Why Your Data Management System Matters in the Era of Big Data

Next Generation Data Services from IBM Data Management
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Market changes driving the need for next generation databases

Technology allows us to consume more data and generate new insight

The scale and scope of big data present new opportunities for innovation and competitive advantage

Fast access to insight is a top requirement

Businesses need to more quickly generate insight from information to accelerate decision making

These insights are sparking new & rapidly evolving analytic requests

Organizations need fast, simple and agile technology strategies for manipulating data and developing new applications

Are you ready to respond?

How to do it leveraging existing investments?

How to achieve the full potential without disrupting the business?
What does the next generation database look like?

- The most advanced in-memory technology on the market today
- Super fast for transactional and analytic workloads
- Available, reliable, resilient
- Leading NoSQL and SQL capabilities
- Simple, intelligent and agile
- Easy to deploy, cloud ready
Multi-workload database software for the era of big data

DB2 10.5 with BLU Acceleration

- **Everything you need for your business in ONE database**
  - OLTP + Data Warehouse, alternative to multi-workload
  - Enterprise NoSQL for greater application flexibility – JSON, RDF-Graph, XML

- **Always available, fast transactions**
  - Online rolling maintenance updates with no planned downtime\(^1\)
  - Designed for disaster recovery over distances of 1000s km\(^2\)

- **Real benefits, low risk**
  - In-memory speed and simplicity on existing infrastructure
  - Optimized for SAP workloads
  - Average 98% Oracle Database application compatibility\(^3\)

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\(^1\) Based on IBM design for normal operation with rolling maintenance updates of DB2 server software on a pureScale cluster. Individual results will vary depending on individual workloads, configurations and conditions, network availability and bandwidth.

\(^2\) Based on IBM design for normal operation under typical workload. Individual results will vary depending on individual workloads, configurations and conditions, network availability and bandwidth.

\(^3\) Available with DB2 Advanced Enterprise Server Edition.
DB2 with BLU Acceleration
Changes the game

Fast Answers. Simply Delivered.

What is DB2 with BLU Acceleration?

- In-memory analytic database
- Multiple IBM innovations
  - In-memory processing of columnar data without the limitations of memory size
  - Analyze compressed data with actionable compression
  - CPU Acceleration
  - …and more
- Ready for Analytics: Cloud, On premise, SAP, Cognos, and more
- Agile warehousing via BLU for Cloud
The benefits of DB2 with BLU Acceleration

Analytics for the NOW business

- **Answers at the speed of thought** for growing revenue, reducing cost and lowering risk
- **Next generation in-memory** with IBM Research innovations
- **8x-25x faster analytics**, with some queries running more than 1000x faster\(^1,2\)

- **In-memory performance not limited** by availability of memory
- **Operational simplicity** with “load and go” performance
- **No need for indexes, aggregates, or tuning**

- **Compression savings, “10x.** That’s how much smaller our tables are with BLU Acceleration” – Andrew Juarez, Coca-Cola Bottling Co.
- **Automatically adapts** to any server, large or small
- **Available for on premise or via the cloud**

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\(^1\) Based on internal IBM testing of sample analytic workloads comparing queries accessing row-based tables on DB2 10.1 vs. columnar tables on DB2 10.5. Performance improvement figures are cumulative of all queries in the workload. Individual results will vary depending on individual workloads, configurations and conditions.

\(^2\) Based on internal IBM tests of pure analytic workloads comparing queries accessing row-based tables on DB2 10.1 vs. columnar tables on DB2 10.5. Results not typical. Individual results will vary depending on individual workloads, configurations and conditions, including size and content of the table, and number of elements being queried from a given table.
DB2 with BLU Acceleration

What more can businesses do with BLU?

How many more questions could your business answer if they could get answers this much faster?

- Analyze data literally as fast as you can ask questions
- “We’ve tested DB2 10.5 with BLU Acceleration and found that it can be up to 43x faster with an analytic workload…” - Randy Wilson, Lead DB2 for LUW DBA

What can you do for your business with an extra month?

- Maximizes business value from existing infrastructure; no need to rip and replace
- “We project this will save us 42 days per year in lower administration and tuning efforts” – Brenda Boshoff, Sr. DBA

Where could you invest the 10x savings to drive more business value?

- Deploy on-premise or via the cloud with only a fraction of the computing resources
- “Using DB2 10.5 with BLU Acceleration, our storage consumption went down by about 10x” - Kent Collins, Database Solutions Architect

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Benefits for key stakeholders

**C-level and Line of Business Executives**
- **CFO**: Faster Financial Performance analysis to reduce day-long processing to minutes, or provide answers to business questions on-demand
- **CMO**: Faster Market and Customer analysis to deliver insights in time to improve campaign results and customer profitability
- **CIO**: Faster analytics with in-memory performance, “load and go” simplicity, and storage space savings with compression – all without the cost and risk of changing infrastructure or building new skills and processes

**IT Managers**
- Deliver new analytic capabilities to the business in days, not months
- Transform service levels for analytics
- Fast and easy migrations from Oracle Database to DB2 with native SQL and PL/SQL compatibility

**Data Professionals**
- Quickly deliver new capabilities and higher service levels to the business
- Work with the most innovative, breakthrough technology in the industry
- Freedom from routine and mundane maintenance and administration
Full service bank for private and corporate customers
Founded in 1871 with operations in 24 countries

100x improvement in performance of one of the queries
Up to 82% compression

“BLU Acceleration is very lucrative for us because it’s very simple to get up and running. The first query ran within 6 hours.”

“We don’t have to tune it with index or table spaces or anything. Just load the data and run the queries to see the results.”

Phillip Kallander – Chief Technical Architect for Data Warehouse and Analytics, Handelsbanken
We tested some representative queries taken from our existing SAP application and tested them on DB2 with BLU Acceleration and observed performance improvements in many of our query response times. For example, one of our most time consuming queries experienced a 50x performance improvement.

Richard Simms - Director of Infrastructure, Fossil
Extraordinary Speed

"Teaming with our SAS actuaries, we gave them a different way to run their analysis which included the BLU Acceleration technology. The result? They experienced incredible speedup in their analysis, one report ran 640x times faster and another ran 1200x faster."

- Randy Wilson, Lead DB2 for LUW DBA, BCBS of Tennessee

"With BLU Acceleration, we’ve been able to reduce the time spent on pre-aggregation by 30x - from one hour to two minutes! BLU Acceleration is truly amazing."

- Yong Zhou, Sr. Manager of Data Warehouse & Business Intelligence Department

"With my analytic query workload running 45x times faster with BLU Acceleration in DB2 10.5, I no longer have an excuse for my usual coffee run!"

- Iqbal Goralwalla, Head of DB2 Managed Services, Triton
“On top of the great storage savings and huge performance gains, one of the things that impressed us the most about BLU Acceleration is its simplicity. No need to define indexes or aggregates. We just load the data and run queries.”

- Kent Collins, Database Solutions Architect, BNSF Railway

“One of the things I like about these BLU Acceleration column-organized tables is that there's nothing for me to do with them. I just load them up, DB2 does its magic, and I'm done.”

- Andrew Juarez, Lead SAP Basis and DBA, Coca-Cola Bottling Co.

“The simplicity that BLU Acceleration provides is remarkable. … From the time we started to install DB2 10.5 with BLU, until we were running queries faster than in production, it took us less than 3 hours!”

- Brenda Boshoff, Senior DBA, University of Toronto
Extraordinary Agility

"The economics of BLU Acceleration are really going to help our bottom line. We were able to migrate off of Sybase IQ and onto DB2 Advanced Workgroup Server Edition running on just 4 cores in a virtualized Linux environment. The simplicity of BLU Acceleration will save us time and money…”

- Hervé Huberiant, Logistic and IT Director, Cora Belux

"We were seeing average acceleration of 7.4X with some queries going from 28 seconds down to sub second response time. This was clear evidence of the advantage of combining the column store organization of tables and performing in-memory analytics directly on compressed data in BLU without having to decompress the data to perform the analytics.”

- Philip Kallander, Chief Technical Architect, Handelsbanken

"What makes DB2 BLU technology so special is that the in memory analytics and column organization of tables is all done right inside DB2. No new skills are required, and I can have column organized and row organized tables side by side in the same database.”

- Joachim Klassen, Consultant, LIS.TEC
DB2 with BLU delivers clear advantages for SAP environment

**Speed and Simplicity**

**Accelerated Performance**
- Over 2x better, 24 core performance for SAP SD benchmark than nearest competitive result

**Faster Time to Value**
- Simple load & go in-memory support
- No change to applications needed

**Business Proven**

**Lower Risk**
- Accelerates SAP BW without application upgrade
- 10+ year track record of SAP optimization

**Transparent Scalability**
- Active data can be larger than available memory
- Automated workload management with shared-everything resource pools

**Lower Cost**

**Lower Acquisition Costs**
- Leverage existing investments
- No need to buy additional HW

**Lower Operating Costs**
- Option for lower cost, near line storage
- Mature technology not requiring frequent patching

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(1.0) IBM Power System S824 on the two-tier SAP SD standard application benchmark running SAP enhancement package 5 for the SAP ERP 6.0 application; 4 processors / 24 cores / 96 threads, POWER8; 3.52GHz, 512 GB memory, 21,212 SD benchmark users, running AIX® 7.1 and DB2® 10.5, dialog response: 0.98 seconds, line items/hour: 2,317,330, dialog steps/hour: 6,952,000 SAPS: 115,870 database response time (dialog/update): 0.011 sec / 0.019sec, CPU utilization: 99%, Certification #: *

Transaction processing workload – SAP S&D
IBM Power System S824 with DB2 10.5 vs. Competition

Over 2x better, 24 core performance than nearest competitive results
Up to 2x greater performance than previous POWER generation
Exploiting more cores, more threads and L3 cache than past POWER platforms

(1.0) IBM Power System S824 on the two-tier SAP SD standard application benchmark running SAP enhancement package 5 for the SAP ERP 6.0 application; 4 processors / 24 cores / 96 threads, POWER8; 3.52GHz, 512 GB memory, 21,212 SD benchmark users, running AIX® 7.1 and DB2® 10.5, dialog response: 0.98 seconds, line items/hour: 2,317,330, dialog steps/hour: 6,992,000 SAPS; 115,870 database response time (dialog/update): 0.011 sec / 0.019sec, CPU utilization: 99%, Certification #: * Results valid as of 3/24/14. * Certification # not available at press time. Source: http://www.sap.com/benchmark.

(1.1) Fujitsu RX300 S8 on the two-tier SAP SD standard application benchmark running SAP enhancement package 5 for the SAP ERP 6.0 application; 2 processors / 24 cores / 48 threads. Intel Xeon E5-2697 processor 2.70 GHz, 256 GB memory, 10,045 SD benchmark users, running Windows Server 2012 DE and SQL Server 2012, Certification #: 2013038

(1.2) Cisco UCS C240 M3 on the two-tier SAP SD standard application benchmark running SAP enhancement package 5 for the SAP ERP 6.0 application; 2 processors / 24 cores / 48 threads. Intel Xeon E5-2697 processor 2.70 GHz, 256 GB memory, 10,025 SD benchmark users, running Windows Server 2012 DE and SQL Server 2012, Certification #: 2013038

(1.3) HP ProLiant BL460c Gen8 on the two-tier SAP SD standard application benchmark running SAP enhancement package 5 for the SAP ERP 6.0 application; 2 processors / 24 cores / 48 threads. Intel Xeon E5-2697 processor 2.70 GHz, 256 GB memory, 10,025 SD benchmark users, running Windows Server 2012 DE and SQL Server 2012, Certification #: 2013025

(2.1 IBM Flex System p270 on the two-tier SAP SD standard application benchmark running SAP enhancement package 5 for the SAP ERP 6.0 application; 4 processors / 24 cores / 96 threads, POWER7+; 3.4GHz, 256 GB memory, 12,528 SD benchmark users, running AIX® 7.1 and DB2® 10.5 Certification #: 3012019 Source: http://www.sap.com/benchmark.

(1.1)IBM Flex System p260 on the two-tier SAP SD standard application benchmark running SAP enhancement package 5 for the SAP ERP 6.0 application; 2 processors / 16 cores / 64 threads, POWER7+; 4.1GHz, 256 GB memory, 10,000 SD benchmark users, running AIX® 7.1 and DB2® 10, Certification #: 2012035

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DB2 is **36x** faster than in-memory competitor’s ‘revolutionary’ approach

- OLTP Brokerage Monitoring Workload
  - 60GB database
  - CPU intensive transaction mix with 4% updates
  - Concurrent client threads drive server load
    - DB2 Server @ 75% and Competitor server @ 80%

- Performance results on identical hardware

  - **7x faster** than competitor’s in-memory row store
  - **36x faster** than competitor’s in-memory row+column store

- Referential integrity constraints removed from competitor workload
  - Required to avoid system failures
  - DB2 implements full referential integrity

- Competitor’s design affects system performance
  - Must decompress data before use
  - Duplicated data wastes memory
  - Row to column store migration costly

- DB2 is a proven OLTP system

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Based on IBM internal tests comparing DB2 10.5 FP1 database with a comparably sized, comparably tuned competitor configuration (version available as of 03/01/2014) executing a materially identical 60GB transactional workload in a controlled laboratory environment. Test measured transaction throughput on identical 40-core, 512GB RAM Intel Westmere systems including vendor recommended software options and features. Results may not be typical and will vary based on actual workload, configuration, applications, queries and other variables in a production environment. Users of this document should verify the applicable data for their specific environment.
50x performance improvement in SAP BW queries

80%+ compression of Fact tables

3 hours up and running
Cognos BI and BLU Acceleration on Power Systems

Fast on Fast on Fast

82x faster

vs. Competitor Row Store Database on Ivy Bridge (x86)\(^1\)

- Exploitation of processors designed for big data with massive parallelism and bandwidth
- Efficient and improved storage savings for Cognos BI customers
- DB2 with BLU complements and enhances Cognos BI

\(^1\) Based on IBM internal tests as of April 7, 2014 comparing IBM DB2 with BLU Acceleration on Power with a comparably tuned competitor row store database server on x86 executing a materially identical 2.6TB BI workload in a controlled laboratory environment. Test measured 60 concurrent user report throughput executing identical Cognos report workloads. Competitor configuration: HP DL380p, 24 cores, 256GB RAM, Competitor row-store database, SuSE Linux 11SP3 (Database) and HP DL380p, 16 cores, 384GB RAM, Cognos 10.2.1.1, SuSE Linux 11SP3 (Cognos). IBM configuration: IBM S824, 24 cores, 256GB RAM, DB2 10.5, AIX 7.1 TL2 (Database) and IBM S824, 16 of 20 cores activated, 384GB 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.

86x calculation based on geometric mean calculation giving equal weighting to the report per hour (RPH) improvements in the three categories of simple, intermediate, and complex reports.

\[
\text{GEOMEAN}(\text{RPH\_simple}, \text{RPH\_intermediate}, \text{RPH\_complex}) = \text{GEOMEAN}(18.85, 40.07, 747.63) = 82.66
\]
What is BLU for Cloud?

The same benefits of DB2 with BLU Acceleration, plus

- On-demand analytics, deploy analytics in under an hour
- Powerful database & analytic capabilities at a fraction of the cost
- No infrastructure investment
- Cognos Business Intelligence included
- Expert-built schemas for business insight

Available on:

For use by:

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<th>Business</th>
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Game changing benefits in the Cloud

Cloud Easy, Enterprise Secure

Powerful
A high performance analytic database
• Columnar
• In-Memory
• Cognos BI included
• R support

Agile
In a ‘cloud easy’ form factor
• No infrastructure
• Pay as you go
• Deploy in less than an hour

Simple
With best in class simplicity
• No indexing
• No tuning
• Load and go

Secure
And built-in security
• Data-in-transit security
• Encryption
• Vulnerability Assessment
• Audit Trail
• Robust password and account policies
What makes BLU Acceleration different?
Unmatched innovations from IBM Research & Development labs

Next Generation In-Memory
In-memory columnar processing with dynamic movement of data from storage

Analyze Compressed Data
Patented compression technique that preserves order so data can be used without decompressing

CPU Acceleration
Multi-core and SIMD parallelism (Single Instruction Multiple Data)

Data Skipping
Skips unnecessary processing of irrelevant data
BLU Acceleration illustration

10TB query in seconds or less

- **The System:** 32 cores, 1TB memory, 10TB table with 100 columns and 10 years of data
- **The Query:** How many “sales” did we have in 2010?
  - `SELECT COUNT(*) from MYTABLE where YEAR = ‘2010’`
- **The Result:** In seconds or less as each CPU core examines the equivalent of just 8MB of data
Terabyte Pricing for DB2 with BLU Acceleration

*Much more power for much lower cost*

**Terabyte Pricing:**

- Pay for only the data you analyze
- Leverage compression to reduce the amount of licensed data (e.g. 20TB compressing to only 2TB)
- Independent of hardware
- Low, predictable licensing cost
- Add more cores and memory without affecting the licensing cost
It’s easy to migrate from Oracle Database to DB2
 Compatibility Features Help Lower Costs & Migration Risks

- Faster, easier migration
- Minimal code changes
- Use current skills
- Better performance

DB2 10.5 achieves an average of 98%* compatibility with Oracle PL/SQL1

1. Based on internal tests and reported client experience from 28 Sep 2011 to 07 Mar 2012.
High availability transaction services

- Extreme capacity
  - Add capacity as your needs grow

- Application transparency
  - Avoid the risk and cost of application changes

- Continuous availability
  - Deliver uninterrupted access to your data with consistent performance

- Your choice of deployment option

Learning from the undisputed Gold Standard... System z
“We pulled cards, we powered off systems, we uninstalled devices, we did everything we could do to make the cluster go out of service, and we couldn’t make it happen.”

-- Robert M. Collins Jr. (Kent), Database Engineer, BNSF Railway Inc.
Introduction to Informix

- Informix is a critical part of the IBM database family

- Provides NoSQL storage in the cloud

- Optimized for maximum flexibility and performance in diverse workload and operating system environments

- Top performance transaction-intensive solutions, near hands free administration, and clustering for high-availability and data replication. Includes BLU DW acceleration technology. Is IBM’s Internet of Things engine

- Optimized for large scale data warehouse (DW) solutions

- Optimized for solutions requiring the highest levels of transaction & data volume and performance
Where does Informix fit?

Internet of Things (IOT) / NoSQL environments and next generation applications
- Full integration of structured and unstructured data in a single environment

Horizontal Scalability and Cloud
- Heterogeneous high availability clusters; On-demand scalability, Hypervisor Edition and Pattern for PureSystems

Warehouse / Data Mart Acceleration
- Operational analytics & in-memory query acceleration

Smart meter and sensor data solutions
- Time series data management and analytics acceleration

Embedded data management
- Custom embeddability, Autonomics
IBM Informix: Intelligent Database for Internet of Things

One Database - For the Cloud & Edge Devices

Informix: Intelligent Database for Internet of Things
- Real-time data analytics
- Time-series data management
- Hybrid database support
- Embedded database for edge devices
- Rapid web and mobile application development
Informix Meets the Big Data Challenge of Sensor Data with TimeSeries

Utilities
- Weather impact analysis on power generation
- Transmission monitoring
- Smart grid management

Financial Services
- Fraud detection based on biometrics
- Risk management

Manufacturing
- Asset location and performance
- Event management and response

Health & Life Sciences
- Remote healthcare monitoring
- Epidemic early warning system
- ICU monitoring

Military and Law Enforcement
- Real-time surveillance and movement detection
- Situational awareness
- Cyber security detection

Logistics & Transportation
- Fleet management and dispatch
- Weather and traffic impact on logistics and fuel consumption
Smarter energy & utilities

Informix TimeSeries

Oncor changes data management platform for Meter Data Management to deliver benefits throughout their value chain, from suppliers to consumers.

Smarter Business Outcomes

- Provide customers better insight and control over how they use energy
- Automate outage management
- Accelerate time-to-value from smart meter data
- Minimize system and storage costs

Smarter Big Data Solution

- 500% faster processing of meter data
- 80% less storage space required
- Consistent, scalable performance yields highly predictable costs
Informix 12: Simply Powerful

*Easy to embed, easy to deploy, easy to rest at night*

- The Smart Choice for embedded database
  - Small footprint, silent install
  - Up and running in minutes; zero administration
  - Automatically sense and respond to changes without intervention
    - **Self Configuring** – *New!* Start server without having to define environment (dynamic onconfig)
    - **Self Healing** – *New!* Table purge by time and/or size
    - **Self Optimizing** – *New!* Automatic compression
  - Deliver innovative virtualization and cloud computing solutions

“It’s very, very important to us that what we have is of high quality, what we have has the power behind it to make sure that it has both the longevity and the support that we need. Cisco is taking advantage of the fact that Informix is easily embeddable, and also, the redundant capabilities allow us to use our distributed architecture to scale for our customers.”

- Phil Harris, Senior Director of Engineering,
Why IBM?

IBM provides:

- Best-in-class data solutions to address every information need
- Broadest and most comprehensive solution portfolio aligned to a big data & analytics strategy
- Only vendor infusing cognitive capabilities into its data strategy
- Industry leading innovation with huge investments in research and development, driving a record number of patents each year
Next Steps – Let us prove it to you!

1. Try BLU for Cloud
   no cost, no risk

2. Live demo at an
   IBM Innovation
   Center

3. Complimentary
   Savings
   Assessment
   & Migration Plan

4. Tailored bottom-
   line
   IBM offers

www.bluforcloud.com

Available IBM financing may eliminate
your cash outlay during the transition.

Just ask your IBM representative
to learn more!

- Migration services
- Training and education
- IBM Systems &
  maintenance
- IBM Software licenses,
  subscription and
  support