Handling High Stress Situations

Laserfiche® System Stress Test Analysis for High Volume Environments

Laserfiche®

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The Problem

Marina Medical Billing Company, a prominent emergency medicine billing company in Cerritos, California, faced a growing paper and electronic document management crisis. Staff received large volumes of both digital and paper information through multiple delivery mechanisms, including US mail, fax, e-mail, FTP site uploads and CD. This information then had to be sorted, filed and retrieved.

With growth over the next three years anticipated to top 50%, problems were only going to increase. It was imperative to find a digital document management solution that had the scalability to accommodate processing and retrieval of a high volume of documents by a large number of users. The company had previously implemented a digital document management solution, but found it lacking; the product was unable to accommodate their current—let alone anticipated—document load and workflow process.

After extensive evaluation, Marina Medical chose a Laserfiche® document management system, due to its ease of use, functionality and technical architecture. To validate their decision, however, they required rigorous stress-testing as the final step in their due diligence process.

A solutions team configured a sample system and set up the required test environment to show that the proposed Laserfiche solution would exceed the company's technical requirements while still offering the scalability and flexibility to expand along with their business.

Test Requirements

Marina Medical provided Laserfiche with a test case that represented twice the highest load forecast for the coming growth cycle. Both system load and processing power were to be tested aggressively.

- To test volume handling, they specified that 200 users be logged into a Laserfiche database that contained approximately 60 million pages.

- To test processing power, they required the system to:

    - Write at least 255 scanned pages per minute (212,500 bytes/second).

    - Respond to user input—whether search requests or opening Laserfiche documents—at a rate of 1,200 input/output reads each second (a technical specification monitoring file, network and device operations).

    - Recover from server failure within 15 minutes.

The company was confident that, if these results were met, the Laserfiche system could handle their enterprise load.

Test Configuration

Laserfiche assembled a project test team consisting of an internal project manager, a systems engineer and two quality assurance test engineers.

The hardware and software employed in the test were identical to those available to the average Laserfiche customer. The test bed's processing power, memory and storage capabilities mimicked what could be found in a customer installation, albeit on the higher end of recommended system specifications.

Hardware

Application hosting	• Three HP® DL380 G5 servers, each with:
	  - 16 GB RAM
	  - Two Intel® Xeon® 2.7 GHz processors with hyperthreading

Storage	• HP modular storage array 1500 SAN (storage area network) with two drive arrays • Set of fault-tolerant HP 4/8 SAN switches

Test bed	• 12 Dell® Inspiron® 1300 notebook computers, each with:
	  - Intel Pentium® 1.7 GHz processor
	  - 1 GB RAM

Table 1: Hardware specifications

Software

Server 1	• VMWare® ESX server® virtualization software • Laserfiche Server™ 7.2 • Microsoft® Windows® Server 2003 R2 (3.75 GB RAM) • VMWare VMotion® software for failover
Server 2	• VMWare's ESX server virtualization software • Microsoft SQL Server™ 2005 • Microsoft Windows Server 2003 R2 (3.75 GB RAM) • VMWare VMotion software for failover
Server 3	• Used for virtualization management
Test bed	• Microsoft Windows XP Service Pack 2

Table 2: Software specifications

Methodology

The test database was created in four days by replicating a single six-page document over many nodes of a folder tree to form a single 10 GB volume. This volume was exported and copied 313 times, then each one was attached again to the Laserfiche database via automated batch files. When ready for testing, the database contained 9,610,672 documents with a total of 57,629,838 pages.

In the test bed, two notebooks were dedicated to scanning and writing 1,500 images to the database, using Laserfiche's Quick Fields™ and Universal Capture software. The remaining 10 computers all ran a Visual Basic® script to query the database for a random string of characters and retrieved the matching documents. The script was set to make 500 queries or search requests, pause briefly, and then run again in a continuous loop. Twenty instances of the script ran on each notebook, simulating 200 users.

The demonstration consisted of an hour of continuous full-speed and full-volume processing. To prepare for this demonstration, the project team ran the scripts in the test bed continuously for approximately 24 hours. Microsoft Windows Server 2003 performance counters were used to monitor the test and the demonstration.

Results

The Laserfiche system performed flawlessly and far exceeded the test requirements established by the customer.

Volume Handling

As specified in the test requirements, 200 effective users were logged in simultaneously to the Laserfiche system, performing constant search requests. The system itself contained more than 57 million pages being searched and returned to the virtual users. In addition, the system also processed the constant scanning and writing to the repository of new documents.

Processing Power

Processor usage of the Laserfiche Server averaged only 41.6%, and peaked at just over 60% for about a minute. This usage was well within Laserfiche-acceptable limits of 10 minutes of constant 80% usage (see Table 3 below).

The SQL server, meanwhile, averaged only 14.5% processor usage and peaked at 25%, representing no concern when compared to the same acceptable limit of 10 minutes and 80% usage.

	Acceptable Limit	Average Test Result/Peak
Laserfiche Server:	80% for 10 minutes	41.6%/62%
SQL server:	80% for 10 minutes	14.5%/25%
Memory:	70%	<10%

Table 3: Processor usage test results

Memory usage was equally within bounds. Less than 10% of total available memory was used, even at peak periods.

Failover

Failover mechanisms were tested by abruptly unplugging the hardware running the Microsoft SQL Server 2005 in the middle of the test. The failover software seamlessly transferred all processes to the other server within four minutes—again, well within the required time of 15 minutes. Once the test scripts were restarted, the Laserfiche scan, query and retrieval processes proceeded without any problems. This test was aimed at proving the failover and load handling capabilities of the entire system in the event of total failure of one piece of hardware. Regularly scheduled maintenance also makes use of the failover software to redistribute load throughout the system, but because maintenance is planned, the interruption to ongoing processes is greatly reduced.
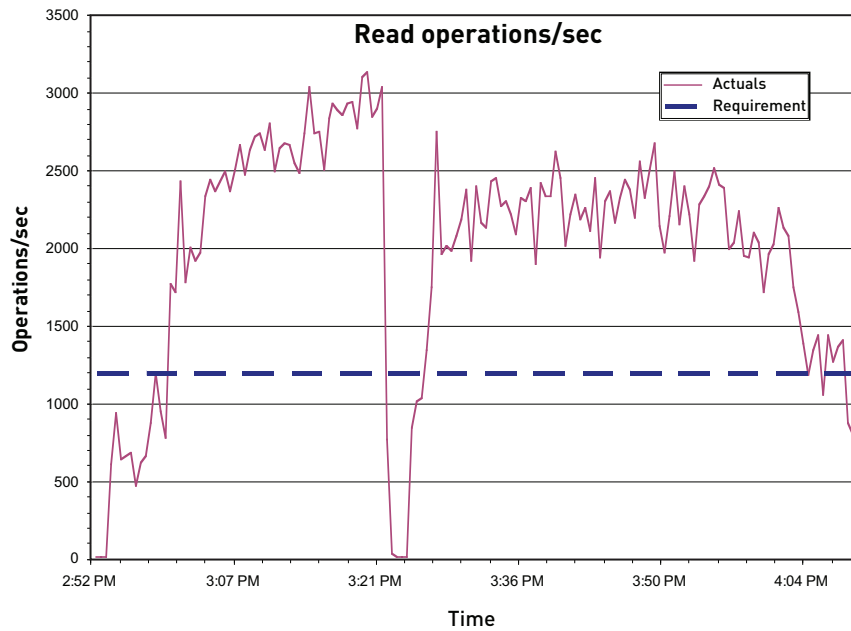
Disk Usage

Disk usage figures were as compelling as other test results. The system processed twice as many user inputs as required while scanning and importing four times as many documents to the database (see Table 4).

|	Requirement	Test Actuals
I/O reads/sec:	1,200	2,576
Write bytes/sec Scanned:	212,500 (255 pages/min)	890,899
Failover recovery:	15 minutes	4 minutes

Table 4: Load capacity test results

Figure 1 below shows that the Laserfiche test bed averaged 215% of the required user inputs, measured by the number of input/output read operations per second. (The drop in operations to zero at approximately 3:22 P.M., shown in Figure 1, represents the services being stopped and restarted as part of the failover test.)

Figure 1: Disk usage, input/output read operations

Figure 2 shows the average number of scanned bytes being written to the database—again, Laserfiche handled a much greater volume than stated in the test requirements—in this case, a 419% increase.
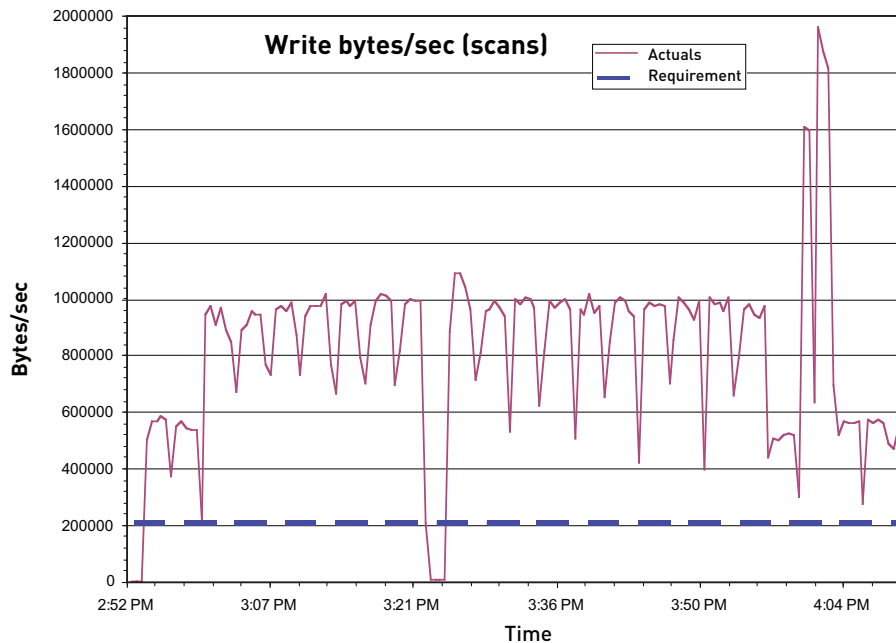
Figure 2: Disk usage, scanned pages written to database

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Summary

Ultimately, the sample Laserfiche system proved to be more than able to handle the worst circumstances Marina Medical anticipated they might face in their day-to-day production environment. The 100% margin on the Laserfiche Server's processing capability and the 700% margin on the SQL server meant that the number of users, the number of pages and the volume of documents processed and accessed were more than adequately handled. Given that database operations of scanning and responding to user input were two and four times the required amounts, the company has plenty of room to grow without concern that their Laserfiche digital document management system will not be able to grow along with them.

This comprehensive system stress test analysis proved Laserfiche is a digital document management solution that can operate effectively even under the rigors of an extremely high-volume environment. The ultimate measure of success was proving that the right combination of software, hardware and technology services can provide the tools any organization needs to operate more efficiently.

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The Laserfiche Institute teaches staff, resellers, and current and prospective clients how to use Laserfiche most effectively. As part of this mission, the Institute conducts more than 500 Webinars each year, covering a variety of topics. The Institute also hosts an annual conference where members of the Laserfiche community attend presentations and network with each other to share ideas and learn best practices. Additionally, the Institute conducts a number of regional training sessions and provides resellers with content for over 100 user conferences each year.

The Institute also develops and distributes educational material through the Laserfiche Support Site. On this Website, clients can access training videos, participate in online forums and download technical papers and presentations that help them become even savvier EDMS users.

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