



Subsystem Performance Testing Report for

EonStor[®] DS B24F-G2840-4

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Table of Contents

1. Performance Configuration.....	4
1.1 Testing Configuration	4
2. Performance Test Results	6
2.1 End-to-End RAID 5 Performance.....	6
2.11 Sequential I/O	6
2.12 Random I/O	7
2.2 End-to-End RAID 6 Performance.....	8
2.21 Sequential I/O.....	8
2.22 Random I/O	9
2.3 Degraded RAID 5 Performance	10
2.31 Sequential I/O.....	10
2.4 Degraded RAID 6 Performance	11
2.41 Sequential I/O – 1 Drive Failed.....	11
2.42 Sequential I/O – 2 Drives Failed	12
2.5 Rebuilding RAID 5 Performance.....	13
2.51 Sequential I/O.....	13
2.6 Rebuilding RAID 6 Performance.....	14
2.61 Sequential I/O – 2 Drives Rebuilding.....	14
2.7 All Cache Hit RAID 5 Performance	15
2.71 Sequential I/O.....	15
2.8 All Cache Hit RAID 6 Performance	16
2.81 Sequential I/O.....	16
3. Performance Test Results with Data Service enable	17
3.1 Snapshot Copy-on-Write End-to-End RAID 5 Performance.....	17
3.11 Sequential I/O	17
3.12 Random I/O	17
3.2 Local Sync Mirror End-to-End RAID 5 Performance (Source to 1 Target).....	18
3.21 Sequential I/O.....	18
3.22 Random I/O	18
3.3 Local Sync Mirror End-to-End RAID 5 Performance (Source to 2 Targets).....	19
3.31 Sequential I/O.....	19
3.32 Random I/O	19
3.4 Snapshot Copy-on-Write End-to-End RAID 6 Performance.....	20

3.41 Sequential I/O	20
3.42 Random I/O	20
3.5 Local Sync Mirror End-to-End RAID 6 Performance (Source to 1 Target).....	21
3.51 Sequential I/O	21
3.52 Random I/O	21
3.6 Local Sync Mirror End-to-End RAID 6 Performance (Source to 2 Targets).....	22
3.61 Sequential I/O	22
3.62 Random I/O	22
3.7 Volume Copy / Virtual Volume Size 100GB / Data Size 10GB	22

1. Performance Configuration

Below is a description of the benchmarking testing environment and includes specifications for the server hardware, disk drive, subsystem, management tools of the subsystem and the software-testing tool. The industry standard test application IOMeter was used to measure the performance of the unit. This system comes with the standard Infortrend management software SANWatch®. Telnet and RS-232 connections can be used to manage the subsystem as well.

1.1 Testing Configuration

RAID	Controller	DSB24F-G2840-4
	FW	3.85C.36 (FA385C36_223_IFT_ESDSG6S6G.BIN)
	RAM	1GB DDR II SDRAM
	Drives	RAID: Toshiba SAS 450GB (Model: MBF2450RC Capacity: 450GB; Speed: 6G; 10,00 RPM)
		JBOD: Toshiba SAS 450GB (Model: MBF2450RC Capacity: 450GB; Speed: 6G; 10,00 RPM)
	Channels	Host Channel - Channel 0, 1, 2, 3
		Drive Channel - Channel 4
	Virtual Volumes (LD RAID5 / 6) (Dual Hosts)	LV0 - Host channel 0; ID 112; LUN 0; 24 drives/channel; 1 partition
		LV1 - Host channel 1; ID 112; LUN 0; 24 drives/channel; 1 partition
	Setting	Optimization for – Sequential, (Raid 5 / 6 Default strip size 128K)
		Periodic Drive Check Time – Disable
		Periodic SAF-TE and SES Device Check Time – Disable
		Verification on Normal Drive Writes – Disable
Verification on LD Rebuild Writes – Disable		
Max Drive Response Timeout – Disable		
Drive Delayed Write – Enable		

		SDRAM ECC – Enable
		BBU – ON
Data Service	Snapshot Copy on Write	V.V Size: 100GB Virtual Volume 1: Host channel 0; ID 112; LUN 0 Virtual Volume 2: Host channel 1; ID 112; LUN 0
	Split mirror	V.V Size: 100GB (Source) Virtual Volume 1: Host channel 0; ID 112; LUN 0 (Target) Virtual Volume 2
Software	SANWatch	SANWatch_2.1.c.20
Server*2 (Host)	M/B	SUPERMICRO
	CPU	Intel Xeon E5506 2.13GHz
	RAM	Kingston 2GB DDRII 667 DIMM * 3
	PCI	PCI-X 64-bit/133MHz *3
	System Drive	IDE Seagate 120G (ST3120026A)
	OS.	Microsoft Windows Server 2003 Enterprise Edition R2 (With Service Pack 2)
HBA	OS Register	MaximumSGList: FF (Hexadecimal) NumberOfRequests: FF (Hexadecimal)
	QLogic	QLE2562, BIOS VER: 2.02; Driver VER: 9.17.18
Benchmark	IOmeter	2004.07.30
	I/O Tool Setting	Outstanding I/O - 16 for MB/s; (Random - 256 for IO/s, Sequential - 64 for IO/s)
		Ramp Up Time: 40 sec.
		Run Time: 30 sec.
		One LD Corresponds to One Worker.
		All Cache: Maximum Disk Size 10240
		Align I/Os on

2. Performance Test Results

The Performance test results are listed below.



NOTE:

1. In the following sections, “write-back” is abbreviated as **WB** and “write-through” is abbreviated as **WT**.
2. End-to-End four-channel IOPS Read having a lower performance than dual-channel configuration is a known issue, and will be resolved in the coming release of firmware.

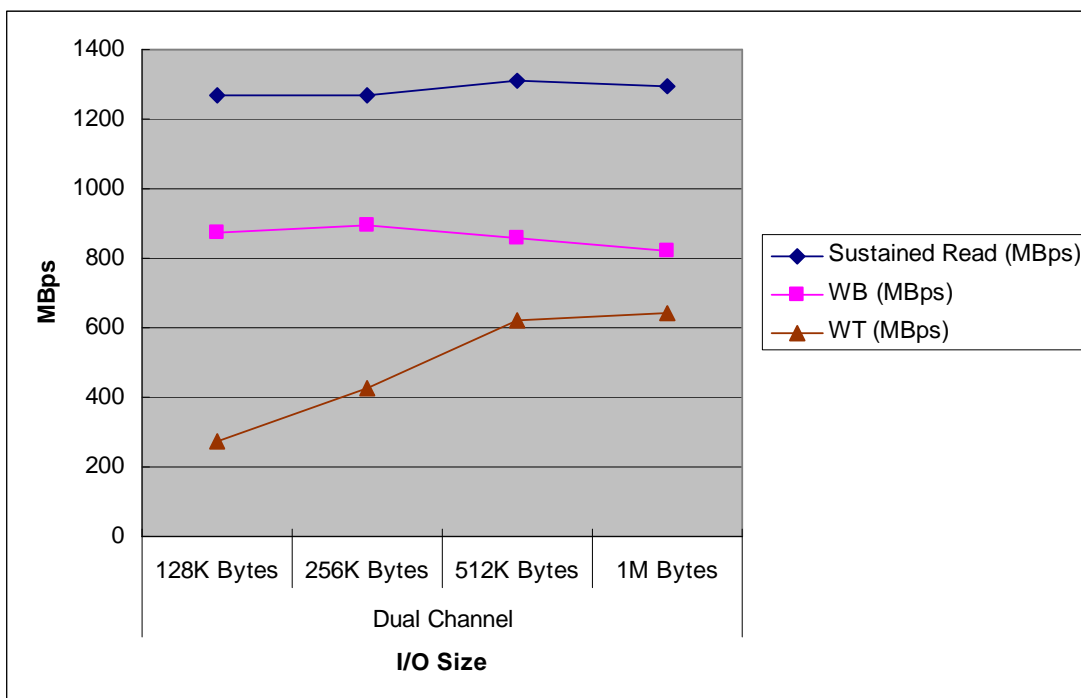
2.1 End-to-End RAID 5 Performance

2.11 Sequential I/O

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		Read	WB	WT
Host Channels	I/O Size	(MB/sec)	(MB/sec)	(MB/sec)
Dual Channel	128K Bytes	1268.52	872.76	274.41
	256K Bytes	1270.07	894.31	426.06
	512K Bytes	1309.16	855.57	622.09
	1M Bytes	1295.90	822.60	642.09



Data Access Rate (IOPS)

I/O Parameters		Read (IOPS)	WB (IOPS)
Host Channels	I/O Size		
Dual Channel	512 Bytes	77472.08	57385.50
	4K Bytes	62260.45	46808.84

2.12 Random I/O

>> Dual Channel

Data Transfer Rate (IOPS)

I/O Parameters		Read (IOPS)	WB (IOPS)
Host Channels	I/O Size		
Dual Channel	512 Bytes	10121.93	3133.07
	4K Bytes	10124.05	3215.44

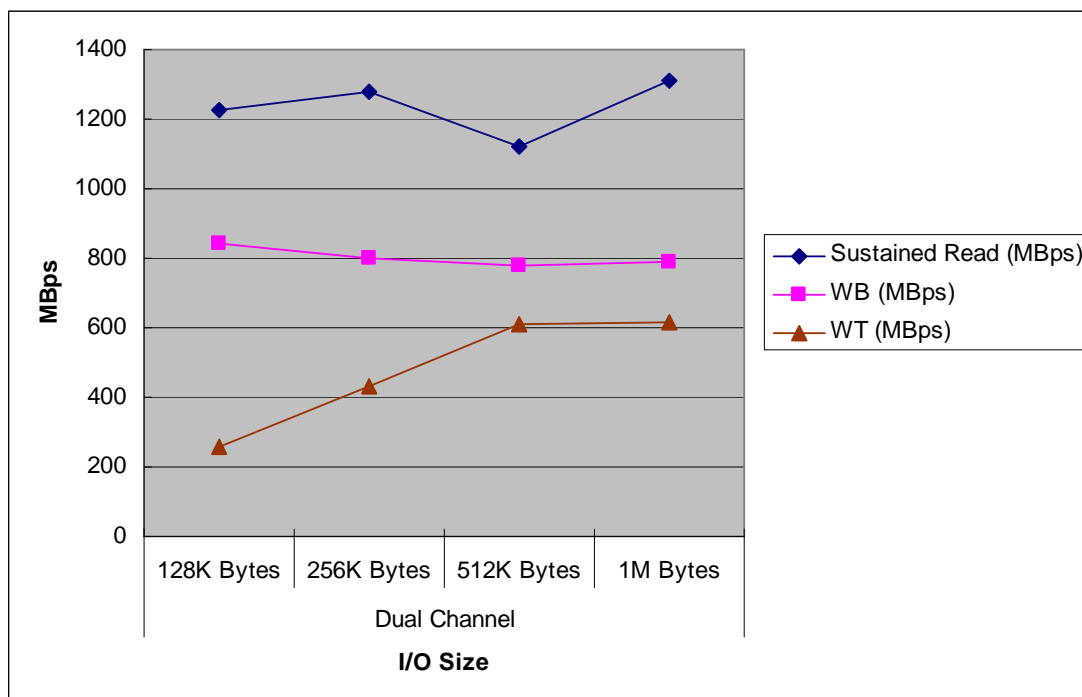
2.2 End-to-End RAID 6 Performance

2.2.1 Sequential I/O

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		Read	WB	WT
Host Channels	I/O Size	(MB/sec)	(MB/sec)	(MB/sec)
Dual Channel	128K Bytes	1227.80	842.91	259.42
	256K Bytes	1281.34	797.95	429.92
	512K Bytes	1118.44	778.55	610.83
	1M Bytes	1312.44	788.83	615.14



Data Access Rate (IOPS)

I/O Parameters		Read	WB
Host Channels	I/O Size	(IOPS)	(IOPS)
Dual Channel	512 Bytes	74393.98	54194.50
	4K Bytes	59798.62	43841.23

2.22 Random I/O

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		Read (IOPS)	WB (IOPS)
Host Channels	I/O Size		
Dual Channel	512 Bytes	9366.22	2165.33
	4K Bytes	9334.50	2070.76

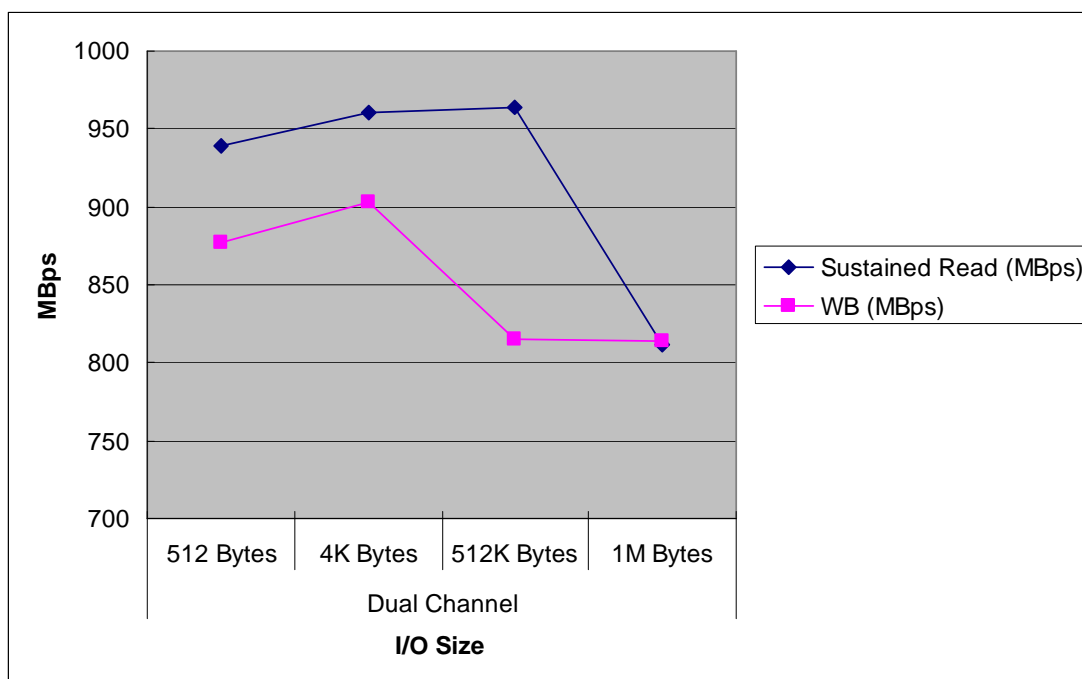
2.3 Degraded RAID 5 Performance

2.3.1 Sequential I/O

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		Read (MB/sec)	WB (MB/sec)
Host Channels	I/O Size		
Dual Channel	128K Bytes	939.25	877.32
	256K Bytes	960.74	902.59
	512K Bytes	963.82	815.39
	1M Bytes	812.14	813.83



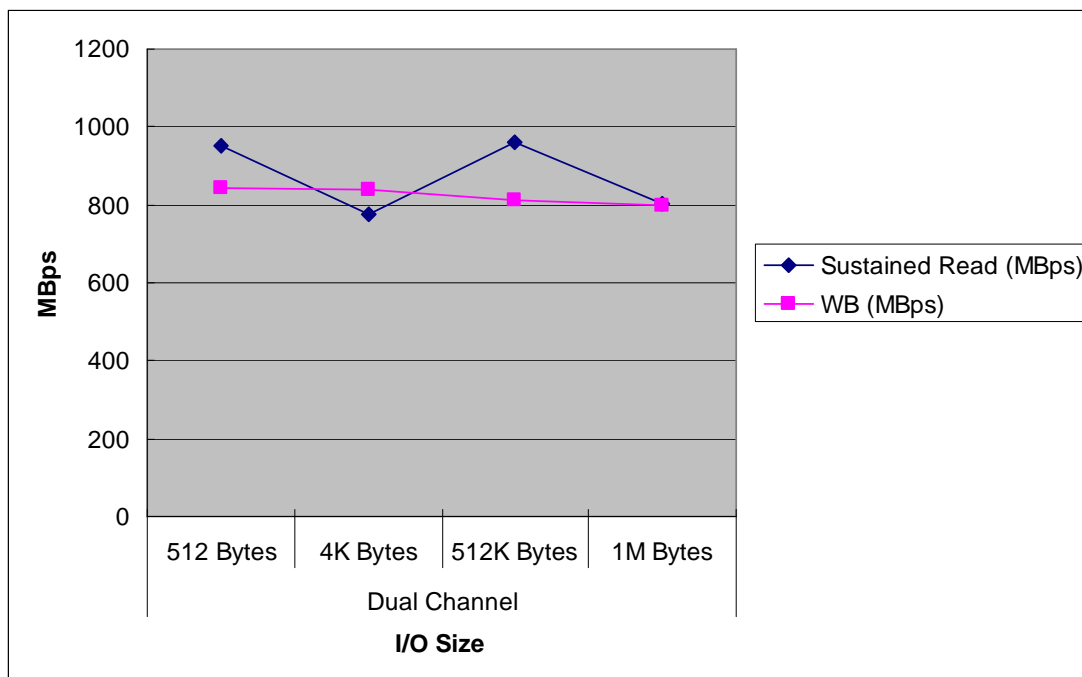
2.4 Degraded RAID 6 Performance

2.41 Sequential I/O – 1 Drive Failed

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		Read (MB/sec)	WB (MB/sec)
Host Channels	I/O Size		
Dual Channel	128K Bytes	949.97	843.99
	256K Bytes	775.55	837.04
	512K Bytes	961.48	814.18
	1M Bytes	804.87	797.63

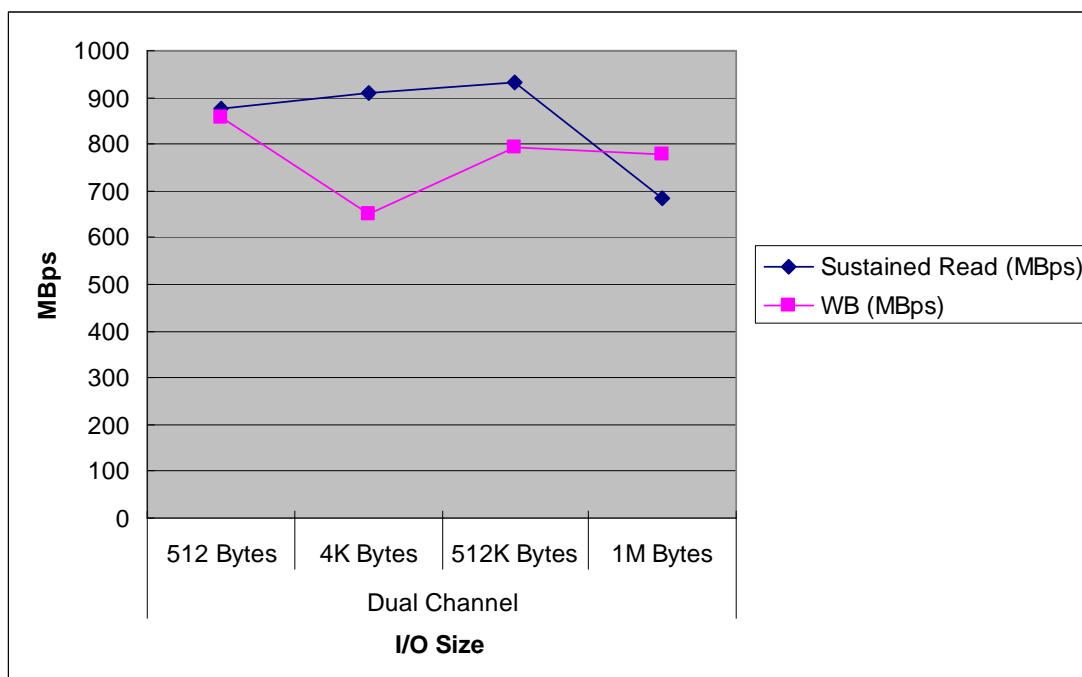


2.42 Sequential I/O – 2 Drives Failed

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		Read (MB/sec)	WB (MB/sec)
Host Channels	I/O Size		
Dual Channel	128K Bytes	875.32	857.94
	256K Bytes	909.32	650.87
	512K Bytes	932.00	794.76
	1M Bytes	682.67	776.80



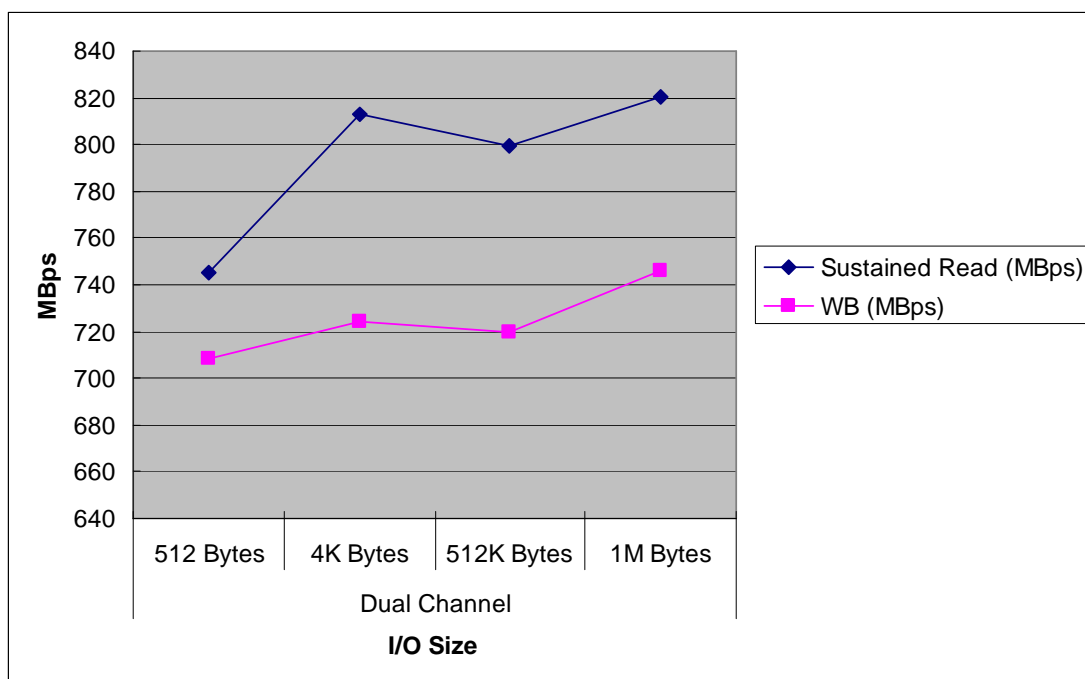
2.5 Rebuilding RAID 5 Performance

2.5.1 Sequential I/O

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		Read (MB/sec)	WB (MB/sec)
Host Channels	I/O Size		
Dual Channel	128K Bytes	745.13	708.60
	256K Bytes	812.81	724.46
	512K Bytes	799.53	719.75
	1M Bytes	820.73	746.32



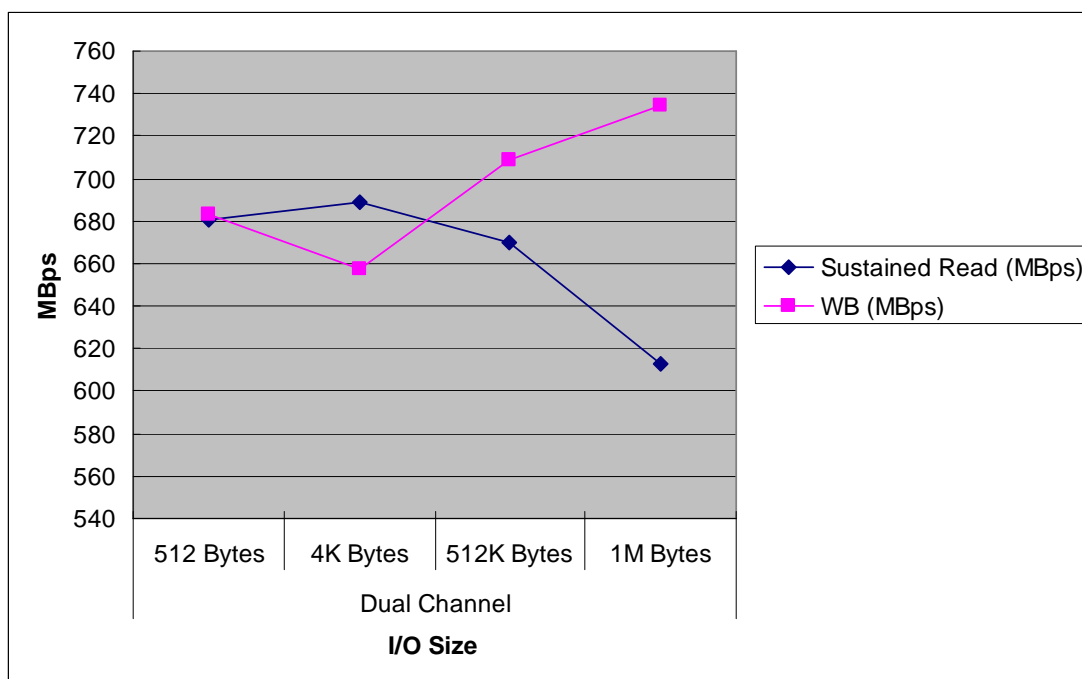
2.6 Rebuilding RAID 6 Performance

2.61 Sequential I/O – 2 Drives Rebuilding

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		Read (MB/sec)	WB (MB/sec)
Host Channels	I/O Size		
Dual Channel	128K Bytes	680.65	682.82
	256K Bytes	688.89	657.61
	512K Bytes	669.45	708.86
	1M Bytes	613.10	734.18



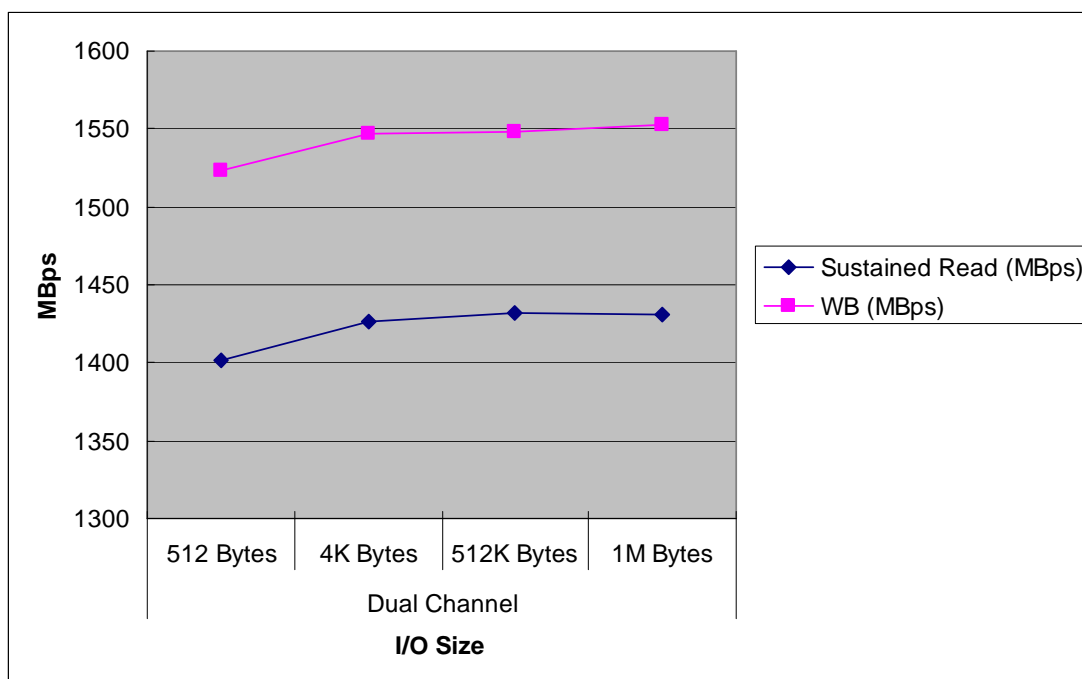
2.7 All Cache Hit RAID 5 Performance

2.7.1 Sequential I/O

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		Read (MB/sec)	WB (MB/sec)
Host Channels	I/O Size		
Dual Channel	128K Bytes	1401.87	1523.17
	256K Bytes	1426.69	1547.53
	512K Bytes	1432.37	1548.02
	1M Bytes	1431.34	1552.58



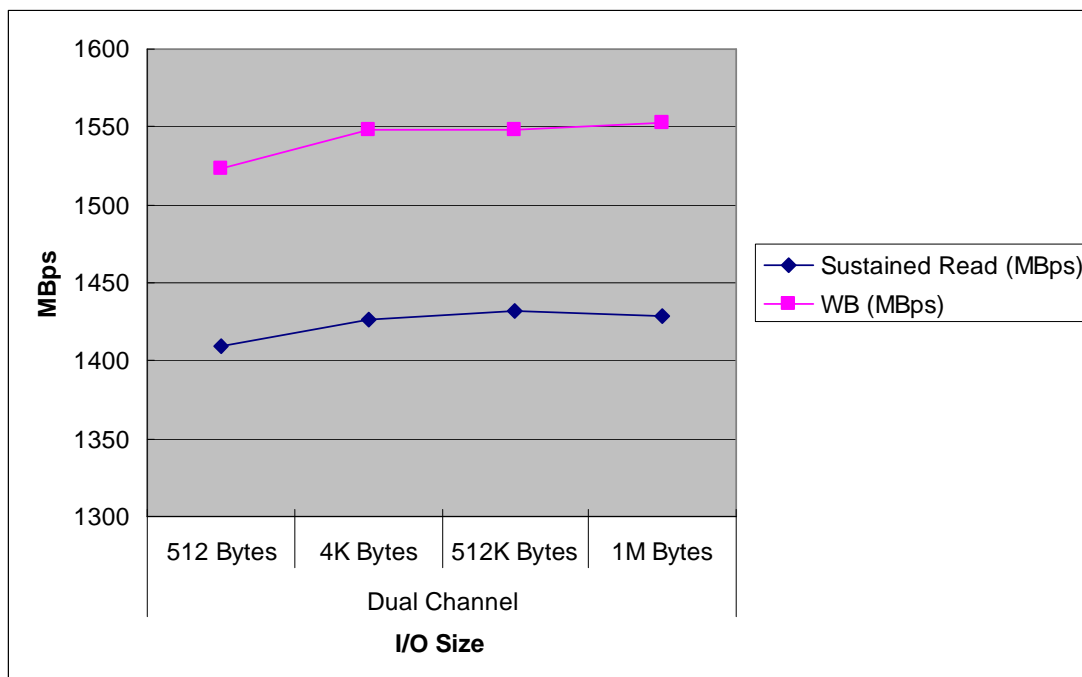
2.8 All Cache Hit RAID 6 Performance

2.8.1 Sequential I/O

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		Read (MB/sec)	WB (MB/sec)
Host Channels	I/O Size		
Dual Channel	128K Bytes	1409.47	1523.20
	256K Bytes	1426.27	1547.63
	512K Bytes	1431.78	1548.01
	1M Bytes	1428.70	1552.59



3. Performance Test Results with Data Service enable

3.1 Snapshot Copy-on-Write End-to-End RAID 5

Performance

3.11 Sequential I/O

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		Read		WB	
Host Channels	I/O Size	IOPS	MB/sec	IOPS	MB/sec
Dual Channel	1M Bytes	1001.81	1001.81	164.47	164.47

3.12 Random I/O

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		Read		WB	
Host Channels	I/O Size	IOPS	MB/sec	IOPS	MB/sec
Dual Channel	8k Bytes	2128.89	16.63	146.23	1.14

I/O Parameters		OLTP : 60 % Read / 40 % Write			
Host Channels	I/O Size	IOPS		MB/sec	
Dual Channel	8K Bytes	338.39		2.64	

3.2 Local Sync Mirror End-to-End RAID 5 Performance (Source to 1 Target)

3.2.1 Sequential I/O

>> One Channel

Data Transfer Rate (MBps)

I/O Parameters		Read		WB	
Host Channels	I/O Size	IOPS	MB/sec	IOPS	MB/sec
One Channel	1M Bytes	777.89	777.89	345.91	345.91

3.2.2 Random I/O

>> One Channel

Data Transfer Rate (MBps)

I/O Parameters		Read		WB	
Host Channels	I/O Size	IOPS	MB/sec	IOPS	MB/sec
One Channel	8k Bytes	6874.29	53.71	1366.19	10.67

I/O Parameters		OLTP : 60 % Read / 40 % Write			
Host Channels	I/O Size	IOPS		MB/sec	
One Channel	8K Bytes	2500.13		19.53	

3.3 Local Sync Mirror End-to-End RAID 5 Performance (Source to 2 Targets)

3.31 Sequential I/O

>> One Channel

Data Transfer Rate (MBps)

I/O Parameters		Read		WB	
Host Channels	I/O Size	IOPS	MB/sec	IOPS	MB/sec
One Channel	1M Bytes	777.48	777.48	205.93	205.93

3.32 Random I/O

>> One Channel

Data Transfer Rate (MBps)

I/O Parameters		Read		WB	
Host Channels	I/O Size	IOPS	MB/sec	IOPS	MB/sec
One Channel	8k Bytes	6713.69	52.45	908.67	7.10

I/O Parameters		OLTP : 60 % Read / 40 % Write			
Host Channels	I/O Size	IOPS		MB/sec	
One Channel	8K Bytes	1764.96		13.79	

3.4 Snapshot Copy-on-Write End-to-End RAID 6

Performance

3.41 Sequential I/O

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		Read		WB	
Host Channels	I/O Size	IOPS	MB/sec	IOPS	MB/sec
Dual Channel	1M Bytes	989.58	989.58	134.66	134.66

3.42 Random I/O

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		Read		WB	
Host Channels	I/O Size	IOPS	MB/sec	IOPS	MB/sec
Dual Channel	8k Bytes	2138.01	16.70	112.93	0.88

I/O Parameters		OLTP : 60 % Read / 40 % Write			
Host Channels	I/O Size	IOPS		MB/sec	
Dual Channel	8K Bytes	257.81		2.01	

3.5 Local Sync Mirror End-to-End RAID 6 Performance (Source to 1 Target)

3.51 Sequential I/O

>> One Channel

Data Transfer Rate (MBps)

I/O Parameters		Read		WB	
Host Channels	I/O Size	IOPS	MB/sec	IOPS	MB/sec
One Channel	1M Bytes	776.62	776.62	326.54	326.54

3.52 Random I/O

>> One Channel

Data Transfer Rate (MBps)

I/O Parameters		Read		WB	
Host Channels	I/O Size	IOPS	MB/sec	IOPS	MB/sec
One Channel	8k Bytes	6651.43	51.96	1190.63	9.30

I/O Parameters		OLTP : 60 % Read / 40 % Write			
Host Channels	I/O Size	IOPS		MB/sec	
One Channel	8K Bytes	2280.83		17.82	

3.6 Local Sync Mirror End-to-End RAID 6 Performance (Source to 2 Targets)

3.61 Sequential I/O

>> One Channel

Data Transfer Rate (MBps)

I/O Parameters		Read		WB	
Host Channels	I/O Size	IOPS	MB/sec	IOPS	MB/sec
One Channel	1M Bytes	777.64	777.64	204.44	204.44

3.62 Random I/O

>> One Channel

Data Transfer Rate (MBps)

I/O Parameters		Read		WB	
Host Channels	I/O Size	IOPS	MB/sec	IOPS	MB/sec
One Channel	8k Bytes	6695.90	52.31	790.31	6.17

I/O Parameters		OLTP : 60 % Read / 40 % Write			
Host Channels	I/O Size	IOPS		MB/sec	
One Channel	8K Bytes	1610.52		12.58	

3.7 Volume Copy / Virtual Volume Size 100GB / Data Size 10GB

Subsystem	1 Raid
Parameters	1 Source to 1 Target
Finish Time	1 hr 29 min