



# **LeftHand Networks SAN/iQ® 50,000 user Exchange 2007 Replicated iSCSI Storage Solution**

**Tested with: ESRP – Storage Version 2.0  
Tested Date: April 17, 2007**

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## Overview

This document provides information on LeftHand Networks SAN/iQ® storage solution for Microsoft Exchange Server, based the *Microsoft Exchange Solution Reviewed Program (ESRP) – Storage* program\*. For any questions or comments regarding the contents of this document, see [Contact for Additional Information](#).

\*The *ESRP – Storage* program was developed by Microsoft Corporation to provide a common storage testing framework for vendors to provide information on its storage solutions for Microsoft Exchange Server software. For more details on the *Microsoft ESRP – Storage* program, please click <http://www.microsoft.com/technet/prodtechnol/exchange/2007/esrp.mspx>

## Disclaimer

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

## Features

The HP ProLiant DL320s used in this ESRP test deliver enterprise level features, storage optimization, and high-end performance with support for both SAS and SATA hard drives. The combination of the DL320s with SAN/iQ is well suited for high I/O and transactional applications such as Microsoft Exchange and SQL Server. LeftHand Networks customer-driven feature-rich solutions are also offered on a variety of other platforms, delivering performance and capacity choices for customers of all sizes.

### LeftHand Networks SAN/iQ

SAN/iQ is the industry's first and only open software platform built from the ground up to deliver iSCSI SANs with enterprise-class features running on x86 server hardware. SAN/iQ transforms the DL320S and other servers into "storage modules" by clustering/aggregating them together into centrally managed storage pool. SAN/iQ powered storage greatly simplifies storage provisioning, management and data availability. Customers can select from a variety of industry standard hardware platforms best suited to meet performance, capacity, reliability, and budget requirements while also

protecting current network storage investments. Customers can implement the best configuration to address today's needs and easily add additional storage as business and capacity requirements change.

Data residing on SANs powered by SAN/iQ is always available, scalable, and simple to maintain. As the amount of data and the number of applications increase, administrators can easily grow individual volumes, add entire storage modules to an existing SAN/iQ Cluster, or create a new cluster, depending on their needs. It's all managed through an intuitive centralized management console, whether the physical storage assets are in the main data center, across a campus, or spread out in remote locations.

The patented distributed architecture of the SAN/iQ enables:

- Ability to scale storage capacity, disk performance and network throughput simultaneously with each additional clustered storage module
- Advanced data protection, availability and performance with LeftHand Networks unique Network RAID technology
- Enhanced disaster recovery solutions via synchronous data replication, snapshots and asynchronous remote copy
- Optimized volume management and storage utilization through thin provisioning and auto-grow functionality
- Easy-to-use centralized management of all SAN resources, regardless of location
- Configuration Wizards that guide the administrator through discovering the storage platforms running SAN/iQ on the network, creating data volumes and connecting volumes to production servers

SAN/iQ automates the process of striping and mirroring volumes across the new storage systems. This same intelligence enables volumes to expand automatically once configured. All management processes can be handled in a matter of minutes during normal business hours, without any system downtime.

As modules are added to a SAN/iQ Cluster, storage capacity, processing power, spindle count and additional data paths are added to the SAN and leveraged for increased throughput and performance. Adding capacity to established storage running SAN/iQ is as simple as adding one or more systems to the SAN/iQ Cluster. There's no application or storage downtime, and it's a simple operation within the management interface that can be performed in a matter of seconds.

With the unique architecture of SAN/iQ, storage modules can be located anywhere on the IP network. All available storage capacity is aggregated and available for SAN/iQ Volume creation. SAN/iQ's Virtual IP Load Balancing and Network RAID features spread the data out across the cluster, distributing the data path load across all storage modules. The SAN/iQ Advanced Provisioning feature allows for thin, or over provisioning of volumes. This functionality enables an administrator to specify volume sizes that exceed the physical capacity of the SAN. Initially, virtual capacity is provisioned where needed, without permanently tying up available physical capacity. When the physical volume approaches set thresholds, the volume can be scaled automatically or the administrator can be alerted to either expand the volume or add more physical capacity.

The quantity and critical nature of data managed in today's IT environments dictates that data be systematically protected, but without impact on users. Because LeftHand SAN/iQ resides on storage modules within a cluster, there is no single point of failure – a problem common with other storage technologies. A SAN/iQ Cluster can survive failure of multiple storage modules and retain full data availability. Because each HP ProLiant DL320s includes its own processor, memory, controller and network connections, performance is also not compromised in the loss of a module.

LeftHand SAN/iQ provides a choice of non-disruptive data protection capabilities which can be optimized for availability, capacity utilization, and data protection. For example, the ability to set SAN/iQ Network RAID levels by volume ensures that capacity is used efficiently by only protecting data that warrants extra levels of protection. Network RAID for individual data volumes can be set to stripe and replicate data one, two, or three times, as needed.

Backup is simplified with Snapshots. SAN/iQ Snap provides an additional level of protection. Should the current version of data become corrupted or unreliable for any reason, the system can "roll back" to earlier versions of the data. With SAN/iQ's intuitive user interface, administrators can create snapshots manually or automatically, at regularly scheduled intervals. SAN/iQ minimizes the amount of reserved capacity required for snapshot volumes by enabling system administrators to be conservative in the amount of space set aside for snapshots. Space allocated for snapshots can be systematically grown through pre-set or administrator-defined increments. Backing up to tape or other medium from a snapshot volume minimizes the backup window, removes backup traffic from the corporate LAN, and off-loads backup processing from application servers.

LeftHand SAN/iQ Remote Copy provides for the efficient distribution of data across geographies. SAN/iQ Remote Copy is ideal for companies wishing to implement centralized backup, storage disaster recovery, or data distribution.

All security mechanisms that can be implemented in an IP network can be implemented with SAN/iQ, including traffic segregation, traffic inspection, and data encryption. The LeftHand SAN also offers a variety of security features unique to the SAN environment, including access control, volume mapping, and volume permissions. Authentication Groups are used to designate which servers and other clients can access which SAN/iQ Volumes. Authentication may be set to all clients on the network, clients with a specific subnet and mask, or no clients. LeftHand SAN/iQ also supports the Challenge-Handshake Authentication Protocol (CHAP) available with iSCSI-compliant initiators and adaptors.

SAN/iQ provides multiple reporting capabilities, including real-time statistical information and active monitoring of selected variables. Active reporting is used to set up notification through emails, alerts in the console, and/or SNMP traps. Configuration is as simple as selecting the variable or variables you want monitored and the action you wish taken. Passive reporting provides point-in-time data about the performance of the iSCSI SAN.

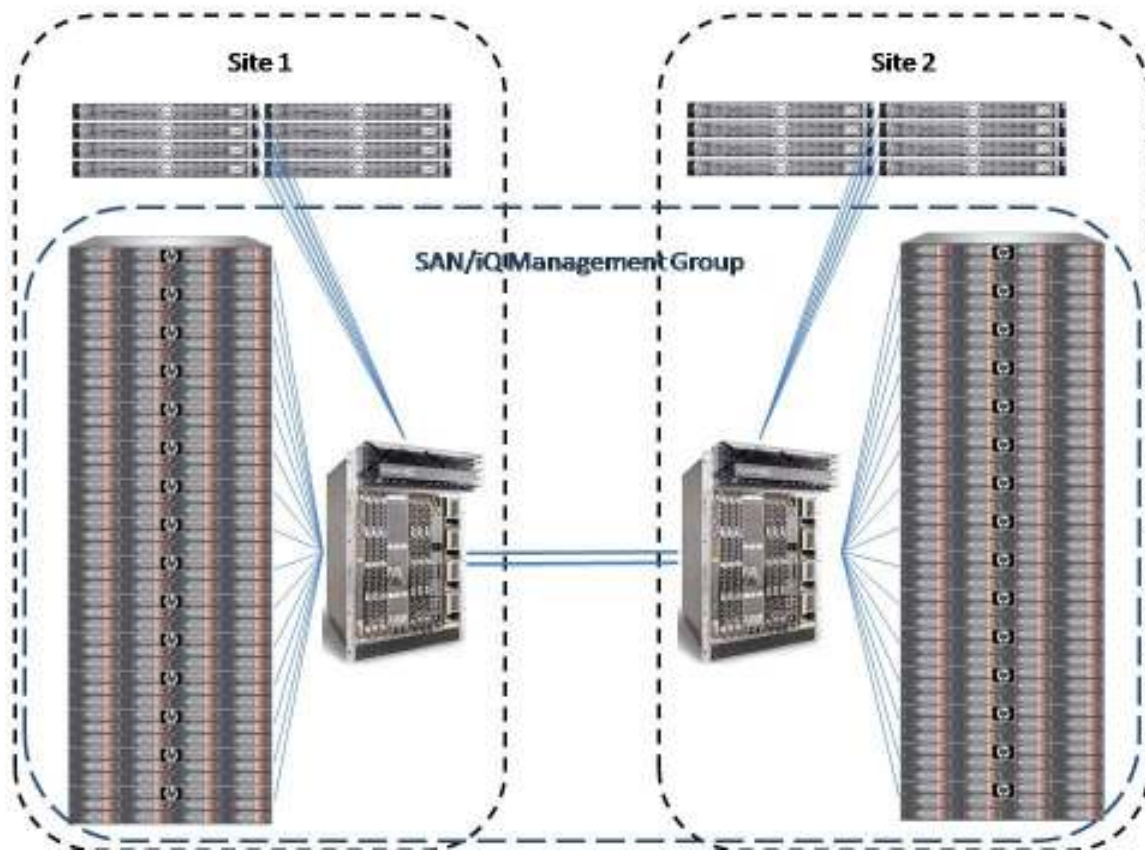
LeftHand's Solution Pack for Microsoft Windows provides essential tools for simplifying SAN management and scaling Microsoft Exchange as the number of users grow. The solution pack includes VSS (Volume Shadow Copy Service) Provider, VDS (Virtual Disk Service) Provider, and LeftHand's DSM (Device Specific Module) technology for MPIO. LeftHand's DSM for MPIO is built with patent pending technology that delivers unmatched performance for Windows applications on SAN/iQ clustered SANs.

## **Solution Description**

This LeftHand Networks ESRP solution is comprised of 30 HP ProLiant DL320s storage modules powered by SAN/iQ® 6.6. All data is synchronously replicated between two sets of 15 storage modules.

The HP ProLiant DL320s platform is configured with

- 2.6GHz Dual core processor
- 2GB of RAM
- 512mb battery backed cache
- 12 300GB 15k RPM SAS drives
- Dual power supplies
- Dual Gigabit Ethernet adapters



SAN/iQ® 6.6 Windows Server Catalog listing

<http://www.windowsservercatalog.com/item.aspx?idItem=e77e0199-31dd-b816-cbf0-18a0bc269ee9>

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

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

## **Targeted Customer Profile**

This LeftHand Networks ESRP solution is intended for large enterprise organizations with high user load and demanding recovery point/time objectives.

- No limit on number of hosts that can connect to storage
- User IO profile
  - Exchange 2007 'heavy' outlook users with 20% overhead added, .4 IOPS/user
  - ~300MB per mailbox
- Backup strategy
  - Nightly SAN snapshots driven by VSS
  - Weekly full backups to disk driven from off host VSS enabled backup application
- SLA time for restore.
  - 100GB db restore from snapshot ~5 minutes of administrator work rolling back snapshot and mounting database
  - 100GB db restore from tape ~40 minutes depending on backup disk speed plus ~5 minutes of administrator work mounting database

## **Tested Deployment**

The following tables summarize the testing environment:

### **Simulated Exchange Configuration:**

Number of Exchange mailboxes simulated	50,000
Number of hosts	16
Number of mailboxes/host	3125
Number of storage groups/host	3
Number of mailbox stores/storage group	5
Number of mailboxes/mailbox store	~208
Number of mailbox store LUNs/storage group	2
Simulated profile: I/O's per second per mailbox (IOPS, include 20% headroom)	.4 IOPS / Exchange 2007 'heavy' user
Database LUN size	500GB
Log LUN size	10GB
Backup LUN size/storage group	NA
Total database size for performance testing	19,563 GB
% storage capacity used by Exchange database**	80%

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

### Primary Storage Hardware

Storage Connectivity (Fiber Channel, SAS, SATA, iSCSI)	iSCSI
Storage model and OS/firmware revision	SAN/iQ® 6.6 on HP DL320s <a href="http://www.windowsservercatalog.com/item.aspx?idItem=e77e0199-31dd-b816-cbf0-18a0bc269ee9">http://www.windowsservercatalog.com/item.aspx?idItem=e77e0199-31dd-b816-cbf0-18a0bc269ee9</a>
Storage cache	7680MB (512MB / storage module)
Number of storage controllers	15
Number of storage ports	30
Maximum bandwidth of storage connectivity to host	30Gbit
Switch type/model/firmware revision	48 port 1000Base-T Ethernet Force 10 E600 EF series OS version 6.5.1.3
HBA model and firmware	MS Software initiator 2.03
Number of HBA's/host	2 Gbit network adapters No Jumbo Frames or offload Flow control enabled
Host server type	Dell 1850 3 GHz 2 GB RAM
Total number of disks tested in solution	180
Maximum number of spindles can be hosted in the storage	No maximum

### Primary Storage Software

HBA driver	MS iSCSI initiator 2.03
HBA QueueTarget Setting	NA
HBA QueueDepth Setting	NA
Multi-Pathing	SAN/iQ® 6.6 Virtual IP Load Balancing
Host OS	Windows 2003 R2 x64

ESE.dll file version	08.00.0685.024
Replication solution name/version	SAN/iQ® 6.6 2 way synchronous replication

### **Primary Storage Disk Configuration (Mailbox Store Disks)**

Disk type, speed and firmware revision	15K SAS
Raw capacity per disk (GB)	274.23GB
Number of physical disks in test	180
total raw storage capacity (GB)	49,362 GB
Disk slice size (GB)	NA
Number of slices per LUN or number of disks per LUN	30 disks per LUN
Raid level	RAID 10 at storage level all striped
Total formatted capacity	24,480GB
Storage capacity utilization	49.5%
Database capacity utilization	39.6%

### **Primary Storage Disk Configuration (Transactional Log Disks)**

Disk type, speed and firmware revision	15K SAS
Raw capacity per disk (GB)	274.23GB
Number of Spindles in test	180 (the same spindles as the databases)
total raw storage capacity (GB)	49,362GB
Disk slice size (GB)	NA
Number of slices per LUN or number of disks per LUN	30 disks per LUN
Raid level	RAID 10 at storage level all striped
Total formatted capacity	24,480GB

### ***Streaming Backup***

NA

### ***Replication Configuration***

Replication mechanism	Synchronous Storage Based Replication
Number of links	2
Simulated link distance	1.24 miles
Link type	IP over Fibre

Link bandwidth	10Gbps
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### Replicated Storage Hardware

Storage Connectivity (Fiber Channel, SAS, SATA, iSCSI)	iSCSI
Storage model and OS/firmware revision	SAN/iQ® 6.6 on HP DL320s <a href="http://www.windowsservercatalog.com/item.aspx?idItem=e77e31dd-b816-cbf0-18a0bc269ee9">http://www.windowsservercatalog.com/item.aspx?idItem=e77e31dd-b816-cbf0-18a0bc269ee9</a>
Storage cache	7680MB
Number of storage controllers	15
Number of storage ports	30
Maximum bandwidth of storage connectivity to host	30Gbit
Switch type/model/firmware revision	48 port 1000Base-T Ethernet Force 10 E600 EF series OS version 6.5.1.3
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Host OS	Windows 2003 R2 x64
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Replication solution name/version	SAN/iQ® 6.6 2 way synchronous replication

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Raw capacity per disk (GB)	274.23GB
Number of physical disks in test	180

total raw storage capacity (GB)	49,362 GB
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Storage capacity utilization	49.5%
Database capacity utilization	39.6%

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Disk type, speed and firmware revision	15K SAS
Raw capacity per disk (GB)	274.23GB
Number of Spindles in test	180 (the same spindles as the databases)
total raw storage capacity (GB)	49,362GB
Disk slice size (GB)	NA
Number of slices per LUN or number of disks per LUN	30 disks per LUN
Raid level	RAID 10 at storage level all striped
Total formatted capacity	24,480GB

### **Best Practices**

Exchange 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 Exchange 2007 best practices on storage design, please visit <http://technet.microsoft.com/en-us/library/bb124518.aspx>

### ***SAN/iQ® Core Storage/Replication***

1. Exchange Logs and Data should be separated by volumes. For example; three storage groups with any number of databases should have 6 volumes (LUNs). One volume for each Storage Groups' logs and 1 for each Storage Groups' associated databases.
2. Exchange databases and logs can be hosted on the same SAN/iQ cluster. To achieve the highest performance for Exchange it should be separated from other applications on its' own SAN/iQ cluster or clusters.
3. Exchange volumes should always be 2 way synchronously replicated in the storage cluster even if not separated between sites. 2 way

replication (Network RAID 10, similar to disk RAID 0+1) guards against storage unit failures regardless of RAID type within each storage module.

4. RAID 10 within individual storage modules provides the best performance and redundancy combination.
5. Snapshots of Storage Groups and their databases should be taken simultaneously. Optimally this should be done using the VSS framework with the LeftHand Networks VSS provider.
6. Volumes should be aligned to a 64K boundary. For diskpart this is a starting sector of 128 and for diskpart this should be "align=64".
7. Full dual Gigabit bandwidth (2000mbit) network with a maximum 2ms latency roundtrip (ping) between all nodes is required for optimal performance.
8. Configure Exchange servers with dual gigabit network cards dedicated for the storage network.
9. Do not register the IP address of the storage network cards on your domain controller.
10. Keep the storage network physically separated from public or corporate LANs when possible. When physical separation is not possible, logical separation using separate subnets and vlans is necessary.
11. Exchange implementations with over 10,000 users should split storage modules into multiple clusters within the same management group. Fewer than 10,000 medium users can utilize a single cluster.
12. If High latency is experienced on the storage cluster inspect for the following in order;
  - All storage modules Cache batteries are in "normal" state
  - Ping between storage modules and hosts looking for high latency connections > 2 ms
  - All network connections are configured 1000mbit full duplex with flow control enabled
  - There is no RAID rebuild or volume re-stripe in progress
  - There are no iSCSI disconnect error messages in hosts system logs

The following best practices are specific to multi site storage based synchronous replication (SAN/iQ® 2 way replication).

1. Links between replication sites should
  - a. Never share a switch between sites
  - b. When possible be comprised of redundant paths
  - c. Have a maximum round trip latency of 2ms to maintain performance
2. Bandwidth necessary between sites increases along with the number of SAN/iQ modules at the rate of approximately 50MB/s per storage module pair. For example; this configuration of 15 nodes per site would require at least 750MB/s of bandwidth between sites.

3. Trouble shooting high latency on database or log LUNs should be done in the same manner as single site configurations with special attention paid to the latency on the links between sites
4. See the following Microsoft documentation for storage based replication best practices and support criteria:

[Deployment Guidelines for Data Replication](#)

<http://www.microsoft.com/technet/prodtechnol/exchange/guides/E2k3DataRepl/bedf62a9-dff7-49a8-bd27-b2f1c46d5651.mspx>

[Multi-site data replication support for Exchange](#)

<http://support.microsoft.com/?kbid=895847>

### ***Backup strategy***

- Snapshot Backup strategy
  - Nightly SAN snapshots driven by VSS
  - Weekly full backups to disk driven from off host VSS enabled backup application
- SLA time for restore.
  - 100GB db restore from snapshot ~5 minutes of administrator work rolling back snapshot and mounting database
  - 100GB db restore from tape ~40 minutes depending on backup disk speed plus ~5 minutes of administrator work mounting database

### **Contact for Additional Information**

For additional sales and support information please contact

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[www.lefthandnetworks.com](http://www.lefthandnetworks.com)

### **Test Result Summary**

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

#### ***Reliability***

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

The following list provides an overview: (click on the underlined word will show the html report after the reliability tests run)

- No application or disk errors were reported in event logs
- No errors were reported during the database and log checksum
- No errors were reported on the replicated storage database and log checksum

### **Primary Storage Performance Results**

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

#### **Individual Server Metrics:**

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

<b>Server 1</b>	
<b>Database I/O</b>	
Average Database Disk Transfers/sec	1233.87
Average Database Disk Reads/sec	678
Average Database Disk Writes/sec	555
Average Database Disk Read Latency (ms)	17
Average Database Disk Write Latency (ms)	9
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	269
Average Log Disk Write Latency (ms)	2

<b>Server 2</b>	
<b>Database I/O</b>	
Average Database Disk Transfers/sec	1251.5
Average Database Disk Reads/sec	688
Average Database Disk Writes/sec	563
Average Database Disk Read Latency (ms)	17
Average Database Disk Write Latency (ms)	10
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	272
Average Log Disk Write Latency (ms)	2

<b>Server 3</b>	
<b>Database I/O</b>	
Average Database Disk Transfers/sec	1240.7
Average Database Disk Reads/sec	683
Average Database Disk Writes/sec	558
Average Database Disk Read Latency (ms)	17
Average Database Disk Write Latency (ms)	9
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	269
Average Log Disk Write Latency (ms)	2

<b>Server 4</b>	
<b>Database I/O</b>	
Average Database Disk Transfers/sec	1224.6
Average Database Disk Reads/sec	672
Average Database Disk Writes/sec	552
Average Database Disk Read Latency (ms)	18
Average Database Disk Write Latency (ms)	10
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	267
Average Log Disk Write Latency (ms)	2

<b>Server 5</b>	
<b>Database I/O</b>	
Average Database Disk Transfers/sec	1248.9
Average Database Disk Reads/sec	687
Average Database Disk Writes/sec	562
Average Database Disk Read Latency (ms)	17
Average Database Disk Write Latency (ms)	10
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	272
Average Log Disk Write Latency (ms)	2

<b>Server 6</b>	
<b>Database I/O</b>	
Average Database Disk Transfers/sec	1245.2
Average Database Disk Reads/sec	685
Average Database Disk Writes/sec	560
Average Database Disk Read Latency (ms)	17

Average Database Disk Write Latency (ms)	9
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	269
Average Log Disk Write Latency (ms)	2

<b>Server 7</b>	
<b>Database I/O</b>	
Average Database Disk Transfers/sec	1230.6
Average Database Disk Reads/sec	678
Average Database Disk Writes/sec	552
Average Database Disk Read Latency (ms)	17
Average Database Disk Write Latency (ms)	9
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	267
Average Log Disk Write Latency (ms)	2

<b>Server 8</b>	
<b>Database I/O</b>	
Average Database Disk Transfers/sec	1230.89
Average Database Disk Reads/sec	678
Average Database Disk Writes/sec	553
Average Database Disk Read Latency (ms)	17
Average Database Disk Write Latency (ms)	10
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	268
Average Log Disk Write Latency (ms)	2

<b>Server 9</b>	
<b>Database I/O</b>	
Average Database Disk Transfers/sec	1237.5
Average Database Disk Reads/sec	682
Average Database Disk Writes/sec	556
Average Database Disk Read Latency (ms)	17
Average Database Disk Write Latency (ms)	10
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	270
Average Log Disk Write Latency (ms)	2

<b>Server 10</b>	
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<b>Database I/O</b>	
Average Database Disk Transfers/sec	1212.1
Average Database Disk Reads/sec	666
Average Database Disk Writes/sec	546
Average Database Disk Read Latency (ms)	17
Average Database Disk Write Latency (ms)	10
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	264
Average Log Disk Write Latency (ms)	2

<b>Server 11</b>	
<b>Database I/O</b>	
Average Database Disk Transfers/sec	1224
Average Database Disk Reads/sec	672
Average Database Disk Writes/sec	552
Average Database Disk Read Latency (ms)	17
Average Database Disk Write Latency (ms)	10
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	267
Average Log Disk Write Latency (ms)	2

<b>Server 12</b>	
<b>Database I/O</b>	
Average Database Disk Transfers/sec	1247.3
Average Database Disk Reads/sec	688
Average Database Disk Writes/sec	560
Average Database Disk Read Latency (ms)	17
Average Database Disk Write Latency (ms)	10
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	270
Average Log Disk Write Latency (ms)	2

<b>Server 13</b>	
<b>Database I/O</b>	
Average Database Disk Transfers/sec	1228.9
Average Database Disk Reads/sec	676
Average Database Disk Writes/sec	553
Average Database Disk Read Latency (ms)	16
Average Database Disk Write Latency	10

(ms)	
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	267
Average Log Disk Write Latency (ms)	2

<b>Server 14</b>	
<b>Database I/O</b>	
Average Database Disk Transfers/sec	1225.3
Average Database Disk Reads/sec	674
Average Database Disk Writes/sec	552
Average Database Disk Read Latency (ms)	17
Average Database Disk Write Latency (ms)	10
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	266
Average Log Disk Write Latency (ms)	2

<b>Server 15</b>	
<b>Database I/O</b>	
Average Database Disk Transfers/sec	1229.2
Average Database Disk Reads/sec	677
Average Database Disk Writes/sec	552
Average Database Disk Read Latency (ms)	17
Average Database Disk Write Latency (ms)	9
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	266
Average Log Disk Write Latency (ms)	2

<b>Server 16</b>	
<b>Database I/O</b>	
Average Database Disk Transfers/sec	1177
Average Database Disk Reads/sec	648
Average Database Disk Writes/sec	529
Average Database Disk Read Latency (ms)	17
Average Database Disk Write Latency (ms)	11
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	255
Average Log Disk Write Latency (ms)	2

**Aggregate Performance across all servers Metrics:**

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

<b>Database I/O</b>	
Average Database Disk Transfers/sec	19687.56
Average Database Disk Reads/sec	10832
Average Database Disk Writes/sec	8855
Average Database Disk Read Latency (ms)	17
Average Database Disk Write Latency (ms)	9.75
<b>Transaction Log I/O</b>	
Average Log Disk Writes/sec	4578
Average Log Disk Write Latency (ms)	2

### ***Replicated Storage Performance Results***

The Replicated Storage provided by LeftHand Networks SAN/iQ® 2 way synchronous replication provides for a single LUN to be replicated synchronously within the storage system. These performance tests would typically measure the performance of the secondary storage accessed through secondary LUNs if it were replicated by software external to the SAN. The performance tests are identical to that of the Primary Storage in the case of SAN/iQ® replication since there is only one accessible version of the data to hosts. In the event of a loss or offline of the primary or secondary versions of the data performance would actually improve since data is no longer being replicated synchronously. Performance degradation would occur at the time when offline storage came available again and needed to be re-synchronized. Users have control over the degree of performance degradation in the form of a setting for bandwidth allowed for re-synchronization within SAN/iQ®.

### ***Streaming Backup 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. First one is to measure the read IO performance metrics by running checksum on all the databases and log files. The second test is to measure the end to end performance when the databases are backed up to disks.

### **Database Read-only Performance**

The test is to measure the maximum rate at which databases could be streaming backed up. The following table shows the average rate for a single database file.

MB read/sec per storage group	11.5 MB/s
MB read/sec total	555.24 MB/s
File size/Seconds taken	22736.4GB took 11 hours and 40

	minutes
--	---------

### **Log Read-only Performance**

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

Average time to play one Log file (sec)	0.25
---	------

### **Conclusion**

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

ESRP program is not designed to be a benchmarking program; tests are not designed to getting the maximum throughput for a giving solution. Rather, it is focused on producing recommendations from vendors for Exchange application. So the data presented in this document should not be used for direct comparisons among the solutions.

## **Appendix**

### **Performance test results**

#### **Server1**

### **Microsoft Exchange Server Jetstress**

#### ***Performance Test Result Report***

##### Test Summary

Overall Test  
Result Pass

Machine  
Name PERCEPT-GU2AV0B

Test Description 30 320s in RAID10 + synchronous 2 way replication ESRP of 50K 'heavy' 2007 us  
(.4 IOPS)

Test Start  
Time 4/5/2007 8:45:52 AM

Test End  
Time 4/5/2007 10:48:36 AM

Jetstress  
Version 08.01.0094.000

Ese Version 08.00.0685.024

Operating  
System Microsoft Windows Server 2003 R2 Service Pack 1 (5.2.3790.65536)

[C:\Program Files\Exchange](#)  
 Performance [Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_45\\_50](#)  
 Log [C:\Program Files\Exchange](#)  
[Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_48](#)

Database Sizing and Throughput  
 Achieved I/O per Second 1233.87  
 Planned I/O per Second 1250  
 Initial database size 1303392141312  
 Final database size 1312888045568  
 Database files (count) 15

Jetstress System Parameters

Thread count 11 (per-storage group)  
 Log buffers 9000  
 Minimum database cache 96.0 MB  
 Maximum database cache 768.0 MB  
 Insert operations 25%  
 Delete operations 10%  
 Replace operations 50%  
 Read operations 15%  
 Lazy commits 80%

Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.018	0.009	226.392	185.844	(n/a)
Database (Y:)	0.018	0.009	225.095	184.312	(n/a)
Database (Z:)	0.016	0.011	226.952	185.275	(n/a)
Log (U:)	0.000	0.002	0.000	87.835	13200.550
Log (V:)	0.000	0.002	0.000	92.634	12443.984
Log (W:)	0.000	0.002	0.000	88.466	13051.401

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	8.632	3.333	24.323
Available MBytes	829.679	827.000	869.000
Free System Page Table Entries	2081436.000	2081436.000	2081436.000
Transition Pages	0.000	0.000	0.000

RePurposed/sec

Pool Nonpaged Bytes	35143867.733	35041280.000	35487744.000
Pool Paged Bytes	37044172.800	36945920.000	37535744.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/5/2007 8:45:52 AM -- Jetstress testing begins ...  
4/5/2007 8:45:52 AM -- Prepare testing begins ...  
4/5/2007 8:45:55 AM -- Attaching databases ...  
4/5/2007 8:45:55 AM -- Prepare testing ends.  
4/5/2007 8:45:55 AM -- Dispatching transactions begins ...  
4/5/2007 8:45:55 AM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)  
4/5/2007 8:45:55 AM -- Database flush thresholds: (start: 7.7 MB, stop: 15.4 MB)  
4/5/2007 8:45:56 AM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).  
4/5/2007 8:45:56 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).  
4/5/2007 8:45:57 AM -- Operation mix: Sessions 11, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
4/5/2007 8:45:57 AM -- Performance logging begins (interval: 15000 ms).  
4/5/2007 8:45:57 AM -- Attaining prerequisites:  
4/5/2007 8:48:30 AM -- \Database(JetstressWin)\Database Cache Size, Last: 724942800.0 (lower bound: 724775700.0, upper bound: none)  
4/5/2007 10:48:31 AM -- Performance logging ends.  
4/5/2007 10:48:31 AM -- JetInterop batch transaction stats: 76040, 75965, and 75947.  
4/5/2007 10:48:32 AM -- Dispatching transactions ends.  
4/5/2007 10:48:32 AM -- Shutting down databases ...  
4/5/2007 10:48:36 AM -- Instance1868.1 (complete), Instance1868.2 (complete), and Instance1868.3 (complete)  
4/5/2007 10:48:37 AM -- Performance logging begins (interval: 30000 ms).  
4/5/2007 10:48:37 AM -- Verifying database checksums ...  
4/5/2007 1:53:18 PM -- X: (100% processed), Y: (100% processed), and Z: (100% processed)  
4/5/2007 1:53:19 PM -- Performance logging ends.  
4/5/2007 1:53:19 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10\\_48\\_36.blg](#) has 369 samples.  
4/5/2007 1:53:22 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10\\_48\\_36.html](#) is saved.  
4/5/2007 1:53:22 PM -- Verifying log checksums ...  
4/5/2007 1:53:32 PM -- U:\ (21 logs passed), V:\ (22 logs passed), and W:\ (22 logs passed)  
4/5/2007 1:53:32 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\Performance 2007 4 5 8 4](#)



Achieved I/O per Second 1251.538  
 Planned I/O per Second 1250  
 Initial database size 1303834640384  
 Final database size 1313471053824  
 Database files (count) 15

#### Jetstress System Parameters

Thread count 11 (per-storage group)  
 Log buffers 9000  
 Minimum database cache 96.0 MB  
 Maximum database cache 768.0 MB  
 Insert operations 25%  
 Delete operations 10%  
 Replace operations 50%  
 Read operations 15%  
 Lazy commits 80%

#### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.017	0.011	229.143	188.677	(n/a)
Database (Y:)	0.018	0.009	227.933	186.710	(n/a)
Database (Z:)	0.017	0.010	231.371	187.703	(n/a)
Log (U:)	0.000	0.002	0.000	93.945	12548.617
Log (V:)	0.000	0.002	0.000	92.590	12620.131
Log (W:)	0.000	0.003	0.000	85.358	13663.827

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	8.879	4.115	25.052
Available MBytes	837.730	834.000	914.000
Free System Page Table Entries	2081766.000	2081766.000	2081766.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	35268297.181	35168256.000	35815424.000
Pool Paged Bytes	35786019.659	35708928.000	36286464.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/5/2007 8:45:55 AM -- Jetstress testing begins ...  
 4/5/2007 8:45:55 AM -- Prepare testing begins ...  
 4/5/2007 8:45:58 AM -- Attaching databases ...  
 4/5/2007 8:45:58 AM -- Prepare testing ends.  
 4/5/2007 8:45:58 AM -- Dispatching transactions begins ...  
 4/5/2007 8:45:58 AM -- Database cache settings: (minimum: 96.0 MB,  
 maximum: 768.0 MB)  
 4/5/2007 8:45:58 AM -- Database flush thresholds: (start: 7.7 MB, stop:  
 15.4 MB)  
 4/5/2007 8:45:58 AM -- Database read latency thresholds: (average: 0.02  
 seconds/read, maximum: 0.05 seconds/read).  
 4/5/2007 8:45:58 AM -- Log write latency thresholds: (average: 0.01  
 seconds/write, maximum: 0.05 seconds/write).  
 4/5/2007 8:45:59 AM -- Operation mix: Sessions 11, Inserts 25%, Deletes  
 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
 4/5/2007 8:45:59 AM -- Performance logging begins (interval: 15000 ms).  
 4/5/2007 8:45:59 AM -- Attaining prerequisites:  
 4/5/2007 8:48:29 AM -- \Database(JetstressWin)\Database Cache Size, Last:  
 725950500.0 (lower bound: 724775700.0, upper bound: none)  
 4/5/2007 10:48:31 AM -- Performance logging ends.  
 4/5/2007 10:48:31 AM -- JetInterop batch transaction stats: 77107, 76929,  
 and 77294.  
 4/5/2007 10:48:32 AM -- Dispatching transactions ends.  
 4/5/2007 10:48:32 AM -- Shutting down databases ...  
 4/5/2007 10:48:36 AM -- Instance1632.1 (complete), Instance1632.2  
 (complete), and Instance1632.3 (complete)  
 4/5/2007 10:48:37 AM -- Performance logging begins (interval: 30000 ms).  
 4/5/2007 10:48:37 AM -- Verifying database checksums ...  
 4/5/2007 1:21:06 PM -- X: (100% processed), Y: (100% processed), and Z:  
 (100% processed)  
 4/5/2007 1:21:07 PM -- Performance logging ends.  
 4/5/2007 1:21:07 PM -- [C:\Program Files\Exchange  
 Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_48\\_36.blg](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\DBChecksum_2007_4_5_10_48_36.blg)  
 has 304 samples.  
 4/5/2007 1:21:10 PM -- [C:\Program Files\Exchange  
 Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_48\\_36.html](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\DBChecksum_2007_4_5_10_48_36.html)  
 is saved.  
 4/5/2007 1:21:10 PM -- Verifying log checksums ...  
 4/5/2007 1:21:25 PM -- U:\ (22 logs passed), V:\ (22 logs passed), and W:\  
 (22 logs passed)  
 4/5/2007 1:21:25 PM -- [C:\Program Files\Exchange  
 Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_4\\_5\\_58.blg](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\Performance_2007_4_5_8_4_5_58.blg)  
 has 490 samples.  
 4/5/2007 1:21:25 PM -- Creating test report ...  
 4/5/2007 1:21:31 PM -- Volume X: has 0.0167 for Avg. Disk sec/Read.  
 4/5/2007 1:21:31 PM -- Volume Y: has 0.0176 for Avg. Disk sec/Read.  
 4/5/2007 1:21:31 PM -- Volume Z: has 0.0169 for Avg. Disk sec/Read.



Final database size 1313691254784  
 Database files (count) 15

Jetstress System Parameters

Thread count 11 (per-storage group)  
 Log buffers 9000  
 Minimum database cache 96.0 MB  
 Maximum database cache 768.0 MB  
 Insert operations 25%  
 Delete operations 10%  
 Replace operations 50%  
 Read operations 15%  
 Lazy commits 80%

Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.018	0.009	227.094	186.990	(n/a)
Database (Y:)	0.017	0.009	227.748	186.029	(n/a)
Database (Z:)	0.017	0.011	227.724	185.208	(n/a)
Log (U:)	0.000	0.002	0.000	88.236	13218.683
Log (V:)	0.000	0.002	0.000	93.143	12465.903
Log (W:)	0.000	0.002	0.000	88.066	13074.268

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	8.741	3.490	23.750
Available MBytes	839.802	837.000	886.000
Free System Page Table Entries	2081766.000	2081766.000	2081766.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	35744110.933	35553280.000	36405248.000
Pool Paged Bytes	36097971.200	36028416.000	36585472.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/5/2007 8:46:05 AM -- Jetstress testing begins ...  
 4/5/2007 8:46:05 AM -- Prepare testing begins ...  
 4/5/2007 8:46:08 AM -- Attaching databases ...  
 4/5/2007 8:46:08 AM -- Prepare testing ends.

4/5/2007 8:46:08 AM -- Dispatching transactions begins ...  
 4/5/2007 8:46:08 AM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)  
 4/5/2007 8:46:08 AM -- Database flush thresholds: (start: 7.7 MB, stop: 15.4 MB)  
 4/5/2007 8:46:09 AM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).  
 4/5/2007 8:46:09 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).  
 4/5/2007 8:46:09 AM -- Operation mix: Sessions 11, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
 4/5/2007 8:46:09 AM -- Performance logging begins (interval: 15000 ms).  
 4/5/2007 8:46:09 AM -- Attaining prerequisites:  
 4/5/2007 8:48:57 AM -- \Database(JetstressWin)\Database Cache Size, Last: 725008400.0 (lower bound: 724775700.0, upper bound: none)  
 4/5/2007 10:49:00 AM -- Performance logging ends.  
 4/5/2007 10:49:00 AM -- JetInterop batch transaction stats: 76474, 76543, and 76327.  
 4/5/2007 10:49:00 AM -- Dispatching transactions ends.  
 4/5/2007 10:49:00 AM -- Shutting down databases ...  
 4/5/2007 10:49:04 AM -- Instance496.1 (complete), Instance496.2 (complete), and Instance496.3 (complete)  
 4/5/2007 10:49:05 AM -- Performance logging begins (interval: 30000 ms).  
 4/5/2007 10:49:05 AM -- Verifying database checksums ...  
 4/5/2007 1:25:42 PM -- X: (100% processed), Y: (100% processed), and Z: (100% processed)  
 4/5/2007 1:25:43 PM -- Performance logging ends.  
 4/5/2007 1:25:43 PM -- [C:\Program Files\Exchange Jetstress\30 320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10 49 4.blg](#) has 313 samples.  
 4/5/2007 1:25:46 PM -- [C:\Program Files\Exchange Jetstress\30 320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10 49 4.html](#) is saved.  
 4/5/2007 1:25:46 PM -- Verifying log checksums ...  
 4/5/2007 1:26:00 PM -- U:\ (22 logs passed), V:\ (21 logs passed), and W:\ (22 logs passed)  
 4/5/2007 1:26:00 PM -- [C:\Program Files\Exchange Jetstress\30 320s RAID10 Rep2\Performance\Performance 2007 4 5 8 4 6 9.blg](#) has 491 samples.  
 4/5/2007 1:26:00 PM -- Creating test report ...  
 4/5/2007 1:26:05 PM -- Volume X: has 0.0178 for Avg. Disk sec/Read.  
 4/5/2007 1:26:05 PM -- Volume Y: has 0.0171 for Avg. Disk sec/Read.  
 4/5/2007 1:26:05 PM -- Volume Z: has 0.0165 for Avg. Disk sec/Read.  
 4/5/2007 1:26:05 PM -- Volume U: has 0.0024 for Avg. Disk sec/Write.  
 4/5/2007 1:26:05 PM -- Volume U: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2007 1:26:05 PM -- Volume V: has 0.0017 for Avg. Disk sec/Write.  
 4/5/2007 1:26:05 PM -- Volume V: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2007 1:26:05 PM -- Volume W: has 0.0022 for Avg. Disk sec/Write.

4/5/2007 1:26:05 PM -- Volume W: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 1:26:05 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
4/5/2007 1:26:05 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
4/5/2007 1:26:05 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_46\\_26\\_9.xml](#) has 479 samples queried.

## Server4

# Microsoft Exchange Server Jetstress

## *Performance Test Result Report*

### Test Summary

Overall Test Result Pass

Machine Name PERCEPT-MAX0Q2A

Test Description 30 320s in RAID10 + synchronous 2 way replication ESRP of 64K 'heavy' 2007 us (.4 IOPS)

Test Start Time 4/5/2007 8:46:23 AM

Test End Time 4/5/2007 10:49:10 AM

Jetstress Version 08.01.0094.000

Ese Version 08.00.0685.024

Operating System Microsoft Windows Server 2003 R2 Service Pack 1 (5.2.3790.65536)

Performance Log [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_46\\_26\\_9.xml](#)  
[C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_49](#)

### Database Sizing and Throughput

Achieved I/O per Second 1224.6

Planned I/O per Second 1250

Initial database size 1303681548288

Final database size 1313173258240

Database files (count) 15

### Jetstress System Parameters

Thread count 11 (per-storage group)  
 Log buffers 9000  
 Minimum database cache 96.0 MB  
 Maximum database cache 768.0 MB  
 Insert operations 25%  
 Delete operations 10%  
 Replace operations 50%  
 Read operations 15%  
 Lazy commits 80%

Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.017	0.011	225.569	184.391	(n/a)
Database (Y:)	0.018	0.009	223.124	184.673	(n/a)
Database (Z:)	0.018	0.011	223.663	183.180	(n/a)
Log (U:)	0.000	0.002	0.000	92.118	12474.092
Log (V:)	0.000	0.002	0.000	91.210	12730.943
Log (W:)	0.000	0.003	0.000	84.043	13585.651

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	8.608	3.802	23.229
Available MBytes	837.733	834.000	892.000
Free System Page Table Entries	2081798.000	2081798.000	2081798.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	35469516.800	35401728.000	35831808.000
Pool Paged Bytes	35962001.067	35893248.000	36462592.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/5/2007 8:46:23 AM -- Jetstress testing begins ...  
 4/5/2007 8:46:23 AM -- Prepare testing begins ...  
 4/5/2007 8:46:26 AM -- Attaching databases ...  
 4/5/2007 8:46:26 AM -- Prepare testing ends.  
 4/5/2007 8:46:26 AM -- Dispatching transactions begins ...  
 4/5/2007 8:46:26 AM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)  
 4/5/2007 8:46:26 AM -- Database flush thresholds: (start: 7.7 MB, stop: 15.4 MB)

4/5/2007 8:46:27 AM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).  
4/5/2007 8:46:27 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).  
4/5/2007 8:46:28 AM -- Operation mix: Sessions 11, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
4/5/2007 8:46:28 AM -- Performance logging begins (interval: 15000 ms).  
4/5/2007 8:46:28 AM -- Attaining prerequisites:  
4/5/2007 8:49:05 AM -- \Database(JetstressWin)\Database Cache Size, Last: 725278700.0 (lower bound: 724775700.0, upper bound: none)  
4/5/2007 10:49:06 AM -- Performance logging ends.  
4/5/2007 10:49:06 AM -- JetInterop batch transaction stats: 75896, 75566, and 75703.  
4/5/2007 10:49:07 AM -- Dispatching transactions ends.  
4/5/2007 10:49:07 AM -- Shutting down databases ...  
4/5/2007 10:49:10 AM -- Instance1940.1 (complete), Instance1940.2 (complete), and Instance1940.3 (complete)  
4/5/2007 10:49:11 AM -- Performance logging begins (interval: 30000 ms).  
4/5/2007 10:49:11 AM -- Verifying database checksums ...  
4/5/2007 1:38:50 PM -- X: (100% processed), Y: (100% processed), and Z: (100% processed)  
4/5/2007 1:38:51 PM -- Performance logging ends.  
4/5/2007 1:38:51 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_49\\_10.blg](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\DBChecksum_2007_4_5_10_49_10.blg) has 339 samples.  
4/5/2007 1:38:54 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_49\\_10.html](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\DBChecksum_2007_4_5_10_49_10.html) is saved.  
4/5/2007 1:38:54 PM -- Verifying log checksums ...  
4/5/2007 1:39:07 PM -- U:\ (22 logs passed), V:\ (22 logs passed), and W:\ (22 logs passed)  
4/5/2007 1:39:07 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_4\\_6\\_27.blg](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\Performance_2007_4_5_8_4_6_27.blg) has 490 samples.  
4/5/2007 1:39:07 PM -- Creating test report ...  
4/5/2007 1:39:13 PM -- Volume X: has 0.0167 for Avg. Disk sec/Read.  
4/5/2007 1:39:13 PM -- Volume Y: has 0.0177 for Avg. Disk sec/Read.  
4/5/2007 1:39:13 PM -- Volume Z: has 0.0180 for Avg. Disk sec/Read.  
4/5/2007 1:39:13 PM -- Volume U: has 0.0016 for Avg. Disk sec/Write.  
4/5/2007 1:39:13 PM -- Volume U: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 1:39:13 PM -- Volume V: has 0.0019 for Avg. Disk sec/Write.  
4/5/2007 1:39:13 PM -- Volume V: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 1:39:13 PM -- Volume W: has 0.0029 for Avg. Disk sec/Write.  
4/5/2007 1:39:13 PM -- Volume W: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 1:39:13 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
4/5/2007 1:39:13 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
4/5/2007 1:39:13 PM -- <C:\Program Files\Exchange>

[Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_4\\_6\\_27.xml](#) has 479 samples queried.

## Server5

# Microsoft Exchange Server Jetstress

## *Performance Test Result Report*

### Test Summary

Overall Test Result Pass

Machine Name PERCEPT-9G2P6L8

Test Description 30 320s in RAID10 + synchronous 2 way replication ESRP of 50K 'heavy' 2007 us (.4 IOPS)

Test Start Time 4/5/2007 8:46:24 AM

Test End Time 4/5/2007 10:49:37 AM

Jetstress Version 08.01.0094.000

Ese Version 08.00.0685.024

Operating System Microsoft Windows Server 2003 R2 Service Pack 1 (5.2.3790.65536)

Performance Log [C:\Program Files\Exchange](#)  
[Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_46\\_28](#)  
[C:\Program Files\Exchange](#)  
[Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_49](#)

### Database Sizing and Throughput

Achieved I/O per Second 1248.985

Planned I/O per Second 1250

Initial database size 1304132435968

Final database size 1313722712064

Database files (count) 15

### Jetstress System Parameters

Thread count 11 (per-storage group)

Log buffers 9000

Minimum database cache 96.0 MB

Maximum database cache 768.0 MB

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

#### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.018	0.009	228.850	186.553	(n/a)
Database (Y:)	0.017	0.009	229.800	187.451	(n/a)
Database (Z:)	0.016	0.012	228.734	187.598	(n/a)
Log (U:)	0.000	0.002	0.000	88.745	13114.164
Log (V:)	0.000	0.002	0.000	94.014	12482.523
Log (W:)	0.000	0.002	0.000	89.481	13063.473

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	8.801	4.219	25.104
Available MBytes	841.119	838.000	917.000
Free System Page Table Entries	2081798.000	2081798.000	2081798.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	35464956.274	35348480.000	35909632.000
Pool Paged Bytes	35651354.079	35586048.000	36134912.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/5/2007 8:46:24 AM -- Jetstress testing begins ...  
 4/5/2007 8:46:24 AM -- Prepare testing begins ...  
 4/5/2007 8:46:27 AM -- Attaching databases ...  
 4/5/2007 8:46:27 AM -- Prepare testing ends.  
 4/5/2007 8:46:27 AM -- Dispatching transactions begins ...  
 4/5/2007 8:46:27 AM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)  
 4/5/2007 8:46:27 AM -- Database flush thresholds: (start: 7.7 MB, stop: 15.4 MB)  
 4/5/2007 8:46:28 AM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).  
 4/5/2007 8:46:28 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).

4/5/2007 8:46:29 AM -- Operation mix: Sessions 11, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
4/5/2007 8:46:29 AM -- Performance logging begins (interval: 15000 ms).  
4/5/2007 8:46:29 AM -- Attaining prerequisites:  
4/5/2007 8:49:29 AM -- \Database(JetstressWin)\Database Cache Size, Last: 727179300.0 (lower bound: 724775700.0, upper bound: none)  
4/5/2007 10:49:31 AM -- Performance logging ends.  
4/5/2007 10:49:31 AM -- JetInterop batch transaction stats: 77078, 77149, and 77022.  
4/5/2007 10:49:31 AM -- Dispatching transactions ends.  
4/5/2007 10:49:31 AM -- Shutting down databases ...  
4/5/2007 10:49:37 AM -- Instance444.1 (complete), Instance444.2 (complete), and Instance444.3 (complete)  
4/5/2007 10:49:38 AM -- Performance logging begins (interval: 30000 ms).  
4/5/2007 10:49:38 AM -- Verifying database checksums ...  
4/5/2007 1:37:26 PM -- X: (100% processed), Y: (100% processed), and Z: (100% processed)  
4/5/2007 1:37:27 PM -- Performance logging ends.  
4/5/2007 1:37:27 PM -- [C:\Program Files\Exchange Jetstress\30 320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10 49 37.blg](#) has 335 samples.  
4/5/2007 1:37:30 PM -- [C:\Program Files\Exchange Jetstress\30 320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10 49 37.html](#) is saved.  
4/5/2007 1:37:30 PM -- Verifying log checksums ...  
4/5/2007 1:37:44 PM -- U:\ (21 logs passed), V:\ (22 logs passed), and W:\ (22 logs passed)  
4/5/2007 1:37:44 PM -- [C:\Program Files\Exchange Jetstress\30 320s RAID10 Rep2\Performance\Performance 2007 4 5 8 4 6 28.blg](#) has 492 samples.  
4/5/2007 1:37:44 PM -- Creating test report ...  
4/5/2007 1:37:50 PM -- Volume X: has 0.0179 for Avg. Disk sec/Read.  
4/5/2007 1:37:50 PM -- Volume Y: has 0.0171 for Avg. Disk sec/Read.  
4/5/2007 1:37:50 PM -- Volume Z: has 0.0162 for Avg. Disk sec/Read.  
4/5/2007 1:37:50 PM -- Volume U: has 0.0024 for Avg. Disk sec/Write.  
4/5/2007 1:37:50 PM -- Volume U: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 1:37:50 PM -- Volume V: has 0.0017 for Avg. Disk sec/Write.  
4/5/2007 1:37:50 PM -- Volume V: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 1:37:50 PM -- Volume W: has 0.0021 for Avg. Disk sec/Write.  
4/5/2007 1:37:50 PM -- Volume W: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 1:37:50 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
4/5/2007 1:37:50 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
4/5/2007 1:37:50 PM -- [C:\Program Files\Exchange Jetstress\30 320s RAID10 Rep2\Performance\Performance 2007 4 5 8 4 6 28.xml](#) has 480 samples queried.

## Server6

# Microsoft Exchange Server Jetstress

## *Performance Test Result Report*

### Test Summary

Overall Test Result Pass

Machine Name PERCEPT-406B0ZZ

Test Description 30 320s in RAID10 + synchronous 2 way replication ESRP of 50K 'heavy' 2007 us (.4 IOPS)

Test Start Time 4/5/2007 8:46:34 AM

Test End Time 4/5/2007 10:49:45 AM

Jetstress Version 08.01.0094.000

Ese Version 08.00.0685.024

Operating System Microsoft Windows Server 2003 R2 Service Pack 1 (5.2.3790.65536)

Performance Log [C:\Program Files\Exchange\Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_46\\_34\\_10\\_49\\_45.log](C:\Program Files\Exchange\Jetstress\30_320s_RAID10_Rep2\Performance\Performance_2007_4_5_8_46_34_10_49_45.log)  
[C:\Program Files\Exchange\Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_49\\_45.log](C:\Program Files\Exchange\Jetstress\30_320s_RAID10_Rep2\Performance\DBChecksum_2007_4_5_10_49_45.log)

### Database Sizing and Throughput

Achieved I/O per Second 1245.227

Planned I/O per Second 1250

Initial database size 1303811571712

Final database size 1313362001920

Database files (count) 15

### Jetstress System Parameters

Thread count 11 (per-storage group)

Log buffers 9000

Minimum database cache 96.0 MB

Maximum database cache 768.0 MB

Insert operations 25%

Delete operations 10%

Replace operations 50%

Read operations 15%

Lazy commits 80%

#### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.017	0.011	229.524	185.910	(n/a)
Database (Y:)	0.018	0.008	228.027	185.805	(n/a)
Database (Z:)	0.017	0.010	227.839	188.122	(n/a)
Log (U:)	0.000	0.002	0.000	92.489	12509.245
Log (V:)	0.000	0.002	0.000	91.462	12684.139
Log (W:)	0.000	0.003	0.000	85.472	13777.162

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	8.729	3.073	24.115
Available MBytes	839.746	837.000	909.000
Free System Page Table Entries	2081798.000	2081798.000	2081798.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	35299362.133	35188736.000	35684352.000
Pool Paged Bytes	36115686.400	36040704.000	36597760.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/5/2007 8:46:34 AM -- Jetstress testing begins ...  
4/5/2007 8:46:34 AM -- Prepare testing begins ...  
4/5/2007 8:46:37 AM -- Attaching databases ...  
4/5/2007 8:46:37 AM -- Prepare testing ends.  
4/5/2007 8:46:37 AM -- Dispatching transactions begins ...  
4/5/2007 8:46:37 AM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)  
4/5/2007 8:46:37 AM -- Database flush thresholds: (start: 7.7 MB, stop: 15.4 MB)  
4/5/2007 8:46:38 AM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).  
4/5/2007 8:46:38 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).  
4/5/2007 8:46:39 AM -- Operation mix: Sessions 11, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
4/5/2007 8:46:39 AM -- Performance logging begins (interval: 15000 ms).  
4/5/2007 8:46:39 AM -- Attaining prerequisites:  
4/5/2007 8:49:36 AM -- \Database(JetstressWin)\Database Cache Size, Last:

725524500.0 (lower bound: 724775700.0, upper bound: none)  
4/5/2007 10:49:37 AM -- Performance logging ends.  
4/5/2007 10:49:37 AM -- JetInterop batch transaction stats: 76166, 75992,  
and 76731.  
4/5/2007 10:49:40 AM -- Dispatching transactions ends.  
4/5/2007 10:49:40 AM -- Shutting down databases ...  
4/5/2007 10:49:45 AM -- Instance972.1 (complete), Instance972.2  
(complete), and Instance972.3 (complete)  
4/5/2007 10:49:46 AM -- Performance logging begins (interval: 30000 ms).  
4/5/2007 10:49:46 AM -- Verifying database checksums ...  
4/5/2007 1:37:42 PM -- X: (100% processed), Y: (100% processed), and Z:  
(100% processed)  
4/5/2007 1:37:43 PM -- Performance logging ends.  
4/5/2007 1:37:43 PM -- [C:\Program Files\Exchange  
Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_49\\_45.blg](#)  
has 335 samples.  
4/5/2007 1:37:46 PM -- [C:\Program Files\Exchange  
Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_49\\_45.html](#)  
is saved.  
4/5/2007 1:37:46 PM -- Verifying log checksums ...  
4/5/2007 1:37:59 PM -- U:\ (22 logs passed), V:\ (22 logs passed), and W:\  
(21 logs passed)  
4/5/2007 1:37:59 PM -- [C:\Program Files\Exchange  
Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_4\\_6\\_38.blg](#)  
has 491 samples.  
4/5/2007 1:37:59 PM -- Creating test report ...  
4/5/2007 1:38:04 PM -- Volume X: has 0.0168 for Avg. Disk sec/Read.  
4/5/2007 1:38:04 PM -- Volume Y: has 0.0177 for Avg. Disk sec/Read.  
4/5/2007 1:38:04 PM -- Volume Z: has 0.0170 for Avg. Disk sec/Read.  
4/5/2007 1:38:04 PM -- Volume U: has 0.0017 for Avg. Disk sec/Write.  
4/5/2007 1:38:04 PM -- Volume U: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 1:38:04 PM -- Volume V: has 0.0019 for Avg. Disk sec/Write.  
4/5/2007 1:38:04 PM -- Volume V: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 1:38:04 PM -- Volume W: has 0.0028 for Avg. Disk sec/Write.  
4/5/2007 1:38:04 PM -- Volume W: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 1:38:04 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
4/5/2007 1:38:04 PM -- Test has 0 Database Page Fault Stalls/sec samples  
higher than 0.  
4/5/2007 1:38:04 PM -- [C:\Program Files\Exchange  
Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_4\\_6\\_38.xml](#)  
has 479 samples queried.

## Server7

# Microsoft Exchange Server Jetstress

## *Performance Test Result Report*

### Test Summary

Overall Test Result Pass

Machine Name PERCEPT-S8FZGE5

Test Description 30 320s in RAID10 + synchronous 2 way replication ESRP of 50K 'heavy' 2007 us (.4 IOPS)

Test Start Time 4/5/2007 8:46:50 AM

Test End Time 4/5/2007 10:50:33 AM

Jetstress Version 08.01.0094.000

Ese Version 08.00.0685.024

Operating System Microsoft Windows Server 2003 R2 Service Pack 1 (5.2.3790.65536)

Performance Log [C:\Program Files\Exchange\Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_46\\_50](C:\Program Files\Exchange\Jetstress\30_320s_RAID10_Rep2\Performance\Performance_2007_4_5_8_46_50)  
[C:\Program Files\Exchange\Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_50](C:\Program Files\Exchange\Jetstress\30_320s_RAID10_Rep2\Performance\DBChecksum_2007_4_5_10_50)

### Database Sizing and Throughput

Achieved I/O per Second 1230.605

Planned I/O per Second 1250

Initial database size 1303811571712

Final database size 1313231978496

Database files (count) 15

### Jetstress System Parameters

Thread count 11 (per-storage group)

Log buffers 9000

Minimum database cache 96.0 MB

Maximum database cache 768.0 MB

Insert operations 25%

Delete operations 10%

Replace operations 50%

Read operations 15%

Lazy commits 80%

### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.018	0.009	226.646	184.475	(n/a)
Database (Y:)	0.017	0.009	223.975	183.763	(n/a)
Database (Z:)	0.016	0.011	227.524	184.222	(n/a)
Log (U:)	0.000	0.002	0.000	87.123	13198.063
Log (V:)	0	0.002	0.000	92.296	12455.487
Log (W:)	0.000	0.002	0.000	87.736	13031.755

### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	11.131	3.646	40.677
Available MBytes	825.604	822.000	891.000
Free System Page Table Entries	2081696.000	2081696.000	2081696.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	35256678.400	35151872.000	35659776.000
Pool Paged Bytes	35740970.667	35672064.000	36225024.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/5/2007 8:46:50 AM -- Jetstress testing begins ...

4/5/2007 8:46:50 AM -- Prepare testing begins ...

4/5/2007 8:46:54 AM -- Attaching databases ...

4/5/2007 8:46:54 AM -- Prepare testing ends.

4/5/2007 8:46:54 AM -- Dispatching transactions begins ...

4/5/2007 8:46:54 AM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)

4/5/2007 8:46:54 AM -- Database flush thresholds: (start: 7.7 MB, stop: 15.4 MB)

4/5/2007 8:46:55 AM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).

4/5/2007 8:46:55 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).

4/5/2007 8:46:55 AM -- Operation mix: Sessions 11, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.

4/5/2007 8:46:55 AM -- Performance logging begins (interval: 15000 ms).

4/5/2007 8:46:55 AM -- Attaining prerequisites:

4/5/2007 8:50:20 AM -- \Database(JetstressWin)\Database Cache Size, Last: 726573100.0 (lower bound: 724775700.0, upper bound: none)

4/5/2007 10:50:22 AM -- Performance logging ends.

4/5/2007 10:50:22 AM -- JetInterop batch transaction stats: 76112, 76053, and 76095.  
4/5/2007 10:50:23 AM -- Dispatching transactions ends.  
4/5/2007 10:50:23 AM -- Shutting down databases ...  
4/5/2007 10:50:33 AM -- Instance700.1 (complete), Instance700.2 (complete), and Instance700.3 (complete)  
4/5/2007 10:50:33 AM -- Performance logging begins (interval: 30000 ms).  
4/5/2007 10:50:33 AM -- Verifying database checksums ...  
4/5/2007 1:44:05 PM -- X: (100% processed), Y: (100% processed), and Z: (100% processed)  
4/5/2007 1:44:07 PM -- Performance logging ends.  
4/5/2007 1:44:07 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10\\_50\\_33.blg](#) has 347 samples.  
4/5/2007 1:44:10 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10\\_50\\_33.html](#) is saved.  
4/5/2007 1:44:10 PM -- Verifying log checksums ...  
4/5/2007 1:44:21 PM -- U:\ (21 logs passed), V:\ (22 logs passed), and W:\ (23 logs passed)  
4/5/2007 1:44:21 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\Performance 2007 4 5 8 4\\_6\\_55.blg](#) has 493 samples.  
4/5/2007 1:44:21 PM -- Creating test report ...  
4/5/2007 1:44:27 PM -- Volume X: has 0.0182 for Avg. Disk sec/Read.  
4/5/2007 1:44:27 PM -- Volume Y: has 0.0171 for Avg. Disk sec/Read.  
4/5/2007 1:44:27 PM -- Volume Z: has 0.0162 for Avg. Disk sec/Read.  
4/5/2007 1:44:27 PM -- Volume U: has 0.0025 for Avg. Disk sec/Write.  
4/5/2007 1:44:27 PM -- Volume U: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 1:44:27 PM -- Volume V: has 0.0017 for Avg. Disk sec/Write.  
4/5/2007 1:44:27 PM -- Volume V: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 1:44:27 PM -- Volume W: has 0.0022 for Avg. Disk sec/Write.  
4/5/2007 1:44:27 PM -- Volume W: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 1:44:27 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
4/5/2007 1:44:27 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
4/5/2007 1:44:27 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\Performance 2007 4 5 8 4\\_6\\_55.xml](#) has 479 samples queried.

## **Server8**

# **Microsoft Exchange Server Jetstress**

## ***Performance Test Result Report***

Test Summary

Overall Test Pass

Result

Machine Name PERCEPT-00FCAIB  
Test Description 30 320s in RAID10 + synchronous 2 way replication ESRP of 50K 'heavy' 2007 us (.4 IOPS)  
Test Start Time 4/5/2007 8:47:24 AM  
Test End Time 4/5/2007 10:51:12 AM  
Jetstress Version 08.01.0094.000  
Ese Version 08.00.0685.024  
Operating System Microsoft Windows Server 2003 R2 Service Pack 1 (5.2.3790.65536)  
<C:\Program Files\Exchange>  
Performance Log [Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_47\\_27](Jetstress\30_320s_RAID10_Rep2\Performance\Performance_2007_4_5_8_47_27)  
<C:\Program Files\Exchange>  
[Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_51](Jetstress\30_320s_RAID10_Rep2\Performance\DBChecksum_2007_4_5_10_51)

Database Sizing and Throughput

Achieved I/O per Second 1230.895  
Planned I/O per Second 1250  
Initial database size 1303853514752  
Final database size 1313219395584  
Database files (count) 15

Jetstress System Parameters

Thread count 11 (per-storage group)  
Log buffers 9000  
Minimum database cache 96.0 MB  
Maximum database cache 768.0 MB  
Insert operations 25%  
Delete operations 10%  
Replace operations 50%  
Read operations 15%  
Lazy commits 80%

Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.017	0.011	226.787	185.311	(n/a)

Database (Y:)	0.018	0.009	226.913	183.947	(n/a)
Database (Z:)	0.017	0.011	224.527	183.410	(n/a)
Log (U:)	0.000	0.002	0.000	92.705	12448.905
Log (V:)	0.000	0.002	0.000	91.819	12509.177
Log (W:)	0.000	0.003	0.000	83.813	13617.046

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	8.620	3.906	24.219
Available MBytes	841.044	838.000	915.000
Free System Page Table Entries	2081696.000	2081696.000	2081696.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	35512354.133	35426304.000	35885056.000
Pool Paged Bytes	35929284.267	35860480.000	36417536.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/5/2007 8:47:24 AM -- Jetstress testing begins ...  
4/5/2007 8:47:24 AM -- Prepare testing begins ...  
4/5/2007 8:47:26 AM -- Attaching databases ...  
4/5/2007 8:47:26 AM -- Prepare testing ends.  
4/5/2007 8:47:26 AM -- Dispatching transactions begins ...  
4/5/2007 8:47:26 AM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)  
4/5/2007 8:47:26 AM -- Database flush thresholds: (start: 7.7 MB, stop: 15.4 MB)  
4/5/2007 8:47:27 AM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).  
4/5/2007 8:47:27 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).  
4/5/2007 8:47:28 AM -- Operation mix: Sessions 11, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
4/5/2007 8:47:28 AM -- Performance logging begins (interval: 15000 ms).  
4/5/2007 8:47:28 AM -- Attaining prerequisites:  
4/5/2007 8:50:56 AM -- \Database(JetstressWin)\Database Cache Size, Last: 725606400.0 (lower bound: 724775700.0, upper bound: none)  
4/5/2007 10:50:58 AM -- Performance logging ends.  
4/5/2007 10:50:58 AM -- JetInterop batch transaction stats: 75776, 75574, and 75193.  
4/5/2007 10:51:00 AM -- Dispatching transactions ends.  
4/5/2007 10:51:00 AM -- Shutting down databases ...  
4/5/2007 10:51:12 AM -- Instance424.1 (complete), Instance424.2 (complete), and Instance424.3 (complete)

4/5/2007 10:51:12 AM -- Performance logging begins (interval: 30000 ms).  
 4/5/2007 10:51:12 AM -- Verifying database checksums ...  
 4/5/2007 1:17:47 PM -- X: (100% processed), Y: (100% processed), and Z:  
 (100% processed)  
 4/5/2007 1:17:48 PM -- Performance logging ends.  
 4/5/2007 1:17:48 PM -- [C:\Program Files\Exchange  
 Jetstress\30 320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10  
 51 12.blg](#) has 293 samples.  
 4/5/2007 1:17:51 PM -- [C:\Program Files\Exchange  
 Jetstress\30 320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10  
 51 12.html](#) is saved.  
 4/5/2007 1:17:51 PM -- Verifying log checksums ...  
 4/5/2007 1:18:06 PM -- U:\ (21 logs passed), V:\ (21 logs passed), and W:\  
 (21 logs passed)  
 4/5/2007 1:18:06 PM -- [C:\Program Files\Exchange  
 Jetstress\30 320s RAID10 Rep2\Performance\Performance 2007 4 5 8 4  
 7 27.blg](#) has 493 samples.  
 4/5/2007 1:18:06 PM -- Creating test report ...  
 4/5/2007 1:18:12 PM -- Volume X: has 0.0169 for Avg. Disk sec/Read.  
 4/5/2007 1:18:12 PM -- Volume Y: has 0.0176 for Avg. Disk sec/Read.  
 4/5/2007 1:18:12 PM -- Volume Z: has 0.0175 for Avg. Disk sec/Read.  
 4/5/2007 1:18:12 PM -- Volume U: has 0.0017 for Avg. Disk sec/Write.  
 4/5/2007 1:18:12 PM -- Volume U: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2007 1:18:12 PM -- Volume V: has 0.0018 for Avg. Disk sec/Write.  
 4/5/2007 1:18:12 PM -- Volume V: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2007 1:18:12 PM -- Volume W: has 0.0028 for Avg. Disk sec/Write.  
 4/5/2007 1:18:12 PM -- Volume W: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2007 1:18:12 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
 4/5/2007 1:18:12 PM -- Test has 0 Database Page Fault Stalls/sec samples  
 higher than 0.  
 4/5/2007 1:18:12 PM -- [C:\Program Files\Exchange  
 Jetstress\30 320s RAID10 Rep2\Performance\Performance 2007 4 5 8 4  
 7 27.xml](#) has 479 samples queried.

## Server9

### Microsoft Exchange Server Jetstress

#### *Performance Test Result Report*

##### Test Summary

Overall Test Result Pass

Machine Name PERCEPT-TP9HWD7

Test Description 30 320s in RAID10 + synchronous 2 way replication ESRP of 50K 'heavy' 2007 us (.4 IOPS)

Test Start Time 4/5/2006 9:47:01 AM  
 Test End Time 4/5/2006 11:51:09 AM  
 Jetstress Version 08.01.0094.000  
 Ese Version 08.00.0685.024  
 Operating System Microsoft Windows Server 2003 R2 Service Pack 1 (5.2.3790.65536)

[C:\Program Files\Exchange](#)  
 Performance Log [Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2006\\_4\\_5\\_9\\_47\\_51](#)  
[C:\Program Files\Exchange](#)  
[Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2006\\_4\\_5\\_11\\_51](#)

#### Database Sizing and Throughput

Achieved I/O per Second 1237.569  
 Planned I/O per Second 1250  
 Initial database size 1303765434368  
 Final database size 1313194229760  
 Database files (count) 15

#### Jetstress System Parameters

Thread count 11 (per-storage group)  
 Log buffers 9000  
 Minimum database cache 96.0 MB  
 Maximum database cache 768.0 MB  
 Insert operations 25%  
 Delete operations 10%  
 Replace operations 50%  
 Read operations 15%  
 Lazy commits 80%

#### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.018	0.009	228.622	185.579	(n/a)
Database (Y:)	0.017	0.009	226.979	185.386	(n/a)
Database (Z:)	0.016	0.012	226.174	184.829	(n/a)
Log (U:)	0.000	0.003	0.000	87.854	13162.191

Log (V:)	0.000	0.002	0.000	92.797	12482.738
Log (W:)	0.000	0.002	0.000	89.042	12938.234

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	8.826	3.698	23.958
Available MBytes	843.077	840.000	896.000
Free System Page Table Entries	2081798.000	2081798.000	2081798.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	35483281.067	35401728.000	35762176.000
Pool Paged Bytes	36019456.000	35958784.000	36532224.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/5/2006 9:47:01 AM -- Jetstress testing begins ...  
 4/5/2006 9:47:01 AM -- Prepare testing begins ...  
 4/5/2006 9:47:04 AM -- Attaching databases ...  
 4/5/2006 9:47:04 AM -- Prepare testing ends.  
 4/5/2006 9:47:04 AM -- Dispatching transactions begins ...  
 4/5/2006 9:47:04 AM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)  
 4/5/2006 9:47:04 AM -- Database flush thresholds: (start: 7.7 MB, stop: 15.4 MB)  
 4/5/2006 9:47:05 AM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).  
 4/5/2006 9:47:05 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).  
 4/5/2006 9:47:06 AM -- Operation mix: Sessions 11, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
 4/5/2006 9:47:06 AM -- Performance logging begins (interval: 15000 ms).  
 4/5/2006 9:47:06 AM -- Attaining prerequisites:  
 4/5/2006 9:50:56 AM -- \Database(JetstressWin)\Database Cache Size, Last: 725557200.0 (lower bound: 724775700.0, upper bound: none)  
 4/5/2006 11:50:58 AM -- Performance logging ends.  
 4/5/2006 11:50:58 AM -- JetInterop batch transaction stats: 76527, 76230, and 76154.  
 4/5/2006 11:50:59 AM -- Dispatching transactions ends.  
 4/5/2006 11:50:59 AM -- Shutting down databases ...  
 4/5/2006 11:51:09 AM -- Instance1352.1 (complete), Instance1352.2 (complete), and Instance1352.3 (complete)  
 4/5/2006 11:51:10 AM -- Performance logging begins (interval: 30000 ms).  
 4/5/2006 11:51:10 AM -- Verifying database checksums ...  
 4/5/2006 2:20:15 PM -- X: (100% processed), Y: (100% processed), and Z: (100% processed)  
 4/5/2006 2:20:16 PM -- Performance logging ends.  
 4/5/2006 2:20:16 PM -- [C:\Program Files\Exchange](#)

[Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2006\\_4\\_5\\_11\\_51\\_9.blg](#) has 298 samples.  
 4/5/2006 2:20:19 PM -- [C:\Program Files\Exchange](#)  
[Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2006\\_4\\_5\\_11\\_51\\_9.html](#) is saved.  
 4/5/2006 2:20:19 PM -- Verifying log checksums ...  
 4/5/2006 2:20:34 PM -- U:\ (21 logs passed), V:\ (21 logs passed), and W:\ (22 logs passed)  
 4/5/2006 2:20:34 PM -- [C:\Program Files\Exchange](#)  
[Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2006\\_4\\_5\\_9\\_4\\_7\\_5.blg](#) has 495 samples.  
 4/5/2006 2:20:34 PM -- Creating test report ...  
 4/5/2006 2:20:40 PM -- Volume X: has 0.0180 for Avg. Disk sec/Read.  
 4/5/2006 2:20:40 PM -- Volume Y: has 0.0171 for Avg. Disk sec/Read.  
 4/5/2006 2:20:40 PM -- Volume Z: has 0.0162 for Avg. Disk sec/Read.  
 4/5/2006 2:20:40 PM -- Volume U: has 0.0025 for Avg. Disk sec/Write.  
 4/5/2006 2:20:40 PM -- Volume U: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2006 2:20:40 PM -- Volume V: has 0.0017 for Avg. Disk sec/Write.  
 4/5/2006 2:20:40 PM -- Volume V: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2006 2:20:40 PM -- Volume W: has 0.0022 for Avg. Disk sec/Write.  
 4/5/2006 2:20:40 PM -- Volume W: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2006 2:20:40 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
 4/5/2006 2:20:40 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
 4/5/2006 2:20:40 PM -- [C:\Program Files\Exchange](#)  
[Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2006\\_4\\_5\\_9\\_4\\_7\\_5.xml](#) has 479 samples queried.

## Server10

# Microsoft Exchange Server Jetstress

## *Performance Test Result Report*

### Test Summary

Overall Test Result Pass

Machine Name PERCEPT-XUTTIOM

Test Description 30 320s in RAID10 + synchronous 2 way replication ESRP of 50K 'heavy' 2007 us (.4 IOPS)

Test Start Time 4/5/2007 8:48:09 AM

Test End Time 4/5/2007 10:52:39 AM

Jetstress Version 08.01.0094.000

Ese Version 08.00.0685.024

Operating System Microsoft Windows Server 2003 R2 Service Pack 1 (5.2.3790.65536)

Performance Log [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\Performance 2007 4 5 8 48 14](#)  
[C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10 52](#)

#### Database Sizing and Throughput

Achieved I/O per Second 1212.133

Planned I/O per Second 1250

Initial database size 1303685742592

Final database size 1313024360448

Database files (count) 15

#### Jetstress System Parameters

Thread count 11 (per-storage group)

Log buffers 9000

Minimum database cache 96.0 MB

Maximum database cache 768.0 MB

Insert operations 25%

Delete operations 10%

Replace operations 50%

Read operations 15%

Lazy commits 80%

#### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.016	0.011	221.093	182.926	(n/a)
Database (Y:)	0.018	0.009	222.992	181.538	(n/a)
Database (Z:)	0.018	0.010	222.321	181.263	(n/a)
Log (U:)	0.000	0.002	0.000	90.624	12638.235
Log (V:)	0.000	0.002	0.000	90.484	12518.407
Log (W:)	0.000	0.003	0.000	82.956	13611.307

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	8.570	2.344	23.958

Available MBytes	842.008	839.000	908.000
Free System Page Table Entries	2081696.000	2081696.000	2081696.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	35638075.733	35524608.000	36069376.000
Pool Paged Bytes	35851605.333	35786752.000	36331520.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/5/2007 8:48:09 AM -- Jetstress testing begins ...  
4/5/2007 8:48:09 AM -- Prepare testing begins ...  
4/5/2007 8:48:13 AM -- Attaching databases ...  
4/5/2007 8:48:13 AM -- Prepare testing ends.  
4/5/2007 8:48:13 AM -- Dispatching transactions begins ...  
4/5/2007 8:48:13 AM -- Database cache settings: (minimum: 96.0 MB,  
maximum: 768.0 MB)  
4/5/2007 8:48:13 AM -- Database flush thresholds: (start: 7.7 MB, stop:  
15.4 MB)  
4/5/2007 8:48:14 AM -- Database read latency thresholds: (average: 0.02  
seconds/read, maximum: 0.05 seconds/read).  
4/5/2007 8:48:14 AM -- Log write latency thresholds: (average: 0.01  
seconds/write, maximum: 0.05 seconds/write).  
4/5/2007 8:48:15 AM -- Operation mix: Sessions 11, Inserts 25%, Deletes  
10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
4/5/2007 8:48:15 AM -- Performance logging begins (interval: 15000 ms).  
4/5/2007 8:48:15 AM -- Attaining prerequisites:  
4/5/2007 8:52:26 AM -- \Database(JetstressWin)\Database Cache Size, Last:  
725090300.0 (lower bound: 724775700.0, upper bound: none)  
4/5/2007 10:52:28 AM -- Performance logging ends.  
4/5/2007 10:52:28 AM -- JetInterop batch transaction stats: 74462, 75065,  
and 74765.  
4/5/2007 10:52:30 AM -- Dispatching transactions ends.  
4/5/2007 10:52:30 AM -- Shutting down databases ...  
4/5/2007 10:52:39 AM -- Instance840.1 (complete), Instance840.2  
(complete), and Instance840.3 (complete)  
4/5/2007 10:52:39 AM -- Performance logging begins (interval: 30000 ms).  
4/5/2007 10:52:39 AM -- Verifying database checksums ...  
4/5/2007 1:39:09 PM -- X: (100% processed), Y: (100% processed), and Z:  
(100% processed)  
4/5/2007 1:39:10 PM -- Performance logging ends.  
4/5/2007 1:39:10 PM -- [C:\Program Files\Exchange  
Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_52\\_39.blg](#)  
has 332 samples.  
4/5/2007 1:39:13 PM -- [C:\Program Files\Exchange  
Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_52\\_39.html](#)  
is saved.  
4/5/2007 1:39:13 PM -- Verifying log checksums ...  
4/5/2007 1:39:26 PM -- U:\ (22 logs passed), V:\ (22 logs passed), and W:\

(22 logs passed)  
 4/5/2007 1:39:26 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_4\\_8\\_14.blg](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\Performance_2007_4_5_8_4_8_14.blg) has 496 samples.  
 4/5/2007 1:39:26 PM -- Creating test report ...  
 4/5/2007 1:39:32 PM -- Volume X: has 0.0165 for Avg. Disk sec/Read.  
 4/5/2007 1:39:32 PM -- Volume Y: has 0.0176 for Avg. Disk sec/Read.  
 4/5/2007 1:39:32 PM -- Volume Z: has 0.0179 for Avg. Disk sec/Read.  
 4/5/2007 1:39:32 PM -- Volume U: has 0.0018 for Avg. Disk sec/Write.  
 4/5/2007 1:39:32 PM -- Volume U: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2007 1:39:32 PM -- Volume V: has 0.0019 for Avg. Disk sec/Write.  
 4/5/2007 1:39:32 PM -- Volume V: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2007 1:39:32 PM -- Volume W: has 0.0029 for Avg. Disk sec/Write.  
 4/5/2007 1:39:32 PM -- Volume W: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2007 1:39:32 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
 4/5/2007 1:39:32 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
 4/5/2007 1:39:32 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_4\\_8\\_14.xml](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\Performance_2007_4_5_8_4_8_14.xml) has 479 samples queried.

**Server11**

**Microsoft Exchange Server Jetstress**

***Performance Test Result Report***

Test Summary

Overall Test Result Pass

Machine Name PERCEPT-B664Z6G

Test Description 30 320s in RAID10 + synchronous 2 way replication ESRP of 50K 'heavy' 2007 us (.4 IOPS)

Test Start Time 4/5/2007 8:48:16 AM

Test End Time 4/5/2007 10:52:51 AM

Jetstress Version 08.01.0094.000

Ese Version 08.00.0685.024

Operating System Microsoft Windows Server 2003 R2 Service Pack 1 (5.2.3790.65536)

Performance Log [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_48\\_2](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\Performance_2007_4_5_8_48_2)  
<C:\Program Files\Exchange>

Database Sizing and Throughput

Achieved I/O per Second 1224.163  
Planned I/O per Second 1250  
Initial database size 1303668965376  
Final database size 1313190035456  
Database files (count) 15

Jetstress System Parameters

Thread count 11 (per-storage group)  
Log buffers 9000  
Minimum database cache 96.0 MB  
Maximum database cache 768.0 MB  
Insert operations 25%  
Delete operations 10%  
Replace operations 50%  
Read operations 15%  
Lazy commits 80%

Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.018	0.010	221.988	183.717	(n/a)
Database (Y:)	0.017	0.010	225.855	184.944	(n/a)
Database (Z:)	0.016	0.012	223.949	183.711	(n/a)
Log (U:)	0	0.003	0.000	86.730	13281.793
Log (V:)	0.000	0.002	0.000	92.339	12525.965
Log (W:)	0.000	0.002	0.000	88.072	13033.278

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	8.678	3.698	24.010
Available MBytes	841.433	839.000	890.000
Free System Page Table Entries	2081766.000	2081766.000	2081766.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	35034897.067	34938880.000	35426304.000

Pool Paged Bytes                    35995665.067 35926016.000 36478976.000  
Database Page Fault Stalls/sec   0.000                    0.000                    0.000

Test Log 4/5/2007 8:48:16 AM -- Jetstress testing begins ...  
4/5/2007 8:48:16 AM -- Prepare testing begins ...  
4/5/2007 8:48:20 AM -- Attaching databases ...  
4/5/2007 8:48:20 AM -- Prepare testing ends.  
4/5/2007 8:48:20 AM -- Dispatching transactions begins ...  
4/5/2007 8:48:20 AM -- Database cache settings: (minimum: 96.0 MB,  
maximum: 768.0 MB)  
4/5/2007 8:48:20 AM -- Database flush thresholds: (start: 7.7 MB, stop:  
15.4 MB)  
4/5/2007 8:48:21 AM -- Database read latency thresholds: (average: 0.02  
seconds/read, maximum: 0.05 seconds/read).  
4/5/2007 8:48:21 AM -- Log write latency thresholds: (average: 0.01  
seconds/write, maximum: 0.05 seconds/write).  
4/5/2007 8:48:22 AM -- Operation mix: Sessions 11, Inserts 25%, Deletes  
10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
4/5/2007 8:48:22 AM -- Performance logging begins (interval: 15000 ms).  
4/5/2007 8:48:22 AM -- Attaining prerequisites:  
4/5/2007 8:52:39 AM -- \Database(JetstressWin)\Database Cache Size, Last:  
726171600.0 (lower bound: 724775700.0, upper bound: none)  
4/5/2007 10:52:41 AM -- Performance logging ends.  
4/5/2007 10:52:41 AM -- JetInterop batch transaction stats: 75636, 75739,  
and 75672.  
4/5/2007 10:52:43 AM -- Dispatching transactions ends.  
4/5/2007 10:52:43 AM -- Shutting down databases ...  
4/5/2007 10:52:51 AM -- Instance1384.1 (complete), Instance1384.2  
(complete), and Instance1384.3 (complete)  
4/5/2007 10:52:52 AM -- Performance logging begins (interval: 30000 ms).  
4/5/2007 10:52:52 AM -- Verifying database checksums ...  
4/5/2007 1:22:11 PM -- X: (100% processed), Y: (100% processed), and Z:  
(100% processed)  
4/5/2007 1:22:12 PM -- Performance logging ends.  
4/5/2007 1:22:12 PM -- [C:\Program Files\Exchange  
Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_52\\_51.blg](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\DBChecksum_2007_4_5_10_52_51.blg)  
has 298 samples.  
4/5/2007 1:22:15 PM -- [C:\Program Files\Exchange  
Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_52\\_51.html](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\DBChecksum_2007_4_5_10_52_51.html)  
is saved.  
4/5/2007 1:22:15 PM -- Verifying log checksums ...  
4/5/2007 1:22:30 PM -- U:\ (21 logs passed), V:\ (22 logs passed), and W:\  
(22 logs passed)  
4/5/2007 1:22:30 PM -- [C:\Program Files\Exchange  
Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_4\\_8\\_21.blg](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\Performance_2007_4_5_8_4_8_21.blg)  
has 497 samples.  
4/5/2007 1:22:30 PM -- Creating test report ...  
4/5/2007 1:22:36 PM -- Volume X: has 0.0181 for Avg. Disk sec/Read.

4/5/2007 1:22:36 PM -- Volume Y: has 0.0170 for Avg. Disk sec/Read.  
 4/5/2007 1:22:36 PM -- Volume Z: has 0.0161 for Avg. Disk sec/Read.  
 4/5/2007 1:22:36 PM -- Volume U: has 0.0027 for Avg. Disk sec/Write.  
 4/5/2007 1:22:36 PM -- Volume U: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2007 1:22:36 PM -- Volume V: has 0.0017 for Avg. Disk sec/Write.  
 4/5/2007 1:22:36 PM -- Volume V: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2007 1:22:36 PM -- Volume W: has 0.0022 for Avg. Disk sec/Write.  
 4/5/2007 1:22:36 PM -- Volume W: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2007 1:22:36 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
 4/5/2007 1:22:36 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
 4/5/2007 1:22:36 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_4\\_8\\_21.xml](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\Performance_2007_4_5_8_4_8_21.xml) has 479 samples queried.

## Server12

# Microsoft Exchange Server Jetstress

## *Performance Test Result Report*

### Test Summary

Overall Test Result Pass

Machine Name PERCEPT-BB4H2G8

Test Description 30 320s in RAID10 + synchronous 2 way replication ESRP of 50K 'heavy' 2007 us (.4 IOPS)

Test Start Time 4/5/2007 8:48:29 AM

Test End Time 4/5/2007 10:52:57 AM

Jetstress Version 08.01.0094.000

Ese Version 08.00.0685.024

Operating System Microsoft Windows Server 2003 R2 Service Pack 1 (5.2.3790.65536)

Performance Log [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_48\\_30.xml](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\Performance_2007_4_5_8_48_30.xml)  
[C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_52.xml](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\DBChecksum_2007_4_5_10_52.xml)

### Database Sizing and Throughput

Achieved I/O per Second 1247.321

Planned I/O per Second 1250

Initial database size 1304040161280

Final database size 1313525579776  
Database files (count) 15

#### Jetstress System Parameters

Thread count 11 (per-storage group)  
Log buffers 9000  
Minimum database cache 96.0 MB  
Maximum database cache 768.0 MB  
Insert operations 25%  
Delete operations 10%  
Replace operations 50%  
Read operations 15%  
Lazy commits 80%

#### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.016	0.012	228.957	187.068	(n/a)
Database (Y:)	0.017	0.009	230.192	186.853	(n/a)
Database (Z:)	0.017	0.010	228.578	185.673	(n/a)
Log (U:)	0.000	0.002	0.000	93.388	12472.949
Log (V:)	0.000	0.002	0.000	92.617	12583.482
Log (W:)	0.000	0.003	0.000	84.391	13691.227

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	9.095	2.708	24.427
Available MBytes	836.456	833.000	911.000
Free System Page Table Entries	2081765.000	2081765.000	2081765.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	35388748.800	35262464.000	35856384.000
Pool Paged Bytes	35917678.933	35840000.000	36417536.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/5/2007 8:48:29 AM -- Jetstress testing begins ...  
4/5/2007 8:48:29 AM -- Prepare testing begins ...  
4/5/2007 8:48:32 AM -- Attaching databases ...  
4/5/2007 8:48:32 AM -- Prepare testing ends.

4/5/2007 8:48:32 AM -- Dispatching transactions begins ...  
 4/5/2007 8:48:32 AM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)  
 4/5/2007 8:48:32 AM -- Database flush thresholds: (start: 7.7 MB, stop: 15.4 MB)  
 4/5/2007 8:48:33 AM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).  
 4/5/2007 8:48:33 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).  
 4/5/2007 8:48:34 AM -- Operation mix: Sessions 11, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
 4/5/2007 8:48:34 AM -- Performance logging begins (interval: 15000 ms).  
 4/5/2007 8:48:34 AM -- Attaining prerequisites:  
 4/5/2007 8:52:47 AM -- \Database(JetstressWin)\Database Cache Size, Last: 724910100.0 (lower bound: 724775700.0, upper bound: none)  
 4/5/2007 10:52:49 AM -- Performance logging ends.  
 4/5/2007 10:52:49 AM -- JetInterop batch transaction stats: 76743, 77041, and 76387.  
 4/5/2007 10:52:50 AM -- Dispatching transactions ends.  
 4/5/2007 10:52:50 AM -- Shutting down databases ...  
 4/5/2007 10:52:57 AM -- Instance1848.1 (complete), Instance1848.2 (complete), and Instance1848.3 (complete)  
 4/5/2007 10:52:58 AM -- Performance logging begins (interval: 30000 ms).  
 4/5/2007 10:52:58 AM -- Verifying database checksums ...  
 4/5/2007 1:42:11 PM -- X: (100% processed), Y: (100% processed), and Z: (100% processed)  
 4/5/2007 1:42:12 PM -- Performance logging ends.  
 4/5/2007 1:42:12 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10\\_52\\_57.blg](#) has 338 samples.  
 4/5/2007 1:42:15 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10\\_52\\_57.html](#) is saved.  
 4/5/2007 1:42:15 PM -- Verifying log checksums ...  
 4/5/2007 1:42:27 PM -- U:\ (22 logs passed), V:\ (22 logs passed), and W:\ (22 logs passed)  
 4/5/2007 1:42:27 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\Performance 2007 4 5 8 4\\_8\\_33.blg](#) has 496 samples.  
 4/5/2007 1:42:27 PM -- Creating test report ...  
 4/5/2007 1:42:33 PM -- Volume X: has 0.0165 for Avg. Disk sec/Read.  
 4/5/2007 1:42:33 PM -- Volume Y: has 0.0174 for Avg. Disk sec/Read.  
 4/5/2007 1:42:33 PM -- Volume Z: has 0.0168 for Avg. Disk sec/Read.  
 4/5/2007 1:42:33 PM -- Volume U: has 0.0017 for Avg. Disk sec/Write.  
 4/5/2007 1:42:33 PM -- Volume U: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2007 1:42:33 PM -- Volume V: has 0.0019 for Avg. Disk sec/Write.  
 4/5/2007 1:42:33 PM -- Volume V: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2007 1:42:33 PM -- Volume W: has 0.0029 for Avg. Disk sec/Write.



Minimum database cache 96.0 MB  
 Maximum database cache 768.0 MB  
 Insert operations 25%  
 Delete operations 10%  
 Replace operations 50%  
 Read operations 15%  
 Lazy commits 80%

#### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.017	0.009	223.418	184.600	(n/a)
Database (Y:)	0.016	0.009	226.181	184.104	(n/a)
Database (Z:)	0.016	0.012	226.290	184.308	(n/a)
Log (U:)	0.000	0.003	0.000	85.887	13383.063
Log (V:)	0	0.002	0.000	92.653	12351.916
Log (W:)	0.000	0.002	0.000	88.386	12883.970

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	8.526	2.552	22.604
Available MBytes	854.792	852.000	919.000
Free System Page Table Entries	2082766.000	2082766.000	2082766.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	29501670.400	29331456.000	29618176.000
Pool Paged Bytes	35241344.000	35139584.000	35696640.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/4/2007 11:45:24 PM -- Jetstress testing begins ...  
 4/4/2007 11:45:25 PM -- Prepare testing begins ...  
 4/4/2007 11:45:28 PM -- Attaching databases ...  
 4/4/2007 11:45:28 PM -- Prepare testing ends.  
 4/4/2007 11:45:28 PM -- Dispatching transactions begins ...  
 4/4/2007 11:45:28 PM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)  
 4/4/2007 11:45:28 PM -- Database flush thresholds: (start: 7.7 MB, stop: 15.4 MB)  
 4/4/2007 11:45:35 PM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).

4/4/2007 11:45:35 PM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).

4/4/2007 11:45:36 PM -- Operation mix: Sessions 10, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.

4/4/2007 11:45:36 PM -- Performance logging begins (interval: 15000 ms).

4/4/2007 11:45:36 PM -- Attaining prerequisites:

4/4/2007 11:49:59 PM -- \Database(JetstressWin)\Database Cache Size, Last: 726695900.0 (lower bound: 724775700.0, upper bound: none)

4/5/2007 1:50:00 AM -- Performance logging ends.

4/5/2007 1:50:00 AM -- JetInterop batch transaction stats: 75272, 75543, and 74837.

4/5/2007 1:50:05 AM -- Dispatching transactions ends.

4/5/2007 1:50:05 AM -- Shutting down databases ...

4/5/2007 1:50:15 AM -- Instance1588.1 (complete), Instance1588.2 (complete), and Instance1588.3 (complete)

4/5/2007 1:50:15 AM -- Performance logging begins (interval: 30000 ms).

4/5/2007 1:50:15 AM -- Verifying database checksums ...

4/5/2007 4:15:29 AM -- X: (100% processed), Y: (100% processed), and Z: (100% processed)

4/5/2007 4:15:30 AM -- Performance logging ends.

4/5/2007 4:15:30 AM -- [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_1\\_5\\_0\\_15.blg](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\DBChecksum_2007_4_5_1_5_0_15.blg) has 290 samples.

4/5/2007 4:15:36 AM -- [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_1\\_5\\_0\\_15.html](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\DBChecksum_2007_4_5_1_5_0_15.html) is saved.

4/5/2007 4:15:36 AM -- Verifying log checksums ...

4/5/2007 4:15:51 AM -- U:\ (22 logs passed), V:\ (21 logs passed), and W:\ (21 logs passed)

4/5/2007 4:15:51 AM -- [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_4\\_23\\_45\\_35.blg](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\Performance_2007_4_4_23_45_35.blg) has 497 samples.

4/5/2007 4:15:51 AM -- Creating test report ...

4/5/2007 4:15:57 AM -- Volume X: has 0.0168 for Avg. Disk sec/Read.

4/5/2007 4:15:57 AM -- Volume Y: has 0.0162 for Avg. Disk sec/Read.

4/5/2007 4:15:57 AM -- Volume Z: has 0.0156 for Avg. Disk sec/Read.

4/5/2007 4:15:57 AM -- Volume U: has 0.0027 for Avg. Disk sec/Write.

4/5/2007 4:15:57 AM -- Volume U: has 0.0000 for Avg. Disk sec/Read.

4/5/2007 4:15:57 AM -- Volume V: has 0.0016 for Avg. Disk sec/Write.

4/5/2007 4:15:57 AM -- Volume V: has 0.0000 for Avg. Disk sec/Read.

4/5/2007 4:15:57 AM -- Volume W: has 0.0021 for Avg. Disk sec/Write.

4/5/2007 4:15:57 AM -- Volume W: has 0.0000 for Avg. Disk sec/Read.

4/5/2007 4:15:57 AM -- Test has 0 Maximum Database Page Fault Stalls/sec.

4/5/2007 4:15:57 AM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.

4/5/2007 4:15:57 AM -- [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_4\\_23\\_45\\_35.html](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Performance\Performance_2007_4_4_23_45_35.html)

[45\\_35.xml](#) has 479 samples queried.

## Server14

# Microsoft Exchange Server Jetstress

## ***Performance Test Result Report***

### Test Summary

Overall Test Result Pass

Machine Name PERCEPT-TWN1VZ4

Test Description 30 320s in RAID10 + synchronous 2 way replication ESRP of 50K 'heavy' 2007 us (.4 IOPS)

Test Start Time 4/5/2007 9:49:10 AM

Test End Time 4/5/2007 11:54:04 AM

Jetstress Version 08.01.0094.000

Ese Version 08.00.0685.024

Operating System Microsoft Windows Server 2003 Service Pack 1 (5.2.3790.65536)

Performance Log [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_9\\_49\\_11\\_54](#)  
[C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_11\\_54](#)

### Database Sizing and Throughput

Achieved I/O per Second 1225.342

Planned I/O per Second 1250

Initial database size 1303864000512

Final database size 1313343127552

Database files (count) 15

### Jetstress System Parameters

Thread count 11 (per-storage group)

Log buffers 9000

Minimum database cache 96.0 MB

Maximum database cache 768.0 MB

Insert operations 25%

Delete operations 10%

Replace operations 50%

Read operations 15%  
 Lazy commits 80%

#### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.017	0.012	223.986	183.735	(n/a)
Database (Y:)	0.017	0.009	224.741	184.894	(n/a)
Database (Z:)	0.017	0.011	224.839	183.148	(n/a)
Log (U:)	0	0.002	0.000	91.910	12488.685
Log (V:)	0.000	0.002	0.000	91.022	12736.676
Log (W:)	0.000	0.003	0.000	82.614	13804.302

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	8.908	3.438	22.500
Available MBytes	841.940	838.000	902.000
Free System Page Table Entries	2081797.000	2081797.000	2081797.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	35378380.800	35295232.000	35717120.000
Pool Paged Bytes	35484467.200	35418112.000	35954688.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/5/2007 9:49:10 AM -- Jetstress testing begins ...  
 4/5/2007 9:49:10 AM -- Prepare testing begins ...  
 4/5/2007 9:49:13 AM -- Attaching databases ...  
 4/5/2007 9:49:13 AM -- Prepare testing ends.  
 4/5/2007 9:49:13 AM -- Dispatching transactions begins ...  
 4/5/2007 9:49:13 AM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)  
 4/5/2007 9:49:13 AM -- Database flush thresholds: (start: 7.7 MB, stop: 15.4 MB)  
 4/5/2007 9:49:15 AM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).  
 4/5/2007 9:49:15 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).  
 4/5/2007 9:49:16 AM -- Operation mix: Sessions 11, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
 4/5/2007 9:49:16 AM -- Performance logging begins (interval: 15000 ms).  
 4/5/2007 9:49:16 AM -- Attaining prerequisites:

4/5/2007 9:53:53 AM -- \Database(JetstressWin)\Database Cache Size, Last: 725909500.0 (lower bound: 724775700.0, upper bound: none)  
4/5/2007 11:53:54 AM -- Performance logging ends.  
4/5/2007 11:53:54 AM -- JetInterop batch transaction stats: 75454, 75499, and 75006.  
4/5/2007 11:53:55 AM -- Dispatching transactions ends.  
4/5/2007 11:53:55 AM -- Shutting down databases ...  
4/5/2007 11:54:04 AM -- Instance1952.1 (complete), Instance1952.2 (complete), and Instance1952.3 (complete)  
4/5/2007 11:54:04 AM -- Performance logging begins (interval: 30000 ms).  
4/5/2007 11:54:04 AM -- Verifying database checksums ...  
4/5/2007 2:37:37 PM -- X: (100% processed), Y: (100% processed), and Z: (100% processed)  
4/5/2007 2:37:38 PM -- Performance logging ends.  
4/5/2007 2:37:38 PM -- [C:\Program Files\Exchange Jetstress\30 320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 11 54 4.blg](#) has 327 samples.  
4/5/2007 2:37:41 PM -- [C:\Program Files\Exchange Jetstress\30 320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 11 54 4.html](#) is saved.  
4/5/2007 2:37:41 PM -- Verifying log checksums ...  
4/5/2007 2:37:49 PM -- U:\ (22 logs passed), V:\ (22 logs passed), and W:\ (21 logs passed)  
4/5/2007 2:37:49 PM -- [C:\Program Files\Exchange Jetstress\30 320s RAID10 Rep2\Performance\Performance 2007 4 5 9 4 9 15.blg](#) has 498 samples.  
4/5/2007 2:37:49 PM -- Creating test report ...  
4/5/2007 2:37:55 PM -- Volume X: has 0.0170 for Avg. Disk sec/Read.  
4/5/2007 2:37:55 PM -- Volume Y: has 0.0171 for Avg. Disk sec/Read.  
4/5/2007 2:37:55 PM -- Volume Z: has 0.0174 for Avg. Disk sec/Read.  
4/5/2007 2:37:55 PM -- Volume U: has 0.0017 for Avg. Disk sec/Write.  
4/5/2007 2:37:55 PM -- Volume U: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 2:37:55 PM -- Volume V: has 0.0019 for Avg. Disk sec/Write.  
4/5/2007 2:37:55 PM -- Volume V: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 2:37:55 PM -- Volume W: has 0.0029 for Avg. Disk sec/Write.  
4/5/2007 2:37:55 PM -- Volume W: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 2:37:55 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
4/5/2007 2:37:55 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
4/5/2007 2:37:55 PM -- [C:\Program Files\Exchange Jetstress\30 320s RAID10 Rep2\Performance\Performance 2007 4 5 9 4 9 15.xml](#) has 479 samples queried.

## Server15



### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.018	0.009	225.470	183.938	(n/a)
Database (Y:)	0.017	0.009	225.945	184.839	(n/a)
Database (Z:)	0.016	0.011	225.703	183.339	(n/a)
Log (U:)	0.000	0.003	0.000	86.491	13258.462
Log (V:)	0.000	0.002	0.000	91.660	12627.231
Log (W:)	0.000	0.002	0.000	88.051	12928.892

### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	8.679	3.125	25.781
Available MBytes	840.552	837.000	893.000
Free System Page Table Entries	2081798.000	2081798.000	2081798.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	35553843.200	35434496.000	35983360.000
Pool Paged Bytes	37296964.267	37220352.000	37748736.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/5/2007 8:49:28 AM -- Jetstress testing begins ...

4/5/2007 8:49:28 AM -- Prepare testing begins ...

4/5/2007 8:49:31 AM -- Attaching databases ...

4/5/2007 8:49:31 AM -- Prepare testing ends.

4/5/2007 8:49:31 AM -- Dispatching transactions begins ...

4/5/2007 8:49:31 AM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)

4/5/2007 8:49:31 AM -- Database flush thresholds: (start: 7.7 MB, stop: 15.4 MB)

4/5/2007 8:49:32 AM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).

4/5/2007 8:49:32 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).

4/5/2007 8:49:33 AM -- Operation mix: Sessions 11, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.

4/5/2007 8:49:33 AM -- Performance logging begins (interval: 15000 ms).

4/5/2007 8:49:33 AM -- Attaining prerequisites:

4/5/2007 8:54:08 AM -- \Database(JetstressWin)\Database Cache Size, Last: 727318500.0 (lower bound: 724775700.0, upper bound: none)

4/5/2007 10:54:09 AM -- Performance logging ends.

4/5/2007 10:54:09 AM -- JetInterop batch transaction stats: 75061, 75622, and 75704.  
4/5/2007 10:54:10 AM -- Dispatching transactions ends.  
4/5/2007 10:54:10 AM -- Shutting down databases ...  
4/5/2007 10:54:20 AM -- Instance648.1 (complete), Instance648.2 (complete), and Instance648.3 (complete)  
4/5/2007 10:54:21 AM -- Performance logging begins (interval: 30000 ms).  
4/5/2007 10:54:21 AM -- Verifying database checksums ...  
4/5/2007 1:39:52 PM -- X: (100% processed), Y: (100% processed), and Z: (100% processed)  
4/5/2007 1:39:53 PM -- Performance logging ends.  
4/5/2007 1:39:53 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10 54 20.blg](#) has 331 samples.  
4/5/2007 1:39:56 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10 54 20.html](#) is saved.  
4/5/2007 1:39:56 PM -- Verifying log checksums ...  
4/5/2007 1:40:05 PM -- U:\ (21 logs passed), V:\ (23 logs passed), and W:\ (22 logs passed)  
4/5/2007 1:40:05 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\Performance 2007 4 5 8 4 9 32.blg](#) has 498 samples.  
4/5/2007 1:40:05 PM -- Creating test report ...  
4/5/2007 1:40:11 PM -- Volume X: has 0.0180 for Avg. Disk sec/Read.  
4/5/2007 1:40:11 PM -- Volume Y: has 0.0169 for Avg. Disk sec/Read.  
4/5/2007 1:40:11 PM -- Volume Z: has 0.0161 for Avg. Disk sec/Read.  
4/5/2007 1:40:11 PM -- Volume U: has 0.0026 for Avg. Disk sec/Write.  
4/5/2007 1:40:11 PM -- Volume U: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 1:40:11 PM -- Volume V: has 0.0018 for Avg. Disk sec/Write.  
4/5/2007 1:40:11 PM -- Volume V: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 1:40:11 PM -- Volume W: has 0.0022 for Avg. Disk sec/Write.  
4/5/2007 1:40:11 PM -- Volume W: has 0.0000 for Avg. Disk sec/Read.  
4/5/2007 1:40:11 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
4/5/2007 1:40:11 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
4/5/2007 1:40:11 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\Performance 2007 4 5 8 4 9 32.xml](#) has 479 samples queried.

## **Server16**

# **Microsoft Exchange Server Jetstress**

## ***Performance Test Result Report***

Test Summary

Overall Test Pass

Result

Machine Name PERCEPT-7B64N5M  
Test Description 30 320s in RAID10 + synchronous 2 way replication ESRP of 50K 'heavy' 2007 us (.4 IOPS)  
Test Start Time 4/5/2007 8:49:35 AM  
Test End Time 4/5/2007 10:54:36 AM  
Jetstress Version 08.01.0094.000  
Ese Version 08.00.0685.024  
Operating System Microsoft Windows Server 2003 R2 Service Pack 1 (5.2.3790.65536)  
<C:\Program Files\Exchange>  
Performance Log <C:\Program Files\Exchange>  
[Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\Performance\\_2007\\_4\\_5\\_8\\_49\\_40](Jetstress\30_320s_RAID10_Rep2\Performance\Performance_2007_4_5_8_49_40)  
[Jetstress\30\\_320s\\_RAID10\\_Rep2\Performance\DBChecksum\\_2007\\_4\\_5\\_10\\_54](Jetstress\30_320s_RAID10_Rep2\Performance\DBChecksum_2007_4_5_10_54)

Database Sizing and Throughput

Achieved I/O per Second 1177.177  
Planned I/O per Second 1250  
Initial database size 1303350198272  
Final database size 1312378437632  
Database files (count) 15

Jetstress System Parameters

Thread count 11 (per-storage group)  
Log buffers 9000  
Minimum database cache 96.0 MB  
Maximum database cache 768.0 MB  
Insert operations 25%  
Delete operations 10%  
Replace operations 50%  
Read operations 15%  
Lazy commits 80%

Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.017	0.013	216.759	176.981	(n/a)

Database (Y:)	0.017	0.010	216.124	175.322	(n/a)
Database (Z:)	0.018	0.011	215.499	176.492	(n/a)
Log (U:)	0.000	0.002	0.000	87.745	12600.478
Log (V:)	0.000	0.002	0.000	86.952	12630.815
Log (W:)	0.000	0.003	0.000	80.333	13737.539

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	11.003	5.104	25.052
Available MBytes	749.738	739.000	816.000
Free System Page Table Entries	2080047.000	2080047.000	2080047.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	35445299.200	35344384.000	35819520.000
Pool Paged Bytes	41430656.000	41218048.000	41897984.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/5/2007 8:49:35 AM -- Jetstress testing begins ...  
4/5/2007 8:49:35 AM -- Prepare testing begins ...  
4/5/2007 8:49:38 AM -- Attaching databases ...  
4/5/2007 8:49:38 AM -- Prepare testing ends.  
4/5/2007 8:49:38 AM -- Dispatching transactions begins ...  
4/5/2007 8:49:38 AM -- Database cache settings: (minimum: 96.0 MB, maximum: 768.0 MB)  
4/5/2007 8:49:38 AM -- Database flush thresholds: (start: 7.7 MB, stop: 15.4 MB)  
4/5/2007 8:49:40 AM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).  
4/5/2007 8:49:40 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).  
4/5/2007 8:49:41 AM -- Operation mix: Sessions 11, Inserts 25%, Deletes 10%, Replaces 50%, Reads 15%, Lazy Commits 80%.  
4/5/2007 8:49:41 AM -- Performance logging begins (interval: 15000 ms).  
4/5/2007 8:49:41 AM -- Attaining prerequisites:  
4/5/2007 8:54:28 AM -- \Database(JetstressWin)\Database Cache Size, Last: 725991400.0 (lower bound: 724775700.0, upper bound: none)  
4/5/2007 10:54:30 AM -- Performance logging ends.  
4/5/2007 10:54:30 AM -- JetInterop batch transaction stats: 72717, 72868, and 72607.  
4/5/2007 10:54:30 AM -- Dispatching transactions ends.  
4/5/2007 10:54:30 AM -- Shutting down databases ...  
4/5/2007 10:54:36 AM -- Instance1700.1 (complete), Instance1700.2 (complete), and Instance1700.3 (complete)

4/5/2007 10:54:37 AM -- Performance logging begins (interval: 30000 ms).  
 4/5/2007 10:54:37 AM -- Verifying database checksums ...  
 4/5/2007 1:49:58 PM -- X: (100% processed), Y: (100% processed), and Z: (100% processed)  
 4/5/2007 1:49:59 PM -- Performance logging ends.  
 4/5/2007 1:49:59 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10\\_54\\_36.blg](#) has 350 samples.  
 4/5/2007 1:50:02 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\DBChecksum 2007 4 5 10\\_54\\_36.html](#) is saved.  
 4/5/2007 1:50:02 PM -- Verifying log checksums ...  
 4/5/2007 1:50:09 PM -- U:\ (22 logs passed), V:\ (22 logs passed), and W:\ (22 logs passed)  
 4/5/2007 1:50:09 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\Performance 2007 4 5 8 4\\_9\\_40.blg](#) has 499 samples.  
 4/5/2007 1:50:09 PM -- Creating test report ...  
 4/5/2007 1:50:15 PM -- Volume X: has 0.0172 for Avg. Disk sec/Read.  
 4/5/2007 1:50:15 PM -- Volume Y: has 0.0174 for Avg. Disk sec/Read.  
 4/5/2007 1:50:15 PM -- Volume Z: has 0.0181 for Avg. Disk sec/Read.  
 4/5/2007 1:50:16 PM -- Volume U: has 0.0019 for Avg. Disk sec/Write.  
 4/5/2007 1:50:16 PM -- Volume U: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2007 1:50:16 PM -- Volume V: has 0.0020 for Avg. Disk sec/Write.  
 4/5/2007 1:50:16 PM -- Volume V: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2007 1:50:16 PM -- Volume W: has 0.0030 for Avg. Disk sec/Write.  
 4/5/2007 1:50:16 PM -- Volume W: has 0.0000 for Avg. Disk sec/Read.  
 4/5/2007 1:50:16 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.  
 4/5/2007 1:50:16 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.  
 4/5/2007 1:50:16 PM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Performance\Performance 2007 4 5 8 4\\_9\\_40.xml](#) has 479 samples queried.

## Streaming test results

### Server1

## Microsoft Exchange Server Jetstress

### *Streaming backup Test Result Report*

Streaming Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance1416.1	485341.87	12:12:34	11.04
Instance1416.2	485043.87	11:39:09	11.56

Instance1416.3 485003.87 12:10:40 11.06

#### Jetstress System Parameters

Thread count 11 (per-storage group)  
Log buffers 9000  
Minimum database cache 96.0 MB  
Maximum database cache 768.0 MB  
Insert operations 25%  
Delete operations 10%  
Replace operations 50%  
Read operations 15%  
Lazy commits 80%

#### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.011	0	89.226	0.001	(n/a)
Database (Y:)	0.010	0	89.142	0.003	(n/a)
Database (Z:)	0.011	0	89.139	0.003	(n/a)
Log (U:)	0.000	0.000	0.000	0.000	0.000
Log (V:)	0.000	0	0.000	0.001	20.519
Log (W:)	0.000	0	0.000	0.002	20.353

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	8.201	2.083	23.802
Available MBytes	1712.850	1648.000	1734.000
Free System Page Table Entries	2082716.000	2082716.000	2082716.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	27537036.145	27529216.000	27561984.000
Pool Paged Bytes	37611708.724	37019648.000	38408192.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/13/2007 2:19:54 PM -- Jetstress testing begins ...

4/13/2007 2:19:54 PM -- Prepare testing begins ...

4/13/2007 2:19:56 PM -- Attaching databases ...

4/13/2007 2:19:56 PM -- Prepare testing ends.

4/13/2007 2:19:58 PM -- Performance logging begins (interval: 30000 ms).

4/13/2007 2:19:58 PM -- Streaming backup databases ...  
 4/14/2007 2:32:33 AM -- Performance logging ends.  
 4/14/2007 2:32:33 AM -- Instance1416.1 (100% processed),  
 Instance1416.2 (100% processed), and Instance1416.3 (100% processed)  
 4/14/2007 2:32:33 AM -- [C:\Program Files\Exchange  
 Jetstress\30\\_320s\\_RAID10\\_Rep2\Streaming\StreamingBackup\\_2007\\_4\\_13\\_14\\_19\\_56.blg](#) has 1465 samples.  
 4/14/2007 2:32:33 AM -- Creating test report ...

## Server2

# Microsoft Exchange Server Jetstress

## *Streaming backup Test Result Report*

### Streaming Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance236.1	485235.87	11:10:35	12.06
Instance236.2	485105.87	11:41:01	11.53
Instance236.3	485653.87	11:12:29	12.04

### Jetstress System Parameters

Thread count	11 (per-storage group)
Log buffers	9000
Minimum database cache	96.0 MB
Maximum database cache	768.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.010	0	93.216	0.003	(n/a)
Database (Y:)	0.011	0	93.161	0.001	(n/a)
Database (Z:)	0.010	0	93.272	0.003	(n/a)
Log (U:)	0.000	0	0.000	0.001	18.074
Log (V:)	0.000	0.000	0.000	0.000	0.000

Log (W:) 0.000 0 0.000 0.002 25.853

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	6.409	1.536	18.151
Available MBytes	1674.597	1667.000	1676.000
Free System Page Table Entries	2082937.255	2082416.000	2083046.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	27937717.501	27865088.000	28180480.000
Pool Paged Bytes	35827790.882	35229696.000	36626432.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/13/2007 2:19:50 PM -- Jetstress testing begins ...  
4/13/2007 2:19:50 PM -- Prepare testing begins ...  
4/13/2007 2:19:53 PM -- Attaching databases ...  
4/13/2007 2:19:53 PM -- Prepare testing ends.  
4/13/2007 2:19:55 PM -- Performance logging begins (interval: 30000 ms).  
4/13/2007 2:19:55 PM -- Streaming backup databases ...  
4/14/2007 2:00:57 AM -- Performance logging ends.  
4/14/2007 2:00:57 AM -- Instance236.1 (100% processed), Instance236.2 (100% processed), and Instance236.3 (100% processed)  
4/14/2007 2:00:57 AM -- [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Stress\StreamingBackup\\_2007\\_4\\_13\\_14\\_19\\_53.blg](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Stress\StreamingBackup_2007_4_13_14_19_53.blg) has 1402 samples.  
4/14/2007 2:00:57 AM -- Creating test report ...

### Server3

## Microsoft Exchange Server Jetstress

### *Streaming backup Test Result Report*

#### Streaming Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance716.1	486245.87	12:10:21	11.10
Instance716.2	486081.87	11:26:27	11.80
Instance716.3	485881.87	12:32:09	10.77

#### Jetstress System Parameters

Thread count 11 (per-storage group)  
Log buffers 9000  
Minimum database cache 96.0 MB  
Maximum database cache 768.0 MB

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

#### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.011	0	87.087	0.003	(n/a)
Database (Y:)	0.010	0	87.031	0.003	(n/a)
Database (Z:)	0.012	0	86.972	0.001	(n/a)
Log (U:)	0.000	0	0.000	0.001	22.506
Log (V:)	0.000	0	0.000	0.001	23.190
Log (W:)	0.000	0.000	0.000	0.000	0.000

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	5.994	1.589	16.719
Available MBytes	1671.503	1670.000	1673.000
Free System Page Table Entries	2082976.000	2082976.000	2082976.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	27902706.383	27889664.000	27918336.000
Pool Paged Bytes	35969617.702	35352576.000	36765696.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/13/2007 2:19:56 PM -- Jetstress testing begins ...  
 4/13/2007 2:19:56 PM -- Prepare testing begins ...  
 4/13/2007 2:19:59 PM -- Attaching databases ...  
 4/13/2007 2:19:59 PM -- Prepare testing ends.  
 4/13/2007 2:20:00 PM -- Performance logging begins (interval: 30000 ms).  
 4/13/2007 2:20:00 PM -- Streaming backup databases ...  
 4/14/2007 2:52:11 AM -- Performance logging ends.  
 4/14/2007 2:52:11 AM -- Instance716.1 (100% processed), Instance716.2 (100% processed), and Instance716.3 (100% processed)  
 4/14/2007 2:52:11 AM -- [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Streaming\StreamingBackup\\_2007\\_4\\_13\\_14\\_19\\_59.blg](#) has 1504 samples.

4/14/2007 2:52:11 AM -- Creating test report ...

## Server4

# Microsoft Exchange Server Jetstress

## **Streaming backup Test Result Report**

### Streaming Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance444.1	483793.87	11:06:45	12.09
Instance444.2	483751.87	12:00:30	11.19
Instance444.3	483695.87	11:20:33	11.85

### Jetstress System Parameters

Thread count	11 (per-storage group)
Log buffers	9000
Minimum database cache	96.0 MB
Maximum database cache	768.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.009	0	90.411	0.003	(n/a)
Database (Y:)	0.011	0	90.379	0.001	(n/a)
Database (Z:)	0.010	0	90.364	0.003	(n/a)
Log (U:)	0.000	0	0.000	0.001	20.257
Log (V:)	0.000	0.000	0.000	0.000	0.000
Log (W:)	0.000	0	0.000	0.002	17.037

### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	6.265	1.563	18.021
Available MBytes	1672.094	1667.000	1674.000

Free System Page Table Entries	2082954.711	2082448.000	2083078.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	27931473.899	27926528.000	27955200.000
Pool Paged Bytes	35724973.746	35102720.000	36519936.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/13/2007 2:20:09 PM -- Jetstress testing begins ...  
 4/13/2007 2:20:09 PM -- Prepare testing begins ...  
 4/13/2007 2:20:12 PM -- Attaching databases ...  
 4/13/2007 2:20:12 PM -- Prepare testing ends.  
 4/13/2007 2:20:13 PM -- Performance logging begins (interval: 30000 ms).  
 4/13/2007 2:20:13 PM -- Streaming backup databases ...  
 4/14/2007 2:20:45 AM -- Performance logging ends.  
 4/14/2007 2:20:45 AM -- Instance444.1 (100% processed), Instance444.2 (100% processed), and Instance444.3 (100% processed)  
 4/14/2007 2:20:45 AM -- [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Streaming\StreamingBackup\\_2007\\_4\\_13\\_14\\_20\\_12.blg](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Streaming\StreamingBackup_2007_4_13_14_20_12.blg) has 1441 samples.  
 4/14/2007 2:20:45 AM -- Creating test report ...

## Server5

### Microsoft Exchange Server Jetstress

#### *Streaming backup Test Result Report*

Streaming Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance1568.1	486185.87	11:55:51	11.32
Instance1568.2	486503.87	11:30:27	11.74
Instance1568.3	486261.87	12:08:50	11.12

Jetstress System Parameters

Thread count	11 (per-storage group)
Log buffers	9000
Minimum database cache	96.0 MB
Maximum database cache	768.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.011	0	89.883	0.003	(n/a)
Database (Y:)	0.010	0	89.921	0.003	(n/a)
Database (Z:)	0.011	0	89.831	0.001	(n/a)
Log (U:)	0.000	0	0.000	0.001	20.204
Log (V:)	0.000	0	0.000	0.001	24.320
Log (W:)	0.000	0.000	0.000	0.000	0.000

### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	6.280	1.589	18.359
Available MBytes	1672.369	1666.000	1674.000
Free System Page Table Entries	2082888.000	2082888.000	2082888.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	27908803.031	27901952.000	28033024.000
Pool Paged Bytes	35971814.172	35368960.000	36782080.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/13/2007 2:19:52 PM -- Jetstress testing begins ...

4/13/2007 2:19:52 PM -- Prepare testing begins ...

4/13/2007 2:19:55 PM -- Attaching databases ...

4/13/2007 2:19:55 PM -- Prepare testing ends.

4/13/2007 2:19:56 PM -- Performance logging begins (interval: 30000 ms).

4/13/2007 2:19:56 PM -- Streaming backup databases ...

4/14/2007 2:28:48 AM -- Performance logging ends.

4/14/2007 2:28:48 AM -- Instance1568.1 (100% processed),

Instance1568.2 (100% processed), and Instance1568.3 (100% processed)

4/14/2007 2:28:48 AM -- [C:\Program Files\Exchange](#)

[Jetstress\30\\_320s\\_RAID10\\_Rep2\Streaming\StreamingBackup\\_2007\\_4\\_13\\_14\\_19\\_55.blg](#) has 1457 samples.

4/14/2007 2:28:48 AM -- Creating test report ...

### Server6

# Microsoft Exchange Server Jetstress

## ***Streaming backup Test Result Report***

### Streaming Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance1156.1	484187.87	11:24:06	11.80
Instance1156.2	484257.87	12:02:41	11.17
Instance1156.3	484561.87	11:24:21	11.80

### Jetstress System Parameters

Thread count	11 (per-storage group)
Log buffers	9000
Minimum database cache	96.0 MB
Maximum database cache	768.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.010	0	90.237	0.003	(n/a)
Database (Y:)	0.011	0	90.207	0.001	(n/a)
Database (Z:)	0.010	0	90.283	0.003	(n/a)
Log (U:)	0.000	0	0.000	0.001	14.495
Log (V:)	0.000	0.000	0.000	0.000	0.000
Log (W:)	0.000	0	0.000	0.001	21.483

### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	6.245	1.458	17.344
Available MBytes	1673.197	1668.000	1675.000
Free System Page Table Entries	2082827.841	2082378.000	2082938.000
Transition Pages RePurposed/sec	0.000	0.000	0.000

Pool Nonpaged Bytes	28319653.293	28303360.000	28336128.000
Pool Paged Bytes	36499113.013	35893248.000	37261312.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/13/2007 2:19:56 PM -- Jetstress testing begins ...  
 4/13/2007 2:19:56 PM -- Prepare testing begins ...  
 4/13/2007 2:19:59 PM -- Attaching databases ...  
 4/13/2007 2:19:59 PM -- Prepare testing ends.  
 4/13/2007 2:20:00 PM -- Performance logging begins (interval: 30000 ms).  
 4/13/2007 2:20:00 PM -- Streaming backup databases ...  
 4/14/2007 2:22:43 AM -- Performance logging ends.  
 4/14/2007 2:22:43 AM -- Instance1156.1 (100% processed),  
 Instance1156.2 (100% processed), and Instance1156.3 (100% processed)  
 4/14/2007 2:22:43 AM -- [C:\Program Files\Exchange  
 Jetstress\30\\_320s\\_RAID10\\_Rep2\Streaming\StreamingBackup\\_2007\\_4\\_13\\_14\\_19\\_59.blg](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Streaming\StreamingBackup_2007_4_13_14_19_59.blg) has 1445 samples.  
 4/14/2007 2:22:43 AM -- Creating test report ...

## Server7

# Microsoft Exchange Server Jetstress

## *Streaming backup Test Result Report*

### Streaming Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance1140.1	486023.87	12:12:29	11.06
Instance1140.2	485927.87	11:31:14	11.72
Instance1140.3	485229.87	12:26:14	10.84

### Jetstress System Parameters

Thread count	11 (per-storage group)
Log buffers	9000
Minimum database cache	96.0 MB
Maximum database cache	768.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
-------------	--------------------	---------------------	----------------	-----------------	-----------------------

Database (X:)	0.011	0	87.744	0.003	(n/a)
Database (Y:)	0.010	0	87.699	0.003	(n/a)
Database (Z:)	0.011	0	87.534	0.001	(n/a)
Log (U:)	0.000	0	0.000	0.001	23.376
Log (V:)	0.000	0	0.000	0.001	21.606
Log (W:)	0.000	0	0.000	0	2.747

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	6.051	1.719	17.630
Available MBytes	1672.275	1671.000	1673.000
Free System Page Table Entries	2082886.429	2082886.000	2083046.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	27675052.268	27611136.000	27774976.000
Pool Paged Bytes	35775350.735	35180544.000	36585472.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/13/2007 2:20:15 PM -- Jetstress testing begins ...  
 4/13/2007 2:20:15 PM -- Prepare testing begins ...  
 4/13/2007 2:20:18 PM -- Attaching databases ...  
 4/13/2007 2:20:18 PM -- Prepare testing ends.  
 4/13/2007 2:20:19 PM -- Performance logging begins (interval: 30000 ms).  
 4/13/2007 2:20:19 PM -- Streaming backup databases ...  
 4/14/2007 2:46:35 AM -- Performance logging ends.  
 4/14/2007 2:46:35 AM -- Instance1140.1 (100% processed),  
 Instance1140.2 (100% processed), and Instance1140.3 (100% processed)  
 4/14/2007 2:46:35 AM -- [C:\Program Files\Exchange Jetstress\30 320s RAID10 Rep2\Streaming\StreamingBackup 2007 4 13 14 20 18.blg](#) has 1492 samples.  
 4/14/2007 2:46:35 AM -- Creating test report ...

## Server8

### Microsoft Exchange Server Jetstress

#### **Streaming backup Test Result Report**

Streaming Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance1460.1	484553.87	11:24:34	11.80

Instance1460.2	483985.87	11:41:00	11.51
Instance1460.3	484305.87	11:05:17	12.13

#### Jetstress System Parameters

Thread count	11 (per-storage group)
Log buffers	9000
Minimum database cache	96.0 MB
Maximum database cache	768.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

#### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.010	0	93.082	0.003	(n/a)
Database (Y:)	0.011	0	92.944	0.001	(n/a)
Database (Z:)	0.010	0	93.000	0.003	(n/a)
Log (U:)	0.000	0	0.000	0.001	14.939
Log (V:)	0.000	0.000	0.000	0.000	0.000
Log (W:)	0.000	0	0.000	0.002	24.000

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	6.391	1.589	17.760
Available MBytes	1668.877	1665.000	1670.000
Free System Page Table Entries	2082856.000	2082856.000	2082856.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	28382860.964	28381184.000	28401664.000
Pool Paged Bytes	36266764.051	35672064.000	37060608.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/13/2007 2:20:24 PM -- Jetstress testing begins ...  
 4/13/2007 2:20:24 PM -- Prepare testing begins ...  
 4/13/2007 2:20:26 PM -- Attaching databases ...  
 4/13/2007 2:20:26 PM -- Prepare testing ends.

4/13/2007 2:20:28 PM -- Performance logging begins (interval: 30000 ms).  
 4/13/2007 2:20:28 PM -- Streaming backup databases ...  
 4/14/2007 2:01:29 AM -- Performance logging ends.  
 4/14/2007 2:01:29 AM -- Instance1460.1 (100% processed),  
 Instance1460.2 (100% processed), and Instance1460.3 (100% processed)  
 4/14/2007 2:01:29 AM -- [C:\Program Files\Exchange  
 Jetstress\30\\_320s\\_RAID10\\_Rep2\Streaming\StreamingBackup\\_2007\\_4\\_13  
 14\\_20\\_26.blg](#) has 1402 samples.  
 4/14/2007 2:01:29 AM -- Creating test report ...

## Server9

# Microsoft Exchange Server Jetstress

## *Streaming backup Test Result Report*

### Streaming Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance1488.1	485617.87	11:59:56	11.24
Instance1488.2	485893.87	11:27:59	11.77
Instance1488.3	485927.87	11:48:13	11.44

### Jetstress System Parameters

Thread count	11 (per-storage group)
Log buffers	9000
Minimum database cache	96.0 MB
Maximum database cache	768.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.011	0	90.838	0.001	(n/a)
Database (Y:)	0.010	0	90.923	0.003	(n/a)
Database (Z:)	0.011	0.000	90.933	0.003	(n/a)
Log (U:)	0.000	0.000	0.000	0.000	0.000

Log (V:)	0.000	0	0.000	0.001	21.367
Log (W:)	0.000	0	0.000	0.002	22.362

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	6.417	1.693	17.448
Available MBytes	1673.618	1669.000	1675.000
Free System Page Table Entries	2082903.316	2082448.000	2083078.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	28419844.092	28418048.000	28438528.000
Pool Paged Bytes	35825360.856	35237888.000	36655104.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/13/2006 3:19:51 PM -- Jetstress testing begins ...  
 4/13/2006 3:19:52 PM -- Prepare testing begins ...  
 4/13/2006 3:19:54 PM -- Attaching databases ...  
 4/13/2006 3:19:54 PM -- Prepare testing ends.  
 4/13/2006 3:19:56 PM -- Performance logging begins (interval: 30000 ms).  
 4/13/2006 3:19:56 PM -- Streaming backup databases ...  
 4/14/2006 3:19:53 AM -- Performance logging ends.  
 4/14/2006 3:19:53 AM -- Instance1488.1 (100% processed),  
 Instance1488.2 (100% processed), and Instance1488.3 (100% processed)  
 4/14/2006 3:19:53 AM -- [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Streaming\StreamingBackup\\_2006\\_4\\_13\\_15\\_19\\_54.blg](#) has 1439 samples.  
 4/14/2006 3:19:53 AM -- Creating test report ...

### Server10

## Microsoft Exchange Server Jetstress

### *Streaming backup Test Result Report*

#### Streaming Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance548.1	483841.87	11:14:56	11.95
Instance548.2	483795.87	12:01:24	11.18
Instance548.3	483717.87	11:21:58	11.82

#### Jetstress System Parameters

Thread count	11 (per-storage group)
Log buffers	9000
Minimum database cache	96.0 MB

Maximum database cache 768.0 MB  
 Insert operations 25%  
 Delete operations 10%  
 Replace operations 50%  
 Read operations 15%  
 Lazy commits 80%

#### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.010	0	90.362	0.003	(n/a)
Database (Y:)	0.011	0	90.272	0.001	(n/a)
Database (Z:)	0.010	0	90.305	0.003	(n/a)
Log (U:)	0.000	0	0.000	0.001	24.165
Log (V:)	0.000	0.000	0.000	0.000	0.000
Log (W:)	0.000	0	0.000	0.002	24.742

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	6.330	1.536	18.073
Available MBytes	1672.519	1671.000	1675.000
Free System Page Table Entries	2082979.870	2082886.000	2083046.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	28172572.050	28168192.000	28188672.000
Pool Paged Bytes	35882337.642	35282944.000	36655104.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/13/2007 2:20:31 PM -- Jetstress testing begins ...

4/13/2007 2:20:31 PM -- Prepare testing begins ...

4/13/2007 2:20:33 PM -- Attaching databases ...

4/13/2007 2:20:33 PM -- Prepare testing ends.

4/13/2007 2:20:35 PM -- Performance logging begins (interval: 30000 ms).

4/13/2007 2:20:35 PM -- Streaming backup databases ...

4/14/2007 2:22:00 AM -- Performance logging ends.

4/14/2007 2:22:00 AM -- Instance548.1 (100% processed), Instance548.2 (100% processed), and Instance548.3 (100% processed)

4/14/2007 2:22:00 AM -- [C:\Program Files\Exchange](#)

[Jetstress\30\\_320s\\_RAID10\\_Rep2\Streaming\StreamingBackup\\_2007\\_4\\_13\\_14\\_20\\_33.blg](#) has 1442 samples.

4/14/2007 2:22:00 AM -- Creating test report ...

## Server11

# Microsoft Exchange Server Jetstress

## **Streaming backup Test Result Report**

### Streaming Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance1012.1	485745.87	12:11:38	11.07
Instance1012.2	486057.87	11:28:13	11.77
Instance1012.3	485819.87	12:09:00	11.11

### Jetstress System Parameters

Thread count	11 (per-storage group)
Log buffers	9000
Minimum database cache	96.0 MB
Maximum database cache	768.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.011	0	89.414	0.001	(n/a)
Database (Y:)	0.010	0	89.461	0.003	(n/a)
Database (Z:)	0.011	0	89.422	0.003	(n/a)
Log (U:)	0.000	0	0.000	0	2.802
Log (V:)	0.000	0	0.000	0.001	21.909
Log (W:)	0.000	0	0.000	0.002	22.201

### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	6.288	1.745	17.552
Available MBytes	1672.863	1671.000	1674.000

Free System Page Table Entries	2083046.000	2083046.000	2083046.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	28591897.023	28590080.000	28602368.000
Pool Paged Bytes	35907798.179	35299328.000	36716544.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/13/2007 2:20:28 PM -- Jetstress testing begins ...  
 4/13/2007 2:20:28 PM -- Prepare testing begins ...  
 4/13/2007 2:20:31 PM -- Attaching databases ...  
 4/13/2007 2:20:31 PM -- Prepare testing ends.  
 4/13/2007 2:20:32 PM -- Performance logging begins (interval: 30000 ms).  
 4/13/2007 2:20:32 PM -- Streaming backup databases ...  
 4/14/2007 2:32:11 AM -- Performance logging ends.  
 4/14/2007 2:32:11 AM -- Instance1012.1 (100% processed),  
 Instance1012.2 (100% processed), and Instance1012.3 (100% processed)  
 4/14/2007 2:32:11 AM -- [C:\Program Files\Exchange Jetstress\30\\_320s RAID10 Rep2\Streaming\StreamingBackup\\_2007\\_4\\_13\\_14\\_20\\_31.blg](#) has 1463 samples.  
 4/14/2007 2:32:12 AM -- Creating test report ...

## Server12

### Microsoft Exchange Server Jetstress

#### *Streaming backup Test Result Report*

Streaming Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance1252.1	485565.87	11:05:00	12.17
Instance1252.2	485865.87	11:24:01	11.84
Instance1252.3	485925.87	11:13:10	12.03

Jetstress System Parameters

Thread count	11 (per-storage group)
Log buffers	9000
Minimum database cache	96.0 MB
Maximum database cache	768.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.010	0	95.608	0.003	(n/a)
Database (Y:)	0.010	0	95.637	0.001	(n/a)
Database (Z:)	0.010	0	95.656	0.003	(n/a)
Log (U:)	0.000	0	0.000	0.002	18.523
Log (V:)	0.000	0.000	0.000	0.000	0.000
Log (W:)	0.000	0	0.000	0.002	18.979

### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	6.804	1.484	17.969
Available MBytes	1669.995	1668.000	1671.000
Free System Page Table Entries	2082975.000	2082975.000	2082975.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	28090490.760	28086272.000	28102656.000
Pool Paged Bytes	35758097.965	35164160.000	36564992.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/13/2007 2:20:49 PM -- Jetstress testing begins ...

4/13/2007 2:20:49 PM -- Prepare testing begins ...

4/13/2007 2:20:52 PM -- Attaching databases ...

4/13/2007 2:20:52 PM -- Prepare testing ends.

4/13/2007 2:20:53 PM -- Performance logging begins (interval: 30000 ms).

4/13/2007 2:20:53 PM -- Streaming backup databases ...

4/14/2007 1:44:56 AM -- Performance logging ends.

4/14/2007 1:44:56 AM -- Instance1252.1 (100% processed),

Instance1252.2 (100% processed), and Instance1252.3 (100% processed)

4/14/2007 1:44:56 AM -- [C:\Program Files\Exchange](#)

[Jetstress\30\\_320s\\_RAID10\\_Rep2\Streaming\StreamingBackup\\_2007\\_4\\_13\\_14\\_20\\_52.blg](#) has 1368 samples.

4/14/2007 1:44:56 AM -- Creating test report ...

### Server13

# Microsoft Exchange Server Jetstress

## ***Streaming backup Test Result Report***

### Streaming Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance624.1	477767.87	11:43:33	11.32
Instance624.2	477399.87	11:11:00	11.86
Instance624.3	477399.87	12:13:20	10.85

### Jetstress System Parameters

Thread count	11 (per-storage group)
Log buffers	9000
Minimum database cache	96.0 MB
Maximum database cache	768.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.010	0	87.711	0.003	(n/a)
Database (Y:)	0.010	0	87.611	0.003	(n/a)
Database (Z:)	0.011	0	87.564	0.001	(n/a)
Log (U:)	0.000	0	0.000	0.001	14.914
Log (V:)	0.000	0	0.000	0.001	17.493
Log (W:)	0.000	0.000	0.000	0.000	0.000

### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	6.046	1.510	17.786
Available MBytes	1673.999	1668.000	1675.000
Free System Page Table Entries	2082828.933	2082276.000	2082976.000
Transition Pages RePurposed/sec	0.000	0.000	0.000

Pool Nonpaged Bytes	27623977.211	27537408.000	27750400.000
Pool Paged Bytes	35548178.161	34988032.000	36315136.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/13/2007 2:20:56 PM -- Jetstress testing begins ...  
 4/13/2007 2:20:56 PM -- Prepare testing begins ...  
 4/13/2007 2:20:59 PM -- Attaching databases ...  
 4/13/2007 2:20:59 PM -- Prepare testing ends.  
 4/13/2007 2:21:00 PM -- Performance logging begins (interval: 30000 ms).  
 4/13/2007 2:21:00 PM -- Streaming backup databases ...  
 4/14/2007 2:34:22 AM -- Performance logging ends.  
 4/14/2007 2:34:22 AM -- Instance624.1 (100% processed), Instance624.2 (100% processed), and Instance624.3 (100% processed)  
 4/14/2007 2:34:22 AM -- [C:\Program Files\Exchange Jetstress\30\\_320s\\_RAID10\\_Rep2\Streaming\StreamingBackup\\_2007\\_4\\_13\\_14\\_20\\_59.blg](C:\Program Files\Exchange Jetstress\30_320s_RAID10_Rep2\Streaming\StreamingBackup_2007_4_13_14_20_59.blg) has 1466 samples.  
 4/14/2007 2:34:22 AM -- Creating test report ...

## Server14

# Microsoft Exchange Server Jetstress

## *Streaming backup Test Result Report*

### Streaming Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance1476.1	476935.87	10:53:49	12.16
Instance1476.2	477165.87	11:31:52	11.49
Instance1476.3	477045.87	11:09:51	11.87

### Jetstress System Parameters

Thread count	11 (per-storage group)
Log buffers	9000
Minimum database cache	96.0 MB
Maximum database cache	768.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
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Database (X:)	0.010	0	92.804	0.003	(n/a)
Database (Y:)	0.011	0	92.766	0.001	(n/a)
Database (Z:)	0.010	0	92.798	0.003	(n/a)
Log (U:)	0.000	0	0.000	0.001	23.923
Log (V:)	0.000	0.000	0.000	0.000	0.000
Log (W:)	0.000	0	0.000	0.002	27.483

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	6.624	1.823	17.786
Available MBytes	1672.069	1671.000	1673.000
Free System Page Table Entries	2082937.000	2082937.000	2082937.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	27959396.697	27951104.000	27975680.000
Pool Paged Bytes	35337127.890	34799616.000	36052992.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/13/2007 3:20:50 PM -- Jetstress testing begins ...  
4/13/2007 3:20:50 PM -- Prepare testing begins ...  
4/13/2007 3:20:52 PM -- Attaching databases ...  
4/13/2007 3:20:52 PM -- Prepare testing ends.  
4/13/2007 3:20:54 PM -- Performance logging begins (interval: 30000 ms).  
4/13/2007 3:20:54 PM -- Streaming backup databases ...  
4/14/2007 2:52:48 AM -- Performance logging ends.  
4/14/2007 2:52:48 AM -- Instance1476.1 (100% processed),  
Instance1476.2 (100% processed), and Instance1476.3 (100% processed)  
4/14/2007 2:52:48 AM -- [C:\Program Files\Exchange Jetstress\30 320s RAID10 Rep2\Streaming\StreamingBackup 2007 4 13 15 20 53.blg](#) has 1383 samples.  
4/14/2007 2:52:48 AM -- Creating test report ...

## Server15

### Microsoft Exchange Server Jetstress

#### *Streaming backup Test Result Report*

Streaming Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance1140.1	477451.87	11:36:20	11.43

Instance1140.2	477833.87	11:02:37	12.02
Instance1140.3	477803.87	11:34:23	11.47

#### Jetstress System Parameters

Thread count	11 (per-storage group)
Log buffers	9000
Minimum database cache	96.0 MB
Maximum database cache	768.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

#### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.011	0	92.265	0.001	(n/a)
Database (Y:)	0.010	0	92.361	0.003	(n/a)
Database (Z:)	0.011	0	92.354	0.003	(n/a)
Log (U:)	0.000	0.000	0.000	0.000	0.000
Log (V:)	0.000	0	0.000	0.001	22.078
Log (W:)	0.000	0	0.000	0.001	21.345

#### Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	6.502	2.161	18.516
Available MBytes	1665.374	1664.000	1679.000
Free System Page Table Entries	2083078.000	2083078.000	2083078.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	28293555.494	28274688.000	28303360.000
Pool Paged Bytes	35740925.057	34308096.000	36487168.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/13/2007 2:21:07 PM -- Jetstress testing begins ...  
 4/13/2007 2:21:07 PM -- Prepare testing begins ...  
 4/13/2007 2:21:10 PM -- Attaching databases ...  
 4/13/2007 2:21:10 PM -- Prepare testing ends.

4/13/2007 2:21:11 PM -- Performance logging begins (interval: 30000 ms).  
 4/13/2007 2:21:11 PM -- Streaming backup databases ...  
 4/14/2007 1:57:33 AM -- Performance logging ends.  
 4/14/2007 1:57:33 AM -- Instance1140.1 (100% processed),  
 Instance1140.2 (100% processed), and Instance1140.3 (100% processed)  
 4/14/2007 1:57:33 AM -- [C:\Program Files\Exchange  
 Jetstress\30\\_320s\\_RAID10\\_Rep2\Streaming\StreamingBackup\\_2007\\_4\\_13\\_14\\_21\\_10.blg](#) has 1392 samples.  
 4/14/2007 1:57:33 AM -- Creating test report ...

## Server16

# Microsoft Exchange Server Jetstress

## *Streaming backup Test Result Report*

### Streaming Backup Statistics - All

Database Instance	Database Size (MBytes)	Elapsed Backup Time	MBytes Transferred/sec
Instance1780.1	483431.87	11:11:49	11.99
Instance1780.2	483393.87	11:38:57	11.53
Instance1780.3	483463.87	11:25:05	11.76

### Jetstress System Parameters

Thread count	11 (per-storage group)
Log buffers	9000
Minimum database cache	96.0 MB
Maximum database cache	768.0 MB
Insert operations	25%
Delete operations	10%
Replace operations	50%
Read operations	15%
Lazy commits	80%

### Disk Subsystem Performance

LogicalDisk	Avg. Disk sec/Read	Avg. Disk sec/Write	Disk Reads/sec	Disk Writes/sec	Avg. Disk Bytes/Write
Database (X:)	0.010	0	93.189	0.003	(n/a)
Database (Y:)	0.011	0	93.091	0.001	(n/a)
Database (Z:)	0.010	0	93.170	0.003	(n/a)
Log (U:)	0.000	0	0.000	0.001	20.749

Log (V:)	0.000	0.000	0.000	0.000	0.000
Log (W:)	0.000	0	0.000	0.002	18.190

Host System Performance

Counter	Average	Minimum	Maximum
% Processor Time	7.215	1.979	18.620
Available MBytes	1649.820	1511.000	1723.000
Free System Page Table Entries	2081468.000	2081468.000	2081468.000
Transition Pages RePurposed/sec	0.000	0.000	0.000
Pool Nonpaged Bytes	27363367.582	26734592.000	27561984.000
Pool Paged Bytes	38651157.807	38064128.000	40218624.000
Database Page Fault Stalls/sec	0.000	0.000	0.000

Test Log 4/13/2007 2:22:00 PM -- Jetstress testing begins ...  
 4/13/2007 2:22:01 PM -- Prepare testing begins ...  
 4/13/2007 2:22:03 PM -- Attaching databases ...  
 4/13/2007 2:22:03 PM -- Prepare testing ends.  
 4/13/2007 2:22:04 PM -- Performance logging begins (interval: 30000 ms).  
 4/13/2007 2:22:04 PM -- Streaming backup databases ...  
 4/14/2007 2:01:03 AM -- Performance logging ends.  
 4/14/2007 2:01:03 AM -- Instance1780.1 (100% processed),  
 Instance1780.2 (100% processed), and Instance1780.3 (100% processed)  
 4/14/2007 2:01:03 AM -- [C:\Program Files\Exchange Jetstress\30 320s RAID10 Rep2\Streaming\StreamingBackup 2007 4 13 14 22 3.blg](#) has 1397 samples.  
 4/14/2007 2:01:03 AM -- Creating test report ...