

# **Deploying Exchange Server 2007 SP1 on Windows Server 2008**

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Product Group - Enterprise

Dell White Paper

By

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# Introduction

Microsoft® Windows Server® 2008 (Code name "Longhorn") offers new features and several improvements over Windows Server predecessors. Some of the new or improved feature areas include server deployment, management, security, high availability, virtualization, terminal services, web technologies and high performance computing (HPC). Microsoft Exchange Server 2007 offers a mission-critical e-mail messaging platform for enterprises along with a host of other capabilities. Microsoft Exchange Server 2007 Service Pack 1 version is supported for deployment on Microsoft Windows Server 2008. This white paper will highlight some of the new features of Windows Server 2008 as applicable to Exchange Server 2007. The paper will also address deployment or migration options for Exchange Server 2007 SP1 on Windows Server 2008.

# Deployment Considerations

## ***Exchange Server version support***

The original RTM (Release to Manufacturing) version of Microsoft Exchange Server 2007 and previous versions of Exchange, such as Exchange Server 2003 are not supported for deployment on Microsoft Windows Server 2008. Only Exchange Server 2007 SP1 (Service Pack 1) is supported for deployment on Windows Server 2008. The RTM version of Exchange Server 2007 however is supported for deployment on Windows Server 2008 directory servers as an exception. Similarly Exchange Server 2003 SP2 (Service Pack 2) is supported on Windows Server 2008 directory servers alone. Only the management tools of Exchange Server 2007 SP1 are supported for installation and use on Windows Server 2008. Management tools of previous Exchange versions on Windows Server 2008 are not supported.

There are certain restrictions in deploying Windows Server 2008 as directory servers for an Exchange environment. Exchange Server 2007 SP1, Exchange Server 2007 RTM and Exchange Server 2003 SP2 are supported only with writeable Windows Server 2008 directory servers. Exchange Server is not supported in Active Directory® sites that contain read-only Windows Server 2008 directory servers exclusively; there must be at least one writeable directory server deployed in the same site. Exchange Server ignores the read-only directory servers and functions with the writeable directory servers. Exchange Server 2000 SP3 and previous versions are not supported with Windows Server 2008 directory servers. Exchange 2000 SP3 can exist in same Active Directory forest with Windows Server 2008 directory servers, but they need to be in different Active Directory sites. If they need to be on the same Active Directory site, Exchange Server 2000 SP3 needs to be manually pointed to Windows Server 2003 or Windows Server 2000 directory servers. Table 1 below illustrates the supported Exchange Server Versions on Windows Server 2008.

| <b>Windows Server 2008 Function</b>                                 | <b>Exchange Server Versions</b>  |
|---|--|
| Exchange Server deployment  | Only Exchange Server 2007 SP1.<br><br>Previous Exchange versions not supported.<br><br><b>Note:</b> Exchange Server 2007 RTM and Exchange Server 2003 SP2 installation supported on Windows Server 2008 directory servers alone. |
| Exchange Server management  | Only Exchange Server 2007 SP1 tools.<br><br>Previous Exchange version management tools not supported.  |
| Domain Controller and Global Catalog Server for Exchange deployment | Only for Exchange Server 2007 SP1, Exchange Server 2007 and Exchange Server 2003 SP2.<br><br>Exchange Server 2000 SP3 (exceptions exist) and previous versions not supported.  |

|  |   |
|--|---|
|  | <b>Note:</b> Exchange requires writeable Windows Server 2008 directory servers in same Active Directory site. |
|--|---|

**Table 1: Windows Server 2008 and Exchange Server Support**

The operating system editions of Windows Server 2008 that are supported with Exchange Server 2007 SP1 are 64-bit edition of Windows Server 2008 Standard, 64-bit edition of Windows Server 2008 Enterprise and 64-bit edition of Windows Server 2008 Datacenter. 32-bit versions of the operating system and application are not supported for production use. Exchange Server 2007 SP1 is not supported on the Server Core installation option of Windows Server 2008. The full installation option of Windows Server 2008 is only supported for installation on all server machines that host Exchange Server 2007 SP1 roles.

## ***Migration to Windows Server 2008***

Exchange Server 2007 RTM is supported with appropriate editions of Windows Server 2003 SP1 or later and Windows Server 2003 R2 or later. Exchange Server 2007 SP1 is supported with appropriate editions of Windows Server 2003 SP2 and Windows Server 2003 R2 SP2. Exchange Server 2007 SP1 only is supported on appropriate 64-bit editions of Windows Server 2008.

In-place upgrade to Windows Server 2008 of an existing server with Exchange Server 2007 SP1 on Windows Server 2003 is not supported. Similarly in-place upgrade to Windows Server 2008 after upgrading Exchange Server 2007 RTM to Exchange Server 2007 SP1 on Windows Server 2003 is not supported. It is required to perform a clean installation of Exchange Server 2007 SP1 on Windows Server 2008. It is also recommended to perform a clean installation of Windows Server 2008 on a server computer before installing Exchange Server 2007 SP1. The same restrictions apply to cluster scenarios as well. An Exchange Server 2007 CCR or SCC cluster based on Windows Server 2003 does not support rolling upgrades of the cluster nodes to Windows Server 2008. Upgrading CCR or SCC nodes one at time to Windows Server 2008 is not supported. A new cluster has to be deployed by performing a clean installation of Windows Server 2008 and then installing Exchange Server 2007 SP1 in a CCR or SCC configuration.

Since in-place upgrade of an Exchange Server 2007 deployment is not supported, the recommended method is to perform data migration from the Windows Server 2003 deployment to Windows Server 2008 deployment. There are various considerations for migration of the different Exchange Server 2007 roles - Mailbox, Hub Transport, Client Access, Edge Transport and Unified Messaging. Also there are different considerations for migrating the mailbox data and the public folder data. The later sections in this paper elaborate some of the methods and considerations for migrating Exchange Server 2007 to Windows Server 2008.

# High Availability

## ***Windows Server 2008 Failover Clustering***

Windows Server 2008 offers significant improvements in failover clustering (server clustering) over those available in the previous operating system editions. Windows Server 2008 failover clusters offer hybrid quorum models to improve quorum resource resiliency and also offer support for GPT (GUID Partition Table) disks that offer disk capacities greater than 2 TB. Cluster deployment has been simplified with an improved setup experience and a cluster validation tool that validates the server, network and storage requirements for functioning in cluster. Other improvement areas include cluster management and operations, cluster networking and security. Networking improvements include support for IPv6 and DHCP addressing for cluster nodes. The failover clustering feature is available only with the Enterprise and Datacenter editions of Windows Server 2008.

Windows Server 2008 failover clustering offers different quorum models to avoid split brain cluster scenarios. Split brain scenarios occur when groups of cluster nodes are isolated and are not able to communicate with other node groups due to network failures. Each group may believe the other groups have failed and form their own cluster hosting all the applications themselves. To ensure consistency and avoid such situations a single group should continue functioning as the cluster. A voting algorithm is employed to determine which group of node has the quorum to continue operating as the cluster. Windows Server 2008 failover clustering includes four different quorum models to avoid split brain scenarios:

**Node majority:** This quorum model is similar to the Majority Node Set in Windows Server 2003 server clustering. A majority of the cluster nodes need to be up and communicating with each other to operate as a cluster. Each node has a vote and this model is suitable for clusters with odd number of nodes. It can sustain failures of half of the number of nodes minus 1.

**Node and Disk Majority:** A witness disk has a vote in this model along with the votes of the cluster nodes in determining a quorum. This model is suitable for clusters with even number of nodes as the witness disk vote will serve to break the tie if the cluster splits into 2 groups. It can sustain failures of half the number of nodes with the witness disk functioning. If the witness disk fails, it can sustain failures of half the number of nodes minus 1.

**Node and File Share Majority:** This model is similar to node and disk majority except that the witness disk is replaced by a file share witness. This model is recommended for CCR deployment with Exchange Server 2007 SP1.

**No Majority: Disk Only:** This model is the legacy shared storage failover clustering model. The ownership of shared disk determines quorum and it can sustain failures of all nodes except one (the disk owner). This model is not recommended with Windows Server 2008 due to the single point of failure with the quorum disk.

Windows Server 2008 failover clustering supports deployment of the cluster nodes in different logical network subnets. Thus the server nodes in the cluster can be part of different subnets and this facilitates geographically dispersed (multi-site) cluster nodes. Administrators are no longer required to create virtual local area networks (VLAN) that spread across a WAN to deploy geographically dispersed cluster nodes as in previous versions of the OS. Further flexible

network latency, node availability timeout settings and heartbeat configurations permit failover cluster nodes being deployed on different subnets much more feasible.

## **Exchange Server 2007 SP1 High Availability**

Exchange Server 2007 RTM offered various high availability options. These include Single Copy Clustering (SCC) based on the shared storage clustering model with single database copy on the storage and using the disk for quorum. Exchange Server 2007 RTM also offered replication based high availability options such as Local Continuous Replication (LCR) and Cluster Continuous Replication (CCR). LCR and CCR are based on built-in log shipping and replay technologies. LCR enables a mailbox server to host additional replicated copies of mailbox databases for recovery. CCR enables a mailbox server to replicate data to another passive mailbox server for recovery and supports failover.

Exchange Server 2007 SP1 offers new high availability features and improvements to existing features in Exchange Server 2007 RTM. Exchange Server 2007 SP1 supports new features available with failover clustering in Windows Server 2008 such as multiple subnets for cluster nodes, IPv6, DHCP addresses and the new quorum models. Exchange Server 2007 SP1 enhances the Cluster Continuous Replication (CCR) feature in areas such as redundant cluster networks for log shipping/seeding, replication performance and transport dumpster operations. Exchange Server 2007 SP1 introduces the Standby Continuous Replication (SCR) which is based on the same built-in log shipping and replay replication technologies that existed with Exchange Server 2007 RTM. Exchange mailbox data from source servers is replicated to standby target server via log copy and replay. SCR does not require a cluster to be deployed. SCR source and target servers can be on different subnets and Active Directory sites. SCR supports flexible source and target server configurations and can be combined with existing clustering or replication technologies that exist with Exchange Server 2007 RTM. SCR provides site resiliency and disaster recovery options for Exchange Server 2007 deployments. CCR supports automatic failover whereas SCR requires manual recovery but offers more flexibility.

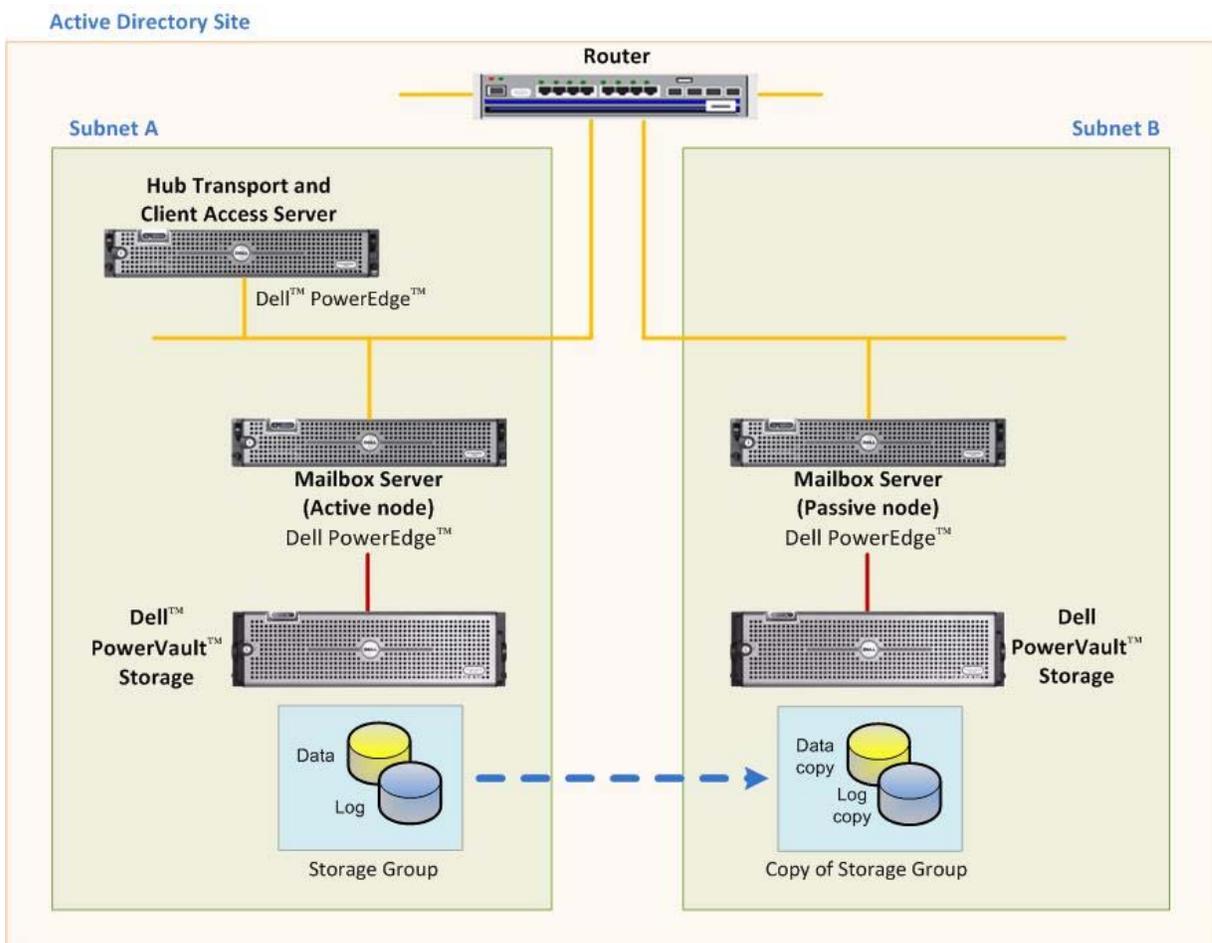
The following table summarizes some of the Exchange Server 2007 SP1 support options with Windows Server 2003 and Windows Server 2008 failover clustering. Support and restrictions with other Windows Server 2008 features such as DHCP addresses and IPv6 addresses for cluster nodes are not highlighted.

| <b>Exchange Server 2007 SP1 clustering feature</b> | <b>Windows Server 2008</b>   | <b>Windows Server 2003</b>   |
|--|--|--|
| Single Copy Clusters (SCC)                         | Recommended using node and disk majority quorum<br>No majority: disk only quorum supported but not recommended | Shared disk quorum supported   |
| Cluster Continuous Replication (CCR)               | Node and file share majority quorum supported and recommended<br><br>Node majority supported but not preferred | Majority node set quorum with file share witness supported<br><br>Majority node set quorum (3 nodes) supported but not preferred |
| Number of cluster nodes                            | Up to 8 nodes with SCC   | Up to 8 nodes with SCC   |

|                      |                            |                     |
|----------------------|----------------------------|---------------------|
|                      | 2 nodes with CCR           | 2 nodes with CCR    |
|                      | OS supports 16 nodes       | OS supports 8 nodes |
| Cluster nodes subnet | Multiple subnets supported | Single subnet only  |

**Table 2: Exchange Server 2007 SP1 clustering options**

The multiple subnet support for cluster nodes in Windows Server 2008 includes support for both SCC and CCR in Exchange Server 2007 SP1. Thus the cluster nodes can be geographically dispersed and can failover across subnets. This feature is attractive in CCR scenarios where the passive node can be located at a remote location on its own subnet. The CCR nodes can be geographically separated and be deployed for addressing disaster recovery scenarios. The active node can be deployed on a primary physical location and the passive node on a secondary location. The passive node can be used to recover from catastrophic disasters to primary location and active node. Figure 1 below illustrates a sample CCR cluster on different subnets based on Windows Server 2008. The hub transport and client access server along with file share witness in the figure can be placed at a different physical location than the active node. This will enable automatic failover if the physical datacenter where the active node is located incurs a disaster. The file share witness server is required to form quorum after an active node failure and hence to support failover.



**Figure 1: Multiple subnet support for CCR in Windows Server 2008**

Although the active and passive nodes may be in different physical locations and subnets, they should be part of the same logical Active Directory site as shown in figure 1. Exchange Server 2007 SP1 does not support active and passive nodes of clusters on different Active Directory sites although Windows Server 2008 failover clustering supports such a scenario. In different subnet deployments, a cluster resource such as network name that depends on IP address should be capable of associating with IP addresses on either subnet. Thus the network name resource has an “OR” logic that facilitates depending on an IP address from either network. After a failover, the network name is associated with the new IP address on the passive node subnet via DNS updates. Thus the applications and services are available after a failover to the passive node on the new subnet by maintaining the same network name bound to a different IP address. The availability of the mailbox server after failover will depend on the propagation of the new IP address throughout DNS which may take significant time. It is recommended that the time to live (TTL) value for clustered mailbox server host record in DNS be set appropriately. Microsoft Outlook® clients do not require re-configuration but require the local DNS cache to be cleared so that the mailbox server name resolution reflects to the new IP address.

# Migration Options

As described in the earlier sections, a clean installation of Exchange Server 2007 SP1 is required on Windows Server 2008. In-place upgrade of the OS to Windows Server 2008 is not supported. Data and configuration settings from the previous Exchange Server 2007 deployment on Windows Server 2003 need to be migrated to the Windows Server 2008 deployment. Some of the planning considerations for the migration include:

- Downtime incurred during the migration
- Pre-production testing required on hardware for Windows Server 2008 and Exchange Server 2007 SP1
- Data backup / restore plan to recover from unforeseen errors during migration
- Testing and verification of the chosen data migration plan
- Post-migration validation
- Migration or re-installation of third party applications

## ***Migration of Exchange Server 2007 Roles***

Specific considerations are required for migration of each Exchange Server 2007 role from Windows Server 2003 to Windows Server 2008. The installation order of roles is important if Exchange Server 2007 RTM only has been deployed on existing Windows Server 2003 deployment and not SP1. The migration should also be treated as Exchange Server 2007 SP1 upgrade and installation order for Exchange server roles required for Exchange Server 2007 SP1 must be followed. It may be suitable to upgrade the existing deployment to Exchange Server 2007 SP1 where possible and then migrate. There are certain installation dependencies required for a clean installation of Exchange Server 2007 Mailbox, Client Access, Hub Transport, Edge Transport and Unified Messaging server roles. Exchange Server 2007 SP1 documentation for installation on Windows Server 2008 provides information on the required dependencies and procedures. The following outlines high level considerations for migrating server roles:

**Client Access Servers:** Migrating client access server settings to new servers based on Windows Server 2008 is mostly manual and using configuration gathering scripts can help migrate certain aspects efficiently. Once settings have been migrated to new servers and Active Directory replication is complete, the original servers can have Client Access Role un-installed from them. Special considerations may be required for migration of client access servers that use load balancing solutions such as Windows Network Load Balancing (NLB), 3<sup>rd</sup> party solutions, or Microsoft ISA (Internet Security and Acceleration) Server 2006.

**Hub Transport Servers:** The Hub Transport settings such as receive connectors and Edge subscriptions need to be manually re-applied on the new servers and dependencies to this server from other servers need to be updated. The original hub server can be un-installed after removing edge subscriptions

**Mailbox Servers:** After installing new mailbox servers on Windows Server 2008, data can be migrated to them. The migration data include public folders, offline address books and mailbox databases. Public folder replication methods should be used for migrating public folder data. Offline address book can be moved using separate documented methods. Mailbox data can be

migrated using move mailbox or database portability. These options are detailed in later sections. LCR or SCR should be disabled on mailbox servers before migration and enabled after migration. SCR requires same OS for source and target after migration. After migration, the deployment cannot have the source OS to be Windows Server 2008 and the target to be Windows Server 2003. After verification of successful migration the original mailbox servers can be un-installed.

**Edge Transport servers:** Configuration settings can be migrated to new servers and this process can be achieved efficiently using configuration gathering scripts. After updating Edge subscription settings, the original Edge server can be un-installed.

**Unified Messaging (UM) servers:** New UM servers need to be joined to same dial plan as existing UM servers. Prompt publishing point that stores custom greetings and attendants on existing server needs to be moved to the new server and dial plan information updated with this new information. After AD replication, existing UM servers can be un-installed.

For environments where a single server has all supported Exchange roles installed on the same machine a different process may be followed. Configuration settings should be exported and manually noted. Mailbox data should be copied after clean shutdown or backed up to suitable locations. Mailboxes should be disabled and Exchange Server 2007 can be un-installed. Windows Server 2008 can then be clean installed on the machine (recommended) or upgraded to if the single server is functioning as directory server as well. After Windows Server 2008 installation, Exchange Server 2007 SP1 can be installed with required roles. Configuration settings can be restored and mailbox data can be migrated into the new mailbox role using database portability. Public folders can be removed before migration with public folder data safely backed up after a clean shutdown. The public folder data can be later restored on newly created public folders on the new Exchange Server 2007 SP1 installation.

## ***Migration Hardware***

The new deployment can be provisioned on new server hardware or existing server hardware from the current deployment may be leveraged. It must be ensured that the hardware requirements for Windows Server 2008 and Exchange Server 2007 SP1 are met. It must be ensured that the hardware is x64 architecture capable since only 64-bit versions of Exchange Server 2007 SP1 are supported for production deployment.

## **Installation on new server hardware**

New servers can be provisioned with Windows Server 2008 and Exchange Server 2007 SP1 can be installed on them. Data from the previous deployment can be migrated using move mailbox Exchange operation on servers and may require new storage when user data is moved along with user configuration. Data migration can also be done using database portability or with backup/restore and existing storage may be leveraged. In cluster scenarios, new CCR or SCC cluster based on Windows Server 2008 may be provisioned. The advantage of using new servers is that the earlier Exchange deployment based on Windows Server 2003 can be preserved for recovery and is recommended. After migration, Exchange Server 2007 can be un-installed from the previous deployment servers and de-commissioned.

## **Re-building existing server hardware**

Existing Exchange Server 2007 mailbox servers can be provisioned with Windows Server 2008 and Exchange Server 2007 SP1 can be installed on them. Data from the previous deployment based on Windows Server 2003 needs to be preserved in this case and restored on the new deployment. This method is not recommended and may not be suitable for certain deployment scenarios. This method may be suitable for single server only environments where one server hosts all applicable Exchange roles. Data migration can be done using database portability or with backup/restore applications. In cluster scenarios, passive node may be evicted and a new cluster with Windows Server 2008 may be formed with the passive node. The active node may be de-commissioned and joined to the Windows Server 2008 cluster later. In multi-server Exchange deployments one server can be installed with Windows Server 2008, while the other servers host its mailboxes via 'move mailbox' command.

A clean installation of Windows Server 2008 on servers is recommended before installing Exchange Server 2007 SP1. Upgrading the base server OS from Windows Server 2003 to Windows Server 2008 and then installing Exchange Server 2007 SP1 should be avoided where possible. In scenarios where this is not avoidable, Windows Server 2008 documentation should be consulted for restrictions and considerations on migration of the standalone base server OS.

## ***Mailbox Data Migration Options***

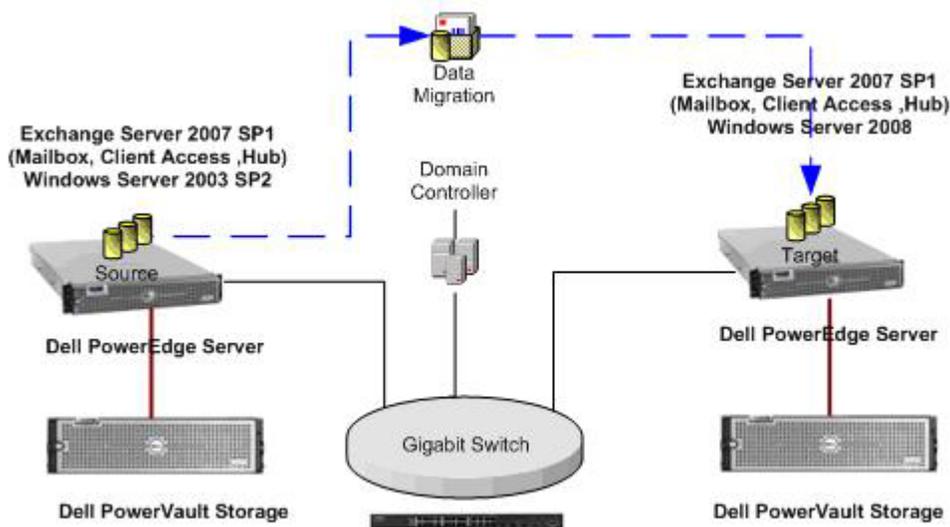
Some of the mailbox server data migration options are outlined in the following sections. The options are applicable for migrating mailbox server data alone. Public folder data can be migrated using existing public folder replication methods.

### **Move Mailbox**

The move mailbox operation available with Exchange Server 2007 can be used for migrating mailboxes from Windows Server 2003 deployment to Windows Server 2008 based deployment. This option is available both with the Exchange management console as a move mailbox wizard and also with the Exchange management shell as a command, for moving multiple mailboxes from one mailbox server to another. User data and user configuration settings are moved to the new mailbox server. Exchange Server 2007 documentation provides more information about this operation. The auto-discover service with Exchange Server 2007 enables Microsoft Outlook 2007 clients to automatically connect to the new server. The move mailbox method is simpler to implement for data migration. New server hardware for target is required with this method as data is copied from old mailbox server to the new mailbox server. It requires additional storage to be provisioned for the new server as data is copied to new location. The time incurred for the move may be significant as mailbox data is copied over the network. Hence this option is only suitable for smaller deployments and may not be ideal for deployments with larger databases or large number of mailbox servers to be migrated.

A sample study was conducted to understand the data migration with move mailbox operation. The setup is as shown in Figure 2 below. The Dell™ PowerEdge™ 2950 Server source server (Exchange Server 2007 SP1 on Windows Server 2003) is direct attached to a Dell PowerVault™

MD1000 storage enclosure and hosts source mailbox data. The Dell PowerEdge 2950 target Server (Exchange Server 2007 SP1 on Windows Server 2008) is direct attached to a Dell PowerVault MD3000 based storage enclosure for mailbox storage. Active Directory and the source mailbox server were populated with users and mailbox data respectively using the Microsoft Loadgen load simulation tool (version 08.01.0177). 25 users were created with approximately 3000 items or 250MB of data on each user's mailbox. The target server was installed with Windows Server 2008 and Exchange Server 2007 SP1. The target server was joined to the same Exchange Organization. Move mailbox wizard was executed from the Exchange management console to move mailbox users and data from the source server to the target mailbox server. The operation took approximately an hour and a half to move 25 mailbox users and data (approximately 6.5 GB database file size). After the mailboxes were moved, the Loadgen tool load simulation tests were conducted to verify data consistency.



**Figure 2: Sample Test Setup**

## Database Portability

Database portability feature has been significantly improved with Exchange Server 2007. Some of the restrictions existing with the previous versions of Exchange have been removed. Exchange Server 2007 allows a mailbox database to be mounted on any server in the same organization. Auto-discover service enables Microsoft Outlook 2007 clients to be re-directed to the new server automatically. Database portability can be used for migrating Exchange data from Windows Server 2003 deployment to Windows Server 2008. To use database portability, the mailbox databases from the source server should be moved to a clean shutdown state. Appropriate storage groups and mailbox stores with storage locations need to be created at the target server. The mailbox database files (.edb files, log files and catalog files) from the source server should then be copied or moved to appropriate locations in the target server. The mailbox databases on the target server can be finally mounted. User mailbox configuration can be changed to point to the new server using the 'Move Mailbox -ConfigurationOnly' Exchange management shell command. Active Directory replication may need to complete for all users to access their mailbox on the new server.

Data migration using this method may be faster since actual mailbox data is copied to target server using separate mechanisms. The move mailbox operation only changes the user mailbox configuration to point to new server. File copy over the network can be used for smaller deployments to copy mailbox database and log files. For larger deployments the files can be backed up from the source server using supported backup applications to tape or disk locations. The required mailbox server files can then be copied to the target server by a restore operation from the backup. Alternatively the storage attached to the source server can be detached after clean shutdown and re-attached to the target server. The target storage groups and mailbox stores can be pointed to the appropriate locations where the source server had the respective data. The target mailbox databases then can be mounted. With this method, the same storage provisioned for the source server can be utilized for target. Suitable backups may be taken before migration for recovery from unforeseen errors.

## Conclusion

Upgrading Exchange Server 2007 deployment operating system from Windows Server 2003 to Windows Server 2008 requires careful planning and consideration. Migration options and impacts to existing deployments need to be clearly understood. Suitable migration plans should be chosen based on downtime requirements, costs, complexity and other factors. Migration procedures and risk mitigation plans need to be clearly articulated and documented. Dell PowerEdge Servers, Dell PowerVault and Dell/EMC storage offer a suitable platform for the Windows Server 2008 environment and can be deployed for migrating Exchange Server 2007 deployments to Windows Server 2008.

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