

**ESRP Storage Program**  
**EMC CLARiiON CX3-20c (1,200 User) iSCSI with CCR**  
**Storage Solution for Microsoft Exchange Server 2007**

**Tested with:** ESRP – Storage Version 2.0  
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EMC CLARiON CX3-20c (1,200 User) iSCSI with CCR Storage Solution for Microsoft Exchange Server 2007

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## Overview

This document provides information on EMC's CLARiiON® CX3-20c (1,200 user) iSCSI with Clustered Continuous Replication (CCR) Storage Solution for Microsoft Exchange Server 2007, which is based on the *Microsoft Exchange Solution Reviewed Program (ESRP) – Storage program*\*. For any questions or comments regarding the contents of this document, see the [Contact](#) section.

\*The *ESRP – Storage* program was developed by Microsoft Corporation to provide a common storage testing framework for EMC and to provide information on its storage solutions for the Microsoft Exchange Server software. For more details on the *Microsoft ESRP – Storage* program, please visit: <http://www.microsoft.com/technet/prodtechnol/exchange/2007/esrp.msp>

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## Features

This document describes an approach that can be used to configure Exchange solutions for CCR around EMC's CLARiiON CX3-20c storage systems. Built on the innovative EMC® CLARiiON CX3 UltraScale™ architecture, the EMC CX3-20c offers exceptional performance, ease of use, and unmatched reliability. It meets the storage needs of a wide range of applications including:

- Mail / Messaging
- Databases
- File, print, and Web services
- Distributed applications
- Remote replication

In addition, the CX3-20c supports a wide range of server operating environments such as: Microsoft Windows, Linux, Solaris, AIX, HP-UX, and VMware ESX Server.

EMC's CLARiiON CX3-20c Fibre Channel (FC) / iSCSI array offers 4 GB/s FC and 1 GB/s iSCSI ports that are fully integrated in the same array, enabling customers to leverage their networked storage investments over a broader range of servers and applications with complete flexibility without additional hardware. A total of eight iSCSI ports (four per SP) and four FC ports (two per SP) are available on each CX3-20c array.

The CLARiiON CX3-20c FC / iSCSI array provides customers with an advantage, irrespective of whether they have iSCSI or FC deployed. For customers who are implementing networked storage for the first time and are considering iSCSI, the CLARiiON CX3-20c FC / iSCSI array provides scalable iSCSI storage as well as the flexibility and investment protection of integrated FC support.

For customers with existing FC deployments, the CX3-20c FC / iSCSI array offers the opportunity to expand the reach of their networked storage environment economically with iSCSI, while maintaining complete flexibility with how the incremental capacity is shared across server platforms and interconnects.

With the CX3-20c FC / iSCSI array, customers can choose drive options that meet their specific needs, thereby providing multiple levels of performance in one system. The CX3-20c supports both high-performance and high-capacity disk drives in the same system; it can scale from 365 GB to 59 TB, and can support 128 high-availability hosts.

It supports 4 GB/s (15k RPM) FC drives for demanding applications that require maximum performance. Customers can also choose from 2 GB/s FC (10k RPM) for applications that require balanced performance and costs. Alternatively, customers have the option to choose low-cost 2 GB/s FC drives (7.2k RPM) for Tier 2 applications that require high-capacity and low cost, such as disk-based backup.

The CX3-20c delivers tiered storage that allows customers to provide the right level of performance to the right applications. The system also delivers an exceptional 4 GB/s of performance throughout the entire system without compromises or bottlenecks. Performance-boosting features include four front-end and two back-end 4 GB/s ports, plus state-of-the art low latency, high bandwidth I/O interconnect technologies.

The performance results and best practices discussed in this document provide tested guidelines for configuring the CX3-20c for a high-performance Exchange environment. For this solution, an EMC CLARiiON CX3-20c storage solution for Microsoft Exchange Server was used and configured for 1,200 Exchange 2007 users.

The server was connected to the CX3-20c by dedicated NICs (used for iSCSI) with the Microsoft iSCSI Software Initiator 2.0.5, and an iSCSI VLAN. Each of the 1,200 users had a profile of .42 IOPS with a 320 MB mailbox requirement.

## Solution description

The solution described is for Microsoft Exchange 2007 Clustered Continuous Replication (CCR) that uses two CX3-20c arrays, each containing a single disk-array enclosure (DAE) that uses four drives for storage group database files, four drives for storage group log files, and five drives for streaming backup with one hot spare drive.

With Microsoft Exchange 2007 CCR (release to manufacturing version) I/O requirements for the passive drives were needed to handle 2-3 times the I/O of the active database drives. With Exchange 2007 SP1 this decreases to .5-1.

On each array the database drives are placed on drives 0\_10-0\_13. The log files are placed on the first four drives 0\_0-0\_3 each in a RAID 10 configuration. Streaming backup drives are placed on the 0\_5-0\_9 in a RAID 5 configuration and drive 0\_14 is configured as a dedicated hot spare.

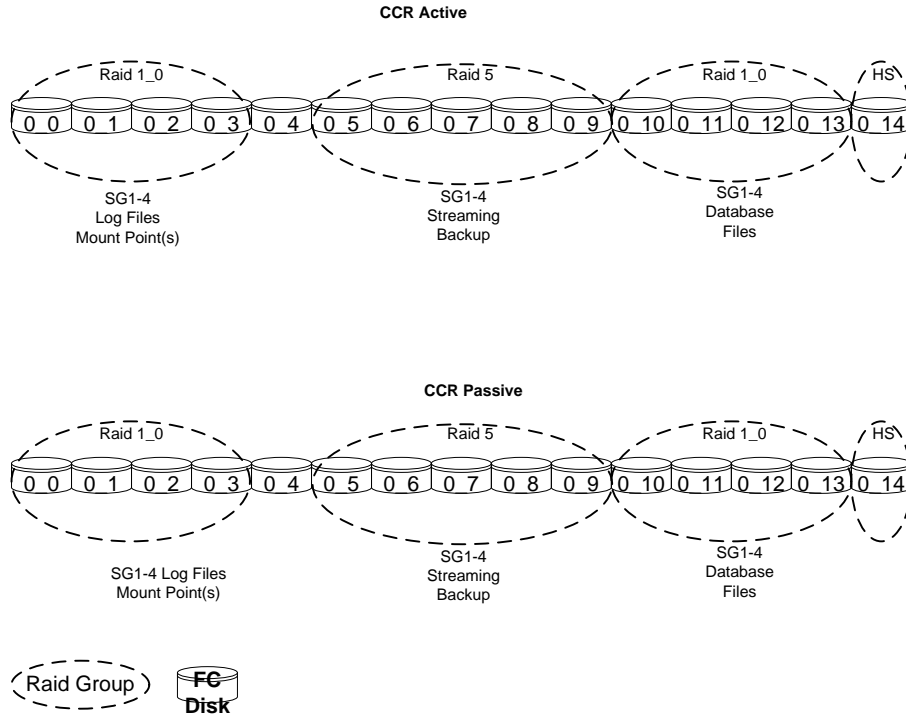
Sizing and configuring storage for use with Microsoft Exchange Server is a complicated process, driven by many variables and factors that vary from one organization to another.

The sizing method described in this ESRP submission is known as the “building block,” which is used to simplify sizing and configuration when using a low number of disks to ensure the highest performance while remaining fault tolerant.

This unit of measure (or building block) is designed to be scalable - based on customer I/O and latency requirements. The building blocks are designed around the Exchange database drives in four-drive increments using RAID 1\_0. The Exchange log files are placed onto a four-drive RAID 1\_0 configuration that is capable of holding multiple building blocks of storage group log files.

The building block is also designed to expand into larger building block deployments. These deployments are detailed in EMC ESRP submission documents for over 4,000 users available on [EMC.com](http://EMC.com).

Figure 1 illustrates the building block layout for this ESRP submission.



**Figure 1 Building block layout**

Figure 2 illustrates the physical architecture for the ESRP submission.

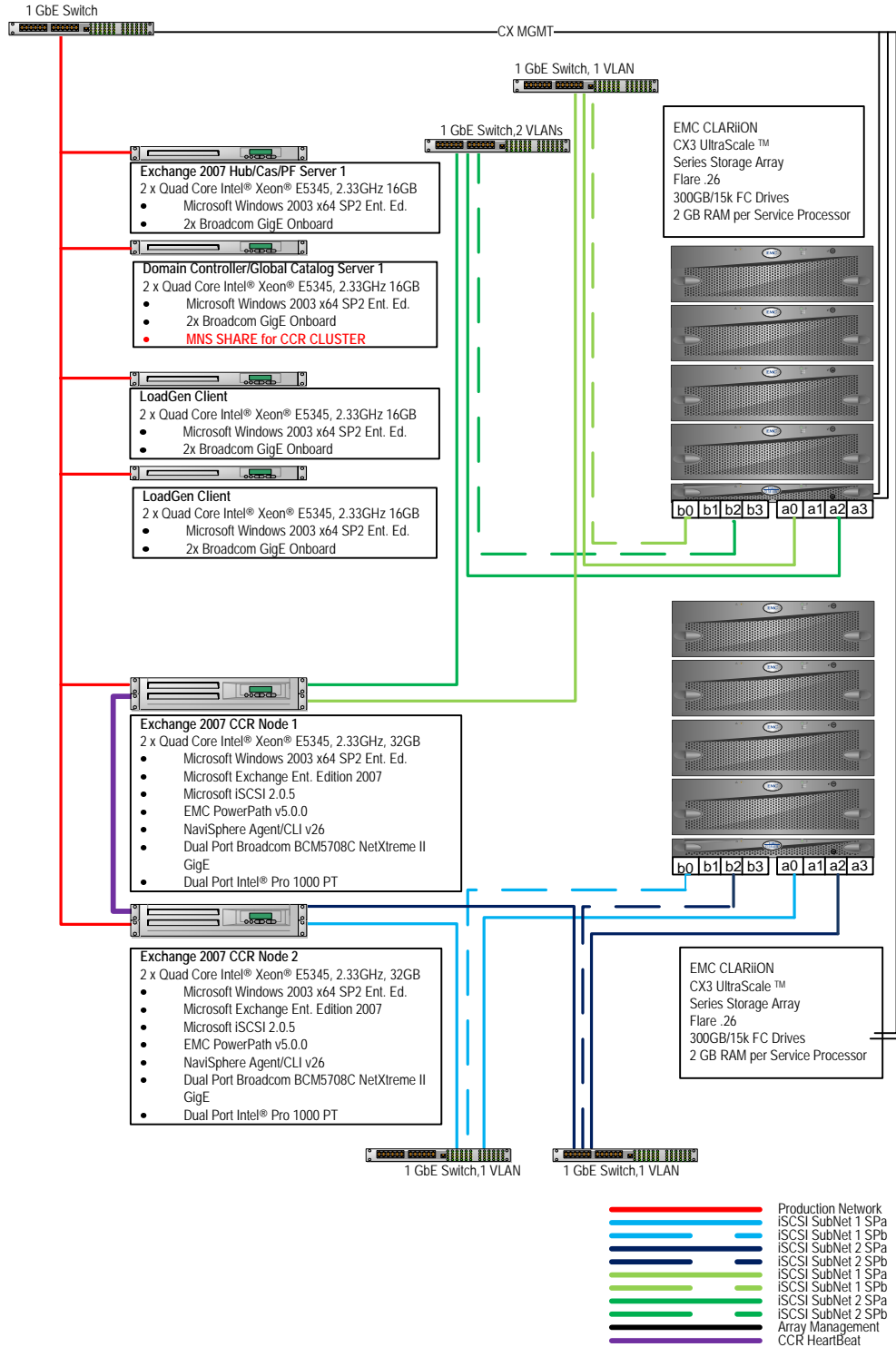


Figure 2 Physical architecture

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 scaling for an Exchange solution. Other factors that 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
- Client usage profiles

All these factors are beyond the scope of ESRP-Storage. Therefore, the number of mailboxes hosted per server as part of the tested configuration may not necessarily be viable for some customer deployments.

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>

### ***Targeted customer profile***

This solution is intended for small and medium-sized businesses hosting 1,200 Exchange mailboxes. The configuration used for testing is as below:

- Number of mailbox servers presented to the storage array = 1
- User IO profile for testing = 0.42
- User mailbox size for testing = 320 MB
- Backup strategy for testing = streaming backup to disk
- Time for restore = less than 3 hours per SG and 100 GB database per SG tested
- Clustered Continuous Replication (CCR)

## ***Tested deployment***

The following tables summarize the testing environment.

### **Simulated Exchange configuration**

<b>Item</b>	<b>Description</b>
Number of Exchange mailboxes simulated	1,200
Number of hosts	1
Number of mailboxes/host	1,200
Number of storage groups/host	4
Number of mailbox stores/storage group	1
Number of mailboxes/mailbox store	300
Number of mailbox store LUNs/storage group	1
Simulated profile: I/Os per second per mailbox (IOPS, include 20% headroom)	0.5
Database LUN size	120 GB
Log LUN size	12 GB
Backup LUN size/storage group	Not applicable
Total database size for performance testing	100 GB
% Storage capacity used by Exchange database**	80%

\*\*Storage performance characteristics change based on the percentage utilization of the individual disks. Tests that use a small percentage of the storage (~25%) may exhibit reduced throughput if the storage capacity utilization is significantly increased beyond what is tested in this paper.

## Primary storage hardware

Item	Description
Storage connectivity (Fibre Channel, SAS, SATA, iSCSI)	iSCSI
Storage model and OS/firmware revision	CX3-20c FLARE® 26
Storage cache	2 GB/SP
Number of storage controllers	2
Number of storage ports	4 tested – 8 possible
Maximum bandwidth of storage connectivity to host	4*1 Gb per SP
Switch type/model/firmware revision	Dell 5324 v2.0.0.39
HBA model and firmware	Intel PRO/1000 PT Dual Port Server Adapter
Number of HBAs/host	2
Host server type	Dell PowerEdge 2950 4: Dual Core [01]: EM64T Family 6 Model 15 Stepping 7 GenuineIntel ~2328 Mhz [02]: EM64T Family 6 Model 15 Stepping 7 GenuineIntel ~2328 Mhz [03]: EM64T Family 6 Model 15 Stepping 7 GenuineIntel ~2328 Mhz [04]: EM64T Family 6 Model 15 Stepping 7 GenuineIntel ~2328 Mhz [05]: EM64T Family 6 Model 15 Stepping 7 GenuineIntel ~2328 Mhz [06]: EM64T Family 6 Model 15 Stepping 7 GenuineIntel ~2328 Mhz [07]: EM64T Family 6 Model 15 Stepping 7 GenuineIntel ~2328 Mhz [08]: EM64T Family 6 Model 15 Stepping 7 GenuineIntel ~2328 Mhz
Total number of disks tested in solution	14 with hotspare
Maximum number of spindles that can be hosted in the storage	15

## Primary storage software

Item	Description
HBA driver	c:\windows\system32\drivers\ele5132.sys 9.9.13.0 built by : winDDK 6/19/2007 10:47am 348,568
HBA QueueTarget Setting	Not applicable
HBA QueueDepth Setting	Not applicable
Multi-Pathing	Microsoft iSCSI Initiator v2.0 Build 3392 EMC powermt for PowerPath® 5.0.0 (build 94)
Host OS	Microsoft Windows Server 2003 Enterprise x64 Edition OS Version: 5.2.3790 Service Pack 2
ESE.dll file version	08.00.0685.024
Replication solution name/version	Not applicable

### Primary storage disk configuration (mailbox store disks)

Item	Description
Disk type, speed and firmware revision	FC SCSI: 4 GB/s, 15,000 rpm, 630A
Raw capacity per disk (GB)	268.403 GB
Number of physical disks in test	4
total raw storage capacity (GB)	1073.612 GB
Disk slice size (GB)	Not applicable
Number of slices per LUN or number of disks per LUN	Not applicable
Number of LUNs per RAID group	4
LUN size in GB	120
RAID level	RAID 1_0
Total formatted capacity	480 GB
Storage capacity utilization	44%
Database capacity utilization	80%

### Primary storage disk configuration (transactional log disks)

Item	Description
Disk type, speed and firmware revision	FC SCSI: 4 GB/s, 15,000 rpm, 630A
Raw capacity per disk (GB)	268.403 GB
Number of spindles in test	4
Total raw storage capacity (GB)	1073.612 GB
Disk slice size (GB)	Not applicable
Number of slices per LUN or number of disks per LUN	Not applicable
Number of LUNs per RAID group	4
LUN size in GB	12
RAID level	RAID 1_0
Total formatted capacity	48 GB

### *Streaming backup*

#### Disk configuration (streaming backup to disk)

Item	Description
Disk type, speed and firmware revision	FC SCSI: 4 GB/s, 15,000 rpm, 630A
Raw capacity per disk (GB)	268.403 GB
Number of spindles in test	5
Total raw storage capacity (GB)	1342.015 GB
Disk slice size (GB)	Not applicable
Number of slices per LUN or number of disks per LUN	Not applicable
Number of LUNs per RAID group	1
RAID level	RAID 5
Total formatted capacity	1073.612 GB

## Best Practices

Microsoft Exchange Server is a disk-intensive application. Based on the testing that is run using the ESRP framework, EMC recommends Exchange 2007 best practices to improve storage performance.

For Exchange 2007 best practices on storage design, refer to:  
<http://technet.microsoft.com/en-us/library/bb124518.aspx>

### Core storage/replication

1. Use diskpart (in Microsoft Windows 2003 SP2 x64) to align all disks used with Microsoft Exchange, using a value of 64 for CLARiiON. This aligns all of the Exchange-related NTFS partitions on a 64 KB boundary.
2. Isolate the Microsoft Exchange database workload from other I/O intensive applications or workloads. This ensures the highest levels of performance for Microsoft Exchange and makes troubleshooting efforts easier in the event of a disk-related Microsoft Exchange performance issue.
3. TcpAckFrequency = 1 for each iSCSI connection. Refer to:  
<http://support.microsoft.com/kb/328890>.
4. Size and configure the environment for spindle performance as a primary consideration, with storage capacity as secondary.
5. iSCSI configuration with PowerPath 5.0 uses a balanced path approach. Log in with NIC0 to A0(SPa) and B0(SPb), NIC1 to A2(SPa) and B2(SPb).
6. Tuning the CX3-20c storage system parameters is important for obtaining best performance. The following list details the optimal parameters for Exchange:
  - Cache page size of 8 KB
  - Balance read and write caching
  - Read and write cache enabled for all LUNs
  - Read cache minimum of 50 - 100 MB for prefetch
7. Clustered Continuous Replication
  - Dedicated heartbeat connection between cluster nodes
  - Network connection with MNS on a reliable server in the environment. It is also recommended to use local DC/GC or Hub/CAS servers

See the following Microsoft documentation for storage-based replication best practices and support criteria:

Deployment Guidelines for Data Replication:

<http://www.microsoft.com/technet/prodtechnol/exchange/guides/E2k3DataRepl/bedf62a9-dff7-49a8-bd27-b2f1c46d5651.mspx>

Multi-site data replication support for Exchange:

<http://support.microsoft.com/?kbid=895847>

### Backup strategy

This solution used RAID 5 for the backup-to-disk LUNs (to maximize space), and then used EMC NetWorker<sup>®</sup> or NTBackup for backup to CDL or tape for long-term storage of databases.

## Test result summary

This section provides a high-level summary of the test data from ESRP. The [Microsoft Exchange Server Jetstress 2-hour performance test results](#); [Microsoft Exchange Server Jetstress 24-hour performance test results](#); [Microsoft Exchange Server Jetstress soft recovery test results](#); and the [Microsoft Exchange Server Jetstress streaming backup test results](#) contain detailed HTML reports that are generated by the ESRP testing framework.

### Reliability

A number of tests in the framework are to check the 24-hour reliability tests. The goal is to verify that the storage can handle high I/O load for a long period of time. Both the log and database files are analyzed for integrity after the stress test to ensure there was no database or log corruption.

- No errors reported in the saved eventlog file
- No errors reported during the database and log
- Event ID: 215 as expected at the end of the Jetstress run for streaming backup
- No errors during database checksum on the remote storage database

### Primary storage performance results

The primary storage performance testing is designed to exercise the storage with the 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 logical disk I/Os, and the average of all the logical disk I/O latency in the 2-hour test duration. Each server is listed separately and the aggregate numbers across all servers is also listed..

### Individual server metrics

The following table details the sum of I/O across storage groups and the average latency across all storage groups on a per server basis..

<b>Database I/O</b>	
Average database disk transfers/sec	593.477
Average database disk reads/sec	299.162
Average database disk writes/sec	294.315
Average database disk read latency (ms)	0.01275
Average database disk write latency (ms)	0.00475
<b>Transaction log I/O</b>	
Average log disk writes/sec	190.039
Average log disk write latency (ms)	0.002

## **Streaming backup performance**

For the 1.0 release, only streaming backup is supported for framework testing. There are two tests in this section: the first test is to measure the read I/O performance metrics by running checksum on all the databases and log files, the second test is to measure the end-to-end performance when the databases are backed up to disks.

## **Database read-only performance**

This test is to measure the maximum rate for the databases (streaming backup). The following table shows the average rate for a single database file.

<b>Item</b>	<b>Description</b>
MB read/sec per storage group	11.0475
MB read/sec total	44.19
File size/sec taken	393203.08/35593

## **Log read-only performance**

This test is to measure the maximum rate that the log files can be played against the databases. The following table shows the average rate for 500 log files played in a single storage group. Each log file is 1 MB in size.

<b>Item</b>	<b>Description</b>
Average time to play one log file (sec)	0.593039773

## **Backup-to-disk performance**

This test runs a backup on all the database files, and stores them on disks. The following table lists the average rate that each storage group can be backed up.

<b>Item</b>	<b>Description</b>
Total database size per storage group (GB)	383.9873828
Time taken to back up each storage group	2:28:18
Average MB backed up/sec per storage group	11.04947142

## Conclusion

This document has been developed by EMC, and reviewed by the Microsoft Exchange Product team. The test results/data presented in this document are based on the tests introduced in the ESRP test framework. The customers should not quote the data directly for their predeployment verification. It is still necessary to go through the exercises to validate the storage design for a specific customer environment.

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

## Contact information

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**Canada:** (800) 543-4782 (543-4SVC)

**Worldwide:** (508) 497-7901

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<http://EMC.com> or <http://powerlink.EMC.com>

# Microsoft Exchange Server Jetstress 2-hour performance test results

## *Performance test result report*

### Test summary

**Overall Test Result** **Pass**  
**Machine Name** 6TTRGD1  
**Test Description**  
**Test Start Time** 10/11/2007 3:11:21 PM  
**Test End Time** 10/11/2007 5:20:14 PM  
**Jetstress Version** 08.01.0177.000  
**Ese Version** 08.00.0685.024  
**Operating System** Microsoft Windows Server 2003 R2 Service Pack 2 (5.2.3790.131072)  
**Performance Log** [C:\Q4\Jetstress\4SG\3t\perf4-with evt cleared\Performance\\_2007\\_10\\_11\\_15\\_11\\_31.blg](C:\Q4\Jetstress\4SG\3t\perf4-with evt cleared\Performance_2007_10_11_15_11_31.blg)  
[C:\Q4\Jetstress\4SG\3t\perf4-with evt cleared\DBChecksum\\_2007\\_10\\_11\\_17\\_20\\_14.blg](C:\Q4\Jetstress\4SG\3t\perf4-with evt cleared\DBChecksum_2007_10_11_17_20_14.blg)

### Database sizing and throughput

**Achieved I/O per Second** 593.478  
**Capacity Percentage** 100%  
**Throughput Percentage** 100%  
**Initial database size** 412311683072  
**Final database size** 418190000128  
**Database files (count)** 4

### Jetstress system parameters

**Thread count** 3 (per-storage group)  
**Log buffers** 9000  
**Minimum database cache** 128.0 MB  
**Maximum database cache** 1024.0 MB  
**Insert operations** 25%  
**Delete operations** 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
Database (t:\sg1db)	0.013	0.004	74.414	74.082	(n/a)
Database (t:\sg2db)	0.012	0.005	75.192	73.259	(n/a)
Database (s:\sg3db)	0.014	0.005	75.764	73.447	(n/a)
Database (s:\sg4db)	0.012	0.005	73.792	73.527	(n/a)
Log (s:\sg1lg)	0.000	0.002	0.000	47.692	10962.134
Log (s:\sg2lg)	0.000	0.002	0.000	47.491	10828.400
Log (t:\sg3lg)	0.000	0.002	0.000	47.590	10807.509
Log (t:\sg4lg)	0.000	0.002	0.000	47.266	11080.007

### Host system performance

Counter	Average	Minimum	Maximum
% Processor Time	1.495	0.039	2.747
Available MBytes	14780.558	14722.000	15622.000
Free System Page Table Entries	16757882.333	16757881.000	16757901.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	57640473.600	57487360.000	57925632.000
Pool Paged Bytes	41372868.267	40349696.000	42209280.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

### Test Log

10/11/2007 3:11:21 PM -- Command Line: "C:\PROGRA~1\EXCHAN~1\jetstresscmd.exe" /c "C:\Q4\Jetstress\4SG\3t\perf4-with evt cleared\Perf.xml"

10/11/2007 3:11:21 PM -- Jetstress testing begins ...

10/11/2007 3:11:21 PM -- Prepare testing begins ...

10/11/2007 3:11:26 PM -- Attaching databases ...

10/11/2007 3:11:26 PM -- Prepare testing ends.

10/11/2007 3:11:26 PM -- Dispatching transactions begins ...

10/11/2007 3:11:26 PM -- Database cache settings: (minimum: 128.0 MB, maximum: 1.0 GB)

10/11/2007 3:11:26 PM -- Database flush thresholds: (start: 10.2 MB, stop: 20.5 MB)

10/11/2007 3:11:31 PM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).

10/11/2007 3:11:31 PM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).

10/11/2007 3:11:32 PM -- Operation mix: Sessions 3, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.

10/11/2007 3:11:32 PM -- Performance logging begins (interval: 15000 ms).

10/11/2007 3:11:32 PM -- Attaining prerequisites:

10/11/2007 3:20:10 PM -- \Database(JetstressCmd)\Database Cache Size, Last: 966426600.0

(lower bound: 966367600.0, upper bound: none)  
10/11/2007 5:20:11 PM -- Performance logging ends.  
10/11/2007 5:20:11 PM -- JetInterop batch transaction stats: 35481, 35536, 35349, and 35392.  
10/11/2007 5:20:11 PM -- Dispatching transactions ends.  
10/11/2007 5:20:11 PM -- Shutting down databases ...  
10/11/2007 5:20:14 PM -- Instance2908.1 (complete), Instance2908.2 (complete), Instance2908.3 (complete), and Instance2908.4 (complete)  
10/11/2007 5:20:14 PM -- Performance logging begins (interval: 15000 ms).  
10/11/2007 5:20:14 PM -- Verifying database checksums ...  
10/11/2007 6:15:28 PM -- t:\sg1db (100% processed), t:\sg2db (100% processed), s:\sg3db (100% processed), and s:\sg4db (100% processed)  
10/11/2007 6:15:29 PM -- Performance logging ends.  
10/11/2007 6:15:29 PM -- [C:\Q4\Jetstress\4SG\3t\perf4-with evt cleared\DBChecksum 2007 10 11 17 20 14.blg](#) has 220 samples.  
10/11/2007 6:15:33 PM -- [C:\Q4\Jetstress\4SG\3t\perf4-with evt cleared\DBChecksum 2007 10 11 17 20 14.html](#) is saved.  
10/11/2007 6:15:33 PM -- Verifying log checksums ...  
10/11/2007 6:15:38 PM -- s:\sg1lg (22 logs passed), s:\sg2lg (22 logs passed), t:\sg3lg (22 logs passed), and t:\sg4lg (22 logs passed)  
10/11/2007 6:15:38 PM -- [C:\Q4\Jetstress\4SG\3t\perf4-with evt cleared\Performance 2007 10 11 15 11 31.blg](#) has 514 samples.  
10/11/2007 6:15:38 PM -- Creating test report ...  
10/11/2007 6:15:43 PM -- Volume t:\sg1db has 0.0135 for Avg. Disk sec/Read.  
10/11/2007 6:15:43 PM -- Volume t:\sg2db has 0.0117 for Avg. Disk sec/Read.  
10/11/2007 6:15:43 PM -- Volume s:\sg3db has 0.0139 for Avg. Disk sec/Read.  
10/11/2007 6:15:43 PM -- Volume s:\sg4db has 0.0117 for Avg. Disk sec/Read.  
10/11/2007 6:15:43 PM -- Volume s:\sg1lg has 0.0016 for Avg. Disk sec/Write.  
10/11/2007 6:15:43 PM -- Volume s:\sg1lg has 0.0000 for Avg. Disk sec/Read.  
10/11/2007 6:15:43 PM -- Volume s:\sg2lg has 0.0016 for Avg. Disk sec/Write.  
10/11/2007 6:15:43 PM -- Volume s:\sg2lg has 0.0000 for Avg. Disk sec/Read.  
10/11/2007 6:15:43 PM -- Volume t:\sg3lg has 0.0016 for Avg. Disk sec/Write.  
10/11/2007 6:15:43 PM -- Volume t:\sg3lg has 0.0000 for Avg. Disk sec/Read.  
10/11/2007 6:15:43 PM -- Volume t:\sg4lg has 0.0016 for Avg. Disk sec/Write.  
10/11/2007 6:15:43 PM -- Volume t:\sg4lg has 0.0000 for Avg. Disk sec/Read.  
10/11/2007 6:15:43 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
10/11/2007 6:15:43 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
10/11/2007 6:15:43 PM -- [C:\Q4\Jetstress\4SG\3t\perf4-with evt cleared\Performance 2007 10 11 15 11 31.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
t:\sg1db\Jetstress1.edb	12765538	0	0	0	99730 MBytes / 3125 seconds
t:\sg2db\Jetstress1.edb	12758114	0	0	0	99672 MBytes / 3313 seconds
s:\sg3db\Jetstress1.edb	12757602	0	0	0	99668 Mbytes / 3295 seconds
s:\sg4db\Jetstress1.edb	12767330	0	0	0	99744 MBytes / 2714 seconds
(Sum)	51048584	0	0	0	398817 MBytes / 3313 seconds

### Disk subsystem performance (of checksum)

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec
t:\sg1db	0.139	0.001	511.503	0.003
t:\sg2db	0.154	0.001	477.627	0.003
s:\sg3db	0.147	0.001	483.350	0.002
s:\sg4db	0.138	0.001	590.263	0.001

### Memory system performance (of checksum)

Counter	Average	Minimum	Maximum
% Processor Time	9.224	3.672	11.484
Available MBytes	15575.114	15553.000	15751.000
Free System Page Table Entries	16757881.000	16757881.000	16757881.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	79005900.800	74108928.000	80625664.000
Pool Paged Bytes	42232664.436	42188800.000	42876928.000

### Test Log

10/11/2007 3:11:21 PM -- Command Line: "C:\PROGRA~1\EXCHAN~1\jetstresscmd.exe" /c "C:\Q4\Jetstress\4SG\3t\perf4-with evt cleared\Perf.xml"

10/11/2007 3:11:21 PM -- Jetstress testing begins ...

10/11/2007 3:11:21 PM -- Prepare testing begins ...

10/11/2007 3:11:26 PM -- Attaching databases ...

10/11/2007 3:11:26 PM -- Prepare testing ends.

10/11/2007 3:11:26 PM -- Dispatching transactions begins ...

10/11/2007 3:11:26 PM -- Database cache settings: (minimum: 128.0 MB, maximum: 1.0 GB)

10/11/2007 3:11:26 PM -- Database flush thresholds: (start: 10.2 MB, stop: 20.5 MB)

10/11/2007 3:11:31 PM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).  
10/11/2007 3:11:31 PM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).  
10/11/2007 3:11:32 PM -- Operation mix: Sessions 3, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
10/11/2007 3:11:32 PM -- Performance logging begins (interval: 15000 ms).  
10/11/2007 3:11:32 PM -- Attaining prerequisites:  
10/11/2007 3:20:10 PM -- \Database(JetstressCmd)\Database Cache Size, Last: 966426600.0 (lower bound: 966367600.0, upper bound: none)  
10/11/2007 5:20:11 PM -- Performance logging ends.  
10/11/2007 5:20:11 PM -- JetInterop batch transaction stats: 35481, 35536, 35349, and 35392.  
10/11/2007 5:20:11 PM -- Dispatching transactions ends.  
10/11/2007 5:20:11 PM -- Shutting down databases ...  
10/11/2007 5:20:14 PM -- Instance2908.1 (complete), Instance2908.2 (complete), Instance2908.3 (complete), and Instance2908.4 (complete)  
10/11/2007 5:20:14 PM -- Performance logging begins (interval: 15000 ms).  
10/11/2007 5:20:14 PM -- Verifying database checksums ...  
10/11/2007 6:15:28 PM -- t:\sg1db (100% processed), t:\sg2db (100% processed), s:\sg3db (100% processed), and s:\sg4db (100% processed)  
10/11/2007 6:15:29 PM -- Performance logging ends.  
10/11/2007 6:15:29 PM -- [C:\Q4\Jetstress\4SG\3t\perf4-with evt cleared\DBChecksum 2007 10 11 17 20 14.blg](#) has 220 samples.

# Microsoft Exchange Server Jetstress 24-hour performance test results

## *Stress test result report*

### Test summary

Overall Test Result **Pass**

Machine Name 6TTRGD1

### Test Description

Test Start Time 10/18/2007 8:20:20 AM

Test End Time 10/19/2007 8:29:05 AM

Jetstress Version 08.01.0177.000

Ese Version 08.00.0685.024

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

Performance Log [C:\Q4\Jetstress\4SG\3t\stress\Stress\\_2007\\_10\\_18\\_8\\_20\\_29.blg](C:\Q4\Jetstress\4SG\3t\stress\Stress_2007_10_18_8_20_29.blg)  
[C:\Q4\Jetstress\4SG\3t\stress\DBCchecksum\\_2007\\_10\\_19\\_8\\_29\\_5.blg](C:\Q4\Jetstress\4SG\3t\stress\DBCchecksum_2007_10_19_8_29_5.blg)

### Database sizing and throughput

Achieved I/O per Second 568.477

Capacity Percentage 100%

Throughput Percentage 100%

Initial database size 412311683072

Final database size 469547679744

Database files (count) 4

### Jetstress system parameters

Thread count 3 (per-storage group)

Log buffers 9000

Minimum database cache 128.0 MB

Maximum database cache 1024.0 MB

Insert operations 25%

Delete operations 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
Database (T:\SG1DB)	0.014	0.004	74.488	67.869	(n/a)
Database (T:\SG2DB)	0.012	0.005	73.940	67.990	(n/a)
Database (S:\SG3DB)	0.014	0.005	74.468	67.795	(n/a)
Database (S:\SG4DB)	0.012	0.005	74.171	67.756	(n/a)
Log (S:\SG1LG)	0.000	0.002	0.000	42.015	10772.706
Log (S:\SG2LG)	0.000	0.002	0.000	41.954	10859.520
Log (T:\SG3LG)	0.000	0.002	0.000	42.158	10777.278
Log (T:\SG4LG)	0.000	0.002	0.000	41.813	10851.923

## Host system performance

Counter	Average	Minimum	Maximum
% Processor Time	1.443	0.026	3.086
Available MBytes	14707.174	14693.000	14820.000
Free System Page Table Entries	16758287.906	16758281.000	16758291.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	57619080.533	57020416.000	58052608.000
Pool Paged Bytes	46624381.156	45297664.000	47407104.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

### Test Log

10/18/2007 8:20:20 AM -- Command Line: "C:\PROGRA~1\EXCHAN~1\jetstresscmd.exe" /c "C:\Q4\Jetstress\4SG\3t\stress\stress.xml"

10/18/2007 8:20:20 AM -- Jetstress testing begins ...

10/18/2007 8:20:20 AM -- Prepare testing begins ...

10/18/2007 8:20:25 AM -- Attaching databases ...

10/18/2007 8:20:25 AM -- Prepare testing ends.

10/18/2007 8:20:25 AM -- Dispatching transactions begins ...

10/18/2007 8:20:25 AM -- Database cache settings: (minimum: 128.0 MB, maximum: 1.0 GB)

10/18/2007 8:20:25 AM -- Database flush thresholds: (start: 10.2 MB, stop: 20.5 MB)

10/18/2007 8:20:29 AM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.1 seconds/read).

10/18/2007 8:20:29 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.1 seconds/write).

10/18/2007 8:20:30 AM -- Operation mix: Sessions 3, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.

10/18/2007 8:20:30 AM -- Performance logging begins (interval: 15000 ms).

10/18/2007 8:20:30 AM -- Attaining prerequisites:

10/18/2007 8:28:59 AM -- \Database(JetstressCmd)\Database Cache Size, Last: 966418400.0

(lower bound: 966367600.0, upper bound: none)  
10/19/2007 8:29:01 AM -- Performance logging ends.  
10/19/2007 8:29:01 AM -- JetInterop batch transaction stats: 347688, 348602, 347642, and 346964.  
10/19/2007 8:29:01 AM -- Dispatching transactions ends.  
10/19/2007 8:29:01 AM -- Shutting down databases ...  
10/19/2007 8:29:05 AM -- Instance2604.1 (complete), Instance2604.2 (complete), Instance2604.3 (complete), and Instance2604.4 (complete)  
10/19/2007 8:29:05 AM -- Performance logging begins (interval: 15000 ms).  
10/19/2007 8:29:05 AM -- Verifying database checksums ...  
10/19/2007 9:30:57 AM -- T:\SG1DB (100% processed), T:\SG2DB (100% processed), S:\SG3DB (100% processed), and S:\SG4DB (100% processed)  
10/19/2007 9:30:58 AM -- Performance logging ends.  
10/19/2007 9:30:58 AM -- [C:\Q4\Jetstress\4SG\3t\stress\DBChecksum\\_2007\\_10\\_19\\_8\\_29\\_5.blg](C:\Q4\Jetstress\4SG\3t\stress\DBChecksum_2007_10_19_8_29_5.blg) has 247 samples.  
10/19/2007 9:31:02 AM -- [C:\Q4\Jetstress\4SG\3t\stress\DBChecksum\\_2007\\_10\\_19\\_8\\_29\\_5.html](C:\Q4\Jetstress\4SG\3t\stress\DBChecksum_2007_10_19_8_29_5.html) is saved.  
10/19/2007 9:31:02 AM -- Verifying log checksums ...  
10/19/2007 9:31:07 AM -- S:\SG1LG (21 logs passed), S:\SG2LG (21 logs passed), T:\SG3LG (21 logs passed), and T:\SG4LG (22 logs passed)  
10/19/2007 9:31:07 AM -- [C:\Q4\Jetstress\4SG\3t\stress\Stress\\_2007\\_10\\_18\\_8\\_20\\_29.blg](C:\Q4\Jetstress\4SG\3t\stress\Stress_2007_10_18_8_20_29.blg) has 5793 samples.  
10/19/2007 9:31:07 AM -- Creating test report ...  
10/19/2007 9:32:15 AM -- Volume T:\SG1DB has 0.0139 for Avg. Disk sec/Read.  
10/19/2007 9:32:15 AM -- Volume T:\SG2DB has 0.0121 for Avg. Disk sec/Read.  
10/19/2007 9:32:15 AM -- Volume S:\SG3DB has 0.0143 for Avg. Disk sec/Read.  
10/19/2007 9:32:15 AM -- Volume S:\SG4DB has 0.0119 for Avg. Disk sec/Read.  
10/19/2007 9:32:15 AM -- Volume S:\SG1LG has 0.0016 for Avg. Disk sec/Write.  
10/19/2007 9:32:15 AM -- Volume S:\SG1LG has 0.0000 for Avg. Disk sec/Read.  
10/19/2007 9:32:15 AM -- Volume S:\SG2LG has 0.0016 for Avg. Disk sec/Write.  
10/19/2007 9:32:15 AM -- Volume S:\SG2LG has 0.0000 for Avg. Disk sec/Read.  
10/19/2007 9:32:15 AM -- Volume T:\SG3LG has 0.0016 for Avg. Disk sec/Write.  
10/19/2007 9:32:15 AM -- Volume T:\SG3LG has 0.0000 for Avg. Disk sec/Read.  
10/19/2007 9:32:15 AM -- Volume T:\SG4LG has 0.0016 for Avg. Disk sec/Write.  
10/19/2007 9:32:15 AM -- Volume T:\SG4LG has 0.0000 for Avg. Disk sec/Read.  
10/19/2007 9:32:15 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
10/19/2007 9:32:15 AM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
10/19/2007 9:32:15 AM -- [C:\Q4\Jetstress\4SG\3t\stress\Stress\\_2007\\_10\\_18\\_8\\_20\\_29.xml](C:\Q4\Jetstress\4SG\3t\stress\Stress_2007_10_18_8_20_29.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
T:\SG1DB\Jetstress1.edb	14304114	0	0	0	111750 MBytes / 3481 seconds
T:\SG2DB\Jetstress1.edb	14360178	0	0	0	112188 MBytes / 3711 seconds
S:\SG3DB\Jetstress1.edb	14321778	0	0	0	111888 MBytes / 3701 seconds
S:\SG4DB\Jetstress1.edb	14331762	0	0	0	111966 MBytes / 3078 seconds
(Sum)	57317832	0	0	0	447795 MBytes / 3711 seconds

### Disk subsystem performance (of checksum)

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec
T:\SG1DB	0.139	0.001	514.733	0.001
T:\SG2DB	0.153	0.000	482.876	0.001
S:\SG3DB	0.146	0.001	482.824	0.001
S:\SG4DB	0.140	0.008	583.335	0.001

### Memory system performance (of checksum)

Counter	Average	Minimum	Maximum
% Processor Time	9.274	4.518	10.846
Available MBytes	15535.437	15513.000	15714.000
Free System Page Table Entries	16758001.283	16758001.000	16758071.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	79274531.239	74285056.000	81252352.000
Pool Paged Bytes	48517219.498	48492544.000	49041408.000

### Test Log

10/18/2007 8:20:20 AM -- Command Line: "C:\PROGRA~1\EXCHAN~1\jetstresscmd.exe" /c "C:\Q4\Jetstress\4SG\3t\stress\stress.xml"  
 10/18/2007 8:20:20 AM -- Jetstress testing begins ...  
 10/18/2007 8:20:20 AM -- Prepare testing begins ...  
 10/18/2007 8:20:25 AM -- Attaching databases ...  
 10/18/2007 8:20:25 AM -- Prepare testing ends.  
 10/18/2007 8:20:25 AM -- Dispatching transactions begins ...  
 10/18/2007 8:20:25 AM -- Database cache settings: (minimum: 128.0 MB, maximum: 1.0 GB)  
 10/18/2007 8:20:25 AM -- Database flush thresholds: (start: 10.2 MB, stop: 20.5 MB)

10/18/2007 8:20:29 AM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.1 seconds/read).  
10/18/2007 8:20:29 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.1 seconds/write).  
10/18/2007 8:20:30 AM -- Operation mix: Sessions 3, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
10/18/2007 8:20:30 AM -- Performance logging begins (interval: 15000 ms).  
10/18/2007 8:20:30 AM -- Attaining prerequisites:  
10/18/2007 8:28:59 AM -- \Database(JetstressCmd)\Database Cache Size, Last: 966418400.0 (lower bound: 966367600.0, upper bound: none)  
10/19/2007 8:29:01 AM -- Performance logging ends.  
10/19/2007 8:29:01 AM -- JetInterop batch transaction stats: 347688, 348602, 347642, and 346964.  
10/19/2007 8:29:01 AM -- Dispatching transactions ends.  
10/19/2007 8:29:01 AM -- Shutting down databases ...  
10/19/2007 8:29:05 AM -- Instance2604.1 (complete), Instance2604.2 (complete), Instance2604.3 (complete), and Instance2604.4 (complete)  
10/19/2007 8:29:05 AM -- Performance logging begins (interval: 15000 ms).  
10/19/2007 8:29:05 AM -- Verifying database checksums ...  
10/19/2007 9:30:57 AM -- T:\SG1DB (100% processed), T:\SG2DB (100% processed), S:\SG3DB (100% processed), and S:\SG4DB (100% processed)  
10/19/2007 9:30:58 AM -- Performance logging ends.  
10/19/2007 9:30:58 AM -- [C:\Q4\Jetstress\4SG\3t\stress\DBChecksum\\_2007\\_10\\_19\\_8\\_29\\_5.blg](C:\Q4\Jetstress\4SG\3t\stress\DBChecksum_2007_10_19_8_29_5.blg) has 247 samples.

# Microsoft Exchange Server Jetstress soft recovery test results

## Soft recovery test result report

### Soft recovery statistics - All

Database Instance	Log files replayed	Elapsed seconds
Instance2892.1	505	314.015625
Instance2892.2	512	289.765625
Instance2892.3	500	310.015625
Instance2892.4	507	286.515625

### Disk subsystem performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (T:\SG1DB)	0.091	0.032	376.036	6.450	(n/a)
Database (T:\SG2DB)	0.079	0.027	366.410	6.824	(n/a)
Database (S:\SG3DB)	0.100	0.033	376.186	6.637	(n/a)
Database (S:\SG4DB)	0.077	0.022	364.662	6.779	(n/a)
Log (S:\SG1LG)	0.001	0.001	53.026	1.775	3122.164
Log (S:\SG2LG)	0.001	0.001	54.517	2.100	4178.471
Log (T:\SG3LG)	0.001	0.001	53.239	1.881	3241.480
Log (T:\SG4LG)	0.001	0.001	53.985	2.094	3570.622

### Host system performance

Counter	Average	Minimum	Maximum
% Processor Time	4.779	0.000	9.570
Available MBytes	14912.045	14699.000	15755.000
Free System Page Table Entries	16757961.000	16757961.000	16757961.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	60199095.795	59924480.000	60960768.000
Pool Paged Bytes	42562796.308	42336256.000	42917888.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

## Test Log

10/12/2007 8:29:59 PM -- Command Line: "C:\PROGRA~1\EXCHAN~1\jetstresscmd.exe" /c "C:\Q4\Jetstress\4SG\3t\soft\soft.xml"  
10/12/2007 8:29:59 PM -- Jetstress testing begins ...  
10/12/2007 8:29:59 PM -- Prepare testing begins ...  
10/12/2007 8:30:04 PM -- Attaching databases ...  
10/12/2007 8:30:04 PM -- Prepare testing ends.  
10/12/2007 8:30:04 PM -- Dispatching transactions begins ...  
10/12/2007 8:30:04 PM -- Database cache settings: (minimum: 128.0 MB, maximum: 1.0 GB)  
10/12/2007 8:30:04 PM -- Database flush thresholds: (start: 10.2 MB, stop: 20.5 MB)  
10/12/2007 8:30:08 PM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).  
10/12/2007 8:30:08 PM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).  
10/12/2007 8:30:09 PM -- Operation mix: Sessions 3, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
10/12/2007 8:30:09 PM -- Performance logging begins (interval: 15000 ms).  
10/12/2007 8:30:09 PM -- Generating log files ...  
10/12/2007 9:03:06 PM -- S:\SG1LG (101.0% generated), S:\SG2LG (102.4% generated), T:\SG3LG (100.2% generated), and T:\SG4LG (101.4% generated)  
10/12/2007 9:03:07 PM -- Performance logging ends.  
10/12/2007 9:03:07 PM -- JetInterop batch transaction stats: 9693, 9979, 9907, and 9844.  
10/12/2007 9:03:07 PM -- Dispatching transactions ends.  
10/12/2007 9:03:07 PM -- Shutting down databases ...  
10/12/2007 9:03:09 PM -- Instance2892.1 (complete), Instance2892.2 (complete), Instance2892.3 (complete), and Instance2892.4 (complete)  
10/12/2007 9:03:09 PM -- [C:\Q4\Jetstress\4SG\3t\soft\Performance\\_2007\\_10\\_12\\_20\\_30\\_8.blg](C:\Q4\Jetstress\4SG\3t\soft\Performance_2007_10_12_20_30_8.blg) has 131 samples.  
10/12/2007 9:03:09 PM -- Creating test report ...  
10/12/2007 9:03:10 PM -- Volume T:\SG1DB has 0.0129 for Avg. Disk sec/Read.  
10/12/2007 9:03:10 PM -- Volume T:\SG2DB has 0.0114 for Avg. Disk sec/Read.  
10/12/2007 9:03:10 PM -- Volume S:\SG3DB has 0.0136 for Avg. Disk sec/Read.  
10/12/2007 9:03:10 PM -- Volume S:\SG4DB has 0.0113 for Avg. Disk sec/Read.  
10/12/2007 9:03:10 PM -- Volume S:\SG1LG has 0.0016 for Avg. Disk sec/Write.  
10/12/2007 9:03:10 PM -- Volume S:\SG1LG has 0.0009 for Avg. Disk sec/Read.  
10/12/2007 9:03:10 PM -- Volume S:\SG2LG has 0.0016 for Avg. Disk sec/Write.  
10/12/2007 9:03:10 PM -- Volume S:\SG2LG has 0.0010 for Avg. Disk sec/Read.  
10/12/2007 9:03:10 PM -- Volume T:\SG3LG has 0.0016 for Avg. Disk sec/Write.  
10/12/2007 9:03:10 PM -- Volume T:\SG3LG has 0.0007 for Avg. Disk sec/Read.  
10/12/2007 9:03:10 PM -- Volume T:\SG4LG has 0.0016 for Avg. Disk sec/Write.  
10/12/2007 9:03:10 PM -- Volume T:\SG4LG has 0.0006 for Avg. Disk sec/Read.  
10/12/2007 9:03:10 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
10/12/2007 9:03:10 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
10/12/2007 9:03:10 PM -- [C:\Q4\Jetstress\4SG\3t\soft\Performance\\_2007\\_10\\_12\\_20\\_30\\_8.xml](C:\Q4\Jetstress\4SG\3t\soft\Performance_2007_10_12_20_30_8.xml) has 130 samples queried.  
10/12/2007 9:03:10 PM -- [C:\Q4\Jetstress\4SG\3t\soft\Performance\\_2007\\_10\\_12\\_20\\_30\\_8.html](C:\Q4\Jetstress\4SG\3t\soft\Performance_2007_10_12_20_30_8.html) is saved.  
10/12/2007 9:03:11 PM -- Performance logging begins (interval: 2000 ms).  
10/12/2007 9:03:11 PM -- Recovering databases ...  
10/12/2007 9:08:26 PM -- Performance logging ends.  
10/12/2007 9:08:26 PM -- Instance2892.1 (314.015625), Instance2892.2 (289.765625),

Instance2892.3 (310.015625), and Instance2892.4 (286.515625)  
 10/12/2007 9:08:26 PM -- [C:\Q4\Jetstress\4SG\3t\soft\SoftRecovery\\_2007\\_10\\_12\\_21\\_3\\_10.blg](C:\Q4\Jetstress\4SG\3t\soft\SoftRecovery_2007_10_12_21_3_10.blg)  
 has 156 samples.  
 10/12/2007 9:08:26 PM -- Creating test report ...

## Microsoft Exchange Server Jetstress streaming backup test results

### Streaming backup test result report

#### Streaming backup statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance1648.1	98300.77	02:30:46	10.87
Instance1648.2	98300.77	02:25:27	11.26
Instance1648.3	98300.77	02:27:08	11.13
Instance1648.4	98300.77	02:29:52	10.93

#### Jetstress system parameters

Thread count	3 (per-storage group)
Log buffers	9000
Minimum database cache	128.0 MB
Maximum database cache	1024.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

#### Disk subsystem performance

Database ==> Instances	Database Reads Latency	Database Writes Latency	Database Reads/sec	Database Writes/sec	Log Reads Latency	Log Writes Latency	Log Reads/sec	Log Writes/sec	Log Writes Bytes
Instance1648.1	6.472	0.039	87.140	0.000	0.000	0.000	0.000	0.000	0.000
Instance1648.2	5.960	0.000	90.361	0.000	0.000	0.000	0.000	0.000	0.000
Instance1648.3	6.001	0.000	89.356	0.000	0.000	0.000	0.000	0.000	0.000
Instance1648.4	6.350	0.013	87.640	0.000	0.000	0.000	0.000	0.000	0.000

## Host system performance

Counter	Average	Minimum	Maximum
% Processor Time	30.353	15.054	50.012
Available MBytes	15263.049	15001.000	15770.000
Free System Page Table Entries	16757876.896	16757851.000	16758011.000
Transition Pages RePurposed/sec	10782.016	0.000	23533.037
Pool Nonpaged Bytes	72304224.911	58179584.000	79306752.000
Pool Paged Bytes	572794410.023	44097536.000	847212544.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

### Test Log

10/12/2007 10:20:16 PM -- Command Line: "C:\PROGRA~1\EXCHAN~1\jetstresscmd.exe" /c "C:\Q4\Jetstress\4SG\3t\b2d\b2d.xml"  
10/12/2007 10:20:16 PM -- Jetstress testing begins ...  
10/12/2007 10:20:16 PM -- Prepare testing begins ...  
10/12/2007 10:20:21 PM -- Attaching databases ...  
10/12/2007 10:20:21 PM -- Prepare testing ends.  
10/12/2007 10:20:26 PM -- Performance logging begins (interval: 15000 ms).  
10/12/2007 10:20:26 PM -- Streaming backup databases ...  
10/13/2007 12:51:13 AM -- Performance logging ends.  
10/13/2007 12:51:13 AM -- Instance1648.1 (100% processed), Instance1648.2 (100% processed), Instance1648.3 (100% processed), and Instance1648.4 (100% processed)  
10/13/2007 12:51:13 AM --  
[C:\Q4\Jetstress\4SG\3t\b2d\StreamingBackup\\_2007\\_10\\_12\\_22\\_20\\_21.blg](#) has 597 samples.  
10/13/2007 12:51:14 AM -- Creating test report ...