustered ')
```
- In SQL Server Management Studio and SQL Server Configuration Manager
 - Look at the property "Is Clustered" = YES
- Add additional shared drives for SQL Server (if required)
 - Note: On Windows 2008 Failover Cluster, you can modify SQL Server resource and add the shared disk as a dependency without taking SQL Server resource "offline"
- Install latest service pack and security updates for SQL Server 2008

Changing SQL IP Address

- Using Failover Cluster Management, change the SQL IP Address to the new IP Address.
- For the change to take effect, take the SQL IP Address resource offline. This takes the SQL Server resource and other dependent resources offline as well.
- Bring the SQL Server resource back online.
 - Note: It may take some time (sometimes 30 minutes or more) for IP changes to propagate through a corporate network.

Changing SQL Network Name

- Renaming SQL Server network name is fully supported
- Instance name cannot be changed
 - Example – SQL Server 2008 failover clustering instance named VS1\INST1 can be changed to SQL35\INST1. The instance name INST1 cannot be changed.
- Cannot change names involved in replication
- If virtual server is configured to use database mirroring, you must turn off database mirroring before the renaming operation
- To change virtual server name of an existing SQL Server 2008 failover cluster:
 - Open Failover Cluster Management. Change the SQL Network Name to the new name.
 - For the change to take effect, take the network name resource offline. This takes the SQL Server resource and other dependent resources offline as well.
 - Bring the SQL Server resource back online.

Changing SQL Network Name (2)

- Verify the renaming operation
Select information from @@servername or sys.servers
- Verify failover process
- New name can be used immediately for connections from any node of cluster
- New name from client computers may take time (typically 3 to 5 mins)
- To minimize network propagation delay
 - ipconfig /flushdns
 - ipconfig /registerdns
 - nbtstat –RR

Changing SQL Service Accounts

- If you have Windows domain group for SQL Server
 - Add the new SQL service account or accounts to the appropriate group.
 - Create a SQL Server login for the new service accounts.
 - Add the new service accounts to the SYSADMIN fixed server role.
- Ensure that ALL the cluster nodes are online.
- Open SQL Server Configuration Manager on the node that owns SQL Server
 - Click "SQL Server Services"
 - Right-click the service that you want to modify, and then click Properties
 - Click the Log On tab, and then enter the account information that you want the service to use
 - Click OK when you finish entering the account information

Common Reasons for the SQL Resource to Fail

- “NT Authority\System” and\or “NT Service\Clussvc” login is removed from SQL Server
- SQL Server is busy working on resource intensive jobs and cannot respond to **IsAlive** check
- Master database is locked by other processes
- SQL server resource bottlenecks
- Anti-virus software blocks access to the SQL resources
- Old network drivers

Common Reasons for the SQL Resource to Fail (2)

- **Troubleshooting:**
 - Check SQL server ERRORLOGs
 - Check Windows Event logs
 - Check Cluster.log
 - Configure SQL Server to obtain a dump file when a SQL Server resource failure occurs. This will help troubleshoot the cause of the failure. When the SQL Server resource DLL determines that a SQL Server resource has failed, the SQL Server resource DLL uses the **Sqldumper.exe** utility to obtain a dump file of the SQL Server process. (KB 917825)

Resources

- [Maintaining a Failover Cluster](#)
- [How to: Rename a SQL Server Failover Cluster Instance](#)
- [How to: Change the Service Startup Account for SQL Server \(SQL Server Configuration Manager\)](#)
- [How to: Change the IP Address of a SQL Server Failover Cluster](#)
- [How to: Add Dependencies to a SQL Server Resource](#)
- [How to: Remove a SQL Server Failover Cluster Instance \(Setup\)](#)
- [Using SQL Server Tools with Failover Clustering](#)
- [How to use the Sqldumper.exe utility to generate a dump file in SQL Server 2005](#)

Q & A

Thank You!



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