What Sellers Need to Know

IBM DB2 with BLU Acceleration on Power

ARROW

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IBM DB2 with BLU Acceleration on Power

IBM Power System sellers looking for solution selling advantages need to look no further than DB2 10.5 with BLink Ultra Acceleration - also known as DB2 with BLU Acceleration.

DB2 10.5 with BLU Acceleration (which will be referred to as simply DB2 from now on) is an industry leading RDBMS Database for OLTP and OLAP workloads that takes advantage of the unique strengths of the POWER processor – high memory capacity, bandwidth and multi-thread processing along with the solid reliability and clustering of UNIX (AIX or Linux) to provide a uniquely powerful enterprise infrastructure solution.

DB2 also holds a unique position against its database competition. Industry leading features and performance as a legacy RDBMS combined with "in-memory" column based flexibility – all combined into one product - DB2 10.5. This allows customers to run traditional and existing DB2 database workloads and applications along side of new workloads that are designed to take advantage of in-memory (BLU acceleration) processing. Workloads accessing data warehouses, business analytics and other Big Data projects, can leverage the column based, in-memory capably of BLU acceleration and realize industry leading performance. No other leading database can offer this combination because their basic design does not allow it!

Technological superiority is important - but as important is the total cost of acquisition (TCA) and total cost of ownership (TCO) that both Power systems and DB2 have, separately and combined, over the competition.

What Makes Power Systems unique for DB2 Workloads

IBM Power systems have several very distinct advantages running DB2 workloads when compared to x86 competition including:

- With relatively recent IBM PowerLinux and Power systems and price adjustments, TCA is very competitive to x86 based systems and TCO is generally superior to x86 solutions.
- Deliver greater performance, higher utilization and superior availability when compared to x86 servers
- Eight-core Power processors can run four threads per core, while Intel's eight-core Xeon processors are limited to two threads for each core. This allows POWER based systems better performance for applications, like Big Data and databases, which can take advantage of a multi-thread processor.
- The Power and PowerLinux systems also have flexibility and granularity when licensing PowerVM. PowerVM is licensed by the core, so the system can initially be licensed for the number of cores needed to run the workload. Additional cores can be licensed to increase performance and utilization. VMware vSphere 5.1 licensing is only available per socketed processor rather than per core.
- Power and PowerLinux solutions have access to vast amounts of memory. There are no limits on memory usage for virtualization, which is the case for some x86 virtualization software packages.
- Logical pooling of physical resources in Power and PowerVM virtualization. This feature allows higher utilization rates for POWER based systems.

This brochure is a key deliverable to present some of the synergy to customers.

What makes DB2 unique as a RDBMS

DB2 with BLU Acceleration offers the following technological advances: Dynamic In-Memory, Actionable Compression, Parallel Vector Processing and Data Skipping

- Dynamic In-Memory – highly efficient procession of data at in-memory speed even if it does not fit entirely in memory. This allows for processing at in-memory speeds.
- Actionable Compression – Highly efficient compression which allows a wide variety of comparative operations to be performed without decompression. Most competitors only allow simple equality comparisons on compressed data.
- Parallel Vector Processing – Extend the parallel processing capabilities of DB2 to utilize the single instruction, multiple data (SIMD) instructions and associated registers in Intel, AMD and POWER processors. SIMD instructions allow vectors of values to be evaluated in parallel enabling the evaluation of as many as 128 values in a single instruction.
- Data Skipping – Allows vast amounts of data to be traversed in a highly efficient manner without examining each block of data.

The DB2 with BLU Acceleration datasheet provides additional details.

This video explains BLU Acceleration in 3:22 minutes.

In-memory Technologies

In-memory technology is the hot topic in databases. The performance gained by processing as much data as possible in-memory provides processing speeds far above those of a traditional RDBMS because moving data from memory to disk and back again impacts query performance.

IBM BLU Acceleration's efficient memory/disk management provides DB2 with significant in-memory capabilities with an "IBM" twist - DB2 assumes that there will never be enough memory for a complete environment. Instead of the entire environment residing in memory, DB2 uses advanced algorithms that allow efficiently transferring of data into memory. This prevents memory size being a limiting factor for database environment size. IBM Power systems adds to the solution by providing industry-leading capability to keep high volumes of data in memory because of its large cache sizes and memory bandwidth.

SAP HANA is designed for the entire database to be in-memory. This ensures in-memory speed processing for all data but limits the size of the database to that of the size of available system memory. Oracle and Microsoft both use memory in a traditional manner of caching data to memory from disk.

This IBM eBook describes how IBM DB2 on Power provides dynamic in-memory performance inexpensively.

Quick Hit Selling Points

- DB2 with BLU Acceleration is simply the latest version of DB2 (version 10.5 and greater). BLU Acceleration refers to technological advances incorporated into the product including new dynamic in-memory capabilities integrated with a column based data structure and advanced compression.

- DB2 with BLU Acceleration is the only in-memory columnar database on Power Systems

- BLU Acceleration raises the performance bar among x86-based solutions and it fully exploits the superior in-memory architecture of IBM Power Systems including its leadership in CPU cache, memory bandwidth and parallel processing threads.

- Since BLU Acceleration is integrated in DB2 10.5, adoption can be evolutionary or incremental. Since DB2 version 10.5 retains compatibility with existing DB2 databases and applications, one table can be converted at a time or all tables can be converted to column-based BLU tables. DB2 includes tools to help assess the impact of using BLU tables. SAP HANA requires a completely converted environment making it most suitable for entirely new workloads.

- DB2 runs on multiple platforms including Power and x86. SAP HANA is certified only on certain x86 configurations. The latest versions of Oracle do not support PowerLinux.

- DB2 supports both row and column-based tables. SAP HANA is completely columnar; Oracle is row based. Column based databases currently allow better in-memory performance and have compression and speed advantages over traditional RDBMS structures.

- DB2 harnesses the massive hardware parallelism of POWER7+-based systems for extreme capacity that is often required by OLTP processing. POWER7+ supports up to 32 threads per chip and DB2 is specifically designed to leverage and optimize multiple threads automatically, with no change to applications. Better overall performance means fewer servers and fewer software licenses are needed, while the multiple compression technologies pioneered by DB2 means less storage space is required.

Key areas of opportunity for DB2 on Power

Solution - RDBMS Database

DB2 is an outstanding RDBMS solution in terms of features, functionality and performance. The base design that allows it to function as a traditional RDBMS and an in-memory columnar database within the same version, provides customers choice, performance and functionality unlike any of the other major database solutions.

See the following whitepaper studies below for supporting information:

- Edison Group study below directly comparing Power/PowerVM vs. x86/vSphere for virtualization with DB2.(Study A)
- Clabby Analytics study comparing DB2 with BLU Acceleration with SAP HANA and Oracle Exadata.(Study D)
- Infostructure Associates study providing a deep dive into DB2 with BLU Acceleration (Study E)
- ITG Report comparing costs of deploying Oracle 11g vs IBM DB2 10. (Study G)
- BI Research paper discussing database management and business intelligence issues and how IBM DB2 competes in each area (Study H)
- IBM case studies of customers using IBM DB2.(Study J)
- IBM paper discussing the technological advances and business value of IBM DB2 (Study K)

Solution - SAP Database

DB2 as the database for SAP solutions is worthy of special mention.   The speed and functionality of DB2 combined with the clustering and performance of IBM Power systems make a powerful combination for SAP solutions. The TCA and TCO of the combination make a compelling business case to financial buyers. This technical overview [presentation](#) provides key selling points for selecting DB2 over the competition for SAP environments.

See the following whitepaper studies below for supporting information:

- Clabby Analytics study comparing DB2 with BLU Acceleration with SAP HANA and Oracle Exadata. (Study D)
- ITG brief comparing the cost and benefit of DB2 10 vs. Microsoft SQL server. (Study F)

Solution - Big Data

Big Data is a great solution to host on Linux on Power platform. The computing power advantage that POWER 7+ based systems have over Intel Xeon based systems make Linux on Power a very compelling solution. Big Data solutions typically take advantage of both large amounts of memory and the four threads/core processing ability of the POWER 7+ processors. In addition, IBM GPFS allows these applications to efficiently exploit parallel file systems across multiple servers. IBM's InfoSphere solution set is an ideal for customer's Big Data needs.

See the following whitepaper studies below for supporting information:

- IBM Research report benchmarking Bid Data on a PowerLinux cluster showing superior throughput (Study C)
- Gabriel paper discussing how organizations can embark on Big Data projects cost effectively using Linux and Power System. (Study L)
- BI Research paper discussing database management and business intelligence issues and how IBM DB2 competes in each area. (Study H)
- IBM paper discussing three must have capacities for a data warehouse. (Study I)

IBM Featured Products

- InfoSphere BigInsights- Analyze data-at-rest - For companies wanting an enterprise-ready Hadoop-based solution, IBM InfoSphere BigInsights is IBM's powerful and versatile solution for managing and analyzing internet-scale volumes of structured and unstructured data at rest. Built on the open source Apache Hadoop software framework, it enhances this technology to withstand the demands of your enterprise, adding administrative, workflow, provisioning, and security features along with sophisticated analytical capabilities including text analytics and IBM BigSheets for data exploration.
- IBM InfoSphere Streams – Analyze data in motion - InfoSphere Streams enables continuous analysis of massive volumes of streaming data with sub-millisecond response times. This offering provides a highly scalable and agile infrastructure that can support a wide variety of both structured and unstructured data types. This capability helps improve an organization's insights and decision-making providing an opportunity to respond to events as they happen.
- InfoSphere Data Explorer -Discovery and navigation software that provides real-time access and fusion of big data with rich and varied data from enterprise applications for greater insight and ROI.
- IBM Smart Analytics System - Provides a comprehensive portfolio of data management, hardware, software, & services capabilities that modularly delivers a wide assortment of business changing analytics
- InfoSphere Master Data Management Creates trusted views of your master data for improving your applications and business processes.
- InfoSphere Information Server Understand, cleanse, transform and deliver trusted information to your critical business initiatives, integrating big data into the rest of your IT systems

Solution - Business Intelligence

IBM Cognos software – Extensive solution family that provides business intelligence insight into financial performance, strategy management and analytics applications.

See the following whitepaper studies below for supporting information:

- Bloor report comparing the characteristics and performance of leading BI platforms. (Study B)
- BI Research paper discussing database management and business intelligence issues and how IBM DB2 competes in each area. (Study H)

Virtualized Workloads

DB2 excels in a virtual environment and so do Power Systems. This is important to many customers looking to consolidate their environments for efficiency and simplicity. Several studies have been conducted that use DB2 for performance, TCA and TCO analysis.

See the following whitepaper studies below for supporting information:

- Edison Group study below directly comparing Power/PowerVM vs. x86/vSphere for virtualization.(Study A)
- Solitaire study looking at customer satisfaction levels of x86 and Power users using PowerVM (Study B)

Key Whitepapers

*Study A - <u>**Edison Group: The Advantages of IBM PowerLinux 7R2 with PowerVM versus HP DL380p G8 with vSphere 5.1**</u>*

This paper directly compares the performance, total cost of acquisition and total cost of ownership of a PowerLinux 7R2 with an x86-based HP DL380p G8 using DB2 as the comparison solution. The PowerLinux system performs roughly twice as many transactions per second as the x86-based system with the same number of physical cores while utilizing almost half as much RAM. This provides a distinct advantage when per-core priced applications are utilized and provides a savings in the cost of RAM. In addition, customers are provided with a platform with greater scalability to meet demanding workloads or highly virtualized systems.

In addition to the performance comparison, this study looks at the TCO and TCA of both systems based upon a normalized 5 year distribution. The IBM PowerLinux solution with IBM DB2 has a 45% lower TCO and a 47.3% lower TCA.   Both the TCO and TCA cost difference are directly attributed to the savings realized by the more powerful and memory efficient IBM POWER processors leading to reduce software license costs. (May 2013)

*Study B - <u>**Bloor Research: Considerations for maximizing analytic performance**</u>*

This report compares the characteristics and performance of the leading BI platforms. Four solutions are compared and contrasted: IBM Cognos BI running on DB2 with BLU Acceleration, SAP Business Objects running on SAP HANA, Oracle Business Intelligence Enterprise Edition running on Oracle Exadata and Microsoft Business Intelligence running on Microsoft SQL Server 2012. (December 2013)

Important database related notes from this research:

- "Neither SAP HANA nor Microsoft SQL Server, with or without their respective business intelligence products are in the same ballpark as Oracle and IBM when it comes to improving the performance of your analytic applications"
- DB2 with BLU Acceleration offers more than twice the performance as Oracle. It also offers more consistent performance.
- SAP HANA has been designed as an in-memory database
- DB2 with BLU Acceleration has significant in-memory capabilities and assumes that there will never be enough memory for a complete environment
- Oracle and Microsoft both use memory in a traditional manner for caching
- SAP HANA is completely columnar
- DB2 with BLU Acceleration supports both row and column-based tables.

Study C - *IBM Research Report: Understanding Systems and Architecture for Big Data*

This paper presents an initial study on Big Data benchmarking and methodology as well as workload optimized systems for Big Data and the sorting of 1TB of data on a 10-node PowerLinux 7R2 cluster. The finding is this dataset takes less than 8 minutes to complete the sort which translates to sorting 12.8GB/node/minute for the IO intensive sort. (March 2013)

Study D - *Clabby Analytics: IBM DB2 Acceleration vs. SAP HANA vs. Oracle Exadata*

This paper looks at the differences between IBM DB2 with BLU Acceleration, SAP HANA and Oracle Exadata. The study notes that in column mode IBM DB2 with BLU Acceleration has been reported to be 8 to 25x faster than traditional row-based relational databases (such as Oracle). At a recent competitive event for analysts in Toronto, we successfully demonstrated the dramatic performance, throughput and compression advantages of DB2 with BLU Acceleration vs. Exadata and SAP HANA. (December 2013)

Study E - *Infostructure Associates: IBM's BLU Acceleration: The Beginning of a Revolution*

Independently written article providing a deep dive into IBM DB2 with BLU Acceleration. It points out some of the architectural and performance strengths DB2 with BLU Acceleration has over the competition (December 2013)

Study F - *ITG Management Brief: Cost/benefit case for IBM DB2 10 compared to Microsoft SQL Server 2012 for SAP Enterprise Deployments*

In this Management Brief, ITG compares the total cost of ownership advantages of migrating from Microsoft SQL Server 2012 to IBM DB2 10 (Linux, UNIX, Windows) for SAP Business Suite 7 deployments. While this report does not evaluate BLU Acceleration, it does position DB2 vs. SQL Server 2012. (May 2013)

Study G - *ITG Report: Database Economics: Comparing Value Propositions for DB2 10 and Oracle Database Systems*

This report compares the costs of deploying Oracle Database 11g and IBM DB2 10 for Linux, UNIX and Windows in large organizations. Noted in this report is that three year license and support costs for use of DB2 10 Advanced Enterprise alone average 39 percent less than those for Oracle Database 11g. It also notes that DB2 wins most areas of feature-by-feature comparison and is effective in handling complex mixed workloads because it is less rooted in the transactional world than that of Oracle. (March 2013)

Study H – BI Research: Technology Innovations for Enhanced Database Management and Advanced BI

This paper discusses the database management and business intelligence issues and innovations over the years and provides descriptions of the IBM products that compete in each area. It is a good technology background article to leave with customers. (May 2013).

Study I - IBM: Three must have capabilities for today's warehouse environments

This paper proposes that customers need three must-have capabilities in a data warehouse: 1) Speed 2) Simplicity 3) Affordability. It describes how DB2 with BLU Acceleration delivers on each. This is a good high level paper for prospects. (May 2013)

Study J - IBM: Running at the speed of business

This brief provides four use cases where DB2 provides customers outstanding value. (May 2013)

Study K - IBM: BLU Acceleration changes the game

This whitepaper describes in detail the technological advances and business value of DB2 with BLU Acceleration. It can serve as a key customer leave-behind to describe both the technology and value. (July 2013)

Study L - Gabriel Consulting Group: Big Data without the Big Bang or Big Bucks

In this report, Gabriel Consulting discusses how most organizations will be approaching big data and why they should (or shouldn't) consider a "Big Data in a Box" solution. This is a key deliverable for prospects that are just getting started with Big Data. It presents some basic recommendations plus highlights some of the advantages Power has over x86 technology.

It also presents some interesting information on Big Data from their 2011-12 x86 Data Center survey such as the uses of Big Data. Enterprise Analytics, complex event processing, and visualization were all being used by over 50% of the respondents. The next most popular uses were data mining, modeling & simulation and real time analytics. (2012)