IBM Data Strategy
Central Ohio DB2 Users Group (CODUG)

“DB2 101”


**Agenda**

- The Fillmore Group, IBM Business Partner
- What’s New in 2013?
- Data Governance
- Information Integration
- Data Warehouse and Big Data
- Mainframe Update
- Competing with Oracle
The Fillmore Group, Inc.

- Frank Fillmore, DB2 Gold Consultant, IBM Champion
- Kim May, IBM Champion
- Dozens of experienced, certified consultants
- Information Management Consulting Services
- IBM Authorized Training Partner
- IBM Information Management Software Reseller
Services

- DB2 – implementation, migration, and tuning
- BigData
  - BigInsights (IBM’s Hadoop distribution)
  - InfoSphere Streams
- Data Governance tools
- Information Integration
- Data Warehousing
IBM Authorized Training

- Exclusive NA provider of IBM BigData training
  - DW611 "IBM InfoSphere BigInsights Foundation"
  - DW641 "BigInsights Analytics for Business Analysts"
  - DW652 "BigInsights Analytics for Programmers"
  - DW723 "Programming for InfoSphere Streams V3 with SPL"
  - DW731 "Administration of InfoSphere Streams V3"
- DB2, InfoSphere, Information Server, Optim
IBM 2013 News

- PureData System for Hadoop
  - 8x faster deployment than custom-built solutions
  - First appliance with built-in analytics accelerator
  - Only Hadoop system with built-in archiving tools

- DB2 for LUW v10.5 with BLU Acceleration
  - 8-25x faster reporting and analytics
  - 10x storage space savings seen during beta test
  - No indexes, aggregates, tuning, or SQL / schema changes
BLU Acceleration

- **Dynamic In-Memory**
  - In-memory columnar processing
  - Dynamic movement of data from storage

- **Actionable Compression**
  - Patented compression technique that preserves order so that the data can be used without decompressing

- **Parallel Vector Processing**
  - Multi-core and SIMD parallelism
  - (Single Instruction Multiple Data)

- **Data Skipping**
  - Skips unnecessary processing of irrelevant data
What’s in the Information Management portfolio?

- Data Servers - DB2 AESE bundle
- Data Governance
- Information Integration
- Data Warehouse
<table>
<thead>
<tr>
<th></th>
<th><strong>DB2</strong></th>
<th><strong>DB2 pureScale</strong></th>
<th><strong>DB2 Data Partitioning Facility</strong></th>
<th><strong>DB2 with BLU Acceleration</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single Instance (scale-up)</strong></td>
<td>Scalable</td>
<td>Clustered Database (scale-out)</td>
<td>Partitioned Database (scale-out)</td>
<td>Columnar Compression Database</td>
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<tr>
<td></td>
<td>Basic</td>
<td>Massive scale</td>
<td>Massive scale</td>
<td>Memory scale</td>
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<tr>
<td></td>
<td>Read/write</td>
<td>Non-partitionable</td>
<td>Partitionable</td>
<td>Ultra-high speed</td>
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<td>Rapid deployment</td>
<td>Transactional</td>
<td>Analytic</td>
<td>Analytic</td>
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<td></td>
<td>Storage efficient</td>
<td>Read/write</td>
<td>Read-mostly</td>
<td>Read-mostly</td>
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<tr>
<td></td>
<td>Multi-tenancy</td>
<td>Highly Available</td>
<td>Mixed query types</td>
<td>Column store</td>
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<tr>
<td>SSD-aware?</td>
<td></td>
<td>High concurrency</td>
<td>High concurrency</td>
<td>Column compressed</td>
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<tr>
<td></td>
<td></td>
<td>Fast response time</td>
<td>Storage efficient</td>
<td>Very storage efficient</td>
</tr>
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<td></td>
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<td>Storage efficient</td>
<td>Multi-tenancy</td>
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<td>Multi-tenancy</td>
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<tr>
<td></td>
<td></td>
<td>“shared disk”</td>
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<tr>
<td></td>
<td></td>
<td>“shared nothing”</td>
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</tbody>
</table>

**PureData System for Transactions**

**PureData System For Operational Analytics**
DB2 pureScale

- **Unlimited Capacity**
  - Buy only what you need, 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
**pureScale - Scalability and High Availability**

- **Efficient Centralized Locking and Caching**
  - As the cluster grows, DB2 maintains one place to go for locking information and shared pages
  - Optimized for very high speed access
    - DB2 pureScale uses Remote Direct Memory Access (RDMA) to communicate with the powerHA pureScale server
    - No IP socket calls, no interrupts, no context switching

- **Results**
  - Near Linear Scalability to large numbers of servers
  - Constant awareness of what each member is doing
    - If one member fails, no need to block I/O from other members
    - Recovery runs at memory speeds
Delivering trusted information for smarter business decisions – across the entire information supply chain
IBM Optim solutions

Managing data throughout its lifecycle in heterogeneous environments

- Easily refresh & maintain right sized non-production environments, while reducing storage costs
- Improve application quality and deploy new functionality more quickly
- Speed understanding and project time through relationship discovery within and across data sources
- Understand sensitive data to protect and secure it

**Discover**
- Subset
- Mask
- Compare
- Refresh

**Test Data Management**
- Easily refresh & maintain right sized non-production environments, while reducing storage costs
- Improve application quality and deploy new functionality more quickly

**Data Masking**
- Protect sensitive information from misuse & fraud
- Prevent data breaches and associated fines

**Data Growth Management**
- Reduce hardware, storage & maintenance costs
- Streamline application upgrades and improve application performance

**Application Retirement**
- Retire legacy & redundant applications while retaining data
- Ensure application-independent access to archive data
Real time database monitoring and protection with InfoSphere Guardium

- No DBMS or application changes
- Does not rely on DBMS-resident logs that can easily be erased by attackers, rogue insiders
- 100% visibility including local DBA access
- Minimal performance impact

- Cross-DBMS solution
- Granular, real-time policies & auditing
  - Who, what, when, how
- Automated compliance reporting, sign-offs and escalations (financial regulations, PCI DSS, data privacy regulations, etc.)
InfoSphere Guardium allows you to protect your most valuable information.

Continuously monitor access to high-value databases to:

1. Prevent data breaches
   Mitigate external and internal threats

2. Ensure the integrity of sensitive data
   Prevent unauthorized changes to sensitive data or structures

3. Reduce cost of compliance
   Automate and centralize controls
   1. Across PCI DSS, data privacy regulations, HIPAA/HITECH, ...
   2. Across databases and applications
   Simplify processes
Optim Query Capture and Replay

**Requirements**

- Minimize unexpected production problems
- Shorten testing cycles
- Develop more realistic database testing scenarios

**Benefits**

- Identify database problems sooner with validation reports and performance tuning
- Use actual production workloads for testing rather than fabricated scenarios
- Extend quality testing efforts to include the data layer

Record and replay SQL

Capture production workloads and replay them in testing environments
Optim Performance Manager

- **Reduce Costs**
  - Quicker time to resolution
    - 3 step workflows rather than many screens
    - Close loop process for typical performance problems
  - Integration shortens time to proactively manage performance
    - Same UI
    - OPM lets you check your WLM configuration and helps in creating initial definitions
    - Problematic SQL statements can easily be identified and will then be analyzed in a one-click step with Query Tuner
    - pureQuery tells you exactly where problematic SQL statements are coded
  - Enable transition from heritage Performance Expert to OPM
    - Packages both heritage PE interface and new OPM UI

- **Prevent outages and reduce application slowdown Reduce Risk**
  - Enhanced WLM management through?
  - Dashboard Alerting capability
  - Historical performance data available to enable capacity planning
    - Visualizing and aggregation for key performances
    - Averages over time
    - Set granularity so can scale on time and focus

- **Decrease time to data value**
  - Increasing current staff expertise through IBM knowledge
    - Close loop process for typical performance problem analysis
  - QA Testing is easier so increase confidence to go into production
  - Historical performance data available to enable capacity planning
OPM – Locking Dashboard

Add-ons:
- Query Tuner
- Extended Insight
IBM InfoSphere Information Server

MANAGE
- DB2, Informix
- FileNet

INTEGRATE
- InfoSphere Information Server
- Optim
- Guardium

ANALYZE
- InfoSphere BigInsights
- InfoSphere Streams

External Information Sources

Business Analytic Applications
IBM’s Information Integration

**Organizations Use Integration for...**

**DataStage, QualityStage**
- ...data loading, cleansing, migrating, movement, high availability and high performance

**Foundation Tools**
- ...deep analysis, design, metadata, collaboration and data governance

**CDC, Federation, Replication**
- ...data delivery for low impact, timely access to critical business data and operational data requirements
InfoSphere Foundation Tools

- InfoSphere Information Analyzer
- InfoSphere Data Architect
- InfoSphere FastTrack
- Business Glossary

Foundation tools help profile, model, define, map and govern information that is spread across your enterprise, so your business can deliver the right information, to the right people, at the right time.

- Foundation tools are designed to be deployed in a heterogeneous IT environment to leverage existing IT investments.
- They work with any IBM or non-IBM data source, business intelligence tool or operating system -- or in conjunction with the Tools’ own comprehensive set of integration products.
InfoSphere QualityStage

Standardize, cleanse and deduplicate data, ensuring a complete, accurate view of information

Requirements
- Resolution of data quality issues
- Standardization of data formats
- Cleanse data
- Manage duplicate data
- Enable ongoing quality

Benefits
- Removes duplicates
- Cross-references matching records
- Survives a single, complete record
- Validate and enriches data

- Redundancies
- Lack of standards
- Unlinked records
- Incorrect data
InfoSphere DataStage

Integrate, transform and deliver data on demand across multiple sources and targets including databases and enterprise applications

Requirements
- Integrate and transform multiple, complex, and disparate sources of information
- Demand for data is diverse – DW, MDM, Analytics, Applications, and real time

Benefits
- Transform and aggregate any volume of information
- Deliver data in batch or real time through visually designed logic
- Hundreds of built-in transformation functions
- Metadata-driven productivity, enabling collaboration
IBM - InfoSphere Data Replication (IIDR)

IBM replication technologies – bundled!

- **SQL Replication**
  - Easy to set up
  - Staging tables

- **Q Replication**
  - High volume, low latency
  - Native Oracle and DB2 sources and targets
  - WebSphere MQ transport layer

- **Change Data Capture (CDC)**
  - Broadest set of heterogeneous sources and targets
  - TCP/IP transport layer
InfoSphere Change Data Capture

Real-time change data capture and delivery to deliver critical information at the speed of business

Change Data Capture

**Requirements**
- Rapid data delivery for mainly heterogeneous environments
- Minimize CPU utilization on source systems
- Increased visibility into lines of business

**Benefits**
- Delivers real-time data for information management projects
- Minimize batch windows to optimize ETL processes
- Flexible implementation for multiple topologies

- DB2 on LUW, i, z/OS
- Informix
- Oracle
- Sybase ASE
- SQL Server
- PureData System for Analytics (Netezza)
InfoSphere Replication Server

- Delivers real-time data for information management projects
- Deep performance monitoring & troubleshooting
- To publish data to MQ, use InfoSphere Data Event Publisher

**Requirements**
- Rapid data delivery for DB2 and Oracle environments
- Resiliency to hardware, software, and network failures
- Visibility into replication processes for monitoring

**Benefits**
- Delivers real-time data for information management projects
- Deep performance monitoring & troubleshooting
- To publish data to MQ, use InfoSphere Data Event Publisher

**Replication Server**

High volume, low latency data replication for continuous business availability

Requirement:
- Rapid data delivery for DB2 and Oracle environments
- Resiliency to hardware, software, and network failures
- Visibility into replication processes for monitoring

Benefits:
- Delivers real-time data for information management projects
- Deep performance monitoring & troubleshooting
- To publish data to MQ, use InfoSphere Data Event Publisher
InfoSphere Federation Server

Enable access and delivery of diverse and distributed information as if it were in one system

**Requirements**
- Access to critical information in disparate databases/apps
- Physical replication not viable
- Budget constraints prevent new database purchases

**Benefits**
- Virtually consolidates data from multiple lines of business
- Cost-effective point of access to multiple DBs
- Enable SOA with InfoSphere Information Services Director
InfoSphere MDM Product Portfolio

IBM® Initiate® Master Data Service®
Virtual master registry for delivering single, trusted versions of master data & their relationships

IBM® InfoSphere™ MDM Server
Physical master repository of customer, account & product data for the business to consume as services

IBM® InfoSphere™ Identity Insight
Analytical capabilities to discover where threat & fraud exists to enable immediate action

IBM® InfoSphere™ MDM Server for PIM
Authors, enriches and maintains product and other master data for a 360 degree view
What is Master Data Management?

- Discipline that provides a consistent understanding of master data entities (customer, product, etc.).
- A set of functionality for data governance that provides mechanisms & governance for consistent use of master data across the organization.
- Is designed to accommodate, control and manage change.

IBM provides a cost-effective, rapidly deployable solution to complex customer data management challenges.
Entity Resolution and Analysis

...It is used to identify the use of false identities and networks of individuals who are trying to hide their relationships to each other. The same technologies or analyses are used in the detection of fraud networks, racketeering and money-laundering. - Gartner

<table>
<thead>
<tr>
<th>Who is who?</th>
<th>Who knows who?</th>
<th>Who does what?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Identity Resolution</strong></td>
<td><strong>Relationship Resolution</strong></td>
<td><strong>Complex Event Processing</strong></td>
</tr>
<tr>
<td>- Establish Identity</td>
<td>- Obvious &amp; Non-Obvious</td>
<td>- Events &amp; Transactions</td>
</tr>
<tr>
<td>- Physical/Digital Attributes</td>
<td>- Links people &amp; groups</td>
<td>- Criteria Based Alerting</td>
</tr>
<tr>
<td>- People &amp; Organizations</td>
<td>- Degrees of Separation</td>
<td>- Quantify Identity Activities</td>
</tr>
<tr>
<td>- Multicultural Names</td>
<td>- Role Alerts</td>
<td></td>
</tr>
</tbody>
</table>

Company & External Sources

Threat and Fraud Alerts

Consuming Applications
Data Warehouse and Big Data

DB2 101
Simplicity, Flexibility, Choice
IBM Data Warehouse & Analytics Solutions

**PureData System for Analytics**
- IBM investment in solution design, integration and upgrades
- Speed and ease of deployment and administration
- Optimized performance for a specific workload range

**PureData System for Operational Analytics**
- IBM investment in solution design, integration and upgrades
- Flexibility of multiple options - platform, capacity, and integrated software
- Customizable to optimize for a range and mix of workloads

**DB2 Advanced Enterprise Server Edition v10.5**
- Client investment in solution design, integration and upgrades
- Complete flexibility to mix and optimize software, servers and storage for the complete range and mix of workloads

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**The right mix of simplicity and flexibility**
Why “Big Data”?

- **Data at Rest**
  - Traditional Data warehouse & Business Intelligence

- **Data in Motion**
  - Mixed (Un)structured Complex Analytics

- **Big Data**
  - Exa: Up to 10,000 times larger
  - Peta: Up to 10,000 times faster
  - Tera: Data at Rest
  - Giga: Occasional
  - Mega: Frequent
  - Kilo: Real-time

**Decision Frequency**

**Homeland Security**
- 600,000 records/sec, 50B/day
- 1-2 ms/decision
- 320TB for Deep Analytics

**Telco Promotions**
- 100,000 records/sec, 6B/day
- 10 ms/decision
- 270TB for Predictive Analytics

**Multi-Channel sales**
- Weblogs and transactions
  - Predictive analytics to up sell and cross sell
  - 1 sec/decision

**Smart Traffic**
- 250K GPS probes/sec
- 630K segments/sec
- 2 ms/decision, 4K vehicles

**Why “Big Data”?**
- Data Scale
  - Up to 10,000 times larger
  - Up to 10,000 times faster

- Data in Motion
  - Weblogs and transactions
  - Predictive analytics to up sell and cross sell
  - 1 sec/decision

- Smart Traffic
  - 250K GPS probes/sec
  - 630K segments/sec
  - 2 ms/decision, 4K vehicles
IBM Big Data Platform

1 – Unlock Big Data
InfoSphere Data Explorer

2 – Analyze Raw Data
InfoSphere BigInsights

3 – Simplify your warehouse
PureData System for Analytics

4 – Reduce costs with Hadoop
InfoSphere BigInsights

5 – Analyze Streaming Data
InfoSphere Streams
Traditional Approach
Structured, analytical, logical

New Approach
Creative, holistic thought, intuition

Enterprise Integration and Context Accumulation

Traditional Sources
- Transaction Data
- Internal App Data
- Mainframe Data
- OLTP System Data
- ERP Data

Structured Repeatable Linear

Data Warehouse

Hadoop and Streams

Unstructured Exploratory Dynamic

Multimedia
- Web Logs
- Social Data
- Text Data: emails
- Sensor data: images
- RFID

New Sources

Traditional Approach

Structured, analytical, logical

New Approach
Creative, holistic thought, intuition
Innovation, integration and optimization at every level

Focused, collaborative innovation
A “complete systems” approach
Intelligent performance
DB2 Analytics Accelerator for z/OS

Netezza appliance connected to System z only accessible through DB2

Blending System z and Netezza technologies to deliver unparalleled, mixed workload performance for complex analytic business needs.

What is the value?

- Fast, predictable response times for “right-time” analysis
- Accelerate analytic query response times
- Improve price/performance for analytic workloads
- Minimize the need to create data marts for performance
- Highly secure environment for sensitive data analysis
- Transparent to the application and user
Large Insurance Company – Business Reporting

“we had this up and running in days with queries that ran over 1000 times faster”

<table>
<thead>
<tr>
<th>Query</th>
<th>Total Rows Reviewed</th>
<th>Total Rows Returned</th>
<th>DB2 Only Hours</th>
<th>DB2 Only Sec(s)</th>
<th>DB2 with IDAA Hours</th>
<th>DB2 with IDAA Sec(s)</th>
<th>Times Faster</th>
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<tbody>
<tr>
<td>Query 1</td>
<td>2,813,571</td>
<td>853,320</td>
<td>2:39</td>
<td>9,540</td>
<td>0.0</td>
<td>5</td>
<td>1,908</td>
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<td>Query 2</td>
<td>2,813,571</td>
<td>585,780</td>
<td>2:16</td>
<td>8,220</td>
<td>0.0</td>
<td>5</td>
<td>1,644</td>
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<td>Query 3</td>
<td>8,260,214</td>
<td>274</td>
<td>1:16</td>
<td>4,560</td>
<td>0.0</td>
<td>6</td>
<td>760</td>
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<td>Query 4</td>
<td>2,813,571</td>
<td>601,197</td>
<td>1:08</td>
<td>4,060</td>
<td>0.0</td>
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<td>816</td>
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<td>Query 5</td>
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<td>0:57</td>
<td>4,080</td>
<td>0.0</td>
<td>70</td>
<td>58</td>
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<td>Query 6</td>
<td>4,290,648</td>
<td>165</td>
<td>0:53</td>
<td>3,180</td>
<td>0.0</td>
<td>6</td>
<td>530</td>
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<td>Query 7</td>
<td>361,521</td>
<td>58,236</td>
<td>0:51</td>
<td>3,120</td>
<td>0.0</td>
<td>4</td>
<td>780</td>
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<td>Query 8</td>
<td>3,425,29</td>
<td>724</td>
<td>0:44</td>
<td>2,640</td>
<td>0.0</td>
<td>2</td>
<td>1,320</td>
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<tr>
<td>Query 9</td>
<td>4,130,107</td>
<td>137</td>
<td>0:42</td>
<td>2,520</td>
<td>0.1</td>
<td>193</td>
<td>13</td>
</tr>
</tbody>
</table>

- **DB2 Analytics Accelerator (Netezza 1000-12)**
  - Production ready - 1 person, 2 days
  - Choose a Table for “Acceleration”

- **Table Acceleration Setup in 2 Hours**
  - DB2 “Add Accelerator
  - Choose a Table for “Acceleration”
  - Load the Table (DB2 Loads Data to the Accelerator
  - Knowledge Transfer
  - Query Comparisons

- **Initial Load Performance**
  - 400 GB Loaded in 29 Minutes
  - 570 Million Rows
  - Loaded 800 GB to 1.3 TB per hour

- **Extreme Query Acceleration - 1908x faster**
  - 2 Hours 39 minutes to 5 Seconds

- **CPU Utilization Reduction to 35%**
Applications have transparent access (no SQL statement changes needed) to the Table.

**Application**
- SELECT FROM X
- Set special register
- SELECT FROM X

**DB2**
- part n
- part n-1

**IDAA**
- part n
- part n-1
- part n-2
- ...
- part 2
- part 1

Backup:
- part 1
- part 2
- ...
- part n
Oracle Takeout Strategy
IBM DB2 Advanced Enterprise Edition is as low as 1/3rd the price\(^1\) of Oracle

DB2 on POWER is as 3X faster per core\(^2\) than Oracle Database on SPARC

Breakthrough migration technology delivers up to 98% compatibility\(^3\) with Oracle PL/SQL

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1. **PRICE**: Based on price per core of comparable hardware and publicly avail U.S. info on 11/11/2011 for IBM DB2 Advanced Enterprise Edition + Oracle software w/comparable capabilities. Price comparison is NOT based on the specific benchmarks listed here. IBM: 100 Processor Value Units. Oracle: assumes 1.0 processor multiplier. Both incl. Y1 maint/support.

2. **PERFORMANCE**: [www.tpc.org](http://www.tpc.org) as of 11/11/11 [IBM Power 780 (3 x 64 C)(24 Ch/192 C/768 Th); 10,366,254 tpmC; $1.38/tpmC; avail 10/13/10 v. Oracle SPARC SuperCluster w/T3-4 Servers (27 x 64 C)(108 Ch/1728 C/13824 Th); 30,249,688 tpmC; $1.01/tpmC; avail 6/1/11]. TPC-C is a trademark of Transaction Performance Processing Council. [www.sap.com/solutions/benchmark/](http://www.sap.com/solutions/benchmark/) as of 11/11/11 [IBM Power 795 (32 P/256 C/1024 Th); 126063 users/2-tier SAP ERP 6.0 pack/AIX 7.1 + DB2 9.7; cert 2010046 v. Oracle SPARC Enterprise Server M9000 (64 P/256 C/512 Th); 39100 users/2-tier SAP ERP 6.0/Solaris 10, Oracle 10g; cert 2008042]. SAP is registered trademark of SAP AG in Germany and in several other countries.

3. **COMPATIBILITY**: Based on internal tests and reported client experience from June 30, 2010 through July 20, 2011.
**Business Value Assessment Tool**

Calculate your savings with DB2

- The tool uses a simple graphical interface - enter a few key inputs and assumptions.
- Assumptions can be modified if inputs change.
- Cost categories show detailed calculations.
- Talk to your IBM Rep or The Fillmore Group to run an assessment.
Migration – Discovery to Implementation

Step 1
- Review Business Value
- Calculate ROI (BVA)
- Oracle Contract & ULA BVA

Step 2
- Review Process
- Perform App Migration Test

Step 3
- Attend DB2 Training
- IBM POC

Conversion
- Review Proposal
- Convert

THE FILLMORE GROUP
Relational Database Solutions
IBM Database Facts:

- Has more patents than Oracle and SQL Server combined
- Over 1300 Core Database developers located in 5 main development laboratories around the world.
- Over 300 researchers located in labs in the United State, Canada, Japan and Israel are currently working on advancement in database technologies for IBM. Examples of past research projects which have developed into product include: database compression, heterogeneous replication, advancements in query optimization for optimal performance, high availability, pureScale and cubing engines. All of these are best of breed in the marketplace.
- 25 of the top 25 banks
- 9 of the top 10 insurance providers
- 23 of the top 25 U.S. retailers
- Migrated over 100 customers from SAP / Oracle to SAP / DB2 in last 2 years
- Over 700 customers have made the SAP / DB2 decision
DB2 101 Summary
Resources

- The Fillmore Group’s blog
  - http://www.thefillmoregroup.com/blog
- Kim May
  - kim.may@thefillmoregroup.com
  - http://twitter.com/KimMayTFG
- Frank Fillmore
  - frank.fillmore@thefillmoregroup.com
  - http://twitter.com/ffillmorejr
  - http://tinyurl.com/ChannelDB2
  - Flipboard for iPad, iPhone, Android: “BigData”