



Subsystem Performance Testing Report for

EonStor[®] DS A24S-G2130

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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	DS A24S-G2130
	FW	3.75A.07 (FA375A07_114_IPT-S_ESDSA24SG2130.BIN)
	RAM	1024MB DDR SDRAM
	Drives	Hitachi SATA 1TB (Model: HUA722010CLA330; Capacity: 1TB; Speed: 3G; 7200 RPM)
	Channels	Host Channel - Channel 0, 1
		Drive Channel - Channel 2, 3
	Logical Drives (RAID5 / 6) (Dual Hosts)	LD0 - Host channel 0; ID 0; LUN 0; 20 drives/channel; 1 partition
		LD1 - Host channel 1; ID 0. LUN 0; 20 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 – OFF
Server*2 (Host)	M/B	SUPERMICRO X8DTN
	CPU	Intel Xeon E5506 2.13GHz
	RAM	Kingston 512MB DDRII400 DIMM * 12
	PCI	PCI-X 64-bit/133MHz *3
	System Drive	WD 160G (WDC WD1500HLFS-01G6U0)
	OS.	Microsoft Windows Server 2003 Enterprise Edition R2 (With Service Pack 2)
HBA	OS Register	MaximumSGList: FF (Hexadecimal) NumberOfRequests: FF (Hexadecimal)
	LSI	SAS3801E (Driver VER: 1.26.5.0)
Benchmark	IOmeter	2004.07.30
	I/O Tool Setting	Outstanding I/O - 16 for MB/s; (Random < 16k: 64 for IO/s); Other 16 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.

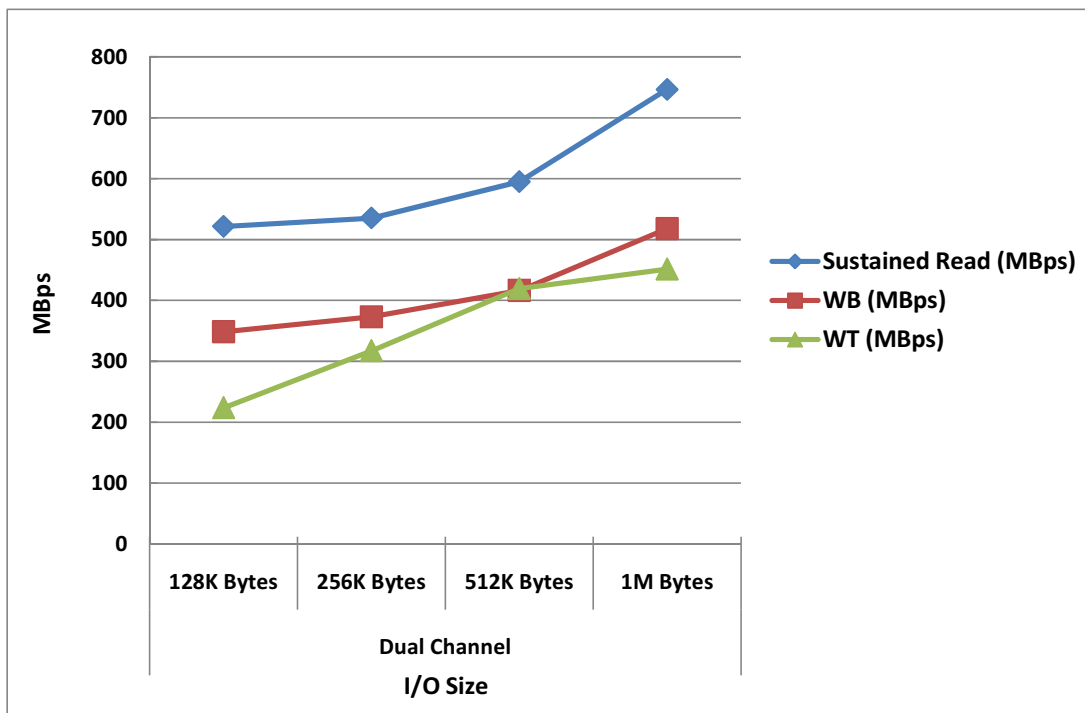
2.1 End-to-End RAID 5 Performance

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	521.78	348.83	224.08
	256K Bytes	535.63	373.36	317.80
	512K Bytes	595.12	416.72	419.84
	1M Bytes	746.80	518.00	451.86



Data Access Rate (IOPS)

I/O Parameters		Read (IOPS)	WB (IOPS)
Host Channels	I/O Size		
Dual Channel	512 Bytes	33390.88	26104.57
	4K Bytes	30820.38	23706.46

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	2949.33	1519.14
	4K Bytes	2930.80	1507.40

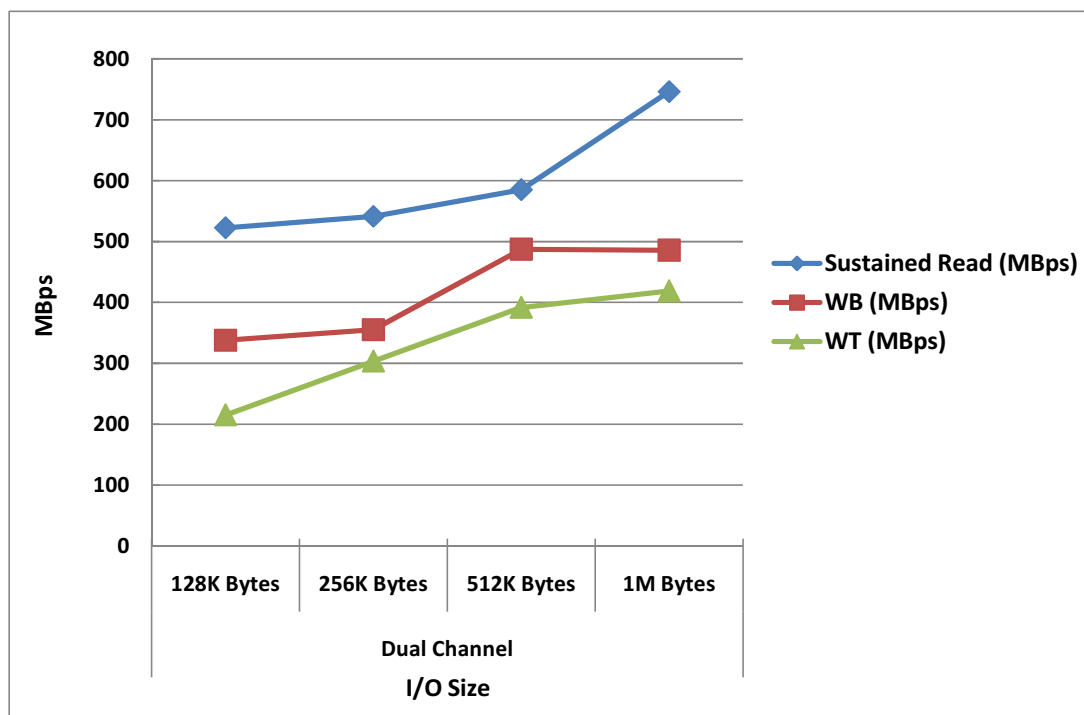
2.2 End-to-End RAID 6 Performance

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	522.73	338.21	215.62
	256K Bytes	541.45	355.56	303.86
	512K Bytes	585.31	487.53	392.19
	1M Bytes	746.51	485.90	419.42



Data Access Rate (IOPS)

I/O Parameters		Read	WB
Host Channels	I/O Size	(IOPS)	(IOPS)
Dual Channel	512 Bytes	33385.49	26429.24
	4K Bytes	31027.53	23773.47

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	2925.20	1052.86
	4K Bytes	2925.49	1053.98

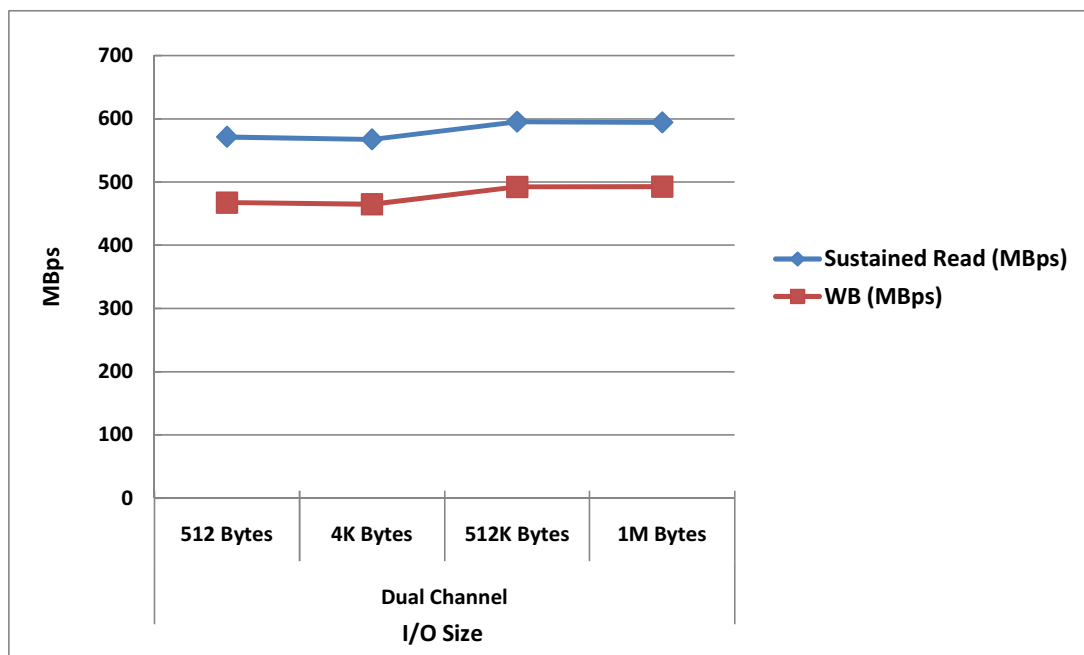
2.3 Degraded RAID 5 Performance

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	571.33	467.39
	256K Bytes	567.25	464.86
	512K Bytes	595.20	492.27
	1M Bytes	594.39	492.63



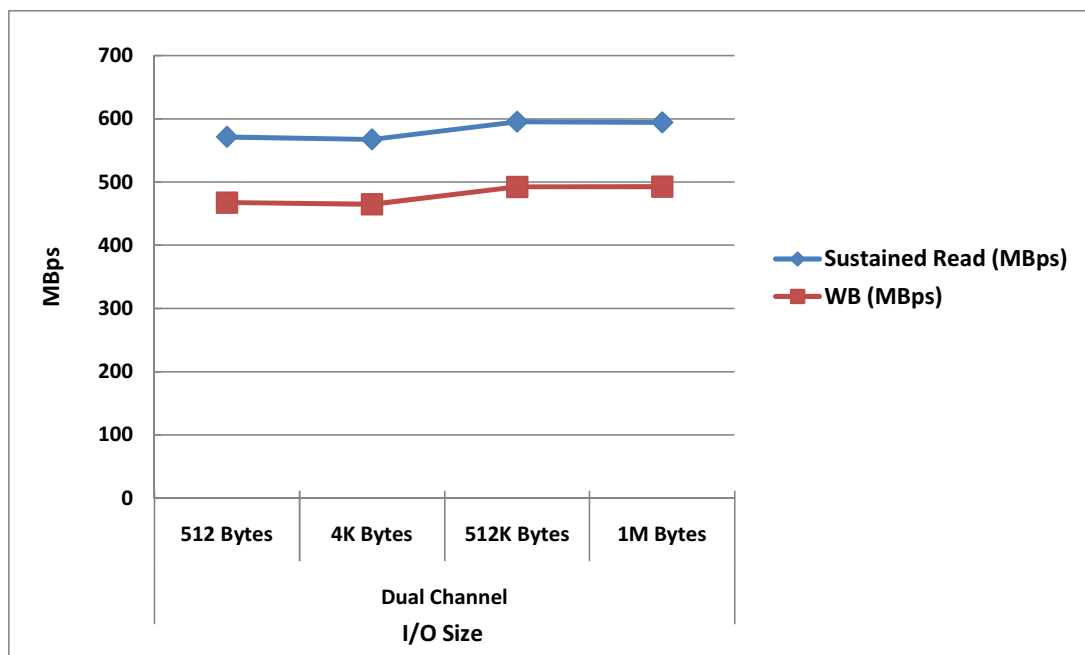
2.4 Degraded RAID 6 Performance

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	571.33	467.39
	256K Bytes	567.25	464.86
	512K Bytes	595.20	492.27
	1M Bytes	594.39	492.63

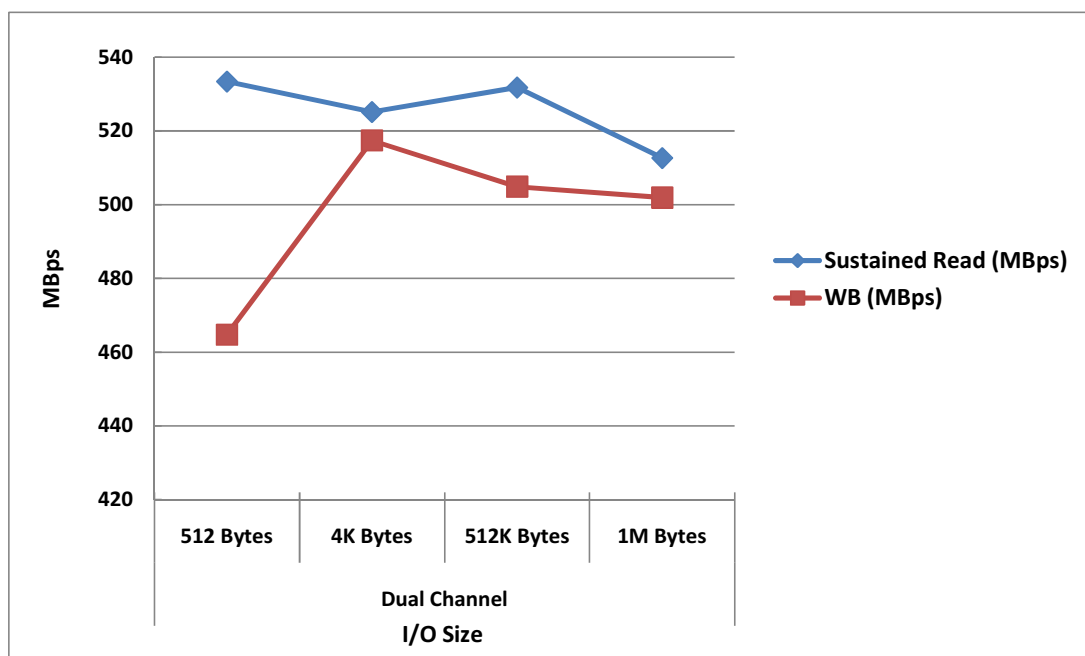


2.42 Sequential I/O – 2 Drives Failed

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		Read (MB/sec)	WB (MB/sec)
Host Channels	I/O Size		
Dual Channel	128K Bytes	533.41	464.75
	256K Bytes	525.16	517.42
	512K Bytes	531.78	504.89
	1M Bytes	512.66	501.94



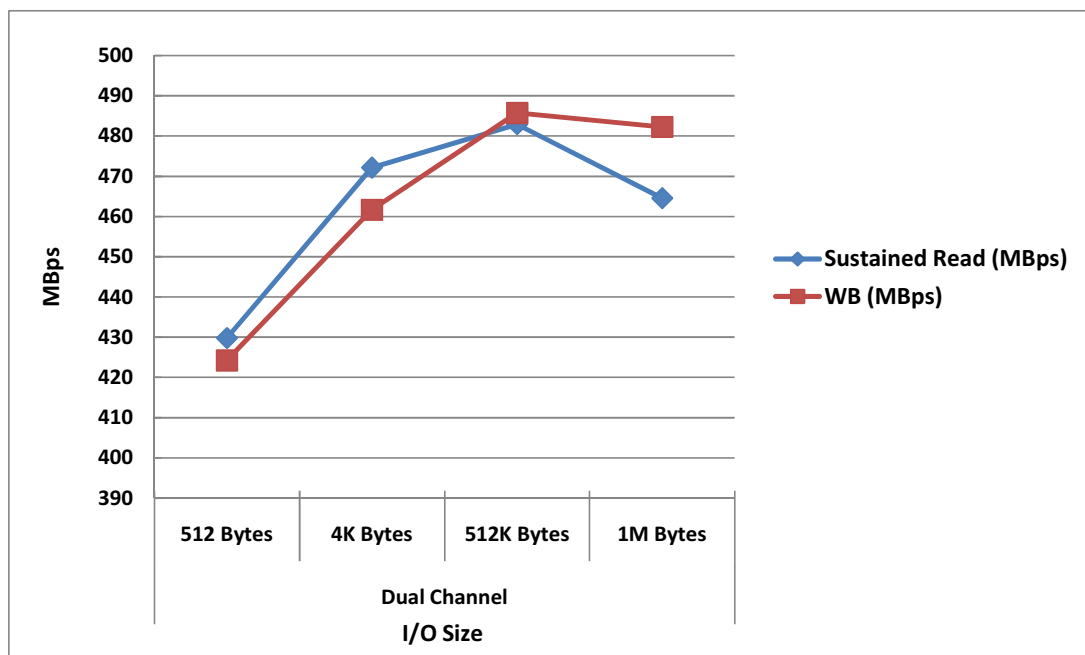
2.5 Rebuilding RAID 5 Performance

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	429.77	424.23
	256K Bytes	472.14	461.65
	512K Bytes	482.92	485.76
	1M Bytes	464.54	482.25



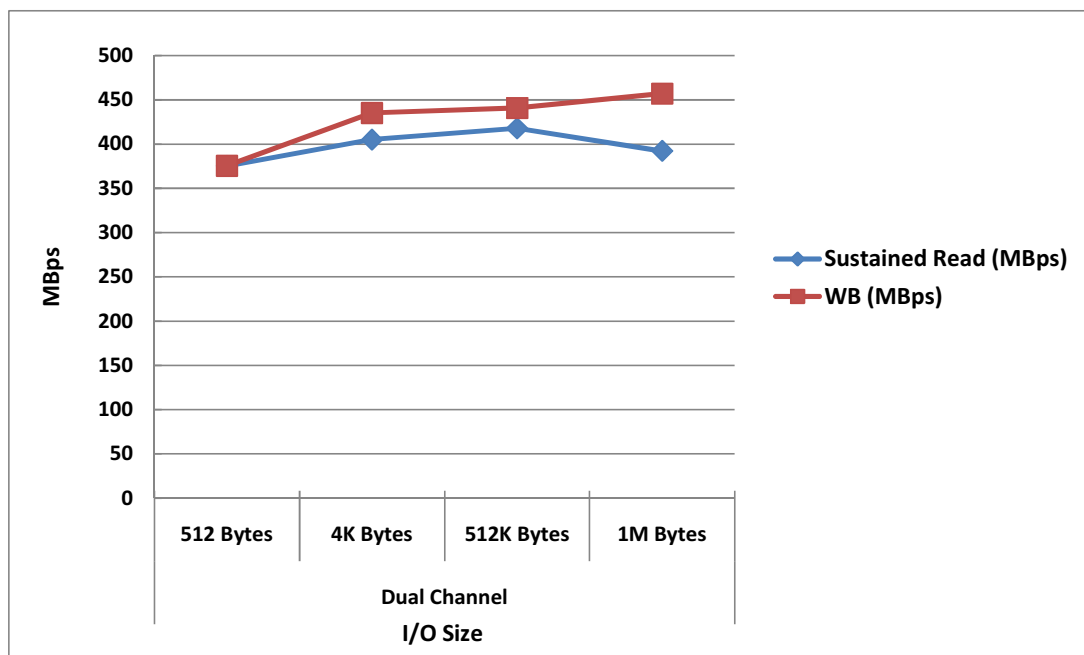
2.6 Rebuilding RAID 6 Performance

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	375.46	375.47
	256K Bytes	405.03	435.16
	512K Bytes	417.87	440.95
	1M Bytes	392.32	457.03



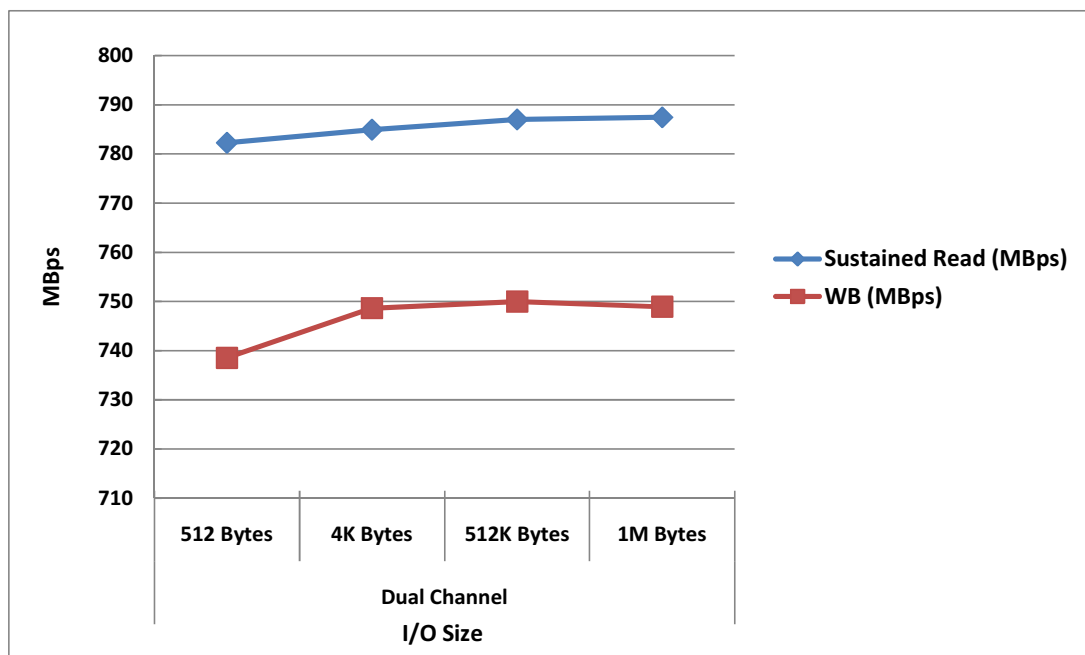
2.7 All Cache Hit RAID 5 Performance

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	782.27	738.51
	256K Bytes	784.95	748.60
	512K Bytes	787.00	749.96
	1M Bytes	787.45	748.89



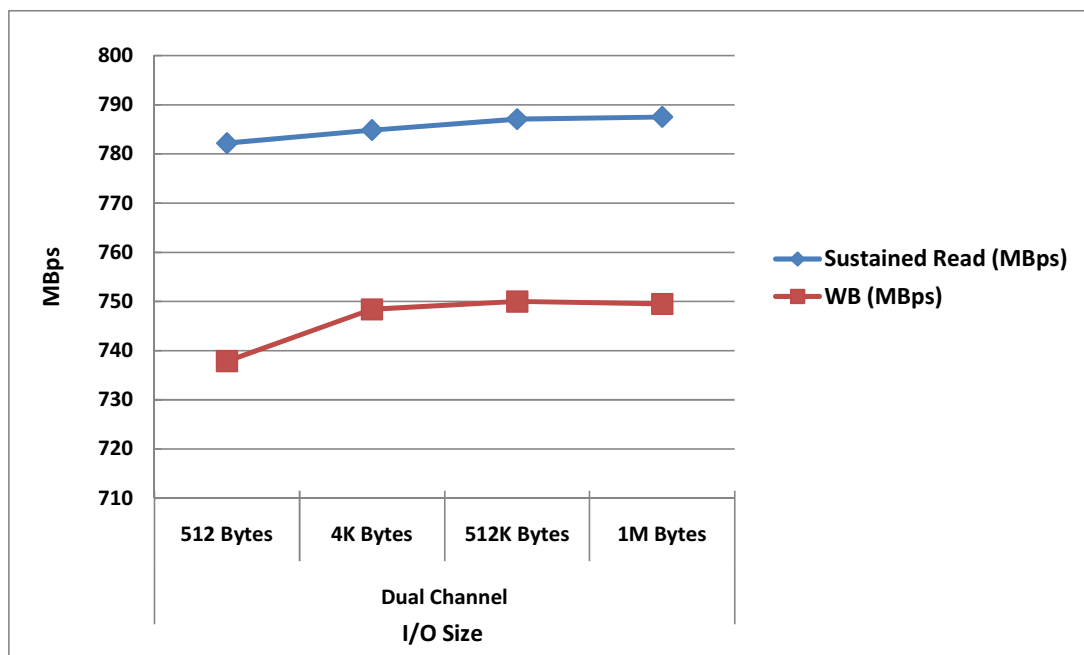
2.8 All Cache Hit RAID 6 Performance

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	782.18	737.81
	256K Bytes	784.85	748.36
	512K Bytes	787.10	749.98
	1M Bytes	787.55	749.49



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	693.30	693.30	99.49	99.49

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	2103.30	16.43	121.58	0.95

I/O Parameters		OLTP : 60 % Read / 40 % Write			
Host Channels	I/O Size	IOPS		MB/sec	
Dual Channel	8K Bytes	269.17		2.10	

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	681.44	681.44	222.88	222.88

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	4295.13	33.56	1050.17	8.20

I/O Parameters		OLTP : 60 % Read / 40 % Write			
Host Channels	I/O Size	IOPS		MB/sec	
One Channel	8K Bytes	2034.94		15.90	

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	676.48	676.48	139.41	139.41

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	4289.60	33.51	664.27	5.19

I/O Parameters		OLTP : 60 % Read / 40 % Write			
Host Channels	I/O Size	IOPS		MB/sec	
One Channel	8K Bytes	1402.89		10.96	

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	694.65	694.65	74.81	74.81

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	2117.49	16.54	99.30	0.78

I/O Parameters		OLTP : 60 % Read / 40 % Write			
Host Channels	I/O Size	IOPS		MB/sec	
Dual Channel	8K Bytes	225.57		1.76	

3.5 Local Sync Mirror End-to-End RAID 5 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	708.50	708.50	223.29	223.29

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	4276.21	33.41	913.10	7.13

I/O Parameters		OLTP : 60 % Read / 40 % Write			
Host Channels	I/O Size	IOPS		MB/sec	
One Channel	8K Bytes	1815.18		14.18	

3.6 Local Sync Mirror End-to-End RAID 5 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	706.87	706.87	136.09	136.09

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	4271.98	33.37	562.86	4.40

I/O Parameters		OLTP : 60 % Read / 40 % Write			
Host Channels	I/O Size	IOPS		MB/sec	
One Channel	8K Bytes	1203.40		9.40	

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

Subsystem	1 Raid
Parameters	1 Source to 1 Target
Finish Time	8 Min