HP E5500 16TB Messaging System 1000 user – 1.25GB mailbox resiliency Exchange 2010 storage solution

Technical white paper

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Overview

This solution brief provides information on an HP E5500 16TB 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

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Features

The HP E5500 16TB Messaging System (E5500 16TB) 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 E5500 16TB 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 E5500 16TB configuration has been optimized for the Small and Medium Business (SMB) customer looking to support 1000 users with large 1.25GB mailbox capacities and mailbox resiliency features, all in a single appliance.

The pre-packaged E5500 16TB 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 E5500 16TB 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 E5500 16TB also includes several HP value-add tools to monitor and manage the health of the messaging system.

The E5500 16TB has been designed to support 1000 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 E5500 16TB host a two-copy Exchange 2010 Database Availability Group – configured with an active and one passive copy of each mailbox database. The E5500 16TB is configured with three active databases in the DAG, each hosting approximately 333 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 E5500 16TB 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:

- 1000 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)
- 1.25 GB tested mailbox size
- Database Availability Group (DAG) deployment with 2 copies of each database in the DAG
- 3 databases total on each server (2 active and 1 passive on server 1; 1 active and 2 passive on server 2) 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 E5500 16TB (or other E5000 models).

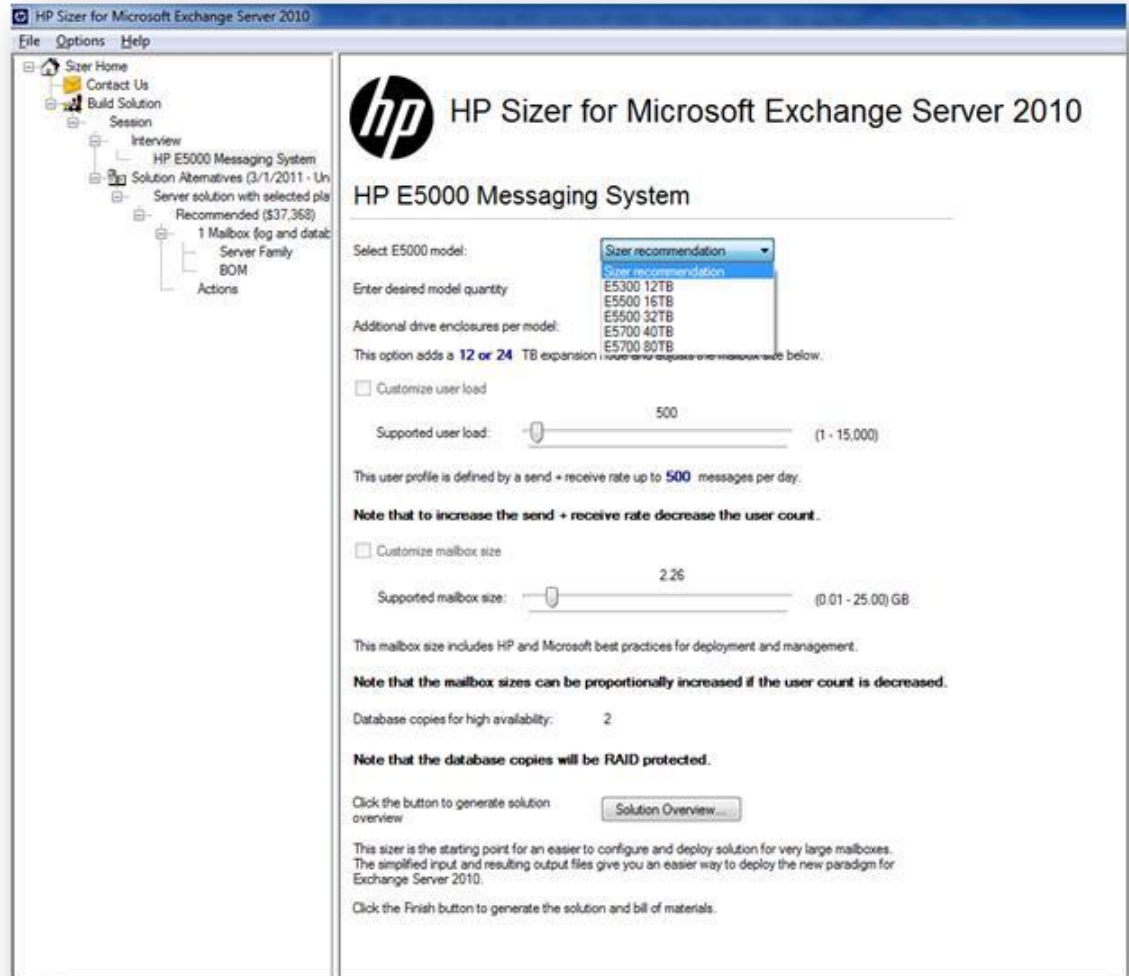**Figure 1.** Using the HP Sizer to select the E5500 16TB (or other E5000 model)

Figure 2 shows the tested solution hardware.

Figure 2. Front view of E5500 16TB

LFF Disk
Storage Drawer

Server blades

Figure 3 shows the rear view of the E5500 16TB enclosure, with dual, redundant power supplies, cooling fans and I/O modules.

Figure 3. Rear view of the E5500 16TB
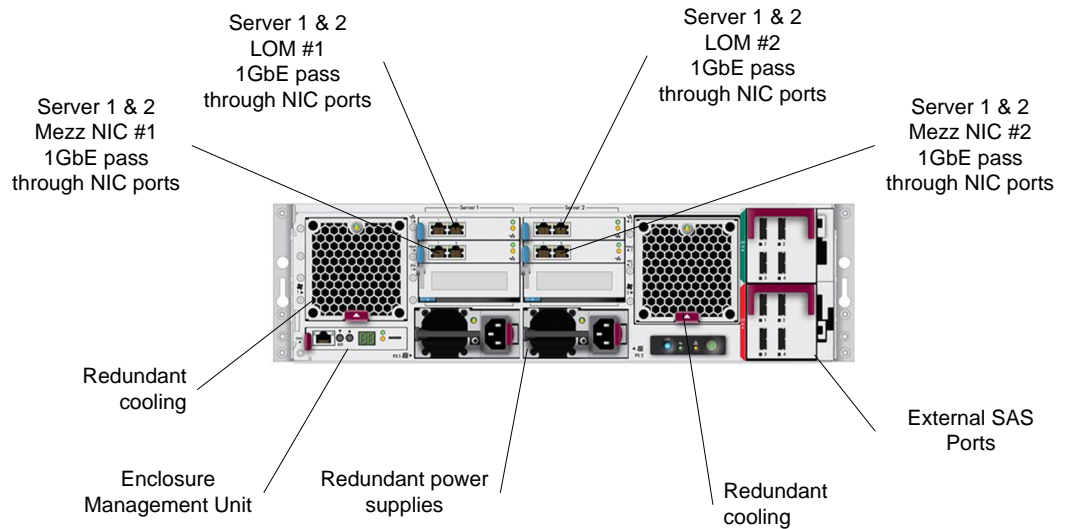
Storage configuration

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.

Figure 4. E5000 Configuration Wizard (ECW)

Figure 5 depicts the Logical Drive configuration
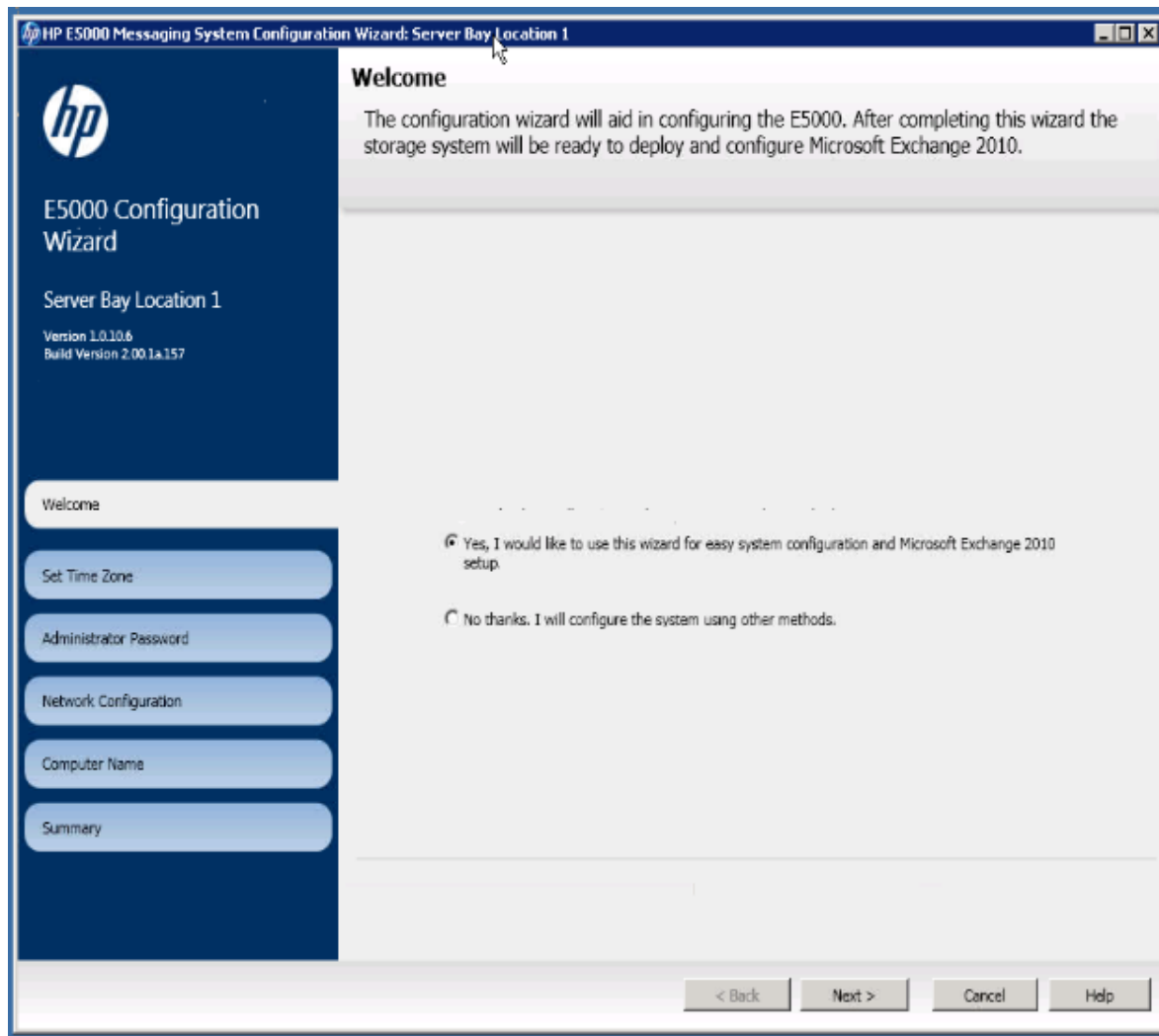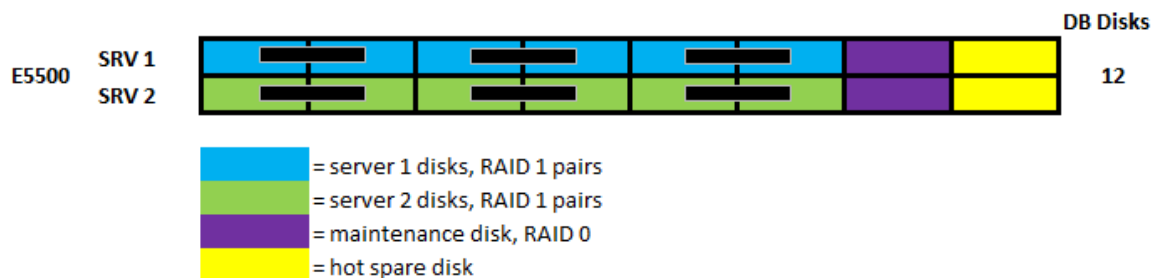
Figure 5. E5500 16TB storage logical diagram

Targeted customer profile

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

- 1000 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)
- 1.25 GB tested mailbox size
- Database Availability Group (DAG) deployment with 2 copies of each database in the DAG
- 3 databases total on each server (2 active and 1 passive on server 1; 1 active and 2 passive on server 2) 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	1000
Number of Database Availability Groups (DAGs)	One (1)
Number of mailbox servers/DAG	Two (2)
Number of active mailboxes/server	Server 1 – 667; Server 2 - 333
Number of databases/host	Server 1 – 2 active and 1 passive; Server 2 – 1 active and 2 passive
Number of copies/database	2 including active
Number of mailboxes/database	333
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	1,260 GB (3 databases x 420GB each)
% storage capacity used by Exchange database**	22.5% (1,260GB/5,589GB)

**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	12
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	12
Total raw storage capacity (GB)	11,178 GB
Disk slice size (GB)	N/A
RAID level	Single RAID 1 (JBOD)
Total formatted capacity	5,589 GB
Storage capacity utilization	50% Formatted capacity/Total raw capacity
Database capacity utilization	11.2% Database size / Total raw capacity 1,260/11,178

Replication configuration

Replication Mechanism	Mailbox Resiliency
Number of links	4 (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
- 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
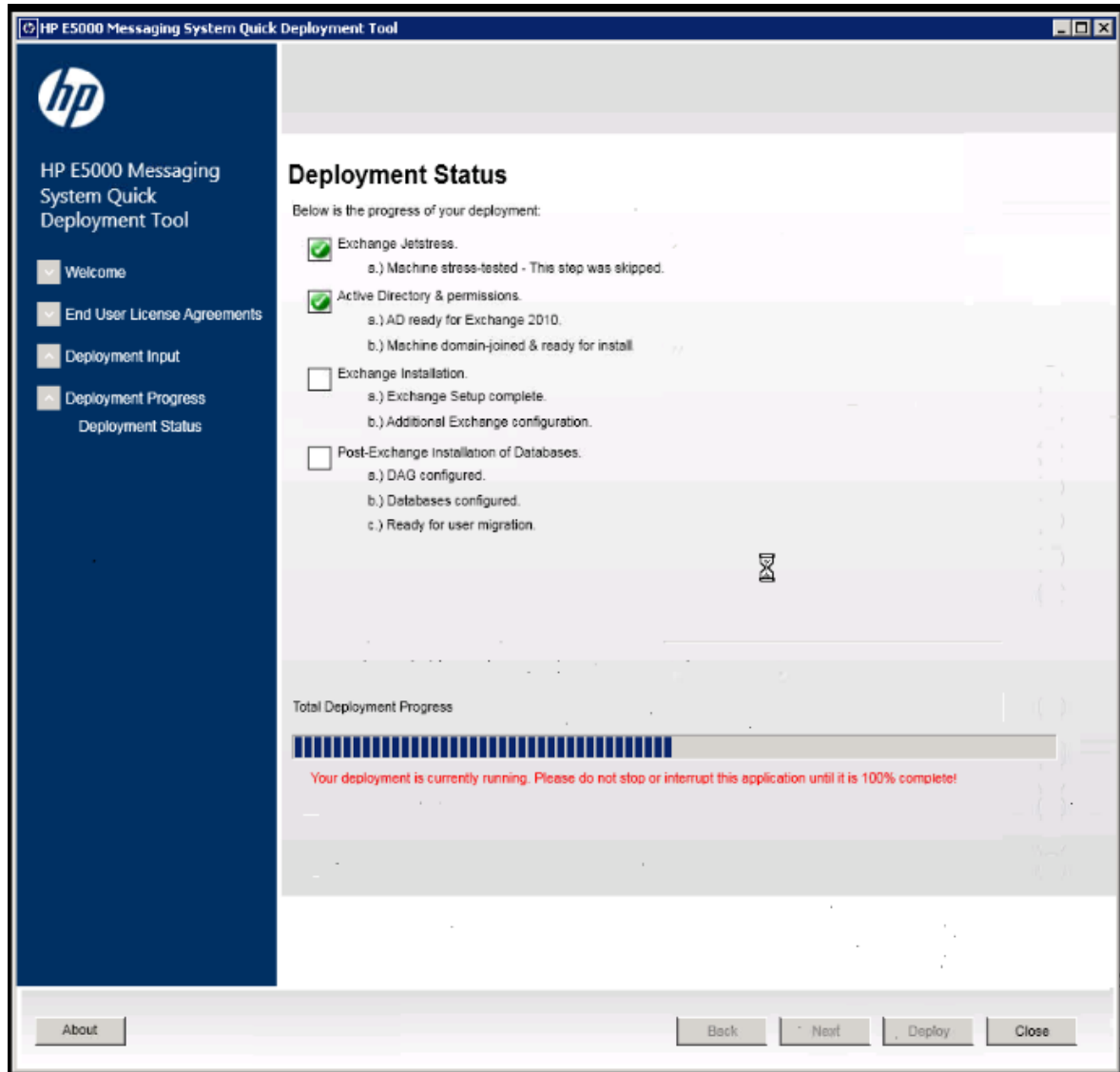
- Before installing Exchange Server 2010, you may test your storage solution with Jetstress to ensure it is configured properly and meets your requirements. The QDT has built-in access to the Jetstress tool to provide either a quicker test or full test. (see figure 7)

Figure 7. E5000 Messaging System Quick Deployment Tool – Jetstress Testing
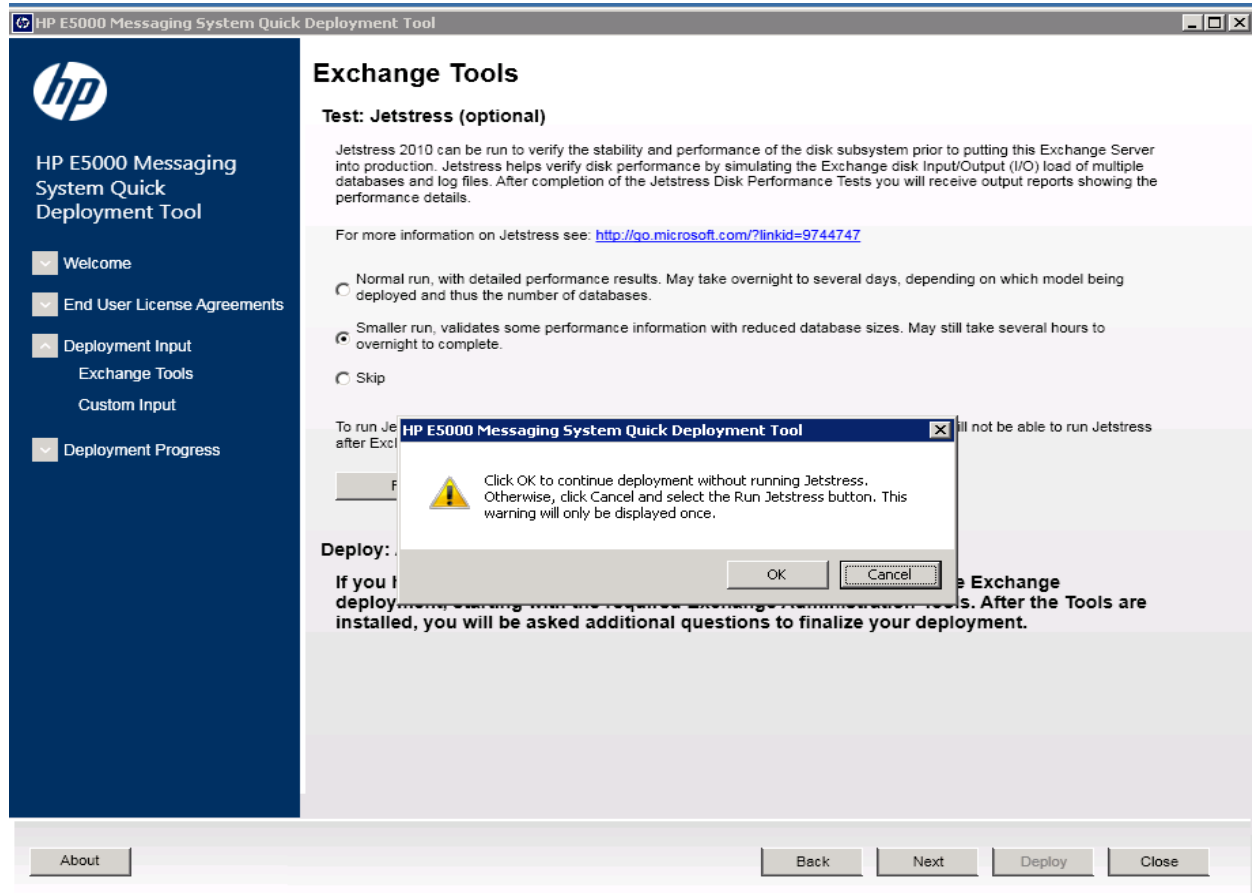
Test results summary

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 their share of databases, but also with a server failure where the remaining server is running all three 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.

Database I/O	Server 1 3 Active Database
Needed Disk Transfers/sec*	240
Database Disks Transfers/sec (total per server)	426.237
Database Disks Reads/sec (average per database)	81.8
Database Disks Writes/sec (average per database)	60.3
Average Database Disk Read Latency (ms)	18.7
Average Database Disk Write Latency (ms)	2.7
Transaction Log I/O	
Log Disks Writes/sec	51.3
Average Log Disk Write Latency (ms)	0.71
Log Disk Reads/sec	0.94

*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 3 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.

Database Read-only	
MB Read/sec per database	128.6
MB Read/sec total per server	385

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.

Transaction Log Replay	
Average time to play one log file (sec)	3.27

Conclusion

The information discussed in this solution brief highlights the tested performance results and configuration best practices for an Exchange Server solution supporting 1000 Exchange users with 1.25GB mailboxes. Testing was performed with an HP P1210m controller with 12 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 1000 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 (2 DB, 667 users)

Test Summary

Overall Test Result	**Pass**
Machine Name	WIN-1UISA2T022V
Test Description	ESRP E5500 16TB 2HR
Test Start Time	2/24/2011 7:32:45 AM
Test End Time	2/24/2011 9:35:51 AM
Collection Start Time	2/24/2011 7:35:36 AM
Collection End Time	2/24/2011 9:35:35 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_32_49.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second	258.525
Target Transactional I/O per Second	160.08
Initial Database Size (bytes)	901031002112
Final Database Size (bytes)	901903417344
Database Files (Count)	2

Jetstress System Parameters

Thread Count	8 (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

Instance6676.1 Log Path: C:\ExchangeDatabases\VOL1\logs
　　　　　　　Database: C:\ExchangeDatabases\VOL1\Jetstress001001.edb

Instance6676.2 Log Path: C:\ExchangeDatabases\VOL2\logs
　　　　　　　　Database: C:\ExchangeDatabases\VOL2\Jetstress002001.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
Instance6676.1	16.332	1.239	73.719	54.801	33678.425	35157.780	0.000	0.590	0.000	46.825	0.000	4481.468
Instance6676.2	16.417	1.245	74.521	55.484	33478.120	35164.070	0.000	0.609	0.000	47.410	0.000	4445.645

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance6676.1	26.289	261261.492
Instance6676.2	26.844	261252.524

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance6676.1	0.848	232017.694
Instance6676.2	0.852	231569.505

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
Instance6676.1	16.332	1.239	100.008	54.801	93501.930	35157.780	12.317	0.590	0.848	46.825	232017.694	4481.468
Instance6676.2	16.417	1.245	101.365	55.484	93799.143	35164.070	12.228	0.609	0.852	47.410	231569.505	4445.645

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.364	0.162	0.577
Available MBytes	45298.848	45294.000	45344.000
Free System Page Table Entries	33555132.371	33555129.000	33555134.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	506941533.867	506933248.000	507015168.000
Pool Paged Bytes	117766553.600	117731328.000	117837824.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log
2/23/2011 12:45:46 PM -- Jetstress testing begins ...
2/23/2011 12:45:46 PM -- Prepare testing begins ...
2/23/2011 12:45:48 PM -- Attaching databases ...
2/23/2011 12:45:48 PM -- Prepare testing ends.
2/23/2011 12:45:48 PM -- Dispatching transactions begins ...
2/23/2011 12:45:49 PM -- Database cache settings: (minimum: 64.0 MB, maximum: 512.0 MB)
2/23/2011 12:45:49 PM -- Database flush thresholds: (start: 5.1 MB, stop: 10.2 MB)
2/23/2011 12:45:51 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
2/23/2011 12:45:51 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
2/23/2011 12:45:56 PM -- Operation mix: Sessions 11, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
2/23/2011 12:45:56 PM -- Performance logging begins (interval: 15000 ms).
2/23/2011 12:45:56 PM -- Attaining prerequisites:
2/23/2011 12:48:29 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 485314600.0 (lower bound: 483183800.0, upper bound: none)
2/23/2011 2:48:29 PM -- Performance logging ends.
2/23/2011 2:50:24 PM -- JetInterop batch transaction stats: 34148 and 34046.
2/23/2011 2:50:25 PM -- Dispatching transactions ends.
2/23/2011 2:50:25 PM -- Shutting down databases ...
2/23/2011 2:50:31 PM -- Instance6676.1 (complete) and Instance6676.2 (complete)
2/23/2011 2:50:31 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_12_45_51.blg has 489 samples.
2/23/2011 2:50:31 PM -- Creating test report ...
2/23/2011 2:50:34 PM -- Instance6676.1 has 20.1 for I/O Database Reads Average Latency.
2/23/2011 2:50:34 PM -- Instance6676.1 has 0.7 for I/O Log Writes Average Latency.
2/23/2011 2:50:34 PM -- Instance6676.1 has 0.7 for I/O Log Reads Average Latency.
2/23/2011 2:50:34 PM -- Instance6676.2 has 20.6 for I/O Database Reads Average Latency.
2/23/2011 2:50:34 PM -- Instance6676.2 has 0.6 for I/O Log Writes Average Latency.
2/23/2011 2:50:34 PM -- Instance6676.2 has 0.6 for I/O Log Reads Average Latency.
2/23/2011 2:50:34 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
2/23/2011 2:50:34 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
2/23/2011 2:50:34 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_12_45_51.xml has 478 samples queried.
2/23/2011 2:50:34 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_12_45_51.html is saved.
2/23/2011 2:50:35 PM -- Performance logging begins (interval: 30000 ms).
2/23/2011 2:50:35 PM -- Verifying database checksums ...
2/23/2011 2:51:14 PM -- C:\ExchangeDatabases\VOL1 (1% processed) and C:\ExchangeDatabases\VOL2 (1% processed)
2/23/2011 2:51:14 PM -- Verifying log checksums ...
2/23/2011 2:51:14 PM -- C:\ExchangeDatabases\VOL1\logs (0 log(s) processed) and C:\ExchangeDatabases\VOL2\logs (0 log(s) processed)
2/23/2011 2:51:14 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Application_2011_2_23_14_51_14.evt is saved.
2/23/2011 2:51:14 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\System_2011_2_23_14_51_14.evt is saved.
2/23/2011 2:51:14 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\XmlConfig_2011_2_23_14_51_14.xml is saved.
2/23/2011 2:51:14 PM -- Jetstress testing ends.
2/23/2011 2:52:49 PM -- Jetstress testing begins ...
2/23/2011 2:52:49 PM -- Prepare testing begins ...
2/23/2011 2:52:51 PM -- Attaching databases ...
2/23/2011 2:52:51 PM -- Prepare testing ends.
2/23/2011 2:52:51 PM -- Dispatching transactions begins ...
2/23/2011 2:52:51 PM -- Database cache settings: (minimum: 64.0 MB, maximum: 512.0 MB)
2/23/2011 2:52:51 PM -- Database flush thresholds: (start: 5.1 MB, stop: 10.2 MB)
2/23/2011 2:52:53 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
2/23/2011 2:52:53 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
2/23/2011 2:52:58 PM -- Operation mix: Sessions 10, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
2/23/2011 2:52:58 PM -- Performance logging begins (interval: 15000 ms).
2/23/2011 2:52:58 PM -- Attaining prerequisites:
2/23/2011 2:55:38 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 485543900.0 (lower bound: 483183800.0, upper bound: none)
2/23/2011 4:55:38 PM -- Performance logging ends.

2/23/2011 5:36:57 PM -- JetInterop batch transaction stats: 42413 and 42808.
2/23/2011 5:36:58 PM -- Dispatching transactions ends.
2/23/2011 5:36:58 PM -- Shutting down databases ...
2/23/2011 5:37:05 PM -- Instance6676.1 (complete) and Instance6676.2 (complete)
2/23/2011 5:37:05 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_14_52_53.blg has 489 samples.
2/23/2011 5:37:05 PM -- Creating test report ...
2/23/2011 5:37:07 PM -- Instance6676.1 has 18.9 for I/O Database Reads Average Latency.
2/23/2011 5:37:07 PM -- Instance6676.1 has 0.7 for I/O Log Writes Average Latency.
2/23/2011 5:37:07 PM -- Instance6676.1 has 0.7 for I/O Log Reads Average Latency.
2/23/2011 5:37:07 PM -- Instance6676.2 has 19.7 for I/O Database Reads Average Latency.
2/23/2011 5:37:07 PM -- Instance6676.2 has 0.6 for I/O Log Writes Average Latency.
2/23/2011 5:37:07 PM -- Instance6676.2 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_52_53.xml has 478 samples queried.
2/23/2011 5:37:08 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_14_52_53.html is saved.
2/23/2011 5:37:09 PM -- Performance logging begins (interval: 30000 ms).
2/23/2011 5:37:09 PM -- Verifying database checksums ...
2/23/2011 5:59:35 PM -- C:\ExchangeDatabases\VOL1 (41% processed) and C:\ExchangeDatabases\VOL2 (41% processed)
2/23/2011 5:59:35 PM -- Verifying log checksums ...
2/23/2011 5:59:35 PM -- C:\ExchangeDatabases\VOL1\logs (0 log(s) processed) and C:\ExchangeDatabases\VOL2\logs (0 log(s) processed)
2/23/2011 5:59:35 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Application_2011_2_23_17_59_35.evt is saved.
2/23/2011 5:59:35 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\System_2011_2_23_17_59_35.evt is saved.
2/23/2011 5:59:35 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\XmlConfig_2011_2_23_17_59_35.xml is saved.
2/23/2011 5:59:35 PM -- Jetstress testing ends.
2/23/2011 6:00:24 PM -- Jetstress testing begins ...
2/23/2011 6:00:24 PM -- Prepare testing begins ...
2/23/2011 6:00:26 PM -- Attaching databases ...
2/23/2011 6:00:26 PM -- Prepare testing ends.
2/23/2011 6:00:26 PM -- Dispatching transactions begins ...
2/23/2011 6:00:26 PM -- Database cache settings: (minimum: 64.0 MB, maximum: 512.0 MB)
2/23/2011 6:00:26 PM -- Database flush thresholds: (start: 5.1 MB, stop: 10.2 MB)
2/23/2011 6:00:29 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
2/23/2011 6:00:29 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
2/23/2011 6:00:33 PM -- Operation mix: Sessions 9, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
2/23/2011 6:00:33 PM -- Performance logging begins (interval: 15000 ms).
2/23/2011 6:00:33 PM -- Attaining prerequisites:
2/23/2011 6:03:30 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 486932500.0 (lower bound: 483183800.0, upper bound: none)
2/23/2011 8:03:30 PM -- Performance logging ends.
2/23/2011 8:28:16 PM -- JetInterop batch transaction stats: 36103 and 36077.
2/23/2011 8:28:17 PM -- Dispatching transactions ends.
2/23/2011 8:28:17 PM -- Shutting down databases ...
2/23/2011 8:28:24 PM -- Instance6676.1 (complete) and Instance6676.2 (complete)
2/23/2011 8:28:24 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_18_0_29.blg has 491 samples.
2/23/2011 8:28:24 PM -- Creating test report ...
2/23/2011 8:28:26 PM -- Instance6676.1 has 18.8 for I/O Database Reads Average Latency.
2/23/2011 8:28:26 PM -- Instance6676.1 has 0.7 for I/O Log Writes Average Latency.
2/23/2011 8:28:26 PM -- Instance6676.1 has 0.7 for I/O Log Reads Average Latency.
2/23/2011 8:28:26 PM -- Instance6676.2 has 18.9 for I/O Database Reads Average Latency.
2/23/2011 8:28:26 PM -- Instance6676.2 has 0.6 for I/O Log Writes Average Latency.
2/23/2011 8:28:26 PM -- Instance6676.2 has 0.6 for I/O Log Reads Average Latency.
2/23/2011 8:28:26 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
2/23/2011 8:28:26 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
2/23/2011 8:28:26 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_18_0_29.xml has 479 samples queried.

2/23/2011 8:28:26 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_18_0_29.html is saved.
2/23/2011 8:28:27 PM -- Performance logging begins (interval: 30000 ms).
2/23/2011 8:28:27 PM -- Verifying database checksums ...
2/23/2011 9:23:40 PM -- C:\ExchangeDatabases\VOL1 (100% processed) and C:\ExchangeDatabases\VOL2 (100% processed)
2/23/2011 9:23:40 PM -- Performance logging ends.
2/23/2011 9:23:40 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\DBChecksum_2011_2_23_20_28_26.blg has 110 samples.
2/23/2011 9:23:41 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\DBChecksum_2011_2_23_20_28_26.html is saved.
2/23/2011 9:23:41 PM -- Verifying log checksums ...
2/23/2011 9:23:41 PM -- C:\ExchangeDatabases\VOL1\logs (8 log(s) processed) and C:\ExchangeDatabases\VOL2\logs (7 log(s) processed)
2/23/2011 9:23:41 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Application_2011_2_23_21_23_41.evt is saved.
2/23/2011 9:23:41 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\System_2011_2_23_21_23_41.evt is saved.
2/23/2011 9:23:41 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\XmlConfig_2011_2_23_21_23_41.xml is saved.
2/23/2011 9:23:41 PM -- Jetstress testing ends.
2/24/2011 7:32:45 AM -- Jetstress testing begins ...
2/24/2011 7:32:45 AM -- Prepare testing begins ...
2/24/2011 7:32:47 AM -- Attaching databases ...
2/24/2011 7:32:47 AM -- Prepare testing ends.
2/24/2011 7:32:47 AM -- Dispatching transactions begins ...
2/24/2011 7:32:47 AM -- Database cache settings: (minimum: 64.0 MB, maximum: 512.0 MB)
2/24/2011 7:32:47 AM -- Database flush thresholds: (start: 5.1 MB, stop: 10.2 MB)
2/24/2011 7:32:49 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
2/24/2011 7:32:49 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
2/24/2011 7:32:54 AM -- Operation mix: Sessions 8, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
2/24/2011 7:32:54 AM -- Performance logging begins (interval: 15000 ms).
2/24/2011 7:32:54 AM -- Attaining prerequisites:
2/24/2011 7:35:36 AM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 484532200.0 (lower bound: 483183800.0, upper bound: none)
2/24/2011 9:35:36 AM -- Performance logging ends.
2/24/2011 9:35:45 AM -- JetInterop batch transaction stats: 30530 and 30641.
2/24/2011 9:35:45 AM -- Dispatching transactions ends.
2/24/2011 9:35:45 AM -- Shutting down databases ...
2/24/2011 9:35:51 AM -- Instance6676.1 (complete) and Instance6676.2 (complete)
2/24/2011 9:35:51 AM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_24_7_32_49.blg has 490 samples.
2/24/2011 9:35:51 AM -- Creating test report ...
2/24/2011 9:35:53 AM -- Instance6676.1 has 16.3 for I/O Database Reads Average Latency.
2/24/2011 9:35:53 AM -- Instance6676.1 has 0.6 for I/O Log Writes Average Latency.
2/24/2011 9:35:53 AM -- Instance6676.1 has 0.6 for I/O Log Reads Average Latency.
2/24/2011 9:35:53 AM -- Instance6676.2 has 16.4 for I/O Database Reads Average Latency.
2/24/2011 9:35:53 AM -- Instance6676.2 has 0.6 for I/O Log Writes Average Latency.
2/24/2011 9:35:53 AM -- Instance6676.2 has 0.6 for I/O Log Reads Average Latency.
2/24/2011 9:35:54 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.
2/24/2011 9:35:54 AM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
2/24/2011 9:35:54 AM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_24_7_32_49.xml has 479 samples queried.

Database checksum – reliability testing

Checksum Statistics - All

Database	Seen pages	Bad pages	Correctable pages	Wrong page-number pages	File length / seconds taken
C:\ExchangeDatabases\VOL1\Jetstress001001.edb	13762338	0	0	0	430073 MBytes / 3077 sec
C:\ExchangeDatabases\VOL2\Jetstress002001.edb	13761570	0	0	0	430049 MBytes / 3115 sec
(Sum)	27523908	0	0	0	860122 MBytes / 3115 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	0.036	0.000	2239.239	0.000	65536.000
C:\ExchangeDatabases\VOL2	0.032	0.000	2209.594	0.000	65536.000

Memory System Performance (of checksum)

Counter	Average	Minimum	Maximum
% Processor Time	1.268	0.955	2.075
Available MBytes	45791.272	45782.000	45801.000
Free System Page Table Entries	33555132.777	33555132.000	33555134.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	507016162.175	506998784.000	507035648.000
Pool Paged Bytes	118095116.427	118054912.000	118173696.000

Test Log
2/23/2011 12:45:46 PM -- Jetstress testing begins ...
2/23/2011 12:45:46 PM -- Prepare testing begins ...
2/23/2011 12:45:48 PM -- Attaching databases ...
2/23/2011 12:45:48 PM -- Prepare testing ends.
2/23/2011 12:45:48 PM -- Dispatching transactions begins ...
2/23/2011 12:45:49 PM -- Database cache settings: (minimum: 64.0 MB, maximum: 512.0 MB)
2/23/2011 12:45:49 PM -- Database flush thresholds: (start: 5.1 MB, stop: 10.2 MB)
2/23/2011 12:45:51 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
2/23/2011 12:45:51 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
2/23/2011 12:45:56 PM -- Operation mix: Sessions 11, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
2/23/2011 12:45:56 PM -- Performance logging begins (interval: 15000 ms).
2/23/2011 12:45:56 PM -- Attaining prerequisites:
2/23/2011 12:48:29 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 485314600.0 (lower bound: 483183800.0, upper bound: none)
2/23/2011 2:48:29 PM -- Performance logging ends.
2/23/2011 2:50:24 PM -- JetInterop batch transaction stats: 34148 and 34046.
2/23/2011 2:50:25 PM -- Dispatching transactions ends.
2/23/2011 2:50:25 PM -- Shutting down databases ...
2/23/2011 2:50:31 PM -- Instance6676.1 (complete) and Instance6676.2 (complete)
2/23/2011 2:50:31 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_12_45_51.blg has 489 samples.
2/23/2011 2:50:31 PM -- Creating test report ...
2/23/2011 2:50:34 PM -- Instance6676.1 has 20.1 for I/O Database Reads Average Latency.
2/23/2011 2:50:34 PM -- Instance6676.1 has 0.7 for I/O Log Writes Average Latency.
2/23/2011 2:50:34 PM -- Instance6676.1 has 0.7 for I/O Log Reads Average Latency.
2/23/2011 2:50:34 PM -- Instance6676.2 has 20.6 for I/O Database Reads Average Latency.
2/23/2011 2:50:34 PM -- Instance6676.2 has 0.6 for I/O Log Writes Average Latency.
2/23/2011 2:50:34 PM -- Instance6676.2 has 0.6 for I/O Log Reads Average Latency.
2/23/2011 2:50:34 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
2/23/2011 2:50:34 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
2/23/2011 2:50:34 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_12_45_51.xml has 478 samples queried.
2/23/2011 2:50:34 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_12_45_51.html is saved.
2/23/2011 2:50:35 PM -- Performance logging begins (interval: 30000 ms).
2/23/2011 2:50:35 PM -- Verifying database checksums ...
2/23/2011 2:51:14 PM -- C:\ExchangeDatabases\VOL1 (1% processed) and C:\ExchangeDatabases\VOL2 (1% processed)

2/23/2011 2:51:14 PM -- Verifying log checksums ...
2/23/2011 2:51:14 PM -- C:\ExchangeDatabases\VOL1\logs (0 log(s) processed) and C:\ExchangeDatabases\VOL2\logs (0 log(s) processed)
2/23/2011 2:51:14 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Application_2011_2_23_14_51_14.evt is saved.
2/23/2011 2:51:14 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\System_2011_2_23_14_51_14.evt is saved.
2/23/2011 2:51:14 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\XmlConfig_2011_2_23_14_51_14.xml is saved.
2/23/2011 2:51:14 PM -- Jetstress testing ends.
2/23/2011 2:52:49 PM -- Jetstress testing begins ...
2/23/2011 2:52:49 PM -- Prepare testing begins ...
2/23/2011 2:52:51 PM -- Attaching databases ...
2/23/2011 2:52:51 PM -- Prepare testing ends.
2/23/2011 2:52:51 PM -- Dispatching transactions begins ...
2/23/2011 2:52:51 PM -- Database cache settings: (minimum: 64.0 MB, maximum: 512.0 MB)
2/23/2011 2:52:51 PM -- Database flush thresholds: (start: 5.1 MB, stop: 10.2 MB)
2/23/2011 2:52:53 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
2/23/2011 2:52:53 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
2/23/2011 2:52:58 PM -- Operation mix: Sessions 10, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
2/23/2011 2:52:58 PM -- Performance logging begins (interval: 15000 ms).
2/23/2011 2:52:58 PM -- Attaining prerequisites:
2/23/2011 2:55:38 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 485543900.0 (lower bound: 483183800.0, upper bound: none)
2/23/2011 4:55:38 PM -- Performance logging ends.
2/23/2011 5:36:57 PM -- JetInterop batch transaction stats: 42413 and 42808.
2/23/2011 5:36:58 PM -- Dispatching transactions ends.
2/23/2011 5:36:58 PM -- Shutting down databases ...
2/23/2011 5:37:05 PM -- Instance6676.1 (complete) and Instance6676.2 (complete)
2/23/2011 5:37:05 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_14_52_53.blg has 489 samples.
2/23/2011 5:37:05 PM -- Creating test report ...
2/23/2011 5:37:07 PM -- Instance6676.1 has 18.9 for I/O Database Reads Average Latency.
2/23/2011 5:37:07 PM -- Instance6676.1 has 0.7 for I/O Log Writes Average Latency.
2/23/2011 5:37:07 PM -- Instance6676.1 has 0.7 for I/O Log Reads Average Latency.
2/23/2011 5:37:07 PM -- Instance6676.2 has 19.7 for I/O Database Reads Average Latency.
2/23/2011 5:37:07 PM -- Instance6676.2 has 0.6 for I/O Log Writes Average Latency.
2/23/2011 5:37:07 PM -- Instance6676.2 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_52_53.xml has 478 samples queried.
2/23/2011 5:37:08 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_14_52_53.html is saved.
2/23/2011 5:37:09 PM -- Performance logging begins (interval: 30000 ms).
2/23/2011 5:37:09 PM -- Verifying database checksums ...
2/23/2011 5:59:35 PM -- C:\ExchangeDatabases\VOL1 (41% processed) and C:\ExchangeDatabases\VOL2 (41% processed)
2/23/2011 5:59:35 PM -- Verifying log checksums ...
2/23/2011 5:59:35 PM -- C:\ExchangeDatabases\VOL1\logs (0 log(s) processed) and C:\ExchangeDatabases\VOL2\logs (0 log(s) processed)
2/23/2011 5:59:35 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Application_2011_2_23_17_59_35.evt is saved.
2/23/2011 5:59:35 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\System_2011_2_23_17_59_35.evt is saved.
2/23/2011 5:59:35 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\XmlConfig_2011_2_23_17_59_35.xml is saved.
2/23/2011 5:59:35 PM -- Jetstress testing ends.
2/23/2011 6:00:24 PM -- Jetstress testing begins ...
2/23/2011 6:00:24 PM -- Prepare testing begins ...
2/23/2011 6:00:26 PM -- Attaching databases ...
2/23/2011 6:00:26 PM -- Prepare testing ends.
2/23/2011 6:00:26 PM -- Dispatching transactions begins ...
2/23/2011 6:00:26 PM -- Database cache settings: (minimum: 64.0 MB, maximum: 512.0 MB)
2/23/2011 6:00:26 PM -- Database flush thresholds: (start: 5.1 MB, stop: 10.2 MB)
2/23/2011 6:00:29 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
2/23/2011 6:00:29 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).

2/23/2011 6:00:33 PM -- Operation mix: Sessions 9, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
2/23/2011 6:00:33 PM -- Performance logging begins (interval: 15000 ms).
2/23/2011 6:00:33 PM -- Attaining prerequisites:
2/23/2011 6:03:30 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 486932500.0 (lower bound: 483183800.0, upper bound: none)
2/23/2011 8:03:30 PM -- Performance logging ends.
2/23/2011 8:28:16 PM -- JetInterop batch transaction stats: 36103 and 36077.
2/23/2011 8:28:17 PM -- Dispatching transactions ends.
2/23/2011 8:28:17 PM -- Shutting down databases ...
2/23/2011 8:28:24 PM -- Instance6676.1 (complete) and Instance6676.2 (complete)
2/23/2011 8:28:24 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_18_0_29.blg has 491 samples.
2/23/2011 8:28:24 PM -- Creating test report ...
2/23/2011 8:28:26 PM -- Instance6676.1 has 18.8 for I/O Database Reads Average Latency.
2/23/2011 8:28:26 PM -- Instance6676.1 has 0.7 for I/O Log Writes Average Latency.
2/23/2011 8:28:26 PM -- Instance6676.1 has 0.7 for I/O Log Reads Average Latency.
2/23/2011 8:28:26 PM -- Instance6676.2 has 18.9 for I/O Database Reads Average Latency.
2/23/2011 8:28:26 PM -- Instance6676.2 has 0.6 for I/O Log Writes Average Latency.
2/23/2011 8:28:26 PM -- Instance6676.2 has 0.6 for I/O Log Reads Average Latency.
2/23/2011 8:28:26 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
2/23/2011 8:28:26 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
2/23/2011 8:28:26 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_18_0_29.xml has 479 samples queried.
2/23/2011 8:28:26 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_23_18_0_29.html is saved.
2/23/2011 8:28:27 PM -- Performance logging begins (interval: 30000 ms).
2/23/2011 8:28:27 PM -- Verifying database checksums ...
2/23/2011 9:23:40 PM -- C:\ExchangeDatabases\VOL1 (100% processed) and C:\ExchangeDatabases\VOL2 (100% processed)
2/23/2011 9:23:40 PM -- Performance logging ends.
2/23/2011 9:23:40 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\DBChecksum_2011_2_23_20_28_26.blg has 110 samples.
2/23/2011 9:23:41 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\DBChecksum_2011_2_23_20_28_26.html is saved.
2/23/2011 9:23:41 PM -- Verifying log checksums ...
2/23/2011 9:23:41 PM -- C:\ExchangeDatabases\VOL1\logs (8 log(s) processed) and C:\ExchangeDatabases\VOL2\logs (7 log(s) processed)
2/23/2011 9:23:41 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Application_2011_2_23_21_23_41.evt is saved.
2/23/2011 9:23:41 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\System_2011_2_23_21_23_41.evt is saved.
2/23/2011 9:23:41 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\XmlConfig_2011_2_23_21_23_41.xml is saved.
2/23/2011 9:23:41 PM -- Jetstress testing ends.
2/24/2011 7:32:45 AM -- Jetstress testing begins ...
2/24/2011 7:32:45 AM -- Prepare testing begins ...
2/24/2011 7:32:47 AM -- Attaching databases ...
2/24/2011 7:32:47 AM -- Prepare testing ends.
2/24/2011 7:32:47 AM -- Dispatching transactions begins ...
2/24/2011 7:32:47 AM -- Database cache settings: (minimum: 64.0 MB, maximum: 512.0 MB)
2/24/2011 7:32:47 AM -- Database flush thresholds: (start: 5.1 MB, stop: 10.2 MB)
2/24/2011 7:32:49 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
2/24/2011 7:32:49 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
2/24/2011 7:32:54 AM -- Operation mix: Sessions 8, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
2/24/2011 7:32:54 AM -- Performance logging begins (interval: 15000 ms).
2/24/2011 7:32:54 AM -- Attaining prerequisites:
2/24/2011 7:35:36 AM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 484532200.0 (lower bound: 483183800.0, upper bound: none)
2/24/2011 9:35:36 AM -- Performance logging ends.
2/24/2011 9:35:45 AM -- JetInterop batch transaction stats: 30530 and 30641.
2/24/2011 9:35:45 AM -- Dispatching transactions ends.
2/24/2011 9:35:45 AM -- Shutting down databases ...
2/24/2011 9:35:51 AM -- Instance6676.1 (complete) and Instance6676.2 (complete)
2/24/2011 9:35:51 AM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_24_7_32_49.blg has 490 samples.
2/24/2011 9:35:51 AM -- Creating test report ...
2/24/2011 9:35:53 AM -- Instance6676.1 has 16.3 for I/O Database Reads Average Latency.

2/24/2011 9:35:53 AM -- Instance6676.1 has 0.6 for I/O Log Writes Average Latency.
2/24/2011 9:35:53 AM -- Instance6676.1 has 0.6 for I/O Log Reads Average Latency.
2/24/2011 9:35:53 AM -- Instance6676.2 has 16.4 for I/O Database Reads Average Latency.
2/24/2011 9:35:53 AM -- Instance6676.2 has 0.6 for I/O Log Writes Average Latency.
2/24/2011 9:35:53 AM -- Instance6676.2 has 0.6 for I/O Log Reads Average Latency.
2/24/2011 9:35:54 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.
2/24/2011 9:35:54 AM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
2/24/2011 9:35:54 AM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_24_7_32_49.xml has 479 samples queried.
2/24/2011 9:35:54 AM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_24_7_32_49.html is saved.
2/24/2011 9:35:55 AM -- Performance logging begins (interval: 30000 ms).
2/24/2011 9:35:55 AM -- Verifying database checksums ...
2/24/2011 10:27:51 AM -- C:\ExchangeDatabases\VOL1 (100% processed) and C:\ExchangeDatabases\VOL2 (100% processed)
2/24/2011 10:27:51 AM -- Performance logging ends.
2/24/2011 10:27:51 AM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\DBChecksum_2011_2_24_9_35_54.blg has 103 samples.

Server 2 – Normal load (1 DB, 333 users)

Test Summary

Overall Test Result	**Pass**
Machine Name	WIN-3NF7N2NC5PI
Test Description	ESRP E5500 16TB Server 2 2Hour
Test Start Time	2/24/2011 10:05:25 AM
Test End Time	2/24/2011 12:09:04 PM
Collection Start Time	2/24/2011 10:08:44 AM
Collection End Time	2/24/2011 12:08:43 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_24_10_5_28.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second	107.201
Target Transactional I/O per Second	79.92
Initial Database Size (bytes)	442282082304
Final Database Size (bytes)	442651181056
Database Files (Count)	1

Jetstress System Parameters

Thread Count	6 (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

Instance4216.1 Log Path: C:\ExchangeDatabases\VOL3\logs
Database: C:\ExchangeDatabases\VOL3\Jetstress001001.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
Instance4216.1	18.582	0.593	61.074	46.127	32857.750	35481.097	0.000	0.902	0.000	39.517	0.000	4510.357

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance4216.1	23.748	261262.880

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance4216.1	0.720	228187.243

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
Instance4216.1	18.582	0.593	84.822	46.127	96805.758	35481.097	15.321	0.902	0.720	39.517	228187.243	4510.357

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.198	0.019	0.467
Available MBytes	45796.038	45763.000	45801.000
Free System Page Table Entries	33555644.381	33555642.000	33555646.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	501497958.400	499945472.000	501575680.000
Pool Paged Bytes	91247965.867	90222592.000	118902784.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log
2/24/2011 10:05:25 AM -- Jetstress testing begins ...
2/24/2011 10:05:25 AM -- Prepare testing begins ...
2/24/2011 10:05:27 AM -- Attaching databases ...
2/24/2011 10:05:27 AM -- Prepare testing ends.
2/24/2011 10:05:27 AM -- Dispatching transactions begins ...
2/24/2011 10:05:27 AM -- Database cache settings: (minimum: 32.0 MB, maximum: 256.0 MB)
2/24/2011 10:05:27 AM -- Database flush thresholds: (start: 2.5 MB, stop: 5.1 MB)
2/24/2011 10:05:28 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
2/24/2011 10:05:28 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
2/24/2011 10:05:32 AM -- Operation mix: Sessions 6, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
2/24/2011 10:05:32 AM -- Performance logging begins (interval: 15000 ms).
2/24/2011 10:05:32 AM -- Attaining prerequisites:
2/24/2011 10:08:44 AM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 242303000.0 (lower bound: 241591900.0, upper bound: none)
2/24/2011 12:08:44 PM -- Performance logging ends.
2/24/2011 12:08:56 PM -- JetInterop batch transaction stats: 25793.
2/24/2011 12:08:56 PM -- Dispatching transactions ends.
2/24/2011 12:08:56 PM -- Shutting down databases ...
2/24/2011 12:09:04 PM -- Instance4216.1 (complete)
2/24/2011 12:09:04 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_24_10_5_28.blg has 492 samples.
2/24/2011 12:09:04 PM -- Creating test report ...
2/24/2011 12:09:06 PM -- Instance4216.1 has 18.6 for I/O Database Reads Average Latency.
2/24/2011 12:09:06 PM -- Instance4216.1 has 0.9 for I/O Log Writes Average Latency.
2/24/2011 12:09:06 PM -- Instance4216.1 has 0.9 for I/O Log Reads Average Latency.
2/24/2011 12:09:06 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
2/24/2011 12:09:06 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.

Database checksum – reliability testing

Checksum Statistics - All

Database	Seen pages	Bad pages	Correctable pages	Wrong page-number pages	File length / seconds taken
C:\ExchangeDatabases\VOL3\Jetstress001001.edb	13508642	0	0	0	422145 MBytes / 3174 sec
(Sum)	13508642	0	0	0	422145 MBytes / 3174 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\VOL3	0.071	0.000	2130.164	0.004	65536.000

Memory System Performance (of checksum)

Counter	Average	Minimum	Maximum
% Processor Time	0.827	0.610	2.299
Available MBytes	46015.507	46006.000	46023.000
Free System Page Table Entries	33555644.559	33555643.000	33555646.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	502763073.517	502689792.000	502898688.000
Pool Paged Bytes	91235061.081	91213824.000	91381760.000

Test Log

2/24/2011 10:05:25 AM -- Jetstress testing begins ...
2/24/2011 10:05:25 AM -- Prepare testing begins ...
2/24/2011 10:05:27 AM -- Attaching databases ...
2/24/2011 10:05:27 AM -- Prepare testing ends.
2/24/2011 10:05:27 AM -- Dispatching transactions begins ...
2/24/2011 10:05:27 AM -- Database cache settings: (minimum: 32.0 MB, maximum: 256.0 MB)
2/24/2011 10:05:27 AM -- Database flush thresholds: (start: 2.5 MB, stop: 5.1 MB)
2/24/2011 10:05:28 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
2/24/2011 10:05:28 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
2/24/2011 10:05:32 AM -- Operation mix: Sessions 6, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
2/24/2011 10:05:32 AM -- Performance logging begins (interval: 15000 ms).
2/24/2011 10:05:32 AM -- Attaining prerequisites:
2/24/2011 10:08:44 AM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 242303000.0 (lower bound: 241591900.0, upper bound: none)
2/24/2011 12:08:44 PM -- Performance logging ends.
2/24/2011 12:08:56 PM -- JetInterop batch transaction stats: 25793.
2/24/2011 12:08:56 PM -- Dispatching transactions ends.
2/24/2011 12:08:56 PM -- Shutting down databases ...
2/24/2011 12:09:04 PM -- Instance4216.1 (complete)
2/24/2011 12:09:04 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_24_10_5_28.blg has 492 samples.
2/24/2011 12:09:04 PM -- Creating test report ...
2/24/2011 12:09:06 PM -- Instance4216.1 has 18.6 for I/O Database Reads Average Latency.
2/24/2011 12:09:06 PM -- Instance4216.1 has 0.9 for I/O Log Writes Average Latency.
2/24/2011 12:09:06 PM -- Instance4216.1 has 0.9 for I/O Log Reads Average Latency.
2/24/2011 12:09:06 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
2/24/2011 12:09:06 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
2/24/2011 12:09:06 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_24_10_5_28.xml has 479 samples queried.
2/24/2011 12:09:07 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_24_10_5_28.html is saved.
2/24/2011 12:09:08 PM -- Performance logging begins (interval: 15000 ms).
2/24/2011 12:09:08 PM -- Verifying database checksums ...
2/24/2011 1:02:02 PM -- C:\ExchangeDatabases\VOL3 (100% processed)
2/24/2011 1:02:02 PM -- Performance logging ends.
2/24/2011 1:02:02 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\DBChecksum_2011_2_24_12_9_7.blg has 211 samples.

Performance test result report 2 hour

Failover load – 3 DB, 1000 users

Test Summary

Overall Test Result	**Pass**
Machine Name	WIN-1UISA2T022V
Test Description	ESRP E5500 16TB 2HR
Test Start Time	2/24/2011 2:06:06 PM
Test End Time	2/24/2011 5:07:52 PM
Collection Start Time	2/24/2011 2:09:27 PM
Collection End Time	2/24/2011 4:09:14 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_24_14_6_13.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second 354.319
Target Transactional I/O per Second 240
Initial Database Size (bytes) 1345745780736
Final Database Size (bytes) 1347540942848
Database Files (Count) 3

Jetstress System Parameters

Thread Count 8 (per database)
Minimum Database Cache 96.0 MB
Maximum Database Cache 768.0 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

Instance6676.1 Log Path: C:\ExchangeDatabases\VOL1\logs
     Database: C:\ExchangeDatabases\VOL1\Jetstress001001.edb

Instance6676.2 Log Path: C:\ExchangeDatabases\VOL2\logs
     Database: C:\ExchangeDatabases\VOL2\Jetstress002001.edb

Instance6676.3 Log Path: C:\ExchangeDatabases\VOL3\logs
     Database: C:\ExchangeDatabases\VOL3\Jetstress003001.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
Instance6676.1	15.324	1.930	67.640	50.655	34232.291	35145.893	0.000	0.631	0.000	43.340	0.000	4497.726
Instance6676.2	15.425	1.986	67.863	51.152	33917.909	35200.803	0.000	0.631	0.000	43.596	0.000	4512.868
Instance6676.3	16.668	1.982	66.860	50.149	33936.904	35356.632	0.000	0.608	0.000	43.569	0.000	4518.538

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance6676.1	27.276	261327.679
Instance6676.2	27.685	261242.076
Instance6676.3	26.044	261272.362

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance6676.1	0.787	231537.008
Instance6676.2	0.795	232079.687
Instance6676.3	0.797	231019.684

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
Instance6676.1	15.324	1.930	94.916	50.655	99492.290	35145.893	11.473	0.631	0.787	43.340	231537.008	4497.726
Instance6676.2	15.425	1.986	95.548	51.152	99785.295	35200.803	12.220	0.631	0.795	43.596	232079.687	4512.868
Instance6676.3	16.668	1.982	92.905	50.149	97666.738	35356.632	13.110	0.608	0.797	43.569	231019.684	4518.538

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.474	0.298	0.668
Available MBytes	45024.603	45020.000	45081.000
Free System Page Table Entries	33555132.430	33555126.000	33555134.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	507212870.547	507183104.000	507260928.000
Pool Paged Bytes	118136019.641	118099968.000	118214656.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log
2/24/2011 2:06:06 PM -- Jetstress testing begins ...
2/24/2011 2:06:06 PM -- Prepare testing begins ...
2/24/2011 2:06:09 PM -- Attaching databases ...
2/24/2011 2:06:09 PM -- Prepare testing ends.
2/24/2011 2:06:09 PM -- Dispatching transactions begins ...
2/24/2011 2:06:09 PM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)
2/24/2011 2:06:09 PM -- Database flush thresholds: (start: 7.7 MB, stop: 15.3 MB)
2/24/2011 2:06:13 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
2/24/2011 2:06:13 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
2/24/2011 2:06:18 PM -- Operation mix: Sessions 8, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.

2/24/2011 2:06:18 PM -- Performance logging begins (interval: 15000 ms).
2/24/2011 2:06:18 PM -- Attaining prerequisites:
2/24/2011 2:09:27 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 727515100.0 (lower bound: 724775700.0, upper bound: none)
2/24/2011 4:09:27 PM -- Performance logging ends.
2/24/2011 5:07:44 PM -- JetInterop batch transaction stats: 41585, 41785 and 41700.
2/24/2011 5:07:45 PM -- Dispatching transactions ends.
2/24/2011 5:07:45 PM -- Shutting down databases ...
2/24/2011 5:07:52 PM -- Instance6676.1 (complete), Instance6676.2 (complete) and Instance6676.3 (complete)
2/24/2011 5:07:52 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_24_14_6_13.blg has 491 samples.
2/24/2011 5:07:52 PM -- Creating test report ...
2/24/2011 5:07:54 PM -- Instance6676.1 has 15.3 for I/O Database Reads Average Latency.
2/24/2011 5:07:54 PM -- Instance6676.1 has 0.6 for I/O Log Writes Average Latency.
2/24/2011 5:07:54 PM -- Instance6676.1 has 0.6 for I/O Log Reads Average Latency.
2/24/2011 5:07:54 PM -- Instance6676.2 has 15.4 for I/O Database Reads Average Latency.
2/24/2011 5:07:54 PM -- Instance6676.2 has 0.6 for I/O Log Writes Average Latency.
2/24/2011 5:07:54 PM -- Instance6676.2 has 0.6 for I/O Log Reads Average Latency.
2/24/2011 5:07:54 PM -- Instance6676.3 has 16.7 for I/O Database Reads Average Latency.
2/24/2011 5:07:54 PM -- Instance6676.3 has 0.6 for I/O Log Writes Average Latency.
2/24/2011 5:07:54 PM -- Instance6676.3 has 0.6 for I/O Log Reads Average Latency.
2/24/2011 5:07:54 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
2/24/2011 5:07:54 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
2/24/2011 5:07:54 PM -- C:\Program Files\Exchange Jetstress\ESRP_2HR_Final\Performance_2011_2_24_14_6_13.xml has 478 samples queried.

24 Hour stress test

Server 1 – Normal load (2 DB, 667 users)

Test Summary

Overall Test Result	**Pass**
Machine Name	WIN-1UISA2T022V
Test Description	ESRP E5500 16TB, 24HR Server1
Test Start Time	3/3/2011 8:37:08 AM
Test End Time	3/4/2011 8:40:38 AM
Collection Start Time	3/3/2011 8:40:28 AM
Collection End Time	3/4/2011 8:40:13 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_24\Stress_2011_3_3_8_37_13.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second	214.53
Target Transactional I/O per Second	160.08
Initial Database Size (bytes)	883045826560
Final Database Size (bytes)	891702870016

Database Files (Count)   2

Jetstress System Parameters

Thread Count	7 (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

Instance3776.1 Log Path: C:\ExchangeDatabases\VOL1\logs
                     Database: C:\ExchangeDatabases\VOL1\Jetstress001001.edb

Instance3776.2 Log Path: C:\ExchangeDatabases\VOL2\logs
                     Database: C:\ExchangeDatabases\VOL2\Jetstress002001.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
Instance3776.1	17.782	0.996	60.958	46.208	33422.064	35378.960	0.000	0.601	0.000	39.974	0.000	4467.157
Instance3776.2	14.882	1.018	61.047	46.318	34363.654	35383.845	0.000	0.546	0.000	40.120	0.000	4483.298

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance3776.1	25.804	261153.552
Instance3776.2	27.771	261158.835

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance3776.1	0.722	227397.672
Instance3776.2	0.727	226310.459

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
Instance3776.1	17.782	0.996	86.762	46.208	101151.133	35378.960	11.051	0.601	0.722	39.974	227397.672	4467.157
Instance3776.2	14.882	1.018	88.818	46.318	105276.253	35383.845	10.338	0.546	0.727	40.120	226310.459	4483.298

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.347	0.110	1.927
Available MBytes	45392.683	45369.000	45448.000
Free System Page Table Entries	33555644.401	33555639.000	33555646.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	503149742.673	502943744.000	503463936.000
Pool Paged Bytes	104592379.192	102674432.000	106180608.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log
3/3/2011 8:37:08 AM -- Jetstress testing begins ...
3/3/2011 8:37:08 AM -- Prepare testing begins ...
3/3/2011 8:37:10 AM -- Attaching databases ...
3/3/2011 8:37:10 AM -- Prepare testing ends.
3/3/2011 8:37:10 AM -- Dispatching transactions begins ...
3/3/2011 8:37:10 AM -- Database cache settings: (minimum: 64.0 MB, maximum: 512.0 MB)
3/3/2011 8:37:10 AM -- Database flush thresholds: (start: 5.1 MB, stop: 10.2 MB)
3/3/2011 8:37:13 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 200 msec/read).
3/3/2011 8:37:13 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 200 msec/write).
3/3/2011 8:37:17 AM -- Operation mix: Sessions 7, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
3/3/2011 8:37:17 AM -- Performance logging begins (interval: 15000 ms).
3/3/2011 8:37:17 AM -- Attaining prerequisites:
3/3/2011 8:40:28 AM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 483999700.0 (lower bound: 483183800.0, upper bound: none)
3/4/2011 8:40:28 AM -- Performance logging ends.
3/4/2011 8:40:28 AM -- JetInterop batch transaction stats: 304795 and 306239.
3/4/2011 8:40:28 AM -- Dispatching transactions ends.
3/4/2011 8:40:28 AM -- Shutting down databases ...
3/4/2011 8:40:38 AM -- Instance3776.1 (complete) and Instance3776.2 (complete)
3/4/2011 8:40:38 AM -- C:\Program Files\Exchange Jetstress\ESRP_24\Stress_2011_3_3_8_37_13.blg has 5763 samples.
3/4/2011 8:40:38 AM -- Creating test report ...
3/4/2011 8:41:00 AM -- Instance3776.1 has 17.8 for I/O Database Reads Average Latency.
3/4/2011 8:41:00 AM -- Instance3776.1 has 0.6 for I/O Log Writes Average Latency.
3/4/2011 8:41:00 AM -- Instance3776.1 has 0.6 for I/O Log Reads Average Latency.
3/4/2011 8:41:00 AM -- Instance3776.2 has 14.9 for I/O Database Reads Average Latency.
3/4/2011 8:41:00 AM -- Instance3776.2 has 0.5 for I/O Log Writes Average Latency.
3/4/2011 8:41:00 AM -- Instance3776.2 has 0.5 for I/O Log Reads Average Latency.
3/4/2011 8:41:00 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.

3/4/2011 8:41:00 AM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
3/4/2011 8:41:00 AM -- C:\Program Files\Exchange Jetstress\ESRP_24\Stress_2011_3_3_8_37_13.xml has 5750 samples queried.

Server 2 – Normal load (1 DB, 333 users)

Test Summary

Overall Test Result	**Pass**
Machine Name	WIN-3NF7N2NC5PI
Test Description	ESRP E5500 16TB Server 2 24 HRtest
Test Start Time	3/3/2011 7:37:35 AM
Test End Time	3/4/2011 7:40:40 AM
Collection Start Time	3/3/2011 7:40:33 AM
Collection End Time	3/4/2011 7:40:22 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\Performance_2011_3_3_7_37_38.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second	116.589
Target Transactional I/O per Second	79.92
Initial Database Size (bytes)	458992189440
Final Database Size (bytes)	464033742848
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

Instance3296.1 Log Path: C:\ExchangeDatabases\VOL3\logs
Database: C:\ExchangeDatabases\VOL3\Jetstress001001.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
Instance3296.1	18.735	0.660	67.397	49.192	32864.245	36136.350	0.000	0.701	0.000	41.991	0.000	4757.289

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance3296.1	25.125	261177.504

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance3296.1	0.810	232174.146

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
Instance3296.1	18.735	0.660	92.521	49.192	94864.112	36136.350	15.680	0.701	0.810	41.991	232174.146	4757.289

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.199	0.000	1.648
Available MBytes	45704.506	45694.000	45729.000
Free System Page Table Entries	33555100.390	33555094.000	33555102.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	501637276.689	501547008.000	501866496.000
Pool Paged Bytes	96496471.025	94572544.000	99651584.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log
3/3/2011 7:37:35 AM -- Jetstress testing begins ...
3/3/2011 7:37:35 AM -- Prepare testing begins ...
3/3/2011 7:37:37 AM -- Attaching databases ...
3/3/2011 7:37:37 AM -- Prepare testing ends.
3/3/2011 7:37:37 AM -- Dispatching transactions begins ...
3/3/2011 7:37:37 AM -- Database cache settings: (minimum: 32.0 MB, maximum: 256.0 MB)
3/3/2011 7:37:37 AM -- Database flush thresholds: (start: 2.5 MB, stop: 5.1 MB)
3/3/2011 7:37:38 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
3/3/2011 7:37:38 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).

3/3/2011 7:37:41 AM -- Operation mix: Sessions 7, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
3/3/2011 7:37:41 AM -- Performance logging begins (interval: 15000 ms).
3/3/2011 7:37:41 AM -- Attaining prerequisites:
3/3/2011 7:40:33 AM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 241791000.0 (lower bound: 241591900.0, upper bound: none)
3/4/2011 7:40:33 AM -- Performance logging ends.
3/4/2011 7:40:33 AM -- JetInterop batch transaction stats: 318938.
3/4/2011 7:40:34 AM -- Dispatching transactions ends.
3/4/2011 7:40:34 AM -- Shutting down databases ...
3/4/2011 7:40:40 AM -- Instance3296.1 (complete)
3/4/2011 7:40:40 AM -- C:\Program Files\Exchange Jetstress\ESRP_24hr\Performance_2011_3_3_7_37_38.blg has 5762 samples.
3/4/2011 7:40:40 AM -- Creating test report ...
3/4/2011 7:40:58 AM -- Instance3296.1 has 18.7 for I/O Database Reads Average Latency.
3/4/2011 7:40:58 AM -- Instance3296.1 has 0.7 for I/O Log Writes Average Latency.
3/4/2011 7:40:58 AM -- Instance3296.1 has 0.7 for I/O Log Reads Average Latency.
3/4/2011 7:40:58 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.
3/4/2011 7:40:58 AM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
3/4/2011 7:40:58 AM -- C:\Program Files\Exchange Jetstress\ESRP_24hr\Performance_2011_3_3_7_37_38.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
Instance6676.1	430633.09	00:55:29	129.32
Instance6676.2	430625.09	00:55:31	129.24
Instance6676.3	423833.09	00:55:24	127.51

Jetstress System Parameters

Thread Count	8 (per database)
Minimum Database Cache	96.0 MB
Maximum Database Cache	768.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%

Database Configuration

Instance6676.1 Log Path: C:\ExchangeDatabases\VOL1\logs
Database: C:\ExchangeDatabases\VOL1\Jetstress001001.edb

Instance6676.2 Log Path: C:\ExchangeDatabases\VOL2\logs
Database: C:\ExchangeDatabases\VOL2\Jetstress002001.edb

Instance6676.3 Log Path: C:\ExchangeDatabases\VOL3\logs
Database: C:\ExchangeDatabases\VOL3\Jetstress003001.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
Instance6676.1	2.710	0.000	517.370	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance6676.2	2.710	0.000	517.043	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance6676.3	2.753	0.000	509.989	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	0.992	0.727	1.250
Available MBytes	45820.636	45810.000	45823.000
Free System Page Table Entries	33555132.545	33555132.000	33555134.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	507400192.000	507392000.000	507420672.000
Pool Paged Bytes	119311192.436	119246848.000	119398400.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log
2/25/2011 9:12:01 AM -- Jetstress testing begins ...
2/25/2011 9:12:01 AM -- Prepare testing begins ...
2/25/2011 9:12:05 AM -- Attaching databases ...
2/25/2011 9:12:05 AM -- Prepare testing ends.
2/25/2011 9:12:11 AM -- Performance logging begins (interval: 30000 ms).
2/25/2011 9:12:11 AM -- Backing up databases ...
2/25/2011 10:07:43 AM -- Performance logging ends.
2/25/2011 10:07:43 AM -- Instance6676.1 (100% processed), Instance6676.2 (100% processed) and Instance6676.3 (100% processed)
2/25/2011 10:07:43 AM -- C:\Program Files\Exchange Jetstress\ESRP_Backup\DatabaseBackup_2011_2_25_9_12_5.blg has 110 samples.
2/25/2011 10:07:43 AM -- Creating test report ...

Soft-Recovery test result report

Soft-Recovery Statistics - All

Database Instance	Log files replayed	Elapsed seconds
Instance5648.1	504	1859.0552652
Instance5648.2	501	1572.9039626
Instance5648.3	501	1494.4046247

Database Configuration

Instance5648.1 Log Path: C:\ExchangeDatabases\VOL1\logs
Database: C:\ExchangeDatabases\VOL1\Jetstress001001.edb

Instance5648.2 Log Path: C:\ExchangeDatabases\VOL2\logs
Database: C:\ExchangeDatabases\VOL2\Jetstress002001.edb

Instance5648.3 Log Path: C:\ExchangeDatabases\VOL3\logs
Database: C:\ExchangeDatabases\VOL3\Jetstress003001.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
Instance5648.1	32.245	0.380	182.190	1.623	40977.956	18622.251	3.420	0.001	2.435	0.002	129163.024	0.560
Instance5648.2	27.892	0.449	226.298	1.904	40973.151	21464.310	3.370	0.000	2.855	0.000	150333.780	0.000
Instance5648.3	26.609	0.481	239.075	2.005	40822.109	22647.815	3.844	0.000	3.007	0.000	159516.734	0.000

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance5648.1	25.521	261148.269
Instance5648.2	25.226	261285.884
Instance5648.3	25.309	261124.792

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
Instance5648.1	32.245	0.380	207.711	1.623	68030.188	18622.251	3.420	0.001	2.435	0.002	129163.024	0.560
Instance5648.2	27.892	0.449	251.524	1.904	63068.568	21464.310	3.370	0.000	2.855	0.000	150333.780	0.000
Instance5648.3	26.609	0.481	264.385	2.005	61911.484	22647.815	3.844	0.000	3.007	0.000	159516.734	0.000

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.573	0.000	1.826
Available MBytes	45217.884	45199.000	45929.000
Free System Page Table Entries	33555644.433	33555639.000	33555646.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	501029217.258	501018624.000	501063680.000
Pool Paged Bytes	91778150.847	91754496.000	91914240.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

3/1/2011 10:20:55 AM -- Jetstress testing begins ...
3/1/2011 10:20:55 AM -- Prepare testing begins ...
3/1/2011 10:21:26 AM -- Attaching databases ...
3/1/2011 10:24:20 AM -- Jetstress testing begins ...
3/1/2011 10:24:20 AM -- Prepare testing begins ...
3/1/2011 10:24:20 AM -- Creating C:\ExchangeDatabases\VOL1\Jetstress001001.edb.
3/1/2011 10:24:20 AM -- Database cache settings: (minimum: 32.0 MB, maximum: 256.0 MB)
3/1/2011 10:24:20 AM -- Database flush thresholds: (start: 2.5 MB, stop: 5.1 MB)
3/1/2011 3:30:17 PM -- 100.0% of 406.9 GB complete (139059095 records inserted).
3/1/2011 3:30:23 PM -- 100.0% of 406.9 GB complete (139059098 records inserted).
3/1/2011 3:30:23 PM -- Duplicating 3 database(s):
3/1/2011 7:05:55 PM -- 100.0% of 1.2 TB complete (1.2 TB duplicated).
3/1/2011 7:05:58 PM -- Attaching databases ...
3/1/2011 7:05:58 PM -- Prepare testing ends.
3/1/2011 7:05:58 PM -- Dispatching transactions begins ...
3/1/2011 7:05:58 PM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)
3/1/2011 7:05:58 PM -- Database flush thresholds: (start: 7.7 MB, stop: 15.3 MB)
3/1/2011 7:06:02 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
3/1/2011 7:06:02 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
3/1/2011 7:06:06 PM -- Operation mix: Sessions 8, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
3/1/2011 7:06:06 PM -- Performance logging begins (interval: 15000 ms).
3/1/2011 7:06:06 PM -- Generating log files ...
3/1/2011 8:22:34 PM -- C:\ExchangeDatabases\VOL1\logs (100.8% generated), C:\ExchangeDatabases\VOL2\logs (100.2% generated) and C:\ExchangeDatabases\VOL3\logs (100.2% generated)
3/1/2011 8:22:34 PM -- Performance logging ends.
3/1/2011 8:22:34 PM -- JetInterop batch transaction stats: 21734, 21822 and 21780.
3/1/2011 8:22:35 PM -- Dispatching transactions ends.
3/1/2011 8:22:35 PM -- Shutting down databases ...
3/1/2011 8:22:41 PM -- Instance5648.1 (complete), Instance5648.2 (complete) and Instance5648.3 (complete)
3/1/2011 8:22:41 PM -- C:\Program Files\Exchange Jetstress\ESRP_Recovery\Performance_2011_3_1_19_6_2.blg has 305 samples.
3/1/2011 8:22:41 PM -- Creating test report ...
3/1/2011 8:22:43 PM -- Instance5648.1 has 18.8 for I/O Database Reads Average Latency.
3/1/2011 8:22:43 PM -- Instance5648.1 has 0.5 for I/O Log Writes Average Latency.
3/1/2011 8:22:43 PM -- Instance5648.1 has 0.5 for I/O Log Reads Average Latency.
3/1/2011 8:22:43 PM -- Instance5648.2 has 15.8 for I/O Database Reads Average Latency.
3/1/2011 8:22:43 PM -- Instance5648.2 has 0.5 for I/O Log Writes Average Latency.
3/1/2011 8:22:43 PM -- Instance5648.2 has 0.5 for I/O Log Reads Average Latency.
3/1/2011 8:22:43 PM -- Instance5648.3 has 15.5 for I/O Database Reads Average Latency.
3/1/2011 8:22:43 PM -- Instance5648.3 has 0.5 for I/O Log Writes Average Latency.

3/1/2011 8:22:43 PM -- Instance5648.3 has 0.5 for I/O Log Reads Average Latency.
3/1/2011 8:22:43 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
3/1/2011 8:22:43 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
3/1/2011 8:22:43 PM -- C:\Program Files\Exchange Jetstress\ESRP_Recovery\Performance_2011_3_1_19_6_2.xml has 304 samples queried.
3/1/2011 8:22:44 PM -- C:\Program Files\Exchange Jetstress\ESRP_Recovery\Performance_2011_3_1_19_6_2.html is saved.
3/1/2011 8:22:52 PM -- Performance logging begins (interval: 2000 ms).
3/1/2011 8:22:52 PM -- Recovering databases ...
3/1/2011 8:53:51 PM -- Performance logging ends.
3/1/2011 8:53:51 PM -- Instance5648.1 (1859.0552652), Instance5648.2 (1572.9039626) and Instance5648.3 (1494.4046247)
3/1/2011 8:53:51 PM -- C:\Program Files\Exchange Jetstress\ESRP_Recovery\SoftRecovery_2011_3_1_20_22_48.blg has 916 samples.
3/1/2011 8:53:51 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

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