

# HP E5300 Messaging System 500 user – 1.75GB mailbox resiliency Exchange 2010 storage solution

Technical white paper

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## Overview

This solution brief provides information on an HP E5300 Messaging System with HP P1210m storage controllers for Microsoft® Exchange Server 2010 (Exchange), based on the Microsoft Exchange Solution Reviewed Program (ESRP) – Storage program.

The ESRP – Storage program was developed by Microsoft Corporation to provide a common storage testing framework for vendors to provide information on their storage solutions for Microsoft Exchange Server software. For more details on the Microsoft ESRP V3.0 – Storage program, please see <http://technet.microsoft.com/en-us/exchange/ff182054.aspx>.

Tested with: ESRP – Storage Version 3.0

Test Date: February 2011

## Disclaimer

This document has been produced independently of Microsoft Corporation. Microsoft Corporation expressly disclaims responsibility for, and makes no warranty, express or implied, with respect to the accuracy of the contents of this document.

## Features

The HP E5300 Messaging System (E5300) is built on the next generation Infrastructure-to-Application (I2A) model designed to reduce IT management complexities and automate existing manual tasks to lower the total cost of ownership. HP and Microsoft have entered into a strategic partnership collaborating on an engineering roadmap for converged application platforms based on Microsoft SQL Server and Microsoft Exchange Server.

The HP E5300 Messaging System is based on the converged application platform for Microsoft Exchange Server which is designed to simplify the initial planning, testing and configuration by providing a pre-tested and pre-packaged solution ready to deploy. The E5300 configuration has been optimized for the Small and Medium Business (SMB) customer looking to support 500 users with large 1.75GB mailbox capacities and mailbox resiliency features, all in a single appliance.

The pre-packaged E5300 configuration ships with all the necessary server and storage hardware pre-integrated to simplify the ordering and initial deployment process. HP has also developed a series of setup and verification tools to perform the initial setup, configuration and verification of the HP E5300 Messaging System. The tools have been developed in close collaboration between HP and Microsoft to reduce the time and complexity needed to deploy Microsoft Exchange Server 2010 SP1 (Exchange 2010). Many of the complex and time consuming hardware and software setup and configuration tasks are now done for you. The E5300 also includes several HP value-add tools to monitor and manage the health of the messaging system.

The E5300 has been designed to support 500 users with an estimated mailbox profile of 200 messages sent/received per mailbox per day. To provide mailbox resiliency, the two server blades in the E5300 host a two-copy Exchange 2010 Database Availability Group – configured with an active and one passive copy of each mailbox database. The E5300 is configured with two active databases in the DAG, each hosting approximately 250 mailboxes.

The DAG replication model supports both (unplanned) failovers and (administrator initiated) switchovers at the database level, unlike CCR (Cluster Continuous Replication) which requires the entire server to be failed over. The DAG availability feature also supports combining the Hub Transport (HT) and Client Access Server (CAS) roles on to the Mailbox (MBX) server. Unlike CCR which supports only the mailbox role, the DAG configuration removes the cluster limitations and allows multi-role configurations.

In the E5300 both of the servers are configured as multi-role Exchange 2010 servers in the DAG, with the MBX, HT and CAS roles installed. The two servers are also configured in a CAS Array to support client connections. To ensure fault tolerance and to distribute the client requests between CAS servers in the CAS Array, a hardware or software based load balancer is recommended. Microsoft offers a qualification program for load balancers supporting Exchange 2010.

More information about the E5000 family is available at: <http://www.hp.com/go/E5000>.

In addition to the best practices described in this solution brief, more deployment guides on HP ProLiant servers for Exchange Server 2010 are available for free download from HP ActiveAnswers at <http://www.hp.com/solutions/activeanswers/exchange>.

## Solution description

This solution brief provides tested best practices to help administrators implement the Exchange deployment, with the following criteria:

- 500 users total, with two (2) active Exchange servers and two (2) database copies
- 0.24 IOPS per user (0.2 with additional 20% headroom included)
- 1.75 GB tested mailbox size
- Database Availability Group (DAG) deployment with 2 copies of each database in the DAG
- 2 databases total on each server (1 active and 1 passive) during normal operations
- 24x7 background database maintenance configured during testing
- Storage in this solution is deployed as single disk RAID 1. See the *Storage configuration* section for more information.

ESRP – Storage is designed to size the storage subsystem for the mailbox server role, and is not designed to size for other Exchange roles, such as Hub Transport or Client Access Server (CAS). While these roles are supported in a DAG, ESRP-Storage does not help to size for those roles on the same server as the mailbox server role. The E5000 incorporates this multi-role design and to help size for these multi-role deployments, the “HP Sizer for Microsoft Exchange Server 2010” should be used. It is available at this site: <http://www.hp.com/solutions/microsoft/exchange>.

Figure 1 shows using the HP Sizer to select the E5300 (or other E5000 models).

Figure 1. Using the HP Sizer to select the E5300 (or other E5000 model)

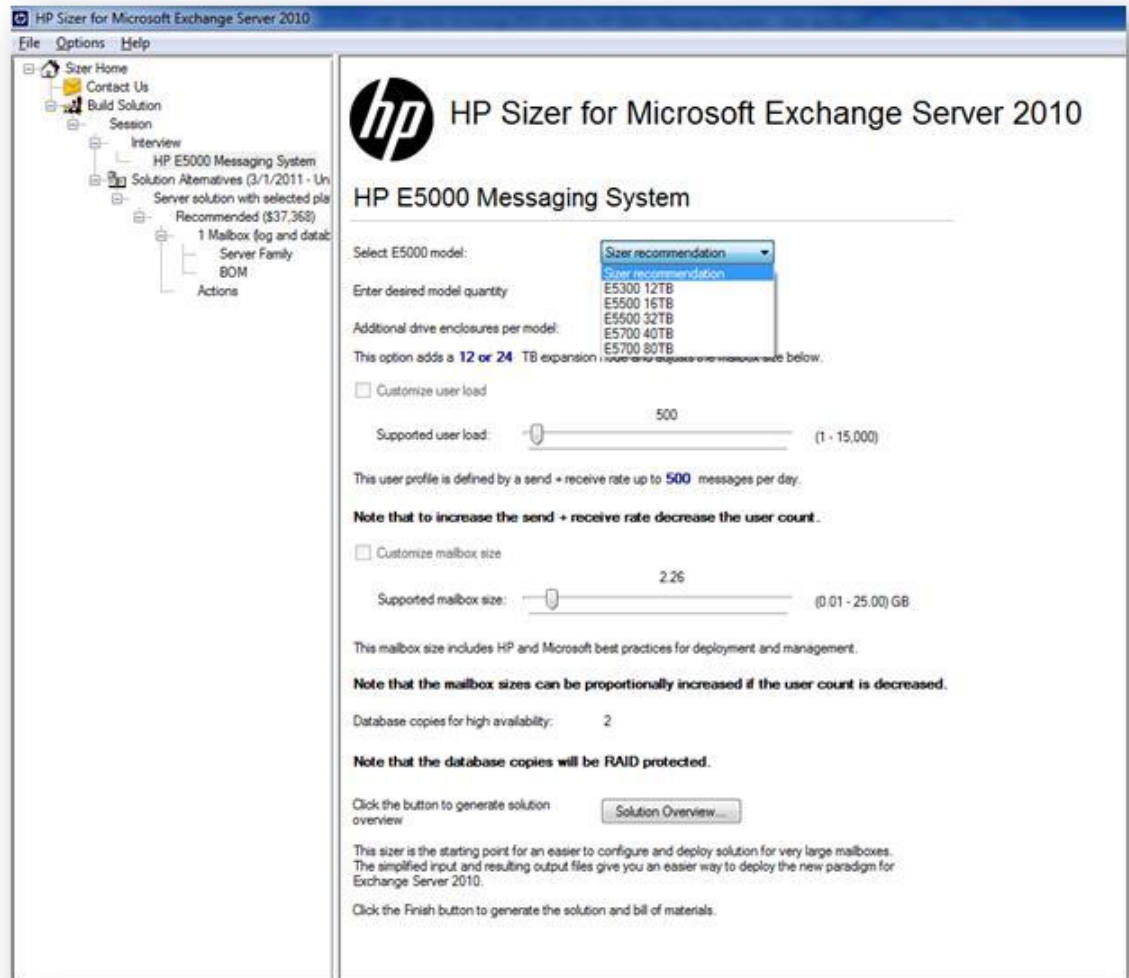


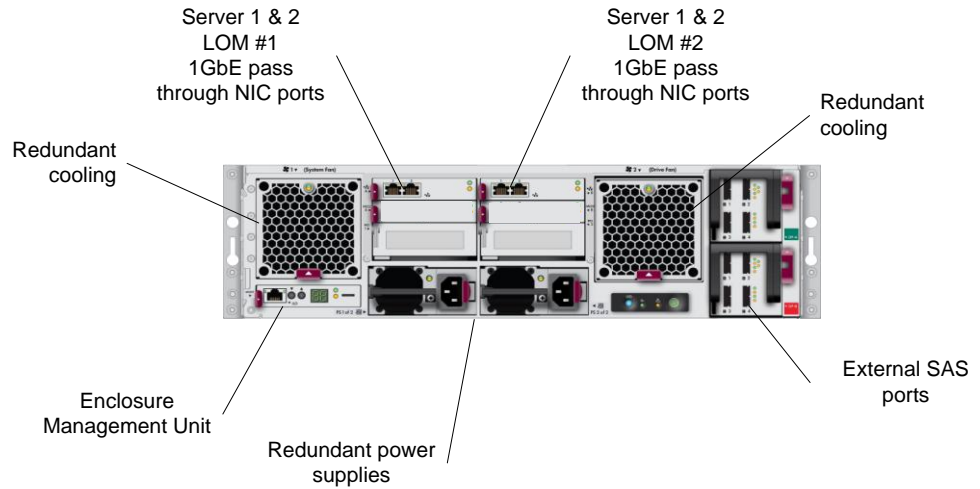
Figure 2 shows the tested solution hardware.

Figure 2. Front view of E5300



Figure 3 shows the rear view of the E5300 enclosure, with dual, redundant power supplies, cooling fans and I/O modules.

**Figure 3.** Rear view of the E5300 enclosure



## Storage configuration

The LFF storage drawer is connected to the server blades using the HP P1210m controllers installed in each of the server blades. The HP P1210m controllers manage RAID configurations and LUN ownership. For storage performance and redundancy, the controllers and the LFF storage drawer are connected using a dual-domain configuration. The dual-domain configuration uses two independent SAS data paths from the servers to the storage. The dual-domain communication paths allow disk I/O to be load balanced across both data paths as well as being capable of handling a single data path failure.

The E5000 system configuration includes the HP E5000 Configuration Wizard (ECW), which is used to deploy the storage in their optimal configurations. The E5000 Configuration Wizard assists during the initial out of box setup and configuration of the messaging system. This tool helps to configure each of the customer specific settings needed to prepare the server. Figure 4 depicts a screenshot of the ECW's introductory screen.



## Targeted customer profile

This solution brief provides tested best practices to help administrators implement the Exchange deployment, with the following criteria:

- 500 users total, with two (2) active Exchange servers and two (2) database copies
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- 2 databases total on each server (1 active and 1 passive) during normal operations
- 24x7 background database maintenance configured during testing

## Tested deployment

The following table summarizes the testing environment.

### Simulated Exchange configuration

Number of Exchange mailboxes simulated	500
Number of Database Availability Groups (DAGs)	One (1 )
Number of mailbox servers/DAG	Two (2)
Number of active mailboxes/server	250
Number of databases/host	1 active
Number of copies/database	2 including active
Number of mailboxes/database	250
Simulated profile: I/O operations per second per mailbox (IOPS, include 20% headroom)	0.24
Database maintenance (DBM)	Tested with 24/7 DBM enabled
Database and Log LUN size***	931 GB
Total database size for performance testing	925 GB (2 databases x 462.5GB each)
% storage capacity used by Exchange database**	24.8% (925GB/3726GB)

\*\*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.

\*\*\*Database and log files are combined within Exchange 2010 as a best practice. This is a new recommended configuration with Exchange 2010

## Storage hardware

Storage Connectivity	SAS
Storage model & firmware	E5000 (0103 firmware)
Storage cache	See Controller Cache below
Number of storage controllers	1 per server
Number of storage ports	Connected one (1) 4x 6G SAS connector (two available)
Maximum bandwidth of storage connectivity to host	6 Gb per 4x SAS connector (1 in use for this solution)
Storage controller	P1210m
Controller cache	1GB Flash Backed Write Cache (50/50 read/write = Read cache and write cache can only be enabled or disabled. They are enabled by default.)
Host server type	HP E5460sb
Total number of disks tested in solution	8
Maximum number of spindles that can be hosted in the storage	64 (12 per Expansion Node x 4 + 16 in the E5000)

## Storage software

Smart Array P1210m Driver	6.1.7600.16385
Queue depth & target setting	Not applicable
Multipathing	Not applicable
Host OS	Windows® Server 2008 R2 Enterprise
ESE.dll file version	14.1.218.12

## Storage disk configuration (mailbox and log disks)

Disk type, speed and firmware	HP 1TB 6G 7.2K LFF MDL SAS HDD (firmware: HPGA)
Raw capacity per disk (GB)	931.5 GB
Number of physical disks in test	8
Total raw storage capacity (GB)	7,452 GB
Disk slice size (GB)	N/A
RAID level	Single RAID 1 (JBOD)
Total formatted capacity	3,726 GB
Storage capacity utilization	50% Formatted capacity/Total raw capacity
Database capacity utilization	12.4% Database size / Total raw capacity 925/7,452



## Replication configuration

Replication Mechanism	Mailbox Resiliency
Number of links	2 (Dual-port Gigabit Ethernet)
Simulated link distance	LAN
Link type	IP Ethernet
Link bandwidth	1 Gb/s

## Best practices

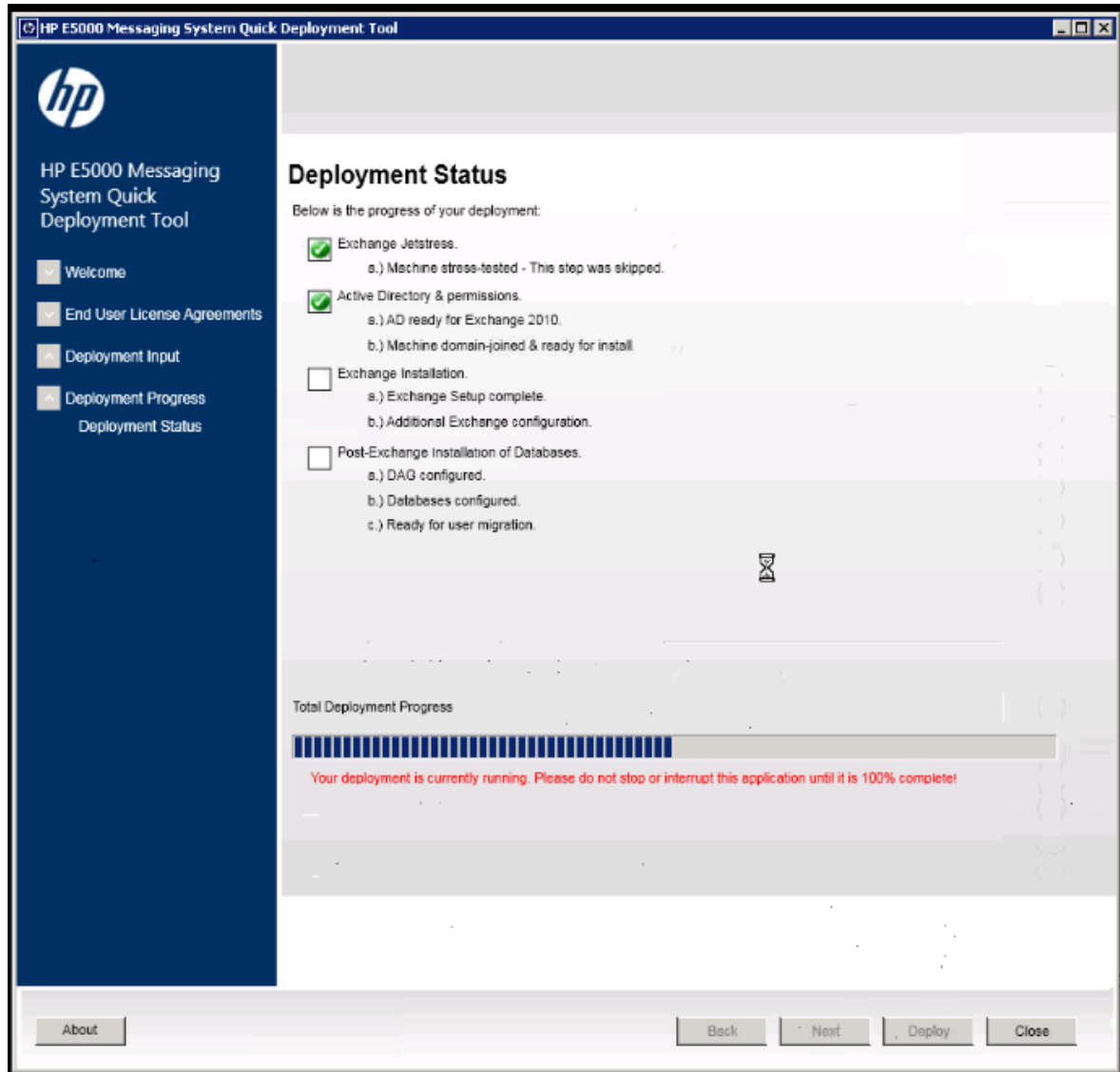
Exchange Server is a disk-intensive application. For Exchange 2010 best practices on storage design from Microsoft, please visit <http://technet.microsoft.com/en-us/library/dd346703.aspx>.

For Exchange Server solution guidance, please visit HP at <http://www.hp.com/solutions/microsoft/exchange>.

The best practices for this solution are:

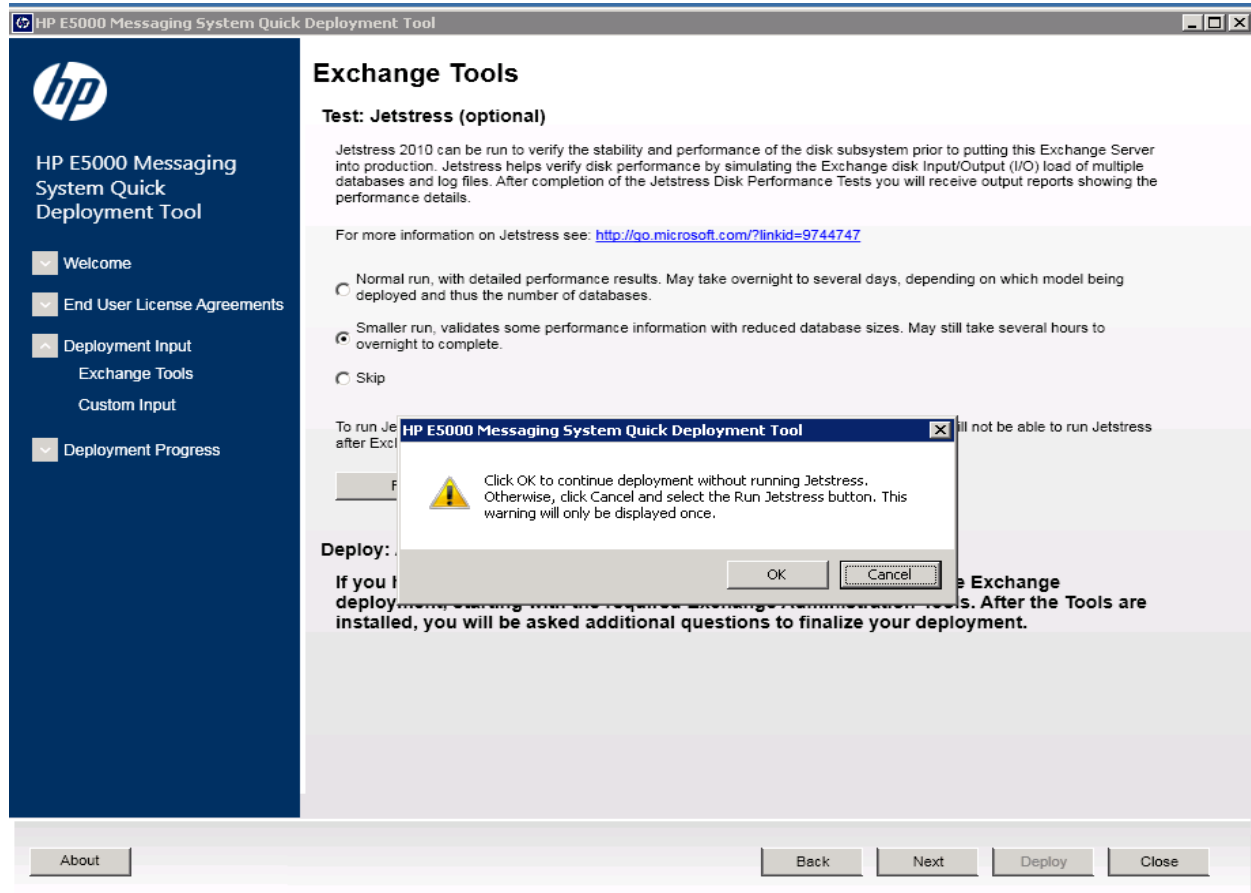
- The E5000 Messaging System includes built-in tools to automate and manage many of the deployment tasks, such as to configure storage and networking, and then later on, to ensure that firmware and drivers for all hardware are up to date.
- The ECW configures RAID arrays (with 256KB stripe size, per best practices at <http://technet.microsoft.com/en-us/library/ee832792.aspx>), and creates volumes as mount points, formatting them with 64K allocation unit sizes, as prescribed by Microsoft best practices.
- Databases and logs are placed on the same volumes on the same RAID1 arrays, since there are multiple database copies
- In Exchange configuration, set database “ActivationPreference” for each copy of the database to align with the primary and secondary servers hosting the databases.
- The E5000 Messaging System Quick Deployment Tool (QDT) has been developed to automate installing Exchange Server 2010 (see figure 6).

Figure 6. E5000 Messaging System Quick Deployment Tool – installing Exchange Server 2010



- Before installing Exchange Server 2010, you may test your storage solution with Jetstress to ensure it is configured properly and meets your requirements. The QDT has built-in access to the Jetstress tool to provide either a quicker test or full test. (see figure 7)

**Figure 7.** E5000 Messaging System Quick Deployment Tool – Jetstress Testing



## Test results summary

This section provides a high level summary of the test data from ESRP and a reference to the detailed HTML reports which are generated by ESRP testing framework.

An HP E5460sb server blade was used to drive the Jetstress I/O load, and simulate the storage I/O. For solutions that utilize a uniform building block style where each building block is independent and isolated, ESRP requires that only one of the building blocks be tested. In this case, a single unit was tested as the building block. However, for production deployments of this solution, two identically units are required.

## Reliability

One of the tests in the framework is designed to test reliability over a 24-hour test period. The goal is to verify that the storage can handle high I/O load for a long period of time. Both log and database files will be analyzed for integrity after the stress test to ensure no database/log corruption.

The following list provides an overview:

- Any errors reported in the saved event log file?  
There were no relevant errors reported in the event log for the storage reliability testing
- Any errors reported during the database and [log](#) checksum process?  
There were no errors reported for the [checksum](#) process

## Storage [performance](#) results

The primary storage performance testing is designed to exercise the storage with maximum sustainable Exchange type of I/O for 2 hours. The test shows how long it takes the storage to respond to an I/O 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 hours test duration.

This solution is designed around a 2 server DAG with a 1 server failure service level. It is important to understand not only the performance of the storage solution in normal operations with all servers hosting 1 database, but also with a server failure where the remaining server is running both databases.

Note that the Jetstress load was increased for additional IOPS beyond the minimum needed disk transfers/sec, thus the read latencies are just below the threshold. This illustrates that the solution is capable of additional IOPS beyond the minimum needed.

<b>Database I/O</b>	<b>Server 1 2 Active Database</b>
Needed Disk Transfers/sec*	120
Database Disks Transfers/sec (total per server)	284
Database Disks Reads/sec (average per database)	82.2
Database Disks Writes/sec (average per database)	60
Average Database Disk Read Latency (ms)	16.7
Average Database Disk Write Latency (ms)	1.4
<b>Transaction Log I/O</b>	
Log Disks Writes/sec	51.3
Average Log Disk Write Latency (ms)	0.59
Log Disk Reads/sec	0.95

\*This row represents the IOPS necessary to satisfy the IOPS per user necessary for the number of active databases in this solution.

## 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). One important characteristic of the default test is that these read rates and log replay rates are measured with all databases under concurrent or simultaneous load. The worst case scenario in this solution is when all 2 databases are mounted on one server.

### Database Read-only Performance

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

<b>Database Read-only</b>	
MB Read/sec per database	128.5
MB Read/sec total per server	257

### Transaction Log Recovery / Replay Performance

The test is 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. Each log file is 1 MB in size.

<b>Transaction Log Replay</b>	
Average time to play one log file (sec)	3.7

## Conclusion

The information discussed in this solution brief highlights the tested performance results and configuration best practices for an Exchange Server solution supporting 500 Exchange users with 1.75GB mailboxes. Testing was performed with an HP P1210m controller with 8 HP 1TB 6G 7.2K LFF MDL SAS HDD disks for Exchange database storage and transaction logs. The testing demonstrated that the storage subsystem was capable of supporting both the IOPS needed to support the 500 Exchange users as well as providing additional headroom.

This document is developed by storage solution providers, and reviewed by Microsoft Exchange product team. The test results and data presented in this document are based on the tests introduced in the ESRP test framework and should be used as a guide, but each specific deployment should be tested to ensure that their solution performs to the requirements of their specific environment.

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

## Appendix A – Test reports

### Performance test result report 2 hour

Server 1 (Normal load – 1 DB, 500 users)

#### Test Summary

**Overall Test Result** Pass  
**Machine Name** WIN-JSSUDLJA1D  
**Test Description** ESRP testing  
E5300 Server 1  
MVB2  
**Test Start Time** 2/23/2011 2:38:27 PM  
**Test End Time** 2/23/2011 5:36:36 PM  
**Collection Start Time** 2/23/2011 2:40:56 PM  
**Collection End Time** 2/23/2011 4:40:44 PM  
**Jetstress Version** 14.01.0180.003  
**Ese Version** 14.01.0218.012  
**Operating System** Windows Server 2008 R2 Enterprise (6.1.7600.0)

#### Database Sizing and Throughput

**Achieved Transactional I/O per Second** 144.778  
**Target Transactional I/O per Second** 60  
**Initial Database Size (bytes)** 471734484992  
**Final Database Size (bytes)** 472439128064  
**Database Files (Count)** 1

#### Jetstress System Parameters

**Thread Count** 9 (per database)  
**Minimum Database Cache** 32.0 MB  
**Maximum Database Cache** 256.0 MB  
**Insert Operations** 40%  
**Delete Operations** 20%  
**Replace Operations** 5%  
**Read Operations** 35%  
**Lazy Commits** 70%  
**Run Background Database Maintenance** True  
**Number of Copies per Database** 2

#### Database Configuration

**Instance5264.1** Log Path: C:\ExchangeDatabases\VOL1\logs  
Database: C:\ExchangeDatabases\VOL1\Jetstress001001.edb

Transactional I/O Performance

<b>MSEXchange Database ==&gt; Instances</b>	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
<b>Instance5264.1</b>	19.714	0.929	83.926	60.852	32891.336	35202.103	0.000	0.601	0.000	52.713	0.000	4472.923

Background Database Maintenance I/O Performance

<b>MSEXchange Database ==&gt; Instances</b>	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
<b>Instance5264.1</b>	25.097	261269.511

Log Replication I/O Performance

<b>MSEXchange Database ==&gt; Instances</b>	I/O Log Reads/sec	I/O Log Reads Average Bytes
<b>Instance5264.1</b>	0.954	232519.769

Total I/O Performance

<b>MSEXchange Database ==&gt; Instances</b>	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
<b>Instance5264.1</b>	19.714	0.929	109.023	60.852	85464.090	35202.103	14.187	0.601	0.954	52.713	232519.769	4472.923

Host System Performance

<b>Counter</b>	Average	Minimum	Maximum
<b>% Processor Time</b>	0.227	0.071	0.467
<b>Available MBytes</b>	45588.457	45585.000	45605.000
<b>Free System Page Table Entries</b>	33555644.463	33555642.000	33555646.000
<b>Transition Pages RePurposed/sec</b>	0.000	0.000	0.000
<b>Pool Nonpaged Bytes</b>	509856663.248	509845504.000	509886464.000
<b>Pool Paged Bytes</b>	117433457.303	117301248.000	117743616.000
<b>Database Page Fault Stalls/sec</b>	0.000	0.000	0.000

Test Log

2/23/2011 12:23:20 PM -- Jetstress testing begins ...  
 2/23/2011 12:23:20 PM -- Prepare testing begins ...  
 2/23/2011 12:23:21 PM -- Attaching databases ...  
 2/23/2011 12:23:21 PM -- Prepare testing ends.  
 2/23/2011 12:23:21 PM -- Dispatching transactions begins ...  
 2/23/2011 12:23:21 PM -- Database cache settings: (minimum: 32.0 MB, maximum: 256.0 MB)  
 2/23/2011 12:23:21 PM -- Database flush thresholds: (start: 2.5 MB, stop: 5.1 MB)  
 2/23/2011 12:23:22 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).  
 2/23/2011 12:23:22 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).

2/23/2011 12:23:25 PM -- Operation mix: Sessions 10, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.  
2/23/2011 12:23:25 PM -- Performance logging begins (interval: 15000 ms).  
2/23/2011 12:23:25 PM -- Attaining prerequisites:  
2/23/2011 12:25:46 PM -- \MSEExchange Database(JetstressWin)\Database Cache Size, Last: 243388400.0 (lower bound: 241591900.0, upper bound: none)  
2/23/2011 2:25:47 PM -- Performance logging ends.  
2/23/2011 2:36:27 PM -- JetInterop batch transaction stats: 38190.  
2/23/2011 2:36:28 PM -- Dispatching transactions ends.  
2/23/2011 2:36:28 PM -- Shutting down databases ...  
2/23/2011 2:36:34 PM -- Instance5264.1 (complete)  
2/23/2011 2:36:34 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_23\_12\_23\_22.blg has 488 samples.  
2/23/2011 2:36:34 PM -- Creating test report ...  
2/23/2011 2:36:36 PM -- Instance5264.1 has 20.9 for I/O Database Reads Average Latency.  
2/23/2011 2:36:36 PM -- Instance5264.1 has 0.6 for I/O Log Writes Average Latency.  
2/23/2011 2:36:36 PM -- Instance5264.1 has 0.6 for I/O Log Reads Average Latency.  
2/23/2011 2:36:36 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
2/23/2011 2:36:36 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
2/23/2011 2:36:36 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_23\_12\_23\_22.xml has 478 samples queried.  
2/23/2011 2:36:36 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_23\_12\_23\_22.html is saved.  
2/23/2011 2:36:37 PM -- Performance logging begins (interval: 15000 ms).  
2/23/2011 2:36:37 PM -- Verifying database checksums ...  
2/23/2011 2:36:52 PM -- C:\ExchangeDatabases\VOL1 (0% processed)  
2/23/2011 2:36:52 PM -- Verifying log checksums ...  
2/23/2011 2:36:52 PM -- C:\ExchangeDatabases\VOL1\logs (0 log(s) processed)  
2/23/2011 2:36:52 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Application\_2011\_2\_23\_14\_36\_52.evt is saved.  
2/23/2011 2:36:52 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\System\_2011\_2\_23\_14\_36\_52.evt is saved.  
2/23/2011 2:36:52 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\XmlConfig\_2011\_2\_23\_14\_36\_52.xml is saved.  
2/23/2011 2:36:52 PM -- Jetstress testing ends.  
2/23/2011 2:38:27 PM -- Jetstress testing begins ...  
2/23/2011 2:38:27 PM -- Prepare testing begins ...  
2/23/2011 2:38:29 PM -- Attaching databases ...  
2/23/2011 2:38:29 PM -- Prepare testing ends.  
2/23/2011 2:38:29 PM -- Dispatching transactions begins ...  
2/23/2011 2:38:29 PM -- Database cache settings: (minimum: 32.0 MB, maximum: 256.0 MB)  
2/23/2011 2:38:29 PM -- Database flush thresholds: (start: 2.5 MB, stop: 5.1 MB)  
2/23/2011 2:38:30 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).  
2/23/2011 2:38:30 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).  
2/23/2011 2:38:33 PM -- Operation mix: Sessions 9, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.  
2/23/2011 2:38:33 PM -- Performance logging begins (interval: 15000 ms).  
2/23/2011 2:38:33 PM -- Attaining prerequisites:  
2/23/2011 2:40:56 PM -- \MSEExchange Database(JetstressWin)\Database Cache Size, Last: 242008100.0 (lower bound: 241591900.0, upper bound: none)  
2/23/2011 4:40:56 PM -- Performance logging ends.  
2/23/2011 5:36:29 PM -- JetInterop batch transaction stats: 49342.  
2/23/2011 5:36:29 PM -- Dispatching transactions ends.  
2/23/2011 5:36:29 PM -- Shutting down databases ...  
2/23/2011 5:36:36 PM -- Instance5264.1 (complete)  
2/23/2011 5:36:36 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_23\_14\_38\_30.blg has 488 samples.  
2/23/2011 5:36:36 PM -- Creating test report ...  
2/23/2011 5:36:38 PM -- Instance5264.1 has 19.7 for I/O Database Reads Average Latency.  
2/23/2011 5:36:38 PM -- Instance5264.1 has 0.6 for I/O Log Writes Average Latency.  
2/23/2011 5:36:38 PM -- Instance5264.1 has 0.6 for I/O Log Reads Average Latency.  
2/23/2011 5:36:38 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
2/23/2011 5:36:38 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
2/23/2011 5:36:38 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_23\_14\_38\_30.xml has 478 samples queried



# Database checksum – reliability testing

## Server 1

### Checksum Statistics - All

Database	Seen pages	Bad pages	Correctable pages	Wrong page-number pages	File length / seconds taken
C:\ExchangeDatabases\VOL1\Jetstress001001.edb	14417698	0	0	0	450553 MBytes / 2963 sec
<b>(Sum)</b>	14417698	0	0	0	450553 MBytes / 2963 sec

### Disk Subsystem Performance (of checksum)

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Read
C:\ExchangeDatabases\VOL1	0.056	0.000	2434.853	0.001	65536.000

### Memory System Performance (of checksum)

Counter	Average	Minimum	Maximum
% Processor Time	0.697	0.389	1.033
Available MBytes	45831.563	45808.000	45839.000
Free System Page Table Entries	33555644.472	33555643.000	33555646.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	510119998.376	509956096.000	510201856.000
Pool Paged Bytes	117851900.102	117800960.000	117989376.000

### Test Log

```

2/23/2011 12:23:20 PM -- Jetstress testing begins ...
2/23/2011 12:23:20 PM -- Prepare testing begins ...
2/23/2011 12:23:21 PM -- Attaching databases ...
2/23/2011 12:23:21 PM -- Prepare testing ends.
2/23/2011 12:23:21 PM -- Dispatching transactions begins ...
2/23/2011 12:23:21 PM -- Database cache settings: (minimum: 32.0 MB, maximum: 256.0 MB)
2/23/2011 12:23:21 PM -- Database flush thresholds: (start: 2.5 MB, stop: 5.1 MB)
2/23/2011 12:23:22 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
2/23/2011 12:23:22 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
2/23/2011 12:23:25 PM -- Operation mix: Sessions 10, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
2/23/2011 12:23:25 PM -- Performance logging begins (interval: 15000 ms).
2/23/2011 12:23:25 PM -- Attaining prerequisites:
2/23/2011 12:25:46 PM -- \MSEExchange Database(JetstressWin)\Database Cache Size, Last: 243388400.0 (lower bound: 241591900.0, upper bound: none)
2/23/2011 2:25:47 PM -- Performance logging ends.
2/23/2011 2:36:27 PM -- JetInterop batch transaction stats: 38190.
2/23/2011 2:36:28 PM -- Dispatching transactions ends.
2/23/2011 2:36:28 PM -- Shutting down databases ...
2/23/2011 2:36:34 PM -- Instance5264.1 (complete)
2/23/2011 2:36:34 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_FINAL\Performance_2011_2_23_12_23_22.blg has 488 samples.
2/23/2011 2:36:34 PM -- Creating test report ...
2/23/2011 2:36:36 PM -- Instance5264.1 has 20.9 for I/O Database Reads Average Latency.
2/23/2011 2:36:36 PM -- Instance5264.1 has 0.6 for I/O Log Writes Average Latency.
2/23/2011 2:36:36 PM -- Instance5264.1 has 0.6 for I/O Log Reads Average Latency.
    
```

2/23/2011 2:36:36 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
2/23/2011 2:36:36 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
2/23/2011 2:36:36 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_23\_12\_23\_22.xml has 478 samples queried.  
2/23/2011 2:36:36 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_23\_12\_23\_22.html is saved.  
2/23/2011 2:36:37 PM -- Performance logging begins (interval: 15000 ms).  
2/23/2011 2:36:37 PM -- Verifying database checksums ...  
2/23/2011 2:36:52 PM -- C:\ExchangeDatabases\VOL1 (0% processed)  
2/23/2011 2:36:52 PM -- Verifying log checksums ...  
2/23/2011 2:36:52 PM -- C:\ExchangeDatabases\VOL1\logs (0 log(s) processed)  
2/23/2011 2:36:52 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Application\_2011\_2\_23\_14\_36\_52.evt is saved.  
2/23/2011 2:36:52 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\System\_2011\_2\_23\_14\_36\_52.evt is saved.  
2/23/2011 2:36:52 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\XmlConfig\_2011\_2\_23\_14\_36\_52.xml is saved.  
2/23/2011 2:36:52 PM -- Jetstress testing ends.  
2/23/2011 2:38:27 PM -- Jetstress testing begins ...  
2/23/2011 2:38:27 PM -- Prepare testing begins ...  
2/23/2011 2:38:29 PM -- Attaching databases ...  
2/23/2011 2:38:29 PM -- Prepare testing ends.  
2/23/2011 2:38:29 PM -- Dispatching transactions begins ...  
2/23/2011 2:38:29 PM -- Database cache settings: (minimum: 32.0 MB, maximum: 256.0 MB)  
2/23/2011 2:38:29 PM -- Database flush thresholds: (start: 2.5 MB, stop: 5.1 MB)  
2/23/2011 2:38:30 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).  
2/23/2011 2:38:30 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).  
2/23/2011 2:38:33 PM -- Operation mix: Sessions 9, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.  
2/23/2011 2:38:33 PM -- Performance logging begins (interval: 15000 ms).  
2/23/2011 2:38:33 PM -- Attaining prerequisites:  
2/23/2011 2:40:56 PM -- \MSEXchange Database(JetstressWin)\Database Cache Size, Last: 242008100.0 (lower bound: 241591900.0, upper bound: none)  
2/23/2011 4:40:56 PM -- Performance logging ends.  
2/23/2011 5:36:29 PM -- JetInterop batch transaction stats: 49342.  
2/23/2011 5:36:29 PM -- Dispatching transactions ends.  
2/23/2011 5:36:29 PM -- Shutting down databases ...  
2/23/2011 5:36:36 PM -- Instance5264.1 (complete)  
2/23/2011 5:36:36 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_23\_14\_38\_30.blg has 488 samples.  
2/23/2011 5:36:36 PM -- Creating test report ...  
2/23/2011 5:36:38 PM -- Instance5264.1 has 19.7 for I/O Database Reads Average Latency.  
2/23/2011 5:36:38 PM -- Instance5264.1 has 0.6 for I/O Log Writes Average Latency.  
2/23/2011 5:36:38 PM -- Instance5264.1 has 0.6 for I/O Log Reads Average Latency.  
2/23/2011 5:36:38 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
2/23/2011 5:36:38 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
2/23/2011 5:36:38 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_23\_14\_38\_30.xml has 478 samples queried.  
2/23/2011 5:36:38 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_23\_14\_38\_30.html is saved.  
2/23/2011 5:36:39 PM -- Performance logging begins (interval: 15000 ms).  
2/23/2011 5:36:39 PM -- Verifying database checksums ...  
2/23/2011 6:26:03 PM -- C:\ExchangeDatabases\VOL1 (100% processed)  
2/23/2011 6:26:03 PM -- Performance logging ends.  
2/23/2011 6:26:03 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\DBChecksum\_2011\_2\_23\_17\_36\_38.blg has 197 samples.

## Server 2 (Normal load – 1 DB, 250 users)

### Test Summary

**Overall Test Result** Pass  
**Machine Name** WIN-QDP8A726PHI  
**Test Description** E5300 Srv 2  
MVB2  
2HR  
ESRP testing  
**Test Start Time** 2/23/2011 2:38:47 PM  
**Test End Time** 2/23/2011 5:37:05 PM  
**Collection Start Time** 2/23/2011 2:41:07 PM  
**Collection End Time** 2/23/2011 4:41:04 PM  
**Jetstress Version** 14.01.0180.003  
**Ese Version** 14.01.0218.012  
**Operating System** Windows Server 2008 R2 Enterprise (6.1.7600.0)  
**Performance Log** C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\Performance\_2011\_2\_23\_14\_38\_49.blg

### Database Sizing and Throughput

**Achieved Transactional I/O per Second** 150.939  
**Target Transactional I/O per Second** 60  
**Initial Database Size (bytes)** 460904792064  
**Final Database Size (bytes)** 461642989568  
**Database Files (Count)** 1

### Jetstress System Parameters

**Thread Count** 9 (per database)  
**Minimum Database Cache** 32.0 MB  
**Maximum Database Cache** 256.0 MB  
**Insert Operations** 40%  
**Delete Operations** 20%  
**Replace Operations** 5%  
**Read Operations** 35%  
**Lazy Commits** 70%  
**Run Background Database Maintenance** True  
**Number of Copies per Database** 2

### Database Configuration

**Instance5452.1** Log Path: C:\ExchangeDatabases\VOL1\logs  
Database: C:\ExchangeDatabases\VOL1\Jetstress001001.edb

Transactional I/O Performance

<b>MSEXchange Database ==&gt; Instances</b>	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
<b>Instance5452.1</b>	18.973	0.934	87.738	63.201	32898.269	35753.493	0.000	0.557	0.000	56.036	0.000	4520.337

Background Database Maintenance I/O Performance

<b>MSEXchange Database ==&gt; Instances</b>	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
<b>Instance5452.1</b>	25.597	261282.798

Log Replication I/O Performance

<b>MSEXchange Database ==&gt; Instances</b>	I/O Log Reads/sec	I/O Log Reads Average Bytes
<b>Instance5452.1</b>	1.028	232058.814

Total I/O Performance

<b>MSEXchange Database ==&gt; Instances</b>	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
<b>Instance5452.1</b>	18.973	0.934	113.335	63.201	84479.426	35753.493	13.085	0.557	1.028	56.036	232058.814	4520.337

Host System Performance

<b>Counter</b>	Average	Minimum	Maximum
<b>% Processor Time</b>	0.220	0.058	0.447
<b>Available MBytes</b>	45589.615	45586.000	45613.000
<b>Free System Page Table Entries</b>	33555132.435	33555130.000	33555134.000
<b>Transition Pages RePurposed/sec</b>	0.000	0.000	0.000
<b>Pool Nonpaged Bytes</b>	509728580.267	509702144.000	509771776.000
<b>Pool Paged Bytes</b>	113579340.800	113557504.000	113647616.000
<b>Database Page Fault Stalls/sec</b>	0.000	0.000	0.000

Test Log

2/23/2011 12:22:11 PM -- Jetstress testing begins ...  
 2/23/2011 12:22:11 PM -- Prepare testing begins ...  
 2/23/2011 12:22:12 PM -- Attaching databases ...  
 2/23/2011 12:22:12 PM -- Prepare testing ends.  
 2/23/2011 12:22:12 PM -- Dispatching transactions begins ...  
 2/23/2011 12:22:12 PM -- Database cache settings: (minimum: 32.0 MB, maximum: 256.0 MB)  
 2/23/2011 12:22:12 PM -- Database flush thresholds: (start: 2.5 MB, stop: 5.1 MB)  
 2/23/2011 12:22:13 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).  
 2/23/2011 12:22:13 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).

2/23/2011 12:22:16 PM -- Operation mix: Sessions 10, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.  
2/23/2011 12:22:16 PM -- Performance logging begins (interval: 15000 ms).  
2/23/2011 12:22:16 PM -- Attaining prerequisites:  
2/23/2011 12:24:23 PM -- \MSEExchange Database(JetstressWin)\Database Cache Size, Last: 241799200.0 (lower bound: 241591900.0, upper bound: none)  
2/23/2011 2:24:23 PM -- Performance logging ends.  
2/23/2011 2:37:02 PM -- JetInterop batch transaction stats: 42788.  
2/23/2011 2:37:03 PM -- Dispatching transactions ends.  
2/23/2011 2:37:03 PM -- Shutting down databases ...  
2/23/2011 2:37:08 PM -- Instance5452.1 (complete)  
2/23/2011 2:37:08 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\Performance\_2011\_2\_23\_12\_22\_13.blg has 487 samples.  
2/23/2011 2:37:08 PM -- Creating test report ...  
2/23/2011 2:37:09 PM -- Instance5452.1 has 19.6 for I/O Database Reads Average Latency.  
2/23/2011 2:37:09 PM -- Instance5452.1 has 0.6 for I/O Log Writes Average Latency.  
2/23/2011 2:37:09 PM -- Instance5452.1 has 0.6 for I/O Log Reads Average Latency.  
2/23/2011 2:37:09 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
2/23/2011 2:37:09 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
2/23/2011 2:37:09 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\Performance\_2011\_2\_23\_12\_22\_13.xml has 478 samples queried.  
2/23/2011 2:37:10 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\Performance\_2011\_2\_23\_12\_22\_13.html is saved.  
2/23/2011 2:37:11 PM -- Performance logging begins (interval: 15000 ms).  
2/23/2011 2:37:11 PM -- Verifying database checksums ...  
2/23/2011 2:38:17 PM -- C:\ExchangeDatabases\VOL1 (2% processed)  
2/23/2011 2:38:18 PM -- Verifying log checksums ...  
2/23/2011 2:38:18 PM -- C:\ExchangeDatabases\VOL1\logs (0 log(s) processed)  
2/23/2011 2:38:18 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\Application\_2011\_2\_23\_14\_38\_18.evt is saved.  
2/23/2011 2:38:18 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\System\_2011\_2\_23\_14\_38\_18.evt is saved.  
2/23/2011 2:38:18 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\XmlConfig\_2011\_2\_23\_14\_38\_18.xml is saved.  
2/23/2011 2:38:18 PM -- Jetstress testing ends.  
2/23/2011 2:38:47 PM -- Jetstress testing begins ...  
2/23/2011 2:38:47 PM -- Prepare testing begins ...  
2/23/2011 2:38:48 PM -- Attaching databases ...  
2/23/2011 2:38:48 PM -- Prepare testing ends.  
2/23/2011 2:38:48 PM -- Dispatching transactions begins ...  
2/23/2011 2:38:48 PM -- Database cache settings: (minimum: 32.0 MB, maximum: 256.0 MB)  
2/23/2011 2:38:48 PM -- Database flush thresholds: (start: 2.5 MB, stop: 5.1 MB)  
2/23/2011 2:38:49 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).  
2/23/2011 2:38:49 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).  
2/23/2011 2:38:52 PM -- Operation mix: Sessions 9, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.  
2/23/2011 2:38:52 PM -- Performance logging begins (interval: 15000 ms).  
2/23/2011 2:38:52 PM -- Attaining prerequisites:  
2/23/2011 2:41:07 PM -- \MSEExchange Database(JetstressWin)\Database Cache Size, Last: 242118700.0 (lower bound: 241591900.0, upper bound: none)  
2/23/2011 4:41:08 PM -- Performance logging ends.  
2/23/2011 5:36:59 PM -- JetInterop batch transaction stats: 52438.  
2/23/2011 5:36:59 PM -- Dispatching transactions ends.  
2/23/2011 5:36:59 PM -- Shutting down databases ...  
2/23/2011 5:37:05 PM -- Instance5452.1 (complete)  
2/23/2011 5:37:05 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\Performance\_2011\_2\_23\_14\_38\_49.blg has 488 samples.  
2/23/2011 5:37:05 PM -- Creating test report ...  
2/23/2011 5:37:07 PM -- Instance5452.1 has 19.0 for I/O Database Reads Average Latency.  
2/23/2011 5:37:07 PM -- Instance5452.1 has 0.6 for I/O Log Writes Average Latency.  
2/23/2011 5:37:07 PM -- Instance5452.1 has 0.6 for I/O Log Reads Average Latency.  
2/23/2011 5:37:07 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
2/23/2011 5:37:07 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
2/23/2011 5:37:07 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\Performance\_2011\_2\_23\_14\_38\_49.xml has 479 samples queried.

# Database checksum – reliability testing

## Server 2

### Checksum Statistics - All

Database	Seen pages	Bad pages	Correctable pages	Wrong page-number pages	File length / seconds taken
C:\ExchangeDatabases\VOL1\Jetstress001001.edb	14088226	0	0	0	440257 MBytes / 2808 sec
(Sum)	14088226	0	0	0	440257 MBytes / 2808 sec

### Disk Subsystem Performance (of checksum)

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Read
C:\ExchangeDatabases\VOL1	0.054	0.000	2510.612	0.006	65536.000

### Memory System Performance (of checksum)

Counter	Average	Minimum	Maximum
% Processor Time	0.562	0.324	0.928
Available MBytes	45819.952	45816.000	45839.000
Free System Page Table Entries	33555132.481	33555131.000	33555134.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	509869116.235	509693952.000	509931520.000
Pool Paged Bytes	113985634.567	113823744.000	114069504.000

### Test Log

```
2/23/2011 12:22:11 PM -- Jetstress testing begins ...
2/23/2011 12:22:11 PM -- Prepare testing begins ...
2/23/2011 12:22:12 PM -- Attaching databases ...
2/23/2011 12:22:12 PM -- Prepare testing ends.
2/23/2011 12:22:12 PM -- Dispatching transactions begins ...
2/23/2011 12:22:12 PM -- Database cache settings: (minimum: 32.0 MB, maximum: 256.0 MB)
2/23/2011 12:22:12 PM -- Database flush thresholds: (start: 2.5 MB, stop: 5.1 MB)
2/23/2011 12:22:13 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
2/23/2011 12:22:13 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
2/23/2011 12:22:16 PM -- Operation mix: Sessions 10, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
2/23/2011 12:22:16 PM -- Performance logging begins (interval: 15000 ms).
2/23/2011 12:22:16 PM -- Attaining prerequisites:
2/23/2011 12:24:23 PM -- \MSEExchange Database(JetstressWin)\Database Cache Size, Last: 241799200.0 (lower bound: 241591900.0, upper bound: none)
2/23/2011 2:24:23 PM -- Performance logging ends.
2/23/2011 2:37:02 PM -- JetInterop batch transaction stats: 42788.
2/23/2011 2:37:03 PM -- Dispatching transactions ends.
2/23/2011 2:37:03 PM -- Shutting down databases ...
2/23/2011 2:37:08 PM -- Instance5452.1 (complete)
2/23/2011 2:37:08 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_12_22_13.blg has 487 samples.
2/23/2011 2:37:08 PM -- Creating test report ...
2/23/2011 2:37:09 PM -- Instance5452.1 has 19.6 for I/O Database Reads Average Latency.
2/23/2011 2:37:09 PM -- Instance5452.1 has 0.6 for I/O Log Writes Average Latency.
2/23/2011 2:37:09 PM -- Instance5452.1 has 0.6 for I/O Log Reads Average Latency.
```

2/23/2011 2:37:09 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
2/23/2011 2:37:09 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
2/23/2011 2:37:09 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\Performance\_2011\_2\_23\_12\_22\_13.xml has 478 samples queried.  
2/23/2011 2:37:10 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\Performance\_2011\_2\_23\_12\_22\_13.html is saved.  
2/23/2011 2:37:11 PM -- Performance logging begins (interval: 15000 ms).  
2/23/2011 2:37:11 PM -- Verifying database checksums ...  
2/23/2011 2:38:17 PM -- C:\ExchangeDatabases\VOL1 (2% processed)  
2/23/2011 2:38:18 PM -- Verifying log checksums ...  
2/23/2011 2:38:18 PM -- C:\ExchangeDatabases\VOL1\logs (0 log(s) processed)  
2/23/2011 2:38:18 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\Application\_2011\_2\_23\_14\_38\_18.evt is saved.  
2/23/2011 2:38:18 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\System\_2011\_2\_23\_14\_38\_18.evt is saved.  
2/23/2011 2:38:18 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\XmlConfig\_2011\_2\_23\_14\_38\_18.xml is saved.  
2/23/2011 2:38:18 PM -- Jetstress testing ends.  
2/23/2011 2:38:47 PM -- Jetstress testing begins ...  
2/23/2011 2:38:47 PM -- Prepare testing begins ...  
2/23/2011 2:38:48 PM -- Attaching databases ...  
2/23/2011 2:38:48 PM -- Prepare testing ends.  
2/23/2011 2:38:48 PM -- Dispatching transactions begins ...  
2/23/2011 2:38:48 PM -- Database cache settings: (minimum: 32.0 MB, maximum: 256.0 MB)  
2/23/2011 2:38:48 PM -- Database flush thresholds: (start: 2.5 MB, stop: 5.1 MB)  
2/23/2011 2:38:49 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).  
2/23/2011 2:38:49 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).  
2/23/2011 2:38:52 PM -- Operation mix: Sessions 9, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.  
2/23/2011 2:38:52 PM -- Performance logging begins (interval: 15000 ms).  
2/23/2011 2:38:52 PM -- Attaining prerequisites:  
2/23/2011 2:41:07 PM -- \MSEXCHANGE Database(JetstressWin)\Database Cache Size, Last: 242118700.0 (lower bound: 241591900.0, upper bound: none)  
2/23/2011 4:41:08 PM -- Performance logging ends.  
2/23/2011 5:36:59 PM -- JetInterop batch transaction stats: 52438.  
2/23/2011 5:36:59 PM -- Dispatching transactions ends.  
2/23/2011 5:36:59 PM -- Shutting down databases ...  
2/23/2011 5:37:05 PM -- Instance5452.1 (complete)  
2/23/2011 5:37:05 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\Performance\_2011\_2\_23\_14\_38\_49.blg has 488 samples.  
2/23/2011 5:37:05 PM -- Creating test report ...  
2/23/2011 5:37:07 PM -- Instance5452.1 has 19.0 for I/O Database Reads Average Latency.  
2/23/2011 5:37:07 PM -- Instance5452.1 has 0.6 for I/O Log Writes Average Latency.  
2/23/2011 5:37:07 PM -- Instance5452.1 has 0.6 for I/O Log Reads Average Latency.  
2/23/2011 5:37:07 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
2/23/2011 5:37:07 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
2/23/2011 5:37:07 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\Performance\_2011\_2\_23\_14\_38\_49.xml has 479 samples queried.  
2/23/2011 5:37:07 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\Performance\_2011\_2\_23\_14\_38\_49.html is saved.  
2/23/2011 5:37:08 PM -- Performance logging begins (interval: 15000 ms).  
2/23/2011 5:37:08 PM -- Verifying database checksums ...  
2/23/2011 6:23:57 PM -- C:\ExchangeDatabases\VOL1 (100% processed)  
2/23/2011 6:23:57 PM -- Performance logging ends.  
2/23/2011 6:23:57 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_Final\DBChecksum\_2011\_2\_23\_17\_37\_7.blg has 187 samples.

# Performance test result report 2 hour

## Server 1 (Failover load – 2 DB, 500 users)

### Test Summary

**Overall Test Result** **Pass**  
**Machine Name** WIN-JSSUDLJA1D  
**Test Description** ESRP testing  
E5300 Server 1  
MVB2  
**Test Start Time** 2/24/2011 7:42:32 AM  
**Test End Time** 2/24/2011 9:48:32 AM  
**Collection Start Time** 2/24/2011 7:45:11 AM  
**Collection End Time** 2/24/2011 9:45:07 AM  
**Jetstress Version** 14.01.0180.003  
**Ese Version** 14.01.0218.012  
**Operating System** Windows Server 2008 R2 Enterprise (6.1.7600.0)  
**Performance Log** C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_24\_7\_42\_36.blg

### Database Sizing and Throughput

**Achieved Transactional I/O per Second** 284.682  
**Target Transactional I/O per Second** 120  
**Initial Database Size (bytes)** 938553245696  
**Final Database Size (bytes)** 939543101440  
**Database Files (Count)** 2

### Jetstress System Parameters

**Thread Count** 9 (per database)  
**Minimum Database Cache** 64.0 MB  
**Maximum Database Cache** 512.0 MB  
**Insert Operations** 40%  
**Delete Operations** 20%  
**Replace Operations** 5%  
**Read Operations** 35%  
**Lazy Commits** 70%  
**Run Background Database Maintenance** True  
**Number of Copies per Database** 2

### Database Configuration

**Instance5264.1** Log Path: C:\ExchangeDatabases\VOL1\logs  
Database: C:\ExchangeDatabases\VOL1\Jetstress001001.edb



**Instance5264.2** Log Path: C:\ExchangeDatabases\VOL2\logs  
 Database: C:\ExchangeDatabases\VOL2\Jetstress002001.edb

Transactional I/O Performance

<b>MSEXchange Database ==&gt; Instances</b>	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
<b>Instance5264.1</b>	17.057	1.466	82.416	60.086	33441.822	35135.418	0.000	0.609	0.000	51.268	0.000	4492.096
<b>Instance5264.2</b>	16.477	1.457	82.118	60.062	33603.596	35262.146	0.000	0.580	0.000	51.339	0.000	4532.749

Background Database Maintenance I/O Performance

<b>MSEXchange Database ==&gt; Instances</b>	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
<b>Instance5264.1</b>	26.384	261237.177
<b>Instance5264.2</b>	26.566	261209.744

Log Replication I/O Performance

<b>MSEXchange Database ==&gt; Instances</b>	I/O Log Reads/sec	I/O Log Reads Average Bytes
<b>Instance5264.1</b>	0.932	232076.263
<b>Instance5264.2</b>	0.943	231560.655

Total I/O Performance

<b>MSEXchange Database ==&gt; Instances</b>	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
<b>Instance5264.1</b>	17.057	1.466	108.799	60.086	88681.876	35135.418	11.866	0.609	0.932	51.268	232076.263	4492.096
<b>Instance5264.2</b>	16.477	1.457	108.684	60.062	89237.841	35262.146	11.803	0.580	0.943	51.339	231560.655	4532.749

Host System Performance

<b>Counter</b>	Average	Minimum	Maximum
<b>% Processor Time</b>	0.398	0.201	0.655
<b>Available MBytes</b>	45308.535	45304.000	45368.000
<b>Free System Page Table Entries</b>	33555644.471	33555642.000	33555646.000
<b>Transition Pages RePurposed/sec</b>	0.000	0.000	0.000
<b>Pool Nonpaged Bytes</b>	511555285.333	511545344.000	511565824.000
<b>Pool Paged Bytes</b>	118214894.933	118173696.000	118312960.000
<b>Database Page Fault Stalls/sec</b>	0.000	0.000	0.000

Test Log  
2/23/2011 12:23:20 PM -- Jetstress testing begins ...  
2/23/2011 12:23:20 PM -- Prepare testing begins ...  
2/23/2011 12:23:21 PM -- Attaching databases ...  
2/23/2011 12:23:21 PM -- Prepare testing ends.  
2/23/2011 12:23:21 PM -- Dispatching transactions begins ...  
2/23/2011 12:23:21 PM -- Database cache settings: (minimum: 32.0 MB, maximum: 256.0 MB)  
2/23/2011 12:23:21 PM -- Database flush thresholds: (start: 2.5 MB, stop: 5.1 MB)  
2/23/2011 12:23:22 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).  
2/23/2011 12:23:22 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).  
2/23/2011 12:23:25 PM -- Operation mix: Sessions 10, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.  
2/23/2011 12:23:25 PM -- Performance logging begins (interval: 15000 ms).  
2/23/2011 12:23:25 PM -- Attaining prerequisites:  
2/23/2011 12:25:46 PM -- \\MSEExchange Database(JetstressWin)\Database Cache Size, Last: 243388400.0 (lower bound: 241591900.0, upper bound: none)  
2/23/2011 2:25:47 PM -- Performance logging ends.  
2/23/2011 2:36:27 PM -- JetInterop batch transaction stats: 38190.  
2/23/2011 2:36:28 PM -- Dispatching transactions ends.  
2/23/2011 2:36:28 PM -- Shutting down databases ...  
2/23/2011 2:36:34 PM -- Instance5264.1 (complete)  
2/23/2011 2:36:34 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_23\_12\_23\_22.blg has 488 samples.  
2/23/2011 2:36:34 PM -- Creating test report ...  
2/23/2011 2:36:36 PM -- Instance5264.1 has 20.9 for I/O Database Reads Average Latency.  
2/23/2011 2:36:36 PM -- Instance5264.1 has 0.6 for I/O Log Writes Average Latency.  
2/23/2011 2:36:36 PM -- Instance5264.1 has 0.6 for I/O Log Reads Average Latency.  
2/23/2011 2:36:36 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
2/23/2011 2:36:36 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
2/23/2011 2:36:36 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_23\_12\_23\_22.xml has 478 samples queried.  
2/23/2011 2:36:36 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_23\_12\_23\_22.html is saved.  
2/23/2011 2:36:37 PM -- Performance logging begins (interval: 15000 ms).  
2/23/2011 2:36:37 PM -- Verifying database checksums ...  
2/23/2011 2:36:52 PM -- C:\ExchangeDatabases\VOL1 (0% processed)  
2/23/2011 2:36:52 PM -- Verifying log checksums ...  
2/23/2011 2:36:52 PM -- C:\ExchangeDatabases\VOL1\logs (0 log(s) processed)  
2/23/2011 2:36:52 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Application\_2011\_2\_23\_14\_36\_52.evt is saved.  
2/23/2011 2:36:52 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\System\_2011\_2\_23\_14\_36\_52.evt is saved.  
2/23/2011 2:36:52 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\XmlConfig\_2011\_2\_23\_14\_36\_52.xml is saved.  
2/23/2011 2:36:52 PM -- Jetstress testing ends.  
2/23/2011 2:38:27 PM -- Jetstress testing begins ...  
2/23/2011 2:38:27 PM -- Prepare testing begins ...  
2/23/2011 2:38:29 PM -- Attaching databases ...  
2/23/2011 2:38:29 PM -- Prepare testing ends.  
2/23/2011 2:38:29 PM -- Dispatching transactions begins ...  
2/23/2011 2:38:29 PM -- Database cache settings: (minimum: 32.0 MB, maximum: 256.0 MB)  
2/23/2011 2:38:29 PM -- Database flush thresholds: (start: 2.5 MB, stop: 5.1 MB)  
2/23/2011 2:38:30 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).  
2/23/2011 2:38:30 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).  
2/23/2011 2:38:33 PM -- Operation mix: Sessions 9, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.  
2/23/2011 2:38:33 PM -- Performance logging begins (interval: 15000 ms).  
2/23/2011 2:38:33 PM -- Attaining prerequisites:  
2/23/2011 2:40:56 PM -- \\MSEExchange Database(JetstressWin)\Database Cache Size, Last: 242008100.0 (lower bound: 241591900.0, upper bound: none)  
2/23/2011 4:40:56 PM -- Performance logging ends.  
2/23/2011 5:36:29 PM -- JetInterop batch transaction stats: 49342.  
2/23/2011 5:36:29 PM -- Dispatching transactions ends.

2/23/2011 5:36:29 PM -- Shutting down databases ...  
2/23/2011 5:36:36 PM -- Instance5264.1 (complete)  
2/23/2011 5:36:36 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_23\_14\_38\_30.blg has 488 samples.  
2/23/2011 5:36:36 PM -- Creating test report ...  
2/23/2011 5:36:38 PM -- Instance5264.1 has 19.7 for I/O Database Reads Average Latency.  
2/23/2011 5:36:38 PM -- Instance5264.1 has 0.6 for I/O Log Writes Average Latency.  
2/23/2011 5:36:38 PM -- Instance5264.1 has 0.6 for I/O Log Reads Average Latency.  
2/23/2011 5:36:38 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
2/23/2011 5:36:38 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
2/23/2011 5:36:38 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_23\_14\_38\_30.xml has 478 samples queried.  
2/23/2011 5:36:38 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_23\_14\_38\_30.html is saved.  
2/23/2011 5:36:39 PM -- Performance logging begins (interval: 15000 ms).  
2/23/2011 5:36:39 PM -- Verifying database checksums ...  
2/23/2011 6:26:03 PM -- C:\ExchangeDatabases\VOL1 (100% processed)  
2/23/2011 6:26:03 PM -- Performance logging ends.  
2/23/2011 6:26:03 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\DBChecksum\_2011\_2\_23\_17\_36\_38.blg has 197 samples.  
2/23/2011 6:26:04 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\DBChecksum\_2011\_2\_23\_17\_36\_38.html is saved.  
2/23/2011 6:26:04 PM -- Verifying log checksums ...  
2/23/2011 6:26:05 PM -- C:\ExchangeDatabases\VOL1\logs (7 log(s) processed)  
2/23/2011 6:26:05 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Application\_2011\_2\_23\_18\_26\_5.evt is saved.  
2/23/2011 6:26:05 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\System\_2011\_2\_23\_18\_26\_5.evt is saved.  
2/23/2011 6:26:05 PM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\XmlConfig\_2011\_2\_23\_18\_26\_5.xml is saved.  
2/23/2011 6:26:05 PM -- Jetstress testing ends.  
2/24/2011 7:42:32 AM -- Jetstress testing begins ...  
2/24/2011 7:42:32 AM -- Prepare testing begins ...  
2/24/2011 7:42:34 AM -- Attaching databases ...  
2/24/2011 7:42:34 AM -- Prepare testing ends.  
2/24/2011 7:42:34 AM -- Dispatching transactions begins ...  
2/24/2011 7:42:34 AM -- Database cache settings: (minimum: 64.0 MB, maximum: 512.0 MB)  
2/24/2011 7:42:34 AM -- Database flush thresholds: (start: 5.1 MB, stop: 10.2 MB)  
2/24/2011 7:42:36 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).  
2/24/2011 7:42:36 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).  
2/24/2011 7:42:41 AM -- Operation mix: Sessions 9, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.  
2/24/2011 7:42:41 AM -- Performance logging begins (interval: 15000 ms).  
2/24/2011 7:42:41 AM -- Attaining prerequisites:  
2/24/2011 7:45:11 AM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 484876300.0 (lower bound: 483183800.0, upper bound: none)  
2/24/2011 9:45:11 AM -- Performance logging ends.  
2/24/2011 9:48:26 AM -- JetInterop batch transaction stats: 34355 and 34508.  
2/24/2011 9:48:26 AM -- Dispatching transactions ends.  
2/24/2011 9:48:26 AM -- Shutting down databases ...  
2/24/2011 9:48:32 AM -- Instance5264.1 (complete) and Instance5264.2 (complete)  
2/24/2011 9:48:32 AM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_24\_7\_42\_36.blg has 489 samples.  
2/24/2011 9:48:32 AM -- Creating test report ...  
2/24/2011 9:48:34 AM -- Instance5264.1 has 17.1 for I/O Database Reads Average Latency.  
2/24/2011 9:48:34 AM -- Instance5264.1 has 0.6 for I/O Log Writes Average Latency.  
2/24/2011 9:48:34 AM -- Instance5264.1 has 0.6 for I/O Log Reads Average Latency.  
2/24/2011 9:48:34 AM -- Instance5264.2 has 16.5 for I/O Database Reads Average Latency.  
2/24/2011 9:48:34 AM -- Instance5264.2 has 0.6 for I/O Log Writes Average Latency.  
2/24/2011 9:48:35 AM -- Instance5264.2 has 0.6 for I/O Log Reads Average Latency.  
2/24/2011 9:48:35 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
2/24/2011 9:48:35 AM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
2/24/2011 9:48:35 AM -- C:\Program Files\Exchange Jetstress\ESRP\_2HR\_FINAL\Performance\_2011\_2\_24\_7\_42\_36.xml has 479 samples queried.

## 24 Hour stress test

### Server 1 (Normal load – 1 DB, 250 Users)

#### Test Summary

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

**Machine Name** WIN-JSSUDLJA1D

**Test Description** ESRP testing  
E5300 Server 1  
MVB2  
24hr

**Test Start Time** 3/1/2011 10:02:48 AM

**Test End Time** 3/2/2011 10:06:18 AM

**Collection Start Time** 3/1/2011 10:06:12 AM

**Collection End Time** 3/2/2011 10:06:06 AM

**Jetstress Version** 14.01.0180.003

**Ese Version** 14.01.0218.012

**Operating System** Windows Server 2008 R2 Enterprise (6.1.7600.0)

**Performance Log** C:\Program Files\Exchange Jetstress\ESRP\_24hr\Stress\_2011\_3\_1\_10\_3\_21.blg

#### Database Sizing and Throughput

**Achieved Transactional I/O per Second** 131.838

**Target Transactional I/O per Second** 60

**Initial Database Size (bytes)** 485642797056

**Final Database Size (bytes)** 490835345408

**Database Files (Count)** 1

#### Jetstress System Parameters

**Thread Count** 7 (per database)

**Minimum Database Cache** 32.0 MB

**Maximum Database Cache** 256.0 MB

**Insert Operations** 40%

**Delete Operations** 20%

**Replace Operations** 5%

**Read Operations** 35%

**Lazy Commits** 70%

**Run Background Database Maintenance** True

**Number of Copies per Database** 2

#### Database Configuration

**Instance5368.1** Log Path: C:\ExchangeDatabases\VOL1\logs  
Database: C:\ExchangeDatabases\VOL1\Jetstress001001.edb

Transactional I/O Performance

<b>MSExchange Database ==&gt; Instances</b>	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
<b>Instance5368.1</b>	16.863	0.813	76.388	55.450	32924.608	35074.739	0.000	0.561	0.000	47.220	0.000	4453.517

Background Database Maintenance I/O Performance

<b>MSExchange Database ==&gt; Instances</b>	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
<b>Instance5368.1</b>	26.274	261235.400

Log Replication I/O Performance

<b>MSExchange Database ==&gt; Instances</b>	I/O Log Reads/sec	I/O Log Reads Average Bytes
<b>Instance5368.1</b>	0.851	232333.478

Total I/O Performance

<b>MSExchange Database ==&gt; Instances</b>	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
<b>Instance5368.1</b>	16.863	0.813	102.662	55.450	91356.045	35074.739	12.193	0.561	0.851	47.220	232333.478	4453.517

Host System Performance

<b>Counter</b>	Average	Minimum	Maximum
<b>% Processor Time</b>	0.210	0.019	1.668
<b>Available MBytes</b>	45753.686	45694.000	45804.000
<b>Free System Page Table Entries</b>	33555644.485	33555635.000	33555646.000
<b>Transition Pages RePurposed/sec</b>	0.000	0.000	0.000
<b>Pool Nonpaged Bytes</b>	504475338.895	503701504.000	505606144.000
<b>Pool Paged Bytes</b>	92779933.268	87801856.000	126566400.000
<b>Database Page Fault Stalls/sec</b>	0.000	0.000	0.000

Test Log

3/1/2011 10:02:48 AM -- Jetstress testing begins ...  
 3/1/2011 10:02:48 AM -- Prepare testing begins ...  
 3/1/2011 10:03:19 AM -- Attaching databases ...  
 3/1/2011 10:03:19 AM -- Prepare testing ends.  
 3/1/2011 10:03:19 AM -- Dispatching transactions begins ...  
 3/1/2011 10:03:19 AM -- Database cache settings: (minimum: 32.0 MB, maximum: 256.0 MB)  
 3/1/2011 10:03:19 AM -- Database flush thresholds: (start: 2.5 MB, stop: 5.1 MB)  
 3/1/2011 10:03:21 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 200 msec/read).  
 3/1/2011 10:03:21 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 200 msec/write).

3/1/2011 10:03:24 AM -- Operation mix: Sessions 7, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.  
 3/1/2011 10:03:24 AM -- Performance logging begins (interval: 15000 ms).  
 3/1/2011 10:03:24 AM -- Attaining prerequisites:  
 3/1/2011 10:06:12 AM -- \MSEExchange Database(JetstressWin)\Database Cache Size, Last: 242864100.0 (lower bound: 241591900.0, upper bound: none)  
 3/2/2011 10:06:12 AM -- Performance logging ends.  
 3/2/2011 10:06:12 AM -- JetInterop batch transaction stats: 359715.  
 3/2/2011 10:06:13 AM -- Dispatching transactions ends.  
 3/2/2011 10:06:13 AM -- Shutting down databases ...  
 3/2/2011 10:06:18 AM -- Instance5368.1 (complete)  
 3/2/2011 10:06:18 AM -- C:\Program Files\Exchange Jetstress\ESRP\_24hr\Stress\_2011\_3\_1\_10\_3\_21.blg has 5762 samples.  
 3/2/2011 10:06:18 AM -- Creating test report ...  
 3/2/2011 10:06:37 AM -- Instance5368.1 has 16.9 for I/O Database Reads Average Latency.  
 3/2/2011 10:06:37 AM -- Instance5368.1 has 0.6 for I/O Log Writes Average Latency.  
 3/2/2011 10:06:37 AM -- Instance5368.1 has 0.6 for I/O Log Reads Average Latency.  
 3/2/2011 10:06:37 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
 3/2/2011 10:06:37 AM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
 3/2/2011 10:06:37 AM -- C:\Program Files\Exchange Jetstress\ESRP\_24hr\Stress\_2011\_3\_1\_10\_3\_21.xml has 5750 samples queried.

## Streaming backup test result report

(Both DBs backup on one blade, other blade powered on with no load)

Database Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
<b>Instance5264.1</b>	451017.09	00:59:22	126.59
<b>Instance5264.2</b>	444985.09	00:56:51	130.44

Jetstress System Parameters

**Thread Count** 9 (per database)  
**Minimum Database Cache** 64.0 MB  
**Maximum Database Cache** 512.0 MB  
**Insert Operations** 40%  
**Delete Operations** 20%  
**Replace Operations** 5%  
**Read Operations** 35%  
**Lazy Commits** 70%

Database Configuration

**Instance5264.1** Log Path: C:\ExchangeDatabases\VOL1\logs  
 Database: C:\ExchangeDatabases\VOL1\Jetstress001001.edb

**Instance5264.2** Log Path: C:\ExchangeDatabases\VOL2\logs  
 Database: C:\ExchangeDatabases\VOL2\Jetstress002001.edb

Transactional I/O Performance

<b>MSExchange Database ==&gt; Instances</b>	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
<b>Instance5264.1</b>	2.769	0.000	506.292	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<b>Instance5264.2</b>	2.685	0.000	521.798	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Host System Performance

<b>Counter</b>	Average	Minimum	Maximum
<b>% Processor Time</b>	0.731	0.327	0.977
<b>Available MBytes</b>	45834.458	45826.000	45836.000
<b>Free System Page Table Entries</b>	33555644.500	33555643.000	33555646.000
<b>Transition Pages RePurposed/sec</b>	0.000	0.000	0.000
<b>Pool Nonpaged Bytes</b>	511872190.915	511864832.000	511881216.000
<b>Pool Paged Bytes</b>	119442067.525	119382016.000	119545856.000
<b>Database Page Fault Stalls/sec</b>	0.000	0.000	0.000

Test Log

2/25/2011 8:55:02 AM -- Jetstress testing begins ...  
 2/25/2011 8:55:02 AM -- Prepare testing begins ...  
 2/25/2011 8:55:05 AM -- Attaching databases ...  
 2/25/2011 8:55:05 AM -- Prepare testing ends.  
 2/25/2011 8:55:10 AM -- Performance logging begins (interval: 30000 ms).  
 2/25/2011 8:55:10 AM -- Backing up databases ...  
 2/25/2011 9:54:33 AM -- Performance logging ends.  
 2/25/2011 9:54:33 AM -- Instance5264.1 (100% processed) and Instance5264.2 (100% processed)  
 2/25/2011 9:54:33 AM -- C:\Program Files\Exchange Jetstress\ESRP\_Backup\DatabaseBackup\_2011\_2\_25\_8\_55\_5.blg has 118 samples.  
 2/25/2011 9:54:33 AM -- Creating test report ...

# Soft-Recovery test result report

(Both DBs recover on one blade, other blade powered on with no load)

## Soft-Recovery Statistics - All

Database Instance	Log files replayed	Elapsed seconds
<b>Instance5368.1</b>	501	2000.4071135
<b>Instance5368.2</b>	512	1761.9918948

## Database Configuration

**Instance5368.1** Log Path: C:\ExchangeDatabases\VOL1\logs  
Database: C:\ExchangeDatabases\VOL1\Jetstress001001.edb

**Instance5368.2** Log Path: C:\ExchangeDatabases\VOL2\logs  
Database: C:\ExchangeDatabases\VOL2\Jetstress002001.edb

## Transactional I/O Performance

<b>MSEExchange Database ==&gt; Instances</b>	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
<b>Instance5368.1</b>	34.222	0.304	200.070	1.496	39741.524	16866.372	3.195	0.000	2.244	0.000	118235.906	0.000
<b>Instance5368.2</b>	29.292	0.360	233.352	1.737	40272.624	19804.420	3.626	0.000	2.610	0.000	138273.520	0.000

## Background Database Maintenance I/O Performance

<b>MSEExchange Database ==&gt; Instances</b>	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
<b>Instance5368.1</b>	22.031	261425.944
<b>Instance5368.2</b>	24.348	261391.010

## Total I/O Performance

<b>MSEExchange Database ==&gt; Instances</b>	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
<b>Instance5368.1</b>	34.222	0.304	222.101	1.496	61731.226	16866.372	3.195	0.000	2.244	0.000	118235.906	0.000
<b>Instance5368.2</b>	29.292	0.360	257.700	1.737	61164.325	19804.420	3.626	0.000	2.610	0.000	138273.520	0.000



Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.438	0.000	6.831
Available MBytes	45449.727	45431.000	45972.000
Free System Page Table Entries	33555644.450	33555642.000	33555646.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	506593570.791	506417152.000	506662912.000
Pool Paged Bytes	102796485.323	102764544.000	102936576.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

3/2/2011 11:04:41 AM -- Jetstress testing begins ...  
 3/2/2011 11:04:41 AM -- Prepare testing begins ...  
 3/2/2011 11:04:43 AM -- Attaching databases ...  
 3/2/2011 11:04:43 AM -- Prepare testing ends.  
 3/2/2011 11:04:43 AM -- Dispatching transactions begins ...  
 3/2/2011 11:04:43 AM -- Database cache settings: (minimum: 64.0 MB, maximum: 512.0 MB)  
 3/2/2011 11:04:43 AM -- Database flush thresholds: (start: 5.1 MB, stop: 10.2 MB)  
 3/2/2011 11:04:45 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).  
 3/2/2011 11:04:45 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).  
 3/2/2011 11:04:49 AM -- Operation mix: Sessions 7, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.  
 3/2/2011 11:04:49 AM -- Performance logging begins (interval: 15000 ms).  
 3/2/2011 11:04:49 AM -- Generating log files ...  
 3/2/2011 12:40:45 PM -- C:\ExchangeDatabases\VOL1\logs (100.2% generated) and C:\ExchangeDatabases\VOL2\logs (102.4% generated)  
 3/2/2011 12:40:45 PM -- Performance logging ends.  
 3/2/2011 12:40:45 PM -- JetInterop batch transaction stats: 22125 and 22224.  
 3/2/2011 12:40:45 PM -- Dispatching transactions ends.  
 3/2/2011 12:40:45 PM -- Shutting down databases ...  
 3/2/2011 12:40:52 PM -- Instance5368.1 (complete) and Instance5368.2 (complete)  
 3/2/2011 12:40:52 PM -- C:\Program Files\Exchange Jetstress\ESRP\_Recovery\Performance\_2011\_3\_2\_11\_4\_45.blg has 383 samples.  
 3/2/2011 12:40:52 PM -- Creating test report ...  
 3/2/2011 12:40:54 PM -- Instance5368.1 has 18.6 for I/O Database Reads Average Latency.  
 3/2/2011 12:40:54 PM -- Instance5368.1 has 0.5 for I/O Log Writes Average Latency.  
 3/2/2011 12:40:54 PM -- Instance5368.1 has 0.5 for I/O Log Reads Average Latency.  
 3/2/2011 12:40:54 PM -- Instance5368.2 has 15.8 for I/O Database Reads Average Latency.  
 3/2/2011 12:40:54 PM -- Instance5368.2 has 0.5 for I/O Log Writes Average Latency.  
 3/2/2011 12:40:54 PM -- Instance5368.2 has 0.5 for I/O Log Reads Average Latency.  
 3/2/2011 12:40:54 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
 3/2/2011 12:40:54 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
 3/2/2011 12:40:54 PM -- C:\Program Files\Exchange Jetstress\ESRP\_Recovery\Performance\_2011\_3\_2\_11\_4\_45.xml has 382 samples queried.  
 3/2/2011 12:40:54 PM -- C:\Program Files\Exchange Jetstress\ESRP\_Recovery\Performance\_2011\_3\_2\_11\_4\_45.html is saved.  
 3/2/2011 12:40:57 PM -- Performance logging begins (interval: 2000 ms).  
 3/2/2011 12:40:57 PM -- Recovering databases ...  
 3/2/2011 1:14:17 PM -- Performance logging ends.  
 3/2/2011 1:14:17 PM -- Instance5368.1 (2000.4071135) and Instance5368.2 (1761.9918948)  
 3/2/2011 1:14:17 PM -- C:\Program Files\Exchange Jetstress\ESRP\_Recovery\SoftRecovery\_2011\_3\_2\_12\_40\_54.blg has 986 samples.  
 3/2/2011 1:14:17 PM -- Creating test report ...

## For more information

For further information on HP Exchange solutions including best practices, sizing tools, and additional testing of HP StorageWorks or ProLiant products with Exchange, please see:

<http://www.hp.com/solutions/exchange>

More information about the E5000 family is available at <http://www.hp.com/go/E5000>

To help us improve our documents, please provide feedback at

[http://h20219.www2.hp.com/ActiveAnswers/us/en/solutions/technical\\_tools\\_feedback.html](http://h20219.www2.hp.com/ActiveAnswers/us/en/solutions/technical_tools_feedback.html).



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4AA3-3920ENW, Created March 2011; Updated May 2011, Rev. 1

