Tegile IntelliFlash Exchange 2013

120,000-Mailbox Resiliency Storage Solution

Tegile T3800 All-Flash Storage Array

Tested with: ESRP – Storage Version 4.0
Tested Date: January 26, 2016

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Executive Summary

The Microsoft Exchange Solution Reviewed Program (ESRP) is designed by Microsoft Corporation to provide you with consistent information about performance and stability of various storage vendors. This information should simplify your selection process and provide you with well documented certified solution architectures for Microsoft Exchange Server software. While this Tegile ESRP architecture targets large (120K mailbox) organizations, Tegile provides small and medium sized solution using the same family of storage arrays.

Target Audience: This document targets CIOs, CTOs, decision makers and managers, as well as individual Exchange architects and administrators.

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Overview & Features

This document describes the Microsoft Certified 120,000-mailbox reference architecture using resiliency (2-copy) database availability group (DAG) configuration for Exchange Server 2013 with Tegile IntelliFlash Flash Storage array.

Many businesses depend on Microsoft Exchange Server for the majority of internal and external communication. Even a small downtime can cause a significant loss of employee productivity while slow response times (poor performance) of E-mail clients and Calendar applications can be a constant source of employees' frustration. On-Premise Exchange deployment also provides companies with complete authority over their entire collection correspondence, which is hard to replicate with most cloud and hosted solutions.

Tegile offers a comprehensive portfolio of hybrid and all-flash storage solutions that deliver high I/O per second (IOPS), high I/O throughput and sustained low latency at a price that fits most budgets. Each array includes (at no cost) a comprehensive set of data protection and management capabilities and can seamlessly support different storage media: high-performance flash, dense flash, and hard disks, under a single version of IntelliFlash operating system. Tegile customers can expand their solution over time with additional all-flash, hybrid and or spinning media shelves to meet the growing sizes of many mailboxes. Tegile solution delivers unparalleled performance and flexibility for the price of disk solutions.

Dramatically Improve Exchange Response Time

Tegile All-Flash Storage Arrays can achieve sustained sub-milliseconds Exchange server transaction response times. Tegile IntelliFlash Operating System (IntelliFlash) achieves this by automatically

separating metadata from data and intelligently caching the most frequently accessed blocks in DRAM and flash media (Hybrid).

All-Flash Performance

- Dramatically Improve Exchange
- Server Response Time and user experience

Inline Compression and Deduplication

- 2x~5x Reduction in Storage Footprint
- Choose your compression algorithm
- Control deduplication

Continuous Availability

- Build in Replication for Disaster Recovery
- Active-Active storage configuration
- No single point of failure
- Choice of RAID

Snapshot & Clones

- Create instant Backups with Snapshots
- Use clones to run multiple copies (e-discovery)

Virtualization and Consolidation

- Hyper-V and ESXi certified
- System Center and vCetner integration
- Ultra-Dense consolidated environments
- Better RIO on existing software assets

Multiple Interconnect Protocols

- SMB3.0, FC, iSCSI, NFS concurrently

Additionally, in Hybrid configurations, business critical mailboxes can be pinned into all-flash storage pools to supercharge their performance when compared to the rest of the mailboxes.

Reduce Your Storage Footprint

Tegile IntelliFlash allows you to Compress Exchange databases and logs by a factor of 2 to 5x. You can also create multiple copies of your entire Exchange without taking up additional storage space.

IntelliFlash Inline Compression and Deduplication capabilities dramatically reduce the overall storage footprint of your Exchange Server while helping to improve performance. Data blocks are compressed, and redundant data blocks are omitted before they are written to disk. You can choose the compression algorithm and turn on/off deduplication at the LUN/file share level or at the project level to strike the perfect balance between speed and capacity.

These data reduction techniques also act as a performance multiplier, freeing up space in the high-performance, low-latency storage layers (DRAM and flash) for faster reads and writes.

Compression and Deduplication are transparently applied to data as it is being written. All data always appears to the requestor as if it were in its original state.

Consolidated Workloads with Multi-Protocol Support

IT organizations often deploy multiple storage arrays to fit the protocol needs and workload characteristics of specific applications. Tegile arrays support natively and concurrently both block and file protocols, enabling you to host Exchange Server along with other workloads on a single array. Supported file protocols include NAS/NFS, CIFS (SMB1, SMB2) and SMB 3.0, and supported block protocols include iSCSI and Fibre Channel. All protocols can be used simultaneously with a variety of storage ports on the same array.

Ensure Availability and Protection of Your Business-Critical Data

Tegile IntelliFlash OS eliminates data loss due to corruption and ensures your data is available 24x7. When deploying Exchange Server on Tegile arrays, you can benefit from the resilience, end-to-end data integrity, application consistent backup and recovery, and high-availability features provided by the IntelliFlash architecture without any additional software licensing cost.

With Tegile arrays, you can achieve

- No single point of failure
- Online capacity expansion
- Non-disruptive software upgrade
- Data integrity checks through block-level checksum
- Application consistent hardware based snapshot and replication
- Integration with Microsoft VSS (Volume Shadow Copy Services) and VAAI/VMAPI
- Quick mailbox recovery through local or remote snapshot
- High I/O throughput (reducing full database backup windows)
- Sub-millisecond log replay (enables instant soft recovery)

Solution Design

The following section outlines the Exchange 2013 mailbox resiliency solution that Tegile implemented to run the ESRP tests.
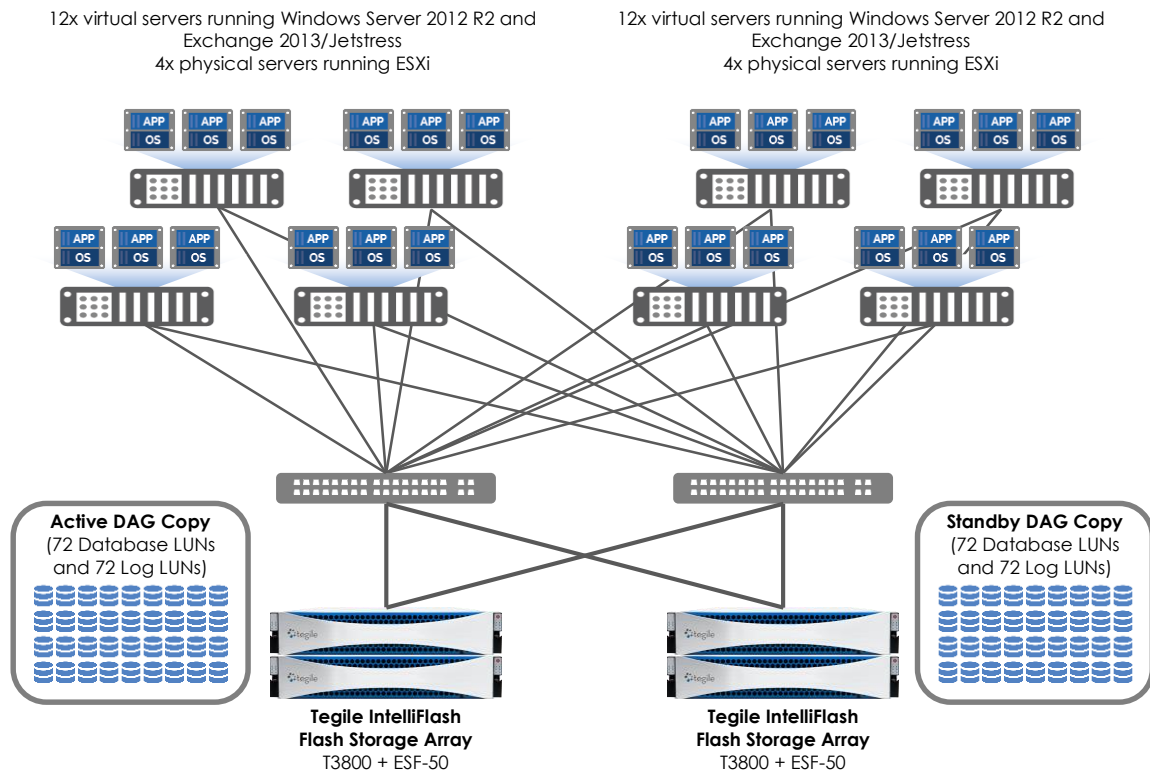
Storage:

- Tegile IntelliFlash T3800 all-flash storage array
  - Active-Active dual redundant controllers
  - 4x10GbE ports per controller (total 8x10GbE)
  - 92.5 TB effective capacity for Exchange
  - Tegile OS version 3.5
  - [Microsoft Windows Certified](#)

- Tegile IntelliFlash ESF-50 all-flash storage expansion shelf
  - Dual redundant IO modules
  - 92.5 TB effective capacity for Exchange

The primary copy storage is described in this document. The secondary copy storage is configured identically (from the host on down to the storage, including brand, model, firmware, drivers, etc.).

The Exchange DAG storage was configured as follows:

- 12 Active Mailbox Servers and 12 Passive Mailbox Servers.
- 2 Tegile T3800 storage arrays with Tegile ESF-50 expansion shelf.
- 72 Active Databases, around 1,667 mailboxes per database
- IntelliFlash Double Parity to protect against drive failure)
- IntelliFlash Hardware-Assisted checksum (to ensure data integrity)
- 2 copies of each database

The ESRP-Storage program focuses on storage testing and validation to eliminate performance and reliability issues. However, storage is not the only factor when designing a reliable Exchange solution. Other factors which affect the Exchange 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 for ESRP-Storage. In some instances, the maximum recommended mailbox count could vary.

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://technet.microsoft.com/en-us/library/dd335215.aspx.

Targeted Customer Profile

This Tegile storage solution targeted for medium and large enterprise customers of Exchange Server 2013 mailbox-resiliency DAG application:

- 120,000 mailboxes
- 12 active servers and 12 passive servers
- 0.10 IOPS per mailbox
- 1000 MB per mailbox
- 24x7 Background Database Maintenance enabled
- Microsoft VSS integrated hardware snapshot based backup

- Exchange application consistent snapshot, clone, and replication for local and remote instant recovery
- Mailbox Resiliency with 2 copies

Tested Deployment

The following tables summarize the testing environment:

Simulated Exchange Configuration:

Criteria Description	Value
Number of Exchange mailboxes simulated	120,000
Number of Database Availability Groups (DAGs)	2
Number of servers/DAG	12
Number of active mailboxes/server	10,000
Number of databases/host	6
Number of copies/database	2
Number of mailboxes/database	1667
Simulated profile: I/Os per second per mailbox (IOPS+20%)	0.12 [achieved 0.24 or 138% headroom]
Database LUN size	2TB
Log LUN size	205GB
Total in database size for performance testing	115TB
% storage capacity used by Exchange database**	80%

**Storage performance characteristics change based on the percentage utilization of the individual disks. ESRP certifications which user relatively small data sets (~25% of total capacity) may exhibit reduced throughput when utilization increase past the tested percentage of total capacity.

Storage Hardware

Configuration Option	Setting
Storage Connectivity	iSCSI
Storage model, OS version	Tegile T3800, IntelliFlash OS 3.5
Storage cache	96GB per controller
Number of storage controllers	2
Number of storage ports	4x 10 GbE ports connected per controller
Maximum availed bandwidth	80 Gbps
Switch type, firmware revision	Arista DCS-7050T-52-R 10GbE, firmware version 4.9.2
HBA model and firmware	Intel 10GbE X540-AT2 w/ firmware version 0x80000313
Number of HBA's/host	2
Host server type	Dual 8-core Intel ® Xeon ® E5-2450 v2 @ 2.50GHz
Host server DRAM	96GB DDR3 RAM
Total number of disks tested in solution	48 SSDs
Max number of disks	168 SSDs, or 168 mixed SSDs and HDDs

Storage Software

Component	Software Version
HBA driver	Intel 10G NIC driver 3.21.4iov
HBA Queue Target Setting	N/A
HBA Queue Depth Setting	Default in Microsoft software iSCSI
Multi-Pathing	Windows Server MPIO, Round Robin
Host OS	Windows Server 2012 R2 Standard
ESE.dll file version	15.0.516.26
Replication solution name/version	N/A

Storage Disk Configuration (Mailbox Store and Transactional Log)

Storage Components	Description
Disk type	SAS Flash SSD
Raw capacity per disk (GB)	1.75 TB
Number of physical disks in test	48 flash SSDs
Total raw storage capacity (GB)	84 TB on flash SSD 195 TB of total effective capacity (68% IntelliFlash data compression)
Disk slice size (GB)	N/A
Number of slices or disk per LUN	N/A
Raid level	RAID60
Total formatted capacity	158.41 TB
Storage capacity utilization	188% (Formatted capacity / Total raw capacity) 81% (Formatted capacity / Total effective capacity)
Database capacity utilization	141% (Database+log size / Total raw capacity) 60% (Database+log size / Total effective capacity)

Best Practices

Exchange server is a read/write-intensive application. Based on the testing run using the ESRP framework, we would recommend using Exchange 2013 best practices for storage design.
http://technet.microsoft.com/en-us/library/dd346703.aspx

Tegile's purpose-built Exchange storage configuration wizard automatically tunes the storage parameters, and simplifies storage sizing and provisioning for Exchange Server.

In general, Tegile recommends separating the LUNs for Exchange server from other applications and separating LUNs (shares) for databases and logs.

Backup strategy

For Exchange Server backup strategy for Tegile arrays, we recommend the following best practices: For local backup, utilize the built-in application consistent snapshots to back up the data on the same array. IntelliFlash snapshots do not require any backup window; hence zero impact on Exchange application performance. IntelliFlash snapshots minimize storage consumption by only

storing the deltas since the previous backup. IntelliFlash snapshots delivery instantly recovery of mailboxes.

For remote backup, utilize the IntelliFlash snapshot-based replication. Again, it minimized the backup window, additional storage requirements and achieved rapid replication by moving compressed deduplicated data blocks which have changed since the last replication. IntelliFlash Replication significantly reduces the consumption of bandwidth between DR sites.

Conclusion

Tegile IntelliFlash all-flash arrays offer one platform for any workload. The presented certified solution is designed to support 120,000 Exchange Server 2013 mailboxes. The T3800 storage was able to maintain *sub-millisecond latency* while *delivering over double the of required IOPS*. In environments with fewer mailboxes, the same storage can be used to host other applications, such as SQL Server OLTP databases, data warehouses, virtual servers, virtual desktops, file sharing and collaboration applications simultaneously. You have the option to deploy Exchange Server on block devices such as iSCSI or FC, or on SMB3 shares. You can choose to run other solutions over different protocols concurrently.

Tegile IntelliFlash is a genuinely unified storage platform. One IntelliFlash array can simultaneously provide multiple interfaces (iSCSI, FC, NFS, and SMB3) eliminating the need for multiple storage platforms.

5 YEARS OF FRESH FLASH
Enterprise workloads require enterprise-grade SSDs, and we guarantee it for 5 years, even in high write I/O environments. Furthermore, we will upgrade your storage controllers at no additional charge after 5 years.

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Test Result Summary

This section provides a high-level summary of the test data from ESRP and the link to the detailed HTML reports, which are generated by the ESRP testing framework. Please click on the underlined headings below to view the HTML report for each test.

Reliability

Some tests in the framework are to check Reliability and run for 24 hours. The goal is to verify the storage can handle high IO load for an extended period. 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:

- There were no errors reported in the saved event log file
- There were no errors reported in during the database and log checksum process

Storage Performance Results

The Primary Storage performance tests are designed to exercise the storage with maximum sustainable I/Os for 2 hours. The tests intend to show how long the storage takes to respond under heavy I/O load. The data below is the sum of all of the logical disk I/O's and average of all the logical disks I/O latency in the 2-hour test duration. Results for each server are listed separately. Aggregate numbers are also provided.

For additional detailed test results, please see Appendix: Jetstress Test Reports.

Individual Server Metrics:

The sum of I/Os across Storage Groups and the average latency across all Storage Groups on a per server basis.

Host 1

Database I/O	
Database Disks Transfers/sec	2,591
Database Disks Reads/sec	1,743
Database Disks Writes/sec	848
Average Database Disk Read Latency (ms)	1.027
Average Database Disk Write Latency (ms)	3.120
Transaction Log I/O	
Log Disks Writes/sec	471
Average Log Disk Write Latency (ms)	0.793

Host 2

Database I/O	
Database Disks Transfers/sec	2,428

Database Disks Reads/sec	1,462
Database Disks Writes/sec	7,86
Average Database Disk Read Latency (ms)	1.076
Average Database Disk Write Latency (ms)	3.059
Transaction Log I/O	
Log Disks Writes/sec	446
Average Log Disk Write Latency (ms)	0.814

Host 3

Database I/O	
Database Disks Transfers/sec	2,527
Database Disks Reads/sec	1,698
Database Disks Writes/sec	829
Average Database Disk Read Latency (ms)	1.078
Average Database Disk Write Latency (ms)	3.320
Transaction Log I/O	
Log Disks Writes/sec	448
Average Log Disk Write Latency (ms)	0.831

Host 4

Database I/O	
Database Disks Transfers/sec	2,403
Database Disks Reads/sec	1,624
Database Disks Writes/sec	779
Average Database Disk Read Latency (ms)	1.066
Average Database Disk Write Latency (ms)	3.010
Transaction Log I/O	
Log Disks Writes/sec	439
Average Log Disk Write Latency (ms)	0.832

Host 5

Database I/O	
Database Disks Transfers/sec	1,883
Database Disks Reads/sec	1,324
Database Disks Writes/sec	559
Average Database Disk Read Latency (ms)	1.068
Average Database Disk Write Latency (ms)	2.893
Transaction Log I/O	
Log Disks Writes/sec	420
Average Log Disk Write Latency (ms)	0.822

Host 6

Database I/O	
Database Disks Transfers/sec	1,875
Database Disks Reads/sec	1,318
Database Disks Writes/sec	557
Average Database Disk Read Latency (ms)	1.092
Average Database Disk Write Latency (ms)	2.889
Transaction Log I/O	
Log Disks Writes/sec	418
Average Log Disk Write Latency (ms)	0.818

Host 7

Database I/O	
Database Disks Transfers/sec	2,362
Database Disks Reads/sec	1,600
Database Disks Writes/sec	762
Average Database Disk Read Latency (ms)	1.102
Average Database Disk Write Latency (ms)	3.292
Transaction Log I/O	
Log Disks Writes/sec	438
Average Log Disk Write Latency (ms)	0.831

Host 8

Database I/O	
Database Disks Transfers/sec	2,521
Database Disks Reads/sec	1,698
Database Disks Writes/sec	823
Average Database Disk Read Latency (ms)	1.044
Average Database Disk Write Latency (ms)	3.086
Transaction Log I/O	
Log Disks Writes/sec	452
Average Log Disk Write Latency (ms)	0.801

Host 9

Database I/O	
Database Disks Transfers/sec	2,536
Database Disks Reads/sec	1,712
Database Disks Writes/sec	824
Average Database Disk Read Latency (ms)	0.996
Average Database Disk Write Latency (ms)	2.730
Transaction Log I/O	
Log Disks Writes/sec	459
Average Log Disk Write Latency (ms)	0.778

Host 10

Database I/O	
Database Disks Transfers/sec	2,477
Database Disks Reads/sec	1,662
Database Disks Writes/sec	815
Average Database Disk Read Latency (ms)	1.131
Average Database Disk Write Latency (ms)	3.513
Transaction Log I/O	
Log Disks Writes/sec	435
Average Log Disk Write Latency (ms)	0.846

Host 11

Database I/O	
Database Disks Transfers/sec	2,470
Database Disks Reads/sec	1,658
Database Disks Writes/sec	812
Average Database Disk Read Latency (ms)	1.083
Average Database Disk Write Latency (ms)	2.954
Transaction Log I/O	
Log Disks Writes/sec	438
Average Log Disk Write Latency (ms)	0.845

Host 12

Database I/O	
Database Disks Transfers/sec	2,474
Database Disks Reads/sec	1,661
Database Disks Writes/sec	813
Average Database Disk Read Latency (ms)	1.089
Average Database Disk Write Latency (ms)	2.974
Transaction Log I/O	
Log Disks Writes/sec	438
Average Log Disk Write Latency (ms)	0.838

Aggregate Performance across all servers Metrics:

The sum of I/Os across servers and the average latency across all servers in the solution:

Database I/O	
Database Disks Transfers/sec	28,549
Database Disks Reads/sec	19,342
Database Disks Writes/sec	9,207
Average Database Disk Read Latency (ms)	1.071
Average Database Disk Write Latency (ms)	3.070
Transaction Log I/O	
Log Disks Writes/sec	5,303
Average Log Disk Write Latency (ms)	**0.821**

Database Backup/Recovery Performance

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

Database Read-only Performance

The test measures the maximum rate at which databases could be backed up via VSS. The following table shows the average backup transfer rate for a single database file and on a single server.

For additional detailed test results, please see Appendix: Jetstress Test Reports.

Host 1

MB read/sec per database	95 MB/s
MB read/sec total per server	571 MB/s

Host 2

MB read/sec per database	92 MB/s
MB read/sec total per server	558 MB/s

Host 3

MB read/sec per database	90 MB/s
MB read/sec total per server	542 MB/s

Host 4

MB read/sec per database	93 MB/s
MB read/sec total per server	561 MB/s

Host 5

MB read/sec per database	95 MB/s
MB read/sec total per server	568 MB/s

Host 6

MB read/sec per database	92 MB/s
MB read/sec total per server	555 MB/s

Host 7

MB read/sec per database	96 MB/s
MB read/sec total per server	574 MB/s

Host 8

MB read/sec per database	94 MB/s
MB read/sec total per server	562 MB/s

Host 9

MB read/sec per database	100 MB/s
MB read/sec total per server	604 MB/s

Host 10

MB read/sec per database	92 MB/s
MB read/sec total per server	553 MB/s

Host 11

MB read/sec per database	94 MB/s
MB read/sec total per server	565 MB/s

Host 12

MB read/sec per database	90 MB/s
MB read/sec total per server	537 MB/s

Database Read-only Performance Summary

Average MB read/sec per database	94 MB/s
Average MB read/sec total per server	562 MB/s
MB read/sec total of all 12 servers	6,748 MB/s

Transaction Log Recovery/Replay Performance

The test measures the maximum rate at which the log files can be played against the databases. The following table shows the average rate of 500 log files played in a single storage group. Each log file is 1 MB in size.

For additional detailed test results, please see Appendix: Jetstress Test Reports.

Host 1

Average time to play one Log file (sec)	0.240

Host 2

Average time to play one Log file (sec)	0.231

Host 3

Average time to play one Log file (sec)	0.309

Host 4

Average time to play one Log file (sec)	0.359

Host 5

Average time to play one Log file (sec)	0.280

Host 6

Average time to play one Log file (sec)	0.343

Host 7

Average time to play one Log file (sec)	0.176

Host 8

Average time to play one Log file (sec)	0.184

Host 9

Average time to play one Log file (sec)	0.296

Host 10

Average time to play one Log file (sec)	0.308

Host 11

Average time to play one Log file (sec)	0.287

Host 12

Average time to play one Log file (sec)	0.287

Transaction Log Recovery/Replay Performance Summary

Average time to play one Log file of all hosts (sec)	0.275

Appendix: Jetstress Test Reports

2-Hour Performance Test - Test Report

Microsoft Exchange Jetstress 2013

Performance Test Result Report

Test Summary

Overall Test Result	**Pass**
Machine Name	ESRP-SERVER-1
Test Description	
Test Start Time	1/21/2016 10:52:34 AM
Test End Time	1/21/2016 2:10:14 PM
Collection Start Time	1/21/2016 10:54:01 AM
Collection End Time	1/21/2016 12:53:58 PM
Jetstress Version	15.01.0318.000
ESE Version	15.00.0516.026
Operating System	Windows Server 2012 R2 Standard (6.2.9200.0)
Performance Log	C:\ESRP\ESRP-120KMailboxes\Performance\Performance_2016_1_21_10_52_47.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second	2591.569
Target Transactional I/O per Second	1200
Initial Database Size (bytes)	10485812822016
Final Database Size (bytes)	10493840719872
Database Files (Count)	6

Jetstress System Parameters

Thread Count	4
Minimum Database Cache	192.0 MB
Maximum Database Cache	1536.0 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

Instance1212.1	Log path: K:\ Database: E:\Jetstress001001.edb
Instance1212.2	Log path: L:\ Database: F:\Jetstress002001.edb
Instance1212.3	Log path: M:\ Database: G:\Jetstress003001.edb
Instance1212.4	Log path: N:\ Database: H:\Jetstress004001.edb
Instance1212.5	Log path: O:\ Database: I:\Jetstress005001.edb

Instance1212.6 Log path: P:\
Database: J:\Jetstress006001.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
Instance1212.1	1.022	2.171	288.573	139.788	32907.064	35964.336	0.000	0.787	0.000	76.931	0.000	7782.766
Instance1212.2	1.024	2.514	291.183	141.778	32905.888	35963.304	0.000	0.790	0.000	76.891	0.000	7776.189
Instance1212.3	1.023	2.907	290.779	141.705	32918.400	35931.493	0.000	0.792	0.000	76.883	0.000	7795.856
Instance1212.4	1.032	3.307	291.442	142.074	32907.143	35966.699	0.000	0.793	0.000	76.902	0.000	7772.127
Instance1212.5	1.035	3.740	290.286	141.117	32910.713	35954.610	0.000	0.797	0.000	76.813	0.000	7795.837
Instance1212.6	1.031	4.083	290.932	141.912	32911.068	35912.385	0.000	0.798	0.000	76.860	0.000	7769.359

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance1212.1	9.079	261902.271
Instance1212.2	9.083	261949.464
Instance1212.3	9.089	261847.174
Instance1212.4	9.083	261938.537
Instance1212.5	9.085	261888.440
Instance1212.6	9.085	261911.012

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance1212.1	1.709	232561.778
Instance1212.2	1.705	232553.229
Instance1212.3	1.713	232563.088
Instance1212.4	1.703	232561.778
Instance1212.5	1.709	232553.701
Instance1212.6	1.700	232561.778

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
Instance1212.1	1.022	2.171	297.652	139.788	39892.262	35964.336	1.026	0.787	1.709	76.931	232561.778	7782.766
Instance1212.2	1.024	2.514	300.266	141.778	39834.512	35963.304	1.076	0.790	1.705	76.891	232553.229	7776.189
Instance1212.3	1.023	2.907	299.868	141.705	39857.092	35931.493	1.016	0.792	1.713	76.883	232563.088	7795.856

Instance1212 .4	1.032	3.307	300.526	142.074	39829.509	35966.699	1.061	0.793	1.703	76.902	232561.778	7772.127
Instance1212 .5	1.035	3.740	299.371	141.117	39859.323	35954.610	1.028	0.797	1.709	76.813	232553.701	7795.837
Instance1212 .6	1.031	4.083	300.017	141.912	39845.704	35912.385	1.117	0.798	1.700	76.860	232561.778	7769.359

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	4.387	2.979	5.886
Available MBytes	28888.367	28862.000	28961.000
Free System Page Table Entries	16610767.383	16610298.000	16610960.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	228625211.733	227164160.000	228917248.000
Pool Paged Bytes	102833365.333	102711296.000	102969344.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 1/21/2016 10:52:34 AM -- Preparing for testing ...
1/21/2016 10:52:41 AM -- Attaching databases ...
1/21/2016 10:52:41 AM -- Preparations for testing are complete.
1/21/2016 10:52:41 AM -- Starting transaction dispatch ..
1/21/2016 10:52:41 AM -- Database cache settings: (minimum: 192.0 MB, maximum: 1.5 GB)
1/21/2016 10:52:41 AM -- Database flush thresholds: (start: 15.3 MB, stop: 30.7 MB)
1/21/2016 10:52:47 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
1/21/2016 10:52:47 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
1/21/2016 10:52:49 AM -- Operation mix: Sessions 4, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
1/21/2016 10:52:49 AM -- Performance logging started (interval: 15000 ms).
1/21/2016 10:52:49 AM -- Attaining prerequisites:
1/21/2016 10:54:01 AM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 1455919000.0 (lower bound: 1449551000.0, upper bound: none)
1/21/2016 12:54:02 PM -- Performance logging has ended.
1/21/2016 2:10:12 PM -- JetInterop batch transaction stats: 96486, 96485, 96485, 96485, 96485 and 96485.
1/21/2016 2:10:12 PM -- Dispatching transactions ends.
1/21/2016 2:10:12 PM -- Shutting down databases ...
1/21/2016 2:10:14 PM -- Instance1212.1 (complete), Instance1212.2 (complete), Instance1212.3 (complete), Instance1212.4 (complete), Instance1212.5 (complete) and Instance1212.6 (complete)
1/21/2016 2:10:14 PM -- C:\ESRP\ESRP-120KMailboxes\Performance\Performance_2016_1_21_10_52_47.blg has 484 samples.
1/21/2016 2:10:14 PM -- Creating test report ...
1/21/2016 2:10:17 PM -- Instance1212.1 has 1.0 for I/O Database Reads Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.1 has 0.8 for I/O Log Writes Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.1 has 0.8 for I/O Log Reads Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.2 has 1.0 for I/O Database Reads Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.2 has 0.8 for I/O Log Writes Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.2 has 0.8 for I/O Log Reads Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.3 has 1.0 for I/O Database Reads Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.3 has 0.8 for I/O Log Writes Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.3 has 0.8 for I/O Log Reads Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.4 has 1.0 for I/O Database Reads Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.4 has 0.8 for I/O Log Writes Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.4 has 0.8 for I/O Log Reads Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.5 has 1.0 for I/O Database Reads Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.5 has 0.8 for I/O Log Writes Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.5 has 0.8 for I/O Log Reads Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.6 has 1.0 for I/O Database Reads Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.6 has 0.8 for I/O Log Writes Average Latency.
1/21/2016 2:10:17 PM -- Instance1212.6 has 0.8 for I/O Log Reads Average Latency.
1/21/2016 2:10:17 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
1/21/2016 2:10:17 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
1/21/2016 2:10:17 PM -- C:\ESRP\ESRP-120KMailboxes\Performance\Performance_2016_1_21_10_52_47.xml has 479 samples queried.

24-Hour Stress Test - Test Report

Microsoft Exchange Jetstress 2013
Stress Test Result Report

Test Summary

Overall Test Result	Pass
Machine Name	ESRP-SERVER-4
Test Description	
Test Start Time	1/21/2016 10:07:16 PM
Test End Time	1/22/2016 10:53:06 PM
Collection Start Time	1/21/2016 10:08:38 PM
Collection End Time	1/22/2016 10:08:37 PM
Jetstress Version	15.01.0318.000
ESE Version	15.00.0516.026
Operating System	Windows Server 2012 R2 Standard (6.2.9200.0)
Performance Log	C:\ESRP\ESRP-120KMailboxes\Stress\Stress_2016_1_21_22_7_29.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second	2655.093
Target Transactional I/O per Second	1200
Initial Database Size (bytes)	10493496786944
Final Database Size (bytes)	10550472212480
Database Files (Count)	6

Jetstress System Parameters

Thread Count	4
Minimum Database Cache	192.0 MB
Maximum Database Cache	1536.0 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

Instance3672.1	Log path: K:\ Database: E:\Jetstress001001.edb
Instance3672.2	Log path: L:\ Database: F:\Jetstress002001.edb
Instance3672.3	Log path: M:\ Database: G:\Jetstress003001.edb
Instance3672.4	Log path: N:\ Database: H:\Jetstress004001.edb
Instance3672.5	Log path: O:\ Database: I:\Jetstress005001.edb
Instance3672.6	Log path: P:\ Database: J:\Jetstress006001.edb

Transactional I/O Performance

MSExchange Database ==> Instances	I/O Database Reads	I/O Database Writes	I/O Database	I/O Database	I/O Database Reads	I/O Database Writes	I/O Log Reads Average	I/O Log Writes Average	I/O Log Reads/sec	I/O Log Writes/sec	I/O Log Reads	I/O Log Writes

	Average Latency (msec)	Average Latency (msec)	Reads/sec	Writes/sec	Average Bytes	Average Bytes	e Latency (msec)	e Latency (msec)			Average Bytes	Average Bytes
Instance3672.1	1.060	2.674	295.046	147.632	32869.553	34566.863	0.000	0.874	0.000	72.949	0.000	7725.547
Instance3672.2	1.065	3.080	295.021	147.512	32867.882	34571.846	0.000	0.876	0.000	72.798	0.000	7721.940
Instance3672.3	1.068	3.535	294.563	147.151	32868.733	34576.068	0.000	0.871	0.000	72.868	0.000	7734.559
Instance3672.4	1.077	3.989	295.585	147.983	32869.380	34566.433	0.000	0.871	0.000	72.907	0.000	7725.865
Instance3672.5	1.083	4.438	295.126	147.460	32869.259	34574.861	0.000	0.874	0.000	72.708	0.000	7729.673
Instance3672.6	1.082	4.874	294.870	147.144	32866.523	34570.443	0.000	0.870	0.000	72.567	0.000	7734.454

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance3672.1	9.086	261911.931
Instance3672.2	9.087	261909.794
Instance3672.3	9.089	261904.087
Instance3672.4	9.089	261918.174
Instance3672.5	9.091	261885.067
Instance3672.6	9.091	261918.587

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance3672.1	1.599	232560.286
Instance3672.2	1.595	232559.623
Instance3672.3	1.601	232560.370
Instance3672.4	1.598	232561.979
Instance3672.5	1.595	232558.427
Instance3672.6	1.594	232561.872

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
Instance3672.1	1.060	2.674	304.132	147.632	39712.557	34566.863	1.165	0.874	1.599	72.949	232560.286	7725.547
Instance3672.2	1.065	3.080	304.108	147.512	39711.643	34571.846	1.145	0.876	1.595	72.798	232559.623	7721.940
Instance3672.3	1.068	3.535	303.652	147.151	39724.311	34576.068	1.156	0.871	1.601	72.868	232560.370	7734.559
Instance3672.4	1.077	3.989	304.674	147.983	39702.529	34566.433	1.162	0.871	1.598	72.907	232561.979	7725.865
Instance3672.5	1.083	4.438	304.217	147.460	39712.775	34574.861	1.154	0.874	1.595	72.708	232558.427	7729.673
Instance3672.6	1.082	4.874	303.961	147.144	39717.236	34570.443	1.156	0.870	1.594	72.567	232561.872	7734.454

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	4.261	2.159	9.079
Available MBytes	28874.323	28847.000	28900.000
Free System Page Table Entries	16610800.625	16610234.000	16611008.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	230135607.579	229183488.000	231731200.000
Pool Paged Bytes	103274880.111	102248448.000	107528192.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 1/21/2016 10:07:16 PM -- Preparing for testing ...
1/21/2016 10:07:22 PM -- Attaching databases ...
1/21/2016 10:07:22 PM -- Preparations for testing are complete.
1/21/2016 10:07:22 PM -- Starting transaction dispatch ..
1/21/2016 10:07:22 PM -- Database cache settings: (minimum: 192.0 MB, maximum: 1.5 GB)
1/21/2016 10:07:22 PM -- Database flush thresholds: (start: 15.3 MB, stop: 30.7 MB)
1/21/2016 10:07:29 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 200 msec/read).
1/21/2016 10:07:29 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 200 msec/write).
1/21/2016 10:07:30 PM -- Operation mix: Sessions 4, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
1/21/2016 10:07:30 PM -- Performance logging started (interval: 15000 ms).
1/21/2016 10:07:30 PM -- Attaining prerequisites:
1/21/2016 10:08:38 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 1462866000.0 (lower bound: 1449551000.0, upper bound: none)
1/22/2016 10:08:39 PM -- Performance logging has ended.
1/22/2016 10:53:04 PM -- JetInterop batch transaction stats: 679912, 679912, 679912, 679911, 679911 and 679911.
1/22/2016 10:53:04 PM -- Dispatching transactions ends.
1/22/2016 10:53:04 PM -- Shutting down databases ...
1/22/2016 10:53:06 PM -- Instance3672.1 (complete), Instance3672.2 (complete), Instance3672.3 (complete), Instance3672.4 (complete), Instance3672.5 (complete) and Instance3672.6 (complete)
1/22/2016 10:53:06 PM -- C:\ESRP\ESRP-120KMailboxes\Stress\Stress_2016_1_21_22_7_29.blg has 5757 samples.
1/22/2016 10:53:06 PM -- Creating test report ...
1/22/2016 10:53:38 PM -- Instance3672.1 has 1.1 for I/O Database Reads Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.1 has 0.9 for I/O Log Writes Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.1 has 0.9 for I/O Log Reads Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.2 has 1.1 for I/O Database Reads Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.2 has 0.9 for I/O Log Writes Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.2 has 0.9 for I/O Log Reads Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.3 has 1.1 for I/O Database Reads Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.3 has 0.9 for I/O Log Writes Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.3 has 0.9 for I/O Log Reads Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.4 has 1.1 for I/O Database Reads Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.4 has 0.9 for I/O Log Writes Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.4 has 0.9 for I/O Log Reads Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.5 has 1.1 for I/O Database Reads Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.5 has 0.9 for I/O Log Writes Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.5 has 0.9 for I/O Log Reads Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.6 has 1.1 for I/O Database Reads Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.6 has 0.9 for I/O Log Writes Average Latency.
1/22/2016 10:53:38 PM -- Instance3672.6 has 0.9 for I/O Log Reads Average Latency.
1/22/2016 10:53:38 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
1/22/2016 10:53:38 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
1/22/2016 10:53:38 PM -- C:\ESRP\ESRP-120KMailboxes\Stress\Stress_2016_1_21_22_7_29.xml has 5752 samples queried.

Database Backup Test – Test Report

Microsoft Exchange Jetstress 2013
Database backup Test Result Report
Database Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec

Instance2168.1	1676867.09	05:01:30	92.69
Instance2168.2	1676899.09	04:49:00	96.70
Instance2168.3	1676851.09	04:56:12	94.35
Instance2168.4	1676843.09	05:00:15	93.08
Instance2168.5	1676867.09	05:02:29	92.39
Instance2168.6	1676899.09	04:27:51	104.34
Avg			95.59
Sum			573.56

Jetstress System Parameters

Thread Count	4
Minimum Database Cache	192.0 MB
Maximum Database Cache	1536.0 MB
Insert Operations	40%
Delete Operations	20%
Replace Operations	5%
Read Operations	35%
Lazy Commits	70%

Database Configuration

Instance2168.1	Log path: K:\ Database: E:\Jetstress001001.edb
Instance2168.2	Log path: L:\ Database: F:\Jetstress002001.edb
Instance2168.3	Log path: M:\ Database: G:\Jetstress003001.edb
Instance2168.4	Log path: N:\ Database: H:\Jetstress004001.edb
Instance2168.5	Log path: O:\ Database: I:\Jetstress005001.edb
Instance2168.6	Log path: P:\ Database: J:\Jetstress006001.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
Instance2168.1	4.385	0.000	369.983	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance2168.2	4.138	0.000	386.550	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance2168.3	4.301	0.000	377.215	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance2168.4	4.374	0.000	372.089	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance2168.5	4.407	0.000	368.629	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance2168.6	3.794	0.000	417.112	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	10.635	5.134	12.110
Available MBytes	30623.088	30575.000	30651.000
Free System Page Table Entries	16610352.343	16609803.000	16610517.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	220313328.742	220147712.000	220512256.000
Pool Paged Bytes	96330718.093	96145408.000	96604160.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 1/23/2016 5:29:38 PM -- Preparing for testing ...
1/23/2016 5:29:44 PM -- Attaching databases ...
1/23/2016 5:29:44 PM -- Preparations for testing are complete.
1/23/2016 5:29:51 PM -- Performance logging started (interval: 30000 ms).
1/23/2016 5:29:51 PM -- Backing up databases ...
1/23/2016 10:32:22 PM -- Performance logging has ended.
1/23/2016 10:32:22 PM -- Instance2168.1 (100% processed), Instance2168.2 (100% processed), Instance2168.3 (100% processed), Instance2168.4 (100% processed), Instance2168.5 (100% processed) and Instance2168.6 (100% processed)
1/23/2016 10:32:22 PM -- C:\ESRP\ESRP-120KMailboxes\Backup\DatabaseBackup_2016_1_23_17_29_44.blg has 604 samples.
1/23/2016 10:32:22 PM -- Creating test report ...

Soft Recovery Test – Test Report

Microsoft Exchange Jetstress 2013

SoftRecovery Test Result Report

Soft-Recovery Statistics - All

Database Instance	Log files replayed	Elapsed seconds
Instance1064.1	504	156.2932598
Instance1064.2	507	154.6878017
Instance1064.3	501	154.156554
Instance1064.4	501	150.969046
Instance1064.5	502	155.4846811
Instance1064.6	505	157.3440565
Avg	503	154.823
Sum	3020	928.9353991

Database Configuration

Instance1064.1	Log path: K:\
	Database: E:\Jetstress001001.edb
Instance1064.2	Log path: L:\
	Database: F:\Jetstress002001.edb
Instance1064.3	Log path: M:\
	Database: G:\Jetstress003001.edb
Instance1064.4	Log path: N:\
	Database: H:\Jetstress004001.edb
Instance1064.5	Log path: O:\
	Database: I:\Jetstress005001.edb
Instance1064.6	Log path: P:\
	Database: J:\Jetstress006001.edb

Transactional I/O Performance

MSExchange Database ==> Instances	I/O Database Reads	I/O Database Writes	I/O Database	I/O Database	I/O Database Reads	I/O Database Writes	I/O Log Reads Averag	I/O Log Writes Averag	I/O Log Reads/sec	I/O Log Writes/sec	I/O Log Reads	I/O Log Writes

	Average Latency (msec)	Average Latency (msec)	Reads/sec	Writes/sec	Average Bytes	Average Bytes	e Latency (msec)	e Latency (msec)			Average Bytes	Average Bytes
Instance1064.1	2.480	2.080	2335.667	12.672	39810.518	32768.000	2.504	0.000	15.840	0.000	209715.200	0.000
Instance1064.2	2.449	3.029	2432.711	12.968	39622.640	32768.000	2.969	0.000	16.210	0.000	209715.200	0.000
Instance1064.3	2.496	2.195	2380.068	12.887	39582.018	32768.000	2.649	0.000	16.075	0.000	209717.831	0.000
Instance1064.4	2.459	1.858	2465.377	13.190	39483.141	32768.000	3.686	0.000	16.488	0.000	209719.579	0.000
Instance1064.5	2.472	1.986	2378.822	12.780	39704.743	32768.000	2.809	0.000	15.976	0.000	209715.200	0.000
Instance1064.6	2.428	2.140	2401.613	12.680	39650.819	32768.000	2.577	0.000	15.851	0.000	209715.200	0.000

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance1064.1	8.676	262144.000
Instance1064.2	8.710	262144.000
Instance1064.3	8.689	262144.000
Instance1064.4	8.661	262144.000
Instance1064.5	8.683	261934.248
Instance1064.6	8.670	261730.015

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
Instance1064.1	2.480	2.080	2344.343	12.672	40633.325	32768.000	2.504	0.000	15.840	0.000	209715.200	0.000
Instance1064.2	2.449	3.029	2441.421	12.968	40416.469	32768.000	2.969	0.000	16.210	0.000	209715.200	0.000
Instance1064.3	2.496	2.195	2388.757	12.887	40391.619	32768.000	2.649	0.000	16.075	0.000	209717.831	0.000
Instance1064.4	2.459	1.858	2474.038	13.190	40262.623	32768.000	3.686	0.000	16.488	0.000	209719.579	0.000
Instance1064.5	2.472	1.986	2387.505	12.780	40512.926	32768.000	2.809	0.000	15.976	0.000	209715.200	0.000
Instance1064.6	2.428	2.140	2410.283	12.680	40449.697	32768.000	2.577	0.000	15.851	0.000	209715.200	0.000

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	25.990	17.315	31.664
Available MBytes	28949.897	28922.000	29676.000
Free System Page Table Entries	16610543.667	16610194.000	16610816.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	228261152.821	227397632.000	228868096.000
Pool Paged Bytes	99695904.821	99635200.000	99778560.000

Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 1/24/2016 11:30:18 AM -- Preparing for testing ...
1/24/2016 11:30:25 AM -- Attaching databases ...
1/24/2016 11:30:25 AM -- Preparations for testing are complete.
1/24/2016 11:30:25 AM -- Starting transaction dispatch ..
1/24/2016 11:30:25 AM -- Database cache settings: (minimum: 192.0 MB, maximum: 1.5 GB)
1/24/2016 11:30:25 AM -- Database flush thresholds: (start: 15.3 MB, stop: 30.7 MB)
1/24/2016 11:30:31 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
1/24/2016 11:30:31 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
1/24/2016 11:30:32 AM -- Operation mix: Sessions 4, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
1/24/2016 11:30:32 AM -- Performance logging started (interval: 15000 ms).
1/24/2016 11:30:32 AM -- Generating log files ...
1/24/2016 12:17:35 PM -- K:\ (100.8% generated), L:\ (101.2% generated), M:\ (100.2% generated), N:\ (100.2% generated), O:\ (100.4% generated) and P:\ (101.0% generated)
1/24/2016 12:17:35 PM -- Performance logging has ended.
1/24/2016 12:17:35 PM -- JetInterop batch transaction stats: 21580, 21580, 21580, 21580, 21580 and 21579.
1/24/2016 12:17:35 PM -- Dispatching transactions ends.
1/24/2016 12:17:35 PM -- Shutting down databases ...
1/24/2016 12:17:37 PM -- Instance1064.1 (complete), Instance1064.2 (complete), Instance1064.3 (complete), Instance1064.4 (complete), Instance1064.5 (complete) and Instance1064.6 (complete)
1/24/2016 12:17:37 PM -- C:\ESRP\ESRP-120KMailboxes\Recovery\Performance_2016_1_24_11_30_31.blg has 187 samples.
1/24/2016 12:17:37 PM -- Creating test report ...
1/24/2016 12:17:38 PM -- Instance1064.1 has 1.0 for I/O Database Reads Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.1 has 0.9 for I/O Log Writes Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.1 has 0.9 for I/O Log Reads Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.2 has 1.0 for I/O Database Reads Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.2 has 1.0 for I/O Log Writes Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.2 has 1.0 for I/O Log Reads Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.3 has 1.0 for I/O Database Reads Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.3 has 0.9 for I/O Log Writes Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.3 has 0.9 for I/O Log Reads Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.4 has 1.0 for I/O Database Reads Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.4 has 0.9 for I/O Log Writes Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.4 has 0.9 for I/O Log Reads Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.5 has 1.0 for I/O Database Reads Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.5 has 0.9 for I/O Log Writes Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.5 has 0.9 for I/O Log Reads Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.6 has 1.0 for I/O Database Reads Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.6 has 0.9 for I/O Log Writes Average Latency.
1/24/2016 12:17:38 PM -- Instance1064.6 has 0.9 for I/O Log Reads Average Latency.
1/24/2016 12:17:38 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
1/24/2016 12:17:38 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
1/24/2016 12:17:38 PM -- C:\ESRP\ESRP-120KMailboxes\Recovery\Performance_2016_1_24_11_30_31.xml has 186 samples queried.
1/24/2016 12:17:38 PM -- C:\ESRP\ESRP-120KMailboxes\Recovery\Performance_2016_1_24_11_30_31.html was saved.
1/24/2016 4:36:27 PM -- Performance logging started (interval: 4000 ms).
1/24/2016 4:36:27 PM -- Recovering databases ...
1/24/2016 4:39:05 PM -- Performance logging has ended.
1/24/2016 4:39:05 PM -- Instance1064.1 (156.2932598), Instance1064.2 (154.6878017), Instance1064.3 (154.156554), Instance1064.4 (150.969046), Instance1064.5 (155.4846811) and Instance1064.6 (157.3440565)
1/24/2016 4:39:05 PM -- C:\ESRP\ESRP-120KMailboxes\Recovery\SoftRecovery_2016_1_24_16_36_26.blg has 39 samples.
1/24/2016 4:39:05 PM -- Creating test report ...