What Sellers Need to Know

IBM® x3850 X5

ARROW

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X3850 X5 Differentiation

- Combination of high compute and memory density allows the creation of the maximum number of virtual machines supported by VMware.
- Scalable to 8 sockets by interconnection of two X3850 X5 single nodes.
- Memory expands to 3TB node and 6 TB of global memory for a dual node configuration.
- Only 4 socket x86 system to offer memory expansion independent of the processor
- Supports the addition of an internal USB key preinstalled with VMware ESXi allowing quick and simple setup and operation.
- All System x servers include an independent service processor.

Customer Motivations

The customers in the market for the x3850 X5 are looking to solve the following issues:

Compute bound applications: The x3850 X5 offers a 4 socket single node using the Intel Xeon E7 series processors with up to 10 cores in each socket. This provides up to 40 cores and 80 threads in a 4U form factor. The system scales to 8 sockets via interconnection of two single nodes making an 8U dual node system with up to 80 cores and 160 threads.

Memory bound applications: The x3850 X5 offers 2 TB native in a single node, expandable to a total of 3 TB using the IBM MAX5 1U expansion unit. Dual node units provide up to 6 TB global memory with two IBM MAX5 expansion units.

Storage I/O bound applications: The x3850 X5 provides up to 300,000 IOs per second (IOPS) using the two included High IOPS SSD PCIe adapters optional with each system. For even greater performance, IBM offers eXFlash, a high-performance internal SSD storage solution offering up to 30 times more performance than enterprise had disk drives with 90 percent power and cooling savings per watt while delivering up to 240,000 IOPS.

> Consolidate up to 32 racks of equivalent 1U machines on to one virtualized x3850 X5 system and realize easier administration with consolidated single points of management

Consolidated VM environment: The x3850 X5 combination of high compute and memory density, along with mainframe inspired reliability provide the ideal platform for a consolidated virtual environment. The combination of high compute density and high memory density provide the optimal platform to deploy the highest density of VMware virtual machines in the industry.

Competitive Landscape

The following are the completive models most closely compared to the IBM X3850 X5:
- Cisco UCS: C460 M2
- Dell PowerEdge: R910
- Fujitsu PRIMERGY: RX600 S6, RX900 S2, PRIMEQUEST 1800E2
- HP ProLiant: DL580 G7, DL980 G7
- Oracle Sun Server: X2-4, X2-8

Quick-Hitting Selling Points

Workload Optimized Systems - These are all named IBM System x3950 X5 to distinguish them from base x3850 X5 models, even though the base hardware is the same. These are systems that are specially configured to meet the requirements of a particular software stack. There are currently two Database workload-optimized models, five SAP HANA workload-optimized models, and three Virtualization workload-optimized models (see section below for details).

Scalable up to 8 Sockets - Two 4U x3950 X5 systems may be interconnected to form a single 8U 8 socket x3950 X5 system. This expanded system houses up to 80 cores and 160 threads along with up to 4 TB of native memory and 6 TB using two IBM MAX5 expansion units.

IBM MAX5 memory expansion unit adds up to 1TB of memory (single node), 2TB of memory (dual node). It is a 1U form factor unit with a built-in memory controller and integrated memory ProteXion technology for increased redundant "bit steering" reliability.

The solid state drives (SSD) like the ones in the eXFlash have more than twice the MTBG of conventional drives, are optimized for mirroring, and reduce power consumption by over 87% compared to conventional drives.

IBM eXFlash Storage unit provides up to 1.6 TB of available eMLC SSD storage space with IBM 200 GB drives or up to 400 GB eMLC SSD storage with IBM 50 GB drives. The x3850 X5 can attach up to two eXFlash units per node includes Raid 5/6 controller and can perform up to 240,000 random read IOPS, Up to 2 GBps of sustained read throughput The eXFlash greatly speeds I/O, delivering up to 240,000 IOPs. By selecting eXFlash over traditional disk drives, clients can achieve a 30x performance increase and 90% better performance per watt for local databases. Cost and complexity savings are phenomenal – a 100-to-1 replacement ratio of traditional drives and cables, $350,000 cost savings over traditional drives, a 10x reduction in energy usage, and up to 30x greater solution density compared to a traditional disk drive solution.

Workload Optimized Systems – x3950 X5

Workload optimized Solutions like the models of the 3950 X5 deliver tested and proven solutions for data management, virtualization solutions and database engines.

These systems use the same base system and components as the x3850 X5, but are optimized with both hardware and software for specific workloads. Performance benchmarks for the X3850 X5 can be used if no specific X3950 X5 benchmark is available because they use the same building block components. Exact specifications for these models are include in the IBM System x3850 X5 Redbook.

The following is a breakdown of the x3950 X5 workload optimized models:

> Enhanced Predictive Failure Analysis helps identify a troubled component before it actually fails.
>
> Light-Path Diagnostics, quickly leads technicians to the specific component that needs to be replaced.

Database Optimized

Models 7143-D3x, D4x: These models are designed for database applications and use solid state drives for the best I/O performance.

- o Backplane connections for sixteen 1.8-inch solid state drives (SSD) are standard, as are sixteen 200 GB high-performance solid-state drives. Model D3x includes two SSD host bus adapters. Model D4x includes four ServeRAID M5015 RAID controllers with four ServeRAID M5000 Series Performance Accelerator Keys.

SAP HANA Optimized

Models 7143-HAx, HBx, HCx: These models are optimized to run the SAP High-Performance Analytic Appliance (HANA) solution and is an integrated, ready-to-run, hardware-software offering, featuring the new SAP HANA software. Models HDx and HEx are specifically designed for SAP Business Suite, powered by SAP HANA (OLTP) workloads.

- o Models HAx, HBx, HDx include a preload comprising SLES for SAP, IBM GPFS, and the SAP HANA software stack.
- o HCx, HEx are add-on models designed to be connected to model HBx or HDx system respectively to form an eight-processor system. HCx and HEx include the four QPI cables necessary to join two systems together to form a two-node complex. HCx and HEx also include the additional GPFS software and SLES licenses to cover the extra four sockets, but do not include any preload because the are designed as an add-on to the HBx and HDx offerings respectively.
- o All H models include either 256 GB, 512 GB or 1024 GB of RAM, SAS disk drives, and a high IOPS solid-state storage PCIe adapter.

Virtualization Workload Optimized

Models 7143-F1x, B9x, F2x: These models are designed for virtualization applications and include expanded memory.

- o Model 7143-F1x, B9x: These models include VMware ESXi 4.1 Update 1 on an integrated bootable USB memory key. The model comes standard with the MAX5 memory expansion unit and 384 GB of memory implemented using 4GB memory DIMMs (256 GB in the server and 128 GB in the MAX5).
- o Model 7143-F2x: This model is designed for Open Virtualization and includes Red Hat Enterprise Linux with the Red Hat Enterprise Virtualization Hypervisor (Kernel-Based Virtual Machine, KVM). The software is not preloaded. The model comes standard with the MAX5 memory expansion unit and 384 GB of memory implemented using cost-effective 4GB memory DIMMs (256 GB in the server and 128 GB in the MAX5).

Key x3850 X5 Whitepapers

Pund-IT: The System x X5 Difference – IBM Innovation on Industry Standard Servers

This study discusses the Intel x86 and Xenon processor in the data center and dives into the innovations IBM brings to the market with their eX5 technologies. This serves as a great document to share with customers detailing IBM's enhancements over competitors more conventional products and what makes IBM eX5 products superior.

> The x3850 X5 features the IBM ex5 Architecture, the fifth generation of mainframe-inspired IBM Enterprise X-Architecture, delivering using the latest generation Intel "Westmere EX" (Xeon 7500 series)

Edison Group: Harnessing the Power of IBM eX5 Systems for High-Frequency Transaction Processing

This white paper discusses transaction processing as it applies to high-frequency trading (HFT) in the securities industry, and specifically examines how NYSE Technologies implemented single-server HFT systems, based on the IBM System x3850 X5 server.

Edison Group: Leveraging IBM eX5 Systems for Breakthrough Cost and Density Improvements in Virtualized x86 Environments

This whitepaper discusses the challenges facing data centers, the widespread adoption of server consolidation via virtualization and how IBM eX5 architecture reduces the number of servers required for a given workload by 50-66 percent and lowers licensing fees by as much as two-thirds over comparably-priced servers. This study highlights the eX5 technology and uses the x3690 X5 and HP DL380 G7 as examples.

Alnean: Server Consolidation for SAP ERP with IBM System x Servers – Lowering TCO

This paper reviews the business case a large chemical manufacturing organization recently put together for migrating their SAP ERP system from Sun SPARC servers to the latest IBM System x eX5 enterprise systems. It includes performance and a cost comparisons leading to the IBM x3850 X5 server solution lowering annual operating costs by 80%, leading to a savings of $684,000 over a three year analysis period.

IBM: SAP Virtualization with VMware on IBM System x3850 X5

This paper explains why and how to virtualize SAP implementations on an IBM System x3850 X5 server including setup and management. It also reviews enhanced monitoring and includes a comparison of the performance of the x3850 X5 and the X3950 M2 with the same workload.

IBM: System x3850/x3950 X5 Combined with High IOPS SSD PCIe Adapters Demonstrate New Levels of I/O Scalability

The IBM System x3850 X5 and x3950 X5 servers are capable of delivering much higher I/O performance than previous generations of the IBM System x server. This paper demonstrates how the combination of the IBM System x3850 X5 servers and these high-IOPS adapters makes it possible for IBM to deliver storage bandwidth of more than 10 GB/s from a single x86 server.

Sageza Group: Integrated Systems Management, The new Generation of IBM System x Servers

This paper explains the importance of IT's ability to deliver dynamic services that are closely aligned with business needs while maximizing the cost-effectiveness of all IT resources. How IBM is advancing the Systems Management discipline in the x86 environment to be consistent with its other hardware platforms is reviewed along with total systems management experience.

Operating Environments supported:

- o Microsoft Windows Server 2008 (Standard, Enterprise and Data Center Editions 64-bit)
- o 64-bit Red Hat Enterprise Linux
- o 64-bit SUSE Enterprise Linux (Server and Advanced Server),
- o VMware vSphere Hypervisor

IBM: Advantages of IBM eX5 for Database Workloads Redpaper

This IBM Redpaper publication describes how features of the IBM eX5 servers address datacenter requirements including requirements and workload optimization specific to OLTP and BA workloads. Additionally, this paper describes other solutions that work in concert with the eX5 family of servers. This paper is based on in-house studies conducted by the IBM Strategy and Testing Laboratory using production-quality IBM System x3690 X5 servers.

Benchmark Highlights

IBM posts best ever TPC-E benchmark performance , March 18 2013

The TPC-E benchmark is designed to enable clients to more objectively measure and compare the performance and price of various OLTP systems. The IBM System x3850 X5 server achieved 5,457.20 tpsE (transactions per second E) at $249.58 USD / tpsE. This result is 18% faster than the next-best result-- at 44% better price/performance.

eX5 architecture is built upon industry-standard processors, memory and I/O. Not only does the chipset outperform those used by HP and other server vendors, but it also helps the industry-standard components work together better.

IBM posts world-record result for Windows on two-tier SAP SD benchmark, September 13, 2011

World-leadership results on Windows on the two-tier SAP Sales and Distribution (SD) standard application benchmark were achieved on IBM x3850 X5. The x3850 X5 using eight Intel Xeon® E7-8870 processors and DB2 9.7 have achieved the highest result ever published on Windows on the two-tier SAP SD standard application benchmark. The x3850 X5 achieved 25,500 SAP SD benchmark users with 0.87 seconds average dialog response time, 140,720 SAPS and an average CPU utilization of 91% for the central server. The This result beats the previous-best eight processor result of 25,160 SAP SD benchmark users on Windows achieved by the HP ProLiant DL980 G7. The x3850 X5's result demonstrates excellent scalability by increasing performance 82% from four sockets to eight sockets.

IBM 3850 X5 and DB2 achieve more than 3 million TPM on TPC-C benchmark , July 11,2011

The TPC-C simulates a complete computing environment where a population of users executes transactions against a database around the principal activities (transactions) of an order-entry environment. IBM has published the highest TPC-C performance result ever achieved by an x86-64 processor-based server and demonstrates the combined power of IBM's exclusive fifth-generation X-Architecture, DB2 9.7, and the latest Intel Xeon E7 processor technology using a configuration housed entirely in a single 42U rack. The IBM System x 3850 X5 server achieved 3,014,684 tpmC (transactions per minute C) at $ .59 USD / tpmC. This TPC-C result ranks fifth in the TPC-C Top Ten Performance Results for Non-Clustered systems and is in the TPC-C Top Ten Price/Performance Results for Non-Clustered systems.