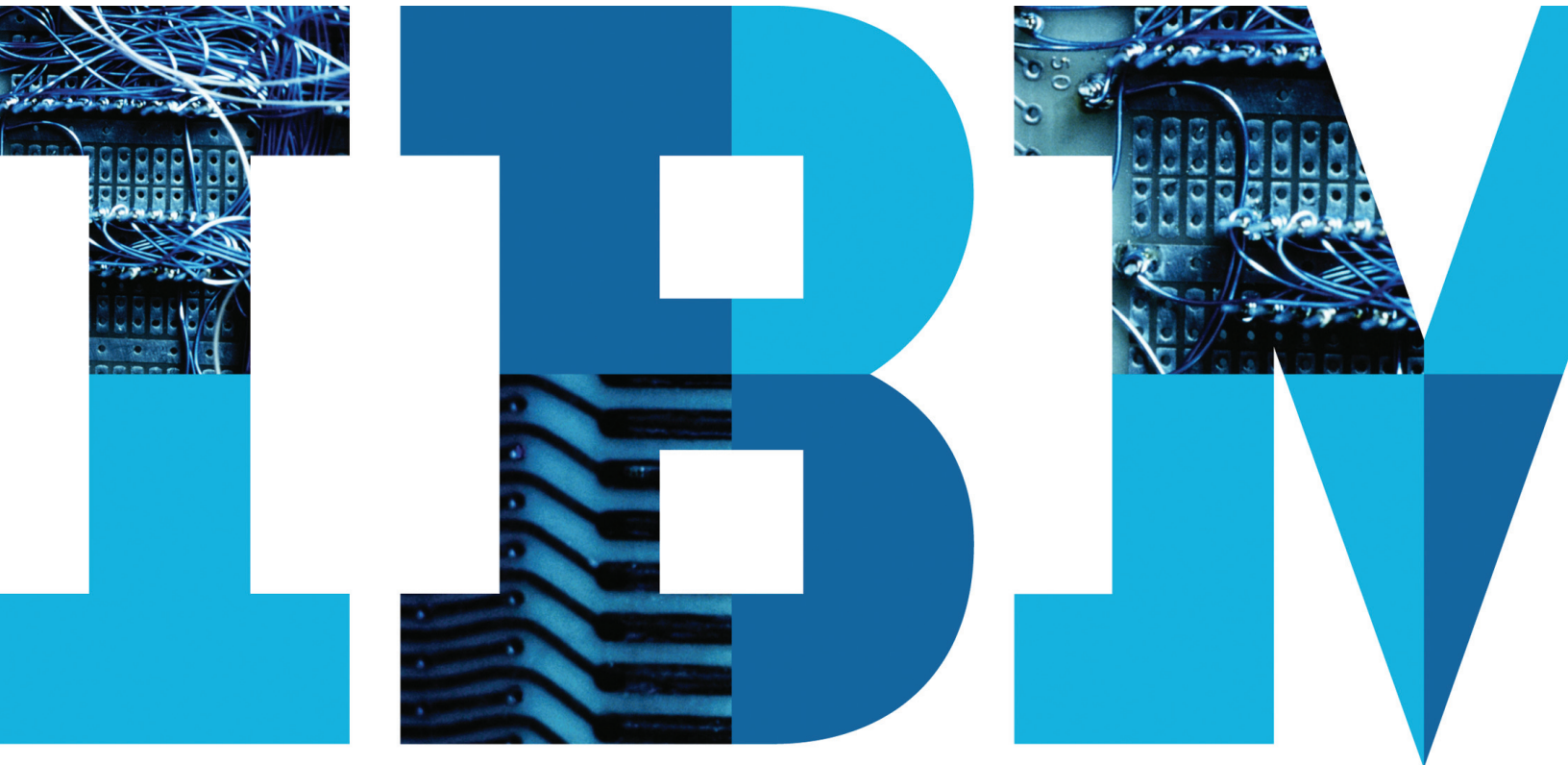


Midsized businesses enhance performance and reduce costs

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Executive summary

The current global financial downturn, along with exploding levels of information, has forced many organizations to change their operating model to become more competitive to survive and grow. More information, increasing customer expectations and continued globalization and growth in emerging economies are driving new business models and shifting the competitive landscape in the midmarket. The world is not only getting smaller and flatter, it's getting smarter. In almost all cases, this means satisfying business and IT infrastructure requirements that will support and sustain competitive advantage while also delivering significant cost efficiencies.

In business, growth is good. Ensuring that your technology and infrastructure keep up with growth is even better. Finding the right servers to meet your needs both today and tomorrow can be the key to sustaining that growth. More than equipment, servers are the foundation of a dependable IT infrastructure.

The new generation of Intel and IBM servers can enable you to enhance performance and reduce costs

Your business faces a range of IT challenges. Energy costs are rising so you need to manage energy used for power and cooling. You need your IT to be reliable and flexible—to support your business through changing times. You need to simplify management of your data center to reduce administration costs.

You need servers to help you meet all of these challenges with:

- Value—To reduce your IT costs
- Quality—To help you keep your critical applications running
- High performance—To keep your business productive
- Ease of use—To allow your IT staff to focus on business innovation rather than IT administration

The new IBM System x® and BladeCenter® servers can help you meet these demands, offering extraordinary value. Now your business can access even more memory, processing power and reliability. The new x86 systems include:

- System x3650 M3 and System x3550 M3 rack servers
- System x3500 M3 and System x3400 M3 tower servers
- BladeCenter HS22 and BladeCenter HS22V

These new servers feature the Intel® Xeon® Processor 5600 Series, the next generation of intelligent server processors. With these new servers you gain the benefit of proven reliability, breakthrough computing power and the operational advantages of using advanced server technology developed specifically for small and medium-sized businesses.

This paper shows how these new x86 servers, by integrating innovations like IBM Systems Director 6.1, IBM Systems Director Active Energy Manager™ and the Integrated Management Module (IMM), offer an outstanding platform for virtualization and consolidation. Moreover, it's a platform that's easy to use and manage, which can help you lower total cost of ownership, reduce development costs, increase performance in the same energy and cooling envelope and with continued investment protection and dramatically increase workload performance.

Server refresh: A smart choice

Your servers have done the job so far, but you're seeing the strains of outdated technology, having to manage multiple systems and locations and the growing footprint of piecemeal server management. Updated servers can also enhance the performance of new applications or operating systems. With IBM servers based on the latest Intel Xeon 5600 series processors, your business will have the headroom to handle bigger data loads and more people, while providing the performance that your customers and business demand. And you can do so with fewer servers, not more.

Updating your servers can offer you:

- Optimal support for the latest applications
- New hardware with warranty support
- The ability to consolidate servers with virtualization to save space, run more quietly and simplify management
- Reduced total cost of ownership due to lower maintenance costs, more efficient energy usage, fewer software licenses and less downtime

Dramatically reduce costs

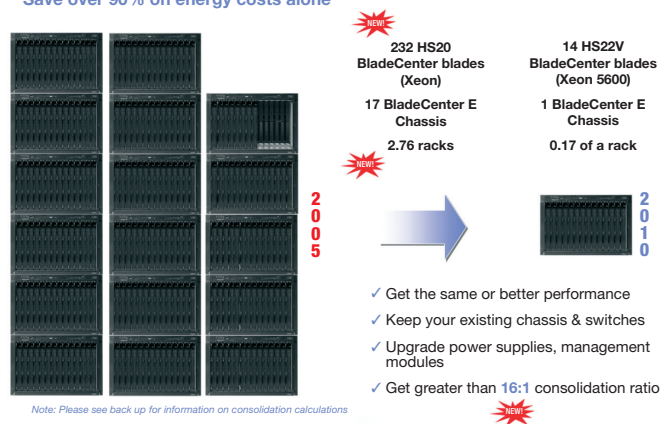
A longtime leader in the data center market, IBM uses a comprehensive understanding of the evolving computing needs of customers to continue to produce new, standards setting offerings for an array of product classes. Among our most recent additions to our leading-edge products are the System x3650 M3 and System x3550 M3 rack servers. Featuring innovative and energy-efficient designs, simplified IT management and dramatic improvements in performance and function, the x3650 M3 and x3550 M3 sets new cost-efficiency standards for the x86 processor-based server markets.

A recently conducted IBM engineering research survey conclusively showed that IBM's new rack servers can reduce annual energy costs by up to \$100 per year per server over previous-generation x3550 and x3650 models¹ using innovative, energy-smart designs and simplified management. Integrating two new Intel Xeon processor 5600 series products with Intel Quick Path Technology and Intel Turbo Boost Technology, the IBM servers provide dramatic performance improvements over previous generations with low acquisition costs. Dramatic performance gains and new virtualization solutions can offset the initial outlay in up to three months.

Figure 1 shows how you can upgrade your HS20 servers with new HS22V Servers and obtain the consolidation benefit of 16:1 with same or better performance. This way you can reduce your energy costs by 90 percent.

Dynamic Infrastructure: Helping build a smarter planet

Replace HS20s in existing BladeCenter E chassis Save over 90% on energy costs alone



Designed to be growth engines for expanding businesses, the x3500 M3 and x3400 M3 tower servers are six-core dual-socket servers equipped with Intel Xeon processors 5600 series. These servers provide increased performance, memory and storage. With these servers, you get new energy-smart design features to help you reduce total cost of ownership, including:

- Low-wattage, efficient power supplies
- Counter-rotating fans
- Pressure-sensitive altimeter that helps to manage power consumption
- Advanced power management tools

In addition to the energy savings enabled by the more efficient processors, the new IBM servers significantly reduce administration costs by providing:

- More efficient BIOS management with Unified Extensible Firmware Interface (UEFI) BIOS with a single consistent level code stack, advanced setup and simple configuration
- Powerful remote control capability for management, monitoring and troubleshooting with Integrated Management Module (IMM)
- An easy way to find, choose and learn management tools with IBM's ToolsCenter
- IBM System Director 6.1

These new servers feature low-voltage processors, which draw less energy and produce less waste heat than high-voltage processors, which help reduce data center energy costs. Selected four-core Xeon 5600 Series processors use only 40 W and selected six-core processors consume only 60 W. This is less than half the wattage consumed by 130 W processors.

Optional solid-state drives (SSDs) use only 2 W of power per drive, versus 9 - 10 W for 2.5-inch HDDs. This is as much as 80 percent less power than a 2.5-inch HDD would use (with a corresponding reduction in heat output).

Finally, IBM Systems Director Active Energy Manager provides you with the tools necessary to monitor actual energy usage (not simply the theoretical maximum power draw), track trends and even cap energy usage at a predetermined point.

From a management standpoint, to use features beyond that of the standard Baseboard Management Controller (BMC) in the older servers (such as remote management and IPMI 1.5), you had to spend several hundred dollars to purchase an IBM Remote Supervisor Adapter II. Now, all of that functionality (along with the BMC and IPMI 2.0) is incorporated inside the new IBM Integrated Management Controller, standard with each of the new servers.

Dramatically increase workload performance

Get great performance, energy and cost efficiency and plenty of room to grow and virtualize in the future with the next generation of IBM x86 servers based on the Intel Xeon processor 5600 series. These servers offer you maximum performance for heavy workloads, while reducing energy consumption when workloads are light. It all adds up to intelligent performance that helps keep energy costs low.

Application performance is critical for day-to-day business operations and for creating new products and services, increasing competitiveness and reaching new customers. For the past decade, IT has rapidly added low-cost hardware to accommodate business growth, and many data centers are now stretched to capacity in terms of power, cooling and floor space. By refreshing your data center infrastructure with

higher performance, more adaptive, power-conscious servers, you can obtain additional capability and scalability in the same energy and space footprint, staying ahead of ever-increasing business demands.

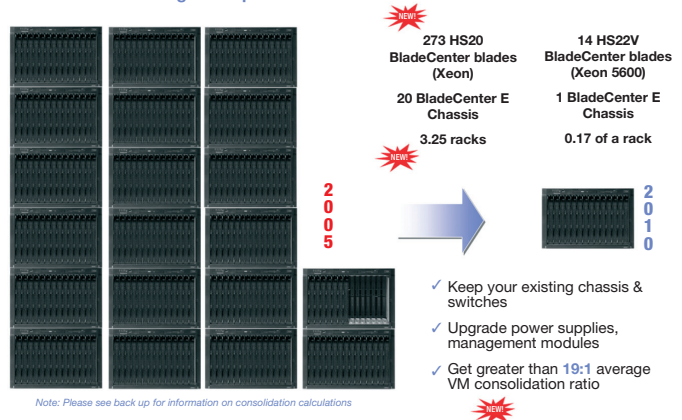
The Intel Xeon processor 5600 series brings together a number of innovative technologies to provide intelligent performance. New features include:

- Intel Turbo Boost Technology**—Turbo Boost dynamically turns off unused processor cores and increases the clock speed of the cores in use, by up to two model frequencies. For example, with three cores active, a 2.26 GHz processor can run the cores at 2.4 GHz. With only one or two cores active, the same processor can run those cores at 2.53 GHz. Similarly, a 2.93 GHz processor can run at 3.06 GHz or even 3.33 GHz. When the cores are needed again, they are dynamically turned back on and the processor frequency is adjusted accordingly.
- Intel Hyper-Threading Technology (Intel HT)**—Let today's well-threaded applications make the most of every clock cycle. With Intel HT Technology, multithreaded software applications can execute threads in parallel within each processor core.
- Intel QuickPath Technology**—Along with an integrated memory controller, Intel QuickPath Technology helps speed traffic between processors and I/O controllers for bandwidth-intensive applications. With the Intel Xeon 5600 Series processors, Intel has diverged from its traditional Symmetric Multiprocessing (SMP) architecture to a Non-Uniform Memory Access (NUMA) architecture. The Intel Xeon 5500 processors are connected by a serial coherency link called Intel QuickPath Interconnect (QPI). QPI is capable of 6.4, 5.6 or 4.8 GT/s (gigabit transfers per second), depending on the processor model. This allows the new servers to deliver as much as 25.6 GB/s, up to 3.5x the bandwidth of previous-generation servers.
- Intel Extended Memory 64 Technology (EM64T)**—64-bit extensions allow the Xeon processor to use large memory addressing when running with a 64-bit operating system. This in turn lets individual software processes directly access more than 4 GB of RAM, which was the limit of 32-bit addressing. This can result in much higher performance for certain kinds of programs, such as database management and CAD.

Figure 2 shows the IBM System BladeCenter HS22V, which offers performance capability to increase workload levels significantly with the same data center footprint and design, while reducing energy costs.

Dynamic Infrastructure: Helping build a smarter planet

Replace HS20s in existing BladeCenter E chassis Run 19X the average VMs per blade



Dramatically increase performance with continued investment protection

Rack and tower servers are not the only area to benefit from new-generation technology. The BladeCenter HS22V offers great performance, balanced with flexible configuration options and simple management in an efficient server that can

run a broad range of workloads exceptionally well. It offers a high density, high performance two-socket blade server that's optimized for virtualization and memory-intensive applications.

You can also mix and match the HS22 and HS22V with other BladeCenter blades² and various operating systems³ in existing BladeCenter S or BladeCenter E chassis for outstanding investment protection, incredible flexibility and deployment choice. And with new innovations, such as UEFI, the IMM, and IBM Systems Director 6.2, you can further simplify systems management and future proof your infrastructure. Compared to earlier-generation Intel Xeon processor-based servers, IBM BladeCenter HS22/HS22V blade servers can help improve the economics of your data center with:

- Up to 60 percent performance boost with next-generation Intel Xeon processors
- Up to 90 percent reduction in energy costs from server consolidation (16:1 ratio)
- Up to 96 percent IT footprint reduction from server consolidation

In addition, BladeCenter consolidation and integration offers significant benefits over rack servers:

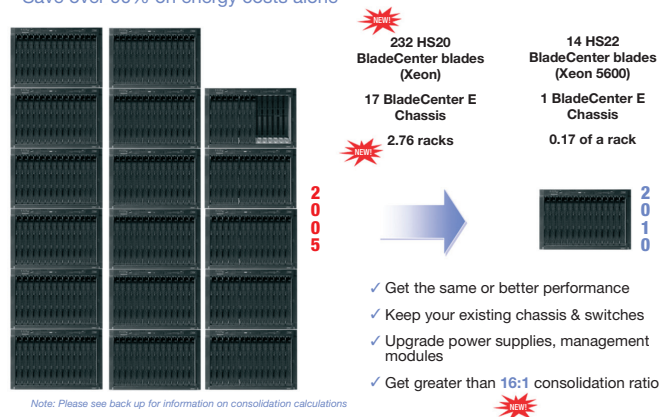
- Up to 65 percent lower connectivity costs
- Up to 84 percent fewer cables

Figure 3 shows how you can use the new performance capability to expand your existing IT infrastructure by reusing your existing chassis.

Dynamic Infrastructure: Helping build a smarter planet

Replace HS20s in existing BladeCenter E chassis

Save over 90% on energy costs alone



Dramatically increase performance within the same energy envelope

Midsized companies can now enjoy the dramatic increase in performance with new HS22V blades without increasing their data center space or energy footprint. New Energy design consumes up to 15 percent less power with energy-efficient 1.35 Volt DIMMS and increases overall performance by 60 percent with next-generation Intel Xeon processors. Now you can replace HS20s in existing BladeCenter E chassis with new HS22V and can dramatically increase performance while keeping your same energy costs.

Summary

IBM, your trusted partner in growth, enables your business growth by offering the right technology to meet your needs today and tomorrow. With IBM servers based on the latest Intel Xeon processors, your business will have the headroom

to handle bigger workload, more people and deliver the dramatic performance that your customers and employees demand, with fewer servers and without impacting too much on your wallet.

For more information call the concierge Monday through Friday at 1-877-IBM-ACCESS for help in selecting or enhancing your current infrastructure. After normal business hours or on weekends, you can leave a message and you'll be contacted the next business day.

Or, visit our IBM Express Advantage® home page for more information: ibm.com/jct03004c/businesscenter/smb/us/en/

Sources

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<ftp://ftp.software.ibm.com/common/ssi/pm/br/n/xbb03004usen/XBB03004USEN.PDF>
- IBM white paper: Optimizing the Performance of IBM System x and BladeCenter Servers using Intel Xeon 5500 Series Processors: <ftp://ftp.software.ibm.com/common/ssi/sa/wh/n/xsw03025usen/XSW03025USEN.PDF>
- Intel white paper: Intel Xeon Processor 5500 Series—An Intelligent Approach to IT Challenges:
<ftp://ftp.software.ibm.com/common/ssi/sa/wh/n/xsw03032usen/XSW03032USEN.PDF>
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- Intel white paper: Performance that Adapts to Your Business Environment <ftp://ftp.software.ibm.com/common/ssi/sa/wh/n/xsw03033usen/XSW03033USEN.PDF>

For more information

To learn more about the How to Enhance Performance and Reduce Energy Costs in the Midmarket, please contact your IBM marketing representative or IBM Business Partner, or visit the following Web sites:

IBM System x Servers ibm.com/systems/x

IBM System x & BladeCenter with Intel Xeon 5500
ibm.com/systems/x/newgeneration

IBM Systems Consolidation Tool for Intel
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ibm.com/systems/bladecenter

IBM System x and BladeCenter Power Configurator
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IBM Standalone Solutions Configuration Tool (SSCT)
ibm.com/servers/eserver/xseries/library/configtools.html

IBM Electronic Service Agent ibm.com/support/electronic

IBM ServerProven® Program
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¹ <ftp://ftp.software.ibm.com/common/ssi/sa/wh/n/xsw03030user/XSW03030USEN.PDF>

² Compatible blades include HC10, HS12, HS20, HS21, HS21 XM, HS40, LS21, LS22, LS41, LS42, JS12, JS21, JS22, QS21, and QS22.

³ Operating systems supported include Microsoft® Windows®, Linux®, Novell NetWare, IBM AIX® and Sun Solaris. (Supported OSes are blade server-specific.)



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