Dell PowerEdge R730xd
8,000 Mailbox Resiliency Microsoft Exchange 2013 Storage Solution

Tested with ESRP – Storage Version 4.0
Tested Date: July 2014

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1 Overview

This document provides information about Dell's storage solution for Microsoft® Exchange Server. This solution is based on the *Microsoft Exchange Solution Reviewed Program (ESRP) – Storage program v4.0.* For any questions or comments regarding the contents of this document, see Additional Information.

The ESRP – Storage program was developed by Microsoft Corporation to provide a common storage testing framework for vendors to provide storage solutions for Microsoft Exchange Server. For more information about the Microsoft ESRP — Storage program, see http://technet.microsoft.com/en-us/exchange/ff182054.aspx.

This technical white paper discusses Dell's solution for 8,000 Exchange mailboxes with 3GB mailbox size supporting up to 150 messages per day in a three-copy DAG. The solution uses the Dell™ PowerEdge™ R730xd server for the Exchange mailbox server role and uses the internal storage of PowerEdge R730xd server for storing the Exchange mailbox databases and transactional logs.

1.1 Disclaimer

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2 Features

This technical white paper describes a tested and validated storage solution for an 8,000 mailbox Exchange 2013 site-resilient environment using Database Availability Group (DAG). A DAG is a high-availability (HA) mechanism in Microsoft Exchange 2013 that supports multiple copies (up to 16) of Exchange database. There can be only one active copy of a given Exchange 2013 database at any given time. Mail clients access the active copy, and changes to the active copy are synchronized to the passive copies (including the copies located at remote sites) in the form of transaction logs. All hosts within a DAG are configured to be identical in terms of storage resources for Exchange 2013 databases and logs. The active and passive copies do not share any storage resources and reside on their own dedicated storage resources.

This mailbox resiliency solution includes a single DAG and three copies of each database, spanning two sites: Local and Remote. The local site has both database copies—active and passive—while the remote site has only a passive copy of the database. The tested environment simulates up to 8,000 users with 3 GB Mailbox size and 150 messages a day or 0.121 IO operations per second (IOPS) per user including a 20% IO headroom.

In this solution, the PowerEdge R730xd server with 3.5-inch drives is configured for the Mailbox Server role. The 3.5-inch chassis of PowerEdge R730xd server has a distinct configuration mode where four 3.5-inch drives could be placed in the internal hard-drive tray of the chassis with twelve 3.5-inch drives in the front of the chassis. Thus, PowerEdge R730xd server provides extra storage compared to PowerEdge R720xd server. Each PowerEdge R730xd server hosts one active copy of an Exchange 2013 database and transaction logs and one passive copy of the peer node's databases at the local site. Passive copies of databases for the local site are hosted at the remote site. The following are the major features of the server/storage system:

- Capable of hosting up to sixteen 3.5-inch Large Form Factor (LFF) SAS/Nearline (NL) SAS/SATA drives of up to 4 TB[1] including the four drives in the internal hard-drive tray of the chassis, plus two additional 2.5-inch disk drives in the back of the system (The 3.5-inch LFF configuration of the PowerEdge R730xd server is used as part of this solution.); or up to twenty-six 2.5-inch Small Form Factor (SFF) SAS/NL SAS/SATA drives of up to 1.2 TB[1] capacity (including the two 2.5-inch back-accessible disk drives) Or up to eighteen 1.8-inch hard drives of up to 960GB in addition to eight 3.5-inch Large Form Factor drives
- Host-based RAID options with Dell PowerEdge RAID Controller H730P Mini

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[1] This information is accurate as of the date written.

3 Solution Components

The solution employs Dell PowerEdge R730xd server/storage combination building blocks, which are capable of meeting the high performance requirements of messaging deployments. The solution is for up to 8,000 mailboxes of size 3GB each. The following subsections describe the hardware components that are part of this Exchange solution:

Figure 1   Dell PowerEdge R730xd 3.5-inch Server

3.1 Dell PowerEdge R730xd Server

Dell PowerEdge R730xd is a 2-socket, 2U, rack server with highly expandable memory, dense storage capacity and impressive I/O capabilities, PowerEdge R730xd server can readily handle data-intensive applications that require large storage capacity and I/O performance, such as email. It delivers the performance and availability required for mission-critical email and is a great hardware building block for midsize or large businesses.

The internal RAID controller enables a range of RAID levels for improved storage reliability, while the optional CacheCade™ feature caches the most frequently accessed data, boosting database performance. Following are the major features of the server or storage system:

- Intel® Xeon® processor E5-2600 product family
- Dual processor sockets
- With 24 slots, up to 768GB of Memory for RDIMMS and 1536GB for LRDIMMs
- Up to 64TB Maximum Raw Internal Storage
- Choice of chassis configuration with sixteen 3.5-inch LFF disk drives, twenty-four 2.5-inch SFF disk drives or eighteen 1.8-inch disk drives along with eight 3.5-inch LFF disk drives
- Front loading drive bays plus two 2.5-inch SFF back-accessible drives
- Integrated RAID support through PERC S130, H330, PERC H730, PERC H730P & External JBOD RAID support through PERC H830
- Six PCIe 3.0 expansion slots
- Choice of NIC technologies

- Dell OpenManage™ Essentials and Dell Management Console, Dell OpenManage Power Center and Dell OpenManage Connections

The PowerEdge R730xd chassis configured with the 3.5-inch large form factor drives is used as part of this solution. For more information, see Dell PowerEdge R730xd Server product page.

3.2 PowerEdge RAID Controller H730P Mini

PowerEdge RAID Controller (PERC) H730P Mini is used in the PowerEdge R730xd server that hosts the Exchange Server. PERC H730P Mini is the internal host-based RAID Controller cards from the PERC Series 8 family. These PERC cards, built on the LSI SAS-3 3108 dual-core PowerPC RAID-on-Chip (ROC), offer unmatched I/O performance for databases, applications, and streaming digital media environments.

Table 1 shows the technical specifications of PERC H730P Mini. For more information, see Dell PowerEdge RAID Controller product page.

Table 1   Dell PowerEdge RAID Controller H730P Mini Technical Specifications

Feature	Specification
Solution	Eight port internal SATA+SAS solution supporting up to 32 hard disk drives (HDDs) and solid-state drives (SSDs)
Physical dimension	167.6mm (6.6in) x 64.4mm (2.5-inch) (MD2 low profile)
Connectors	Two internal mini-SAS HD SFF8643
Device support	Up to 32 SAS or SATA devices
Host bus type	8-lane, PCI Express 3.0 compliant
Data transfer rate	Up to 12 Gb/s per port
SAS controller	LSISAS3108 dual-core PowerPC ROC
Cache size	2 GB
RAID management	Dell OpenManage Storage Services & Additional management through UEFI (HII) & CEM
Optional SSD optimization	Dell FastPath™ software: delivers high passive performance on SSD arrays

For more information about recommended hardware specifications, see Section 4.3.

4 Solution Description

In this solution, the PowerEdge R730xd server with 3.5-inch LFF drives is used as the Mailbox Server. PowerEdge R730xd server provides SAS-based internal storage with RAID. The solution uses sixteen 3.5-inch LFF 7.2KRPM NL-SAS disks and back-accessible 2.5-inch disks drives in the following layout:

- Two back-accessible disk drives (in RAID 1 container) for the operating system plus application files and Exchange Transport database
- Fourteen disk drives (in Seven RAID 1 containers) for the Exchange database and its transaction logs
- One disk drive marked for Restore LUN
- One disk drive configured as a Global Hot-spare

The solution has a 3-copy DAG Layout with Exchange Servers distributed between two sites: Local and Remote. Each server node has 7-RAID 1 LUNs hosting one active and one passive database per LUN. Each of these databases hosts 286 users with 3GB mailbox size. Thus, a single server can accommodate 2,000 users during normal operating conditions. Four servers placed in the local site provide Exchange Mailbox Services for 8,000 users. The mailbox user profile that was tested had 150 messages per day or 0.121 IOPS per user, which included a 20% IO overhead.

Figure 2 represents the distribution of database copies across the DAG members. It shows a 3-copy DAG site resiliency solution with Exchange Servers hosted at both local and remote sites. The local site has one active and one passive copy of each database. The remote site holds one passive copy of each database. If a server fails in the local site, the databases are activated on the surviving hosts to provide mailbox service continuity. In case of a local site failure, the databases are activated in the remote site to provide the Exchange Server service.

Figure 2   Database Availability Group architectural diagram
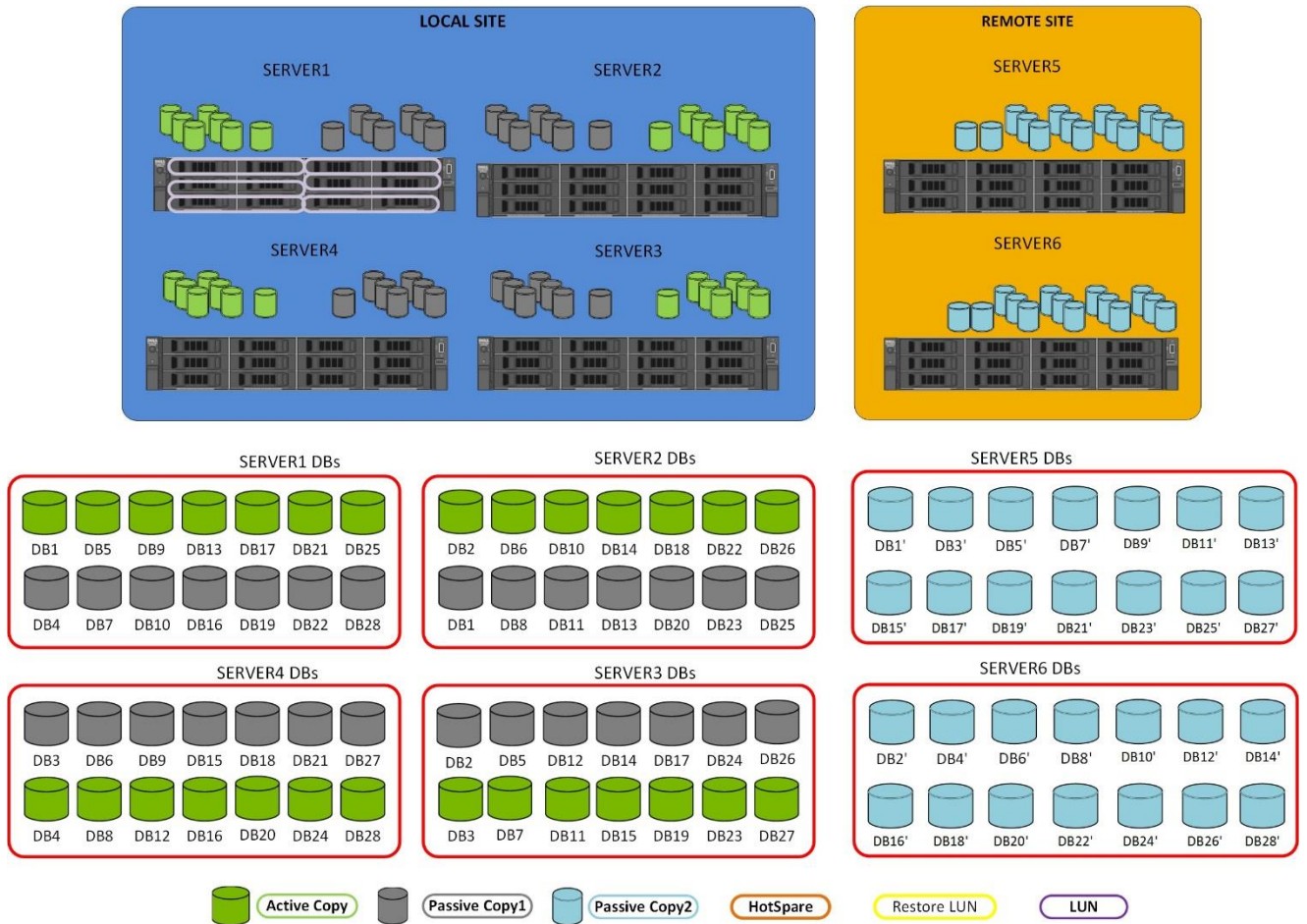
4.1   Failure and Recovery Scenarios

Figure 2 shows the logical diagram of the solution on the local site and remote site. There are a total of four servers on the local site and two servers on the remote site. A single server failure on the local site activates the passive copies of the impacted databases. If there is a complete site failure, then the remote passive copies get activated, and the users connect to their databases on the remote site. This is shown in Figure 3. The condition considered and simulated here is a worst-case failure wherein the local site is completely unavailable and all the databases are activated on the remote site. Thus, each of the hosts is designed in a way that any two servers are capable of holding the entire load. Each server is capable of handling the load for 4,000 users. Therefore, with two servers, all 8,000 users can be managed without compromising on the performance.

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Figure 3   With all four Servers being unavailable in the Local Site
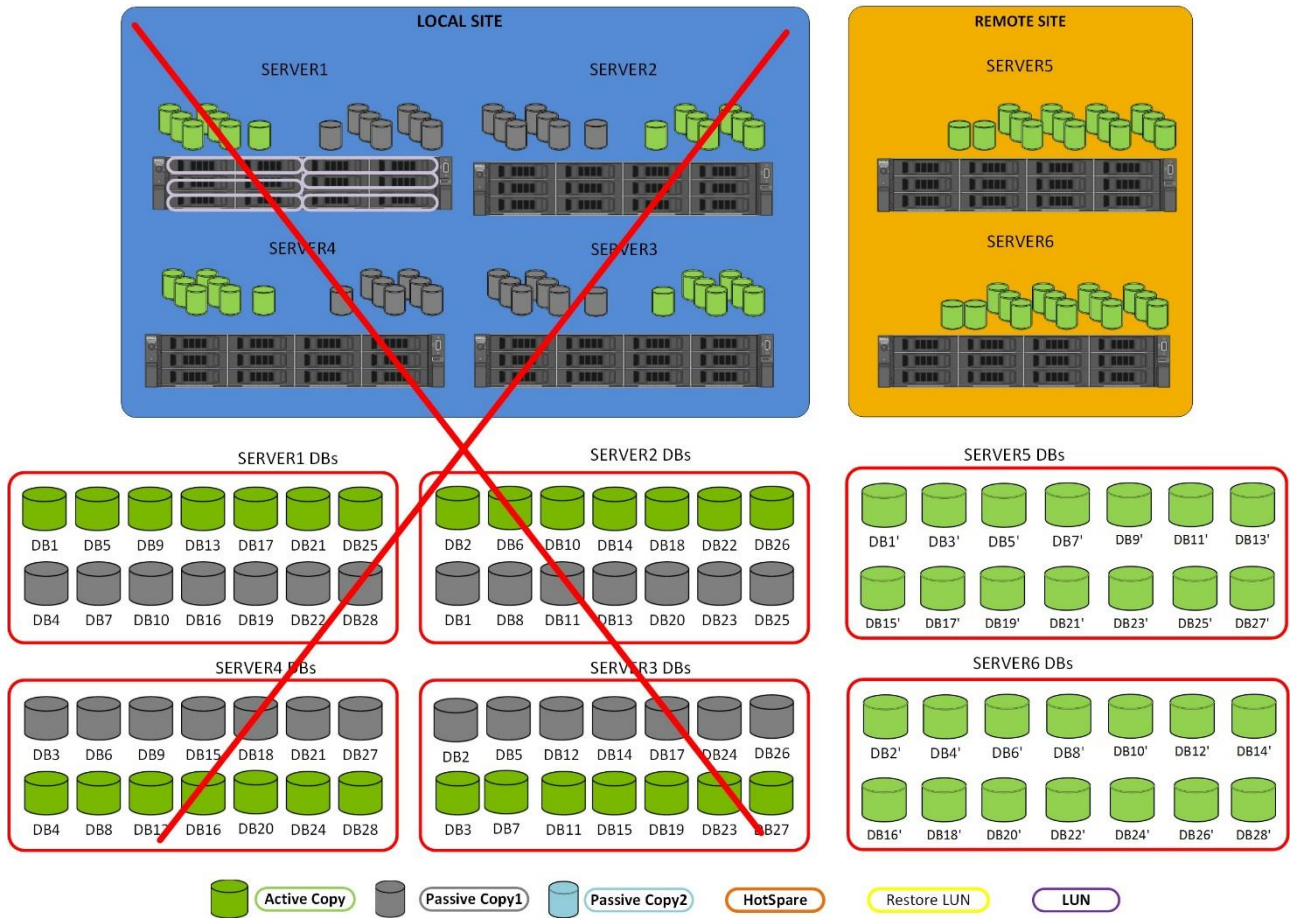
Figure 4 represents the database distribution across servers. The Microsoft Exchange 2013 Server Role Requirements Calculator can be used to derive the database distribution including the active and passive copies across servers located both in local and remote sites. The database distribution follows a particular pattern to ensure that, if a server fails, the passive copies are activated on the remaining host such that the load on each of the host machines is evenly distributed.

Figure 4   Database/Transaction Log Layout across servers in DAG

Database Name	Active Server	Local Site Server-1	Local Site Server-2	Local Site Server-3	Local Site Server-4	Remote Site Server-5	Remote Site Server-6
DB1	Server1	1	2			3	
DB2	Server2		1	2			3
DB3	Server3			1	2	3	
DB4	Server4	2			1		3
DB5	Server1	1		2		3	
DB6	Server2		1		2		3
DB7	Server3	2		1		3	
DB8	Server4		2		1		3
DB9	Server1	1			2	3	
DB10	Server2	2	1				3
DB11	Server3		2	1		3	
DB12	Server4			2	1		3
DB13	Server1	1	2			3	
DB14	Server2		1	2			3
DB15	Server3			1	2	3	
DB16	Server4	2			1		3
DB17	Server1	1		2		3	
DB18	Server2		1		2		3
DB19	Server3	2		1		3	
DB20	Server4		2		1		3
DB21	Server1	1			2	3	
DB22	Server2	2	1				3
DB23	Server3		2	1		3	
DB24	Server4			2	1		3
DB25	Server1	1	2			3	
DB26	Server2		1	2			3
DB27	Server3			1	2	3	
DB28	Server4	2			1		3

Legend:
1 — Active Copy
2 — Passive Copy
3

4.2   Storage Sizing

The storage sizing process includes the type of RAID, type of disk drives and number of disk drives both from capacity and IOPS perspective. Selecting the right storage is crucial to achieving a balance between cost and performance. The storage design also depends on the actual size of the mailbox on the disk drive, content indexing space, and log space required.

[Microsoft Exchange 2013 Server Role Requirements Calculator](#) can be used to derive the required IOPS for a particular user profile. Figure 5 shows the Mailbox Calculator output for 8,000 users with 150 messages per day profile. The recommended IOPS per server is 482. Microsoft Exchange Jetstress tools verify if the storage subsystem meets the targeted IOPS requirement. For more information, see [Section 5](#).

Figure 5 Recommended IOPS from the Microsoft Exchange 2013 Server Role Requirements Calculator

Host IO and Throughput Requirements	/ Database	/ Server	/ DAG	/ Environment
Total Database Required IOPS	34	482	1447	1447
Total Log Required IOPS	8	106	318	318
Database Read I/O Percentage	60%	--	--	--
Background Database Maintenance Throughput Requirements	1.0 MB/s	14 MB/s	42 MB/s	42 MB/s

4.3 Recommended Hardware Configuration

Based on the solution requirements described in the earlier sections, Table 2 and Table 3provides more information about the server and storage configuration. The firmware and driver versions are also provided for the tested solution.

Table 2 Exchange Server Configuration

Microsoft Exchange Server System	Dell PowerEdge R730xd Server with 3.5" HDD Chassis
CPU	2 × Intel Xeon E5-2660 v3 processor with 10-cores
Memory	Up to 192 GB DDR4
NIC	Broadcom NetXtreme II
RAID Controller	Dell PowerEdge RAID Controller H730P Mini Firmware version: 25.2.1.0037 Storport Driver Version 6.3.9600.16384 Driver version 6.602.07.00
Internal Disks	2 x 1.2 TB SAS 2.5-inch 10K RPM disk drives (Operating System and Application)

Table 3   Storage Subsystem configuration

Storage System	Dell PowerEdge R730xd Internal 3.5-inch drives
Disks	16 x 4 TB 7.2K RPM NL-SAS 3.5-inch disk: • 14 x 4 TB 7.2K RPM NL-SAS 3.5-inch drive in 7 x RAID 1 (for DB and Log) • 1 x 4 TB 7.2K RPM NL-SAS 3.5-inch drive (for Restore LUN) • 1 x 4 TB 7.2K RPM NL-SAS 3.5-inch drive (for Global Hot-spare)
RAID Controller	Dell PowerEdge RAID Controller H730P Mini (Firmware version: 25.2.1.0037)

5 Targeted Customer Profile

This solution is intended for midsize to large organizations hosting up to 8,000 Exchange 2013 mailboxes. The configuration used for testing was as follows:

- Number of mailboxes: 8,000
- Number of sites: 2 (Local & Remote)
- Number of servers in each site: 4 in Local and 2 in Remote
- User IO profile: 150 messages sent and received or 0.121 IOPS per mailbox (This includes 20% IO overhead factor.)
- 3 GB Mailbox quota per mailbox
- 24x7 Background Database Maintenance enabled
- Data Availability Group (DAG) for Mailbox Resiliency (3 copies simulated--1, 2 Passive)

5.1 Tested User Profile

The tested user profile had 0.121 IOPS per user with a 3 GB mailbox size. This equates to 150 messages (sent or received) per mailbox per day and accounts for an additional 20% I/O overhead. Additional applications such as certain mobile messaging applications can increase the IOPS profile of a user by three or four times.

5.2 Tested Deployment

The tested deployment simulated a failure scenario where up to four members of the local site were completely unavailable and the passive copies on the surviving DAG members at the remote site were activated to provide mailbox service continuity. Therefore, the IOPS simulated 4,000 mailboxes on the same Exchange 2013 Server. The target IOPS for the given profile was 482. The achieved IOPS was 1085—-—much higher than the target—and the solution still maintained read and write latencies well within the recommended thresholds. The following tables summarize the testing environment:

Table 4   Simulated Exchange Configuration

Feature	Specification
Number of Exchange mailboxes simulated	8,000 (at 3 GB mailbox size each)
Number of Database Availability Groups (DAGs)	1
Number of Sites	2 (Local and Remote)

Feature	Specification
Number of servers/DAG	6 (4 Local and 2 Remote) (2 Tested)
Number of active mailboxes/server	2,000 (during normal operations) & 4,000 (during site failure)
Number of databases/server	14 (7 active, 7 passive)
Number of copies/database	3 (2 in Local and 1 in remote site)
Number of mailboxes/database	286
Simulated profile: IOPS/mailbox	0.121 (150 messages/day) This includes 20% IO overhead factor
Database/Log LUN size	3725GB
Number of LUNs per server	7
Number of DBs per LUN	2 (one active, one passive)
Background database maintenance (BDM)	Tested with BDM enabled
Total database size for performance testing	857.1GB per DB 23.43TB total
% storage capacity used by Exchange database	23.43 TB / 50.92 TB 46.02%

Table 5   Storage and Server Hardware

Feature	Specification
Storage connectivity (Fiber Channel, SAS, SATA, iSCSI)	SAS
Storage model and OS/firmware revision	Dell PowerEdge R730xd server with PERC H730P Mini Firmware 6.3.9600.16384
Storage cache	1 GB- PERC H730P Mini
Number of storage controllers	1
Number of storage ports	2 (Two internal mini-SAS HD SFF8643)
Maximum bandwidth of storage connectivity to host	12Gb/s per port
Switch type/model/firmware revision	NA
HBA model and firmware	H730P Mini Firmware 21.2.1.0037
Number of HBA's/host	1
Host server type	Dell PowerEdge R730xd 2 x Intel® Xeon® processor 192 GB RAM
Total number of disks tested in solution	28 (14 per server)
Maximum number of spindles that can be hosted in the storage	16 x 3.5" and 2 x 2.5" per Dell PowerEdge R730xd server

Table 6   Storage and Server Software

Feature	Specification
HBA driver	PERC H730P SAS-RAID 6.602.7.0
HBA QueueTarget Setting	N/A
HBA QueueDepth Setting	N/A
Multi-Pathing	N/A

	Windows Server 2012 R2 Datacenter X64 Edition
Host OS	Windows Server 2012 R2 Datacenter X64 Edition
ESE.dll file version	15.00.0913.022
Replication solution name/version	N/A

Table 7   Storage Disk Configuration (Mailbox Store Disks)

Feature	Specification
Disk type, speed and firmware revision	DELL 7.2K 3.5" RPM 4 TB NL-SAS Model – ST4000NM0063
Raw capacity per disk (TB)	4 TB
Number of physical disks in test	28 (14 per Server)
Total raw storage capacity (TB)	112 TB(56 TB per Server)
Raid level	RAID 1 pairs
Number of disks per LUN	2
Total formatted capacity	3725 GB per LUN 50.92 TB total
Storage capacity utilization	50.92/112=45.47% Formatted capacity/Total raw capacity
Database capacity utilization	23.43 TB / 50.92 TB=46.01% Database size / Total formatted capacity

5.3 Best Practices

Exchange Server 2007, 2010 and 2013 overcome the memory limitations of earlier Exchange versions by providing support as a 64-bit application. On Windows Server 2012 x64 Edition, about 4 TB of addressable memory is available for kernel mode and user mode applications. Both the application and kernel have sufficient memory for operations, allowing the Extensible Storage Engine (ESE) in Exchange Server 2013 to utilize more memory to buffer data pages. The result is a reduction in the number of I/O, specifically the read operations required to the disk subsystem. The total number of database disk I/O operations for a given user load depends on the available system memory. For a given load, the total database disk I/O operations required per second (IOPS) decreases over a period with increase in system memory. This decrease in database IOPS is primarily caused by a decrease in database reads.

Even with the decrease in database IOPS using larger server memory, it is essential to size the Exchange Storage subsystem accurately to make sure that there are no I/O bottlenecks from an IOPS and disk latency perspective. The disk subsystem should be capable of supporting both the capacity and I/O throughput demands of the application. The following best practices are recommended to improve the I/O subsystem performance:

- For Exchange 2013 database, it is recommended that the size of elements within a RAID stripe be set to 512K for best performance.
- Windows NTFS allocation unit size for Exchange 2013 database partitions should be set to 64K for best performance. If log partitions are separated from the database, the default allocation unit size should be used. While formatting the windows partitions, GUID partition table (GPT) should be used.
- Average database read latencies (Avg. Disk sec/Read) should not exceed 20 ms. Exchange Server 2013 storage latencies are most often related to the number of disk drives available for a given workload. Windows Performance Monitor may be used to monitor Exchange Server 2013 database counters.
- Sharing Exchange 2013 storage resources with other applications may negatively affect the performance of Exchange 2013 deployment. Therefore, sharing the spindles hosting the Exchange Database and log with any other application or operating system is not recommended.

For Exchange 2013 best practices on storage design, see:
http://technet.microsoft.com/en-us/library/ee832792(v=exchg.150).aspx

5.4 Backup Strategy

To protect email data from potential disasters, having a well designed and implemented backup solution is critical. Depending on environmental requirements, different backup strategies may be implemented, such as backup to tape or LAN/SAN-based backup. In this solution, DAG is used to maintain a passive database copy on a separate storage system. This passive copy of the database may be used to back up to tape or disk drive.

The log replay test was used to measure the maximum rate at which the log files can be replayed on the passive copies. This was used to determine the restore times and the database write throughput that can be achieved during a log recovery.

6   Test Result Summary

This section provides a high-level summary of the test data from Microsoft Exchange Jetstress as part of the ESRP requirements and the link to the detailed HTML reports, which are generated by the ESRP testing framework.

6.1   Reliability

Reliability tests run for 24 hours and the goal is to verify if the storage can handle a high I/O load for a long period. After the stress test, both log and database files are analyzed for integrity to make sure that there is no database/log corruption.

The following list provides a summary of errors reported during testing:

- Any errors reported in the saved event log file? No
- Any errors reported during the database and log checksum process? No

6.2   Storage Performance Test Result Report

The storage performance test is designed to exercise the storage with maximum sustainable Exchange I/O for two hours. The test shows how long it takes the storage to respond to an I/O under load. The data here is the sum of all of the logical disks I/O and average of all the logical disks I/O latency in the two hour test duration. The achieved IOPS was around 1000.

As part of the ESRP framework, the Stress Test was also performed. The duration of the test was 24 hours with a target IOPS of 0.121 per user or 482 IOPS per server. The achieved IOPS was around 1011 per server. This was well above the target IOPS. The Stress Test Result Report

6.2.1 Individual Server Metrics

Table 8 shows the sum of I/O across Mailbox databases and the average latency across all databases on a per server basis.

Table 8   Individual Server Metrics
Server 1:

Database I/O	
Target Disk Transfers/sec	484
Database Disks Transfers/sec	1000.755
Database Disks Reads/sec	674.71
Database Disks Writes/sec	326.045
Average Database Disk Read Latency (ms)	13.58

Database I/O	
Average Database Disk Write Latency (ms)	1.69
Transaction Log I/O	
Log Disks Writes/sec	77.117
Average Log Disk Write Latency (ms)	0.126

Server 2:

Database I/O	
Target Disk Transfers/sec	484
Database Disks Transfers/sec	1012.595
Database Disks Reads/sec	684.458
Database Disks Writes/sec	328.137
Average Database Disk Read Latency (ms)	13.43
Average Database Disk Write Latency (ms)	1.66
Transaction Log I/O	
Log Disks Writes/sec	85.127
Average Log Disk Write Latency (ms)	0.108

6.2.1 Aggregate Performance across all servers/DAGs Metrics

Table 9 shows the aggregated results of I/O and the average latency across all servers in the solution.

Table 9   Aggregated Performance Metrics across all Servers

Database I/O	
Database Disks Transfers/sec	2013.35
Database Disks Reads/sec	1359.168
Database Disks Writes/sec	654.182
Average Database Disk Read Latency (ms)	13.505
Average Database Disk Write Latency (ms)	1.675
Transaction Log I/O	
Log Disks Writes/sec	162.244

Database I/O	
Average Log Disk Write Latency (ms)	0.117

6.3   Database Backup/Recovery Performance

There are two test reports in this section. The database backup test measures the sequential read rate of the database files, and the soft recovery test measures the recovery/replay performance (playing transaction logs in to the database).

6.3.1 Database Backup Test Result Report

6.3.2

The test measures the maximum rate at which databases could be backed up through VSS. The following table shows the average rate for a single database file:

Table 10   Database Backup Test Metrics

MB read/sec per database	168.98
MB read/sec total per server	2365.72

6.3.3 Soft Recovery test Result Report

The test measures the maximum rate at which the log files can be played on the passive copies. The following table shows the average rate for 505 log files played in a single storage group. Each log file is 1 MB in size.

Table 11   Soft Recovery Test metrics

Average number of log files played	506
Average time to play one Log file (sec)	2.466

7   Conclusion

This ESRP document presents a tested and validated Exchange solution for 8,000 mailboxes with 3GB mailbox size supporting up to 150 messages per day in a three-copy DAG. The solution uses the PowerEdge R730xd server for the Exchange mailbox server role and uses the internal storage of PowerEdge R730xd server for storing the Exchange mailbox databases and transactional logs.

Testing was carried out as part of the ESRP test framework using Microsoft Exchange Server 2013 Jetstress. The test results showed that the proposed solution is capable of delivering the IOPS and meeting the capacity requirements to support 8,000 mailboxes with the set mailbox profile.

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

The ESRP program is not designed to be a benchmarking program and the tests are not designed to obtain the maximum throughput for a given solution. Rather, the tests focus on obtaining recommendations from vendors for Exchange application. The data presented in this document should not be used for direct comparisons among solutions.

8 Additional Information

1. **Support.dell.com** is focused on meeting customer requirements with proven services.
2. **DellTechCenter.com** is an IT Community where you can connect with Dell Customers and Dell employees for sharing knowledge, best practices and information about Dell products and installations.
3. Referenced or recommended Dell publications:
   a. [Dell Unified Communications and Collaboration website](#)
   b. [Dell PowerEdge R730xd](#)
   c. [Dell PowerEdge RAID Controller (PERC) H730P User Guide](#)

A   Performance Test Result Report

A.1   Server1

Microsoft Exchange Jetstress 2013

Performance Test Result Report

Test Summary

Overall Test Result	Pass
Machine Name	WIN-EXCH1
Test Description	Exchange Mailbox Profile-Performance
	WIN-EXCH1
	16*4TB 7.2KRPM NL-SAS
	7 RAID1 Volumes for Exchange
	1 RAID1 Volume for OS
	1 RAID0 Volume for RestoreLUN, 1 HotSpare
	4000 users, 150 messages a day and 3GB Mailbox Size
Test Start Time	8/4/2014 10:55:52 AM
Test End Time	8/4/2014 1:01:14 PM
Collection Start Time	8/4/2014 11:00:51 AM
Collection End Time	8/4/2014 1:00:40 PM
Jetstress Version	15.00.0775.000
ESE Version	15.00.0913.022
Operating System	Windows Server 2012 R2 Datacenter (6.2.9200.0)
Performance Log	C:\Users\Administrator\Desktop\ESRP\All New\20T-2 hrs\Performance_2014_8_4_10_56_22.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second	1000.758
Target Transactional I/O per Second	484
Initial Database Size (bytes)	12921828540416
Final Database Size (bytes)	12924454174720
Database Files (Count)	14

Jetstress System Parameters

Thread Count	20
Minimum Database Cache	448.0 MB
Maximum Database Cache	3584.0 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	3

Database Configuration

Instance2228.1 Log path: C:\VOL1\DB1
                           Database: C:\VOL1\DB1\Jetstress001001.edb

Instance2228.2 Log path: C:\VOL1\DB2
                           Database: C:\VOL1\DB2\Jetstress002001.edb

Instance2228.3 Log path: C:\VOL2\DB3
                           Database: C:\VOL2\DB3\Jetstress003001.edb

Instance2228.4 Log path: C:\VOL2\DB4
                           Database: C:\VOL2\DB4\Jetstress004001.edb

Instance2228.5 Log path: C:\VOL3\DB5
                           Database: C:\VOL3\DB5\Jetstress005001.edb

Instance2228.6 Log path: C:\VOL3\DB6
                           Database: C:\VOL3\DB6\Jetstress006001.edb

Instance2228.7 Log path: C:\VOL4\DB7
                           Database: C:\VOL4\DB7\Jetstress007001.edb

Instance2228.8 Log path: C:\VOL4\DB8
                           Database: C:\VOL4\DB8\Jetstress008001.edb

Instance2228.9 Log path: C:\VOL5\DB9
                           Database: C:\VOL5\DB9\Jetstress009001.edb

Instance2228.10 Log path: C:\VOL5\DB10
                           Database: C:\VOL5\DB10\Jetstress010001.edb

Instance2228.11 Log path: C:\VOL6\DB11
                           Database: C:\VOL6\DB11\Jetstress011001.edb

Instance2228.12 Log path: C:\VOL6\DB12
                           Database: C:\VOL6\DB12\Jetstress012001.edb

Instance2228.13 Log path: C:\VOL7\DB13
                           Database: C:\VOL7\DB13\Jetstress013001.edb

Instance2228.14 Log path: C:\VOL7\DB14
                           Database: C:\VOL7\DB14\Jetstress014001.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
Instance2228.1	12.260	1.932	48.082	23.148	33037.252	35056.242	0.000	0.121	0.000	5.476	0.000	20769.473
Instance2228.2	12.855	1.931	48.121	23.446	33024.527	35072.823	0.000	0.123	0.000	5.562	0.000	20752.280
Instance2228.3	12.624	1.777	48.481	23.647	33045.611	35026.194	0.000	0.128	0.000	5.531	0.000	20402.835
Instance2228.4	13.688	1.778	48.043	23.260	33015.542	35078.404	0.000	0.123	0.000	5.505	0.000	20578.497
Instance2228.5	14.062	1.599	48.165	23.303	33053.502	35060.941	0.000	0.128	0.000	5.550	0.000	20623.390
Instance2228.6	13.113	1.619	48.301	23.288	33018.636	35062.952	0.000	0.128	0.000	5.520	0.000	20365.967
Instance2228.7	13.078	1.497	48.080	23.087	33071.183	35121.429	0.000	0.126	0.000	5.449	0.000	20697.814
Instance2228.8	14.179	1.493	48.030	23.084	33027.821	35085.182	0.000	0.125	0.000	5.490	0.000	20496.623
Instance2228.9	13.691	1.507	48.138	23.134	33022.927	35031.262	0.000	0.127	0.000	5.476	0.000	20537.722
Instance2228.10	14.194	1.532	48.360	23.355	32991.028	35045.109	0.000	0.130	0.000	5.510	0.000	20269.903
Instance2228.11	13.753	1.675	48.274	23.342	33017.343	35046.009	0.000	0.129	0.000	5.507	0.000	20397.383
Instance2228.12	14.445	1.681	47.971	22.989	33030.290	35093.706	0.000	0.123	0.000	5.458	0.000	20710.636
Instance2228.13	13.542	1.891	48.295	23.376	33019.777	35031.667	0.000	0.131	0.000	5.528	0.000	20376.184
Instance2228.14	14.707	1.881	48.369	23.586	33010.689	35025.620	0.000	0.127	0.000	5.555	0.000	20169.977

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance2228.1	8.834	261663.785
Instance2228.2	8.633	261498.899
Instance2228.3	8.790	261590.196
Instance2228.4	8.596	261658.659
Instance2228.5	8.580	261630.420
Instance2228.6	8.770	261755.519
Instance2228.7	8.777	261770.556
Instance2228.8	8.572	261733.434
Instance2228.9	8.763	261800.605
Instance2228.10	8.573	261712.377
Instance2228.11	8.791	261637.217
Instance2228.12	8.574	261657.941
Instance2228.13	8.752	261608.834
Instance2228.14	8.541	261768.322

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance2228.1	0.970	186731.993
Instance2228.2	0.982	190144.850
Instance2228.3	0.960	185276.949
Instance2228.4	0.965	186768.755
Instance2228.5	0.972	187262.309
Instance2228.6	0.957	184781.790
Instance2228.7	0.960	184781.790
Instance2228.8	0.960	186731.993
Instance2228.9	0.955	186192.137
Instance2228.10	0.952	182831.586
Instance2228.11	0.957	184294.239
Instance2228.12	0.960	185756.892
Instance2228.13	0.960	185269.341
Instance2228.14	0.955	184781.790

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
Instance2228.1	12.260	1.932	56.915	23.148	68522.140	35056.242	0.571	0.121	0.970	5.476	186731.993	20769.473
Instance2228.2	12.855	1.931	56.755	23.446	67778.855	35072.823	0.592	0.123	0.982	5.562	190144.850	20752.280
Instance2228.3	12.624	1.777	57.271	23.647	68123.301	35026.194	1.131	0.128	0.960	5.531	185276.949	20402.835
Instance2228.4	13.688	1.778	56.639	23.260	67716.541	35078.404	1.115	0.123	0.965	5.505	186768.755	20578.497
Instance2228.5	14.062	1.599	56.745	23.303	67613.718	35060.941	1.285	0.128	0.972	5.550	187262.309	20623.390
Instance2228.6	13.113	1.619	57.071	23.288	68168.937	35062.952	1.288	0.128	0.957	5.520	184781.790	20365.967
Instance2228.7	13.078	1.497	56.857	23.087	68375.764	35121.429	1.520	0.126	0.960	5.449	184781.790	20697.814
Instance2228.8	14.179	1.493	56.602	23.084	67662.040	35085.182	1.323	0.125	0.960	5.490	186731.993	20496.623
Instance2228.9	13.691	1.507	56.901	23.134	68255.477	35031.262	1.478	0.127	0.955	5.476	186192.137	20537.722
Instance2228.10	14.194	1.532	56.934	23.355	67433.115	35045.109	1.372	0.130	0.952	5.510	182831.586	20269.903
Instance2228.11	13.753	1.675	57.066	23.342	68238.144	35046.009	1.501	0.129	0.957	5.507	184294.239	20397.383
Instance2228.12	14.445	1.681	56.545	22.989	67697.288	35093.706	1.522	0.123	0.960	5.458	185756.892	20710.636
Instance2228.13	13.542	1.891	57.047	23.376	68090.327	35031.667	1.043	0.131	0.960	5.528	185269.341	20376.184
Instance2228.14	14.707	1.881	56.910	23.586	67342.045	35025.620	1.147	0.127	0.955	5.555	184781.790	20169.977

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.441	0.257	0.570
Available MBytes	183701.029	183674.000	183961.000
Free System Page Table Entries	16484136.582	16483885.000	16484394.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	129228525.791	128970752.000	129392640.000
Pool Paged Bytes	106203658.711	105988096.000	106233856.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

8/4/2014 10:55:52 AM -- Preparing for testing ...
8/4/2014 10:56:07 AM -- Attaching databases ...
8/4/2014 10:56:07 AM -- Preparations for testing are complete.
8/4/2014 10:56:07 AM -- Starting transaction dispatch ..
8/4/2014 10:56:07 AM -- Database cache settings: (minimum: 448.0 MB, maximum: 3.5 GB)
8/4/2014 10:56:07 AM -- Database flush thresholds: (start: 35.8 MB, stop: 71.7 MB)
8/4/2014 10:56:22 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
8/4/2014 10:56:22 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
8/4/2014 10:56:24 AM -- Operation mix: Sessions 20, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/4/2014 10:56:24 AM -- Performance logging started (interval: 15000 ms).
8/4/2014 10:56:24 AM -- Attaining prerequisites:
8/4/2014 11:00:51 AM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 3401417000.0 (lower bound: 3382287000.0, upper bound: none)
8/4/2014 1:00:52 PM -- Performance logging has ended.
8/4/2014 1:00:52 PM -- JetInterop batch transaction stats: 13443, 13443, 13443, 13443, 13443, 13443, 13443, 13443, 13442, 13442, 13442, 13442, 13442 and 13442.
8/4/2014 1:00:52 PM -- Dispatching transactions ends.
8/4/2014 1:00:52 PM -- Shutting down databases ...
8/4/2014 1:01:14 PM -- Instance2228.1 (complete), Instance2228.2 (complete), Instance2228.3 (complete), Instance2228.4 (complete), Instance2228.5 (complete), Instance2228.6 (complete), Instance2228.7 (complete), Instance2228.8 (complete), Instance2228.9 (complete), Instance2228.10 (complete), Instance2228.11 (complete), Instance2228.12 (complete), Instance2228.13 (complete) and Instance2228.14 (complete)
8/4/2014 1:01:14 PM -- C:\Users\Administrator\Desktop\ESRP\All New\20T-2 hrs\Performance_2014_8_4_10_56_22.blg has 495 samples.
8/4/2014 1:01:14 PM -- Creating test report ...
8/4/2014 1:01:22 PM -- Instance2228.1 has 12.3 for I/O Database Reads Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.1 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.1 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.2 has 12.9 for I/O Database Reads Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.2 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.2 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.3 has 12.6 for I/O Database Reads Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.3 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.3 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.4 has 13.7 for I/O Database Reads Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.4 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.4 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.5 has 14.1 for I/O Database Reads Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.5 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.5 has 0.1 for I/O Log Reads Average Latency.

8/4/2014 1:01:22 PM -- Instance2228.13 has 13.5 for I/O Database Reads Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.13 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.13 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.14 has 14.7 for I/O Database Reads Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.14 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 1:01:22 PM -- Instance2228.14 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 1:01:22 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/4/2014 1:01:22 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/4/2014 1:01:22 PM -- C:\Users\Administrator\Desktop\ESRP\All New\20T-2 hrs\Performance_2014_8_4_10_56_22.xml has 477 samples queried.

A.2   Server 2

Microsoft Exchange Jetstress 2013

Performance Test Result Report

Test Summary

Overall Test Result	Pass
Machine Name	WIN-EXCH2
Test Description	Exchange Mailbox Profile-Performance
	WIN-EXCH1
	16*4TB 7.2KRPM NL-SAS
	7 RAID1 Volumes for Exchange
	1 RAID1 Volume for OS
	1 RAID0 Volume for RestoreLUN, 1 HotSpare
	4000 users, 150 messages a day and 3GB Mailbox Size
Test Start Time	8/10/2014 7:04:40 AM
Test End Time	8/10/2014 9:10:01 AM
Collection Start Time	8/10/2014 7:09:40 AM
Collection End Time	8/10/2014 9:09:26 AM
Jetstress Version	15.00.0775.000
ESE Version	15.00.0913.022
Operating System	Windows Server 2012 R2 Datacenter (6.2.9200.0)
Performance Log	C:\Users\Administrator\Desktop\ESRP\20T-2 2hrs\Performance_2014_8_10_7_5_9.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second	1012.595
Target Transactional I/O per Second	484
Initial Database Size (bytes)	12888030838784
Final Database Size (bytes)	12890924908544
Database Files (Count)	14

Jetstress System Parameters

Thread Count	20
Minimum Database Cache	448.0 MB
Maximum Database Cache	3584.0 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	3

Database Configuration

Instance3296.1 Log path: C:\VOL1\DB1
Database: C:\VOL1\DB1\Jetstress001001.edb

Instance3296.2 Log path: C:\VOL1\DB2
Database: C:\VOL1\DB2\Jetstress002001.edb

Instance3296.3 Log path: C:\VOL2\DB3
Database: C:\VOL2\DB3\Jetstress003001.edb

Instance3296.4 Log path: C:\VOL2\DB4
Database: C:\VOL2\DB4\Jetstress004001.edb

Instance3296.5 Log path: C:\VOL3\DB5
Database: C:\VOL3\DB5\Jetstress005001.edb

Instance3296.6 Log path: C:\VOL3\DB6
Database: C:\VOL3\DB6\Jetstress006001.edb

Instance3296.7 Log path: C:\VOL4\DB7
Database: C:\VOL4\DB7\Jetstress007001.edb

Instance3296.8 Log path: C:\VOL4\DB8
Database: C:\VOL4\DB8\Jetstress008001.edb

Instance3296.9 Log path: C:\VOL5\DB9
Database: C:\VOL5\DB9\Jetstress009001.edb

Instance3296.10 Log path: C:\VOL5\DB10
Database: C:\VOL5\DB10\Jetstress010001.edb

Instance3296.11 Log path: C:\VOL6\DB11
Database: C:\VOL6\DB11\Jetstress011001.edb

Instance3296.12 Log path: C:\VOL6\DB12
Database: C:\VOL6\DB12\Jetstress012001.edb

Instance3296.13 Log path: C:\VOL7\DB13
Database: C:\VOL7\DB13\Jetstress013001.edb

Instance3296.14 Log path: C:\VOL7\DB14
Database: C:\VOL7\DB14\Jetstress014001.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	11.832	2.505	49.087	23.514	33027.895	36407.719	0.000	0.104	0.000	6.034	0.000	20436.605
Instance3296.2	12.641	2.523	48.983	23.600	33031.818	36371.725	0.000	0.103	0.000	6.172	0.000	20370.589
Instance3296.3	12.938	2.227	48.700	23.291	33039.542	36418.300	0.000	0.104	0.000	6.089	0.000	20602.656
Instance3296.4	14.007	2.251	49.004	23.558	33030.389	36329.240	0.000	0.109	0.000	6.087	0.000	20369.791
Instance3296.5	14.155	1.921	48.731	23.107	33034.157	36479.957	0.000	0.114	0.000	6.024	0.000	20549.852
Instance3296.6	13.176	1.937	49.030	23.566	33047.218	36371.144	0.000	0.111	0.000	6.106	0.000	20404.796
Instance3296.7	12.879	1.628	49.040	23.569	33048.988	36349.305	0.000	0.118	0.000	6.095	0.000	20251.991
Instance3296.8	13.995	1.630	48.688	23.247	33015.175	36534.539	0.000	0.110	0.000	6.034	0.000	20648.536
Instance3296.9	12.787	1.326	48.773	23.417	33049.605	36414.927	0.000	0.107	0.000	6.112	0.000	20590.452
Instance3296.10	13.857	1.339	48.745	23.410	33063.989	36474.200	0.000	0.108	0.000	6.115	0.000	20600.726
Instance3296.11	14.359	1.072	49.026	23.570	33012.179	36401.934	0.000	0.115	0.000	6.112	0.000	20495.158
Instance3296.12	15.296	1.066	49.038	23.462	33044.597	36418.488	0.000	0.110	0.000	5.992	0.000	20560.963
Instance3296.13	12.583	0.904	48.847	23.485	33070.547	36454.977	0.000	0.109	0.000	6.050	0.000	20826.940
Instance3296.14	13.621	0.915	48.766	23.341	33019.123	36530.178	0.000	0.103	0.000	6.105	0.000	20500.602

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance3296.1	8.847	261685.161
Instance3296.2	8.614	261630.248
Instance3296.3	8.779	261717.798
Instance3296.4	8.523	261598.010
Instance3296.5	8.508	261670.156
Instance3296.6	8.776	261607.048
Instance3296.7	8.788	261616.564
Instance3296.8	8.529	261733.702
Instance3296.9	8.784	261644.370
Instance3296.10	8.551	261550.382
Instance3296.11	8.692	261770.758
Instance3296.12	8.365	261643.787
Instance3296.13	8.796	261659.030
Instance3296.14	8.541	261639.986

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance3296.1	1.050	198991.145
Instance3296.2	1.075	204342.985
Instance3296.3	1.067	203856.454
Instance3296.4	1.057	200937.268
Instance3296.5	1.057	198963.889
Instance3296.6	1.060	200291.212
Instance3296.7	1.050	198504.614
Instance3296.8	1.060	202396.861
Instance3296.9	1.072	202883.392
Instance3296.10	1.072	202883.392
Instance3296.11	1.067	202883.392
Instance3296.12	1.047	198963.889
Instance3296.13	1.072	203856.454
Instance3296.14	1.067	204713.379

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	11.832	2.505	57.934	23.514	67945.197	36407.719	0.359	0.104	1.050	6.034	198991.145	20436.605
Instance3296.2	12.641	2.523	57.597	23.600	67218.682	36371.725	0.329	0.103	1.075	6.172	204342.985	20370.589
Instance3296.3	12.938	2.227	57.479	23.291	67968.125	36418.300	1.185	0.104	1.067	6.089	203856.454	20602.656
Instance3296.4	14.007	2.251	57.527	23.558	66895.843	36329.240	1.037	0.109	1.057	6.087	200937.268	20369.791
Instance3296.5	14.155	1.921	57.239	23.107	67019.869	36479.957	1.157	0.114	1.057	6.024	198963.889	20549.852
Instance3296.6	13.176	1.937	57.806	23.566	67745.378	36371.144	1.173	0.111	1.060	6.106	200291.212	20404.796
Instance3296.7	12.879	1.628	57.828	23.569	67785.402	36349.305	1.243	0.118	1.050	6.095	198504.614	20251.991
Instance3296.8	13.995	1.630	57.217	23.247	67109.664	36534.539	1.095	0.110	1.060	6.034	202396.861	20648.536
Instance3296.9	12.787	1.326	57.558	23.417	67936.311	36414.927	0.977	0.107	1.072	6.112	202883.392	20590.452
Instance3296.10	13.857	1.339	57.297	23.410	67164.877	36474.200	0.944	0.108	1.072	6.115	202883.392	20600.726
Instance3296.11	14.359	1.072	57.718	23.570	67463.637	36401.934	1.013	0.115	1.067	6.112	202883.392	20495.158
Instance3296.12	15.296	1.066	57.403	23.462	66355.608	36418.488	1.135	0.110	1.047	5.992	198963.889	20560.963
Instance3296.13	12.583	0.904	57.644	23.485	67953.189	36454.977	0.957	0.109	1.072	6.050	203856.454	20826.940
Instance3296.14	13.621	0.915	57.307	23.341	67092.945	36530.178	0.853	0.103	1.067	6.105	204713.379	20500.602

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.309	0.075	0.564
Available MBytes	152211.280	152193.000	152513.000
Free System Page Table Entries	16513545.697	16513263.000	16513760.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	121533980.860	120643584.000	121716736.000
Pool Paged Bytes	106822089.486	106799104.000	106856448.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/10/2014 7:04:40 AM -- Preparing for testing ...
8/10/2014 7:04:54 AM -- Attaching databases ...
8/10/2014 7:04:54 AM -- Preparations for testing are complete.
8/10/2014 7:04:54 AM -- Starting transaction dispatch ..
8/10/2014 7:04:54 AM -- Database cache settings: (minimum: 448.0 MB, maximum: 3.5 GB)
8/10/2014 7:04:54 AM -- Database flush thresholds: (start: 35.8 MB, stop: 71.7 MB)
8/10/2014 7:05:09 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
8/10/2014 7:05:09 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
8/10/2014 7:05:10 AM -- Operation mix: Sessions 20, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/10/2014 7:05:10 AM -- Performance logging started (interval: 15000 ms).
8/10/2014 7:05:10 AM -- Attaining prerequisites:
8/10/2014 7:09:40 AM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 3398853000.0 (lower bound: 3382287000.0, upper bound: none)
8/10/2014 9:09:41 AM -- Performance logging has ended.
8/10/2014 9:09:41 AM -- JetInterop batch transaction stats: 14794, 14794, 14794, 14793, 14793, 14793, 14793, 14793, 14793, 14793, 14793, 14793, 14793 and 14793.
8/10/2014 9:09:41 AM -- Dispatching transactions ends.
8/10/2014 9:09:41 AM -- Shutting down databases ...
8/10/2014 9:10:01 AM -- Instance3296.1 (complete), Instance3296.2 (complete), Instance3296.3 (complete), Instance3296.4 (complete), Instance3296.5 (complete), Instance3296.6 (complete),
Instance3296.7 (complete), Instance3296.8 (complete), Instance3296.9 (complete), Instance3296.10 (complete), Instance3296.11 (complete), Instance3296.12 (complete), Instance3296.13 (complete)
and Instance3296.14 (complete)
8/10/2014 9:10:01 AM -- C:\Users\Administrator\Desktop\ESRP\20T-2 2hrs\Performance_2014_8_10_7_5_9.blg has 496 samples.
8/10/2014 9:10:01 AM -- Creating test report ...
8/10/2014 9:10:07 AM -- Instance3296.1 has 11.8 for I/O Database Reads Average Latency.
8/10/2014 9:10:07 AM -- Instance3296.1 has 0.1 for I/O Log Writes Average Latency.
8/10/2014 9:10:07 AM -- Instance3296.1 has 0.1 for I/O Log Reads Average Latency.
8/10/2014 9:10:07 AM -- Instance3296.2 has 12.6 for I/O Database Reads Average Latency.
8/10/2014 9:10:07 AM -- Instance3296.2 has 0.1 for I/O Log Writes Average Latency.
8/10/2014 9:10:07 AM -- Instance3296.2 has 0.1 for I/O Log Reads Average Latency.
8/10/2014 9:10:07 AM -- Instance3296.3 has 12.9 for I/O Database Reads Average Latency.
8/10/2014 9:10:07 AM -- Instance3296.3 has 0.1 for I/O Log Writes Average Latency.
8/10/2014 9:10:07 AM -- Instance3296.3 has 0.1 for I/O Log Reads Average Latency.
8/10/2014 9:10:07 AM -- Instance3296.4 has 14.0 for I/O Database Reads Average Latency.
8/10/2014 9:10:07 AM -- Instance3296.4 has 0.1 for I/O Log Writes Average Latency.
8/10/2014 9:10:07 AM -- Instance3296.4 has 0.1 for I/O Log Reads Average Latency.
8/10/2014 9:10:07 AM -- Instance3296.5 has 14.2 for I/O Database Reads Average Latency.
8/10/2014 9:10:07 AM -- Instance3296.5 has 0.1 for I/O Log Writes Average Latency.
8/10/2014 9:10:07 AM -- Instance3296.5 has 0.1 for I/O Log Reads Average Latency.
```

B   Stress Test Result Report

B.1   Server 1

Microsoft Exchange Jetstress 2013

Stress Test Result Report

Test Summary

Overall Test Result	Pass
Machine Name	WIN-EXCH1
Test Description	Exchange Mailbox Profile-Performance WIN-EXCH1 16*4TB 7.2KRPM NL-SAS 7 RAID1 Volumes for Exchange 1 RAID1 Volume for OS 1 RAID0 Volume for RestoreLUN, 1 HotSpare 4000 users, 150 messages a day and 3GB Mailbox Size
Test Start Time	8/2/2014 6:09:10 PM
Test End Time	8/3/2014 6:14:33 PM
Collection Start Time	8/2/2014 6:14:09 PM
Collection End Time	8/3/2014 6:13:56 PM
Jetstress Version	15.00.0775.000
ESE Version	15.00.0913.022
Operating System	Windows Server 2012 R2 Datacenter (6.2.9200.0)
Performance Log	C:\Users\Administrator\Desktop\ESRP\All New\20T-24 hrs\Stress_2014_8_2_18_9_39.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second	1011.45
Target Transactional I/O per Second	484
Initial Database Size (bytes)	12886747381760
Final Database Size (bytes)	12918515040256
Database Files (Count)	14

Jetstress System Parameters

Thread Count	20
Minimum Database Cache	448.0 MB
Maximum Database Cache	3584.0 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	3

Database Configuration

Instance4176.1 Log path: C:\VOL1\DB1
Database: C:\VOL1\DB1\Jetstress001001.edb

Instance4176.2 Log path: C:\VOL1\DB2
Database: C:\VOL1\DB2\Jetstress002001.edb

Instance4176.3 Log path: C:\VOL2\DB3
Database: C:\VOL2\DB3\Jetstress003001.edb

Instance4176.4 Log path: C:\VOL2\DB4
Database: C:\VOL2\DB4\Jetstress004001.edb

Instance4176.5 Log path: C:\VOL3\DB5
Database: C:\VOL3\DB5\Jetstress005001.edb

Instance4176.6 Log path: C:\VOL3\DB6
Database: C:\VOL3\DB6\Jetstress006001.edb

Instance4176.7 Log path: C:\VOL4\DB7
Database: C:\VOL4\DB7\Jetstress007001.edb

Instance4176.8 Log path: C:\VOL4\DB8
Database: C:\VOL4\DB8\Jetstress008001.edb

Instance4176.9 Log path: C:\VOL5\DB9
Database: C:\VOL5\DB9\Jetstress009001.edb

Instance4176.10 Log path: C:\VOL5\DB10
Database: C:\VOL5\DB10\Jetstress010001.edb

Instance4176.11 Log path: C:\VOL6\DB11
Database: C:\VOL6\DB11\Jetstress011001.edb

Instance4176.12 Log path: C:\VOL6\DB12
Database: C:\VOL6\DB12\Jetstress012001.edb

Instance4176.13 Log path: C:\VOL7\DB13
Database: C:\VOL7\DB13\Jetstress013001.edb

Instance4176.14 Log path: C:\VOL7\DB14
Database: C:\VOL7\DB14\Jetstress014001.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
Instance4176.1	12.016	1.842	48.789	23.413	33041.307	35871.134	0.000	0.131	0.000	5.763	0.000	20607.925
Instance4176.2	12.688	1.855	48.847	23.442	33033.980	35852.216	0.000	0.133	0.000	5.754	0.000	20552.452
Instance4176.3	12.879	1.706	48.761	23.330	33034.605	35881.408	0.000	0.138	0.000	5.728	0.000	20573.521
Instance4176.4	14.102	1.705	48.822	23.423	33033.725	35866.915	0.000	0.138	0.000	5.758	0.000	20563.226
Instance4176.5	14.096	1.532	48.820	23.382	33022.208	35864.503	0.000	0.137	0.000	5.751	0.000	20481.683
Instance4176.6	12.895	1.533	48.864	23.488	33032.109	35872.567	0.000	0.138	0.000	5.770	0.000	20535.833
Instance4176.7	12.979	1.424	48.822	23.416	33032.873	35868.715	0.000	0.138	0.000	5.772	0.000	20513.017
Instance4176.8	14.181	1.423	48.764	23.324	33024.587	35874.495	0.000	0.138	0.000	5.733	0.000	20580.870
Instance4176.9	13.060	1.442	48.954	23.539	33025.211	35845.850	0.000	0.137	0.000	5.778	0.000	20453.304
Instance4176.10	13.983	1.438	48.841	23.435	33029.867	35876.538	0.000	0.135	0.000	5.759	0.000	20562.517
Instance4176.11	13.473	1.597	48.848	23.449	33027.598	35855.806	0.000	0.137	0.000	5.760	0.000	20479.833
Instance4176.12	14.409	1.601	48.814	23.398	33031.897	35867.552	0.000	0.138	0.000	5.762	0.000	20488.253
Instance4176.13	13.574	1.805	48.818	23.402	33030.458	35859.786	0.000	0.139	0.000	5.753	0.000	20477.531
Instance4176.14	14.814	1.800	48.817	23.428	33020.628	35860.000	0.000	0.139	0.000	5.745	0.000	20558.951

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance4176.1	8.835	261659.813
Instance4176.2	8.609	261663.136
Instance4176.3	8.781	261681.294
Instance4176.4	8.545	261635.863
Instance4176.5	8.543	261644.244
Instance4176.6	8.778	261674.732
Instance4176.7	8.776	261671.947
Instance4176.8	8.541	261683.738
Instance4176.9	8.781	261646.154
Instance4176.10	8.549	261671.256
Instance4176.11	8.763	261681.120
Instance4176.12	8.523	261660.237
Instance4176.13	8.745	261676.301
Instance4176.14	8.497	261654.794

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance4176.1	1.010	193836.640
Instance4176.2	1.006	193227.513
Instance4176.3	1.003	193229.881
Instance4176.4	1.007	193203.321
Instance4176.5	1.003	193081.509
Instance4176.6	1.009	193970.157
Instance4176.7	1.008	193773.241
Instance4176.8	1.004	193443.565
Instance4176.9	1.006	193556.504
Instance4176.10	1.008	193332.906
Instance4176.11	1.005	193123.881
Instance4176.12	1.005	193999.559
Instance4176.13	1.003	193483.779
Instance4176.14	1.005	193522.494

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
Instance4176.1	12.016	1.842	57.624	23.413	68093.723	35871.134	0.519	0.131	1.010	5.763	193836.640	20607.925
Instance4176.2	12.688	1.855	57.455	23.442	67289.556	35852.216	0.492	0.133	1.006	5.754	193227.513	20552.452
Instance4176.3	12.879	1.706	57.543	23.330	67927.388	35881.408	1.310	0.138	1.003	5.728	193229.881	20573.521
Instance4176.4	14.102	1.705	57.367	23.423	67086.089	35866.915	1.290	0.138	1.007	5.758	193203.321	20563.226
Instance4176.5	14.096	1.532	57.362	23.382	67070.330	35864.503	1.287	0.137	1.003	5.751	193081.509	20481.683
Instance4176.6	12.895	1.533	57.641	23.488	67849.812	35872.567	1.252	0.138	1.009	5.770	193970.157	20535.833
Instance4176.7	12.979	1.424	57.598	23.416	67871.054	35868.715	1.371	0.138	1.008	5.772	193773.241	20513.017
Instance4176.8	14.181	1.423	57.306	23.324	67105.706	35874.495	1.359	0.138	1.004	5.733	193443.565	20580.870
Instance4176.9	13.060	1.442	57.736	23.539	67797.469	35845.850	1.056	0.137	1.006	5.778	193556.504	20453.304
Instance4176.10	13.983	1.438	57.390	23.435	67088.114	35876.538	1.062	0.135	1.008	5.759	193332.906	20562.517
Instance4176.11	13.473	1.597	57.611	23.449	67807.222	35855.806	1.146	0.137	1.005	5.760	193123.881	20479.833
Instance4176.12	14.409	1.601	57.337	23.398	67015.343	35867.552	1.158	0.138	1.005	5.762	193999.559	20488.253
Instance4176.13	13.574	1.805	57.564	23.402	67767.780	35859.786	1.320	0.139	1.003	5.753	193483.779	20477.531
Instance4176.14	14.814	1.800	57.314	23.428	66915.333	35860.000	1.352	0.139	1.005	5.745	193522.494	20558.951

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.488	0.231	0.962
Available MBytes	183745.834	183659.000	184050.000
Free System Page Table Entries	16484220.392	16483739.000	16484620.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	128325560.591	127971328.000	128651264.000
Pool Paged Bytes	97829913.707	97435648.000	102871040.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

8/2/2014 6:09:10 PM -- Preparing for testing ...
8/2/2014 6:09:24 PM -- Attaching databases ...
8/2/2014 6:09:24 PM -- Preparations for testing are complete.
8/2/2014 6:09:24 PM -- Starting transaction dispatch ..
8/2/2014 6:09:24 PM -- Database cache settings: (minimum: 448.0 MB, maximum: 3.5 GB)
8/2/2014 6:09:24 PM -- Database flush thresholds: (start: 35.8 MB, stop: 71.7 MB)
8/2/2014 6:09:39 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 200 msec/read).
8/2/2014 6:09:39 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 200 msec/write).
8/2/2014 6:09:41 PM -- Operation mix: Sessions 20, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/2/2014 6:09:41 PM -- Performance logging started (interval: 15000 ms).
8/2/2014 6:09:41 PM -- Attaining prerequisites:
8/2/2014 6:14:09 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 3394605000.0 (lower bound: 3382287000.0, upper bound: none)
8/3/2014 6:14:10 PM -- Performance logging has ended.
8/3/2014 6:14:10 PM -- JetInterop batch transaction stats: 162810, 162810, 162810, 162810, 162810, 162810, 162810, 162810, 162809, 162809, 162809, 162809, 162809 and 162809.
8/3/2014 6:14:10 PM -- Dispatching transactions ends.
8/3/2014 6:14:11 PM -- Shutting down databases ...
8/3/2014 6:14:33 PM -- Instance4176.1 (complete), Instance4176.2 (complete), Instance4176.3 (complete), Instance4176.4 (complete), Instance4176.5 (complete), Instance4176.6 (complete), Instance4176.7 (complete), Instance4176.8 (complete), Instance4176.9 (complete), Instance4176.10 (complete), Instance4176.11 (complete), Instance4176.12 (complete), Instance4176.13 (complete) and Instance4176.14 (complete)
8/3/2014 6:14:33 PM -- C:\Users\Administrator\Desktop\ESRP\All New\20T-24 hrs\Stress_2014_8_2_18_9_39.blg has 5753 samples.
8/3/2014 6:14:33 PM -- Creating test report ...
8/3/2014 6:15:34 PM -- Instance4176.1 has 12.0 for I/O Database Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.1 has 0.1 for I/O Log Writes Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.1 has 0.1 for I/O Log Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.2 has 12.7 for I/O Database Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.2 has 0.1 for I/O Log Writes Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.2 has 0.1 for I/O Log Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.3 has 12.9 for I/O Database Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.3 has 0.1 for I/O Log Writes Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.3 has 0.1 for I/O Log Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.4 has 14.1 for I/O Database Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.4 has 0.1 for I/O Log Writes Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.4 has 0.1 for I/O Log Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.5 has 14.1 for I/O Database Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.5 has 0.1 for I/O Log Writes Average Latency.

8/3/2014 6:15:34 PM -- Instance4176.5 has 0.1 for I/O Log Writes Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.5 has 0.1 for I/O Log Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.6 has 12.9 for I/O Database Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.6 has 0.1 for I/O Log Writes Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.6 has 0.1 for I/O Log Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.7 has 13.0 for I/O Database Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.7 has 0.1 for I/O Log Writes Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.7 has 0.1 for I/O Log Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.8 has 14.2 for I/O Database Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.8 has 0.1 for I/O Log Writes Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.8 has 0.1 for I/O Log Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.9 has 13.1 for I/O Database Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.9 has 0.1 for I/O Log Writes Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.9 has 0.1 for I/O Log Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.10 has 14.0 for I/O Database Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.10 has 0.1 for I/O Log Writes Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.10 has 0.1 for I/O Log Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.11 has 13.5 for I/O Database Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.11 has 0.1 for I/O Log Writes Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.11 has 0.1 for I/O Log Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.12 has 14.4 for I/O Database Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.12 has 0.1 for I/O Log Writes Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.12 has 0.1 for I/O Log Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.13 has 13.6 for I/O Database Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.13 has 0.1 for I/O Log Writes Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.13 has 0.1 for I/O Log Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.14 has 14.8 for I/O Database Reads Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.14 has 0.1 for I/O Log Writes Average Latency.
8/3/2014 6:15:34 PM -- Instance4176.14 has 0.1 for I/O Log Reads Average Latency.
8/3/2014 6:15:34 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/3/2014 6:15:34 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/3/2014 6:15:34 PM -- C:\Users\Administrator\Desktop\ESRP\All New\20T-24 hrs\Stress_2014_8_2_18_9_39.xml has 5735 samples queried.

B.2   Server 2

Microsoft Exchange Jetstress 2013

Stress Test Result Report

Test Summary

Overall Test Result	Pass
Machine Name	WIN-EXCH2
Test Description	Exchange Mailbox Profile-Performance
	WIN-EXCH1
	16*4TB 7.2KRPM NL-SAS
	7 RAID1 Volumes for Exchange
	1 RAID1 Volume for OS
	1 RAID0 Volume for RestoreLUN, 1 HotSpare
	4000 users, 150 messages a day and 3GB Mailbox Size
Test Start Time	8/10/2014 11:23:50 PM
Test End Time	8/11/2014 11:29:08 PM
Collection Start Time	8/10/2014 11:28:46 PM
Collection End Time	8/11/2014 11:28:43 PM
Jetstress Version	15.00.0775.000
ESE Version	15.00.0913.022
Operating System	Windows Server 2012 R2 Datacenter (6.2.9200.0)
Performance Log	C:\Users\Administrator\Desktop\ESRP\20T 24hrs 2\Stress_2014_8_10_23_24_19.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second	1022.818
Target Transactional I/O per Second	484
Initial Database Size (bytes)	12888248942592
Final Database Size (bytes)	12920226316288
Database Files (Count)	14

Jetstress System Parameters

Thread Count	20
Minimum Database Cache	448.0 MB
Maximum Database Cache	3584.0 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	3

Database Configuration

Instance4336.1 Log path: C:\VOL1\DB1
Database: C:\VOL1\DB1\Jetstress001001.edb

Instance4336.2 Log path: C:\VOL1\DB2
Database: C:\VOL1\DB2\Jetstress002001.edb

Instance4336.3 Log path: C:\VOL2\DB3
Database: C:\VOL2\DB3\Jetstress003001.edb

Instance4336.4 Log path: C:\VOL2\DB4
Database: C:\VOL2\DB4\Jetstress004001.edb

Instance4336.5 Log path: C:\VOL3\DB5
Database: C:\VOL3\DB5\Jetstress005001.edb

Instance4336.6 Log path: C:\VOL3\DB6
Database: C:\VOL3\DB6\Jetstress006001.edb

Instance4336.7 Log path: C:\VOL4\DB7
Database: C:\VOL4\DB7\Jetstress007001.edb

Instance4336.8 Log path: C:\VOL4\DB8
Database: C:\VOL4\DB8\Jetstress008001.edb

Instance4336.9 Log path: C:\VOL5\DB9
Database: C:\VOL5\DB9\Jetstress009001.edb

Instance4336.10 Log path: C:\VOL5\DB10
Database: C:\VOL5\DB10\Jetstress010001.edb

Instance4336.11 Log path: C:\VOL6\DB11
Database: C:\VOL6\DB11\Jetstress011001.edb

Instance4336.12 Log path: C:\VOL6\DB12
Database: C:\VOL6\DB12\Jetstress012001.edb

Instance4336.13 Log path: C:\VOL7\DB13
Database: C:\VOL7\DB13\Jetstress013001.edb

Instance4336.14 Log path: C:\VOL7\DB14
Database: C:\VOL7\DB14\Jetstress014001.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
Instance4336.1	13.244	2.529	49.379	23.661	33037.266	35826.498	0.000	0.100	0.000	5.801	0.000	20480.907
Instance4336.2	13.917	2.533	49.320	23.611	33034.157	35839.228	0.000	0.097	0.000	5.787	0.000	20576.315
Instance4336.3	12.481	2.294	49.377	23.703	33039.009	35848.309	0.000	0.095	0.000	5.815	0.000	20493.319
Instance4336.4	13.497	2.299	49.325	23.605	33031.486	35846.470	0.000	0.097	0.000	5.783	0.000	20552.388
Instance4336.5	13.556	1.992	49.352	23.681	33032.981	35840.656	0.000	0.096	0.000	5.809	0.000	20562.251
Instance4336.6	12.569	1.999	49.396	23.732	33044.879	35838.044	0.000	0.095	0.000	5.829	0.000	20484.422
Instance4336.7	12.470	1.688	49.384	23.702	33037.961	35828.062	0.000	0.093	0.000	5.812	0.000	20479.751
Instance4336.8	13.322	1.693	49.424	23.705	33035.425	35816.855	0.000	0.094	0.000	5.795	0.000	20468.729
Instance4336.9	12.580	1.394	49.434	23.722	33035.294	35821.405	0.000	0.096	0.000	5.808	0.000	20495.148
Instance4336.10	13.550	1.399	49.411	23.679	33031.113	35838.630	0.000	0.094	0.000	5.800	0.000	20462.793
Instance4336.11	15.024	1.170	49.319	23.600	33025.636	35839.248	0.000	0.102	0.000	5.782	0.000	20516.905
Instance4336.12	15.785	1.175	49.366	23.699	33020.620	35828.511	0.000	0.101	0.000	5.808	0.000	20465.918
Instance4336.13	12.378	1.061	49.369	23.688	33041.250	35848.239	0.000	0.095	0.000	5.805	0.000	20555.057
Instance4336.14	13.096	1.066	49.461	23.714	33038.188	35833.372	0.000	0.093	0.000	5.784	0.000	20487.216

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance4336.1	8.732	261656.882
Instance4336.2	8.517	261684.536
Instance4336.3	8.796	261666.427
Instance4336.4	8.575	261709.299
Instance4336.5	8.568	261664.070
Instance4336.6	8.790	261680.002
Instance4336.7	8.797	261669.570
Instance4336.8	8.586	261658.513
Instance4336.9	8.790	261647.280
Instance4336.10	8.569	261650.379
Instance4336.11	8.635	261669.202
Instance4336.12	8.338	261669.851
Instance4336.13	8.800	261678.889
Instance4336.14	8.594	261668.606

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance4336.1	1.012	193926.957
Instance4336.2	1.014	194115.681
Instance4336.3	1.015	194638.554
Instance4336.4	1.012	194156.936
Instance4336.5	1.017	194843.944
Instance4336.6	1.017	194176.740
Instance4336.7	1.014	193609.486
Instance4336.8	1.010	193746.489
Instance4336.9	1.013	194102.563
Instance4336.10	1.010	193781.713
Instance4336.11	1.010	193546.653
Instance4336.12	1.012	194000.655
Instance4336.13	1.015	194425.773
Instance4336.14	1.009	193025.121

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
Instance4336.1	13.244	2.529	58.111	23.661	67391.042	35826.498	1.929	0.100	1.012	5.801	193926.957	20480.907
Instance4336.2	13.917	2.533	57.837	23.611	66704.717	35839.228	2.010	0.097	1.014	5.787	194115.681	20576.315
Instance4336.3	12.481	2.294	58.174	23.703	67609.963	35848.309	0.862	0.095	1.015	5.815	194638.554	20493.319
Instance4336.4	13.497	2.299	57.900	23.605	66899.767	35846.470	0.873	0.097	1.012	5.783	194156.936	20552.388
Instance4336.5	13.556	1.992	57.920	23.681	66854.700	35840.656	0.864	0.096	1.017	5.809	194843.944	20562.251
Instance4336.6	12.569	1.999	58.186	23.732	67585.124	35838.044	0.826	0.095	1.017	5.829	194176.740	20484.422
Instance4336.7	12.470	1.688	58.181	23.702	67607.159	35828.062	0.792	0.093	1.014	5.812	193609.486	20479.751
Instance4336.8	13.322	1.693	58.011	23.705	66875.062	35816.855	0.818	0.094	1.010	5.795	193746.489	20468.729
Instance4336.9	12.580	1.394	58.224	23.722	67549.304	35821.405	0.761	0.096	1.013	5.808	194102.563	20495.148
Instance4336.10	13.550	1.399	57.980	23.679	66819.513	35838.630	0.767	0.094	1.010	5.800	193781.713	20462.793
Instance4336.11	15.024	1.170	57.954	23.600	67093.178	35839.248	0.894	0.102	1.010	5.782	193546.653	20516.905
Instance4336.12	15.785	1.175	57.704	23.699	66058.841	35828.511	0.933	0.101	1.012	5.808	194000.655	20465.918
Instance4336.13	12.378	1.061	58.170	23.688	67630.282	35848.239	0.792	0.095	1.015	5.805	194425.773	20555.057
Instance4336.14	13.096	1.066	58.055	23.714	66882.900	35833.372	0.774	0.093	1.009	5.784	193025.121	20487.216

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.333	0.107	1.177
Available MBytes	152192.082	152120.000	152465.000
Free System Page Table Entries	16513498.643	16511945.000	16513815.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	121229217.225	121094144.000	121462784.000
Pool Paged Bytes	108589358.853	107884544.000	113262592.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/10/2014 11:23:50 PM -- Preparing for testing ...
8/10/2014 11:24:05 PM -- Attaching databases ...
8/10/2014 11:24:05 PM -- Preparations for testing are complete.
8/10/2014 11:24:05 PM -- Starting transaction dispatch ..
8/10/2014 11:24:05 PM -- Database cache settings: (minimum: 448.0 MB, maximum: 3.5 GB)
8/10/2014 11:24:05 PM -- Database flush thresholds: (start: 35.8 MB, stop: 71.7 MB)
8/10/2014 11:24:19 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 200 msec/read).
8/10/2014 11:24:19 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 200 msec/write).
8/10/2014 11:24:21 PM -- Operation mix: Sessions 20, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/10/2014 11:24:21 PM -- Performance logging started (interval: 15000 ms).
8/10/2014 11:24:21 PM -- Attaining prerequisites:
8/10/2014 11:28:46 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 3403133000.0 (lower bound: 3382287000.0, upper bound: none)
8/11/2014 11:28:46 PM -- Performance logging has ended.
8/11/2014 11:28:46 PM -- JetInterop batch transaction stats: 163920, 163920, 163920, 163920, 163920, 163920, 163919, 163919, 163919, 163919, 163919, 163919, 163919 and 163919.
8/11/2014 11:28:46 PM -- Dispatching transactions ends.
8/11/2014 11:28:47 PM -- Shutting down databases ...
8/11/2014 11:29:08 PM -- Instance4336.1 (complete), Instance4336.2 (complete), Instance4336.3 (complete), Instance4336.4 (complete), Instance4336.5 (complete), Instance4336.6 (complete),
Instance4336.7 (complete), Instance4336.8 (complete), Instance4336.9 (complete), Instance4336.10 (complete), Instance4336.11 (complete), Instance4336.12 (complete), Instance4336.13 (complete)
and Instance4336.14 (complete)
8/11/2014 11:29:08 PM -- C:\Users\Administrator\Desktop\ESRP\20T 24hrs 2\Stress_2014_8_10_23_24_19.blg has 5765 samples.
8/11/2014 11:29:09 PM -- Creating test report ...
8/11/2014 11:30:12 PM -- Instance4336.1 has 13.2 for I/O Database Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.1 has 0.1 for I/O Log Writes Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.1 has 0.1 for I/O Log Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.2 has 13.9 for I/O Database Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.2 has 0.1 for I/O Log Writes Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.2 has 0.1 for I/O Log Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.3 has 12.5 for I/O Database Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.3 has 0.1 for I/O Log Writes Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.3 has 0.1 for I/O Log Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.4 has 13.5 for I/O Database Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.4 has 0.1 for I/O Log Writes Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.4 has 0.1 for I/O Log Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.5 has 13.6 for I/O Database Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.5 has 0.1 for I/O Log Writes Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.5 has 0.1 for I/O Log Reads Average Latency.

8/11/2014 11:30:12 PM -- Instance4336.7 has 12.5 for I/O Database Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.7 has 0.1 for I/O Log Writes Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.7 has 0.1 for I/O Log Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.8 has 13.3 for I/O Database Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.8 has 0.1 for I/O Log Writes Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.8 has 0.1 for I/O Log Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.9 has 12.6 for I/O Database Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.9 has 0.1 for I/O Log Writes Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.9 has 0.1 for I/O Log Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.10 has 13.6 for I/O Database Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.10 has 0.1 for I/O Log Writes Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.10 has 0.1 for I/O Log Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.11 has 15.0 for I/O Database Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.11 has 0.1 for I/O Log Writes Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.11 has 0.1 for I/O Log Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.12 has 15.8 for I/O Database Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.12 has 0.1 for I/O Log Writes Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.12 has 0.1 for I/O Log Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.13 has 12.4 for I/O Database Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.13 has 0.1 for I/O Log Writes Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.13 has 0.1 for I/O Log Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.14 has 13.1 for I/O Database Reads Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.14 has 0.1 for I/O Log Writes Average Latency.
8/11/2014 11:30:12 PM -- Instance4336.14 has 0.1 for I/O Log Reads Average Latency.
8/11/2014 11:30:12 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/11/2014 11:30:12 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/11/2014 11:30:12 PM -- C:\Users\Administrator\Desktop\ESRP\20T 24hrs 2\Stress_2014_8_10_23_24_19.xml has 5747 samples queried.
```

C   Database Backup Test Result Report

C.1   Server 1

Microsoft Exchange Jetstress 2013

Database backup Test Result Report

Database Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance3488.1	880000.03	01:25:46	171.00
Instance3488.2	879992.03	01:32:10	159.12
Instance3488.3	879992.03	01:23:45	175.11
Instance3488.4	880000.03	01:30:04	162.81
Instance3488.5	879984.03	01:29:49	163.29
Instance3488.6	880000.03	01:22:46	177.18
Instance3488.7	879992.03	01:20:47	181.54
Instance3488.8	879992.03	01:30:05	162.80
Instance3488.9	880000.03	01:23:00	176.70
Instance3488.10	880000.03	01:32:03	159.31
Instance3488.11	880000.03	01:22:59	176.71
Instance3488.12	880000.03	01:29:51	163.22
Instance3488.13	879992.03	01:23:07	176.44
Instance3488.14	880000.03	01:32:13	159.05
Avg			168.88
Sum			2364.27

Jetstress System Parameters

Thread Count	20
Minimum Database Cache	448.0 MB
Maximum Database Cache	3584.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%

Instance3488.1 Log path: C:\VOL1\DB1
Database: C:\VOL1\DB1\Jetstress001001.edb

Instance3488.2 Log path: C:\VOL1\DB2
Database: C:\VOL1\DB2\Jetstress002001.edb

Instance3488.3 Log path: C:\VOL2\DB3
Database: C:\VOL2\DB3\Jetstress003001.edb

Instance3488.4 Log path: C:\VOL2\DB4
Database: C:\VOL2\DB4\Jetstress004001.edb

Instance3488.5 Log path: C:\VOL3\DB5
Database: C:\VOL3\DB5\Jetstress005001.edb

Instance3488.6 Log path: C:\VOL3\DB6
Database: C:\VOL3\DB6\Jetstress006001.edb

Instance3488.7 Log path: C:\VOL4\DB7
Database: C:\VOL4\DB7\Jetstress007001.edb

Instance3488.8 Log path: C:\VOL4\DB8
Database: C:\VOL4\DB8\Jetstress008001.edb

Instance3488.9 Log path: C:\VOL5\DB9
Database: C:\VOL5\DB9\Jetstress009001.edb

Instance3488.10 Log path: C:\VOL5\DB10
Database: C:\VOL5\DB10\Jetstress010001.edb

Instance3488.11 Log path: C:\VOL6\DB11
Database: C:\VOL6\DB11\Jetstress011001.edb

Instance3488.12 Log path: C:\VOL6\DB12
Database: C:\VOL6\DB12\Jetstress012001.edb

Instance3488.13 Log path: C:\VOL7\DB13
Database: C:\VOL7\DB13\Jetstress013001.edb

Instance3488.14 Log path: C:\VOL7\DB14
Database: C:\VOL7\DB14\Jetstress014001.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
Instance3488.1	2.243	0.000	684.943	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3488.2	2.393	0.000	636.354	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3488.3	1.939	0.000	700.340	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3488.4	2.103	0.000	651.319	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3488.5	2.123	0.000	653.055	0.000	262144.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3488.6	1.946	0.000	708.621	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3488.7	1.890	0.000	726.002	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3488.8	2.126	0.000	651.200	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3488.9	1.927	0.000	706.773	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3488.10	2.160	0.000	637.175	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3488.11	1.947	0.000	706.777	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3488.12	2.122	0.000	652.825	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3488.13	1.944	0.000	705.693	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3488.14	2.176	0.000	636.072	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	2.557	0.686	2.855
Available MBytes	187484.440	187483.000	187486.000
Free System Page Table Entries	16484598.082	16484401.000	16484875.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	128695385.043	128581632.000	128888832.000
Pool Paged Bytes	104787834.435	104755200.000	104816640.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

8/3/2014 9:17:45 PM -- Preparing for testing ...
8/3/2014 9:17:59 PM -- Attaching databases ...
8/3/2014 9:17:59 PM -- Preparations for testing are complete.
8/3/2014 9:18:15 PM -- Performance logging started (interval: 30000 ms).
8/3/2014 9:18:15 PM -- Backing up databases ...
8/3/2014 10:50:28 PM -- Performance logging has ended.
8/3/2014 10:50:28 PM -- Instance3488.1 (100% processed), Instance3488.2 (100% processed), Instance3488.3 (100% processed), Instance3488.4 (100% processed), Instance3488.5 (100% processed), Instance3488.6 (100% processed), Instance3488.7 (100% processed), Instance3488.8 (100% processed), Instance3488.9 (100% processed), Instance3488.10 (100% processed), Instance3488.11 (100% processed), Instance3488.12 (100% processed), Instance3488.13 (100% processed) and Instance3488.14 (100% processed)
8/3/2014 10:50:28 PM -- C:\Users\Administrator\Desktop\ESRP\All New\DB Backup\DatabaseBackup_2014_8_3_21_18_0.blg has 184 samples.
8/3/2014 10:50:28 PM -- Creating test report ...

C.2   Server 2

Microsoft Exchange Jetstress 2013

Database backup Test Result Report

Database Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance4380.1	880112.03	01:26:08	170.28
Instance4380.2	880120.03	01:32:57	157.80
Instance4380.3	880112.03	01:21:40	179.59
Instance4380.4	880096.03	01:31:27	160.40
Instance4380.5	880120.03	01:31:01	161.14
Instance4380.6	880120.03	01:22:47	177.18
Instance4380.7	880112.03	01:22:23	178.03
Instance4380.8	880112.03	01:29:39	163.59
Instance4380.9	880112.03	01:21:37	179.69
Instance4380.10	880104.03	01:29:09	164.52
Instance4380.11	880120.03	01:24:23	173.82
Instance4380.12	880120.03	01:31:06	160.99
Instance4380.13	880112.03	01:22:14	178.37
Instance4380.14	880104.03	01:30:43	161.69
Avg			169.08
Sum			2367.10

Jetstress System Parameters

Thread Count	20
Minimum Database Cache	448.0 MB
Maximum Database Cache	3584.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%

Instance4380.1 Log path: C:\VOL1\DB1
Database: C:\VOL1\DB1\Jetstress001001.edb

Instance4380.2 Log path: C:\VOL1\DB2
Database: C:\VOL1\DB2\Jetstress002001.edb

Instance4380.3 Log path: C:\VOL2\DB3
Database: C:\VOL2\DB3\Jetstress003001.edb

Instance4380.4 Log path: C:\VOL2\DB4
Database: C:\VOL2\DB4\Jetstress004001.edb

Instance4380.5 Log path: C:\VOL3\DB5
Database: C:\VOL3\DB5\Jetstress005001.edb

Instance4380.6 Log path: C:\VOL3\DB6
Database: C:\VOL3\DB6\Jetstress006001.edb

Instance4380.7 Log path: C:\VOL4\DB7
Database: C:\VOL4\DB7\Jetstress007001.edb

Instance4380.8 Log path: C:\VOL4\DB8
Database: C:\VOL4\DB8\Jetstress008001.edb

Instance4380.9 Log path: C:\VOL5\DB9
Database: C:\VOL5\DB9\Jetstress009001.edb

Instance4380.10 Log path: C:\VOL5\DB10
Database: C:\VOL5\DB10\Jetstress010001.edb

Instance4380.11 Log path: C:\VOL6\DB11
Database: C:\VOL6\DB11\Jetstress011001.edb

Instance4380.12 Log path: C:\VOL6\DB12
Database: C:\VOL6\DB12\Jetstress012001.edb

Instance4380.13 Log path: C:\VOL7\DB13
Database: C:\VOL7\DB13\Jetstress013001.edb

Instance4380.14 Log path: C:\VOL7\DB14
Database: C:\VOL7\DB14\Jetstress014001.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
Instance4380.1	2.556	0.000	681.964	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4380.2	2.494	0.000	631.458	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4380.3	2.057	0.000	718.243	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4380.4	2.307	0.000	641.512	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4380.5	2.297	0.000	644.339	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4380.6	2.084	0.000	708.606	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4380.7	2.075	0.000	711.980	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4380.8	2.260	0.000	654.240	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4380.9	2.055	0.000	718.688	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4380.10	2.250	0.000	657.930	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4380.11	2.125	0.000	695.250	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4380.12	2.299	0.000	643.835	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4380.13	2.070	0.000	713.376	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4380.14	2.289	0.000	646.686	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	1.503	0.127	1.897
Available MBytes	155925.308	155924.000	155929.000
Free System Page Table Entries	16513950.459	16513710.000	16514178.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	121434112.000	121421824.000	121479168.000
Pool Paged Bytes	115746362.119	115728384.000	115781632.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

8/12/2014 6:52:25 AM -- Preparing for testing ...
8/12/2014 6:52:39 AM -- Attaching databases ...
8/12/2014 6:52:39 AM -- Preparations for testing are complete.
8/12/2014 6:52:54 AM -- Performance logging started (interval: 30000 ms).
8/12/2014 6:52:54 AM -- Backing up databases ...
8/12/2014 8:25:52 AM -- Performance logging has ended.
8/12/2014 8:25:52 AM -- Instance4380.1 (100% processed), Instance4380.2 (100% processed), Instance4380.3 (100% processed), Instance4380.4 (100% processed), Instance4380.5 (100% processed), Instance4380.6 (100% processed), Instance4380.7 (100% processed), Instance4380.8 (100% processed), Instance4380.9 (100% processed), Instance4380.10 (100% processed), Instance4380.11 (100% processed), Instance4380.12 (100% processed), Instance4380.13 (100% processed) and Instance4380.14 (100% processed)
8/12/2014 8:25:52 AM -- C:\Users\Administrator\Desktop\ESRP\DB Backup\DatabaseBackup_2014_8_12_6_52_39.blg has 185 samples.
8/12/2014 8:25:52 AM -- Creating test report ...

D   Soft Recovery test Result Report

D.1   Server 1

Microsoft Exchange Jetstress 2013

SoftRecovery Test Result Report

Soft-Recovery Statistics - All

Database Instance	Log files replayed	Elapsed seconds
Instance2984.1	511	1219.9673714
Instance2984.2	504	1199.3723952
Instance2984.3	509	1248.6716692
Instance2984.4	503	1246.6102792
Instance2984.5	504	1259.769952
Instance2984.6	504	1250.2307373
Instance2984.7	504	1244.2848498
Instance2984.8	505	1253.3136341
Instance2984.9	506	1263.6230162
Instance2984.10	501	1262.3333799
Instance2984.11	505	1260.7942389
Instance2984.12	506	1269.025359
Instance2984.13	511	1273.6719717
Instance2984.14	502	1277.2902455
Avg	505	1252.069
Sum	7075	17528.9590994

Database Configuration

Instance2984.1 Log path: C:\VOL1\DB1
Database: C:\VOL1\DB1\Jetstress001001.edb

Instance2984.2 Log path: C:\VOL1\DB2
Database: C:\VOL1\DB2\Jetstress002001.edb

Instance2984.3 Log path: C:\VOL2\DB3
Database: C:\VOL2\DB3\Jetstress003001.edb

Instance2984.4 Log path: C:\VOL2\DB4
Database: C:\VOL2\DB4\Jetstress004001.edb

Instance2984.5 Log path: C:\VOL3\DB5
Database: C:\VOL3\DB5\Jetstress005001.edb

Instance2984.6 Log path: C:\VOL3\DB6
Database: C:\VOL3\DB6\Jetstress006001.edb

Instance2984.7 Log path: C:\VOL4\DB7
Database: C:\VOL4\DB7\Jetstress007001.edb

Instance2984.8 Log path: C:\VOL4\DB8
Database: C:\VOL4\DB8\Jetstress008001.edb

Instance2984.9 Log path: C:\VOL5\DB9
Database: C:\VOL5\DB9\Jetstress009001.edb

Instance2984.10 Log path: C:\VOL5\DB10
Database: C:\VOL5\DB10\Jetstress010001.edb

Instance2984.11 Log path: C:\VOL6\DB11
Database: C:\VOL6\DB11\Jetstress011001.edb

Instance2984.12 Log path: C:\VOL6\DB12
Database: C:\VOL6\DB12\Jetstress012001.edb

Instance2984.13 Log path: C:\VOL7\DB13
Database: C:\VOL7\DB13\Jetstress013001.edb

Instance2984.14 Log path: C:\VOL7\DB14
Database: C:\VOL7\DB14\Jetstress014001.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
Instance2984.1	31.729	10.859	175.835	1.675	38731.363	32768.000	5.656	0.000	2.094	0.000	209689.204	0.000
Instance2984.2	30.845	9.776	175.315	1.680	38763.492	32768.000	10.835	0.000	2.108	0.000	209714.283	0.000
Instance2984.3	31.746	9.990	171.270	1.627	38780.243	32768.000	11.017	0.000	2.034	0.000	209675.072	0.000
Instance2984.4	32.980	9.784	171.203	1.613	38780.703	32768.000	8.446	0.000	2.017	0.000	209750.276	0.000
Instance2984.5	33.794	10.399	168.700	1.599	38864.028	32768.000	7.595	0.000	2.006	0.000	209728.240	0.000
Instance2984.6	32.693	10.355	168.234	1.611	38793.560	32768.000	13.944	0.000	2.014	0.000	209635.767	0.000
Instance2984.7	32.029	10.145	170.844	1.620	38722.781	32768.000	13.513	0.000	2.025	0.000	209613.121	0.000
Instance2984.8	33.377	10.532	168.320	1.609	38745.441	32768.000	8.374	0.000	2.012	0.000	209723.890	0.000
Instance2984.9	33.138	10.744	166.114	1.599	38620.681	32768.000	13.439	0.000	1.999	0.000	209531.546	0.000
Instance2984.10	33.445	11.009	168.119	1.586	38762.209	32768.000	8.587	0.000	1.983	0.000	209686.779	0.000
Instance2984.11	32.762	10.484	168.601	1.602	38794.722	32768.000	12.412	0.000	2.003	0.000	209646.544	0.000
Instance2984.12	33.627	10.624	169.259	1.592	38806.265	32768.000	8.126	0.000	1.990	0.000	209719.173	0.000
Instance2984.13	32.657	10.670	167.177	1.603	38626.712	32768.000	10.115	0.000	2.003	0.000	209752.315	0.000
Instance2984.14	33.914	9.941	167.947	1.569	38790.160	32768.000	9.469	0.000	1.962	0.000	209701.696	0.000

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance2984.1	0.000	0.000
Instance2984.2	0.000	0.000
Instance2984.3	0.000	0.000
Instance2984.4	0.000	0.000
Instance2984.5	0.000	0.000
Instance2984.6	0.000	0.000
Instance2984.7	0.000	0.000
Instance2984.8	0.000	0.000
Instance2984.9	0.000	0.000
Instance2984.10	0.000	0.000
Instance2984.11	0.000	0.000
Instance2984.12	0.000	0.000
Instance2984.13	0.000	0.000
Instance2984.14	0.000	0.000

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
Instance2984.1	31.729	10.859	175.835	1.675	38731.363	32768.000	5.656	0.000	2.094	0.000	209689.204	0.000
Instance2984.2	30.845	9.776	175.315	1.680	38763.492	32768.000	10.835	0.000	2.108	0.000	209714.283	0.000
Instance2984.3	31.746	9.990	171.270	1.627	38780.243	32768.000	11.017	0.000	2.034	0.000	209675.072	0.000
Instance2984.4	32.980	9.784	171.203	1.613	38780.703	32768.000	8.446	0.000	2.017	0.000	209750.276	0.000
Instance2984.5	33.794	10.399	168.700	1.599	38864.028	32768.000	7.595	0.000	2.006	0.000	209728.240	0.000
Instance2984.6	32.693	10.355	168.234	1.611	38793.560	32768.000	13.944	0.000	2.014	0.000	209635.767	0.000
Instance2984.7	32.029	10.145	170.844	1.620	38722.781	32768.000	13.513	0.000	2.025	0.000	209613.121	0.000
Instance2984.8	33.377	10.532	168.320	1.609	38745.441	32768.000	8.374	0.000	2.012	0.000	209723.890	0.000
Instance2984.9	33.138	10.744	166.114	1.599	38620.681	32768.000	13.439	0.000	1.999	0.000	209531.546	0.000
Instance2984.10	33.445	11.009	168.119	1.586	38762.209	32768.000	8.587	0.000	1.983	0.000	209686.779	0.000
Instance2984.11	32.762	10.484	168.601	1.602	38794.722	32768.000	12.412	0.000	2.003	0.000	209646.544	0.000
Instance2984.12	33.627	10.624	169.259	1.592	38806.265	32768.000	8.126	0.000	1.990	0.000	209719.173	0.000
Instance2984.13	32.657	10.670	167.177	1.603	38626.712	32768.000	10.115	0.000	2.003	0.000	209752.315	0.000
Instance2984.14	33.914	9.941	167.947	1.569	38790.160	32768.000	9.469	0.000	1.962	0.000	209701.696	0.000

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.981	0.101	1.679
Available MBytes	183904.339	183726.000	187307.000
Free System Page Table Entries	16484421.924	16484115.000	16484637.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	129082212.456	129040384.000	129171456.000
Pool Paged Bytes	105545598.380	105541632.000	105553920.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

8/4/2014 7:13:20 AM -- Preparing for testing ...
8/4/2014 7:13:34 AM -- Attaching databases ...
8/4/2014 7:13:34 AM -- Preparations for testing are complete.
8/4/2014 7:13:34 AM -- Starting transaction dispatch ..
8/4/2014 7:13:34 AM -- Database cache settings: (minimum: 448.0 MB, maximum: 3.5 GB)
8/4/2014 7:13:34 AM -- Database flush thresholds: (start: 35.8 MB, stop: 71.7 MB)
8/4/2014 7:13:49 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
8/4/2014 7:13:49 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
8/4/2014 7:13:50 AM -- Operation mix: Sessions 20, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/4/2014 7:13:50 AM -- Performance logging started (interval: 15000 ms).
8/4/2014 7:13:50 AM -- Generating log files ...
8/4/2014 9:43:17 AM -- C:\VOL1\DB1 (102.2% generated), C:\VOL1\DB2 (100.6% generated), C:\VOL2\DB3 (101.8% generated), C:\VOL2\DB4 (100.6% generated), C:\VOL3\DB5 (100.8% generated), C:\VOL3\DB6 (100.8% generated), C:\VOL4\DB7 (100.8% generated), C:\VOL4\DB8 (101.0% generated), C:\VOL5\DB9 (101.2% generated), C:\VOL5\DB10 (100.2% generated), C:\VOL6\DB11 (101.0% generated), C:\VOL6\DB12 (101.2% generated), C:\VOL7\DB13 (102.0% generated) and C:\VOL7\DB14 (100.4% generated)
8/4/2014 9:43:18 AM -- Performance logging has ended.
8/4/2014 9:43:18 AM -- JetInterop batch transaction stats: 17002, 17002, 17002, 17002, 17002, 17001, 17001, 17001, 17001, 17001, 17001, 17001, 17001 and 17001.
8/4/2014 9:43:18 AM -- Dispatching transactions ends.
8/4/2014 9:43:18 AM -- Shutting down databases ...
8/4/2014 9:43:41 AM -- Instance2984.1 (complete), Instance2984.2 (complete), Instance2984.3 (complete), Instance2984.4 (complete), Instance2984.5 (complete), Instance2984.6 (complete), Instance2984.7 (complete), Instance2984.8 (complete), Instance2984.9 (complete), Instance2984.10 (complete), Instance2984.11 (complete), Instance2984.12 (complete), Instance2984.13 (complete) and Instance2984.14 (complete)
8/4/2014 9:43:41 AM -- C:\Users\Administrator\Desktop\ESRP\All New\Soft recovery\Performance_2014_8_4_7_13_49.blg has 596 samples.
8/4/2014 9:43:41 AM -- Creating test report ...
8/4/2014 9:43:46 AM -- Instance2984.1 has 12.8 for I/O Database Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.1 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.1 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.2 has 12.8 for I/O Database Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.2 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.2 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.3 has 13.2 for I/O Database Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.3 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.3 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.4 has 13.6 for I/O Database Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.4 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.4 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.5 has 13.9 for I/O Database Reads Average Latency.

8/4/2014 9:43:46 AM -- Instance2984.5 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.5 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.6 has 13.6 for I/O Database Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.6 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.6 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.7 has 13.3 for I/O Database Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.7 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.7 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.8 has 13.8 for I/O Database Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.8 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.8 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.9 has 13.7 for I/O Database Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.9 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.9 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.10 has 14.0 for I/O Database Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.10 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.10 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.11 has 13.8 for I/O Database Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.11 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.11 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.12 has 14.0 for I/O Database Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.12 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.12 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.13 has 14.0 for I/O Database Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.13 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.13 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.14 has 14.5 for I/O Database Reads Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.14 has 0.1 for I/O Log Writes Average Latency.
8/4/2014 9:43:46 AM -- Instance2984.14 has 0.1 for I/O Log Reads Average Latency.
8/4/2014 9:43:46 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/4/2014 9:43:46 AM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/4/2014 9:43:46 AM -- C:\Users\Administrator\Desktop\ESRP\All New\Soft recovery\Performance_2014_8_4_7_13_49.xml has 595 samples queried.
8/4/2014 9:43:46 AM -- C:\Users\Administrator\Desktop\ESRP\All New\Soft recovery\Performance_2014_8_4_7_13_49.html was saved.
8/4/2014 9:43:47 AM -- Performance logging started (interval: 4000 ms).
8/4/2014 9:43:47 AM -- Recovering databases ...
8/4/2014 10:05:06 AM -- Performance logging has ended.
8/4/2014 10:05:06 AM -- Instance2984.1 (1219.9673714), Instance2984.2 (1199.3723952), Instance2984.3 (1248.6716692), Instance2984.4 (1246.6102792), Instance2984.5 (1259.769952), Instance2984.6 (1250.2307373), Instance2984.7 (1244.2848498), Instance2984.8 (1253.3136341), Instance2984.9 (1263.6230162), Instance2984.10 (1262.3333799), Instance2984.11 (1260.7942389),

Instance2984.6 (1250.2307373), Instance2984.7 (1244.2848498), Instance2984.8 (1253.3136341), Instance2984.9 (1263.6230162), Instance2984.10 (1262.3333799), Instance2984.11 (1260.7942389), Instance2984.12 (1269.025359), Instance2984.13 (1273.6719717) and Instance2984.14 (1277.2902455)
8/4/2014 10:05:06 AM -- C:\Users\Administrator\Desktop\ESRP\All New\Soft recovery\SoftRecovery_2014_8_4_9_43_46.blg has 316 samples.
8/4/2014 10:05:06 AM -- Creating test report ...

D.2   Server 2

Microsoft Exchange Jetstress 2013

SoftRecovery Test Result Report

Soft-Recovery Statistics - All

Database Instance	Log files replayed	Elapsed seconds
Instance4860.1	501	1220.8887306
Instance4860.2	504	1220.8887306
Instance4860.3	506	1213.894981
Instance4860.4	512	1246.4801976
Instance4860.5	509	1266.6067963
Instance4860.6	504	1236.9430511
Instance4860.7	513	1235.1449905
Instance4860.8	509	1245.7159949
Instance4860.9	509	1238.2277013
Instance4860.10	505	1257.8673255
Instance4860.11	510	1275.4723014
Instance4860.12	511	1288.4405322
Instance4860.13	506	1225.812664
Instance4860.14	501	1244.6877742
Avg	507	1244.077
Sum	7100	17417.0717712

Database Configuration

Instance4860.1 Log path: C:\VOL1\DB1
Database: C:\VOL1\DB1\Jetstress001001.edb

Instance4860.2 Log path: C:\VOL1\DB2
Database: C:\VOL1\DB2\Jetstress002001.edb

Instance4860.3 Log path: C:\VOL2\DB3
Database: C:\VOL2\DB3\Jetstress003001.edb

Instance4860.4 Log path: C:\VOL2\DB4
Database: C:\VOL2\DB4\Jetstress004001.edb

Instance4860.5 Log path: C:\VOL3\DB5
Database: C:\VOL3\DB5\Jetstress005001.edb

Instance4860.6 Log path: C:\VOL3\DB6
Database: C:\VOL3\DB6\Jetstress006001.edb

Instance4860.7 Log path: C:\VOL4\DB7
Database: C:\VOL4\DB7\Jetstress007001.edb

Instance4860.8 Log path: C:\VOL4\DB8
Database: C:\VOL4\DB8\Jetstress008001.edb

Instance4860.9 Log path: C:\VOL5\DB9
Database: C:\VOL5\DB9\Jetstress009001.edb

Instance4860.10 Log path: C:\VOL5\DB10
Database: C:\VOL5\DB10\Jetstress010001.edb

Instance4860.11 Log path: C:\VOL6\DB11
Database: C:\VOL6\DB11\Jetstress011001.edb

Instance4860.12 Log path: C:\VOL6\DB12
Database: C:\VOL6\DB12\Jetstress012001.edb

Instance4860.13 Log path: C:\VOL7\DB13
Database: C:\VOL7\DB13\Jetstress013001.edb

Instance4860.14 Log path: C:\VOL7\DB14
Database: C:\VOL7\DB14\Jetstress014001.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
Instance4860.1	29.631	9.689	175.691	1.641	38892.692	32768.000	7.932	0.000	2.051	0.000	209720.991	0.000
Instance4860.2	29.375	10.160	176.962	1.651	38732.702	32768.000	8.477	0.000	2.063	0.000	209760.939	0.000
Instance4860.3	29.134	9.731	176.543	1.666	38858.504	32768.000	13.156	0.000	2.090	0.000	209761.818	0.000
Instance4860.4	30.013	9.567	174.408	1.642	38753.830	32768.000	8.734	0.000	2.053	0.000	209632.410	0.000
Instance4860.5	31.474	10.900	169.901	1.607	38892.559	32768.000	9.537	0.000	2.008	0.000	209732.070	0.000
Instance4860.6	29.876	9.898	174.504	1.626	38880.763	32768.000	13.447	0.000	2.032	0.000	209628.539	0.000
Instance4860.7	29.757	10.469	174.300	1.661	38726.479	32768.000	10.631	0.000	2.077	0.000	209712.140	0.000
Instance4860.8	30.355	10.065	171.319	1.631	38859.190	32768.000	9.801	0.000	2.039	0.000	209753.038	0.000
Instance4860.9	29.903	9.396	174.601	1.643	38726.912	32768.000	12.859	0.000	2.061	0.000	209746.496	0.000
Instance4860.10	31.269	10.545	169.143	1.603	38772.311	32768.000	8.426	0.000	2.004	0.000	209689.962	0.000
Instance4860.11	30.691	10.468	169.732	1.596	38716.907	32768.000	13.456	0.000	1.996	0.000	209699.410	0.000
Instance4860.12	31.479	11.051	166.180	1.585	38770.463	32768.000	9.205	0.000	1.981	0.000	209662.082	0.000
Instance4860.13	29.591	10.131	175.897	1.648	38793.910	32768.000	12.006	0.000	2.061	0.000	209684.033	0.000
Instance4860.14	30.924	10.297	171.453	1.606	39043.588	32768.000	8.415	0.000	2.007	0.000	209703.279	0.000

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance4860.1	0.000	0.000
Instance4860.2	0.000	0.000
Instance4860.3	0.000	0.000
Instance4860.4	0.000	0.000
Instance4860.5	0.000	0.000
Instance4860.6	0.000	0.000
Instance4860.7	0.000	0.000
Instance4860.8	0.000	0.000
Instance4860.9	0.000	0.000
Instance4860.10	0.000	0.000
Instance4860.11	0.000	0.000
Instance4860.12	0.000	0.000
Instance4860.13	0.000	0.000
Instance4860.14	0.000	0.000

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
Instance4860.1	29.631	9.689	175.691	1.641	38892.692	32768.000	7.932	0.000	2.051	0.000	209720.991	0.000
Instance4860.2	29.375	10.160	176.962	1.651	38732.702	32768.000	8.477	0.000	2.063	0.000	209760.939	0.000
Instance4860.3	29.134	9.731	176.543	1.666	38858.504	32768.000	13.156	0.000	2.090	0.000	209761.818	0.000
Instance4860.4	30.013	9.567	174.408	1.642	38753.830	32768.000	8.734	0.000	2.053	0.000	209632.410	0.000
Instance4860.5	31.474	10.900	169.901	1.607	38892.559	32768.000	9.537	0.000	2.008	0.000	209732.070	0.000
Instance4860.6	29.876	9.898	174.504	1.626	38880.763	32768.000	13.447	0.000	2.032	0.000	209628.539	0.000
Instance4860.7	29.757	10.469	174.300	1.661	38726.479	32768.000	10.631	0.000	2.077	0.000	209712.140	0.000
Instance4860.8	30.355	10.065	171.319	1.631	38859.190	32768.000	9.801	0.000	2.039	0.000	209753.038	0.000
Instance4860.9	29.903	9.396	174.601	1.643	38726.912	32768.000	12.859	0.000	2.061	0.000	209746.496	0.000
Instance4860.10	31.269	10.545	169.143	1.603	38772.311	32768.000	8.426	0.000	2.004	0.000	209689.962	0.000
Instance4860.11	30.691	10.468	169.732	1.596	38716.907	32768.000	13.456	0.000	1.996	0.000	209699.410	0.000
Instance4860.12	31.479	11.051	166.180	1.585	38770.463	32768.000	9.205	0.000	1.981	0.000	209662.082	0.000
Instance4860.13	29.591	10.131	175.897	1.648	38793.910	32768.000	12.006	0.000	2.061	0.000	209684.033	0.000
Instance4860.14	30.924	10.297	171.453	1.606	39043.588	32768.000	8.415	0.000	2.007	0.000	209703.279	0.000

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.571	0.000	1.431
Available MBytes	152357.969	152184.000	155748.000
Free System Page Table Entries	16513787.619	16513433.000	16514003.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	123940454.400	123801600.000	124035072.000
Pool Paged Bytes	119925030.400	119902208.000	120016896.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/12/2014 10:23:07 AM -- Preparing for testing ...
8/12/2014 10:23:22 AM -- Attaching databases ...
8/12/2014 10:23:22 AM -- Preparations for testing are complete.
8/12/2014 10:23:22 AM -- Starting transaction dispatch ..
8/12/2014 10:23:22 AM -- Database cache settings: (minimum: 448.0 MB, maximum: 3.5 GB)
8/12/2014 10:23:22 AM -- Database flush thresholds: (start: 35.8 MB, stop: 71.7 MB)
8/12/2014 10:23:36 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
8/12/2014 10:23:36 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
8/12/2014 10:23:37 AM -- Operation mix: Sessions 20, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/12/2014 10:23:37 AM -- Performance logging started (interval: 15000 ms).
8/12/2014 10:23:37 AM -- Generating log files ...
8/12/2014 12:52:30 PM -- C:\VOL1\DB1 (100.2% generated), C:\VOL1\DB2 (100.8% generated), C:\VOL2\DB3 (101.2% generated), C:\VOL2\DB4 (102.4% generated), C:\VOL3\DB5 (101.8% generated), C:\VOL3\DB6 (100.6% generated), C:\VOL4\DB7 (102.6% generated), C:\VOL4\DB8 (101.8% generated), C:\VOL5\DB9 (101.8% generated), C:\VOL5\DB10 (101.0% generated), C:\VOL6\DB11 (102.0% generated), C:\VOL6\DB12 (102.2% generated), C:\VOL7\DB13 (101.2% generated) and C:\VOL7\DB14 (100.2% generated)
8/12/2014 12:52:30 PM -- Performance logging has ended.
8/12/2014 12:52:30 PM -- JetInterop batch transaction stats: 16957, 16957, 16957, 16957, 16957, 16956, 16956, 16956, 16956, 16956, 16956, 16956, 16956 and 16956.
8/12/2014 12:52:30 PM -- Dispatching transactions ends.
8/12/2014 12:52:31 PM -- Shutting down databases ...
8/12/2014 12:52:52 PM -- Instance4860.1 (complete), Instance4860.2 (complete), Instance4860.3 (complete), Instance4860.4 (complete), Instance4860.5 (complete), Instance4860.6 (complete), Instance4860.7 (complete), Instance4860.8 (complete), Instance4860.9 (complete), Instance4860.10 (complete), Instance4860.11 (complete), Instance4860.12 (complete), Instance4860.13 (complete) and Instance4860.14 (complete)
8/12/2014 12:52:52 PM -- C:\Users\Administrator\Desktop\ESRP\Soft Recovery\Performance_2014_8_12_10_23_36.blg has 594 samples.
8/12/2014 12:52:52 PM -- Creating test report ...
8/12/2014 12:52:56 PM -- Instance4860.1 has 13.5 for I/O Database Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.1 has 0.1 for I/O Log Writes Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.1 has 0.1 for I/O Log Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.2 has 13.4 for I/O Database Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.2 has 0.1 for I/O Log Writes Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.2 has 0.1 for I/O Log Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.3 has 13.1 for I/O Database Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.3 has 0.1 for I/O Log Writes Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.3 has 0.1 for I/O Log Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.4 has 13.2 for I/O Database Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.4 has 0.1 for I/O Log Writes Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.4 has 0.1 for I/O Log Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.5 has 13.4 for I/O Database Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.5 has 0.1 for I/O Log Writes Average Latency.
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8/12/2014 12:52:56 PM -- Instance4860.6 has 0.1 for I/O Log Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.7 has 13.2 for I/O Database Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.7 has 0.1 for I/O Log Writes Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.7 has 0.1 for I/O Log Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.8 has 13.5 for I/O Database Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.8 has 0.1 for I/O Log Writes Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.8 has 0.1 for I/O Log Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.9 has 13.0 for I/O Database Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.9 has 0.1 for I/O Log Writes Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.9 has 0.1 for I/O Log Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.10 has 13.2 for I/O Database Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.10 has 0.1 for I/O Log Writes Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.10 has 0.1 for I/O Log Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.11 has 15.7 for I/O Database Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.11 has 0.1 for I/O Log Writes Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.11 has 0.1 for I/O Log Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.12 has 15.3 for I/O Database Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.12 has 0.1 for I/O Log Writes Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.12 has 0.1 for I/O Log Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.13 has 13.0 for I/O Database Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.13 has 0.1 for I/O Log Writes Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.13 has 0.1 for I/O Log Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.14 has 13.0 for I/O Database Reads Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.14 has 0.1 for I/O Log Writes Average Latency.
8/12/2014 12:52:56 PM -- Instance4860.14 has 0.1 for I/O Log Reads Average Latency.
8/12/2014 12:52:56 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/12/2014 12:52:56 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/12/2014 12:52:56 PM -- C:\Users\Administrator\Desktop\ESRP\Soft Recovery\Performance_2014_8_12_10_23_36.xml has 593 samples queried.
8/12/2014 12:52:56 PM -- C:\Users\Administrator\Desktop\ESRP\Soft Recovery\Performance_2014_8_12_10_23_36.html was saved.
8/12/2014 12:52:57 PM -- Performance logging started (interval: 4000 ms).
8/12/2014 12:52:57 PM -- Recovering databases ...
8/12/2014 1:14:26 PM -- Performance logging has ended.
8/12/2014 1:14:26 PM -- Instance4860.1 (1220.8887306), Instance4860.2 (1220.8887306), Instance4860.3 (1213.894981), Instance4860.4 (1246.4801976), Instance4860.5 (1266.6067963), Instance4860.6 (1236.9430511), Instance4860.7 (1235.1449905), Instance4860.8 (1245.7159949), Instance4860.9 (1238.2277013), Instance4860.10 (1257.8673255), Instance4860.11 (1275.4723014), Instance4860.12 (1288.4405322), Instance4860.13 (1225.812664) and Instance4860.14 (1244.6877742)
8/12/2014 1:14:26 PM -- C:\Users\Administrator\Desktop\ESRP\Soft Recovery\SoftRecovery_2014_8_12_12_52_56.blg has 320 samples.
8/12/2014 1:14:26 PM -- Creating test report ...