IBM Smarter Analytics

Infrastructure for zEnterprise
Transforming your business to be Information Driven

Caryn Meyers
IBM System z Business Intelligence Marketing Manager
Drowning in a sea of data...

..with no information

Information is exploding

2009
800,000 petabytes

2020
35 zettabytes

44x digital data growth through 2020

Velocity

Variety

Volume

Varacity

Business leaders say they don’t have access to the information they need to do their jobs

1 in 2

Organization leaders frequently make decisions based on information they don’t trust, or don’t have

1 in 3

Organizations competing on analytics substantially outperform their peers

220%

Revenue growth and 12X more profit growth for organizations that apply advanced analytics

33%

Sources:
- The Guardian, May 2010
Analytics Shifts to Pervasive Operational Workload

- Enterprises are modernizing and extending functionally
  - Better decisions from the right information
  - Informed decisions at the point of contact
  - Consistency of information across organizations

- Which is driving operational characteristics requirements
  - Cost of downtime is escalating
  - The impact of unauthorized intrusion of private information is overwhelming
  - Stringent Service Level Agreements

- Newer applications - demanding lower latency of data
  - Businesses want the most up-to-date information they can get
  - Yesterday’s information was good yesterday

- While focusing on reducing costs and consolidating
  - Lower costs through reduced complexity
  - Simplified environment with easier administration
  - Lower SW costs, elimination of redundant servers and resources
System z: The INFORMATION HUB of the Enterprise

Easy to manage Infrastructure

IBM Smart Analytics System 9700

Dashboards / Reporting

IBM Cognos Software / QMF
ISV: SAS/IBI

Data Mining and Statistics

IBM SPSS Predictive Analytics Software

Data Administration and Data Protection

IBM Optim and Guardium Software

Master Data, Data Warehouse and Data Integration

IBM InfoSphere Software

Query Accelerator

IBM DB2 Analytics Accelerator

Guardium Host-Based Probes

Guardium Collectors

Database Servers
The IBM zEnterprise Smarter Analytics Foundation is designed to enable a data-centric approach towards business analytics by easing the integration of all aspects of decision management into operational systems.

**Historical View**

Data warehouses, marts, etc. These sources support reporting and predictive model creation.

**Predictive View**

Analytics software. These are the tools that deliver actionable insights from data.

**Real-Time View**

The operational systems that house the book of record. These sources are critical to day-to-day business processes.
A Closer Look:
Elements of the IBM zEnterprise Smarter Analytics Foundation

**IBM zEnterprise Analytics System 9700 / 9710**
- A highly competitive solution specifically designed to support a complete business analytics and data warehouse environment on System z
- A customizable and integrated solution of hardware, software and services that enables rapid integration of Decision Management into operational systems
- Combines the availability and security of System z with the characteristics of an appliance that enables mixed workload analytics to drive business optimization with information-led actionable decisions

**IBM DB2® Analytics Accelerator**
- A workload optimized appliance that enables the integration of business insights into operational processes
- Unprecedented response times enable ‘train of thought’ analyses frequently blocked by poor query performance
- Deep integration with DB2 z/OS® provides transparency to all applications
- Queries are automatically executed in the most efficient location
- Appliance hands-free operations, eliminating most database tuning tasks
- Included in the IBM zEnterprise Smart Analytics System 9700 (optional element of the 9710)

**IBM zEnterprise BladeCenter® Extension**
- Extends System z qualities of service to distributed applications accessing data or applications hosted on System z, facilitating lower overall cost and an improved user experience
- Preserves existing application architecture: no modifications required for operating systems or applications
- An integrated solution: infrastructure is built and tested at the factory
- Improves the connectivity between distributed applications and IBM System z through isolated, secure, redundant and automatically configured high-speed network connection
IBM zEnterprise Analytics System 9700
Mixed Workloads for Next Generation Business Analytics

An integrated solution designed and tested to support rapid deployment of business analytics across the enterprise

- Integrated offering of hardware, software, and optional services
- Secure, Available Business Analytics
- Simplified administration
- Optimized software stack
  - OS, DB2, Utilities, InfoWarehouse, Cognos, SPSS
- Plus OPTIONAL PACKS –
  - To create end-to-end solution
IBM zEnterprise Analytics System 9700
Flexibility in Critical Data Decision Systems

Organized for simplicity and functionality

System z z196 / EC12
z/OS Operating System Stack

DS8870

Data Warehouse
Data Mart
ODS

Analytics Accelerator

DB2 for z/OS

Operational Source Systems

ETL/ELT

Fast Start Services Pack

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IBM zEnterprise Analytics System 9710

Cost Effective Critical Data Decision Systems

Organized for simplicity and functionality

ETL/ELT
Data Integration Pack
Operational Source Systems

System z/114
z/OS Operating System Stack

Fast Start Services Pack

Data Warehouse
Data Mart
ODS

DB2 for z/OS

DS8870

DB2 Analytics Accelerator

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Data Analytics Pack

Delivering information when, where, and how each user needs it

- Delivers information where, when and how it is needed
  - Self-service reporting and analysis
  - Individualized by user
  - Automated delivery of information in context
  - Author once, consume anywhere

- Full range of BI capabilities
  - Query, reporting, analysis, dashboarding, realtime monitoring
Data Integration Pack

Delivers data integration capabilities, and includes a common metadata server to support reuse and enhanced governance, as well as capabilities to support creating managing project blueprints, to help improve project visibility and decrease project risk.

- **Information Server for Data Integration:**
  - Discovery
  - Metadata Workbench
  - DataStage
  - BluePrint Director
  - Data Architect
  - InfoServices Director
  - FastTrack
  - Change Data Capture
DB2 Analytics Accelerator V3
Further extending the features

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

More insight from your data

• Unprecedented response times for “right-time” analysis
• Complex queries in seconds rather than hours
• Transparent to the application
• Inherits all System z DB2 attributes
• No need to create or maintain indices
• Eliminate query tuning
• Fast deployment and time-to-value
Most data warehouses have a mixture of queries that require the unique capabilities of both SMP and MPP.
Did you know: DB2 for z/OS delivers a single, workload-optimized system for both operations AND warehousing?

- Simplification
- High fidelity data
- Competitive price/performance
- Dynamic routing for most efficient fit for purpose execution architecture
- Combines the strengths of both System z and Netezza technology
- Merges operational and data warehouse into a single optimized environment
- Single environment for security, logging, back-up, and recovery

* Advanced analytics is supported by Netezza but not currently exploited by IDAA
Combining the Best…

...transaction system with the best analytics system

Queries executed without DB2 Analytics Accelerator
Queries executed with DB2 Analytics Accelerator
DB2 Analytics Accelerator V3

Lowering the costs of trusted analytics

What’s New?

• High Performance Storage Saver
  • Store a DB2 table or partition of data solely on the Accelerator.

• Incremental Update
  • Enables continual updates to Accelerator data.

• zEnterprise EC12 Support
  • Supports zEnterprise EC12, z196, z114

• Query Prioritization
  • Brings System z workload management prioritization down to the individual query

• High Capacity
  • Support has been extended to include the entire Netezza 1000 line (1.28 PB)

• UNLOAD Lite
  • Reduces z/OS MIPS consumption, by moving the preparation off System z.
High Performance Storage Saver

Reducing the cost of high speed storage

Time-partitioned tables where:

- only the recent partitions are used in a transactional context (frequent data changes, short running queries)
- the entire table is used for analytics (data intensive, complex queries).

DB2 partitions are deleted after the High Performance Storage Saver are created on the accelerator.
### Storage options to match data needs

*Optimized in both price and performance for differing workloads*

#### High Performance Storage Saver

<table>
<thead>
<tr>
<th>Single Disk Store</th>
<th>Dual Disk Store</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Only stored on Accelerator storage (Less Cost)</td>
<td>• Stored on both DB2 and Accelerator storage</td>
</tr>
<tr>
<td>• Optimized performance for deep analytics, multifaceted, reporting and complex queries</td>
<td>• Mixed query workload with transactions, single record queries and record updates with deep analytics, multifaceted, reporting and complex queries.</td>
</tr>
<tr>
<td>• Only full table update or full partition update from backup</td>
<td>• Full table, full partition update, Incremental update from DB2 data</td>
</tr>
<tr>
<td>• Same high speed query access transparently through DB2</td>
<td>• Same high speed query access transparently through DB2</td>
</tr>
</tbody>
</table>

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**Cost**

*The right mix of cost and functionality*

**Functionality**
# N1001 Systems and Sizes

*PureData System for Analytics N1001*

<table>
<thead>
<tr>
<th>Cabinets</th>
<th>1/4</th>
<th>1/2</th>
<th>1</th>
<th>1 1/2</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-Blades</td>
<td>3</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td>24</td>
<td>36</td>
<td>48</td>
<td>72</td>
<td>96</td>
<td>120</td>
</tr>
<tr>
<td>Processing Units</td>
<td>24</td>
<td>48</td>
<td>96</td>
<td>144</td>
<td>192</td>
<td>288</td>
<td>384</td>
<td>576</td>
<td>768</td>
<td>960</td>
</tr>
<tr>
<td>Capacity (TB)</td>
<td>8</td>
<td>16</td>
<td>32</td>
<td>48</td>
<td>64</td>
<td>96</td>
<td>128</td>
<td>192</td>
<td>256</td>
<td>320</td>
</tr>
<tr>
<td>Effective Capacity</td>
<td>32</td>
<td>64</td>
<td>128</td>
<td>192</td>
<td>256</td>
<td>384</td>
<td>512</td>
<td>768</td>
<td>1024</td>
<td>1280</td>
</tr>
</tbody>
</table>

**Predictable, Linear Scalability throughout entire family**

*Capacity = User Data space*  
*Effective Capacity = User Data Space with compression*  
*:* 4X compression assumed
End-to-end Business Analytics - Fraud Detection

Operational database
DB2 for z/OS

Data Warehouse
DB2 for z/OS
DB2 Utilities

Linux on Z
Cognos Reporting

System z Host
z/OS

DB2
z/OS

IWHouse

z/VM

Linux on System z

COGNOS

System z PR/SM™
z HW Resources

Support Element

System z Hardware Management Console (HMC)
with Unified Resource Manager

Select IBM Blades

SAS-Fraud Detection

AIX® on POWER®

Blade HW Resources

zBX

Private data network (IEDN)

ISAS-9700

Power Blades
SAS-Fraud Detection
AIX-Grid
zEnterprise contains all processing required for decision management within a single system image.
IBM Analytics Tools:

Making complex business information understandable

Translate data from various corporate systems into:

- Deliver information where, when and how it is needed
  - Self-service reporting and analysis
  - Individualized by user
  - Visually rich presentations
    - Gauges, maps, charts, and other graphical elements

- Integrated results from multiple sources, combined in a more meaningful way
- While delivering integrated offerings designed to optimize performance

.....Delivered into the hands of business users
Answering the questions – “Why?”

• Reporting
  • full breadth of report types
  • Access via email, portal, MS-Office, search and mobile devices etc.
  • Easy Integration of info from external sources
  • Push data and formats to other tools such as Excel

• Analysis
  – guided exploration
  – Easy click-through to details
  – Extreme query performance with the IBM IDAA

• Dashboards
  • at-a-glance - highly visual and intuitive
  • high impact views of complex info
  • operational, tactical, strategic
  • Designed to help monitor, measure, and manage corporate performance

“How are we doing?”

• Advanced Analytics
  – Statistical analysis and trending
  – Forecasting and key measurements
  – In DBMS scoring and temporal data with DB2 for z/OS
  – Integration with SPSS
**BI Mobility – QMF/Cognos**

***Making information accessible!***

• **Advances**
  - Leverage mobile technology to accelerate delivery of interactive analytics to executives and frontline workers
  - Address challenges of compressed decision cycles with real-time analytics
  - Integrate analytics in everyday work and in workflow to inform business processes

• **Key features**
  - Mobile interaction on iPhone and iPad
  - Interactive, disconnected reports
  - Real-time monitoring of in-flight information
  - Mashups
  - Business-driven workflow

Mobile, real-time, and portable.
Taking Predictive Analytics to the Next Level

*Predict the Behavior of the Next Case by modeling*

**A Universe of Data**

- Married
- Lives in the City of Chicago
- VP R&D, SPSS / IBM
- Owns a Corvette and a Plane
- 47 years old
- Drinks Martinis, extra dry

**A Predictive Model**

- Likes Rush
- Likes Chopin
- Works long hours
- Travels overseas

**Predicted Attributes**

- Wants to Buy aviation headsets
- Buys Car Washes!
- Buys Champagne
- Vacations to N. California to golf
**IBM SPSS –**

*Making information...predictive*

- High-performance data mining and text analytics workbench
  - Set of mining algorithms that provide insight and prediction
  - Identify patterns and trends in data that can be used to optimize business decisions
  - Cognos integration of SPSS models
- Benefits
  - Maximize Analyst Output
  - Create Practical Solutions Faster
  - Open & Efficient Architecture
    - Data mining within standard databases
- Data/Text Mining
  - natural language processing
  - heuristic rules
  - statistical techniques
  - .... to reveal meaning in text
- Collaboration & Deployment Services
  - Flexible enterprise foundation for managing and deploying analytics throughout the organization
- Benefits
  - Automates analytical processes
  - Securely share and reuse analytic models
  - Streamlines delivery of analytical information on a scheduled or real-time basis

WEB-DEMO of MODELER at: http://ibmtvdemo.edgesuite.net/software/analytics/spss/demos/modeler/
The Impact on Real-time Scoring

Customer interaction

Delivers a dynamic score

Business Application/OLTP

Historical Data Store

Scoring Application

Web services call

Multiple infrastructures required

High Networking Traffic

Difficult to commit to SLA’s

ETL

R-T, min, hr, wk, mth

Copy

Web services call

Delivers a dynamic score
Anti-fraud, Waste and Abuse Solution

For Healthcare – For Insurance
Detect suspicious transactions prior to payment, minimize loss from overpayments, and recommend method of intervention

Solution overview
Provide prepayment fraud detection with adaptive system that learns from the latest data
• Detect suspicious transactions using predictive models and smarter business rules
• Harness analytics to recommend best method of interaction for each transaction

Solution benefits
• Dramatically reduce costs from fraud and abuse
• Pay valid transactions faster and with greater certainty
• More efficient use of investigative resources reduces costs and increases rate of return

Business Outcomes
• State government stopped fraud prior to payment and saved on average $220 million annually
• Healthcare provider significantly reduced false positive rate from 79 percent to 29 percent
• Organizations applying predictive analytics are 2.2 more likely to outperform their peers\(^1\).
Workload Assessment

- **Customer**
  - Collects information from dynamic statement cache, supported by step-by-step instruction and REXX script (small effort for customer)
  - Upload compressed file (up to some MB) to IBM FTP server

- **IBM**
  - Import data into local database
  - Quick analysis based on known DB2 Analytics Accelerator capabilities

**Key contact:** Data Warehouse System z/Germany/IBM
The following benefits were determined through the CVE process based on on-site interviews, conference calls and questionnaires. All of the benefits can be achieved through proper implementation as determined by the solution blueprint within this CVE final deliverable.
Would you like to know more…
about how zEnterprise business intelligence and analytic offerings will enable your enterprise to become information-driven?

www.ibm.com/systems/zbi

Contact local IBM zEnterprise Sales contact to arrange a follow-on session
WW contact: joys@us.ibm.com
Thank You!