Principled Technologies®

Exchange comparison: Dell PowerEdge R710 vs. HP ProLiant DL380 G6

Test report commissioned by Dell Inc. December 2009

Executive summary

We compared a Dell™ PowerEdge™ R710 server to an HP ProLiant DL380 G6 server, both running Microsoft Windows Server® 2008 SP2 and Microsoft® Exchange Server 2007 SP2. Specifically, we tested nearly identical server configurations with internal storage only, running Microsoft Exchange Load Generator (LoadGen) to determine the average throughput of each system in messages per second.

With these configurations, the Dell PowerEdge R710 server delivered 13.5 percent better price-performance than the HP ProLiant DL380 G6 server. (See Figure 1.)

Dell PowerEdge R710 server

HP DL380 G6 server

With similar workload performance

Dell delivered 13.5% better price-performance than HP.

Figure 1: The Dell PowerEdge R710 server delivers a 13.5 percent price-performance advantage.

LoadGen is a simulation tool, which measures the impact of various clients (MAPI, OWA, IMAP, POP, and SMTP) on Exchange servers. The simulator sends multiple message requests to the server running Exchange, resulting in a mail load. For more details about LoadGen, see http://www.microsoft.com/downloads/details.aspx?familyid=ddec1642-f6e3-4d66-a82f-8d3062c6fa98&displaylang=en.

We created a custom workload of 10,000 users distributed across 10 storage groups with one mailbox database of 1,000 users per storage group. We used a single client machine running LoadGen in stress mode, issuing Exchange SendMail requests to the server. The mailbox database that LoadGen created was approximately 40GB in size. To verify acceptable performance, we ran the LoadGen for 30 minutes, and obtained the messages per second throughput in each case.

What we found

Figure 2 shows each server's throughput in messages per second for the three runs of the test. We show the median in bold print. In our testing, both servers delivered about the same performance in messages per second, well within the variance of this test on these systems.

Average throughput (messages per second)		
	Dell PowerEdge R710	**HP ProLiant DL380 G6**
Run 1	**19.2**	**19.5**
Run 2	21.3	18.6
Run 3	18.1	20.5

Figure 2: Throughput (messages per second) results for the Dell PowerEdge R710 server and the HP ProLiant DL380 G6 server. Higher numbers are better.

Figure 3 shows the price-performance comparison of the Dell PowerEdge R710 server to the HP ProLiant DL380 G6 server. To compute the price-performance for each server, we divided the server price by the number of messages per second of the median run, and obtained a figure in dollars per messages/sec. The price for the Dell PowerEdge R710 server as configured for this test was $11,268. The price for the HP ProLiant DL380 G6 as configured for this test was $13,224. The Dell server showed a better price-performance of $586.88 per message/second compared to the HP server, which showed a price-performance of $678.15 per message/second.
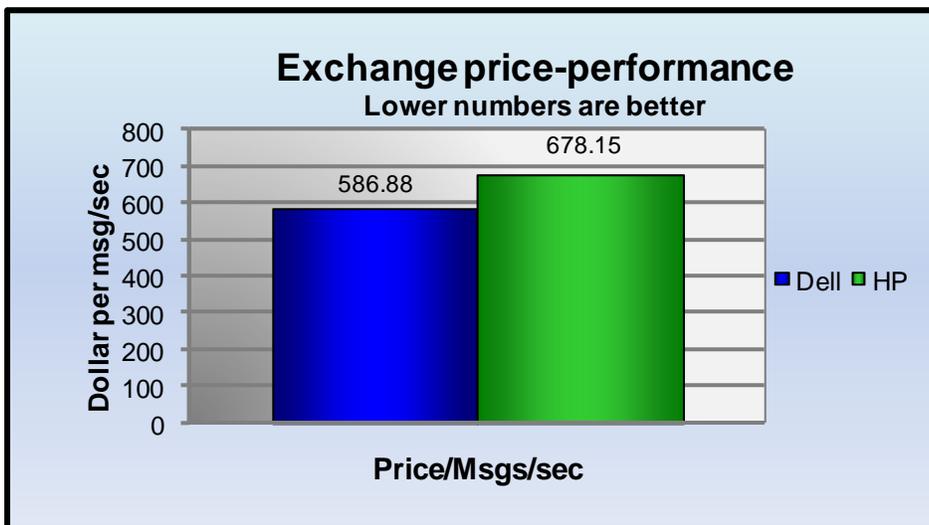

Figure 3: Exchange price-performance comparison of the Dell PowerEdge R710 server and the HP ProLiant DL380 G6 server. Lower numbers are better.

How we tested
Adjusting BIOS settings
We used the default BIOS settings on both the Dell PowerEdge R710 server and HP ProLiant DL380 G6 server, except that we disabled hardware prefetch and node interleaving on both systems.

Setting up and configuring the servers and storage
We installed eight internal drives in the Dell PowerEdge R710 and HP ProLiant DL380 G6 servers. We configured two of these drives as a RAID 1 array for the Microsoft Server 2008 SP2 installation on both systems. We configured the remaining six drives as a RAID 10 array for the mailbox databases and backup.

Setting up and configuring the OS
We performed the following steps on both the Dell PowerEdge R710 server and HP ProLiant DL380 G6 server to install the OS:

Installing Windows Server 2008 SP2
1. Insert the installation DVD for Windows Server 2008 SP2 into the DVD drive.
2. Choose the language, time and currency, and keyboard input. Click Next.
3. Click Install Now.
4. Choose Windows Server Enterprise (Full Installation). Click Next.
5. Accept the license terms, and click Next.
6. Click Custom.
7. Click the Disk, and click Drive options (advanced).
8. Click New, Apply, Format, and click Next.
9. After the installation completes, click OK to set the Administrator password.
10. Enter the administrator password twice, and click OK.

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11. Click Start, type `change power-saving settings` and press Enter.
12. Click Change plan settings.
13. Change the Turn off the display drop-down menu to Never.
14. Click Save changes, and close the Power Options, Screen Saver Settings, and Personalization windows.

Installing system updates in Windows Server 2008
We installed the following updates on the system using the Microsoft Windows Update feature:
- Update for Windows Server 2008 x64 Edition (KB968389)
- Update to .NET Framework 3.5 Service Pack 1 for the .NET Framework Assistant 1.0 x64 (KB963707)
- Update for Internet Explorer 8 for Windows Server 2008 x64 Edition (KB976749)
- Security Update for Jscript 5.8 for Windows Server 2008 x64 Edition (KB971961)
- Security Update for Windows Server 2008 x64 Edition (KB973565)
- Security Update for Windows Server 2008 x64 Edition (KB971657)
- Security Update for Jscript 5.7 for Windows Server 2008 x64 Edition (KB971961)
- Security Update for Windows Server 2008 x64 Edition (KB971486)
- Security Update for Windows Media Format Runtime 11 for Windows Server 2008 x64 Edition (KB954155)
- Microsoft .NET Framework 3.5 Service Pack 1 and .NET Framework 3.5 Family Update (KB951847) x64
- Microsoft .NET Framework 2.0 Service Pack 2 Security Update for Windows Vista Service Pack 2 and Windows Server 2008 Service Pack 2 for x64 based Systems (KB974470)
- Security Update for Windows Server 2008 x64 Edition (KB974571)
- Security Update for Windows Server 2008 x64 Edition (KB961501)
- Update for Windows Server 2008 x64 Edition (KB973687)
- Security Update for Windows Server 2008 x64 Edition (KB971557)
- Cumulative Security Update for ActiveX Killbits for Windows Server 2008 x64 Edition (KB973525)
- Windows Malicious Software Removal Tool x64 – November 2009 (KB890830)
- Security Update for Windows Server 2008 x64 Edition (KB975517)
- Security Update for Windows Server 2008 x64 Edition (KB969947)
- Security Update for Windows Server 2008 x64 Edition (KB967723)
- Security Update for Windows Server 2008 x64 Edition (KB975467)
- Internet Explorer 8 for Windows Server 2008 x64 Edition
- Security Update for Windows Server 2008 x64 Edition (KB961371)
- Update for Windows Server 2008 x64 Edition (KB976098)
- Security Update for Windows Server 2008 x64 Edition (KB956744)
- Security Update for Windows Server 2008 x64 Edition (KB970238)
- Cumulative Security Update for Internet Explorer 7 for Windows Server 2008 x64 Edition (KB974455)
- Security Update for Windows Server 2008 x64 Edition (KB973507)
- Windows Update Agent 7.4.7600.226

Installing the domain controller
1. Set a static IP address using the following steps:
   a. Right-click the network icon in the quick-launch bar, and choose Network and Sharing Center.
   b. Click Manage network connections.
   c. Right-click the local area connection, and choose Properties.
   d. Select Internet Protocol Version (TCP/IPv4), and click Properties.
   e. Select the Use the following IP address radio button and type `192.168.0.250` in the IP address field.
   f. Press Tab to auto-fill 255.255.255.0 in the Subnet mask field.
   g. In the Preferred DNS server field, type `127.0.0.1` and click OK to close the IPv4 properties window.
   h. Click Close.
2. Give the computer a name using the following steps:

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a. Click Start, right-click Computer, and select Properties.
b. Click Change Settings.
c. Click Change.
d. Type `mailserver` in the Computer name field, and click OK.
e. In the Computer Name/Domain Changes pop-up window, click OK.
f. Click OK.
g. In the Microsoft pop-up window, click Restart Now.
3. Promote the mailserver to domain controller by following these steps:
a. Select Start→Command Prompt.
b. Type `dcpromo`
c. At the Welcome pop-up window, click Next.
d. At the Operating System Compatibility screen, click Next.
e. At the Choose a Deployment Configuration screen, select the Create a new domain in a new forest radio button, and click Next.
f. At the Name the Forest Root Domain screen, type a domain name (`mailserver.com`), and click Next.
g. At the Set Forest Functional Level screen, choose Windows Server 2008 from the drop-down menu, and click Next.
h. At the Additional Domain Controller Options screen, accept the defaults, and click Next.
i. When the Static IP assignment window pops up, click Yes, the computer will use a dynamically assigned IP address.
j. When the Active Directory domain Services Installation Wizard window pops up, click Yes.
k. At the Location for Database, Log Files, and SYSVOL screen, leave defaults, and click Next.
l. At the Directory Services Restore Mode Administrator Password screen, enter a password, and click Next.
m. At the Summary screen, review the selections, and click Next.
n. When the installation software prompts you to do so, insert the OS CD, and click OK.
o. At the Completing the Active Directory Installation Wizard screen, click Finish.
p. When the system prompts you to reboot the server, click Restart Now.
q. After the server reboots, log into the system.

Installing Internet Information Services 6.0
1. Select Start→Administrative Tools→Server Manager.
2. Click Add Roles.
3. At the Select Server Roles screen, click Web Server (IIS).
4. In the pop up Add features required for Web Server (IIS) window, click Add Required Features.
5. Click Next.
6. At the Web Server (IIS) screen, click Next.
7. At the Select Role Services screen select the IIS 6 Metabase Compatibility, IIS 6 Management Console, Basic Authentication, Windows Authentication, Digest Authentication, and Dynamic content Compression checkboxes, and click Next.
8. At the Confirm Installation Selections screen, click Install.
9. At the Installation Results screen, click Close.

Installing Exchange Server 2007 SP2
1. Insert the Microsoft Exchange Server 2007 CD.
2. In the pop-up AutoPlay window, click Run Setup.EXE.
3. Steps 1 and 2 should already be completed and grayed out.
4. Click Step 3: Install Microsoft Windows PowerShell.
5. Select Start→Command Prompt.
6. In the Command Prompt window, type `ServerManagerCmd –I PowerShell` and press Enter.
7. When the installation completes, close the Command Prompt window.
8. Click the link to Step 4: Install Microsoft Exchange Server 2007 SP1.
9. Click Next to go past the introduction screen.
10. Accept the license agreement, and click Next.

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11. Select No for error reporting, and click Next.
12. Select Typical Exchange Server Installation, and click Next.
13. Leave the organization name at default (First Organization), and click Next.
14. Select No to the question about client computers running Outlook 2003 and earlier, and click Next.
15. If a warning about a lack of SMTP appears after the check finishes, ignore it.
16. Click Install to start the installation process.
17. Once installation is complete, click Finish. Exchange should automatically open the Exchange Management Console.

Configuring Exchange Server 2007 SP2

1. If Exchange does not automatically open the Exchange Management Console, select Start→All Programs→Microsoft Exchange Server 2007→Exchange Management Console.
2. In the left pane, expand Organization Configuration, and select Hub Transport.
3. In the action pane on the far right, select New Send Connector.
4. Name the send connector SMTP select the intended use as Internet, and click Next.
5. In the Address space window, click Add.
6. In the SMTP Address Space window, type * as the address, make sure Include all subdomains is checked, and click OK.
7. Click Next.
8. Accept defaults for the next two pages by clicking Next.
9. At the New Connector page, click New to create the connector.
10. Click Finish to close the New SMTP Send Connector wizard.
11. In the left pane of the Exchange Management Console window, expand Server Configuration, and select Mailbox.
12. In the Database Management tab, right-click First Storage Group, and select New Public Folder Database.
13. Name the new public folder database Public Folder Database and click New.
14. In the Completion page, click Finish to close the New Public Folder Database window.
15. Close the Exchange Management Console, and reboot the server.
16. Once the server successfully reboots, log in, and select Start→All Programs→Administrative Tools→Active Directory Users and Computers.
17. In the Active Directory Users and Computers window, select mailserver.com in the left pane, and open Users in the right pane.
18. Right-click a blank area in the Users folder, and select New→User.
19. In the New Object - User window, complete the name fields as you wish (we used first name: test, last name: tester, logon name: tester), and select Next.
20. Enter a secure password (we used Password1), and check Password never expires.
21. In the pop-up information window, click Accept.
22. Select Next to close the New Object – User window.
23. Double-click the new user to bring up the Properties window.
24. Under the Member Of tab, click Add.
25. In the Enter the object names to select dialog box, type Domain Admins; Exchange Organization Administrators, select Check Names to verify, and click OK.
26. Click OK to close the user Properties window and close Active Directory Users and Computers window.
27. Select Start→All Programs→Microsoft Exchange Server 2007→Exchange Management Console.
28. In the left pane of the Exchange Management Console window, select Recipient Configuration; and in the right pane, select New Mailbox.
29. In the New Mailbox window, select User Mailbox, and click Next.
30. In the User Type page, select Existing users, and click Add.
31. Select the new account you created earlier, and click OK to add it to selection box.
32. Click Next.
33. In the Mailbox Settings page, leave the Alias textbox with default settings, and select Browse in the Mailbox database selection spot.
34. In the Select Mailbox database window, select Mailbox Database, and click OK.
35. Click through the next screens to create the new mailbox, and close when you have done so.

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36. Close the Exchange Management Console.
37. Select Start→All Programs→Microsoft Exchange Server 2007→Exchange Management Console.
38. In the left window pane, expand Server Configuration and Mailbox so the First Storage Group is visible.
39. Right-click First Storage Group, and select Properties.
40. Click Browse, and change the Transaction log and System path location to C:\First Storage Group.
41. Check the Enable circular logging box.
42. Click Apply.
43. When the pop-up message appears asking if you want to perform this task, click Yes.
44. When the message appears saying that all mounted stores are back online, click OK.
45. Right-click Mailbox Database under First Storage Group, and select Properties.
46. Select the Database tab.
47. Click Browse, and move the Exchange database and Exchange streaming database to E:\Mailstore. If there is not a directory called Mailstore, create it.
48. Check the box beside This database can be overwritten by a restore.
49. Click Customize next to Maintenance interval.
50. Remove all blue from the boxes so the system will not perform maintenance, and click OK.
51. At the Mailbox Store Properties window, click Apply.
52. When a warning message appears, click Yes.
53. When the message that the database files have been moved appears, click OK.
54. Click OK to close the Mailbox Store Properties window.
55. On the right side of the screen, click New Storage Group.
56. Under Storage Group name, write Second Storage Group.
57. Click the New button to create the Storage Group.
58. Click Finish when Exchange finishes creating the second storage group.
59. Right-click First Storage Group, and select Properties.
60. Click Browse, and change the Transaction log and System path location to C:\Second Storage Group.
61. Check the Enable circular logging box.
62. Click Apply.
63. Right-click Second Storage Group, and select New Mailbox Database.
64. Under Mailbox database name, type `Mailbox Database 2`
65. Click the Browse button, and select E:\Mailstore.
66. Click the New button to create the database.
67. Right-click Mailbox Database 2 under First Storage Group, and select Properties.
68. Select the Database tab.
69. Click Browse, and move the Exchange database and Exchange streaming database to E:\.
70. Check the box beside This database can be overwritten by a restore.
71. Click Customize next to Maintenance interval.
72. Remove all blue from the boxes so the system will not perform maintenance, and click OK.
73. At the Mailbox Database 2 Properties window, click Apply.
74. When a warning message appears, click Yes.
75. When the message that the database files have been moved appears, click OK.
76. Click OK to close the Mailbox Database 2 Properties window.
77. Repeat steps 55 through 76 six more times to create a total of eight storage groups and mailbox databases.
78. Right-click Public Mailbox Database under First Storage Group, and select Properties.
79. Select the Database tab.
80. Click Browse, and move the Exchange database and Exchange streaming database to E:\.
81. Check the box beside This database can be overwritten by a restore.
82. Click Customize next to Maintenance interval.
83. Remove all blue from the boxes so the system will not perform maintenance, and click OK.
84. At the Public Store Properties window, click Apply.
85. When a warning message appears, click Yes.
86. When the message that the database files have been moved appears, click OK.
87. Click OK to close the Public Mailbox Database Properties window.

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Installing and configuring the mail client

To create the mail client, you must install several software components. Before following these instructions, make sure to statically assign an IP address for the client, and then plug that port into the system under test. This allows the client to join the Active Directory domain. We followed this process:

1. Install Microsoft Windows Server 2003 R2 Enterprise x64 Edition Service Pack 2.
2. Assign a computer name of `Client1` for the mail client.
3. For the licensing mode, use the default setting of five concurrent connections.
4. Enter a password for the administrator log on.
5. Select Eastern Time Zone.
6. Use typical settings for the Network installation.
7. Type `Testbed` for the workgroup.

The following subsections detail the necessary installation processes we had to follow for the client.

Joining the domain

1. Select Start→Control Panel→Network Connections→Local Area Connection.
2. Click Properties.
3. Highlight Internet Protocol (TCP/IP), and click Properties.
4. Select the Use the following DNS server addresses radio button, and enter the IP of the DNS server in the Preferred DNS server field. Click OK.
5. Right-click My Computer, and select Properties.
6. Under the Computer Name tab, click Change.
7. In the Computer Name Changes window, under the Member of section, select the Domain radial box, and type `mailserver.com`
8. Select OK to start joining the domain.
9. When the window appears asking for a person qualified on the domain, type `tester` as the username and `Password1` as the password.
10. Click OK at the welcome pop-up window and the window warning that you must reset the computer for the changes to take effect.
11. Click OK in the System Properties window.
12. When a pop-up appears asking if you want to restart now, click Yes to restart your computer.

Installing Internet Information Services 6.0

1. Select Start→Control Panel→Add or Remove Programs.
2. Click Add/Remove Windows Components.
3. Select Application Servers, and click Details.
4. Click ASP.NET, and make sure a check appears in the check box.
5. Select Internet Information Services (IIS), and click Details.
6. Click OK to close the Application Server window.
7. At the Windows Components Wizard, click Next to begin the installation.
8. When the system prompts you to do so, insert the OS CD, and click OK.
9. At the Completing the Windows Components Wizard window, click Finish.
10. Close the Add or Remove Programs window.

Installing Exchange Server 2007 and Load Generator

1. Insert the Microsoft Exchange Server 2007 CD. The CD should automatically launch the installation software.
2. Click the link to Step 1: Install .NET Framework 2.0.
3. When you arrive at the download link, download the x64 version of the .NET Framework, and install.
4. Click the link to Step 3: Install Microsoft Windows PowerShell; this takes you to the download link.
5. When you arrive at the download link, download Microsoft Windows PowerShell, and install with defaults.
6. Search for and download SP1 for .NET Framework 2.0.
7. Install SP1 with all defaults.
8. Click the link to Step 4: Install Microsoft Exchange Server 2007 SP1.

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9. Click Next to go past the introduction screen.
10. Accept the license agreement, and click Next.
11. Select No for error reporting, and click Next.
12. Select Custom Exchange Server Installation, and click Next.
13. Check Management Tools, and click Next.
14. After the check finishes, click Install to start the installation process.
15. Once installation is complete, click Finish.
16. Download and install Load Generator using all defaults.

Preparing Load Generator

1. Log into the MailClient using the tester account.
2. Select Start→All Programs→Microsoft Exchange→Exchange Load Generator.
3. When the Load Generator window appears, select Start a new test.
4. Select Create a new test configuration, and click Continue.
5. Type `tester` as the account name.
6. In the Specify test settings window, type `Password1` as the Directory Access Password and Mailbox Account Master Password, and click Continue with recipient management.
7. Select the Stress mode checkbox.
8. Make 1000 users in each Mailbox Database, and click Continue.
9. To accept defaults for Advanced recipient settings, click Continue.
10. In the Specify test user groups window, select the plus sign to add a user group.
11. Change the Client Type to Outlook 2007 Online and the Action Profile to Custom, and click Continue.
12. Leave defaults in Remote configurations, and click Continue.
13. Click Save the configuration file as, and name it `Loadgencfg`
14. Click Start the initialization phase (recommended before running the test) to start initialization. The initialization process might take a few hours.

Backing up the Exchange databases

1. Log into the servers using the Administrator account.
2. Select Start→All Programs→Microsoft Exchange Server 2007→Exchange Management Console.
3. In the left window pane, expand Server Configuration and Mailbox so the First Storage Group is visible.
4. Right-click Mailbox Database 1, and select dismount.
5. Repeat Step 4 for the remaining four Mailbox Databases.
6. Once all of the server's mailbox databases are dismounted, browse to E:\Mailstore.
7. Copy the contents of E:\Mailstore to F:\Mailstore.
8. Copy the log folders for all five of the storage groups to the F drive as well.
9. Browse back to the Exchange Management Console.
10. Right-click Mailbox Database 1, and select mount.
11. Repeat Step 10 for the remaining four Mailbox Databases.

Conducting the test

To perform the test, we used a series of batch files. We stored batch files under the C:\LoadGenScripts folder on the controller machine. We installed a single listener batch file on the mail client that starts at boot time and sits idle waiting to receive a run batch file from the controller, at which point it executes the file and returns to the idle wait loop. First, we powered on the servers. We started the scripts, which copied the LoadGen parameter files to the clients. Then, we started our monitoring programs. To start the test, we executed the start batch file on our controller, which copied a test run file to all clients to start LoadGen. After LoadGen finished, we used another batch file to copy the results from all clients. The batch files simply used the copy command and referred to all clients by their IP addresses. Once a run finished, we used a restore batch file, which restored the mail database store to the original state for each server. This allowed us to start from the same point in testing.

We obtained performance test results by running the LoadGen workload three times, and taking the median result as representative of the sample.

Appendix A – Test server information

Figure 4 presents detailed information for the test servers we used in this report.

Servers	Dell PowerEdge R710	HP ProLiant DL380 G6
General dimension information		
Height (inches)	3.50	3.39
Width (inches)	17.50	17.53
Depth (inches)	27.00	25.81
U size in server rack (U)	2	2
Power supplies		
Total number	2	2
Brand and model	Dell A570P-00	HP HSTNS-PL14
Wattage (W)	570	460
Cooling fans		
Total number	5	6
Dimensions (h x w)	2.5" x 2.5"	2 3/8" x 2.5"
Voltage (V)	12	12
Amps (A)	1.60	2.45
General processor setup		
Number of processor packages	2	2
Number of cores per processor package	4	4
Number of hardware threads per core	2	2
System power management policy	Balanced	Balanced
CPU		
Vendor	Intel	Intel
Name	Xeon E5540	Xeon E5540
Stepping	D0	D0
Socket type	LGA1366	LGA1366
Core frequency (GHz)	2.53	2.53
L1 cache	4 x 32 KB + 32 KB	4 x 32 KB + 32 KB
L2 cache	4 x 256 KB	4 x 256 KB
L3 cache (MB)	8	8
Platform		
Vendor and model number	Dell PowerEdge R710	HP ProLiant DL380 G6
Motherboard model number	0N047H	PADAB0G9VXC1CQ
Motherboard revision number	13	13
BIOS name and version	Dell 1.2.6 (07/17/2009)	HP BIOS P62 (10/01/2009)
BIOS settings	Hardware Prefetch disabled, Node Interleaving disabled	Hardware Prefetch disabled, Node Interleaving disabled
Memory modules		
Total RAM in system (GB)	48	48
Vendor and model number	Samsung M393B1K70BH1	Samsung M393B1K70BH1

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Servers	Dell PowerEdge R710	HP ProLiant DL380 G6
Type	PC3-8500R DDR3	PC3-8500R DDR3
Speed (MHz)	1,066	1,066
Speed in the system currently running @ (MHz)	1,066	1,066
Timing/latency (tCL-tRCD-iRP-tRASmin)	7-7-7-20	7-7-7-20
Size (GB)	48	48
Number of RAM modules	6 x 8 GB	6 x 8 GB
Chip organization	Double-sided	Double-sided
Hard disk		
Vendor and model number	Seagate ST973451SS	Fujitsu DH072BAAKN
Number of disks in system	8	8
Size (GB)	73	73
Buffer size (MB)	16	16
RPM	15,000	15,000
Type	SAS	SAS
Controller	Dell PERC 6/i Integrated RAID Controller, 256MB cache and BBWC	HP 410i Integrated Smart Array Controller, 256MB cache and BBWC
Operating system		
Name	Windows Server 2008 Enterprise with SP2	Windows Server 2008 Enterprise with SP2
Build number	7600	7600
File system	NTFS	NTFS
Language	English	English
Network card/subsystem		
Vendor and model number	Broadcom NetXtreme II gigE 5709C Quad-Port Ethernet	Broadcom NetXtreme II gigE 5709C Quad-Port Ethernet
Type	Integrated	Integrated
Fibre card		
Vendor and model number	N/A	HP StorageWorks FC2242 Dual Channel 4Gb PCI-E HBA
Type	N/A	PCI Express
Optical drive		
Vendor and model number	TEAC DV28SV DVD-ROM	LG GDR-D20N DVD-ROM
USB ports		
Number	4	4
Type	2.0	2.0

Figure 4: Detailed system configuration information for the two test servers.

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About Principled Technologies

We provide industry-leading technology assessment and fact-based marketing services. We bring to every assignment extensive experience with and expertise in all aspects of technology testing and analysis, from researching new technologies, to developing new methodologies, to testing with existing and new tools.

When the assessment is complete, we know how to present the results to a broad range of target audiences. We provide our clients with the materials they need, from market-focused data to use in their own collateral to custom sales aids, such as test reports, performance assessments, and white papers. Every document reflects the results of our trusted independent analysis.

We provide customized services that focus on our clients' individual requirements. Whether the technology involves hardware, software, Web sites, or services, we offer the experience, expertise, and tools to help you assess how it will fare against its competition, its performance, whether it's ready to go to market, and its quality and reliability.

Our founders, Mark L. Van Name and Bill Catchings, have worked together in technology assessment for over 20 years. As journalists, they published over a thousand articles on a wide array of technology subjects. They created and led the Ziff-Davis Benchmark Operation, which developed such industry-standard benchmarks as Ziff Davis Media's Winstone and WebBench. They founded and led eTesting Labs, and after the acquisition of that company by Lionbridge Technologies were the head and CTO of VeriTest.

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