

# HP recommended configuration for Microsoft Exchange Server 2010: ProLiant BL460c G6 supporting 4000 – 2GB mailboxes

Technical white paper

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## Executive summary

With the release of Microsoft® Exchange Server 2010 (Exchange 2010) there are many new design features and configuration options to consider. To better understand how to deploy these new features with HP servers and storage, HP has developed a series of recommended configurations. The recommended configurations provide sizing guidance and deployment options to support the new Exchange 2010 solutions. The configurations described in this guide are meant to assist you in designing solutions that address your email business requirements.

The recommended configurations provide several design options following HP's tiered solutions matrix for Microsoft Exchange 2010. The tiered solution matrix provides recommended configurations that have been designed to support various service levels requirements. The service level requirements range from supporting basic mailbox services to deploying highly available solutions.

This recommended configuration white paper details solutions based on two of the tiered solutions levels, the gold and platinum tiers, and incorporates server and storage guidelines to support the new availability features of Exchange 2010.

The recommended configuration has been sized to support 4000 users, with 2GB mailboxes, hosted on HP ProLiant BL460c G6 server blades. The recommended configurations provide three different storage hardware options. Two of the options feature the HP StorageWorks 600 Modular Disk System (MDS600) configured with either Midline Serial ATA (MDL-SATA) or Serial Attached SCSI (SAS) disk. The third option features the HP StorageWorks 4400 Enterprise Virtual Array (EVA4400). These configurations provide ideal hardware solutions to support the new Exchange Server 2010 availability features. These solutions combine the flexibility and scalability of the HP BladeSystem along with the HP StorageWorks portfolio, ranging from lower cost SATA and SAS configurations to highly available, centralized Fibre Channel (FC) Storage Area Networks (SAN).

**Target audience:** The information contained in this white paper is intended for solutions architects, engineers, and project managers involved in the planning and design of Microsoft Exchange Server 2010 solutions. The reader should be familiar with Exchange Server 2010 terminology and best practices. For additional Exchange Server best practices go to: [www.hp.com/solutions/activeanswers/exchange](http://www.hp.com/solutions/activeanswers/exchange).

This white paper describes sizing performed in September 2009 on the pre-released version of Exchange Server 2010 and is subject to change.

## Introduction

The recommended configurations described in this document provide server and storage sizing details to assist you in planning and budgeting for your Exchange 2010 hardware deployments. Details in this recommended configuration provide server and storage requirements to support 4000 mailboxes using the new Exchange 2010 Database Availability Group (DAG) availability feature. The DAG replication model supports both (unplanned) failovers and (administrator initiated) switchovers at the database level, unlike CCR (Cluster Continuous Replication) which requires the entire server to be failed over. The DAG concept also integrates the SCR (Standby Continuous Replication) multi-server database replication process but enhances it with the new active manager component. The active manager monitors all of the active databases within a DAG and in the event of a database failure, determines which of the database copies to make the active copy. The DAG availability feature also supports combining the Hub Transport (HT) and Client Access Server (CAS) roles on to the Mailbox server. Unlike CCR which supports only the mailbox role, the DAG configuration removes the cluster limitations and allows multi-role configurations.

In addition to the new replication model, Microsoft has made significant improvements in Exchange 2010 database disk I/O. Some of the key improvements in the Extensible Storage Engine (ESE) database include moving from bursty smaller data I/O patterns in Exchange 2007 to larger less frequent data I/O transfers in Exchange 2010. The database page size has also been increased to improve database cache read performance along with more sequential database writes. These new database I/O changes allow for new storage configurations to be supported which were generally not feasible in Exchange 2007. These new storage configurations are targeted at reducing the overall storage costs; however it is important to match the storage configuration with the appropriate availability and service level options.

The recommended configurations follow the tiered solution matrix which matches server and storage configuration options with different levels of availability in Exchange 2010 to meet different service level requirements. Solutions provided in this recommended configuration document will detail RAID based storage solutions, and where appropriate RAID-less Just a Bunch Of Disks (JBOD) configurations.

## Tiered solution matrix

HP has developed the tiered solutions matrix for Exchange to provide guidance on building Exchange 2010 solutions to meet different Exchange service levels and business requirements. Solutions range from basic mailbox services on HP's entry level server and storage platforms to highly available configurations, built with HP's enterprise server and storage platforms. The HP tiered solutions matrix matches server and storage hardware components and configurations along with the appropriate Exchange 2010 availability features for each of the given tiers. There are four tiers in the matrix: bronze, silver, gold and platinum. These tiers provide guidance in matching different mailbox service levels with appropriate HP server and storage configurations.

The bronze tier is designed for deployments where cost is a driving factor. This tier provides basic services without the additional cost of high availability and is targeted towards smaller, cost-sensitive deployments. The bronze tier uses an all-in-one approach by combining each of the primary Exchange roles Mailbox (MB), Hub Transport (HT) and the Client Access Server (CAS) on to a single server. The silver tier is targeted towards smaller environments supporting sensitive users with limited IT budgets. For increased availability, the silver tier provides support for database replication using DAGs, but limits costs by combining the Exchange roles using the all-in-one approach with two servers. The gold tier is targeted towards a wide range of customer scenarios from small to large organizations needing a high level of data protection and availability for their important users. This tier expands the servers and storage high availability options along with dedicated Exchange server

roles. The highest level in the tiered solutions matrix is the platinum tier which is targeted towards enterprise deployments requiring the highest levels of data protection for their most critical users. The Platinum tier builds on the gold tier offering additional database copies and new storage options including RAID-less JBOD<sup>1</sup> with enterprise server and storage hardware with Exchange's high availability features.

Table 1 lists the details of each of the different tiers of service.

**Table 1.** Tiers of service

Tiers of service	Data Availability Group	Database copies	Combined Exchange roles	Disk types	Storage type	Combined LOG and Database LUN
Bronze	No	1	MB/HT/CAS	SAS/MDL-SATA	RAID	No
Silver	Yes	2	MB/HT/CAS	SAS/MDL-SATA	RAID	No
Gold	Yes	2	Dedicated	FC/SAS/MDL-SATA	RAID	No
Platinum	Yes	3	Dedicated	FC/ SAS/MDL-SATA	RAID/ JBOD	YES/JBOD

### Solution criteria

The recommended configurations have been sized using the ProLiant BL460c G6 server blades coupled with the MDS600 for direct attached configurations and the EVA4400 for SAN configurations. The recommended configurations are detailed using gold and platinum tiered solutions.

The gold tier configuration has been sized to provide high availability within a single site, by providing two copies of the databases in a single DAG. The platinum tier builds on the gold tier by adding database copies and support for JBOD storage configurations. The solution has been sized to support 4000 users with a 2GB mailbox and an Exchange 2010 heavy usage profile<sup>2</sup>.

The gold tier server configuration (2 database copies)

- 2 dedicated Mailbox servers
- 2 dedicated Hub Transport servers
- 2 dedicated Client Access Servers

The platinum tier server configurations (3 database copies)

- 3 dedicated Mailbox servers
- 2 dedicated Hub Transport servers
- 2 dedicated Client Access Servers

The HP ProLiant BL460c G6 server blade, pictured in figure 1, features the Intel® Xeon® 5500 series processors with the QuickPath Interconnect. The BL460c G6 features a new power regulator which provides an operating system-independent power management feature for server power consumption and system performance to meet critical business needs. For more information on the BL460c G6 go to <http://www.hp.com/servers/bl460c>.

<sup>1</sup> Minimum of 3 database copies are recommended when using RAID-less JBOD configurations

<sup>2</sup> For more information on usage profiles go to [http://technet.microsoft.com/en-us/library/dd346699\(EXCHG.140\).aspx](http://technet.microsoft.com/en-us/library/dd346699(EXCHG.140).aspx)

**Figure 1.** HP ProLiant BL460c G6 server blade



Table 2 provides sizing details for each of the Exchange 2010 roles deployed using the BL460c G6 server blade.

**Table 2.** Server configuration

Exchange roles	Memory	Processor configuration	Processor model	GHz
Dedicated Mailbox Server	24 GB	Two quad-core	Intel Xeon E5530	2.4GHz 80W/8M
Dedicated HT Server	8GB	One quad-core	Intel Xeon E5530	2.4GHz 80W/8M
Dedicated CAS Server	8GB	One quad-core	Intel Xeon E5530	2.4GHz 80W/8M

The storage configuration for the Mailbox servers has been sized with four configuration options:

- SATA using the MDS600 with RAID fault tolerance
- SATA using the MDS600 with RAID-less JBOD
- SAS using the MDS600 with RAID fault tolerance
- Fibre Channel using the EVA4400 with Virtual RAID (VRAID) fault tolerance

The recommended configurations provide details on hardware based RAID configurations using SATA, SAS and FC with array level fault tolerance, as well as, RAID-less configurations. The RAID-less configurations uses SATA disks in a JBOD and relies on the DAG for database level fault tolerance. Each JBOD is configured with a single database and its logs, if the disk fails the database and logs are then failed-over to another copy within the DAG. With fault tolerance at the database level, there should be a minimum of 3 database copies, to ensure adequate database redundancy. The SATA JBOD option is one of the platinum tier storage options.

The MDS600 pictured in figure 2, has been specifically designed to provide direct attached storage capabilities for the HP ProLiant server blades. It provides high density storage, capable of supporting up to 70 LFF SAS or SATA disks in just 5U of rack space. With the direct attached capabilities, disks can be zoned and assigned to individual blade servers, allowing the disks to appear as local storage to the server.

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**Figure 2.** HP StorageWorks 600 Modular Disk System



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The EVA4400 pictured in figure 3, offers an easily deployed enterprise class virtual storage array for midsized customers at an affordable price. With built in virtualization, it is designed to improve capacity utilization and be easy to manage, which lowers the cost of ownership compared to traditional arrays. The EVA4400 has high performance, scales easily, and is highly reliable and available.

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**Figure 3.** HP StorageWorks 4400 Enterprise Virtual Array



The Mailbox server disk configuration requirements for each of the storage configuration options, including SATA, SAS and FC, are listed in table 3. Sizing details include the disk type, capacity and the number of disks needed for each Mailbox server. Sizing recommendations provide the minimum number of disks needed to support the 4000 users in terms of both their performance and capacity requirements.

**Table 3.** Disk configuration storage options (per Mailbox server)

Storage option	Database RAID type	Disk type	Capacity	Number Database disks	Number Logs disks	Number restore disks
DAS SATA	JBOD	MDL-SATA LFF 7.2K	1TB	28 combined DB /LOGs	n/a	1
DAS SATA	RAID10	MDL-SATA LFF 7.2K	1TB	38	4	4
DAS SAS	RAID5	SAS LFF 15K	450GB	40	4	10
SAN FC	VRAID5	FC 15K	600GB	32	8 <sup>3</sup>	8

<sup>3</sup> Minimum disks per EVA disk group

# Recommended configuration

## Hardware Mailbox servers

- Three BL460c G6 servers for the platinum or two for the gold tier
- Two Intel Xeon E5530 processors per server
- 24 gigabytes system memory (DDR3 registered DIMMs) per server
- Two 146GB internal disks per server
- Smart Array P410i storage controller with 256MB BBWC option kit per server
- Smart Array P700m/512 (used to connect to the MDS600) or Fibre Channel host bus adapter (used to connect to the EVA4400) per server

## Hardware HT servers

- Two BL460c G6 servers
- One Intel Xeon E5530 processor per server
- 8 gigabytes system memory (DDR3 registered DIMMs) per server
- P410i storage controller with 256MB BBWC option kit per server
- Two 146GB internal disks per server
- Smart Array P700m/512 (used to connect to the MDS600) or Fibre Channel host bus adapter (used to connect to the EVA4400) per server
- Two 450GB SAS disks for MDS600 configuration for Hub transport queues per server
- EVA4400 storage option, the hub transport queue can be configured with the existing Database disk group

## Hardware CAS servers

- Two BL460c G6 servers
- One Intel Xeon E5530 processor per server
- 8 gigabytes system memory (DDR3 registered DIMMs) per server
- P410i storage controller with 256MB BBWC option kit per server
- Two 146GB internal disks per server

## Hardware DAS SATA / JBOD option

- BladeSystem c3000 enclosure<sup>4</sup>
- Two 1/10Gb Virtual Connect Ethernet Modules
- Two StorageWorks 3Gb SAS BL Switches
- Two MDS600 disk enclosures for the platinum tier and one for the gold tier
- 29 1TB midline SATA disks 7.2K per server

## Hardware DAS SATA / RAID option

- BladeSystem c3000 enclosure
- Two 1/10Gb Virtual Connect Ethernet Modules
- Two StorageWorks 3Gb SAS BL Switches
- Two MDS600 disk enclosures for the platinum and gold tiers
- 46 1TB midline SATA disks 7.2K per server

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<sup>4</sup> Additional BladeSystem enclosures are required to isolate server configurations or when servers are to be located in different datacenters

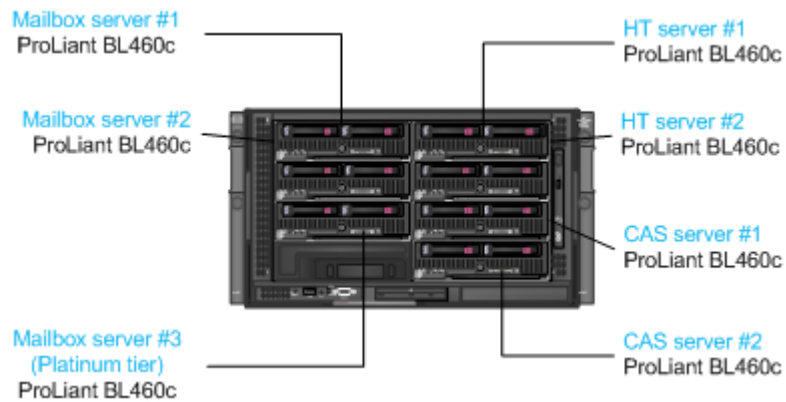
### Hardware DAS SAS / RAID option

- BladeSystem c3000 enclosure
- Two 1/10Gb Virtual Connect Ethernet Modules
- Two StorageWorks 3Gb SAS BL Switches
- Three MDS600 disk enclosures for the platinum tier and two for the gold tier
- 54 450GB SAS disks 15K per server

### Hardware SAN FC / VRAID configuration option

- BladeSystem c3000 enclosure
- Two 1/10Gb Virtual Connect Ethernet Modules
- Two 4Gb Virtual Connect Fibre Channel Modules
- Two EVA4400 storage arrays for the Platinum tier and one for the gold tier
- 48 600GB FC disks 15K per server

**Figure 4.** Example recommended configuration showing HP BladeSystem server roles



## Bill of materials

The following bill of materials lists the major server and storage hardware components needed for each of the recommended configurations, however this is not an exhaustive listing of all the necessary components needed to build the complete solutions. For complete configuration details, please contact your HP Reseller or HP Sales Representative.

**Table 4.** Bill of materials

Platinum Tier QTY	Gold Tier QTY	Description	Part Number
<b>Mailbox server configuration</b>			
3	2	ProLiant BL460c G6 CTO Blade	507864-B21
3	2	Intel Xeon Processor E5530 (2.40 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2) BL460c G6 Kit, FIO	507797-L21
3	2	(Second processor kit ) Intel Xeon Processor E5530 (2.40 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2) BL460c G6 Kit, FIO	507797-B21
18	12	HP 4GB 2Rx4 PC3-10600R-9 Kit	500658-B21
6	4	HP 146GB 3G SAS 10K SFF DP HDD	418367-B21
3	2	256 MB Cache Module	462968-B21
3	2	Battery Kit Upgrade (for BBWC)	462969-B21
3	2	HP Smart Array P700m Controller/512 (this option is used with the MDS600)	508226-B21
3	2	Battery Kit for P700m Smart Array Controller/512 (this option is used with MDS600)	452348-B21
3	2	Emulex LPe1 105 FC Dual Channel 4Gb, PCI-E-to-Fibre Channel Host Bus or QLogic QMH2462 4Gb FC HBA (use one of these options with EVA4400)	403621-B21 or 403619-B21
<b>HT server configuration</b>			
2	2	ProLiant BL460c G6 CTO Blade	507864-B21
2	2	Intel Xeon Processor E5530 (2.40 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2) BL460c G6 Kit, FIO	507797-L21
4	4	HP 4GB 2Rx4 PC3-10600R-9 Kit	500658-B21
4	4	HP 146GB 3G SAS 10K SFF DP HDD	418367-B21
2	2	256 MB Cache Module	462968-B21
2	2	Battery Kit Upgrade (for BBWC)	462969-B21
4	4	HP 450GB SAS 3.5" 15K DP HDD (this option is used with the MDS600)	454232-B21

Platinum Tier QTY	Gold Tier QTY	Description	Part Number
2	2	HP Smart Array P700m Controller/512 (this option is used with the MDS600)	508226-B21
2	2	Battery Kit for P700m Smart Array Controller/512 (this option is used with MDS600)	452348-B21
2	2	Emulex LPe1105 FC Dual Channel 4Gb, PCI-E-to-Fibre Channel Host Bus or QLogic QMH2462 4Gb FC HBA (use one of these options with EVA4400)	403621-B21 or 403619-B21
<b>CAS server configuration</b>			
2	2	ProLiant BL460c G6 CTO Blade	507864-B21
2	2	Intel Xeon Processor E5530 (2.40 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2) BL460c G6 Kit, FIO	507797-L21
4	4	HP 4GB 2Rx4 PC3-10600R-9 Kit	500658-B21
4	4	HP 146GB 3G SAS 10K SFF DP HDD	418367-B21
2	2	256 MB Cache Module	462968-B21
2	2	Battery Kit Upgrade (for BBWC)	462969-B21
<b>BladeSystem enclosure configuration</b>			
1	1	HP BladeSystem c3000 Rack Enclosure with 8 Insight Control Suite Licenses	508664-B21
2	2	HP 1/10Gb Virtual Connect Ethernet Module for c-Class BladeSystem	447047-B21
1	1	HP StorageWorks 3Gb SAS BL Switch - Dual Pack (this option is used to connect to MDS600)	AJ865A
2	2	HP 4Gb Virtual Connect Fibre Channel Module for c-Class BladeSystem (this option is used to connect to EVA4400)	409513-B21
<b>DAS SATA with JBOD storage configuration option</b>			
2	1	HP MDS600 with two Dual Port I/O Module System	AJ866A
87	58	HP 1TB 3G SATA 7.2K 3.5" MDL HDD	454146-B21
<b>DAS SATA with RAID storage configuration option</b>			
2	2	HP MDS600 with two Dual Port I/O Module System	AJ866A
138	92	HP 1TB 3G SATA 7.2K 3.5" MDL HDD	454146-B21
<b>DAS SAS with RAID storage configuration option</b>			
3	2	HP MDS600 with two Dual Port I/O Module System	AJ866A
162	108	HP 450GB SAS 3.5" 15K DP HDD	454232-B21

Platinum Tier QTY	Gold Tier QTY	Description	Part Number
<b>SAN FC with VRAID storage configuration option</b>			
2	1	HP StorageWorks 4400 Dual Controller Enterprise Virtual Array	AG637B
12	8	HP StorageWorks M6412A Fibre Channel Drive Enclosure	AG638B
144	96	HP EVA M6412A 600GB 15K 4Gb Fibre Channel Dual Port Hard Disk Drive	AJ872B

## Implementing a proof-of-concept

As a matter of best practice for all deployments, HP recommends implementing a proof-of-concept using a test environment that matches as closely as possible the planned production environment. In this way, appropriate performance and scalability characterizations can be obtained. For help with a proof-of-concept, contact an HP Services representative (<http://www.hp.com/large/contact/enterprise/index.html>) or your HP partner.

## For more information

For more information on planning, deploying, or managing Microsoft Exchange Server on HP ProLiant servers and HP storage see:

[www.hp.com/solutions/exchange](http://www.hp.com/solutions/exchange)

For HP ActiveAnswers sizing tools and best practices on Microsoft Exchange Server see:

[www.hp.com/solutions/activeanswers/exchange](http://www.hp.com/solutions/activeanswers/exchange)

For more information on HP ProLiant servers see:

[www.hp.com/go/proliant](http://www.hp.com/go/proliant)

For more information on HP storage solutions see:

[www.hp.com/go/storage](http://www.hp.com/go/storage)

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