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# Hitachi Adaptable Modular Storage 2300 15,200 User Exchange 2007 RAID-5 Storage Solution

Tested with: ESRP – Storage Version 2.1

Test Date: July 2009

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# Hitachi Adaptable Modular Storage 2300 15,200 User Exchange 2007 RAID-5 Storage Solution

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## Overview

This document provides information on a Hitachi Adaptable Modular Storage 2300 storage solution for Microsoft Exchange Server 2007, based on the Microsoft® Exchange Solution Reviewed Program (ESRP) – Storage program. For more information about the contents of this document or Hitachi Data Systems' best practice recommendations for Microsoft Exchange Server 2007 storage design, see http://www.hds.com/solutions/microsoft/exchange.html.

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 information about the Microsoft ESRP – Storage program, see http://www.microsoft.com/technet/prodtechnol/exchange/2007/esrp.mspx.

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## Features

The purpose of this testing was to measure the ESRP 2.1 results on a Microsoft Exchange 2007 environment with 15,200 mailboxes and four servers. This testing used the Hitachi Adaptable Modular Storage 2300 storage system. These results help answer questions about the kind of performance capabilities to expect with a large-scale Exchange deployment on the 2300.

This document details a tested configuration capable of supporting 15,200 mailboxes with a 0.384 IOPS per user profile and user mailbox size of 1024MB. A 2300 with 240 300GB 15K RPM disks, 16GB of cache and eight 4Gb/s paths was used for these tests. Testing used four Sun Fire 4600 M2 servers with 64GB of RAM, four quad-core Opteron 2.8GHz CPUs, four Emulex 4Gb/s Fibre Channel adapters, and Windows Server 2008 Enterprise with Service Pack 1.

The Hitachi Adaptable Modular Storage 2300 is a medium-sized, high-performance, highly reliable midrange storage system that can scale to 240 disks while maintaining 99.999% availability. It is highly suitable for a variety of applications and host platforms and is modular in scale. With the option of in-system and cross-system replication functionality, the AMS2300 is fully capable of being used as the core underlying storage platform for high-performance Exchange Server 2007 architectures.

# Solution Description

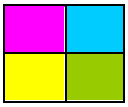
Deploying Microsoft Exchange Server 2007 requires careful consideration of all aspects of the solution architecture. Host servers need to be configured so that they are robust enough to handle the required Exchange load. The storage solution must be designed to provide the necessary performance while also being reliable and easy to administer. Of course, an effective backup and recovery plan should be incorporated into the solution as well. The aim of this solution report is to provide a tested configuration that utilizes the Adaptable Modular Storage 2300 to meet the needs of a large Exchange Server deployment.

For more information about the Hitachi Adaptable Modular Storage 2000 family, see http://www.hds.com/products/storage-systems/adaptable-modular-storage-2000-family/index.html?WT.ac=prodssams2000.

For the targeted 15,200-user Exchange environment, a 2300 configured with 240 disks (the maximum) and four host servers was used. Table 1 illustrates how the 2300's disks were organized into RAID groups for use by either databases or logs. Each set of colored disks represents a RAID-5 (4D+1P) or RAID-1 (1+1) RAID group. Except for RKA-0 (internal disks), each RKA is an external disk enclosure with 15 SAS disks. For the 40 RAID-5 groups, two 200GB LUs were created per RAID group, and for the RAID-1 groups, four 20GB LUs were created per RAID group.

**Table 1. Adaptable Modular Storage 2300 RAID Group Layout**

| ***Drive Slot*** | ***0*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***6*** | ***7*** | ***8*** | ***9*** | ***10*** | ***11*** | ***12*** | ***13*** | ***14*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RKA 15 | 52 | 53 | 53 | 54 | 54 | 55 | 55 | 56 | 56 | 57 | 57 | 58 | 58 | 59 | 59 |
| RKA 14 | 45 | 45 | 46 | 46 | 47 | 47 | 48 | 48 | 49 | 49 | 50 | 50 | 51 | 51 | 52 |
| RKA 13 | 39 | 39 | 39 | 39 | 39 | 40 | 40 | 41 | 41 | 42 | 42 | 43 | 43 | 44 | 44 |
| RKA 12 | 36 | 36 | 36 | 36 | 36 | 37 | 37 | 37 | 37 | 37 | 38 | 38 | 38 | 38 | 38 |
| RKA 11 | 33 | 33 | 33 | 33 | 33 | 34 | 34 | 34 | 34 | 34 | 35 | 35 | 35 | 35 | 35 |
| RKA 10 | 30 | 30 | 30 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 32 | 32 | 32 | 32 | 32 |
| RKA 9 | 27 | 27 | 27 | 27 | 27 | 28 | 28 | 28 | 28 | 28 | 29 | 29 | 29 | 29 | 29 |
| RKA 8 | 24 | 24 | 24 | 24 | 24 | 25 | 25 | 25 | 25 | 25 | 26 | 26 | 26 | 26 | 26 |
| RKA 7 | 21 | 21 | 21 | 21 | 21 | 22 | 22 | 22 | 22 | 22 | 23 | 23 | 23 | 23 | 23 |
| RKA 6 | 18 | 18 | 18 | 18 | 18 | 19 | 19 | 19 | 19 | 19 | 20 | 20 | 20 | 20 | 20 |
| RKA 5 | 15 | 15 | 15 | 15 | 15 | 16 | 16 | 16 | 16 | 16 | 17 | 17 | 17 | 17 | 17 |
| RKA 4 | 12 | 12 | 12 | 12 | 12 | 13 | 13 | 13 | 13 | 13 | 14 | 14 | 14 | 14 | 14 |
| RKA 3 | 9 | 9 | 9 | 9 | 9 | 10 | 10 | 10 | 10 | 10 | 11 | 11 | 11 | 11 | 11 |
| RKA 2 | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 8 |
| RKA 1 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 |
| RKA 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 |



RAID-5 (4D+1P) for Databases

RAID-1 (1D+1D) for Logs

Table 2 provides the detailed logical unit (LU) layout and RAID group allocation for the tested storage configuration.

**Table 2. Adaptable Modular Storage 2300 LU Layout for Databases**

| *RAID Group* | *LU Number* | |
|---|---|---|
| 0 | 0 | 1 |
| 1 | 2 | 3 |
| 2 | 4 | 5 |
| 3 | 6 | 7 |
| 4 | 8 | 9 |
| 5 | 10 | 11 |
| 6 | 12 | 13 |
| 7 | 14 | 15 |
| 8 | 16 | 17 |
| 9 | 18 | 19 |
| 10 | 20 | 21 |
| 11 | 22 | 23 |
| 12 | 24 | 25 |
| 13 | 26 | 27 |
| 14 | 28 | 29 |
| 15 | 30 | 31 |
| 16 | 32 | 33 |
| 17 | 34 | 35 |
| 18 | 36 | 37 |
| 19 | 38 | 39 |
| 20 | 40 | 41 |
| 21 | 42 | 43 |
| 22 | 44 | 45 |
| 23 | 46 | 47 |
| 24 | 48 | 49 |
| 25 | 50 | 51 |
| 26 | 52 | 53 |
| 27 | 54 | 55 |
| 28 | 56 | 57 |
| 29 | 58 | 59 |
| 30 | 60 | 61 |
| 31 | 62 | 63 |
| 32 | 64 | 65 |
| 33 | 66 | 67 |

| | | |
|---|---|---|
| 34 | 68 | 69 |
| 35 | 70 | 71 |
| 36 | 72 | 73 |
| 37 | 74 | 75 |
| 38 | 76 | 77 |
| 39 | 78 | 79 |

Table 3 provides the detailed LU layout and RAID group allocation for the tested storage configuration for logs.

**Table 3. Adaptable Modular Storage 2300 LU Layout for Logs**

| *RAID Group* | *LU Number* |
|---|---|
| 40 | 80-83 |
| 41 | 84-87 |
| 42 | 88-91 |
| 43 | 92-95 |
| 44 | 96-99 |
| 45 | 100-103 |
| 46 | 104-107 |
| 47 | 108-111 |
| 48 | 112-115 |
| 49 | 116-110 |
| 50 | 120-123 |
| 51 | 124-127 |
| 52 | 128-131 |
| 53 | 132-135 |
| 54 | 136-130 |
| 55 | 140-143 |
| 56 | 144-147 |
| 57 | 148-151 |
| 58 | 152-155 |
| 59 | 156-159 |

Table 4 outlines the port layout with LU assignments for the storage configuration.

**Table 4. Adaptable Modular Storage 2300 Port Layout**

| *Server* | *Port* | *LU Number* | | | | |
|---|---|---|---|---|---|---|
| SUN21 | 0A | 0 | 1 | 2 | 3 | 4 |
| | | 5 | 6 | 7 | 8 | 9 |
| | | 10 | 11 | 12 | 13 | 14 |
| | | 15 | 16 | 17 | 18 | 19 |
| | | 80 | 81 | 82 | 83 | 84 |
| | | 85 | 86 | 87 | 88 | 89 |
| | | 90 | 91 | 92 | 93 | 94 |
| | | 95 | 96 | 97 | 98 | 99 |
| SUN22 | 0B | 20 | 21 | 22 | 23 | 24 |
| | | 25 | 26 | 27 | 28 | 29 |
| | | 30 | 31 | 32 | 33 | 34 |
| | | 35 | 36 | 37 | 38 | 39 |
| | | 100 | 101 | 102 | 103 | 104 |
| | | 105 | 106 | 107 | 108 | 109 |
| | | 110 | 111 | 112 | 113 | 114 |
| | | 115 | 116 | 117 | 118 | 119 |
| SUN23 | 0C | 40 | 41 | 42 | 43 | 44 |
| | | 45 | 46 | 47 | 48 | 49 |
| | | 50 | 51 | 52 | 53 | 54 |
| | | 55 | 56 | 57 | 58 | 59 |
| | | 120 | 121 | 122 | 123 | 124 |
| | | 125 | 126 | 127 | 128 | 129 |
| | | 130 | 131 | 132 | 133 | 134 |
| | | 135 | 136 | 137 | 138 | 139 |
| SUN24 | 0D | 60 | 61 | 62 | 63 | 64 |
| | | 65 | 66 | 67 | 68 | 69 |
| | | 70 | 71 | 72 | 73 | 74 |
| | | 75 | 76 | 77 | 78 | 79 |
| | | 140 | 141 | 142 | 143 | 144 |
| | | 145 | 146 | 147 | 148 | 149 |
| | | 150 | 151 | 152 | 153 | 154 |
| | | 155 | 156 | 157 | 158 | 159 |
| SUN21 | 1A | 0 | 1 | 2 | 3 | 4 |
| | | 5 | 6 | 7 | 8 | 9 |
| | | 10 | 11 | 12 | 13 | 14 |
| | | 15 | 16 | 17 | 18 | 19 |
| | | 80 | 81 | 82 | 83 | 84 |
| | | 85 | 86 | 87 | 88 | 89 |
| | | 90 | 91 | 92 | 93 | 94 |
| | | 95 | 96 | 97 | 98 | 99 |
| SUN22 | 1B | 20 | 21 | 22 | 23 | 24 |
| | | 25 | 26 | 27 | 28 | 29 |
| | | 30 | 31 | 32 | 33 | 34 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | 35 | 36 | 37 | 38 | 39 |
| | | 100 | 101 | 102 | 103 | 104 |
| | | 105 | 106 | 107 | 108 | 109 |
| | | 110 | 111 | 112 | 113 | 114 |
| | | 115 | 116 | 117 | 118 | 119 |
| SUN23 | 1C | 40 | 41 | 42 | 43 | 44 |
| | | 45 | 46 | 47 | 48 | 49 |
| | | 50 | 51 | 52 | 53 | 54 |
| | | 55 | 56 | 57 | 58 | 59 |
| | | 120 | 121 | 122 | 123 | 124 |
| | | 125 | 126 | 127 | 128 | 129 |
| | | 130 | 131 | 132 | 133 | 134 |
| | | 135 | 136 | 137 | 138 | 139 |
| SUN24 | 1D | 60 | 61 | 62 | 63 | 64 |
| | | 65 | 66 | 67 | 68 | 69 |
| | | 70 | 71 | 72 | 73 | 74 |
| | | 75 | 76 | 77 | 78 | 79 |
| | | 140 | 141 | 142 | 143 | 144 |
| | | 145 | 146 | 147 | 148 | 149 |
| | | 150 | 151 | 152 | 153 | 154 |
| | | 155 | 156 | 157 | 158 | 159 |

| | | |
|---|---|---|
| Databases | | |
| Logs | | |

Table 5 provides the detailed specifications for the storage configuration.

**Table 5. Adaptable Modular Storage 2300 Configuration Details**

| *Host* | *RAID Group* | *Port* | *LU* | *Size (GB)* | *RAID Level* | *RAID Type* | *Disk Spec* | *Description* |
|---|---|---|---|---|---|---|---|---|
| SUN21 | 0 | 0A/1A | 0-1 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 1-2 |
| | 1 | 0A/1A | 2-3 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 3-4 |
| | 2 | 0A/1A | 4-5 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 5-6 |
| | 3 | 0A/1A | 6-7 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 7-8 |
| | 4 | 0A/1A | 8-9 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 9-10 |
| | 5 | 0A/1A | 10-11 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 11-12 |
| | 6 | 0A/1A | 12-13 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 13-14 |
| | 7 | 0A/1A | 14-15 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 15-16 |
| | 8 | 0A/1A | 16-17 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 17-18 |
| | 9 | 0A/1A | 18-19 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 19-20 |
| SUN22 | 10 | 0B/1B | 20-21 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 21-22 |
| | 11 | 0B/1B | 22-23 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 23-24 |
| | 12 | 0B/1B | 24-25 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 25-26 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 13 | 0B/1B | 26-27 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 27-28 |
| | 14 | 0B/1B | 28-29 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 29-30 |
| | 15 | 0B/1B | 30-31 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 31-32 |
| | 16 | 0B/1B | 32-33 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 33-34 |
| | 17 | 0B/1B | 34-35 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 35-36 |
| | 18 | 0B/1B | 36-37 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 37-38 |
| | 19 | 0B/1B | 38-39 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 39-40 |
| SUN23 | 20 | 0C/1C | 40-41 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 41-42 |
| | 21 | 0C/1C | 42-43 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 43-44 |
| | 22 | 0C/1C | 44-45 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 45-46 |
| | 23 | 0C/1C | 46-47 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 47-48 |
| | 24 | 0C/1C | 48-49 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 49-50 |
| | 25 | 0C/1C | 50-51 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 51-52 |
| | 26 | 0C/1C | 52-53 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 53-54 |
| | 27 | 0C/1C | 54-55 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 55-56 |
| | 28 | 0C/1C | 56-57 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 57-58 |
| | 29 | 0C/1C | 58-59 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 59-60 |
| SUN24 | 30 | 0D/1D | 60-61 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 61-62 |
| | 31 | 0D/1D | 62-63 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 63-64 |
| | 32 | 0D/1D | 64-65 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 65-66 |
| | 33 | 0D/1D | 66-67 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 67-68 |
| | 34 | 0D/1D | 68-69 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 69-70 |
| | 35 | 0D/1D | 70-71 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 71-72 |
| | 36 | 0D/1D | 72-73 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 73-74 |
| | 37 | 0D/1D | 74-75 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 75-76 |
| | 38 | 0D/1D | 76-77 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 77-78 |
| | 39 | 0D/1D | 78-79 | 200 | RAID-5 | 4+1 | 300GB 15K | Storage Groups 79-80 |
| SUN21 | 40 | 0A/1A | 80-83 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 1-4 |
| | 41 | 0A/1A | 84-87 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 5-8 |
| | 42 | 0A/1A | 88-91 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 9-12 |
| | 43 | 0A/1A | 92-95 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 13-16 |
| | 44 | 0A/1A | 96-99 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 17-20 |
| SUN22 | 45 | 0B/1B | 100-103 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 21-24 |
| | 46 | 0B/1B | 104-107 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 25-28 |
| | 47 | 0B/1B | 108-111 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 29-32 |
| | 48 | 0B/1B | 112-115 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 33-36 |
| | 49 | 0B/1B | 116-119 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 37-40 |
| SUN23 | 50 | 0C/1C | 120-123 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 41-44 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 51 | 0C/1C | 124-127 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 45-48 |
| | 52 | 0C/1C | 128-131 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 49-52 |
| | 53 | 0C/1C | 132-135 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 53-56 |
| | 54 | 0C/1C | 136-139 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 57-60 |
| SUN24 | 55 | 0D/1D | 140-143 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 61-64 |
| | 56 | 0D/1D | 144-147 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 65-68 |
| | 57 | 0D/1D | 148-151 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 69-72 |
| | 58 | 0D/1D | 152-155 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 73-76 |
| | 59 | 0D/1D | 156-159 | 20 | RAID-1 | 1+1 | 300GB 15K | Logs 77-80 |

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. These factors also affect server scalability:

- 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
- Client usage profiles

These factors are all beyond the scope of the ESRP – Storage program. Therefore, the number of mailboxes hosted per server as part of the tested configuration might not necessarily be viable for some customer deployments.

For more information about identifying and addressing performance bottlenecks in an Exchange system, see Microsoft's Troubleshooting Microsoft Exchange Server Performance.

# Targeted Customer Profile

This solution is designed for medium to large organizations that plan to consolidate their Exchange Server 2007 storage on high-performance, high-reliability storage systems. This configuration supports 15,200 Exchange users with the following specifications:

- 4 Exchange Servers
- 3,800 users on a single Exchange Server
- 0.384 IOPS per user
- 1024MB mailbox size
- 80 storage groups
- 2 database per storage group (160 total)

# Test Deployment

The following tables summarize the testing environment.

**Table 6. Simulated Exchange Configuration**

| | |
|---|---|
| ***Number of Exchange mailboxes simulated*** | 15,200 |
| ***Number of hosts*** | 4 |
| ***Number of mailboxes per host*** | 3,800 |
| ***Number of storage groups per host*** | 20 |
| ***Number of mailbox stores per storage group*** | 2 |
| ***Number of mailboxes per mailbox store*** | 95 |
| ***Number of mailbox store LUs per storage group*** | 2 |
| ***Simulated profile: I/Os per second per mailbox (IOPS, include 20% headroom)*** | 0.384 |
| ***Database LU size*** | 200GB |
| ***Log LU size*** | 20GB |
| ***Total database size for performance testing*** | 15564.8GB |
| ***% storage capacity used by Exchange database**** | 97.28% |

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

**Table 7. Primary Storage Hardware**

| | |
|---|---|
| ***Storage type (SAN, DAS,iSCSI, NAS, iSCSI)*** | SAN |
| ***Storage connectivity (Fibre Channel, SAS, SATA, iSCSI)*** | Fiber Channel |
| ***Storage model and OS/firmware revision*** | 1 Hitachi Adaptable Modular Storage 2300<br>Firmware: 0860/A-M<br>WHQL listing: Hitachi Adaptable Modular Storage 2300 |
| ***Storage cache*** | 16 GB |
| ***Number of storage controllers*** | 2 |
| ***Number of storage ports*** | 8 |
| ***Maximum bandwidth of storage connectivity to host*** | 32Gb/s (8x4Gb/s ports) |
| ***Switch type/model/firmware revision*** | Brocade 5320, Fabric OS v6.1.1c |
| ***HBA model and firmware*** | Emulex LPe11002-M4-H, FW 2.80A4 |
| ***Number of HBAs/host*** | 2 dual-ported HBA per host, 1 4Gb/s port used per HBA |
| ***Host server type*** | Sun Fire 4600M2<br>4 2.8 GHz dual-core AMD Opteron CPUs, 64 GB memory |
| ***Total number of disks tested in solution*** | 240 |
| ***Maximum number of spindles can be hosted in the storage*** | 240 |

**Table 8. Primary Storage Software**

| | |
|---|---|
| ***HBA driver*** | STOR Miniport 9.1.7.16 |
| ***HBA QueueTarget setting*** | 1 |
| ***HBA QueueDepth setting*** | 254 |
| ***Multipathing*** | Hitachi Dynamic Link Manager software v6.0 |
| ***Host OS*** | Windows Server 2008 Enterprise Service Pack 1 |
| ***ESE.dll file version*** | 08.01.0240.005 |
| ***Replication solution name/version*** | N/A |

**Table 9. Primary Storage Disk Configuration (Mailbox Store Disks)**

| | |
|---|---|
| ***Disk type, speed and firmware revision*** | SAS Disk 300GB 15K D06A |
| ***Raw capacity per disk (GB)*** | 300GB |
| ***Number of physical disks in test*** | 200 |
| ***Total raw storage capacity (GB)*** | 60,000GB |
| ***Disk slice size (GB)*** | 2 200GB LUs per RAID group |
| ***Number of slices per LU or number of disks per LU*** | 2 LUs per 5 disks |
| ***RAID level*** | RAID-5 (4+1) at storage level |
| ***Total formatted capacity*** | 16,000GB |
| ***Storage capacity utilization*** | 26.67% |
| ***Database capacity utilization*** | 25.94% |

**Table 10. Primary Storage Disk Configuration (Transaction Log Disks)**

| | |
|---|---|
| ***Disk type, speed and firmware revision*** | SAS Disk 300GB 15K D06A |
| ***Raw capacity per disk (GB)*** | 300GB |
| ***Number of spindles in test*** | 40 |
| ***Total raw storage capacity (GB)*** | 12,000GB |
| ***Disk slice size (GB)*** | 2 20GB LUs per RAID group |
| ***Number of slices per LU or number of disks per LU*** | 2 LUs per 2 disks |
| ***RAID level*** | RAID-1 at storage level |
| ***Total formatted capacity*** | 1600GB |

# Streaming Backup

N/A

# Replication

N/A

# Best Practices

Microsoft Exchange Server 2007 is a very disk-intensive application. It presents two distinct workload patterns to the storage, with 8KB random read/write operations to the databases, and sequential write operations of varying size (between 512 bytes up to the log buffer size) to the transaction logs. For this reason, designing an optimal storage configuration can prove challenging in practice. Based on the testing run using the ESRP framework, Hitachi Data Systems recommends these best practices to improve the performance of the Adaptable Modular Storage 2300 running Exchange.

For more information about Exchange 2007 best practices for storage design, see the Microsoft TechNet article *Planning Storage Configurations*.

## Core Storage

1. Use Microsoft's diskpar or diskpart to create track-aligned disk partitions. For the 2300, using an offset of 64KB is optimal. This is optional in the case of using Windows Server 2008.
2. Keep the Exchange workload isolated from other applications. Mixing another I/O intensive application whose workload differs from Exchange can cause the performance for both applications to degrade.
3. Due to the difference in I/O patterns, isolate the Exchange database storage groups from the log groups. Create dedicated RAID groups for the databases and separate RAID groups for the logs.
4. Hitachi Data Systems recommends RAID-5 or RAID-1+0 for the database RAID groups and RAID-1 for the log RAID groups. Hitachi Data Systems does not recommend LU concatenation.
5. Size storage solutions for Exchange based primarily on performance criteria. The number of disks, RAID level and percent utilization of each disk directly affect the level of achievable performance. Factor in capacity requirements only after performance is addressed.
6. Spindle size is unrelated to performance with regards to IOPS or throughput rates. Spindle size is related to the usable capacity of all of the LUs from a RAID group, which is a choice users make.
7. The number of spindles, coupled with the RAID level, determines the physical IOPS capacity of the RAID group and all of its LUs. If the disk has too few spindles, the response times grow to large values very quickly.
8. For more information about RAID-5 drive failure and rebuild, see Appendix A.

# Backup Strategy

N/A

# Test Result Summary

This section provides a high-level summary of the test data from ESRP and the link to the detailed HTML reports that are generated by ESRP testing framework.

## Reliability

A number of tests in the framework check reliability spanning a 24-hour window. The goal is to verify the storage can handle high I/O load for a long period of time. Following these stress tests, both log and database files are analyzed for integrity to ensure that no database or log corruption occurs.

- No errors were reported in the event log file for the storage reliability testing
- No errors were reported for the database and log checksum process

## Primary Storage Performance Results

The primary storage performance testing exercises the storage with maximum sustainable Exchange type of I/O for two hours. The test shows how long it takes for the storage to respond to an I/O under load. The following data is the sum of all of the logical disk I/Os and average of all the logical disks I/O latency in the two-hour test duration.

### *Individual Server Metrics*

Individual server metrics show the sum of I/Os across storage groups and the average latency across all storage groups.

**Table 11. Individual Server Metrics for Exchange Server SUN21**

| | |
|---|---|
| **Database I/O** | |
| ***Database Disk Transfers/sec*** | 2252 IOPS |
| ***Database Disk Reads/sec*** | 1274 IOPS |
| ***Database Disk Writes/sec*** | 977 IOPS |
| ***Average Database Disk Read Latency (ms)*** | 11 |
| ***Average Database Disk Write Latency (ms)*** | 6 |
| **Transaction Log I/O** | |
| ***Log Disk Writes/sec*** | 717 IOPS |
| ***Average Log Disk Write Latency (ms)*** | 1 |

**Table 12. Individual Server Metrics for Exchange Server SUN22**

| | |
|---|---|
| **Database I/O** | |
| ***Database Disk Transfers/sec*** | 2262 IOPS |
| ***Database Disk Reads/sec*** | 1286 IOPS |
| ***Database Disk Writes/sec*** | 977 IOPS |
| ***Average Database Disk Read Latency (ms)*** | 11 |
| ***Average Database Disk Write Latency (ms)*** | 6 |
| **Transaction Log I/O** | |
| ***Log Disk Writes/sec*** | 717 IOPS |
| ***Average Log Disk Write Latency (ms)*** | 1 |

**Table 13. Individual Server Metrics for Exchange Server SUN23**

| | |
|---|---|
| **Database I/O** | |
| ***Database Disk Transfers/sec*** | 2223 IOPS |
| ***Database Disk Reads/sec*** | 1263 IOPS |
| ***Database Disk Writes/sec*** | 960 IOPS |
| ***Average Database Disk Read Latency (ms)*** | 11 |
| ***Average Database Disk Write Latency (ms)*** | 6 |
| **Transaction Log I/O** | |
| ***Log Disk Writes/sec*** | 702 IOPS |
| ***Average Log Disk Write Latency (ms)*** | 1 |

**Table 14. Individual Server Metrics for Exchange Server SUN24**

| | |
|---|---|
| **Database I/O** | |
| ***Database Disk Transfers/sec*** | 2215 IOPS |
| ***Database Disk Reads/sec*** | 1270 IOPS |
| ***Database Disk Writes/sec*** | 945 IOPS |
| ***Average Database Disk Read Latency (ms)*** | 11 |
| ***Average Database Disk Write Latency (ms)*** | 6 |
| **Transaction Log I/O** | |
| ***Log Disk Writes/sec*** | 684 IOPS |
| ***Average Log Disk Write Latency (ms)*** | 1 |

## *Aggregate Performance Across All Servers Metrics*

The aggregate performance across all server metrics shows the sum of I/Os across all servers in the solution and the average latency across all servers in the solution.

**Table 15. Aggregate Performance for Exchange Server 2007**

| | |
|---|---|
| **Database I/O** | |
| ***Database Disk Transfers/sec*** | 8,952 IOPS |
| ***Database Disk Reads/sec*** | 5,093 IOPS |
| ***Database Disk Writes/sec*** | 3,859 IOPS |
| ***Average Database Disk Read Latency (ms)*** | 11 |
| ***Average Database Disk Write Latency (ms)*** | 6 |
| **Transaction Log I/O** | |
| ***Average Log Disk Writes/sec*** | 2,820 IOPS |
| ***Average Log Disk Write Latency (ms)*** | 1 |

## Streaming Backup Performance

For the ESRP Version 2.1 release, only the streaming backup type is supported for testing in the framework. This section has two tests: The first measures the read I/O performance metrics by running checksums on all of the database and log files and the second measures the end-to-end performance when the databases are backed up to disks.

### *Database Read-only Performance*

This test measures the maximum rate at which databases can be recovered. The following tables show the average rate for a single database file.

**Table 16. Database Read-only Performance for Exchange Server SUN21**

| | |
|---|---|
| ***MB read/sec per storage group*** | 13.7 |
| ***MB read/sec total*** | 274.0 |

**Table 17. Database Read-only Performance for Exchange Server SUN22**

| | |
|---|---|
| ***MB read/sec per storage group*** | 13.6 |
| ***MB read/sec total*** | 272.8 |

**Table 18. Database Read-only Performance for Exchange Server SUN23**

| | |
|---|---|
| ***MB read/sec per storage group*** | 13.7 |
| ***MB read/sec total*** | 273.7 |

**Table 19. Database Read-only Performance for Exchange Server SUN24**

| | |
|---|---|
| ***MB read/sec per storage group*** | 13.4 |
| ***MB read/sec total*** | 268.8 |

### *Log Read-only Performance*

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

**Table 20. Log Read-only Performance for Exchange Server SUN21**

| | |
|---|---|
| ***Average time to play one log file (sec)*** | 1.18 |

**Table 21. Log Read-only Performance for Exchange Server SUN22**

| | |
|---|---|
| ***Average time to play one log file (sec)*** | 1.19 |

**Table 22. Log Read-only Performance for Exchange Server SUN23**

| | |
|---|---|
| ***Average time to play one log file (sec)*** | 1.19 |

**Table 23. Log Read-only Performance for Exchange Server SUN24**

| | |
|---|---|
| ***Average time to play one log file (sec)*** | 1.19 |

# Conclusion

This document details a tested configuration capable of supporting 15,200 users with a 0.384 IOPS per user profile and user mailbox size of 1024MB. A Hitachi Adaptable Modular Storage 2300 with 240 300GB 15K RPM SAS disks, 16GB of cache and eight 4Gb/s Fibre Channel host paths was used for these tests. Testing confirmed that the 2300 is capable of delivering the IOPS and capacity requirements needed to support 15,200 Exchange mailboxes configured with the specified user profile, while maintaining additional headroom to support peak throughput.

The solution outlined in this document does not include data protection components such as local or remote replication. Adding these technologies might affect performance and capacity requirements and each needs to be factored into the storage design accordingly.

For additional information about planning Exchange Server 2007 storage architectures for the Hitachi Adaptable Modular Storage 2000 family, see http://www.hds.com/assets/pdf/hitachi-ams-2000-family.pdf.

This document is developed by Hitachi Data Systems and reviewed by Microsoft Exchange Product team. The test results and data presented in this document are based on the tests introduced in the ESRP test framework. Do not quote the data directly for pre-deployment verification. It is still necessary to validate the storage design for a specific customer environment.

The ESRP program is not designed to be a benchmarking program; tests do not generate the maximum throughput for a given solution. Rather, it is focused on producing recommendations from vendors for Exchange application. Thus, do not use the data presented in this document for direct comparisons among the solutions.

# Appendix A – RAID-5 Drive Failure and Rebuild

These ESRP tests used RAID-5 (4D+1P) rather than RAID-6 (for example,4D+2P) or RAID-1+0 (for example, 4D+4D). RAID-5 is a much more capacity-efficient RAID level than the others, losing only 20 percent of the usable space (using 4D+1P) instead of 33 percent (4D+2P) or 50 percent (4D+4D). One downside with the use of parity RAID instead of mirrored and striped (RAID-1+0) is that for *writes*, the internal disk write penalty is higher. For SAS or Fibre Channel disks, RAID-5 requires four physical disk I/Os on the backend for every host write, whereas RAID-1+0 consumes two physical I/Os. RAID-6 requires six physical I/Os for each host write.

The other downside is the RAID group rebuild time after a sudden disk failure. The Hitachi Adaptable Modular Storage 2000 family is always scanning the storage system looking for *soft fails*, because excessive soft fails often predict a hard failure. If the number *of* soft fails exceeds the failure threshold in a 24-hour period (user parameter driven), the 2000 family storage system first executes a disk-to-disk copy to a global hot spare (thus avoiding a RAID-5 or RAID-6 rebuild), and then marks the disk as *failed* and replaces it.

If hard fail does occur, for RAID-1+0, the contents of the good disk are mirrored onto a spare disk (these 'hot spares' are user defined to be in several disk enclosures on a storage system). For RAID-5 and RAID-6, all disks in the RAID group must be read to recreate the missing data and parity that was on the failed disk onto the spare disk. This rebuild mode is called *Corrective Copy*. An associated array setting called *[Drive] Restore Options* determines how aggressive the rebuild operation is in the face of ongoing host I/Os. This setting has three levels: aggressive, moderate and background.

Lab tests show that, on a RAID-6 group using Fibre Channel disks (the only sample available), and an *aggressive* Restore Option setting, a RAID-6 (8D+2P) group Corrective Copy operation requires about 30 minutes to complete in the absence of host workloads on LUs from that RAID group. In the presence of sustained 100 percent sequential write workloads to LUs from that RAID Group, this rebuild time increased to 18 hours. The host performance on a LU from that RAID group was measured at 154MB/s (normal state) and 95MB/s (Corrective Copy state). Had this been RAID-5, the Corrective Copy times would have been reduced.

# Appendix B – Test Reports

This appendix contains Jetstress test results for one of the servers used in testing this storage solution. These test results are representative of the results obtained for all of the servers tested.

## Performance Test Result: SUN21

### *Test Summary*

| | |
|---|---|
| ***Overall Test Result*** | Pass |
| ***Machine Name*** | SUN21 |
| ***Test Description*** | |
| ***Test Start Time*** | 7/9/2009 9:41:34 AM |
| ***Test End Time*** | 7/9/2009 11:57:20 AM |
| ***Jetstress Version*** | 08.02.0060.000 |
| ***Ese Version*** | 08.01.0240.005 |
| ***Operating System*** | Windows Server (R) 2008 Enterprise Service Pack 1 (6.0.6001.65536) |
| ***Performance Log*** | C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800 users\Performance_2009_7_9_9_42_58.blg<br>C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800 users\DBChecksum_2009_7_9_11_57_20.blg |

### *Database Sizing and Throughput*

| | |
|---|---|
| ***Achieved I/O per Second*** | 2251.611 |
| ***Target I/O per Second*** | 1459.2 |
| ***Initial database size*** | 4080418816000 |
| ***Final database size*** | 4088950030336 |
| ***Database files (count)*** | 40 |

### *Jetstress System Parameters*

| | |
|---|---|
| ***Thread count*** | 4 (per storage group) |
| ***Log buffers*** | 9000 |
| ***Minimum database cache*** | 640.0 MB |
| ***Maximum database cache*** | 5120.0 MB |
| ***Insert operations*** | 40% |
| ***Delete operations*** | 30% |
| ***Replace operations*** | 5% |
| ***Read operations*** | 25% |
| ***Lazy commits*** | 55% |

### *Disk Subsystem Performance*

| ***Logical Disk*** | ***Avg. Disk*** | ***Avg. Disk*** | ***Disk*** | ***Disk*** | ***Avg. Disk*** |
|---|---|---|---|---|---|

| | sec/Read | sec/Write | Reads/sec | Writes/sec | Bytes/Write |
|---|---|---|---|---|---|
| Database (C:\asgluns\sg1) | 0.011 | 0.005 | 63.715 | 49.013 | (n/a) |
| Database (C:\asgluns\sg2) | 0.012 | 0.006 | 64.553 | 49.154 | (n/a) |
| Database (C:\asgluns\sg3) | 0.011 | 0.005 | 64.307 | 49.473 | (n/a) |
| Database (C:\asgluns\sg4) | 0.012 | 0.006 | 63.887 | 49.188 | (n/a) |
| Database (C:\asgluns\sg5) | 0.011 | 0.005 | 64.397 | 49.455 | (n/a) |
| Database (C:\asgluns\sg6) | 0.011 | 0.006 | 62.767 | 48.311 | (n/a) |
| Database (C:\asgluns\sg7) | 0.011 | 0.006 | 65.244 | 50.524 | (n/a) |
| Database (C:\asgluns\sg8) | 0.011 | 0.005 | 63.040 | 48.019 | (n/a) |
| Database (C:\asgluns\sg9) | 0.011 | 0.007 | 63.418 | 48.541 | (n/a) |
| Database (C:\asgluns\sg10) | 0.011 | 0.006 | 64.152 | 49.256 | (n/a) |
| Database (C:\asgluns\sg11) | 0.011 | 0.007 | 63.910 | 48.482 | (n/a) |
| Database (C:\asgluns\sg12) | 0.010 | 0.006 | 63.345 | 48.831 | (n/a) |
| Database (C:\asgluns\sg13) | 0.011 | 0.006 | 63.443 | 48.450 | (n/a) |
| Database (C:\asgluns\sg14) | 0.012 | 0.007 | 64.345 | 49.266 | (n/a) |
| Database (C:\asgluns\sg15) | 0.011 | 0.006 | 63.394 | 48.901 | (n/a) |
| Database (C:\asgluns\sg16) | 0.011 | 0.007 | 63.151 | 48.588 | (n/a) |
| Database (C:\asgluns\sg17) | 0.011 | 0.006 | 63.411 | 48.522 | (n/a) |
| Database (C:\asgluns\sg18) | 0.011 | 0.007 | 63.068 | 48.441 | (n/a) |
| Database | 0.011 | 0.007 | 64.409 | 49.632 | (n/a) |

| | | | | | |
|---|---|---|---|---|---|
| (C:\asgluns\sg19) | | | | | |
| Database (C:\asgluns\sg20) | 0.011 | 0.006 | 62.154 | 47.452 | (n/a) |
| Log (C:\alogluns\log1) | 0.000 | 0.001 | 0.000 | 35.228 | 4404.502 |
| Log (C:\alogluns\log2) | 0.000 | 0.001 | 0.000 | 35.978 | 4325.688 |
| Log (C:\alogluns\log3) | 0.000 | 0.001 | 0.000 | 36.047 | 4396.513 |
| Log (C:\alogluns\log4) | 0.000 | 0.001 | 0.000 | 36.079 | 4372.955 |
| Log (C:\alogluns\log5) | 0.000 | 0.001 | 0.000 | 35.845 | 4356.906 |
| Log (C:\alogluns\log6) | 0.000 | 0.001 | 0.000 | 35.866 | 4383.336 |
| Log (C:\alogluns\log7) | 0.000 | 0.001 | 0.000 | 36.573 | 4313.289 |
| Log (C:\alogluns\log8) | 0.000 | 0.001 | 0.000 | 35.538 | 4295.845 |
| Log (C:\alogluns\log9) | 0.000 | 0.001 | 0.000 | 35.549 | 4331.152 |
| Log (C:\alogluns\log10) | 0.000 | 0.001 | 0.000 | 36.569 | 4359.365 |
| Log (C:\alogluns\log11) | 0.000 | 0.001 | 0.000 | 35.750 | 4350.709 |
| Log (C:\alogluns\log12) | 0.000 | 0.001 | 0.000 | 35.881 | 4337.586 |
| Log (C:\alogluns\log13) | 0.000 | 0.001 | 0.000 | 35.449 | 4433.281 |
| Log (C:\alogluns\log14) | 0.000 | 0.001 | 0.000 | 36.389 | 4355.617 |
| Log (C:\alogluns\log15) | 0.000 | 0.002 | 0.000 | 35.388 | 4393.108 |
| Log (C:\alogluns\log16) | 0.000 | 0.001 | 0.000 | 35.929 | 4370.241 |
| Log (C:\alogluns\log17) | 0.000 | 0.001 | 0.000 | 35.696 | 4377.075 |
| Log (C:\alogluns\log18) | 0.000 | 0.001 | 0.000 | 35.959 | 4359.267 |
| Log (C:\alogluns\log19) | 0.000 | 0.001 | 0.000 | 36.207 | 4412.931 |
| Log (C:\alogluns\log20) | 0.000 | 0.001 | 0.000 | 35.193 | 4374.362 |

## *Host System Performance*

| *Counter* | *Average* | *Minimum* | *Maximum* |
|---|---|---|---|
| % Processor Time | 1.020 | 0.584 | 1.945 |
| Available MBytes | 56528.370 | 56504.000 | 57021.000 |
| Free System Page Table Entries | 33560847.361 | 33560505.000 | 33561088.000 |
| Transition Pages RePurposed/sec | 0.000 | 0.000 | 0.000 |
| Pool Nonpaged Bytes | 139852130.873 | 139821056.000 | 140034048.000 |
| Pool Paged Bytes | 146917876.242 | 146538496.000 | 178331648.000 |

| | | | |
|---|---|---|---|
| Database Page Fault Stalls/sec | 0.000 | 0.000 | 0.000 |

*Test Log*

```
7/8/2009 8:43:07 PM -- Prepare testing begins ...
7/8/2009 8:43:12 PM -- Creating C:\asgluns\sg1\Jetstress1.edb.
7/8/2009 8:43:12 PM -- Database cache settings: (minimum: 32.0 MB, maximum:
256.0 MB)
7/8/2009 8:43:12 PM -- Database flush thresholds: (start: 2.6 MB, stop: 5.1
MB)
7/8/2009 9:47:39 PM -- 60.0% of 95.0 GB complete (11598932 records inserted).
7/8/2009 11:00:36 PM -- 100.0% of 95.0 GB complete (20195146 records
inserted).
7/8/2009 11:00:47 PM -- Duplicating 39 databases:
7/9/2009 9:38:13 AM -- 100.0% of 3.6 TB complete (3.6 TB duplicated).
7/9/2009 9:38:54 AM -- Attaching databases ...
7/9/2009 9:38:54 AM -- Prepare testing ends.
7/9/2009 9:41:34 AM -- Jetstress testing begins ...
7/9/2009 9:41:34 AM -- Prepare testing begins ...
7/9/2009 9:42:15 AM -- Attaching databases ...
7/9/2009 9:42:15 AM -- Prepare testing ends.
7/9/2009 9:42:15 AM -- Dispatching transactions begins ...
7/9/2009 9:42:15 AM -- Database cache settings: (minimum: 640.0 MB, maximum:
5.0 GB)
7/9/2009 9:42:15 AM -- Database flush thresholds: (start: 51.2 MB, stop:
102.4 MB)
7/9/2009 9:42:58 AM -- Database read latency thresholds: (average: 0.02
seconds/read, maximum: 0.05 seconds/read).
7/9/2009 9:42:58 AM -- Log write latency thresholds: (average: 0.01
seconds/write, maximum: 0.05 seconds/write).
7/9/2009 9:43:00 AM -- Operation mix: Sessions 4, Inserts 40%, Deletes 30%,
Replaces 5%, Reads 25%, Lazy Commits 55%.
7/9/2009 9:43:00 AM -- Performance logging begins (interval: 15000 ms).
7/9/2009 9:43:00 AM -- Attaining prerequisites:
7/9/2009 9:56:43 AM -- \MSExchange Database(JetstressWin)\Database Cache
Size, Last: 4835918000.0 (lower bound: 4831838000.0, upper bound: none)
7/9/2009 11:56:44 AM -- Performance logging ends.
7/9/2009 11:57:16 AM -- JetInterop batch transaction stats: 14198, 14282,
14165, 14261, 14109, 14095, 14308, 13978, 14030, 14261, 14205, 14152, 14076,
14288, 14039, 14071, 14157, 14123, 14332, and 13921.
7/9/2009 11:57:16 AM -- Dispatching transactions ends.
7/9/2009 11:57:16 AM -- Shutting down databases ...
7/9/2009 11:57:20 AM -- Instance4876.1 (complete), Instance4876.2 (complete),
Instance4876.3 (complete), Instance4876.4 (complete), Instance4876.5
(complete), Instance4876.6 (complete), Instance4876.7 (complete),
Instance4876.8 (complete), Instance4876.9 (complete), Instance4876.10
(complete), Instance4876.11 (complete), Instance4876.12 (complete),
Instance4876.13 (complete), Instance4876.14 (complete), Instance4876.15
(complete), Instance4876.16 (complete), Instance4876.17 (complete),
Instance4876.18 (complete), Instance4876.19 (complete), and Instance4876.20
(complete)
7/9/2009 11:57:21 AM -- Performance logging begins (interval: 30000 ms).
7/9/2009 11:57:21 AM -- Verifying database checksums ...
7/9/2009 4:08:07 PM -- C:\asgluns\sg1 (100% processed), C:\asgluns\sg2 (100%
processed), C:\asgluns\sg3 (100% processed), C:\asgluns\sg4 (100% processed),
C:\asgluns\sg5 (100% processed), C:\asgluns\sg6 (100% processed),
C:\asgluns\sg7 (100% processed), C:\asgluns\sg8 (100% processed),
C:\asgluns\sg9 (100% processed), C:\asgluns\sg10 (100% processed),
C:\asgluns\sg11 (100% processed), C:\asgluns\sg12 (100% processed),
C:\asgluns\sg13 (100% processed), C:\asgluns\sg14 (100% processed),
C:\asgluns\sg15 (100% processed), C:\asgluns\sg16 (100% processed),
C:\asgluns\sg17 (100% processed), C:\asgluns\sg18 (100% processed),
C:\asgluns\sg19 (100% processed), and C:\asgluns\sg20 (100% processed)
7/9/2009 4:08:07 PM -- Performance logging ends.
7/9/2009 4:08:07 PM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800
users\DBChecksum_2009_7_9_11_57_20.blg has 500 samples.
```

7/9/2009 4:10:21 PM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800 users\DBChecksum_2009_7_9_11_57_20.html is saved.
7/9/2009 4:10:21 PM -- Verifying log checksums ...
7/9/2009 4:10:28 PM -- C:\alogluns\log1 (2 logs passed), C:\alogluns\log2 (2 logs passed), C:\alogluns\log3 (2 logs passed), C:\alogluns\log4 (2 logs passed), C:\alogluns\log5 (2 logs passed), C:\alogluns\log6 (2 logs passed), C:\alogluns\log7 (2 logs passed), C:\alogluns\log8 (2 logs passed), C:\alogluns\log9 (2 logs passed), C:\alogluns\log10 (3 logs passed), C:\alogluns\log11 (2 logs passed), C:\alogluns\log12 (2 logs passed), C:\alogluns\log13 (2 logs passed), C:\alogluns\log14 (2 logs passed), C:\alogluns\log15 (2 logs passed), C:\alogluns\log16 (3 logs passed), C:\alogluns\log17 (3 logs passed), C:\alogluns\log18 (2 logs passed), C:\alogluns\log19 (2 logs passed), and C:\alogluns\log20 (2 logs passed)
7/9/2009 4:10:28 PM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800 users\Performance_2009_7_9_9_42_58.blg has 533 samples.
7/9/2009 4:10:28 PM -- Creating test report ...
7/9/2009 4:10:48 PM -- Volume C:\asgluns\sg1 has 0.0115 for Avg. Disk sec/Read.
7/9/2009 4:10:48 PM -- Volume C:\asgluns\sg2 has 0.0117 for Avg. Disk sec/Read.
7/9/2009 4:10:48 PM -- Volume C:\asgluns\sg3 has 0.0110 for Avg. Disk sec/Read.
7/9/2009 4:10:48 PM -- Volume C:\asgluns\sg4 has 0.0117 for Avg. Disk sec/Read.
7/9/2009 4:10:48 PM -- Volume C:\asgluns\sg5 has 0.0108 for Avg. Disk sec/Read.
7/9/2009 4:10:48 PM -- Volume C:\asgluns\sg6 has 0.0113 for Avg. Disk sec/Read.
7/9/2009 4:10:48 PM -- Volume C:\asgluns\sg7 has 0.0113 for Avg. Disk sec/Read.
7/9/2009 4:10:48 PM -- Volume C:\asgluns\sg8 has 0.0108 for Avg. Disk sec/Read.
7/9/2009 4:10:48 PM -- Volume C:\asgluns\sg9 has 0.0114 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\asgluns\sg10 has 0.0106 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\asgluns\sg11 has 0.0114 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\asgluns\sg12 has 0.0105 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\asgluns\sg13 has 0.0111 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\asgluns\sg14 has 0.0118 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\asgluns\sg15 has 0.0109 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\asgluns\sg16 has 0.0113 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\asgluns\sg17 has 0.0108 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\asgluns\sg18 has 0.0114 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\asgluns\sg19 has 0.0112 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\asgluns\sg20 has 0.0108 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log1 has 0.0015 for Avg. Disk sec/Write.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log1 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log2 has 0.0011 for Avg. Disk sec/Write.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log2 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log3 has 0.0015 for Avg. Disk sec/Write.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log3 has 0.0000 for Avg. Disk sec/Read.

7/9/2009 4:10:49 PM -- Volume C:\alogluns\log4 has 0.0011 for Avg. Disk sec/Write.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log4 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log5 has 0.0015 for Avg. Disk sec/Write.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log5 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log6 has 0.0011 for Avg. Disk sec/Write.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log6 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log7 has 0.0014 for Avg. Disk sec/Write.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log7 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log8 has 0.0009 for Avg. Disk sec/Write.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log8 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log9 has 0.0014 for Avg. Disk sec/Write.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log9 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log10 has 0.0009 for Avg. Disk sec/Write.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log10 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log11 has 0.0014 for Avg. Disk sec/Write.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log11 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log12 has 0.0010 for Avg. Disk sec/Write.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log12 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:49 PM -- Volume C:\alogluns\log13 has 0.0015 for Avg. Disk sec/Write.
7/9/2009 4:10:50 PM -- Volume C:\alogluns\log13 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:50 PM -- Volume C:\alogluns\log14 has 0.0011 for Avg. Disk sec/Write.
7/9/2009 4:10:50 PM -- Volume C:\alogluns\log14 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:50 PM -- Volume C:\alogluns\log15 has 0.0015 for Avg. Disk sec/Write.
7/9/2009 4:10:50 PM -- Volume C:\alogluns\log15 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:50 PM -- Volume C:\alogluns\log16 has 0.0011 for Avg. Disk sec/Write.
7/9/2009 4:10:50 PM -- Volume C:\alogluns\log16 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:50 PM -- Volume C:\alogluns\log17 has 0.0015 for Avg. Disk sec/Write.
7/9/2009 4:10:50 PM -- Volume C:\alogluns\log17 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:50 PM -- Volume C:\alogluns\log18 has 0.0011 for Avg. Disk sec/Write.
7/9/2009 4:10:50 PM -- Volume C:\alogluns\log18 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:50 PM -- Volume C:\alogluns\log19 has 0.0014 for Avg. Disk sec/Write.
7/9/2009 4:10:50 PM -- Volume C:\alogluns\log19 has 0.0000 for Avg. Disk sec/Read.
7/9/2009 4:10:50 PM -- Volume C:\alogluns\log20 has 0.0010 for Avg. Disk sec/Write.
7/9/2009 4:10:50 PM -- Volume C:\alogluns\log20 has 0.0000 for Avg. Disk sec/Read.

```
7/9/2009 4:10:50 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
7/9/2009 4:10:50 PM -- Test has 0 Database Page Fault Stalls/sec samples
higher than 0.
7/9/2009 4:10:50 PM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800
users\Performance_2009_7_9_9_42_58.xml has 478 samples queried.
```

## Performance Test Database Checksums Result: SUN21

*Checksum Statistics - All*

| Database | Seen pages | Bad pages | Correctable pages | Wrong page no pages | File length / seconds taken |
|---|---|---|---|---|---|
| C:\asgluns\sg1\Jetstress1.edb | 12477538 | 0 | 0 | 0 | 97480 MBytes / 12265 seconds |
| C:\asgluns\sg1\Jetstress2.edb | 12478562 | 0 | 0 | 0 | 97488 MBytes / 2779 seconds |
| C:\asgluns\sg2\Jetstress1.edb | 12477538 | 0 | 0 | 0 | 97480 MBytes / 7692 seconds |
| C:\asgluns\sg2\Jetstress2.edb | 12479586 | 0 | 0 | 0 | 97496 MBytes / 7253 seconds |
| C:\asgluns\sg3\Jetstress1.edb | 12478818 | 0 | 0 | 0 | 97490 MBytes / 7399 seconds |
| C:\asgluns\sg3\Jetstress2.edb | 12478306 | 0 | 0 | 0 | 97486 MBytes / 6940 seconds |
| C:\asgluns\sg4\Jetstress1.edb | 12477794 | 0 | 0 | 0 | 97482 MBytes / 7772 seconds |
| C:\asgluns\sg4\Jetstress2.edb | 12479586 | 0 | 0 | 0 | 97496 MBytes / 7191 seconds |
| C:\asgluns\sg5\Jetstress1.edb | 12478306 | 0 | 0 | 0 | 97486 MBytes / 7340 seconds |
| C:\asgluns\sg5\Jetstress2.edb | 12478562 | 0 | 0 | 0 | 97488 MBytes / 6970 seconds |
| C:\asgluns\sg6\Jetstress1.edb | 12478562 | 0 | 0 | 0 | 97488 MBytes / 7665 seconds |
| C:\asgluns\sg6\Jetstress2.edb | 12478562 | 0 | 0 | 0 | 97488 MBytes / 7246 seconds |
| C:\asgluns\sg7\Jetstress1.edb | 12478306 | 0 | 0 | 0 | 97486 MBytes / 6855 seconds |
| C:\asgluns\sg7\Jetstress2.edb | 12478818 | 0 | 0 | 0 | 97490 MBytes / 6939 seconds |
| C:\asgluns\sg8\Jetstress1.edb | 12477538 | 0 | 0 | 0 | 97480 MBytes / 6796 seconds |
| C:\asgluns\sg8\Jetstress2.edb | 12478050 | 0 | 0 | 0 | 97484 MBytes / 7072 seconds |
| C:\asgluns\sg9\Jetstress1.edb | 12478050 | 0 | 0 | 0 | 97484 MBytes / 6850 seconds |
| C:\asgluns\sg9\Jetstress2.edb | 12477794 | 0 | 0 | 0 | 97482 MBytes / 6932 seconds |
| C:\asgluns\sg10\Jetstress1.edb | 12478818 | 0 | 0 | 0 | 97490 MBytes / |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | 6788 seconds |
| C:\asgluns\sg10\Jetstress2.edb | 12478818 | 0 | 0 | 0 | 97490 MBytes / 7062 seconds |
| C:\asgluns\sg11\Jetstress1.edb | 12477538 | 0 | 0 | 0 | 97480 MBytes / 6788 seconds |
| C:\asgluns\sg11\Jetstress2.edb | 12479586 | 0 | 0 | 0 | 97496 MBytes / 6942 seconds |
| C:\asgluns\sg12\Jetstress1.edb | 12478818 | 0 | 0 | 0 | 97490 MBytes / 6796 seconds |
| C:\asgluns\sg12\Jetstress2.edb | 12478306 | 0 | 0 | 0 | 97486 MBytes / 7057 seconds |
| C:\asgluns\sg13\Jetstress1.edb | 12478306 | 0 | 0 | 0 | 97486 MBytes / 7298 seconds |
| C:\asgluns\sg13\Jetstress2.edb | 12478562 | 0 | 0 | 0 | 97488 MBytes / 6971 seconds |
| C:\asgluns\sg14\Jetstress1.edb | 12479074 | 0 | 0 | 0 | 97492 MBytes / 7625 seconds |
| C:\asgluns\sg14\Jetstress2.edb | 12478818 | 0 | 0 | 0 | 97490 MBytes / 7245 seconds |
| C:\asgluns\sg15\Jetstress1.edb | 12478050 | 0 | 0 | 0 | 97484 MBytes / 7295 seconds |
| C:\asgluns\sg15\Jetstress2.edb | 12477794 | 0 | 0 | 0 | 97482 MBytes / 6950 seconds |
| C:\asgluns\sg16\Jetstress1.edb | 12479330 | 0 | 0 | 0 | 97494 MBytes / 7636 seconds |
| C:\asgluns\sg16\Jetstress2.edb | 12477794 | 0 | 0 | 0 | 97482 MBytes / 7262 seconds |
| C:\asgluns\sg17\Jetstress1.edb | 12479074 | 0 | 0 | 0 | 97492 MBytes / 7271 seconds |
| C:\asgluns\sg17\Jetstress2.edb | 12478050 | 0 | 0 | 0 | 97484 MBytes / 6988 seconds |
| C:\asgluns\sg18\Jetstress1.edb | 12478306 | 0 | 0 | 0 | 97486 MBytes / 7722 seconds |
| C:\asgluns\sg18\Jetstress2.edb | 12479074 | 0 | 0 | 0 | 97492 MBytes / 7214 seconds |
| C:\asgluns\sg19\Jetstress1.edb | 12478818 | 0 | 0 | 0 | 97490 MBytes / 6841 seconds |
| C:\asgluns\sg19\Jetstress2.edb | 12479074 | 0 | 0 | 0 | 97492 MBytes / 6962 seconds |
| C:\asgluns\sg20\Jetstress1.edb | 12478306 | 0 | 0 | 0 | 97486 MBytes / 6953 seconds |
| C:\asgluns\sg20\Jetstress2.edb | 12478818 | 0 | 0 | 0 | 97490 MBytes / 6939 seconds |
| (Sum) | 499139408 | 0 | 0 | 0 | 3899526 MBytes / 15045 seconds |

## Disk Subsystem Performance of Checksum

| Logical Disk | Avg. Disk sec/Read | Avg. Disk sec/Write | Disk Reads/sec | Disk Writes/sec |
|---|---|---|---|---|
| C:\asgluns\sg1 | 0.106 | 0.000 | 203.998 | 0.000 |
| C:\asgluns\sg2 | 0.076 | 0.000 | 208.228 | 0.000 |
| C:\asgluns\sg3 | 0.073 | 0.000 | 217.106 | 0.000 |
| C:\asgluns\sg4 | 0.076 | 0.000 | 208.074 | 0.000 |
| C:\asgluns\sg5 | 0.072 | 0.000 | 217.591 | 0.000 |
| C:\asgluns\sg6 | 0.076 | 0.000 | 208.994 | 0.000 |
| C:\asgluns\sg7 | 0.070 | 0.000 | 225.885 | 0.000 |
| C:\asgluns\sg8 | 0.070 | 0.000 | 224.568 | 0.000 |
| C:\asgluns\sg9 | 0.070 | 0.000 | 225.990 | 0.000 |
| C:\asgluns\sg10 | 0.070 | 0.000 | 225.188 | 0.000 |
| C:\asgluns\sg11 | 0.070 | 0.000 | 227.130 | 0.000 |
| C:\asgluns\sg12 | 0.070 | 0.000 | 225.156 | 0.000 |
| C:\asgluns\sg13 | 0.072 | 0.000 | 218.628 | 0.000 |
| C:\asgluns\sg14 | 0.075 | 0.000 | 209.754 | 0.000 |
| C:\asgluns\sg15 | 0.072 | 0.000 | 218.962 | 0.000 |
| C:\asgluns\sg16 | 0.076 | 0.000 | 209.342 | 0.000 |
| C:\asgluns\sg17 | 0.072 | 0.000 | 218.645 | 0.000 |
| C:\asgluns\sg18 | 0.076 | 0.000 | 208.577 | 0.000 |
| C:\asgluns\sg19 | 0.070 | 0.000 | 225.342 | 0.000 |
| C:\asgluns\sg20 | 0.071 | 0.000 | 223.905 | 0.000 |

## Memory System Performance of Checksum

| Counter | Average | Minimum | Maximum |
|---|---|---|---|
| % Processor Time | 2.358 | 0.617 | 3.044 |
| Available MBytes | 61789.006 | 61779.000 | 61815.000 |
| Free System Page Table Entries | 33560730.724 | 33560150.000 | 33562019.000 |
| Transition Pages RePurposed/sec | 0.000 | 0.000 | 0.000 |
| Pool Nonpaged Bytes | 139850817.536 | 139767808.000 | 139960320.000 |
| Pool Paged Bytes | 145999085.568 | 145649664.000 | 146563072.000 |

## Test Log

```
7/8/2009 8:43:07 PM -- Prepare testing begins ...
7/8/2009 8:43:12 PM -- Creating C:\asgluns\sg1\Jetstress1.edb.
7/8/2009 8:43:12 PM -- Database cache settings: (minimum: 32.0 MB, maximum:
256.0 MB)
7/8/2009 8:43:12 PM -- Database flush thresholds: (start: 2.6 MB, stop: 5.1
MB)
7/8/2009 9:47:39 PM -- 60.0% of 95.0 GB complete (11598932 records inserted).
7/8/2009 11:00:36 PM -- 100.0% of 95.0 GB complete (20195146 records
```

inserted).
7/8/2009 11:00:47 PM -- Duplicating 39 databases:
7/9/2009 9:38:13 AM -- 100.0% of 3.6 TB complete (3.6 TB duplicated).
7/9/2009 9:38:54 AM -- Attaching databases ...
7/9/2009 9:38:54 AM -- Prepare testing ends.
7/9/2009 9:41:34 AM -- Jetstress testing begins ...
7/9/2009 9:41:34 AM -- Prepare testing begins ...
7/9/2009 9:42:15 AM -- Attaching databases ...
7/9/2009 9:42:15 AM -- Prepare testing ends.
7/9/2009 9:42:15 AM -- Dispatching transactions begins ...
7/9/2009 9:42:15 AM -- Database cache settings: (minimum: 640.0 MB, maximum: 5.0 GB)
7/9/2009 9:42:15 AM -- Database flush thresholds: (start: 51.2 MB, stop: 102.4 MB)
7/9/2009 9:42:58 AM -- Database read latency thresholds: (average: 0.02 seconds/read, maximum: 0.05 seconds/read).
7/9/2009 9:42:58 AM -- Log write latency thresholds: (average: 0.01 seconds/write, maximum: 0.05 seconds/write).
7/9/2009 9:43:00 AM -- Operation mix: Sessions 4, Inserts 40%, Deletes 30%, Replaces 5%, Reads 25%, Lazy Commits 55%.
7/9/2009 9:43:00 AM -- Performance logging begins (interval: 15000 ms).
7/9/2009 9:43:00 AM -- Attaining prerequisites:
7/9/2009 9:56:43 AM -- \MSExchange Database(JetstressWin)\Database Cache Size, Last: 4835918000.0 (lower bound: 4831838000.0, upper bound: none)
7/9/2009 11:56:44 AM -- Performance logging ends.
7/9/2009 11:57:16 AM -- JetInterop batch transaction stats: 14198, 14282, 14165, 14261, 14109, 14095, 14308, 13978, 14030, 14261, 14205, 14152, 14076, 14288, 14039, 14071, 14157, 14123, 14332, and 13921.
7/9/2009 11:57:16 AM -- Dispatching transactions ends.
7/9/2009 11:57:16 AM -- Shutting down databases ...
7/9/2009 11:57:20 AM -- Instance4876.1 (complete), Instance4876.2 (complete), Instance4876.3 (complete), Instance4876.4 (complete), Instance4876.5 (complete), Instance4876.6 (complete), Instance4876.7 (complete), Instance4876.8 (complete), Instance4876.9 (complete), Instance4876.10 (complete), Instance4876.11 (complete), Instance4876.12 (complete), Instance4876.13 (complete), Instance4876.14 (complete), Instance4876.15 (complete), Instance4876.16 (complete), Instance4876.17 (complete), Instance4876.18 (complete), Instance4876.19 (complete), and Instance4876.20 (complete)
7/9/2009 11:57:21 AM -- Performance logging begins (interval: 30000 ms).
7/9/2009 11:57:21 AM -- Verifying database checksums ...
7/9/2009 4:08:07 PM -- C:\asgluns\sg1 (100% processed), C:\asgluns\sg2 (100% processed), C:\asgluns\sg3 (100% processed), C:\asgluns\sg4 (100% processed), C:\asgluns\sg5 (100% processed), C:\asgluns\sg6 (100% processed), C:\asgluns\sg7 (100% processed), C:\asgluns\sg8 (100% processed), C:\asgluns\sg9 (100% processed), C:\asgluns\sg10 (100% processed), C:\asgluns\sg11 (100% processed), C:\asgluns\sg12 (100% processed), C:\asgluns\sg13 (100% processed), C:\asgluns\sg14 (100% processed), C:\asgluns\sg15 (100% processed), C:\asgluns\sg16 (100% processed), C:\asgluns\sg17 (100% processed), C:\asgluns\sg18 (100% processed), C:\asgluns\sg19 (100% processed), and C:\asgluns\sg20 (100% processed)
7/9/2009 4:08:07 PM -- Performance logging ends.
7/9/2009 4:08:07 PM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800 users\DBChecksum_2009_7_9_11_57_20.blg has 500 samples.

## Stress Test Database Performance Result: SUN21

### *Test Summary*

| | |
|---|---|
| ***Overall Test Result*** | Pass |
| ***Machine Name*** | SUN21 |
| ***Test Description*** | |
| ***Test Start Time*** | 7/9/2009 10:32:52 PM |

| | |
|---|---|
| **Test End Time** | 7/11/2009 9:01:13 AM |
| **Jetstress Version** | 08.02.0060.000 |
| **Ese Version** | 08.01.0240.005 |
| **Operating System** | Windows Server (R) 2008 Enterprise Service Pack 1 (6.0.6001.65536) |
| **Performance Log** | C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800 users\Stress_2009_7_9_22_34_16.blg<br>C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800 users\DBChecksum_2009_7_11_9_1_13.blg |

## Database Sizing and Throughput

| | |
|---|---|
| **Achieved I/O per Second** | 2252.052 |
| **Target I/O per Second** | 1459.2 |
| **Initial database size** | 4088950030336 |
| **Final database size** | 4204509396992 |
| **Database files (count)** | 40 |

## Jetstress System Parameters

| | |
|---|---|
| **Thread count** | 4 (per storage group) |
| **Log buffers** | 9000 |
| **Minimum database cache** | 640.0 MB |
| **Maximum database cache** | 5120.0 MB |
| **Insert operations** | 40% |
| **Delete operations** | 30% |
| **Replace operations** | 5% |
| **Read operations** | 25% |
| **Lazy commits** | 55% |

## Disk Subsystem Performance

| Logical Disk | Avg. Disk sec/Read | Avg. Disk sec/Write | Disk Reads/sec | Disk Writes/sec | Avg. Disk Bytes/Write |
|---|---|---|---|---|---|
| Database (C:\asgluns\sg1) | 0.011 | 0.006 | 65.263 | 47.388 | (n/a) |
| Database (C:\asgluns\sg2) | 0.012 | 0.006 | 65.433 | 47.513 | (n/a) |
| Database (C:\asgluns\sg3) | 0.011 | 0.005 | 65.420 | 47.469 | (n/a) |
| Database (C:\asgluns\sg4) | 0.011 | 0.006 | 65.525 | 47.448 | (n/a) |
| Database (C:\asgluns\sg5) | 0.011 | 0.005 | 65.229 | 47.456 | (n/a) |
| Database (C:\asgluns\sg6) | 0.011 | 0.006 | 65.235 | 47.286 | (n/a) |

| | | | | | |
|---|---|---|---|---|---|
| Database (C:\asgluns\sg7) | 0.011 | 0.007 | 65.411 | 47.429 | (n/a) |
| Database (C:\asgluns\sg8) | 0.011 | 0.005 | 65.326 | 47.213 | (n/a) |
| Database (C:\asgluns\sg9) | 0.011 | 0.006 | 65.522 | 47.483 | (n/a) |
| Database (C:\asgluns\sg10) | 0.011 | 0.005 | 65.199 | 47.141 | (n/a) |
| Database (C:\asgluns\sg11) | 0.011 | 0.006 | 65.415 | 47.362 | (n/a) |
| Database (C:\asgluns\sg12) | 0.011 | 0.005 | 65.313 | 47.349 | (n/a) |
| Database (C:\asgluns\sg13) | 0.011 | 0.006 | 65.185 | 47.187 | (n/a) |
| Database (C:\asgluns\sg14) | 0.011 | 0.007 | 65.239 | 47.051 | (n/a) |
| Database (C:\asgluns\sg15) | 0.011 | 0.006 | 65.234 | 47.240 | (n/a) |
| Database (C:\asgluns\sg16) | 0.011 | 0.007 | 65.574 | 47.399 | (n/a) |
| Database (C:\asgluns\sg17) | 0.011 | 0.006 | 65.120 | 47.135 | (n/a) |
| Database (C:\asgluns\sg18) | 0.011 | 0.007 | 65.499 | 47.287 | (n/a) |
| Database (C:\asgluns\sg19) | 0.011 | 0.007 | 65.247 | 47.063 | (n/a) |
| Database (C:\asgluns\sg20) | 0.010 | 0.006 | 64.963 | 46.803 | (n/a) |
| Log (C:\alogluns\log1) | 0.000 | 0.001 | 0.000 | 34.381 | 4362.224 |
| Log (C:\alogluns\log2) | 0.000 | 0.001 | 0.000 | 34.869 | 4333.578 |
| Log (C:\alogluns\log3) | 0.000 | 0.001 | 0.000 | 34.359 | 4356.108 |
| Log (C:\alogluns\log4) | 0.000 | 0.001 | 0.000 | 34.867 | 4324.865 |
| Log (C:\alogluns\log5) | 0.000 | 0.001 | 0.000 | 34.404 | 4368.025 |
| Log (C:\alogluns\log6) | 0.000 | 0.001 | 0.000 | 34.716 | 4313.900 |
| Log (C:\alogluns\log7) | 0.000 | 0.001 | 0.000 | 34.516 | 4338.434 |
| Log (C:\alogluns\log8) | 0.000 | 0.001 | 0.000 | 34.816 | 4315.417 |
| Log (C:\alogluns\log9) | 0.000 | 0.001 | 0.000 | 34.610 | 4353.204 |
| Log (C:\alogluns\log10) | 0.000 | 0.001 | 0.000 | 34.798 | 4309.629 |
| Log (C:\alogluns\log11) | 0.000 | 0.001 | 0.000 | 34.460 | 4353.164 |
| Log (C:\alogluns\log12) | 0.000 | 0.001 | 0.000 | 34.893 | 4317.098 |
| Log (C:\alogluns\log13) | 0.000 | 0.001 | 0.000 | 34.203 | 4370.590 |
| Log (C:\alogluns\log14) | 0.000 | 0.001 | 0.000 | 34.545 | 4337.229 |
| Log (C:\alogluns\log15) | 0.000 | 0.001 | 0.000 | 34.304 | 4368.192 |

| | | | | | |
|---|---|---|---|---|---|
| Log (C:\alogluns\log16) | 0.000 | 0.001 | 0.000 | 34.751 | 4325.398 |
| Log (C:\alogluns\log17) | 0.000 | 0.001 | 0.000 | 34.168 | 4387.517 |
| Log (C:\alogluns\log18) | 0.000 | 0.001 | 0.000 | 34.737 | 4319.330 |
| Log (C:\alogluns\log19) | 0.000 | 0.001 | 0.000 | 34.378 | 4356.888 |
| Log (C:\alogluns\log20) | 0.000 | 0.001 | 0.000 | 34.553 | 4320.704 |

## Host System Performance

| Counter | Average | Minimum | Maximum |
|---|---|---|---|
| % Processor Time | 1.173 | 0.583 | 2.694 |
| Available MBytes | 56528.182 | 56476.000 | 57007.000 |
| Free System Page Table Entries | 33560800.753 | 33560330.000 | 33561140.000 |
| Transition Pages RePurposed/sec | 0.000 | 0.000 | 0.000 |
| Pool Nonpaged Bytes | 141394494.539 | 140705792.000 | 142843904.000 |
| Pool Paged Bytes | 146640193.706 | 145784832.000 | 179470336.000 |
| Database Page Fault Stalls/sec | 0.000 | 0.000 | 0.000 |

## Test Log

```
7/9/2009 10:32:47 PM -- Jetstress testing begins ...
7/9/2009 10:32:52 PM -- Prepare testing begins ...
7/9/2009 10:33:33 PM -- Attaching databases ...
7/9/2009 10:33:33 PM -- Prepare testing ends.
7/9/2009 10:33:33 PM -- Dispatching transactions begins ...
7/9/2009 10:33:33 PM -- Database cache settings: (minimum: 640.0 MB, maximum:
5.0 GB)
7/9/2009 10:33:33 PM -- Database flush thresholds: (start: 51.2 MB, stop:
102.4 MB)
7/9/2009 10:34:16 PM -- Database read latency thresholds: (average: 0.02
seconds/read, maximum: 0.1 seconds/read).
7/9/2009 10:34:16 PM -- Log write latency thresholds: (average: 0.01
seconds/write, maximum: 0.1 seconds/write).
7/9/2009 10:34:19 PM -- Operation mix: Sessions 4, Inserts 40%, Deletes 30%,
Replaces 5%, Reads 25%, Lazy Commits 55%.
7/9/2009 10:34:19 PM -- Performance logging begins (interval: 15000 ms).
7/9/2009 10:34:19 PM -- Attaining prerequisites:
7/9/2009 10:48:27 PM -- \MSExchange Database(JetstressWin)\Database Cache
Size, Last: 4833108000.0 (lower bound: 4831838000.0, upper bound: none)
7/10/2009 10:48:28 PM -- Performance logging ends.
7/11/2009 9:01:08 AM -- JetInterop batch transaction stats: 206795, 207354,
207490, 207178, 207069, 206717, 207620, 207508, 207724, 206829, 207499,
207006, 206634, 206638, 206441, 207295, 206733, 207098, 206922, and 206614.
7/11/2009 9:01:08 AM -- Dispatching transactions ends.
7/11/2009 9:01:08 AM -- Shutting down databases ...
7/11/2009 9:01:13 AM -- Instance4560.1 (complete), Instance4560.2 (complete),
Instance4560.3 (complete), Instance4560.4 (complete), Instance4560.5
(complete), Instance4560.6 (complete), Instance4560.7 (complete),
Instance4560.8 (complete), Instance4560.9 (complete), Instance4560.10
(complete), Instance4560.11 (complete), Instance4560.12 (complete),
Instance4560.13 (complete), Instance4560.14 (complete), Instance4560.15
(complete), Instance4560.16 (complete), Instance4560.17 (complete),
Instance4560.18 (complete), Instance4560.19 (complete), and Instance4560.20
(complete)
7/11/2009 9:01:14 AM -- Performance logging begins (interval: 30000 ms).
7/11/2009 9:01:14 AM -- Verifying database checksums ...
7/11/2009 1:17:10 PM -- C:\asgluns\sg1 (100% processed), C:\asgluns\sg2 (100%
```

processed), C:\asgluns\sg3 (100% processed), C:\asgluns\sg4 (100% processed),
C:\asgluns\sg5 (100% processed), C:\asgluns\sg6 (100% processed),
C:\asgluns\sg7 (100% processed), C:\asgluns\sg8 (100% processed),
C:\asgluns\sg9 (100% processed), C:\asgluns\sg10 (100% processed),
C:\asgluns\sg11 (100% processed), C:\asgluns\sg12 (100% processed),
C:\asgluns\sg13 (100% processed), C:\asgluns\sg14 (100% processed),
C:\asgluns\sg15 (100% processed), C:\asgluns\sg16 (100% processed),
C:\asgluns\sg17 (100% processed), C:\asgluns\sg18 (100% processed),
C:\asgluns\sg19 (100% processed), and C:\asgluns\sg20 (100% processed)
7/11/2009 1:17:11 PM -- Performance logging ends.
7/11/2009 1:17:11 PM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800
users\DBChecksum_2009_7_11_9_1_13.blg has 511 samples.
7/11/2009 1:20:10 PM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800
users\DBChecksum_2009_7_11_9_1_13.html is saved.
7/11/2009 1:20:10 PM -- Verifying log checksums ...
7/11/2009 1:20:17 PM -- C:\alogluns\log1 (2 logs passed), C:\alogluns\log2 (2
logs passed), C:\alogluns\log3 (2 logs passed), C:\alogluns\log4 (2 logs
passed), C:\alogluns\log5 (2 logs passed), C:\alogluns\log6 (2 logs passed),
C:\alogluns\log7 (2 logs passed), C:\alogluns\log8 (2 logs passed),
C:\alogluns\log9 (2 logs passed), C:\alogluns\log10 (2 logs passed),
C:\alogluns\log11 (2 logs passed), C:\alogluns\log12 (2 logs passed),
C:\alogluns\log13 (2 logs passed), C:\alogluns\log14 (2 logs passed),
C:\alogluns\log15 (2 logs passed), C:\alogluns\log16 (2 logs passed),
C:\alogluns\log17 (3 logs passed), C:\alogluns\log18 (2 logs passed),
C:\alogluns\log19 (2 logs passed), and C:\alogluns\log20 (2 logs passed)
7/11/2009 1:20:17 PM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800
users\Stress_2009_7_9_22_34_16.blg has 5795 samples.
7/11/2009 1:20:17 PM -- Creating test report ...
7/11/2009 1:24:49 PM -- Volume C:\asgluns\sg1 has 0.0110 for Avg. Disk
sec/Read.
7/11/2009 1:24:49 PM -- Volume C:\asgluns\sg2 has 0.0116 for Avg. Disk
sec/Read.
7/11/2009 1:24:49 PM -- Volume C:\asgluns\sg3 has 0.0109 for Avg. Disk
sec/Read.
7/11/2009 1:24:49 PM -- Volume C:\asgluns\sg4 has 0.0115 for Avg. Disk
sec/Read.
7/11/2009 1:24:49 PM -- Volume C:\asgluns\sg5 has 0.0108 for Avg. Disk
sec/Read.
7/11/2009 1:24:49 PM -- Volume C:\asgluns\sg6 has 0.0114 for Avg. Disk
sec/Read.
7/11/2009 1:24:49 PM -- Volume C:\asgluns\sg7 has 0.0113 for Avg. Disk
sec/Read.
7/11/2009 1:24:49 PM -- Volume C:\asgluns\sg8 has 0.0107 for Avg. Disk
sec/Read.
7/11/2009 1:24:49 PM -- Volume C:\asgluns\sg9 has 0.0114 for Avg. Disk
sec/Read.
7/11/2009 1:24:49 PM -- Volume C:\asgluns\sg10 has 0.0107 for Avg. Disk
sec/Read.
7/11/2009 1:24:49 PM -- Volume C:\asgluns\sg11 has 0.0112 for Avg. Disk
sec/Read.
7/11/2009 1:24:49 PM -- Volume C:\asgluns\sg12 has 0.0107 for Avg. Disk
sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\asgluns\sg13 has 0.0108 for Avg. Disk
sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\asgluns\sg14 has 0.0114 for Avg. Disk
sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\asgluns\sg15 has 0.0109 for Avg. Disk
sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\asgluns\sg16 has 0.0114 for Avg. Disk
sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\asgluns\sg17 has 0.0108 for Avg. Disk
sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\asgluns\sg18 has 0.0113 for Avg. Disk
sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\asgluns\sg19 has 0.0113 for Avg. Disk
sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\asgluns\sg20 has 0.0105 for Avg. Disk
sec/Read.

7/11/2009 1:24:50 PM -- Volume C:\alogluns\log1 has 0.0014 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log1 has 0.0000 for Avg. Disk sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log2 has 0.0011 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log2 has 0.0000 for Avg. Disk sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log3 has 0.0015 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log3 has 0.0000 for Avg. Disk sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log4 has 0.0011 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log4 has 0.0000 for Avg. Disk sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log5 has 0.0014 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log5 has 0.0000 for Avg. Disk sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log6 has 0.0011 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log6 has 0.0000 for Avg. Disk sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log7 has 0.0014 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log7 has 0.0000 for Avg. Disk sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log8 has 0.0009 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log8 has 0.0000 for Avg. Disk sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log9 has 0.0014 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log9 has 0.0000 for Avg. Disk sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log10 has 0.0009 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log10 has 0.0000 for Avg. Disk sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log11 has 0.0014 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log11 has 0.0000 for Avg. Disk sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log12 has 0.0009 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log12 has 0.0000 for Avg. Disk sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log13 has 0.0015 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log13 has 0.0000 for Avg. Disk sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log14 has 0.0011 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log14 has 0.0000 for Avg. Disk sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log15 has 0.0015 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log15 has 0.0000 for Avg. Disk sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log16 has 0.0011 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log16 has 0.0000 for Avg. Disk sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log17 has 0.0015 for Avg. Disk sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log17 has 0.0000 for Avg. Disk sec/Read.

```
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log18 has 0.0011 for Avg. Disk
sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log18 has 0.0000 for Avg. Disk
sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log19 has 0.0014 for Avg. Disk
sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log19 has 0.0000 for Avg. Disk
sec/Read.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log20 has 0.0009 for Avg. Disk
sec/Write.
7/11/2009 1:24:50 PM -- Volume C:\alogluns\log20 has 0.0000 for Avg. Disk
sec/Read.
7/11/2009 1:24:50 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
7/11/2009 1:24:50 PM -- Test has 0 Database Page Fault Stalls/sec samples
higher than 0.
7/11/2009 1:24:50 PM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800
users\Stress_2009_7_9_22_34_16.xml has 5738 samples queried.
```

## Stress Test Database Checksums Result: SUN21

### *Checksum Statistics - All*

| *Database* | *Seen pages* | *Bad pages* | *Correctable pages* | *Wrong page no pages* | *File length / seconds taken* |
|---|---|---|---|---|---|
| C:\asgluns\sg1\Jetstress1.edb | 12830562 | 0 | 0 | 0 | 100238 MBytes / 13121 seconds |
| C:\asgluns\sg1\Jetstress2.edb | 12831586 | 0 | 0 | 0 | 100246 MBytes / 2179 seconds |
| C:\asgluns\sg2\Jetstress1.edb | 12832610 | 0 | 0 | 0 | 100254 MBytes / 7458 seconds |
| C:\asgluns\sg2\Jetstress2.edb | 12833122 | 0 | 0 | 0 | 100258 MBytes / 5976 seconds |
| C:\asgluns\sg3\Jetstress1.edb | 12833634 | 0 | 0 | 0 | 100262 MBytes / 7538 seconds |
| C:\asgluns\sg3\Jetstress2.edb | 12828514 | 0 | 0 | 0 | 100222 MBytes / 6467 seconds |
| C:\asgluns\sg4\Jetstress1.edb | 12830818 | 0 | 0 | 0 | 100240 MBytes / 7399 seconds |
| C:\asgluns\sg4\Jetstress2.edb | 12836194 | 0 | 0 | 0 | 100282 MBytes / 6036 seconds |
| C:\asgluns\sg5\Jetstress1.edb | 12831586 | 0 | 0 | 0 | 100246 MBytes / 7247 seconds |
| C:\asgluns\sg5\Jetstress2.edb | 12832098 | 0 | 0 | 0 | 100250 MBytes / 6491 seconds |
| C:\asgluns\sg6\Jetstress1.edb | 12828002 | 0 | 0 | 0 | 100218 MBytes / 6917 seconds |
| C:\asgluns\sg6\Jetstress2.edb | 12832354 | 0 | 0 | 0 | 100252 MBytes / 6072 seconds |
| C:\asgluns\sg7\Jetstress1.edb | 12829026 | 0 | 0 | 0 | 100226 MBytes / 6578 seconds |
| C:\asgluns\sg7\Jetstress2.edb | 12830562 | 0 | 0 | 0 | 100238 MBytes / 6101 seconds |
| C:\asgluns\sg8\Jetstress1.edb | 12836962 | 0 | 0 | 0 | 100288 MBytes / |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | 6816 seconds |
| C:\asgluns\sg8\Jetstress2.edb | 12829538 | 0 | 0 | 0 | 100230 MBytes / 6659 seconds |
| C:\asgluns\sg9\Jetstress1.edb | 12831842 | 0 | 0 | 0 | 100248 MBytes / 6526 seconds |
| C:\asgluns\sg9\Jetstress2.edb | 12831330 | 0 | 0 | 0 | 100244 MBytes / 6214 seconds |
| C:\asgluns\sg10\Jetstress1.edb | 12835170 | 0 | 0 | 0 | 100274 MBytes / 6913 seconds |
| C:\asgluns\sg10\Jetstress2.edb | 12830050 | 0 | 0 | 0 | 100234 MBytes / 6546 seconds |
| C:\asgluns\sg11\Jetstress1.edb | 12831842 | 0 | 0 | 0 | 100248 MBytes / 6622 seconds |
| C:\asgluns\sg11\Jetstress2.edb | 12830818 | 0 | 0 | 0 | 100240 MBytes / 6097 seconds |
| C:\asgluns\sg12\Jetstress1.edb | 12833890 | 0 | 0 | 0 | 100264 MBytes / 6964 seconds |
| C:\asgluns\sg12\Jetstress2.edb | 12830306 | 0 | 0 | 0 | 100236 MBytes / 6531 seconds |
| C:\asgluns\sg13\Jetstress1.edb | 12829538 | 0 | 0 | 0 | 100230 MBytes / 7399 seconds |
| C:\asgluns\sg13\Jetstress2.edb | 12828770 | 0 | 0 | 0 | 100224 MBytes / 6545 seconds |
| C:\asgluns\sg14\Jetstress1.edb | 12833634 | 0 | 0 | 0 | 100262 MBytes / 7275 seconds |
| C:\asgluns\sg14\Jetstress2.edb | 12829282 | 0 | 0 | 0 | 100228 MBytes / 6082 seconds |
| C:\asgluns\sg15\Jetstress1.edb | 12833890 | 0 | 0 | 0 | 100264 MBytes / 7887 seconds |
| C:\asgluns\sg15\Jetstress2.edb | 12828002 | 0 | 0 | 0 | 100218 MBytes / 6389 seconds |
| C:\asgluns\sg16\Jetstress1.edb | 12831330 | 0 | 0 | 0 | 100244 MBytes / 13331 seconds |
| C:\asgluns\sg16\Jetstress2.edb | 12829026 | 0 | 0 | 0 | 100226 MBytes / 2024 seconds |
| C:\asgluns\sg17\Jetstress1.edb | 12828514 | 0 | 0 | 0 | 100222 MBytes / 8124 seconds |
| C:\asgluns\sg17\Jetstress2.edb | 12830050 | 0 | 0 | 0 | 100234 MBytes / 6268 seconds |
| C:\asgluns\sg18\Jetstress1.edb | 12829282 | 0 | 0 | 0 | 100228 MBytes / 8707 seconds |
| C:\asgluns\sg18\Jetstress2.edb | 12829538 | 0 | 0 | 0 | 100230 MBytes / 5358 seconds |
| C:\asgluns\sg19\Jetstress1.edb | 12828770 | 0 | 0 | 0 | 100224 MBytes / 12939 seconds |
| C:\asgluns\sg19\Jetstress2.edb | 12832354 | 0 | 0 | 0 | 100252 MBytes / 1414 seconds |

| | | | | | |
|---|---|---|---|---|---|
| C:\asgluns\sg20\Jetstress1.edb | 12832610 | 0 | 0 | 0 | 100254 MBytes / 8411 seconds |
| C:\asgluns\sg20\Jetstress2.edb | 12828770 | 0 | 0 | 0 | 100224 MBytes / 5858 seconds |
| (Sum) | 513245776 | 0 | 0 | 0 | 4009732 MBytes / 15356 seconds |

## *Disk Subsystem Performance of Checksum*

| Logical Disk | Avg. Disk sec/Read | Avg. Disk sec/Write | Disk Reads/sec | Disk Writes/sec |
|---|---|---|---|---|
| C:\asgluns\sg1 | 0.149 | 0.000 | 208.107 | 0.000 |
| C:\asgluns\sg2 | 0.066 | 0.000 | 238.666 | 0.000 |
| C:\asgluns\sg3 | 0.069 | 0.000 | 229.034 | 0.000 |
| C:\asgluns\sg4 | 0.066 | 0.000 | 238.632 | 0.000 |
| C:\asgluns\sg5 | 0.067 | 0.000 | 233.492 | 0.000 |
| C:\asgluns\sg6 | 0.064 | 0.000 | 246.876 | 0.000 |
| C:\asgluns\sg7 | 0.062 | 0.000 | 252.954 | 0.000 |
| C:\asgluns\sg8 | 0.066 | 0.000 | 238.006 | 0.000 |
| C:\asgluns\sg9 | 0.063 | 0.000 | 251.771 | 0.000 |
| C:\asgluns\sg10 | 0.066 | 0.000 | 238.395 | 0.000 |
| C:\asgluns\sg11 | 0.063 | 0.000 | 252.106 | 0.000 |
| C:\asgluns\sg12 | 0.066 | 0.000 | 237.579 | 0.000 |
| C:\asgluns\sg13 | 0.069 | 0.000 | 229.920 | 0.000 |
| C:\asgluns\sg14 | 0.066 | 0.000 | 240.019 | 0.000 |
| C:\asgluns\sg15 | 0.071 | 0.000 | 224.535 | 0.000 |
| C:\asgluns\sg16 | 0.127 | 0.000 | 207.895 | 0.000 |
| C:\asgluns\sg17 | 0.072 | 0.000 | 222.702 | 0.000 |
| C:\asgluns\sg18 | 0.076 | 0.000 | 227.932 | 0.000 |
| C:\asgluns\sg19 | 0.129 | 0.000 | 218.032 | 0.000 |
| C:\asgluns\sg20 | 0.076 | 0.000 | 224.638 | 0.000 |

## *Memory System Performance of Checksum*

| Counter | Average | Minimum | Maximum |
|---|---|---|---|
| % Processor Time | 2.324 | 0.448 | 3.071 |
| Available MBytes | 61777.186 | 61744.000 | 61801.000 |
| Free System Page Table Entries | 33560842.967 | 33560132.000 | 33562071.000 |
| Transition Pages RePurposed/sec | 0.000 | 0.000 | 0.000 |
| Pool Nonpaged Bytes | 143753993.519 | 143728640.000 | 143769600.000 |
| Pool Paged Bytes | 147924090.239 | 146866176.000 | 179564544.000 |

*Test Log*

```
7/9/2009 10:32:47 PM -- Jetstress testing begins ...
7/9/2009 10:32:52 PM -- Prepare testing begins ...
7/9/2009 10:33:33 PM -- Attaching databases ...
7/9/2009 10:33:33 PM -- Prepare testing ends.
7/9/2009 10:33:33 PM -- Dispatching transactions begins ...
7/9/2009 10:33:33 PM -- Database cache settings: (minimum: 640.0 MB, maximum:
5.0 GB)
7/9/2009 10:33:33 PM -- Database flush thresholds: (start: 51.2 MB, stop:
102.4 MB)
7/9/2009 10:34:16 PM -- Database read latency thresholds: (average: 0.02
seconds/read, maximum: 0.1 seconds/read).
7/9/2009 10:34:16 PM -- Log write latency thresholds: (average: 0.01
seconds/write, maximum: 0.1 seconds/write).
7/9/2009 10:34:19 PM -- Operation mix: Sessions 4, Inserts 40%, Deletes 30%,
Replaces 5%, Reads 25%, Lazy Commits 55%.
7/9/2009 10:34:19 PM -- Performance logging begins (interval: 15000 ms).
7/9/2009 10:34:19 PM -- Attaining prerequisites:
7/9/2009 10:48:27 PM -- \MSExchange Database(JetstressWin)\Database Cache
Size, Last: 4833108000.0 (lower bound: 4831838000.0, upper bound: none)
7/10/2009 10:48:28 PM -- Performance logging ends.
7/11/2009 9:01:08 AM -- JetInterop batch transaction stats: 206795, 207354,
207490, 207178, 207069, 206717, 207620, 207508, 207724, 206829, 207499,
207006, 206634, 206638, 206441, 207295, 206733, 207098, 206922, and 206614.
7/11/2009 9:01:08 AM -- Dispatching transactions ends.
7/11/2009 9:01:08 AM -- Shutting down databases ...
7/11/2009 9:01:13 AM -- Instance4560.1 (complete), Instance4560.2 (complete),
Instance4560.3 (complete), Instance4560.4 (complete), Instance4560.5
(complete), Instance4560.6 (complete), Instance4560.7 (complete),
Instance4560.8 (complete), Instance4560.9 (complete), Instance4560.10
(complete), Instance4560.11 (complete), Instance4560.12 (complete),
Instance4560.13 (complete), Instance4560.14 (complete), Instance4560.15
(complete), Instance4560.16 (complete), Instance4560.17 (complete),
Instance4560.18 (complete), Instance4560.19 (complete), and Instance4560.20
(complete)
7/11/2009 9:01:14 AM -- Performance logging begins (interval: 30000 ms).
7/11/2009 9:01:14 AM -- Verifying database checksums ...
7/11/2009 1:17:10 PM -- C:\asgluns\sg1 (100% processed), C:\asgluns\sg2 (100%
processed), C:\asgluns\sg3 (100% processed), C:\asgluns\sg4 (100% processed),
C:\asgluns\sg5 (100% processed), C:\asgluns\sg6 (100% processed),
C:\asgluns\sg7 (100% processed), C:\asgluns\sg8 (100% processed),
C:\asgluns\sg9 (100% processed), C:\asgluns\sg10 (100% processed),
C:\asgluns\sg11 (100% processed), C:\asgluns\sg12 (100% processed),
C:\asgluns\sg13 (100% processed), C:\asgluns\sg14 (100% processed),
C:\asgluns\sg15 (100% processed), C:\asgluns\sg16 (100% processed),
C:\asgluns\sg17 (100% processed), C:\asgluns\sg18 (100% processed),
C:\asgluns\sg19 (100% processed), and C:\asgluns\sg20 (100% processed)
7/11/2009 1:17:11 PM -- Performance logging ends.
7/11/2009 1:17:11 PM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800
users\DBChecksum_2009_7_11_9_1_13.blg has 511 samples.
```

## Streaming Backup Test Result: SUN21

*Streaming Backup Statistics - All*

| Database Instance | Database Size (MBytes) | Elapsed Backup Time | MBytes Transferred/sec |
|---|---|---|---|
| Instance4840.1 | 200481.55 | 04:12:30 | 13.23 |
| Instance4840.2 | 200509.55 | 04:12:59 | 13.21 |
| Instance4840.3 | 200481.55 | 04:11:56 | 13.26 |
| Instance4840.4 | 200519.55 | 04:12:39 | 13.23 |

| | | | |
|---|---|---|---|
| Instance4840.5 | 200493.55 | 04:12:08 | 13.25 |
| Instance4840.6 | 200467.55 | 04:12:47 | 13.22 |
| Instance4840.7 | 200461.55 | 03:52:10 | 14.39 |
| Instance4840.8 | 200515.55 | 03:51:46 | 14.42 |
| Instance4840.9 | 200489.55 | 03:51:48 | 14.42 |
| Instance4840.10 | 200505.55 | 03:50:05 | 14.52 |
| Instance4840.11 | 200485.55 | 03:52:01 | 14.40 |
| Instance4840.12 | 200497.55 | 03:52:01 | 14.40 |
| Instance4840.13 | 200451.55 | 04:12:56 | 13.21 |
| Instance4840.14 | 200487.55 | 04:13:30 | 13.18 |
| Instance4840.15 | 200479.55 | 04:12:47 | 13.22 |
| Instance4840.16 | 200467.55 | 04:13:04 | 13.20 |
| Instance4840.17 | 200453.55 | 04:12:35 | 13.23 |
| Instance4840.18 | 200455.55 | 04:13:00 | 13.21 |
| Instance4840.19 | 200473.55 | 03:52:47 | 14.35 |
| Instance4840.20 | 200475.55 | 03:51:41 | 14.42 |

## *Jetstress System Parameters*

| | |
|---|---|
| ***Thread count*** | 4 (per storage group) |
| ***Log buffers*** | 9000 |
| ***Minimum database cache*** | 640.0 MB |
| ***Maximum database cache*** | 5120.0 MB |
| ***Insert operations*** | 40% |
| ***Delete operations*** | 30% |
| ***Replace operations*** | 5% |
| ***Read operations*** | 25% |
| ***Lazy commits*** | 55% |

## *Disk Subsystem Performance*

| ***Logical Disk*** | ***Avg. Disk sec/Read*** | ***Avg. Disk sec/Write*** | ***Disk Reads/sec*** | ***Disk Writes/sec*** | ***Avg. Disk Bytes/Write*** |
|---|---|---|---|---|---|
| Database (C:\asgluns\sg1) | 0.009 | 0.000 | 105.474 | 0.003 | (n/a) |
| Database (C:\asgluns\sg2) | 0.009 | 0.000 | 105.493 | 0.002 | (n/a) |
| Database (C:\asgluns\sg3) | 0.009 | 0.000 | 105.475 | 0.003 | (n/a) |
| Database (C:\asgluns\sg4) | 0.009 | 0.000 | 105.509 | 0.003 | (n/a) |
| Database | 0.009 | 0.000 | 105.487 | 0.003 | (n/a) |

| | | | | | |
|---|---|---|---|---|---|
| (C:\asgluns\sg5) | | | | | |
| Database (C:\asgluns\sg6) | 0.009 | 0.000 | 105.471 | 0.002 | (n/a) |
| Database (C:\asgluns\sg7) | 0.008 | 0.000 | 105.439 | 0.003 | (n/a) |
| Database (C:\asgluns\sg8) | 0.008 | 0.000 | 105.470 | 0.003 | (n/a) |
| Database (C:\asgluns\sg9) | 0.008 | 0.000 | 105.455 | 0.003 | (n/a) |
| Database (C:\asgluns\sg10) | 0.008 | 0.000 | 105.455 | 0.003 | (n/a) |
| Database (C:\asgluns\sg11) | 0.008 | 0.000 | 105.457 | 0.003 | (n/a) |
| Database (C:\asgluns\sg12) | 0.008 | 0.000 | 105.463 | 0.003 | (n/a) |
| Database (C:\asgluns\sg13) | 0.009 | 0.000 | 105.451 | 0.002 | (n/a) |
| Database (C:\asgluns\sg14) | 0.009 | 0.000 | 105.401 | 0.000 | (n/a) |
| Database (C:\asgluns\sg15) | 0.009 | 0.000 | 105.478 | 0.003 | (n/a) |
| Database (C:\asgluns\sg16) | 0.009 | 0.000 | 105.463 | 0.002 | (n/a) |
| Database (C:\asgluns\sg17) | 0.009 | 0.000 | 105.470 | 0.003 | (n/a) |
| Database (C:\asgluns\sg18) | 0.009 | 0.000 | 105.459 | 0.002 | (n/a) |
| Database (C:\asgluns\sg19) | 0.008 | 0.000 | 105.443 | 0.003 | (n/a) |
| Database (C:\asgluns\sg20) | 0.008 | 0.000 | 105.447 | 0.003 | (n/a) |
| Log (C:\alogluns\log1) | 0.000 | 0.000 | 0.000 | 0.002 | 13.492 |
| Log (C:\alogluns\log2) | 0.000 | 0.000 | 0.000 | 0.002 | 5.154 |
| Log (C:\alogluns\log3) | 0.000 | 0.000 | 0.000 | 0.002 | 13.492 |
| Log (C:\alogluns\log4) | 0.000 | 0.000 | 0.000 | 0.002 | 12.028 |
| Log (C:\alogluns\log5) | 0.000 | 0.000 | 0.000 | 0.002 | 19.956 |
| Log (C:\alogluns\log6) | 0.000 | 0.000 | 0.000 | 0.002 | 11.585 |
| Log (C:\alogluns\log7) | 0.000 | 0.000 | 0.000 | 0.002 | 19.956 |
| Log (C:\alogluns\log8) | 0.000 | 0.000 | 0.000 | 0.002 | 19.897 |
| Log (C:\alogluns\log9) | 0.000 | 0.000 | 0.000 | 0.002 | 19.787 |
| Log (C:\alogluns\log10) | 0.000 | 0.000 | 0.000 | 0.002 | 19.655 |
| Log (C:\alogluns\log11) | 0.000 | 0.000 | 0.000 | 0.003 | 21.704 |
| Log (C:\alogluns\log12) | 0.000 | 0.000 | 0.000 | 0.003 | 21.603 |
| Log (C:\alogluns\log13) | 0.000 | 0.000 | 0.000 | 0.002 | 5.381 |

| | | | | | |
|---|---|---|---|---|---|
| Log (C:\alogluns\log14) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Log (C:\alogluns\log15) | 0.000 | 0.000 | 0.000 | 0.002 | 12.200 |
| Log (C:\alogluns\log16) | 0.000 | 0.000 | 0.000 | 0.001 | 4.917 |
| Log (C:\alogluns\log17) | 0.000 | 0.000 | 0.000 | 0.002 | 13.489 |
| Log (C:\alogluns\log18) | 0.000 | 0.000 | 0.000 | 0.002 | 5.154 |
| Log (C:\alogluns\log19) | 0.000 | 0.000 | 0.000 | 0.002 | 19.787 |
| Log (C:\alogluns\log20) | 0.000 | 0.000 | 0.000 | 0.002 | 19.897 |

### *Host System Performance*

| Counter | Average | Minimum | Maximum |
|---|---|---|---|
| % Processor Time | 1.743 | 0.269 | 2.340 |
| Available MBytes | 61807.779 | 61802.000 | 61813.000 |
| Free System Page Table Entries | 33561931.431 | 33561604.000 | 33562021.000 |
| Transition Pages RePurposed/sec | 0.000 | 0.000 | 0.000 |
| Pool Nonpaged Bytes | 143674444.901 | 143671296.000 | 143736832.000 |
| Pool Paged Bytes | 151724801.012 | 150863872.000 | 151801856.000 |
| Database Page Fault Stalls/sec | 0.000 | 0.000 | 0.000 |

### *Test Log*

```
7/12/2009 1:48:28 AM -- Jetstress testing begins ...
7/12/2009 1:48:33 AM -- Prepare testing begins ...
7/12/2009 1:49:14 AM -- Attaching databases ...
7/12/2009 1:49:14 AM -- Prepare testing ends.
7/12/2009 1:49:57 AM -- Performance logging begins (interval: 30000 ms).
7/12/2009 1:49:57 AM -- Streaming backup databases ...
7/12/2009 6:03:28 AM -- Performance logging ends.
7/12/2009 6:03:28 AM -- Instance4840.1 (100% processed), Instance4840.2 (100%
processed), Instance4840.3 (100% processed), Instance4840.4 (100% processed),
Instance4840.5 (100% processed), Instance4840.6 (100% processed),
Instance4840.7 (100% processed), Instance4840.8 (100% processed),
Instance4840.9 (100% processed), Instance4840.10 (100% processed),
Instance4840.11 (100% processed), Instance4840.12 (100% processed),
Instance4840.13 (100% processed), Instance4840.14 (100% processed),
Instance4840.15 (100% processed), Instance4840.16 (100% processed),
Instance4840.17 (100% processed), Instance4840.18 (100% processed),
Instance4840.19 (100% processed), and Instance4840.20 (100% processed)
7/12/2009 6:03:28 AM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800
users\StreamingBackup\StreamingBackup_2009_7_12_1_49_14.blg has 506 samples.
7/12/2009 6:03:28 AM -- Creating test report ...
```

## Soft Recovery Test Result: SUN21

### *Soft Recovery Statistics - All*

| Database Instance | Log files replayed | Elapsed seconds |
|---|---|---|
| Instance5728.1 | 506 | 605.4710812 |
| Instance5728.2 | 509 | 603.3494676 |
| Instance5728.3 | 504 | 597.5150302 |
| Instance5728.4 | 510 | 606.531888 |

| | | |
|---|---|---|
| Instance5728.5 | 512 | 602.8190642 |
| Instance5728.6 | 514 | 603.3494676 |
| Instance5728.7 | 516 | 607.0622914 |
| Instance5728.8 | 510 | 602.8190642 |
| Instance5728.9 | 513 | 607.0622914 |
| Instance5728.10 | 500 | 598.575837 |
| Instance5728.11 | 503 | 593.271803 |
| Instance5728.12 | 516 | 607.5926948 |
| Instance5728.13 | 510 | 607.3274931 |
| Instance5728.14 | 521 | 609.183905 |
| Instance5728.15 | 525 | 607.5926948 |
| Instance5728.16 | 510 | 605.7362829 |
| Instance5728.17 | 510 | 603.879871 |
| Instance5728.18 | 512 | 606.2666863 |
| Instance5728.19 | 506 | 608.9187033 |
| Instance5728.20 | 514 | 606.0014846 |

## *Disk Subsystem Performance*

| *Logical Disk* | *Avg. Disk sec/Read* | *Avg. Disk sec/Write* | *Disk Reads/sec* | *Disk Writes/sec* | *Avg. Disk Bytes/Write* |
|---|---|---|---|---|---|
| Database (C:\asgluns\sg1) | 0.079 | 0.004 | 455.945 | 13.164 | (n/a) |
| Database (C:\asgluns\sg2) | 0.085 | 0.005 | 452.645 | 13.286 | (n/a) |
| Database (C:\asgluns\sg3) | 0.074 | 0.004 | 448.722 | 13.054 | (n/a) |
| Database (C:\asgluns\sg4) | 0.077 | 0.004 | 461.067 | 13.312 | (n/a) |
| Database (C:\asgluns\sg5) | 0.074 | 0.004 | 460.472 | 13.339 | (n/a) |
| Database (C:\asgluns\sg6) | 0.080 | 0.004 | 456.476 | 13.373 | (n/a) |
| Database (C:\asgluns\sg7) | 0.082 | 0.005 | 456.438 | 13.388 | (n/a) |
| Database (C:\asgluns\sg8) | 0.080 | 0.004 | 456.766 | 13.330 | (n/a) |
| Database (C:\asgluns\sg9) | 0.083 | 0.004 | 456.809 | 13.338 | (n/a) |
| Database (C:\asgluns\sg10) | 0.080 | 0.004 | 460.112 | 13.084 | (n/a) |
| Database (C:\asgluns\sg11) | 0.084 | 0.005 | 451.267 | 13.120 | (n/a) |

| | | | | | |
|---|---|---|---|---|---|
| Database (C:\asgluns\sg12) | 0.087 | 0.005 | 455.412 | 13.391 | (n/a) |
| Database (C:\asgluns\sg13) | 0.075 | 0.003 | 457.253 | 13.281 | (n/a) |
| Database (C:\asgluns\sg14) | 0.083 | 0.005 | 460.980 | 13.356 | (n/a) |
| Database (C:\asgluns\sg15) | 0.074 | 0.004 | 468.242 | 13.646 | (n/a) |
| Database (C:\asgluns\sg16) | 0.084 | 0.004 | 454.113 | 13.309 | (n/a) |
| Database (C:\asgluns\sg17) | 0.077 | 0.004 | 457.169 | 13.331 | (n/a) |
| Database (C:\asgluns\sg18) | 0.078 | 0.004 | 458.140 | 13.331 | (n/a) |
| Database (C:\asgluns\sg19) | 0.083 | 0.005 | 453.636 | 13.128 | (n/a) |
| Database (C:\asgluns\sg20) | 0.080 | 0.004 | 462.580 | 13.389 | (n/a) |
| Log (C:\alogluns\log1) | 0.002 | 0.000 | 27.568 | 0.051 | 157.017 |
| Log (C:\alogluns\log2) | 0.002 | 0.000 | 27.824 | 0.056 | 165.015 |
| Log (C:\alogluns\log3) | 0.002 | 0.000 | 27.329 | 0.061 | 177.997 |
| Log (C:\alogluns\log4) | 0.002 | 0.000 | 27.933 | 0.043 | 147.961 |
| Log (C:\alogluns\log5) | 0.002 | 0.000 | 27.933 | 0.056 | 161.202 |
| Log (C:\alogluns\log6) | 0.002 | 0.000 | 28.043 | 0.059 | 164.397 |
| Log (C:\alogluns\log7) | 0.002 | 0.000 | 28.098 | 0.023 | 150.507 |
| Log (C:\alogluns\log8) | 0.002 | 0.000 | 27.938 | 0.056 | 161.202 |
| Log (C:\alogluns\log9) | 0.002 | 0.000 | 28.026 | 0.023 | 150.507 |
| Log (C:\alogluns\log10) | 0.002 | 0.000 | 27.385 | 0.061 | 179.334 |
| Log (C:\alogluns\log11) | 0.002 | 0.000 | 27.490 | 0.063 | 206.824 |
| Log (C:\alogluns\log12) | 0.002 | 0.000 | 28.152 | 0.024 | 150.507 |
| Log (C:\alogluns\log13) | 0.002 | 0.000 | 27.888 | 0.024 | 152.913 |
| Log (C:\alogluns\log14) | 0.002 | 0.000 | 28.153 | 0.015 | 137.450 |
| Log (C:\alogluns\log15) | 0.002 | 0.000 | 28.700 | 0.024 | 150.507 |
| Log (C:\alogluns\log16) | 0.002 | 0.000 | 27.898 | 0.051 | 157.017 |
| Log (C:\alogluns\log17) | 0.002 | 0.000 | 27.938 | 0.055 | 163.866 |
| Log (C:\alogluns\log18) | 0.002 | 0.000 | 27.988 | 0.044 | 146.546 |
| Log (C:\alogluns\log19) | 0.003 | 0.000 | 27.650 | 0.021 | 146.899 |
| Log (C:\alogluns\log20) | 0.002 | 0.000 | 28.098 | 0.046 | 147.216 |

## *Host System Performance*

| Counter | Average | Minimum | Maximum |
|---|---|---|---|

| | | | |
|---|---|---|---|
| % Processor Time | 5.160 | 2.896 | 44.208 |
| Available MBytes | 57013.560 | 56475.000 | 61534.000 |
| Free System Page Table Entries | 33561845.567 | 33561430.000 | 33561949.000 |
| Transition Pages RePurposed/sec | 0.000 | 0.000 | 0.000 |
| Pool Nonpaged Bytes | 152280296.107 | 148008960.000 | 152866816.000 |
| Pool Paged Bytes | 154317482.667 | 153714688.000 | 154632192.000 |
| Database Page Fault Stalls/sec | 0.000 | 0.000 | 0.000 |

*Test Log*

```
7/12/2009 6:08:30 PM -- Jetstress testing begins ...
7/12/2009 6:08:35 PM -- Prepare testing begins ...
7/12/2009 6:09:16 PM -- Attaching databases ...
7/12/2009 6:09:16 PM -- Prepare testing ends.
7/12/2009 6:09:16 PM -- Dispatching transactions begins ...
7/12/2009 6:09:16 PM -- Database cache settings: (minimum: 640.0 MB, maximum:
5.0 GB)
7/12/2009 6:09:16 PM -- Database flush thresholds: (start: 51.2 MB, stop:
102.4 MB)
7/12/2009 6:09:59 PM -- Database read latency thresholds: (average: 0.02
seconds/read, maximum: 0.05 seconds/read).
7/12/2009 6:09:59 PM -- Log write latency thresholds: (average: 0.01
seconds/write, maximum: 0.05 seconds/write).
7/12/2009 6:10:01 PM -- Operation mix: Sessions 4, Inserts 40%, Deletes 30%,
Replaces 5%, Reads 25%, Lazy Commits 55%.
7/12/2009 6:10:01 PM -- Performance logging begins (interval: 15000 ms).
7/12/2009 6:10:01 PM -- Generating log files ...
7/12/2009 8:24:21 PM -- C:\alogluns\log1 (101.4% generated), C:\alogluns\log2
(102.0% generated), C:\alogluns\log3 (101.0% generated), C:\alogluns\log4
(102.2% generated), C:\alogluns\log5 (102.6% generated), C:\alogluns\log6
(103.0% generated), C:\alogluns\log7 (103.4% generated), C:\alogluns\log8
(102.2% generated), C:\alogluns\log9 (102.8% generated), C:\alogluns\log10
(100.2% generated), C:\alogluns\log11 (100.8% generated), C:\alogluns\log12
(103.4% generated), C:\alogluns\log13 (102.2% generated), C:\alogluns\log14
(104.4% generated), C:\alogluns\log15 (105.2% generated), C:\alogluns\log16
(102.2% generated), C:\alogluns\log17 (102.2% generated), C:\alogluns\log18
(102.6% generated), C:\alogluns\log19 (101.4% generated), and
C:\alogluns\log20 (103.0% generated)
7/12/2009 8:24:21 PM -- Performance logging ends.
7/12/2009 8:24:21 PM -- JetInterop batch transaction stats: 12980, 12994,
13017, 13260, 13117, 13222, 13161, 13045, 13233, 13135, 12962, 13075, 13106,
13172, 13369, 13123, 12993, 13142, 12993, and 13137.
7/12/2009 8:24:22 PM -- Dispatching transactions ends.
7/12/2009 8:24:22 PM -- Shutting down databases ...
7/12/2009 8:24:26 PM -- Instance5728.1 (complete), Instance5728.2 (complete),
Instance5728.3 (complete), Instance5728.4 (complete), Instance5728.5
(complete), Instance5728.6 (complete), Instance5728.7 (complete),
Instance5728.8 (complete), Instance5728.9 (complete), Instance5728.10
(complete), Instance5728.11 (complete), Instance5728.12 (complete),
Instance5728.13 (complete), Instance5728.14 (complete), Instance5728.15
(complete), Instance5728.16 (complete), Instance5728.17 (complete),
Instance5728.18 (complete), Instance5728.19 (complete), and Instance5728.20
(complete)
7/12/2009 8:24:26 PM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800
users\SoftRecovery\Performance_2009_7_12_18_9_59.blg has 535 samples.
7/12/2009 8:24:26 PM -- Creating test report ...
7/12/2009 8:24:40 PM -- Volume C:\asgluns\sg1 has 0.0110 for Avg. Disk
sec/Read.
7/12/2009 8:24:40 PM -- Volume C:\asgluns\sg2 has 0.0116 for Avg. Disk
sec/Read.
7/12/2009 8:24:40 PM -- Volume C:\asgluns\sg3 has 0.0110 for Avg. Disk
```

sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg4 has 0.0116 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg5 has 0.0109 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg6 has 0.0113 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg7 has 0.0114 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg8 has 0.0106 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg9 has 0.0113 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg10 has 0.0106 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg11 has 0.0113 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg12 has 0.0104 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg13 has 0.0108 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg14 has 0.0114 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg15 has 0.0109 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg16 has 0.0114 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg17 has 0.0111 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg18 has 0.0113 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\asgluns\sg19 has 0.0112 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\asgluns\sg20 has 0.0106 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log1 has 0.0015 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log1 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log2 has 0.0011 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log2 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log3 has 0.0015 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log3 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log4 has 0.0011 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log4 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log5 has 0.0015 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log5 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log6 has 0.0011 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log6 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log7 has 0.0014 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log7 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log8 has 0.0009 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log8 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log9 has 0.0014 for Avg. Disk

sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log9 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log10 has 0.0010 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log10 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log11 has 0.0014 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log11 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log12 has 0.0009 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log12 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log13 has 0.0015 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log13 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log14 has 0.0011 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log14 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log15 has 0.0015 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log15 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log16 has 0.0011 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log16 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log17 has 0.0015 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log17 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log18 has 0.0011 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log18 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log19 has 0.0014 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log19 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log20 has 0.0010 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log20 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
7/12/2009 8:24:42 PM -- Test has 0 Database Page Fault Stalls/sec samples
higher than 0.
7/12/2009 8:24:42 PM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800
users\SoftRecovery\Performance_2009_7_12_18_9_59.xml has 534 samples queried.
7/12/2009 8:24:42 PM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800
users\SoftRecovery\Performance_2009_7_12_18_9_59.html is saved.
7/12/2009 8:28:03 PM -- Performance logging begins (interval: 4000 ms).
7/12/2009 8:28:03 PM -- Recovering databases ...
7/12/2009 8:38:13 PM -- Performance logging ends.
7/12/2009 8:38:13 PM -- Instance5728.1 (605.4710812), Instance5728.2
(603.3494676), Instance5728.3 (597.5150302), Instance5728.4 (606.531888),
Instance5728.5 (602.8190642), Instance5728.6 (603.3494676), Instance5728.7
(607.0622914), Instance5728.8 (602.8190642), Instance5728.9 (607.0622914),
Instance5728.10 (598.575837), Instance5728.11 (593.271803), Instance5728.12
(607.5926948), Instance5728.13 (607.3274931), Instance5728.14 (609.183905),
Instance5728.15 (607.5926948), Instance5728.16 (605.7362829), Instance5728.17
(603.879871), Instance5728.18 (606.2666863), Instance5728.19 (608.9187033),
and Instance5728.20 (606.0014846)
7/12/2009 8:38:14 PM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800

```
users\SoftRecovery\SoftRecovery_2009_7_12_20_27_58.blg has 150 samples.
7/12/2009 8:38:14 PM -- Creating test report ...
```

# Soft Recovery Test Performance Result: SUN21

## Test Summary

| | |
|---|---|
| ***Overall Test Result*** | Pass |
| ***Machine Name*** | SUN21 |
| ***Test Description*** | |
| ***Test Start Time*** | 7/12/2009 6:08:35 PM |
| ***Test End Time*** | 7/12/2009 8:24:26 PM |
| ***Jetstress Version*** | 08.02.0060.000 |
| ***Ese Version*** | 08.01.0240.005 |
| ***Operating System*** | Windows Server (R) 2008 Enterprise Service Pack 1 (6.0.6001.65536) |
| ***Performance Log*** | C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800 users\SoftRecovery\Performance_2009_7_12_18_9_59.blg |

## Database Sizing and Throughput

| | |
|---|---|
| ***Achieved I/O per Second*** | 2250.565 |
| ***Capacity Percentage*** | 100% |
| ***Throughput Percentage*** | 100% |
| ***Initial database size*** | 4204509396992 |
| ***Final database size*** | 4211356598272 |
| ***Database files (count)*** | 40 |

## Jetstress System Parameters

| | |
|---|---|
| ***Thread count*** | 4 (per storage group) |
| ***Log buffers*** | 9000 |
| ***Minimum database cache*** | 640.0 MB |
| ***Maximum database cache*** | 5120.0 MB |
| ***Insert operations*** | 40% |
| ***Delete operations*** | 30% |
| ***Replace operations*** | 5% |
| ***Read operations*** | 25% |
| ***Lazy commits*** | 55% |

## Disk Subsystem Performance

| ***Logical Disk*** | ***Avg. Disk sec/Read*** | ***Avg. Disk sec/Write*** | ***Disk Reads/sec*** | ***Disk Writes/sec*** | ***Avg. Disk Bytes/Write*** |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Database (C:\asgluns\sg1) | 0.011 | 0.005 | 66.065 | 45.870 | (n/a) |
| Database (C:\asgluns\sg2) | 0.012 | 0.006 | 65.330 | 46.103 | (n/a) |
| Database (C:\asgluns\sg3) | 0.011 | 0.005 | 65.520 | 45.752 | (n/a) |
| Database (C:\asgluns\sg4) | 0.012 | 0.006 | 67.355 | 46.778 | (n/a) |
| Database (C:\asgluns\sg5) | 0.011 | 0.005 | 66.217 | 46.411 | (n/a) |
| Database (C:\asgluns\sg6) | 0.011 | 0.006 | 66.046 | 46.291 | (n/a) |
| Database (C:\asgluns\sg7) | 0.011 | 0.007 | 66.241 | 46.979 | (n/a) |
| Database (C:\asgluns\sg8) | 0.011 | 0.005 | 66.013 | 46.235 | (n/a) |
| Database (C:\asgluns\sg9) | 0.011 | 0.007 | 66.196 | 46.254 | (n/a) |
| Database (C:\asgluns\sg10) | 0.011 | 0.005 | 67.155 | 46.560 | (n/a) |
| Database (C:\asgluns\sg11) | 0.011 | 0.007 | 65.560 | 45.780 | (n/a) |
| Database (C:\asgluns\sg12) | 0.010 | 0.005 | 65.863 | 46.274 | (n/a) |
| Database (C:\asgluns\sg13) | 0.011 | 0.005 | 65.912 | 45.984 | (n/a) |
| Database (C:\asgluns\sg14) | 0.011 | 0.007 | 66.950 | 47.466 | (n/a) |
| Database (C:\asgluns\sg15) | 0.011 | 0.006 | 67.117 | 47.088 | (n/a) |
| Database (C:\asgluns\sg16) | 0.011 | 0.007 | 65.678 | 45.953 | (n/a) |
| Database (C:\asgluns\sg17) | 0.011 | 0.006 | 65.541 | 45.725 | (n/a) |
| Database (C:\asgluns\sg18) | 0.011 | 0.007 | 66.548 | 46.536 | (n/a) |
| Database (C:\asgluns\sg19) | 0.011 | 0.007 | 65.551 | 45.887 | (n/a) |
| Database (C:\asgluns\sg20) | 0.011 | 0.006 | 66.869 | 46.911 | (n/a) |
| Log (C:\alogluns\log1) | 0.000 | 0.001 | 0.000 | 33.193 | 4413.734 |
| Log (C:\alogluns\log2) | 0.000 | 0.001 | 0.000 | 33.851 | 4374.887 |
| Log (C:\alogluns\log3) | 0.000 | 0.002 | 0.000 | 33.169 | 4388.688 |
| Log (C:\alogluns\log4) | 0.000 | 0.001 | 0.000 | 33.979 | 4351.095 |
| Log (C:\alogluns\log5) | 0.000 | 0.001 | 0.000 | 33.623 | 4403.583 |
| Log (C:\alogluns\log6) | 0.000 | 0.001 | 0.000 | 33.926 | 4374.001 |

| | | | | | |
|---|---|---|---|---|---|
| Log (C:\alogluns\log7) | 0.000 | 0.001 | 0.000 | 34.053 | 4410.686 |
| Log (C:\alogluns\log8) | 0.000 | 0.001 | 0.000 | 33.922 | 4365.252 |
| Log (C:\alogluns\log9) | 0.000 | 0.001 | 0.000 | 33.811 | 4356.674 |
| Log (C:\alogluns\log10) | 0.000 | 0.001 | 0.000 | 33.684 | 4314.636 |
| Log (C:\alogluns\log11) | 0.000 | 0.001 | 0.000 | 33.175 | 4386.403 |
| Log (C:\alogluns\log12) | 0.000 | 0.001 | 0.000 | 34.087 | 4395.583 |
| Log (C:\alogluns\log13) | 0.000 | 0.002 | 0.000 | 33.289 | 4441.629 |
| Log (C:\alogluns\log14) | 0.000 | 0.001 | 0.000 | 34.434 | 4394.531 |
| Log (C:\alogluns\log15) | 0.000 | 0.002 | 0.000 | 34.166 | 4461.635 |
| Log (C:\alogluns\log16) | 0.000 | 0.001 | 0.000 | 33.679 | 4391.776 |
| Log (C:\alogluns\log17) | 0.000 | 0.002 | 0.000 | 33.271 | 4434.397 |
| Log (C:\alogluns\log18) | 0.000 | 0.001 | 0.000 | 33.916 | 4379.689 |
| Log (C:\alogluns\log19) | 0.000 | 0.001 | 0.000 | 33.322 | 4417.691 |
| Log (C:\alogluns\log20) | 0.000 | 0.001 | 0.000 | 34.290 | 4343.359 |

## Host System Performance

| Counter | Average | Minimum | Maximum |
|---|---|---|---|
| % Processor Time | 1.756 | 0.791 | 5.544 |
| Available MBytes | 56760.366 | 56475.000 | 61496.000 |
| Free System Page Table Entries | 33560786.277 | 33560448.000 | 33561087.000 |
| Transition Pages RePurposed/sec | 0.000 | 0.000 | 0.000 |
| Pool Nonpaged Bytes | 145772237.757 | 144683008.000 | 146321408.000 |
| Pool Paged Bytes | 154022691.888 | 151658496.000 | 154480640.000 |
| Database Page Fault Stalls/sec | 0.000 | 0.000 | 0.000 |

## Test Log

```
7/12/2009 6:08:30 PM -- Jetstress testing begins ...
7/12/2009 6:08:35 PM -- Prepare testing begins ...
7/12/2009 6:09:16 PM -- Attaching databases ...
7/12/2009 6:09:16 PM -- Prepare testing ends.
7/12/2009 6:09:16 PM -- Dispatching transactions begins ...
7/12/2009 6:09:16 PM -- Database cache settings: (minimum: 640.0 MB, maximum:
5.0 GB)
7/12/2009 6:09:16 PM -- Database flush thresholds: (start: 51.2 MB, stop:
102.4 MB)
7/12/2009 6:09:59 PM -- Database read latency thresholds: (average: 0.02
seconds/read, maximum: 0.05 seconds/read).
7/12/2009 6:09:59 PM -- Log write latency thresholds: (average: 0.01
seconds/write, maximum: 0.05 seconds/write).
7/12/2009 6:10:01 PM -- Operation mix: Sessions 4, Inserts 40%, Deletes 30%,
Replaces 5%, Reads 25%, Lazy Commits 55%.
7/12/2009 6:10:01 PM -- Performance logging begins (interval: 15000 ms).
7/12/2009 6:10:01 PM -- Generating log files ...
7/12/2009 8:24:21 PM -- C:\alogluns\log1 (101.4% generated), C:\alogluns\log2
(102.0% generated), C:\alogluns\log3 (101.0% generated), C:\alogluns\log4
(102.2% generated), C:\alogluns\log5 (102.6% generated), C:\alogluns\log6
(103.0% generated), C:\alogluns\log7 (103.4% generated), C:\alogluns\log8
```

(102.2% generated), C:\alogluns\log9 (102.8% generated), C:\alogluns\log10
(100.2% generated), C:\alogluns\log11 (100.8% generated), C:\alogluns\log12
(103.4% generated), C:\alogluns\log13 (102.2% generated), C:\alogluns\log14
(104.4% generated), C:\alogluns\log15 (105.2% generated), C:\alogluns\log16
(102.2% generated), C:\alogluns\log17 (102.2% generated), C:\alogluns\log18
(102.6% generated), C:\alogluns\log19 (101.4% generated), and
C:\alogluns\log20 (103.0% generated)
7/12/2009 8:24:21 PM -- Performance logging ends.
7/12/2009 8:24:21 PM -- JetInterop batch transaction stats: 12980, 12994,
13017, 13260, 13117, 13222, 13161, 13045, 13233, 13135, 12962, 13075, 13106,
13172, 13369, 13123, 12993, 13142, 12993, and 13137.
7/12/2009 8:24:22 PM -- Dispatching transactions ends.
7/12/2009 8:24:22 PM -- Shutting down databases ...
7/12/2009 8:24:26 PM -- Instance5728.1 (complete), Instance5728.2 (complete),
Instance5728.3 (complete), Instance5728.4 (complete), Instance5728.5
(complete), Instance5728.6 (complete), Instance5728.7 (complete),
Instance5728.8 (complete), Instance5728.9 (complete), Instance5728.10
(complete), Instance5728.11 (complete), Instance5728.12 (complete),
Instance5728.13 (complete), Instance5728.14 (complete), Instance5728.15
(complete), Instance5728.16 (complete), Instance5728.17 (complete),
Instance5728.18 (complete), Instance5728.19 (complete), and Instance5728.20
(complete)
7/12/2009 8:24:26 PM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800
users\SoftRecovery\Performance_2009_7_12_18_9_59.blg has 535 samples.
7/12/2009 8:24:26 PM -- Creating test report ...
7/12/2009 8:24:40 PM -- Volume C:\asgluns\sg1 has 0.0110 for Avg. Disk
sec/Read.
7/12/2009 8:24:40 PM -- Volume C:\asgluns\sg2 has 0.0116 for Avg. Disk
sec/Read.
7/12/2009 8:24:40 PM -- Volume C:\asgluns\sg3 has 0.0110 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg4 has 0.0116 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg5 has 0.0109 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg6 has 0.0113 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg7 has 0.0114 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg8 has 0.0106 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg9 has 0.0113 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg10 has 0.0106 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg11 has 0.0113 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg12 has 0.0104 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg13 has 0.0108 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg14 has 0.0114 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg15 has 0.0109 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg16 has 0.0114 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg17 has 0.0111 for Avg. Disk
sec/Read.
7/12/2009 8:24:41 PM -- Volume C:\asgluns\sg18 has 0.0113 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\asgluns\sg19 has 0.0112 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\asgluns\sg20 has 0.0106 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log1 has 0.0015 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log1 has 0.0000 for Avg. Disk

sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log2 has 0.0011 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log2 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log3 has 0.0015 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log3 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log4 has 0.0011 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log4 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log5 has 0.0015 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log5 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log6 has 0.0011 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log6 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log7 has 0.0014 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log7 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log8 has 0.0009 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log8 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log9 has 0.0014 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log9 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log10 has 0.0010 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log10 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log11 has 0.0014 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log11 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log12 has 0.0009 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log12 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log13 has 0.0015 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log13 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log14 has 0.0011 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log14 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log15 has 0.0015 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log15 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log16 has 0.0011 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log16 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log17 has 0.0015 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log17 has 0.0000 for Avg. Disk
sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log18 has 0.0011 for Avg. Disk
sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log18 has 0.0000 for Avg. Disk

sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log19 has 0.0014 for Avg. Disk sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log19 has 0.0000 for Avg. Disk sec/Read.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log20 has 0.0010 for Avg. Disk sec/Write.
7/12/2009 8:24:42 PM -- Volume C:\alogluns\log20 has 0.0000 for Avg. Disk sec/Read.
7/12/2009 8:24:42 PM -- Test has 0 Maximum Database Page Fault Stalls/sec.
7/12/2009 8:24:42 PM -- Test has 0 Database Page Fault Stalls/sec samples higher than 0.
7/12/2009 8:24:42 PM -- C:\ESRP Testing\SUN21\4 servers\Heavy Users\3800 users\SoftRecovery\Performance_2009_7_12_18_9_59.xml has 534 samples queried.

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