

NSTL

A CMP Company

NSTL Final Report Summary

**Defragmentation
Performance Testing**

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EXECUTIVE SUMMARY

NSTL is the leading independent hardware and software testing organization in the microcomputer industry, dedicated to providing high quality services and test tools to the PC community. NSTL has extensive experience developing and conducting objective tests to assess new and existing products for compatibility, performance, usability, acceptance (bug) testing, and BIOS evaluation. NSTL's proficiency and thoroughness provide clients with a high quality, cost-effective means to conduct testing. More information on NSTL is available through the World Wide Web at <http://www.nstl.com>.

NSTL, under an agreement with Executive Software, conducted defragmentation performance testing using Diskeeper® 5.0, the most commonly used disk defragmentation program for Windows NT¹. The main goal of testing was to document the effects of defragmentation on system performance and show the increase in performance when a system has been defragmented. Diskeeper's defragmentation tool was used to defragment and analyze all systems before and during testing. More information on Diskeeper is available through the World Wide Web at <http://www.diskeeper.com>.

Benchmark testing was conducted on four computer systems, running Microsoft® Windows® 2000 RC2 build 2128. Two systems were running Microsoft Window 2000 Professional RC2 build 2128 and two were running Microsoft Windows Windows® 2000 Server RC2 build 2128. Two of the most common real-world system configurations were tested; these configurations were based on independent surveys conducted on 6,000 NT system managers. This survey was performed and provided by Broadcasters Network International.

NSTL performed the performance tests using four applications: Microsoft Excel 2000, SQL Server 7.0, Microsoft Outlook 2000, and Microsoft Exchange 5.5.

Performance Results Summary

NSTL's results show that a system that was defragmented would perform benchmarks quicker than a system that was fragmented.

The results showed that the workstation in Configuration #1, running Excel and Outlook, showed an increase in performance of 219.6% after defragmentation.

The server in Configuration #1, running Exchange and SQL Server 7.0, showed an increase in performance of 83.5% after defragmentation.

The workstation in Configuration #2, running Excel and Outlook, showed an increase in performance of 85.5% after defragmentation.

The server in Configuration #2, running Exchange and SQL Server 7.0, showed an increase in performance of 61.9% after defragmentation.

¹ According to *Microsoft Windows NT Server Resource Guide* and *Running Microsoft Windows Server NT 4.0*.

The Excel 2000 test repeatedly opened and saved several Excel files to the fragmented (or defragmented) partition. The four files that it used (file1, file2, file3 and file4) varied in size from 5MB to 20MB. These large files contained many formulas that were also auto-calculated when the spreadsheet opened. File3 opened itself and used data from file1 and file2.

The SQL Server 7.0 test combined two different types of activities on the database: queries and some database maintenance. The database maintenance was probably the least important, as this type of activity is not usually very common. However, it demonstrated the differences in doing these types of activities on fragmented vs. defragmented systems. The query section executed a simple query on the database that simulated the types of queries typically run by users. The two queries chosen only read from the database, but displayed results from several of the tables.

The Outlook2000/Exchange 5.5 test determined the effects of fragmentation on the personal folder database used by Microsoft Outlook. Several tests were run including: opening 50 messages simultaneously; moving messages from the inbox to a separate folder; opening (and displaying to: from: subject: and date:) a large subfolder; a full text search of all messages in a folder for a specific string; and a filter that displayed all messages in a folder that contained an attachment. Each of these tests was executed on the system when the personal folder file was fragmented, and when it was defragmented.

The Microsoft Exchange (v 5.5) test was identical to the Outlook test (indeed Outlook was used as the client). The difference was that all mail existed on the Exchange database (as opposed to locally) and the Exchange database itself was fragmented.

PERFORMANCE TEST CONCLUSIONS

Excel 2000

Results show that when Configuration #1 was defragmented it ran the Excel Benchmark 208.9% faster than a system that has Excel and the Page File fragmented – a little more than 2 times faster.

Results show that when Configuration #2 was defragmented it ran the Excel Benchmark 151.5% faster than a system that has Excel and the Page File fragmented - a little more than 1 1/2 times faster.

SQL Server 7.0

System Configuration #1

Table Creation A: Results show that when Configuration #1 was defragmented it ran the Table Creation Benchmark 8.3% faster than a system that has the Database and the Page File fragmented.

Table Creation B: A defragmented system ran the Table Creation Benchmark 3.8% faster than a system where only the Database was fragmented.

Key Creation 1-5 A: Results show that when Configuration #1 was defragmented the Key Creation 1 Benchmark ran 5.9% faster, Key Creation 2 Benchmark ran 23% faster, Key Creation 3 Benchmark ran 39.6% faster, Key Creation 4 Benchmark ran 53% faster, and Key Creation 5 Benchmark ran 175.9% faster than a system that had the Database and the Page File fragmented.

Key Creation 1-5 B: A defragmented system ran Key Creation 1 Benchmark 3.4% faster, Key Creation 2 Benchmark ran 23.9% faster, Key Creation 3 Benchmark ran 23.9% faster, Key Creation 4 Benchmark ran 13.6% faster, and Key Creation 5 Benchmark ran 160.4% faster a system where only the Database was fragmented.

Query 1 & 2 A: Results show that when Configuration #1 was defragmented the Query 1 Benchmark ran 56.1% faster, and Query 2 Benchmark ran 5.7% faster than a system that had the Database and the Page File fragmented.

Query 1 & 2 B: A defragmented system ran the Query 1 Benchmark 5.6% faster, and Query 2 Benchmark ran 1.6% faster than a system where only the Database was fragmented.

System Configuration #2

Table Creation A: Results show that when Configuration #2 was defragmented the Table Creation Benchmark ran 18.2% faster than a system that had the Database and the Page File fragmented.

Table Creation B: A defragmented system ran the Table Creation Benchmark 15.8% faster than a system where only the Database was fragmented.

Key Creation 1-5 A: Results show that when Configuration #2 was defragmented the Key Creation 1 Benchmark ran 16.1% faster, Key Creation 2 Benchmark ran 69.2% faster, Key Creation 3 Benchmark ran 15.7% faster, Key Creation 4 Benchmark ran 11.9% faster, and Key Creation 5 Benchmark ran 108% faster than a system that had the Database and the Page File fragmented.

Key Creation 1-5 B: A defragmented system ran Key Creation 1 Benchmark ran 2.3% faster, Key Creation 2 Benchmark ran 22.5% faster, Key Creation 3 Benchmark ran 6.1% faster, Key Creation 4 Benchmark ran 10.3% faster, and Key Creation 5 Benchmark ran 42.3% faster a system where only the Database was fragmented.

Query 1 & 2 A: Results show that when Configuration #2 was defragmented the Query 1 Benchmark ran 1122.9% faster, and Query 2 Benchmark ran 3.6% faster than a system that had the Database and the Page File fragmented.

Query 1 & 2 B: A defragmented system ran the Query 1 Benchmark 41208.6% faster, and Query 2 Benchmark ran 13% faster than a system where only the Database was fragmented.

Outlook 2000/Exchange 5.5

Workstation Configuration #1

The workstation in Configuration #1 that was defragmented opened the first 50 messages 2% faster than a fragmented system.

A defragmented system moved the inbox to a new folder 53% faster than a fragmented system.

A defragmented system opened the Business folder 77% faster than a fragmented system.

A defragmented system searched all messages for a particular word 1813% faster than a fragmented system.

A defragmented system searched all messages for attachments 21% faster than a fragmented system.

Workstation Configuration #2

The workstation in Configuration #2 that was defragmented opened the first 50 messages 16% faster than a fragmented system.

A defragmented system moved the inbox to a new folder 104% faster than a fragmented system.

A defragmented system opened the Business folder 961% faster than a fragmented system.

A defragmented system searched all messages for a particular word 11% faster than a fragmented system.

A defragmented system searched all messages for attachments 41% faster than a fragmented system.

Server Configuration #1

The server in Configuration #1 that was defragmented opened the first 50 messages 23% faster than a fragmented system.

A defragmented system moved the inbox to a new folder 57% faster than a fragmented system.

A defragmented system opened the Business folder 53% faster than a fragmented system.

A defragmented system searched all messages for a particular word 117% faster than a fragmented system.

A defragmented system searched all messages for attachments 61% faster than a fragmented system.

A defragmented system copied the inbox to a PST file 80% faster than a fragmented system.

Server Configuration #2

The server in Configuration #2 that was defragmented opened the first 50 messages 4% faster than a fragmented system.

A defragmented system moved the inbox to a new folder 39% faster than a fragmented system.

A defragmented system opened the Business folder 40% faster than a fragmented system.

A defragmented system searched all messages for a particular word 16% faster than a fragmented system.

A defragmented system searched all messages for attachments 62% faster than a fragmented system.

A defragmented system copied the inbox to PST file 21% faster than a fragmented system.

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