



# Subsystem Performance Testing Report for

## EonStor® A16F-R2431

**CONFIDENTIAL**

This document is the property of Infotrend Technology, Inc. and contains information which is confidential and proprietary to Infotrend Technology, Inc. No part of this document may be copied, reproduced or disclosed to third parties without the prior written consent of Infotrend Technology, Inc.

## Table of Contents

<b>1. Performance Configuration .....</b>	<b>3</b>
A16F-R2431 Testing Configuration .....	3
<b>2. Performance Test Results .....</b>	<b>5</b>
End-to-End RAID 5 Performance .....	5
End-to-End RAID 6 Performance .....	8
Degraded RAID 5 Performance .....	10
Degraded RAID 6 Performance (1 Drive Failed) .....	12
Degraded RAID 6 Performance (2 Drive Failed) .....	14
Rebuilding RAID 5 Performance .....	16
Rebuilding RAID 6 Performance (2 Drives Rebuilding) .....	18
All Cache Hit RAID 5 Performance .....	20
All Cache Hit RAID 6 Performance .....	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.

### A16F-R2431 Testing Configuration

RAID	Controller	A16F-R2431
	FW	3.61F.05 (FA361F05_207_IFT_ESA16FR2431.BIN)
	RAM	512MB DDR SDRAM
	Drives	Seagate SATAII 750GB (Model: ST37500640NS; Capacity: 750GB; Speed: 3G; 7200 RPM)
	Channels	Host Channel - Channel 0, 1
		Drive Channel - Channel 2
		Redundant Commutation Channel: 5 ~ 10
	Logical Drives (RAID5/6) (Dual Hosts)	LD0 - Host channel 0; ID 0; LUN 0; 8 drives/channel; 1 partition
		LD1 - Host channel 1; ID 0. LUN 0; 8 drives/channel; 1 partition
	Logical Drives (RAID5/6) (Four Hosts)	LD0 - Host channel 0; ID 112; LUN 0; 4 drives/channel; 1 partition
		LD1 - Host channel 0; ID 113; LUN 0; 4 drives/channel; 1 partition
		LD2 - Host channel 1; ID 112; LUN 0; 4 drives/channel; 1 partition
		LD3 - Host channel 1; ID 113; LUN 0; 4 drives/channel; 1 partition

	Setting	Optimization for – Sequential, (Default strip size 128K)
		Auto Rebuild on Drive Swap – Disable
		Verification on Normal Drive Writes – Disable
		Verification on LD Rebuild Writes – Disable
		Drive Delayed Write – Disabled
		SDRAM ECC – Enable
		BBU – ON
Server*2 (Host)	M/B	SUPERMICRO X6DHE-XG2
	CPU	Intel Xeon 2.8GHz
	RAM	Kingston 512MB DDRII400 DIMM * 2
	PCI	PCI-X 64-bit/133MHz *3
	System Drive	IDE Seagate 120G (ST3120026A)
	OS.	Microsoft Windows Server 2003 Enterprise R2 (With Service Pack 2)
	HBA Card	QLogic QLA2462 (Driver VER: 9.1.4.15)
Benchmark	IOmeter	2004.07.30
	I/O Tool Setting	Outstanding I/O - 16 for MB/s; 64or IO/s
		Ramp Up Time: 40 sec.
		Run Time: 30 sec.
		One LD Corresponds to One Worker.

## 2. Performance Test Results

The Performance test results are listed below.



**NOTE:**

In the following sections, “write-back” is abbreviated as **WB** and “write-through” is abbreviated as **WT**.

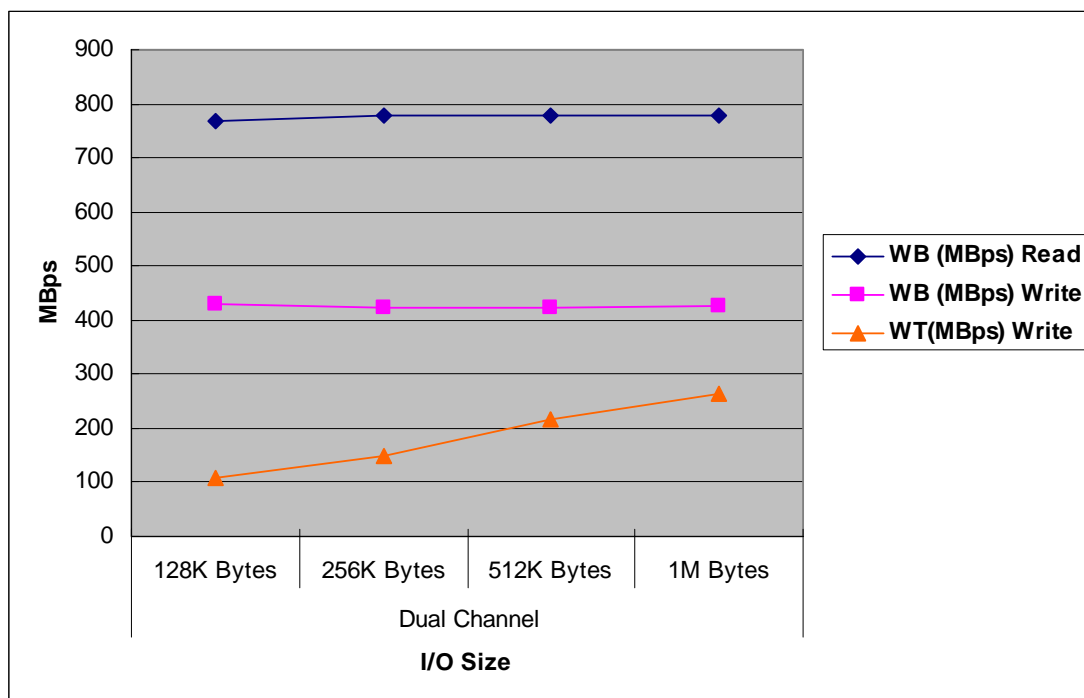
❖ **End-to-End RAID 5 Performance**

(Sequential I/O)

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		WB (MBPS)		WT (MBPS)
Host Channels	I/O Size	Read	Write	Write
Dual Channel	128K Bytes	768.30	429.11	107.73
	256K Bytes	776.84	422.55	148.87
	512K Bytes	777.45	424.55	217.46
	1M Bytes	779.23	426.81	264.71



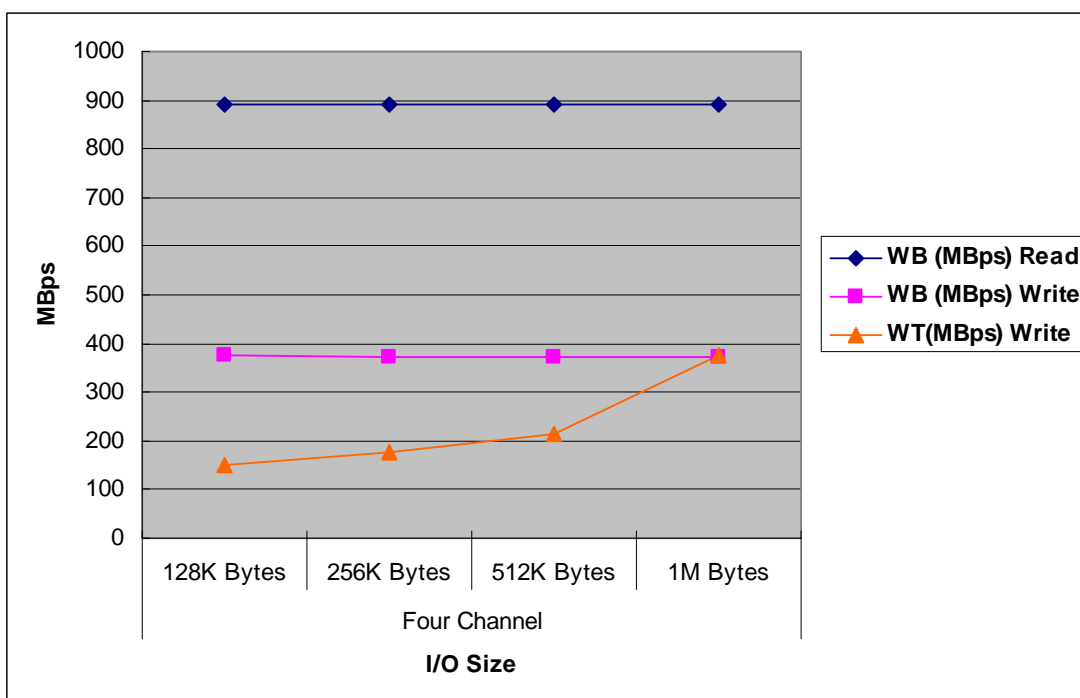
**Data Access Rate (IOPS)**

I/O Parameters		WB (IOPS)	
Host Channels	I/O Size	Read	Write
Dual Channel	512 Bytes	130763.83	46816.12
	4K Bytes	110519.15	34277.65

>> Four Channel

Data Transfer Rate (MBps)

I/O Parameters		WB (MBPS)		WT (MBPS)
Host Channels	I/O Size	Read	Write	Write
Four Channel	128K Bytes	889.66	375.71	150.60
	256K Bytes	889.52	373.96	178.45
	512K Bytes	890.30	372.33	214.31
	1M Bytes	890.99	373.53	374.77



Data Access Rate (IOPS)

I/O Parameters		WB (IOPS)	
Host Channels	I/O Size	Read	Write
Four Channel	512 Bytes	126984.05	51517.85
	4K Bytes	105802.85	34111.50

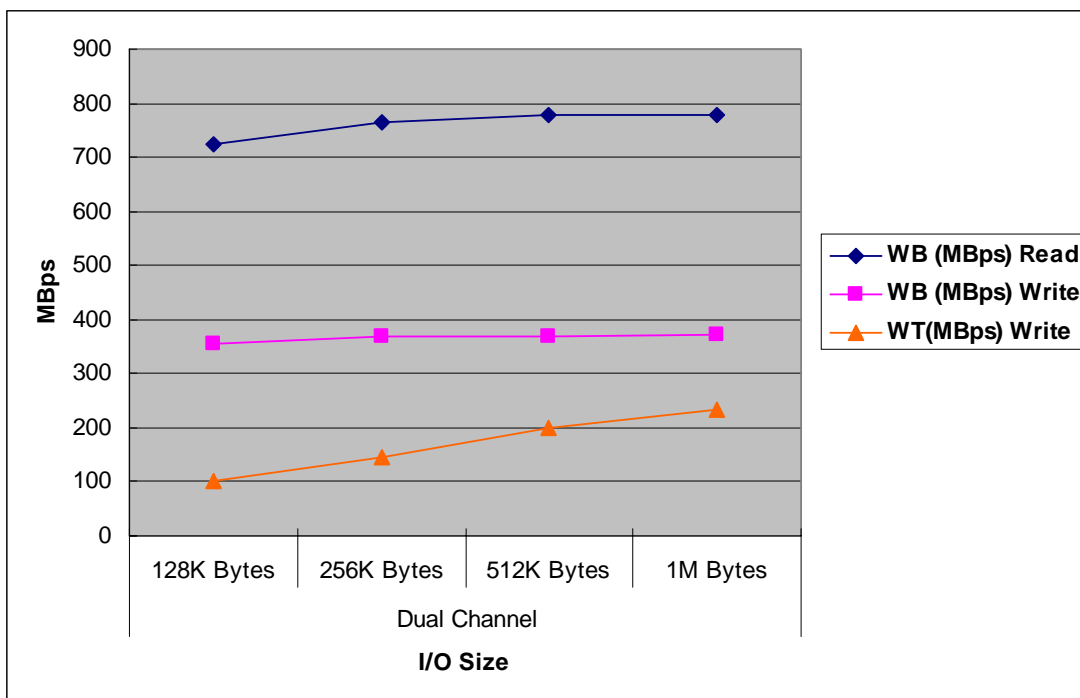
## ❖ End-to-End RAID 6 Performance

(Sequential I/O)

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		WB (MBPS)		WT (MBPS)
Host Channels	I/O Size	Read	Write	Write
Dual Channel	128K Bytes	723.00	356.42	102.05
	256K Bytes	765.93	367.66	144.93
	512K Bytes	778.54	369.77	198.86
	1M Bytes	779.20	372.05	234.48



Data Access Rate (IOPS)

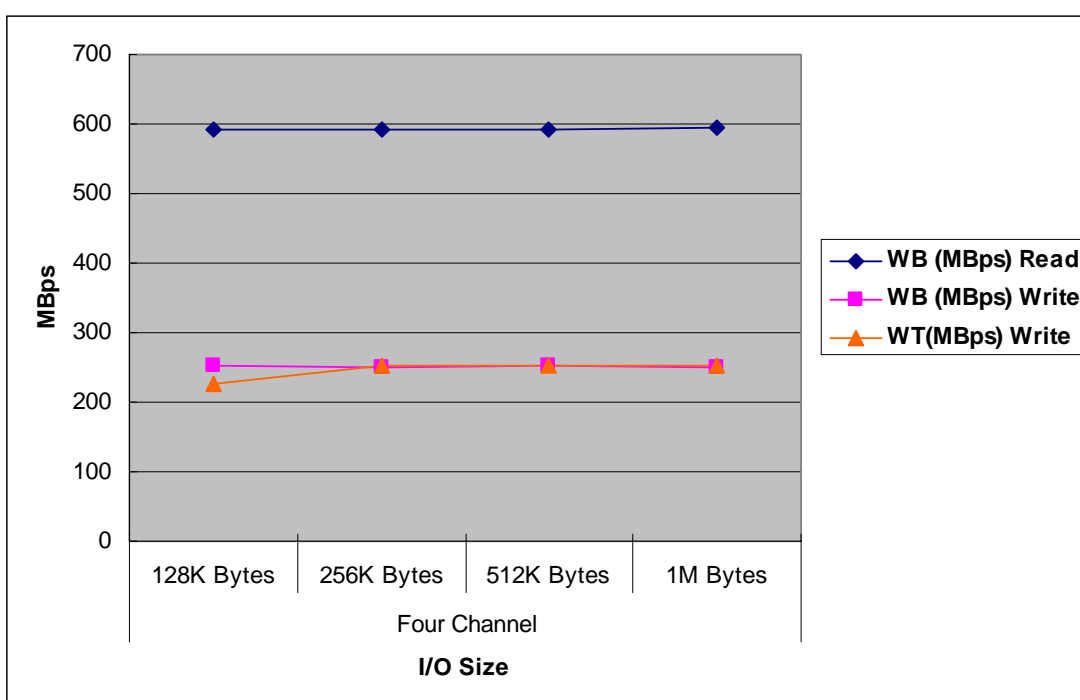
I/O Parameters		WB (IOPS)	
Host Channels	I/O Size	Read	Write
Dual Channel	512 Bytes	130922.24	46420.15
	4K Bytes	111995.61	33047.94



>> Four Channel

Data Transfer Rate (MBps)

I/O Parameters		WB (MBPS)		WT (MBPS)
Host Channels	I/O Size	Read	Write	Write
Four Channel	128K Bytes	592.43	252.45	226.98
	256K Bytes	591.80	251.19	253.02
	512K Bytes	592.97	251.65	252.65
	1M Bytes	594.32	249.95	251.84



Data Access Rate (IOPS)

I/O Parameters		WB (IOPS)	
Host Channels	I/O Size	Read	Write
Four Channel	512 Bytes	128290.69	50308.63
	4K Bytes	108310.50	29499.68

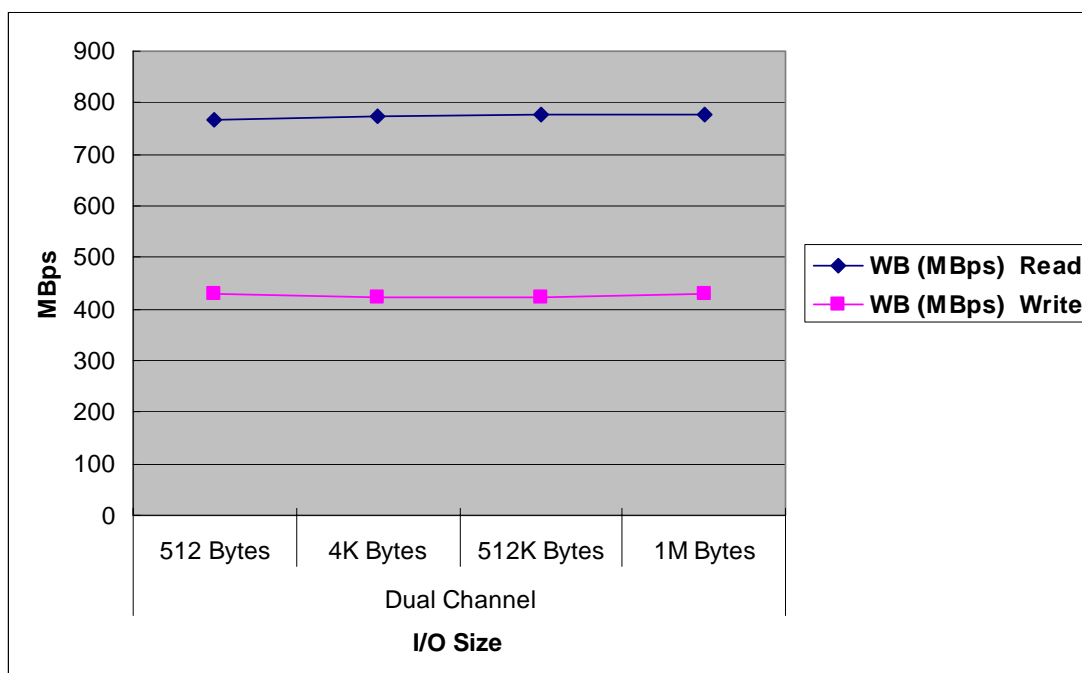
## ❖ Degraded RAID 5 Performance

(Sequential I/O)

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		WB (MBPS)	
Host Channels	I/O Size	Read	Write
Dual Channel	128K Bytes	765.93	429.06
	256K Bytes	772.89	422.40
	512K Bytes	776.14	423.37
	1M Bytes	777.98	430.44



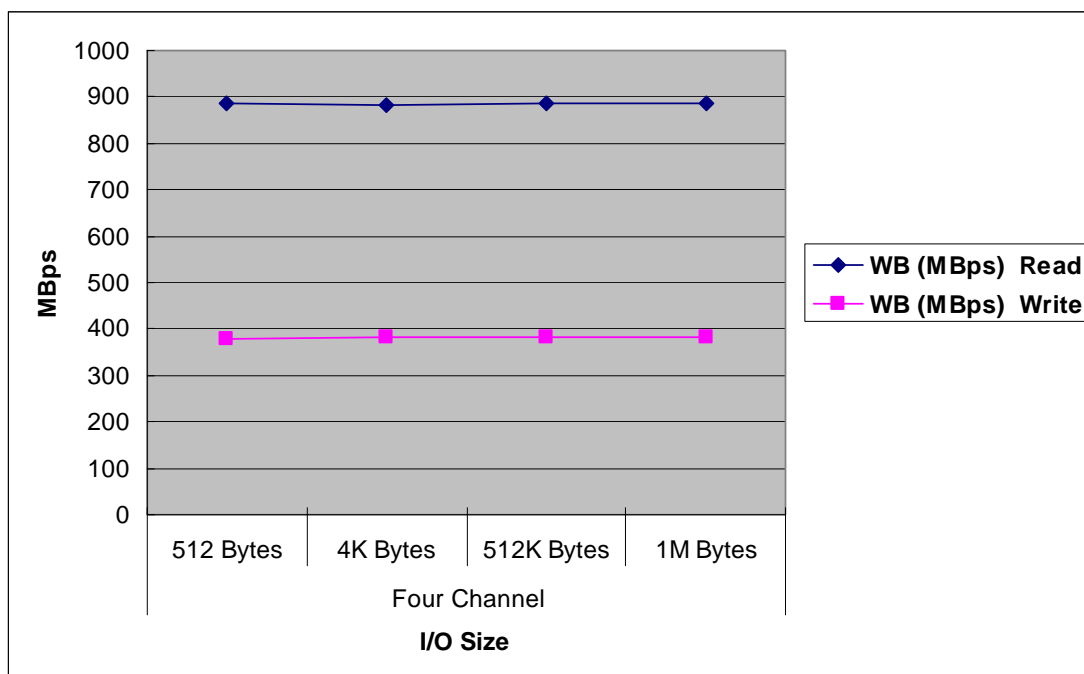
Data Access Rate (IOPS)

I/O Parameters		WB (IOPS)	
Host Channels	I/O Size	Read	Write
Dual Channel	512 Bytes	130174.19	46856.37
	4K Bytes	107288.62	34513.39

>> Four Channel

Data Transfer Rate (MBps)

I/O Parameters		WB (MBPS)	
Host Channels	I/O Size	Read	Write
Four Channel	128K Bytes	887.36	379.42
	256K Bytes	881.77	381.06
	512K Bytes	886.62	382.18
	1M Bytes	887.46	381.43



Data Access Rate (IOPS)

I/O Parameters		WB (IOPS)	
Host Channels	I/O Size	Read	Write
Four Channel	512 Bytes	126001.36	51834.48
	4K Bytes	98661.96	35177.14

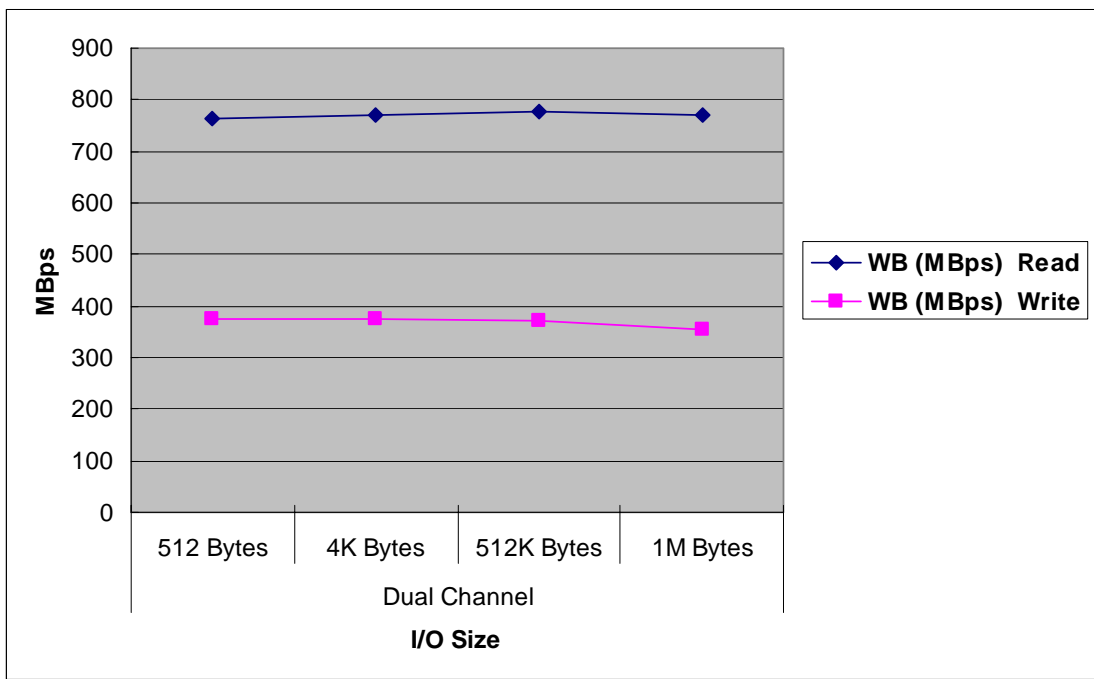
❖ **Degraded RAID 6 Performance (1 Drive Failed)**

(Sequential I/O)

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		WB (MBPS)	
Host Channels	I/O Size	Read	Write
Dual Channel	128K Bytes	762.38	374.74
	256K Bytes	772.04	374.75
	512K Bytes	776.76	371.60
	1M Bytes	771.97	355.45



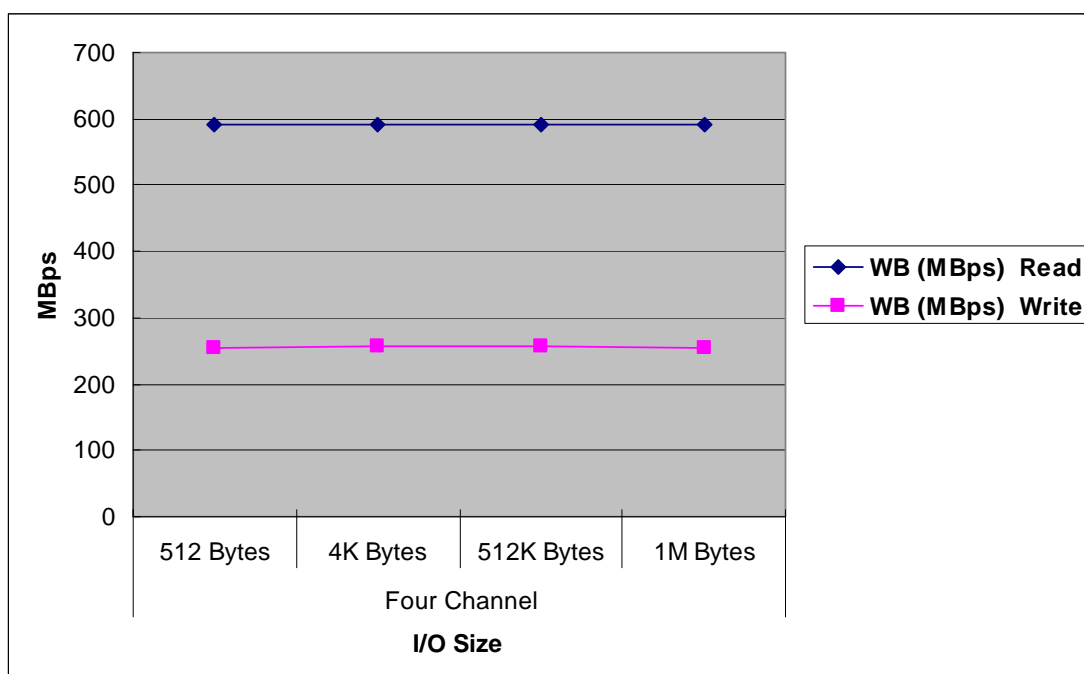
Data Access Rate (IOPS)

I/O Parameters		WB (IOPS)	
Host Channels	I/O Size	Read	Write
Dual Channel	512 Bytes	128203.20	46652.69
	4K Bytes	104965.54	33569.63

>> Four Channel

Data Transfer Rate (MBps)

I/O Parameters		WB (MBPS)	
Host Channels	I/O Size	Read	Write
Four Channel	128K Bytes	591.86	255.71
	256K Bytes	591.87	256.41
	512K Bytes	592.21	256.09
	1M Bytes	592.47	255.86



Data Access Rate (IOPS)

I/O Parameters		WB (IOPS)	
Host Channels	I/O Size	Read	Write
Four Channel	512 Bytes	126600.23	50695.62
	4K Bytes	97127.41	30867.73

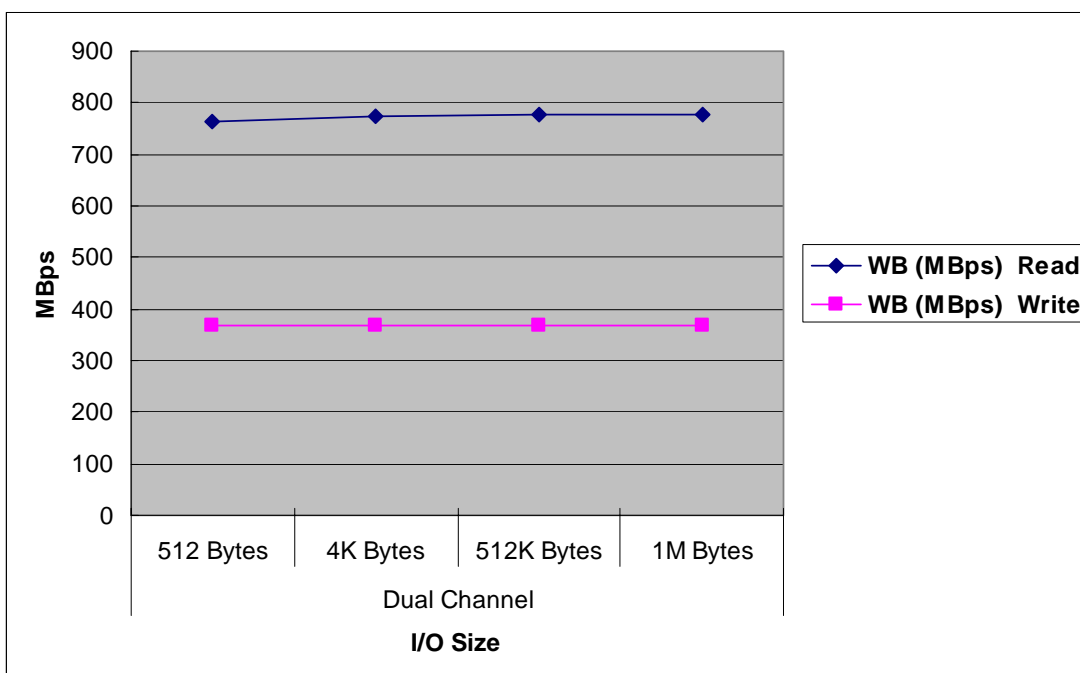
❖ **Degraded RAID 6 Performance (2 Drive Failed)**

(Sequential I/O)

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		WB (MBPS)	
Host Channels	I/O Size	Read	Write
Dual Channel	128K Bytes	764.98	368.54
	256K Bytes	773.13	367.98
	512K Bytes	776.29	368.85
	1M Bytes	777.03	367.45



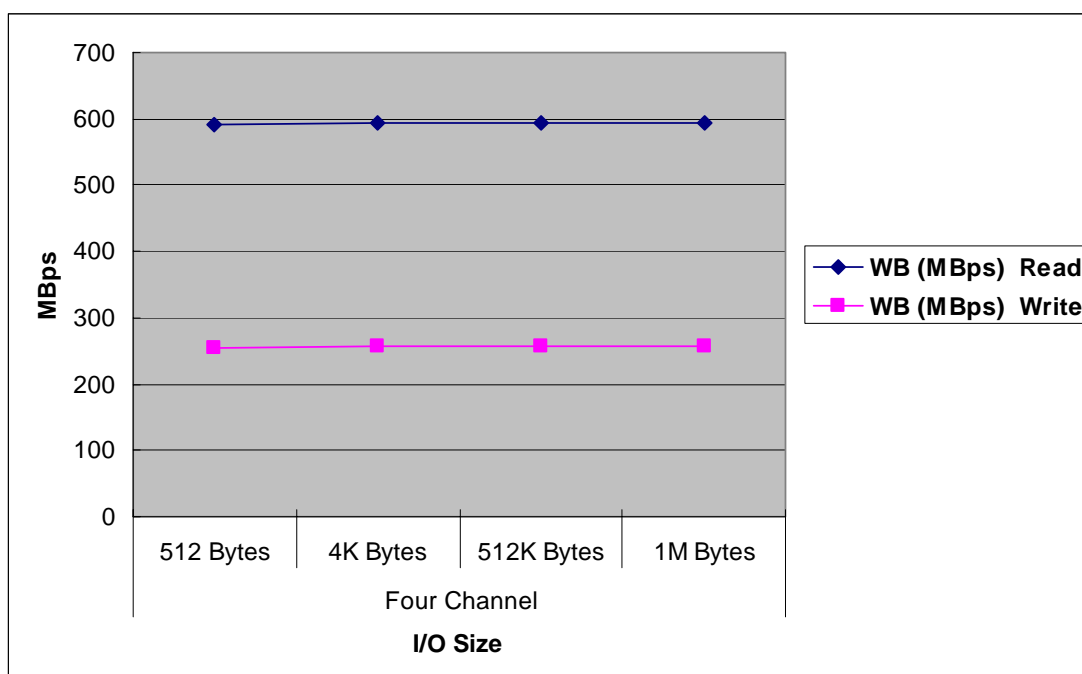
Data Access Rate (IOPS)

I/O Parameters		WB (IOPS)	
Host Channels	I/O Size	Read	Write
Dual Channel	512 Bytes	130228.02	46574.76
	4K Bytes	103082.08	33486.46

>> Four Channel

Data Transfer Rate (MBps)

I/O Parameters		WB (MBPS)	
Host Channels	I/O Size	Read	Write
Four Channel	128K Bytes	591.51	253.95
	256K Bytes	592.63	256.84
	512K Bytes	592.93	257.32
	1M Bytes	592.73	257.24



Data Access Rate (IOPS)

I/O Parameters		WB (IOPS)	
Host Channels	I/O Size	Read	Write
Four Channel	512 Bytes	126530.88	51554.33
	4K Bytes	97505.28	32566.59

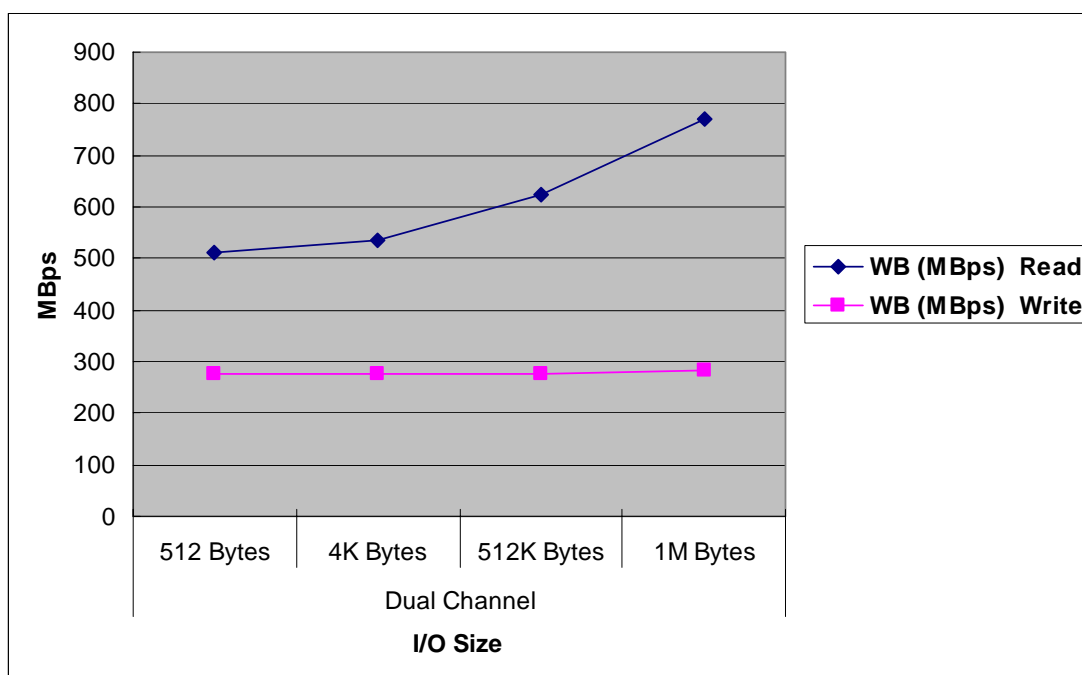
## ❖ Rebuilding RAID 5 Performance

(Sequential I/O)

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		WB (MBPS)	
Host Channels	I/O Size	Read	Write
Dual Channel	128K Bytes	510.00	277.59
	256K Bytes	534.82	274.67
	512K Bytes	624.02	276.25
	1M Bytes	772.05	282.01

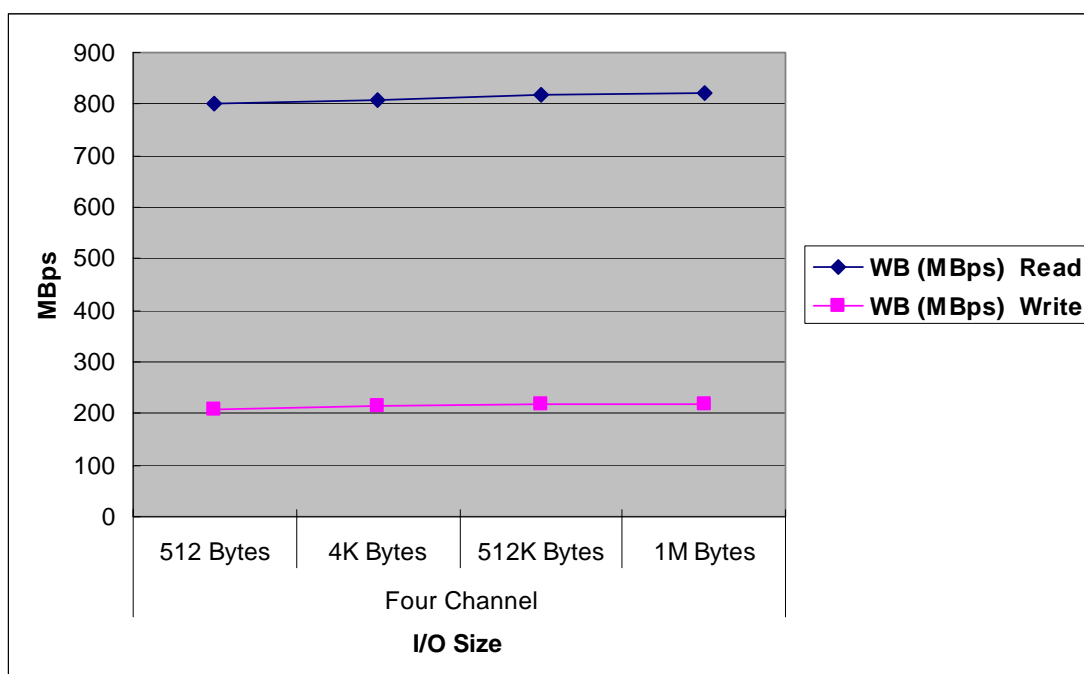




>> Four Channel

Data Transfer Rate (MBps)

I/O Parameters		WB (MBPS)	
Host Channels	I/O Size	Read	Write
Four Channel	128K Bytes	801.81	207.78
	256K Bytes	808.94	213.95
	512K Bytes	819.13	219.26
	1M Bytes	823.05	219.31



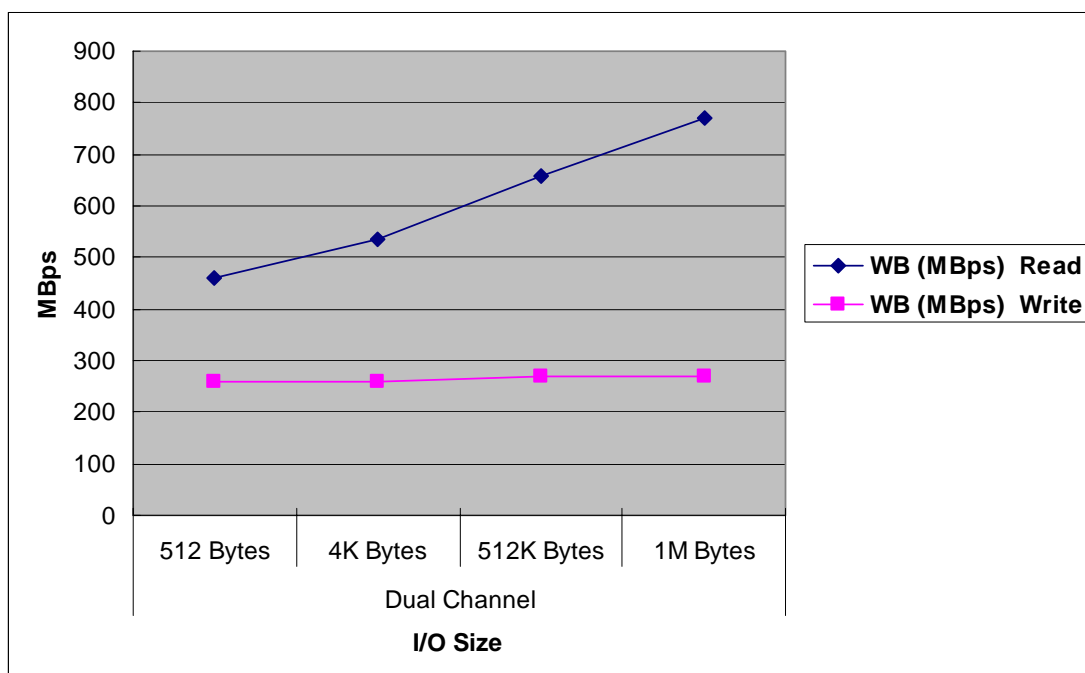
❖ **Rebuilding RAID 6 Performance (2 Drives Rebuilding)**

(Sequential I/O)

>> Dual Channel

Data Transfer Rate (MBps)

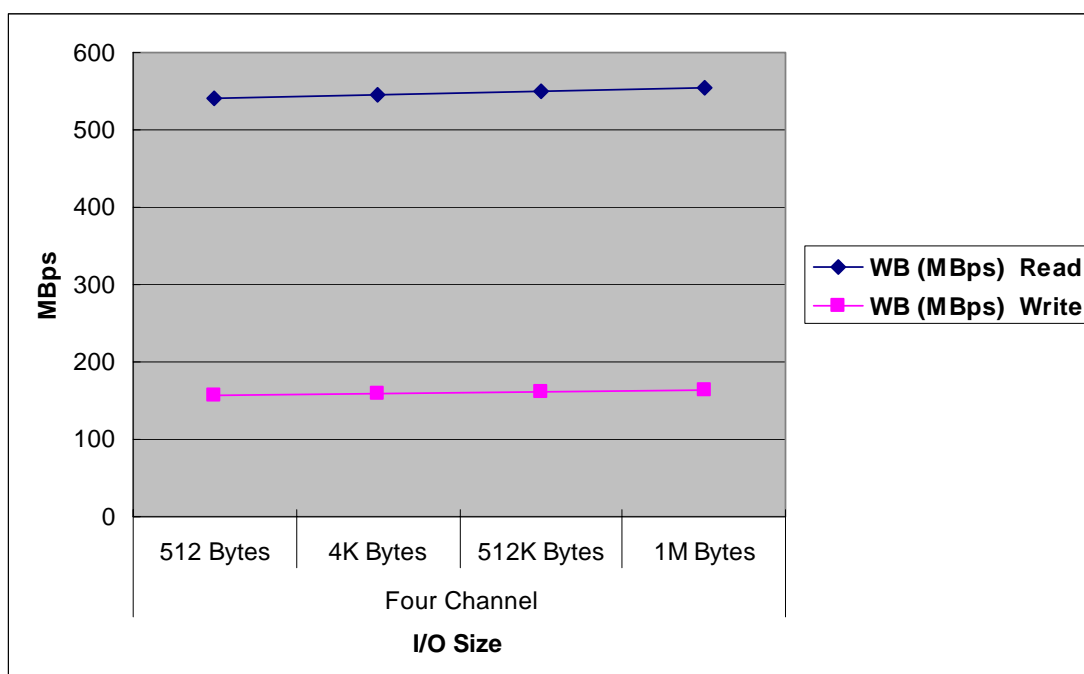
I/O Parameters		WB (MBPS)	
Host Channels	I/O Size	Read	Write
Dual Channel	128K Bytes	458.67	259.47
	256K Bytes	536.51	257.87
	512K Bytes	658.69	270.25
	1M Bytes	771.84	270.43



>> Four Channel

Data Transfer Rate (MBps)

I/O Parameters		WB (MBPS)	
Host Channels	I/O Size	Read	Write
Four Channel	128K Bytes	541.74	157.41
	256K Bytes	545.24	159.85
	512K Bytes	550.78	160.79
	1M Bytes	554.50	164.76



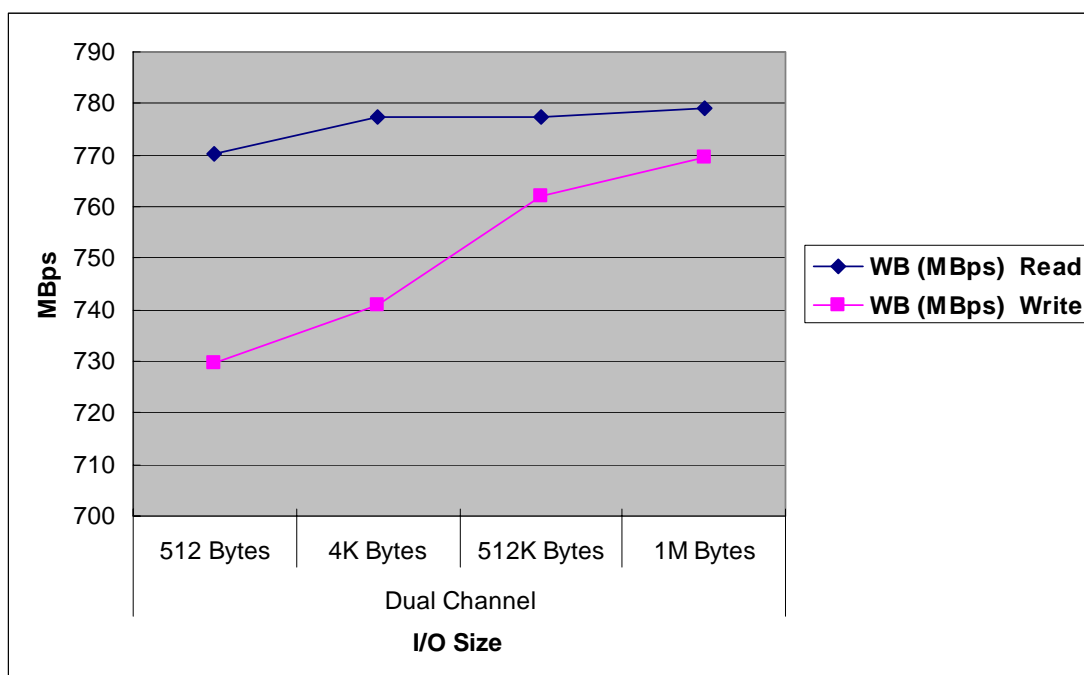
❖ **All Cache Hit RAID 5 Performance**

(Sequential I/O)

>> Dual Channel

Data Transfer Rate (MBps)

I/O Parameters		WB (MBPS)	
Host Channels	I/O Size	Read	Write
Dual Channel	128K Bytes	770.36	729.80
	256K Bytes	777.41	740.87
	512K Bytes	777.47	762.10
	1M Bytes	779.00	769.45



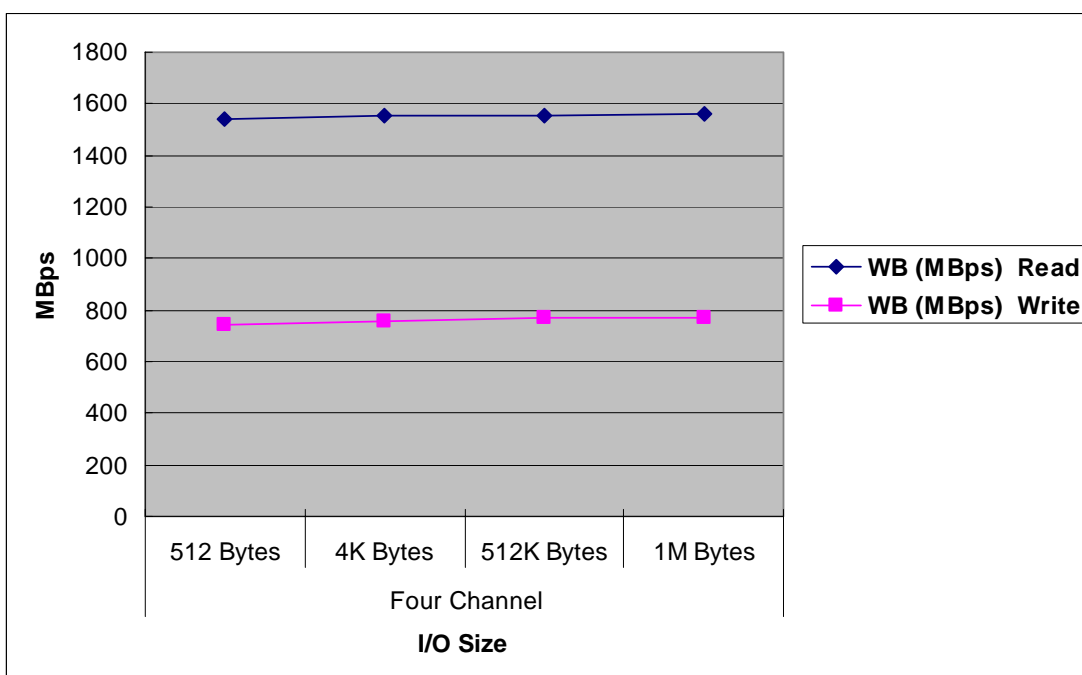
Data Access Rate (IOPS)

I/O Parameters		WB (IOPS)	
Host Channels	I/O Size	Read	Write
Dual Channel	512 Bytes	137592.01	48695.94
	4K Bytes	118689.98	41893.21

>> Four Channel

Data Transfer Rate (MBps)

I/O Parameters		WB (MBPS)	
Host Channels	I/O Size	Read	Write
Four Channel	128K Bytes	1539.89	745.26
	256K Bytes	1554.63	755.36
	512K Bytes	1554.79	770.85
	1M Bytes	1558.14	770.39



Data Access Rate (IOPS)

I/O Parameters		WB (IOPS)	
Host Channels	I/O Size	Read	Write
Four Channel	512 Bytes	137592.01	48695.94
	4K Bytes	118689.98	41893.21

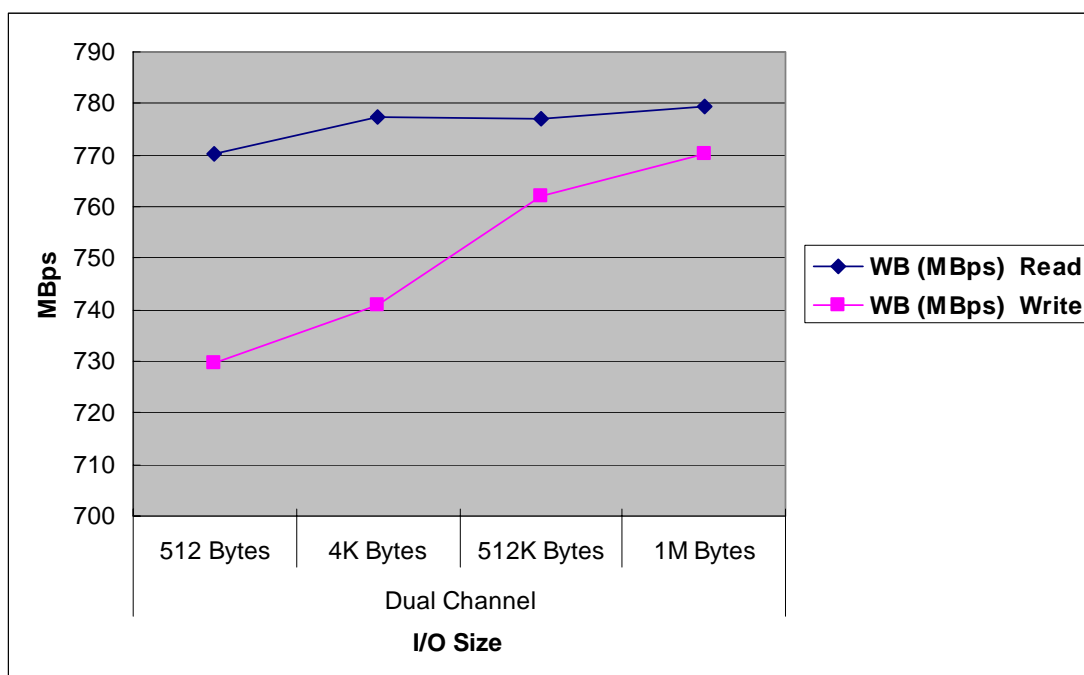
❖ **All Cache Hit RAID 6 Performance**

(Sequential I/O)

>> Dual Channel

**Data Transfer Rate (MBps)**

I/O Parameters		WB (MBPS)	
Host Channels	I/O Size	Read	Write
Dual Channel	128K Bytes	770.37	729.69
	256K Bytes	777.34	740.74
	512K Bytes	777.05	761.91
	1M Bytes	779.51	770.34



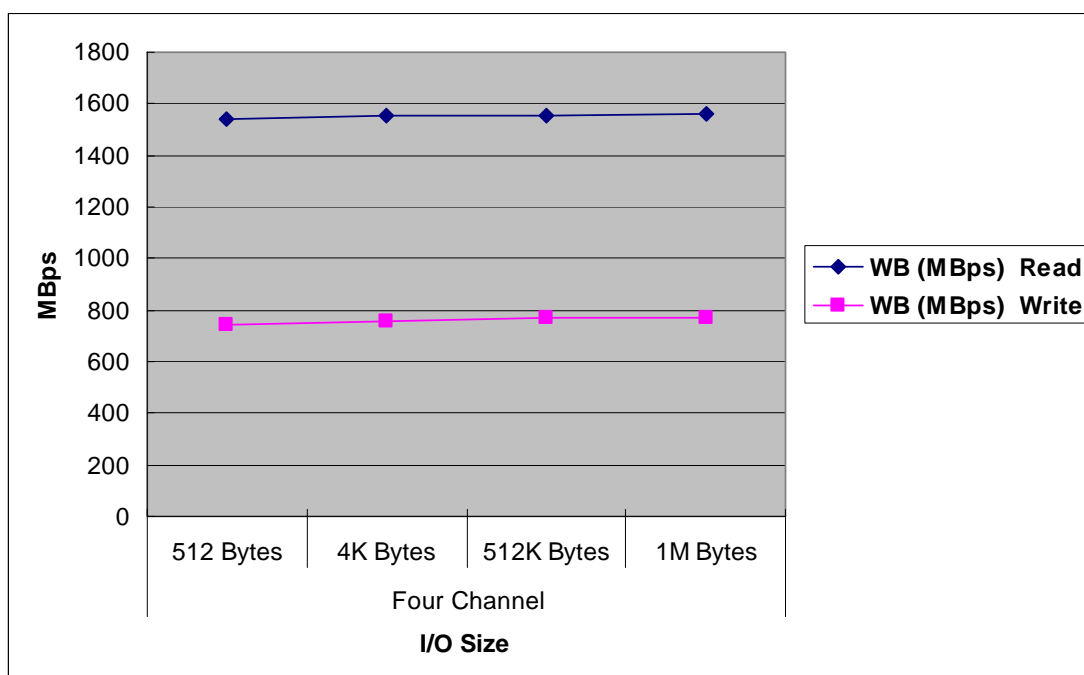
**Data Access Rate (IOPS)**

I/O Parameters		WB (IOPS)	
Host Channels	I/O Size	Read	Write
Dual Channel	512 Bytes	137407.81	48653.69
	4K Bytes	118824.98	41935.15

>> Four Channel

Data Transfer Rate (MBps)

I/O Parameters		WB (MBPS)	
Host Channels	I/O Size	Read	Write
Four Channel	128K Bytes	1537.90	745.32
	256K Bytes	1554.73	754.95
	512K Bytes	1554.58	770.14
	1M Bytes	1558.38	769.99



Data Access Rate (IOPS)

I/O Parameters		WB (IOPS)	
Host Channels	I/O Size	Read	Write
Four Channel	512 Bytes	135137.07	55071.91
	4K Bytes	120366.21	47882.33