IBM X-Architecture Servers Built on eX4 Technology

Highlights

- ***Manage growth with scalable, balanced design***
- ***Manage complexity and risk with consistent, reliable performance with advanced memory subsystem***
- ***Provide configuration flexibility with unique ScaleXpander Option Kit***
- ***Go green and save by helping reduce overall power consumption for energy-efficient service***
- ***Realize innovation with simplified design for improved ease-of-use and serviceability***

Quad-core processing technology is here, and IBM's scale-up chipset architecture is ready to fully exploit it. Multi-core processors are changing the scalability game with new system challenges for addressing higher levels of inherent parallelism. The fourth generation of IBM X-Architecture®, eX4 technology, offers an unprecedented solution for utilizing 16, 32 or even 64 concurrent processing units or "cores." eX4 technology maintains a system balance with scalability, reliability, availability and superior design to accommodate database processing, enterprise application hosting and server consolidation through virtualization—all in an energy-efficient package.

Balanced design for expanding needs

Exploding growth in databases requires a powerful system to run more transactions, more data queries and even multiple database instances on the same piece of hardware as companies strive

to maintain their global competitiveness. The dramatic rise in on-line digital data offers new opportunities to mine these resources for valuable information, but off-the-shelf servers are ill-equipped for the task. Their designs lack an ability to expand memory and I/O subsystems, resulting in lower utilization and wasted resources. In today's enterprise environment, implementing a balanced memory subsystem has become more important than adding additional processors. With IBM eX4 technology, organizations can independently scale processors, memory, networking and storage I/O to realize enhanced performance—ideal for a virtualized world.

Features in X-Architecture servers that help address these businesses needs include:

- *Supports up to 16 processor sockets across four chassis–delivering up to 64 cores of processing power*
- *Unique multi-chassis flexibility with 32 memory DIMMs per chassis provides the ability to scale up to 128 DIMMs and up to 1.0 TB[1] of memory availability*
- *Flexible design delivers cost-savings by allowing organizations to buy lower-cost memory technology*
- *Capacity to add more PCI-Express slots to maintain consistent I/O throughput for data-intensive applications*
- *Integrated virtualization capability with optional USB-based hypervisor technology.*

To scale or not to scale?

Customers have a choice of two standard models with new eX4 servers. The IBM System x3850 M2 ships as a 4-socket system with a future ability to scale using an option kit. This may be the right system for customers implementing mid-tier, business logic servers who have questions about the need for more than 16 processing cores. The new x3950 M2 ships ready to scale right from the beginning, and can be ordered in multi-chassis configurations. The x3950 M2 is the logical choice for back-end database serving and large scale server consolidation efforts.

An x3850 M2 can be converted to an x3950 M2 via the ScaleXpander Option kit to accommodate unforeseen

Flexibility redefined with ScaleXpander chip technology.

business growth or server redeployments. This new level of flexibility with eX4 servers allows organizations to better manage their data center environments and more tightly control IT costs with a familiar pay-as-you-grow computing model.

Delivers continued reliability

As more applications are being deployed on fewer servers, it's never been more critical to have systems that deliver rock-solid reliability to avoid catastrophic business disruption. Enterprise servers allow clients to easily replace fans, drives and power supplies without compromising the system.

Enterprise servers provide these features that help deliver confidence in the reliability of your applications:

- *Predictive Failure Analysis® is available on almost all major subsystem components, including processors, VRMs, memory DIMMs, power supplies, fans and hard drives*
- *IBM Chipkill™ memory helps effectively recover from a double-bit error in DRAMs*
- *Memory ProteXion™ works at the DIMM level to recover from multi-bit DRAM errors and further prevent data loss*
- *Memory Mirroring with hot-swap support provides the ultimate level of data protection by simultaneously writing to, and reading from, independent and redundant memory cards.*

Provides high-efficiency power management

Fourth generation X-Architecture offers significant power-saving features, enabling organizations to function in a greener, more energy-efficient, cost-effective manner. Performance per watt has become an important metric within large data center environments where power and cooling environmental limitations are decelerating a trend toward ever increasing levels of rack server density.

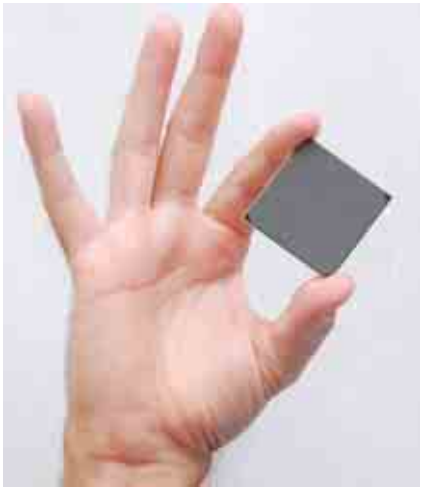
By designing the eX4 technology platform with registered DIMM technology and the Advanced Buffer eXecution (ABX) chip, IBM was able to double the DIMM slot capacity of the base system without resorting to memory buffering technology. As a result, these systems are more power efficient and can operate using up to 37% less power in the memory subsystem compared to Fully Buffered DIMM technology while maintaining the same level of data protection. In addition to these cost savings, eX4 servers deliver power supplies with efficiency ratings as high as 91.3%—delivering one of the most effective designs in the industry.

IBM Systems Director Active Energy Manager™ is a new systems management tool for planning, measuring and controlling how x86 servers are deployed and managed. The software replaces assumptions about power consumption based on server power supply nameplates with a more intelligent approach using operational measurements. Customers can then continuously monitor and even cap power consumption to help improve energy efficiency and manage costs.

eX4 servers feature innovative design for ease of use and serviceability.

Simpler design for improved ease-of-use

To be truly effective, a high-end enterprise server needs an intuitive, easily accessible design for quick servicing and software installation. Several new



Small and powerful, the eX4 memory controller delivers unique scalability and extra memory reliability

features have been designed to increase ease-of-use in the new eX4 servers. Key advantages include:

- *Multi-node software enhancements helping simplify and reduce installation time for large server deployments*
- *Improved design with easy access to processors and memory for upgrades and troubleshooting*
- *Integrated systems management and scalability cabling helps reduce setup time and rack clutter*
- *Rear-access power supply helps serviceability by allowing clients to change out the power supply without opening up the system*
- *Simpler cable design with innovative mechanisms for more robust physical connections between nodes*
- *Advanced diagnostics with Dynamic System Analysis, allowing clients to find and fix problems faster and more easily than previous generations*
- *Embedded hypervisor capability supports the addition of third-party virtualization software using an enterprise-class flash device.*

For more information

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[1] Maximum internal hard disk and memory capacities may require the replacement of any standard hard drives and/or memory and the population of all hard disk bays and memory slots with the largest capacity supported drives available. When referring to variable speed CD-ROMs, CD-Rs, CD-RWs and DVDs, actual playback speed will vary and is often less than the maximum possible.

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