

# **Exchange 2010 on Dell: Two Architecture Models for Improving User Productivity on a More Cost-Efficient Infrastructure**

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Dell White Paper

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## 1 Introduction

Dell's approach to Exchange 2010 offers many potential benefits for organizations running enterprise class messaging systems. Microsoft introduced new features in Exchange 2010 that can enhance productivity, but that can also take advantage of Dell's innovative hardware portfolio to provide a more cost-effective infrastructure for enterprise messaging. However, that infrastructure must be specifically designed to take advantage of new efficiencies in Dell's server and storage platforms, and the new features and capabilities introduced in Exchange 2010, to allow an organization to get the most out of the synergy of the two. Dell allows any organization to take advantage of our broad server and storage portfolio by offering two basic architecture models on which to base its Exchange 2010 designs and realize all the advantages the hardware and software have to offer.

## 2 Improvements in Exchange 2010

Many high-level changes occurred in Exchange 2010 that offer significant improvements over Exchange 2007, and more dramatically, Exchange 2003. A more comprehensive list of the new features is out of scope for this paper but available here (<http://www.microsoft.com/exchange/2010/en/us/overview.aspx>). The following is a shorter list of some of the most beneficial features:

- **90% reduction of user disk IO:** Lower-cost, larger near-line SAS and SATA disks are an option giving opportunity for storage consolidation and large mailboxes
- **DAG (Database Availability Group):** Provides native HA and DR features that increase Exchange uptime without complex, clunky, or expensive on-premise third party solutions. The DAG allows up to 16 replicas to exist for each mail database. A separate server node owns each copy in the DAG for a 1:1 ratio of database replicas to servers. Of the potential 16 replicas, they may be used as HA or DR copies. HA copies assume automatic failover, up to date copies that are typically local to users. DR copies assume off-site and/or time-lagged copies desired to become active only in a disaster scenario.
- **Support for 10GB mailboxes:** Database performance improvements along with the aforementioned reduction in disk IO makes 10 GB mailboxes a reality without manageability, cost, and performance concerns present in Exchange 2007 and especially Exchange 2003. Larger mailboxes also allow users to be more productive by removing the amount of time managing and searching for email due to quota restrictions
- **Native archive features:** New personal archiving capabilities, though more limited in terms of advanced compliance requirements, combined with support for larger mailboxes allow for the cost effective elimination of PST files to be a reality.
- **Enhanced mobility and anywhere access capabilities:** Collectively, they let users be more productive and give more flexible client issues.
- **Exchange voice mail improvements:** Legacy voice mail systems often have expensive maintenance contracts and require proprietary systems operations and management processes. Users benefit from integrating voice mail and email with features such as voice to text previews.

## 3 Benefits of Dell 11G Servers and Storage

Dell introduced many new benefits and efficiencies in some of its server and storage products in the last few months and years. Dell 11G servers are a great leap forward in overall performance and efficiency than previous generation servers:

- 40% greater power efficiency over 10G servers and industries first Energy Star certified servers; potentially saves \$1000's/ year in energy costs

- Three times greater processing power over 9G servers<sup>1</sup>
- Three times more memory capacity over 9G servers
- New R510 provides 8x3.5" drives in a 2u, 2s rack server. An expanded version is coming soon in the same 2u chassis.
- 11G blade servers offer the same processing power as rack and tower servers in a condensed, more efficient package.

Dell EqualLogic storage has set new standards in manageability, ease of use and performance:

- Advanced management and protection software included at no charge in array purchase
- Native Microsoft Exchange VSS integration for data protection
- Reduces complexity in deployment, management and expansion of SAN storage
- The EqualLogic PS6500 is one of the densest storage solutions on the market today, cramming 48x3.5" HDD's into a 4u enclosure.

Dell PowerVault storage arrays provide cost-effective storage that scales in performance or capacity for any size Exchange server

- MD1000 today provides 15x3.5" SAS/SATA/NL SAS drives in a 3u chassis
- Up to 12 arrays/180 drives attached to a server
- Upcoming model provides even more storage density and 6Gb SAS
- Support for 2TB near-line SAS drives coming soon. Near-line SAS drives are offered at SATA capacities and cost with some additional performance.

## 4 Dell's Exchange 2010 Architecture Models

How do you design an Exchange 2010 architecture that takes advantage of the software and hardware to produce the biggest payoffs in user productivity and infrastructure efficiency? With all of the options available from server-form factors, storage choices, virtualization, and number of replicas/copies in a DAG for HA and DR there could be dozens of ways to design an Exchange infrastructure. Dell has developed two basic architecture models to squeeze the most value out of a deployment. Within these two models, different requirements and design goals are considered. The following sections look at these models at a high level to help you understand the characteristics and differences.

### 4.1 Agile Consolidated Model

This architecture fits Exchange 2010 into what Dell calls the dynamic data center. It assumes that the organization values server and storage consolidation and standardization over building unique infrastructures for each application. In addition, this model enables virtualization to play a big role in contributing to consolidation and also the deployment flexibility that comes with abstracting the application and OS from the hardware infrastructure. Dell SAN products, including EqualLogic PS arrays and Dell/EMC CX4 and AX4 arrays, provide the storage foundation for this model.

### 4.2 Simple Distributed Model

This architecture model's goal is to design a server and storage infrastructure optimized and tuned to provide Exchange 2010 in the simplest, most highly available, and cost-effective manner. For the sake of simplicity and cost, the majority of Exchange servers can be built using server and storage 'bricks';

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<sup>1</sup> Based on the SPECfp\_rate2006 benchmark tests performed by Dell Labs in July 2009 on the PowerEdge R710 and October 2007 on the PowerEdge 2950 published on <http://www.spec.org> as of September 16, 2009. For the latest SPECfp benchmark results, visit <http://www.spec.org/cpu2006>. SPEC® and the benchmark name SPECfp® are registered trademarks of the Standard Performance Evaluation Corporation.

which are defined as either a single storage dense rack server (like the R510) or a rack server with direct attached storage (like Dell's PoweVault MD1000). This model takes advantage of the new DAG to distribute at least three copies of every mail database across these low-cost 'bricks', providing simple, cost-effective high availability.. The DAG provides automatic failover in case of server or storage failures.

Table 1 provides a quick look at some of the features and design goals of each model.

**Table 1. Features and Designs of Dell's Exchange 2010 Architecture Models**

	<b>Agile Consolidated Model</b>	<b>Simple Distributed Model</b>
<b>Virtualization</b>	Recommended: to take advantage of further consolidation and agility of deploying and managing Exchange VM's	Not recommended: could add additional cost and complexity without reaping benefits.
<b>Server form factors</b>	Two-socket and four-socket M-series (blade) or R-series (rack) servers: blade servers offer a lot of potential in saving space and power costs. Four-socket servers provide a lot of resources for virtualization hosts.	Typically two-socket rack servers only; especially the storage dense PowerEdge R510:  With the R510 you can eliminate external storage requirements altogether for Exchange databases and logs.
<b>Storage platforms</b>	Dell EqualLogic PS series or Dell  EMC CX/AX4 arrays: SAN platforms offer storage consolidation, mobility for virtual implementations, and advanced features for managing and protecting data.	Server internal storage (in the case of the R510) or MD1000:  Using DAS or eliminating external storage altogether offers savings and simplicity.
<b>High Availability</b>	Should use two DAG copies/server nodes of each database to provide HA at server/application and data/storage layers.	Requires at least three DAG copies to provide HA at server/application and data/storage layers. Having three copies allows for full double failures and the ability to avoid the costs and inefficiencies of RAID 10 and RAID 5.
<b>RAID</b>	Recommend RAID 10 or in some cases RAID 5 works as well.	Having three HA copies and servers for every database allows an effectively RAID-less configuration. This is accomplished by using RAID 0 to make a LUN out of one, or a few disks at a time. This avoids the performance and capacity penalties of RAID and enables failover at the database level vs. an entire server, should only one disk fail. Distributing Exchange data over three copies and servers provides effective application layer RAID.
<b>Disaster Recovery</b>	Potential to add more DAG copies that are time lagged for data protection, at remote sites, or both.	Potential to add more DAG copies that are time lagged for data protection, at remote sites or both.

In addition to these two models aimed at more enterprise-level customers and data centers, a third model is also available for small and branch offices. This model provides full functionality and 100 percent redundancy in two tower or rack form factor servers. Using two servers with internal storage only and two DAG copies of the databases, Exchange 2010 can be deployed reliably and cost effectively for up to a thousand or more mailboxes.

## 5 Conclusion

Microsoft delivered on making enhancements to Exchange 2010 that bring real value. To what extent any given organization takes advantage of these potential benefits depends greatly on the underlying server and storage architecture. Realizing that not all organizations have the same goals and design requirements, Dell has taken advantage of our broad server and storage portfolio as well as internal Exchange expertise and Exchange 2010 TAP membership to develop two basic architecture models through which any organization can maximize their payoff of an Exchange 2010 deployment. Call your Dell sales representative or visit <http://www.dell.com/> today to learn more about how Dell can assist in your design and deployment of Exchange 2010.