

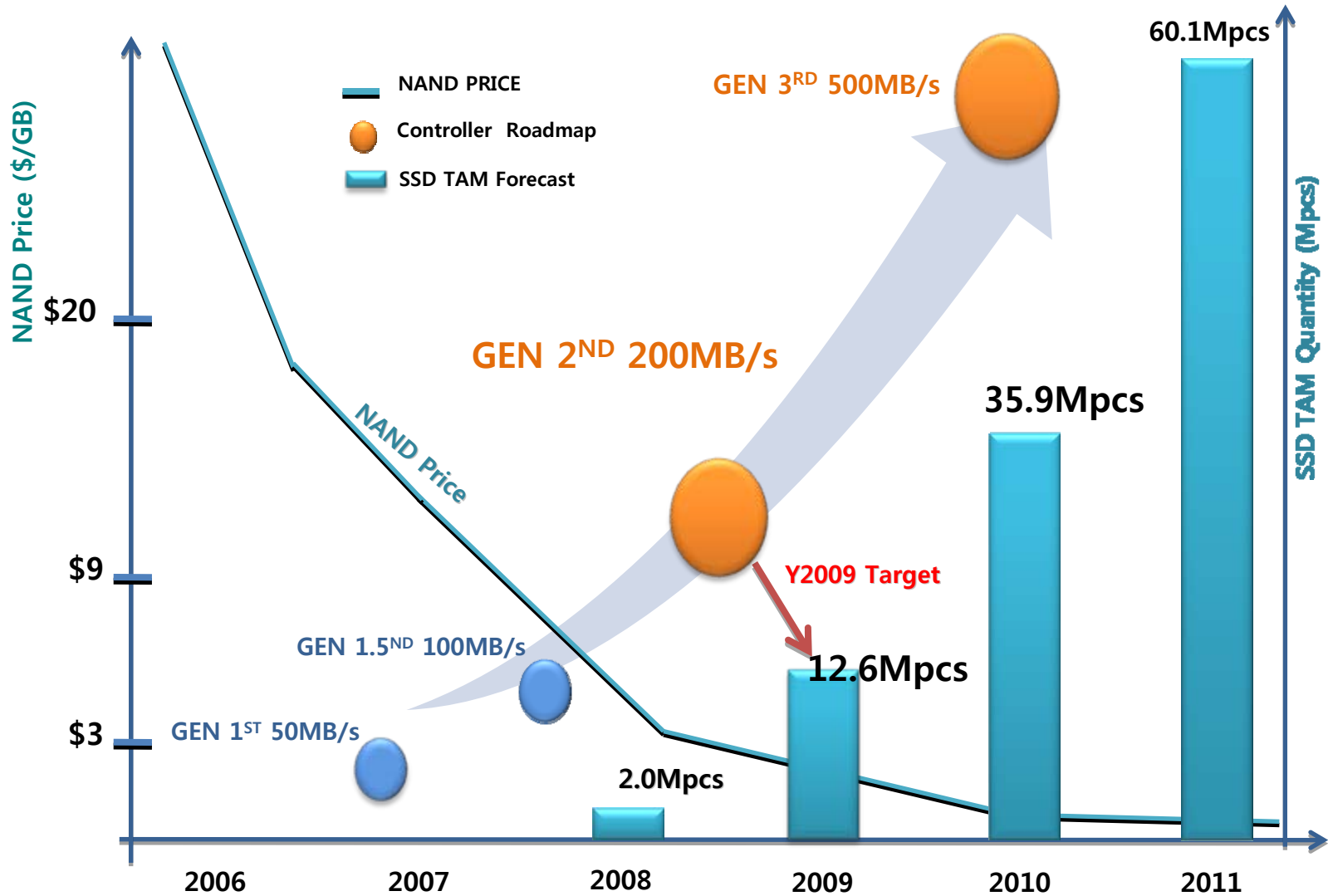
NVRAMOS 2009 Spring

Flash SSDs : Industry Trends and Future Perspectives

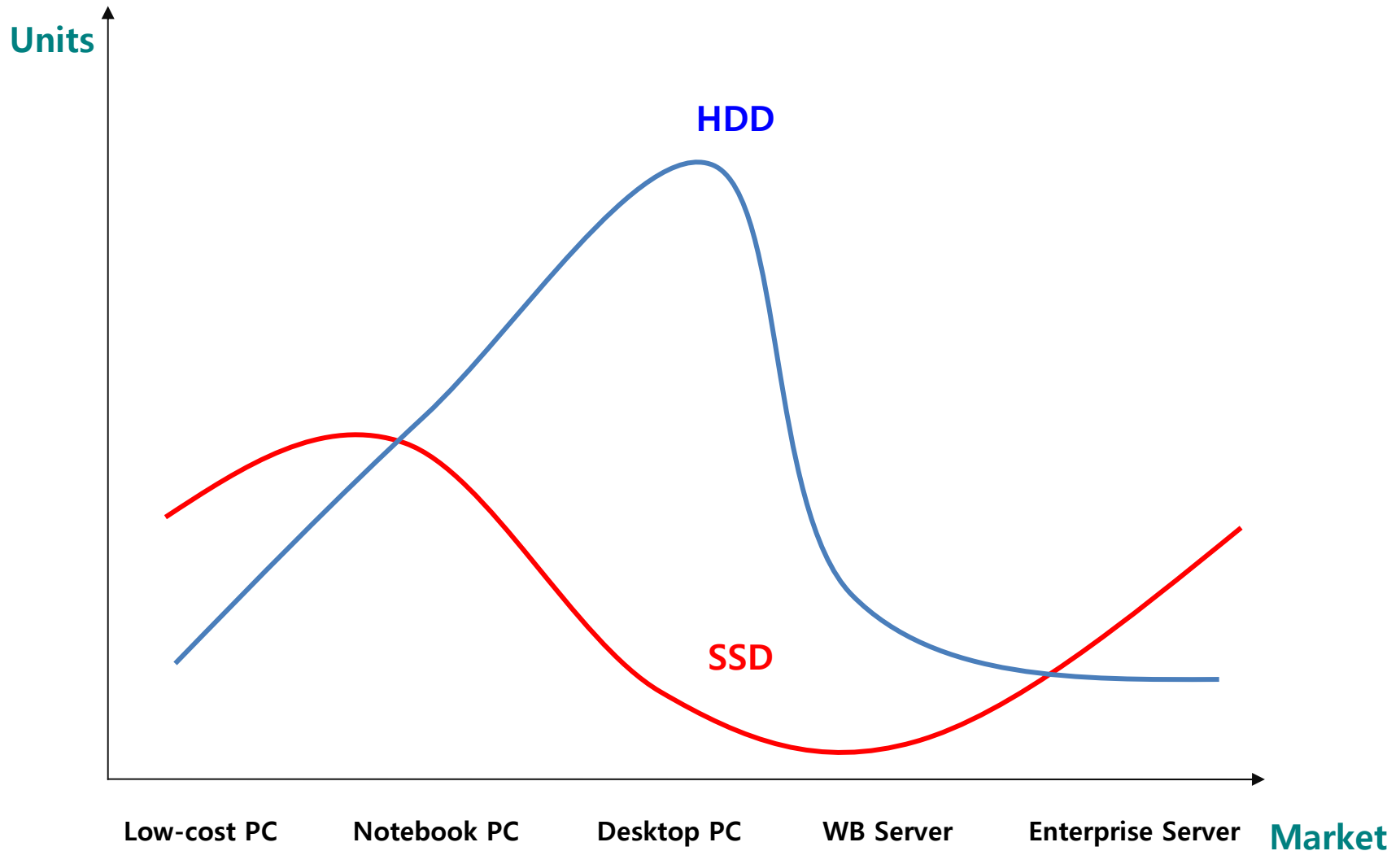
Apr 23, 2009

Bumsoo Kim
INDILINX Co., Ltd.

SSD Market and Performance Generations

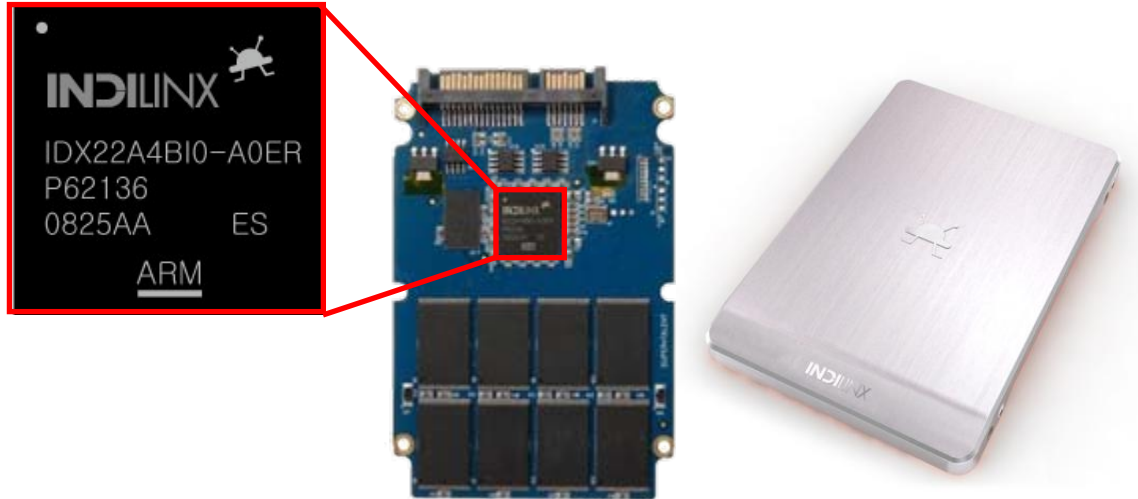


Expected SSD Adoption Rates

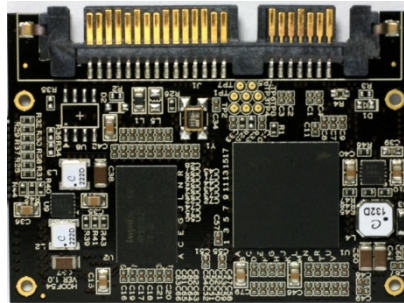


INDILINX SSD Solutions

2.5inch Form Factor



Module Type for Netbooks



Design-Win Case : OCZ Vertex

Avoid SSDs with Jmicron's JMF602 Controller

3:40 PM - February 19, 2009 by Tuan Nguyen
Source: Tom's Hardware US - Category : Buyers Guides

Solid state drives (SSDs) are the latest in hot tech upgrades these days, and rightly so. SSDs add huge boosts in performance to a system that is HDD based, but a computer is the weakest link in its performance.

As you will witness a steep degradation in performance over time. The performance occurs from a combination of things, but not because of file defragmentation like on a regular disc-based drive. With a regular HDD, you can simply run a good defragmentation utility to optimize the drive back to optimized conditions, and immediately experience the performance gains. On an SSD, due to wear and tear of the flash memory cells, but this is only part of the problem. Another big problem with many SSD drives on the market is their use of the Jmicron JMF602 controller. We'll just go ahead and say it right here: the controller is terrible.

First, the Jmicron JMF602 controller only has a 16 KB of onboard cache. That's barely enough to do anything. Contrary to this, the controller that Intel uses, the PC29AS21A blows it with 256 KB of cache. The Intel controller also has significantly better wear leveling and write combining algorithms.

During heavy use, the Jmicron controller will literally choke on incoming data, and consequently report back to the operating system that its buffers are filled and writes and reads of incoming and outgoing disk I/O, causing applications to hiccup and hang while the controller chugs along. Worst, the performance degrades significantly over time as the drive is used. Recently, OCZ swapped out the Jmicron controllers in its drives in favor of Indilinx's Barefoot controller, offering significantly better performance and cell management algorithms. Overall, well.

If you're in the market for an SSD, do a bit of research to find out if the drive uses a Jmicron controller. News from Jmicron is that its updated to a new revision of its SSD controller. Save yourself the problem of testing out these claims and just avoid Jmicron-based drives altogether.

OCZ Says Its New Vertex SSD Beats Intel's X25-E

7:20 PM - March 2, 2009 by David Murphy
Source: Tom's Hardware US - Category : Internal Storage

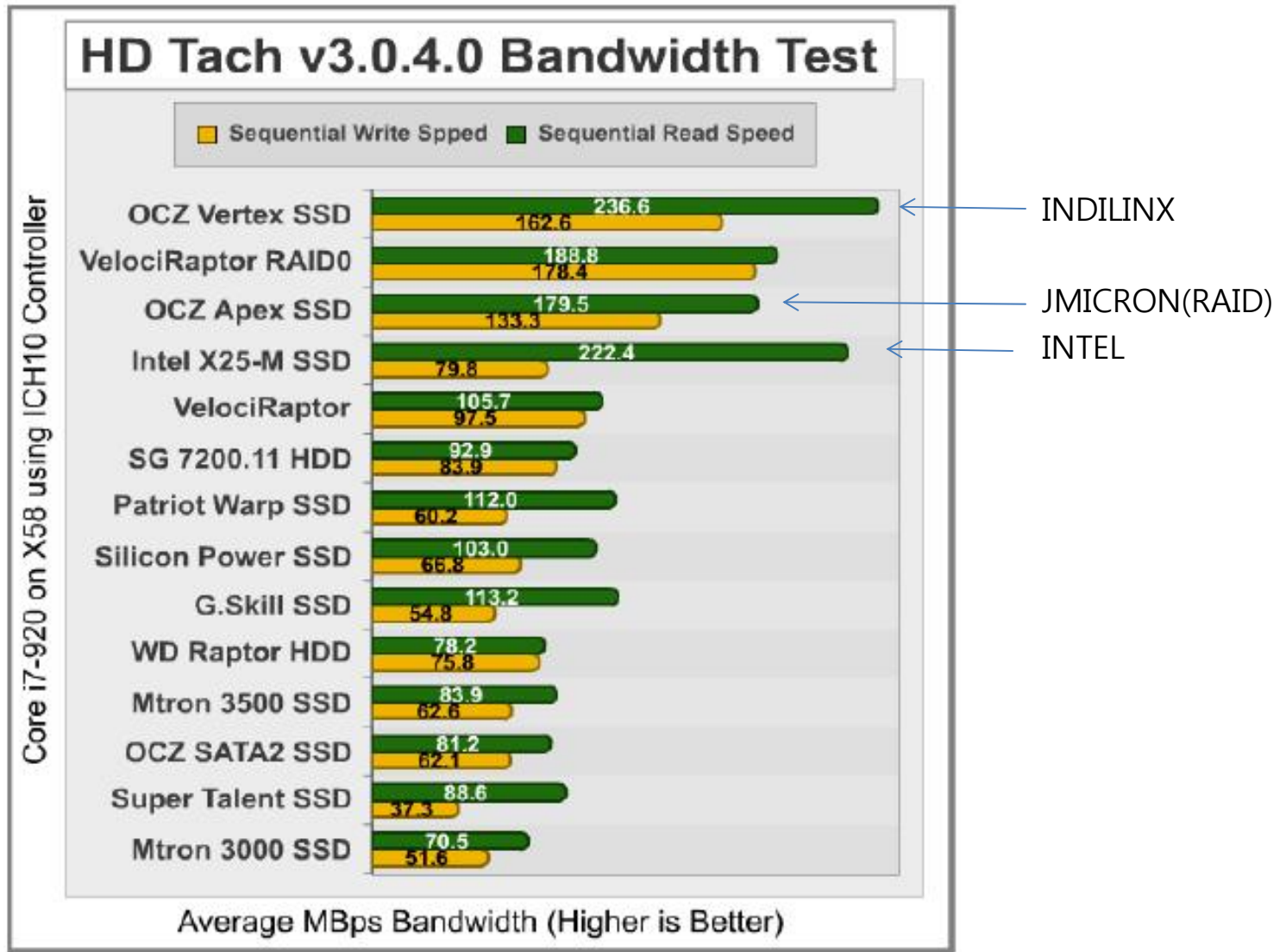


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OCZ's Vertex series of solid-state drives has started shipping. That doesn't sound like big news at first, since the company previously announced the birth of the drives at the end of last year. However, if OCZ's claims hold up to spec, their Vertex drives will rival the very best of the consumer SSDs, Intel's X25-M and X25-E drives.

The delay on shipping the SSDs came as a result of firmware updates, and OCZ now boasts sequential read and write speeds of 250 MB/s and 240 MB/s respectively.

Bandwidth Test by 3rd Party

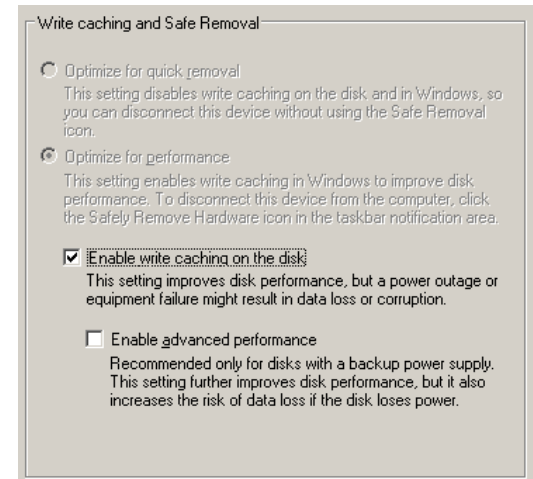


Performance Test Results

(1) PC

Test Configurations

Part	Description
Mainboard	MSI P35 Neo2-FR
CPU	Intel Core2 Duo E6750
RAM	2GB
O/S	Microsoft Windows XP SP2
Write Cache	Enable (see figure)
Host controller	Intel ICH9R, AHCI enable
Drives	INDILINX 2.5" 64, 128, 256GB SSD(MLC) INDILINX 2.5" 32, 64, 128GB SSD(SLC) INDILINX Slim-light 16, 32, 64GB(MLC) Seagate Barracuda 7200.10 SATA 320GB HDD Seagate Momentum 5400.3 80G SATA HDD
Test S/W	PCMark 05

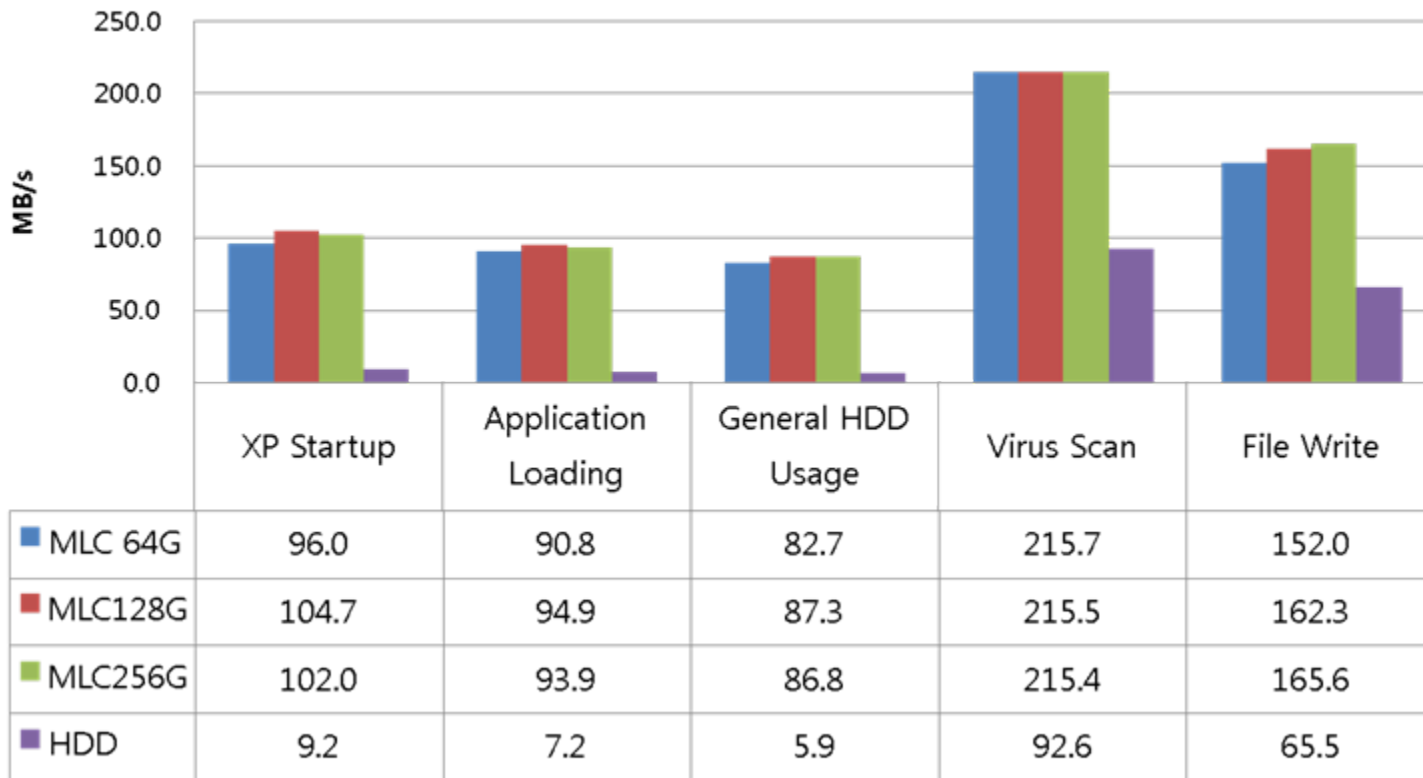


PCMark Test : Barefoot/MLC

Description : PCMark05 supports both system level and component level benchmarking. It is comprised of different test suites including HDD test suite and the user also has the ability to design custom test suites.



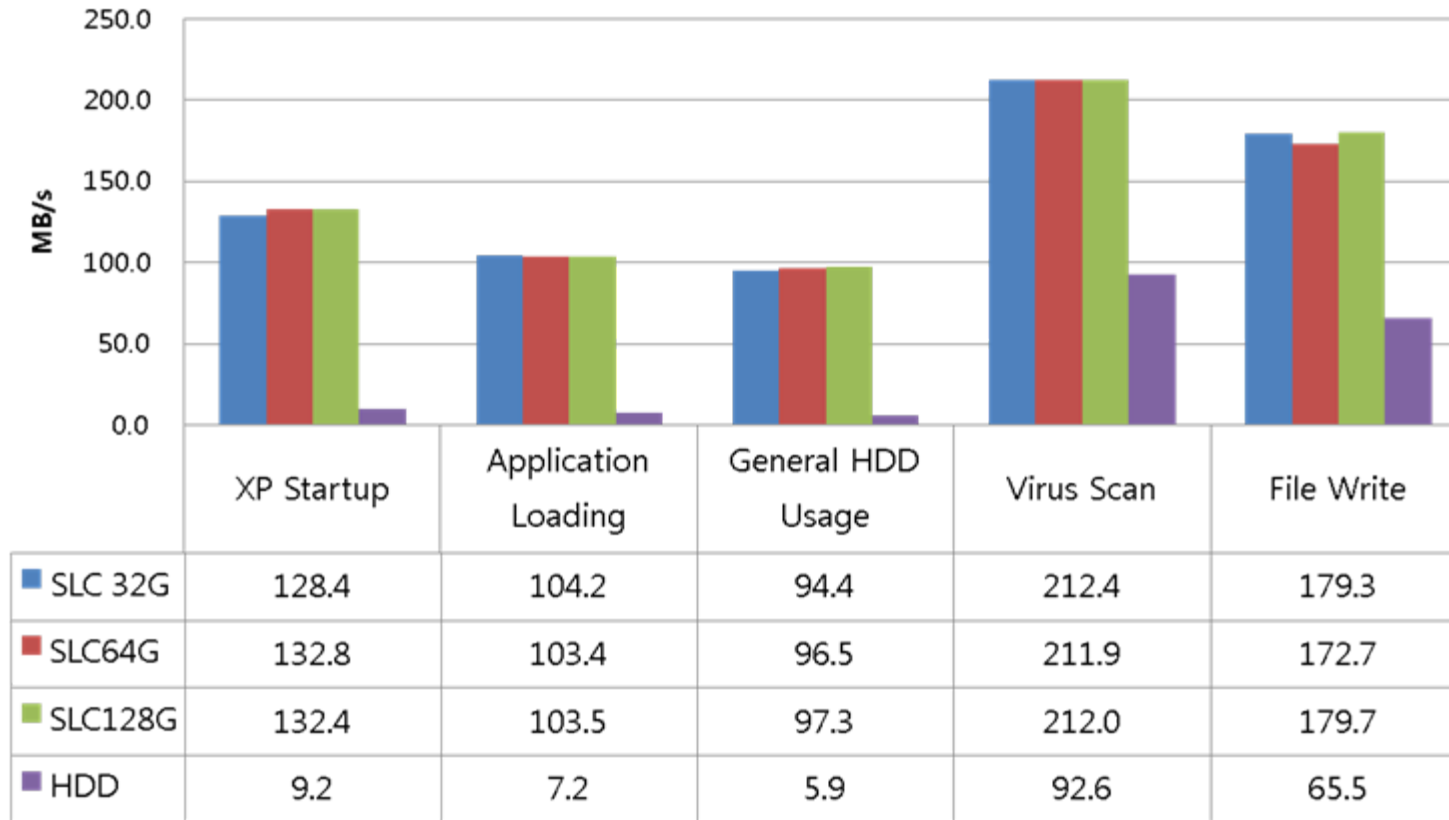
PCMark 05 test results



* HDD : Seagate Barracuda 7200 SATA 320GB HDD

PCMark Test : Barefoot/SLC

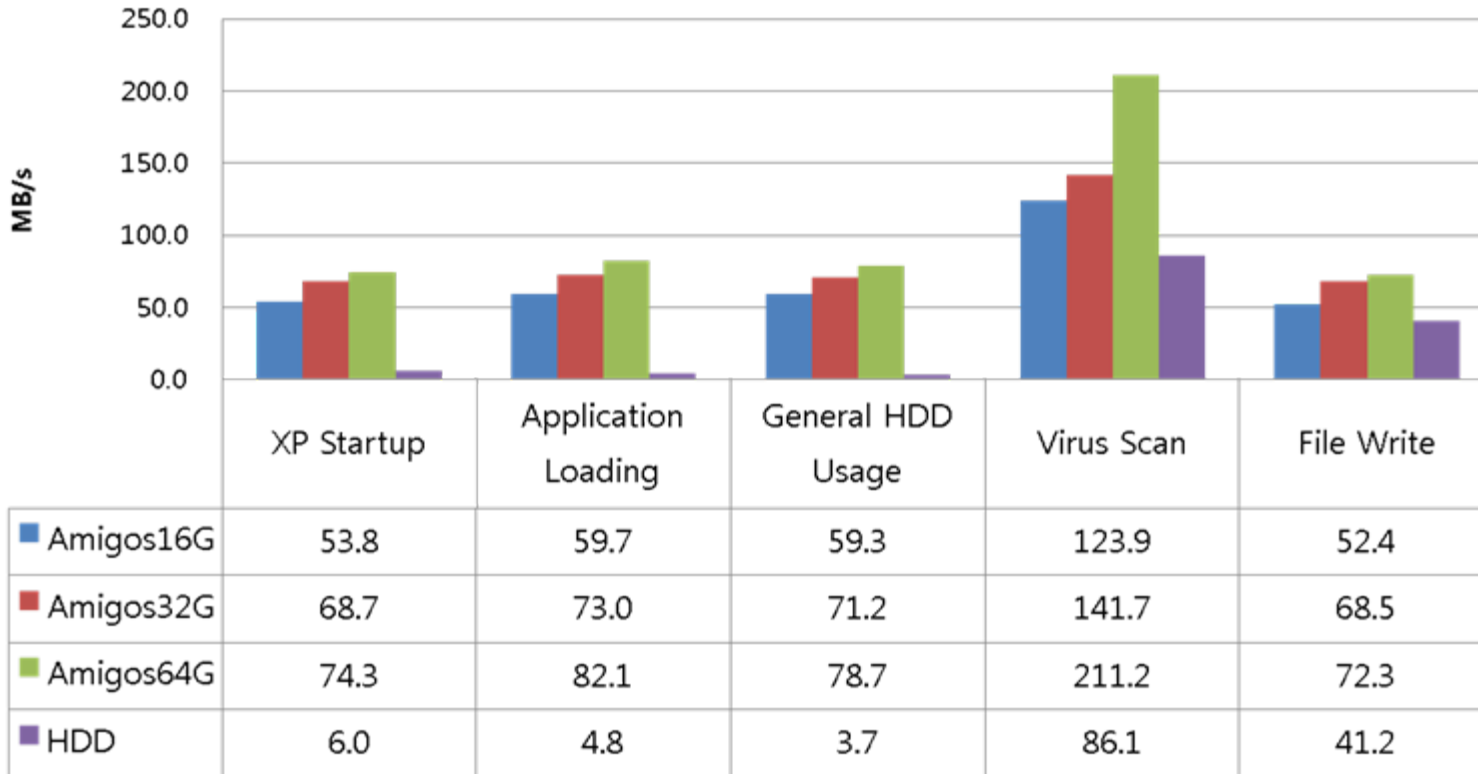
PCMark 05 test results



* HDD : Seagate Barracuda 7200 SATA 320GB HDD

PCMark Test : Amigos/MLC

PCMark 05 test results



* HDD : Seagate Momentum 5400.3 80G SATA HDD

Performance Test Results

(2) RAID

Test Configurations

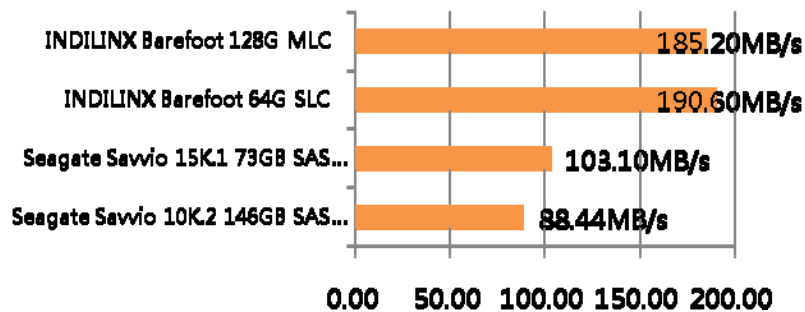
Part	Description
Platform	Intel SR1550AL Server Platform CPU : Xeon Quadcore 2.0GHz Dual RAM : Total 4G FBDIMM
Drives	INDILINX 2.5" 64GB SSD(SLC) INDILINX 2.5" 128GB SSD(MLC) Seagate SAS 10K rpm 146G HDD Seagate SAS 15K rpm 73G HDD
RAID 0	Upto 4 SSD
RAID HBA	Intel SRCASJVL(LSI 1078 Chip)
RAID Option	Stripe size 64K and basic function
O/S	Windows 2003 Enterprise 64bit
Test S/W	CrystalDiskMark 2.2 HDTunePro 3.5



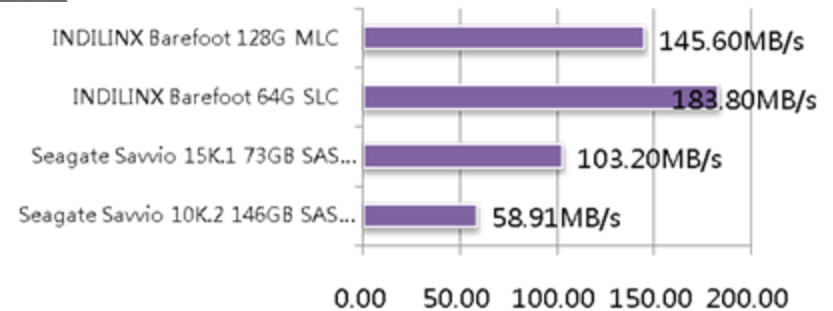
CrystalDiskMark Test (INDILINX SATA SSD vs Seagate SAS HDD)



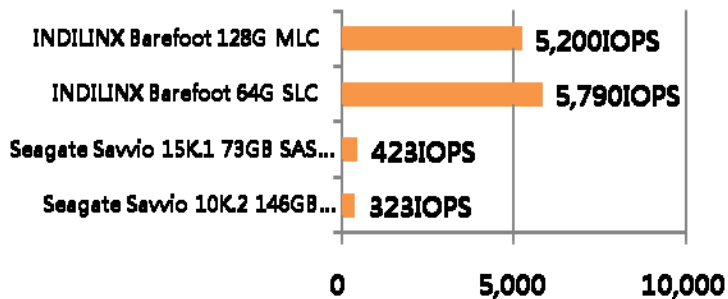
Sequential Read



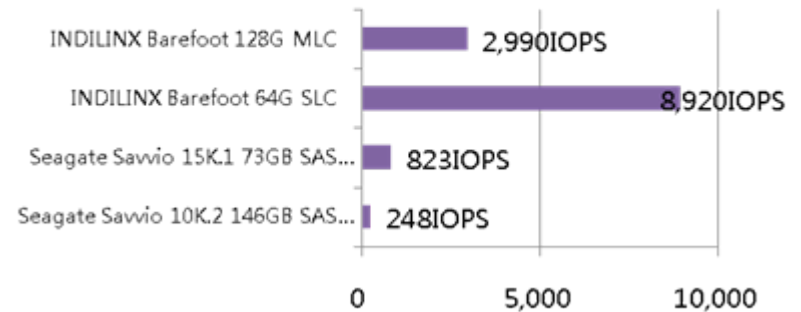
Sequential Write



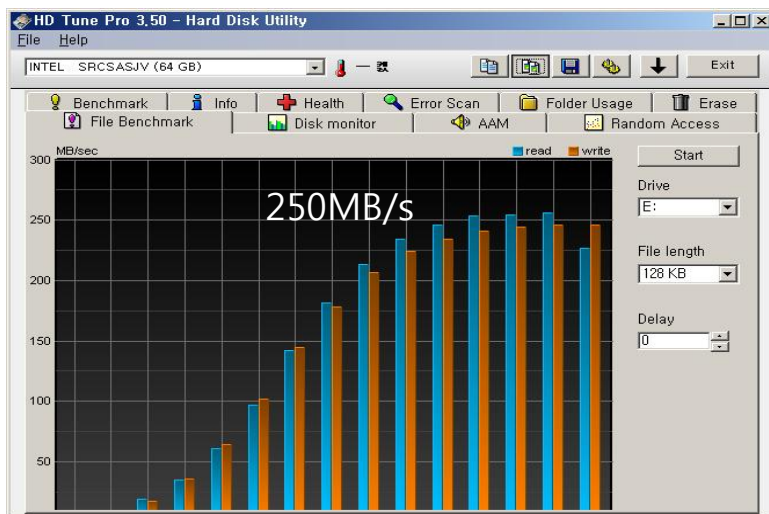
Random Read(4KB)



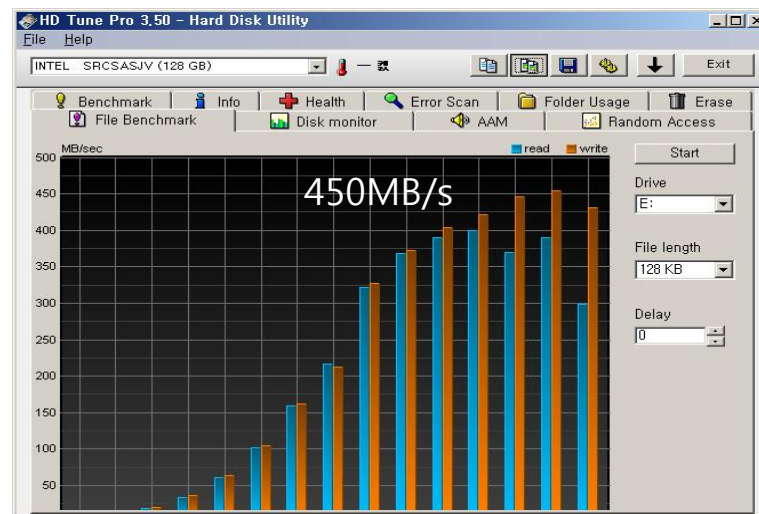
Random Write(4KB)



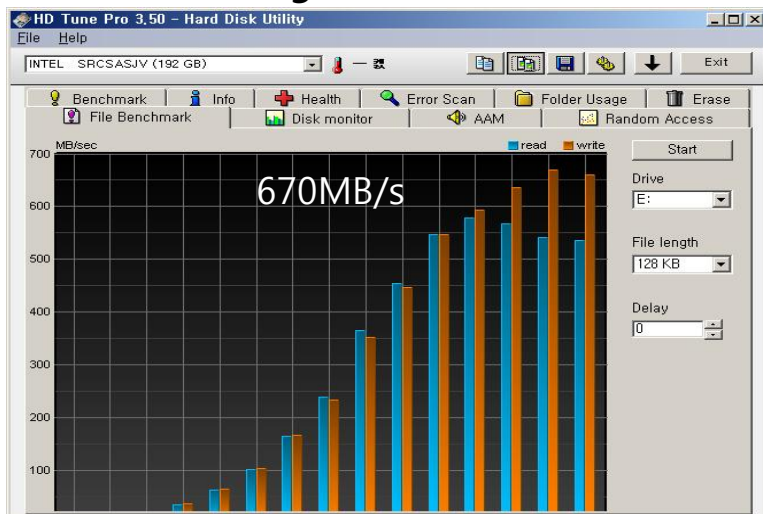
HDTune Test - RAID Performance Test



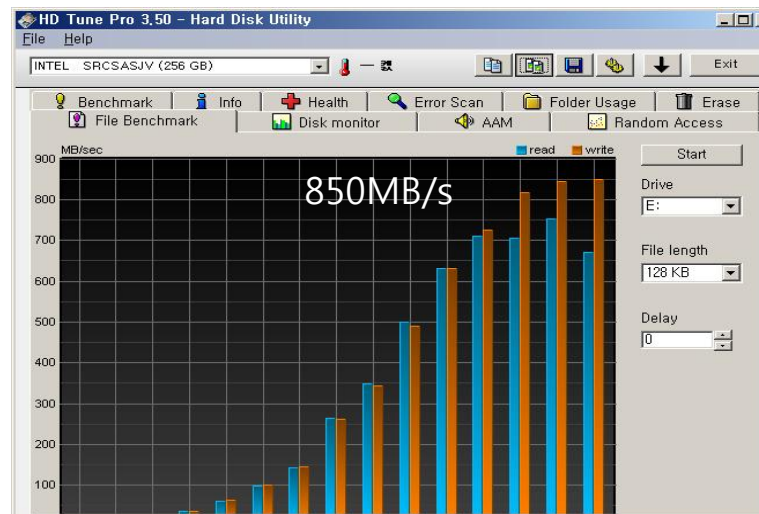
Single Drive



RAID0 : 2 Drives



RAID0 : 3 Drives



RAID0 : 4 Drives

Performance Test Results

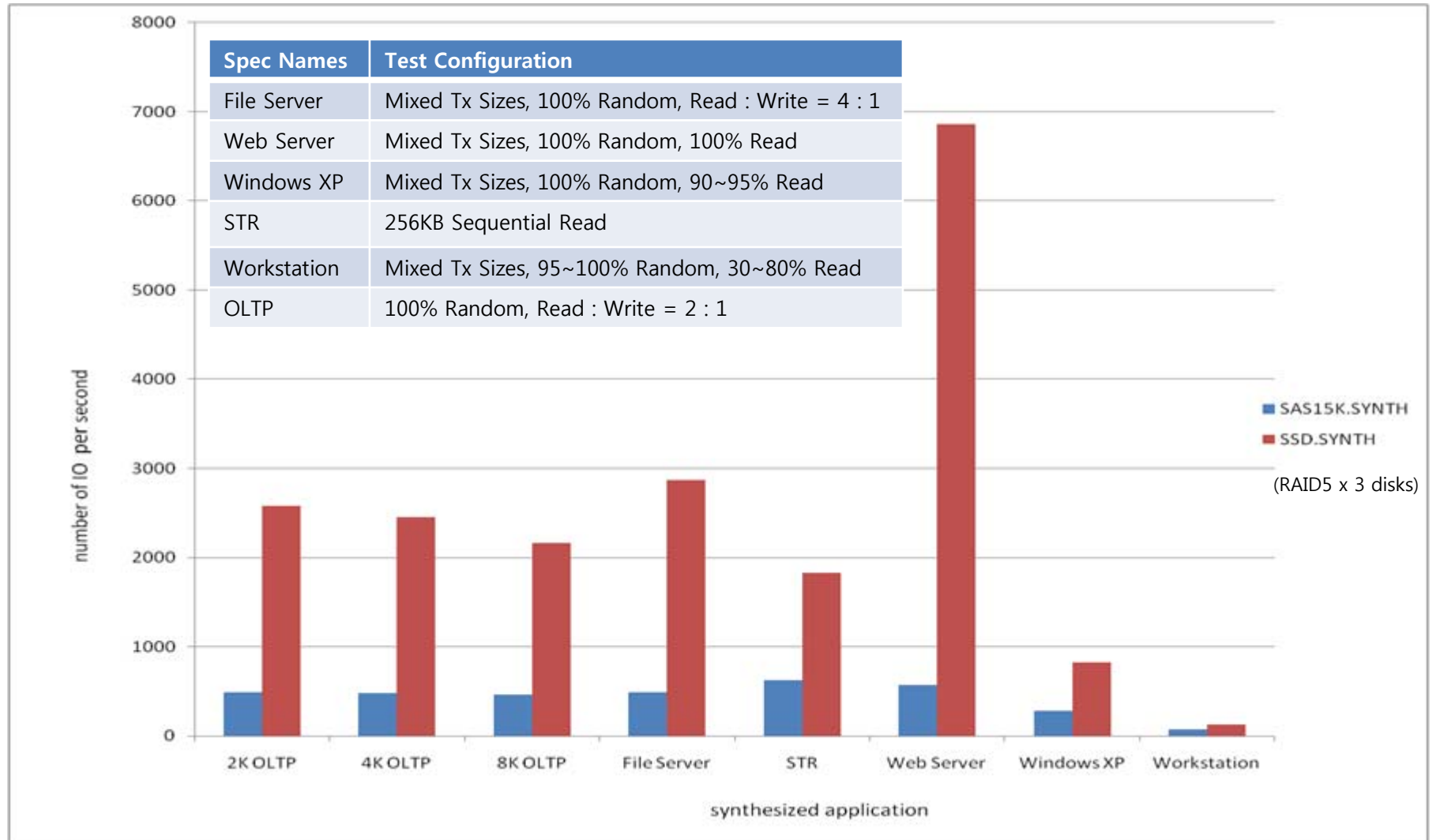
(3) OLTP & Streaming

Test Configurations

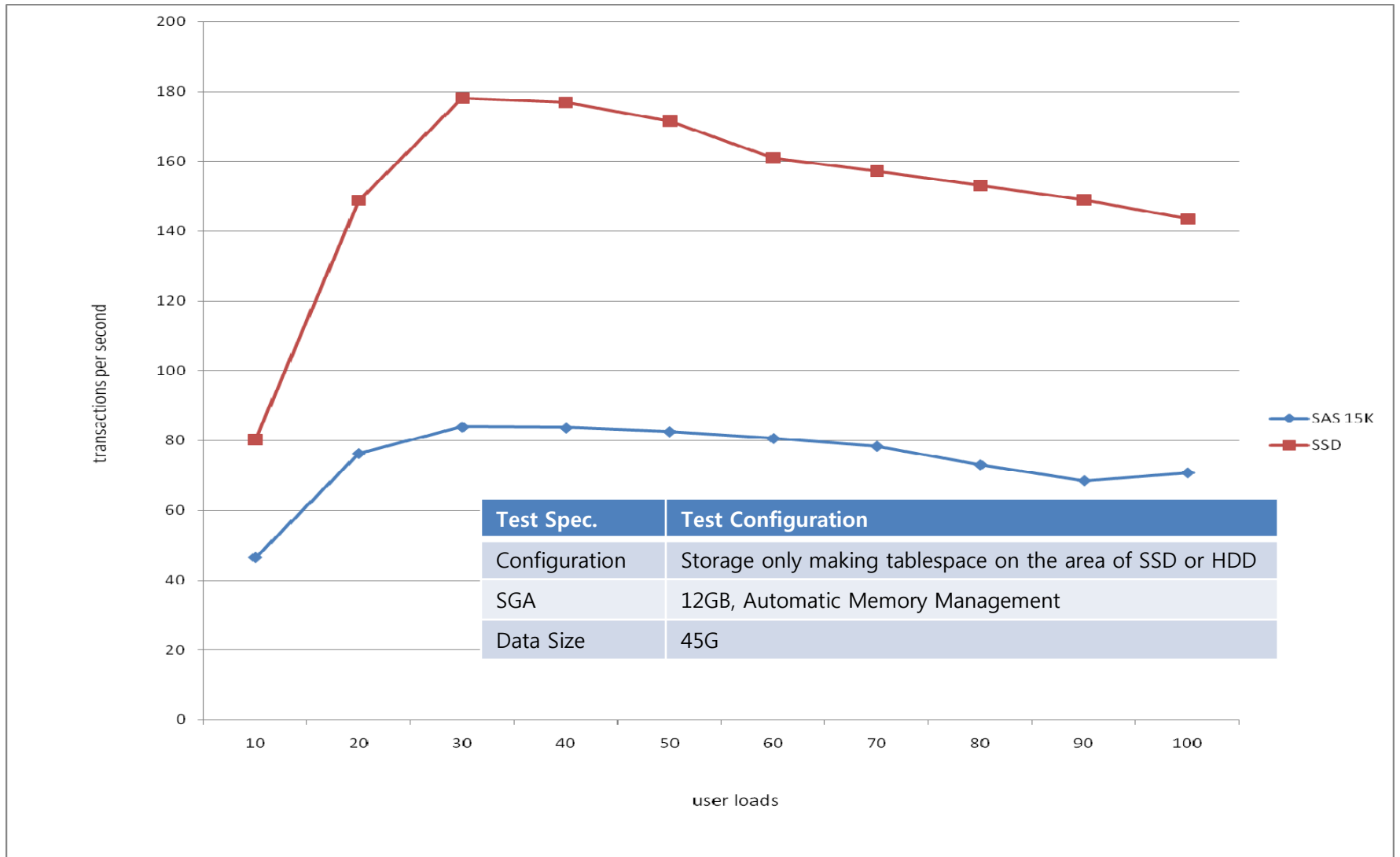
Part	Description
Platform	IBM x3850M2
SSD	INDILINX 64GB SSD (MLC)
HDD	Seagate SAS 15K RPM 74GB HDD
RAID 0	2 x SSD or 2 x HDD
RAID 5	3 x SSD or 3 x HDD
RAID Config	Default
OS	Windows 2003 Enterprise 64bit
DBMS	Oracle 11g
Test S/W	IOMETER 2007.6.27 Benchmark Factory 5.5 IndiStreamer(INDILINX proprietary solution)



IOMeter Synthesized Test



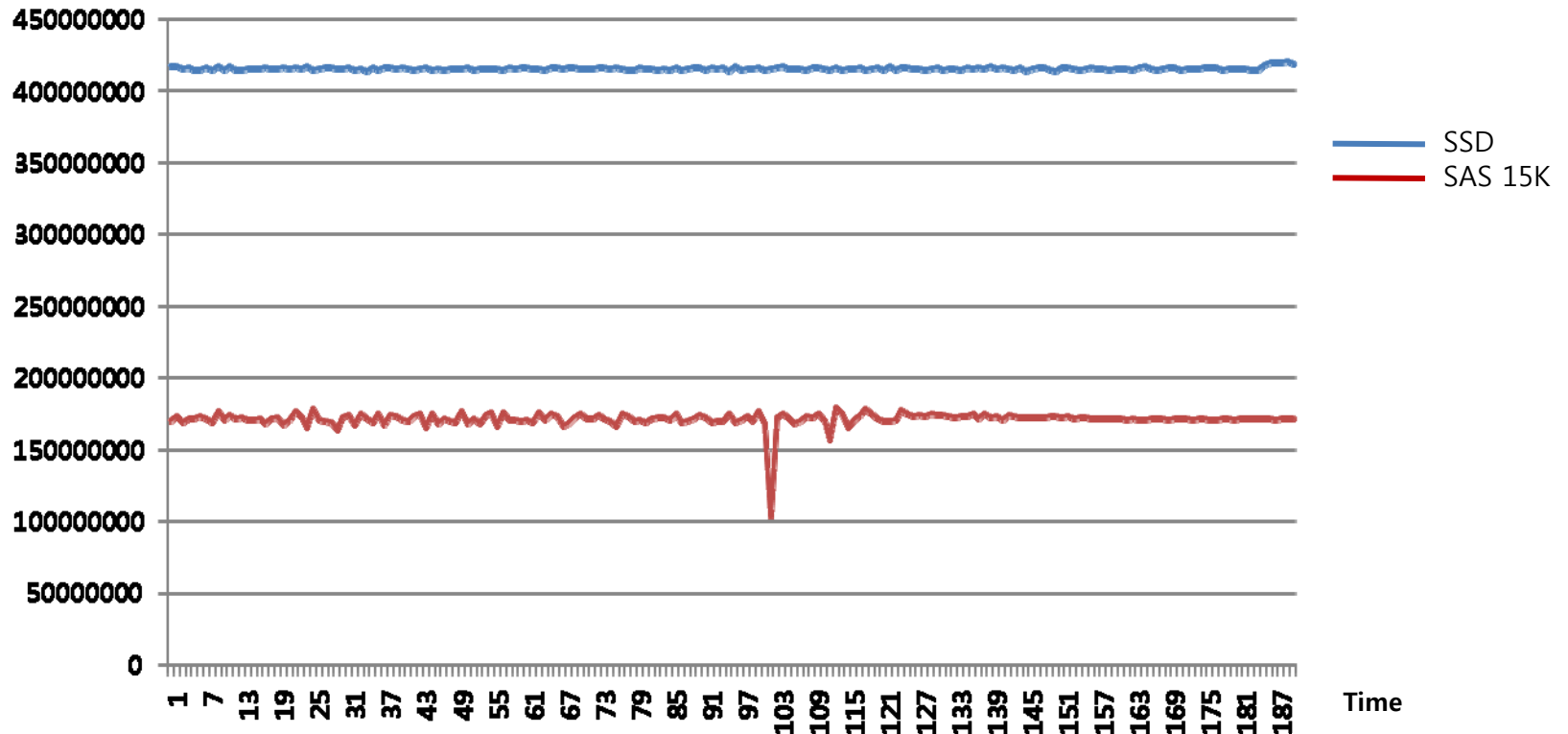
ORACLE TPC-C Test



Streaming Performance

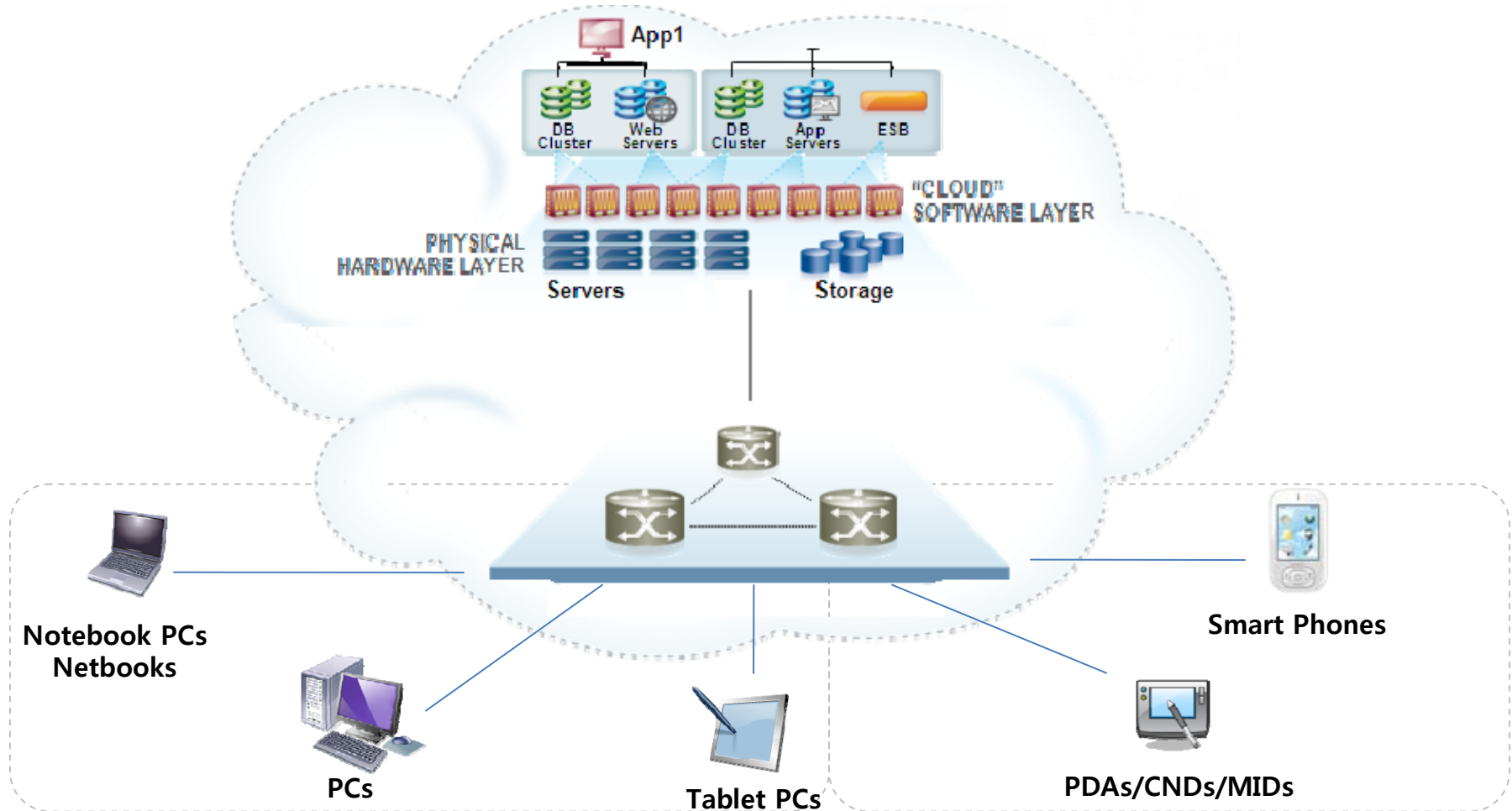
Test Spec.	Test Configuration
# of Drives	4
Streaming Contents	10Mbps H.264 Video Data
Read Request Size	1MBytes
Access Pattern	Random contents and random session (worst case scenario)
Performance Metric	Disk IO(read) only

Network Bytes Sent/sec



Mega-Trends : Cloud Computing

Storage Innovation in Every Places



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Storage Innovation in Every Places

