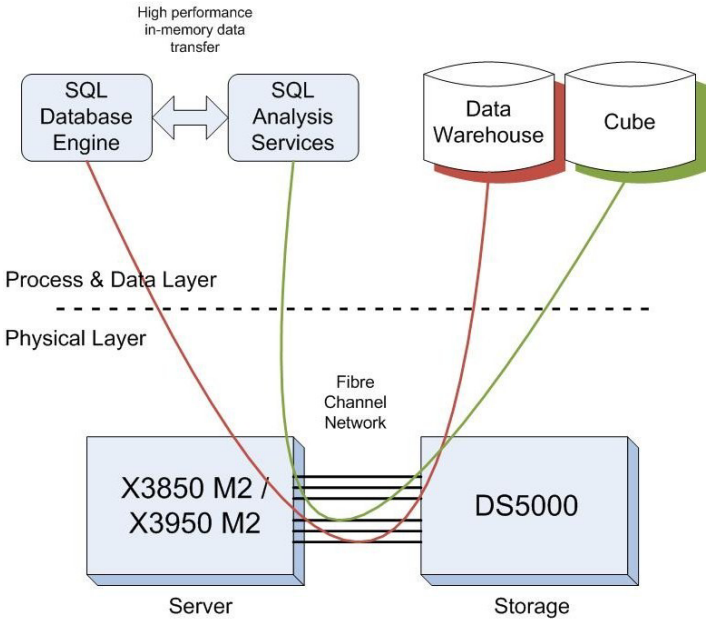
IBM Business Intelligence Architecture for Microsoft SQL Server and Microsoft Windows Server 2008

Highlights

- *Exploit business intelligence by turning raw data into actionable knowledge*
- *Improve information availability for mission-critical databases*
- *Enjoy a robust, easy-to-manage environment featuring the flexibility and efficiency of the IBM System x 3950 M2 and the IBM DS5000 modular storage system*
- *Meet business needs for higher levels of scalability, performance, and operational efficiencies with IBM X-Architecture*
- *Enjoy flexible and reliable IBM information infrastructure business intelligence solutions based on close collaboration with the Microsoft product teams*

IBM BI Reference Architecture



Are you overwhelmed by too much data across the enterprise that is simply not giving you the consolidated business intelligence you need? Are you facing mounting costs associated with storing and managing data?

Turn your data into knowledge that can be used for competitive advantage. Whether you have an existing data warehouse or business intelligence infrastructure or are just getting started, the IBM Business Intelligence Architecture for Microsoft SQL Server 2008 offers a business intelligence infrastructure that gets you up and running quickly and with minimal impact on your business.

Running on an IBM System x™ 3950M2 Server and IBM System Storage™ DS5000 platform with Microsoft® SQL Server 2008®, the IBM BI Architecture for Microsoft SQL Server 2008 delivers application database affordability to companies of all sizes, offering new opportunities for increased resource utilization, ease of management, and improved ROI. Through close collaboration with Microsoft, IBM systems and storage are designed to work with Microsoft SQL Server 2008.

IBM Business Intelligence Architecture for Microsoft SQL Server 2008

Microsoft SQL Server 2008 combined with IBM technology helps speed up business decision-making, and helps you control the rising costs of managing data volumes as you seek to meet key performance targets.

Microsoft SQL Server 2008 offers outstanding data management and analysis for demanding business intelligence workloads. Business applications that use SQL Server can rely on proven performance from the IBM System x 3950M2, which is designed to meet business needs for higher levels of scalability, flexibility, availability, performance, and operational efficiencies. The IBM X-Architecture scale-up environment is designed to increase system utilization, reduce power and cooling requirements, decrease space requirements, and simplify operations, thus reducing system management requirements. IBM System Storage DS5000 provides the high performing, scalable, reliable, available, and flexible midrange storage systems needed to support the business intelligence infrastructure.

In summary:

- IBM System x provides the most scalable Intel-based system
- IBM System Storage provides high performance and robust disk solutions for mission-critical applications
- In combination with Microsoft SQL Server 2008 and Microsoft Windows Server 2008, this architecture provides all the components needed to build a comprehensive BI solution

IBM Business Intelligence: Reference System Configuration

The IBM BI Reference Architecture for Microsoft SQL Server 2008 has been designed and tested to provide a high performance platform for building and processing Analysis Services Cubes and processing queries sequentially with multiple users in parallel on a web tracking workload.

IBM System x 3950 M2 and IBM System Storage DS5000 used in conjunction with Microsoft SQL Server 2008 running BI workloads and BI applications can transform raw data into business intelligence – opening the door for reduced costs, increased system flexibility and an enhanced and simplified infrastructure. IBM works closely with Microsoft to ensure our products are optimized for SQL Server 2008 deployments.

Microsoft SQL Server 2008 ushers in a new era of application database affordability to companies of all sizes, offering new opportunities for increased resource utilization, ease of management, and improved ROI. Together, the IBM x3950 M2 server and IBM DS5000 storage running Microsoft Windows Server 2008 and Microsoft SQL server 2008 provide a powerful platform for customers to design a cost-effective, scalable BI solution in a traditional x86 environment.

Traditionally, Business Intelligence solutions have been proposed with the SQL Relational Database running on one server and Analysis Services on another server. IBM has tested configurations with both of these components running on the same server and proposes such configurations. For these set of reference configurations, the size of the RDW database and OLAP cube size is kept constant and scaling is shown in terms of improvement in cube building and processing time.

IBM Business Intelligence Reference Configurations

Relational Database Warehouse (RDW) size: 1.8TB, OLAP Cube size – 412GB

Configuration Size:	Configuration 1	Configuration 2	Configuration 3
Server configuration	IBM x3850 M2 server 4 x2.93 GHz quad-core processors 64 GB Samsung DDR2 memory 3 Emulex LPE 12002 8Gb HBAs	IBM x3850 M2 server 4 x2.66 GHz six-core processors 96 GB Samsung DDR2 memory 3 Emulex LPE 12002 8Gb HBAs	IBM x3850 M2 server 8 x2.93 GHz quad-core processors 128 GB Samsung DDR2 memory 3 Emulex LPE 12002 8Gb HBAs
Storage configuration - RDW	1 IBM DS5300 controller 2 x 72 GB RAID1 15K SFF (OS and SQL drive) 4 RAID5 7 disk arrays for fact data 1 RAID10 6 disk array for tempdb, database log and OLAP temp directory	1 IBM DS5300 controller 2 x 72 GB RAID1 15K SFF (OS and SQL drive) 5 RAID5 7 disk arrays for fact data 1 RAID10 6 disk array for tempdb, database log and OLAP temp directory	1 IBM DS5300 controller 2 x 72 GB RAID1 15K SFF (OS and SQL drive) 7 RAID5 7 disk arrays for fact data 1 RAID10 6 disk array for log 1 RAID10 6 disk array for tempdb, database log and OLAP temp directory
Storage configuration - OLAP cube	1 RAID10 14 disk array	1 RAID10 22 disk array	1 RAID10 30 disk array
Cube building and processing time	8 hours and 17 minutes	6 hours and 08 minutes	4 hours and 34 minutes
Scaling	1x	1.3 5x	1.34x over 24 cores 1.81x over 16 cores

Components of the Tested Architecture

Microsoft SQL Server 2008

Microsoft SQL Server 2008 running on Microsoft Windows Server 2008 enables organizations to build comprehensive, enterprise-scale analytic solutions that deliver actionable intelligence.

Key features:

- 64-bit native DBMS
- Ability to run 32-bit and 64-bit instances concurrently
- High availability via Failover Clustering, Database Mirroring
- Data compression for reduced on disk space utilization and increased speed
- Policy-Based Management for managing SQL Server instances across the enterprise

IBM System x3950 M2 Server

The IBM System x3950 M2 server is based on the 4th generation and proven IBM Enterprise X-Architecture chipset, X4 – providing the ability to scale-up based on a modular "pay-as-you-grow" design, high performance as demonstrated by leadership TPC benchmarks, and mainframe-like reliability in an x86 environment. IBM System x3950 M2 servers provide an uncomplicated, cost-effective and highly flexible solution. With the ability to scale while maintaining balanced performance between processors, memory and I/O, these servers can easily accommodate business expansion and the resulting need for additional application space.

Key features:

- True 2–to–16-socket scalability up to 96 cores (Current Windows versions only scale up to 64 cores)
- Revolutionary Intel Xeon MP 7400 Series processors with up to six computing cores and 16MB of L3 Cache
- Up to 1TB of registered DIMM memory for better workload density and up to 20–30% less power consumption than competitors' fully buffered DIMM technology
- IBM Memory ProteXion™ with redundant bit-steering offers twice the memory resilience of the competition
- IBM Predictive Failure Analysis®, not just on hard drives and memory but also on processors, power supplies, fans, and voltage regulator modules
- Flexible memory configurations at lower costs

The New IBM System Storage DS5000

The IBM System Storage DS5000 sets new standards for performance, scalability, reliability, availability, and flexibility for midrange storage systems. As IBM's most powerful midrange storage system, the DS5000 is the ideal platform for a database transactional environment that can keep pace with your business growth. Organizations can buy only the capacity needed initially, and can then dynamically upgrade and reconfigure additional capacity and features later to meet changing business requirements, all without any system downtime.

System x 3850

The DS5000 delivers class-leading performance and is equally adept at supporting transactional applications, such as databases and OLTP, throughput-intensive applications, such as HPC and rich media, and concurrent workloads, well-suited for consolidation and databases. With its relentless performance and architected to provide the highest reliability and availability, the DS5000 storage system is comfortable supporting the most demanding service level agreements (SLAs). And when requirements change, the DS5000 can easily be reconfigured "on-the-fly" to add or replace host interfaces, increase performance, grow capacity, or add cache – ensuring it keeps pace with your growing company.

Key features:

- Flexible host interface options are 8 Gb/s Fibre Channel and 10 Gb/s iSCSI ready
- Sixteen 4 Gb/s Fibre Channel drive interfaces for support up to 256 drives in initial release, with future support for 448 FC /SATA drives, using EXP5000/EXP810 drive expansion units.
- Remote Volume Mirroring and FlashCopy premium features for Volume Shadow Copy (VSS) supported backups and flexible DR scenarios

System Storage DS5000

Why Choose IBM Infrastructure?

The IBM Information Infrastructure helps customers of all sizes deliver the Information Services needed for modern data centers, while managing challenges such as exploding data growth, new applications, dynamic workloads, and new regulations. IBM understands the challenges and is responding with integrated hardware, software, and services solutions to help our clients achieve competitive advantage.

IBM system x3950 M2 provides a powerful and flexible scale-up x86 based solution to meet customer's demands for growth in this age of exploding information. Customers are faced with scaling problems as their database sizes keep growing and need for computing power keeps increasing. Scaling out their infrastructure leads to complexities of management and maintenance.

IBM system x3950 M2 servers provide a scale-up solution where customers can maintain their x86 environment and scale up to 64 cores with either the Intel x7350 quad-core processors or 96 cores using the Intel x7400 six-core processors. Seven PCIe slots per IBM x3950M2 server and a dual port 1Gb Ethernet NIC per server provide customers with enough IO and network bandwidth to handle the scaling needs.

IBM system x3950 M2 is built on the 4th generation of Hurricane chipset, called X4. The Hurricane chipset is based on proven IBM mainframe technologies and provides outstanding performance, scalability, and reliability. IBM X4 technology provides numerous advantages such as an improved memory subsystem, better power efficiency, faster data transfers and X4 scalability features that include:

- **XpandOnDemand** gives customers ability to grow your system when you need it. It is a modular building-block approach that provides an easier growth path to larger, scalable server configurations. Customers don't have to make a large investment up front. They can start small and grow the server seamlessly as the workload grows.

- **Scalable Systems Manager Software**, utilizing the RSA-II adapter, x3950 M2 customers can configure multiple x3950 M2 chassis into any combination of SMP or Clustering combinations.

IBM Information Infrastructure is comprehensive and client-focused. It includes the full range of Information Services and technologies, including archiving, virtualization, high speed replication, and off-line storage. IBM Information Infrastructure provides what many other vendors cannot: the full range of technology and technical know how to help most customers modernize their entire IT environment.

IBM Information Infrastructure offers:

- Unified Storage and Security Management Software
- Comprehensive Tape, Disk and Network Hardware
- Integrated Business Solutions
- Deep and Proven Industry Expertise

IBM Global Financing

IBM Global Financing offers:

- Hardware and Software Leasing
- Competitive Rates
- Improved Corporate Cash Flow
- Flexibility in Financing

For more information

For more information, please contact your IBM representative or visit:

IBM System Storage ISV solutions	http://www-03.ibm.com/systems/storage/solutions/isv/index.html/#microsoft
IBM System Storage	http://www-03.ibm.com/systems/storage/index.html http://www-03.ibm.com/systems/storage/product/i.html
IBM System x 3950M2	http://www-03.ibm.com/systems/info/x/3850m2/ http://www-03.ibm.com/systems/x/hardware/enterprise/index.html
IBM DS5000	http://www-03.ibm.com/systems/storage/disk/ds5000/index.html
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