

Exchange Server 2007 Design Considerations

Product Group - Enterprise

Dell White Paper

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Introduction

Messaging systems are integral and crucial for today's business operations. Over the years, messaging systems have evolved from providing basic functionality such as e-mail to providing rich collaboration features. The messaging requirements and needs of today's information worker have also changed significantly from basic desktop e-mail access to collaboration from anywhere with any device. In such an evolving environment, IT administrators face an increasingly complex task of administering and maintaining messaging systems. Business requirements such as security, regulatory compliance, and availability further add to complexity. Businesses also face the enormous challenge of implementing a suitable messaging system that meets their Total Cost of Ownership (TCO) and Return on Investment (ROI) targets. Microsoft® Exchange Server 2007 incorporates features that enable businesses to effectively meet those challenges, without fundamentally altering the traditional methods for end users to access e-mail. This whitepaper highlights some of these features and architectural benefits, in the areas of server roles, core Exchange architecture, mailbox data access, and secure Exchange.

Server Roles in Exchange 2007

Exchange Server 2007 provides or distributes its features and functionality through five newly defined server roles: Mailbox, Hub Transport, Client Access, Edge Transport and Unified Messaging. A server role provides a defined set of Exchange 2007 functionality and can be deployed standalone on a hardware server system or, with certain restrictions, be combined with other roles. Figure 1 illustrates the different Exchange Server 2007 roles in an example Exchange Server 2007 infrastructure.

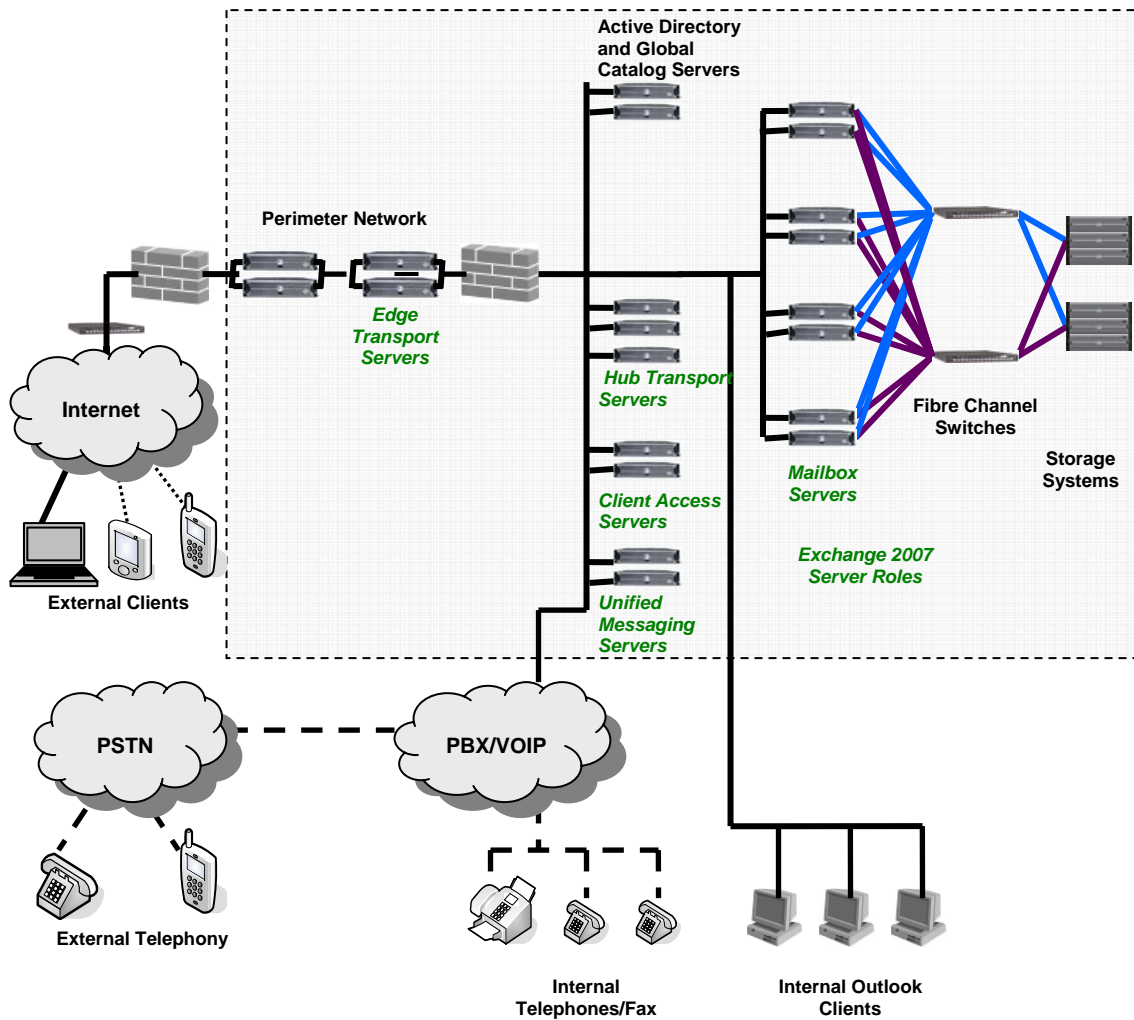


Figure 1: Microsoft Exchange Server 2007 Infrastructure

Mailbox Server Role

The Mailbox server role provides the functionality for hosting user mailboxes, public folders, and calendar data, and for storing offline address books. Enhanced integration of the mailbox role with Active Directory enables Exchange Server 2007 to provide a better experience with usability and deployment operations. The Mailbox role communicates directly with all other server roles and internal Outlook clients, as shown in Figure 1.

Dell's best practice recommendations for sizing the Mailbox server role are given in Table 1. These recommendations are based on Exchange Server 2007 performance characterization tests conducted at Dell labs. The user profiles given in the table are defined as follows:

- Medium user: 10 send and 40 receive e-mail operations per 8 hour work day
- Heavy user: 20 send and 80 receive e-mail operations per 8 hour work day

| Server | Dell PowerEdge 1950 | Dell PowerEdge 2950 | Dell PowerEdge 6850 or 6950 |
|---------------------|---------------------|---------------------|-----------------------------|
| RAM (1GB DIMMs) | 4GB | 8GB | 16GB |
| No. of Medium users | 750 | 1500 | 3600 |
| No. of Heavy users | 500 | 1000 | 2400 |
| RAM (2GB DIMMs) | 8GB* | 16GB | 32GB |
| No. of Medium users | 1500 | 3600 | 7700 |
| No. of Heavy users | 1000 | 2400 | 5100 |
| Processors | 2 x Dual Core | 2 x Dual Core | 4 x Dual Core |

* Dell™ PowerEdge™ 1950 can also be configured for 8GB system memory using 1GB DIMMs

Table 1: Best practice user recommendations for Mailbox role on Dell server hardware

The recommended server models can scale to more number of users than mentioned in Table 1, by configuring more system memory using 4GB DIMMs. The above recommendations are guidelines for choosing an appropriate Dell™ PowerEdge™ server for the Mailbox server role alone. Recommendations for Dell™ PowerVault™ or Dell | EMC storage on which the actual mailbox database files reside vary based on factors such as mailbox size, mailbox profile, price/performance requirements, high availability features and disk drive type choices. The Dell Exchange 2007 Advisor tool hosted at www.dell.com/exchange uses these factors to help in sizing Exchange Server 2007 deployments.

Hub Transport Server Role

The Hub Transport server role is responsible for handling all internal mail flow across Exchange roles and appropriate delivery of user messages. This role is mandatory for an Exchange 2007 deployment and provides functionality such as journaling, server side rules, and an additional layer of anti-virus/anti-spam security. All incoming external SMTP e-mail is forwarded to the Hub Transport by the Edge server role. The Hub Transport can also be configured to directly receive external e-mail in deployments where an Edge server is not used. In such deployments

the anti-virus and anti-spam functions can be enabled on the Hub Transport server. All transport, journaling, and user policy information is stored in Active Directory, which facilitates scaling and simplified management of the Hub Transport role. All messages in the Exchange 2007 Organization are routed to and processed by the Hub Transport server before delivery to user mailbox. This enables enforcing messaging compliance regulations and policies at the Hub Transport server role using server side rules and journaling.

Dell™ PowerEdge™ 2950 or Dell™ PowerEdge™ 1950 is a suitable server platform for hosting the Hub Transport role. The hardware platform should be appropriately sized for the required Hub Transport functions. Specifically ample system resources including processors and memory should be allocated if Edge functions such as ant-virus/anti-spam and rule-based policies are configured on the Hub Transport role.

Client Access Server Role

The Client Access server role hosts services and functions required for supporting a variety of mail clients. It hosts functionality for supporting Outlook(r) Web Access (OWA), Exchange ActiveSync client access, POP3/IMAP4 client access and Outlook Anywhere (RPC over HTTP) access. OWA provides access to the mailbox hosted on the Mailbox server through a web browser and Outlook Anywhere enables Outlook clients to connect to the mailbox without being dialed into the internal corporate network. Exchange ActiveSync provides functionality for supporting mobile devices as clients. ActiveSync enables synchronization between supported mobile devices and the user mailbox hosted on Mailbox server. Mail software clients that use POP3/IMAP4 as protocols for connecting to the e-mail servers can connect to the Client Access server configured with POP3/IMAP4 support and access user mailbox data. Client Access role also hosts the autodiscover service and Exchange web services. The autodiscover service enables Outlook clients to automatically discover and connect to their Exchange environment by providing configuration information. Exchange web services provide features and support for custom client applications to access mailbox data.

The Dell PowerEdge 2950 or Dell PowerEdge 1950 is a suitable server platform for hosting the Client Access role. For larger deployments more than one server may be required to host the Client Access role. The hardware platform should be appropriately sized for the required Client Access role functions described and the user load.

Edge Transport Server Role

The Edge Transport server role sits in the perimeter network and provides functionality for routing external SMTP mail flow to and from the Internet. Additionally, the Edge Transport server role provides anti-virus/anti-spam protection, filtering capabilities, and rule-based protection. The Edge Transport role is not a member of the Active Directory domain and sits outside the Active Directory framework. The Edge server uses the Active Directory Application Mode and EdgeSync to obtain the required Active Directory information for performing its functions. The Edge Transport role is optional and the Hub Transport can be configured directly

to handle external Internet e-mail. However in such scenarios, it is highly recommended that the Hub Transport role be protected by well known firewall and security mechanisms.

The Dell PowerEdge 2950 or Dell PowerEdge 1950 is a suitable platform for hosting the Edge Transport role. The hardware platform should be sized appropriately for the various required Edge functions such as SMTP mail load, anti-virus/anti-spam enablement, and rule processing.

Unified Messaging Server Role

The Unified Messaging (UM) server role provides the new Exchange Server 2007 functionality for integration of voice mail and fax, along with e-mail, into user mailboxes. It also provides for Outlook Voice Access functionality, which allows users to access e-mail, voice mail, and calendar entities from a telephone. The UM server role requires integration with existing Private Branch Exchange (PBX) telephony systems to enable this functionality (Figure 1). The UM server utilizes VOIP based protocols to interact with the telephony systems. A VOIP gateway is required for the UM server to integrate with traditional PBX systems. VOIP gateways may also be required with IP-PBX systems, if those systems do not support protocols required for UM server integration. Once this integration is enabled the Exchange environment acts as the voice mail repository and all voice mail operations are routed to the Unified Messaging server by the telephony system. The UM server processes the voice or fax information and compresses it into a supported digital file format. It then sends the compressed file to the corresponding user mailbox on the mailbox server as an e-mail with attachment. The user mailbox and corresponding telephony information is stored in Active Directory and effects this voicemail/fax integration with user mailbox. Also, users can call into the UM server, from either internal or external PSTN phones, to retrieve their e-mail and calendar entries in addition to voicemail. The UM server includes a voice attendant function that enables handling of all user requests from a telephone.

Dell PowerEdge 2950 is a suitable platform for hosting the Unified Messaging server role. The hardware should be sized appropriately based on user voicemail/fax load and user voice access requests to the UM server.

Deployment Considerations for Server Roles

High Availability and Scalability

High Availability for the Mailbox server role can be provided through Single Copy clusters (SCC) or Cluster Continuous Replication (CCR). SCC is based on Microsoft® Cluster Services (MSCS) shared storage clustering, wherein a single copy of the databases resides on a shared external storage connected to 2 Mailbox server nodes. One of the server nodes, called the “active” node, hosts the mailbox databases and serves the clients. If the “active” node incurs a failure, the other node, called the “passive” node, takes over hosting mailbox databases from the shared storage and continues serving the clients. CCR is based on MSCS Majority Node Set (MNS) clustering, wherein a copy of the mailbox databases is hosted on another server with its own storage space. Mail clients access the primary server, and database changes to it are shipped to the secondary server in the form of log records. The shipped log records are played on the secondary server to keep the secondary database copies consistent with the primary. If the primary Mailbox server fails, the MNS clustering mechanism automatically promotes the secondary server to start serving the clients. CCR provides both mailbox high availability and also site recovery through hosting the secondary server on a separate datacenter. Database availability alone can be achieved without application availability via the Local Continuous Replication (LCR) feature. LCR maintains a local copy of the mailbox database on the Mailbox server and keeps the copy consistent with the production database by re-playing log records on them. The database copies can be manually switched to function as production databases during failures or during maintenance.

High availability and scalability for server roles other than Mailbox role can be affected by a variety of methods. It can be achieved for the Client Access role by deploying multiple server nodes hosting the role and using Windows Network Load Balancing Services (WNLBS) or other third party hardware based network load balancing mechanisms. High Availability for the Hub Transport Role can be achieved by deploying multiple servers with the role. No explicit load balancing solution is required for the Hub Transport role, as Exchange 2007 is implicitly designed to scale to multiple Hub role instances. High Availability for Edge and Unified Messaging servers can be provided through DNS round-robin methods to load balance incoming requests.

Server Role Consolidation

The Hub Transport server role is mandatory for any Exchange 2007 deployment to handle all transport functions. In order to host user mailboxes and public folders, the Mailbox server role is mandatory. The Client Access role is required in the same Active Directory (AD) site where a Mailbox role is deployed. The Hub Transport role and Client Access roles are required on every AD site within the organization. The Edge Transport and Unified Messaging server roles are

optional for a deployment. Server roles or a subset of server roles can be consolidated and deployed on a single server system. Exceptions for consolidating server roles are as follows:

- All Exchange Server 2007 server roles are members of the Active Directory domain except the Edge Transport server role. Hence Edge Transport cannot be consolidated and deployed on a single server system with other server roles.
- If the Mailbox server role is deployed in a highly available clustered configuration using Single Copy Clusters (SCC) or Cluster Continuous Replication (CCR) based on Microsoft Cluster Services (MSCS), no other role can be consolidated with the mailbox role on the same server.

Regardless of specific scenarios for consolidation and deployment, hardware for each server role should be sized appropriately for capacity and performance.

Core Architectural improvements in Exchange 2007

64-bit Application Support

Exchange Server 2003 is a 32-bit application and is limited by the amount of addressable memory. Roughly 3GB of user mode virtual memory can be utilized for Exchange Server 2003 and the remaining 1GB is required for the kernel. Exchange Server 2003 cannot utilize the physical memory available above 4GB made available to the system through Physical Address Extensions (PAE) on supported Windows platforms. Exchange 2003 does not support using Address Windowing Extensions (AWE) to access memory made available through PAE. Due to this memory limitation the application is more disk sub-system centric and is required to perform large amounts of I/O operations. Outside of the 4GB physical memory limitation, the kernel running Exchange 2003 is also under constant stress due to the limited kernel mode memory available for user connections and other processing.

Exchange Server 2007 overcomes the memory limitations by providing support as a 64-bit application capable of running on supported x64 platforms. On Windows Server 2003 x64 Editions about 8TB of addressable memory is available for the kernel mode and the user mode applications. Support for up to 1TB of physical RAM is provided on Windows Server 2003 Enterprise x64 Editions. Both the application and kernel can have sufficient memory for operations, allowing the Extensible Storage Engine (ESE) in Exchange Server 2007 to utilize more memory to buffer data pages. The result is a reduction in the number of I/Os, specifically the read operations, required to the disk sub-system. Figure 2 illustrates the effect of increased memory on Exchange Server 2007 database I/O operations.

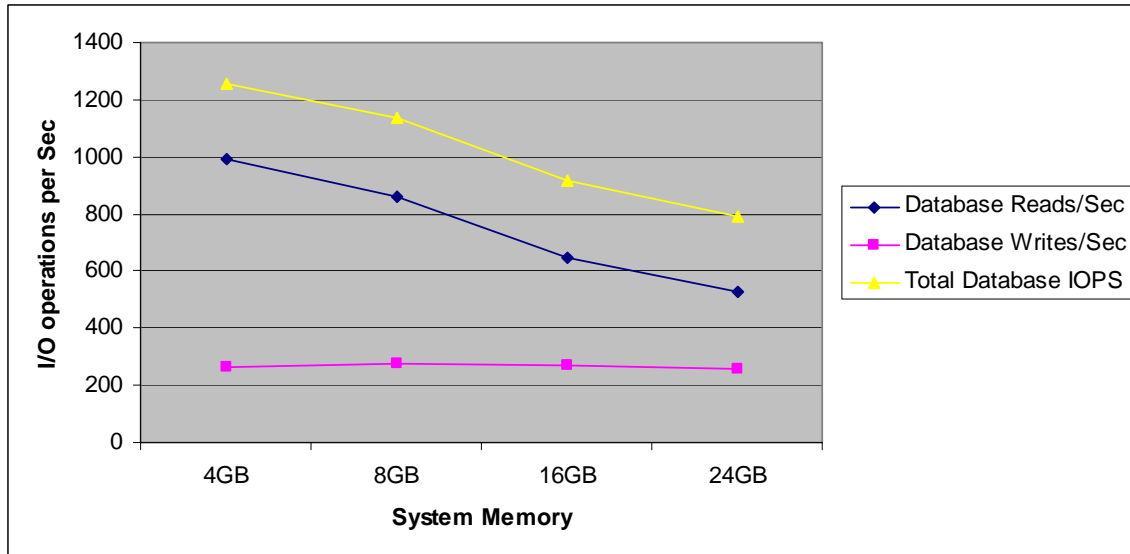


Figure 2: Effect of increasing memory on database I/O operations – 2000 heavy users

Configuration details:

- Exchange roles – Mailbox, Hub and Client Access roles consolidated on one server with clustering options and LCR not enabled
- Server hardware– Dell™ PowerEdge™ 6850 with four 3.6GHz Dual-Core Intel® Xeon® 7140M Processors
- Exchange layout – two storage groups with one mailbox store on each and 1000 users each
- Storage hardware – Dell | EMC CX3-40 with RAID1/0 LUN (10 x 73GB 4G 15K drives) for each mailbox store and RAID1 LUN (2 x 146GB 4G 15K drives) for each storage group logs
- Client users – 2000 heavy users simulated with Loadgen load simulator tool. Users simulate Outlook 2007 clients in online mode. Each user performs approximately 94 outlook operations per 8 hour user day on a 250MB mailbox.

From the figure it can be seen that the total number of database disk I/O operations for a given user load is dependent on the available system memory. For a given load, the total database disk I/O operations required per second (IOPS) decreases over a period with increase in system memory. This decrease in database IOPS is primarily caused by a decrease in database reads. The database disk read/write ratio also changes significantly with an increase in system memory due to the disproportional decrease in reads and writes. The decrease in IOPS and change in read/write ratio significantly affect sizing of the disk sub-system for I/O performance. Hence at optimal system memory for a given user load, fewer disk drives are required to satisfy the disk I/O requirements of the database.

Storage Group Improvements

Exchange Server 2007 also provides support for more storage groups to host mailbox database stores or databases – up to 50 storage groups, compared to 4 in Exchange 2003. This enables splitting user mailboxes across multiple available storage groups, providing ease of management for administrative operations such as backup/restore. Besides management ease, splitting

mailboxes across multiple storage groups provides increased log checkpoint depth available for user data operations. In certain scenarios dirty data pages can be optimized to reside in memory for a longer period of time and reduce the number of write I/O operations required to the disk sub-system. In Exchange Server 2007, the data page size is increased from 4KB to 8KB and can provide I/O optimization in certain scenarios by containing larger messages within a page and holding internal data structures within one page due to the larger page size.

Exchange 2003 Comparison

The architectural changes in Exchange Server 2007 enhance its scalability and performance. More Mailbox servers can be supported on servers with lesser storage sub-system requirements and optimal efficient utilization of storage hardware. The five Exchange Server 2007 roles refine and add richer features than the traditional roles available with Exchange Server 2003. The mailbox and public folder functionality of Exchange 2003 Back-End Server is provided by the Mailbox role in Exchange Server 2007. Some of the functionality of the Exchange 2003 Bridgehead server is provided and enhanced by the Hub Transport role. A subset of the Exchange 2003 Front End server functionality is handled by the Client Access server role. Major architectural differences between Exchange Server 2003 and 2007 are given in Table 2.

| | Exchange Server 2003 | Exchange Server 2007 |
|-----------------------------------|---|--|
| Platform | 32-bit application based on x86 platforms | 64-bit application based on x64 platforms |
| Memory scalability | Limited to 4GB system memory | Scales beyond 4GB system memory |
| Exchange storage groups | <ul style="list-style-type: none"> • Up to 4 storage groups and 1 Recovery Storage Group • Up to 5 mailbox stores per storage group | <ul style="list-style-type: none"> • Up to 50 storage groups • Up to 50 mailbox stores total |
| Server roles | Back-End, Front-End and Bridgehead | Mailbox, Hub Transport, Client Access, Edge Transport, Unified Messaging |
| Mailbox high availability options | MSCS based shared storage clustering | <ul style="list-style-type: none"> • Single Copy Cluster (SCC) - MSCS based shared storage clustering • Cluster Continuous Replication (CCR) - MSCS based Majority Node Set (MNS) clustering |
| Supported backup methods | Support for legacy and VSS backups on active database | Support for legacy and VSS backups on both active and database copies in LCR and CCR |

| | | |
|---|---|---|
| Business Continuity Volumes (Local Data Replicas) | Through storage hardware or third party software mechanisms | Local Continuous Replications (LCR) besides other mechanisms |
| Unified Messaging features | None | <ul style="list-style-type: none"> • Unified mailbox for e-mail, voicemail, and fax • Voice access to e-mail, calendar, voicemail, fax, and contacts. |

Table 2: Major architectural differences between Exchange Server 2003 and Exchange Server 2007

Mailbox Access for Exchange 2007

Exchange 2007 provides new features and options that enable users to access their mailbox from office, home, or on the road. The various methods available for mailbox access are:

- Microsoft Outlook
- Outlook Web Access
- Mobile devices using Exchange Active Sync
- Voice Access using Unified Messaging

Depending on user location, one of the above options may be the most suitable method to access your mailbox.

Microsoft Outlook

Microsoft® Outlook® is an e-mail client that can be used to access e-mail from different e-mail servers including Microsoft Exchange 2007. Microsoft Outlook provides access to all user mailbox data including e-mails, contacts, calendar, etc. The versions of Outlook that are compatible with Exchange 2007 include Outlook 2007, Outlook 2003 and Outlook 2002/XP.

Outlook is most suitable to access e-mail from the office. From outside the office network, a Virtual Private Network (VPN) connection to the corporate network is required to be able to use Outlook to access mailbox data. However, with Outlook Anywhere for Exchange 2007, this is no longer a requirement. With Outlook Anywhere, Outlook 2003 and 2007 clients can access Exchange 2007 mailbox data using RPC over HTTP, eliminating the need for VPN. This makes it easier and provides an efficient way to access a mailbox using Outlook from a remote network.

Microsoft Outlook can also be used in Cached Exchange mode. In this mode a copy of the user's mailbox is stored on local storage. This local copy of the mailbox is updated and synchronized periodically from the Exchange server. In this mode, users need not have on-going connectivity to the Exchange server. Even while offline; they have access to their entire mailbox data as Outlook works from the local copy of the mailbox. Cached Exchange mode also has a significant impact on disk input/output operations per second (IOPS) of the Exchange server. Since Outlook optimizes the type and amount of data sent to Exchange, the total disk I/O footprint of an Outlook user is reduced on the server. This may translate into reduced disk bandwidth requirements for the Exchange server. Figure 3 illustrates the effect of Cached mode on Exchange 2007 database I/O operations from disk.

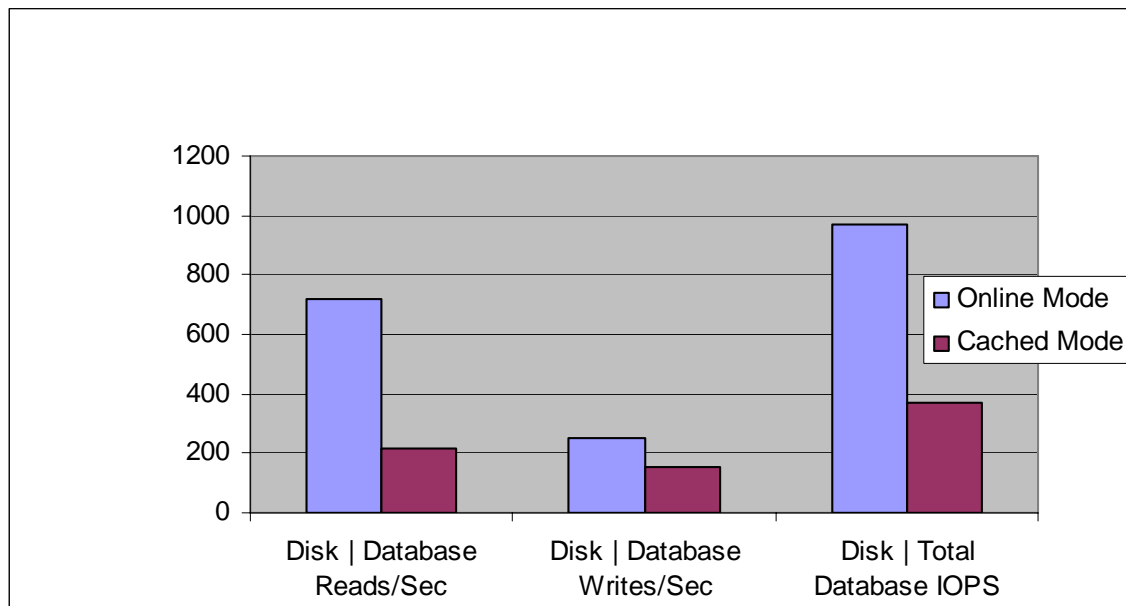


Figure 3: Impact of Exchange Cached Mode on database I/O operations – 2000 heavy users

Configuration details:

- Exchange roles – Mailbox, Hub and Client Access roles consolidated on one server with clustering options and LCR not enabled
- Server hardware– Dell™ PowerEdge™ 6950 with four 2.4GHz Dual-Core AMD Opteron® 8216 Processors
- Exchange layout – two storage groups with one mailbox store on each and 1000 users each
- Storage hardware – Dell | EMC CX3-40 with RAID1/0 LUN (10 x 73GB 4G 15K drives) for each mailbox store and RAID1 LUN (2 x 146GB 4G 15K drives) for each storage group logs
- Client users – 2000 heavy users simulated with Loadgen load simulator tool. Users simulate Outlook 2007 clients in online mode. Each user performs approximately 94 outlook operations per 8 hour user day on a 250MB mailbox.

From Figure 3 we can see that Cached Exchange mode helps reduce Exchange database I/O operations to disk. Most of the I/O reduction is realized due to the substantial decrease in database read operations from disk. Due to this reduction in disk read operations the read/write ratio of Exchange database operations to disk changes. This change in read/write ratio to disk can have a significant impact on disk sizing for the Exchange server. The values shown in the graph are representative of the decrease in database I/O operations. The absolute value of I/O reduction realized depends on several other factors, including configuration details of the Exchange server.

Outlook Web Access

Outlook Web Access (OWA) provides secure access to mailbox data from any web browser. Exchange 2007 Client Access Server role (CAS) is required within the Exchange organization to enable Outlook Web Access for clients. Exchange 2007 provides an enhanced browser-based Outlook experience that includes access to all types of unified messaging data, HTML conversion of data, and avoidance of client local data storage to enhance security. OWA also provides access to Windows and SharePoint file shares. OWA does not require an Outlook client, but only Internet connectivity through a browser. To ensure performance and to deploy the most OWA users per server, it is recommended to move the Client Access server role out of the Exchange Mailbox server. The Client Access server handles and processes all client user requests and forwards the requests to the Exchange Mailbox server. The Exchange Mailbox server delivers the content requested by the clients. As the number of Outlook Web Access users increases, more Client Access servers can be added to the Exchange organization.

Mobile Devices Using Exchange ActiveSync

Exchange ActiveSync is a synchronization protocol that is designed to work with high latency, low bandwidth networks. This is suitable for mobile devices that need to synchronize and transfer data from the Exchange server. New features like Direct Push ensure that the mobile device is always synchronized with the latest messages from the Exchange server. Exchange 2007 ActiveSync also includes support for HTML messages, enhanced message flagging, server side searching for older items not stored locally, and file share access to Windows and SharePoint file shares. Exchange 2007 Client Access server role is required within the Exchange organization to enable ActiveSync client applications. The Client Access server communicates with mobile clients and enables accessing the user mailbox data hosted on the Mailbox server.

Outlook Voice Access Using Unified Messaging

Exchange 2007 Unified Messaging provides functionality to integrate e-mail, office voicemail, and fax data into the user's mailbox. Traditionally voice mail and fax data were maintained within separate telephony and fax systems. With Unified Messaging voice mail and fax data can be routed to the user's inbox so that the mailbox becomes the consolidated repository for all messaging data. Users can access all their messaging data via Outlook clients which may be running on a computer or a mobile device. The voice mail and fax appear as e-mail attachments with unique identification flags and the voice mail can be played on the computer or device speakers.

Unified Messaging server role is required within the Exchange organization to enable Outlook voice access functionality. Besides enabling a consolidated mailbox, Unified Messaging also provides telephone access to the messaging data via Outlook Voice Access. This functionality enables users to access their mailbox data by dialing into a user access phone number and listen

to, forward, reply to, or create both e-mail and voice messages. The users can also access or change calendar entries using touch-tone or voice-enabled menus. The Exchange 2007 Unified Messaging server role hosts all the services and functionality required to implement Unified Messaging. This server role should be appropriately integrated with the PBX voice network systems to enable routing of the voicemail and fax. The VOIP gateways and PBX systems should meet the appropriate requirements for Unified Messaging server integration. The Unified Messaging server role receives the voicemail and fax data and enables storing them on the user mailbox hosted on the Mailbox server. It also provides the interface for voice access to mailbox data. To ensure performance and to deploy the most Unified Messaging users per server, it is recommended to move the Unified Messaging server role out of the Exchange Mailbox server.

Securing Exchange 2007 Deployments

Antivirus and Anti-Spam

Security has become one of the biggest concerns in any IT deployment and Exchange is no exception. The threat from viruses and spam is ever-increasing which has made antivirus/anti-spam systems a significant component of the Exchange deployment. The Edge Transport server role in Exchange 2007 provides antivirus/anti-spam protection capabilities for the Exchange environment.

The Edge Transport server is located in the perimeter network and is not a member of the Active Directory domain. A perimeter network is typically the network segment that is closest to the Internet gateway. It is the first network encountered by any incoming traffic from the Internet into the internal network. Typically, if the network design includes a firewall, the perimeter network will be a part of it. The Edge Transport server uses the Active Directory application mode and EdgeSync to obtain the required Active Directory information. As it is located in the perimeter network, it forms the first line of defense for the Exchange environment.

The Edge Transport server can be configured to perform the following spam filtering functions:

- Attachment filtering based on file type and name
- Connecting filtering based on certain IP block list or IP block list
- Content filtering using the Content Filter agent, which assigns a spam confidence level to each message
- Recipient filtering based on a blocked-recipient list
- Sender filtering for messages outside the organization based on SMTP header

Security of the Exchange Mailbox servers is a major concern as these servers host critical data such as user mailboxes and/or public folders. Even with strong perimeter network security in place, the Mailbox servers require protection against spam and virus as viruses can enter through other methods such as USB drives or other removable storage media. Therefore, even though the Edge Transport server forms an effective first line of defense against security threats, it is recommended to run transport-based antivirus software on the Hub Transport server. Several antivirus software vendors offer solutions for Exchange 2007.

Archiving and Compliance

With the ever-growing volume of e-mails, there may be several reasons for an organization to consider archiving or journaling solutions, including business needs, technical requirements, or both. The business needs may include compliance or legal requirements. The technical reasons may include better mailbox management, PST migration, faster retrieval, or other factors. Exchange Server 2007 includes features that enable organizations to effectively meet their regulatory compliance and archiving requirements. Journaling is the ability to maintain a record of all communication within an organization including e-mail. Archiving refers to storing of the

Exchange data away from the native Exchange environment. Even though the data is stored away from the Exchange storage environment, it should be accessible easily. This frees storage space and capacity in the native Exchange storage environment and reduces the overall load on the system.

Exchange 2007 provides the journaling feature through the Hub Transport server role. All e-mail traffic that passes through the Hub Transport server role can be recorded using the Exchange journaling agent. Standard journaling enables the recording of all messages sent to or received from users that are located on a specific mailbox database. Premium journaling enables recording messages for a single user or a group of users within the organization. Further, the messages included in journaling can be sent for archiving to a third party SMTP server or an Exchange mailbox or SharePoint folders. User-wide mailbox scan and search functionalities are provided to meet compliance and retention requirements.

Backup and Recovery

To protect e-mail data from potential disaster, the first line of defense is usually to back up critical information using tape or disk. Depending on the size and design of the Exchange environment different backup methods may be used to back up the Exchange server:

- Standalone server backup
- LAN-based backup
- SAN-based backup

Standalone server backup

A standalone backup and restore scenario can be appropriate for small Exchange environments that are hosted on a single standalone server. The tape backup unit can be directly attached to the server. The advantages of this model are that it is simple, easy to deploy and implement, and cost-effective.

LAN-based backup

In the LAN-based scenario, the tape library attaches to a separate server known as the backup server or media server. The backup server connects to the Exchange servers over the LAN. The LAN-based model may be suitable for environments that support multiple servers or are running multiple applications. With this backup model, different application servers can share a single tape library over the LAN. This centralized approach helps simplify backup administration.

SAN-based backup

The SAN-based scenario is similar to the LAN-based approach; also streamlines administration through centralized backups. The network topology for SAN-based backups is designed to improve application performance by routing over a high-speed Fibre Channel network. This model may be suitable for larger SAN-based Exchange environments.

Exchange 2007 supports database backups on the copies available when LCR or CCR is implemented. Backing up the copies instead of active production databases provides improved performance due to the reduced load on production databases. It also provides opportunity for removing time restrictions on backup/maintenance windows, due to the minimal impact on

production servers and mail clients. The Database Portability feature enables hosting a failed server's user mailboxes on any server to enable those users to continue immediate communications while the actual backed up mailbox data is being recovered.

Conclusion

Exchange Server 2007 includes new built-in features and enhancements that enable businesses to suitably meet their ever growing messaging needs. These new features and architectural changes have changed the design and sizing methodologies used with older versions of Exchange. This paper presented a summary of the changes and the potential impacts that it may have on your datacenter. It presented some of the design considerations and best practices to keep in mind if you are deploying or upgrading to Exchange 2007.

Dell PowerEdge Servers, Dell PowerVault Storage and Dell | EMC Storage provide a standards-based hardware platform for deploying Exchange Server 2007 messaging solutions. More information can be obtained at www.dell.com/exchange. Dell Services include assessment, design and implementation tailored for those messaging deployments. Dell also offers end-to-end Exchange messaging solutions that include partner offerings for security, archiving, backup and recovery. More information can be obtained at www.dell.com/secureexchange.

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