Principled Technologies®

TEST REPORT SUMMARY
APRIL 2009

# OLTP and Exchange Server performance summary of Intel Xeon Processor E5506, E5520, E5540, and X5550 on the Dell PowerEdge R710 server

## Executive summary

Dell Inc. (Dell) commissioned Principled Technologies (PT) to compare the Microsoft SQL Server 2008 online transaction processing (OLTP) and Microsoft Exchange Server 2007 performance of four Intel Xeon processors, each running on the same Dell PowerEdge R710 server:

- Intel Xeon Processor E5506 (2.13GHz Quad-Core Server Processor)
- Intel Xeon Processor E5520 (2.26GHz Quad-Core Server Processor)
- Intel Xeon Processor E5540 (2.53GHz Quad-Core Server Processor)
- Intel Xeon Processor X5550 (2.66GHz Quad-Core Server Processor)

For our Microsoft SQL Server 2008 OLTP tests, we selected the DVD Store Version 2 (DS2) test tool, whose main metric is orders per minute (OPM). We installed two instances of SQL Server 2008 on the Dell PowerEdge R710 solution and ran one 10GB database on each instance. The Dell PowerEdge R710 server contained two of the processors under test and had iSCSI-attached storage consisting of three Dell EqualLogic arrays for the DS2 testing and six Dell EqualLogic arrays for the Exchange testing.

## KEY FINDINGS

- The Intel Xeon Processor E5520 2.26GHz-based Dell PowerEdge R710 server achieved 75.9 percent higher SQL Server 2008 performance than did the Intel Xeon Processor E5506 2.13GHz-based Dell PowerEdge R710 server.[1] (See Figure 1.)
- The Intel Xeon Processor X5550 2.66GHz-based Dell PowerEdge R710 server achieved 13.6 percent higher SQL Server 2008 performance than did the Intel Xeon Processor E5540 2.53GHz-based Dell PowerEdge R710 server.[2] (See Figure 1.)
- The Intel Xeon Processor E5520 2.26GHz-based Dell PowerEdge R710 server achieved 28.8 percent higher Microsoft Exchange Server 2007 performance than did the Intel Xeon Processor E5506 2.13GHz-based Dell PowerEdge R710 server.[3] (See Figure 2.)
- The Intel Xeon Processor X5550 2.66GHz-based Dell PowerEdge R710 server achieved 10.7 percent higher Microsoft Exchange Server 2007 performance than did the Intel Xeon Processor E5540 2.53GHz-based Dell PowerEdge R710 server.[4] (See Figure 2.)

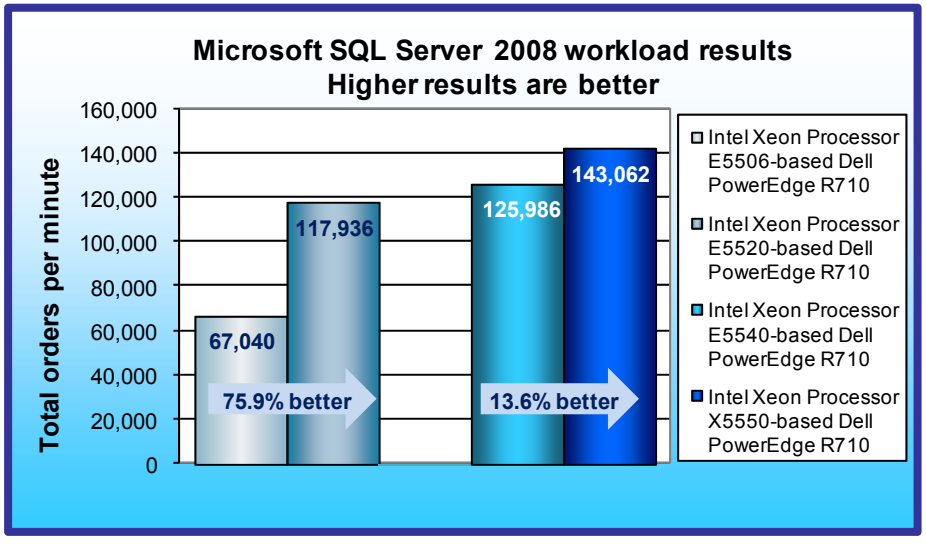


**Figure 1: Median DVD Store results, in orders per minute, for the Intel Xeon Processor E5506, E5520, E5540, and X5550-based Dell PowerEdge R710 server. Higher numbers are better.**

As Figure 1 shows, the Intel Xeon Processor E5520-based Dell PowerEdge R710 server delivered 75.9 percent more OPM than did the Intel Xeon Processor E5506-based Dell PowerEdge R710 server: 117,936 OPM vs. 67,040 OPM, respectively. The Intel Xeon Processor X5550-based Dell PowerEdge R710 server delivered 13.6 percent more OPM than did the Intel Xeon Processor E5540-based Dell PowerEdge R710 server: 143,062 OPM vs. 125,986 OPM, respectively.

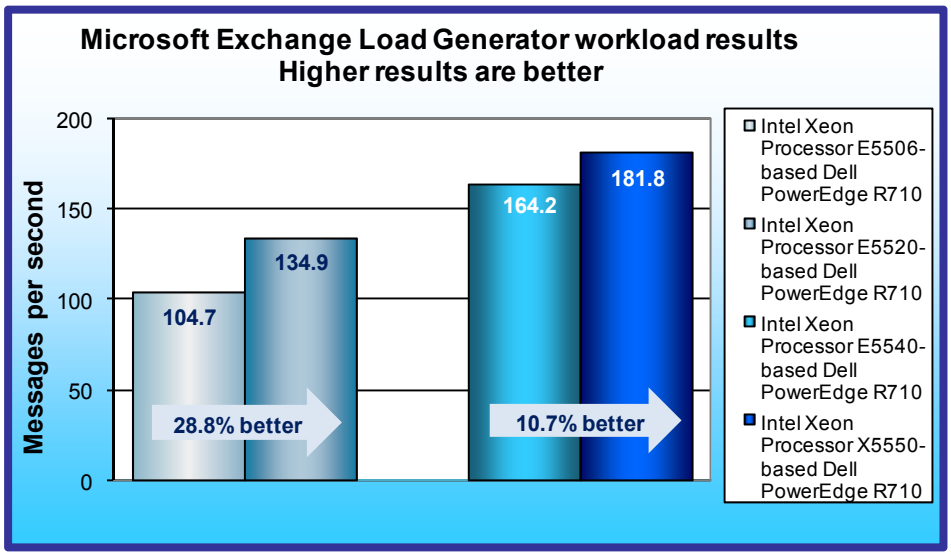


**Figure 2: Microsoft Exchange Server 2007 workload median performance results, in messages per second, for the Intel Xeon Processor E5506, E5520, E5540, and X5550-based Dell PowerEdge R710 server. Higher numbers are better.**

For our Exchange Server 2007 tests, we selected Microsoft Exchange Load Generator, whose main metric is messages per second. As Figure 2 shows, the Intel Xeon Processor E5520-based Dell PowerEdge R710 server delivered 28.8 percent more messages per second than did the Intel Xeon Processor E5506-based Dell PowerEdge R710 server: 134.9 messages per second vs. 104.7 messages per second, respectively. The Intel Xeon Processor X5550-based Dell PowerEdge R710 server delivered 10.7 percent more messages per second than did the Intel Xeon Processor E5540-based Dell PowerEdge R710 server: 181.8 messages per second vs. 164.2 messages per second, respectively. We present the median results from each of the three test runs.

## Test results

Figure 3 shows the number of DS2 OPM each Dell PowerEdge R710 solution achieved during our measurement period, minutes 24 through 29 of the test. We calculated the scores by averaging the OPM for each of the two SQL instances during the measurement period and then adding those averages.

| Server | Run 1 | Run 2 | Run 3 | Median |
|---|---|---|---|---|
| Intel Xeon Processor E5506-based Dell PowerEdge R710 server with Dell EqualLogic storage arrays | 67,040 | 67,012 | 67,190 | 67,040 |
| Intel Xeon Processor E5520-based Dell PowerEdge R710 server with Dell EqualLogic storage arrays | 118,224 | 117,733 | 117,936 | 117,936 |
| Intel Xeon Processor E5540-based Dell PowerEdge R710 server with Dell EqualLogic storage arrays | 125,772 | 127,056 | 125,986 | 125,986 |
| Intel Xeon Processor X5550-based Dell PowerEdge R710 server with Dell EqualLogic storage arrays | 143,739 | 143,062 | 142,914 | 143,062 |

**Figure 3: OPM scores for the four Dell PowerEdge R710 solutions during minutes 24 through 29 of the DVD Store test. Higher numbers are better.**

Figure 4 shows the shows the number of Microsoft Exchange Load Generator messages per second each Dell PowerEdge R170 solution delivered during our measurement period, minutes 10 through 20 of the test. We gathered these results by using the MSExchangeIS Mailbox\Messages Delivered/sec counter in Windows Performance Monitor and averaging the results.

| Server | Run 1 | Run 2 | Run 3 | Median |
|---|---|---|---|---|
| Intel Xeon Processor E5506-based Dell PowerEdge R710 server with Dell EqualLogic storage arrays | 104.7 | 102.4 | 113.2 | 104.7 |
| Intel Xeon Processor E5520-based Dell PowerEdge R710 server with Dell EqualLogic storage arrays | 134.9 | 133.0 | 145.8 | 134.9 |
| Intel Xeon Processor E5540-based Dell PowerEdge R710 server with Dell EqualLogic storage arrays | 149.2 | 164.2 | 165.2 | 164.2 |
| Intel Xeon Processor X5550-based Dell PowerEdge R710 server with Dell EqualLogic storage arrays | 168.0 | 188.1 | 181.8 | 181.8 |

**Figure 4: Messages-per-second results for the four Dell PowerEdge R710 solutions during minutes 10 through 20 of the Microsoft Exchange Load Generator test. Higher numbers are better.**

## Server configuration information

Figure 5 presents detailed configuration information about each Dell PowerEdge R710 server.

| Servers | Intel Xeon Processor E5506-based Dell PowerEdge R710 | Intel Xeon Processor E5520-based Dell PowerEdge R710 | Intel Xeon Processor E5540-based Dell PowerEdge R710 | Intel Xeon Processor X5550-based Dell PowerEdge R710 |
|---|---|---|---|---|
| CPU name | Dual Intel Xeon Processor E5506 | Dual Intel Xeon Processor E5520 | Dual Intel Xeon Processor E5540 | Dual Intel Xeon Processor X5550 |
| CPU core frequency (GHz) | 2.13 | 2.26 | 2.53 | 2.66 |
| System/vendor model number | Dell PowerEdge R710 | Dell PowerEdge R710 | Dell PowerEdge R710 | Dell PowerEdge R710 |
| RAM | 24 GB PC3-10600 DDR3 | 24 GB PC3-10600 DDR3 | 24 GB PC3-10600 DDR3 | 24 GB PC3-10600 DDR3 |
| RAM speed (MHz) | 1,333 | 1,333 | 1,333 | 1,333 |
| RAM speed in the system currently running @ (MHz) | 800 | 1,066 | 1,066 | 1,333 |
| Operating system | Windows Server 2008 Enterprise Edition x64 | Windows Server 2008 Enterprise Edition x64 | Windows Server 2008 Enterprise Edition x64 | Windows Server 2008 Enterprise Edition x64 |
| Storage arrays | Three or six Dell EqualLogic PS5000XV arrays | Three or six Dell EqualLogic PS5000XV arrays | Three or six Dell EqualLogic PS5000XV arrays | Three or six Dell EqualLogic PS5000XV arrays |
| Disks | 16 15,000RPM SAS disks per array | 16 15,000RPM SAS disks per array | 16 15,000RPM SAS disks per array | 16 15,000RPM SAS disks per array |

**Figure 5: System configuration information for the four Dell PowerEdge R710 test solutions.**

For more information on these tests, and to see the full test reports, visit:
http://www.principledtechnologies.com/Clients/Reports/Dell/E5506vsE5520DVDStore.pdf
http://www.principledtechnologies.com/Clients/Reports/Dell/E5540vsX5550DVDStore.pdf
http://www.principledtechnologies.com/Clients/Reports/Dell/E5506vsE5520Exchange.pdf
http://www.principledtechnologies.com/Clients/Reports/Dell/E5540vsX5550Exchange.pdf

Sources

[1] Principled Technologies, Inc., "OLTP performance comparison: Intel Xeon Processor E5506-based Dell PowerEdge R710 server vs. Intel Xeon Processor E5520-based Dell PowerEdge R710 server," an April 2009 report commissioned by Dell utilizing the DVD Store Version 2 (DS2) test tool. Actual performance will vary based on configuration, usage, and manufacturing variability.

[2] Principled Technologies, Inc., "OLTP performance comparison: Intel Xeon Processor E5540-based Dell PowerEdge R710 server vs. Intel Xeon Processor X5550-based Dell PowerEdge R710 server," an April 2009 report commissioned by Dell utilizing the DVD Store Version 2 (DS2) test tool. Actual performance will vary based on configuration, usage, and manufacturing variability.

[3] Principled Technologies, Inc., "Exchange Server 2007 workload performance comparison: Intel Xeon Processor E5506-based Dell PowerEdge R710 server vs. Intel Xeon Processor E5520-based Dell PowerEdge R710 server," an April 2009 report commissioned by Dell utilizing the Microsoft Exchange Load Generator test tool. Actual performance will vary based on configuration, usage, and manufacturing variability.

[4] Principled Technologies, Inc., "Exchange Server 2007 workload performance comparison: Intel Xeon Processor E5540-based Dell PowerEdge R710 server vs. Intel Xeon Processor X5550-based Dell PowerEdge R710 server," an April 2009 report commissioned by Dell utilizing the Microsoft Exchange Load Generator test tool. Actual performance will vary based on configuration, usage, and manufacturing variability.