

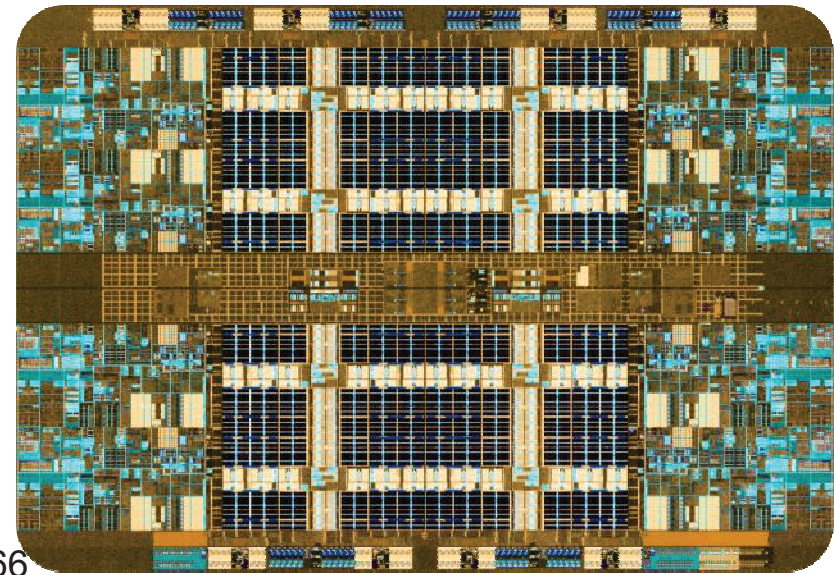
5th Generation of X-Architecture



Intel Nehalem-EX Overview

Key Features:

- Up to **8 cores** per socket
- Intel® **Hyper-Threading** (2 threads/core)
- 24MB shared last level cache
- Intel® **Turbo Boost** Technology
- **45nm** process technology
- **Integrated memory controller**
 - Supports speeds of DDR3-800, 978 and 1066 MHz via a memory buffer (Mill Brook)
- Four full-width, bidirectional Intel® QuickPath interconnects
 - 4.8, 5.86, or 6.4 GT/s
- CPU TDP: ~130W to ~95W



Driving performance through Multi-threaded, Multi-Core Technology in addition to platform enhancements



Westmere-EX

Westmere-EX/MB2 launch is April 5th

More Performance

- 10 cores / 20 threads
- 30MB of last level cache

More Security & RAS

SECURITY

- Intel® Advanced Encryption Standard-New Instructions
- Intel® Trusted Execution Technology (TXT)

RELIABILITY, AVAILABILITY, SERVICEABILITY

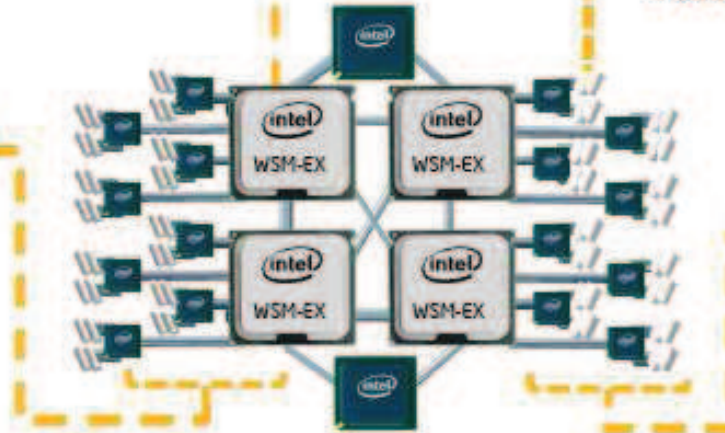
- Double Device Data Correction (DDDC)
- Partial Memory Mirroring

More Expandable

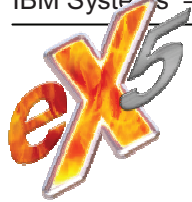
- Supports 32GB DDR3 DIMMs (2TB per 4-socket system)¹

More Efficient

- More performance within same max CPU TDP as Xeon 7500
- Lower partial active & idle power via Intel Intelligent Power Technology²
- Support for Low Voltage-DIMMs³
- Reduced power memory buffers⁴



Delivers more Performance, Expandability and RAS while improving Energy Efficiency



...announced March 2nd 2010 ...started shipping March 30

The new thinking of x



5th generation portfolio of IBM innovative technology in enterprise x86 computing.



Expansion of **Enterprise X-Architecture** to **IBM BladeCenter** and **2-socket systems**.



2X the memory of standard offerings resulting in more workload at lower cost.



Culmination of **10 years and \$800M** in x86 research and development

3 systems using Xeon 7500 + 3 innovations



April 6th : System x WSM-EX refresh with new Intel processor E7

Introducing eX5 – a portfolio that redefines enterprise x86 computing



System x3850 X5



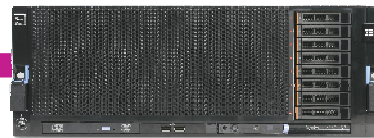
BladeCenter HX5



System x3690 X5

MAX5

Maximum memory scaling
independent of processors



eXFlash

Extreme IOPs SSD
storage

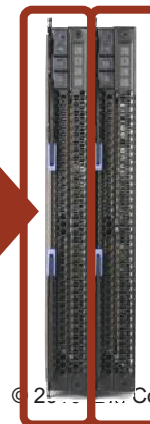
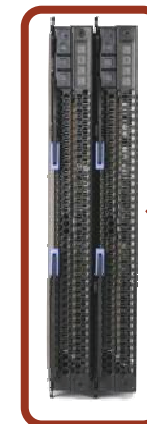


FlexNode

Scheduled
provisioning

One 4-Socket
System

Two 2-Socket
Systems



IBM System x3850 X5 & x3950 X5

Premier System x flexible platform for maximum performance and productivity

Customer value

Flexibility

- Scalable systems

Customized Performance

- Achieve database and virtualization performance and productivity

Easy to Own

- Increase performance on a smaller IT budget

OnForever IT

- Maximum memory integrity
- Greater system uptime than monolithic design

Target Workloads

- Virtualization / consolidation / virtual desktop
- Database
- Compute-intensive

Features and Benefits

- Scale via QPI from 4 sockets and 64 DIMMs to 8 sockets and 128 DIMMs
- Capable of scaling via eXA and MAX5 up to 192 DIMMs
- MAX5 for leadership database and virtualization performance, and lower cost high performance configurations
- eXFlash for high IOPS storage
- Achieve higher performance while purchasing fewer processors with MAX5
- Reach desired memory capacity using less expensive DIMMs with MAX5
- Reduce software license costs by expanding memory capacity with MAX5 rather than purchasing more processors
- Memory Protexion
- Predictive Failure Analysis
- Automatic Node Failover
- QPI Fail Down



Key Features

- ✓ 4x Xeon E7 CPUs (6C/8C/10C)
- ✓ 64 DDR3 DIMMs in base
- ✓ 7 PCIe slots
- ✓ Up to 8x 2.5" HDDs or 16x 1.8" SSDs
- ✓ RAID 0/1 Std, Opt RAID 5/6
- ✓ 2x GigE
- ✓ Emulex 10GigE
- ✓ Scalable to 8 sockets
- ✓ Internal USB for embedded hypervisor
- ✓ IMM & uEFI

Learn More: <http://www-03.ibm.com/systems/x/hardware/enterprise/x3850x5/index.html?>

IBM System x3690 X5

Maximum performance, maximum memory for virtualization and database applications

Customer Value

- Achieve high database and virtualization performance at a lower purchase price compared to a 4 processor system
- Increase performance while reducing power consumption in the data center
- Up-front hardware and software savings
- The reassurance of ample room to grow
- Maximum memory integrity
- Greater system uptime than high volume designs

Features and Benefits

- 100% more virtual machines per system with MAX5 memory expansion
- Leadership database performance: more database transactions processed per minute with eXFlash
- More performance per watt in transactional database processing with eXFlash
- Spend less than a 4 socket system at time of purchase
- Cut per-socket software license costs by 50% by purchasing a system with 2 fewer sockets
- Scales via MAX5 from 32 DIMMs to 64 DIMMs
- Memory Protection
- Predictive Failure Analysis
- RAS features of high end processors and systems



Key Features

- ✓ 2x Xeon E7 CPUs (6C/8C/10C)
- ✓ 32 DDR3 DIMMs in base
- ✓ 5 PCIe slots
- ✓ Up to 16x 2.5" HDDs or 24x 1.8" SSDs
- ✓ RAID 0/1 Std, Opt RAID 5/6
- ✓ 2x GigE
- ✓ Emulex 10 GigE
- ✓ IMM & uEFI

Target Workloads

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Learn More: <http://www-03.ibm.com/systems/x/hardware/enterprise/x3690x5/index.html?>

IBM BladeCenter HX5 WSM-EX refresh

Scalable high end blade for high density compute and memory capacity

Key Features

High End Scalable Blade

Customer Benefits

- Maximum compute capacity with up to **40 CPU cores in 4 processor blade**
- **Up to 2.3x greater performance** over 2S WSM-EP systems

MAX5 Memory Expansion

- Memory capacity up to **640GB in a 60mm design**
- Memory bound VMWare customers can **save over \$10K in licensing** with memory rich two socket configurations
- Upgrade to **40 DIMMs** for max memory performance or to **save by using smaller, less expensive DIMMs**

FlexNode Partitioning and Automatic Node Failover

- **Get up and running up to faster** by qualifying a single platform for 2 and 4 socket server needs
- **Partitioning** of 4 socket to two 2 sockets without any physical system reconfiguration, and automatically fail over for **maximum uptime**

Energy Efficiency

- **Consume up to 15% less power** with energy efficient 1.35V DIMMs
- 20-30% more performance in the **same power envelope** as the predecessor product

Investment protection

- Start with a 2P system and add **capacity on demand** with scalability
- No system premium or parts on the floor to upgrade or boost memory
- Separation of memory capacity from processors, enabling license constrained memory rich configurations

Where to win

Target Workloads: Database, Virtualization, Modeling & Simulation

Target Industries: Finance, Industrial, EDA and Federal

Target Customers: HP BL620/BL680 customers and 2S BL490c customers



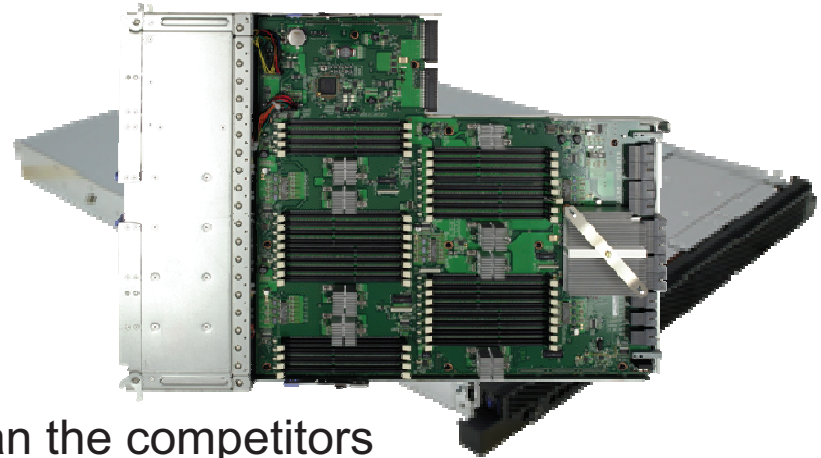
How To Beat the Competition

- Stomp HP's 4S blades with flexible, 4S, 32 DIMM HX5 or 2S 40 DIMM HX5 + MAX5
- Undercut HP's 2S blade with denser, cost optimized 2S, 16 DIMM HX5 or beat it with max performance 2S, 40 DIMM HX5+MAX5 for 1.25X the memory capacity for the same software license cost
- Deliver faster time to value with single scalable platform for 2 and 4 socket needs

MAX 5 Doubles Memory Capacity

MAX 5 Features:

- Expand memory capacity
- No impact on memory latency
- Up to double the number of memory DIMMs than the competitors
- Over five times the memory capacity in two sockets vs. today's leading two-socket systems
- 2 mechanical designs (1u or Blade)



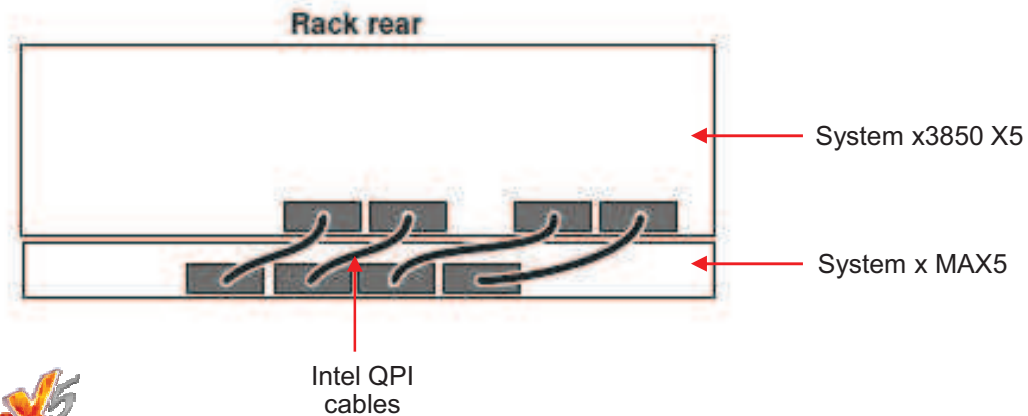
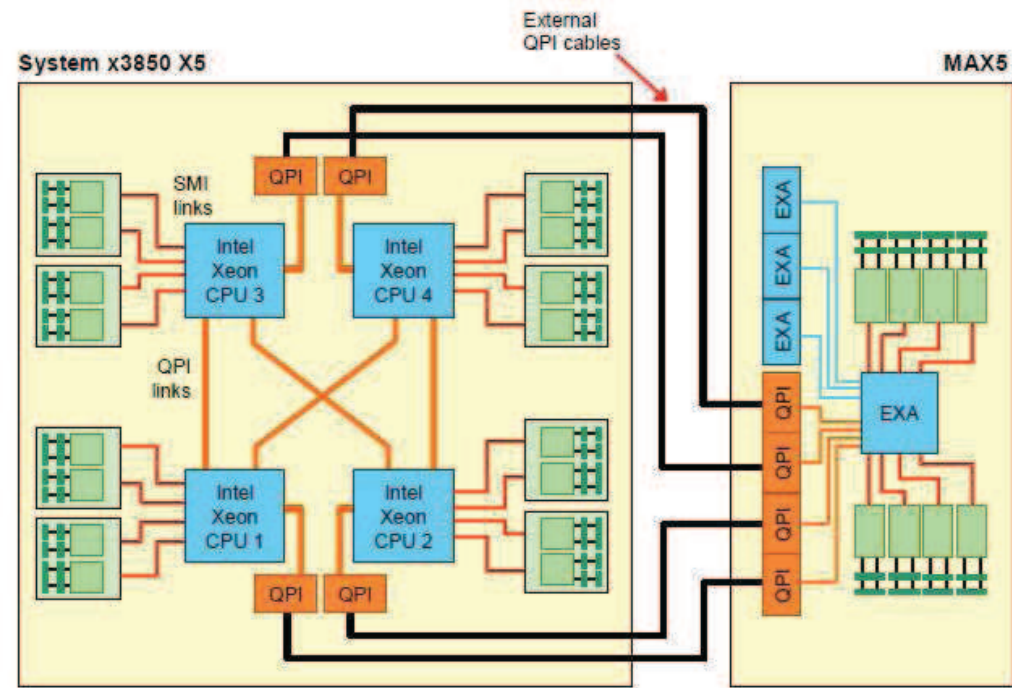
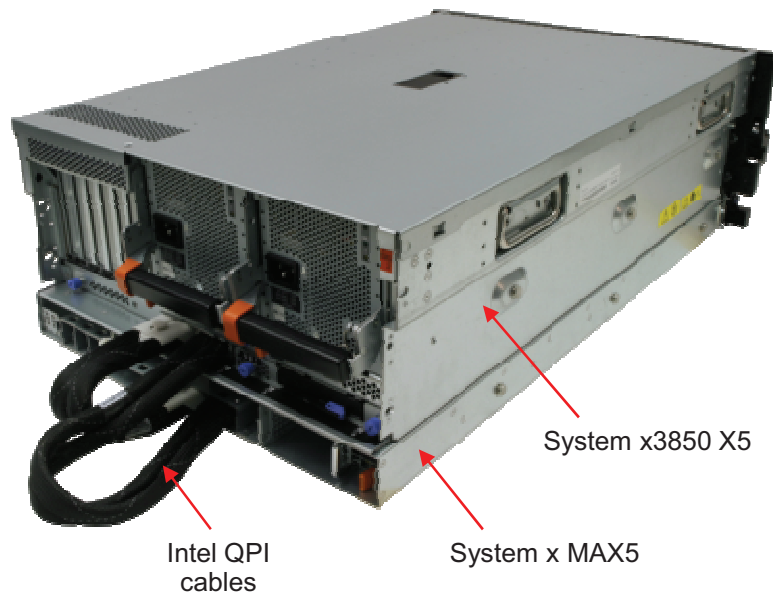
Provides the memory customers have needed for database and virtualization – up to 100% more virtual machines

Allows higher memory capacity to be reached with less expensive DIMMs for more economical high end implementations



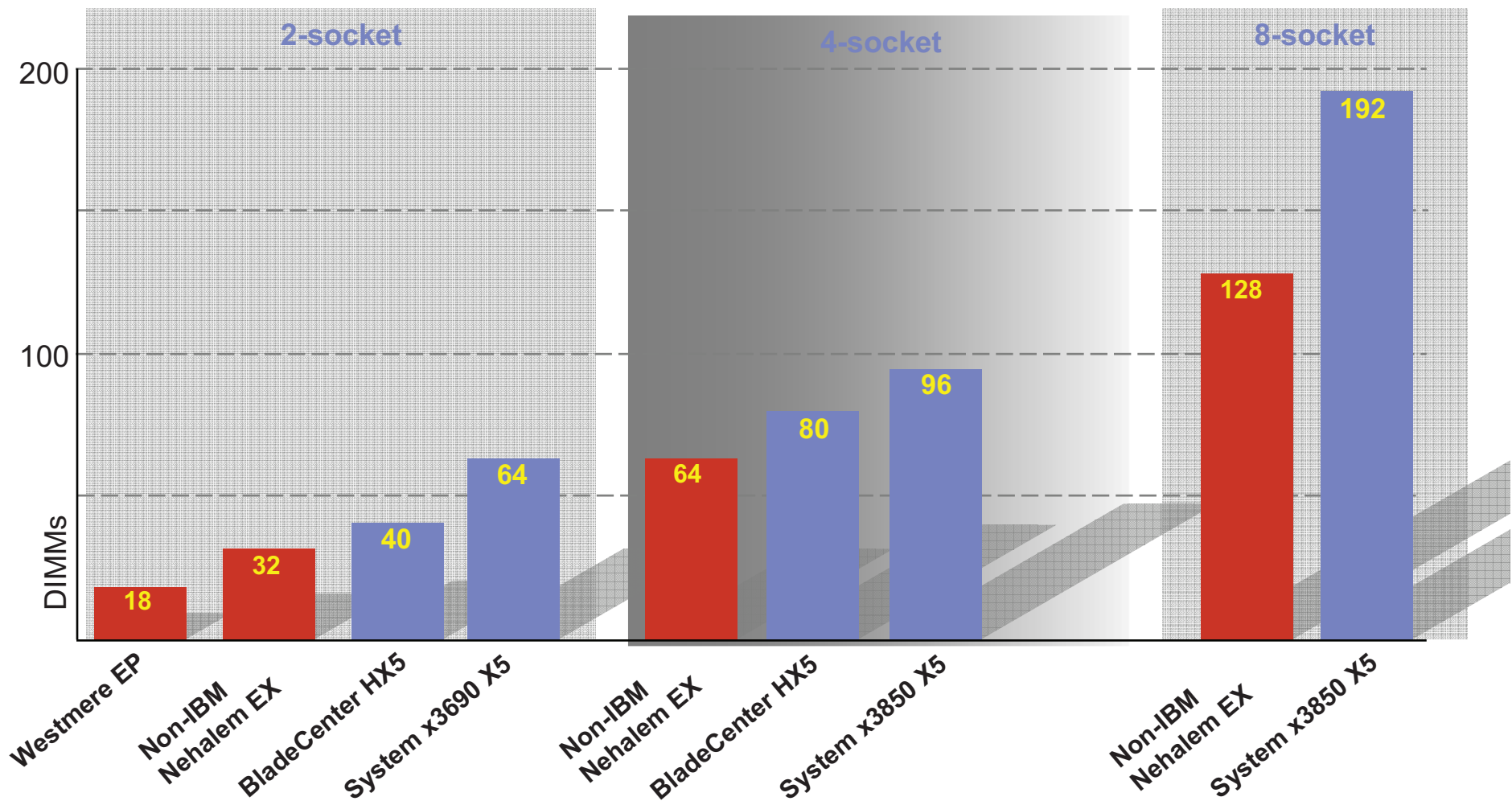
IBM System x MAX5

IBM Systems – Geneve 13 April, 2011



Maximize memory

The new eX5 portfolio provides as much as twice the amount of memory as competitive systems



Minimize cost

Eliminate the memory bottleneck and minimize VMware licensing costs

82%
more VMs

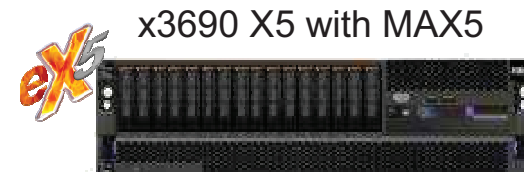
Same 2S license cost

50%
license cost

Same number of VMs



x3690 X5 with MAX5



x3690 X5 with MAX5

2S Non-IBM server



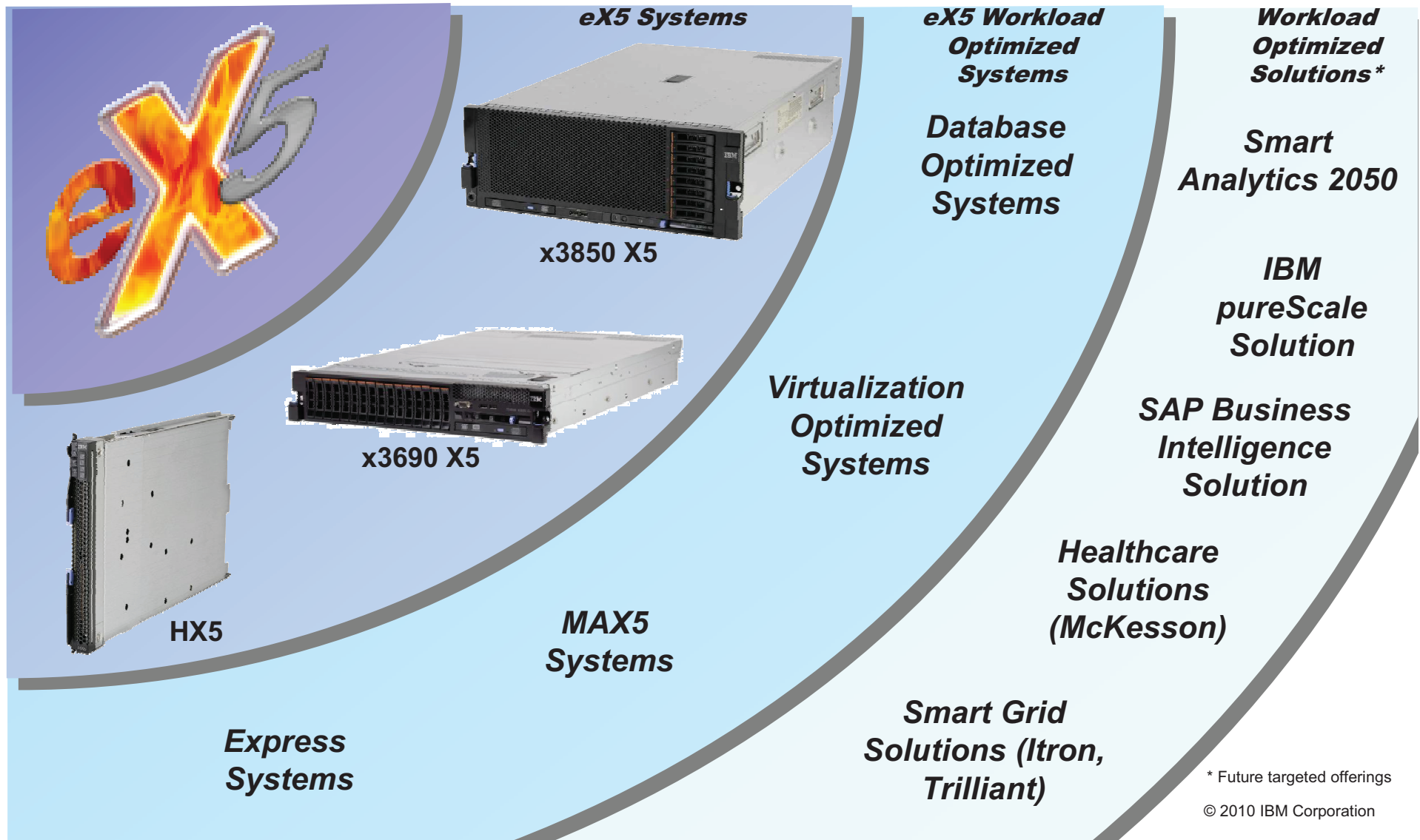
4S Non-IBM server



Software licensing costs for VMware Enterprise Plus Cost: \$3,500 per processor.
Memory is constrained before processors are fully utilized.

eX5 Workload Optimized Brand Value

Integrated solutions and workload optimized Systems enhance the eX5 brand value



* Future targeted offerings

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eX5 Workload Optimized Customer Value Example

Spectrum of offerings adding incremental value with each offering



x3850 X5 System

Base 4 Socket System

- Maximize memory with large memory capacity & MAX5 Memory Expansion
- Minimize cost by consolidating on most powerful System x platform ever
- Simplify Deployment with IBM Systems Director

Database Optimized System

x3950 X5 with eXFlash technology

- Up to 200x faster local database performance over spinning disks
- 97% storage cost savings over equal IOPs spinning storage
- 99% power savings over equivalent eight racks of storage
- Maximum reliability with RAID 5/6 and hot-swap components

Smart Analytics 2050 Solution

DB2 Integrated Analytics Solution

- Intelligent cost reduction with improved decision making
- Faster time to value with pretested, easy-to-install solutions
- Optimized for top performance by IBM experts that deliver results in days rather than months
- Improve performance and 50% less floor space than competition

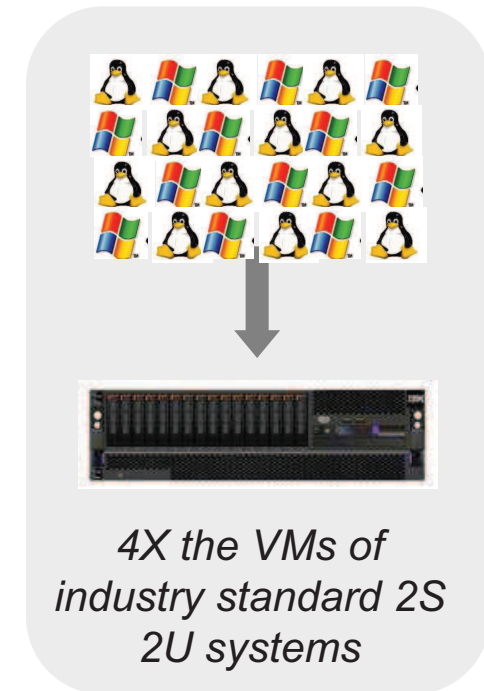
eX5 Virtualization Optimized System Summary

Capabilities

- MAX5 expansion for up to a 512GB of added memory
- Large quantity of smaller, lower cost DIMMs per system
- Open source hypervisor option for Linux environments

Benefits

- Up to 5.3X the number of virtual machines of single VMware license industry standard 2U Nehalem EP system
- Up to 3X the number of virtual machines of single VMware license competitor Nehalem EX system
- Integrated hypervisor for simpler deployment and management



Preconfigured Models

	MTM	Hypervisor	Processors	DIMMs	Memory (max)
x3950 X5	7145-4Dx	VMware vSphere 4.1	4 x X7550	96 DIMMs	1.5TB
x3690 X5	71482Dx	VMware vSphere 4.1	2 x E6540	64 DIMMs	1TB
HX5	7872-68x	VMware vSphere 4.1	2 x E6540	40 DIMMs	640GB