



Sun StorageTek™ 6540 Array Storage Solution for 20,000 Mailboxes in Microsoft Exchange 2007



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Sun Microsystems, Inc.

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Introduction

This document provides information on a Sun Microsystems storage solution for Microsoft Exchange Server, based on the Microsoft Exchange Solution Reviewed Program (ESRP) – Storage program¹. For any questions or comments regarding the contents of this document, see <http://www.sun.com/exchange>.

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Features

This document describes a Microsoft Exchange 2007 primary storage solution on the Sun StorageTek™ 6540 array. The targeted number of users in this environment is 20,000 with four servers. The tested user profile was 0.5 (0.42 + 20%) Input/Output Per Second (IOPS) per mailbox with a limit of 300 Mbytes. This solution can be scaled by adding additional arrays. The StorageTek 6540 array can be an excellent choice for medium and large sized businesses.

Solution Description

The tested solution consists of a Sun StorageTek 6540 dual Fibre Channel (FC) RAID controller cabinet with 10 Sun StorageTek CSM200 rack-ready expansion tray modules. There are one hundred sixty 146-Gbyte 15,000-rpm, FC 4-Gbps drives for 23.36 Tbytes (raw) / 11.68 Tbytes (usable, RAID 10). This solution can expand to 14 StorageTek CSM200 modules for a total of 168 Tbytes (raw) / 84 Tbytes (usable, RAID 10) with 750-Gbyte SATA-II drives.

Key specifications:

- Dual Fibre Channel RAID controller
- End-to-end speed of 4 Gbps
- Ability to scale up to 168 Tbytes and 224 drives
- 575,000 IOPS out of cache
- Supports high-performance FC and high-capacity SATA drives

Table 1 shows a description of the solution. (Information subject to change.)

¹ The ESRP – Storage program was developed by Microsoft Corporation to provide a common storage testing framework with which vendors can provide information on storage solutions for Microsoft Exchange Server software. For more details on the Microsoft ESRP – Storage program, see <http://www.microsoft.com/technet/prodtechnol/exchange/2007/esrp.msp>.

Table 1: Solution Description
Sun StorageTek 6540 Array

Controller card	Dual Fibre Channel RAID controller
Cache size (with ECC protection)	4 GB, 8 GB, or 16 GB dedicated data cache
Host interfaces/link speeds	Eight 4 Gbps direct, arbitrated loop or switched attach ports
Other interfaces	Eight 4 Gbps FC expansion ports Four 10/100 Base-T Ethernet ports Two 9-pin RS-232 serial ports
RAID Level	0, 1, 3, 5, and 1+0
Cache Battery Backup	Up to 7 days (depending on cache size)
Integrated data services/ premium features (optional)	Sun StorageTek Data Snapshot (optional), supports four snaps per volume, 1,024 per array: http://www.sun.com/storagetek/management_software/data_protection/data_snapshot/ Sun StorageTek Data Volume Copy (optional), supports eight active copies per volume, 1,024 per array Sun StorageTek Data Replicator (optional), supports 64 replicated volumes: http://www.sun.com/storagetek/management_software/data_protection/data_replicator/ Sun StorageTek Storage Domain (4, 8, 16, or 64)
Dynamic capacity expansion	Five to 224 drives 365 GB to 168 TB
Expansion tray	Up to 14 Sun StorageTek CSM200 expansion modules
Dynamic reconfiguration	Volume expansion, RAID migration, capacity expansion, segment size migration, volume and virtual disk reconfiguration, controller firmware upgrades
Drive depopulation	Scales from five to 16 hard disk drives per expansion module
Volume	Up to 2,048
Global hot spares	Up to 15
Maximum array capacity	168 TB
Disk Drives	
Form factor	3.5 in., low-profile
Interface	Dual-ported Fibre Channel
Supported drives/system per tray capacity (raw, unformatted)	Fibre Channel drives: <ul style="list-style-type: none"> ● 73 GB 15,000-rpm 4 Gbps -- 1,168 GB per tray (3RU) ● 146 GB 15,000-rpm 4 Gbps -- 2,336 GB per tray (3RU) ● 146 GB 10,000-rpm 2 Gbps -- 2,336 GB per tray (3RU) ● 300 GB 15,000-rpm 4 Gbps -- 4,800 GB per tray (3RU) ● 300 GB 10,000-rpm 2 Gbps -- 4,800 GB per tray (3RU) SATA-II drives:

- 500 GB 7,200-rpm 3 Gbps -- 8,000 GB per tray (3RU)
- 750 GB 7,200-rpm 3 Gbps -- 12,000 GB per tray (3RU)

Software

Supported software

- Sun StorageTek QFS software:
http://www.sun.com/storagetek/management_software/data_management/qfs/
 - Sun StorageTek Storage Archive Manager software:
http://www.sun.com/storagetek/management_software/data_management/sam/index.xml
 - Solaris Cluster (formerly Sun™ Cluster) software:
<http://www.sun.com/software/solaris/cluster/index.xml>
 - Sun StorageTek Enterprise Backup software:
http://www.sun.com/storagetek/management_software/data_protection/enterprise_backup_software/
 - Solstice DiskSuite™ 4.2.1 in conjunction with the Solaris™ 8 OS
(<http://www.sun.com/software/solaris/8/ds/ds-disksuite/ds-disksuite.pdf>)
 - Solaris Volume Manager (embedded in the Solaris 9 OS)
 - Symantec Veritas NetBackup:
http://www.sun.com/storagetek/management_software/data_protection/veritas_netbackup/
 - Symantec Veritas Volume Manager with DMP (VxVM)
 - Symantec Veritas File System (VxFS)
 - Symantec Veritas Storage Foundation:
http://www.sun.com/storagetek/management_software/data_management/veritas_storage_foundation/index.xml
- Management software support** Sun StorageTek Common Array Manager (included)
SANtricity Storage Manager v9.16 (optional)

Support

Operating system support

Solaris 8, 9, and 10 OS for x64 platforms:
<http://www.sun.com/software/solaris/index.jsp>
Microsoft Windows 2000 Server and Advanced Server (SP4)
Microsoft Windows 2003 Server Standard, Enterprise, and Web editions
HP-UX 11.11 and 11.23
IBM AIX 5.2, 5.3
Red Hat Linux AS/ES/WS Enterprise Edition 3.0/4.0
SUSE Linux LES 8 and 9
Novell Netware 6 SP5, Novell Netware 6.5 SP3
SGI IRIX 6.5.28
VMware ESX 3.0

	The Sun StorageTek 6540 array is fully supported with major host operating systems and multipath drivers.
Warranty	
Duration	3 years
Phone support	8 a.m. through 8 p.m., Monday through Friday
On-site service	Next business day, 8 a.m. through 5 p.m., Monday through Friday
On-site response time	Next business day, local business hours
Service upgrade	SunSpectrum SM Support upgrades are available
Dimensions	
Height x width x depth	Controller module: 17.5cm (6.9 in.) x 48.3cm (19.0 in.) x 65.1cm (25.6 in.) Expansion module: 12.95cm (5.1 in.) x 44.70cm (17.6 in.) x 57.15cm (22.5 in.) Cabinet: 188cm (74 in.) x 59.7cm (23.5 in.) x 100cm (39.4 in.) x 100cm (39.4 in.)
Weight (maximum)	Controller module: 36.5 kg (80.5 lbs.) Expansion module: 40 kg (88 lbs.) Cabinet: 364.5 kg (810 lbs.) cabinet only
Power Requirements	
AC power	Controller module: 2.65 A max. operating at 240 V AC (180-264 V AC range), 50/60 Hz 5.53 A max. operating at 115 V AC (90-136 V AC range), 50/60 Hz Expansion module: 1.97 A max. operating at 240 V AC (180-264 V AC range), 50/60 Hz 4.11 A max. operating at 115 V AC (90-136 V AC range), 50/60 Hz Cabinet: 32 A (2 x 16 A) maximum, N+1/dual grid redundant systems, single-phase 180-240 V AC, 47-63 Hz
Environment	
Operating temperature	10° C to 40° C (50° to 104° F)
Relative humidity	20% to 80% noncondensing
Altitude	100 ft. (30.5m) below sea level to 9,840 ft. (3,000m)
Shock	25 G, 3.75 ms triangular
Vibration	Random vibration to specified power spectral density
Heat output	Controller module: 235 watts (804 BTU/hr.) Expansion module: 444 watts (1,517 BTU/hr.)
Regulations	
Safety and emissions	IEC 60950, EN 60950, UL/CSA 60950, FCC Part 15 (47CFR15B), CISPR 22 (EN55022—RF Radiated and Conducted Emissions), IEC 61000-3-2, IEC 61000-3-3



Figure 1: Sun StorageTek 6540 Array

The Sun StorageTek 6540 array is listed on the Windows Server Catalog of tested products:
<http://www.windowsservercatalog.com/item.aspx?idItem=b51c1c3f-e72b-e910-f98a-fdfc7ed25497>

RAID Module LUNs

Sun StorageTek 6540 RAID module LUNs can be managed through Sun StorageTek Common Array Manager (CAM). RAID levels 0, 1, (1+0), 3, and 5 are supported.

Tested Configuration

The LUN layout of this solution is as follows. For the database LUNs, 30 disks from two trays were mirrored with RAID 10 with a single disk on each as a hot spare. For the log LUNs, three disks from two trays were mirrored with RAID 10.

The I/O activity to the log was 100% small, sequential writes. The I/O activity to the database was mostly random. By separating the two distinct I/O characteristics to different LUNs, performance increased.

The ESRP-Storage program focuses on storage solution testing to address performance and reliability issues with storage design. However, storage is not the only factor to take into consideration when

designing a scaled up Microsoft Exchange 2007 solution. Other factors that affect the server scalability are server processor utilization, server physical and virtual memory limitations, resource requirements for other applications, directory and network service latencies, network infrastructure limitations, replication and recovery requirements, and client usage profiles. All these factors are beyond the scope for ESRP-Storage. Therefore, the number of mailboxes hosted per server as part of the tested configuration might not necessarily be viable for some customer deployments.

For more information on identifying and addressing performance bottlenecks in a Microsoft Exchange 2007 system, refer to Microsoft's *Troubleshooting Microsoft Exchange Server Performance* at <http://go.microsoft.com/fwlink/?LinkId=23454>.

Targeted Customer Profile

This solution is targeted towards a 20,000-user Microsoft Exchange 2007 deployment for the following:

- Large organization
- Four Microsoft Exchange 2007 servers
- .42 IOPS + 20% headroom user I/O profile (0.5 tested)
- 300-Mbyte mailbox quota

Tested Deployment

The following tables summarize the testing environment.

Table 2: Simulated Microsoft Exchange Configuration

Number of Microsoft Exchange mailboxes simulated	20,000
Number of hosts	Four
Number of mailboxes/host	5,000
Number of storage groups/host	Seven
Number of mailbox stores/storage group	One
Number of mailboxes/mailbox store	714
Number of mailbox store LUNs/storage group	One
Simulated profile: IOPS per mailbox (include 20% headroom)	.5 (very heavy workload)
Database LUN size	2,048 GB
Log LUN size	408 GB
Total database size for performance testing	6,291 GB
% storage capacity used by Microsoft Exchange database**	72%

**Storage performance characteristics change based on the percentage utilization of the individual disks. Tests that use a small percentage of the storage (~25%) might exhibit reduced throughput if the storage capacity utilization is significantly increased beyond what is tested in this paper.

Table 3: Primary Storage Hardware

Storage connectivity (Fiber Channel, SAS, SATA, iSCSI)	Fiber Channel
Storage model and OS/firmware revision	Sun StorageTek 6540 array 06.19.25.16; see http://www.windowsservercatalog.com/item.aspx?idItem=b51c1c3f-e72b-e910-f98a-fdfc7ed25497
Storage cache	4 GB
Number of storage controllers	Two
Number of storage ports	Eight
Maximum bandwidth of storage connectivity to host	32 Gbps
Switch type and model/firmware revision	QLogic 5600 FC V5.0.0.31.0
Host Bus Adapter (HBA) model and firmware	Sun StorageTek PCI-X Enterprise 4-GB Single Channel FC HBA (part number SG-XPCI1FC-EM4-Z)
Number of HBAs/host	Two
Host server type	Sun Fire™ X4200 M2 server Two dual-core AMD Opteron™ 2220 processors 32,768 MB RAM
Total number of disks tested in solution	184
Maximum number of spindles that can be hosted in the storage	224

Table 4: Primary Storage Software

HBA driver	Storport 7-1.30A9
HBA QueueTarget Setting	0
HBA QueueDepth Setting	128
Multipathing	Sun StorageTek Multipath I/O Device Specific Module (MPIO DSM): SMIA-WSX64-01.01.32.04
Host OS	Microsoft Windows Server 2003, Enterprise Edition x64 SP2
ESE .dll file version	08.00.0685.024
Replication solution name/version	N/A

Table 5: Primary Storage Disk Configuration (Mailbox Store Disks)

Disk type, speed, and firmware revision	Fibre Channel, 15K, 0409
Raw capacity per disk	146 GB
Number of physical disks in test	120
Total raw storage capacity	17,520 GB
Disk slice size	N/A
Number of disks per LUN	30
RAID level	RAID 10
Total formatted capacity	8,192 GB
Storage capacity utilization	47%
Database capacity utilization	36%

Table 6: Primary Storage Disk Configuration (Transactional Log Disks)

Disk type, speed, and firmware revision	Fibre Channel, 15K, 0409
Raw capacity per disk	146 GB
Number of spindles in test	24
Total raw storage capacity	3,504 GB
Disk slice size	N/A
Number of disks per LUN	Six
RAID level	RAID 10
Total formatted capacity	1,752 GB

Best Practices

Microsoft Exchange 2007 server is a disk-intensive application. Based on the testing run using the ESRP framework, we would recommend the following to improve the storage performance.

For Microsoft Exchange 2007 best practices on storage design, visit

<http://technet.microsoft.com/en-us/library/bb124518.aspx>.

Core Storage

- Use the Microsoft DiskPart utility to align the sectors of all Microsoft Exchange 2007 storage volumes before formatting. The DiskPart value should be set to 64.
- Do not share Microsoft Exchange 2007 disks with any other applications that are I/O intensive. Sharing has a negative effect on your disk subsystem performance.

- When possible, separate the sequential writes of logs from the random access of database volumes.
- The primary focus should be on the speed of the disks and not on size.

Test Result Summary

This section provides a high-level summary of the test data from ESRP.

Reliability

A number of tests in the framework check reliability, and these tests run for 24 hours. The goal is to verify the storage can handle high I/O load for a long period of time. Both log and database files are analyzed for integrity after the stress test to ensure no database or log corruption.

The following list provides an overview:

- No errors were reported in the saved eventlog file.
- No errors were reported during the database and log checksum process.

Primary Storage Performance Results

The primary storage performance testing is designed to exercise the storage with maximum sustainable Microsoft Exchange type of I/O for 2 hours. The test shows how long it takes for the storage to respond to an I/O under load. The data in Table 7 is the sum of all the logical disk I/O operations and an average of all the logical disks I/O latency in the 2-hour test duration. Each server is listed separately and the aggregate numbers across all servers are listed as well.

Table 7 shows the individual server metrics: the sum of I/O operations across storage groups and the average latency across all storage groups on a per-server basis.

Table 7: Individual Server Metrics

Database I/O	
Average database disk transfers/sec	3202.92
Average database disk reads/sec	1773.321
Average database disk writes/sec	1429.599
Average database disk read latency	12 ms
Average database disk write latency	7 ms
Transaction Log I/O	
Average log disk writes/sec	830.962
Average log disk write latency	1 ms
Database I/O	

Average database disk transfers/sec	3429.772
Average database disk reads/sec	1892.125
Average database disk writes/sec	1537.647
Average database disk read latency	11 ms
Average database disk write latency	8 ms
Transaction Log I/O	
Average log disk writes/sec	882.556
Average log disk write latency	1 ms

Database I/O	
Average database disk transfers/sec	2961.134
Average database disk reads/sec	1633.004
Average database disk writes/sec	1328.130
Average database disk read latency	11 ms
Average database disk write latency	8 ms
Transaction Log I/O	
Average log disk writes/sec	768.327
Average log disk write latency	1 ms

Database I/O	
Average database disk transfers/sec	3228.218
Average database disk reads/sec	1779.871
Average database disk writes/sec	1448.346
Average database disk read latency	12 ms
Average database disk write latency	6 ms
Transaction Log I/O	
Average log disk writes/sec	839.876
Average log disk write latency	1 ms

Table 8 shows the sum of I/O operations across all servers in the solution and the average latency across all servers in the solution.

Table 8: Metrics for Aggregate Performance Across All Servers

Database I/O	
Average database disk transfers/sec	12822.044

Average database disk reads/sec	7078.321
Average database disk writes/sec	5743.722
Average database disk read latency	11.5 ms
Average database disk write latency	7.25 ms
Transaction Log I/O	
Average log disk writes/sec	3321.721
Average log disk write latency	1 ms

Streaming Backup and Recovery Performance

For the Version 1.0 release, only streaming backup type is supported for testing in the framework. There are two tests in this section. The first one measures the read I/O performance metrics by running a checksum on all the databases and log files. The second test measures the end-to-end performance when the databases are backed up to disks.

Database Read-only Performance

The test measures the maximum rate at which databases could be streaming backed up. Table 9 shows the average rate for a single database file.

Table 9: I/O Read Performance

MB read/sec per storage group	46.36
MB read/sec per system	324.538
MB read/sec total	1298.15

Log Read-only Performance

This test measures the maximum rate at which the log files can be played against the databases. Table 10 shows the average rate for 500 log files played in a single storage group. Each log file is 1 Mbyte.

Table 10: End-to-End Performance

Average time to play one log file (sec)	.362
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Conclusion

This document was developed by storage solution providers and reviewed by the Microsoft Exchange Product team. The test results and data presented in this document are based on the tests introduced in the ESRP test framework. Customers should not quote the data directly for their 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 given solution. Rather, the program is focused on producing recommendations from vendors for Microsoft Exchange applications. So the data presented in this document should not be used for direct comparisons among the solutions. (Results may vary.)

Appendix

Microsoft Exchange Server Jetstress: Performance Test Result Report

Table 11: Test Summary

Overall test result	Pass
Machine name	ISV-ESRP1
Test description	
Test start time	1/30/2008 7:19:24 PM
Test end time	1/30/2008 9:22:29 PM
Jetstress version	08.01.0112.000
Ese version	08.00.0685.024
Operating system	Microsoft Windows Server 2003 Service Pack 2 (5.2.3790.131072)
Performance log	C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_26.blg C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_29.blg

Table 12: Database Sizing and Throughput

Achieved I/O per second	3202.92
Planned I/O per second	2500
Initial database size	1736435023872
Final database size	1762312699904
Database files (count)	Seven

Table 13: Jetstress System Parameters

Thread count	12 (per-storage group)
Log buffers	9000
Minimum database cache	224.0 MB
Maximum database cache	1792.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

Table 14: Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (F:)	0.012	0.007	1773.321	1429.599	(n/a)
Log (G:)	0.000	0.001	0.000	830.962	11665.350

Table 15: Host System Performance

Counter	Average	Minimum	Maximum
% processor time	5.766	3.271	8.168
Available Mbytes	25579.852	25577.000	25680.000

Free system page table entries	16755696.500	16755693.000	16755833.000
Transition pages repurposed/sec	0.000	0.000	0.000
Pool nonpaged bytes	76333798.400	76320768.000	76472320.000
Pool paged bytes	34107042.133	34021376.000	34566144.000
Database page fault stalls/sec	0.000	0.000	0.000

```

Test Log1/30/2008 7:19:24 PM -- Jetstress testing begins ...
1/30/2008 7:19:24 PM -- Prepare testing begins ...
1/30/2008 7:19:25 PM -- Attaching databases ...
1/30/2008 7:19:25 PM -- Prepare testing ends.
1/30/2008 7:19:25 PM -- Dispatching transactions begins ...
1/30/2008 7:19:25 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
1/30/2008 7:19:25 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
1/30/2008 7:19:26 PM -- Database read latency thresholds: (average: 0.02 seconds/read,
maximum: 0.05 seconds/read).
1/30/2008 7:19:26 PM -- Log write latency thresholds: (average: 0.01 seconds/write,
maximum: 0.05 seconds/write).
1/30/2008 7:19:27 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces 50%,
Reads 15%, Lazy Commits 80%.
1/30/2008 7:19:27 PM -- Performance logging begins (interval: 15000 ms).
1/30/2008 7:19:27 PM -- Attaining prerequisites:
1/30/2008 7:22:18 PM -- \Database(JetstressWin)\Database Cache Size, Last: 1693663000.0
(lower bound: 1691143000.0, upper bound: none)
1/30/2008 9:22:19 PM -- Performance logging ends.
1/30/2008 9:22:19 PM -- JetInterop batch transaction stats: 90046, 89962, 89952, 90078,
90334, 89865, and 89559.
1/30/2008 9:22:20 PM -- Dispatching transactions ends.
1/30/2008 9:22:20 PM -- Shutting down databases ...
1/30/2008 9:22:29 PM -- Instance744.1 (complete), Instance744.2 (complete), Instance744.3
(complete), Instance744.4 (complete), Instance744.5 (complete), Instance744.6 (complete),
and Instance744.7 (complete)
1/30/2008 9:22:30 PM -- Performance logging begins (interval: 30000 ms).
1/30/2008 9:22:30 PM -- Verifying database checksums ...
1/30/2008 10:46:12 PM -- F: (100% processed)
1/30/2008 10:46:14 PM -- Performance logging ends.
1/30/2008 10:46:14 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_29.blg
has 167 samples.
1/30/2008 10:46:15 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_29.html
is saved.
1/30/2008 10:46:15 PM -- Verifying log checksums ...
1/30/2008 10:46:37 PM -- G:\sg1 (22 logs passed), G:\sg2 (23 logs passed), G:\sg3 (22 logs
passed), G:\sg4 (21 logs passed), G:\sg5 (22 logs passed), G:\sg6 (22 logs passed), and
G:\sg7 (22 logs passed)
1/30/2008 10:46:37 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_26.blg
has 491 samples.
1/30/2008 10:46:37 PM -- Creating test report ...
1/30/2008 10:46:40 PM -- Volume F: has 0.0119 for Avg. Disk sec/Read.
1/30/2008 10:46:40 PM -- Volume G: has 0.0007 for Avg. Disk sec/Write.
1/30/2008 10:46:40 PM -- Volume G: has 0.0000 for Avg. Disk sec/Read.
1/30/2008 10:46:40 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
1/30/2008 10:46:40 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
1/30/2008 10:46:40 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_26.xml
has 479 samples queried.

```

Microsoft Exchange Server Jetstress: Performance Test Result Report 2

Table 16: Test Summary

Overall test result	Pass
Machine name	ISV-ESRP2
Test description	
Test start time	1/30/2008 7:19:17 PM
Test end time	1/30/2008 9:22:10 PM
Jetstress version	08.01.0112.000
Ese version	08.00.0685.024
Operating system	Microsoft Windows Server 2003 Service Pack 2 (5.2.3790.131072)
Performance log	C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_18.blg C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_10.blg

Table 17: Database Sizing and Throughput

Achieved I/O per second	3429.772
Planned I/O per second	2500
Initial database size	1728115621888
Final database size	1756100935680
Database files (count)	Seven

Table 18: Jetstress System Parameters

Thread count	12 (per-storage group)
Log buffers	9000
Minimum database cache	224.0 MB
Maximum database cache	1792.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

Table 19: Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (F:)	0.011	0.008	1892.125	1537.647	(n/a)
Log (G:)	0.000	0.001	0.000	882.556	11815.677

Table 20: Host System Performance

Counter	Average	Minimum	Maximum
% processor time	6.255	4.628	7.962
Available Mbytes	25574.433	25571.000	25669.000
Free system page table entries	16755705.542	16755693.000	16755763.000
Transition pages repurposed/sec	0.000	0.000	0.000
Pool nonpaged bytes	76209766.400	76144640.000	76492800.000
Pool paged bytes	35055086.933	34979840.000	35557376.000
Database page fault stalls/sec	0.000	0.000	0.000

```

Test Log1/30/2008 7:19:17 PM -- Jetstress testing begins ...
1/30/2008 7:19:17 PM -- Prepare testing begins ...
1/30/2008 7:19:18 PM -- Attaching databases ...
1/30/2008 7:19:18 PM -- Prepare testing ends.
1/30/2008 7:19:18 PM -- Dispatching transactions begins ...
    
```

```

1/30/2008 7:19:18 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
1/30/2008 7:19:18 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
1/30/2008 7:19:18 PM -- Database read latency thresholds: (average: 0.02 seconds/read,
maximum: 0.05 seconds/read).
1/30/2008 7:19:18 PM -- Log write latency thresholds: (average: 0.01 seconds/write,
maximum: 0.05 seconds/write).
1/30/2008 7:19:19 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces 50%,
Reads 15%, Lazy Commits 80%.
1/30/2008 7:19:19 PM -- Performance logging begins (interval: 15000 ms).
1/30/2008 7:19:19 PM -- Attaining prerequisites:
1/30/2008 7:21:57 PM -- \Database(JetstressWin)\Database Cache Size, Last: 1696317000.0
(lower bound: 1691143000.0, upper bound: none)
1/30/2008 9:21:59 PM -- Performance logging ends.
1/30/2008 9:21:59 PM -- JetInterop batch transaction stats: 96141, 96351, 96431, 96518,
96331, 96218, and 96103.
1/30/2008 9:21:59 PM -- Dispatching transactions ends.
1/30/2008 9:21:59 PM -- Shutting down databases ...
1/30/2008 9:22:10 PM -- Instance1548.1 (complete), Instance1548.2 (complete),
Instance1548.3 (complete), Instance1548.4 (complete), Instance1548.5 (complete),
Instance1548.6 (complete), and Instance1548.7 (complete)
1/30/2008 9:22:10 PM -- Performance logging begins (interval: 30000 ms).
1/30/2008 9:22:10 PM -- Verifying database checksums ...
1/30/2008 10:49:43 PM -- F: (100% processed)
1/30/2008 10:49:44 PM -- Performance logging ends.
1/30/2008 10:49:44 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_10.blg
has 175 samples.
1/30/2008 10:49:45 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_10.html
is saved.
1/30/2008 10:49:46 PM -- Verifying log checksums ...
1/30/2008 10:50:07 PM -- G:\sg1 (22 logs passed), G:\sg2 (21 logs passed), G:\sg3 (23 logs
passed), G:\sg4 (23 logs passed), G:\sg5 (22 logs passed), G:\sg6 (22 logs passed), and
G:\sg7 (22 logs passed)
1/30/2008 10:50:07 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_18.blg
has 490 samples.
1/30/2008 10:50:07 PM -- Creating test report ...
1/30/2008 10:50:10 PM -- Volume F: has 0.0111 for Avg. Disk sec/Read.
1/30/2008 10:50:10 PM -- Volume G: has 0.0007 for Avg. Disk sec/Write.
1/30/2008 10:50:10 PM -- Volume G: has 0.0000 for Avg. Disk sec/Read.
1/30/2008 10:50:10 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
1/30/2008 10:50:10 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
1/30/2008 10:50:10 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_18.xml
has 479 samples queried.

```

Microsoft Exchange Server Jetstress: Performance Test Result Report 3

Table 21: Test Summary

Overall test result	Pass
Machine name	ISV-ESRP4
Test description	
Test start time	1/30/2008 7:19:15 PM
Test end time	1/30/2008 9:22:08 PM
Jetstress version	08.01.0112.000
Ese version	08.00.0685.024
Operating system	Microsoft Windows Server 2003 Service Pack 2 (5.2.3790.131072)
Performance log	C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_16.blg C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_8.blg

Table 22: Database Sizing and Throughput

Achieved I/O per second	2961.134
Planned I/O per second	2500
Initial database size	1728254033920
Final database size	1752332353536

Database files (count) Seven

Table 23: Jetstress System Parameters

Thread count	12 (per-storage group)
Log buffers	9000
Minimum database cache	224.0 MB
Maximum database cache	1792.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

Table 24: Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (F:)	0.011	0.008	1633.004	1328.130	(n/a)
Log (G:)	4.09185803757829E-06	0.001	0.001	768.327	11300.503

Table 25: Host System Performance

Counter	Average	Minimum	Maximum
% processor time	5.547	0.000	9.579
Available Mbytes	25578.898	25553.000	25711.000
Free system page table entries	16755835.042	16755833.000	16755903.000
Transition pages repurposed/sec	0.000	0.000	0.000
Pool nonpaged bytes	75819630.933	75427840.000	76304384.000
Pool paged bytes	33536853.333	33443840.000	34054144.000
Database page fault stalls/sec	0.000	0.000	0.000

```
Test Log1/30/2008 7:19:15 PM -- Jetstress testing begins ...
1/30/2008 7:19:15 PM -- Prepare testing begins ...
1/30/2008 7:19:16 PM -- Attaching databases ...
1/30/2008 7:19:16 PM -- Prepare testing ends.
1/30/2008 7:19:16 PM -- Dispatching transactions begins ...
1/30/2008 7:19:16 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
1/30/2008 7:19:16 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
1/30/2008 7:19:16 PM -- Database read latency thresholds: (average: 0.02 seconds/read,
maximum: 0.05 seconds/read).
1/30/2008 7:19:16 PM -- Log write latency thresholds: (average: 0.01 seconds/write,
maximum: 0.05 seconds/write).
1/30/2008 7:19:18 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces 50%,
Reads 15%, Lazy Commits 80%.
1/30/2008 7:19:18 PM -- Performance logging begins (interval: 15000 ms).
1/30/2008 7:19:18 PM -- Attaining prerequisites:
1/30/2008 7:21:58 PM -- \Database(JetstressWin)\Database Cache Size, Last: 1697513000.0
(lower bound: 1691143000.0, upper bound: none)
1/30/2008 9:21:59 PM -- Performance logging ends.
1/30/2008 9:21:59 PM -- JetInterop batch transaction stats: 83361, 83224, 83034, 82537,
82823, 83600, and 83655.
1/30/2008 9:22:00 PM -- Dispatching transactions ends.
1/30/2008 9:22:00 PM -- Shutting down databases ...
1/30/2008 9:22:08 PM -- Instance2052.1 (complete), Instance2052.2 (complete),
Instance2052.3 (complete), Instance2052.4 (complete), Instance2052.5 (complete),
Instance2052.6 (complete), and Instance2052.7 (complete)
1/30/2008 9:22:09 PM -- Performance logging begins (interval: 30000 ms).
1/30/2008 9:22:09 PM -- Verifying database checksums ...
1/30/2008 10:49:30 PM -- F: (100% processed)
1/30/2008 10:49:31 PM -- Performance logging ends.
1/30/2008 10:49:31 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_8.blg has
174 samples.
```

```

1/30/2008 10:49:32 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_8.html is
saved.
1/30/2008 10:49:32 PM -- Verifying log checksums ...
1/30/2008 10:49:50 PM -- G:\sg1 (22 logs passed), G:\sg2 (22 logs passed), G:\sg3 (22 logs
passed), G:\sg4 (23 logs passed), G:\sg5 (21 logs passed), G:\sg6 (22 logs passed), and
G:\sg7 (22 logs passed)
1/30/2008 10:49:50 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_16.blg
has 490 samples.
1/30/2008 10:49:50 PM -- Creating test report ...
1/30/2008 10:49:53 PM -- Volume F: has 0.0113 for Avg. Disk sec/Read.
1/30/2008 10:49:53 PM -- Volume G: has 0.0007 for Avg. Disk sec/Write.
1/30/2008 10:49:53 PM -- Volume G: has 0.0000 for Avg. Disk sec/Read.
1/30/2008 10:49:53 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
1/30/2008 10:49:53 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
1/30/2008 10:49:53 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_16.xml
has 479 samples queried.

```

Microsoft Exchange Server Jetstress: Performance Test Result Report 4

Table 26: Test Summary

```

Overall test result Pass
Machine name ISV-ESRP5
Test description
Test start time 1/30/2008 7:19:13 PM
Test end time 1/30/2008 9:22:26 PM
Jetstress version 08.01.0112.000
Ese version 08.00.0685.024
Operating system Microsoft Windows Server 2003 Service Pack 2 (5.2.3790.131072)
Performance log C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_15.blg
C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_26.blg

```

Table 27: Database Sizing and Throughput

```

Achieved I/O per second 3228.218
Planned I/O per second 2500
Initial database size 1706191994880
Final database size 1732674830336
Database files (count) Seven

```

Table 28: Jetstress System Parameters

```

Thread count 12 (per-storage group)
Log buffers 9000
Minimum database cache 224.0 MB
Maximum database cache 1792.0 MB
Insert operations 25%
Delete operations 10%
Replace operations 50%
Read operations 15%
Lazy commits 80%

```

Table 29: Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (F:)	0.012	0.006	1779.871	1448.346	(n/a)
Log (G:)	0.000	0.001	0.000	839.876	11750.661

Table 30: Host System Performance

Counter	Average	Minimum	Maximum
% processor time	7.017	5.126	8.773
Available Mbytes	25566.081	25563.000	25666.000
Free system page table entries	16755803.000	16755803.000	16755803.000
Transition pages repurposed/sec	0.000	0.000	0.000
Pool nonpaged bytes	75174579.200	75157504.000	75390976.000
Pool paged bytes	35443131.733	35352576.000	35909632.000
Database page fault stalls/sec	0.000	0.000	0.000

```

Test Log1/30/2008 7:19:13 PM -- Jetstress testing begins ...
1/30/2008 7:19:13 PM -- Prepare testing begins ...
1/30/2008 7:19:14 PM -- Attaching databases ...
1/30/2008 7:19:14 PM -- Prepare testing ends.
1/30/2008 7:19:14 PM -- Dispatching transactions begins ...
1/30/2008 7:19:14 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
1/30/2008 7:19:14 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
1/30/2008 7:19:15 PM -- Database read latency thresholds: (average: 0.02 seconds/read,
maximum: 0.05 seconds/read).
1/30/2008 7:19:15 PM -- Log write latency thresholds: (average: 0.01 seconds/write,
maximum: 0.05 seconds/write).
1/30/2008 7:19:16 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces 50%,
Reads 15%, Lazy Commits 80%.
1/30/2008 7:19:16 PM -- Performance logging begins (interval: 15000 ms).
1/30/2008 7:19:16 PM -- Attaining prerequisites:
1/30/2008 7:22:08 PM -- \Database(JetstressWin)\Database Cache Size, Last: 1694990000.0
(lower bound: 1691143000.0, upper bound: none)
1/30/2008 9:22:09 PM -- Performance logging ends.
1/30/2008 9:22:09 PM -- JetInterop batch transaction stats: 91169, 90356, 90277, 90634,
90597, 90853, and 91203.
1/30/2008 9:22:18 PM -- Dispatching transactions ends.
1/30/2008 9:22:18 PM -- Shutting down databases ...
1/30/2008 9:22:26 PM -- Instance996.1 (complete), Instance996.2 (complete), Instance996.3
(complete), Instance996.4 (complete), Instance996.5 (complete), Instance996.6 (complete),
and Instance996.7 (complete)
1/30/2008 9:22:27 PM -- Performance logging begins (interval: 30000 ms).
1/30/2008 9:22:27 PM -- Verifying database checksums ...
1/30/2008 10:58:16 PM -- F: (100% processed)
1/30/2008 10:58:17 PM -- Performance logging ends.
1/30/2008 10:58:17 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_26.blg
has 191 samples.
1/30/2008 10:58:20 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_26.html
is saved.
1/30/2008 10:58:20 PM -- Verifying log checksums ...
1/30/2008 10:58:31 PM -- G:\sg1 (21 logs passed), G:\sg2 (21 logs passed), G:\sg3 (23 logs
passed), G:\sg4 (22 logs passed), G:\sg5 (21 logs passed), G:\sg6 (21 logs passed), and
G:\sg7 (21 logs passed)
1/30/2008 10:58:31 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_15.blg
has 491 samples.
1/30/2008 10:58:31 PM -- Creating test report ...
1/30/2008 10:58:35 PM -- Volume F: has 0.0118 for Avg. Disk sec/Read.
1/30/2008 10:58:35 PM -- Volume G: has 0.0007 for Avg. Disk sec/Write.
1/30/2008 10:58:35 PM -- Volume G: has 0.0000 for Avg. Disk sec/Read.
1/30/2008 10:58:35 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
1/30/2008 10:58:35 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
1/30/2008 10:58:35 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_15.xml
has 479 samples queried.

```

Microsoft Exchange Server Jetstress: Streaming Backup Test Result Report

Table 31: Streaming Backup Statistics – All

Database Instance	Database Size (Mbytes)	Elapsed Backup Time	Mbytes Transferred/sec
Instance744.1	240649.77	01:30:46	44.19
Instance744.2	240301.77	01:28:51	45.07
Instance744.3	240277.77	01:28:52	45.06
Instance744.4	240421.77	01:28:51	45.09
Instance744.5	240653.77	01:29:36	44.76
Instance744.6	240661.77	01:29:36	44.76
Instance744.7	240423.77	01:21:10	49.36

Table 32: Jetstress System Parameters

Thread count	12 (per-storage group)
Log buffers	9000
Minimum database cache	224.0 MB
Maximum database cache	1792.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

Table 33: Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (F:)	0.003	6.50912510900256E-05	2492.524	0.039	(n/a)
Log (G:)	0.000	9.16351076060992E-05	0.000	0.047	751.856

Table 34: Host System Performance

Counter	Average	Minimum	Maximum
% processor time	7.335	0.877	8.403
Available Mbytes	27433.608	27426.000	27435.000
Free system page table entries	16755273.000	16755273.000	16755273.000
Transition pages repurposed/sec	0.000	0.000	0.000
Pool nonpaged bytes	76734237.702	76722176.000	76767232.000
Pool paged bytes	34668747.669	34553856.000	35643392.000
Database page fault stalls/sec	0.000	0.000	0.000

```

Test Log1/30/2008 7:19:24 PM -- Jetstress testing begins ...
1/30/2008 7:19:24 PM -- Prepare testing begins ...
1/30/2008 7:19:25 PM -- Attaching databases ...
1/30/2008 7:19:25 PM -- Prepare testing ends.
1/30/2008 7:19:25 PM -- Dispatching transactions begins ...
1/30/2008 7:19:25 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
1/30/2008 7:19:25 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
1/30/2008 7:19:26 PM -- Database read latency thresholds: (average: 0.02 seconds/read,
maximum: 0.05 seconds/read).
1/30/2008 7:19:26 PM -- Log write latency thresholds: (average: 0.01 seconds/write,
maximum: 0.05 seconds/write).
1/30/2008 7:19:27 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces 50%,
Reads 15%, Lazy Commits 80%.
1/30/2008 7:19:27 PM -- Performance logging begins (interval: 15000 ms).

```

1/30/2008 7:19:27 PM -- Attaining prerequisites:
1/30/2008 7:22:18 PM -- \Database(JetstressWin)\Database Cache Size, Last: 1693663000.0
(lower bound: 1691143000.0, upper bound: none)
1/30/2008 9:22:19 PM -- Performance logging ends.
1/30/2008 9:22:19 PM -- JetInterop batch transaction stats: 90046, 89962, 89952, 90078,
90334, 89865, and 89559.
1/30/2008 9:22:20 PM -- Dispatching transactions ends.
1/30/2008 9:22:20 PM -- Shutting down databases ...
1/30/2008 9:22:29 PM -- Instance744.1 (complete), Instance744.2 (complete), Instance744.3
(complete), Instance744.4 (complete), Instance744.5 (complete), Instance744.6 (complete),
and Instance744.7 (complete)
1/30/2008 9:22:30 PM -- Performance logging begins (interval: 30000 ms).
1/30/2008 9:22:30 PM -- Verifying database checksums ...
1/30/2008 10:46:12 PM -- F: (100% processed)
1/30/2008 10:46:14 PM -- Performance logging ends.
1/30/2008 10:46:14 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_29.blg
has 167 samples.
1/30/2008 10:46:15 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_29.html
is saved.
1/30/2008 10:46:15 PM -- Verifying log checksums ...
1/30/2008 10:46:37 PM -- G:\sg1 (22 logs passed), G:\sg2 (23 logs passed), G:\sg3 (22 logs
passed), G:\sg4 (21 logs passed), G:\sg5 (22 logs passed), G:\sg6 (22 logs passed), and
G:\sg7 (22 logs passed)
1/30/2008 10:46:37 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_26.blg
has 491 samples.
1/30/2008 10:46:37 PM -- Creating test report ...
1/30/2008 10:46:40 PM -- Volume F: has 0.0119 for Avg. Disk sec/Read.
1/30/2008 10:46:40 PM -- Volume G: has 0.0007 for Avg. Disk sec/Write.
1/30/2008 10:46:40 PM -- Volume G: has 0.0000 for Avg. Disk sec/Read.
1/30/2008 10:46:40 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
1/30/2008 10:46:40 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
1/30/2008 10:46:40 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_26.xml
has 479 samples queried.
1/30/2008 10:46:40 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_26.html
is saved.
1/30/2008 10:46:40 PM -- Jetstress testing ends.
1/30/2008 11:08:17 PM -- Jetstress testing begins ...
1/30/2008 11:08:17 PM -- Prepare testing begins ...
1/30/2008 11:08:17 PM -- Attaching databases ...
1/30/2008 11:08:17 PM -- Prepare testing ends.
1/30/2008 11:08:17 PM -- Dispatching transactions begins ...
1/30/2008 11:08:17 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
1/30/2008 11:08:17 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
1/30/2008 11:08:17 PM -- Database read latency thresholds: (average: 0.02 seconds/read,
maximum: 0.05 seconds/read).
1/30/2008 11:08:18 PM -- Log write latency thresholds: (average: 0.01 seconds/write,
maximum: 0.05 seconds/write).
1/30/2008 11:08:18 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces
50%, Reads 15%, Lazy Commits 80%.
1/30/2008 11:08:18 PM -- Performance logging begins (interval: 15000 ms).
1/30/2008 11:08:18 PM -- Generating log files ...
1/30/2008 11:22:26 PM -- G:\sg1 (102.4% generated), G:\sg2 (101.0% generated), G:\sg3
(102.8% generated), G:\sg4 (103.2% generated), G:\sg5 (100.2% generated), G:\sg6 (102.0%
generated), and G:\sg7 (104.0% generated)
1/30/2008 11:22:27 PM -- Performance logging ends.
1/30/2008 11:22:27 PM -- JetInterop batch transaction stats: 10000, 9980, 9939, 9921, 9781,
9876, and 10221.
1/30/2008 11:22:27 PM -- Dispatching transactions ends.
1/30/2008 11:22:27 PM -- Shutting down databases ...
1/30/2008 11:22:37 PM -- Instance744.1 (complete), Instance744.2 (complete), Instance744.3
(complete), Instance744.4 (complete), Instance744.5 (complete), Instance744.6 (complete),
and Instance744.7 (complete)
1/30/2008 11:22:37 PM -- Performance logging begins (interval: 30000 ms).
1/30/2008 11:22:37 PM -- Verifying database checksums ...
1/31/2008 12:46:30 AM -- F: (100% processed)
1/31/2008 12:46:31 AM -- Performance logging ends.
1/31/2008 12:46:31 AM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_23_22_37.blg
has 167 samples.

```

1/31/2008 12:46:31 AM -- C:\Program Files\Exchange2007\DBCchecksum_2008_1_30_23_22_37.html
is saved.
1/31/2008 12:46:31 AM -- Verifying log checksums ...
1/31/2008 12:47:55 AM -- G:\sg1 (100 logs passed), G:\sg2 (100 logs passed), G:\sg3 (100
logs passed), G:\sg4 (100 logs passed), G:\sg5 (100 logs passed), G:\sg6 (100 logs passed),
and G:\sg7 (100 logs passed)
1/31/2008 12:47:55 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_8_18.blg
has 56 samples.
1/31/2008 12:47:55 AM -- Creating test report ...
1/31/2008 12:47:55 AM -- Volume F: has 0.0125 for Avg. Disk sec/Read.
1/31/2008 12:47:55 AM -- Volume G: has 0.0008 for Avg. Disk sec/Write.
1/31/2008 12:47:55 AM -- Volume G: has 0.0002 for Avg. Disk sec/Read.
1/31/2008 12:47:55 AM -- Test has 2.19621539241372 Maximum Database Page Fault Stalls/sec.
1/31/2008 12:47:55 AM -- Test has 5 Database Page Fault Stalls/sec samples higher than 0.
1/31/2008 12:47:55 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_8_18.xml
has 55 samples queried.
1/31/2008 12:47:55 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_8_18.html
is saved.
1/31/2008 12:47:57 AM -- Performance logging begins (interval: 4000 ms).
1/31/2008 12:47:57 AM -- Recovering databases ...
1/31/2008 12:52:36 AM -- Performance logging ends.
1/31/2008 12:52:36 AM -- Instance744.1 (265.2418572), Instance744.2 (241.2440076),
Instance744.3 (262.9920588), Instance744.4 (277.4907596), Instance744.5 (246.2435596),
Instance744.6 (271.4912972), and Instance744.7 (256.4926412)
1/31/2008 12:52:36 AM -- C:\Program Files\Exchange2007\SoftRecovery_2008_1_31_0_47_55.blg
has 69 samples.
1/31/2008 12:52:36 AM -- Creating test report ...
1/31/2008 12:52:37 AM -- C:\Program Files\Exchange2007\SoftRecovery_2008_1_31_0_47_55.html
is saved.
1/31/2008 12:52:37 AM -- Jetstress testing ends.
1/31/2008 6:24:20 AM -- Jetstress testing begins ...
1/31/2008 6:24:20 AM -- Prepare testing begins ...
1/31/2008 6:24:21 AM -- Attaching databases ...
1/31/2008 6:24:21 AM -- Prepare testing ends.
1/31/2008 6:24:23 AM -- Performance logging begins (interval: 30000 ms).
1/31/2008 6:24:23 AM -- Streaming backup databases ...
1/31/2008 7:55:10 AM -- Performance logging ends.
1/31/2008 7:55:10 AM -- Instance744.1 (100% processed), Instance744.2 (100% processed),
Instance744.3 (100% processed), Instance744.4 (100% processed), Instance744.5 (100%
processed), Instance744.6 (100% processed), and Instance744.7 (100% processed)
1/31/2008 7:55:10 AM -- C:\Program Files\Exchange2007\StreamingBackup_2008_1_31_6_24_21.blg
has 181 samples.
1/31/2008 7:55:10 AM -- Creating test report ...

```

Microsoft Exchange Server Jetstress: Streaming Backup Test Result Report 2

Table 35: Streaming Backup Statistics – All

Database Instance	Database Size (Mbytes)	Elapsed Backup Time	Mbytes Transferred/sec
Instance2672.1	239461.77	01:27:07	45.81
Instance2672.2	239565.77	01:29:13	44.75
Instance2672.3	239691.77	01:27:23	45.71
Instance2672.4	239551.77	01:27:59	45.37
Instance2672.5	239727.77	01:27:12	45.82
Instance2672.6	239745.77	01:27:46	45.53
Instance2672.7	239753.77	01:19:01	50.57

Table 36: Jetstress System Parameters

Thread count	12 (per-storage group)
Log buffers	9000
Minimum database cache	224.0 MB

Maximum database cache 1792.0 MB
Insert operations 25%
Delete operations 10%
Replace operations 50%
Read operations 15%
Lazy commits 80%

Table 37: Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (F:)	0.003	6.4740577359466E-05	2524.538	0.038	(n/a)
Log (G:)	0.000	2.22484530535378E-05	0.000	0.048	506.816

Table 38: Host System Performance

Counter	Average	Minimum	Maximum
% processor time	9.098	1.072	10.709
Available Mbytes	27441.567	27435.000	27443.000
Free system page table entries	16755203.000	16755203.000	16755203.000
Transition pages repurposed/sec	0.000	0.000	0.000
Pool nonpaged bytes	76487507.416	76480512.000	76521472.000
Pool paged bytes	36250704.539	36143104.000	37224448.000
Database page fault stalls/sec	0.000	0.000	0.000

```

Test Log1/31/2008 6:24:16 AM -- Jetstress testing begins ...
1/31/2008 6:24:16 AM -- Prepare testing begins ...
1/31/2008 6:24:16 AM -- Attaching databases ...
1/31/2008 6:24:16 AM -- Prepare testing ends.
1/31/2008 6:24:19 AM -- Performance logging begins (interval: 30000 ms).
1/31/2008 6:24:19 AM -- Streaming backup databases ...
1/31/2008 7:53:34 AM -- Performance logging ends.
1/31/2008 7:53:34 AM -- Instance2672.1 (100% processed), Instance2672.2 (100% processed),
Instance2672.3 (100% processed), Instance2672.4 (100% processed), Instance2672.5 (100%
processed), Instance2672.6 (100% processed), and Instance2672.7 (100% processed)
1/31/2008 7:53:34 AM -- C:\Program Files\Exchange2007\StreamingBackup_2008_1_31_6_24_16.blg
has 178 samples.
1/31/2008 7:53:34 AM -- Creating test report ...
  
```

Microsoft Exchange Server Jetstress: Streaming Backup Test Result Report 3

Table 39: Streaming Backup Statistics – All

Database Instance	Database Size (Mbytes)	Elapsed Backup Time	Mbytes Transferred/sec
Instance2052.1	239089.77	01:24:26	47.19
Instance2052.2	239201.77	01:24:25	47.22
Instance2052.3	239069.77	01:24:26	47.19
Instance2052.4	239059.77	01:25:26	46.64
Instance2052.5	239165.77	01:25:26	46.65
Instance2052.6	239251.77	01:24:26	47.23
Instance2052.7	239055.77	01:18:54	50.49

Table 40: Jetstress System Parameters

Thread count 12 (per-storage group)
Log buffers 9000
Minimum database cache 224.0 MB
Maximum database cache 1792.0 MB

Insert operations 25%
Delete operations 10%
Replace operations 50%
Read operations 15%
Lazy commits 80%

Table 41: Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (F:)	0.002	5.97236306151313E-05	2635.811	0.033	(n/a)
Log (G:)	0.000	7.75883091267707E-05	0.000	0.042	602.768

Table 42: Host System Performance

Counter	Average	Minimum	Maximum
% processor time	8.493	3.027	10.137
Available Mbytes	27437.665	27429.000	27439.000
Free system page table entries	16755413.000	16755413.000	16755413.000
Transition pages repurposed/sec	0.000	0.000	0.000
Pool nonpaged bytes	75955549.365	75931648.000	76001280.000
Pool paged bytes	33922903.341	33828864.000	34877440.000
Database page fault stalls/sec	0.000	0.000	0.000

```

Test Log1/30/2008 7:19:15 PM -- Jetstress testing begins ...
1/30/2008 7:19:15 PM -- Prepare testing begins ...
1/30/2008 7:19:16 PM -- Attaching databases ...
1/30/2008 7:19:16 PM -- Prepare testing ends.
1/30/2008 7:19:16 PM -- Dispatching transactions begins ...
1/30/2008 7:19:16 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
1/30/2008 7:19:16 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
1/30/2008 7:19:16 PM -- Database read latency thresholds: (average: 0.02 seconds/read,
maximum: 0.05 seconds/read).
1/30/2008 7:19:16 PM -- Log write latency thresholds: (average: 0.01 seconds/write,
maximum: 0.05 seconds/write).
1/30/2008 7:19:18 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces 50%,
Reads 15%, Lazy Commits 80%.
1/30/2008 7:19:18 PM -- Performance logging begins (interval: 15000 ms).
1/30/2008 7:19:18 PM -- Attaining prerequisites:
1/30/2008 7:21:58 PM -- \Database(JetstressWin)\Database Cache Size, Last: 1697513000.0
(lower bound: 1691143000.0, upper bound: none)
1/30/2008 9:21:59 PM -- Performance logging ends.
1/30/2008 9:21:59 PM -- JetInterop batch transaction stats: 83361, 83224, 83034, 82537,
82823, 83600, and 83655.
1/30/2008 9:22:00 PM -- Dispatching transactions ends.
1/30/2008 9:22:00 PM -- Shutting down databases ...
1/30/2008 9:22:08 PM -- Instance2052.1 (complete), Instance2052.2 (complete),
Instance2052.3 (complete), Instance2052.4 (complete), Instance2052.5 (complete),
Instance2052.6 (complete), and Instance2052.7 (complete)
1/30/2008 9:22:09 PM -- Performance logging begins (interval: 30000 ms).
1/30/2008 9:22:09 PM -- Verifying database checksums ...
1/30/2008 10:49:30 PM -- F: (100% processed)
1/30/2008 10:49:31 PM -- Performance logging ends.
1/30/2008 10:49:31 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_8.blg has
174 samples.
1/30/2008 10:49:32 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_8.html is
saved.
1/30/2008 10:49:32 PM -- Verifying log checksums ...
1/30/2008 10:49:50 PM -- G:\sg1 (22 logs passed), G:\sg2 (22 logs passed), G:\sg3 (22 logs
passed), G:\sg4 (23 logs passed), G:\sg5 (21 logs passed), G:\sg6 (22 logs passed), and
G:\sg7 (22 logs passed)
1/30/2008 10:49:50 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_16.blg
has 490 samples.
1/30/2008 10:49:50 PM -- Creating test report ...
  
```

1/30/2008 10:49:53 PM -- Volume F: has 0.0113 for Avg. Disk sec/Read.
1/30/2008 10:49:53 PM -- Volume G: has 0.0007 for Avg. Disk sec/Write.
1/30/2008 10:49:53 PM -- Volume G: has 0.0000 for Avg. Disk sec/Read.
1/30/2008 10:49:53 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
1/30/2008 10:49:53 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
1/30/2008 10:49:53 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_16.xml
has 479 samples queried.
1/30/2008 10:49:53 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_16.html
is saved.
1/30/2008 10:49:53 PM -- Jetstress testing ends.
1/30/2008 11:09:40 PM -- Jetstress testing begins ...
1/30/2008 11:09:40 PM -- Prepare testing begins ...
1/30/2008 11:09:40 PM -- Attaching databases ...
1/30/2008 11:09:40 PM -- Prepare testing ends.
1/30/2008 11:09:40 PM -- Dispatching transactions begins ...
1/30/2008 11:09:40 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
1/30/2008 11:09:40 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
1/30/2008 11:09:41 PM -- Database read latency thresholds: (average: 0.02 seconds/read,
maximum: 0.05 seconds/read).
1/30/2008 11:09:41 PM -- Log write latency thresholds: (average: 0.01 seconds/write,
maximum: 0.05 seconds/write).
1/30/2008 11:09:41 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces
50%, Reads 15%, Lazy Commits 80%.
1/30/2008 11:09:41 PM -- Performance logging begins (interval: 15000 ms).
1/30/2008 11:09:41 PM -- Generating log files ...
1/30/2008 11:23:35 PM -- G:\sg1 (103.4% generated), G:\sg2 (104.2% generated), G:\sg3
(100.2% generated), G:\sg4 (103.6% generated), G:\sg5 (104.6% generated), G:\sg6 (100.6%
generated), and G:\sg7 (102.6% generated)
1/30/2008 11:23:36 PM -- Performance logging ends.
1/30/2008 11:23:36 PM -- JetInterop batch transaction stats: 10074, 10092, 9892, 10104,
10222, 9876, and 9900.
1/30/2008 11:23:36 PM -- Dispatching transactions ends.
1/30/2008 11:23:36 PM -- Shutting down databases ...
1/30/2008 11:23:47 PM -- Instance2052.1 (complete), Instance2052.2 (complete),
Instance2052.3 (complete), Instance2052.4 (complete), Instance2052.5 (complete),
Instance2052.6 (complete), and Instance2052.7 (complete)
1/30/2008 11:23:48 PM -- Performance logging begins (interval: 30000 ms).
1/30/2008 11:23:48 PM -- Verifying database checksums ...
1/31/2008 12:51:14 AM -- F: (100% processed)
1/31/2008 12:51:15 AM -- Performance logging ends.
1/31/2008 12:51:15 AM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_23_23_47.blg
has 174 samples.
1/31/2008 12:51:16 AM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_23_23_47.html
is saved.
1/31/2008 12:51:16 AM -- Verifying log checksums ...
1/31/2008 12:52:07 AM -- G:\sg1 (100 logs passed), G:\sg2 (100 logs passed), G:\sg3 (100
logs passed), G:\sg4 (100 logs passed), G:\sg5 (100 logs passed), G:\sg6 (100 logs passed),
and G:\sg7 (100 logs passed)
1/31/2008 12:52:07 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_9_41.blg
has 55 samples.
1/31/2008 12:52:07 AM -- Creating test report ...
1/31/2008 12:52:08 AM -- Volume F: has 0.0117 for Avg. Disk sec/Read.
1/31/2008 12:52:08 AM -- Volume G: has 0.0014 for Avg. Disk sec/Write.
1/31/2008 12:52:08 AM -- Volume G: has 0.0005 for Avg. Disk sec/Read.
1/31/2008 12:52:08 AM -- Test has 2.19612190912938 Maximum Database Page Fault Stalls/sec.
1/31/2008 12:52:08 AM -- Test has 5 Database Page Fault Stalls/sec samples higher than 0.
1/31/2008 12:52:08 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_9_41.xml
has 54 samples queried.
1/31/2008 12:52:08 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_9_41.html
is saved.
1/31/2008 12:52:10 AM -- Performance logging begins (interval: 4000 ms).
1/31/2008 12:52:10 AM -- Recovering databases ...
1/31/2008 12:54:26 AM -- Performance logging ends.
1/31/2008 12:54:26 AM -- Instance2052.1 (135.0061199), Instance2052.2 (129.0065423),
Instance2052.3 (126.7567007), Instance2052.4 (127.7566303), Instance2052.5 (128.0066127),
Instance2052.6 (127.5066479), and Instance2052.7 (135.0061199)
1/31/2008 12:54:26 AM -- C:\Program Files\Exchange2007\SoftRecovery_2008_1_31_0_52_8.blg
has 33 samples.

```

1/31/2008 12:54:26 AM -- Creating test report ...
1/31/2008 12:54:27 AM -- C:\Program Files\Exchange2007\SoftRecovery_2008_1_31_0_52_8.html
is saved.
1/31/2008 12:54:27 AM -- Jetstress testing ends.
1/31/2008 6:24:31 AM -- Jetstress testing begins ...
1/31/2008 6:24:31 AM -- Prepare testing begins ...
1/31/2008 6:24:33 AM -- Attaching databases ...
1/31/2008 6:24:33 AM -- Prepare testing ends.
1/31/2008 6:24:35 AM -- Performance logging begins (interval: 30000 ms).
1/31/2008 6:24:35 AM -- Streaming backup databases ...
1/31/2008 7:50:03 AM -- Performance logging ends.
1/31/2008 7:50:03 AM -- Instance2052.1 (100% processed), Instance2052.2 (100% processed),
Instance2052.3 (100% processed), Instance2052.4 (100% processed), Instance2052.5 (100%
processed), Instance2052.6 (100% processed), and Instance2052.7 (100% processed)
1/31/2008 7:50:03 AM -- C:\Program Files\Exchange2007\StreamingBackup_2008_1_31_6_24_33.blg
has 170 samples.
1/31/2008 7:50:03 AM -- Creating test report ...

```

Microsoft Exchange Server Jetstress: Streaming Backup Test Result Report 4

Table 43: Streaming Backup Statistics – All

Database Instance	Database Size (Mbytes)	Elapsed Backup Time	Mbytes Transferred/sec
Instance996.1	236687.65	01:26:22	45.67
Instance996.2	236359.65	01:26:22	45.61
Instance996.3	236247.65	01:26:22	45.59
Instance996.4	236455.65	01:26:22	45.63
Instance996.5	236333.65	01:26:22	45.61
Instance996.6	236611.65	01:26:22	45.66
Instance996.7	236421.65	01:18:55	49.92

Table 44: Jetstress System Parameters

Thread count	12 (per-storage group)
Log buffers	9000
Minimum database cache	224.0 MB
Maximum database cache	1792.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

Table 45: Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (F:)	0.003	5.13690208427051E-05	2569.740	0.011	(n/a)
Log (G:)	0.000	4.85948667966212E-05	0.000	0.011	357.302

Table 46: Host System Performance

Counter	Average	Minimum	Maximum
% processor time	10.192	6.572	12.327
Available Mbytes	27420.058	27412.000	27422.000
Free system page table entries	16755243.000	16755243.000	16755243.000
Transition pages repurposed/sec	0.000	0.000	0.000

Pool nonpaged bytes	77533612.651	77467648.000	77606912.000
Pool paged bytes	35807351.070	35713024.000	36802560.000
Database page fault stalls/sec	0.000	0.000	0.000

```

Test Log1/30/2008 7:19:13 PM -- Jetstress testing begins ...
1/30/2008 7:19:13 PM -- Prepare testing begins ...
1/30/2008 7:19:14 PM -- Attaching databases ...
1/30/2008 7:19:14 PM -- Prepare testing ends.
1/30/2008 7:19:14 PM -- Dispatching transactions begins ...
1/30/2008 7:19:14 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
1/30/2008 7:19:14 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
1/30/2008 7:19:15 PM -- Database read latency thresholds: (average: 0.02 seconds/read,
maximum: 0.05 seconds/read).
1/30/2008 7:19:15 PM -- Log write latency thresholds: (average: 0.01 seconds/write,
maximum: 0.05 seconds/write).
1/30/2008 7:19:16 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces 50%,
Reads 15%, Lazy Commits 80%.
1/30/2008 7:19:16 PM -- Performance logging begins (interval: 15000 ms).
1/30/2008 7:19:16 PM -- Attaining prerequisites:
1/30/2008 7:22:08 PM -- \Database(JetstressWin)\Database Cache Size, Last: 1694990000.0
(lower bound: 1691143000.0, upper bound: none)
1/30/2008 9:22:09 PM -- Performance logging ends.
1/30/2008 9:22:09 PM -- JetInterop batch transaction stats: 91169, 90356, 90277, 90634,
90597, 90853, and 91203.
1/30/2008 9:22:18 PM -- Dispatching transactions ends.
1/30/2008 9:22:18 PM -- Shutting down databases ...
1/30/2008 9:22:26 PM -- Instance996.1 (complete), Instance996.2 (complete), Instance996.3
(complete), Instance996.4 (complete), Instance996.5 (complete), Instance996.6 (complete),
and Instance996.7 (complete)
1/30/2008 9:22:27 PM -- Performance logging begins (interval: 30000 ms).
1/30/2008 9:22:27 PM -- Verifying database checksums ...
1/30/2008 10:58:16 PM -- F: (100% processed)
1/30/2008 10:58:17 PM -- Performance logging ends.
1/30/2008 10:58:17 PM -- C:\Program Files\Exchange2007\DBCchecksum_2008_1_30_21_22_26.blg
has 191 samples.
1/30/2008 10:58:20 PM -- C:\Program Files\Exchange2007\DBCchecksum_2008_1_30_21_22_26.html
is saved.
1/30/2008 10:58:20 PM -- Verifying log checksums ...
1/30/2008 10:58:31 PM -- G:\sg1 (21 logs passed), G:\sg2 (21 logs passed), G:\sg3 (23 logs
passed), G:\sg4 (22 logs passed), G:\sg5 (21 logs passed), G:\sg6 (21 logs passed), and
G:\sg7 (21 logs passed)
1/30/2008 10:58:31 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_15.blg
has 491 samples.
1/30/2008 10:58:31 PM -- Creating test report ...
1/30/2008 10:58:35 PM -- Volume F: has 0.0118 for Avg. Disk sec/Read.
1/30/2008 10:58:35 PM -- Volume G: has 0.0007 for Avg. Disk sec/Write.
1/30/2008 10:58:35 PM -- Volume G: has 0.0000 for Avg. Disk sec/Read.
1/30/2008 10:58:35 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
1/30/2008 10:58:35 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
1/30/2008 10:58:35 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_15.xml
has 479 samples queried.
1/30/2008 10:58:35 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_15.html
is saved.
1/30/2008 10:58:35 PM -- Jetstress testing ends.
1/30/2008 11:08:43 PM -- Jetstress testing begins ...
1/30/2008 11:08:43 PM -- Prepare testing begins ...
1/30/2008 11:08:44 PM -- Attaching databases ...
1/30/2008 11:08:44 PM -- Prepare testing ends.
1/30/2008 11:08:44 PM -- Dispatching transactions begins ...
1/30/2008 11:08:44 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
1/30/2008 11:08:44 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
1/30/2008 11:08:44 PM -- Database read latency thresholds: (average: 0.02 seconds/read,
maximum: 0.05 seconds/read).
1/30/2008 11:08:44 PM -- Log write latency thresholds: (average: 0.01 seconds/write,
maximum: 0.05 seconds/write).
1/30/2008 11:08:45 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces
50%, Reads 15%, Lazy Commits 80%.

```

1/30/2008 11:08:45 PM -- Performance logging begins (interval: 15000 ms).
1/30/2008 11:08:45 PM -- Generating log files ...
1/30/2008 11:22:26 PM -- G:\sg1 (101.0% generated), G:\sg2 (100.2% generated), G:\sg3 (101.0% generated), G:\sg4 (102.0% generated), G:\sg5 (101.0% generated), G:\sg6 (104.6% generated), and G:\sg7 (100.8% generated)
1/30/2008 11:22:27 PM -- Performance logging ends.
1/30/2008 11:22:27 PM -- JetInterop batch transaction stats: 9814, 9679, 9928, 9840, 9656, 9855, and 9722.
1/30/2008 11:22:27 PM -- Dispatching transactions ends.
1/30/2008 11:22:27 PM -- Shutting down databases ...
1/30/2008 11:22:35 PM -- Instance996.1 (complete), Instance996.2 (complete), Instance996.3 (complete), Instance996.4 (complete), Instance996.5 (complete), Instance996.6 (complete), and Instance996.7 (complete)
1/30/2008 11:22:36 PM -- Performance logging begins (interval: 30000 ms).
1/30/2008 11:22:36 PM -- Verifying database checksums ...
1/31/2008 12:58:41 AM -- F: (100% processed)
1/31/2008 12:58:42 AM -- Performance logging ends.
1/31/2008 12:58:42 AM -- C:\Program Files\Exchange2007\DBCchecksum_2008_1_30_23_22_35.blg has 192 samples.
1/31/2008 12:58:43 AM -- C:\Program Files\Exchange2007\DBCchecksum_2008_1_30_23_22_35.html is saved.
1/31/2008 12:58:43 AM -- Verifying log checksums ...
1/31/2008 12:59:36 AM -- G:\sg1 (100 logs passed), G:\sg2 (100 logs passed), G:\sg3 (100 logs passed), G:\sg4 (100 logs passed), G:\sg5 (100 logs passed), G:\sg6 (100 logs passed), and G:\sg7 (100 logs passed)
1/31/2008 12:59:36 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_8_44.blg has 54 samples.
1/31/2008 12:59:36 AM -- Creating test report ...
1/31/2008 12:59:37 AM -- Volume F: has 0.0123 for Avg. Disk sec/Read.
1/31/2008 12:59:37 AM -- Volume G: has 0.0008 for Avg. Disk sec/Write.
1/31/2008 12:59:37 AM -- Volume G: has 0.0002 for Avg. Disk sec/Read.
1/31/2008 12:59:37 AM -- Test has 1.26317308266576 Maximum Database Page Fault Stalls/sec.
1/31/2008 12:59:37 AM -- Test has 5 Database Page Fault Stalls/sec samples higher than 0.
1/31/2008 12:59:37 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_8_44.xml has 53 samples queried.
1/31/2008 12:59:37 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_8_44.html is saved.
1/31/2008 12:59:39 AM -- Performance logging begins (interval: 4000 ms).
1/31/2008 12:59:39 AM -- Recovering databases ...
1/31/2008 1:02:57 AM -- Performance logging ends.
1/31/2008 1:02:57 AM -- Instance996.1 (188.9927424), Instance996.2 (180.7430592), Instance996.3 (174.99328), Instance996.4 (176.9932032), Instance996.5 (182.9929728), Instance996.6 (192.7425984), and Instance996.7 (196.7424448)
1/31/2008 1:02:57 AM -- C:\Program Files\Exchange2007\SoftRecovery_2008_1_31_0_59_37.blg has 49 samples.
1/31/2008 1:02:57 AM -- Creating test report ...
1/31/2008 1:02:58 AM -- C:\Program Files\Exchange2007\SoftRecovery_2008_1_31_0_59_37.html is saved.
1/31/2008 1:02:58 AM -- Jetstress testing ends.
1/31/2008 6:24:27 AM -- Jetstress testing begins ...
1/31/2008 6:24:27 AM -- Prepare testing begins ...
1/31/2008 6:24:28 AM -- Attaching databases ...
1/31/2008 6:24:28 AM -- Prepare testing ends.
1/31/2008 6:24:31 AM -- Performance logging begins (interval: 30000 ms).
1/31/2008 6:24:31 AM -- Streaming backup databases ...
1/31/2008 7:50:54 AM -- Performance logging ends.
1/31/2008 7:50:54 AM -- Instance996.1 (100% processed), Instance996.2 (100% processed), Instance996.3 (100% processed), Instance996.4 (100% processed), Instance996.5 (100% processed), Instance996.6 (100% processed), and Instance996.7 (100% processed)
1/31/2008 7:50:54 AM -- C:\Program Files\Exchange2007\StreamingBackup_2008_1_31_6_24_28.blg has 172 samples.
1/31/2008 7:50:54 AM -- Creating test report ...

Microsoft Exchange Server Jetstress: SoftRecovery Test Result Report

Table 47: Soft-Recovery Statistics – All

Database Instance	Log Files Replayed	Elapsed Seconds
Instance744.1	512	265.2418572
Instance744.2	505	241.2440076
Instance744.3	515	262.9920588
Instance744.4	516	277.4907596
Instance744.5	500	246.2435596
Instance744.6	510	271.4912972
Instance744.7	519	256.4926412

Table 48: Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (F:)	0.033	0.015	3812.908	52.861	(n/a)
Log (G:)	0.003	0.006	429.209	21.243	5149.421

Table 49: Host System Performance

Counter	Average	Minimum	Maximum
% processor time	7.153	1.847	9.269
Available Mbytes	25806.855	25557.000	27290.000
Free system page table entries	16755273.000	16755273.000	16755273.000
Transition pages repurposed/sec	0.000	0.000	0.000
Pool nonpaged bytes	77213933.449	77094912.000	77377536.000
Pool paged bytes	35580883.478	35016704.000	35921920.000
Database page fault stalls/sec	0.000	0.000	0.000

```

Test Log1/30/2008 7:19:24 PM -- Jetstress testing begins ...
1/30/2008 7:19:24 PM -- Prepare testing begins ...
1/30/2008 7:19:25 PM -- Attaching databases ...
1/30/2008 7:19:25 PM -- Prepare testing ends.
1/30/2008 7:19:25 PM -- Dispatching transactions begins ...
1/30/2008 7:19:25 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
1/30/2008 7:19:25 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
1/30/2008 7:19:26 PM -- Database read latency thresholds: (average: 0.02 seconds/read,
maximum: 0.05 seconds/read).
1/30/2008 7:19:26 PM -- Log write latency thresholds: (average: 0.01 seconds/write,
maximum: 0.05 seconds/write).
1/30/2008 7:19:27 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces 50%,
Reads 15%, Lazy Commits 80%.
1/30/2008 7:19:27 PM -- Performance logging begins (interval: 15000 ms).
1/30/2008 7:19:27 PM -- Attaining prerequisites:
1/30/2008 7:22:18 PM -- \Database(JetstressWin)\Database Cache Size, Last: 1693663000.0
(lower bound: 1691143000.0, upper bound: none)
1/30/2008 9:22:19 PM -- Performance logging ends.
1/30/2008 9:22:19 PM -- JetInterop batch transaction stats: 90046, 89962, 89952, 90078,
90334, 89865, and 89559.
1/30/2008 9:22:20 PM -- Dispatching transactions ends.
1/30/2008 9:22:20 PM -- Shutting down databases ...
1/30/2008 9:22:29 PM -- Instance744.1 (complete), Instance744.2 (complete), Instance744.3
(complete), Instance744.4 (complete), Instance744.5 (complete), Instance744.6 (complete),
and Instance744.7 (complete)
1/30/2008 9:22:30 PM -- Performance logging begins (interval: 30000 ms).
1/30/2008 9:22:30 PM -- Verifying database checksums ...
1/30/2008 10:46:12 PM -- F: (100% processed)
1/30/2008 10:46:14 PM -- Performance logging ends.
1/30/2008 10:46:14 PM -- C:\Program Files\Exchange2007\DBCchecksum_2008_1_30_21_22_29.blg

```

has 167 samples.
1/30/2008 10:46:15 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_29.html is saved.
1/30/2008 10:46:15 PM -- Verifying log checksums ...
1/30/2008 10:46:37 PM -- G:\sg1 (22 logs passed), G:\sg2 (23 logs passed), G:\sg3 (22 logs passed), G:\sg4 (21 logs passed), G:\sg5 (22 logs passed), G:\sg6 (22 logs passed), and G:\sg7 (22 logs passed)
1/30/2008 10:46:37 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_26.blg has 491 samples.
1/30/2008 10:46:37 PM -- Creating test report ...
1/30/2008 10:46:40 PM -- Volume F: has 0.0119 for Avg. Disk sec/Read.
1/30/2008 10:46:40 PM -- Volume G: has 0.0007 for Avg. Disk sec/Write.
1/30/2008 10:46:40 PM -- Volume G: has 0.0000 for Avg. Disk sec/Read.
1/30/2008 10:46:40 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
1/30/2008 10:46:40 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
1/30/2008 10:46:40 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_26.xml has 479 samples queried.
1/30/2008 10:46:40 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_26.html is saved.
1/30/2008 10:46:40 PM -- Jetstress testing ends.
1/30/2008 11:08:17 PM -- Jetstress testing begins ...
1/30/2008 11:08:17 PM -- Prepare testing begins ...
1/30/2008 11:08:17 PM -- Attaching databases ...
1/30/2008 11:08:17 PM -- Prepare testing ends.
1/30/2008 11:08:17 PM -- Dispatching transactions begins ...
1/30/2008 11:08:17 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
1/30/2008 11:08:17 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
1/30/2008 11:08:17 PM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).
1/30/2008 11:08:18 PM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).
1/30/2008 11:08:18 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.
1/30/2008 11:08:18 PM -- Performance logging begins (interval: 15000 ms).
1/30/2008 11:08:18 PM -- Generating log files ...
1/30/2008 11:22:26 PM -- G:\sg1 (102.4% generated), G:\sg2 (101.0% generated), G:\sg3 (102.8% generated), G:\sg4 (103.2% generated), G:\sg5 (100.2% generated), G:\sg6 (102.0% generated), and G:\sg7 (104.0% generated)
1/30/2008 11:22:27 PM -- Performance logging ends.
1/30/2008 11:22:27 PM -- JetInterop batch transaction stats: 10000, 9980, 9939, 9921, 9781, 9876, and 10221.
1/30/2008 11:22:27 PM -- Dispatching transactions ends.
1/30/2008 11:22:27 PM -- Shutting down databases ...
1/30/2008 11:22:37 PM -- Instance744.1 (complete), Instance744.2 (complete), Instance744.3 (complete), Instance744.4 (complete), Instance744.5 (complete), Instance744.6 (complete), and Instance744.7 (complete)
1/30/2008 11:22:37 PM -- Performance logging begins (interval: 30000 ms).
1/30/2008 11:22:37 PM -- Verifying database checksums ...
1/31/2008 12:46:30 AM -- F: (100% processed)
1/31/2008 12:46:31 AM -- Performance logging ends.
1/31/2008 12:46:31 AM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_23_22_37.blg has 167 samples.
1/31/2008 12:46:31 AM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_23_22_37.html is saved.
1/31/2008 12:46:31 AM -- Verifying log checksums ...
1/31/2008 12:47:55 AM -- G:\sg1 (100 logs passed), G:\sg2 (100 logs passed), G:\sg3 (100 logs passed), G:\sg4 (100 logs passed), G:\sg5 (100 logs passed), G:\sg6 (100 logs passed), and G:\sg7 (100 logs passed)
1/31/2008 12:47:55 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_8_18.blg has 56 samples.
1/31/2008 12:47:55 AM -- Creating test report ...
1/31/2008 12:47:55 AM -- Volume F: has 0.0125 for Avg. Disk sec/Read.
1/31/2008 12:47:55 AM -- Volume G: has 0.0008 for Avg. Disk sec/Write.
1/31/2008 12:47:55 AM -- Volume G: has 0.0002 for Avg. Disk sec/Read.
1/31/2008 12:47:55 AM -- Test has 2.19621539241372 Maximum Database Page Fault Stalls/sec.
1/31/2008 12:47:55 AM -- Test has 5 Database Page Fault Stalls/sec samples higher than 0.
1/31/2008 12:47:55 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_8_18.xml has 55 samples queried.

```

1/31/2008 12:47:55 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_8_18.html
is saved.
1/31/2008 12:47:57 AM -- Performance logging begins (interval: 4000 ms).
1/31/2008 12:47:57 AM -- Recovering databases ...
1/31/2008 12:52:36 AM -- Performance logging ends.
1/31/2008 12:52:36 AM -- Instance744.1 (265.2418572), Instance744.2 (241.2440076),
Instance744.3 (262.9920588), Instance744.4 (277.4907596), Instance744.5 (246.2435596),
Instance744.6 (271.4912972), and Instance744.7 (256.4926412)
1/31/2008 12:52:36 AM -- C:\Program Files\Exchange2007\SoftRecovery_2008_1_31_0_47_55.blg
has 69 samples.
1/31/2008 12:52:36 AM -- Creating test report ...

```

Microsoft Exchange Server Jetstress: SoftRecovery Test Result Report 2

Table 50: Soft-Recovery Statistics – All

Database Instance	Log Files Replayed	Elapsed Seconds
Instance1548.1	521	173.2523182
Instance1548.2	513	166.5028366
Instance1548.3	521	165.2529326
Instance1548.4	515	164.0030286
Instance1548.5	501	162.5031438
Instance1548.6	519	166.002875
Instance1548.7	517	167.0027982

Table 51: Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (F:)	0.025	0.004	7314.635	85.941	(n/a)
Log (G:)	0.003	0.005	699.133	29.285	5049.094

Table 52: Host System Performance

Counter	Average	Minimum	Maximum
% processor time	12.882	2.629	16.595
Available Mbytes	25843.558	25554.000	27267.000
Free system page table entries	16755203.000	16755203.000	16755203.000
Transition pages repurposed/sec	0.000	0.000	0.000
Pool nonpaged bytes	77130728.186	76750848.000	77426688.000
Pool paged bytes	36699778.977	36069376.000	36900864.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

```

Test Log1/30/2008 7:19:17 PM -- Jetstress testing begins ...
1/30/2008 7:19:17 PM -- Prepare testing begins ...
1/30/2008 7:19:18 PM -- Attaching databases ...
1/30/2008 7:19:18 PM -- Prepare testing ends.
1/30/2008 7:19:18 PM -- Dispatching transactions begins ...
1/30/2008 7:19:18 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
1/30/2008 7:19:18 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
1/30/2008 7:19:18 PM -- Database read latency thresholds: (average: 0.02 seconds/read,
maximum: 0.05 seconds/read).
1/30/2008 7:19:18 PM -- Log write latency thresholds: (average: 0.01 seconds/write,
maximum: 0.05 seconds/write).
1/30/2008 7:19:19 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces 50%,
Reads 15%, Lazy Commits 80%.
1/30/2008 7:19:19 PM -- Performance logging begins (interval: 15000 ms).
1/30/2008 7:19:19 PM -- Attaining prerequisites:
1/30/2008 7:21:57 PM -- \Database(JetstressWin)\Database Cache Size, Last: 1696317000.0
(lower bound: 1691143000.0, upper bound: none)
1/30/2008 9:21:59 PM -- Performance logging ends.
1/30/2008 9:21:59 PM -- JetInterop batch transaction stats: 96141, 96351, 96431, 96518,

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96331, 96218, and 96103.
 1/30/2008 9:21:59 PM -- Dispatching transactions ends.
 1/30/2008 9:21:59 PM -- Shutting down databases ...
 1/30/2008 9:22:10 PM -- Instance1548.1 (complete), Instance1548.2 (complete),
 Instance1548.3 (complete), Instance1548.4 (complete), Instance1548.5 (complete),
 Instance1548.6 (complete), and Instance1548.7 (complete)
 1/30/2008 9:22:10 PM -- Performance logging begins (interval: 30000 ms).
 1/30/2008 9:22:10 PM -- Verifying database checksums ...
 1/30/2008 10:49:43 PM -- F: (100% processed)
 1/30/2008 10:49:44 PM -- Performance logging ends.
 1/30/2008 10:49:44 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_10.blg
 has 175 samples.
 1/30/2008 10:49:45 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_10.html
 is saved.
 1/30/2008 10:49:46 PM -- Verifying log checksums ...
 1/30/2008 10:50:07 PM -- G:\sg1 (22 logs passed), G:\sg2 (21 logs passed), G:\sg3 (23 logs
 passed), G:\sg4 (23 logs passed), G:\sg5 (22 logs passed), G:\sg6 (22 logs passed), and
 G:\sg7 (22 logs passed)
 1/30/2008 10:50:07 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_18.blg
 has 490 samples.
 1/30/2008 10:50:07 PM -- Creating test report ...
 1/30/2008 10:50:10 PM -- Volume F: has 0.0111 for Avg. Disk sec/Read.
 1/30/2008 10:50:10 PM -- Volume G: has 0.0007 for Avg. Disk sec/Write.
 1/30/2008 10:50:10 PM -- Volume G: has 0.0000 for Avg. Disk sec/Read.
 1/30/2008 10:50:10 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
 1/30/2008 10:50:10 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
 1/30/2008 10:50:10 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_18.xml
 has 479 samples queried.
 1/30/2008 10:50:10 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_18.html
 is saved.
 1/30/2008 10:50:10 PM -- Jetstress testing ends.
 1/30/2008 11:09:12 PM -- Jetstress testing begins ...
 1/30/2008 11:09:12 PM -- Prepare testing begins ...
 1/30/2008 11:09:12 PM -- Attaching databases ...
 1/30/2008 11:09:12 PM -- Prepare testing ends.
 1/30/2008 11:09:12 PM -- Dispatching transactions begins ...
 1/30/2008 11:09:12 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
 1/30/2008 11:09:12 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
 1/30/2008 11:09:13 PM -- Database read latency thresholds: (average: 0.02 seconds/read,
 maximum: 0.05 seconds/read).
 1/30/2008 11:09:13 PM -- Log write latency thresholds: (average: 0.01 seconds/write,
 maximum: 0.05 seconds/write).
 1/30/2008 11:09:13 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces
 50%, Reads 15%, Lazy Commits 80%.
 1/30/2008 11:09:13 PM -- Performance logging begins (interval: 15000 ms).
 1/30/2008 11:09:13 PM -- Generating log files ...
 1/30/2008 11:22:27 PM -- G:\sg1 (104.2% generated), G:\sg2 (102.6% generated), G:\sg3
 (104.2% generated), G:\sg4 (103.0% generated), G:\sg5 (100.2% generated), G:\sg6 (103.8%
 generated), and G:\sg7 (103.4% generated)
 1/30/2008 11:22:29 PM -- Performance logging ends.
 1/30/2008 11:22:29 PM -- JetInterop batch transaction stats: 9964, 10083, 10075, 9988,
 9896, 10012, and 10014.
 1/30/2008 11:22:29 PM -- Dispatching transactions ends.
 1/30/2008 11:22:29 PM -- Shutting down databases ...
 1/30/2008 11:22:35 PM -- Instance1548.1 (complete), Instance1548.2 (complete),
 Instance1548.3 (complete), Instance1548.4 (complete), Instance1548.5 (complete),
 Instance1548.6 (complete), and Instance1548.7 (complete)
 1/30/2008 11:22:36 PM -- Performance logging begins (interval: 30000 ms).
 1/30/2008 11:22:36 PM -- Verifying database checksums ...
 1/31/2008 12:50:13 AM -- F: (100% processed)
 1/31/2008 12:50:14 AM -- Performance logging ends.
 1/31/2008 12:50:14 AM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_23_22_35.blg
 has 175 samples.
 1/31/2008 12:50:15 AM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_23_22_35.html
 is saved.
 1/31/2008 12:50:15 AM -- Verifying log checksums ...
 1/31/2008 12:51:38 AM -- G:\sg1 (100 logs passed), G:\sg2 (100 logs passed), G:\sg3 (100
 logs passed), G:\sg4 (100 logs passed), G:\sg5 (100 logs passed), G:\sg6 (100 logs passed),

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and G:\sg7 (100 logs passed)
1/31/2008 12:51:38 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_9_13.blg
has 52 samples.
1/31/2008 12:51:38 AM -- Creating test report ...
1/31/2008 12:51:39 AM -- Volume F: has 0.0116 for Avg. Disk sec/Read.
1/31/2008 12:51:39 AM -- Volume G: has 0.0008 for Avg. Disk sec/Write.
1/31/2008 12:51:39 AM -- Volume G: has 0.0003 for Avg. Disk sec/Read.
1/31/2008 12:51:39 AM -- Test has 1.59720834077965 Maximum Database Page Fault Stalls/sec.
1/31/2008 12:51:39 AM -- Test has 4 Database Page Fault Stalls/sec samples higher than 0.
1/31/2008 12:51:39 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_9_13.xml
has 51 samples queried.
1/31/2008 12:51:39 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_9_13.html
is saved.
1/31/2008 12:51:41 AM -- Performance logging begins (interval: 4000 ms).
1/31/2008 12:51:41 AM -- Recovering databases ...
1/31/2008 12:54:35 AM -- Performance logging ends.
1/31/2008 12:54:35 AM -- Instance1548.1 (173.2523182), Instance1548.2 (166.5028366),
Instance1548.3 (165.2529326), Instance1548.4 (164.0030286), Instance1548.5 (162.5031438),
Instance1548.6 (166.002875), and Instance1548.7 (167.0027982)
1/31/2008 12:54:35 AM -- C:\Program Files\Exchange2007\SoftRecovery_2008_1_31_0_51_39.blg
has 43 samples.
1/31/2008 12:54:35 AM -- Creating test report ...

```

Microsoft Exchange Server Jetstress: SoftRecovery Test Result Report 3

Table 53: Soft-Recovery Statistics – All

Database Instance	Log Files Replayed	Elapsed Seconds
Instance2052.1	516	135.0061199
Instance2052.2	521	129.0065423
Instance2052.3	500	126.7567007
Instance2052.4	517	127.7566303
Instance2052.5	523	128.0066127
Instance2052.6	503	127.5066479
Instance2052.7	513	135.0061199

Table 54: Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (F:)	0.020	0.003	9707.069	110.519	(n/a)
Log (G:)	0.002	0.001	901.650	38.826	5112.652

Table 55: Host System Performance

Counter	Average	Minimum	Maximum
% processor time	17.422	9.173	23.041
Available Mbytes	25903.273	25565.000	27230.000
Free system page table entries	16755413.000	16755413.000	16755413.000
Transition pages repurposed/sec	0.000	0.000	0.000
Pool nonpaged bytes	76749110.303	76505088.000	76902400.000
Pool paged bytes	35140701.091	34496512.000	35229696.000
Database page fault stalls/sec	0.063	0.000	2.000

```

Test Log1/30/2008 7:19:15 PM -- Jetstress testing begins ...
1/30/2008 7:19:15 PM -- Prepare testing begins ...
1/30/2008 7:19:16 PM -- Attaching databases ...
1/30/2008 7:19:16 PM -- Prepare testing ends.
1/30/2008 7:19:16 PM -- Dispatching transactions begins ...
1/30/2008 7:19:16 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
1/30/2008 7:19:16 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
1/30/2008 7:19:16 PM -- Database read latency thresholds: (average: 0.02 seconds/read,

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maximum: 0.05 seconds/read).
 1/30/2008 7:19:16 PM -- Log write latency thresholds: (average: 0.01 seconds/write,
 maximum: 0.05 seconds/write).
 1/30/2008 7:19:18 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces 50%,
 Reads 15%, Lazy Commits 80%.
 1/30/2008 7:19:18 PM -- Performance logging begins (interval: 15000 ms).
 1/30/2008 7:19:18 PM -- Attaining prerequisites:
 1/30/2008 7:21:58 PM -- \Database(JetstressWin)\Database Cache Size, Last: 1697513000.0
 (lower bound: 1691143000.0, upper bound: none)
 1/30/2008 9:21:59 PM -- Performance logging ends.
 1/30/2008 9:21:59 PM -- JetInterop batch transaction stats: 83361, 83224, 83034, 82537,
 82823, 83600, and 83655.
 1/30/2008 9:22:00 PM -- Dispatching transactions ends.
 1/30/2008 9:22:00 PM -- Shutting down databases ...
 1/30/2008 9:22:08 PM -- Instance2052.1 (complete), Instance2052.2 (complete),
 Instance2052.3 (complete), Instance2052.4 (complete), Instance2052.5 (complete),
 Instance2052.6 (complete), and Instance2052.7 (complete)
 1/30/2008 9:22:09 PM -- Performance logging begins (interval: 30000 ms).
 1/30/2008 9:22:09 PM -- Verifying database checksums ...
 1/30/2008 10:49:30 PM -- F: (100% processed)
 1/30/2008 10:49:31 PM -- Performance logging ends.
 1/30/2008 10:49:31 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_8.blg has
 174 samples.
 1/30/2008 10:49:32 PM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_21_22_8.html is
 saved.
 1/30/2008 10:49:32 PM -- Verifying log checksums ...
 1/30/2008 10:49:50 PM -- G:\sg1 (22 logs passed), G:\sg2 (22 logs passed), G:\sg3 (22 logs
 passed), G:\sg4 (23 logs passed), G:\sg5 (21 logs passed), G:\sg6 (22 logs passed), and
 G:\sg7 (22 logs passed)
 1/30/2008 10:49:50 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_16.blg
 has 490 samples.
 1/30/2008 10:49:50 PM -- Creating test report ...
 1/30/2008 10:49:53 PM -- Volume F: has 0.0113 for Avg. Disk sec/Read.
 1/30/2008 10:49:53 PM -- Volume G: has 0.0007 for Avg. Disk sec/Write.
 1/30/2008 10:49:53 PM -- Volume G: has 0.0000 for Avg. Disk sec/Read.
 1/30/2008 10:49:53 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
 1/30/2008 10:49:53 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
 1/30/2008 10:49:53 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_16.xml
 has 479 samples queried.
 1/30/2008 10:49:53 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_16.html
 is saved.
 1/30/2008 10:49:53 PM -- Jetstress testing ends.
 1/30/2008 11:09:40 PM -- Jetstress testing begins ...
 1/30/2008 11:09:40 PM -- Prepare testing begins ...
 1/30/2008 11:09:40 PM -- Attaching databases ...
 1/30/2008 11:09:40 PM -- Prepare testing ends.
 1/30/2008 11:09:40 PM -- Dispatching transactions begins ...
 1/30/2008 11:09:40 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
 1/30/2008 11:09:40 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
 1/30/2008 11:09:41 PM -- Database read latency thresholds: (average: 0.02 seconds/read,
 maximum: 0.05 seconds/read).
 1/30/2008 11:09:41 PM -- Log write latency thresholds: (average: 0.01 seconds/write,
 maximum: 0.05 seconds/write).
 1/30/2008 11:09:41 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces
 50%, Reads 15%, Lazy Commits 80%.
 1/30/2008 11:09:41 PM -- Performance logging begins (interval: 15000 ms).
 1/30/2008 11:09:41 PM -- Generating log files ...
 1/30/2008 11:23:35 PM -- G:\sg1 (103.4% generated), G:\sg2 (104.2% generated), G:\sg3
 (100.2% generated), G:\sg4 (103.6% generated), G:\sg5 (104.6% generated), G:\sg6 (100.6%
 generated), and G:\sg7 (102.6% generated)
 1/30/2008 11:23:36 PM -- Performance logging ends.
 1/30/2008 11:23:36 PM -- JetInterop batch transaction stats: 10074, 10092, 9892, 10104,
 10222, 9876, and 9900.
 1/30/2008 11:23:36 PM -- Dispatching transactions ends.
 1/30/2008 11:23:36 PM -- Shutting down databases ...
 1/30/2008 11:23:47 PM -- Instance2052.1 (complete), Instance2052.2 (complete),
 Instance2052.3 (complete), Instance2052.4 (complete), Instance2052.5 (complete),
 Instance2052.6 (complete), and Instance2052.7 (complete)

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1/30/2008 11:23:48 PM -- Performance logging begins (interval: 30000 ms).
1/30/2008 11:23:48 PM -- Verifying database checksums ...
1/31/2008 12:51:14 AM -- F: (100% processed)
1/31/2008 12:51:15 AM -- Performance logging ends.
1/31/2008 12:51:15 AM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_23_23_47.blg
has 174 samples.
1/31/2008 12:51:16 AM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_23_23_47.html
is saved.
1/31/2008 12:51:16 AM -- Verifying log checksums ...
1/31/2008 12:52:07 AM -- G:\sg1 (100 logs passed), G:\sg2 (100 logs passed), G:\sg3 (100
logs passed), G:\sg4 (100 logs passed), G:\sg5 (100 logs passed), G:\sg6 (100 logs passed),
and G:\sg7 (100 logs passed)
1/31/2008 12:52:07 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_9_41.blg
has 55 samples.
1/31/2008 12:52:07 AM -- Creating test report ...
1/31/2008 12:52:08 AM -- Volume F: has 0.0117 for Avg. Disk sec/Read.
1/31/2008 12:52:08 AM -- Volume G: has 0.0014 for Avg. Disk sec/Write.
1/31/2008 12:52:08 AM -- Volume G: has 0.0005 for Avg. Disk sec/Read.
1/31/2008 12:52:08 AM -- Test has 2.19612190912938 Maximum Database Page Fault Stalls/sec.
1/31/2008 12:52:08 AM -- Test has 5 Database Page Fault Stalls/sec samples higher than 0.
1/31/2008 12:52:08 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_9_41.xml
has 54 samples queried.
1/31/2008 12:52:08 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_9_41.html
is saved.
1/31/2008 12:52:10 AM -- Performance logging begins (interval: 4000 ms).
1/31/2008 12:52:10 AM -- Recovering databases ...
1/31/2008 12:54:26 AM -- Performance logging ends.
1/31/2008 12:54:26 AM -- Instance2052.1 (135.0061199), Instance2052.2 (129.0065423),
Instance2052.3 (126.7567007), Instance2052.4 (127.7566303), Instance2052.5 (128.0066127),
Instance2052.6 (127.5066479), and Instance2052.7 (135.0061199)
1/31/2008 12:54:26 AM -- C:\Program Files\Exchange2007\SoftRecovery_2008_1_31_0_52_8.blg
has 33 samples.
1/31/2008 12:54:26 AM -- Creating test report ...

```

Microsoft Exchange Server Jetstress: Streaming Backup Test Result Report 5

Table 56: Streaming Backup Statistics – All

Database Instance	Database Size (Mbytes)	Elapsed Backup Time	Mbytes Transferred/sec
Instance996.1	236687.65	01:26:22	45.67
Instance996.2	236359.65	01:26:22	45.61
Instance996.3	236247.65	01:26:22	45.59
Instance996.4	236455.65	01:26:22	45.63
Instance996.5	236333.65	01:26:22	45.61
Instance996.6	236611.65	01:26:22	45.66
Instance996.7	236421.65	01:18:55	49.92

Table 57: Jetstress System Parameters

Thread count	12 (per-storage group)
Log buffers	9000
Minimum database cache	224.0 MB
Maximum database cache	1792.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

Table 58: Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (F:)	0.003	5.13690208427051E-05	2569.740	0.011	(n/a)
Log (G:)	0.000	4.85948667966212E-05	0.000	0.011	357.302

Table 59: Host System Performance

Counter	Average	Minimum	Maximum
% processor time	10.192	6.572	12.327
Available Mbytes	27420.058	27412.000	27422.000
Free system page table entries	16755243.000	16755243.000	16755243.000
Transition pages repurposed/sec	0.000	0.000	0.000
Pool nonpaged bytes	77533612.651	77467648.000	77606912.000
Pool paged bytes	35807351.070	35713024.000	36802560.000
Database page fault stalls/sec	0.000	0.000	0.000

```

Test Log1/30/2008 7:19:13 PM -- Jetstress testing begins ...
1/30/2008 7:19:13 PM -- Prepare testing begins ...
1/30/2008 7:19:14 PM -- Attaching databases ...
1/30/2008 7:19:14 PM -- Prepare testing ends.
1/30/2008 7:19:14 PM -- Dispatching transactions begins ...
1/30/2008 7:19:14 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
1/30/2008 7:19:14 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
1/30/2008 7:19:15 PM -- Database read latency thresholds: (average: 0.02 seconds/read,
maximum: 0.05 seconds/read).
1/30/2008 7:19:15 PM -- Log write latency thresholds: (average: 0.01 seconds/write,
maximum: 0.05 seconds/write).
1/30/2008 7:19:16 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces 50%,
Reads 15%, Lazy Commits 80%.
1/30/2008 7:19:16 PM -- Performance logging begins (interval: 15000 ms).
1/30/2008 7:19:16 PM -- Attaining prerequisites:
1/30/2008 7:22:08 PM -- \Database(JetstressWin)\Database Cache Size, Last: 1694990000.0
(lower bound: 1691143000.0, upper bound: none)
1/30/2008 9:22:09 PM -- Performance logging ends.
1/30/2008 9:22:09 PM -- JetInterop batch transaction stats: 91169, 90356, 90277, 90634,
90597, 90853, and 91203.
1/30/2008 9:22:18 PM -- Dispatching transactions ends.
1/30/2008 9:22:18 PM -- Shutting down databases ...
1/30/2008 9:22:26 PM -- Instance996.1 (complete), Instance996.2 (complete), Instance996.3
(complete), Instance996.4 (complete), Instance996.5 (complete), Instance996.6 (complete),
and Instance996.7 (complete)
1/30/2008 9:22:27 PM -- Performance logging begins (interval: 30000 ms).
1/30/2008 9:22:27 PM -- Verifying database checksums ...
1/30/2008 10:58:16 PM -- F: (100% processed)
1/30/2008 10:58:17 PM -- Performance logging ends.
1/30/2008 10:58:17 PM -- C:\Program Files\Exchange2007\DBCchecksum_2008_1_30_21_22_26.blg
has 191 samples.
1/30/2008 10:58:20 PM -- C:\Program Files\Exchange2007\DBCchecksum_2008_1_30_21_22_26.html
is saved.
1/30/2008 10:58:20 PM -- Verifying log checksums ...
1/30/2008 10:58:31 PM -- G:\sg1 (21 logs passed), G:\sg2 (21 logs passed), G:\sg3 (23 logs
passed), G:\sg4 (22 logs passed), G:\sg5 (21 logs passed), G:\sg6 (21 logs passed), and
G:\sg7 (21 logs passed)
1/30/2008 10:58:31 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_15.blg
has 491 samples.
1/30/2008 10:58:31 PM -- Creating test report ...
1/30/2008 10:58:35 PM -- Volume F: has 0.0118 for Avg. Disk sec/Read.
1/30/2008 10:58:35 PM -- Volume G: has 0.0007 for Avg. Disk sec/Write.
1/30/2008 10:58:35 PM -- Volume G: has 0.0000 for Avg. Disk sec/Read.
1/30/2008 10:58:35 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
1/30/2008 10:58:35 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
1/30/2008 10:58:35 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_15.xml
has 479 samples queried.

```

1/30/2008 10:58:35 PM -- C:\Program Files\Exchange2007\Performance_2008_1_30_19_19_15.html is saved.
1/30/2008 10:58:35 PM -- Jetstress testing ends.
1/30/2008 11:08:43 PM -- Jetstress testing begins ...
1/30/2008 11:08:43 PM -- Prepare testing begins ...
1/30/2008 11:08:44 PM -- Attaching databases ...
1/30/2008 11:08:44 PM -- Prepare testing ends.
1/30/2008 11:08:44 PM -- Dispatching transactions begins ...
1/30/2008 11:08:44 PM -- Database cache settings: (minimum: 224.0 MB, maximum: 1.8 GB)
1/30/2008 11:08:44 PM -- Database flush thresholds: (start: 17.9 MB, stop: 35.8 MB)
1/30/2008 11:08:44 PM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).
1/30/2008 11:08:44 PM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).
1/30/2008 11:08:45 PM -- Operation mix: Sessions 12, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.
1/30/2008 11:08:45 PM -- Performance logging begins (interval: 15000 ms).
1/30/2008 11:08:45 PM -- Generating log files ...
1/30/2008 11:22:26 PM -- G:\sg1 (101.0% generated), G:\sg2 (100.2% generated), G:\sg3 (101.0% generated), G:\sg4 (102.0% generated), G:\sg5 (101.0% generated), G:\sg6 (104.6% generated), and G:\sg7 (100.8% generated)
1/30/2008 11:22:27 PM -- Performance logging ends.
1/30/2008 11:22:27 PM -- JetInterop batch transaction stats: 9814, 9679, 9928, 9840, 9656, 9855, and 9722.
1/30/2008 11:22:27 PM -- Dispatching transactions ends.
1/30/2008 11:22:27 PM -- Shutting down databases ...
1/30/2008 11:22:35 PM -- Instance996.1 (complete), Instance996.2 (complete), Instance996.3 (complete), Instance996.4 (complete), Instance996.5 (complete), Instance996.6 (complete), and Instance996.7 (complete)
1/30/2008 11:22:36 PM -- Performance logging begins (interval: 30000 ms).
1/30/2008 11:22:36 PM -- Verifying database checksums ...
1/31/2008 12:58:41 AM -- F: (100% processed)
1/31/2008 12:58:42 AM -- Performance logging ends.
1/31/2008 12:58:42 AM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_23_22_35.blg has 192 samples.
1/31/2008 12:58:43 AM -- C:\Program Files\Exchange2007\DBChecksum_2008_1_30_23_22_35.html is saved.
1/31/2008 12:58:43 AM -- Verifying log checksums ...
1/31/2008 12:59:36 AM -- G:\sg1 (100 logs passed), G:\sg2 (100 logs passed), G:\sg3 (100 logs passed), G:\sg4 (100 logs passed), G:\sg5 (100 logs passed), G:\sg6 (100 logs passed), and G:\sg7 (100 logs passed)
1/31/2008 12:59:36 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_8_44.blg has 54 samples.
1/31/2008 12:59:36 AM -- Creating test report ...
1/31/2008 12:59:37 AM -- Volume F: has 0.0123 for Avg. Disk sec/Read.
1/31/2008 12:59:37 AM -- Volume G: has 0.0008 for Avg. Disk sec/Write.
1/31/2008 12:59:37 AM -- Volume G: has 0.0002 for Avg. Disk sec/Read.
1/31/2008 12:59:37 AM -- Test has 1.26317308266576 Maximum Database Page Fault Stalls/sec.
1/31/2008 12:59:37 AM -- Test has 5 Database Page Fault Stalls/sec samples higher than 0.
1/31/2008 12:59:37 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_8_44.xml has 53 samples queried.
1/31/2008 12:59:37 AM -- C:\Program Files\Exchange2007\Performance_2008_1_30_23_8_44.html is saved.
1/31/2008 12:59:39 AM -- Performance logging begins (interval: 4000 ms).
1/31/2008 12:59:39 AM -- Recovering databases ...
1/31/2008 1:02:57 AM -- Performance logging ends.
1/31/2008 1:02:57 AM -- Instance996.1 (188.9927424), Instance996.2 (180.7430592), Instance996.3 (174.99328), Instance996.4 (176.9932032), Instance996.5 (182.9929728), Instance996.6 (192.7425984), and Instance996.7 (196.7424448)
1/31/2008 1:02:57 AM -- C:\Program Files\Exchange2007\SoftRecovery_2008_1_31_0_59_37.blg has 49 samples.
1/31/2008 1:02:57 AM -- Creating test report ...
1/31/2008 1:02:58 AM -- C:\Program Files\Exchange2007\SoftRecovery_2008_1_31_0_59_37.html is saved.
1/31/2008 1:02:58 AM -- Jetstress testing ends.
1/31/2008 6:24:27 AM -- Jetstress testing begins ...
1/31/2008 6:24:27 AM -- Prepare testing begins ...
1/31/2008 6:24:28 AM -- Attaching databases ...

```
1/31/2008 6:24:28 AM -- Prepare testing ends.
1/31/2008 6:24:31 AM -- Performance logging begins (interval: 30000 ms).
1/31/2008 6:24:31 AM -- Streaming backup databases ...
1/31/2008 7:50:54 AM -- Performance logging ends.
1/31/2008 7:50:54 AM -- Instance996.1 (100% processed), Instance996.2 (100% processed),
Instance996.3 (100% processed), Instance996.4 (100% processed), Instance996.5 (100%
processed), Instance996.6 (100% processed), and Instance996.7 (100% processed)
1/31/2008 7:50:54 AM -- C:\Program Files\Exchange2007\StreamingBackup_2008_1_31_6_24_28.blg
has 172 samples.
1/31/2008 7:50:54 AM -- Creating test report ...
```

For More Information

Here are additional Sun resources:

- Sun storage management downloads page:
<http://www.sun.com/download/index.jsp?cat=Systems%20Administration&tab=3&subcat=Storage%20Management>
- Sun training courses at <http://www.sun.com/training/>, for example:
 - Sun StorageTek 6000 Installation and Configuration Training (LSI-6000)
 - Sun StorageTek 6000 Performance Tuning (LSI-6001)
 - Sun StorageTek Business Analytics Software Administration (STK-2702)
 - Sun StorageTek Common Array Manager 5.0 Administration (WET-2301)

Support:

- Register your Sun gear: <https://inventory.sun.com/inventory/>
- Services: <http://www.sun.com/service/>
- SunSolveSM: <http://sunsolve.sun.com>
- Discussions, such as the Storage Forums (available from the Hardware tab):
<http://forum.java.sun.com/index.jspa>
- Sun StorageTek 6540 array document collections at <http://docs.sun.com/>:
 - Sun StorageTek 6540 Array Documentation
 - Sun StorageTek Common Array Manager Software 6.1 Documentation
 - Sun StorageTek Common Array Manager Software 6.0 Documentation
- Wikis:
 - Storage Administration wiki: <http://wikis.sun.com/display/StorageAdmin/Home>
 - BluePrints™ wiki, especially the Storage BluePrints:
<http://wikis.sun.com/display/BluePrints/Storage+BluePrints>
 - BigAdmin wiki's Storage Tech Tips page:
<http://wikis.sun.com/display/BigAdmin/Storage+Tech+Tips>
- Related web sites and articles:
 - Sun storage web site: <http://www.sun.com/storagetek/index.jsp>
 - Sun StorageTek 6540 array web site:
http://www.sun.com/storagetek/disk_systems/midrange/6540/

- BigAdmin Storage Resource Collection:
<http://www.sun.com/bigadmin/collections/storage.html>
- Events of interest to users of Sun products:
 - Worldwide developer events: <http://developers.sun.com/events/>
 - Current events: <http://www.sun.com/events/index.jsp>

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