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OPTIMIZING MICROSOFT EXCHANGE SERVER 2010 DEPLOYMENTS ON DELL SERVERS AND STORAGE

Dell has created three architecture models for configuring Microsoft® Exchange Server 2010 messaging environments. These best-practice models combine the performance and efficiency enhancements of 11th-generation Dell™ PowerEdge™ servers and leading-edge Dell storage platforms with the productivity and manageability gains enabled by Exchange Server 2010—allowing enterprises to design cost-effective messaging platforms to meet their specific needs.

Microsoft Exchange Server 2010 offers a range of enhancements designed to dramatically advance user productivity and simplify manageability—including exceptional performance, large mailbox sizes, and built-in high-availability features. These enhancements also enable organizations to take advantage of recent technology advances that help increase the efficiency of Exchange messaging platforms and reduce the cost of deploying and supporting Exchange Server 2010.

As a starting point, Dell has created three architecture models to help enterprises optimize the productivity and manageability benefits of Exchange Server 2010 messaging environments. These models offer administrators the flexibility to design their own Exchange Server 2010 platform deployments to meet specific organizational requirements. The configurations explored in this article are designed to leverage technology advances that enhance performance, power efficiency, memory capacity, availability, management, and data protection capabilities across a broad range of server and storage platforms, including 11th-generation Dell PowerEdge servers, Dell EqualLogic™ PS Series Internet SCSI (iSCSI) storage area network (SAN) arrays, Dell/EMC CX4 Series SAN arrays, and Dell PowerVault™ direct attach storage (DAS). By deploying Exchange Server 2010 on 11th-generation PowerEdge

servers and Dell storage systems, IT organizations can cost-effectively address a comprehensive range of messaging requirements while dramatically increasing user productivity and management efficiency.

BOOSTING PRODUCTIVITY AND MANAGEABILITY

Key features in Microsoft Exchange Server 2010 designed to enhance user productivity and manageability include the following:

- **Massive reduction in disk I/O:** Previous releases of Exchange often generated large amounts of disk I/O, which could limit storage options and hamper user productivity. Exchange Server 2010 enables dramatic reductions in disk I/O compared with previous versions, providing enhanced user productivity, flexibility, and cost-efficiency in storage options. For example, organizations now may elect to use Serial ATA (SATA) drives and nearline Serial Attached SCSI (SAS) drives instead of having to rely on more expensive SAS or Fibre Channel drives.
- **Increased mailbox sizes:** Traditionally, end users have had to spend significant amounts of time managing e-mail because of mailbox size limits. Exchange Server 2010 supports expanded 10 GB mailboxes, which can enhance user productivity by

reducing the time spent managing and searching e-mail. Also, increased mailbox sizes combined with performance enhancements such as reduced disk I/O enable mailboxes to be stored on large, cost-effective storage arrays.

- Built-in high-availability and disaster recovery features:** Exchange Server 2010 offers several high-availability and disaster recovery features. Built-in storage replication, for example, allows up to 16 copies of the Exchange database to be automatically distributed, kept up-to-date, and recovered in the event of a disaster. These built-in features offer organizations a simple option for helping ensure application uptime.
- Native archiving:** The proliferation of .pst files has emerged as a huge challenge to meeting data protection and compliance demands. Exchange Server 2010 offers advanced archiving and compliance capabilities that, when combined with large mailbox sizes, help organizations to ensure data protection and compliance without the use of these files.

Additionally, 11th-generation Dell PowerEdge servers and Dell storage—including Dell EqualLogic PS Series iSCSI SAN arrays, Dell/EMC CX4 Series SAN arrays, and Dell PowerVault DAS systems—provide significant performance and efficiency enhancements that help organizations take advantage of Exchange capabilities while optimizing the efficiency and cost-effectiveness of their messaging database infrastructures. U.S. ENERGY STAR-certified 11th-generation PowerEdge servers are designed to offer significantly greater power efficiency than 10th-generation PowerEdge servers; 11th-generation PowerEdge servers can also provide up to triple the processing power of 9th-generation PowerEdge servers.¹ Enhancements in EqualLogic arrays include advanced management and protection software incorporated into the arrays at no additional cost, as well

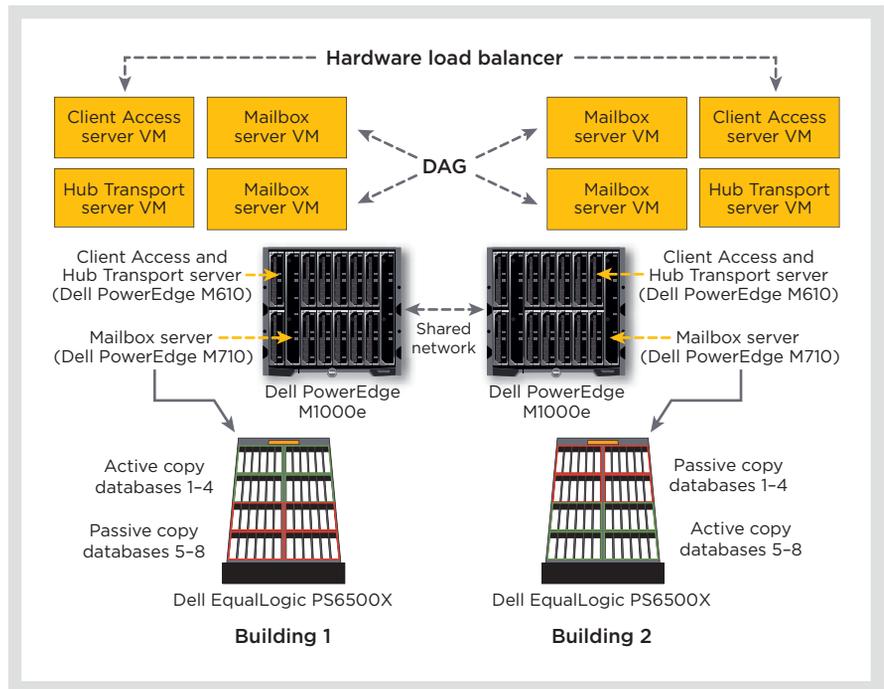


Figure 1. Agile consolidated model: 10,000-mailbox Exchange Server 2010 reference architecture

as native Microsoft Exchange Volume Shadow Copy Service (VSS) integration for advanced data protection.

CONFIGURING EXCHANGE SERVER 2010

To help organizations design a Microsoft Exchange Server 2010 infrastructure that is well suited to their size and needs, Dell has created three architecture models that utilize recent advances in Dell server and storage technology to help simplify Exchange messaging environments. Each architecture model is designed to meet general requirements for Exchange platforms ranging from small and branch office deployments to large, enterprise-scale environments. These three architecture models provide a basic framework to help organizations design their own environments; IT managers can use the online Dell Exchange 2010 Advisor tool with its Web browser-based interface to assess size and capability needs and create a custom solution to meet specific organizational requirements.

Agile consolidated model

For large organizations primarily interested in enhancing efficiency and reducing costs through consolidation and standardization, Dell offers the agile consolidated model. By leveraging centralization, virtualization, and storage-based snapshots, this model is designed for robust, efficient, high-performing, and highly available and recoverable Exchange Server 2010 deployments. In particular, the agile consolidated model combines 11th-generation Dell PowerEdge rack and blade servers and Dell EqualLogic PS Series iSCSI SANs or Dell/EMC CX4 Series SANs with virtualization to enhance resource utilization, efficiency, and manageability.

To illustrate a typical Exchange deployment based on the agile consolidated model, Dell created a reference architecture designed to support a 10,000-mailbox campus Exchange Server 2010 environment (see Figure 1). If campus redundancy is not desired, a single blade enclosure and Hub Transport/Client Access blade can be used.

¹Based on SPECintp_rate2006 benchmark tests performed by Dell Labs in June 2009 on a Dell PowerEdge R710 server with two quad-core Intel Xeon X5570 processors at 2.93 GHz and 48 GB of RAM, compared against August 2007 tests performed on a Dell PowerEdge 2950 server with two quad-core Intel Xeon X5365 processors at 3.00 GHz and 16 GB of RAM. For complete details, visit www.spec.org/cpu2006/results/rfp2006.html.

In Exchange Server 2010, server failover clustering is replaced with database availability groups (DAGs), which allows for more rapid failover than in previous versions with no need for soft recovery or crash recovery. This feature provides two separate logical stores of data so that erroneous writes emanating from one server do not affect the data used by the other server. It can also provide for nondisruptive planned site failover and minimally disruptive unplanned site failover, again avoiding the soft recovery process.

This reference architecture assumes a 1 GB average mailbox size limit and 0.14 I/Os per second (IOPS) per user (approximately 160 messages per day), and includes DAGs. It consists of two PowerEdge M1000e modular blade enclosures housing a total of two PowerEdge M710 blade servers, each with two quad-core Intel® Xeon® 5500 series processors and 144 GB of RAM. Each server is configured with either Microsoft Hyper-V™ or VMware® ESX virtualization software, and hosts two virtual machines (VMs) with four virtual processors (vCPUs) and 64 GB of virtual RAM running Exchange Server 2010. By virtualizing the Exchange servers into VMs and running them on advanced storage, organizations can take advantage of advanced protection techniques such as hardware independence; replication of VMs; snapshots; clones; rapid recovery of operating systems, applications, and data; and other features provided by SAN and virtualization integration. If site failover is to be automatic, it is important to have a third building (not shown) hosting the witness server, and that the connection leading to the third building be well isolated from the connection going to the second building.

Each site also houses one PowerEdge M610 blade server, configured with two quad-core Intel Xeon 5500 series processors, 48 GB of RAM, and either Microsoft Hyper-V or VMware ESX virtualization software. Each server hosts a Client Access VM with two vCPUs and 8 GB of virtual RAM as well as a Hub Transport VM with two vCPUs and 12 GB of virtual RAM.

For storage, the reference architecture utilizes two EqualLogic PS6500X iSCSI SANs. Each SAN includes forty-eight 600 GB, 10,000 rpm SAS drives in a RAID-50 configuration, with four active and four passive database volumes per server, 1,250 mailboxes per database volume, and room for 25 percent growth in database size. The two arrays allow comprehensive redundancy (both logical and physical) using Exchange DAG replication, which provides automatic failover to the other server and array.

An Exchange infrastructure based on the agile consolidated model can enhance efficiency and cost-effectiveness in several ways. For example, by consolidating processing power and storage into reduced form factors—11th-generation PowerEdge blade servers are designed to offer the same processing power as comparable rack and tower servers in a condensed form factor, and EqualLogic PS6500X iSCSI SANs are designed to offer outstanding density, supporting up to forty-eight 3.5-inch hard drives in a 4U enclosure—organizations can significantly enhance data center space efficiency. Also, because 11th-generation PowerEdge blade servers are designed to consume significantly less power than 10th-generation PowerEdge servers, they enable organizations to enhance energy efficiency as well. The Dell EqualLogic PS Series arrays also come standard with a comprehensive suite of software including snapshots, clones, replication, and other integration tools for simple protection and management of the environment.

Simple distributed model

For organizations interested in simplicity and ease of management, Dell offers the simple distributed model. The model leverages the high-availability and disaster recovery features native to Exchange Server 2010 to help deliver robust, highly available Exchange environments in a simple, cost-effective manner. In particular, the simple distributed model utilizes all-in-one server and storage “bricks” that can be combined to cost-effectively deliver performance and high availability. A brick can be either a single storage-dense rack server such as the Dell PowerEdge R510, or a rack server with DAS such as the Dell PowerVault MD1200 enclosure.

To illustrate a typical deployment based on the simple distributed model, Dell created a reference architecture designed to support a 10,000-mailbox Exchange Server 2010 environment with three DAGs (see Figure 2). This reference architecture assumes a 2 GB average mailbox size limit and 0.1 IOPS per user (approximately 100 messages per day). It consists of six PowerEdge R510 servers, each with two quad-core Intel Xeon 5500 series processors, 48 GB of RAM, and two internal 146 GB, 10,000 rpm, 2.5-inch SAS drives (in a FlexBay drive cage) in a RAID-1 configuration running the Microsoft Windows Server® 2008 R2 OS. Each server is configured with Mailbox, Client Access, and Hub Transport server roles (see Figure 2).

For the Exchange database and logs, each server contains 12 internal 2 TB, 7,200 rpm, 3.5-inch nearline SAS drives.

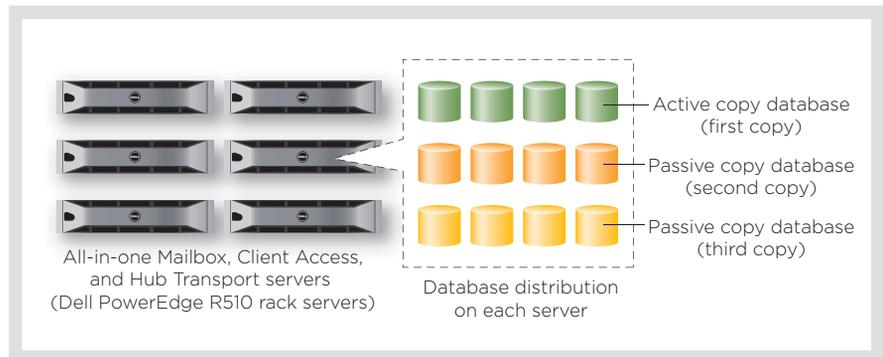


Figure 2. Simple distributed model: 10,000-mailbox Exchange Server 2010 reference architecture

One database is deployed on each disk, with 24 active databases and 48 passive databases deployed across the 72 disks. Each database has three copies, with each copy on a different server. Twelve databases reside on each server; the database and logs are combined on each disk. This configuration allows for 420 mailboxes per database, with a 2 GB capacity per mailbox and 36 percent estimated storage capacity available for growth.

By taking advantage of the high-availability features built into Exchange Server 2010, the simple distributed model provides extremely robust availability and failover capabilities with minimal management overhead. Also, by utilizing all-in-one server and storage bricks, the simple distributed model allows organizations to take advantage of the enhanced density of the PowerEdge R510 rack server or the scalability of using PowerEdge R710 rack servers combined with one or more PowerVault MD1200 storage arrays. The PowerVault MD1200 has twelve 3.5-inch SAS drives in a 2U chassis, with the option to daisy-chain multiple arrays together.

Small and branch office model

For small and midsize organizations, Dell offers the small and branch office model. This model leverages individual tower or rack servers such as the Dell PowerEdge T610 to help provide reliable, fully redundant Exchange Server 2010 environments for Mailbox, Client Access (hardware-based IP load balancing assumed), and Hub Transport server roles. This redundancy enhances cost-effective data protection in Exchange Server 2010 when compared with previous versions of the Exchange messaging platform.

To illustrate a typical deployment based on the small and branch office model, Dell created a reference architecture designed to support a 1,000-mailbox Exchange Server 2010 environment (see Figure 3). This reference architecture assumes a 1 GB average mailbox size limit and 0.14 IOPS per user (approximately 160 messages per day). It consists of

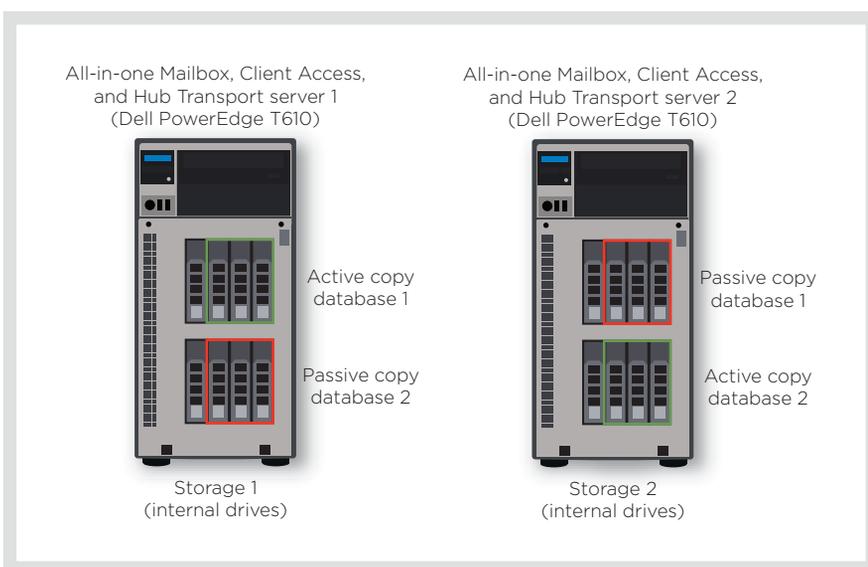


Figure 3. Small and branch office model: 1,000-mailbox Exchange Server 2010 reference architecture

two PowerEdge T610 tower servers, each configured with two dual-core Intel Xeon 5500 series processors, 24 GB of RAM, and Windows Server 2008 R2. Each all-in-one server hosts the Exchange Server 2010 Mailbox, Client Access, and Hub Transport server roles.

For storage, each PowerEdge T610 server contains two internal 3.5-inch hard drives in a RAID-1 configuration for the OS, and six internal 3.5-inch hard drives for database and log storage. Each disk is a 600 GB, 10,000 rpm SAS drive with two sets in a RAID-5 configuration and with one active and one passive database per server, three database and log disks, 500 mailboxes per database volume, and a 25 percent estimated capacity for growth.

UNLOCKING THE POWER OF EXCHANGE SERVER 2010

The productivity and manageability features in Microsoft Exchange Server 2010, together with performance and efficiency advances in Dell servers and storage, offer enhanced value to end users and administrators alike. The three reference architectures explored in this article together with the Dell Exchange 2010 Advisor tool offer a starting point to help enterprises transition successfully to

Exchange Server 2010. By building on best-practice configurations using 11th-generation Dell PowerEdge servers, Dell EqualLogic PS Series iSCSI SANs, Dell/EMC CX4 Series SANs, and Dell PowerVault DAS systems, administrators can tailor their messaging infrastructures to meet specific size and organizational requirements—helping to cost-effectively streamline management while enhancing overall enterprise efficiency and boosting user productivity. [u](#)

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