Fujitsu PRIMEFLEX for VMware vSAN 20,000 User Mailbox Exchange 2016 Mailbox Resiliency Storage Solution

Tested with: ESRP – Storage Version 4.0

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vmware®

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Content

Content 2
Overview 3
Disclaimer 3
Components 3
Hardware Resource 3
VMware vSphere 6.7 3
VMware vSAN 6.7 5
Native to vSphere Hypervisor 5
Storage Policy Based Management 5
Deduplication and Compression 5
Data-at-Rest-Encryption 6
Monitoring with vRealize Operations 6
Solution Description 7
Solution Overview 7
Network configuration 7
Exchange Virtual Machine Configuration 7
vSAN Storage Policy Configuration 8
Scalability for Exchange 2016 on vSAN 8
Targeted Customer Profile 9
Tested Deployment 9
Simulated Exchange Configuration 9
Storage Hardware 10
Storage Software 10
Storage Disk Configuration (Mailbox Store and Transactional Log Disks) 10
Best Practices 11
Backup Strategy 11
Contact for Additional Information 11
Test Result Summary 11
Reliability 11
Storage Performance Results 11
Database Backup/Recovery Performance 12
Database Read-only Performance 12
Transaction Log Recovery/Replay Performance 12
Conclusion 13
Appendix A—Stress Test Result Report 14
Appendix B—Performance Test Result Report 17
Appendix C—Database Backup Test Result Report 20
Appendix D—Soft Recovery Test Result Report 21

Overview

This document provides information on Fujitsu PRIMEFLEX for VMware vSAN solution for Microsoft Exchange Server, based on the *Microsoft Exchange Solution Reviewed Program (ESRP) – Storage* program*. For any questions or comments regarding the contents of this document, see Contact for Additional Information.

*The *ESRP – Storage* program was developed by Microsoft Corporation to provide a common storage testing framework for storage and server OEMs to provide information on its storage solutions for Microsoft Exchange Server software. For more details on the *Microsoft ESRP – Storage* program, click http://technet.microsoft.com/en-us/exchange/ff182054.aspx.

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The information contained in this document represents the current view of Fujitsu and VMware on the issues discussed as of the date of publication. Due to changing market conditions, it should not be interpreted to be a commitment on the part of Fujitsu and VMware, and Fujitsu and VMware cannot guarantee the accuracy of any information presented after the date of publication.

Components

Hardware Resource

Fujitsu Integrated System PRIMEFLEX for VMware vSAN is a validated server configuration for VMware® vSAN ReadyNode™ in a tested and certified hardware form factor for vSAN deployment, jointly recommended by Fujitsu and VMware. For more details about VMware vSAN ReadyNode, visit VMware Compatibility Guide.

Hardware List

Item	Description
Platform	Fujitsu PRIMEFLEX for VMware vSAN
Hardware Model	Fujitsu PRIMERGY RX2540 M4
CPU	Intel(R) Xeon(R) Gold 6154 CPU @ 3.00GHz
Socket/core	2/18
Memory	192GB
Network	2 x 1Gbps Intel Corporation I350 Gigabit Network Connection 4 x Intel(R) Ethernet Connection X722 for 10GBASE-T
Hypervisor	VMware ESXi, 6.7.0, 9214924
Storage	VMware vSAN 6.7.0 1 x 400GB Cache SSD 4 x 1,920GB Capacity SSDs

On top of the general VMware vSAN ReadyNode, PRIMEFLEX for VMware vSAN adds several unique features delivered through Fujitsu factory integration service and Fujitsu Software Infrastructure Manager.

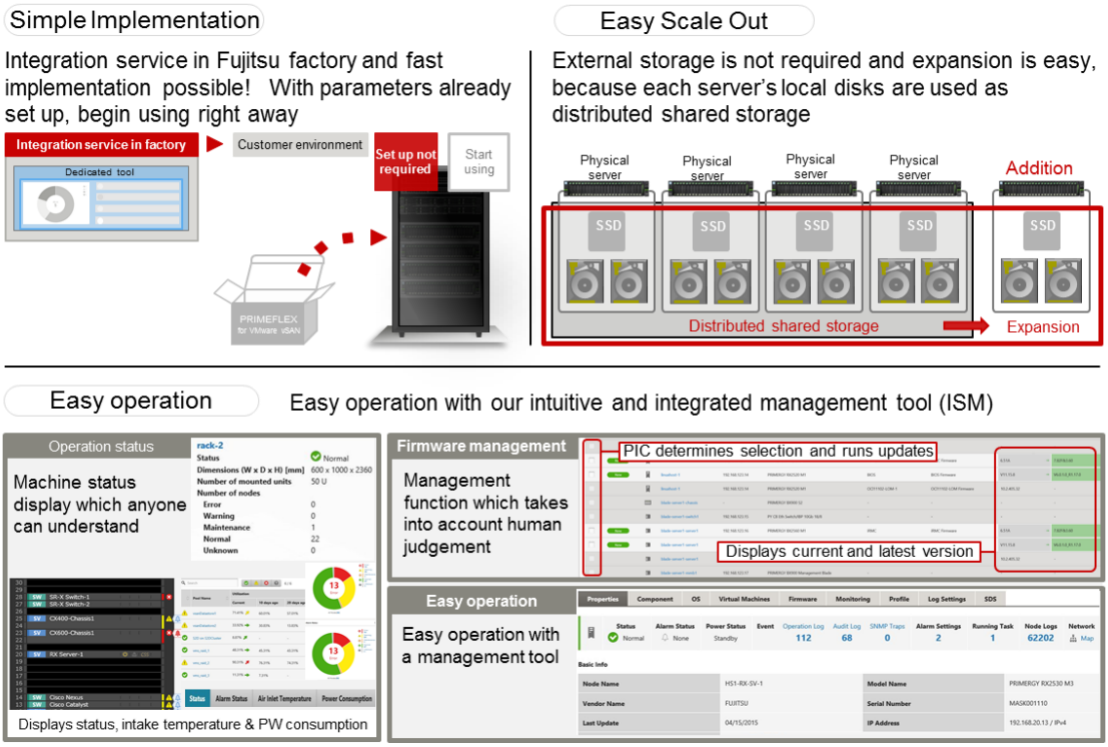

Figure 1. Fujitsu Factory Integration Service and Fujitsu Software Infrastructure Manager

Fujitsu offers several types of PRIMEFLEX system which can fit various workloads.

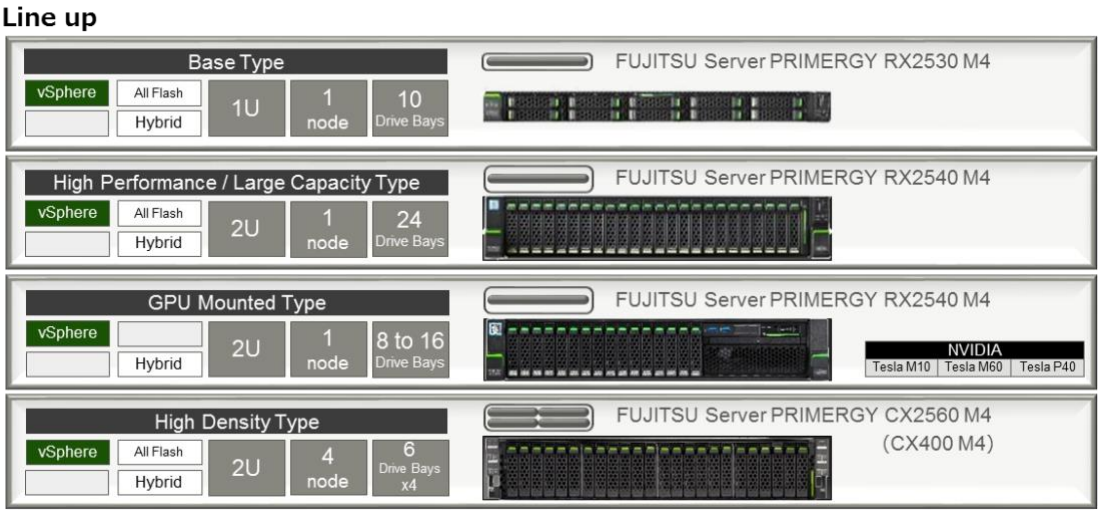

Figure 2. PRIMEFLEX System Types

For more details about PRIMEFLEX for VMware vSAN, visit [FUJITSU Integrated System].

VMware vSphere 6.7

VMware vSphere 6.7 is the next-generation infrastructure for next-generation applications. It provides a powerful, flexible, and secure foundation for business agility that accelerates the digital transformation to cloud computing and promotes success in the digital economy. vSphere 6.7 supports both existing and next-generation applications through its:

- Simplified customer experience for automation and management at scale
- Comprehensive built-in security for protecting data, infrastructure, and access
- Universal application platform for running any application anywhere

With vSphere 6.7, customers can run, manage, connect, and secure their applications in a common operating environment, across clouds and devices.

VMware vSAN 6.7

VMware vSAN, the market leader hyper converged infrastructure (HCI), enables low-cost and high-performance next-generation HCI solutions. vSAN converges traditional IT infrastructure silos onto industry-standard servers and virtualizes physical infrastructure to help customers easily evolve their infrastructure without risk, improve TCO over traditional resource silos, and scale to tomorrow with support for new hardware, applications, and cloud strategies. The natively integrated VMware infrastructure combines radically simple VMware vSAN storage, the market-leading VMware vSphere Hypervisor, and the VMware vCenter Server® unified management solution, all on the broadest and deepest set of HCI deployment options.

vSAN 6.7 introduces further performance and space efficiencies. Adaptive Resync ensures fair-share of resources are available for VM IOs and Resync IOs during dynamic changes in load on the system providing optimal use of resources. Optimization of the destaging mechanism has resulted in data that drains more quickly from the write buffer to the capacity tier. The swap object for each VM is now thin provisioned by default and will also match the storage policy attributes assigned to the VM introducing the potential for significant space efficiency.

Native to vSphere Hypervisor

vSAN does not require the deployment of storage virtual appliances or the installation of a vSphere Installation Bundle (VIB) on every host in the cluster. vSAN is native in the vSphere hypervisor and typically consumes less than 10% of the computing resources on each host. vSAN does not compete with other virtual machines for resources and the I/O path is shorter.

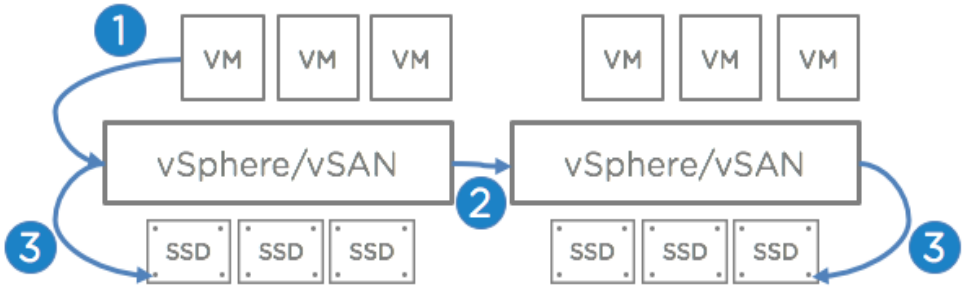

Figure 3. vSAN is Native in the vSphere Hypervisor

As shown in Figure 3, a shorter I/O path and the absence of resource-intensive storage virtual appliances enables vSAN to provide excellent performance with minimal overhead. Higher virtual machine consolidation ratios translate into lower total costs of ownership.

Storage Policy Based Management

As shown in Figure 4, Storage Policy-Based Management (SPBM) from VMware enables the precise control of storage services. Like other storage solutions, VMware vSAN provides services such as resiliency, tolerance method, capacity reservation, and IOPS limits. A storage policy contains one or more rules that define service levels.

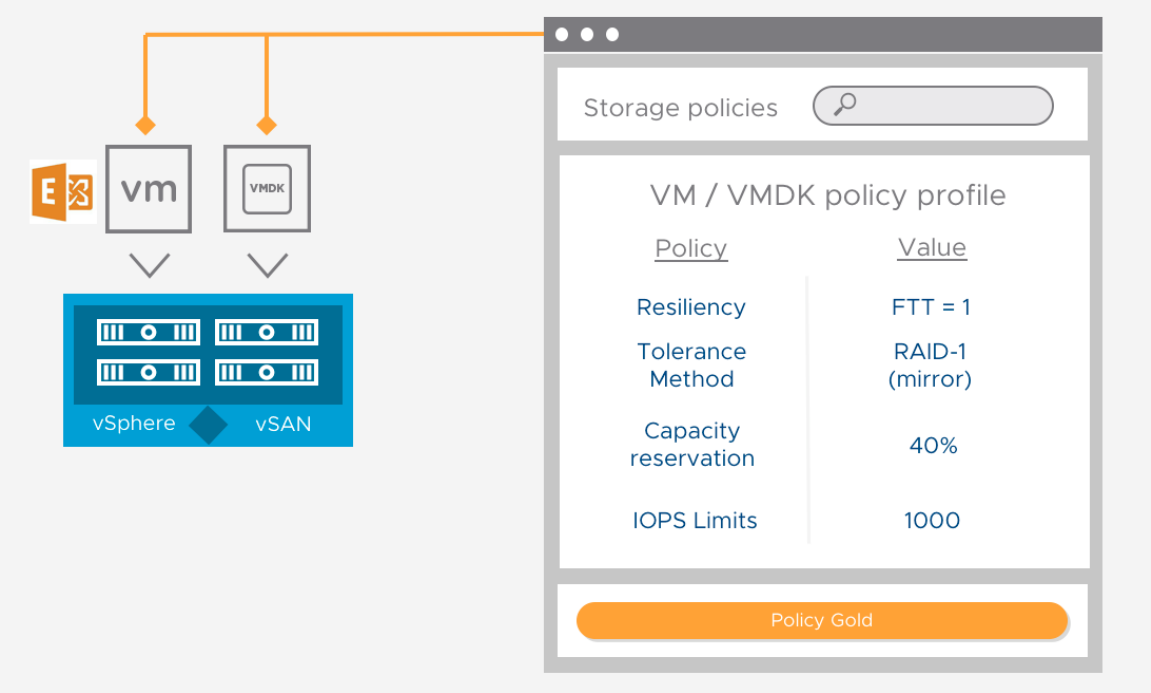

Figure 4. vSAN Storage Policy Based Management

Storage policies are created and managed using the vSphere Web Client. Policies can be assigned to virtual machines and individual objects such as a virtual disk. Storage policies are easily changed or reassigned if application requirements change. These modifications are performed with no downtime and without the need to migrate virtual machines from one datastore to another. SPBM makes it possible to assign and modify service levels with precision on a per-virtual machine basis.

Monitoring with vRealize Operations

vSphere and vSAN 6.7 includes VMware vRealize® Operations™ within vCenter. This new feature allows vSphere customers to see a subset of intelligence offered up by vRealize Operations through a single vCenter user interface. Light-weight purpose-built dashboards are included for both vSphere and vSAN. It is easy to deploy, provides multi-cluster visibility, and does not require any additional licensing.

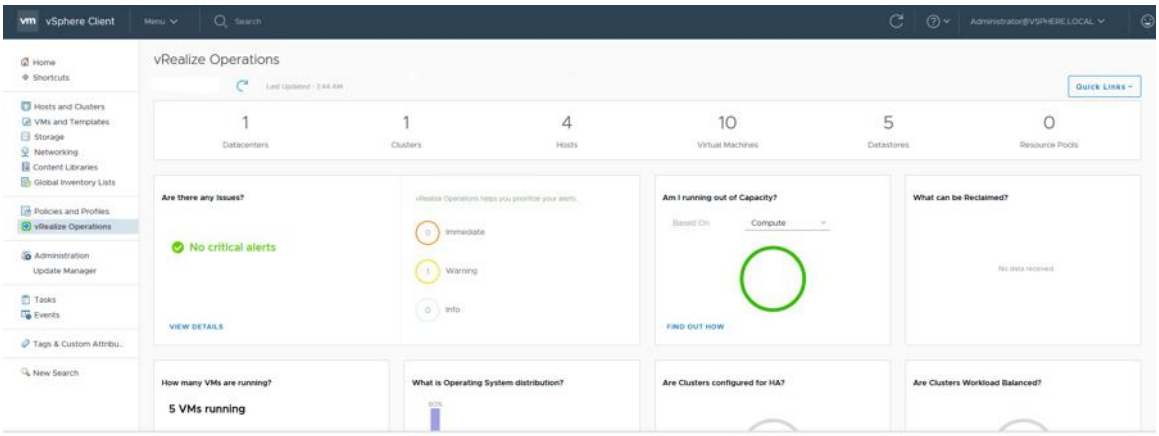

Figure 5. vRealize Operation Management Portal

Solution Description

Solution Overview

As shown in Figure 6, we design Microsoft Exchange 2016 Mailbox resiliency solution targeted for medium to large enterprises. Exchange Database Availability Group feature is enabled to support Mailbox resiliency across the VMware vSAN clusters. Each VMware vSAN cluster consists of four Fujitsu PRIMERGY RX2540 M4 ESXi servers with 1x400GB SSD as cache tier and 4x1,920GB SSDs as capacity tier.

Each mailbox virtual machine is configured with 8 vCPU and 64 GB memory, running Microsoft Exchange 2016 on Windows Server 2016 Datacenter platform. A single mailbox VM contains eight databases including 4 active copies and 4 passive copies.

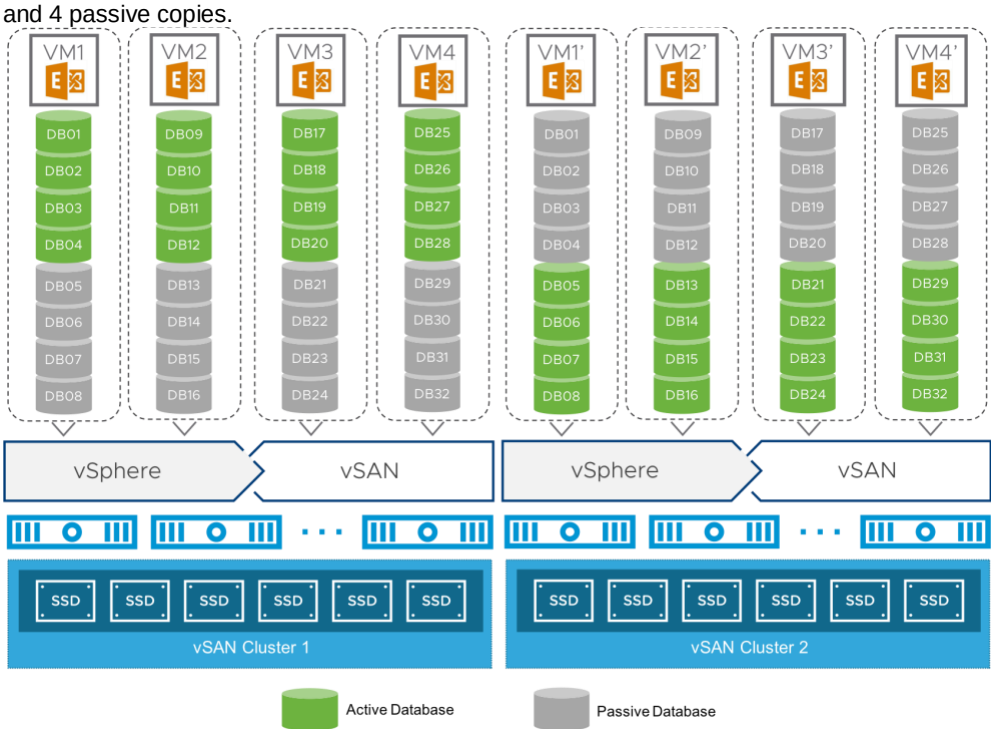

Figure 6. 20,000 Mailbox Resilience Solution Architecture on VMware vSAN

Network configuration

We created a vSphere Distributed Switch™ to act as a single virtual switch across all four Fujitsu PRIMERGY RX2540 M4 server in the vSAN cluster.

The vSphere Distributed Switch used two 10GbE adapters for the teaming and failover. A port group defines properties regarding security, traffic shaping, and NIC teaming. To isolate vSAN, VM (node) and vMotion traffic, we used the default port group settings except for the uplink failover order. We assigned one dedicated NIC as the active link and assigned another NIC as the standby link. For vSAN and vMotion, the uplink order is reversed. See Table 1 for network configuration.

Table 1 Distributed Switch Port Group Configuration

Distributed port group	Active uplink	Standby uplink
VMware vSAN	Uplink 1	Uplink 2
VM and vSphere vMotion	Uplink 2	Uplink 1

Exchange Virtual Machine Configuration

We configure each Exchange 2016 virtual machine as described in Table 2, and all the virtual machines are with the identical configuration. The virtual disks are configured with thin provisioning by default. We set the virtual SCSI controller mode for Exchange database disks for both data and transaction log to VMware Paravirtual with even distribution.

Table 2 Exchange Virtual Machine Configuration

Exchange VM	vCPU	Memory (GB)	Virtual Disks	SCSI ID (Controller, ID)	SCSI Type
EX01, EX02, EX03, EX04	8	64	OS disk: 40GB	SCSI(0, 0)	LSI Logic
			Data disk 1: 320GB	SCSI(1, 0)	VMware Paravirtual
			Data disk 2: 320GB	SCSI(2, 0)	VMware Paravirtual
			Data disk 3: 320GB	SCSI(3, 0)	VMware Paravirtual
			Data disk 4: 320GB	SCSI(1, 1)	VMware Paravirtual
			Data disk 5: 320GB	SCSI(2, 1)	VMware Paravirtual
			Data disk 6: 320GB	SCSI(3, 1)	VMware Paravirtual
			Data disk 7: 320GB	SCSI(1, 2)	VMware Paravirtual
			Data disk 8: 320GB	SCSI(2, 2)	VMware Paravirtual

vSAN Storage Policy Configuration

In this solution, we use the default vSAN storage policy for Exchange 2016 databases. The detailed configuration is defined in Table 3.

Table 3 vSAN Storage Policy Configuration

Settings	Value	Description
Failure to Tolerate	1	Defines the number of disk, host, or fault domain failures a storage object can tolerate.
Erasure Coding	RAID 1 (Mirroring)	Defines the method used to tolerate failures. By default, Exchange database will preserve two copies on vSAN as storage level protection.
Number of disk stripes per object	1	The number of capacity disks across which each replica of a storage object is striped.
Checksum	Enabled	Checksum is calculated by default to prevent from Exchange data corruption.

Scalability for Exchange 2016 on vSAN

VMware vSAN is designed for easy scalability for business-critical applications. In this solution, we configure a four-node Fujitsu PRIMEFLEX for VMware vSAN cluster with one disk group for Exchange 2016 mailbox resiliency solution. vSAN supports both scale-up and scale-out for capacity and performance considerations for Exchange.

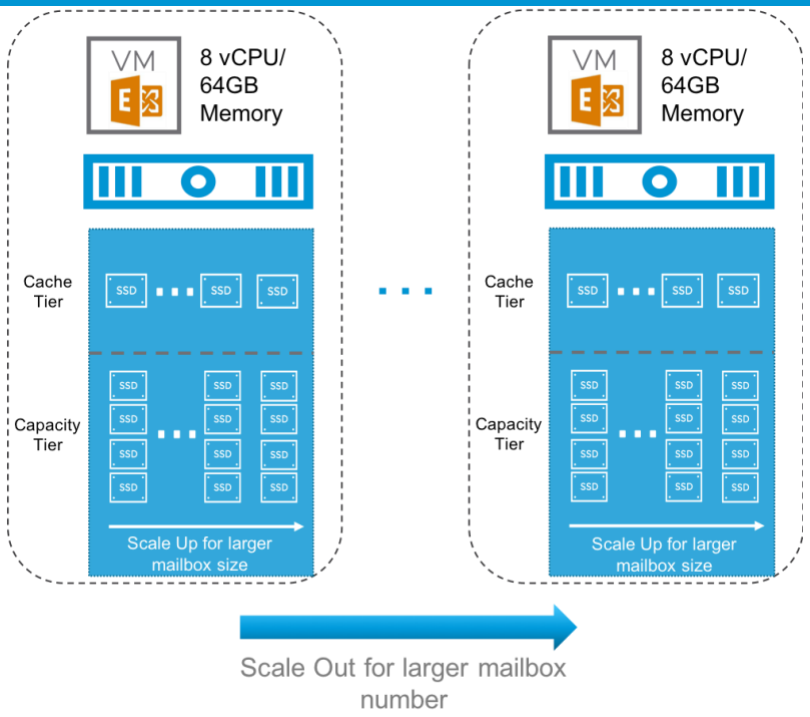

Figure 7. Building Block Methodology for vSAN Scale-up and Scale-out Sizing for Exchange 2016

As shown in Figure 7, for larger mailbox size sizing, we set each building block as single disk group, or 1 x 400GB Cache Tier SSD plus 4 x 1,920GB Capacity Tier SSDs in the Fujitsu PRIMERGY Rx2540 M4 server. A single disk group can support up to 2,500 user mailboxes per node with 1GB per mailbox size, and up to 0.36 IOPS per user (including 20 percent overhead). It is easy to scale up for 2GB mailbox size with the same profile by simply adding another disk group to the system. As you may have multiple hosts in the vSAN cluster, it is recommended to plan for scale-up for all the servers with identical configuration in the cluster as best practices.

For larger mailbox number sizing, we set each building block as single vSAN node, or one Fujitsu PRIMERGY Rx2540 M4 server. You may scale out for additional 2,500 user mailboxes support with the same profile by adding another Fujitsu node to the vSAN cluster.

For more details about vSAN sizing and scalability guide, visit VMware® vSAN™ Design and Sizing Guide.

Targeted Customer Profile

The targeted customer profile for the tested Microsoft Exchange 2016 Mailbox profile in this solution is defined as follows:

- 20,000 user mailboxes
- 1GB mailbox size
- 8 Exchange Servers with DAG configured
- Mailbox Resiliency with 2 database copies
- 0.36 IOPS per user mailbox (450 message per day, including 20 percent headroom)
- 24x7 Background Database Maintenance job enabled

Tested Deployment

The following tables summarize the testing environment:

Simulated Exchange Configuration

Number of Exchange mailboxes simulated	20,000
Mailbox Size	1GB
Number of Database Availability Groups (DAGs)	1
Number of servers/DAG	8 (4 tested)

Number of active mailboxes/server	2,500
Number of databases/host	8
Number of copies/database	2
Number of mailboxes/database	Up to 320
Simulated profile: I/O's per second per mailbox (IOPS, include 20% headroom)	0.36
Database/Log LUN size	320GB
Total database size for performance testing	10TB
% storage capacity used by Exchange database	71.4% (including vSAN storage mirroring copy)

Storage Hardware

Storage Connectivity	Pass-Through
Storage model and OS/firmware revision	VMware vSAN 6.7 build number 9214924
Storage cache	1 x 400GB SSD as Cache Tier per node
Number of storage controllers	4
Number of storage ports	2 x 10Gb Ethernet port per node
Maximum bandwidth of storage connectivity to host	2 x 10Gbps per node
HBA model and firmware	Fusion-MPT 12GSAS SAS3008 PCI-Express Fw Rev. 13.00.00.00
Number of HBA's/host	1
Host server type	4 x Fujitsu PRIMERGY RX2540 M4 Intel(R) Xeon(R) Gold 6154 CPU @ 3.00GHz 192GB memory
Total number of disks tested in solution	1 Cache Tier SSD and 4 Capacity Tier SSDs per host
Maximum number of spindles can be hosted in the storage	24 per host

Storage Software

Storage Software	VMware vSAN 6.7
HBA driver	lsi-msgpt3 version 16.00.01.00
HBA QueueTarget Setting	N/A
HBA QueueDepth Setting	N/A
Multi-Pathing	NMP (Direct-Access)
Host OS	FUJITSU Custom Image for ESXi 6.7
ESE.dll file version	15.01.1531.003
Replication solution name/version	N/A

Storage Disk Configuration (Mailbox Store and Transactional Log Disks)

Disk type, speed and firmware revision	Cache Tier: TOSHIBA PX05SMB040 SSD Capacity Tier: HGST SDLL1CLR020T5CF1 SSD
Raw capacity per disk (GB)	Cache Tier: 400GB per disk Capacity Tier: 1,920GB per disk
Number of physical disks in test	One disk group per host Cache Tier: 1 SSD Capacity Tier: 4 SSDs
Total raw storage capacity (GB)	27.95TB
Disk slice size (GB)	N/A
Number of slices per LUN or number of disks per LUN	N/A
Raid level	RAID 1 (Mirroring)
Total formatted capacity	19.22TB
Storage capacity utilization	68.7%
Database capacity utilization	35.7%

Best Practices

Exchange server is a disk-intensive application. Based on the testing run using the ESRP framework, we would recommend the following practices to improve the storage performance. The best practices for Microsoft Exchange 2013 and 2016 are applicable to each other.

- For Exchange virtualization best practices for VMware vSphere, visit Microsoft Exchange 2013 on VMware Best Practices Guide.
- For Exchange on VMware vSAN best practices, visit Microsoft Exchange 2013 on VMware vSAN.
- For Exchange 2007 best practices on storage design, visit Planning Storage Configurations.

Backup Strategy

VMware vSAN snapshot and clone technologies are primarily used for providing support to VM level backup and restore for Exchange operations.

vSphere Data Protection enables simple and robust backup and recovery solution integrated with vCenter and Microsoft Exchange. Site Recovery Manager provides a disaster recovery plan built in and automated within vCenter that can be tested before an outage, planned maintenance, or periodically in preparation for a disaster situation. Using VMware's Site Recovery Manager and vSphere Data Protection provides a resilient and highly available Microsoft Exchange environment.

Other third-party data protection products, like Veeam, provide application-level backup and restore since it internally integrated with Microsoft Volume Snapshot Service (VSS) Writer for application quiescing methodology to provide point-in-time backup and restore, which simplifies the database maintenance in a VMware virtualized environment for Exchange administrators. Best practices and implementation recommendations vary by the third-party and it is recommended to consult with your data protection product vendor for optimal solutions.

Contact for Additional Information

- vSAN
- Virtual Blocks Blog
- Customer Stories

See Storagehub for more vSAN details.

Test Result Summary

This section provides a high-level summary of the test data from ESRP and the link to the detailed html reports that are generated by the ESRP testing framework. See Appendix A—Stress Test Result Report to view the html report for each test.

Reliability

A number of tests in the framework are to check reliability tests runs for 24 hours. The goal is to verify the storage can handle high IO load for a long period of time. Both log and database files will be analyzed for integrity after the stress test to ensure there is no database/log corruption.

The reliability test results are summarized as follows:

- Minimal performance drop compared with 2-hour performance test.
- No error reported in the saved eventlog file.
- No error reported during the database and log checksum process.

See Appendix A—Stress Test Result Report for more details.

Storage Performance Results

The primary storage performance testing is designed to exercise the storage with the maximum sustainable Exchange type of IO for 2 hours. The test is to show how long it takes for the storage to respond to an IO under

load. The data below is the sum of all of the logical disk I/Os and the average of all the logical disks I/O latency in the 2-hour test. Each server is listed separately and the aggregated number across all servers is listed as well.

Individual Server Metrics

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

Database I/O	EX01	EX02	EX03	EX04
Database Disks Transfers/sec	11,508.80	11,551.85	11,684.21	11,834.36
Database Disks Reads/sec	7,060.64	7,049.51	7,095.86	7,193.28
Database Disks Writes/sec	4,448.16	4,502.34	4,588.35	4,641.09
Average Database Disk Read Latency (ms)	1.51	1.51	1.47	1.44
Average Database Disk Write Latency (ms)	5.13	5.05	4.99	5.23
Transaction Log I/O				
Log Disks Writes/sec	1,003.47	1,015.28	1,018.85	1,015.86
Average Log Disk Write Latency (ms)	2.58	2.51	2.47	2.51

Aggregate Performance across All Servers Metrics

The following table shows the sum of I/O's across servers in solution and the average latency across all servers in this solution.

Database I/O	
Database Disks Transfers/sec	46,579.22
Database Disks Reads/sec	28,399.29
Database Disks Writes/sec	18,179.93
Average Database Disk Read Latency (ms)	1.48
Average Database Disk Write Latency (ms)	5.10
Transaction Log I/O	
Log Disks Writes/sec	4,053.44
Average Log Disk Write Latency (ms)	2.52

Database Backup/Recovery Performance

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

Database Read-only Performance

The test is to measure 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 and the aggregated bandwidth.

MB read/sec per database	213.86
MB read/sec total per server (8 databases)	1,710.84
MB read/sec total per server (4 servers)	6,843.32

Transaction Log Recovery/Replay Performance

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

Average time to play one Log file (sec)	0.095

Conclusion

This document is developed by storage solution providers, and reviewed by Microsoft Exchange Product team. The test results presented are based on the tests introduced in the ESRP test framework. Customer 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; tests are not designed to get the maximum throughput for a giving solution. Rather, it is focused on producing recommendations from Fujitsu and VMware for Exchange application. So the data presented in this document should not be used for direct comparisons among the solutions.

In conclusion, the FUJITSU PRIMEFLEX for VMware vSAN with 4-node and 1+4 single disk group all-flash configuration achieved over 46,000 aggregated Exchange 2016 transactional IOPS with only 1.48 ms read latency and 5.10 ms write latency. With a simple calculation, we have achieved more than 4.6 IOPS per user mailbox, which equals 12.8 times the targeted performance profile (0.36 IOPS per user mailbox including 20 percent headroom). In addition, the performance test generated more than 4,000 log writes per second while keeping the log latency within 2.52 milliseconds.

The achieved backup performance for Exchange 2016 database is over 210 MBps per database and aggregated over 1,700 MBps per mailbox server. And a single log file replay for soft recovery test can be completed within 0.1 second.

Appendix A—Stress Test Result Report

This section provides the 24-hour stress test results on one of the test virtual machine. All the other test results are comparable to one another.

Test Summary

Overall Test Result	**Pass**
Machine Name	EX01
Test Description	
Test Start Time	9/14/2018 9:17:09 PM
Test End Time	9/15/2018 9:17:40 PM
Collection Start Time	9/14/2018 9:17:42 PM
Collection End Time	9/15/2018 9:17:33 PM
Jetstress Version	15.01.1019.000
ESE Version	15.01.1531.003
Operating System	Windows Server 2016 Datacenter (6.2.9200.0)
Performance Log	C:\Users\Administrator\Desktop\JetResult\Stress_2018_9_14_21_17_26.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second	11132.026
Capacity Percentage	100%
Throughput Percentage	100%
Initial Database Size (bytes)	2223660597248
Final Database Size (bytes)	2512480370688
Database Files (Count)	8

Jetstress System Parameters

Thread Count	32
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

Instance5096.1 Log path: C:\EXDB\DB1\Logs
Database: C:\EXDB\DB1\Jetstress001001.edb

Instance5096.2 Log path: C:\EXDB\DB2\Logs
Database: C:\EXDB\DB2\Jetstress002001.edb

Instance5096.3 Log path: C:\EXDB\DB3\Logs
Database: C:\EXDB\DB3\Jetstress003001.edb

Instance5096.4 Log path: C:\EXDB\DB4\Logs
Database: C:\EXDB\DB4\Jetstress004001.edb

Instance5096.5 Log path: C:\EXDB\DB5\Logs
Database: C:\EXDB\DB5\Jetstress005001.edb

Instance5096.6 Log path: C:\EXDB\DB6\Logs
Database: C:\EXDB\DB6\Jetstress006001.edb

Instance5096.7 Log path: C:\EXDB\DB7\Logs
Database: C:\EXDB\DB7\Jetstress007001.edb

Instance5096.8 Log path: C:\EXDB\DB8\Logs
Database: C:\EXDB\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
Instance5096.1	1.451	4.603	867.088	529.399	32789.552	33730.397	0.000	2.229	0.000	122.366	0.000	15000.486
Instance5096.2	1.553	5.908	864.643	519.095	32789.138	33738.208	0.000	3.341	0.000	114.608	0.000	16054.480
Instance5096.3	1.526	4.643	869.282	529.510	32789.642	33726.216	0.000	2.211	0.000	123.276	0.000	14893.650
Instance5096.4	1.557	4.764	869.732	528.827	32789.477	33727.682	0.000	2.317	0.000	122.801	0.000	14972.682
Instance5096.5	1.351	4.446	866.493	533.614	32790.240	33726.909	0.000	2.026	0.000	123.615	0.000	14891.587
Instance5096.6	1.516	6.239	863.300	519.100	32789.656	33738.659	0.000	3.518	0.000	113.033	0.000	16295.189
Instance5096.7	1.519	4.883	863.782	530.248	32789.180	33726.291	0.000	2.249	0.000	123.460	0.000	14879.261
Instance5096.8	1.653	6.233	859.790	518.122	32789.138	33736.391	0.000	3.411	0.000	114.992	0.000	15992.954

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance5096.1	8.986	260816.877
Instance5096.2	8.984	260727.706
Instance5096.3	8.983	260761.454
Instance5096.4	8.985	260768.178
Instance5096.5	8.993	260842.108
Instance5096.6	8.986	260740.689
Instance5096.7	8.983	260781.306
Instance5096.8	8.983	260665.662

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance5096.1	4.073	209715.256
Instance5096.2	4.068	209715.254
Instance5096.3	4.069	209715.417
Instance5096.4	4.074	209715.444
Instance5096.5	4.075	209715.312
Instance5096.6	4.068	209715.091
Instance5096.7	4.070	209715.193
Instance5096.8	4.073	209715.148

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
Instance5096.1	1.451	4.603	876.074	529.399	35128.452	33730.397	2.188	2.229	4.073	122.366	209715.256	15000.486
Instance5096.2	1.553	5.908	873.627	519.095	35133.121	33738.208	2.080	3.341	4.068	114.608	209715.254	16054.480
Instance5096.3	1.526	4.643	878.265	529.510	35121.381	33726.216	2.165	2.211	4.069	123.276	209715.417	14893.650
Instance5096.4	1.557	4.764	878.717	528.827	35120.673	33727.682	2.162	2.317	4.074	122.801	209715.444	14972.682
Instance5096.5	1.351	4.446	875.486	533.614	35132.679	33726.909	1.888	2.026	4.075	123.615	209715.312	14891.587
Instance5096.6	1.516	6.239	872.286	519.100	35138.057	33738.659	2.034	3.518	4.068	113.033	209715.091	16295.189
Instance5096.7	1.519	4.883	872.765	530.248	35135.783	33726.291	2.174	2.249	4.070	123.460	209715.193	14879.261
Instance5096.8	1.653	6.233	868.774	518.122	35145.451	33736.391	2.279	3.411	4.073	114.992	209715.148	15992.954

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	9.247	5.834	22.087
Available MBytes	59367.565	58953.000	59518.000
Free System Page Table Entries	12303849.196	12303062.000	12304425.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	142593235.776	136081408.000	151113728.000
Pool Paged Bytes	304950812.652	299929600.000	311906304.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
9/14/2018 9:17:09 PM -- Preparing for testing ...
9/14/2018 9:17:17 PM -- Attaching databases ...
9/14/2018 9:17:17 PM -- Preparations for testing are complete.
9/14/2018 9:17:17 PM -- Starting transaction dispatch ..
9/14/2018 9:17:17 PM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
9/14/2018 9:17:17 PM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
9/14/2018 9:17:26 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 200 msec/read).
9/14/2018 9:17:26 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 200 msec/write).
9/14/2018 9:17:27 PM -- Operation mix: Sessions 32, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
9/14/2018 9:17:27 PM -- Performance logging started (interval: 15000 ms).
9/14/2018 9:17:27 PM -- Attaining prerequisites:
9/14/2018 9:17:37 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 1983541000.0 (lower bound: 1932735000.0, upper bound: none)
9/15/2018 9:17:38 PM -- Performance logging has ended.
9/15/2018 9:17:38 PM -- JetInterop batch transaction stats: 2511907, 2511907, 2511907, 2511907, 2511906, 2511906, 2511906 and 2511906.
9/15/2018 9:17:38 PM -- Dispatching transactions ends.
9/15/2018 9:17:38 PM -- Shutting down databases ...
9/15/2018 9:17:40 PM -- Instance5096.1 (complete), Instance5096.2 (complete), Instance5096.3 (complete), Instance5096.4 (complete), Instance5096.5 (complete), Instance5096.6 (complete), Instance5096.7 (complete) and Instance5096.8 (complete)
9/15/2018 9:17:40 PM -- C:\Users\Administrator\Desktop\JetResult\Stress_2018_9_14_21_17_26.blg has 5754 samples.
9/15/2018 9:17:40 PM -- Creating test report ...
9/15/2018 9:18:29 PM -- Instance5096.1 has 1.5 for I/O Database Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.1 has 2.2 for I/O Log Writes Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.1 has 2.2 for I/O Log Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.2 has 1.6 for I/O Database Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.2 has 3.3 for I/O Log Writes Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.2 has 3.3 for I/O Log Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.3 has 1.5 for I/O Database Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.3 has 2.2 for I/O Log Writes Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.3 has 2.2 for I/O Log Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.4 has 1.6 for I/O Database Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.4 has 2.3 for I/O Log Writes Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.4 has 2.3 for I/O Log Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.5 has 1.4 for I/O Database Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.5 has 2.0 for I/O Log Writes Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.5 has 2.0 for I/O Log Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.6 has 1.5 for I/O Database Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.6 has 3.5 for I/O Log Writes Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.6 has 3.5 for I/O Log Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.7 has 1.5 for I/O Database Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.7 has 2.2 for I/O Log Writes Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.7 has 2.2 for I/O Log Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.8 has 1.7 for I/O Database Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.8 has 3.4 for I/O Log Writes Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.8 has 3.4 for I/O Log Reads Average Latency.
9/15/2018 9:18:29 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
9/15/2018 9:18:29 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
9/15/2018 9:18:29 PM -- C:\Users\Administrator\Desktop\JetResult\Stress_2018_9_14_21_17_26.xml has 5753 samples queried.
```

Test Result Report

Checksum Statistics - All

Database	Seen pages	Bad pages	Correctable pages	Wrong page-number pages	File length / seconds taken
C:\EXDB\DB1\Jetstress001001.edb	9584384	0	0	0	299512 MB/2694 sec
C:\EXDB\DB2\Jetstress002001.edb	9583872	0	0	0	299496 MB/1943 sec
C:\EXDB\DB3\Jetstress003001.edb	9583616	0	0	0	299488 MB/2159 sec
C:\EXDB\DB4\Jetstress004001.edb	9585664	0	0	0	299552 MB/1818 sec
C:\EXDB\DB5\Jetstress005001.edb	9584128	0	0	0	299504 MB/1890 sec
C:\EXDB\DB6\Jetstress006001.edb	9583360	0	0	0	299480 MB/2685 sec
C:\EXDB\DB7\Jetstress007001.edb	9582592	0	0	0	299456 MB/2000 sec
C:\EXDB\DB8\Jetstress008001.edb	9587200	0	0	0	299600 MB/2708 sec
(Sum)	76674816	0	0	0	2396088 MB/2708 sec

Disk Subsystem Performance (of checksum)

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Read
C:\EXDB\DB1	0.029	0.000	1758.422	0.000	65536.000
C:\EXDB\DB2	0.017	0.000	2444.076	0.000	65536.000
C:\EXDB\DB3	0.021	0.000	2159.138	0.000	65536.000
C:\EXDB\DB4	0.015	0.000	2613.938	0.000	65536.000
C:\EXDB\DB5	0.016	0.000	2528.915	0.000	65536.000
C:\EXDB\DB6	0.029	0.000	1776.334	0.000	65536.000
C:\EXDB\DB7	0.018	0.000	2357.682	0.000	65536.000
C:\EXDB\DB8	0.036	0.000	1730.112	0.000	65536.000

Memory System Performance (of checksum)

Counter	Average	Minimum	Maximum
% Processor Time	8.302	5.625	13.691
Available MBytes	61468.633	61460.000	61483.000
Free System Page Table Entries	12304010.444	12303420.000	12304664.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	136326030.222	136224768.000	136400896.000
Pool Paged Bytes	314867211.378	314724352.000	315170816.000

Test Log

9/14/2018 9:17:09 PM -- Preparing for testing ...
9/14/2018 9:17:17 PM -- Attaching databases ...
9/14/2018 9:17:17 PM -- Preparations for testing are complete.
9/14/2018 9:17:17 PM -- Starting transaction dispatch ..
9/14/2018 9:17:17 PM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
9/14/2018 9:17:17 PM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
9/14/2018 9:17:26 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 200 msec/read).
9/14/2018 9:17:26 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 200 msec/write).
9/14/2018 9:17:27 PM -- Operation mix: Sessions 32, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
9/14/2018 9:17:27 PM -- Performance logging started (interval: 15000 ms).
9/14/2018 9:17:27 PM -- Attaining prerequisites:
9/14/2018 9:17:37 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 1983541000.0 (lower bound: 1932735000.0, upper bound: none)
9/15/2018 9:17:38 PM -- Performance logging has ended.
9/15/2018 9:17:38 PM -- JetInterop batch transaction stats: 2511907, 2511907, 2511907, 2511907, 2511906, 2511906, 2511906 and 2511906.
9/15/2018 9:17:38 PM -- Dispatching transactions ends.
9/15/2018 9:17:38 PM -- Shutting down databases ...
9/15/2018 9:17:40 PM -- Instance5096.1 (complete), Instance5096.2 (complete), Instance5096.3 (complete), Instance5096.4 (complete), Instance5096.5 (complete), Instance5096.6 (complete), Instance5096.7 (complete) and Instance5096.8 (complete)
9/15/2018 9:17:40 PM -- C:\Users\Administrator\Desktop\JetResult\Stress_2018_9_14_21_17_26.blg has 5754 samples.
9/15/2018 9:17:40 PM -- Creating test report ...
9/15/2018 9:18:29 PM -- Instance5096.1 has 1.5 for I/O Database Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.1 has 2.2 for I/O Log Writes Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.1 has 2.2 for I/O Log Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.2 has 1.6 for I/O Database Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.2 has 3.3 for I/O Log Writes Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.2 has 3.3 for I/O Log Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.3 has 1.5 for I/O Database Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.3 has 2.2 for I/O Log Writes Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.3 has 2.2 for I/O Log Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.4 has 1.6 for I/O Database Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.4 has 2.3 for I/O Log Writes Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.4 has 2.3 for I/O Log Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.5 has 1.4 for I/O Database Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.5 has 2.0 for I/O Log Writes Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.5 has 2.0 for I/O Log Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.6 has 1.5 for I/O Database Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.6 has 3.5 for I/O Log Writes Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.6 has 3.5 for I/O Log Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.7 has 1.5 for I/O Database Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.7 has 2.2 for I/O Log Writes Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.7 has 2.2 for I/O Log Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.8 has 1.7 for I/O Database Reads Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.8 has 3.4 for I/O Log Writes Average Latency.
9/15/2018 9:18:29 PM -- Instance5096.8 has 3.4 for I/O Log Reads Average Latency.
9/15/2018 9:18:29 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
9/15/2018 9:18:29 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
9/15/2018 9:18:29 PM -- C:\Users\Administrator\Desktop\JetResult\Stress_2018_9_14_21_17_26.xml has 5753 samples queried.
9/15/2018 9:18:29 PM -- C:\Users\Administrator\Desktop\JetResult\Stress_2018_9_14_21_17_26.html was saved.
9/15/2018 9:18:29 PM -- Performance logging started (interval: 30000 ms).
9/15/2018 9:18:29 PM -- Verifying database checksums ...
9/15/2018 10:03:38 PM -- C:\EXDB\DB1 (100% processed), C:\EXDB\DB2 (100% processed), C:\EXDB\DB3 (100% processed), C:\EXDB\DB4 (100% processed), C:\EXDB\DB5 (100% processed), C:\EXDB\DB6 (100% processed), C:\EXDB\DB7 (100% processed) and C:\EXDB\DB8 (100% processed)
9/15/2018 10:03:38 PM -- Performance logging has ended.
9/15/2018 10:03:38 PM -- C:\Users\Administrator\Desktop\JetResult\DBChecksum_2018_9_15_21_18_29.blg has 90 samples.

Appendix B—Performance Test Result Report

This section provides the 2-hour performance test results on one of the test virtual machines. All the other test results are comparable to one another.

Test Summary

Overall Test Result	Pass
Machine Name	EX01
Test Description	
Test Start Time	9/14/2018 6:29:24 PM
Test End Time	9/14/2018 8:29:56 PM
Collection Start Time	9/14/2018 6:29:57 PM
Collection End Time	9/14/2018 8:29:49 PM
Jetstress Version	15.01.1019.000
ESE Version	15.01.1531.003
Operating System	Windows Server 2016 Datacenter (6.2.9200.0)
Performance Log	C:\Users\Administrator\Desktop\JetResult\Performance_2018_9_14_18_29_41.blg

Database Sizing and Throughput

Achieved Transactional I/O per Second	11508.804
Capacity Percentage	100%
Throughput Percentage	100%
Initial Database Size (bytes)	2198217949184
Final Database Size (bytes)	2223660597248
Database Files (Count)	8

Jetstress System Parameters

Thread Count	32
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

Instance5096.1 Log path: C:\EXDB\DB1\Logs
Database: C:\EXDB\DB1\Jetstress001001.edb

Instance5096.2 Log path: C:\EXDB\DB2\Logs
Database: C:\EXDB\DB2\Jetstress002001.edb

Instance5096.3 Log path: C:\EXDB\DB3\Logs
Database: C:\EXDB\DB3\Jetstress003001.edb

Instance5096.4 Log path: C:\EXDB\DB4\Logs
Database: C:\EXDB\DB4\Jetstress004001.edb

Instance5096.5 Log path: C:\EXDB\DB5\Logs
Database: C:\EXDB\DB5\Jetstress005001.edb

Instance5096.6 Log path: C:\EXDB\DB6\Logs
Database: C:\EXDB\DB6\Jetstress006001.edb

Instance5096.7 Log path: C:\EXDB\DB7\Logs
Database: C:\EXDB\DB7\Jetstress007001.edb

Instance5096.8 Log path: C:\EXDB\DB8\Logs
Database: C:\EXDB\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
Instance5096.1	1.440	4.732	881.671	557.574	32803.625	34744.255	0.000	2.332	0.000	126.465	0.000	15421.763
Instance5096.2	1.531	5.509	884.824	552.530	32804.996	34791.320	0.000	3.002	0.000	121.945	0.000	16100.593
Instance5096.3	1.528	4.766	890.590	559.479	32803.235	34752.075	0.000	2.306	0.000	127.973	0.000	15294.974
Instance5096.4	1.539	4.820	882.542	557.678	32803.434	34703.548	0.000	2.360	0.000	127.434	0.000	15348.851
Instance5096.5	1.323	4.579	886.962	563.518	32804.764	34720.599	0.000	2.097	0.000	128.456	0.000	15273.063
Instance5096.6	1.518	5.330	879.048	551.988	32802.948	34771.037	0.000	2.766	0.000	123.984	0.000	15794.807
Instance5096.7	1.523	5.012	880.817	558.961	32802.225	34757.689	0.000	2.333	0.000	127.935	0.000	15303.287
Instance5096.8	1.654	6.272	874.188	546.433	32802.944	34793.828	0.000	3.451	0.000	119.273	0.000	16520.502

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance5096.1	9.019	260818.040
Instance5096.2	9.017	260833.828
Instance5096.3	9.020	260795.031
Instance5096.4	9.022	260676.298
Instance5096.5	9.023	260821.337
Instance5096.6	9.016	260851.467
Instance5096.7	9.023	260792.539
Instance5096.8	9.014	260710.042

Log Replication I/O Performance

MSExchange Database ==> Instances	I/O Log Reads/sec	I/O Log Reads Average Bytes
Instance5096.1	4.357	209714.870
Instance5096.2	4.370	209715.398
Instance5096.3	4.368	209715.584
Instance5096.4	4.365	209715.254
Instance5096.5	4.373	209715.266
Instance5096.6	4.370	209715.200
Instance5096.7	4.368	209715.300
Instance5096.8	4.386	209715.569

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
Instance5096.1	1.440	4.732	890.691	557.574	35112.496	34744.255	2.311	2.332	4.357	126.465	209714.870	15421.763
Instance5096.2	1.531	5.509	893.841	552.530	35105.379	34791.320	2.236	3.002	4.370	121.945	209715.398	16100.593
Instance5096.3	1.528	4.766	899.610	559.479	35089.129	34752.075	2.220	2.306	4.368	127.973	209715.584	15294.974
Instance5096.4	1.539	4.820	891.564	557.678	35109.252	34703.548	2.315	2.360	4.365	127.434	209715.254	15348.851
Instance5096.5	1.323	4.579	895.985	563.518	35100.969	34720.599	1.991	2.097	4.373	128.456	209715.266	15273.063
Instance5096.6	1.518	5.330	888.064	551.988	35118.245	34771.037	2.180	2.766	4.370	123.984	209715.200	15794.807
Instance5096.7	1.523	5.012	889.840	558.961	35114.128	34757.689	2.242	2.333	4.368	127.935	209715.300	15303.287
Instance5096.8	1.654	6.272	883.202	546.433	35128.970	34793.828	2.355	3.451	4.386	119.273	209715.569	16520.502

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	9.194	6.166	12.747
Available MBytes	59540.450	59517.000	59609.000
Free System Page Table Entries	12304107.867	12303765.000	12304619.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	139412727.467	139300864.000	139558912.000
Pool Paged Bytes	298522496.000	297840640.000	299028480.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

```
9/14/2018 6:29:24 PM -- Preparing for testing ...
9/14/2018 6:29:32 PM -- Attaching databases ...
9/14/2018 6:29:32 PM -- Preparations for testing are complete.
9/14/2018 6:29:32 PM -- Starting transaction dispatch ..
9/14/2018 6:29:32 PM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
9/14/2018 6:29:32 PM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
9/14/2018 6:29:41 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
9/14/2018 6:29:41 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
9/14/2018 6:29:42 PM -- Operation mix: Sessions 32, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
9/14/2018 6:29:42 PM -- Performance logging started (interval: 15000 ms).
9/14/2018 6:29:42 PM -- Attaining prerequisites:
9/14/2018 6:29:54 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 1980621000.0 (lower bound: 1932735000.0, upper bound: none)
9/14/2018 8:29:55 PM -- Performance logging has ended.
9/14/2018 8:29:55 PM -- JetInterop batch transaction stats: 225986, 225986, 225986, 225986, 225986, 225986, 225985 and 225985.
9/14/2018 8:29:55 PM -- Dispatching transactions ends.
9/14/2018 8:29:55 PM -- Shutting down databases ...
9/14/2018 8:29:56 PM -- Instance5096.1 (complete), Instance5096.2 (complete), Instance5096.3 (complete), Instance5096.4 (complete), Instance5096.5 (complete), Instance5096.6 (complete), Instance5096.7 (complete) and Instance5096.8 (complete)
9/14/2018 8:29:56 PM -- C:\Users\Administrator\Desktop\JetResult\Performance_2018_9_14_18_29_41.blg has 480 samples.
9/14/2018 8:29:56 PM -- Creating test report ...
9/14/2018 8:30:02 PM -- Instance5096.1 has 1.4 for I/O Database Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.1 has 2.3 for I/O Log Writes Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.1 has 2.3 for I/O Log Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.2 has 1.5 for I/O Database Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.2 has 3.0 for I/O Log Writes Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.2 has 3.0 for I/O Log Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.3 has 1.5 for I/O Database Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.3 has 2.3 for I/O Log Writes Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.3 has 2.3 for I/O Log Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.4 has 1.5 for I/O Database Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.4 has 2.4 for I/O Log Writes Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.4 has 2.4 for I/O Log Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.5 has 1.3 for I/O Database Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.5 has 2.1 for I/O Log Writes Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.5 has 2.1 for I/O Log Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.6 has 1.5 for I/O Database Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.6 has 2.8 for I/O Log Writes Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.6 has 2.8 for I/O Log Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.7 has 1.5 for I/O Database Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.7 has 2.3 for I/O Log Writes Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.7 has 2.3 for I/O Log Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.8 has 1.7 for I/O Database Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.8 has 3.5 for I/O Log Writes Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.8 has 3.5 for I/O Log Reads Average Latency.
9/14/2018 8:30:02 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
9/14/2018 8:30:02 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
9/14/2018 8:30:02 PM -- C:\Users\Administrator\Desktop\JetResult\Performance_2018_9_14_18_29_41.xml has 479 samples queried.
```

Checksum Statistics - All

Database	Seen pages	Bad pages	Correctable pages	Wrong page-number pages	File length / seconds taken
C:\EXDB\DB1\Jetstress001001.edb	8482304	0	0	0	265072 MB/2348 sec
C:\EXDB\DB2\Jetstress002001.edb	8482560	0	0	0	265080 MB/1690 sec
C:\EXDB\DB3\Jetstress003001.edb	8482560	0	0	0	265080 MB/1880 sec
C:\EXDB\DB4\Jetstress004001.edb	8482560	0	0	0	265080 MB/1566 sec
C:\EXDB\DB5\Jetstress005001.edb	8482304	0	0	0	265072 MB/1653 sec
C:\EXDB\DB6\Jetstress006001.edb	8482560	0	0	0	265080 MB/2339 sec
C:\EXDB\DB7\Jetstress007001.edb	8482560	0	0	0	265080 MB/1752 sec
C:\EXDB\DB8\Jetstress008001.edb	8483328	0	0	0	265104 MB/2361 sec
(Sum)	67860736	0	0	0	2120648 MB/2362 sec

Disk Subsystem Performance (of checksum)

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Read
C:\EXDB\DB1	0.029	0.000	1798.335	0.000	65536.000
C:\EXDB\DB2	0.017	0.000	2491.943	0.000	65536.000
C:\EXDB\DB3	0.021	0.000	2227.922	0.000	65536.000
C:\EXDB\DB4	0.015	0.000	2688.895	0.000	65536.000
C:\EXDB\DB5	0.016	0.000	2553.947	0.000	65536.000
C:\EXDB\DB6	0.029	0.000	1783.973	0.000	65536.000
C:\EXDB\DB7	0.018	0.000	2394.185	0.000	65536.000
C:\EXDB\DB8	0.036	0.000	1692.487	0.000	65536.000

Memory System Performance (of checksum)

Counter	Average	Minimum	Maximum
% Processor Time	8.996	5.488	14.064
Available MBytes	61639.987	61581.000	61654.000
Free System Page Table Entries	12304260.179	12303609.000	12304915.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	139978699.487	139841536.000	140099584.000
Pool Paged Bytes	299550299.897	299429888.000	299765760.000

Test Log

9/14/2018 6:29:24 PM -- Preparing for testing ...
9/14/2018 6:29:32 PM -- Attaching databases ...
9/14/2018 6:29:32 PM -- Preparations for testing are complete.
9/14/2018 6:29:32 PM -- Starting transaction dispatch ..
9/14/2018 6:29:32 PM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
9/14/2018 6:29:32 PM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
9/14/2018 6:29:41 PM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
9/14/2018 6:29:41 PM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
9/14/2018 6:29:42 PM -- Operation mix: Sessions 32, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
9/14/2018 6:29:42 PM -- Performance logging started (interval: 15000 ms).
9/14/2018 6:29:42 PM -- Attaining prerequisites:
9/14/2018 6:29:54 PM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 1980621000.0 (lower bound: 1932735000.0, upper bound: none)
9/14/2018 8:29:55 PM -- Performance logging has ended.
9/14/2018 8:29:55 PM -- JetInterop batch transaction stats: 225986, 225986, 225986, 225986, 225986, 225986, 225985 and 225985.
9/14/2018 8:29:55 PM -- Dispatching transactions ends.
9/14/2018 8:29:55 PM -- Shutting down databases ...
9/14/2018 8:29:56 PM -- Instance5096.1 (complete), Instance5096.2 (complete), Instance5096.3 (complete), Instance5096.4 (complete), Instance5096.5 (complete), Instance5096.6 (complete), Instance5096.7 (complete) and Instance5096.8 (complete)
9/14/2018 8:29:56 PM -- C:\Users\Administrator\Desktop\JetResult\Performance_2018_9_14_18_29_41.blg has 480 samples.
9/14/2018 8:29:56 PM -- Creating test report ...
9/14/2018 8:30:02 PM -- Instance5096.1 has 1.4 for I/O Database Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.1 has 2.3 for I/O Log Writes Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.1 has 2.3 for I/O Log Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.2 has 1.5 for I/O Database Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.2 has 3.0 for I/O Log Writes Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.2 has 3.0 for I/O Log Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.3 has 1.5 for I/O Database Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.3 has 2.3 for I/O Log Writes Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.3 has 2.3 for I/O Log Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.4 has 1.5 for I/O Database Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.4 has 2.4 for I/O Log Writes Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.4 has 2.4 for I/O Log Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.5 has 1.3 for I/O Database Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.5 has 2.1 for I/O Log Writes Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.5 has 2.1 for I/O Log Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.6 has 1.5 for I/O Database Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.6 has 2.8 for I/O Log Writes Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.6 has 2.8 for I/O Log Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.7 has 1.5 for I/O Database Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.7 has 2.3 for I/O Log Writes Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.7 has 2.3 for I/O Log Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.8 has 1.7 for I/O Database Reads Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.8 has 3.5 for I/O Log Writes Average Latency.
9/14/2018 8:30:02 PM -- Instance5096.8 has 3.5 for I/O Log Reads Average Latency.
9/14/2018 8:30:02 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
9/14/2018 8:30:02 PM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
9/14/2018 8:30:02 PM -- C:\Users\Administrator\Desktop\JetResult\Performance_2018_9_14_18_29_41.xml has 479 samples queried.
9/14/2018 8:30:02 PM -- C:\Users\Administrator\Desktop\JetResult\Performance_2018_9_14_18_29_41.html was saved.
9/14/2018 8:30:02 PM -- Performance logging started (interval: 30000 ms).
9/14/2018 8:30:02 PM -- Verifying database checksums ...
9/14/2018 9:09:24 PM -- C:\EXDB\DB1 (100% processed), C:\EXDB\DB2 (100% processed), C:\EXDB\DB3 (100% processed), C:\EXDB\DB4 (100% processed), C:\EXDB\DB5 (100% processed), C:\EXDB\DB6 (100% processed), C:\EXDB\DB7 (100% processed) and C:\EXDB\DB8 (100% processed)
9/14/2018 9:09:24 PM -- Performance logging has ended.
9/14/2018 9:09:24 PM -- C:\Users\Administrator\Desktop\JetResult\DBChecksum_2018_9_14_20_30_2.blg has 78 samples.

Appendix C—Database Backup Test Result Report

This section provides the database backup test results on one of the test virtual machine. All the other test results are comparable to one another.

Database Configuration

Instance4776.1 Log path: C:\EXDB\DB1\Logs
Database: C:\EXDB\DB1\Jetstress001001.edb

Instance4776.2 Log path: C:\EXDB\DB2\Logs
Database: C:\EXDB\DB2\Jetstress002001.edb

Instance4776.3 Log path: C:\EXDB\DB3\Logs
Database: C:\EXDB\DB3\Jetstress003001.edb

Instance4776.4 Log path: C:\EXDB\DB4\Logs
Database: C:\EXDB\DB4\Jetstress004001.edb

Instance4776.5 Log path: C:\EXDB\DB5\Logs
Database: C:\EXDB\DB5\Jetstress005001.edb

Instance4776.6 Log path: C:\EXDB\DB6\Logs
Database: C:\EXDB\DB6\Jetstress006001.edb

Instance4776.7 Log path: C:\EXDB\DB7\Logs
Database: C:\EXDB\DB7\Jetstress007001.edb

Instance4776.8 Log path: C:\EXDB\DB8\Logs
Database: C:\EXDB\DB8\Jetstress008001.edb

Database backup Test Result Report

Database Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance4776.1	300544.03	00:19:21	258.73
Instance4776.2	300456.03	00:20:14	247.40
Instance4776.3	300440.03	00:20:09	248.44
Instance4776.4	300472.03	00:20:33	243.67
Instance4776.5	300424.03	00:19:19	259.19
Instance4776.6	300424.03	00:19:14	260.29
Instance4776.7	300440.03	00:19:40	254.57
Instance4776.8	300496.03	00:20:03	249.66
Avg			252.75
Sum			2021.96

Jetstress System Parameters

Thread Count	32
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%

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
Instance4776.1	1.569	0.000	1033.536	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4776.2	1.730	0.000	984.409	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4776.3	1.671	0.000	990.319	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4776.4	1.721	0.000	974.422	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4776.5	1.620	0.000	1039.179	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4776.6	1.584	0.000	1041.369	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4776.7	1.662	0.000	1016.322	0.000	262144.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Instance4776.8	1.693	0.000	998.422	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	6.466	2.131	7.440
Available MBytes	61648.634	61632.000	61695.000
Free System Page Table Entries	1579132421.146	12303710.000	4294967295.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	148715070.439	148688896.000	148758528.000
Pool Paged Bytes	326078663.805	325431296.000	338108416.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log

9/18/2018 9:49:05 AM -- Preparing for testing ...
9/18/2018 9:49:13 AM -- Attaching databases ...
9/18/2018 9:49:13 AM -- Preparations for testing are complete.
9/18/2018 9:49:22 AM -- Performance logging started (interval: 30000 ms).
9/18/2018 9:49:22 AM -- Backing up databases ...
9/18/2018 10:09:55 AM -- Performance logging has ended.
9/18/2018 10:09:55 AM -- Instance4776.1 (100% processed), Instance4776.2 (100% processed), Instance4776.3 (100% processed), Instance4776.4 (100% processed), Instance4776.5 (100% processed), Instance4776.6 (100% processed), Instance4776.7 (100% processed) and Instance4776.8 (100% processed)
9/18/2018 10:09:55 AM -- C:\Users\Administrator\Desktop\JetResult\DatabaseBackup_2018_9_18_9_49_13.blg has 41 samples.
9/18/2018 10:09:55 AM -- Creating test report ...

Appendix D—Soft Recovery Test Result Report

Soft-Recovery Statistics - All

Database Instance	Log files replayed	Elapsed seconds
Instance5096.1	507	48.6094717
Instance5096.2	508	48.0782217
Instance5096.3	501	47.8125961
Instance5096.4	505	48.6094717
Instance5096.5	505	47.5469728
Instance5096.6	511	48.6094717
Instance5096.7	508	47.5469728
Instance5096.8	502	49.4063511
Avg	505	48.277
Sum	4047	386.2195296

Database Configuration

Instance5096.1 Log path: C:\EXDB\DB1\Logs
Database: C:\EXDB\DB1\Jetstress001001.edb

Instance5096.2 Log path: C:\EXDB\DB2\Logs
Database: C:\EXDB\DB2\Jetstress002001.edb

Instance5096.3 Log path: C:\EXDB\DB3\Logs
Database: C:\EXDB\DB3\Jetstress003001.edb

Instance5096.4 Log path: C:\EXDB\DB4\Logs
Database: C:\EXDB\DB4\Jetstress004001.edb

Instance5096.5 Log path: C:\EXDB\DB5\Logs
Database: C:\EXDB\DB5\Jetstress005001.edb

Instance5096.6 Log path: C:\EXDB\DB6\Logs
Database: C:\EXDB\DB6\Jetstress006001.edb

Instance5096.7 Log path: C:\EXDB\DB7\Logs
Database: C:\EXDB\DB7\Jetstress007001.edb

Instance5096.8 Log path: C:\EXDB\DB8\Logs
Database: C:\EXDB\DB8\Jetstress008001.edb

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
Instance5096.1	1.033	1.144	4880.513	76.501	36608.311	95344.960	1.205	0.000	52.848	0.000	209715.200	0.000
Instance5096.2	1.050	1.121	4833.320	75.834	36408.844	94827.633	1.225	0.000	53.152	0.000	209715.200	0.000
Instance5096.3	1.028	1.092	4874.231	74.513	36594.562	94657.534	1.203	0.000	52.529	0.000	209714.607	0.000
Instance5096.4	1.022	1.077	4861.002	73.851	36623.021	94816.566	1.209	0.000	52.508	0.000	209715.200	0.000
Instance5096.5	0.895	1.081	4936.917	74.040	36471.685	95967.840	1.068	0.000	53.027	0.000	209715.200	0.000
Instance5096.6	1.037	1.126	4854.819	75.277	36532.662	94091.097	1.203	0.000	53.074	0.000	209715.200	0.000
Instance5096.7	1.038	1.109	4891.662	75.134	36529.333	95577.964	1.213	0.000	53.774	0.000	209715.493	0.000
Instance5096.8	1.208	1.140	4623.520	72.155	36399.100	93605.557	1.340	0.000	50.788	0.000	209809.133	0.000

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	46.892	44.163	50.243
Available MBytes	59183.833	59107.000	59395.000
Free System Page Table Entries	12303453.333	12303211.000	12303706.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	142914218.667	142843904.000	143060992.000
Pool Paged Bytes	330897066.667	330231808.000	337858560.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

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
Instance5096.1	1.033	1.144	4880.513	76.501	36608.311	95344.960	1.205	0.000	52.848	0.000	209715.200	0.000
Instance5096.2	1.050	1.121	4833.320	75.834	36408.844	94827.633	1.225	0.000	53.152	0.000	209715.200	0.000
Instance5096.3	1.028	1.092	4874.231	74.513	36594.562	94657.534	1.203	0.000	52.529	0.000	209714.607	0.000
Instance5096.4	1.022	1.077	4861.002	73.851	36623.021	94816.566	1.209	0.000	52.508	0.000	209715.200	0.000
Instance5096.5	0.895	1.081	4936.917	74.040	36471.685	95967.840	1.068	0.000	53.027	0.000	209715.200	0.000
Instance5096.6	1.037	1.126	4854.819	75.277	36532.662	94091.097	1.203	0.000	53.074	0.000	209715.200	0.000
Instance5096.7	1.038	1.109	4891.662	75.134	36529.333	95577.964	1.213	0.000	53.774	0.000	209715.493	0.000
Instance5096.8	1.208	1.140	4623.520	72.155	36399.100	93605.557	1.340	0.000	50.788	0.000	209809.133	0.000

Background Database Maintenance I/O Performance

MSExchange Database ==> Instances	Database Maintenance IO Reads/sec	Database Maintenance IO Reads Average Bytes
Instance5096.1	0.000	0.000
Instance5096.2	0.000	0.000
Instance5096.3	0.000	0.000
Instance5096.4	0.000	0.000
Instance5096.5	0.000	0.000
Instance5096.6	0.000	0.000
Instance5096.7	0.000	0.000
Instance5096.8	0.000	0.000

Test Log

9/17/2018 9:41:09 AM -- Preparing for testing ...
9/17/2018 9:41:17 AM -- Attaching databases ...
9/17/2018 9:41:17 AM -- Preparations for testing are complete.
9/17/2018 9:41:17 AM -- Starting transaction dispatch ..
9/17/2018 9:41:17 AM -- Database cache settings: (minimum: 256.0 MB, maximum: 2.0 GB)
9/17/2018 9:41:17 AM -- Database flush thresholds: (start: 20.5 MB, stop: 40.9 MB)
9/17/2018 9:41:26 AM -- Database read latency thresholds: (average: 20 msec/read, maximum: 100 msec/read).
9/17/2018 9:41:26 AM -- Log write latency thresholds: (average: 10 msec/write, maximum: 100 msec/write).
9/17/2018 9:41:26 AM -- Operation mix: Sessions 32, Inserts 40%, Deletes 20%, Replaces 5%, Reads 35%, Lazy Commits 70%.
9/17/2018 9:41:26 AM -- Performance logging started (interval: 15000 ms).
9/17/2018 9:41:26 AM -- Generating log files ...
9/17/2018 9:46:40 AM -- C:\EXDB\DB1\Logs (101.2% generated), C:\EXDB\DB2\Logs (101.4% generated), C:\EXDB\DB3\Logs (100.2% generated), C:\EXDB\DB4\Logs (100.8% generated), C:\EXDB\DB5\Logs (101.0% generated), C:\EXDB\DB6\Logs (102.2% generated), C:\EXDB\DB7\Logs (101.4% generated) and C:\EXDB\DB8\Logs (100.2% generated)
9/17/2018 9:46:40 AM -- Performance logging has ended.
9/17/2018 9:46:40 AM -- JetInterop batch transaction stats: 18070, 18070, 18070, 18070, 18070, 18070, 18070 and 18069.
9/17/2018 9:46:40 AM -- Dispatching transactions ends.
9/17/2018 9:46:41 AM -- Shutting down databases ...
9/17/2018 9:46:41 AM -- Instance5096.1 (complete), Instance5096.2 (complete), Instance5096.3 (complete), Instance5096.4 (complete), Instance5096.5 (complete), Instance5096.6 (complete), Instance5096.7 (complete) and Instance5096.8 (complete)
9/17/2018 9:46:41 AM -- C:\Users\Administrator\Desktop\JetResult\Performance_2018_9_17_9_41_26.blg has 20 samples.
9/17/2018 9:46:41 AM -- Creating test report ...
9/17/2018 9:46:42 AM -- Instance5096.1 has 1.1 for I/O Database Reads Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.1 has 1.8 for I/O Log Writes Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.1 has 1.8 for I/O Log Reads Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.2 has 1.1 for I/O Database Reads Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.2 has 1.7 for I/O Log Writes Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.2 has 1.7 for I/O Log Reads Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.3 has 1.1 for I/O Database Reads Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.3 has 1.7 for I/O Log Writes Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.3 has 1.7 for I/O Log Reads Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.4 has 1.2 for I/O Database Reads Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.4 has 1.8 for I/O Log Writes Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.4 has 1.8 for I/O Log Reads Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.5 has 1.1 for I/O Database Reads Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.5 has 1.7 for I/O Log Writes Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.5 has 1.7 for I/O Log Reads Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.6 has 1.2 for I/O Database Reads Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.6 has 1.8 for I/O Log Writes Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.6 has 1.8 for I/O Log Reads Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.7 has 1.1 for I/O Database Reads Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.7 has 1.8 for I/O Log Writes Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.7 has 1.8 for I/O Log Reads Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.8 has 1.2 for I/O Database Reads Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.8 has 1.9 for I/O Log Writes Average Latency.
9/17/2018 9:46:42 AM -- Instance5096.8 has 1.9 for I/O Log Reads Average Latency.
9/17/2018 9:46:42 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.
9/17/2018 9:46:42 AM -- The test has 0 Database Page Fault Stalls/sec samples higher than 0.
9/17/2018 9:46:42 AM -- C:\Users\Administrator\Desktop\JetResult\Performance_2018_9_17_9_41_26.xml has 19 samples queried.
9/17/2018 9:46:42 AM -- C:\Users\Administrator\Desktop\JetResult\Performance_2018_9_17_9_41_26.html was saved.
9/17/2018 9:46:42 AM -- Performance logging started (interval: 4000 ms).
9/17/2018 9:46:42 AM -- Recovering databases ...
9/17/2018 9:47:32 AM -- Performance logging has ended.
9/17/2018 9:47:32 AM -- Instance5096.1 (48.6094717), Instance5096.2 (48.0782217), Instance5096.3 (47.8125961), Instance5096.4 (48.6094717), Instance5096.5 (47.5469728), Instance5096.6 (48.6094717), Instance5096.7 (47.5469728) and Instance5096.8 (49.4063511)
9/17/2018 9:47:32 AM -- C:\Users\Administrator\Desktop\JetResult\SoftRecovery_2018_9_17_9_46_42.blg has 12 samples.
9/17/2018 9:47:32 AM -- Creating test report ...