

## ESRP Storage Program

EMC Iomega ix12-300r (260 User)  
Exchange Server 2010 Mailbox Resiliency  
Storage Solution

**Tested with:** ESRP - Storage Version 3.0  
**Tested Date:** 16 May 2010



**EMC Global Solutions**

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EMC Iomega ix12-300r (260 User) Exchange Server 2010 Mailbox Resiliency Storage Solution  
Part Number: H6994

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## Overview

This document provides information on the EMC® Iomega® ix12-300r (260 User) Mailbox Resiliency storage solution for Microsoft Exchange Server 2010 based on the *Microsoft Exchange Solution Reviewed Program (ESRP) - Storage* program (Version 3.0). 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 vendors to provide information on its storage solutions for Microsoft Exchange Server software. For more details on the Microsoft ESRP - Storage program, visit:

<http://technet.microsoft.com/en-us/exchange/ff182054.aspx>

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## Features

The Iomega StorCenter ix12-300r Network Storage Array offers easy-to-use, powerful and affordable network storage for any small business or remote office. Powered by enterprise-class EMC LifeLine software, the StorCenter ix12-300r is available in configurations starting at 4TB, and can be expanded up to 24TB in a single array. Robust connectivity allows simultaneous multi-protocol file and iSCSI block-level access. High performance makes the ix12-300r an ideal candidate for email and database applications or as a fast backup target. High reliability features ensure maximum availability, including RAID with hot-swap drives and automatic rebuild, dual hot-swap power supplies, and redundant variable-speed hot-swap chassis cooling fans.

Figure 1 illustrates an Iomega StorCenter ix12-300r Network Storage Array.



**Figure 1** Iomega StorCenter ix12-300r Network Storage Array

- **Capacity:** Starting at 4 TB (4 x 1 TB SATA-II Hard Disk Drives or HDDs) with maximum capacity of 24 TB (12 SATA-II HDDs)
  - 4-drive disk packs enable expansion to 8- or 12- drive configurations
- **RAID support:** On-disk data protection and organization configurable as RAID 0, 1, 5, 6 and 10. Automatic RAID rebuild and hot swap drives.
- **Storage pools:** Storage Pools group drives of like size and RAID protection together to simplify management.

- **Sophisticated networking:** Ethernet port bonding for load balancing, high performance bandwidth aggregation or failover; Virtual LAN (VLAN) capability simplifies management and operation by enabling devices to be logically, but not physically in the same subnet.
- **Expandability:** Add storage capacity by simply adding drives in the unpopulated drive bays. Added drives can be brought into an existing Storage Pool or made into a new Storage Pool. Additionally, USB connected Hard Disk Drives can be attached and used as shares. The StorCenter ix12 supports read and write on Fat32, NTFS, or ext2/ext3 formatted hard disks; read only of external HFS+ formatted drives,
- **Sharing:** Access files from any networked Windows, Mac, or Linux workstation or server for easy file sharing, data backup and print serving.
- **Network and file protocols supported:**
  - FTP
  - HTTP
  - SNMP
  - Microsoft (CIFS/SMB/Rally)
  - Linux/UNIX (NFS)
  - Apple AFP / Bonjour support
  - Windows DFS
  - WebDAV
- **Data organization and access:** Windows DFS organizes folders and files on a network, such that they appear to be all in one directory tree on a single Iomega StorCenter system, even if the folders reside on many devices in many different locations. WebDAV (Web-based Distributed Authoring and Versioning) enables viewing, adding, or deleting files on a StorCenter from the web, via HTTP or HTTPS for added security
- **iSCSI support:** Provides block-level access for the most efficient storage utilization, especially for database and email application performance.
- **High performance:** Quad-Gigabit Ethernet connectivity and high-performance embedded architecture, plus link aggregation (port bonding) provide extremely high throughput.

- **Active directory support:** Allows the domain users and groups to authenticate to the Active Directory service to access the StorCenter ix12.
- **UPS support:** Enables an uninterruptible power supply to communicate with the system via a USB port to initiate an unattended system shutdown without data loss in the case of extended power failure.
- **Drive spindown:** For maximum energy efficiency, drives spin down based on user-set policy.
- **E-mail alerts:** If the device detects a problem, an email alert is sent to one or more email addresses.
- **Remote access:** Connect from anywhere on the Internet to access content or manage the device.
- **System dashboard:** Provides a one-stop summary for status information on space utilization, device, peripheral, and backup status.
- **VMware certified:** HCL certified NAS (NFS) and iSCSI storage for VMware ESX (vSphere).
- **Microsoft Windows Server certified:** Windows Server Catalog certified iSCSI storage for Windows Server 2003, Windows Server 2008, and Windows Server 2008 R2.
- **Citrix certified:** HCL certified NAS (NFS) and iSCSI storage for Citrix XenServer.
- **Replication:** The StorCenter ix12 supports device-to-device (D2D) asynchronous replication based on the end-user determined policy. Replication uses the secure rsync, rsync, or remote CIFS protocols.
- **Total data protection:**
  - Multiple network interface cards (NICs) can be configured for I/O failover.
  - Robust username and password authorized access or integration with Microsoft Active Directory Service.
  - Configure with RAID 0, 1, 5, 6, 10 to assure data integrity if a drive fails.
  - RSA BSAFE technology protects installs and upgrades.

- **Security camera:** Connect Axis and/or Panasonic network security cameras and the StorCenter ix12 captures and stores video without the need of a dedicated PC.
- **Simple to use:**
  - Easy network file sharing with automatic configuration; ready to work with any networked computer
  - Management via user-friendly web interface
  - Event logging and e-mail notification
  - 11 languages supported by the user interface (concurrently from different clients)
- **Software compatibility:** Compatible with today's most common backup software titles, web browsers, media devices and computers.
- **Software included:** StorCenter Manager.
- **Warranty:** 3 years, Basic coverage.

## Solution description

This solution utilizes low-cost, high-capacity 1 TB SATA disks for Microsoft Exchange data in a RAIDless configuration. High availability is provided for this solution with the use of Microsoft Database Availability Groups (DAGs). A DAG is a set of mailbox servers that uses continuous replication to provide automatic recovery in the event of failures. A DAG may contain up to 16 mailbox servers, each one having a replicated copy of the production databases and log files.

Due to changes in the architecture of Exchange Server 2010, failover is now at the individual database level. DAGs provide automatic failover without the complexity of traditional clustering. With the new features in Exchange Server 2010, customers can now deploy much larger mailboxes than with previous versions of Exchange Server, without degraded performance. Exchange data can now also reside on lower speed disks such as the SATA drives as used in this solution.

This solution uses a building-block approach to storage design. One of the methods used to simplify the sizing and configuration of storage for use with Microsoft Exchange Server 2010 is to define a unit of measure -- a building-block. Such a unit of measure needs to meet all of the Microsoft Exchange Server recommended metrics for excellent reliability, scalability and performance, and needs to be easy to implement. An organization can take this block of work and multiply it by some factor until the desired number of Microsoft Exchange server users (that is, Microsoft Messaging API (MAPI) Outlook users), has been properly met or configured to satisfy the Microsoft Exchange server recommended performance metrics. If each unit is properly configured, it will match the Microsoft Exchange server recommendations for a healthy-performing system, from both a disk and an end-user perspective.

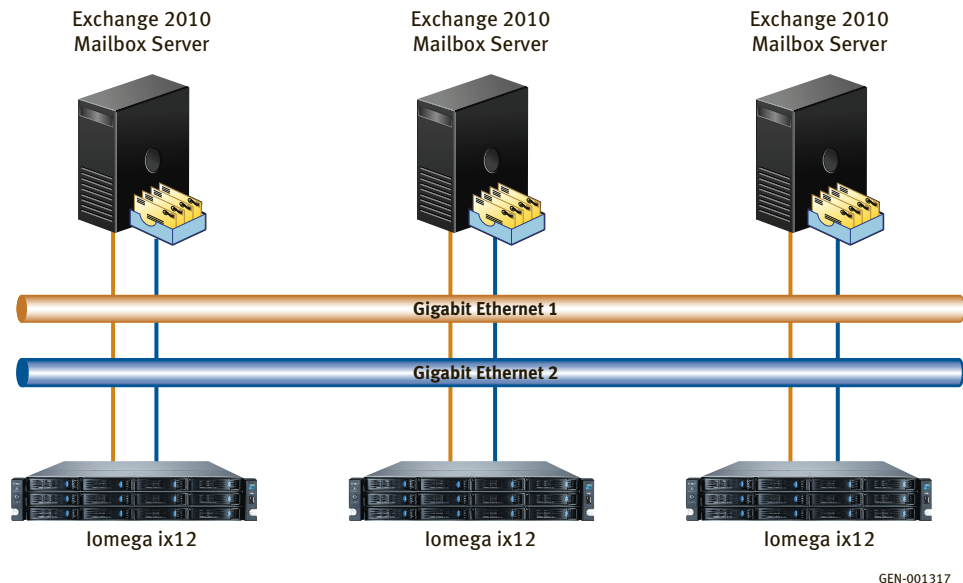
EMC's best practices involving the building-block approach for an Exchange server design proved to be very successful throughout many customers' implementations.

In this configuration, a single disk spindle supports a database and its corresponding log files. A 1 TB spindle can be used for 65 users with a profile of 0.18 IOPS (which includes 20 percent overhead) and a mailbox size of 10 GB. This building block can then be used for each DAG copy of the Exchange data. A total of four Exchange building blocks without RAID were used in this solution. When RAID is not

being used there must be at least three copies of the database to provide sufficient protection in the event of disaster. In this solution, there are three copies of each of the four Exchange server databases, and each copy of the database is placed on a separate array.

**Note:** In a larger deployment, you can fully utilize the 12 drives from each ix12 -300r to host four primary database copies and eight secondary database copies for the other two Exchange servers. Therefore, this environment can support up to 780 user mailboxes in total.

Network redundancy is provided by utilizing two switches, each having connection both to the Windows server where JetStress is installed and to the ix12 device. Network teaming is configured on the Windows server and networking bonding is set up on the ix12 side to provide the high availability. [Figure 2](#) illustrates the layout of the physical architecture.



**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 consider when designing a scalable 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 for ESRP-Storage. Therefore, the number of mailboxes hosted per server as part of the tested configuration may not necessarily be viable for some customer deployment.

For more information on identifying and addressing performance bottlenecks in an Exchange system, please refer to Microsoft's Exchange Server 2010 Performance and Scalability document, available at:

<http://technet.microsoft.com/en-us/library/dd351197.aspx>

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## Targeted customer profile

This solution is intended for small-sized businesses hosting under 500 Exchange mailboxes. The configuration used for testing is described below:

- 260 users.
- 1 host attached.
- User I/O profile of 0.18 (including 20% headroom).
- User mailbox size of 10 GB.
- Background Database Maintenance (BDM) was running 24x7.

## Tested deployment

The testing is performed on one EMC Iomega ix12-300r array and with one Exchange server with 4 databases simulating 3 database copies. The following tables summarize the tested environment.

## Simulated Exchange configuration

Table 1 lists the simulated Exchange configuration details.

**Table 1 Simulated Exchange configuration**

Item	Description
Number of Exchange mailboxes simulated	260
Number of DAGs	1
Number of servers/DAG	3
Number of active mailboxes/server	260
Number of databases/host	4
Number of copies/database	3
Number of mailboxes/database	65
Simulated profile: I/O's per second per mailbox (IOPS, include 20% headroom)	0.18
Database/Log LUN size	800 GB
Total database size for performance testing	2536 GB
% storage capacity used by Exchange database**	79.25%

\*\*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.

## Storage hardware

Table 2 lists the hardware used in the environment.

**Table 2 Hardware (list of all hardware used for the test)**

Item	Description
Storage Connectivity (Fibre Channel, SAS, SATA, iSCSI)	iSCSI
Storage model and OS/firmware revision	Iomega StorCenter ix12-300r, Firmware version 2.6.5.11910
Storage cache	2 GB memory/cache (No mirroring)
Number of storage controllers	1
Number of storage ports	4 gigabit Ethernet Ports
Maximum bandwidth of storage connectivity to host	4 Gb/s
Switch type/model/firmware revision	2 Cisco Catalyst 3750E switches
HBA model and firmware	Software iSCSI
Host server type	Dell PowerEdge R710 2 core CPUs, 8 GB RAM
Total number of disks tested in solution	4
Maximum number of spindles that can be hosted in the storage	12

## Storage software

Table 3 lists the software used in the environment.

**Table 3**      **Software**

Item	Description
Multipathing	Microsoft iSCSI Initiator Version 6.0 Build 6000
Host OS	Microsoft® Windows Server® 2008 Enterprise Service Pack 2 (6.0.6002.131072)
ESE.dll file version	14.0.639.19
Replication solution name/version	N/A

## Storage disk configuration (database and log disks)

Table 4 lists the disk configuration (database and log disks) for the environment.

**Table 4 Disk configuration (mailbox store)**

Item	Description
Disk type, speed and firmware revision	SATA II 5900 rpm
Raw capacity per disk (GB)	932
Number of physical disks in test	4
Total raw storage capacity (GB)	3728
Disk slice size (GB)	932
Number of slices per LUN or number of disks per LUN	1
RAID level	N/A, JBOD was used
Total formatted capacity	3200 GB
Storage capacity utilization	86.11%
Database capacity utilization	68.03%

## Best practices

A building block approach should be used when designing Exchange 2010 storage layouts. The building block approach defines the number of physical disks required for a certain number of users with a certain user profile.

In this solution each individual disk supports 65 users with a user profile of 0.18 IOPS (including 20% overhead). Each disk holds the database and log files on one single LUN that was created on each disk. A mailbox size of 10 GB per user was also used.

Microsoft Exchange Server 2010 has changed significantly since early versions of Exchange particularly when it comes to I/O and storage. There have been many changes to the core schema and the extensible storage engine (ESE) to reduce I/O. Due to this I/O reduction, Exchange Server 2010 now also supports SATA disks. In addition, Mailbox Resiliency solutions that utilize 3 or more copies of a database can choose to use JBOD storage.

For more information on these changes, visit:

[http://technet.microsoft.com/en-us/library/bb125040\(EXCHG.140\).aspx#StoreSchemaChanges](http://technet.microsoft.com/en-us/library/bb125040(EXCHG.140).aspx#StoreSchemaChanges)

For Exchange Server 2010 best practices on storage design, visit:

<http://technet.microsoft.com/en-us/library/dd346703.aspx>

Based on the testing run using an ESRP framework, EMC recommends the following best practices to improve storage performance with Exchange solutions.

- 1 Disk alignment is no longer required when running Microsoft Windows Server 2008.

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**Note:** Exchange Server 2010 requires Windows Server 2008.

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- 2 When formatting a new NTFS volume, it is recommended that for database and log files, set the allocation unit size (ALU) size to 64 KB. This can be done from the drop-down list in Disk Manager or through the DiskPart command.
- 3 The following list details the recommended best practices for networking:
  - a. Multiple network switches are preferred for fault tolerance and performance. Where this is not possible, VLANs must be used to isolate iSCSI traffic.

- b For iSCSI solutions, 1 GB NICs are recommended as a minimum.
- c On each iSCSI NIC, do the following:
  - Set all iSCSI NIC speeds to 1 GB full.
  - Disable **Microsoft Networking**.
  - Disable **File & Print Sharing**.
  - Disable **IPv6** if not being used.
  - Disable all TCP offload engine parameters.
- 4 The following list details the recommended best practices for core storage:
  - a. Enable Write Cache on the ix12-300r to optimize the storage performance.
  - b. Isolate the Microsoft Exchange server database workload from other IO-intensive applications or workloads. This ensures the highest level of performance for Exchange and simplifies troubleshooting in the event of a disk-related Microsoft Exchange performance issue.
  - c. Always size the disks for IOPS before capacity. Once this is calculated, determine the capacity required.
  - d. When you get the actual IOPS numbers, always apply a 20 percent I/O overhead factor to your calculations to add some reserve.
  - e. Logs and databases can be placed on the same physical spindles under the following conditions:
    - DAG is in place.
    - DAG contains a minimum of three database copies.
  - f. Mailbox Resiliency solutions that utilize 3 or more copies of a database can use JBOD storage. When using JBOD storage solutions, use the following configurations:
    - Placing both log files and database files for a given database and this database only on a single disk spindle.
    - You can choose to configure two volumes per spindle (one for log files, and one for the database file) or one volume per spindle (where logs are placed in a separate directory from the database file). Both configurations are OK.
  - g. The maximum number of database copies is 16 but it is recommended that 3 to 6 copies are selected for JBOD configuration.

- h Microsoft recommends a maximum database size of 200 GB in solutions where DAG is not being used. When DAG is being used with a minimum of three database copies, the maximum database size can be up to 2 TB. Backup (if applicable) and restore times should be accounted for when calculating the database size.

For more information on EMC solutions for Microsoft Exchange Server, visit:

<http://www.emc.com/solutions/application-environment/microsoft/solutions-for-microsoft-exchange-unified-communications.htm>

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## Test results summary

This section provides a high-level summary of the test data from ESRP, as well as links to the detailed reports that are generated by the ESRP testing framework. The results are located in [“Appendix: Test reports” on page 23](#).

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## Reliability

A number of the tests in the framework are designed to test reliability over a 24-hour period. The goal of these tests is to verify that the storage can handle high I/O load for a long period of time while replicating synchronously. Following the stress test, both log and database files on production and DR hosts are analyzed for integrity to ensure there is no database/log corruption.

- No errors were reported in the event log file for the storage reliability testing.
- No errors were reported for the database and log checksum.
- No errors were reported during the backup-to-disk test.

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## Storage performance results

To see the Jetstress performance results (2-hour performance test), see the section [“Microsoft Exchange Server 2010 Jetstress – 2-hour performance” on page 34](#).

The Primary Storage performance testing is designed to exercise the storage with maximum sustainable Exchange type of I/O for 2 hours. The test is to show how long it takes for the storage to respond to an IO under load. The data below is the sum of all of the logical disk I/Os and average of all the logical disks I/O latency in the 2-hour test duration.

Each server is listed separately, and the aggregate numbers across all servers are listed in [“Server metrics” on page 20](#).

**Server metrics**

The information in this table includes the sum of I/Os across storage groups and the average latency across all storage groups on a per-server basis.

<b>Database I/O</b>	
Database disks transfers/sec	90.872
Database disks reads/sec	54.175
Database disks writes/sec	36.697
Average database disk read latency (ms)	13.652
Average database disk write latency (ms)	8.552
<b>Transaction log I/O</b>	
Log disks writes/sec	32.799
Average log disk write latency (ms)	1.255

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**Database backup/recovery performance**

There are two test reports in this section. The first one is to measure the sequential read rate of the database files, and the second is to measure the recovery/replay performance (playing transaction logs in to the database).

**Database read-only performance**

This test is used to measure the maximum rate at which databases could be backed up using Volume Shadow (Copy) Service (VSS). The following table shows the average rate for a single database file.

<b>MB read/sec per database</b>	28.275
<b>MB read/sec total per server</b>	113.1

**Transaction log recovery/replay performance**

This test is used to measure the maximum rate at which 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>Average time to play one log file (sec)</b>	7.55
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## Conclusion

The testing described in this document validated the ESRP for Exchange Server 2010 on EMC Iomega ix12-300r. This solution was tested under a very heavy user profile of Exchange server 2010 with mailbox resiliency. The high performance achieved makes the StorCenter ix12-300r an ideal candidate for Exchange server 2010. Furthermore, the robust connectivity allows simultaneous multi-protocol file and iSCSI block-level access, and the high reliability features, including hot-swap drives and automatic rebuild, dual hot-swap power supplies and redundant variable-speed hot-swap cooling fans, ensure maximum availability for your Exchange server environment.

The building-block approach and methodologies were used in this solution to deploy Exchange Server 2010. A unit of 260-user profile was defined and tested to meet all of the Microsoft Exchange Server recommended metrics. An organization can take this block of work and multiply it by some factor until the desired number of Microsoft Exchange server users are properly configured. Available in configurations starting at 4TB, the StorCenter ix12-300r can be expanded up to 24TB in a single array without I-O interruption. Therefore, this solution can expand to a 780-user environment with 3 Exchange servers attached, by fully utilizing ix12-300r's 12 drives to host 4 primary database copies and 8 (4 x 2) secondary database copies for the another 2 Exchange servers. StorCenter ix12-300r offers easy-to-use, powerful and affordable network storage for any small- to medium-sized business or distributed enterprise.

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

EMC recommends that you consult with EMC Professional Services to assist with the design and deployment of a similar solution. For information regarding this or any other EMC solution, use the following numbers:

United States: **(800) 782-4362 (SVC-4EMC)**

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

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

For additional information on EMC products and services available to customers and partners, visit:

**[http//EMC.com](http://EMC.com)**

or to:

**<http://Powerlink.EMC.com>**

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## Appendix: Test reports

The test results included in this section include:

- [“Microsoft Exchange Server 2010 Jetstress – 24-hour stress” on page 24](#)
- [“Microsoft Exchange Server 2010 Jetstress – 2-hour performance” on page 34](#)
- [“Microsoft Exchange Server 2010 Jetstress – database backup” on page 48](#)
- [“Microsoft Exchange Server 2010 Jetstress – soft recovery” on page 51](#)

## Microsoft Exchange Server 2010 Jetstress – 24-hour stress

### Stress test result report

#### Test summary

<b>Overall Test Result</b>	<b>Pass</b>
<b>Machine Name</b>	E2010-JETSTRESS
<b>Test Description</b>	
<b>Test Start Time</b>	5/17/2010 4:07:09 PM
<b>Test End Time</b>	5/18/2010 4:26:54 PM
<b>Collection Start Time</b>	5/17/2010 4:26:49 PM
<b>Collection End Time</b>	5/18/2010 4:26:48 PM
<b>Jetstress Version</b>	14.01.0043.000
<b>Ese Version</b>	14.00.0639.019
<b>Operating System</b>	Windows Server (R) 2008 Enterprise Service Pack 2 (6.0.6002.131072)
<b>Performance Log</b>	C:\JetStress_Test_Results\Stress_2010_5_17_16_7_17.blg  C:\JetStress_Test_Results\DBCchecksum_2010_5_18_16_26_54.blg

#### Database sizing and throughput

<b>Achieved Transactional I/O per Second</b>	92.199
<b>Target Transactional I/O per Second</b>	46.8
<b>Initial Database Size (bytes)</b>	2728166424576
<b>Final Database Size (bytes)</b>	2731840634880
<b>Database Files (Count)</b>	4

**Jetstress system parameters**

<b>Thread Count</b>	1 (per database)
<b>Minimum Database Cache</b>	128.0 MB
<b>Maximum Database Cache</b>	1024.0 MB
<b>Insert Operations</b>	40%
<b>Delete Operations</b>	20%
<b>Replace Operations</b>	5%
<b>Read Operations</b>	35%
<b>Lazy Commits</b>	70%
<b>Run Background Database Maintenance</b>	True
<b>Number of Copies per Database</b>	3

**Database configuration**

<b>Instance2572.1</b>	Log Path: G:\LOG1 Database: G:\DB1\Jetstress001001.edb
<b>Instance2572.2</b>	Log Path: H:\LOG2 Database: H:\DB2\Jetstress002001.edb
<b>Instance2572.3</b>	Log Path: I:\LOG3 Database: I:\DB3\Jetstress003001.edb
<b>Instance2572.4</b>	Log Path: J:\LOG4 Database: J:\DB4\Jetstress004001.edb

## Transactional I/O performance

MSExchange Database ==> Instances	I/O Database Reads Average Latency (msec)	I/O Database Writes Average Latency (msec)	I/O Database Reads/sec	I/O Database Writes/sec	I/O Database Reads Average Bytes	I/O Database Writes Average Bytes	I/O Log Reads Average Latency (msec)	I/O Log Writes Average Latency (msec)	I/O Log Reads/sec	I/O Log Writes/sec	I/O Log Reads Average Bytes	I/O Log Writes Average Bytes
Instance2572.1	13.037	8.214	13.823	9.372	40632.059	36763.689	0.000	1.195	0.000	8.509	0.000	4591.476
Instance2572.2	13.189	8.280	13.669	9.244	40536.136	36790.271	0.000	1.202	0.000	8.449	0.000	4607.971
Instance2572.3	13.714	9.417	13.754	9.305	40284.641	36869.624	0.000	1.203	0.000	8.478	0.000	4612.322
Instance2572.4	14.014	9.444	13.735	9.297	40654.331	36737.220	0.000	1.277	0.000	8.434	0.000	4605.662

## Background database maintenance I/O performance

MSExchange Database ==> Instances	Database Maintenance I/O Reads/sec	Database Maintenance I/O Reads Average Bytes
Instance2572.1	28.271	261463.871
Instance2572.2	28.245	261509.717
Instance2572.3	27.827	261473.383
Instance2572.4	27.745	261484.436

## Log Replication I/O performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance2572.1	0.312	60944.181
Instance2572.2	0.312	60760.946
Instance2572.3	0.313	61000.593
Instance2572.4	0.310	60429.238

## Total I/O performance

MSExchange Database ==> Instances	I/O Database Reads Average Latency (msec)	I/O Database Writes Average Latency (msec)	I/O Database Reads/sec	I/O Database Writes/sec	I/O Database Reads Average Bytes	I/O Database Writes Average Bytes	I/O Log Reads Average Latency (msec)	I/O Log Writes Average Latency (msec)	I/O Log Reads/sec	I/O Log Writes/sec	I/O Log Reads Average Bytes	I/O Log Writes Average Bytes
Instance2572.1	13.037	8.214	42.094	9.372	188944.287	36763.689	1.179	1.195	0.312	8.509	60944.181	4591.476
Instance2572.2	13.189	8.280	41.914	9.244	189446.029	36790.271	1.092	1.202	0.312	8.449	60760.946	4607.971
Instance2572.3	13.714	9.417	41.581	9.305	188310.892	36869.624	1.186	1.203	0.313	8.478	61000.593	4612.322
Instance2572.4	14.014	9.444	41.479	9.297	188363.275	36737.220	1.083	1.277	0.310	8.434	60429.238	4605.662

**Host system performance**

Counter	Average	Minimum	Maximum
% Processor Time	1.240	0.234	6.471
Available MBytes	3875.257	3765.000	3982.000
Free System Page Table Entries	33559343.811	33558526.000	33560285.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	62118463.489	62107648.000	62148608.000
Pool Paged Bytes	1446539784.714	1446383616.000	1482387456.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

**Test log**

```

5/17/2010 4:07:09 PM -- Jetstress testing begins ...
5/17/2010 4:07:09 PM -- Prepare testing begins ...
5/17/2010 4:07:13 PM -- Attaching databases ...
5/17/2010 4:07:13 PM -- Prepare testing ends.
5/17/2010 4:07:13 PM -- Dispatching transactions begins ...
5/17/2010 4:07:13 PM -- Database cache settings: (minimum: 128.0 MB,
maximum: 1.0 GB)
5/17/2010 4:07:13 PM -- Database flush thresholds: (start: 10.2 MB, stop:
20.5 MB)
5/17/2010 4:07:17 PM -- Database read latency thresholds: (average: 20
msec/read, maximum: 200 msec/read).
5/17/2010 4:07:17 PM -- Log write latency thresholds: (average: 10
msec/write, maximum: 200 msec/write).
5/17/2010 4:07:19 PM -- Operation mix: Sessions 1, Inserts 40%, Deletes
20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
5/17/2010 4:07:19 PM -- Performance logging begins (interval: 15000 ms).
5/17/2010 4:07:19 PM -- Attaining prerequisites:

```

5/17/2010 4:26:49 PM -- \MSEExchange Database(JetstressWin)\Database  
Cache Size, Last: 967061500.0 (lower bound: 966367600.0, upper bound:  
none)

5/18/2010 4:26:50 PM -- Performance logging ends.

5/18/2010 4:26:50 PM -- JetInterop batch transaction stats: 65679,  
65129, 65581 and 65269.

5/18/2010 4:26:50 PM -- Dispatching transactions ends.

5/18/2010 4:26:50 PM -- Shutting down databases ...

5/18/2010 4:26:54 PM -- Instance2572.1 (complete), Instance2572.2  
(complete), Instance2572.3 (complete) and Instance2572.4 (complete)

5/18/2010 4:26:54 PM -- Performance logging begins (interval: 30000 ms).

5/18/2010 4:26:54 PM -- Verifying database checksums ...

5/18/2010 10:51:40 PM -- G: (100% processed), H: (100% processed), I:  
(100% processed) and J: (100% processed)

5/18/2010 10:51:40 PM -- Performance logging ends.

5/18/2010 10:51:40 PM --  
C:\JetStress\_Test\_Results\DBChecksum\_2010\_5\_18\_16\_26\_54.blg has 769  
samples.

5/18/2010 10:51:44 PM --  
C:\JetStress\_Test\_Results\DBChecksum\_2010\_5\_18\_16\_26\_54.html is saved.

5/18/2010 10:51:44 PM -- Verifying log checksums ...

5/18/2010 10:51:44 PM -- G:\LOG1 (7 log(s) processed), H:\LOG2 (6 log(s)  
processed), I:\LOG3 (7 log(s) processed) and J:\LOG4 (7 log(s)  
processed)

5/18/2010 10:51:44 PM --  
C:\JetStress\_Test\_Results\Stress\_2010\_5\_17\_16\_7\_17.blg has 5835 samples.

5/18/2010 10:51:44 PM -- Creating test report ...

5/18/2010 10:52:12 PM -- Instance2572.1 has 13.0 for I/O Database Reads  
Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.1 has 1.2 for I/O Log Writes  
Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.1 has 1.2 for I/O Log Reads Average  
Latency.

5/18/2010 10:52:12 PM -- Instance2572.2 has 13.2 for I/O Database Reads  
Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.2 has 1.2 for I/O Log Writes Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.2 has 1.2 for I/O Log Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.3 has 13.7 for I/O Database Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.3 has 1.2 for I/O Log Writes Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.3 has 1.2 for I/O Log Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.4 has 14.0 for I/O Database Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.4 has 1.3 for I/O Log Writes Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.4 has 1.3 for I/O Log Reads Average Latency.

5/18/2010 10:52:12 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.

5/18/2010 10:52:12 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.

5/18/2010 10:52:12 PM --

C:\JetStress\_Test\_Results\Stress\_2010\_5\_17\_16\_7\_17.xml has 5757 samples queried.

## Test result report

## Checksum statistics - All

Database	Seen pages	Bad pages	Correctable pages	Wrong page-number pages	File length/seconds taken
G:\DB1\Jetstress001001.edb	20842802	0	0	0	651337 MBytes / 23054 sec
H:\DB2\Jetstress002001.edb	20843058	0	0	0	651345 MBytes / 23069 sec
I:\DB3\Jetstress003001.edb	20840498	0	0	0	651265 MBytes / 23081 sec
J:\DB4\Jetstress004001.edb	20842802	0	0	0	651337 MBytes / 23085 sec
(Sum)	83369160	0	0	0	2605286 MBytes / 23085 sec

## Disk subsystem performance (of checksum)

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
G:	0.101	0.000	452.157	0.000	65535.994
H:	0.101	0.000	451.894	0.000	65535.994
I:	0.100	0.000	451.753	0.000	65535.994
J:	0.100	0.000	451.513	0.000	65535.994

**Memory system performance (of checksum)**

Counter	Average	Minimum	Maximum
% Processor Time	8.991	7.692	11.110
Available MBytes	4922.135	4880.000	4952.000
Free System Page Table Entries	33559636.693	33558802.000	33559752.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	62130152.031	62119936.000	62177280.000
Pool Paged Bytes	1445642948.411	1445294080.000	1445875712.000

**Test log**

```

5/17/2010 4:07:09 PM -- Jetstress testing begins ...
5/17/2010 4:07:09 PM -- Prepare testing begins ...
5/17/2010 4:07:13 PM -- Attaching databases ...
5/17/2010 4:07:13 PM -- Prepare testing ends.
5/17/2010 4:07:13 PM -- Dispatching transactions begins ...
5/17/2010 4:07:13 PM -- Database cache settings: (minimum: 128.0 MB,
maximum: 1.0 GB)
5/17/2010 4:07:13 PM -- Database flush thresholds: (start: 10.2 MB, stop:
20.5 MB)
5/17/2010 4:07:17 PM -- Database read latency thresholds: (average: 20
msec/read, maximum: 200 msec/read).
5/17/2010 4:07:17 PM -- Log write latency thresholds: (average: 10
msec/write, maximum: 200 msec/write).
5/17/2010 4:07:19 PM -- Operation mix: Sessions 1, Inserts 40%, Deletes
20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
5/17/2010 4:07:19 PM -- Performance logging begins (interval: 15000 ms).
5/17/2010 4:07:19 PM -- Attaining prerequisites:
5/17/2010 4:26:49 PM -- \MSExchange Database(JetstressWin)\Database
Cache Size, Last: 967061500.0 (lower bound: 966367600.0, upper bound:
none)

```

5/18/2010 4:26:50 PM -- Performance logging ends.  
5/18/2010 4:26:50 PM -- JetInterop batch transaction stats: 65679,  
65129, 65581 and 65269.  
5/18/2010 4:26:50 PM -- Dispatching transactions ends.  
5/18/2010 4:26:50 PM -- Shutting down databases ...  
5/18/2010 4:26:54 PM -- Instance2572.1 (complete), Instance2572.2  
(complete), Instance2572.3 (complete) and Instance2572.4 (complete)  
5/18/2010 4:26:54 PM -- Performance logging begins (interval: 30000 ms).  
5/18/2010 4:26:54 PM -- Verifying database checksums ...  
5/18/2010 10:51:40 PM -- G: (100% processed), H: (100% processed), I:  
(100% processed) and J: (100% processed)  
5/18/2010 10:51:40 PM -- Performance logging ends.  
5/18/2010 10:51:40 PM --  
C:\JetStress\_Test\_Results\DBChecksum\_2010\_5\_18\_16\_26\_54.blg has 769  
samples.

## Microsoft Exchange Server 2010 Jetstress – 2-hour performance

### Performance test result report

#### Test summary

<b>Overall Test Result</b>	<b>Pass</b>
<b>Machine Name</b>	E2010-JETSTRESS
<b>Test Description</b>	N/A
<b>Test Start Time</b>	5/18/2010 11:08:42 PM
<b>Test End Time</b>	5/19/2010 1:29:16 AM
<b>Collection Start Time</b>	5/18/2010 11:29:11 PM
<b>Collection End Time</b>	5/19/2010 1:28:57 AM
<b>Jetstress Version</b>	14.01.0043.000
<b>Ese Version</b>	14.00.0639.019
<b>Operating System</b>	Windows Server (R) 2008 Enterprise Service Pack 2 (6.0.6002.131072)
<b>Performance Log</b>	C:\JetStress_Test_Results\Performance_2010_5_18_23_8_51.blg C:\JetStress_Test_Results\DBCchecksum_2010_5_19_1_29_16.blg

#### Database sizing and throughput

<b>Achieved Transactional I/O per Second</b>	90.872
<b>Target Transactional I/O per Second</b>	46.8
<b>Initial Database Size (bytes)</b>	2731840634880
<b>Final Database Size (bytes)</b>	2732184567808
<b>Database Files (Count)</b>	4

**Jetstress system parameters**

<b>Thread Count</b>	1 (per database)
<b>Minimum Database Cache</b>	128.0 MB
<b>Maximum Database Cache</b>	1024.0 MB
<b>Insert Operations</b>	40%
<b>Delete Operations</b>	20%
<b>Replace Operations</b>	5%
<b>Read Operations</b>	35%
<b>Lazy Commits</b>	70%
<b>Run Background Database Maintenance</b>	True
<b>Number of Copies per Database</b>	3

**Database configuration**

<b>Instance2572.1</b>	Log Path: G:\LOG1 Database: G:\DB1\Jetstress001001.edb
<b>Instance2572.2</b>	Log Path: H:\LOG2 Database: H:\DB2\Jetstress002001.edb
<b>Instance2572.3</b>	Log Path: I:\LOG3 Database: I:\DB3\Jetstress003001.edb
<b>Instance2572.4</b>	Log Path: J:\LOG4 Database: J:\DB4\Jetstress004001.edb

## Transactional I/O performance

MSExchange Database ==> Instances	I/O Database Reads Average Latency (msec)	I/O Database Writes Average Latency (msec)	I/O Database Reads/sec	I/O Database Writes/sec	I/O Database Reads Average Bytes	I/O Database Writes Average Bytes	I/O Log Reads Average Latency (msec)	I/O Log Writes Average Latency (msec)	I/O Log Reads/sec	I/O Log Writes/sec	I/O Log Reads Average Bytes	I/O Log Writes Average Bytes
Instance2572.1	13.947	8.832	13.582	9.224	40366.728	36457.921	0.000	1.263	0.000	8.151	0.000	4515.105
Instance2572.2	13.763	8.209	13.666	9.265	40669.546	36221.551	0.000	1.220	0.000	8.146	0.000	4580.866
Instance2572.3	13.147	8.471	13.358	8.947	40919.677	36477.918	0.000	1.245	0.000	8.176	0.000	4575.389
Instance2572.4	13.749	8.696	13.569	9.261	40518.118	36129.928	0.000	1.290	0.000	8.326	0.000	4569.544

## Background database maintenance I/O performance

MSExchange Database ==> Instances	Database Maintenance I/O Reads/sec	Database Maintenance I/O Reads Average Bytes
Instance2572.1	27.824	261520.478
Instance2572.2	27.944	261508.762
Instance2572.3	28.046	261506.635
Instance2572.4	27.883	261484.484

## Log replication I/O performance

MSEExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance2572.1	0.299	57897.179
Instance2572.2	0.299	57897.179
Instance2572.3	0.301	59275.162
Instance2572.4	0.301	58383.710

## Total I/O performance

MSEExchange Database ==> Instances	I/O Database Reads Average Latency (msec)	I/O Database Writes Average Latency (msec)	I/O Database Reads/sec	I/O Database Writes/sec	I/O Database Reads Average Bytes	I/O Database Writes Average Bytes	I/O Log Reads Average Latency (msec)	I/O Log Writes Average Latency (msec)	I/O Log Reads/sec	I/O Log Writes/sec	I/O Log Reads Average Bytes	I/O Log Writes Average Bytes
Instance 2572.1	13.947	8.832	41.406	9.224	188977.302	36457.921	10.979	1.263	0.299	8.151	57897.179	4515.105
Instance 2572.2	13.763	8.209	41.611	9.265	188977.661	36221.551	11.018	1.220	0.299	8.146	57897.179	4580.866
Instance 2572.3	13.147	8.471	41.404	8.947	190340.805	36477.918	11.033	1.245	0.301	8.176	59275.162	4575.389
Instance 2572.4	13.749	8.696	41.453	9.261	189152.654	36129.928	11.030	1.290	0.301	8.326	58383.710	4569.544

## Host system performance

Counter	Average	Minimum	Maximum
% Processor Time	1.096	0.312	3.041
Available MBytes	5134.119	5114.000	5235.000
Free System Page Table Entries	33559871.221	33559765.000	33559944.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	62127136.067	62124032.000	62136320.000
Pool Paged Bytes	117737074.372	117682176.000	117792768.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

## Test log

```

5/17/2010 4:07:09 PM -- Jetstress testing begins ...
5/17/2010 4:07:09 PM -- Prepare testing begins ...
5/17/2010 4:07:13 PM -- Attaching databases ...
5/17/2010 4:07:13 PM -- Prepare testing ends.
5/17/2010 4:07:13 PM -- Dispatching transactions begins ...
5/17/2010 4:07:13 PM -- Database cache settings: (minimum: 128.0 MB,
maximum: 1.0 GB)
5/17/2010 4:07:13 PM -- Database flush thresholds: (start: 10.2 MB, stop:
20.5 MB)
5/17/2010 4:07:17 PM -- Database read latency thresholds: (average: 20
msec/read, maximum: 200 msec/read).
5/17/2010 4:07:17 PM -- Log write latency thresholds: (average: 10
msec/write, maximum: 200 msec/write).
5/17/2010 4:07:19 PM -- Operation mix: Sessions 1, Inserts 40%, Deletes
20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
5/17/2010 4:07:19 PM -- Performance logging begins (interval: 15000 ms).
5/17/2010 4:07:19 PM -- Attaining prerequisites:
5/17/2010 4:26:49 PM -- \MSExchange Database(JetstressWin)\Database
Cache Size, Last: 967061500.0 (lower bound: 966367600.0, upper bound:
none)

```

5/18/2010 4:26:50 PM -- Performance logging ends.

5/18/2010 4:26:50 PM -- JetInterop batch transaction stats: 65679, 65129, 65581 and 65269.

5/18/2010 4:26:50 PM -- Dispatching transactions ends.

5/18/2010 4:26:50 PM -- Shutting down databases ...

5/18/2010 4:26:54 PM -- Instance2572.1 (complete), Instance2572.2 (complete), Instance2572.3 (complete) and Instance2572.4 (complete)

5/18/2010 4:26:54 PM -- Performance logging begins (interval: 30000 ms).

5/18/2010 4:26:54 PM -- Verifying database checksums ...

5/18/2010 10:51:40 PM -- G: (100% processed), H: (100% processed), I: (100% processed) and J: (100% processed)

5/18/2010 10:51:40 PM -- Performance logging ends.

5/18/2010 10:51:40 PM --  
C:\JetStress\_Test\_Results\DBChecksum\_2010\_5\_18\_16\_26\_54.blg has 769 samples.

5/18/2010 10:51:44 PM --  
C:\JetStress\_Test\_Results\DBChecksum\_2010\_5\_18\_16\_26\_54.html is saved.

5/18/2010 10:51:44 PM -- Verifying log checksums ...

5/18/2010 10:51:44 PM -- G:\LOG1 (7 log(s) processed), H:\LOG2 (6 log(s) processed), I:\LOG3 (7 log(s) processed) and J:\LOG4 (7 log(s) processed)

5/18/2010 10:51:44 PM --  
C:\JetStress\_Test\_Results\Stress\_2010\_5\_17\_16\_7\_17.blg has 5835 samples.

5/18/2010 10:51:44 PM -- Creating test report ...

5/18/2010 10:52:12 PM -- Instance2572.1 has 13.0 for I/O Database Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.1 has 1.2 for I/O Log Writes Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.1 has 1.2 for I/O Log Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.2 has 13.2 for I/O Database Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.2 has 1.2 for I/O Log Writes Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.2 has 1.2 for I/O Log Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.3 has 13.7 for I/O Database Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.3 has 1.2 for I/O Log Writes Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.3 has 1.2 for I/O Log Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.4 has 14.0 for I/O Database Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.4 has 1.3 for I/O Log Writes Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.4 has 1.3 for I/O Log Reads Average Latency.

5/18/2010 10:52:12 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.

5/18/2010 10:52:12 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.

5/18/2010 10:52:12 PM --  
C:\JetStress\_Test\_Results\Stress\_2010\_5\_17\_16\_7\_17.xml has 5757 samples queried.

5/18/2010 10:52:13 PM --  
C:\JetStress\_Test\_Results\Stress\_2010\_5\_17\_16\_7\_17.html is saved.

5/18/2010 10:52:13 PM --  
C:\JetStress\_Test\_Results\Application\_2010\_5\_18\_22\_52\_13.evt is saved.

5/18/2010 10:52:13 PM --  
C:\JetStress\_Test\_Results\System\_2010\_5\_18\_22\_52\_13.evt is saved.

5/18/2010 10:52:13 PM -- Jetstress testing ends.

5/18/2010 11:08:42 PM -- Jetstress testing begins ...

5/18/2010 11:08:42 PM -- Prepare testing begins ...

5/18/2010 11:08:47 PM -- Attaching databases ...

5/18/2010 11:08:47 PM -- Prepare testing ends.

5/18/2010 11:08:47 PM -- Dispatching transactions begins ...

5/18/2010 11:08:47 PM -- Database cache settings: (minimum: 128.0 MB, maximum: 1.0 GB)

5/18/2010 11:08:47 PM -- Database flush thresholds: (start: 10.2 MB, stop: 20.5 MB)

5/18/2010 11:08:51 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).

5/18/2010 11:08:51 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).

5/18/2010 11:08:53 PM -- Operation mix: Sessions 1, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.

5/18/2010 11:08:53 PM -- Performance logging begins (interval: 15000 ms).

5/18/2010 11:08:53 PM -- Attaining prerequisites:

5/18/2010 11:29:11 PM -- \MSEExchange Database(JetstressWin)\Database Cache Size, Last: 966672400.0 (lower bound: 966367600.0, upper bound: none)

5/19/2010 1:29:12 AM -- Performance logging ends.

5/19/2010 1:29:12 AM -- JetInterop batch transaction stats: 5979, 6061, 6001 and 6140.

5/19/2010 1:29:12 AM -- Dispatching transactions ends.

5/19/2010 1:29:12 AM -- Shutting down databases ...

5/19/2010 1:29:16 AM -- Instance2572.1 (complete), Instance2572.2 (complete), Instance2572.3 (complete) and Instance2572.4 (complete)

5/19/2010 1:29:16 AM -- Performance logging begins (interval: 30000 ms).

5/19/2010 1:29:16 AM -- Verifying database checksums ...

5/19/2010 7:54:07 AM -- G: (100% processed), H: (100% processed), I: (100% processed) and J: (100% processed)

5/19/2010 7:54:07 AM -- Performance logging ends.

5/19/2010 7:54:07 AM --  
C:\JetStress\_Test\_Results\DBChecksum\_2010\_5\_19\_1\_29\_16.blg has 769 samples.

5/19/2010 7:54:12 AM --  
C:\JetStress\_Test\_Results\DBChecksum\_2010\_5\_19\_1\_29\_16.html is saved.

5/19/2010 7:54:12 AM -- Verifying log checksums ...

5/19/2010 7:54:12 AM -- G:\LOG1 (7 log(s) processed), H:\LOG2 (7 log(s) processed), I:\LOG3 (8 log(s) processed) and J:\LOG4 (7 log(s) processed)

5/19/2010 7:54:12 AM --  
C:\JetStress\_Test\_Results\Performance\_2010\_5\_18\_23\_8\_51.blg has 560 samples.

5/19/2010 7:54:12 AM -- Creating test report ...

5/19/2010 7:54:15 AM -- Instance2572.1 has 13.9 for I/O Database Reads Average Latency.

5/19/2010 7:54:15 AM -- Instance2572.1 has 1.3 for I/O Log Writes Average Latency.

5/19/2010 7:54:15 AM -- Instance2572.1 has 1.3 for I/O Log Reads Average Latency.

5/19/2010 7:54:15 AM -- Instance2572.2 has 13.8 for I/O Database Reads Average Latency.

5/19/2010 7:54:15 AM -- Instance2572.2 has 1.2 for I/O Log Writes Average Latency.

5/19/2010 7:54:15 AM -- Instance2572.2 has 1.2 for I/O Log Reads Average Latency.

5/19/2010 7:54:15 AM -- Instance2572.3 has 13.1 for I/O Database Reads Average Latency.

5/19/2010 7:54:15 AM -- Instance2572.3 has 1.2 for I/O Log Writes Average Latency.

5/19/2010 7:54:15 AM -- Instance2572.3 has 1.2 for I/O Log Reads Average Latency.

5/19/2010 7:54:15 AM -- Instance2572.4 has 13.7 for I/O Database Reads Average Latency.

5/19/2010 7:54:15 AM -- Instance2572.4 has 1.3 for I/O Log Writes Average Latency.

5/19/2010 7:54:15 AM -- Instance2572.4 has 1.3 for I/O Log Reads Average Latency.

5/19/2010 7:54:15 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.

5/19/2010 7:54:15 AM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.

5/19/2010 7:54:15 AM --  
C:\JetStress\_Test\_Results\Performance\_2010\_5\_18\_23\_8\_51.xml has 478 samples queried.

## Test result report

## Checksum statistics - All

Database	Seen pages	Bad pages	Correctable pages	Wrong page-number pages	File length/seconds taken
G:\DB1\Jetstress001001.edb	20845362	0	0	0	651417 MBytes / 23068 sec
H:\DB2\Jetstress002001.edb	20845618	0	0	0	651425 MBytes / 23074 sec
I:\DB3\Jetstress003001.edb	20843058	0	0	0	651345 MBytes / 23090 sec
J:\DB4\Jetstress004001.edb	20845618	0	0	0	651425 MBytes / 23079 sec
(Sum)	83379656	0	0	0	2605614 MBytes / 23091

## Disk subsystem performance (of checksum)

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
G:	0.101	0.000	451.920	0.000	65535.994
H:	0.101	0.000	451.887	0.000	65535.994
I:	0.100	0.000	451.319	0.000	65535.994
J:	0.100	0.000	451.732	0.000	65535.994

**Memory system performance (of checksum)**

Counter	Average	Minimum	Maximum
% Processor Time	8.918	7.562	10.330
Available MBytes	6174.332	6068.000	6196.000
Free System Page Table Entries	33559647.848	33559318.000	33559911.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	62130599.449	62124032.000	62152704.000
Pool Paged Bytes	116994910.876	116350976.000	152584192.000

**Test log**

```

5/17/2010 4:07:09 PM -- Jetstress testing begins ...
5/17/2010 4:07:09 PM -- Prepare testing begins ...
5/17/2010 4:07:13 PM -- Attaching databases ...
5/17/2010 4:07:13 PM -- Prepare testing ends.
5/17/2010 4:07:13 PM -- Dispatching transactions begins ...
5/17/2010 4:07:13 PM -- Database cache settings: (minimum: 128.0 MB,
maximum: 1.0 GB)
5/17/2010 4:07:13 PM -- Database flush thresholds: (start: 10.2 MB, stop:
20.5 MB)
5/17/2010 4:07:17 PM -- Database read latency thresholds: (average: 20
msec/read, maximum: 200 msec/read).
5/17/2010 4:07:17 PM -- Log write latency thresholds: (average: 10
msec/write, maximum: 200 msec/write).
5/17/2010 4:07:19 PM -- Operation mix: Sessions 1, Inserts 40%, Deletes
20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
5/17/2010 4:07:19 PM -- Performance logging begins (interval: 15000 ms).
5/17/2010 4:07:19 PM -- Attaining prerequisites:
5/17/2010 4:26:49 PM -- \MSEExchange Database(JetstressWin)\Database
Cache Size, Last: 967061500.0 (lower bound: 966367600.0, upper bound:
none)
5/18/2010 4:26:50 PM -- Performance logging ends.

```

5/18/2010 4:26:50 PM -- JetInterop batch transaction stats: 65679, 65129, 65581 and 65269.

5/18/2010 4:26:50 PM -- Dispatching transactions ends.

5/18/2010 4:26:50 PM -- Shutting down databases ...

5/18/2010 4:26:54 PM -- Instance2572.1 (complete), Instance2572.2 (complete), Instance2572.3 (complete) and Instance2572.4 (complete)

5/18/2010 4:26:54 PM -- Performance logging begins (interval: 30000 ms).

5/18/2010 4:26:54 PM -- Verifying database checksums ...

5/18/2010 10:51:40 PM -- G: (100% processed), H: (100% processed), I: (100% processed) and J: (100% processed)

5/18/2010 10:51:40 PM -- Performance logging ends.

5/18/2010 10:51:40 PM --  
C:\JetStress\_Test\_Results\DBChecksum\_2010\_5\_18\_16\_26\_54.blg has 769 samples.

5/18/2010 10:51:44 PM --  
C:\JetStress\_Test\_Results\DBChecksum\_2010\_5\_18\_16\_26\_54.html is saved.

5/18/2010 10:51:44 PM -- Verifying log checksums ...

5/18/2010 10:51:44 PM -- G:\LOG1 (7 log(s) processed), H:\LOG2 (6 log(s) processed), I:\LOG3 (7 log(s) processed) and J:\LOG4 (7 log(s) processed)

5/18/2010 10:51:44 PM --  
C:\JetStress\_Test\_Results\Stress\_2010\_5\_17\_16\_7\_17.blg has 5835 samples.

5/18/2010 10:51:44 PM -- Creating test report ...

5/18/2010 10:52:12 PM -- Instance2572.1 has 13.0 for I/O Database Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.1 has 1.2 for I/O Log Writes Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.1 has 1.2 for I/O Log Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.2 has 13.2 for I/O Database Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.2 has 1.2 for I/O Log Writes Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.2 has 1.2 for I/O Log Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.3 has 13.7 for I/O Database Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.3 has 1.2 for I/O Log Writes Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.3 has 1.2 for I/O Log Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.4 has 14.0 for I/O Database Reads Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.4 has 1.3 for I/O Log Writes Average Latency.

5/18/2010 10:52:12 PM -- Instance2572.4 has 1.3 for I/O Log Reads Average Latency.

5/18/2010 10:52:12 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.

5/18/2010 10:52:12 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.

5/18/2010 10:52:12 PM --  
C:\JetStress\_Test\_Results\Stress\_2010\_5\_17\_16\_7\_17.xml has 5757 samples queried.

5/18/2010 10:52:13 PM --  
C:\JetStress\_Test\_Results\Stress\_2010\_5\_17\_16\_7\_17.html is saved.

5/18/2010 10:52:13 PM --  
C:\JetStress\_Test\_Results\Application\_2010\_5\_18\_22\_52\_13.evt is saved.

5/18/2010 10:52:13 PM --  
C:\JetStress\_Test\_Results\System\_2010\_5\_18\_22\_52\_13.evt is saved.

5/18/2010 10:52:13 PM -- Jetstress testing ends.

5/18/2010 11:08:42 PM -- Jetstress testing begins ...

5/18/2010 11:08:42 PM -- Prepare testing begins ...

5/18/2010 11:08:47 PM -- Attaching databases ...

5/18/2010 11:08:47 PM -- Prepare testing ends.

5/18/2010 11:08:47 PM -- Dispatching transactions begins ...

5/18/2010 11:08:47 PM -- Database cache settings: (minimum: 128.0 MB, maximum: 1.0 GB)

5/18/2010 11:08:47 PM -- Database flush thresholds: (start: 10.2 MB, stop: 20.5 MB)

5/18/2010 11:08:51 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).

5/18/2010 11:08:51 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).

5/18/2010 11:08:53 PM -- Operation mix: Sessions 1, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.

5/18/2010 11:08:53 PM -- Performance logging begins (interval: 15000 ms).

5/18/2010 11:08:53 PM -- Attaining prerequisites:

5/18/2010 11:29:11 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 966672400.0 (lower bound: 966367600.0, upper bound: none)

5/19/2010 1:29:12 AM -- Performance logging ends.

5/19/2010 1:29:12 AM -- JetInterop batch transaction stats: 5979, 6061, 6001 and 6140.

5/19/2010 1:29:12 AM -- Dispatching transactions ends.

5/19/2010 1:29:12 AM -- Shutting down databases ...

5/19/2010 1:29:16 AM -- Instance2572.1 (complete), Instance2572.2 (complete), Instance2572.3 (complete) and Instance2572.4 (complete)

5/19/2010 1:29:16 AM -- Performance logging begins (interval: 30000 ms).

5/19/2010 1:29:16 AM -- Verifying database checksums ...

5/19/2010 7:54:07 AM -- G: (100% processed), H: (100% processed), I: (100% processed) and J: (100% processed)

5/19/2010 7:54:07 AM -- Performance logging ends.

5/19/2010 7:54:07 AM --  
C:\JetStress\_Test\_Results\DBChecksum\_2010\_5\_19\_1\_29\_16.blg has 769 samples.

## Microsoft Exchange Server 2010 Jetstress – database backup

### Database backup statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance2572.1	650465.59	06:24:07	28.22
Instance2572.2	650465.59	06:22:29	28.34
Instance2572.3	650385.59	06:24:29	28.19
Instance2572.4	650465.59	06:22:26	28.35

### Jetstress system parameters

<b>Thread Count</b>	1 (per database)
<b>Minimum Database Cache</b>	128.0 MB
<b>Maximum Database Cache</b>	1024.0 MB
<b>Insert Operations</b>	40%
<b>Delete Operations</b>	20%
<b>Replace Operations</b>	5%
<b>Read Operations</b>	35%
<b>Lazy Commits</b>	70%

### Database configuration

<b>Instance2572.1</b>	Log Path: G:\LOG1 Database: G:\DB1\Jetstress001001.edb
<b>Instance2572.2</b>	Log Path: H:\LOG2 Database: H:\DB2\Jetstress002001.edb
<b>Instance2572.3</b>	Log Path: I:\LOG3 Database: I:\DB3\Jetstress003001.edb
<b>Instance2572.4</b>	Log Path: J:\LOG4 Database: J:\DB4\Jetstress004001.edb

## Transactional I/O performance

MSEExchange Database ==> Instances	I/O Database Reads Average Latency (msec)	I/O Database Writes Average Latency (msec)	I/O Database Reads/sec	I/O Database Writes/sec	I/O Database Reads Average Bytes	I/O Database Writes Average Bytes	I/O Log Reads Average Latency (msec)	I/O Log Writes Average Latency (msec)	I/O Log Reads/sec	I/O Log Writes/sec	I/O Log Reads Average Bytes	I/O Log Writes Average Bytes
Instance2572.1	13.797	0.000	112.790	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance2572.2	13.810	0.000	113.369	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance2572.3	13.860	0.000	112.611	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance2572.4	13.725	0.000	113.387	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## Host system performance

Counter	Average	Minimum	Maximum
% Processor Time	6.223	5.016	11.201
Available MBytes	4967.801	4908.000	4994.000
Free System Page Table Entries	33558953.292	33558417.000	33559084.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	62167258.667	62144512.000	62271488.000
Pool Paged Bytes	1446308832.000	1445568512.000	1446625280.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

## Test log

```
5/17/2010 9:40:35 AM -- Jetstress testing begins ...
5/17/2010 9:40:35 AM -- Prepare testing begins ...
5/17/2010 9:40:42 AM -- Attaching databases ...
5/17/2010 9:40:42 AM -- Prepare testing ends.
5/17/2010 9:40:48 AM -- Performance logging begins (interval: 30000 ms).
5/17/2010 9:40:48 AM -- Backing up databases ...
5/17/2010 4:05:17 PM -- Performance logging ends.
5/17/2010 4:05:17 PM -- Instance2572.1 (100% processed), Instance2572.2
(100% processed), Instance2572.3 (100% processed) and Instance2572.4
(100% processed)
5/17/2010 4:05:17 PM --
C:\JetStress_Test_Results\DatabaseBackup_2010_5_17_9_40_42.blg has 768
samples.
5/17/2010 4:05:17 PM -- Creating test report ...
```

## Microsoft Exchange Server 2010 Jetstress – soft recovery

### SoftRecovery test result report

#### Test summary

<b>Overall Test Result</b>	<b>Pass</b>
<b>Machine Name</b>	E2010-JETSTRESS
<b>Test Description</b>	
<b>Test Start Time</b>	5/16/2010 10:08:33 PM
<b>Test End Time</b>	5/17/2010 4:01:53 AM
<b>Collection Start Time</b>	5/16/2010 10:08:58 PM
<b>Collection End Time</b>	5/17/2010 4:01:39 AM
<b>Jetstress Version</b>	14.01.0043.000
<b>Ese Version</b>	14.00.0639.019
<b>Operating System</b>	Windows Server (R) 2008 Enterprise Service Pack 2 (6.0.6002.131072)
<b>Performance Log</b>	C:\JetStress_Test_Results\Performance_2010_5_16_22_8_42.blg

#### Database sizing and throughput

<b>Achieved Transactional I/O per Second</b>	121.624
<b>Target Transactional I/O per Second</b>	46.8
<b>Initial Database Size (bytes)</b>	2726992019456
<b>Final Database Size (bytes)</b>	2728199979008
<b>Database Files (Count)</b>	4

### Jetstress system parameters

<b>Thread Count</b>	1 (per database)
<b>Minimum Database Cache</b>	128.0 MB
<b>Maximum Database Cache</b>	1024.0 MB
<b>Insert Operations</b>	40%
<b>Delete Operations</b>	20%
<b>Replace Operations</b>	5%
<b>Read Operations</b>	35%
<b>Lazy Commits</b>	70%

### Database configuration

<b>Instance2572.1</b>	Log Path: G:\LOG1 Database: G:\DB1\Jetstress001001.edb
<b>Instance2572.2</b>	Log Path: H:\LOG2 Database: H:\DB2\Jetstress002001.edb
<b>Instance2572.3</b>	Log Path: I:\LOG3 Database: I:\DB3\Jetstress003001.edb
<b>Instance2572.4</b>	Log Path: J:\LOG4 Database: J:\DB4\Jetstress004001.edb

## Transactional I/O performance

MSEXchange Database ==> Instances	I/O Database Reads Average Latency (msec)	I/O Database Writes Average Latency (msec)	I/O Database Reads/sec	I/O Database Writes/sec	I/O Database Reads Average Bytes	I/O Database Writes Average Bytes	I/O Log Reads Average Latency (msec)	I/O Log Writes Average Latency (msec)	I/O Log Reads/sec	I/O Log Writes/sec	I/O Log Reads Average Bytes	I/O Log Writes Average Bytes
Instance2572.1	14.247	4.817	17.984	11.934	32768.000	37612.874	0.000	0.394	0.000	11.442	0.000	4616.973
Instance2572.2	14.703	4.963	18.417	12.316	32768.000	37627.340	0.000	0.407	0.000	11.690	0.000	4593.243
Instance2572.3	15.590	5.097	18.136	12.069	32768.000	37620.479	0.000	0.421	0.000	11.633	0.000	4623.833
Instance2572.4	15.552	5.379	18.464	12.304	32768.000	37582.649	0.000	0.412	0.000	11.635	0.000	4626.686

## Host system performance

Counter	Average	Minimum	Maximum
% Processor Time	1.285	0.520	3.041
Available MBytes	3907.104	3792.000	4910.000
Free System Page Table Entries	33558844.347	33558372.000	33558966.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	61403899.464	61399040.000	61435904.000
Pool Paged Bytes	1444947795.277	1443995648.000	1445068800.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

## Test log

```
5/16/2010 10:08:33 PM -- Jetstress testing begins ...
5/16/2010 10:08:33 PM -- Prepare testing begins ...
5/16/2010 10:08:38 PM -- Attaching databases ...
5/16/2010 10:08:38 PM -- Prepare testing ends.
5/16/2010 10:08:38 PM -- Dispatching transactions begins ...
5/16/2010 10:08:38 PM -- Database cache settings: (minimum: 128.0 MB,
maximum: 1.0 GB)
5/16/2010 10:08:38 PM -- Database flush thresholds: (start: 10.2 MB,
stop: 20.5 MB)
5/16/2010 10:08:42 PM -- Database read latency thresholds: (average: 20
msec/read, maximum: 100 msec/read).
5/16/2010 10:08:42 PM -- Log write latency thresholds: (average: 10
msec/write, maximum: 100 msec/write).
5/16/2010 10:08:43 PM -- Operation mix: Sessions 1, Inserts 40%, Deletes
20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
5/16/2010 10:08:43 PM -- Performance logging begins (interval: 15000
ms).
5/16/2010 10:08:43 PM -- Generating log files ...
5/17/2010 4:01:49 AM -- G:\LOG1 (100.2% generated), H:\LOG2 (101.8%
generated), I:\LOG3 (100.8% generated) and J:\LOG4 (101.4% generated)
5/17/2010 4:01:49 AM -- Performance logging ends.
5/17/2010 4:01:49 AM -- JetInterop batch transaction stats: 21631,
21952, 21693 and 21936.
5/17/2010 4:01:49 AM -- Dispatching transactions ends.
5/17/2010 4:01:49 AM -- Shutting down databases ...
5/17/2010 4:01:53 AM -- Instance2572.1 (complete), Instance2572.2
(complete), Instance2572.3 (complete) and Instance2572.4 (complete)
5/17/2010 4:01:53 AM --
C:\JetStress_Test_Results\Performance_2010_5_16_22_8_42.blg has 1411
samples.
5/17/2010 4:01:53 AM -- Creating test report ...
```

5/17/2010 4:01:58 AM -- Instance2572.1 has 14.2 for I/O Database Reads Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.1 has 0.4 for I/O Log Writes Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.1 has 0.4 for I/O Log Reads Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.2 has 14.7 for I/O Database Reads Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.2 has 0.4 for I/O Log Writes Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.2 has 0.4 for I/O Log Reads Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.3 has 15.6 for I/O Database Reads Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.3 has 0.4 for I/O Log Writes Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.3 has 0.4 for I/O Log Reads Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.4 has 15.6 for I/O Database Reads Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.4 has 0.4 for I/O Log Writes Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.4 has 0.4 for I/O Log Reads Average Latency.

5/17/2010 4:01:58 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.

5/17/2010 4:01:58 AM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.

5/17/2010 4:01:58 AM --  
C:\JetStress\_Test\_Results\Performance\_2010\_5\_16\_22\_8\_42.xml has 1410 samples queried.

## SoftRecovery test result report

### Soft recovery statistics - All

Database Instance	Log files replayed	Elapsed seconds
Instance2572.1	500	3705.1329507
Instance2572.2	508	3835.8773888
Instance2572.3	503	3831.1037582
Instance2572.4	506	3854.7067095

### Database configuration

**Instance2572.1**      Log Path: G:\LOG1  
Database: G:\DB1\Jetstress001001.edb

**Instance2572.2**      Log Path: H:\LOG2  
Database: H:\DB2\Jetstress002001.edb

**Instance2572.3**      Log Path: I:\LOG3  
Database: I:\DB3\Jetstress003001.edb

**Instance2572.4**      Log Path: J:\LOG4  
Database: J:\DB4\Jetstress004001.edb

## Transactional I/O performance

MSEExchange Database ==> Instances	I/O Database Reads Average Latency (msec)	I/O Database Writes Average Latency (msec)	I/O Database Reads/sec	I/O Database Writes/sec	I/O Database Reads Average Bytes	I/O Database Writes Average Bytes	I/O Log Reads Average Latency (msec)	I/O Log Writes Average Latency (msec)	I/O Log Reads/sec	I/O Log Writes/sec	I/O Log Reads Average Bytes	I/O Log Writes Average Bytes
Instance2572.1	1066.525	200.802	65.881	0.809	75277.628	19472.130	2.268	0.001	1.215	0.003	64579.737	0.556
Instance2572.2	1111.178	216.418	65.557	0.793	73187.004	19196.372	2.260	0.000	1.190	0.001	63250.467	0.269
Instance2572.3	1188.600	316.592	64.308	0.787	71207.477	20290.689	2.171	0.000	1.183	0.003	63043.036	0.538
Instance2572.4	1139.918	251.585	65.545	0.787	72327.086	19482.750	2.244	0.001	1.182	0.001	62537.685	0.268

## Background database maintenance I/O performance

MSEExchange Database ==> Instances	Database Maintenance I/O Reads/sec	Database Maintenance I/O Reads Average Bytes
Instance2572.1	11.962	216538.338
Instance2572.2	11.421	216559.394
Instance2572.3	10.769	211965.489
Instance2572.4	11.171	216586.912

## Total I/O performance

MSExchange Database ==> Instances	I/O Database Reads Average Latency (msec)	I/O Database Writes Average Latency (msec)	I/O Database Reads/sec	I/O Database Writes/sec	I/O Database Reads Average Bytes	I/O Database Writes Average Bytes	I/O Log Reads Average Latency (msec)	I/O Log Writes Average Latency (msec)	I/O Log Reads/sec	I/O Log Writes/sec	I/O Log Reads Average Bytes	I/O Log Writes Average Bytes
Instance 2572.1	1066.525	200.802	77.843	0.809	96985.199	19472.130	2.268	0.001	1.215	0.003	64579.737	0.556
Instance 2572.2	1111.178	216.418	76.979	0.793	94459.379	19196.372	2.260	0.000	1.190	0.001	63250.467	0.269
Instance 2572.3	1188.600	316.592	75.077	0.787	91397.314	20290.689	2.171	0.000	1.183	0.003	63043.036	0.538
Instance 2572.4	1139.918	251.585	76.716	0.787	93333.570	19482.750	2.244	0.001	1.182	0.001	62537.685	0.268

## Host system performance

Counter	Average	Minimum	Maximum
% Processor Time	2.198	0.000	13.953
Available MBytes	3917.117	3837.000	4933.000
Free System Page Table Entries	33558781.443	33558417.000	33558882.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	62938631.219	61427712.000	63492096.000
Pool Paged Bytes	1446022258.966	1444446208.000	1481175040.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

## Test log

```
5/16/2010 10:08:33 PM -- Jetstress testing begins ...
5/16/2010 10:08:33 PM -- Prepare testing begins ...
5/16/2010 10:08:38 PM -- Attaching databases ...
5/16/2010 10:08:38 PM -- Prepare testing ends.
5/16/2010 10:08:38 PM -- Dispatching transactions begins ...
5/16/2010 10:08:38 PM -- Database cache settings: (minimum: 128.0 MB,
maximum: 1.0 GB)
5/16/2010 10:08:38 PM -- Database flush thresholds: (start: 10.2 MB,
stop: 20.5 MB)
5/16/2010 10:08:42 PM -- Database read latency thresholds: (average: 20
msec/read, maximum: 100 msec/read).
5/16/2010 10:08:42 PM -- Log write latency thresholds: (average: 10
msec/write, maximum: 100 msec/write).
5/16/2010 10:08:43 PM -- Operation mix: Sessions 1, Inserts 40%, Deletes
20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
5/16/2010 10:08:43 PM -- Performance logging begins (interval: 15000
ms).
5/16/2010 10:08:43 PM -- Generating log files ...
5/17/2010 4:01:49 AM -- G:\LOG1 (100.2% generated), H:\LOG2 (101.8%
generated), I:\LOG3 (100.8% generated) and J:\LOG4 (101.4% generated)
5/17/2010 4:01:49 AM -- Performance logging ends.
5/17/2010 4:01:49 AM -- JetInterop batch transaction stats: 21631,
21952, 21693 and 21936.
5/17/2010 4:01:49 AM -- Dispatching transactions ends.
5/17/2010 4:01:49 AM -- Shutting down databases ...
5/17/2010 4:01:53 AM -- Instance2572.1 (complete), Instance2572.2
(complete), Instance2572.3 (complete) and Instance2572.4 (complete)
5/17/2010 4:01:53 AM --
C:\JetStress_Test_Results\Performance_2010_5_16_22_8_42.blg has 1411
samples.
5/17/2010 4:01:53 AM -- Creating test report ...
```

5/17/2010 4:01:58 AM -- Instance2572.1 has 14.2 for I/O Database Reads Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.1 has 0.4 for I/O Log Writes Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.1 has 0.4 for I/O Log Reads Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.2 has 14.7 for I/O Database Reads Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.2 has 0.4 for I/O Log Writes Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.2 has 0.4 for I/O Log Reads Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.3 has 15.6 for I/O Database Reads Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.3 has 0.4 for I/O Log Writes Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.3 has 0.4 for I/O Log Reads Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.4 has 15.6 for I/O Database Reads Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.4 has 0.4 for I/O Log Writes Average Latency.

5/17/2010 4:01:58 AM -- Instance2572.4 has 0.4 for I/O Log Reads Average Latency.

5/17/2010 4:01:58 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.

5/17/2010 4:01:58 AM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.

5/17/2010 4:01:58 AM --  
C:\JetStress\_Test\_Results\Performance\_2010\_5\_16\_22\_8\_42.xml has 1410 samples queried.

5/17/2010 4:01:58 AM --  
C:\JetStress\_Test\_Results\Performance\_2010\_5\_16\_22\_8\_42.html is saved.

5/17/2010 4:02:00 AM -- Performance logging begins (interval: 2000 ms).

5/17/2010 4:02:00 AM -- Recovering databases ...

5/17/2010 5:06:14 AM -- Performance logging ends.

5/17/2010 5:06:14 AM -- Instance2572.1 (3705.1329507), Instance2572.2 (3835.8773888), Instance2572.3 (3831.1037582) and Instance2572.4 (3854.7067095)

5/17/2010 5:06:15 AM --

C:\JetStress\_Test\_Results\SoftRecovery\_2010\_5\_17\_4\_1\_58.blg has 1915 samples.

5/17/2010 5:06:15 AM -- Creating test report ...