Fusion-io: Supercharging
MS SQL Server 2005/2008 Performance

THE CHALLENGE

Database Administrators are faced with ever-growing data and ever-increasing demand for better performance. Even when they are able to meet the desired performance profile, success is fleeting. Poorly performing databases cause:

- Slow applications, resulting in customer and staff complaints or even lost sales
- Slow reporting and business intelligence queries, resulting in lost productivity, poor market awareness, or slow time-to-market
- Hours of DBA frustration rerunning overnight maintenance tasks that didn't complete on time or that stopped during the night.

Until now, the only solution has been constant outlays on performance disks which buy just a few months of breathing room, or on-going pleas to IT staff to purchase or provide access to shared resources with the right performance profiles. These disk-based solutions add racks of servers, increase system complexity and administration overhead, consume valuable real estate, and result in escalating power and cooling costs.

THE FUSION-IO SOLUTION

Fusion-io enables Database Administrators to create architectures that deliver the high I/O performance necessary to handle performance and transaction growth well into the future.

The many benefits Fusion-io offers Database Administrators include:

- The highest IOPS and bandwidth with the lowest latency available from a single device
- Performance that scales linearly as devices are added
- Enabling a simple and elegant architecture that eliminates network latency with a single device that provides the performance of racks of disk arrays
- Reduced time of maintenance tasks such as backups, recoveries, and batch jobs from hours to minutes and run them during business hours
- Database integrity checks that run in a fraction of the time

WHAT MAKES FUSION-IO DIFFERENT?

Fusion-io is a new server-side memory tier (we call Sub-Zero) that runs on the same server as the database. It provides near RAM speeds for active data at a much lower price, and reserves traditional disk for larger files and archives.

It is much faster than both traditional spinning and solid state disk solutions for two primary reasons.

1) It integrates with the host server at the system and the kernel level avoiding unnecessary hand-offs between the host and device processor and SAS and SATA interface translation.

2) It provides a massively parallel architecture and write-management technology that delivers unmatched read and write throughput.
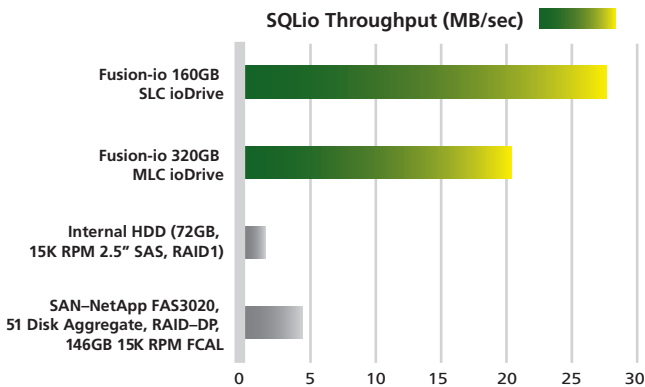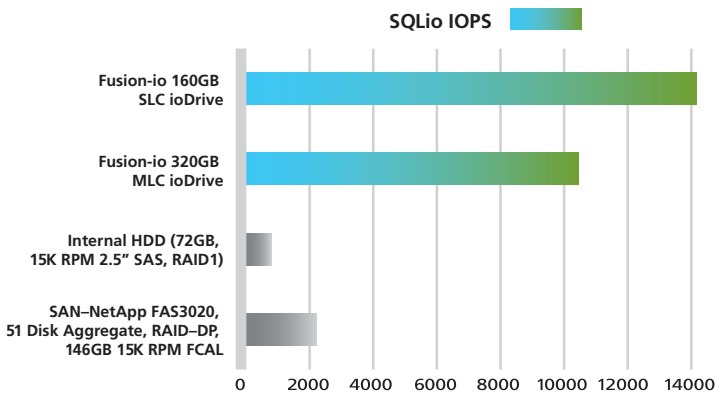
FUSION-IO

- Strong data protection, with advanced error correction, non-volatile memory, onboard chip-level parity, and power-cut

- Eliminating waste on excess capacity purchased for performance striped arrays

- Ability to enable unused features with high I/O impact like SQL mirroring to improve availability

- Eliminating mechanical failures and disk maintenance tasks by replacing disks with memory that will last longer than its host server

- Freeing up valuable server real estate

- Slashing power and cooling costs

- The best price/performance value on the market[1]

A LOOK AT THE NUMBERS

As the table and the graphs show, ioDrives offer significantly more performance at a much lower cost than even the most cost effective hard disk array.[2]

SQLio IOPS

	IOPS
Fusion-io 160GB SLC ioDrive	~14000
Fusion-io 320GB MLC ioDrive	~10500
Internal HDD (72GB, 15K RPM 2.5" SAS, RAID1)	~800
SAN–NetApp FAS3020, 51 Disk Aggregate, RAID–DP, 146GB 15K RPM FCAL	~2200

(0, 2000, 4000, 6000, 8000, 10000, 12000, 14000)

SQLio Throughput (MB/sec)

	MB/sec
Fusion-io 160GB SLC ioDrive	~28
Fusion-io 320GB MLC ioDrive	~21
Internal HDD (72GB, 15K RPM 2.5" SAS, RAID1)	~2
SAN–NetApp FAS3020, 51 Disk Aggregate, RAID–DP, 146GB 15K RPM FCAL	~4

(0, 5, 10, 15, 20, 25, 30)

FUSION-IO BEST PRACTICES

Moving the entire database to an ioDrive can deliver at least 4x improvement for databases with the following characteristics:

- Heavy simultaneous transactions

- Heavy read activity

- Large data-set movement

- Heavy write activity

The following components are good candidates to move to an ioDrive for an easy performance upgrade:

- Tempdb database

- Indexes

- Frequently accessed tables

- Transaction/Redo logs

- Very large tables

1. Fusion-io systems consistently rank at the top of the TPC-H'S best price/performance value.

Go to http://www.tpc.org/tpch/results/tpch_price_perf_results.asp to view these systems.

2. Testing performed for Fusion-io by Veritest.

www.fusionio.com

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