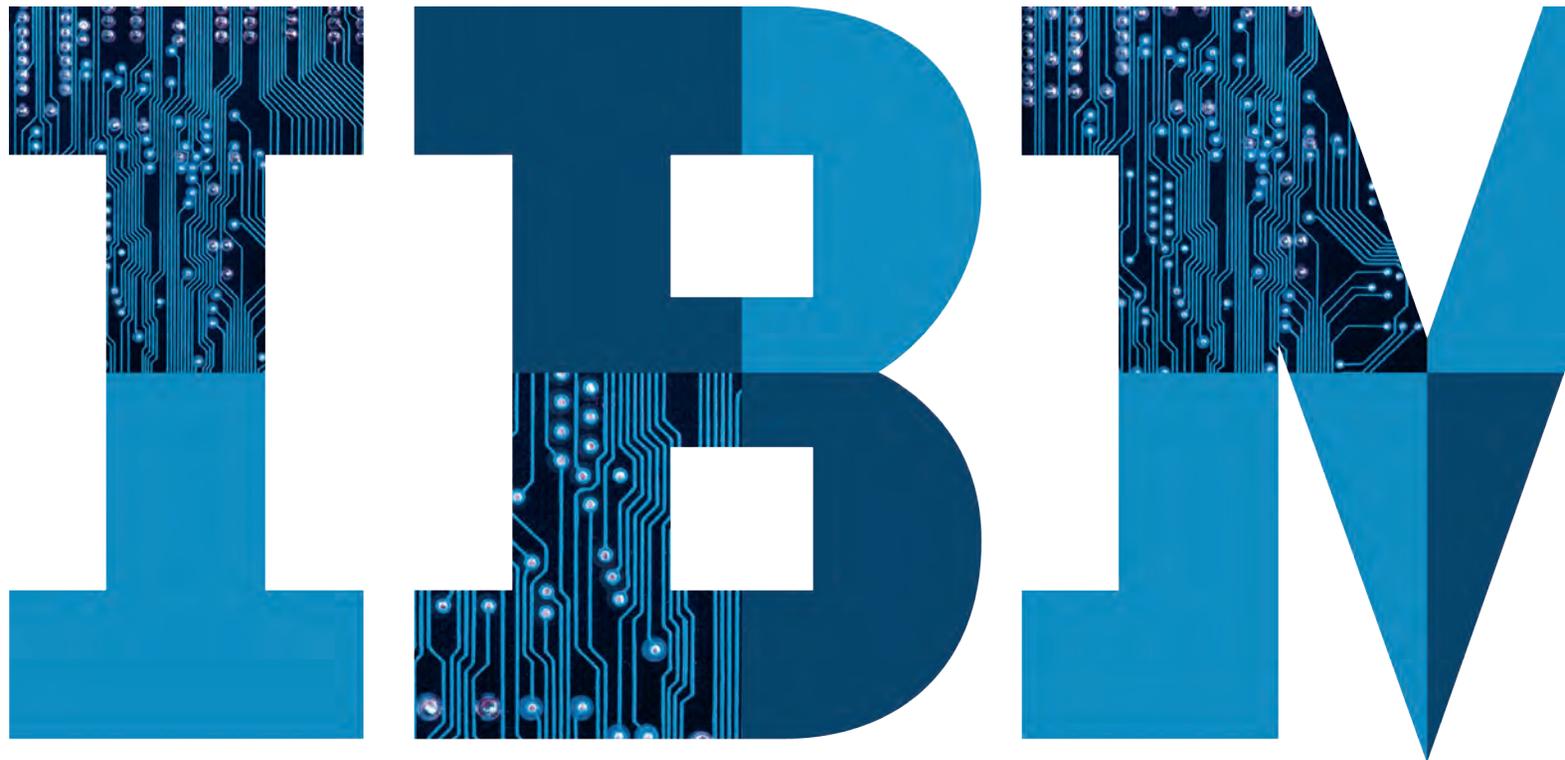


Next-generation in-memory performance

Reap the benefits of a workload-optimized solution for fast transaction and analytics processing



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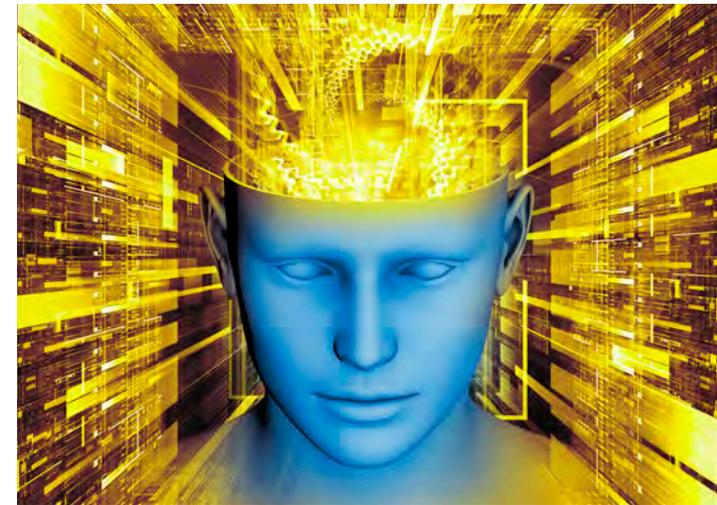
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Introduction

In-memory technology is all the rage, and for good reason: it works. It can accelerate your analytics queries by utilizing main server memory instead of disk for database processing, reducing I/O bottlenecks and providing fast, more predictable performance. It's great for managing the onslaught of information confronting your organization, rapidly analyzing all that data and delivering the timely insights your workforce demands.

You're probably looking for a way to speed up your analytics queries, and you would like to take advantage of in-memory database processing for your business intelligence (BI) or decision-support system. But a couple of questions and concerns may be stopping you:

- Do you *have* to buy a dedicated appliance to realize the promise of in-memory technology?
- Aren't these new solutions prohibitively costly?



The answers are no, and no—if you have the right solution. This e-book will explore the key elements to consider when evaluating your in-memory database options.

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Accelerated query results without the high cost

First, you're looking for a solution that capitalizes on the performance advantages of in-memory database processing, placing the highest-value data in main server memory where it can be quickly accessed and processed.

At the same time, you don't want your database solution to be limited to main server memory, because that would mean continuously adding costly memory to match your data growth. Instead, you want a solution that can intelligently pull data from other storage media as required for a query and make optimum use of all your existing hardware resources.



The result: your organization gains the performance advantages of next-generation in-memory processing without the cost or limitations of in-memory-only systems.

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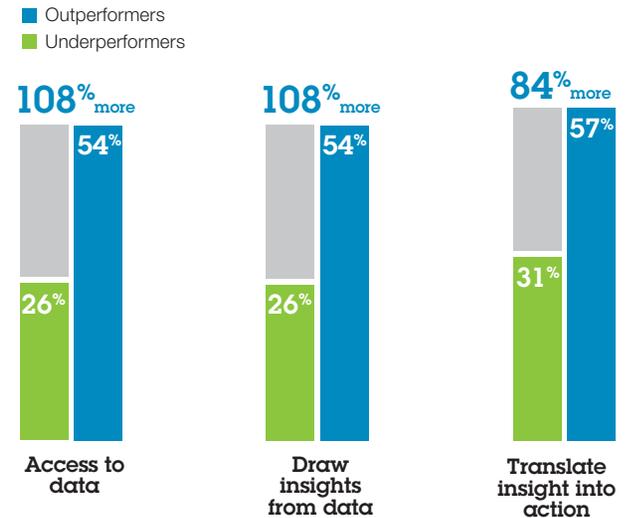
Big data: It's a trend, a threat and a promise

Sometimes it feels like a data deluge. But you also know about the benefits of tapping into your data resources with analytics and business intelligence applications.

Deriving value from data presents a significant advantage in a wide variety of processes, from customer-service responses to deciding which product lines are most likely to return R&D investment in the shortest time. According to the 2013 IBM Global C-suite Study, "outperforming" organizations make far better use of their data than underperforming organizations.¹ And organizations with infrastructures optimized to process that data and deliver analytics with exceptional speed can further sharpen their competitive edge.

Are your systems ready for the challenge? Look for a database solution that can handle massive amounts of data to help you translate insight into action.

Outperforming organizations excel in three data-driven tasks



Source: IBM Global C-suite Study, October 2013.

A simple solution that IT can deploy quickly

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If you're spending money to upgrade or install new software, you want it up and running—now. The longer it takes to tweak, tune and plug in, the longer it takes to start realizing any returns on your investment.

A solution that ships with the necessary components to develop, implement, support and deploy a warehouse environment eases part of that burden, whether your organization is a small business or a large enterprise. But don't forget to account for the expertise and staff hours involved in planning and executing the deployment.

The following list shows how labor-intensive and time-consuming some traditional approaches can be:

Traditional database design and tuning

1. Decide on partition strategies
2. Select compression strategy
3. Create table
4. Load data
5. Create auxiliary performance structures:
 - Materialized views
 - B+ indexes
 - Bitmap indexes
6. Tune memory
7. Tune I/O
8. Add optimizer hints
9. Set up statistics collection
10. Repeat the preceding steps as necessary to complete

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Many of these items require a lot of expensive design, management and tuning—and knowledgeable staff. Wouldn't it be great if your database administrators didn't have to worry about them? You can reduce the staff hours and expertise required by choosing a solution designed for simplicity.

Ask questions such as:

- How much work does it take to design, create, load and tune a data set?
- Are there different models to support different data warehouse sizes?
- How closely does it match up with the current infrastructure and other applications you have in-house so you can streamline connections?

Application flexibility is also essential, so your database team can handle new types of applications in the future without drastic, time-consuming changes. Look for built-in business-grade NoSQL capabilities, for example, to give developers the options they need to push applications forward.

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Equipped with IBM POWER8™ processor-based architecture, the latest IBM Power Systems™ servers are designed to bring insight to the point of impact faster and offer performance-for-price advantages with greater utilization. They can scale out intelligently with lower hardware, energy and cooling requirements.

In fact, clients moving up from a traditional database on commodity systems to IBM DB2® with BLU Acceleration on Power Systems with POWER8 processors can expect to gain an 82 times faster performance advantage for analytics workloads.²

You want a database server optimized to put data to work. Power Systems with POWER8 processors provide:

- The first processor designed for big data to run more concurrent queries in parallel faster, across multiple cores with more threads per core
- Increased memory bandwidth to access up to 1 TB of memory for data operations and enlarged cache in every processor
- Faster I/O to ingest, move and access data, and smart acceleration enabled by Coherent Accelerator Processor Interface (CAPI) technologies

Your solution should be able to dramatically simplify and accelerate deployment, reduce project risks and save IT resources and budget. And it should do all this while delivering the performance, reliability and scalability required to meet SLAs for uptime and deliver speed-of-thought analytics to business users faster and with less IT involvement.

“Our big data analysis stuff is on an IBM Power box. We had it running on an Oracle box before, but the costs were pretty high. When we figured out what the cost per model run was, it looked like it would be about 30 percent cheaper on the Power box. What we are finding is that it is almost 55 percent cheaper. And it runs faster. So we have started to transition all of our big data work to the Power platform.”

—Distribution CIO

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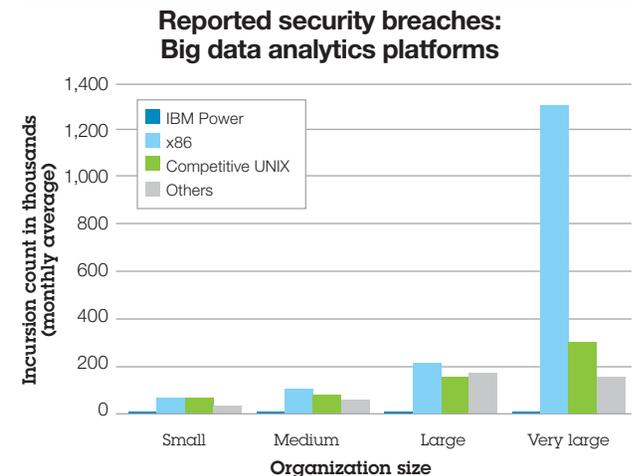
Keeping your big data secure

Every day, all day, data center security is front and center. It's hard to miss in today's headlines: Trojan. Malware. Phishing. Virus. Worm. Spyware. Stolen data.

Suffering a security breach can cause irreparable harm to your business and your clients, and can have a negative impact on you as an individual. Big data involves fast-moving information, so it's especially critical that you evaluate and carefully consider security as an aspect of your infrastructure environment. For example, look for solutions that have streamlined installation processes to eliminate security concerns.

Power Systems provides the security to protect critical systems and data. According to a recent study published by Solitaire Interglobal Ltd. (SIL), in an analysis of 31,000 environments worldwide, there were no reports of a successful security breach on the

Power Systems platform (including the OS or IBM PowerVM® virtualization) for big data and analytics.³ This is compared to more than 14 million security breaches reported on x86 systems (see Figure 1).



Source: "Power Boost Your Big Data Analytics Strategy." Solitaire Interglobal Ltd. October 2013.

Figure 1. Reported security breaches for big data analytics platforms.

Delivering business agility

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Agile organizations can adjust rapidly to changing market conditions; capitalize on emergent business opportunities, distribution channels or supply chains; and reduce costs or increase revenue streams in the process. Supporting business agility requires a well-balanced combination of software and hardware. You need to consider execution completion (feasibility), execution time compliance (speed) and execution schedule compliance (dependability).

“Big data is the new catchword, so of course we need big data. Sorry about the sarcasm, but the reality is that we are doing more and more wide-scale analysis and it is useful. Our Power box is what we run all of our big-view stuff on. That was deliberate since it is the only one that we knew would not crash or mess things up. It really helps that we can move resources where we need them. Saves me lots of money.”

—Telecom CIO

For reliable, consistent and fast big data and analytics, Power Systems provides significant advantages when it comes to on-time and on-schedule execution. Based on research analysis of 31,000 worldwide environments done by Solitaire Interglobal, Power Systems showed a 49 percent agility advantage compared to other systems (see Figure 2).

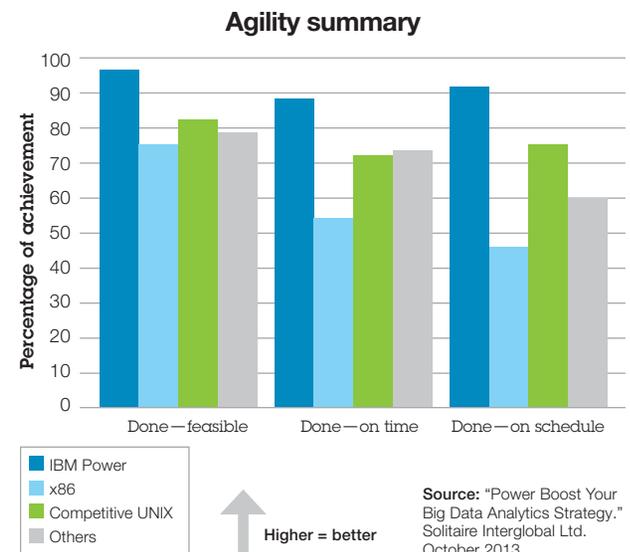


Figure 2. Summary of agility results based on organizational size.

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Introducing IBM DB2 with BLU Acceleration

IBM DB2 delivers all of the advantages you're looking for in an in-memory solution: next-generation in-memory performance, simple deployment and deep alignment with Power Systems.

Next-generation in-memory processing is just the beginning

Available in DB2, BLU Acceleration is a combination of innovations from IBM Research and Development Labs that dramatically simplifies and speeds the delivery of business insight from data.

The advantages of BLU Acceleration start with load-and-go simplicity to get your deployments rolled out quickly and easily. And there are many performance and cost benefits, including:

- Actionable compression dramatically reduces the storage space required for your data, which saves on storage costs, data center space, power and cooling. But the “secret sauce” is that your compressed data can be analyzed while it is still compressed—eliminating the



need for additional I/O and computing power to decompress the data before analysis and recompress it afterward.

- All your data is not required to fit into system memory, avoiding a major limitation of in-memory-only systems.
- Storing data efficiently in columnar format with data skipping technology further enhances performance by reducing the amount of data that needs to be processed for a query.

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All these benefits speed up processing. Take a look at the resulting numbers from IBM internal testing and client experiences with BLU Acceleration on Power Systems:⁴

- Recreational goods company experiences 50 times faster business insights
- Leading health insurance company experiences over 1,000 times faster business insights
- Large bottling company experiences 10 times storage space savings

Big data? No problem

As your organization faces a flood of data generated by computers, mobile devices, sensors and social networks, you're under unprecedented pressure to analyze much more data at faster speeds and lower costs. Easy to set up and self-optimizing, DB2 with BLU

Acceleration on Power Systems helps analyze more data faster and more efficiently than ever before, with exceptional price-performance.

“I was asked to help one of our analysts who gave up on something he was investigating (across 3.6 million records) because after three hours, the answer didn’t come back. We took that query (which involved a big join) and ran it on DB2 with BLU Acceleration [on Power Systems] and it finished in 10 seconds –1,080 times faster.”

—Randy Wilson,
Lead DB2 for LUW Database Administrator,
BlueCross BlueShield of Tennessee

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Load-and-go to save time and money

BLU Acceleration enables load-and-go deployment of DB2 on your company's existing infrastructure. Instead of the 9 or 10 steps required to deploy and optimize traditional database solutions, you can deploy DB2 with BLU Acceleration in just two steps:

1. Create the table
2. Load the data

This simplicity ultimately helps reduce costs and speed time-to-value for your business.

Keeping it simple

To make it even easier for your organization to deploy and implement DB2 with BLU Acceleration, IBM offers the IBM BLU Acceleration – Power Systems Edition.

- Simple to acquire: Multiple solution sizes to support data warehouse needs
- Simple to deploy: Preloaded with software on optimized server and storage
- Simple to implement: Highly scalable to grow along with your data warehouse needs

“What IBM has done that’s so special with BLU Acceleration is it enables us to deliver strong performance, even if the entire data set won’t fit into memory. That’s very special because in a big data world, I might not be able to fit all of my data into memory, even with very high compression ratios. DB2 gives me a single solution for a vital business goal: deliver faster analytics to our users.”

—Andrew Juarez,

Lead SAP Basis and DBA, Coca-Cola Bottling Company Consolidated

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DB2 with BLU Acceleration is fully optimized to exploit the performance, scalability and trusted resiliency of IBM Power Systems. In fact, Power Systems is a great choice for running DB2, because it provides the computing power you need to process and manage growing compute-intensive workloads, such as analytics, on fewer processors than other server architectures. BLU Acceleration takes this a step further, capitalizing on multi-core parallel processing for faster analytics (see Figure 3).

- BLU Acceleration spreads the work across multiple POWER8 processor cores. It's like having many assembly lines producing goods instead of just one line.
- BLU Acceleration leverages special instruction sets encoded into POWER8 that allow multiple data elements to be packed into each processing cycle. It can deliver insights 82 times faster than a commodity server with a traditional database.⁵

The combination of DB2 and Power Systems with POWER8 pushes the physical and virtual boundaries of big data and analytics technology. It helps your organization cost-effectively drive fast and efficient data-centric analytics applications, perform large-scale processing of big data and consolidate workloads to simplify the entire processing environment.

DB2 can also take advantage of IBM PowerVM virtualization technology. By virtualizing the Power processors and partitioning each processing core, PowerVM lets you do the same amount of work on fewer physical servers, which helps you reduce hardware and energy costs.



Figure 3. DB2 on Power Systems is an outstanding combination for delivering the speed and performance advantages that can help transform all areas of business, including these examples.

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Ready to see what DB2 with BLU Acceleration on Power Systems can do for you?

Take a few moments to explore the game-changing combination of DB2 with BLU Acceleration and Power Systems. There's no better time to get started on garnering value from your ever-growing natural resource—data—at breakthrough speed and differentiated price-performance. Contact an IBM representative or IBM Business Partner and request a proof-of-concept to see what this powerful combination can do for you.

For more information about IBM DB2 and Power Systems, visit:

- ibm.com/db2/power-systems
- ibmbluhub.com



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Actual available storage capacity may be reported for both uncompressed and compressed data and will vary and may be less than stated.



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¹ IBM Global C-suite Study. October 2013. ibm.com/services/us/en/c-suite/csuitestudy2013/

^{2,5} Based on IBM internal tests as of April 17, 2014 comparing IBM DB2 with BLU Acceleration on Power with a comparably tuned competitor row store database server on x86 executing a materially identical 2.6 TB BI workload in a controlled laboratory environment. Test measured 60 concurrent user report throughput executing identical IBM Cognos® report workloads. Report per hour (RPH) metric calculated for each category of reports as total completed reports/hours to complete all reports in the category. Competitor configuration: HP ProLiant DL380p, 24 cores, 256 GB RAM, competitor row-store database, SuSE Linux 11SP3 (database) and HP ProLiant DL380p, 16 cores, 384 GB RAM, Cognos 10.2.1.1, SuSE Linux 11SP3 (Cognos). IBM configuration: IBM Power System S824, 24 cores, 256 GB RAM, DB2 10.5, IBM AIX® 7.1 TL2 (database) and IBM Power System S822L, 16 of 20 cores activated, 384 GB RAM, Cognos 10.2.1.1, SuSE Linux 11SP3 (Cognos). Results may not be typical and will vary based on actual workload, configuration, applications, queries and other variables in a production environment.

³ IBM commissioned paper: “Power Boost Your Big Data Analytics Strategy.” Solitaire Interglobal Ltd. October 2013.

⁴ Client-reported testing results in DB2 10.5 early release program. Individual results will vary depending on individual workloads, configurations and conditions, including table size and content.