

IBM Announces New xSeries Servers — Better Solutions for the x86 Enterprise

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Management Summary

Back in the early '60's, before he became a trademark for late night television, Johnny Carson was the host of a daytime game show called "Who do you Trust". We may not remember the theme of the show, the contestants, or even the prizes, but we do remember Johnny Carson. We remember that we trusted him, and that was enough for the TV audience. Obviously, it was enough for NBC's executives; they trusted him with their most valuable property – *The Tonight Show*.

Frequently, when we go shopping, we use the same philosophy: we may not have tried this product before, but if we recognize, and trust, the brand, we will try it. In the supermarket, this is true for a new cola formulation from Coke, a new cereal from General Mills, or a new razor from Gillette. In the auto showroom, this is definitely true for a General Motors or a Toyota. An enterprise invests a lot of time and money into its brand, its logo. It tries to associate its image with your trust. Once an enterprise has your trust, it has your loyalty and you return to that company for follow on needs whether that means a \$3.00 box of cereal or a \$30,000 automobile.

In the world of Information Technology (IT), the trust - the loyalty - is even more profound. In an industry where the "architecture life" may be only 18 months, the CIO is apt to be replacing his server infrastructure within two years from original purchase, three years at most. Moreover, the same server that may run a department within an SMB, could also be a node in a cluster for the enterprise. This is especially true when dealing with servers based upon an x86 architecture where CPU performance is doubled every few chip generations, whether from Intel or AMD. Moreover, we are not discussing one or two servers, here. In many distributed environments, the CIO could be replacing thousands of nodes at a time, or even more. Yes, there will be an RFP. Yes, there will be a competitive purchase. However, the value of the goodwill established over decades of providing reliable equipment and a positive experience earn any vendor points in the competitive countdown. In the IT world, no corporation has more goodwill stored up in its corporate brand than IBM. No institution has more goodwill stored up in its product lines than IBM. One of those product line brands is *eServer xSeries*.

IBM has responded to Intel's delivery of the *Xeon EM64T* with a new line of dual processor eServers. To see how IBM has upheld the trust bestowed upon them with this new line of performance products, please read on.

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Market Trends

The growth of distributed architectures in recent years has created an environment within the IT space where an enterprise can have hundreds, or even thousands, of x86-based servers¹ installed throughout its network. Each of these servers may perform only a single function for the enterprise. However, a single server, when installed within a smaller enterprise, might be the primary (or only) server, or perhaps a department's local server. Although this class of server has seen remarkable improvements in performance over the past few years, many enterprises have refrained from joining the performance parade for a variety of reasons.

First, during the latter half of the 1990's, tremendous investments were made in IT hardware due to the concerns over the crisis caused by the fear of Y2K. Many servers configured with earlier generations of Intel chips, along with many legacy platforms built on proprietary architectures, were replaced with then state-of-the-art products. Unfortunately, when these platforms neared the end of their fiscal life, i.e., three to five years, depending upon depreciation schedules, the economy had gone south and few CIOs were willing to invest heavily in server replacement. This is especially true for widely distributed nodes on the enterprise's network.

Second, concurrent with the failing economy, egregious errors by a few corporate executives led to a collection of new laws, which resulted in requirements to keep better track of enterprise communications. This has led to a significant increase in the preservation of everything from financial documentation to email, leading to a significant investment in storage, well out of proportion to server reinvestment or growth.

Third, and perhaps most significant, a spate of recent developments in *Windows* and *Linux* server offerings have resulted in a continuous wave of performance improvements in the commodity microprocessor-based servers of all sorts. This has led many CIOs to pause before committing to put a stake in the ground and proceeding with the procurement of new servers. The announcement of Intel's *Itanium* in 2003 brought the *Windows/Linux* environment into the world of 64-bit computing. This was

followed shortly thereafter by the introduction of *Opteron* by AMD, which could run both 32-bit and 64-bit applications. Now the industry has taken another step forward with the arrival of *Xeon EM64T*. Previously known as *Nocona*, this is the first offering from Intel that allows for full 32-bit compatibility as well as extending the compute range to a full 64 bits. The microprocessors may be commodities because of the support for *Windows* and *Linux* on a similar set of instruction codes, but are the server platforms in which they are configured as similar? How do the various vendors adapt their technology around these industry-standard cores?

In each instance, *Itanium*, *Opteron*, and *Xeon EM64T*, the industry has seen computer vendors produce a set of personalized, *scale-up* and *scale-out* servers. *Itanium* appears to be the focus of a few vendors for scale-up SMP requirements such, as OLTP applications. This is evident in the multi-processor configurations of the Bull *NovaScale*, the HP *Integrity Superdome*, and the IBM *eServer x400* family, with the x445 scaling up to 32 processors. Many vendors are focusing on either *Opteron* or *Xeon EM64T* for their high-performance, scale-out environments, with multiple dual- or quad-processor nodes clustered² together for high performance computing. Examples of this are evident in the HP *Proliant* family *DL145* and *DL585*, IBM's *e325* and *Cluster 1350* servers, and Sun's *Sun Fire V20z*. These solutions not only take advantage of the processing improvements made within each architecture, but also take advantage of developments in server design architecture, storage, and maintenance techniques. IBM, for example, complemented their base of 32-bit *Xeon* servers with a pair of *Opteron* offerings for scale-out environments. The *eServer 325* and the *eServer Cluster 1350*, provide an easy migration path to high performance 64-bit computing requirements for customers needing leading 32-bit performance now. IBM also introduced a high-performance *Itanium 2*-based dual processor platform, the *x382*, to take advantage of floating point intensive 64-bit applications.

With the arrival of *Nocona*, IBM has taken the opportunity to completely redesign its entire line of *eServer xSeries Xeon* systems, not only standalone, but also rack-mounted and blade, in response to market requirements for performance, availability, manageability, and

¹ These older servers are mostly one- and two-ways (one or two processors), but may have 4 or 8 processors.

² Either in a blade chassis or in a more loosely-defined grid.

flexibility. Enabling the wealth of 64-bit experience that predates the arrival of 64-bits in an x86 architecture, IBM has surrounded the EM64T microprocessor with technological innovations. These new features specifically address business-focused problems that came from within IBM's vast customer base, exhibiting the trust they have invested in IBM.

IBM Innovation

IBM has responded quickly and effectively to transition its "commodity" server line into one with high-performance characteristics for their mission-critical environments, not only in terms of functionality, but also for manageability. Moreover, they have done this while maintaining consistency with existing 32-bit applications throughout the mission-critical space. How did they do this? They did not simply evolve the xSeries to Nocona. They accomplished it through the implementation of an *Xtended Design Architecture* with the following characteristics.

Performance

In addition to the 64-bit extensions available from Intel with 3.60 GHz Xeon EM64T processors, IBM has extended the capability of the xSeries with additional memory slots, configuring eight dual in-line memory modules (DIMMs), to enable memory expansion to 16 GBs. These slots also permit the installation of less expensive DIMMs, if a smaller memory capacity is required. In addition, IBM uses the faster Double Data Rate (DDR) PC3200 memory rather than the PC2700 memory used in comparable systems. This enables IBM to achieve transfer rates up to 3200 MB/sec rather than the 2700 MB/sec of the older memory chips.

IBM has also implemented an 800MHz front-side bus to provide better throughput for the memory. In addition, these xSeries models have an Ultra320 SCSI controller and additional slots for PCI-X, Active PCI, and high-performance PCI-Express.

Availability

The most significant availability feature in the Xtended Design Architecture is *Calibrated Vector Cooling*. Based upon decades of IBM systems engineering, Calibrated Vector Cooling optimizes the path of cooled airflow through the system. This permits IBM to pack more technology in less space (1U), including dual Xeon

chips, 16GB of memory, and hot spare hard drives for greater fault tolerance in order to maximize memory, I/O and storage capacity.

With an integrated RAID controller and four, hot-swap SCSI drives or *Simple-Swap*³ SATA drives, IBM improves the reliability within disk I/O. The xSeries also comes with hot-swappable power and fans.

Cost Reduction

By deploying an application server in a 1U package, this permits the client to double the density of application servers, saving critical floor space.

Manageability

With the implementation of *Light Path Diagnostics*, a fourth-generation IBM technology, IBM provides externally visible failure alerts without having to open the system. The Xtended Design Architecture also includes an integrated systems management card with remote management capability, without the requirement to use a PCI slot.

The easy replacement of SATA drives is enabled with the simple design of the chassis. Remove the front panel and security bar and slide out the drive. No tools are required.

Flexibility

In addition to the option of 32- or 64-bit processing, data centers using the xSeries with Xeon EM64T also have the option of Windows and Linux environments. Scalability is also a noteworthy feature here, with double the memory capacity of comparable systems and more I/O capability due to the integration of such features as RAID and advanced systems management.

This flexibility also extends to the external storage where the xSeries has always had the capability to attach to various members of IBM's TotalStorage family. IBM has recently added two new storage arrays to that family with the *DS300* (iSCSI) and *DS400* (Fibre Channel). (More on this shortly.)

The New eServer xSeries

New eServers have been introduced in three separate areas: *BladeCenter*, tower and rack. In addition, two new arrays have been added to the

³ Simple-swap requires power to be removed from the SATA drives before removal, which is done without tools.

TotalStorage family, specifically to interface with these new xSeries processors.

BladeCenter

Designed to support the largest scale-out requirements, BladeCenter now supports the most critical collaboration applications and workgroup infrastructure. With the flexibility to support both high-performance clusters and web applications, BladeCenter is becoming a mainstay in many data centers.

Up to 14 dual-processor EM64T blades are configurable in a 7U-drawer implementation. Capable of supporting 8GB of memory per blade, BladeCenter has hot-swap and redundant power and cooling.

xSeries 200 Family

Designed for both departmental capability in the enterprise and mission-critical applications in the small business arena, the eServer x206, x226, and x236 provide the best cost and performance value in an integrated dual-processor tower⁴. Whether being used as an infrastructure server for file, print, or web services or as an application server in a retail store or workgroup, the x200 family is priced right for distributed processing requirements.

Configurable as a uni- (x206) or dual-processor (x226, x236), these servers can support up to 16GB of memory with up to nine hot-swap SCSI drives. Models with SATA drives support Simple Swap, as power must be removed from the drives before exchange.

xSeries 300 Family

Designed as 1U and 2U mission-critical servers for data dense environments, the new members of the eServer 300 family are ideal for space constrained centralized computing solutions. Whether used as infrastructure servers or high-performance cluster nodes, the x306, x336, and x346 provide all of the technology innovation designed for the tower systems.

Configurable as uni- or dual-processor servers, these models can support up to 16GB of memory (4GB for the x306) with multiple hot-swap SCSI or Simple Swap SATA drives

DS TotalStorage Arrays

These low-cost disk array solutions allow 14

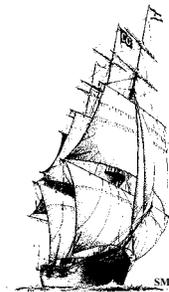
drives to fit into a 3U rack-mounted enclosure, capable of supporting up to 12TBs. Two models are available: the DS300 for iSCSI solutions and the DS400 for Fibre Channel requirements. With hot-swap and redundant power for enterprise availability, these arrays come with *ServeRAID* code integrated into IBM Director.

These modular, easy to use, easy to install arrays can maximize the storage utilization in any environment and can achieve new levels of price/performance for any external storage array.

Conclusion

In the ever-changing world of IT, commodity processors enable the enterprise with the capability to change IT vendors without dramatically changing the architecture of the environment. However, the CIO's decision is not due exclusively to the technology of the microprocessor. System architecture, the variety and capabilities of server offerings, and maintenance capabilities are all determining factors in vendor and product selection, but the decision is often based on "who do you trust" the most. The enterprise has to be able to trust their vendor to be there for them when needed. IBM has proven over the years that it can be counted upon to deliver the right product, with the right solution, and the right services at the right time. **Moreover, IBM has them all, Itanium, Opteron, and Xeon (not to mention POWER in the pSeries and iSeries, now called i5), along with systems personnel to help your enterprise determine which x86 architecture and solution is best suited to your IT needs.**

Yes, value-add to a commodity architecture can improve performance, but that delta will be of no use if the quality of the product is missing. In the past, the xSeries has delivered the performance and the quality that every enterprise, large or small, requires. **By adding value to the commodity microprocessors through creative engineering, IBM has again proven that they can be trusted to deliver the quality, performance, and value the data center has come to expect.**



⁴ The x206 and x226 can be configured as a 4U drawer and the x236 can be configured as a 5U drawer.

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