



# **Intel® 1200 Mailbox Exchange Server 2007 Storage Solution**

## **Intel® Server Chassis SC5400 and Server Board S5000PSL**

Tested with: ESRP – Storage Version 2.1, Windows Server 2003 R2

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## Hardware Components

Quantity	Item	Manufacturer	Model
One	Intel® Server Board	Intel	S5000PSL. Additional information is available at: <a href="http://www.intel.com/products/server/motherboards/s5000psl/s5000psl-overview.htm">http://www.intel.com/products/server/motherboards/s5000psl/s5000psl-overview.htm</a> .
One	Intel® Server Chassis	Intel	SC5400. Additional information is available at: <a href="http://www.intel.com/products/server/chassis/sc5400/sc5400-overview.htm">http://www.intel.com/products/server/chassis/sc5400/sc5400-overview.htm</a> .
One (Select one)	Intel® RAID Controller	Intel	SRCSASJV. Additional information is available at: <a href="http://www.intel.com/products/server/raid-controllers/srcsasjv/srcsasjv-overview.htm">http://www.intel.com/products/server/raid-controllers/srcsasjv/srcsasjv-overview.htm</a> .
	Intel® RAID Controller	Intel	SRCSASRB. Additional information is available at: <a href="http://www.intel.com/products/server/raid-controllers/srcsasrb/srcsasrb-overview.htm">http://www.intel.com/products/server/raid-controllers/srcsasrb/srcsasrb-overview.htm</a> .
Two	Intel® Xeon® Processors	Intel	Please refer to the Supported Processor List at <a href="http://www.intel.com/support/motherboards/server/sb/CS-022346.htm">http://www.intel.com/support/motherboards/server/sb/CS-022346.htm</a> . Processors must support Intel® EM64T.
4 GB minimum	Memory	Any supported	Please refer to the Tested Memory List at <a href="http://www.intel.com/support/motherboards/server/s5000psl/sb/CS-022924.htm">http://www.intel.com/support/motherboards/server/s5000psl/sb/CS-022924.htm</a> .
One (60 GB minimum)	SAS or SATA 3.5-inch hard drives	Any supported	Please refer to the Server Hard Drive Validation Test Report at <a href="http://www.intel.com/support/motherboards/server/sb/CS-025416.htm">http://www.intel.com/support/motherboards/server/sb/CS-025416.htm</a> .

Table 1 - Intel® Server Board S5000PSL Hardware Configuration

## Software Components

Item	Version	Manufacturer	Comment
1	Windows Server 2003 R2	Microsoft	Any 64-bit edition
1	Exchange Server 2007	Microsoft	Available in 64-bit only

Table 2 - Installation Software BOM



## Introduction

This document provides information on Intel's storage solution for Microsoft Exchange Server 2007, based on the Microsoft Exchange Solution Reviewed Program (ESRP) – Storage program\*.

\*The ESRP – Storage program was developed by Microsoft Corporation to provide a common storage testing framework for vendors to provide information on its storage solutions for Microsoft Exchange Server 2007 software. For more details on the Microsoft ESRP – Storage program, please view:

<http://www.microsoft.com/technet/prodtechnol/exchange/2007/esrp.msp>.

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## Features

This document describes an Exchange storage solution for 1200 users on the Intel® Server Chassis SC5400 storage system. The tested user profile was 0.50 IOPS per user with a mailbox limit of 250 MB.

## Solution Description

The tested solution consists of one Intel® server chassis and server board with an Intel® SRCSASRB RAID controller and 10 500GB SATA-interface desktop-class disk drives installed into the 4-drive and 6-drive cages in the Intel® SC5400 system chassis. This configuration includes 5TB of raw capacity. The Intel® SRCSASRB controller supports SAS and SATA interfaces to disk drives, and can support a mixture of SAS and SATA interface disk drives.

The ESRP-Storage program focuses on storage solution testing to address performance and reliability issues with storage design. However, storage is not the only factor to take into consideration when designing a scale up Exchange solution. Other factors which affect the server scalability are: server processor utilization, server physical and virtual memory limitations, resource requirements for other applications, directory and network service latencies, network infrastructure limitations, replication and recovery requirements, and client usage profiles. All these factors are beyond the scope for ESRP-Storage. Therefore, the number of mailboxes hosted per server as part of the tested configuration may not necessarily be viable for some customer deployment.

For more information on identifying and addressing performance bottlenecks in an Exchange system,



please refer to Microsoft's Troubleshooting Microsoft Exchange Server Performance, available at <http://go.microsoft.com/fwlink/?LinkId=23454>.

### Test Server Configuration

Component	Description
Server Chassis	Intel® SC5400
Server Board	Intel® S500PSL
CPU	2 Intel® Xeon® E5320, quad-core, 1.86 GHz (8 total cores)
Memory	4 GB DDR2 ECC
NIC	Dual Intel® Gigabit Ethernet (Intel® 82563EB)
RAID Controller	Intel® SRCSASRB
Internal Boot Disk	Qty. 1 - Seagate 320GB
Disk Array Disks	Qty. 10 - Seagate Barracuda 7200.11, ST3500320AS, 500GB, 7200 RPM

## Targeted Customer Profile

This solution is intended for small and medium-sized organization hosting up to 1200 mailboxes. The configuration used for testing is:

- Number of mailboxes: 1200
- Number of hosts: 1
- User I/O profile: 0.50 I/O per second (IOPS)
- 3 Storage Groups, 3 Databases
- Mailbox size: 250 MB



## Tested Deployment

The following tables summarize the testing environment:

Description	Data
Number of Exchange mailboxes simulated	1200
Number of hosts	1
Number of storage groups / host	3
Number of mailbox stores / storage group	1
Number of mailboxes / mailbox store	400
Number of mailbox store LUNs / storage group	1
Simulated profile: I/O's per second per mailbox	0.50 IOPS
Database LUN size	1860 GB
Log LUN size	465 GB
Backup LUN size / storage group	N/A
Total database size for performance testing	293.1 GB
% storage capacity used by Exchange database	15%

### Primary Storage Hardware

Component	Description
Storage Connectivity (Fibre Channel, SAS, SATA, iSCSI)	SAS/SATA
Storage model and OS firmware	
Storage cache	256 MB
Number of storage controllers	1
Number of storage ports	2
Maximum bandwidth of storage	6 Gb/sec (2 x 3 Gb SAS ports)
Adapter model and firmware	Intel® SRCSASRB
Number of adapters / host	1
Host server type	Intel® S5000PSL, 2 Intel® Xeon® E5320 quad-core (1.86 GHz), 8 total cores
Total number of disks tested in solution	10
Maximum number of spindles can be hosted in the storage	10



Primary Storage Software

Component	Description
HBA driver	Intel SRCASRB
HBA Queue Target Setting	N/A
HBA Queue Depth Setting	N/A
Multi-Pathing	N/A
Host OS	MS Windows Server 2003 R2 Enterprise x64 Edition w/ Service Pack 1
ESE.dll file version	08.00.0685.024
Replication solution name / version	N/A

Primary Storage Disk Configuration (Mailbox Store Disks)

Component	Description
Disk type, speed and firmware revision	Seagate SATA, 7200 RPM, SD15 (ST3500329AS)
Raw capacity per disk (GB)	465.8
Number of physical disks in test	8
Total raw storage capacity (GB)	3726.4
Number of slices per LUN or number of disks per LUN	2
RAID level	RAID 10
Total formatted capacity	1860

Primary Storage Disk Configuration (Transactional Log Disks)

Component	Description
Disk type, speed and firmware revision	Seagate SATA, 7200 RPM, SD15 (ST3500329AS)
Raw capacity per disk (GB)	465.8
Number of physical disks in test	2
Total raw storage capacity (GB)	931.6
Number of slices per LUN or number of disks per LUN	2
RAID level	RAID 1
Total formatted capacity	464.7





## Best Practices

Exchange Server is a disk-intensive application. Based on the testing runs using the ESRP framework, we recommend the following Microsoft best practices for storage system design for Exchange Server 2007, available at: <http://technet.microsoft.com/en-us/library/bb124518.aspx>.

## Contact for Additional Information

Consult the *Certified Intel RAID Configurations for Microsoft Exchange Servers* document available at: <http://www.intelraid.com/tech.php>.

## Test Result Summary

This section provides a high level summary of the test data from ESRP and the link to the detailed html reports which are generated by ESRP testing framework. Please click on the underlined headings below to view the html report for each test.

### Reliability

A number of tests in the framework are to check Reliability tests runs for 24 hours. The goal is to verify the storage can handle high I/O load for a long period of time. Both log and database files will be analyzed for integrity after the stress test to ensure no database/log corruption.

The following list provides an overview: (click on the underlined word will show the html report after the reliability tests run)

- No errors reported in the saved eventlog file.
- No errors reported in during the database and log checksum process.

### Primary Storage Performance Results

The Primary Storage performance testing is designed to exercise the storage with maximum sustainable Exchange type of I/O for 2 hours. The test is to show how long it takes for the storage to respond to an I/O under load. The data below is the sum of all of the logical disk I/O's and average of all the logical disks I/O latency in the 2 hours test duration. Each server is listed separately and the aggregate numbers across all servers is listed as well.

#### Individual Server Metrics:

The sum of I/O's across Storage Groups and the average latency across all Storage Groups on a per server basis.



<b>I/O Component</b>	<b>Metric</b>
<b>Database I/O</b>	
Average Database Disk Transfers/sec	136.1
Average Database Disk Reads/sec	71.6
Average Database Disk Writes/sec	64.5
Average Database Disk Read Latency (ms)	0.018
Average Database Disk Write Latency (ms)	0.023
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	41.1
Average Log Disk Write Latency (ms)	0.001

## Conclusion

This document is developed by storage solution providers, and reviewed by Microsoft Exchange Product team. The test results/data presented in this document is based on the tests introduced in the ESRP test framework. Customer should not quote the data directly for his/her pre-deployment verification. It is still necessary to go through the exercises to validate the storage design for a specific customer environment.

ESRP program is not designed to be a benchmarking program; tests are not designed to getting the maximum throughput for a giving solution. Rather, it is focused on producing recommendations from vendors for Exchange application. So the data presented in this document should not be used for direct comparisons among the solutions.



## Appendix A - Test Results

# Microsoft Exchange Server Jetstress 24 Hour Reliability

## Microsoft Exchange Server **Jetstress**

### Stress Test Result Report

#### Test Summary

**Overall Test Result** **Pass**

**Machine Name** DMRTK-SRVR-12

**Test Description** Intel® SRCSASRB 10-SATA drives, mailboxes=1200, size=250, IOPS=0.3, threads=04, DB=RAID10(4+4), Log=RAID1(1+1) SG=3

**Test Start Time** 3/28/2009 7:39:24 PM

**Test End Time** 3/29/2009 7:51:22 PM

**Jetstress Version** 08.02.0060.000

**Ese Version** 08.00.0685.024

**Operating System** Microsoft Windows Server 2003 R2 Service Pack 2 (5.2.3790.131072)

**Performance Log** [C:\Data\Jetstress\Stress\\_2009\\_3\\_28\\_19\\_39\\_31.blg](C:\Data\Jetstress\Stress_2009_3_28_19_39_31.blg)  
[C:\Data\Jetstress\DBChecksum\\_2009\\_3\\_29\\_19\\_51\\_22.blg](C:\Data\Jetstress\DBChecksum_2009_3_29_19_51_22.blg)

#### Database Sizing and Throughput

**Achieved I/O per Second** 408.248

**Target I/O per Second** 360

**Initial database size** 318945673216

**Final database size** 359676952576

**Database files (count)** 3

#### Jetstress System Parameters

**Thread count** 4 (per-storage group)

**Log buffers** 9000

**Minimum database cache** 96.0 MB

**Maximum database cache** 768.0 MB



<b>Insert operations</b>	25%
<b>Delete operations</b>	10%
<b>Replace operations</b>	50%
<b>Read operations</b>	15%
<b>Lazy commits</b>	80%

#### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
<b>Database (M:)</b>	0.017	0.017	71.397	64.556	(n/a)
<b>Database (N:)</b>	0.018	0.022	71.630	64.479	(n/a)
<b>Database (O:)</b>	0.019	0.031	71.759	64.426	(n/a)
<b>Log (Q:)</b>	0.000	0.001	0.000	40.880	10607.949
<b>Log (R:)</b>	0.000	0.001	0.000	41.165	10538.314
<b>Log (S:)</b>	0.000	0.001	0.000	41.156	10533.467

#### Host System Performance

Counter	Average	Minimum	Maximum
<b>% Processor Time</b>	0.546	0.012	2.487
<b>Available MBytes</b>	2576.661	2561.000	2647.000
<b>Free System Page Table Entries</b>	4170086.000	4170086.000	4170086.000
<b>Transition Pages RePurposed/sec</b>	0.000	0.000	0.000
<b>Pool Nonpaged Bytes</b>	34932601.600	34914304.000	35028992.000
<b>Pool Paged Bytes</b>	46697818.311	45993984.000	47931392.000
<b>Database Page Fault Stalls/sec</b>	0.000	0.000	0.000

#### Test Log

3/28/2009 7:39:24 PM -- Jetstress testing begins ...  
 3/28/2009 7:39:24 PM -- Prepare testing begins ...  
 3/28/2009 7:39:28 PM -- Attaching databases ...  
 3/28/2009 7:39:28 PM -- Prepare testing ends.  
 3/28/2009 7:39:28 PM -- Dispatching transactions begins ...  
 3/28/2009 7:39:28 PM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)  
 3/28/2009 7:39:28 PM -- Database flush thresholds: (start: 7.7 MB, stop: 15.4 MB)  
 3/28/2009 7:39:31 PM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.1 seconds/read).  
 3/28/2009 7:39:31 PM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.1 seconds/write).  
 3/28/2009 7:39:33 PM -- Operation mix: Sessions 4, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
 3/28/2009 7:39:33 PM -- Performance logging begins (interval: 15000 ms).  
 3/28/2009 7:39:33 PM -- Attaining prerequisites:



3/28/2009 7:50:50 PM -- \Database(JetstressWin)\Database Cache Size, Last: 724926500.0  
(lower bound: 724775700.0, upper bound: none)  
3/29/2009 7:50:51 PM -- Performance logging ends.  
3/29/2009 7:50:52 PM -- JetInterop batch transaction stats: 326944, 327492, and 327061.  
3/29/2009 7:50:52 PM -- Dispatching transactions ends.  
3/29/2009 7:50:52 PM -- Shutting down databases ...  
3/29/2009 7:51:22 PM -- Instance2896.1 (complete), Instance2896.2 (complete), and  
Instance2896.3 (complete)  
3/29/2009 7:51:23 PM -- Performance logging begins (interval: 15000 ms).  
3/29/2009 7:51:23 PM -- Verifying database checksums ...  
3/29/2009 8:18:36 PM -- M: (100% processed), N: (100% processed), and O: (100%  
processed)  
3/29/2009 8:18:37 PM -- Performance logging ends.  
3/29/2009 8:18:37 PM -- [C:\Data\Jetstress\DBChecksum\\_2009\\_3\\_29\\_19\\_51\\_22.blg](#) has 108  
samples.  
3/29/2009 8:18:41 PM -- [C:\Data\Jetstress\DBChecksum\\_2009\\_3\\_29\\_19\\_51\\_22.html](#) is saved.  
3/29/2009 8:18:41 PM -- Verifying log checksums ...  
3/29/2009 8:18:44 PM -- Q:\ (22 logs passed), R:\ (22 logs passed), and S:\ (22 logs passed)  
3/29/2009 8:18:44 PM -- [C:\Data\Jetstress\Stress\\_2009\\_3\\_28\\_19\\_39\\_31.blg](#) has 5805  
samples.  
3/29/2009 8:18:44 PM -- Creating test report ...  
3/29/2009 8:19:49 PM -- Volume M: has 0.0168 for Avg. Disk sec/Read.  
3/29/2009 8:19:49 PM -- Volume N: has 0.0179 for Avg. Disk sec/Read.  
3/29/2009 8:19:49 PM -- Volume O: has 0.0186 for Avg. Disk sec/Read.  
3/29/2009 8:19:49 PM -- Volume Q: has 0.0011 for Avg. Disk sec/Write.  
3/29/2009 8:19:49 PM -- Volume Q: has 0.0000 for Avg. Disk sec/Read.  
3/29/2009 8:19:49 PM -- Volume R: has 0.0011 for Avg. Disk sec/Write.  
3/29/2009 8:19:49 PM -- Volume R: has 0.0000 for Avg. Disk sec/Read.  
3/29/2009 8:19:49 PM -- Volume S: has 0.0011 for Avg. Disk sec/Write.  
3/29/2009 8:19:49 PM -- Volume S: has 0.0000 for Avg. Disk sec/Read.  
3/29/2009 8:19:49 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
3/29/2009 8:19:49 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
3/29/2009 8:19:49 PM -- [C:\Data\Jetstress\Stress\\_2009\\_3\\_28\\_19\\_39\\_31.xml](#) has 5759  
samples queried.



# Microsoft Exchange Server Jetstress

## Test Result Report

### Checksum Statistics - All

Database	Seen pages	Bad pages	Correctable pages	Wrong page no pages	File length / seconds taken
<b>M:\Jetstress1.edb</b>	14644338	0	0	0	114408 MBytes / 1102 seconds
<b>N:\Jetstress1.edb</b>	14636402	0	0	0	114346 MBytes / 1567 seconds
<b>O:\Jetstress1.edb</b>	14625138	0	0	0	114258 MBytes / 1633 seconds
<b>(Sum)</b>	43905878	0	0	0	343014 MBytes / 1633 seconds

### Disk Subsystem Performance (of checksum)

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec
<b>M:</b>	0.041	0.001	1659.972	0.002
<b>N:</b>	0.052	0.000	1168.253	0.002
<b>O:</b>	0.048	0.001	1106.769	0.006

### Memory System Performance (of checksum)

Counter	Average	Minimum	Maximum
<b>% Processor Time</b>	3.993	3.281	4.622
<b>Available MBytes</b>	3365.917	3357.000	3380.000
<b>Free System Page Table Entries</b>	4170086.000	4170086.000	4170086.000
<b>Transition Pages RePurposed/sec</b>	0.000	0.000	0.000
<b>Pool Nonpaged Bytes</b>	35407227.259	35356672.000	35438592.000
<b>Pool Paged Bytes</b>	48148593.778	47861760.000	48918528.000

## Test Log

3/28/2009 7:39:24 PM -- Jetstress testing begins ...  
 3/28/2009 7:39:24 PM -- Prepare testing begins ...  
 3/28/2009 7:39:28 PM -- Attaching databases ...  
 3/28/2009 7:39:28 PM -- Prepare testing ends.  
 3/28/2009 7:39:28 PM -- Dispatching transactions begins ...  
 3/28/2009 7:39:28 PM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)  
 3/28/2009 7:39:28 PM -- Database flush thresholds: (start: 7.7 MB, stop: 15.4 MB)  
 3/28/2009 7:39:31 PM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.1 seconds/read).  
 3/28/2009 7:39:31 PM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.1 seconds/write).



3/28/2009 7:39:33 PM -- Operation mix: Sessions 4, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
3/28/2009 7:39:33 PM -- Performance logging begins (interval: 15000 ms).  
3/28/2009 7:39:33 PM -- Attaining prerequisites:  
3/28/2009 7:50:50 PM -- \Database(JetstressWin)\Database Cache Size, Last: 724926500.0 (lower bound: 724775700.0, upper bound: none)  
3/29/2009 7:50:51 PM -- Performance logging ends.  
3/29/2009 7:50:52 PM -- JetInterop batch transaction stats: 326944, 327492, and 327061.  
3/29/2009 7:50:52 PM -- Dispatching transactions ends.  
3/29/2009 7:50:52 PM -- Shutting down databases ...  
3/29/2009 7:51:22 PM -- Instance2896.1 (complete), Instance2896.2 (complete), and Instance2896.3 (complete)  
3/29/2009 7:51:23 PM -- Performance logging begins (interval: 15000 ms).  
3/29/2009 7:51:23 PM -- Verifying database checksums ...  
3/29/2009 8:18:36 PM -- M: (100% processed), N: (100% processed), and O: (100% processed)  
3/29/2009 8:18:37 PM -- Performance logging ends.  
3/29/2009 8:18:37 PM -- [C:\Data\Jetstress\DBChecksum\\_2009\\_3\\_29\\_19\\_51\\_22.blg](C:\Data\Jetstress\DBChecksum_2009_3_29_19_51_22.blg) has 108 samples.



# Microsoft Exchange Server **Jetstress 2 Hour Performance**

## Microsoft Exchange Server **Jetstress**

### Performance Test Result Report

#### Test Summary

<b>Overall Test Result</b>	<b>Pass</b>
<b>Machine Name</b>	DMRTK-SRVR-I2
<b>Test Description</b>	Intel SRCASARB 10-SATA drives, mailboxes=1200, size=250, IOPS=0.3, threads=04, DB=RAID10(4+4), Log=RAID1(1+1) SG=3
<b>Test Start Time</b>	3/28/2009 1:54:25 PM
<b>Test End Time</b>	3/28/2009 5:37:07 PM
<b>Jetstress Version</b>	08.02.0060.000
<b>Ese Version</b>	08.00.0685.024
<b>Operating System</b>	Microsoft Windows Server 2003 R2 Service Pack 2 (5.2.3790.131072)
<b>Performance Log</b>	<a href="C:\Data\Jetstress\Performance_2009_3_28_15_24_52.blg">C:\Data\Jetstress\Performance_2009_3_28_15_24_52.blg</a> <a href="C:\Data\Jetstress\DBChecksum_2009_3_28_17_37_7.blg">C:\Data\Jetstress\DBChecksum_2009_3_28_17_37_7.blg</a>

#### Database Sizing and Throughput

<b>Achieved I/O per Second</b>	424.21
<b>Target I/O per Second</b>	360
<b>Initial database size</b>	314581499904
<b>Final database size</b>	318945673216
<b>Database files (count)</b>	3

#### Jetstress System Parameters

<b>Thread count</b>	4 (per-storage group)
<b>Log buffers</b>	9000
<b>Minimum database cache</b>	96.0 MB
<b>Maximum database cache</b>	768.0 MB
<b>Insert operations</b>	25%
<b>Delete operations</b>	10%





**Replace operations**            50%  
**Read operations**                15%  
**Lazy commits**                    80%

Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
<b>Database (M:)</b>	0.016	0.017	71.034	69.756	(n/a)
<b>Database (N:)</b>	0.018	0.022	71.977	70.305	(n/a)
<b>Database (O:)</b>	0.018	0.032	71.556	69.581	(n/a)
<b>Log (Q:)</b>	0.000	0.001	0.000	45.683	10728.240
<b>Log (R:)</b>	0.000	0.001	0.000	46.274	10670.550
<b>Log (S:)</b>	0.000	0.001	0.000	45.715	10679.447

Host System Performance

Counter	Average	Minimum	Maximum
<b>% Processor Time</b>	0.589	0.234	1.106
<b>Available MBytes</b>	2539.077	2508.000	2582.000
<b>Free System Page Table Entries</b>	4170226.000	4170226.000	4170226.000
<b>Transition Pages RePurposed/sec</b>	0.000	0.000	0.000
<b>Pool Nonpaged Bytes</b>	34501324.800	34496512.000	34516992.000
<b>Pool Paged Bytes</b>	46213930.667	45789184.000	46608384.000
<b>Database Page Fault Stalls/sec</b>	0.000	0.000	0.000

Test Log

3/28/2009 1:54:25 PM -- Jetstress testing begins ...  
 3/28/2009 1:54:25 PM -- Prepare testing begins ...  
 3/28/2009 1:54:25 PM -- Creating M:\Jetstress1.edb.  
 3/28/2009 1:54:25 PM -- Database cache settings: (minimum: 32.0 MB, maximum: 256.0 MB)  
 3/28/2009 1:54:25 PM -- Database flush thresholds: (start: 2.6 MB, stop: 5.1 MB)  
 3/28/2009 2:19:34 PM -- 60.0% of 97.7 GB complete (3570604 records inserted).  
 3/28/2009 2:38:12 PM -- 100.0% of 97.7 GB complete (5986019 records inserted).  
 3/28/2009 2:38:15 PM -- Duplicating 2 databases:  
 3/28/2009 3:24:45 PM -- 100.0% of 195.3 GB complete (195.3 GB duplicated).  
 3/28/2009 3:24:48 PM -- Attaching databases ...  
 3/28/2009 3:24:48 PM -- Prepare testing ends.



3/28/2009 3:24:48 PM -- Dispatching transactions begins ...  
3/28/2009 3:24:48 PM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)  
3/28/2009 3:24:48 PM -- Database flush thresholds: (start: 7.7 MB, stop: 15.4 MB)  
3/28/2009 3:24:52 PM -- Database read latency thresholds: (average: 0.02 seconds/read,  
maximum: 0.05 seconds/read).  
3/28/2009 3:24:52 PM -- Log write latency thresholds: (average: 0.01 seconds/write,  
maximum: 0.05 seconds/write).  
3/28/2009 3:24:54 PM -- Operation mix: Sessions 4, Inserts 25%, Deletes 10%, Replaces 50%,  
Reads 15%, Lazy Commits 80%.  
3/28/2009 3:24:54 PM -- Performance logging begins (interval: 15000 ms).  
3/28/2009 3:24:54 PM -- Attaining prerequisites:  
3/28/2009 3:36:36 PM -- \Database(JetstressWin)\Database Cache Size, Last: 725082100.0  
(lower bound: 724775700.0, upper bound: none)  
3/28/2009 5:36:38 PM -- Performance logging ends.  
3/28/2009 5:36:38 PM -- JetInterop batch transaction stats: 33670, 33932, and 33604.  
3/28/2009 5:36:38 PM -- Dispatching transactions ends.  
3/28/2009 5:36:38 PM -- Shutting down databases ...  
3/28/2009 5:37:07 PM -- Instance1696.1 (complete), Instance1696.2 (complete), and  
Instance1696.3 (complete)  
3/28/2009 5:37:08 PM -- Performance logging begins (interval: 15000 ms).  
3/28/2009 5:37:08 PM -- Verifying database checksums ...  
3/28/2009 6:01:11 PM -- M: (100% processed), N: (100% processed), and O: (100%  
processed)  
3/28/2009 6:01:12 PM -- Performance logging ends.  
3/28/2009 6:01:12 PM -- [C:\Data\Jetstress\DBChecksum\\_2009\\_3\\_28\\_17\\_37\\_7.blg](C:\Data\Jetstress\DBChecksum_2009_3_28_17_37_7.blg) has 96  
samples.  
3/28/2009 6:01:16 PM -- [C:\Data\Jetstress\DBChecksum\\_2009\\_3\\_28\\_17\\_37\\_7.html](C:\Data\Jetstress\DBChecksum_2009_3_28_17_37_7.html) is saved.  
3/28/2009 6:01:16 PM -- Verifying log checksums ...  
3/28/2009 6:01:19 PM -- Q:\ (22 logs passed), R:\ (21 logs passed), and S:\ (21 logs passed)  
3/28/2009 6:01:19 PM -- [C:\Data\Jetstress\Performance\\_2009\\_3\\_28\\_15\\_24\\_52.blg](C:\Data\Jetstress\Performance_2009_3_28_15_24_52.blg) has 526  
samples.  
3/28/2009 6:01:19 PM -- Creating test report ...  
3/28/2009 6:01:25 PM -- Volume M: has 0.0164 for Avg. Disk sec/Read.  
3/28/2009 6:01:25 PM -- Volume N: has 0.0175 for Avg. Disk sec/Read.  
3/28/2009 6:01:25 PM -- Volume O: has 0.0184 for Avg. Disk sec/Read.  
3/28/2009 6:01:25 PM -- Volume Q: has 0.0011 for Avg. Disk sec/Write.  
3/28/2009 6:01:25 PM -- Volume Q: has 0.0000 for Avg. Disk sec/Read.



3/28/2009 6:01:25 PM -- Volume R: has 0.0011 for Avg. Disk sec/Write.  
3/28/2009 6:01:25 PM -- Volume R: has 0.0000 for Avg. Disk sec/Read.  
3/28/2009 6:01:25 PM -- Volume S: has 0.0011 for Avg. Disk sec/Write.  
3/28/2009 6:01:25 PM -- Volume S: has 0.0000 for Avg. Disk sec/Read.  
3/28/2009 6:01:25 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
3/28/2009 6:01:25 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
3/28/2009 6:01:25 PM -- [C:\Data\Jetstress\Performance\\_2009\\_3\\_28\\_15\\_24\\_52.xml](C:\Data\Jetstress\Performance_2009_3_28_15_24_52.xml) has 479  
samples queried.



Microsoft Exchange Server Jetstress

## Test Result Report

Checksum Statistics - All

Database	Seen pages	Bad pages	Correctable pages	Wrong page no pages	File length / seconds taken
<b>M:\Jetstress1.edb</b>	12978530	0	0	0	101394 MBytes / 998 seconds
<b>N:\Jetstress1.edb</b>	12977762	0	0	0	101388 MBytes / 1398 seconds
<b>O:\Jetstress1.edb</b>	12977506	0	0	0	101386 MBytes / 1442 seconds
<b>(Sum)</b>	38933798	0	0	0	304170 MBytes / 1442 seconds

Disk Subsystem Performance (of checksum)

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec
<b>M:</b>	0.041	0.001	1627.649	0.011
<b>N:</b>	0.052	0.001	1162.127	0.010
<b>O:</b>	0.048	0.001	1125.107	0.008

Memory System Performance (of checksum)

Counter	Average	Minimum	Maximum
<b>% Processor Time</b>	4.024	3.164	4.935
<b>Available MBytes</b>	3337.302	3328.000	3350.000
<b>Free System Page Table Entries</b>	4170086.000	4170086.000	4170086.000
<b>Transition Pages RePurposed/sec</b>	0.000	0.000	0.000
<b>Pool Nonpaged Bytes</b>	35493418.667	35450880.000	35512320.000
<b>Pool Paged Bytes</b>	45863168.000	45568000.000	46653440.000

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