MIGRATING FAILOVER CLUSTERS TO MICROSOFT WINDOWS SERVER 2008 ON DELL POWEREDGE SERVERS

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The Microsoft® Windows Server® 2008 OS includes significant changes to the failover clustering architecture designed to enhance flexibility and availability, but migrating a cluster from Windows Server 2003 can be challenging. Following best practices can help administrators plan and execute a smooth migration for clusters based on Dell™ PowerEdge™ servers.

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Failover clustering in Microsoft Windows Server 2008 offers significant advantages over failover clustering in Windows Server 2003, including new quorum models, simplified configuration, and other enhancements that can help increase flexibility and availability. However, like many data center tasks, migrating from a failover cluster running Microsoft Windows Server 2003 to one running Windows Server 2008 can be time-consuming and require significant advance planning. Before proceeding with a migration for clusters based on Dell PowerEdge servers, administrators should understand the potential benefits, the tools available to help them assess their cluster and plan the migration, and the possible methods they might choose to carry out the migration.

UNDERSTANDING WINDOWS SERVER 2008 FAILOVER CLUSTERING

Microsoft has made significant changes to the failover clustering architecture in Windows Server 2008 compared with Windows Server 2003, including the following:

- **New quorum models:** The Windows Server 2008 quorum models help eliminate the quorum disk as a single point of failure by enabling clusters to survive the loss of the quorum disk. The new models include a node and disk majority, node majority, disk-only majority, and node and file share majority.
- **Simplified configuration:** Failover clustering in Windows Server 2008 is designed for simplicity, security, and stability, offering streamlined, intuitive configuration and setup through an enhanced management graphical user interface.
- **Enhanced storage features:** Storage enhancements for failover clustering include a mechanism for managing shared disks designed to integrate smoothly with storage area networks. Failover clustering also now offers enhanced disk fencing with the use of persistent reservations, tightened integration with core OS disk management, and support for Globally Unique Identifier (GUID) Partition Table (GPT) to allow partition sizes greater than 2 TB.
- **Support for increased distances:** Failover clusters are no longer limited to a single subnet across nodes and now include comprehensively configurable heartbeats, enabling the use of geographically dispersed clusters over greater distances than were possible in Windows Server 2003.

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- **Increased configuration flexibility:** Qualifying for Microsoft support previously required that the entire failover cluster—including its overall configuration and individual hardware and software components—be validated by Microsoft and have the Microsoft logo. Individual hardware components in Windows Server 2008 failover clusters still must have a "Certified for Windows Server 2008" logo, but Microsoft now typically supports clusters provided they have passed the tests in the Validate a Configuration wizard (included in the failover clustering snap-in). This change offers increased flexibility and helps keep minor modifications to a cluster configuration from being disqualified for Microsoft support. Dell maintains a list of tested, recommended configuration matrices in the "Products & Services" section at DELL.COM/HA.

Administrators should also be aware of restrictions introduced in Windows Server 2008 before planning a migration. For example, failover clustering now only supports Serial Attached SCSI (SAS), Internet SCSI (iSCSI), and Fibre Channel, and no longer supports SCSI as a shared bus type—meaning organizations cannot use Dell SCSI-based enclosures such as PowerVault™ 220S and PowerVault 221S systems as shared storage. Host bus adapters must use the Storport mini-port driver, and the multipath software must be based on Microsoft Multipath I/O and/or have a Windows Server 2008 logo.[1]

PLANNING THE CLUSTER MIGRATION

Failover clusters in enterprise data centers typically host critical applications and data. Although Dell engineers have extensively validated failover clusters with Windows Server 2008 running on a variety of Dell-supported hardware, Dell strongly recommends that organizations validate their migration plan in a test lab to help identify potential problems, take corrective action, and refine migration plans.

The Dell Windows Server 2008 Readiness Advisor tool (available as a complimentary download from DELL.COM/WindowsServer2008) is designed to automate and centralize the collection, assessment, and reporting of information required to help determine system readiness for Windows Server 2008. However, administrators should keep in mind that only a subset of Dell PowerEdge servers, storage arrays, peripherals, and controllers are supported in Windows Server 2008 failover clusters.

Administrators must perform two key tasks when planning to migrate an existing failover cluster to Windows Server 2008. First, they must ensure that the hardware components—servers, controllers, storage arrays, switches, and so on—have the "Certified for Windows Server 2008" logo. Dell and its partners have worked closely with Microsoft to help ensure that hardware supported by Dell has been certified to run Windows Server 2008 and validated for failover clustering. Administrators can view a detailed list of supported components, driver and firmware versions, and so on in the "Products & Services" section at DELL.COM/HA.

Second, administrators must run all tests included in the Validate a Configuration wizard and be sure that the cluster has passed all tests. This tool runs a focused set of tests on a collection of servers to help identify potential hardware and configuration problems before they are configured as a production cluster. (*Note:* Administrators must add the failover cluster feature to access the snap-in containing this tool.)

PERFORMING THE CLUSTER MIGRATION

Administrators can use a variety of methods to migrate a cluster running Windows Server 2003 to Windows Server 2008. The following methods represent two possibilities, depending on hardware availability in the environment:

- **Create a new failover cluster and then migrate the settings from the existing cluster:** In this method, administrators install Windows Server 2008 on the nodes (servers), add the failover cluster feature, and run the Validate a Configuration wizard, then create the new failover cluster and migrate the settings from the existing cluster. Setting up a new failover cluster can allow administrators to experiment with cluster settings and help them isolate

"The architectural enhancements in Windows Server 2008 and the extensive validation work performed by Dell and its partners are designed to ease the burden on enterprise IT staff and help maintain cluster uptime. Following the best practices described in this article can help administrators plan and execute a successful migration in their environments."

[1] For more information on key changes introduced in Windows Server 2008 failover clustering, visit technet2.microsoft.com/windowsserver2008/en/library/13c0a922-6097-4f34-ac64-18820094128b1033.mspx.

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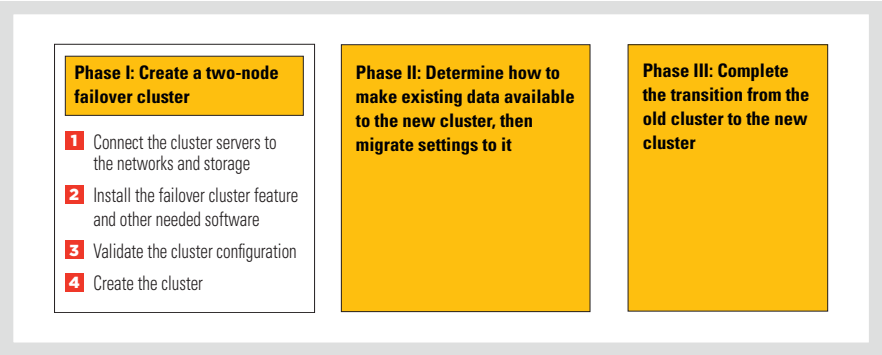

Figure 1. *Process for creating a new failover cluster and then migrating settings from an existing cluster*

potential problems before performing the migration and removing the existing cluster. This method is well suited for environments with spare hardware available, and is required when the existing cluster is based on PowerEdge servers and/or PowerVault storage systems that are not supported for Windows Server 2008 failover clustering (see Figure 1).

- **Perform an in-place migration on a two-node cluster:** In this method, administrators remove one of the servers from the existing cluster, install Windows Server 2008 on it, configure the connections, and run the Validate a Configuration wizard. They then create a single-node cluster on this server and migrate the cluster settings from the other node (running Windows Server 2003) to this new node (running Windows Server 2008). Next, they install Windows Server 2008 on the other node and run the validation tests before joining it to the first node. Finally, they bring the migrated resources online in the new Windows Server 2008 failover cluster. Provided the hardware in the existing cluster is supported for Windows Server 2008 failover clustering, this method helps minimize spare hardware requirements (see Figure 2).[2]

MIGRATING CLUSTER RESOURCES

The Migrate a Cluster wizard in the Windows Server 2008 failover clustering snap-in is designed to help migrate some types of resources from a cluster running Windows Server 2003 to one running Windows Server 2008.[3] This wizard can perform a comprehensive migration for file shares, physical disks (except the quorum disk), IP addresses (except the cluster IP address), network names (except the cluster name), and print servers.[4] It can perform a partial migration for Dynamic Host Configuration Protocol (DHCP) services, Windows Internet Naming Service (WINS) services, Distributed File System (DFS) namespaces, and generic applications, scripts, and services, and then provide guidance on the remaining steps that administrators must perform manually.

The Migrate a Cluster wizard cannot migrate e-mail servers or database applications, and it does not copy or move data during the migration. In addition, if administrators plan to use new storage in a failover cluster after migration and want to assign the same drive letters as were used in the previous cluster, they must do so manually; migrating a cluster that uses mount points also requires several additional steps.[5]

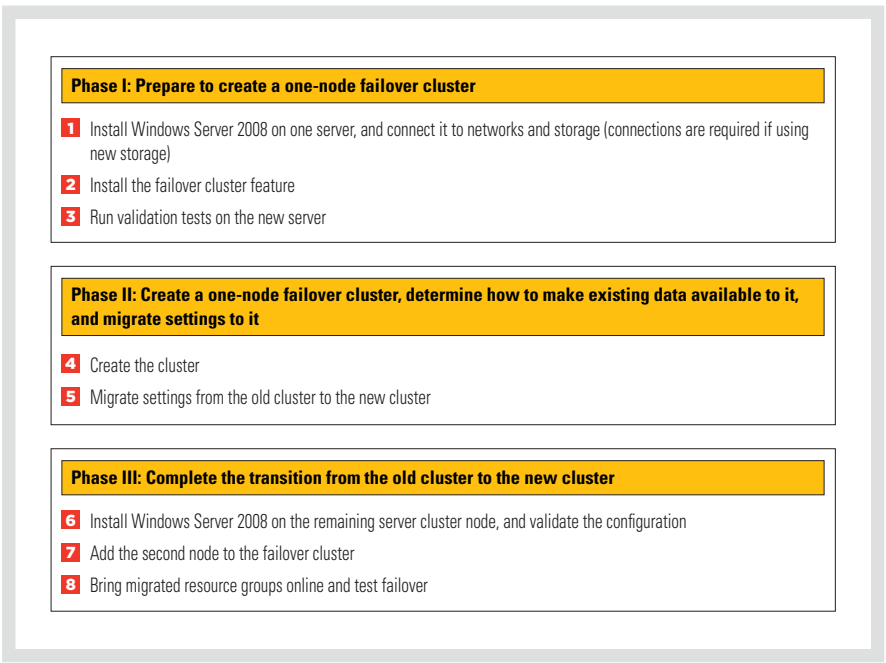

Figure 2. *Process for performing an in-place migration on a two-node cluster*

[2] For matrices of Dell-supported hardware and software, see the "Products & Services" section at DELL.COM/HA. For a detailed step-by-step guide on performing each of these types of migration, visit technet2.microsoft.com/windowsserver2008/en/library/6820ae3f-1ecc-43fd-8a76-fe8c2125cfe61033.mspx.

[3] For more information on the Migrate a Cluster wizard, visit technet2.microsoft.com/WindowsServer2008/en/library/6cb27a88-0708-4068-87cf-45b5b2b793c91033.mspx.

[4] Migrating print servers also requires the Printer Migration wizard built into the Windows Server 2008 print management snap-in. For more information on migrating print servers, visit technet2.microsoft.com/windowsserver2008/en/library/71b0e978-d1ff-47a2-b4bd-1f4d19280dbe1033.mspx.

[5] For more information on maintaining existing drive letters and labels after a migration, visit technet2.microsoft.com/WindowsServer2008/en/library/093b5270-a117-411c-be88-c6dd1afb144e1033.mspx. For more information on mount points, visit technet2.microsoft.com/WindowsServer2008/en/library/a281bc1a-344e-47c8-9ab5-f8d9b62188cc1033.mspx.

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DEPLOYING FLEXIBLE, SIMPLIFIED FAILOVER CLUSTERS

Failover clustering in Microsoft Windows Server 2008 can provide a high degree of flexibility and help simplify overall cluster management. As with any change in a data center, administrators must anticipate and plan for potential risks during the migration process, but the architectural enhancements in Windows Server 2008 and the extensive validation work performed by Dell and its partners are designed to ease the burden on enterprise IT staff and help maintain cluster uptime. Following the best practices described in this article can help administrators plan and execute a successful migration in their environments.

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www.microsoft.com/windowsserver2008/en/us/high-availability.aspx

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