Dell PowerVault MD3860f 20,000 user Mailbox Exchange 2013 Resiliency Storage Solution — Direct Attach FC using dual QLogic QLE2662 16Gb FC adapters

Microsoft ESRP 4.0

Dell MD3 Series storage solutions
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About Microsoft ESRP-Storage program

The Microsoft ESRP-Storage program focuses on storage solution testing to address performance and reliability issues with storage design. However, storage is not the only factor to take into consideration when designing a scale up Exchange solution. Other factors which affect the server scalability are: server processor utilization, server physical and virtual memory limitations, resource requirements for other applications, directory and network service latencies, network infrastructure limitations, replication and recovery requirements, and client usage profiles. All these factors are beyond the scope this document. Therefore, the number of mailboxes hosted per server as part of the tested configuration may not necessarily be viable for some customer deployments.

For more information on identifying and addressing performance bottlenecks in an Exchange system, please refer to Microsoft's Troubleshooting Microsoft Exchange Server Performance, available at http://go.microsoft.com/fwlink/?LinkId=23454.

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1 Executive summary

1.1 Overview

This technical paper describes a tested and validated resilient storage solution for a 20,000 user mailbox Microsoft Exchange 2013 site, with one Data Availability Group (DAG). A DAG is a high availability mechanism in Microsoft Exchange 2013.

The "Low Maintenance" concept of this configuration is based on the self-healing data protection capability of the Dell PowerVault MD3860f storage array using Dynamic Disk Pooling (DDP) technology. DDP enables the solution to withstand multiple drive failures over time without requiring drive maintenance actions by the customer. In addition to up to 8x faster rebuilds during a drive failure, DDP also provides higher levels of system performance during drive failures, delivering improved service to the infrastructure end-users. This capability can be used to design system solutions that require no drive maintenance for multiple years, significantly lowering the operational and therefore total cost of system ownership. Dynamic Disk Pooling is a standard (no-cost) feature of the PowerVault MD3 Series storage. DDP requires a minimum of 11 drives in the pool, so to see the benefits of "low maintenance" it is recommended to add two additional drives to the pool. This will provide at least two years of predicted "no drive maintenance" based on standard drive failure rates.

This mailbox resiliency model supports multiple copies (up to 16) of Exchange databases in a DAG. There can be only one active copy of a given Exchange 2013 database at any given time. Secondary copies, including the copies located at remote sites, are periodically synched with the primary copy. Mail clients access the primary (active) copy, and database changes to the primary copy are copied to the secondary (passive) copies in the form of transaction logs. The copied log records are played on the secondary copy to keep the secondary database copies consistent with the primary copy. All hosts within a DAG are configured to be identical in terms of storage resources for Exchange 2013 databases and logs. The primary and secondary copies do not share any storage resources and reside on their own dedicated storage resources, as discussed later in this document.

This document provides information on a specific Dell MD3860f solution for Microsoft Exchange Server, based on the Microsoft Exchange Solution Reviewed Program (ESRP) Storage program.

The ESRP–Storage program was developed by Microsoft Corporation to provide a common storage testing framework for vendors for information on its storage solutions with Microsoft Exchange Server software. Details about the Microsoft ESRP Storage program are available at http://technet.microsoft.com/en-us/exchange/ff182054.aspx.

1.2 Simulated environment

This Mailbox Resiliency solution utilizes one Database Availability Group (DAG) and two copies of every database with (DDP) Dynamic Disk Pool technology. The tested environment simulates all users in this DAG running on two MD3860f arrays. The tested environment simulates up to 20,000 users with 2GB Mailbox size and 200 messages a day, or 0.12 IOPS for every user, including 20% headroom.

1.3 Solution description

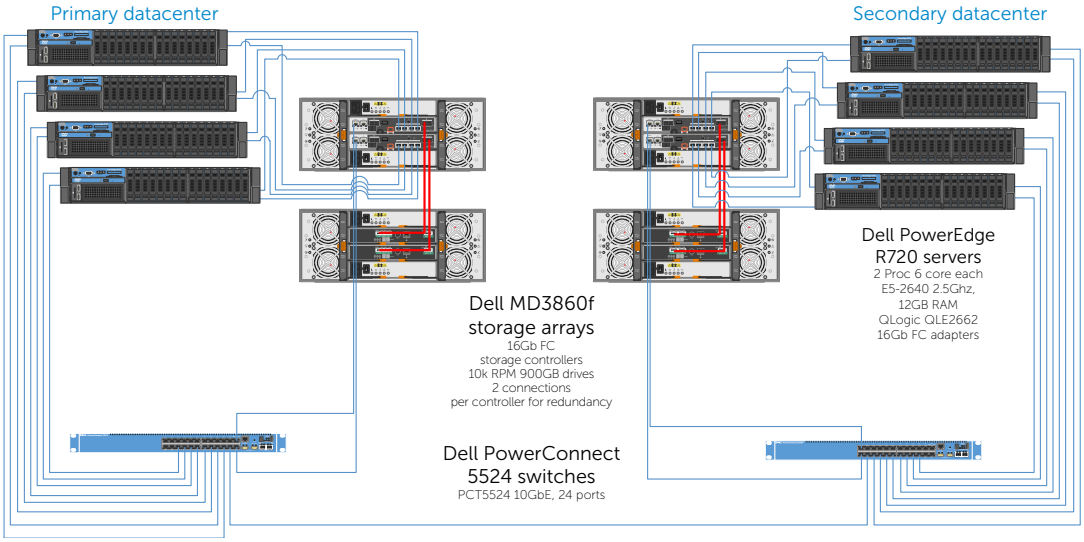
Testing was performed on four Dell R720 servers, dual QLogic QLE2662 16Gb FC HBAs, and two Dell MD3860f storage arrays with redundant controller pair; front-end connections and back-end connections. Exchange is a critical application in most businesses today and the design of the system supporting Exchange should have redundant components and a design to support continued operation in case a single component fails. This solution was designed with the ability to support continuous operation during component failure.

The MD3860f is a 4U drive enclosure with 60 2.5" or 3.5" drive slots offering four 16Gb Fibre Channel and two 12Gb SAS host connections per controller. Eighty-three 10k 900GB 6Gbps SAS drives were used in the dedicated dynamic disk pool (DDP). As a redundant solution, databases and logs were stored together on the same volumes using Microsoft best practices. Given the self healing benefits of DDP consideration should be given to add additional HDDs to provide for a long term "no drive replacement" scenario. Adding 5% drive overhead to the drive pool provides for a predicted two years, or more, of no drive maintenance, based on typical drive failure rates. The cost of two additional drives is very low when compared to a skilled professionals time to have to order a new drive and travel to a remote site to replace a single drive.

Information about compatibility is available at http://www.windowsservercatalog.com/item.aspx?idItem=467135f9-8f78-bfed-b511- f62d42b2d1cb&bCatID=1338.

This figure illustrates the architectural design of the solution showing both primary site and secondary site configurations. This solution was tested on the primary site. The secondary site illustrates what a typical configuration would look like if a redundant Exchange environment were implemented.

Direct-attach Fibre Channel storage diagram



2 The Dell MD3860f solution for Microsoft ESRP

2.1 A modular hardware design

The PowerVault MD3860f enclosure is designed to scale the needs of applications requiring large amounts of data storage. The MD3860f is a 60-drive, 4U standard rack enclosure and can scale up to 180 drives using MD3660e expansion enclosures. The MD3 Series is available in 16Gb Fibre Channel and 12Gb SAS host interfaces, 10Gb iSCSI and 12Gb SAS host interfaces or 12Gb SAS host interfaces. The MD3 Series also comes in a 2U 12-drive 3.5 inch drive module, 2U 24-drive 2.5 inch drive module or 4U 60-drive module supporting either 2.5 or 3.5 inch drives. The PowerVault MD3 Series supports simultaneous use of multiple host protocols making it highly adaptable to customer infrastructure environments. The solution described in this paper utilizes the 16Gb FC interface.

Figure 1 Dell PowerVault MD3860f front and back view

The MD3860f supports SAS, SED SAS, near-line SAS (NL-SAS), SED NL-SAS and SSD drives. The ability to mix SAS, near-line SAS and SSD drives within the same enclosure enables the user to blend drives to best suit their application storage needs across three tiers of performance offerings. Non-disruptive and on-line firmware upgrades are designed to enable high availability.

The storage management software, PowerVault Modular Disk Storage Manager (MDSM), was used to configure the storage for this solution. The MD storage management software has three major components:

- Client management software
- Host-agent management software
- Multi-path driver software

The client management software contains the graphical user interface for managing the storage array. It also contains an optional monitor service that sends alerts when an event occurs in the storage array.

The host-agent management software is installed on one or more hosts that are connected to the storage arrays to enable in-band management. The host-agent management software, along with the Ethernet connection on the host, provides another network management connection to the storage array, rather than using the individual Ethernet connections on each RAID controller module in the storage array.

The multi-path driver is also referred to as the I/O path failover driver. With the redundant pair of active RAID controller modules in a storage array, when a virtual disk is created, one of the RAID controller modules is automatically or manually chosen to "own" the virtual disk. The I/O between the virtual disk and the application host along the I/O path is controlled by the RAID controller "owning" virtual disk. When a component along the I/O path to a RAID controller module or the RAID controller module itself fails, ownership of the virtual disks that had been assigned to that RAID controller module automatically transfer to the other RAID controller module. The multi-path driver manages this failover process.

Figure 2 shows the view of disk groups, virtual disks, and the physical disks as displayed in PowerVault Modular Disk Storage Manager. Figure 3 provides an overall summary view of the PowerVault MD3860f. The features of Dell PowerVault MD3860f are detailed in Table 1.

Figure 2 MDSM view of disk groups, virtual disks and physical disks

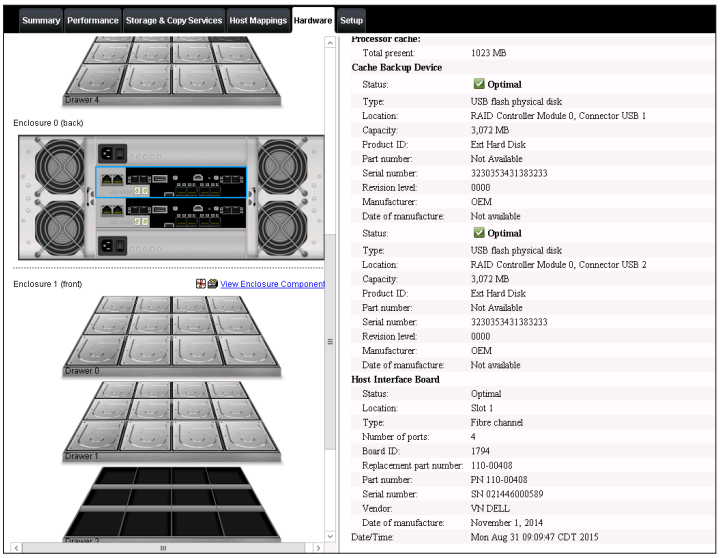


Figure 3 MDSM summary view

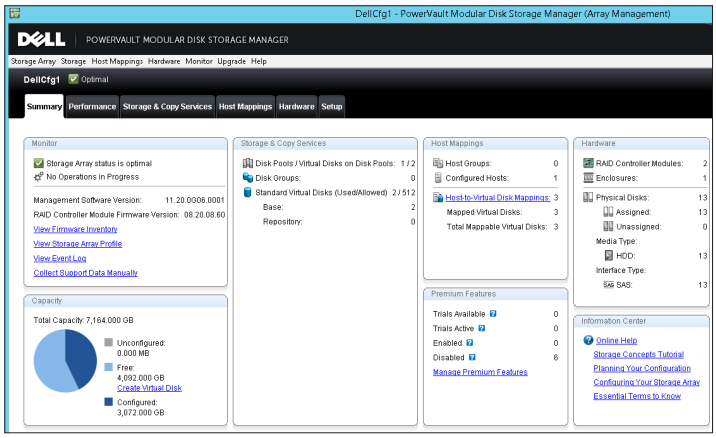


Table 1 Dell PowerVault MD3860f Features

Feature	Details
2U, 24 drive FC enclosure	Designed to fit standard 1,000mm cabinets (32" max depth).
6Gb/s SAS-based storage system	Provides a high availability and high capacity storage offering when using 6GB near-line SAS drives.
Ports	Eight 16Gb/s FC ports (4 per each controller) and four 12Gb/s SAS ports (2 per controller)
Scales to support up to 192 2.5-in SAS drives	• Up to 120 drive slots are supported as part of the base; moving from 121-180 drive slots requires purchase of the Premium Feature Key (PFK) for firmware • High performance SAS, NL-SAS, SEDs and SSDs drives • Configuration supports up to eight additional MD1220 expansion modules.
Support for SAS, near-line SAS and Solid State Disk drives	The ability to mix SAS, near-line SAS and SSD drives within the same enclosure supports a user's ability to blend drives to best suit their applications' storage needs across three tiers of performance offerings.
Non-disruptive, on-line firmware upgrades	Improved data availability
High Performance Tiering (HPT)	Increases system performance
SSD Cache (included as part of HPT)	Increases execution speed of applications by caching previously read data.
Thin Provisioning	• Allocate and consume physical storage capacity as needed • Thin virtual disk can only be created from a disk pool • Reduces the likelihood of having excess, unused capacity in the disk pool
Support for self-encrypting drives (SED)	Secures data at rest.
VMware VAAI support	• The ability to integrate array commands with VMware, allowing for an increased number of VM's. • Reduces SAN traffic as functions are executed in the array.
Dynamic Disk Pools	• Dynamically rebalances data in the event of a drive failure • Allows for the creation of pools without the complexity of RAID • Enables Thin Provisioning
Asymmetric Logical Unit Access (ALUA)	Enables the array to service I/O requests through either RAID controller module

2.2 Dell PowerEdge R720 Features

Dell PowerEdge™ R720 is a 2-socket CPU, 1U, multi-purpose server, offering an excellent balance of redundancy and value in a compact form factor. It is a most suitable hardware building block for any mid-size or large business. It delivers enormous performance in a dense 1U form-factor, enabling larger and more efficient databases and mail servers. Major features of the server/storage system include:

- Intel® Xeon® processor E5-2600 or E5-2600 v2 product family
- Dual processor sockets
- Up to 768 GB of Memory with 24 DIMMs
- Integrated RAID support through PERC H310, PERC H710, PERC H710P
- Up to three PCIe 3.0 expansion slots
- Choice of NIC technologies

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

For more information, see Dell PowerEdge R720 Server product page.

2.3 QLogic QLE2662 FC adapter

The QLogic Fibre Channel adapters have the following design characteristics:

- 16Gbps per port maximum throughput for high bandwidth (SAN) traffic
- Over 1.2 million IOPS reduces latency in high transaction intensive applications and virtualized environments
- Optimization for virtualized environments: with increasing numbers of VMs on virtualized servers it is essential that the I/O performance scales as the VM count grows and doesn't become a bottleneck
- Decreased power and cooling costs by using the fewest PCI Express® lanes in PCIe® Gen 3 environments
- Overlapping protection domains (OPDs) to ensure a high level of reliability as data moves to and from the PCI bus and Fibre Channel network
- Complete investment protection for legacy 8Gb Fibre Channel infrastructure

2.4 Storage Sizing

Storage sizing typically involves the type of data protection chosen, type of disks and the number of disks, both from a capacity and IOPS perspective. Selecting the right storage is crucial to achieve the balance between cost and performance. Jetstress tools provide a way of capturing the storage subsystem IOPS. Storage design also depends on the actual size of the mailbox on the disk, 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 **2**0,000 users with 200 messages/day profile. The recommended IOPS per server is 600. This will be the target IOPs that will be verified and tested as part of ESRP Jetstress verification. More details on this are provided in Section 6.

Figure 4 Recommended IOPS from the Microsoft Exchange 2013 Server Role Requirements Calculator

Role Requirements Results Pane - Log, Disk Space, and IO Requirements				
Transaction Log Requirements	**/ Database**	**/ Server**	**/ DAG**	**/ Environment**
User Transaction Logs Generated / Day	5000	5000	10000	20000
Average Move Mailbox Transaction Logs Generated / Day	1945	1945	3889	7779
Average Transaction Logs Generated / Day	6945	6945	13889	27779
Disk Space Requirements	**/ Database**	**/ Server**	**/ DAG**	**/ Environment**
Transport Database Space Required	--	64 GB	257 GB	515 GB
Database Space Required	1329 GB	1329 GB	10635 GB	21270 GB
Log Space Required	47 GB	47 GB	380 GB	760 GB
Database+Log Volume Space Required	2009 GB	2009 GB	16072 GB	32144 GB
Log Volume Space Required	0 GB	0 GB	0 GB	0 GB
Restore Volume Space Required	--	1449 GB	5797 GB	11594 GB
Host IO and Throughput Requirements	**/ Database**	**/ Server**	**/ DAG**	**/ Environment**
Total Database Required IOPS	20	20	80	161
Total Log Required IOPS	4	4	18	35
Database Read I/O Percentage	60%	--	--	--
Background Database Maintenance Throughput Requirements	1.0 MB/s	1 MB/s	4 MB/s	8 MB/s

2.5 Targeted customer profile

This solution is targeted for a medium-sized organization. Capacity can be dynamically scaled from 600GB to over a petabyte.

1. A Dell MD3 Series storage solution can be sized for any organization
2. Up to four servers can be directly connected to the storage array in a fully redundant configuration via Fibre Channel or iSCSI, two via SAS
3. User I/O profile (0.09 IOPs per user, 0.12 tested, giving 20% headroom).
4. User mailbox size (2GB quota)
5. Dynamic Disk Pooling was chosen for data protection of the database volumes and log volumes

2.6 Volume sizing

The volume size tested was just large enough to support the database size. Volumes on Dell MD3 storage can be grown dynamically, without affecting service. As database sizes approach volume sizes, any volume can be automatically increased on demand. This simplifies sizing, as capacity can be added as needed.

Using Dell Dynamic Volume Expansion and hot upgrades, additional disk capacity can be added as needed. If more spindles are required to accommodate growth, they can simply be added to the disk pool to grow volume space. Since volumes are not tied to spindle boundaries, adding spindles will increase performance and capacity as the system grows.

The testing environment was configured for 88% storage utilization. If the storage requirement grows beyond the design specified, additional spindles will provide additional capacity for any volume to be expanded.

3 Tested Deployment

The following tables summarize the testing environment.

3.1 Simulated Exchange configuration

Configuration Item	Detail
Number of Exchange mailboxes simulated	20,000
Number of DAG	1
Number of servers/DAG	4
Number of active mailboxes/server	5,000
Number of databases/host	8
Number of copies/database	2
Number of mailboxes/database	625
Simulated profile: I/O per second per mailbox (IOPS, include 20% headroom)	0.12
Database/Log LUN size	5.763TB
Total database size for performance testing	46.104GB
% storage capacity used by Exchange database*	87.54%

* Note: Database size and capacity utilized may not match on a thin-provisioned system, as only used pages will consume space. Pages that are allocated, but contain no data, will consume no disk space.

3.2 Primary storage hardware

Configuration Item	Detail
Storage Connectivity (Fibre Channel, SAS, SATA, iSCSI)	FC
Storage Model and OS/firmware revision	Dell MD3860f: 08.20.08.60
Storage Cache	16GB
Number of storage controllers	2
Number of storage ports	4 active FC port per controller
Maximum bandwidth of storage connectivity to host	128GB/s(8x16Gb HBA)
Switch type/model/firmware revision	N/A
HBA model and firmware	QLogic QLE2662 16Gb FC HBA:02.00.84
Number of HBA's/host	2
Host server type	Dell PowerEdge R720 Dual E5-2640 6-core CPU, 32GB RAM
Total number of disks tested in solution	83
Maximum number of spindles that can be hosted in the storage	120 Drives (dual 60 drive modules, one with controllers and the other as expansion)

3.3 Primary storage software

Configuration Item	Detail
HBA driver	9.1.11.3
Multi-Pathing (MPI/O)	Microsoft Windows Server 2012 R2 MPI/O Round-Robin (InBox DSM)
Host OS	Windows Server 2012 R2 Datacenter (6.3.9600)
ESE.dll file version	15.00.0847.030
Replication solution name/version	Microsoft Exchange Server 2013 DAG replication

3.4 Primary storage disk configuration (Mailbox store/ Log disks)

Configuration Item	Detail
Disk Type, speed and firmware revision	SAS 10k 900GB, B556
Raw capacity per disk (GB)	838.363GB
Number of physical disks in test	83
Total raw storage capacity (TB)	51.429TB
Data protection	DDP
Total formatted capacity	837.863 GB
Storage capacity utilization	89.65%
Database capacity utilization	87.41%

4 Best practices

- Ensure Multipath I/O is installed and configured on the server before installing MS Exchange. This feature provides alternate paths between storage devices and hosts in case the primary path fails. This feature also provides load balancing between paths.
- Configure the page file size to be 10MB larger than the physical RAM installed in the server.
- Assign an allocation unit size of 64KB when creating volumes in Windows Server 2012. This option increases the block size of the volume being created. This setting can result in increased performance because it uses the most efficient block size for data transfer on the system bus.
- Set the start demand cache flushing value to 80% in the Dell Modular Disk Storage Manager.
- When creating volumes in the Modular Disk Storage Manager, make sure read and write cache are both enabled. Also confirm that dynamic cache read pre-fetch is enabled. These three settings increase the performance of the storage system.
- Adjust IOPs per user to 0.12 to allow for 20% headroom.

- From a controller resource allocation perspective, there are two user-modifiable reconstruction priorities within DDP. It is recommended to set these as Low or Medium priority settings for NL-SAS drives, this will increase the drive reconstruction time but will also lessen the impact of I/O performance during rebuild.
  - Degraded reconstruction priority is assigned for instances where only a single D-Piece needs to be rebuilt for affected D-Stripes. The default is 'high' 1.
  - Critical reconstruction priority is assigned for instances where a D-Stripe has two missing D-Pieces which need to be rebuilt. The default is 'highest'.
- Given the self healing benefits of DDP consideration should be given to add additional HDDs to provide for a long term "no drive replacement" scenario. Adding 5% drive overhead to the drive pool provides for a predicted two years, or more, of no drive maintenance, based on typical drive failure rates. The cost of two additional drives is very low when compared to a skilled professionals time to have to order a new drive and travel to a remote site to replace a single drive.
- It is best to use SAS drives with Exchange 2013 when a moderate amount of storage capacity is needed with high performance and balanced power consumption. It is also important to disable physical disk-write caching when the drives are used without an un-interruptible power supply (UPS). The 900GB 10k RPM SAS drives used in the testing were chosen for their average storage capacity, excellent random I/O performance, and great sequential I/O performance and power utilization.

Best Practice Exchange 2013 storage configuration options

https://technet.microsoft.com/en-us/library/ee832792(v=exchg.150).aspx

Planning for high availability and site resilience, see https://technet.microsoft.com/library/dd638104(EXCHG.150)#StoreReq

Exchange Server 2013 has changed dramatically from previous versions, see http://technet.microsoft.com/en-us/library/jj150540(v=exchg.150).aspx

Exchange 2013 requirements that you need to know before you install Exchange 2013, see https://technet.microsoft.com/en-us/library/aa996719.aspx

Exchange 2013 Sizing and Configuration Recommendations, see https://technet.microsoft.com/en-us/library/dn879075.aspx

Drive Best Practices

When initializing disks in Windows Server 2012, the disks should be initialized as Basic Disks. Initializing a disk as dynamic increases processor overhead as the server also becomes responsible for managing volumes. This is the recommended disk configuration by Microsoft. When formatting drives, use the GUID partition table (GPT) scheme as opposed to MBR. GPT allows volumes to reach 256TB in size.

It is also important to disable automatic disk optimization and de-fragmentation on Windows Server 2012. When this feature is enabled, additional processor overhead will be incurred because the system will monitor and move data around to prevent fragmentation. Confirm that NTFS compression is not enabled. Do not use NTFS encrypting file system (EFS) or resilient file system (ReFS) as these will also increase processor overhead.

Dynamic Disk Pools

Dell MD3 Series Dynamic Disk Pools (DDP) is a data protection technology designed to deliver consistent storage system performance, data protection, and efficiency throughout the lifecycle of the system. DDP simplifies the setup process and reduces the ongoing maintenance requirements of data protection. With DDP, customers do not have to define RAID array sizes, hot spares, and drive maintenance schedules. DDP distributes data, parity information, and spare capacity across a pool of drives. Its intelligent algorithm defines which drives are used for segment placement, making sure data is fully protected.

DDP is able to utilize every drive in the pool for the intensive process of rebuilding a failed drive. This dynamic rebuild technology is the key to its exceptional performance under failure and returns the system to optimal conditions up to eight times more quickly than traditional RAID technology. With shorter rebuild times and patented prioritization reconstruction technology, DDP significantly reduces exposure to numerous cascading disk failures. Flexible disk pool sizing provides optimal utilization of any configuration for maximum performance, protection, and efficiency. DDP can easily be grown by adding up to 12 additional disk drives at one time.

In addition to superior data protection, Dynamic Disk Pools enable customers to structure their storage infrastructure in a way that can greatly reduce drive maintenance schedules. Designing a disk pool with additional drive capacity for growth at system installation leverages the technology's automatic self-healing capability and can extend drive maintenance schedules by years, driving operational costs down.

Configuration flexibility enables DDP to address wide-ranging requirements. Drives can be configured into one large disk pool to maximize simplicity and protection or into numerous smaller pools to maximize sequential performance. Different drive types can be used to create storage tiers, such as performance pools and capacity pools, and disk pools can reside in the same system with traditional RAID groups.

The following are the four key benefits of DDP technology:

- Reduce performance degradation following a drive (or multiple-drive) failure
- Eliminate complex RAID management without sacrificing data protection
- Eliminate deployment and management of idle hot spare drives
- Expand or contract the disk pool without reconfiguring RAID

Backup strategy

Other features of the MD3 Series that protect data include mirroring and backing up controller cache. If power is lost to the system during operation, onboard batteries are used to destage the data from cache memory to internal controller flash so that it will be available when power is restored. The DDP algorithms allow the system to recreate any lost data in the rare case of drive failure. Users also have the option of confirming data with RAID parity at all times and even continuing a rebuild when hitting an unreadable sector.

Behind the scenes, the system performs other tasks that protect data at all times. The optional media scan feature looks for inconsistencies even on sectors not currently being accessed by any host. All types of diagnostic data are constantly collected for later use by support if necessary.

Not only does the MD3 Series offer the detailed reliability and availability features already described, but using the MDSM software features allows the possibility to maximize availability.

Additional information

For more information Dell MD3 Series storage solutions, visit our website at http://www.dell.com/storage.

5 Test results summary

This section provides a high level summary of the test data from ESRP. The detailed html reports which are generated by ESRP testing framework are shown in the Appendix later in this white-paper.

5.1 Reliability

Tests in this framework to check storage reliability are run over a 24 hour period. The goal of these "Stress tests" is to verify that the storage can handle high I/O load for a long period of time. Both log and database files were analyzed for integrity after the stress test to ensure no database/log corruption.

The following list provides an overview of reliability results:

- No errors were reported in either the application or system log
- No errors were reported during the database and log checksum process
- No errors were reported during either the backup or restore process

5.2 Storage performance results

The Primary Storage performance testing is designed to exercise the storage with maximum sustainable Exchange type I/O for 2 hours. The test illustrates how long it takes for the storage to respond to a specific mailbox profile I/O load. The data below is the sum of all the logical disk I/O and average of all the logical disks I/O latency in the 2 hour test duration. Each server is listed separately and the aggregate numbers across all servers is listed as well.

Multiple Server Metrics:

The sum of all transactional I/O performance across all mailbox databases and the average latency across all databases on a per server basis.

Database I/O	Value
Disks Reads/sec sum	2030.984
Disks Writes/sec sum	915.100
Disk Read Latency (ms) average	11.114
Disk Write Latency (ms) average	1.900
Transaction Log I/O	
Log Disks Writes/sec sum	215.491
Log Disk Write Latency (ms) average	0.629

5.3 Database backup/recovery performance

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

5.3.1 Database read-only performance

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

Performance item	Detail
MB read/sec per database	100.935
MB read/sec total per server	807.505

5.3.2 Transaction log recovery/Replay performance

The purpose of this test is to measure the maximum rate at which the log files can be played against the databases. The following table shows the average rate for 10,000 log files played in a single database. Each log file is 1MB in size.

Performance item	Detail
Average time to play one Log file (sec)	0.708

6 Conclusion

This ESRP document presents a tested and validated Exchange solution for 20,000 mailboxes with 2GB mailbox size supporting up to 200 messages/day in a single DAG. The solution uses four Dell PowerEdge R720 servers attached to two PowerVault MD3860f storage arrays for 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 show that the proposed solution is more than capable of delivering the IOPs and meeting the capacity requirements to support 20,000 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. Customers should not quote the data directly for his/her 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 deliver the maximum throughput for a given solution. Rather, the tests are focused on producing recommendations from vendors for Exchange application. The data presented in this document should not be used for direct comparisons among solutions.

7 Additional resources

Microsoft ESRP Program Website: http://technet.microsoft.com/en- us/exchange/ff182054.aspx

Dell Storage Website: http://www.dell.com/storage/

Dell TechCenter storage page: http://en.community.dell.com/techcenter/storage/

8 Appendix

Test results for each particular mailbox size, users and connection

A Performance testing

Server 1

Test Summary

Overall Test Result	**Pass**
Machine Name	Servers
Test Description	Machine Name: Dell Poweredge R720 (non-virtual) 20000 users Microsoft Exchange 2013 4 Dell Poweredge R720 servers with Microsoft Server 2012 r2 installed 2GB Mailboxes, 5000 users per server, 0.12 IOPs 32 DB and LOG on 8 LUNs (combined) Dell MD3860f and MD3060e using Dynamic Disk Pool (83 drives) technology for data protection Dual QLogic QLE2662 16Gb FC HBAs per server FC-Direct
Test Start Time	8/21/2015 5:55:15 PM
Test End Time	8/22/2015 8:50:18 AM
Collection Start Time	8/21/2015 5:59:31 PM
Collection End Time	8/21/2015 7:59:24 PM
Jetstress Version	15.00.0995.000
ESE Version	15.00.0847.030
Operating System	Windows Server 2012 R2 Datacenter (6.2.9200.0)
Performance Log	C:\Program Files\Exchange Jetstress\Performance_2015_8_21_17_55_32.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second	713.784
Target Transactional I/O per Second	600
Initial Database Size (bytes)	10774051291136
Final Database Size (bytes)	10786751643648
Database Files (Count)	8

Jetstress System Parameters

Thread Count	13
Minimum Database Cache	256.0 MB
Maximum Database Cache	2048.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%
Run Background Database Maintenance	True
Number of Copies per Database	2

Database Configuration

Instance604.1 Log path: C:\Users\Administrator\Desktop\Volume2\log1
Database: C:\Users\Administrator\Desktop\Volume1\db1\Jetstress001001.edb

Instance604.2 Log path: C:\Users\Administrator\Desktop\Volume2\log2
Database: C:\Users\Administrator\Desktop\Volume1\db2\Jetstress002001.edb

Instance604.3 Log path: C:\Users\Administrator\Desktop\Volume2\log3
Database: C:\Users\Administrator\Desktop\Volume1\db3\Jetstress003001.edb

Instance604.4 Log path: C:\Users\Administrator\Desktop\Volume2\log4
Database: C:\Users\Administrator\Desktop\Volume1\db4\Jetstress004001.edb

Instance604.5 Log path: C:\Users\Administrator\Desktop\Volume1\log5
Database: C:\Users\Administrator\Desktop\Volume2\db5\Jetstress005001.edb

Instance604.6 Log path: C:\Users\Administrator\Desktop\Volume1\log6
Database: C:\Users\Administrator\Desktop\Volume2\db6\Jetstress006001.edb

Instance604.7 Log path: C:\Users\Administrator\Desktop\Volume1\log7
Database: C:\Users\Administrator\Desktop\Volume2\db7\Jetstress007001.edb

Instance604.8 Log path: C:\Users\Administrator\Desktop\Volume1\log8
Database: C:\Users\Administrator\Desktop\Volume2\db8\Jetstress008001.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
Instance604.1	12.108	1.629	61.258	27.612	32920.379	34681.624	0.000	0.674	0.000	6.539	0.000	20632.850
Instance604.2	12.597	1.761	61.608	27.683	32911.259	34641.503	0.000	0.674	0.000	6.556	0.000	20245.760
Instance604.3	11.408	1.740	61.525	27.685	32920.151	34653.251	0.000	0.680	0.000	6.490	0.000	20602.998
Instance604.4	11.580	1.766	61.713	27.808	32907.159	34618.238	0.000	0.680	0.000	6.555	0.000	20316.245
Instance604.5	11.117	1.936	61.510	27.572	32931.127	34658.894	0.000	0.669	0.000	6.578	0.000	20277.940
Instance604.6	11.051	1.957	61.335	27.416	32928.552	34662.758	0.000	0.673	0.000	6.460	0.000	20657.643
Instance604.7	10.923	1.998	61.813	27.988	32920.247	34597.825	0.000	0.672	0.000	6.556	0.000	20307.224
Instance604.8	10.769	1.941	61.570	27.689	32930.264	34642.659	0.000	0.670	0.000	6.515	0.000	20548.605

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance604.1	9.669	261852.712
Instance604.2	9.234	261847.909
Instance604.3	9.670	261812.574
Instance604.4	9.668	261882.668
Instance604.5	9.667	261902.124
Instance604.6	9.670	261813.001
Instance604.7	9.669	261832.888
Instance604.8	9.671	261786.948

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance604.1	0.576	211640.948
Instance604.2	0.567	212614.010
Instance604.3	0.571	214073.603
Instance604.4	0.567	210181.356
Instance604.5	0.568	213195.385
Instance604.6	0.570	212682.325
Instance604.7	0.567	209694.825
Instance604.8	0.570	210181.356

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
Instance604.1	12.108	1.629	70.927	27.612	64129.796	34681.624	2.609	0.674	0.576	6.539	211640.948	20632.850
Instance604.2	12.597	1.761	70.842	27.683	62752.228	34641.503	2.720	0.674	0.567	6.556	212614.010	20245.760
Instance604.3	11.408	1.740	71.195	27.685	64010.238	34653.251	2.659	0.680	0.571	6.490	214073.603	20602.998
Instance604.4	11.580	1.766	71.381	27.808	63921.250	34618.238	2.751	0.680	0.567	6.555	210181.356	20316.245
Instance604.5	11.117	1.936	71.177	27.572	64029.060	34658.894	2.386	0.669	0.568	6.578	213195.385	20277.940
Instance604.6	11.051	1.957	71.006	27.416	64100.469	34662.758	2.511	0.673	0.570	6.460	212682.325	20657.643
Instance604.7	10.923	1.998	71.482	27.988	63884.836	34597.825	2.197	0.672	0.567	6.556	209694.825	20307.224
Instance604.8	10.769	1.941	71.241	27.689	63997.827	34642.659	2.290	0.670	0.570	6.515	210181.356	20548.605

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.733	0.411	1.699
Available MBytes	31423.883	31400.000	31589.000
Free System Page Table Entries	16625181.111	16624762.000	16625419.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	203740316.058	203534336.000	203866112.000
Pool Paged Bytes	194629700.409	194531328.000	194785280.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/21/2015 5:55:15 PM -- Preparing for testing ...
8/21/2015 5:55:23 PM -- Attaching databases ...
8/21/2015 5:55:23 PM -- Preparations for testing are complete.
8/21/2015 5:55:23 PM -- Starting transaction dispatch ..
8/21/2015 5:55:23 PM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
8/21/2015 5:55:23 PM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
8/21/2015 5:55:32 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
8/21/2015 5:55:32 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
8/21/2015 5:55:34 PM -- Operation mix: Sessions 13, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/21/2015 5:55:34 PM -- Performance logging started (interval: 15000 ms).
8/21/2015 5:55:34 PM -- Attaining prerequisites:
8/21/2015 5:59:31 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 1935782000.0 (lower bound: 1932735000.0, upper bound: none)
8/21/2015 7:59:32 PM -- Performance logging has ended.
8/22/2015 8:50:13 AM -- JetInterop batch transaction stats: 113712, 113712, 113712, 113712, 113712, 113712, 113711 and 113711.
8/22/2015 8:50:13 AM -- Dispatching transactions ends.
8/22/2015 8:50:15 AM -- Shutting down databases ...
8/22/2015 8:50:18 AM -- Instance604.1 (complete), Instance604.2 (complete), Instance604.3 (complete), Instance604.4 (complete), Instance604.5 (complete), Instance604.6
(complete), Instance604.7 (complete) and Instance604.8 (complete)
8/22/2015 8:50:18 AM -- C:\Program Files\Exchange Jetstress\Performance_2015_8_21_17_55_32.blg has 494 samples.
8/22/2015 8:50:18 AM -- Creating test report ...
8/22/2015 8:50:21 AM -- Instance604.1 has 12.1 for I/O Database Reads Average Latency.
8/22/2015 8:50:21 AM -- Instance604.1 has 0.7 for I/O Log Writes Average Latency.
8/22/2015 8:50:21 AM -- Instance604.1 has 0.7 for I/O Log Reads Average Latency.
8/22/2015 8:50:21 AM -- Instance604.2 has 12.6 for I/O Database Reads Average Latency.
8/22/2015 8:50:21 AM -- Instance604.2 has 0.7 for I/O Log Writes Average Latency.
8/22/2015 8:50:21 AM -- Instance604.2 has 0.7 for I/O Log Reads Average Latency.
8/22/2015 8:50:21 AM -- Instance604.3 has 11.4 for I/O Database Reads Average Latency.
8/22/2015 8:50:21 AM -- Instance604.3 has 0.7 for I/O Log Writes Average Latency.
8/22/2015 8:50:21 AM -- Instance604.3 has 0.7 for I/O Log Reads Average Latency.
8/22/2015 8:50:21 AM -- Instance604.4 has 11.6 for I/O Database Reads Average Latency.
8/22/2015 8:50:21 AM -- Instance604.4 has 0.7 for I/O Log Writes Average Latency.
8/22/2015 8:50:21 AM -- Instance604.4 has 0.7 for I/O Log Reads Average Latency.
8/22/2015 8:50:21 AM -- Instance604.5 has 11.1 for I/O Database Reads Average Latency.
8/22/2015 8:50:21 AM -- Instance604.5 has 0.7 for I/O Log Writes Average Latency.
8/22/2015 8:50:21 AM -- Instance604.5 has 0.7 for I/O Log Reads Average Latency.
8/22/2015 8:50:21 AM -- Instance604.6 has 11.1 for I/O Database Reads Average Latency.
8/22/2015 8:50:21 AM -- Instance604.6 has 0.7 for I/O Log Writes Average Latency.
8/22/2015 8:50:21 AM -- Instance604.6 has 0.7 for I/O Log Reads Average Latency.
8/22/2015 8:50:21 AM -- Instance604.7 has 10.9 for I/O Database Reads Average Latency.
8/22/2015 8:50:21 AM -- Instance604.7 has 0.7 for I/O Log Writes Average Latency.
8/22/2015 8:50:21 AM -- Instance604.7 has 0.7 for I/O Log Reads Average Latency.
8/22/2015 8:50:21 AM -- Instance604.8 has 10.8 for I/O Database Reads Average Latency.
8/22/2015 8:50:21 AM -- Instance604.8 has 0.7 for I/O Log Writes Average Latency.
8/22/2015 8:50:21 AM -- Instance604.8 has 0.7 for I/O Log Reads Average Latency.
8/22/2015 8:50:21 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/22/2015 8:50:21 AM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/22/2015 8:50:21 AM -- C:\Program Files\Exchange Jetstress\Performance_2015_8_21_17_55_32.xml has 478 samples queried.
```

Server 2

Test Summary

Overall Test Result	**Pass**
Machine Name	Servers
Test Description	Machine Name: Dell Poweredge R720 (non-virtual) 20000 users Microsoft Exchange 2013 4 Dell Poweredge R720 servers with Microsoft Server 2012 r2 installed 2GB Mailboxes, 5000 users per server, 0.12 IOPs 32 DB and LOG on 8 LUNs (combined) Dell MD3860f and MD3060e using Dynamic Disk Pool (83 drives) technology for data protection Dual QLogic QLE2662 16Gb FC HBAs per server FC-Direct
Test Start Time	8/21/2015 5:55:15 PM
Test End Time	8/22/2015 8:50:18 AM
Collection Start Time	8/21/2015 5:59:31 PM
Collection End Time	8/21/2015 7:59:24 PM
Jetstress Version	15.00.0995.000
ESE Version	15.00.0847.030
Operating System	Windows Server 2012 R2 Datacenter (6.2.9200.0)
Performance Log	C:\Program Files\Exchange Jetstress\Performance_2015_8_21_17_55_32.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second	786.822
Target Transactional I/O per Second	600
Initial Database Size (bytes)	10779470331904
Final Database Size (bytes)	10793504473088
Database Files (Count)	8

Jetstress System Parameters

Thread Count	13
Minimum Database Cache	256.0 MB
Maximum Database Cache	2048.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%
Run Background Database Maintenance	True
Number of Copies per Database	2

Database Configuration

Instance2792.1 Log path: C:\Users\Administrator\Desktop\Volume2\log1
Database: C:\Users\Administrator\Desktop\Volume1\db1\Jetstress001001.edb

Instance2792.2 Log path: C:\Users\Administrator\Desktop\Volume2\log2
Database: C:\Users\Administrator\Desktop\Volume1\db2\Jetstress002001.edb

Instance2792.3 Log path: C:\Users\Administrator\Desktop\Volume2\log3
Database: C:\Users\Administrator\Desktop\Volume1\db3\Jetstress003001.edb

Instance2792.4 Log path: C:\Users\Administrator\Desktop\Volume2\log4
Database: C:\Users\Administrator\Desktop\Volume1\db4\Jetstress004001.edb

Instance2792.5 Log path: C:\Users\Administrator\Desktop\Volume1\log5
Database: C:\Users\Administrator\Desktop\Volume2\db5\Jetstress005001.edb

Instance2792.6 Log path: C:\Users\Administrator\Desktop\Volume1\log6
Database: C:\Users\Administrator\Desktop\Volume2\db6\Jetstress006001.edb

Instance2792.7 Log path: C:\Users\Administrator\Desktop\Volume1\log7
Database: C:\Users\Administrator\Desktop\Volume2\db7\Jetstress007001.edb

Instance2792.8 Log path: C:\Users\Administrator\Desktop\Volume1\log8
Database: C:\Users\Administrator\Desktop\Volume2\db8\Jetstress008001.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
Instance2792.1	10.640	1.579	67.503	30.171	32892.689	34573.176	0.000	0.597	0.000	7.101	0.000	20601.305
Instance2792.2	10.568	1.570	68.056	30.804	32909.542	34514.988	0.000	0.594	0.000	7.221	0.000	20258.020
Instance2792.3	10.500	1.572	67.479	30.474	32900.940	34556.189	0.000	0.674	0.000	7.188	0.000	20593.682
Instance2792.4	10.420	1.566	67.931	30.760	32893.209	34511.459	0.000	0.607	0.000	7.228	0.000	20225.816
Instance2792.5	10.405	1.688	67.915	30.741	32894.005	34518.660	0.000	0.551	0.000	7.152	0.000	20510.994
Instance2792.6	10.391	1.711	67.729	30.618	32891.442	34521.233	0.000	0.552	0.000	7.223	0.000	20383.265
Instance2792.7	10.396	1.835	67.809	30.750	32895.446	34524.704	0.000	0.549	0.000	7.194	0.000	20377.395
Instance2792.8	10.353	1.789	67.588	30.493	32884.508	34568.957	0.000	0.553	0.000	7.217	0.000	20417.940

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance2792.1	9.773	261729.131
Instance2792.2	9.770	261792.872
Instance2792.3	9.771	261766.120
Instance2792.4	9.768	261870.636
Instance2792.5	9.765	261820.397
Instance2792.6	9.765	261814.720
Instance2792.7	9.766	261802.413
Instance2792.8	9.765	261827.189

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance2792.1	0.624	225263.814
Instance2792.2	0.623	220398.505
Instance2792.3	0.632	223804.221
Instance2792.4	0.624	219911.974
Instance2792.5	0.624	221858.098
Instance2792.6	0.628	220398.505
Instance2792.7	0.626	222292.432
Instance2792.8	0.628	227195.323

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
Instance2792.1	10.640	1.579	77.276	30.171	61833.040	34573.176	2.477	0.597	0.624	7.101	225263.814	20601.305
Instance2792.2	10.568	1.570	77.826	30.804	61643.989	34514.988	2.509	0.594	0.623	7.221	220398.505	20258.020
Instance2792.3	10.500	1.572	77.250	30.474	61849.369	34556.189	2.403	0.674	0.632	7.188	223804.221	20593.682
Instance2792.4	10.420	1.566	77.699	30.760	61679.476	34511.459	2.407	0.607	0.624	7.228	219911.974	20225.816
Instance2792.5	10.405	1.688	77.681	30.741	61671.803	34518.660	1.283	0.551	0.624	7.152	221858.098	20510.994
Instance2792.6	10.391	1.711	77.494	30.618	61738.372	34521.233	1.191	0.552	0.628	7.223	220398.505	20383.265
Instance2792.7	10.396	1.835	77.574	30.750	61711.800	34524.704	1.240	0.549	0.626	7.194	222292.432	20377.395
Instance2792.8	10.353	1.789	77.353	30.493	61785.330	34568.957	1.284	0.553	0.628	7.217	227195.323	20417.940

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.321	0.093	0.935
Available MBytes	27856.142	27826.000	27958.000
Free System Page Table Entries	16611312.223	16610844.000	16611574.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	165220411.858	165060608.000	165310464.000
Pool Paged Bytes	107923896.384	107687936.000	113344512.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/21/2015 5:55:17 PM -- Preparing for testing ...
8/21/2015 5:55:25 PM -- Attaching databases ...
8/21/2015 5:55:25 PM -- Preparations for testing are complete.
8/21/2015 5:55:25 PM -- Starting transaction dispatch ..
8/21/2015 5:55:25 PM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
8/21/2015 5:55:25 PM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
8/21/2015 5:55:34 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
8/21/2015 5:55:34 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
8/21/2015 5:55:34 PM -- Operation mix: Sessions 13, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/21/2015 5:55:34 PM -- Performance logging started (interval: 15000 ms).
8/21/2015 5:55:35 PM -- Attaining prerequisites:
8/21/2015 5:59:26 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 1937076000.0 (lower bound: 1932735000.0, upper bound: none)
8/21/2015 7:59:26 PM -- Performance logging has ended.
8/22/2015 8:50:00 AM -- JetInterop batch transaction stats: 125277, 125277, 125277, 125277, 125277, 125277, 125276 and 125276.
8/22/2015 8:50:00 AM -- Dispatching transactions ends.
8/22/2015 8:50:00 AM -- Shutting down databases ...
8/22/2015 8:50:03 AM -- Instance2792.1 (complete), Instance2792.2 (complete), Instance2792.3 (complete), Instance2792.4 (complete), Instance2792.5 (complete),
Instance2792.6 (complete), Instance2792.7 (complete) and Instance2792.8 (complete)
8/22/2015 8:50:03 AM -- C:\Program Files\Exchange Jetstress\Performance_2015_8_21_17_55_34.blg has 494 samples.
8/22/2015 8:50:03 AM -- Creating test report ...
8/22/2015 8:50:05 AM -- Instance2792.1 has 10.6 for I/O Database Reads Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.1 has 0.6 for I/O Log Writes Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.1 has 0.6 for I/O Log Reads Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.2 has 10.6 for I/O Database Reads Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.2 has 0.6 for I/O Log Writes Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.2 has 0.6 for I/O Log Reads Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.3 has 10.5 for I/O Database Reads Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.3 has 0.7 for I/O Log Writes Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.3 has 0.7 for I/O Log Reads Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.4 has 10.4 for I/O Database Reads Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.4 has 0.6 for I/O Log Writes Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.4 has 0.6 for I/O Log Reads Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.5 has 10.4 for I/O Database Reads Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.5 has 0.6 for I/O Log Writes Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.5 has 0.6 for I/O Log Reads Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.6 has 10.4 for I/O Database Reads Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.6 has 0.6 for I/O Log Writes Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.6 has 0.6 for I/O Log Reads Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.7 has 10.4 for I/O Database Reads Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.7 has 0.5 for I/O Log Writes Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.7 has 0.5 for I/O Log Reads Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.8 has 10.4 for I/O Database Reads Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.8 has 0.6 for I/O Log Writes Average Latency.
8/22/2015 8:50:05 AM -- Instance2792.8 has 0.6 for I/O Log Reads Average Latency.
8/22/2015 8:50:05 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/22/2015 8:50:05 AM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/22/2015 8:50:05 AM -- C:\Program Files\Exchange Jetstress\Performance_2015_8_21_17_55_34.xml has 478 samples queried.
```

Server 3

Test Summary

Overall Test Result	**Pass**
Machine Name	Servers
Test Description	Machine Name: Dell Poweredge R720 (non-virtual) 20000 users Microsoft Exchange 2013 4 Dell Poweredge R720 servers with Microsoft Server 2012 r2 installed 2GB Mailboxes, 5000 users per server, 0.12 IOPs 32 DB and LOG on 8 LUNs (combined) Dell MD3860f and MD3060e using Dynamic Disk Pool (83 drives) technology for data protection Dual QLogic QLE2662 16Gb FC HBAs per server FC-Direct
Test Start Time	8/21/2015 5:55:15 PM
Test End Time	8/22/2015 8:50:18 AM
Collection Start Time	8/21/2015 5:59:31 PM
Collection End Time	8/21/2015 7:59:24 PM
Jetstress Version	15.00.0995.000
ESE Version	15.00.0847.030
Operating System	Windows Server 2012 R2 Datacenter (6.2.9200.0)
Performance Log	C:\Program Files\Exchange Jetstress\Performance_2015_8_21_17_55_32.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second	772.474
Target Transactional I/O per Second	600
Initial Database Size (bytes)	10778857963520
Final Database Size (bytes)	10792648835072
Database Files (Count)	8

Jetstress System Parameters

Thread Count	13
Minimum Database Cache	256.0 MB
Maximum Database Cache	2048.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%
Run Background Database Maintenance	True
Number of Copies per Database	2

Database Configuration

Instance3400.1 Log path: C:\Users\Administrator\Desktop\Volume2\log1
Database: C:\Users\Administrator\Desktop\Volume1\db1\Jetstress001001.edb

Instance3400.2 Log path: C:\Users\Administrator\Desktop\Volume2\log2
Database: C:\Users\Administrator\Desktop\Volume1\db2\Jetstress002001.edb

Instance3400.3 Log path: C:\Users\Administrator\Desktop\Volume2\log3
Database: C:\Users\Administrator\Desktop\Volume1\db3\Jetstress003001.edb

Instance3400.4 Log path: C:\Users\Administrator\Desktop\Volume2\log4
Database: C:\Users\Administrator\Desktop\Volume1\db4\Jetstress004001.edb

Instance3400.5 Log path: C:\Users\Administrator\Desktop\Volume1\log5
Database: C:\Users\Administrator\Desktop\Volume2\db5\Jetstress005001.edb

Instance3400.6 Log path: C:\Users\Administrator\Desktop\Volume1\log6
Database: C:\Users\Administrator\Desktop\Volume2\db6\Jetstress006001.edb

Instance3400.7 Log path: C:\Users\Administrator\Desktop\Volume1\log7
Database: C:\Users\Administrator\Desktop\Volume2\db7\Jetstress007001.edb

Instance3400.8 Log path: C:\Users\Administrator\Desktop\Volume1\log8
Database: C:\Users\Administrator\Desktop\Volume2\db8\Jetstress008001.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
Instance3400.1	10.474	2.095	66.759	30.203	32894.518	34519.883	0.000	0.608	0.000	7.088	0.000	20284.022
Instance3400.2	10.490	2.127	66.438	30.063	32885.151	34562.272	0.000	0.607	0.000	7.099	0.000	20426.792
Instance3400.3	10.468	2.158	66.328	29.892	32903.580	34534.335	0.000	0.606	0.000	7.061	0.000	20425.002
Instance3400.4	10.527	2.149	66.628	30.056	32886.618	34553.078	0.000	0.606	0.000	7.065	0.000	20288.543
Instance3400.5	11.190	2.357	66.383	29.967	32891.620	34544.938	0.000	0.593	0.000	7.067	0.000	20478.827
Instance3400.6	10.694	2.384	66.447	29.916	32892.515	34564.558	0.000	0.596	0.000	7.043	0.000	20518.986
Instance3400.7	10.740	2.430	66.568	30.101	32896.199	34532.617	0.000	0.595	0.000	7.060	0.000	20367.680
Instance3400.8	10.847	2.424	66.614	30.110	32914.771	34528.398	0.000	0.590	0.000	7.045	0.000	20365.820

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance3400.1	9.671	261793.346
Instance3400.2	9.668	261882.375
Instance3400.3	9.669	261847.359
Instance3400.4	9.668	261856.420
Instance3400.5	9.369	261848.466
Instance3400.6	9.668	261843.083
Instance3400.7	9.669	261812.307
Instance3400.8	9.671	261751.226

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance3400.1	0.613	224308.019
Instance3400.2	0.619	222851.474
Instance3400.3	0.616	223336.989
Instance3400.4	0.612	223336.989
Instance3400.5	0.617	222851.474
Instance3400.6	0.616	221394.928
Instance3400.7	0.613	220460.506
Instance3400.8	0.611	222365.959

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
Instance3400.1	10.474	2.095	76.430	30.203	61856.755	34519.883	2.015	0.608	0.613	7.088	224308.019	20284.022
Instance3400.2	10.490	2.127	76.106	30.063	61974.705	34562.272	2.112	0.607	0.619	7.099	222851.474	20426.792
Instance3400.3	10.468	2.158	75.996	29.892	62031.374	34534.335	2.010	0.606	0.616	7.061	223336.989	20425.002
Instance3400.4	10.527	2.149	76.296	30.056	61901.459	34553.078	1.936	0.606	0.612	7.065	223336.989	20288.543
Instance3400.5	11.190	2.357	75.752	29.967	61210.308	34544.938	2.533	0.593	0.617	7.067	222851.474	20478.827
Instance3400.6	10.694	2.384	76.115	29.916	61974.055	34564.558	2.438	0.596	0.616	7.043	221394.928	20518.986
Instance3400.7	10.740	2.430	76.237	30.101	61929.257	34532.617	2.490	0.595	0.613	7.060	220460.506	20367.680
Instance3400.8	10.847	2.424	76.285	30.110	61925.245	34528.398	2.504	0.590	0.611	7.045	222365.959	20365.820

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.295	0.138	0.480
Available MBytes	27676.800	27660.000	27811.000
Free System Page Table Entries	16609700.640	16609418.000	16609935.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	215471069.867	214970368.000	215568384.000
Pool Paged Bytes	180655581.867	180563968.000	180760576.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/21/2015 5:55:25 PM -- Preparing for testing ...
8/21/2015 5:55:33 PM -- Attaching databases ...
8/21/2015 5:55:33 PM -- Preparations for testing are complete.
8/21/2015 5:55:33 PM -- Starting transaction dispatch ..
8/21/2015 5:55:33 PM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
8/21/2015 5:55:33 PM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
8/21/2015 5:55:41 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
8/21/2015 5:55:41 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
8/21/2015 5:55:42 PM -- Operation mix: Sessions 13, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/21/2015 5:55:42 PM -- Performance logging started (interval: 15000 ms).
8/21/2015 5:55:42 PM -- Attaining prerequisites:
8/21/2015 5:59:37 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 1948897000.0 (lower bound: 1932735000.0, upper bound: none)
8/21/2015 7:59:38 PM -- Performance logging has ended.
8/22/2015 8:50:03 AM -- JetInterop batch transaction stats: 123173, 123173, 123173, 123173, 123172, 123172, 123172 and 123172.
8/22/2015 8:50:03 AM -- Dispatching transactions ends.
8/22/2015 8:50:05 AM -- Shutting down databases ...
8/22/2015 8:50:08 AM -- Instance3400.1 (complete), Instance3400.2 (complete), Instance3400.3 (complete), Instance3400.4 (complete), Instance3400.5 (complete),
Instance3400.6 (complete), Instance3400.7 (complete) and Instance3400.8 (complete)
8/22/2015 8:50:08 AM -- C:\Program Files\Exchange Jetstress\Performance_2015_8_21_17_55_41.blg has 495 samples.
8/22/2015 8:50:08 AM -- Creating test report ...
8/22/2015 8:50:10 AM -- Instance3400.1 has 10.5 for I/O Database Reads Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.1 has 0.6 for I/O Log Writes Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.1 has 0.6 for I/O Log Reads Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.2 has 10.5 for I/O Database Reads Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.2 has 0.6 for I/O Log Writes Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.2 has 0.6 for I/O Log Reads Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.3 has 10.5 for I/O Database Reads Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.3 has 0.6 for I/O Log Writes Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.3 has 0.6 for I/O Log Reads Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.4 has 10.5 for I/O Database Reads Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.4 has 0.6 for I/O Log Writes Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.4 has 0.6 for I/O Log Reads Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.5 has 11.2 for I/O Database Reads Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.5 has 0.6 for I/O Log Writes Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.5 has 0.6 for I/O Log Reads Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.6 has 10.7 for I/O Database Reads Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.6 has 0.6 for I/O Log Writes Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.6 has 0.6 for I/O Log Reads Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.7 has 10.7 for I/O Database Reads Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.7 has 0.6 for I/O Log Writes Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.7 has 0.6 for I/O Log Reads Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.8 has 10.8 for I/O Database Reads Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.8 has 0.6 for I/O Log Writes Average Latency.
8/22/2015 8:50:10 AM -- Instance3400.8 has 0.6 for I/O Log Reads Average Latency.
8/22/2015 8:50:10 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/22/2015 8:50:10 AM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/22/2015 8:50:10 AM -- C:\Program Files\Exchange Jetstress\Performance_2015_8_21_17_55_41.xml has 479 samples queried.
```

Server 4

Test Summary

Overall Test Result	**Pass**
Machine Name	Servers
Test Description	Machine Name: Dell Poweredge R720 (non-virtual) 20000 users Microsoft Exchange 2013 4 Dell Poweredge R720 servers with Microsoft Server 2012 r2 installed 2GB Mailboxes, 5000 users per server, 0.12 IOPs 32 DB and LOG on 8 LUNs (combined) Dell MD3860f and MD3060e using Dynamic Disk Pool (83 drives) technology for data protection Dual QLogic QLE2662 16Gb FC HBAs per server FC-Direct
Test Start Time	8/21/2015 5:55:15 PM
Test End Time	8/22/2015 8:50:18 AM
Collection Start Time	8/21/2015 5:59:31 PM
Collection End Time	8/21/2015 7:59:24 PM
Jetstress Version	15.00.0995.000
ESE Version	15.00.0847.030
Operating System	Windows Server 2012 R2 Datacenter (6.2.9200.0)
Performance Log	C:\Program Files\Exchange Jetstress\Performance_2015_8_21_17_55_32.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second	673.006
Target Transactional I/O per Second	600
Initial Database Size (bytes)	10771610206208
Final Database Size (bytes)	10783689801728
Database Files (Count)	8

Jetstress System Parameters

Thread Count	13
Minimum Database Cache	256.0 MB
Maximum Database Cache	2048.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%
Run Background Database Maintenance	True
Number of Copies per Database	2

Database Configuration

Instance460.1 Log path: C:\Users\Administrator\Desktop\Volume2\log1
Database: C:\Users\Administrator\Desktop\Volume1\db1\Jetstress001001.edb

Instance460.2 Log path: C:\Users\Administrator\Desktop\Volume2\log2
Database: C:\Users\Administrator\Desktop\Volume1\db2\Jetstress002001.edb

Instance460.3 Log path: C:\Users\Administrator\Desktop\Volume2\log3
Database: C:\Users\Administrator\Desktop\Volume1\db3\Jetstress003001.edb

Instance460.4 Log path: C:\Users\Administrator\Desktop\Volume2\log4
Database: C:\Users\Administrator\Desktop\Volume1\db4\Jetstress004001.edb

Instance460.5 Log path: C:\Users\Administrator\Desktop\Volume1\log5
Database: C:\Users\Administrator\Desktop\Volume2\db5\Jetstress005001.edb

Instance460.6 Log path: C:\Users\Administrator\Desktop\Volume1\log6
Database: C:\Users\Administrator\Desktop\Volume2\db6\Jetstress006001.edb

Instance460.7 Log path: C:\Users\Administrator\Desktop\Volume1\log7
Database: C:\Users\Administrator\Desktop\Volume2\db7\Jetstress007001.edb

Instance460.8 Log path: C:\Users\Administrator\Desktop\Volume1\log8
Database: C:\Users\Administrator\Desktop\Volume2\db8\Jetstress008001.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
Instance460.1	11.118	1.771	58.164	26.171	32940.606	34664.103	0.000	0.662	0.000	6.190	0.000	20299.474
Instance460.2	11.280	1.748	57.891	26.198	32926.454	34688.340	0.000	0.662	0.000	6.166	0.000	20586.664
Instance460.3	11.556	1.812	58.153	26.004	32931.972	34659.618	0.000	0.662	0.000	6.115	0.000	20352.137
Instance460.4	11.439	1.757	57.680	25.774	32928.534	34717.143	0.000	0.669	0.000	6.164	0.000	20481.908
Instance460.5	12.018	1.887	58.195	26.100	32923.084	34668.540	0.000	0.651	0.000	6.122	0.000	20250.231
Instance460.6	12.262	1.881	58.157	26.359	32920.999	34689.317	0.000	0.649	0.000	6.221	0.000	20386.662
Instance460.7	12.511	1.897	58.145	25.915	32914.146	34681.172	0.000	0.660	0.000	6.104	0.000	20382.292
Instance460.8	12.813	1.879	58.092	26.008	32929.097	34655.441	0.000	0.650	0.000	6.108	0.000	20414.155

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance460.1	9.443	261844.250
Instance460.2	9.442	261887.048
Instance460.3	9.445	261779.231
Instance460.4	9.444	261817.943
Instance460.5	9.443	261851.868
Instance460.6	9.442	261851.396
Instance460.7	9.441	261861.443
Instance460.8	9.441	261869.813

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance460.1	0.536	202344.665
Instance460.2	0.542	205802.577
Instance460.3	0.531	202396.861
Instance460.4	0.538	205316.046
Instance460.5	0.529	201910.330
Instance460.6	0.541	204331.178
Instance460.7	0.529	201910.330
Instance460.8	0.531	200450.737

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
Instance460.1	11.118	1.771	67.607	26.171	64912.742	34664.103	1.995	0.662	0.536	6.190	202344.665	20299.474
Instance460.2	11.280	1.748	67.333	26.198	65032.166	34688.340	1.883	0.662	0.542	6.166	205802.577	20586.664
Instance460.3	11.556	1.812	67.598	26.004	64907.085	34659.618	1.907	0.662	0.531	6.115	202396.861	20352.137
Instance460.4	11.439	1.757	67.124	25.774	65132.076	34717.143	2.045	0.669	0.538	6.164	205316.046	20481.908
Instance460.5	12.018	1.887	67.638	26.100	64883.359	34668.540	1.996	0.651	0.529	6.122	201910.330	20250.231
Instance460.6	12.262	1.881	67.599	26.359	64896.592	34689.317	2.093	0.649	0.541	6.221	204331.178	20386.662
Instance460.7	12.511	1.897	67.586	25.915	64896.038	34681.172	2.050	0.660	0.529	6.104	201910.330	20382.292
Instance460.8	12.813	1.879	67.533	26.008	64935.884	34655.441	1.996	0.650	0.531	6.108	200450.737	20414.155

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.782	0.451	1.868
Available MBytes	27650.217	27622.000	27820.000
Free System Page Table Entries	16599777.812	16599363.000	16600058.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	240348422.948	239706112.000	240463872.000
Pool Paged Bytes	195445103.699	195383296.000	195571712.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/21/2015 5:55:23 PM -- Preparing for testing ...
8/21/2015 5:55:32 PM -- Attaching databases ...
8/21/2015 5:55:32 PM -- Preparations for testing are complete.
8/21/2015 5:55:32 PM -- Starting transaction dispatch ..
8/21/2015 5:55:32 PM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
8/21/2015 5:55:32 PM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
8/21/2015 5:55:40 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
8/21/2015 5:55:40 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
8/21/2015 5:55:42 PM -- Operation mix: Sessions 13, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/21/2015 5:55:42 PM -- Performance logging started (interval: 15000 ms).
8/21/2015 5:55:42 PM -- Attaining prerequisites:
8/21/2015 5:59:57 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 1935172000.0 (lower bound: 1932735000.0, upper bound: none)
8/21/2015 7:59:58 PM -- Performance logging has ended.
8/22/2015 8:50:09 AM -- JetInterop batch transaction stats: 107931, 107931, 107931, 107931, 107931, 107931, 107930 and 107930.
8/22/2015 8:50:09 AM -- Dispatching transactions ends.
8/22/2015 8:50:10 AM -- Shutting down databases ...
8/22/2015 8:50:16 AM -- Instance460.1 (complete), Instance460.2 (complete), Instance460.3 (complete), Instance460.4 (complete), Instance460.5 (complete), Instance460.6
(complete), Instance460.7 (complete) and Instance460.8 (complete)
8/22/2015 8:50:16 AM -- C:\Program Files\Exchange Jetstress\Performance_2015_8_21_17_55_40.blg has 495 samples.
8/22/2015 8:50:16 AM -- Creating test report ...
8/22/2015 8:50:20 AM -- Instance460.1 has 11.1 for I/O Database Reads Average Latency.
8/22/2015 8:50:20 AM -- Instance460.1 has 0.7 for I/O Log Writes Average Latency.
8/22/2015 8:50:20 AM -- Instance460.1 has 0.7 for I/O Log Reads Average Latency.
8/22/2015 8:50:20 AM -- Instance460.2 has 11.3 for I/O Database Reads Average Latency.
8/22/2015 8:50:20 AM -- Instance460.2 has 0.7 for I/O Log Writes Average Latency.
8/22/2015 8:50:20 AM -- Instance460.2 has 0.7 for I/O Log Reads Average Latency.
8/22/2015 8:50:20 AM -- Instance460.3 has 11.6 for I/O Database Reads Average Latency.
8/22/2015 8:50:20 AM -- Instance460.3 has 0.7 for I/O Log Writes Average Latency.
8/22/2015 8:50:20 AM -- Instance460.3 has 0.7 for I/O Log Reads Average Latency.
8/22/2015 8:50:20 AM -- Instance460.4 has 11.4 for I/O Database Reads Average Latency.
8/22/2015 8:50:20 AM -- Instance460.4 has 0.7 for I/O Log Writes Average Latency.
8/22/2015 8:50:20 AM -- Instance460.4 has 0.7 for I/O Log Reads Average Latency.
8/22/2015 8:50:20 AM -- Instance460.5 has 12.0 for I/O Database Reads Average Latency.
8/22/2015 8:50:20 AM -- Instance460.5 has 0.7 for I/O Log Writes Average Latency.
8/22/2015 8:50:20 AM -- Instance460.5 has 0.7 for I/O Log Reads Average Latency.
8/22/2015 8:50:20 AM -- Instance460.6 has 12.3 for I/O Database Reads Average Latency.
8/22/2015 8:50:20 AM -- Instance460.6 has 0.6 for I/O Log Writes Average Latency.
8/22/2015 8:50:20 AM -- Instance460.6 has 0.6 for I/O Log Reads Average Latency.
8/22/2015 8:50:20 AM -- Instance460.7 has 12.5 for I/O Database Reads Average Latency.
8/22/2015 8:50:20 AM -- Instance460.7 has 0.7 for I/O Log Writes Average Latency.
8/22/2015 8:50:20 AM -- Instance460.7 has 0.7 for I/O Log Reads Average Latency.
8/22/2015 8:50:20 AM -- Instance460.8 has 12.8 for I/O Database Reads Average Latency.
8/22/2015 8:50:20 AM -- Instance460.8 has 0.7 for I/O Log Writes Average Latency.
8/22/2015 8:50:20 AM -- Instance460.8 has 0.7 for I/O Log Reads Average Latency.
8/22/2015 8:50:20 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/22/2015 8:50:20 AM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/22/2015 8:50:20 AM -- C:\Program Files\Exchange Jetstress\Performance_2015_8_21_17_55_40.xml has 478 samples queried.
```

B Stress testing

Server 1

Database Sizing and Throughput

Achieved Transactional I/O per Second	713.487
Target Transactional I/O per Second	600
Initial Database Size (bytes)	10788664246272
Final Database Size (bytes)	10814190780416
Database Files (Count)	8

Jetstress System Parameters

Thread Count	13
Minimum Database Cache	256.0 MB
Maximum Database Cache	2048.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%
Run Background Database Maintenance	True
Number of Copies per Database	2

Database Configuration

Instance2032.1 Log path: C:\Users\Administrator\Desktop\Volume2\log1
Database: C:\Users\Administrator\Desktop\Volume1\db1\Jetstress001001.edb

Instance2032.2 Log path: C:\Users\Administrator\Desktop\Volume2\log2
Database: C:\Users\Administrator\Desktop\Volume1\db2\Jetstress002001.edb

Instance2032.3 Log path: C:\Users\Administrator\Desktop\Volume2\log3
Database: C:\Users\Administrator\Desktop\Volume1\db3\Jetstress003001.edb

Instance2032.4 Log path: C:\Users\Administrator\Desktop\Volume2\log4
Database: C:\Users\Administrator\Desktop\Volume1\db4\Jetstress004001.edb

Instance2032.5 Log path: C:\Users\Administrator\Desktop\Volume1\log5
Database: C:\Users\Administrator\Desktop\Volume2\db5\Jetstress005001.edb

Instance2032.6 Log path: C:\Users\Administrator\Desktop\Volume1\log6
Database: C:\Users\Administrator\Desktop\Volume2\db6\Jetstress006001.edb

Instance2032.7 Log path: C:\Users\Administrator\Desktop\Volume1\log7
Database: C:\Users\Administrator\Desktop\Volume2\db7\Jetstress007001.edb

Instance2032.8 Log path: C:\Users\Administrator\Desktop\Volume1\log8
Database: C:\Users\Administrator\Desktop\Volume2\db8\Jetstress008001.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
Instance2032.1	12.121	1.810	61.376	27.761	32920.581	34414.130	0.000	0.692	0.000	6.478	0.000	20434.248
Instance2032.2	11.838	1.833	61.412	27.748	32920.295	34409.679	0.000	0.693	0.000	6.478	0.000	20397.880
Instance2032.3	11.472	1.863	61.407	27.724	32920.478	34410.603	0.000	0.689	0.000	6.476	0.000	20385.799
Instance2032.4	11.648	1.835	61.450	27.754	32925.435	34409.775	0.000	0.688	0.000	6.479	0.000	20353.708
Instance2032.5	11.184	2.026	61.454	27.708	32925.416	34408.431	0.000	0.682	0.000	6.466	0.000	20355.994
Instance2032.6	11.063	2.057	61.454	27.738	32924.008	34400.156	0.000	0.682	0.000	6.478	0.000	20346.646
Instance2032.7	10.878	2.084	61.478	27.796	32927.218	34401.505	0.000	0.681	0.000	6.482	0.000	20339.968
Instance2032.8	10.922	2.058	61.485	27.740	32923.991	34405.299	0.000	0.681	0.000	6.474	0.000	20349.989

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance2032.1	9.631	261841.830
Instance2032.2	9.632	261831.599
Instance2032.3	9.629	261818.847
Instance2032.4	9.630	261777.478
Instance2032.5	9.602	261792.062
Instance2032.6	9.584	261797.180
Instance2032.7	9.614	261795.654
Instance2032.8	9.537	261815.711

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance2032.1	0.564	209445.639
Instance2032.2	0.563	210114.748
Instance2032.3	0.563	209727.981
Instance2032.4	0.562	209886.660
Instance2032.5	0.561	210404.279
Instance2032.6	0.562	210326.470
Instance2032.7	0.562	209583.018
Instance2032.8	0.561	209285.428

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
Instance2032.1	12.121	1.810	71.008	27.761	63970.958	34414.130	2.992	0.692	0.564	6.478	209445.639	20434.248
Instance2032.2	11.838	1.833	71.044	27.748	63954.993	34409.679	3.020	0.693	0.563	6.478	210114.748	20397.880
Instance2032.3	11.472	1.863	71.036	27.724	63947.952	34410.603	2.948	0.689	0.563	6.476	209727.981	20385.799
Instance2032.4	11.648	1.835	71.080	27.754	63929.049	34409.775	3.017	0.688	0.562	6.479	209886.660	20353.708
Instance2032.5	11.184	2.026	71.056	27.708	63851.755	34408.431	2.284	0.682	0.561	6.466	210404.279	20355.994
Instance2032.6	11.063	2.057	71.038	27.738	63802.182	34400.156	2.307	0.682	0.562	6.478	210326.470	20346.646
Instance2032.7	10.878	2.084	71.092	27.796	63878.248	34401.505	2.309	0.681	0.562	6.482	209583.018	20339.968
Instance2032.8	10.922	2.058	71.022	27.740	63658.822	34405.299	2.295	0.681	0.561	6.474	209285.428	20349.989

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.734	0.341	3.084
Available MBytes	31452.757	31300.000	31595.000
Free System Page Table Entries	16625121.119	16624140.000	16625524.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	208805586.362	205520896.000	210092032.000
Pool Paged Bytes	194786446.618	194551808.000	200421376.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/24/2015 8:30:56 AM -- Preparing for testing ...
8/24/2015 8:31:05 AM -- Attaching databases ...
8/24/2015 8:31:05 AM -- Preparations for testing are complete.
8/24/2015 8:31:05 AM -- Starting transaction dispatch ..
8/24/2015 8:31:05 AM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
8/24/2015 8:31:05 AM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
8/24/2015 8:31:13 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 200 msec/read).
8/24/2015 8:31:13 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 200 msec/write).
8/24/2015 8:31:15 AM -- Operation mix: Sessions 13, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/24/2015 8:31:15 AM -- Performance logging started (interval: 15000 ms).
8/24/2015 8:31:15 AM -- Attaining prerequisites:
8/24/2015 8:35:06 AM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 1934369000.0 (lower bound: 1932735000.0, upper bound: none)
8/25/2015 8:35:07 AM -- Performance logging has ended.
8/25/2015 2:30:52 PM -- JetInterop batch transaction stats: 227383, 227382, 227382, 227382, 227382, 227382, 227382 and 227382.
8/25/2015 2:30:52 PM -- Dispatching transactions ends.
8/25/2015 2:30:52 PM -- Shutting down databases ...
8/25/2015 2:30:56 PM -- Instance2032.1 (complete), Instance2032.2 (complete), Instance2032.3 (complete), Instance2032.4 (complete), Instance2032.5 (complete), Instance2032.6 (complete), Instance2032.7
(complete) and Instance2032.8 (complete)
8/25/2015 2:30:56 PM -- C:\Program Files\Exchange Jetstress\Stress_2015_8_24_8_31_13.blg has 5759 samples.
8/25/2015 2:30:56 PM -- Creating test report ...
8/25/2015 2:31:26 PM -- Instance2032.1 has 12.1 for I/O Database Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.1 has 0.7 for I/O Log Writes Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.1 has 0.7 for I/O Log Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.2 has 11.8 for I/O Database Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.2 has 0.7 for I/O Log Writes Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.2 has 0.7 for I/O Log Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.3 has 11.5 for I/O Database Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.3 has 0.7 for I/O Log Writes Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.3 has 0.7 for I/O Log Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.4 has 11.6 for I/O Database Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.4 has 0.7 for I/O Log Writes Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.4 has 0.7 for I/O Log Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.5 has 11.2 for I/O Database Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.5 has 0.7 for I/O Log Writes Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.5 has 0.7 for I/O Log Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.6 has 11.1 for I/O Database Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.6 has 0.7 for I/O Log Writes Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.6 has 0.7 for I/O Log Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.7 has 10.9 for I/O Database Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.7 has 0.7 for I/O Log Writes Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.7 has 0.7 for I/O Log Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.8 has 10.9 for I/O Database Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.8 has 0.7 for I/O Log Writes Average Latency.
8/25/2015 2:31:26 PM -- Instance2032.8 has 0.7 for I/O Log Reads Average Latency.
8/25/2015 2:31:26 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/25/2015 2:31:26 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/25/2015 2:31:26 PM -- C:\Program Files\Exchange Jetstress\Stress_2015_8_24_8_31_13.xml has 5743 samples queried.
```

Server 2

Database Sizing and Throughput

Achieved Transactional I/O per Second	788.698
Target Transactional I/O per Second	600
Initial Database Size (bytes)	10795425464320
Final Database Size (bytes)	10823678296064
Database Files (Count)	8

Jetstress System Parameters

Thread Count	13
Minimum Database Cache	256.0 MB
Maximum Database Cache	2048.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%
Run Background Database Maintenance	True
Number of Copies per Database	2

Database Configuration

Instance3884.1 Log path: C:\Users\Administrator\Desktop\Volume2\log1
Database: C:\Users\Administrator\Desktop\Volume1\db1\Jetstress001001.edb

Instance3884.2 Log path: C:\Users\Administrator\Desktop\Volume2\log2
Database: C:\Users\Administrator\Desktop\Volume1\db2\Jetstress002001.edb

Instance3884.3 Log path: C:\Users\Administrator\Desktop\Volume2\log3
Database: C:\Users\Administrator\Desktop\Volume1\db3\Jetstress003001.edb

Instance3884.4 Log path: C:\Users\Administrator\Desktop\Volume2\log4
Database: C:\Users\Administrator\Desktop\Volume1\db4\Jetstress004001.edb

Instance3884.5 Log path: C:\Users\Administrator\Desktop\Volume1\log5
Database: C:\Users\Administrator\Desktop\Volume2\db5\Jetstress005001.edb

Instance3884.6 Log path: C:\Users\Administrator\Desktop\Volume1\log6
Database: C:\Users\Administrator\Desktop\Volume2\db6\Jetstress006001.edb

Instance3884.7 Log path: C:\Users\Administrator\Desktop\Volume1\log7
Database: C:\Users\Administrator\Desktop\Volume2\db7\Jetstress007001.edb

Instance3884.8 Log path: C:\Users\Administrator\Desktop\Volume1\log8
Database: C:\Users\Administrator\Desktop\Volume2\db8\Jetstress008001.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
Instance3884.1	10.594	1.613	67.896	30.680	32894.016	34347.575	0.000	0.612	0.000	7.147	0.000	20390.117
Instance3884.2	10.527	1.645	67.951	30.787	32894.140	34335.398	0.000	0.616	0.000	7.179	0.000	20340.729
Instance3884.3	10.480	1.631	67.964	30.671	32897.470	34332.344	0.000	0.608	0.000	7.140	0.000	20271.573
Instance3884.4	10.416	1.623	67.862	30.651	32895.022	34340.637	0.000	0.612	0.000	7.150	0.000	20360.281
Instance3884.5	10.383	1.771	67.919	30.732	32897.805	34346.342	0.000	0.567	0.000	7.146	0.000	20399.613
Instance3884.6	10.363	1.806	67.851	30.660	32898.118	34348.957	0.000	0.565	0.000	7.147	0.000	20413.213
Instance3884.7	10.368	1.788	67.882	30.740	32898.043	34344.847	0.000	0.565	0.000	7.178	0.000	20332.008
Instance3884.8	10.350	1.804	67.826	30.627	32899.216	34346.184	0.000	0.562	0.000	7.149	0.000	20369.408

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance3884.1	9.766	261834.408
Instance3884.2	9.766	261823.730
Instance3884.3	9.767	261803.531
Instance3884.4	9.766	261822.224
Instance3884.5	9.763	261826.971
Instance3884.6	9.764	261818.968
Instance3884.7	9.764	261799.935
Instance3884.8	9.764	261813.299

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance3884.1	0.621	222824.613
Instance3884.2	0.623	221481.850
Instance3884.3	0.618	220024.944
Instance3884.4	0.621	220961.656
Instance3884.5	0.622	221991.884
Instance3884.6	0.622	222433.290
Instance3884.7	0.623	221469.133
Instance3884.8	0.621	221604.194

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
Instance3884.1	10.594	1.613	77.662	30.680	61683.474	34347.575	2.494	0.612	0.621	7.147	222824.613	20390.117
Instance3884.2	10.527	1.645	77.717	30.787	61662.540	34335.398	2.437	0.616	0.623	7.179	221481.850	20340.729
Instance3884.3	10.480	1.631	77.731	30.671	61659.654	34332.344	2.493	0.608	0.618	7.140	220024.944	20271.573
Instance3884.4	10.416	1.623	77.628	30.651	61696.351	34340.637	2.502	0.612	0.621	7.150	220961.656	20360.281
Instance3884.5	10.383	1.771	77.683	30.732	61670.293	34346.342	1.597	0.567	0.622	7.146	221991.884	20399.613
Instance3884.6	10.363	1.806	77.615	30.660	61696.169	34348.957	1.560	0.565	0.622	7.147	222433.290	20413.213
Instance3884.7	10.368	1.788	77.646	30.740	61683.307	34344.847	1.580	0.565	0.623	7.178	221469.133	20332.008
Instance3884.8	10.350	1.804	77.590	30.627	61706.310	34346.184	1.575	0.562	0.621	7.149	221604.194	20369.408

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.341	0.067	2.132
Available MBytes	27820.263	27783.000	27895.000
Free System Page Table Entries	16611229.306	16610519.000	16611531.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	169478363.251	167829504.000	169906176.000
Pool Paged Bytes	109045561.393	108818432.000	114180096.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/24/2015 8:30:54 AM -- Preparing for testing ...
8/24/2015 8:31:02 AM -- Attaching databases ...
8/24/2015 8:31:02 AM -- Preparations for testing are complete.
8/24/2015 8:31:02 AM -- Starting transaction dispatch ..
8/24/2015 8:31:02 AM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
8/24/2015 8:31:02 AM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
8/24/2015 8:31:11 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 200 msec/read).
8/24/2015 8:31:11 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 200 msec/write).
8/24/2015 8:31:11 AM -- Operation mix: Sessions 13, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/24/2015 8:31:11 AM -- Performance logging started (interval: 15000 ms).
8/24/2015 8:31:11 AM -- Attaining prerequisites:
8/24/2015 8:34:43 AM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 1944195000.0 (lower bound: 1932735000.0, upper bound: none)
8/24/2015 8:34:44 AM -- Performance logging has ended.
8/25/2015 2:31:00 PM -- JetInterop batch transaction stats: 251459, 251459, 251459, 251458, 251458, 251458, 251458 and 251458.
8/25/2015 2:31:00 PM -- Dispatching transactions ends.
8/25/2015 2:31:00 PM -- Shutting down databases ...
8/25/2015 2:31:03 PM -- Instance3884.1 (complete), Instance3884.2 (complete), Instance3884.3 (complete), Instance3884.4 (complete), Instance3884.5 (complete), Instance3884.6 (complete), Instance3884.7 (complete) and Instance3884.8
(complete)
8/25/2015 2:31:03 PM -- C:\Program Files\Exchange Jetstress\Stress_2015_8_24_8_31_11.blg has 5768 samples.
8/25/2015 2:31:03 PM -- Creating test report ...
8/25/2015 2:31:26 PM -- Instance3884.1 has 10.6 for I/O Database Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.1 has 0.6 for I/O Log Writes Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.1 has 0.6 for I/O Log Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.2 has 10.5 for I/O Database Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.2 has 0.6 for I/O Log Writes Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.2 has 0.6 for I/O Log Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.3 has 10.5 for I/O Database Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.3 has 0.6 for I/O Log Writes Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.3 has 0.6 for I/O Log Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.4 has 10.4 for I/O Database Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.4 has 0.6 for I/O Log Writes Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.4 has 0.6 for I/O Log Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.5 has 10.4 for I/O Database Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.5 has 0.6 for I/O Log Writes Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.5 has 0.6 for I/O Log Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.6 has 10.4 for I/O Database Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.6 has 0.6 for I/O Log Writes Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.6 has 0.6 for I/O Log Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.7 has 10.4 for I/O Database Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.7 has 0.6 for I/O Log Writes Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.7 has 0.6 for I/O Log Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.8 has 10.4 for I/O Database Reads Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.8 has 0.6 for I/O Log Writes Average Latency.
8/25/2015 2:31:26 PM -- Instance3884.8 has 0.6 for I/O Log Reads Average Latency.
8/25/2015 2:31:26 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/25/2015 2:31:26 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/25/2015 2:31:26 PM -- C:\Program Files\Exchange Jetstress\Stress_2015_8_24_8_31_11.xml has 5753 samples queried.
```

Server 3

Database Sizing and Throughput

Achieved Transactional I/O per Second	775.054
Target Transactional I/O per Second	600
Initial Database Size (bytes)	10794544660480
Final Database Size (bytes)	10822227066880
Database Files (Count)	8

Jetstress System Parameters

Thread Count	13
Minimum Database Cache	256.0 MB
Maximum Database Cache	2048.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%
Run Background Database Maintenance	True
Number of Copies per Database	2

Database Configuration

Instance3460.1 Log path: C:\Users\Administrator\Desktop\Volume2\log1
Database: C:\Users\Administrator\Desktop\Volume1\db1\Jetstress001001.edb

Instance3460.2 Log path: C:\Users\Administrator\Desktop\Volume2\log2
Database: C:\Users\Administrator\Desktop\Volume1\db2\Jetstress002001.edb

Instance3460.3 Log path: C:\Users\Administrator\Desktop\Volume2\log3
Database: C:\Users\Administrator\Desktop\Volume1\db3\Jetstress003001.edb

Instance3460.4 Log path: C:\Users\Administrator\Desktop\Volume2\log4
Database: C:\Users\Administrator\Desktop\Volume1\db4\Jetstress004001.edb

Instance3460.5 Log path: C:\Users\Administrator\Desktop\Volume1\log5
Database: C:\Users\Administrator\Desktop\Volume2\db5\Jetstress005001.edb

Instance3460.6 Log path: C:\Users\Administrator\Desktop\Volume1\log6
Database: C:\Users\Administrator\Desktop\Volume2\db6\Jetstress006001.edb

Instance3460.7 Log path: C:\Users\Administrator\Desktop\Volume1\log7
Database: C:\Users\Administrator\Desktop\Volume2\db7\Jetstress007001.edb

Instance3460.8 Log path: C:\Users\Administrator\Desktop\Volume1\log8
Database: C:\Users\Administrator\Desktop\Volume2\db8\Jetstress008001.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
Instance3460.1	10.456	2.185	66.707	30.190	32891.654	34336.753	0.000	0.613	0.000	7.026	0.000	20360.633
Instance3460.2	10.538	2.244	66.724	30.078	32903.135	34336.355	0.000	0.613	0.000	7.005	0.000	20309.669
Instance3460.3	10.475	2.234	66.604	30.092	32897.435	34356.642	0.000	0.619	0.000	7.006	0.000	20447.411
Instance3460.4	10.535	2.214	66.710	30.202	32891.811	34349.069	0.000	0.612	0.000	7.038	0.000	20367.052
Instance3460.5	10.681	2.415	66.720	30.249	32894.040	34344.233	0.000	0.602	0.000	7.055	0.000	20332.198
Instance3460.6	10.746	2.473	66.772	30.234	32896.101	34339.946	0.000	0.605	0.000	7.034	0.000	20330.338
Instance3460.7	10.726	2.513	66.752	30.158	32892.504	34339.682	0.000	0.603	0.000	7.012	0.000	20335.693
Instance3460.8	10.807	2.470	66.713	30.148	32893.014	34349.950	0.000	0.603	0.000	7.032	0.000	20346.822

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance3460.1	9.668	261815.825
Instance3460.2	9.626	261804.233
Instance3460.3	9.674	261827.662
Instance3460.4	9.647	261825.167
Instance3460.5	9.644	261807.713
Instance3460.6	9.640	261817.201
Instance3460.7	9.673	261813.374
Instance3460.8	9.672	261838.896

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance3460.1	0.611	219539.170
Instance3460.2	0.607	219130.489
Instance3460.3	0.611	220056.690
Instance3460.4	0.611	218755.827
Instance3460.5	0.612	219910.983
Instance3460.6	0.610	219534.955
Instance3460.7	0.608	220687.717
Instance3460.8	0.610	220605.784

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
Instance3460.1	10.456	2.185	76.376	30.190	61870.511	34336.753	2.094	0.613	0.611	7.026	219539.170	20360.633
Instance3460.2	10.538	2.244	76.350	30.078	61761.771	34336.355	2.102	0.613	0.607	7.005	219130.489	20309.669
Instance3460.3	10.475	2.234	76.278	30.092	61931.970	34356.642	2.092	0.619	0.611	7.006	220056.690	20447.411
Instance3460.4	10.535	2.214	76.357	30.202	61815.052	34349.069	2.125	0.612	0.611	7.038	218755.827	20367.052
Instance3460.5	10.681	2.415	76.364	30.249	61803.454	34344.233	3.063	0.602	0.612	7.055	219910.983	20332.198
Instance3460.6	10.746	2.473	76.411	30.234	61775.375	34339.946	3.010	0.605	0.610	7.034	219534.955	20330.338
Instance3460.7	10.726	2.513	76.425	30.158	61866.614	34339.682	3.005	0.603	0.608	7.012	220687.717	20335.693
Instance3460.8	10.807	2.470	76.386	30.148	61883.377	34349.950	3.040	0.603	0.610	7.032	220605.784	20346.822

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.297	0.124	1.848
Available MBytes	27621.760	27587.000	27763.000
Free System Page Table Entries	16609606.789	16608977.000	16609850.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	218153831.308	217333760.000	218525696.000
Pool Paged Bytes	181594578.263	181460992.000	186519552.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/24/2015 8:30:59 AM -- Preparing for testing ...
8/24/2015 8:31:07 AM -- Attaching databases ...
8/24/2015 8:31:07 AM -- Preparations for testing are complete.
8/24/2015 8:31:07 AM -- Starting transaction dispatch ..
8/24/2015 8:31:07 AM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
8/24/2015 8:31:07 AM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
8/24/2015 8:31:15 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 200 msec/read).
8/24/2015 8:31:15 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 200 msec/write).
8/24/2015 8:31:16 AM -- Operation mix: Sessions 13, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/24/2015 8:31:16 AM -- Performance logging started (interval: 15000 ms).
8/24/2015 8:31:16 AM -- Attaining prerequisites:
8/24/2015 8:34:56 AM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 1950736000.0 (lower bound: 1932735000.0, upper bound: none)
8/25/2015 8:34:56 AM -- Performance logging has ended.
8/25/2015 2:31:05 PM -- JetInterop batch transaction stats: 246812, 246812, 246812, 246812, 246812, 246812, 246812 and 246811.
8/25/2015 2:31:05 PM -- Dispatching transactions ends.
8/25/2015 2:31:05 PM -- Shutting down databases ...
8/25/2015 2:31:08 PM -- Instance3460.1 (complete), Instance3460.2 (complete), Instance3460.3 (complete), Instance3460.4 (complete), Instance3460.5 (complete),
Instance3460.6 (complete), Instance3460.7 (complete) and Instance3460.8 (complete)
8/25/2015 2:31:08 PM -- C:\Program Files\Exchange Jetstress\Stress_2015_8_24_8_31_15.blg has 5768 samples.
8/25/2015 2:31:08 PM -- Creating test report ...
8/25/2015 2:31:32 PM -- Instance3460.1 has 10.5 for I/O Database Reads Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.1 has 0.6 for I/O Log Writes Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.1 has 0.6 for I/O Log Reads Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.2 has 10.5 for I/O Database Reads Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.2 has 0.6 for I/O Log Writes Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.2 has 0.6 for I/O Log Reads Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.3 has 10.5 for I/O Database Reads Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.3 has 0.6 for I/O Log Writes Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.3 has 0.6 for I/O Log Reads Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.4 has 10.5 for I/O Database Reads Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.4 has 0.6 for I/O Log Writes Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.4 has 0.6 for I/O Log Reads Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.5 has 10.7 for I/O Database Reads Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.5 has 0.6 for I/O Log Writes Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.5 has 0.6 for I/O Log Reads Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.6 has 10.7 for I/O Database Reads Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.6 has 0.6 for I/O Log Writes Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.6 has 0.6 for I/O Log Reads Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.7 has 10.7 for I/O Database Reads Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.7 has 0.6 for I/O Log Writes Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.7 has 0.6 for I/O Log Reads Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.8 has 10.8 for I/O Database Reads Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.8 has 0.6 for I/O Log Writes Average Latency.
8/25/2015 2:31:32 PM -- Instance3460.8 has 0.6 for I/O Log Reads Average Latency.
8/25/2015 2:31:32 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/25/2015 2:31:32 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/25/2015 2:31:32 PM -- C:\Program Files\Exchange Jetstress\Stress_2015_8_24_8_31_15.xml has 5753 samples queried.
```

Server 4

Database Sizing and Throughput

Achieved Transactional I/O per Second	677.254
Target Transactional I/O per Second	600
Initial Database Size (bytes)	10785602404352
Final Database Size (bytes)	10809895813120
Database Files (Count)	8

Jetstress System Parameters

Thread Count	13
Minimum Database Cache	256.0 MB
Maximum Database Cache	2048.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%
Run Background Database Maintenance	True
Number of Copies per Database	2

Database Configuration

Instance2288.1 Log path: C:\Users\Administrator\Desktop\Volume2\log1
Database: C:\Users\Administrator\Desktop\Volume1\db1\Jetstress001001.edb

Instance2288.2 Log path: C:\Users\Administrator\Desktop\Volume2\log2
Database: C:\Users\Administrator\Desktop\Volume1\db2\Jetstress002001.edb

Instance2288.3 Log path: C:\Users\Administrator\Desktop\Volume2\log3
Database: C:\Users\Administrator\Desktop\Volume1\db3\Jetstress003001.edb

Instance2288.4 Log path: C:\Users\Administrator\Desktop\Volume2\log4
Database: C:\Users\Administrator\Desktop\Volume1\db4\Jetstress004001.edb

Instance2288.5 Log path: C:\Users\Administrator\Desktop\Volume1\log5
Database: C:\Users\Administrator\Desktop\Volume2\db5\Jetstress005001.edb

Instance2288.6 Log path: C:\Users\Administrator\Desktop\Volume1\log6
Database: C:\Users\Administrator\Desktop\Volume2\db6\Jetstress006001.edb

Instance2288.7 Log path: C:\Users\Administrator\Desktop\Volume1\log7
Database: C:\Users\Administrator\Desktop\Volume2\db7\Jetstress007001.edb

Instance2288.8 Log path: C:\Users\Administrator\Desktop\Volume1\log8
Database: C:\Users\Administrator\Desktop\Volume2\db8\Jetstress008001.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
Instance2288.1	11.092	1.766	58.307	26.243	32930.985	34439.498	0.000	0.670	0.000	6.136	0.000	20458.386
Instance2288.2	11.227	1.779	58.332	26.278	32936.397	34440.223	0.000	0.670	0.000	6.144	0.000	20445.960
Instance2288.3	11.528	1.798	58.444	26.436	32930.634	34433.860	0.000	0.676	0.000	6.175	0.000	20373.100
Instance2288.4	11.372	1.784	58.321	26.270	32930.831	34444.307	0.000	0.674	0.000	6.148	0.000	20419.476
Instance2288.5	11.982	1.849	58.357	26.351	32932.159	34454.818	0.000	0.670	0.000	6.158	0.000	20443.782
Instance2288.6	12.211	1.895	58.352	26.312	32924.138	34442.304	0.000	0.667	0.000	6.154	0.000	20383.622
Instance2288.7	12.435	1.916	58.379	26.351	32926.862	34442.333	0.000	0.671	0.000	6.150	0.000	20423.770
Instance2288.8	12.756	1.876	58.283	26.239	32924.789	34446.586	0.000	0.670	0.000	6.151	0.000	20404.030

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance2288.1	9.475	261816.697
Instance2288.2	9.475	261820.273
Instance2288.3	9.475	261820.947
Instance2288.4	9.476	261804.931
Instance2288.5	9.475	261826.583
Instance2288.6	9.475	261802.106
Instance2288.7	9.474	261830.793
Instance2288.8	9.475	261817.060

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance2288.1	0.535	203465.868
Instance2288.2	0.535	202539.138
Instance2288.3	0.536	203278.022
Instance2288.4	0.535	203393.053
Instance2288.5	0.536	203398.967
Instance2288.6	0.535	203161.860
Instance2288.7	0.535	203675.944
Instance2288.8	0.535	203037.032

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
Instance2288.1	11.092	1.766	67.782	26.243	64926.686	34439.498	2.133	0.670	0.535	6.136	203465.868	20458.386
Instance2288.2	11.227	1.779	67.807	26.278	64918.965	34440.223	2.149	0.670	0.535	6.144	202539.138	20445.960
Instance2288.3	11.528	1.798	67.919	26.436	64862.048	34433.860	2.137	0.676	0.536	6.175	203278.022	20373.100
Instance2288.4	11.372	1.784	67.797	26.270	64919.215	34444.307	2.186	0.674	0.535	6.148	203393.053	20419.476
Instance2288.5	11.982	1.849	67.831	26.351	64903.981	34454.818	2.101	0.670	0.536	6.158	203398.967	20443.782
Instance2288.6	12.211	1.895	67.827	26.312	64897.694	34442.304	2.086	0.667	0.535	6.154	203161.860	20383.622
Instance2288.7	12.435	1.916	67.853	26.351	64888.649	34442.333	2.091	0.671	0.535	6.150	203675.944	20423.770
Instance2288.8	12.756	1.876	67.758	26.239	64931.211	34446.586	2.104	0.670	0.535	6.151	203037.032	20404.030

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.802	0.445	2.250
Available MBytes	27580.037	27545.000	27763.000
Free System Page Table Entries	16599647.268	16598941.000	16599996.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	242784309.135	242057216.000	243027968.000
Pool Paged Bytes	195651771.219	195530752.000	200523776.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/24/2015 8:31:02 AM -- Preparing for testing ...
8/24/2015 8:31:11 AM -- Attaching databases ...
8/24/2015 8:31:11 AM -- Preparations for testing are complete.
8/24/2015 8:31:11 AM -- Starting transaction dispatch ..
8/24/2015 8:31:11 AM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
8/24/2015 8:31:11 AM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
8/24/2015 8:31:20 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 200 msec/read).
8/24/2015 8:31:20 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 200 msec/write).
8/24/2015 8:31:21 AM -- Operation mix: Sessions 13, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/24/2015 8:31:21 AM -- Performance logging started (interval: 15000 ms).
8/24/2015 8:31:21 AM -- Attaining prerequisites:
8/24/2015 8:35:35 AM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 1937891000.0 (lower bound: 1932735000.0, upper bound: none)
8/25/2015 8:35:35 AM -- Performance logging has ended.
8/25/2015 2:31:14 PM -- JetInterop batch transaction stats: 216169, 216168, 216168, 216168, 216168, 216168, 216168 and 216168.
8/25/2015 2:31:14 PM -- Dispatching transactions ends.
8/25/2015 2:31:16 PM -- Shutting down databases ...
8/25/2015 2:31:21 PM -- Instance2288.1 (complete), Instance2288.2 (complete), Instance2288.3 (complete), Instance2288.4 (complete), Instance2288.5 (complete),
Instance2288.6 (complete), Instance2288.7 (complete) and Instance2288.8 (complete)
8/25/2015 2:31:21 PM -- C:\Program Files\Exchange Jetstress\Stress_2015_8_24_8_31_20.blg has 5759 samples.
8/25/2015 2:31:21 PM -- Creating test report ...
8/25/2015 2:31:53 PM -- Instance2288.1 has 11.1 for I/O Database Reads Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.1 has 0.7 for I/O Log Writes Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.1 has 0.7 for I/O Log Reads Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.2 has 11.2 for I/O Database Reads Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.2 has 0.7 for I/O Log Writes Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.2 has 0.7 for I/O Log Reads Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.3 has 11.5 for I/O Database Reads Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.3 has 0.7 for I/O Log Writes Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.3 has 0.7 for I/O Log Reads Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.4 has 11.4 for I/O Database Reads Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.4 has 0.7 for I/O Log Writes Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.4 has 0.7 for I/O Log Reads Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.5 has 12.0 for I/O Database Reads Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.5 has 0.7 for I/O Log Writes Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.5 has 0.7 for I/O Log Reads Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.6 has 12.2 for I/O Database Reads Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.6 has 0.7 for I/O Log Writes Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.6 has 0.7 for I/O Log Reads Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.7 has 12.4 for I/O Database Reads Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.7 has 0.7 for I/O Log Writes Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.7 has 0.7 for I/O Log Reads Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.8 has 12.8 for I/O Database Reads Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.8 has 0.7 for I/O Log Writes Average Latency.
8/25/2015 2:31:53 PM -- Instance2288.8 has 0.7 for I/O Log Reads Average Latency.
8/25/2015 2:31:53 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/25/2015 2:31:53 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/25/2015 2:31:53 PM -- C:\Program Files\Exchange Jetstress\Stress_2015_8_24_8_31_20.xml has 5742 samples queried.
```

C Backup testing

Server 1

Database Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance5520.1	1285888.03	03:52:39	92.12
Instance5520.2	1285864.03	03:45:44	94.94
Instance5520.3	1285880.03	03:43:47	95.77
Instance5520.4	1285880.03	03:43:20	95.96
Instance5520.5	1285856.03	03:36:48	98.85
Instance5520.6	1285864.03	03:34:40	99.83
Instance5520.7	1285880.03	03:32:00	101.09
Instance5520.8	1285872.03	03:32:00	101.09
Avg			97.45
Sum			779.63

Jetstress System Parameters

Thread Count	13
Minimum Database Cache	256.0 MB
Maximum Database Cache	2048.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%

Database Configuration

Instance5520.1 Log path: C:\Users\Administrator\Desktop\Volume2\log1
Database: C:\Users\Administrator\Desktop\Volume1\db1\Jetstress001001.edb

Instance5520.2 Log path: C:\Users\Administrator\Desktop\Volume2\log2
Database: C:\Users\Administrator\Desktop\Volume1\db2\Jetstress002001.edb

Instance5520.3 Log path: C:\Users\Administrator\Desktop\Volume2\log3
Database: C:\Users\Administrator\Desktop\Volume1\db3\Jetstress003001.edb

Instance5520.4 Log path: C:\Users\Administrator\Desktop\Volume2\log4
Database: C:\Users\Administrator\Desktop\Volume1\db4\Jetstress004001.edb

Instance5520.5 Log path: C:\Users\Administrator\Desktop\Volume1\log5
Database: C:\Users\Administrator\Desktop\Volume2\db5\Jetstress005001.edb

Instance5520.6 Log path: C:\Users\Administrator\Desktop\Volume1\log6
Database: C:\Users\Administrator\Desktop\Volume2\db6\Jetstress006001.edb

Instance5520.7 Log path: C:\Users\Administrator\Desktop\Volume1\log7
Database: C:\Users\Administrator\Desktop\Volume2\db7\Jetstress007001.edb

Instance5520.8 Log path: C:\Users\Administrator\Desktop\Volume1\log8
Database: C:\Users\Administrator\Desktop\Volume2\db8\Jetstress008001.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
Instance5520.1	3.707	0.000	368.242	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance5520.2	3.509	0.000	379.586	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance5520.3	3.562	0.000	382.717	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance5520.4	3.556	0.000	383.637	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance5520.5	4.973	0.000	395.426	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance5520.6	5.176	0.000	399.666	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance5520.7	4.970	0.000	404.401	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance5520.8	5.154	0.000	404.664	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	1.296	0.207	1.955
Available MBytes	33674.935	33649.000	33686.000
Free System Page Table Entries	16625413.433	16625060.000	16625711.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	204745030.621	204673024.000	204857344.000
Pool Paged Bytes	194597605.517	194486272.000	194723840.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/22/2015 4:25:58 PM -- Preparing for testing ...
8/22/2015 4:26:07 PM -- Attaching databases ...
8/22/2015 4:26:07 PM -- Preparations for testing are complete.
8/22/2015 4:26:16 PM -- Performance logging started (interval: 30000 ms).
8/22/2015 4:26:16 PM -- Backing up databases ...
8/22/2015 8:18:56 PM -- Performance logging has ended.
8/22/2015 8:18:56 PM -- Instance5520.1 (100% processed), Instance5520.2 (100% processed), Instance5520.3 (100% processed), Instance5520.4 (100%
processed), Instance5520.5 (100% processed), Instance5520.6 (100% processed), Instance5520.7 (100% processed) and Instance5520.8 (100% processed)
8/22/2015 8:18:56 PM -- C:\Program Files\Exchange Jetstress\DatabaseBackup_2015_8_22_16_26_7.blg has 464 samples.
8/22/2015 8:18:56 PM -- Creating test report ...
```

Server 2

Database Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance3468.1	1286672.03	03:19:04	107.72
Instance3468.2	1286680.03	03:08:46	113.60
Instance3468.3	1286680.03	03:09:31	113.15
Instance3468.4	1286680.03	03:16:06	109.35
Instance3468.5	1286680.03	03:17:50	108.39
Instance3468.6	1286680.03	03:18:21	108.11
Instance3468.7	1286664.03	03:18:12	108.19
Instance3468.8	1286688.03	03:18:24	108.08
Avg			109.57
Sum			876.59

Jetstress System Parameters

Thread Count	13
Minimum Database Cache	256.0 MB
Maximum Database Cache	2048.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%

Database Configuration

Instance3468.1 Log path: C:\Users\Administrator\Desktop\Volume2\log1
Database: C:\Users\Administrator\Desktop\Volume1\db1\Jetstress001001.edb

Instance3468.2 Log path: C:\Users\Administrator\Desktop\Volume2\log2
Database: C:\Users\Administrator\Desktop\Volume1\db2\Jetstress002001.edb

Instance3468.3 Log path: C:\Users\Administrator\Desktop\Volume2\log3
Database: C:\Users\Administrator\Desktop\Volume1\db3\Jetstress003001.edb

Instance3468.4 Log path: C:\Users\Administrator\Desktop\Volume2\log4
Database: C:\Users\Administrator\Desktop\Volume1\db4\Jetstress004001.edb

Instance3468.5 Log path: C:\Users\Administrator\Desktop\Volume1\log5
Database: C:\Users\Administrator\Desktop\Volume2\db5\Jetstress005001.edb

Instance3468.6 Log path: C:\Users\Administrator\Desktop\Volume1\log6
Database: C:\Users\Administrator\Desktop\Volume2\db6\Jetstress006001.edb

Instance3468.7 Log path: C:\Users\Administrator\Desktop\Volume1\log7
Database: C:\Users\Administrator\Desktop\Volume2\db7\Jetstress007001.edb

Instance3468.8 Log path: C:\Users\Administrator\Desktop\Volume1\log8
Database: C:\Users\Administrator\Desktop\Volume2\db8\Jetstress008001.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
Instance3468.1	3.204	0.000	430.623	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3468.2	2.957	0.000	454.767	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3468.3	2.967	0.000	453.045	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3468.4	3.122	0.000	437.065	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3468.5	4.683	0.000	433.686	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3468.6	4.820	0.000	432.975	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3468.7	4.585	0.000	432.994	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance3468.8	4.563	0.000	432.773	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	1.161	0.143	1.699
Available MBytes	30015.482	29978.000	30023.000
Free System Page Table Entries	16611528.525	16611072.000	16611805.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	166403138.894	166338560.000	166453248.000
Pool Paged Bytes	108292353.286	108126208.000	108392448.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/22/2015 4:26:03 PM -- Preparing for testing ...
8/22/2015 4:26:12 PM -- Attaching databases ...
8/22/2015 4:26:12 PM -- Preparations for testing are complete.
8/22/2015 4:26:20 PM -- Performance logging started (interval: 30000 ms).
8/22/2015 4:26:20 PM -- Backing up databases ...
8/22/2015 7:45:26 PM -- Performance logging has ended.
8/22/2015 7:45:26 PM -- Instance3468.1 (100% processed), Instance3468.2 (100% processed), Instance3468.3 (100% processed), Instance3468.4 (100% processed),
Instance3468.5 (100% processed), Instance3468.6 (100% processed), Instance3468.7 (100% processed) and Instance3468.8 (100% processed)
8/22/2015 7:45:26 PM -- C:\Program Files\Exchange Jetstress\DatabaseBackup_2015_8_22_16_26_12.blg has 398 samples.
8/22/2015 7:45:26 PM -- Creating test report ...
```

Server 3

Database Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance4720.1	1286608.03	03:25:05	104.56
Instance4720.2	1286592.03	03:27:09	103.51
Instance4720.3	1286568.03	03:27:10	103.50
Instance4720.4	1286552.03	03:35:47	99.37
Instance4720.5	1286584.03	03:34:21	100.03
Instance4720.6	1286568.03	03:39:10	97.83
Instance4720.7	1286584.03	03:40:35	97.21
Instance4720.8	1286552.03	03:44:13	95.63
Avg			100.20
Sum			801.63

Jetstress System Parameters

Thread Count	13
Minimum Database Cache	256.0 MB
Maximum Database Cache	2048.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%

Database Configuration

Instance4720.1 Log path: C:\Users\Administrator\Desktop\Volume2\log1
Database: C:\Users\Administrator\Desktop\Volume1\db1\Jetstress001001.edb

Instance4720.2 Log path: C:\Users\Administrator\Desktop\Volume2\log2
Database: C:\Users\Administrator\Desktop\Volume1\db2\Jetstress002001.edb

Instance4720.3 Log path: C:\Users\Administrator\Desktop\Volume2\log3
Database: C:\Users\Administrator\Desktop\Volume1\db3\Jetstress003001.edb

Instance4720.4 Log path: C:\Users\Administrator\Desktop\Volume2\log4
Database: C:\Users\Administrator\Desktop\Volume1\db4\Jetstress004001.edb

Instance4720.5 Log path: C:\Users\Administrator\Desktop\Volume1\log5
Database: C:\Users\Administrator\Desktop\Volume2\db5\Jetstress005001.edb

Instance4720.6 Log path: C:\Users\Administrator\Desktop\Volume1\log6
Database: C:\Users\Administrator\Desktop\Volume2\db6\Jetstress006001.edb

Instance4720.7 Log path: C:\Users\Administrator\Desktop\Volume1\log7
Database: C:\Users\Administrator\Desktop\Volume2\db7\Jetstress007001.edb

Instance4720.8 Log path: C:\Users\Administrator\Desktop\Volume1\log8
Database: C:\Users\Administrator\Desktop\Volume2\db8\Jetstress008001.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
Instance4720.1	3.312	0.000	419.166	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4720.2	3.557	0.000	413.895	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4720.3	3.542	0.000	414.183	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4720.4	3.610	0.000	397.875	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4720.5	5.403	0.000	400.037	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4720.6	5.473	0.000	391.480	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4720.7	5.573	0.000	389.084	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4720.8	5.762	0.000	382.771	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.988	0.019	1.405
Available MBytes	29844.804	29819.000	29853.000
Free System Page Table Entries	16609942.337	16609371.000	16610131.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	216558473.143	216494080.000	216600576.000
Pool Paged Bytes	180771081.143	180682752.000	180899840.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/22/2015 4:26:02 PM -- Preparing for testing ...
8/22/2015 4:26:10 PM -- Attaching databases ...
8/22/2015 4:26:10 PM -- Preparations for testing are complete.
8/22/2015 4:26:18 PM -- Performance logging started (interval: 30000 ms).
8/22/2015 4:26:18 PM -- Backing up databases ...
8/22/2015 8:10:33 PM -- Performance logging has ended.
8/22/2015 8:10:33 PM -- Instance4720.1 (100% processed), Instance4720.2 (100% processed), Instance4720.3 (100% processed), Instance4720.4 (100%
processed), Instance4720.5 (100% processed), Instance4720.6 (100% processed), Instance4720.7 (100% processed) and Instance4720.8 (100% processed)
8/22/2015 8:10:33 PM -- C:\Program Files\Exchange Jetstress\DatabaseBackup_2015_8_22_16_26_10.blg has 448 samples.
8/22/2015 8:10:33 PM -- Creating test report ...
```

Server 4

Database Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance4312.1	1285520.03	03:31:22	101.36
Instance4312.2	1285496.03	03:33:10	100.50
Instance4312.3	1285504.03	03:39:57	97.40
Instance4312.4	1285512.03	03:33:10	100.50
Instance4312.5	1285496.03	03:45:51	94.86
Instance4312.6	1285512.03	03:49:46	93.24
Instance4312.7	1285504.03	03:52:01	92.34
Instance4312.8	1285520.03	03:52:59	91.96
Avg			96.52
Sum			772.17

Jetstress System Parameters

Thread Count	13
Minimum Database Cache	256.0 MB
Maximum Database Cache	2048.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%

Database Configuration

Instance4312.1 Log path: C:\Users\Administrator\Desktop\Volume2\log1
Database: C:\Users\Administrator\Desktop\Volume1\db1\Jetstress001001.edb

Instance4312.2 Log path: C:\Users\Administrator\Desktop\Volume2\log2
Database: C:\Users\Administrator\Desktop\Volume1\db2\Jetstress002001.edb

Instance4312.3 Log path: C:\Users\Administrator\Desktop\Volume2\log3
Database: C:\Users\Administrator\Desktop\Volume1\db3\Jetstress003001.edb

Instance4312.4 Log path: C:\Users\Administrator\Desktop\Volume2\log4
Database: C:\Users\Administrator\Desktop\Volume1\db4\Jetstress004001.edb

Instance4312.5 Log path: C:\Users\Administrator\Desktop\Volume1\log5
Database: C:\Users\Administrator\Desktop\Volume2\db5\Jetstress005001.edb

Instance4312.6 Log path: C:\Users\Administrator\Desktop\Volume1\log6
Database: C:\Users\Administrator\Desktop\Volume2\db6\Jetstress006001.edb

Instance4312.7 Log path: C:\Users\Administrator\Desktop\Volume1\log7
Database: C:\Users\Administrator\Desktop\Volume2\db7\Jetstress007001.edb

Instance4312.8 Log path: C:\Users\Administrator\Desktop\Volume1\log8
Database: C:\Users\Administrator\Desktop\Volume2\db8\Jetstress008001.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
Instance4312.1	3.308	0.000	405.508	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4312.2	3.178	0.000	402.417	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4312.3	3.320	0.000	389.956	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4312.4	3.132	0.000	402.703	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4312.5	5.628	0.000	379.486	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4312.6	6.011	0.000	372.819	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4312.7	5.571	0.000	369.336	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4312.8	5.888	0.000	366.877	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	1.959	1.301	3.273
Available MBytes	29797.133	29742.000	29808.000
Free System Page Table Entries	16599980.256	16599459.000	16600304.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	241484489.497	241377280.000	241590272.000
Pool Paged Bytes	195472967.570	195411968.000	195694592.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/22/2015 4:26:08 PM -- Preparing for testing ...
8/22/2015 4:26:16 PM -- Attaching databases ...
8/22/2015 4:26:16 PM -- Preparations for testing are complete.
8/22/2015 4:26:26 PM -- Performance logging started (interval: 30000 ms).
8/22/2015 4:26:26 PM -- Backing up databases ...
8/22/2015 8:19:25 PM -- Performance logging has ended.
8/22/2015 8:19:25 PM -- Instance4312.1 (100% processed), Instance4312.2 (100% processed), Instance4312.3 (100% processed), Instance4312.4 (100%
processed), Instance4312.5 (100% processed), Instance4312.6 (100% processed), Instance4312.7 (100% processed) and Instance4312.8 (100% processed)
8/22/2015 8:19:25 PM -- C:\Program Files\Exchange Jetstress\DatabaseBackup_2015_8_22_16_26_16.blg has 465 samples.
8/22/2015 8:19:25 PM -- Creating test report ...
```

D Recovery testing

Server 1

Database Sizing and Throughput

Achieved Transactional I/O per Second	744.613
Target Transactional I/O per Second	600
Initial Database Size (bytes)	10786751643648
Final Database Size (bytes)	10788664246272
Database Files (Count)	8

Jetstress System Parameters

Thread Count	13
Minimum Database Cache	256.0 MB
Maximum Database Cache	2048.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%

Database Configuration

Instance5308.1 Log path: C:\Users\Administrator\Desktop\Volume2\log1
Database: C:\Users\Administrator\Desktop\Volume1\db1\Jetstress001001.edb

Instance5308.2 Log path: C:\Users\Administrator\Desktop\Volume2\log2
Database: C:\Users\Administrator\Desktop\Volume1\db2\Jetstress002001.edb

Instance5308.3 Log path: C:\Users\Administrator\Desktop\Volume2\log3
Database: C:\Users\Administrator\Desktop\Volume1\db3\Jetstress003001.edb

Instance5308.4 Log path: C:\Users\Administrator\Desktop\Volume2\log4
Database: C:\Users\Administrator\Desktop\Volume1\db4\Jetstress004001.edb

Instance5308.5 Log path: C:\Users\Administrator\Desktop\Volume1\log5
Database: C:\Users\Administrator\Desktop\Volume2\db5\Jetstress005001.edb

Instance5308.6 Log path: C:\Users\Administrator\Desktop\Volume1\log6
Database: C:\Users\Administrator\Desktop\Volume2\db6\Jetstress006001.edb

Instance5308.7 Log path: C:\Users\Administrator\Desktop\Volume1\log7
Database: C:\Users\Administrator\Desktop\Volume2\db7\Jetstress007001.edb

Instance5308.8 Log path: C:\Users\Administrator\Desktop\Volume1\log8
Database: C:\Users\Administrator\Desktop\Volume2\db8\Jetstress008001.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
Instance5308.1	13.240	2.683	64.372	28.777	32768.000	34445.040	0.000	0.667	0.000	6.841	0.000	20308.082
Instance5308.2	12.930	2.860	64.597	28.765	32768.000	34444.933	0.000	0.672	0.000	6.764	0.000	20250.428
Instance5308.3	12.512	3.062	64.124	28.225	32768.000	34458.347	0.000	0.667	0.000	6.708	0.000	20329.835
Instance5308.4	12.717	2.918	64.409	28.708	32768.000	34464.314	0.000	0.664	0.000	6.842	0.000	20138.944
Instance5308.5	12.224	2.707	64.200	28.660	32768.000	34482.560	0.000	0.659	0.000	6.818	0.000	20321.810
Instance5308.6	12.060	2.985	64.278	28.755	32768.000	34496.703	0.000	0.658	0.000	6.785	0.000	20461.090
Instance5308.7	11.927	3.191	64.457	28.778	32768.000	34465.982	0.000	0.662	0.000	6.769	0.000	20444.056
Instance5308.8	11.849	2.970	64.586	28.922	32768.000	34431.525	0.000	0.658	0.000	6.811	0.000	20231.836

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.615	0.406	1.663
Available MBytes	31535.227	31479.000	33327.000
Free System Page Table Entries	16625304.436	16624740.000	16625588.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	205833184.000	204759040.000	206131200.000
Pool Paged Bytes	194621744.000	194502656.000	194703360.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/23/2015 3:02:36 PM -- Preparing for testing ...
8/23/2015 3:02:44 PM -- Attaching databases ...
8/23/2015 3:02:44 PM -- Preparations for testing are complete.
8/23/2015 3:02:44 PM -- Starting transaction dispatch ..
8/23/2015 3:02:44 PM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
8/23/2015 3:02:44 PM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
8/23/2015 3:02:53 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
8/23/2015 3:02:53 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
8/23/2015 3:02:54 PM -- Operation mix: Sessions 13, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/23/2015 3:02:54 PM -- Performance logging started (interval: 15000 ms).
8/23/2015 3:02:54 PM -- Generating log files ...
8/23/2015 5:11:14 PM -- C:\Users\Administrator\Desktop\Volume2\log1 (101.8% generated), C:\Users\Administrator\Desktop\Volume2\log2 (100.4% generated),
C:\Users\Administrator\Desktop\Volume2\log3 (100.2% generated), C:\Users\Administrator\Desktop\Volume2\log4 (101.0% generated),
C:\Users\Administrator\Desktop\Volume1\log5 (101.6% generated), C:\Users\Administrator\Desktop\Volume1\log6 (101.8% generated),
C:\Users\Administrator\Desktop\Volume1\log7 (101.4% generated) and C:\Users\Administrator\Desktop\Volume1\log8 (101.0% generated)
8/23/2015 5:11:14 PM -- Performance logging has ended.
8/23/2015 5:11:14 PM -- JetInterop batch transaction stats: 17061, 17061, 17061, 17061, 17060, 17060, 17060 and 17060.
8/23/2015 5:11:14 PM -- Dispatching transactions ends.
8/23/2015 5:11:15 PM -- Shutting down databases ...
8/23/2015 5:11:19 PM -- Instance5308.1 (complete), Instance5308.2 (complete), Instance5308.3 (complete), Instance5308.4 (complete), Instance5308.5 (complete),
Instance5308.6 (complete), Instance5308.7 (complete) and Instance5308.8 (complete)
8/23/2015 5:11:19 PM -- C:\Program Files\Exchange Jetstress\Performance_2015_8_23_15_2_53.blg has 512 samples.
8/23/2015 5:11:19 PM -- Creating test report ...
8/23/2015 5:11:21 PM -- Instance5308.1 has 13.2 for I/O Database Reads Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.1 has 0.7 for I/O Log Writes Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.1 has 0.7 for I/O Log Reads Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.2 has 12.9 for I/O Database Reads Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.2 has 0.7 for I/O Log Writes Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.2 has 0.7 for I/O Log Reads Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.3 has 12.5 for I/O Database Reads Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.3 has 0.7 for I/O Log Writes Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.3 has 0.7 for I/O Log Reads Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.4 has 12.7 for I/O Database Reads Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.4 has 0.7 for I/O Log Writes Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.4 has 0.7 for I/O Log Reads Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.5 has 12.2 for I/O Database Reads Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.5 has 0.7 for I/O Log Writes Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.5 has 0.7 for I/O Log Reads Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.6 has 12.1 for I/O Database Reads Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.6 has 0.7 for I/O Log Writes Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.6 has 0.7 for I/O Log Reads Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.7 has 11.9 for I/O Database Reads Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.7 has 0.7 for I/O Log Writes Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.7 has 0.7 for I/O Log Reads Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.8 has 11.8 for I/O Database Reads Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.8 has 0.7 for I/O Log Writes Average Latency.
8/23/2015 5:11:21 PM -- Instance5308.8 has 0.7 for I/O Log Reads Average Latency.
8/23/2015 5:11:21 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/23/2015 5:11:21 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/23/2015 5:11:21 PM -- C:\Program Files\Exchange Jetstress\Performance_2015_8_23_15_2_53.xml has 511 samples queried.
```

Server 2

Database Sizing and Throughput

Achieved Transactional I/O per Second	805.657
Target Transactional I/O per Second	600
Initial Database Size (bytes)	10793504473088
Final Database Size (bytes)	10795425464320
Database Files (Count)	8

Jetstress System Parameters

Thread Count	13
Minimum Database Cache	256.0 MB
Maximum Database Cache	2048.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%

Database Configuration

Instance2556.1 Log path: C:\Users\Administrator\Desktop\Volume2\log1
Database: C:\Users\Administrator\Desktop\Volume1\db1\Jetstress001001.edb

Instance2556.2 Log path: C:\Users\Administrator\Desktop\Volume2\log2
Database: C:\Users\Administrator\Desktop\Volume1\db2\Jetstress002001.edb

Instance2556.3 Log path: C:\Users\Administrator\Desktop\Volume2\log3
Database: C:\Users\Administrator\Desktop\Volume1\db3\Jetstress003001.edb

Instance2556.4 Log path: C:\Users\Administrator\Desktop\Volume2\log4
Database: C:\Users\Administrator\Desktop\Volume1\db4\Jetstress004001.edb

Instance2556.5 Log path: C:\Users\Administrator\Desktop\Volume1\log5
Database: C:\Users\Administrator\Desktop\Volume2\db5\Jetstress005001.edb

Instance2556.6 Log path: C:\Users\Administrator\Desktop\Volume1\log6
Database: C:\Users\Administrator\Desktop\Volume2\db6\Jetstress006001.edb

Instance2556.7 Log path: C:\Users\Administrator\Desktop\Volume1\log7
Database: C:\Users\Administrator\Desktop\Volume2\db7\Jetstress007001.edb

Instance2556.8 Log path: C:\Users\Administrator\Desktop\Volume1\log8
Database: C:\Users\Administrator\Desktop\Volume2\db8\Jetstress008001.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
Instance2556.1	11.689	2.190	69.721	31.249	32768.000	34390.739	0.000	0.585	0.000	7.402	0.000	20281.426
Instance2556.2	11.623	2.376	69.494	31.021	32768.000	34422.040	0.000	0.575	0.000	7.400	0.000	20298.455
Instance2556.3	11.595	2.543	69.380	30.914	32768.000	34414.718	0.000	0.582	0.000	7.291	0.000	20556.739
Instance2556.4	11.503	2.392	69.747	30.806	32768.000	34387.577	0.000	0.580	0.000	7.218	0.000	20367.044
Instance2556.5	11.465	2.682	70.026	31.258	32768.000	34373.283	0.000	0.546	0.000	7.347	0.000	20177.419
Instance2556.6	11.455	2.446	69.614	31.097	32768.000	34395.438	0.000	0.545	0.000	7.338	0.000	20373.194
Instance2556.7	11.475	2.761	69.821	31.169	32768.000	34385.922	0.000	0.548	0.000	7.379	0.000	20260.245
Instance2556.8	11.433	2.645	69.634	30.708	32768.000	34381.042	0.000	0.547	0.000	7.250	0.000	20182.251

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.350	0.080	0.948
Available MBytes	27878.477	27823.000	29669.000
Free System Page Table Entries	16611467.136	16610915.000	16611738.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	167601387.649	166690816.000	167751680.000
Pool Paged Bytes	108353621.690	108306432.000	108494848.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/23/2015 3:02:38 PM -- Preparing for testing ...
8/23/2015 3:02:47 PM -- Attaching databases ...
8/23/2015 3:02:47 PM -- Preparations for testing are complete.
8/23/2015 3:02:47 PM -- Starting transaction dispatch ..
8/23/2015 3:02:47 PM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
8/23/2015 3:02:47 PM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
8/23/2015 3:02:55 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
8/23/2015 3:02:55 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
8/23/2015 3:02:56 PM -- Operation mix: Sessions 13, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/23/2015 3:02:56 PM -- Performance logging started (interval: 15000 ms).
8/23/2015 3:02:56 PM -- Generating log files ...
8/23/2015 5:02:33 PM -- C:\Users\Administrator\Desktop\Volume2\log1 (102.6% generated), C:\Users\Administrator\Desktop\Volume2\log2 (102.6% generated),
C:\Users\Administrator\Desktop\Volume2\log3 (102.4% generated), C:\Users\Administrator\Desktop\Volume2\log4 (100.4% generated),
C:\Users\Administrator\Desktop\Volume1\log5 (101.0% generated), C:\Users\Administrator\Desktop\Volume1\log6 (102.2% generated),
C:\Users\Administrator\Desktop\Volume1\log7 (102.0% generated) and C:\Users\Administrator\Desktop\Volume1\log8 (100.2% generated)
8/23/2015 5:02:33 PM -- Performance logging has ended.
8/23/2015 5:02:33 PM -- JetInterop batch transaction stats: 17179, 17179, 17179, 17178, 17178, 17178, 17178 and 17178.
8/23/2015 5:02:33 PM -- Dispatching transactions ends.
8/23/2015 5:02:33 PM -- Shutting down databases ...
8/23/2015 5:02:36 PM -- Instance2556.1 (complete), Instance2556.2 (complete), Instance2556.3 (complete), Instance2556.4 (complete), Instance2556.5 (complete),
Instance2556.6 (complete), Instance2556.7 (complete) and Instance2556.8 (complete)
8/23/2015 5:02:36 PM -- C:\Program Files\Exchange Jetstress\Performance_2015_8_23_15_2_55.blg has 478 samples.
8/23/2015 5:02:36 PM -- Creating test report ...
8/23/2015 5:02:37 PM -- Instance2556.1 has 11.7 for I/O Database Reads Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.1 has 0.6 for I/O Log Writes Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.1 has 0.6 for I/O Log Reads Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.2 has 11.6 for I/O Database Reads Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.2 has 0.6 for I/O Log Writes Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.2 has 0.6 for I/O Log Reads Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.3 has 11.6 for I/O Database Reads Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.3 has 0.6 for I/O Log Writes Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.3 has 0.6 for I/O Log Reads Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.4 has 11.5 for I/O Database Reads Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.4 has 0.6 for I/O Log Writes Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.4 has 0.6 for I/O Log Reads Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.5 has 11.5 for I/O Database Reads Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.5 has 0.5 for I/O Log Writes Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.5 has 0.5 for I/O Log Reads Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.6 has 11.5 for I/O Database Reads Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.6 has 0.5 for I/O Log Writes Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.6 has 0.5 for I/O Log Reads Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.7 has 11.5 for I/O Database Reads Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.7 has 0.5 for I/O Log Writes Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.7 has 0.5 for I/O Log Reads Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.8 has 11.4 for I/O Database Reads Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.8 has 0.5 for I/O Log Writes Average Latency.
8/23/2015 5:02:38 PM -- Instance2556.8 has 0.5 for I/O Log Reads Average Latency.
8/23/2015 5:02:38 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/23/2015 5:02:38 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/23/2015 5:02:38 PM -- C:\Program Files\Exchange Jetstress\Performance_2015_8_23_15_2_55.xml has 477 samples queried.
```

Server 3

Database Sizing and Throughput

Achieved Transactional I/O per Second	792.304
Target Transactional I/O per Second	600
Initial Database Size (bytes)	10792648835072
Final Database Size (bytes)	10794544660480
Database Files (Count)	8

Jetstress System Parameters

Thread Count	13
Minimum Database Cache	256.0 MB
Maximum Database Cache	2048.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%

Database Configuration

Instance3904.1 Log path: C:\Users\Administrator\Desktop\Volume2\log1
Database: C:\Users\Administrator\Desktop\Volume1\db1\Jetstress001001.edb

Instance3904.2 Log path: C:\Users\Administrator\Desktop\Volume2\log2
Database: C:\Users\Administrator\Desktop\Volume1\db2\Jetstress002001.edb

Instance3904.3 Log path: C:\Users\Administrator\Desktop\Volume2\log3
Database: C:\Users\Administrator\Desktop\Volume1\db3\Jetstress003001.edb

Instance3904.4 Log path: C:\Users\Administrator\Desktop\Volume2\log4
Database: C:\Users\Administrator\Desktop\Volume1\db4\Jetstress004001.edb

Instance3904.5 Log path: C:\Users\Administrator\Desktop\Volume1\log5
Database: C:\Users\Administrator\Desktop\Volume2\db5\Jetstress005001.edb

Instance3904.6 Log path: C:\Users\Administrator\Desktop\Volume1\log6
Database: C:\Users\Administrator\Desktop\Volume2\db6\Jetstress006001.edb

Instance3904.7 Log path: C:\Users\Administrator\Desktop\Volume1\log7
Database: C:\Users\Administrator\Desktop\Volume2\db7\Jetstress007001.edb

Instance3904.8 Log path: C:\Users\Administrator\Desktop\Volume1\log8
Database: C:\Users\Administrator\Desktop\Volume2\db8\Jetstress008001.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
Instance3904.1	11.544	3.002	68.222	30.277	32768.000	34415.521	0.000	0.587	0.000	7.192	0.000	20496.703
Instance3904.2	11.576	3.446	68.663	30.799	32768.000	34384.620	0.000	0.586	0.000	7.192	0.000	20519.912
Instance3904.3	11.594	3.727	68.424	30.533	32768.000	34422.149	0.000	0.587	0.000	7.211	0.000	20410.716
Instance3904.4	11.589	3.373	68.407	30.689	32768.000	34411.554	0.000	0.585	0.000	7.225	0.000	20448.292
Instance3904.5	11.744	3.270	68.710	30.845	32768.000	34391.728	0.000	0.587	0.000	7.243	0.000	20345.957
Instance3904.6	11.806	3.666	68.107	30.337	32768.000	34426.767	0.000	0.586	0.000	7.185	0.000	20571.591
Instance3904.7	11.857	3.891	68.300	30.569	32768.000	34426.706	0.000	0.587	0.000	7.259	0.000	20411.370
Instance3904.8	11.914	3.562	68.625	30.799	32768.000	34402.730	0.000	0.590	0.000	7.261	0.000	20342.839

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.303	0.149	0.531
Available MBytes	27722.523	27679.000	29510.000
Free System Page Table Entries	16609830.761	16609442.000	16610036.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	217184582.992	216526848.000	217350144.000
Pool Paged Bytes	180812610.689	180690944.000	180883456.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
8/23/2015 3:02:41 PM -- Preparing for testing ...
8/23/2015 3:02:49 PM -- Attaching databases ...
8/23/2015 3:02:49 PM -- Preparations for testing are complete.
8/23/2015 3:02:49 PM -- Starting transaction dispatch ..
8/23/2015 3:02:49 PM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
8/23/2015 3:02:49 PM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
8/23/2015 3:02:57 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
8/23/2015 3:02:57 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
8/23/2015 3:02:58 PM -- Operation mix: Sessions 13, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/23/2015 3:02:58 PM -- Performance logging started (interval: 15000 ms).
8/23/2015 3:02:58 PM -- Generating log files ...
8/23/2015 5:02:10 PM -- C:\Users\Administrator\Desktop\Volume2\log1 (100.2% generated), C:\Users\Administrator\Desktop\Volume2\log2 (100.2% generated),
C:\Users\Administrator\Desktop\Volume2\log3 (100.2% generated), C:\Users\Administrator\Desktop\Volume2\log4 (100.6% generated),
C:\Users\Administrator\Desktop\Volume1\log5 (100.6% generated), C:\Users\Administrator\Desktop\Volume1\log6 (100.6% generated),
C:\Users\Administrator\Desktop\Volume1\log7 (100.8% generated) and C:\Users\Administrator\Desktop\Volume1\log8 (100.4% generated)
8/23/2015 5:02:10 PM -- Performance logging has ended.
8/23/2015 5:02:10 PM -- JetInterop batch transaction stats: 16825, 16824, 16824, 16824, 16824, 16824, 16824 and 16824.
8/23/2015 5:02:10 PM -- Dispatching transactions ends.
8/23/2015 5:02:10 PM -- Shutting down databases ...
8/23/2015 5:02:14 PM -- Instance3904.1 (complete), Instance3904.2 (complete), Instance3904.3 (complete), Instance3904.4 (complete), Instance3904.5 (complete),
Instance3904.6 (complete), Instance3904.7 (complete) and Instance3904.8 (complete)
8/23/2015 5:02:14 PM -- C:\Program Files\Exchange Jetstress\Performance_2015_8_23_15_2_57.blg has 476 samples.
8/23/2015 5:02:14 PM -- Creating test report ...
8/23/2015 5:02:15 PM -- Instance3904.1 has 11.5 for I/O Database Reads Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.1 has 0.6 for I/O Log Writes Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.1 has 0.6 for I/O Log Reads Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.2 has 11.6 for I/O Database Reads Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.2 has 0.6 for I/O Log Writes Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.2 has 0.6 for I/O Log Reads Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.3 has 11.6 for I/O Database Reads Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.3 has 0.6 for I/O Log Writes Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.3 has 0.6 for I/O Log Reads Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.4 has 11.6 for I/O Database Reads Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.4 has 0.6 for I/O Log Writes Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.4 has 0.6 for I/O Log Reads Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.5 has 11.7 for I/O Database Reads Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.5 has 0.6 for I/O Log Writes Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.5 has 0.6 for I/O Log Reads Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.6 has 11.8 for I/O Database Reads Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.6 has 0.6 for I/O Log Writes Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.6 has 0.6 for I/O Log Reads Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.7 has 11.9 for I/O Database Reads Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.7 has 0.6 for I/O Log Writes Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.7 has 0.6 for I/O Log Reads Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.8 has 11.9 for I/O Database Reads Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.8 has 0.6 for I/O Log Writes Average Latency.
8/23/2015 5:02:15 PM -- Instance3904.8 has 0.6 for I/O Log Reads Average Latency.
8/23/2015 5:02:15 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/23/2015 5:02:15 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/23/2015 5:02:15 PM -- C:\Program Files\Exchange Jetstress\Performance_2015_8_23_15_2_57.xml has 475 samples queried.
```

Server 4

Database Sizing and Throughput

Achieved Transactional I/O per Second	720.4
Target Transactional I/O per Second	600
Initial Database Size (bytes)	10783689801728
Final Database Size (bytes)	10785602404352
Database Files (Count)	8

Jetstress System Parameters

Thread Count	13
Minimum Database Cache	256.0 MB
Maximum Database Cache	2048.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%

Database Configuration

Instance4480.1 Log path: C:\Users\Administrator\Desktop\Volume2\log1
Database: C:\Users\Administrator\Desktop\Volume1\db1\Jetstress001001.edb

Instance4480.2 Log path: C:\Users\Administrator\Desktop\Volume2\log2
Database: C:\Users\Administrator\Desktop\Volume1\db2\Jetstress002001.edb

Instance4480.3 Log path: C:\Users\Administrator\Desktop\Volume2\log3
Database: C:\Users\Administrator\Desktop\Volume1\db3\Jetstress003001.edb

Instance4480.4 Log path: C:\Users\Administrator\Desktop\Volume2\log4
Database: C:\Users\Administrator\Desktop\Volume1\db4\Jetstress004001.edb

Instance4480.5 Log path: C:\Users\Administrator\Desktop\Volume1\log5
Database: C:\Users\Administrator\Desktop\Volume2\db5\Jetstress005001.edb

Instance4480.6 Log path: C:\Users\Administrator\Desktop\Volume1\log6
Database: C:\Users\Administrator\Desktop\Volume2\db6\Jetstress006001.edb

Instance4480.7 Log path: C:\Users\Administrator\Desktop\Volume1\log7
Database: C:\Users\Administrator\Desktop\Volume2\db7\Jetstress007001.edb

Instance4480.8 Log path: C:\Users\Administrator\Desktop\Volume1\log8
Database: C:\Users\Administrator\Desktop\Volume2\db8\Jetstress008001.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
Instance4480.1	12.115	2.793	62.098	27.479	32768.000	34523.434	0.000	0.654	0.000	6.521	0.000	20422.190
Instance4480.2	12.259	2.728	62.305	27.692	32768.000	34492.319	0.000	0.663	0.000	6.537	0.000	20486.808
Instance4480.3	12.529	2.966	62.288	27.548	32768.000	34506.461	0.000	0.683	0.000	6.534	0.000	20363.128
Instance4480.4	12.390	2.930	62.279	27.567	32768.000	34483.743	0.000	0.679	0.000	6.526	0.000	20285.913
Instance4480.5	13.006	2.549	62.210	27.821	32768.000	34510.718	0.000	0.661	0.000	6.582	0.000	20400.816
Instance4480.6	13.249	2.874	62.424	27.775	32768.000	34484.034	0.000	0.664	0.000	6.560	0.000	20276.285
Instance4480.7	13.491	2.938	62.619	28.126	32768.000	34482.753	0.000	0.651	0.000	6.653	0.000	20270.370
Instance4480.8	13.830	2.759	62.279	27.891	32768.000	34505.227	0.000	0.675	0.000	6.647	0.000	20305.395

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	0.722	0.490	1.962
Available MBytes	27665.626	27609.000	29466.000
Free System Page Table Entries	16599885.607	16599396.000	16600195.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	241919506.459	241491968.000	242147328.000
Pool Paged Bytes	195418473.412	195342336.000	195530752.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

8/23/2015 3:02:44 PM -- Preparing for testing ...
8/23/2015 3:02:53 PM -- Attaching databases ...
8/23/2015 3:02:53 PM -- Preparations for testing are complete.
8/23/2015 3:02:53 PM -- Starting transaction dispatch ..
8/23/2015 3:02:53 PM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
8/23/2015 3:02:53 PM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
8/23/2015 3:03:01 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
8/23/2015 3:03:01 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
8/23/2015 3:03:02 PM -- Operation mix: Sessions 13, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
8/23/2015 3:03:02 PM -- Performance logging started (interval: 15000 ms).
8/23/2015 3:03:02 PM -- Generating log files ...
8/23/2015 5:15:09 PM -- C:\Users\Administrator\Desktop\Volume2\log1 (100.4% generated), C:\Users\Administrator\Desktop\Volume2\log2 (100.8% generated), C:\Users\Administrator\Desktop\Volume2\log3 (100.2% generated), C:\Users\Administrator\Desktop\Volume2\log4 (100.2% generated), C:\Users\Administrator\Desktop\Volume1\log5 (101.4% generated), C:\Users\Administrator\Desktop\Volume1\log6 (100.6% generated), C:\Users\Administrator\Desktop\Volume1\log7 (101.8% generated) and C:\Users\Administrator\Desktop\Volume1\log8 (102.0% generated)
8/23/2015 5:15:10 PM -- Performance logging has ended.
8/23/2015 5:15:10 PM -- JetInterop batch transaction stats: 17011, 17011, 17011, 17011, 17010, 17010, 17010 and 17010.
8/23/2015 5:15:10 PM -- Dispatching transactions ends.
8/23/2015 5:15:10 PM -- Shutting down databases ...
8/23/2015 5:15:14 PM -- Instance4480.1 (complete), Instance4480.2 (complete), Instance4480.3 (complete), Instance4480.4 (complete), Instance4480.5 (complete), Instance4480.6 (complete), Instance4480.7 (complete) and Instance4480.8 (complete)
8/23/2015 5:15:14 PM -- C:\Program Files\Exchange Jetstress\Performance_2015_8_23_15_3_1.blg has 527 samples.
8/23/2015 5:15:14 PM -- Creating test report ...
8/23/2015 5:15:16 PM -- Instance4480.1 has 12.1 for I/O Database Reads Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.1 has 0.7 for I/O Log Writes Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.1 has 0.7 for I/O Log Reads Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.2 has 12.3 for I/O Database Reads Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.2 has 0.7 for I/O Log Writes Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.2 has 0.7 for I/O Log Reads Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.3 has 12.5 for I/O Database Reads Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.3 has 0.7 for I/O Log Writes Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.3 has 0.7 for I/O Log Reads Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.4 has 12.4 for I/O Database Reads Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.4 has 0.7 for I/O Log Writes Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.4 has 0.7 for I/O Log Reads Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.5 has 13.0 for I/O Database Reads Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.5 has 0.7 for I/O Log Writes Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.5 has 0.7 for I/O Log Reads Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.6 has 13.2 for I/O Database Reads Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.6 has 0.7 for I/O Log Writes Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.6 has 0.7 for I/O Log Reads Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.7 has 13.5 for I/O Database Reads Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.7 has 0.7 for I/O Log Writes Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.7 has 0.7 for I/O Log Reads Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.8 has 13.8 for I/O Database Reads Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.8 has 0.7 for I/O Log Writes Average Latency.
8/23/2015 5:15:16 PM -- Instance4480.8 has 0.7 for I/O Log Reads Average Latency.
8/23/2015 5:15:16 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
8/23/2015 5:15:16 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
8/23/2015 5:15:16 PM -- C:\Program Files\Exchange Jetstress\Performance_2015_8_23_15_3_1.xml has 526 samples queried.