



SAMSUNG GREEN SSD

High-Performance, Energy-Efficient Memory
for Today's Enterprise Computing Platforms





SAMSUNG GREEN SSD

In a world where a high degree of energy efficiency is critical to our future, we must examine every way possible to reduce our power consumption.

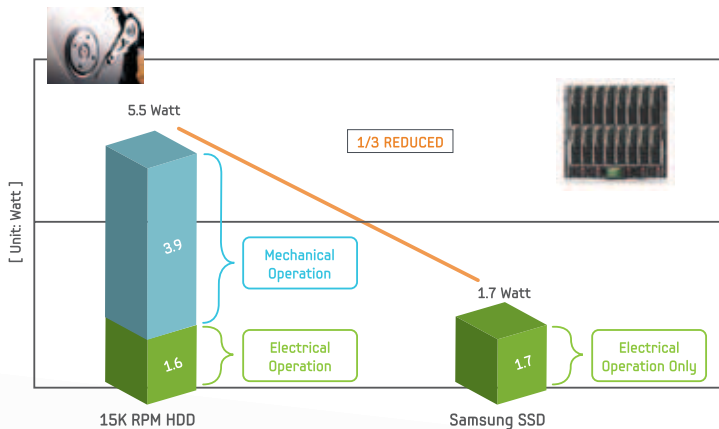
A 2008 study by McKinsey & Company found that data centers consume 0.5% of the world's energy and are second to the airline industry in carbon dioxide emissions, emitting more CO2 gases than Argentina or the Netherlands. In the US, data centers consume more electricity than all of the country's televisions, and the EPA estimates that by 2011, they will consume an incredible 3% of the country's electricity.

Samsung is advocating widespread use of Solid State Drives, commonly called SSDs, as a critical power-saving component in enterprise servers.

SAMSUNG SSD. LESS ENERGY.

On average, Samsung SSDs consume 60% less power than the hard disk drives commonly used in data centers. The most significant difference between the HDD and the SSD is the lack of mechanical parts in an SSD. This enables faster access to data, while reducing energy consumption.

SSD VS. HDD POWER CONSUMPTION COMPARISON



SSD power consumption is estimated as measured with a 70% random read and 30% random write workload

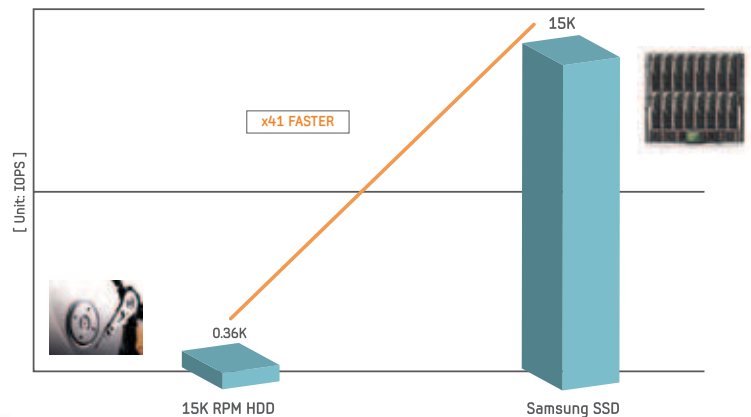
* Source: Samsung

* All test results can vary under different test circumstances and preconditions

SAMSUNG SSD. MORE PERFORMANCE.

Widespread data center adoption of solid state drives as their primary storage devices will result in greater server-room energy and cost savings in the long run. In certain high performance applications, a single SSD can replace anywhere from 4 to 40 hard disk drives, due to the significant performance advantages of solid state technology. In terms of Input Output Per Second (IOPS), an SSD performs 41 times faster than an HDD.

SSD VS. HDD RANDOM IOPS PERFORMANCE COMPARISON



* Source: Samsung and available specification 15K RPM SAS HDD

* Assumption; based on normal workload, random read 70% + random write 30%

* All test results can be carried under different test circumstances and preconditions

This performance advantage over HDDs is primarily due to the latency and seek time that hard drives require.

The SSD does not depend on the use of a motor and spindle to locate data. An SSD uses electrons to locate the data within microseconds making it significantly faster than a comparably-sized hard disk drive.

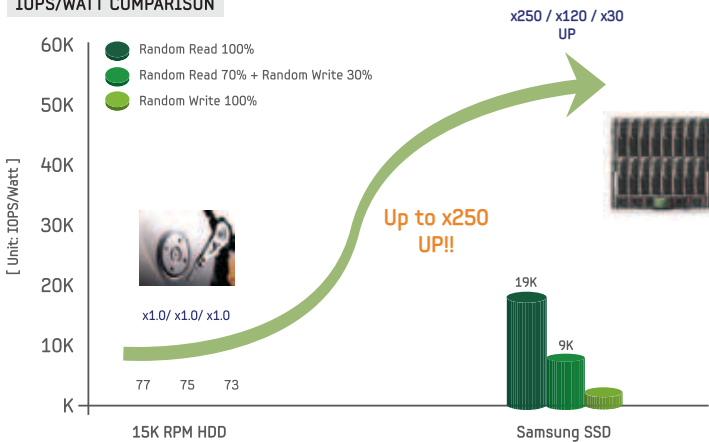
SAMSUNG SSD IS GREEN.

In the US, data centers consume more electricity than all of the country's televisions, and the EPA estimates that by 2011, data centers will consume 3% of the country's electricity.

For these reasons, companies today are increasingly seeking ways to reduce power consumption without compromising performance.

IOPS per watt is a key factor in judging storage capacity, as well as how IOPS manage and restrict power consumption. Samsung SSDs can access up to 250 times more IOPS per watt than a traditional 15K rpm HDD.

IOPS/WATT COMPARISON



* All Samsung SSD test results are based on internal measurements. Performance results can vary under different test conditions and FW changes.
 * 15K RPM HDD power consumption is based on available spec.

With growing government regulation around the world, IT managers must look not only at overall power consumption levels in their data centers and server farms, but also at CO2 emissions. Samsung's advanced Green SSD technology dramatically reduces total cost of ownership and increases ROI, while helping to tackle the challenges of excess power drain and CO2 emissions.

IDC reported that worldwide performance-optimized storage amounted to 6096PB in 2009. It is estimated if all that capacity was stored in Samsung's Green SSDs, then 746 billion watt hours of electricity could be saved annually.

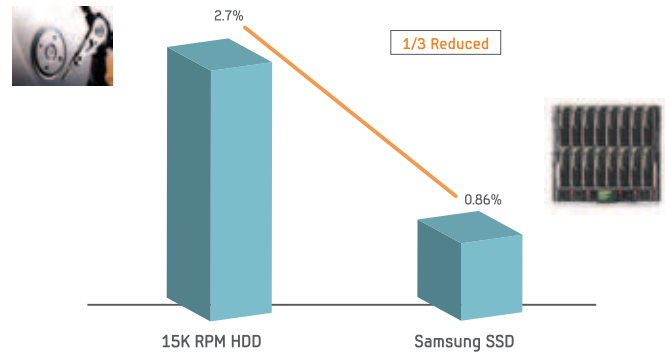


SAMSUNG SSD. MORE RELIABILITY.

Adding to their attractiveness, SSDs are 30% more reliable than even the most reliable enterprise hard drives and will generate almost no heat, reducing data center cooling requirements.

Adopting a SSD storage solution requires less hardware, which is not only better for the environment, but will result in substantial cost savings and a reduced server footprint.

SSD VS. HDD ANNUAL FIELD FAILURE RATE COMPARISON



* Source: Samsung

Looking at the most common reliability indicator – Mean Time Between Failures (MTBF) – SSDs guarantee 2 million hours of MTBF, almost 3 times higher than that of traditional hard disk drives.

In addition, because they are designed to make use of an auxiliary power supply, Samsung Enterprise SSDs fully protect data in the event of unexpected storage problems or sudden power loss.



SAMSUNG GREEN SSD

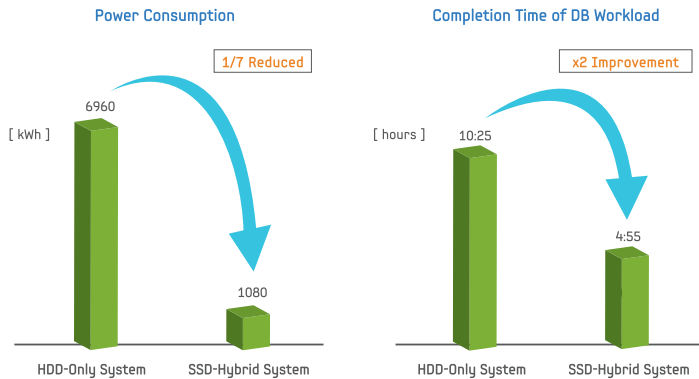
SSD BENEFITS.

So how do SSDs impact your company's bottom line?

In a typical enterprise storage application, the savings in moving from hard disk drives to SSDs can be realized on day 1. You start saving money the second you decide to adopt SSD technology, essentially an "instantaneous TCO savings."

The chart below shows the benefits of a hybrid SSD system versus a HDD in a 48TB configuration. This HDD storage scenario utilizes 160 300GB 15Krpm FC HDDs while the SSD storage is comprised of 4 (ea) of 100GB SSDs with 155 (ea) of HDDs.

SSD BENEFIT IN REAL SYSTEM



* Source: EMC and Samsung Lab
 HDD Only System: 160 x 300GB 15K FC HDDSSD
 Hybrid System: 4 x 100GB SSD + 155 x 300GB 15K FC HDD

The hybrid SSD system here shows only a seventh of the power consumed by an HDD-only system, with twice the performance.

Using Samsung SSDs, you can expand the capacity and increase the performance of your data center without increasing space or spending. Samsung SSDs are the perfect economic and environmental solution for today's data centers.

Find out more at www.samsungssd.com.

Key Features

Active Read	2.5-inch SFF (100x69.85x15.00mmt)	
Density	50GB and 100GB	
Weight	50GB : Max. 121g 100GB : Max. 131g	
Power Consumption	Active Read	1.3 W
	Active Write	2.6 W
	Idle	0.7 W
Performance	Sequential Read	Up to 230MB/s
	Sequential Write	Up to 180MB/s
Interface	<ul style="list-style-type: none"> -Serial ATA interface of 3.0Gbps (SATA 3.0Gbps) -Fully complies with ATA/ATAPI-7 standard -Asynchronous Signal Recovery(Hot-plug) -Active LED indication (Pin11) -Native Command Queuing(NCQ, 32Depth) 	
Operating Temperature	0°C ~ 60°C	
Operating Voltage	5V	
Shock	1500G, duration 0.5ms, Half Sine Wave	
Vibration	20G peak, 10~2000Hz (15min/Axis)x3Axis	
System Reliability	Min. 2million hours MTBF	



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