

**ESRP Storage Program**  
**EMC CLARiiON CX3-20c (1,000 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 (1,000 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 (1,000 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 information](#) 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.mspx>

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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 1,000 Exchange 2007 users.

The server was connected to the CX3-20c through dedicated NICs (used for iSCSI) with the Microsoft iSCSI Software Initiator 2.0.5, and an iSCSI VLAN. Each of the 1,000 users had a profile of 0.42 IOPS with a 380 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.

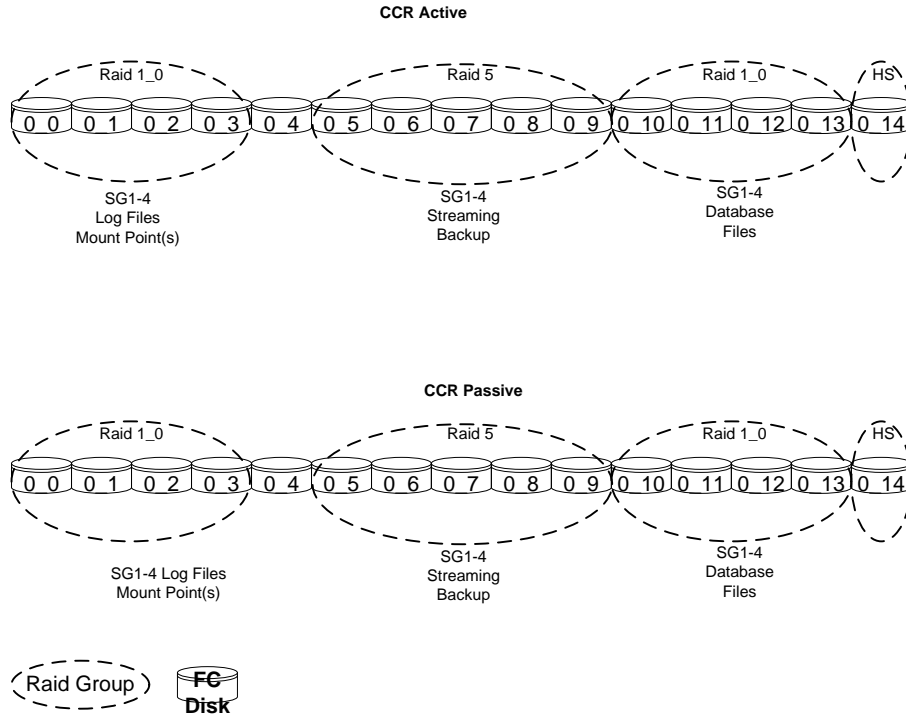
Sizing and configuring storage for use with Microsoft Exchange Server is a complicated process, driven by many variables and factors that vary from one organization to another.

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) 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.

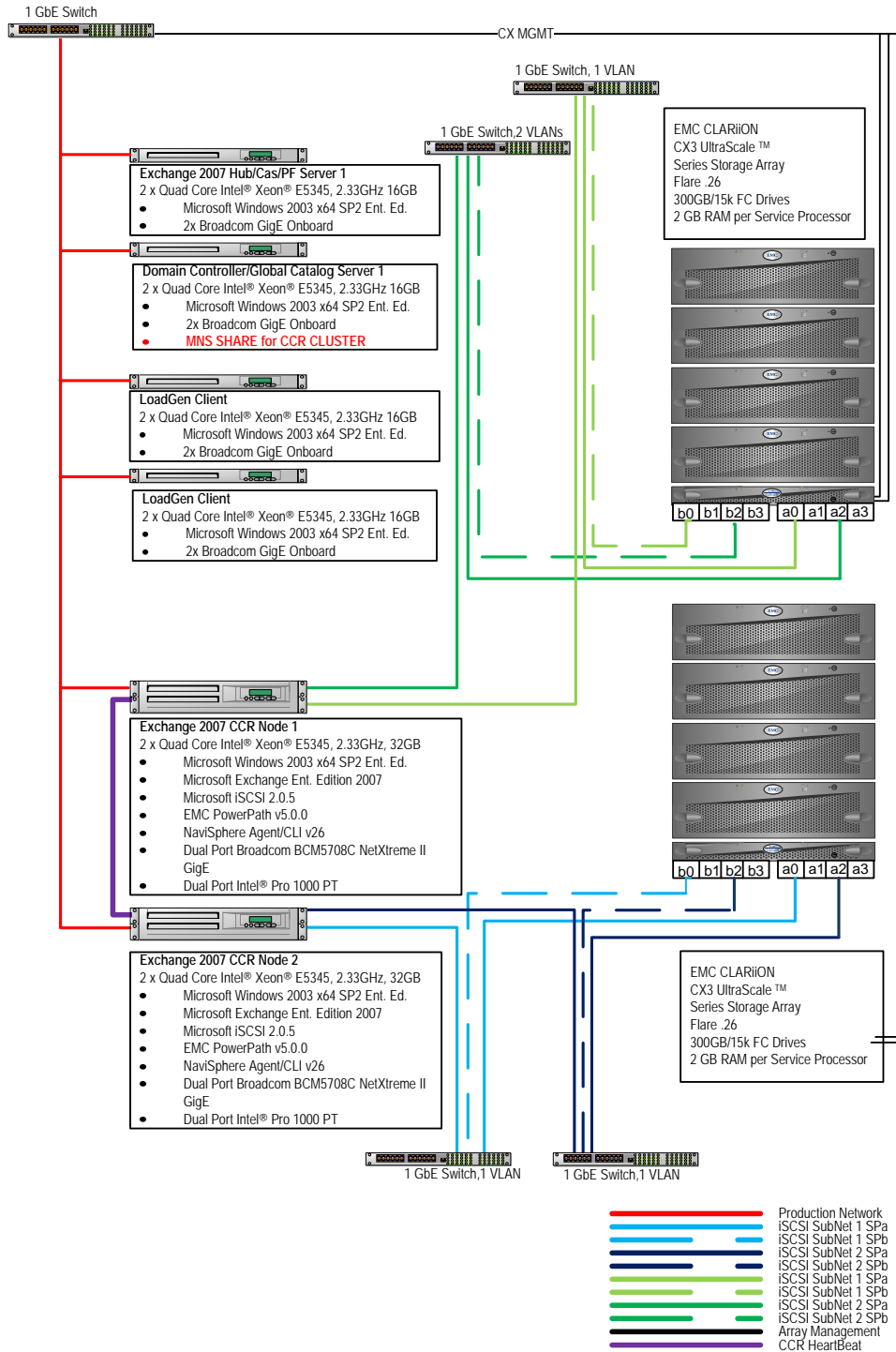


Figure 2 Physical architecture

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 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 1,000 Exchange mailboxes. The configuration used for testing is detailed in the following section:

- Number of mailbox servers presented to the storage array = 1
- User I/O profile for testing = 0.42
- User mailbox size for testing = 380 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	1,000
Number of hosts	1
Number of mailboxes/host	1,000
Number of storage groups/host	4
Number of mailbox stores/storage group	1
Number of mailboxes/mailbox store	250
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 2.0.0.39
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 2.0 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.msp>

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/second	496.42
Average database disk reads/second	248.68
Average database disk writes/second	247.74
Average database disk read latency (ms)	0.0105
Average database disk write latency (ms)	0.004
<b>Transaction log I/O</b>	
Average log disk writes/second	166.86
Average log disk write latency (ms)	0.001

## **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/second per storage group	10.7525
MB read/second total	43.01
File size/second taken	393203.08/36617

## **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 (s)	0.586236506

## **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	2:32:34
Average MB backed up/second per storage group	10.75347024

## 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 10:52:04 AM

**Test End Time**      10/11/2007 1:03:06 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\2t\perf4-with evt cleared\Performance\\_2007\\_10\\_11\\_10\\_52\\_13.blg](C:\Q4\Jetstress\4SG\2t\perf4-with evt cleared\Performance_2007_10_11_10_52_13.blg)  
[C:\Q4\Jetstress\4SG\2t\perf4-with evt cleared\DBChecksum\\_2007\\_10\\_11\\_13\\_3\\_6.blg](C:\Q4\Jetstress\4SG\2t\perf4-with evt cleared\DBChecksum_2007_10_11_13_3_6.blg)

### Database sizing and throughput

**Achieved I/O per Second**      496.419  
**Capacity Percentage**            100%  
**Throughput Percentage**        100%  
**Initial database size**          412311683072  
**Final database size**            417365819392  
**Database files (count)**        4

### Jetstress system parameters

**Thread count**                    2 (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)	0.011	0.004	60.643	61.653	(n/a)
Database (t:\sg2db)	0.010	0.004	63.651	61.963	(n/a)
Database (s:\sg3db)	0.011	0.004	61.965	61.861	(n/a)
Database (s:\sg4db)	0.010	0.004	62.421	62.263	(n/a)
Log (s:\sg1lg)	0.000	0.001	0.000	41.727	10494.279
Log (s:\sg2lg)	0.000	0.001	0.000	41.940	10403.040
Log (t:\sg3lg)	0.000	0.001	0.000	41.609	10536.623
Log (t:\sg4lg)	0.000	0.001	0.000	41.584	10615.879

## Host system performance

Counter	Average	Minimum	Maximum
% Processor Time	1.209	0.117	2.318
Available MBytes	14811.300	14786.000	15649.000
Free System Page Table Entries	16758161.000	16758161.000	16758161.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	57405943.467	57221120.000	57663488.000
Pool Paged Bytes	41214327.467	41136128.000	41422848.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

### Test Log

10/11/2007 10:52:04 AM -- Command Line:  
 "C:\PROGRA~1\EXCHAN~1\jetstresscmd.exe" /c "C:\Q4\Jetstress\4SG\2t\perf4-with evt  
 cleared\Perf.xml"  
 10/11/2007 10:52:04 AM -- Jetstress testing begins ...  
 10/11/2007 10:52:04 AM -- Prepare testing begins ...  
 10/11/2007 10:52:09 AM -- Attaching databases ...  
 10/11/2007 10:52:09 AM -- Prepare testing ends.  
 10/11/2007 10:52:09 AM -- Dispatching transactions begins ...  
 10/11/2007 10:52:09 AM -- Database cache settings: (minimum: 128.0 MB, maximum: 1.0 GB)  
 10/11/2007 10:52:09 AM -- Database flush thresholds: (start: 10.2 MB, stop: 20.5 MB)  
 10/11/2007 10:52:13 AM -- Database read latency thresholds: (average: 0.02 seconds/read,  
 maximum: 0.05 seconds/read).  
 10/11/2007 10:52:13 AM -- Log write latency thresholds: (average: 0.01 seconds/write,  
 maximum: 0.05 seconds/write).  
 10/11/2007 10:52:14 AM -- Operation mix: Sessions 2, Inserts 25%, Deletes 10%, Replaces 50%,  
 Reads 15%, Lazy Commits 80%.  
 10/11/2007 10:52:14 AM -- Performance logging begins (interval: 15000 ms).  
 10/11/2007 10:52:14 AM -- Attaining prerequisites:  
 10/11/2007 11:03:01 AM -- \Database(JetstressCmd)\Database Cache Size, Last: 967360500.0

(lower bound: 966367600.0, upper bound: none)  
10/11/2007 1:03:03 PM -- Performance logging ends.  
10/11/2007 1:03:03 PM -- JetInterop batch transaction stats: 30162, 30450, 30027, and 30343.  
10/11/2007 1:03:04 PM -- Dispatching transactions ends.  
10/11/2007 1:03:04 PM -- Shutting down databases ...  
10/11/2007 1:03:06 PM -- Instance2156.1 (complete), Instance2156.2 (complete), Instance2156.3 (complete), and Instance2156.4 (complete)  
10/11/2007 1:03:06 PM -- Performance logging begins (interval: 15000 ms).  
10/11/2007 1:03:06 PM -- Verifying database checksums ...  
10/11/2007 1:58:15 PM -- t:\sg1db (100% processed), t:\sg2db (100% processed), s:\sg3db (100% processed), and s:\sg4db (100% processed)  
10/11/2007 1:58:16 PM -- Performance logging ends.  
10/11/2007 1:58:16 PM -- [C:\Q4\Jetstress\4SG\2t\perf4-with evt cleared\DBChecksum 2007 10 11 13 3 6.blg](#) has 220 samples.  
10/11/2007 1:58:20 PM -- [C:\Q4\Jetstress\4SG\2t\perf4-with evt cleared\DBChecksum 2007 10 11 13 3 6.html](#) is saved.  
10/11/2007 1:58:20 PM -- Verifying log checksums ...  
10/11/2007 1:58:25 PM -- s:\sg1lg (22 logs passed), s:\sg2lg (22 logs passed), t:\sg3lg (22 logs passed), and t:\sg4lg (21 logs passed)  
10/11/2007 1:58:25 PM -- [C:\Q4\Jetstress\4SG\2t\perf4-with evt cleared\Performance 2007 10 11 10 52 13.blg](#) has 523 samples.  
10/11/2007 1:58:25 PM -- Creating test report ...  
10/11/2007 1:58:31 PM -- Volume t:\sg1db has 0.0115 for Avg. Disk sec/Read.  
10/11/2007 1:58:31 PM -- Volume t:\sg2db has 0.0097 for Avg. Disk sec/Read.  
10/11/2007 1:58:31 PM -- Volume s:\sg3db has 0.0109 for Avg. Disk sec/Read.  
10/11/2007 1:58:31 PM -- Volume s:\sg4db has 0.0097 for Avg. Disk sec/Read.  
10/11/2007 1:58:31 PM -- Volume s:\sg1lg has 0.0012 for Avg. Disk sec/Write.  
10/11/2007 1:58:31 PM -- Volume s:\sg1lg has 0.0000 for Avg. Disk sec/Read.  
10/11/2007 1:58:31 PM -- Volume s:\sg2lg has 0.0012 for Avg. Disk sec/Write.  
10/11/2007 1:58:31 PM -- Volume s:\sg2lg has 0.0000 for Avg. Disk sec/Read.  
10/11/2007 1:58:31 PM -- Volume t:\sg3lg has 0.0012 for Avg. Disk sec/Write.  
10/11/2007 1:58:31 PM -- Volume t:\sg3lg has 0.0000 for Avg. Disk sec/Read.  
10/11/2007 1:58:31 PM -- Volume t:\sg4lg has 0.0013 for Avg. Disk sec/Write.  
10/11/2007 1:58:31 PM -- Volume t:\sg4lg has 0.0000 for Avg. Disk sec/Read.  
10/11/2007 1:58:31 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
10/11/2007 1:58:31 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
10/11/2007 1:58:31 PM -- [C:\Q4\Jetstress\4SG\2t\perf4-with evt cleared\Performance 2007 10 11 10 52 13.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	12740450	0	0	0	99534 MBytes / 3103 seconds
t:\sg2db\Jetstress1.edb	12730466	0	0	0	99456 MBytes / 3307 seconds
s:\sg3db\Jetstress1.edb	12737634	0	0	0	99512 MBytes / 3292 seconds
s:\sg4db\Jetstress1.edb	12739426	0	0	0	99526 MBytes / 2738 seconds
(Sum)	50947976	0	0	0	398031 MBytes / 3308 seconds

### Disk subsystem performance (of checksum)

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec
t:\sg1db	0.140	0.001	513.601	0.002
t:\sg2db	0.153	0.001	480.085	0.001
s:\sg3db	0.148	0.002	483.561	0.001
s:\sg4db	0.139	0.002	584.034	0.002

### Memory system performance (of checksum)

Counter	Average	Minimum	Maximum
% Processor Time	9.282	3.451	10.990
Available Mbytes	15585.332	15561.000	15764.000
Free System Page Table Entries	16758021.318	16758021.000	16758091.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	79160655.127	74313728.000	80797696.000
Pool Paged Bytes	41413780.945	41357312.000	41938944.000

### Test Log

10/11/2007 10:52:04 AM -- Command Line:

"C:\PROGRA~1\EXCHAN~1\jetstresscmd.exe" /c "C:\Q4\Jetstress\4SG\2t\perf4-with evt cleared\Perf.xml"

10/11/2007 10:52:04 AM -- Jetstress testing begins ...

10/11/2007 10:52:04 AM -- Prepare testing begins ...

10/11/2007 10:52:09 AM -- Attaching databases ...

10/11/2007 10:52:09 AM -- Prepare testing ends.

10/11/2007 10:52:09 AM -- Dispatching transactions begins ...

10/11/2007 10:52:09 AM -- Database cache settings: (minimum: 128.0 MB, maximum: 1.0 GB)

10/11/2007 10:52:09 AM -- Database flush thresholds: (start: 10.2 MB, stop: 20.5 MB)  
10/11/2007 10:52:13 AM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).  
10/11/2007 10:52:13 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).  
10/11/2007 10:52:14 AM -- Operation mix: Sessions 2, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
10/11/2007 10:52:14 AM -- Performance logging begins (interval: 15000 ms).  
10/11/2007 10:52:14 AM -- Attaining prerequisites:  
10/11/2007 11:03:01 AM -- \Database(JetstressCmd)\Database Cache Size, Last: 967360500.0 (lower bound: 966367600.0, upper bound: none)  
10/11/2007 1:03:03 PM -- Performance logging ends.  
10/11/2007 1:03:03 PM -- JetInterop batch transaction stats: 30162, 30450, 30027, and 30343.  
10/11/2007 1:03:04 PM -- Dispatching transactions ends.  
10/11/2007 1:03:04 PM -- Shutting down databases ...  
10/11/2007 1:03:06 PM -- Instance2156.1 (complete), Instance2156.2 (complete), Instance2156.3 (complete), and Instance2156.4 (complete)  
10/11/2007 1:03:06 PM -- Performance logging begins (interval: 15000 ms).  
10/11/2007 1:03:06 PM -- Verifying database checksums ...  
10/11/2007 1:58:15 PM -- t:\sg1db (100% processed), t:\sg2db (100% processed), s:\sg3db (100% processed), and s:\sg4db (100% processed)  
10/11/2007 1:58:16 PM -- Performance logging ends.  
10/11/2007 1:58:16 PM -- [C:\Q4\Jetstress\4SG\2t\perf4-with evt cleared\DBChecksum 2007 10 11 13 3 6.blg](#) has 220 samples.

# Microsoft Exchange Server Jetstress 24-hour performance test results

## *Stress test result report*

### Test summary

<b>Overall Test Result</b>	<b>Pass</b>
<b>Machine Name</b>	6TTRGD1
<b>Test Description</b>	
<b>Test Start Time</b>	10/26/2007 8:45:02 PM
<b>Test End Time</b>	10/27/2007 9:06:15 PM
<b>Jetstress Version</b>	08.01.0177.000
<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="G:\3tstress\Stress_2007_10_26_20_45_15.blg">G:\3tstress\Stress_2007_10_26_20_45_15.blg</a> <a href="G:\3tstress\DBChecksum_2007_10_27_21_6_15.blg">G:\3tstress\DBChecksum_2007_10_27_21_6_15.blg</a>

### Database sizing and throughput

<b>Achieved I/O per Second</b>	302.7
<b>Capacity Percentage</b>	100%
<b>Throughput Percentage</b>	100%
<b>Initial database size</b>	412311683072
<b>Final database size</b>	443253063680
<b>Database files (count)</b>	4

### Jetstress system parameters

<b>Thread count</b>	2 (per-storage group)
<b>Log buffers</b>	9000
<b>Minimum database cache</b>	128.0 MB
<b>Maximum database cache</b>	1024.0 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
Database (T:\SG1DB)	0.012	0.091	38.708	36.596	(n/a)
Database (T:\SG2DB)	0.011	0.085	38.764	36.813	(n/a)
Database (S:\SG3DB)	0.012	0.103	39.008	36.808	(n/a)
Database (S:\SG4DB)	0.011	0.088	39.104	36.899	(n/a)
Log (S:\SG1LG)	0.000	0.007	0.000	22.089	11070.569
Log (S:\SG2LG)	0.000	0.006	0.000	22.146	11125.067
Log (T:\SG3LG)	0.000	0.006	0.000	22.258	11053.185
Log (T:\SG4LG)	0.000	0.006	0.000	22.096	11155.903

### Host system performance

Counter	Average	Minimum	Maximum
% Processor Time	0.872	0.391	2.266
Available MBytes	14769.971	14728.000	15763.000
Free System Page Table Entries	16758093.366	16758081.000	16758141.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	58544660.622	58040320.000	58781696.000
Pool Paged Bytes	44478569.956	44158976.000	45658112.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

### Test Log

10/26/2007 8:45:02 PM -- Command Line:  
 "C:\PROGRA~1\EXCHAN~1\jetstresscmd.exe" /c "G:\3tstress\stress.xml"  
 10/26/2007 8:45:02 PM -- Jetstress testing begins ...  
 10/26/2007 8:45:02 PM -- Prepare testing begins ...  
 10/26/2007 8:45:09 PM -- Attaching databases ...  
 10/26/2007 8:45:09 PM -- Prepare testing ends.  
 10/26/2007 8:45:09 PM -- Dispatching transactions begins ...  
 10/26/2007 8:45:09 PM -- Database cache settings: (minimum: 128.0 MB, maximum: 1.0 GB)  
 10/26/2007 8:45:10 PM -- Database flush thresholds: (start: 10.2 MB, stop: 20.5 MB)  
 10/26/2007 8:45:15 PM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.1 seconds/read).  
 10/26/2007 8:45:15 PM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.1 seconds/write).  
 10/26/2007 8:45:16 PM -- Operation mix: Sessions 2, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
 10/26/2007 8:45:16 PM -- Performance logging begins (interval: 15000 ms).  
 10/26/2007 8:45:16 PM -- Attaining prerequisites:

10/26/2007 9:05:25 PM -- \Database(JetstressCmd)\Database Cache Size, Last: 966762500.0  
 (lower bound: 966367600.0, upper bound: none)  
 10/27/2007 9:05:27 PM -- Performance logging ends.  
 10/27/2007 9:05:28 PM -- JetInterop batch transaction stats: 187399, 187817, 188274, and  
 187640.  
 10/27/2007 9:05:28 PM -- Dispatching transactions ends.  
 10/27/2007 9:05:28 PM -- Shutting down databases ...  
 10/27/2007 9:06:15 PM -- Instance1692.1 (complete), Instance1692.2 (complete), Instance1692.3  
 (complete), and Instance1692.4 (complete)  
 10/27/2007 9:06:15 PM -- Performance logging begins (interval: 15000 ms).  
 10/27/2007 9:06:15 PM -- Verifying database checksums ...  
 10/27/2007 10:03:43 PM -- T:\SG1DB (100% processed), T:\SG2DB (100% processed),  
 S:\SG3DB (100% processed), and S:\SG4DB (100% processed)  
 10/27/2007 10:03:44 PM -- Performance logging ends.  
 10/27/2007 10:03:44 PM -- [G:\3tstress\DBChecksum\\_2007\\_10\\_27\\_21\\_6\\_15.blg](#) has 229 samples.  
 10/27/2007 10:03:49 PM -- [G:\3tstress\DBChecksum\\_2007\\_10\\_27\\_21\\_6\\_15.html](#) is saved.  
 10/27/2007 10:03:49 PM -- Verifying log checksums ...  
 10/27/2007 10:03:54 PM -- S:\SG1LG (22 logs passed), S:\SG2LG (22 logs passed), T:\SG3LG  
 (22 logs passed), and T:\SG4LG (21 logs passed)  
 10/27/2007 10:03:54 PM -- [G:\3tstress\Stress\\_2007\\_10\\_26\\_20\\_45\\_15.blg](#) has 5840 samples.  
 10/27/2007 10:03:54 PM -- Creating test report ...  
 10/27/2007 10:04:50 PM -- Volume T:\SG1DB has 0.0117 for Avg. Disk sec/Read.  
 10/27/2007 10:04:50 PM -- Volume T:\SG2DB has 0.0108 for Avg. Disk sec/Read.  
 10/27/2007 10:04:50 PM -- Volume S:\SG3DB has 0.0121 for Avg. Disk sec/Read.  
 10/27/2007 10:04:50 PM -- Volume S:\SG4DB has 0.0108 for Avg. Disk sec/Read.  
 10/27/2007 10:04:50 PM -- Volume S:\SG1LG has 0.0065 for Avg. Disk sec/Write.  
 10/27/2007 10:04:50 PM -- Volume S:\SG1LG has 0.0000 for Avg. Disk sec/Read.  
 10/27/2007 10:04:50 PM -- Volume S:\SG2LG has 0.0065 for Avg. Disk sec/Write.  
 10/27/2007 10:04:50 PM -- Volume S:\SG2LG has 0.0000 for Avg. Disk sec/Read.  
 10/27/2007 10:04:50 PM -- Volume T:\SG3LG has 0.0064 for Avg. Disk sec/Write.  
 10/27/2007 10:04:50 PM -- Volume T:\SG3LG has 0.0000 for Avg. Disk sec/Read.  
 10/27/2007 10:04:50 PM -- Volume T:\SG4LG has 0.0065 for Avg. Disk sec/Write.  
 10/27/2007 10:04:50 PM -- Volume T:\SG4LG has 0.0000 for Avg. Disk sec/Read.  
 10/27/2007 10:04:50 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
 10/27/2007 10:04:50 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
 10/27/2007 10:04:50 PM -- [G:\3tstress\Stress\\_2007\\_10\\_26\\_20\\_45\\_15.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	13522786	0	0	0	105646 MBytes / 3270 seconds
T:\SG2DB\Jetstress1.edb	13534818	0	0	0	105740 MBytes / 3447 seconds
S:\SG3DB\Jetstress1.edb	13523810	0	0	0	105654 MBytes / 3429 seconds
S:\SG4DB\Jetstress1.edb	13526626	0	0	0	105676 MBytes / 2860 seconds
(Sum)	54108040	0	0	0	422719 MBytes / 3447 seconds

### Disk subsystem performance (of checksum)

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec
T:\SG1DB	0.138	0.002	518.026	0.003
T:\SG2DB	0.154	0.001	480.307	0.002
S:\SG3DB	0.146	0.001	491.632	0.003
S:\SG4DB	0.138	0.001	592.478	0.003

### Memory system performance (of checksum)

Counter	Average	Minimum	Maximum
% Processor Time	9.709	8.021	11.654
Available MBytes	15554.895	15529.000	15733.000
Free System Page Table Entries	16758011.000	16758011.000	16758011.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	79966404.751	75010048.000	81248256.000
Pool Paged Bytes	46019311.231	45658112.000	46878720.000

### Test Log

10/26/2007 8:45:02 PM -- Command Line:

"C:\PROGRA~1\EXCHAN~1\jetstresscmd.exe" /c "G:\3tstress\stress.xml"

10/26/2007 8:45:02 PM -- Jetstress testing begins ...

10/26/2007 8:45:02 PM -- Prepare testing begins ...

10/26/2007 8:45:09 PM -- Attaching databases ...

10/26/2007 8:45:09 PM -- Prepare testing ends.

10/26/2007 8:45:09 PM -- Dispatching transactions begins ...

10/26/2007 8:45:09 PM -- Database cache settings: (minimum: 128.0 MB, maximum: 1.0 GB)

10/26/2007 8:45:10 PM -- Database flush thresholds: (start: 10.2 MB, stop: 20.5 MB)

10/26/2007 8:45:15 PM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.1 seconds/read).  
10/26/2007 8:45:15 PM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.1 seconds/write).  
10/26/2007 8:45:16 PM -- Operation mix: Sessions 2, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
10/26/2007 8:45:16 PM -- Performance logging begins (interval: 15000 ms).  
10/26/2007 8:45:16 PM -- Attaining prerequisites:  
10/26/2007 9:05:25 PM -- \Database(JetstressCmd)\Database Cache Size, Last: 966762500.0 (lower bound: 966367600.0, upper bound: none)  
10/27/2007 9:05:27 PM -- Performance logging ends.  
10/27/2007 9:05:28 PM -- JetInterop batch transaction stats: 187399, 187817, 188274, and 187640.  
10/27/2007 9:05:28 PM -- Dispatching transactions ends.  
10/27/2007 9:05:28 PM -- Shutting down databases ...  
10/27/2007 9:06:15 PM -- Instance1692.1 (complete), Instance1692.2 (complete), Instance1692.3 (complete), and Instance1692.4 (complete)  
10/27/2007 9:06:15 PM -- Performance logging begins (interval: 15000 ms).  
10/27/2007 9:06:15 PM -- Verifying database checksums ...  
10/27/2007 10:03:43 PM -- T:\SG1DB (100% processed), T:\SG2DB (100% processed), S:\SG3DB (100% processed), and S:\SG4DB (100% processed)  
10/27/2007 10:03:44 PM -- Performance logging ends.  
10/27/2007 10:03:44 PM -- [G:\3tstress\DBChecksum 2007 10 27 21 6 15.blg](#) has 229 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
Instance1752.1	500	302.5
Instance1752.2	505	290
Instance1752.3	513	311
Instance1752.4	520	291.25

### 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)	0.092	0.032	360.942	6.706	(n/a)
Database (T:\SG2DB)	0.082	0.025	376.389	6.791	(n/a)
Database (S:\SG3DB)	0.103	0.034	365.574	6.671	(n/a)
Database (S:\SG4DB)	0.079	0.025	369.043	6.956	(n/a)
Log (S:\SG1LG)	0.001	0.001	53.585	1.913	3191.485
Log (S:\SG2LG)	0.001	0.001	54.121	2.114	3310.490
Log (T:\SG3LG)	0.001	0.001	54.657	1.832	3185.145
Log (T:\SG4LG)	0.001	0.001	55.728	2.134	4101.039

### Host system performance

Counter	Average	Minimum	Maximum
% Processor Time	4.851	0.391	10.059
Available MBytes	14932.755	14705.000	15764.000
Free System Page Table Entries	16758011.000	16758011.000	16758011.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	60335322.013	59990016.000	60764160.000
Pool Paged Bytes	41581957.781	41332736.000	41897984.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

## Test Log

10/12/2007 9:27:57 AM -- Command Line:  
"C:\PROGRA~1\EXCHAN~1\jetstresscmd.exe" /c "C:\Q4\Jetstress\4SG\2t\soft\soft.xml"  
10/12/2007 9:27:57 AM -- Jetstress testing begins ...  
10/12/2007 9:27:57 AM -- Prepare testing begins ...  
10/12/2007 9:28:02 AM -- Attaching databases ...  
10/12/2007 9:28:02 AM -- Prepare testing ends.  
10/12/2007 9:28:02 AM -- Dispatching transactions begins ...  
10/12/2007 9:28:02 AM -- Database cache settings: (minimum: 128.0 MB, maximum: 1.0 GB)  
10/12/2007 9:28:02 AM -- Database flush thresholds: (start: 10.2 MB, stop: 20.5 MB)  
10/12/2007 9:28:06 AM -- Database read latency thresholds: (average: 0.02 seconds/read,  
maximum: 0.05 seconds/read).  
10/12/2007 9:28:06 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum:  
0.05 seconds/write).  
10/12/2007 9:28:07 AM -- Operation mix: Sessions 2, Inserts 25%, Deletes 10%, Replaces 50%,  
Reads 15%, Lazy Commits 80%.  
10/12/2007 9:28:07 AM -- Performance logging begins (interval: 15000 ms).  
10/12/2007 9:28:07 AM -- Generating log files ...  
10/12/2007 10:07:47 AM -- S:\SG1LG (100.2% generated), S:\SG2LG (101.2% generated),  
T:\SG3LG (102.8% generated), and T:\SG4LG (104.2% generated)  
10/12/2007 10:07:48 AM -- Performance logging ends.  
10/12/2007 10:07:48 AM -- JetInterop batch transaction stats: 9943, 9765, 9880, and 9814.  
10/12/2007 10:07:48 AM -- Dispatching transactions ends.  
10/12/2007 10:07:48 AM -- Shutting down databases ...  
10/12/2007 10:07:50 AM -- Instance1752.1 (complete), Instance1752.2 (complete),  
Instance1752.3 (complete), and Instance1752.4 (complete)  
10/12/2007 10:07:50 AM -- [C:\Q4\Jetstress\4SG\2t\soft\Performance\\_2007\\_10\\_12\\_9\\_28\\_6.blg](C:\Q4\Jetstress\4SG\2t\soft\Performance_2007_10_12_9_28_6.blg)  
has 158 samples.  
10/12/2007 10:07:50 AM -- Creating test report ...  
10/12/2007 10:07:51 AM -- Volume T:\SG1DB has 0.0118 for Avg. Disk sec/Read.  
10/12/2007 10:07:51 AM -- Volume T:\SG2DB has 0.0090 for Avg. Disk sec/Read.  
10/12/2007 10:07:51 AM -- Volume S:\SG3DB has 0.0119 for Avg. Disk sec/Read.  
10/12/2007 10:07:51 AM -- Volume S:\SG4DB has 0.0102 for Avg. Disk sec/Read.  
10/12/2007 10:07:51 AM -- Volume S:\SG1LG has 0.0013 for Avg. Disk sec/Write.  
10/12/2007 10:07:51 AM -- Volume S:\SG1LG has 0.0007 for Avg. Disk sec/Read.  
10/12/2007 10:07:51 AM -- Volume S:\SG2LG has 0.0013 for Avg. Disk sec/Write.  
10/12/2007 10:07:51 AM -- Volume S:\SG2LG has 0.0007 for Avg. Disk sec/Read.  
10/12/2007 10:07:51 AM -- Volume T:\SG3LG has 0.0012 for Avg. Disk sec/Write.  
10/12/2007 10:07:51 AM -- Volume T:\SG3LG has 0.0008 for Avg. Disk sec/Read.  
10/12/2007 10:07:51 AM -- Volume T:\SG4LG has 0.0013 for Avg. Disk sec/Write.  
10/12/2007 10:07:51 AM -- Volume T:\SG4LG has 0.0006 for Avg. Disk sec/Read.  
10/12/2007 10:07:51 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
10/12/2007 10:07:51 AM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
10/12/2007 10:07:51 AM -- [C:\Q4\Jetstress\4SG\2t\soft\Performance\\_2007\\_10\\_12\\_9\\_28\\_6.xml](C:\Q4\Jetstress\4SG\2t\soft\Performance_2007_10_12_9_28_6.xml)  
has 157 samples queried.  
10/12/2007 10:07:52 AM -- [C:\Q4\Jetstress\4SG\2t\soft\Performance\\_2007\\_10\\_12\\_9\\_28\\_6.html](C:\Q4\Jetstress\4SG\2t\soft\Performance_2007_10_12_9_28_6.html)  
is saved.  
10/12/2007 10:07:52 AM -- Performance logging begins (interval: 2000 ms).  
10/12/2007 10:07:52 AM -- Recovering databases ...  
10/12/2007 10:13:04 AM -- Performance logging ends.  
10/12/2007 10:13:04 AM -- Instance1752.1 (302.5), Instance1752.2 (290), Instance1752.3 (311),

and Instance1752.4 (291.25)

10/12/2007 10:13:04 AM -- [C:\Q4\Jetstress\4SG\2t\soft\SoftRecovery\\_2007\\_10\\_12\\_10\\_7\\_52.blg](C:\Q4\Jetstress\4SG\2t\soft\SoftRecovery_2007_10_12_10_7_52.blg)

has 155 samples.

10/12/2007 10:13:04 AM -- 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
Instance2920.1	98300.77	02:35:13	10.55
Instance2920.2	98300.77	02:36:15	10.49
Instance2920.3	98300.77	02:35:57	10.50
Instance2920.4	98300.77	02:22:52	11.47

#### Jetstress system parameters

Thread count	2 (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
Instance2920.1	6.423	0.000	85.057	0.000	0.000	0.000	0.000	0.000	0.000
Instance2920.2	6.488	0.000	84.413	0.000	0.000	0.000	0.000	0.000	0.000
Instance2920.3	6.539	0.012	84.614	0.000	0.000	0.000	0.000	0.000	0.000
Instance2920.4	6.037	0.111	92.322	0.000	0.000	0.000	0.000	0.000	0.000

## Host system performance

Counter	Average	Minimum	Maximum
% Processor Time	31.732	14.108	54.113
Available MBytes	15267.531	14990.000	15779.000
Free System Page Table Entries	16758078.101	16758061.000	16758191.000
Transition Pages RePurposed/sec	10437.229	0.000	23983.227
Pool Nonpaged Bytes	71742567.401	57864192.000	79196160.000
Pool Paged Bytes	570501293.446	43237376.000	847765504.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

### Test Log

10/11/2007 10:17:53 PM -- Command Line:

"C:\PROGRA~1\EXCHAN~1\jetstresscmd.exe" /c "C:\Q4\Jetstress\4SG\2t\b2d\b2d.xml"

10/11/2007 10:17:53 PM -- Jetstress testing begins ...

10/11/2007 10:17:54 PM -- Prepare testing begins ...

10/11/2007 10:17:58 PM -- Attaching databases ...

10/11/2007 10:17:58 PM -- Prepare testing ends.

10/11/2007 10:18:03 PM -- Performance logging begins (interval: 15000 ms).

10/11/2007 10:18:03 PM -- Streaming backup databases ...

10/12/2007 12:54:20 AM -- Performance logging ends.

10/12/2007 12:54:20 AM -- Instance2920.1 (100% processed), Instance2920.2 (100% processed), Instance2920.3 (100% processed), and Instance2920.4 (100% processed)

10/12/2007 12:54:20 AM --

[C:\Q4\Jetstress\4SG\2t\b2d\StreamingBackup\\_2007\\_10\\_11\\_22\\_17\\_58.blg](#) has 614 samples.

10/12/2007 12:54:20 AM -- Creating test report ...