Michigan DB2 User Group Meeting

Investing in information integration and business analytics on DB2 for z/OS to achieve a competitive advantage

Shantan Kethireddy
shantank@us.ibm.com
DB2 System z FTSS

Generate More Revenue
Reduce Risk
Predict Future Outcomes with Greater Confidence
Lower Costs
The ability to create competitive advantage using analytics surged dramatically in 12 months; the bottom-line impact is clear

Respondents who say analytics creates a competitive advantage

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>37%</td>
</tr>
<tr>
<td>2011</td>
<td>58%</td>
</tr>
</tbody>
</table>

57% increase

Organizations achieving a competitive advantage with analytics are 2.2x more likely to substantially outperform their industry peers


Elevated demand for Business Analytics

- Business Analytics is priority for the business because of the insight that can be gained
- Needs to support strategic, tactical and operational decisions
- Must be timely, accurate and integrated across the enterprise
- Must be protected with stringent levels of security

More users, with higher expectations
New requirements have emerged

- Enterprise-level scale & performance
- Mission critical availability
- Faster access to operational data
- Rapid, cost effective deployment & expansion
- More integrated view of data across the environment

- Modernization
- Standardization & Consolidation
- Operational BI
- Data Governance
- Cloud Computing

Current State of Affairs: Execution by Department
What's hindering success?

- Insufficient processing power to support large or complex queries
- Servers are run at sub-capacity
- Data transfer is limited to off-peak times
- Each department needs to finance and acquire the HW, SW admin, facilities, training, and support to meet demand
- Growth = re-engineering
- Duplicate environments needed for development, test, production, high availability are multiplied over applications and lines of business
- Complexity of multiple infrastructures is impacting effectiveness of DR, admin., audit ability, compliance, etc.,
- Inconsistency of security controls across duplicated data
- Multiple copies of the data are being created

What role can you play to help overcome these barriers?

- Help meet new requirements by extending the characteristics of the transactional systems to data warehousing and business analytics
- Enable operational business analytics by co-locating data warehousing and business analytics closer to the transactional data
- Help minimize cost and reduce complexity by supporting a centralized, scalable infrastructure
- Respond quickly to data warehousing and business analytic needs by enabling rapid deployment and expansion

An average of 70% of transactional data that sources today’s informational systems originates on System z.
How can System z help?

- **Co-locations** of data warehousing, business analytics, transactional data
- Reduced data movement
- Lower latency and near real-time data
- Rapid acceleration of complex queries
- High security (EAL5)
- High availability (99.999%)
- Performs at 100% capacity
- Prioritization of critical queries & workloads
- Integrated disaster recovery
- Processor, disk, memory added dynamically without outage
- Pre-install then activate as needed
- Flexible deployment options
- Centralized, scalable infrastructure
- Virtualization
- Start with your final architecture

Analytics-driven Organizations Can...

**Price by opportunity**

...matching room prices to availability and customer type

- Maximize price to inventory yield
- Best price, best yield for both Marriott and the customer in less than one second
Analytics-driven Organizations Can…

**Identify Risk**

…and immediately control it

- Increase system capacity and availability while keeping IT costs flat
- Insights into overlapping policies from multiple insurance companies
- Getting their reports as much as 70 percent faster

---

Analytics-driven Organizations Can…

**Anticipate demand**

…and immediately match it

- Infusing business analytics into every new solution
- Able to scale to meet the demands of internal growth
System z responds to modern analytic demands

- Supports strategic, tactical and operational decisions
- Helps reduce uncertainty in decision making
- Helps improve competitive positioning
- Enhances business performance

Delivers an end-to-end solution on a single platform...

- Data warehousing
- Business intelligence
- Predictive analytics

Combines innovative capabilities & platform strengths to support...

- Timely, accurate and secure information
- Superior availability, scalability and performance
- Reduced costs and complexity
- Rapid deployment and expansion

Evolves with your business...

- Start with what you need
  - Functionality
  - Application
  - Department
  - Enterprise
- Deploy the way you need
  - Turnkey optimized
  - Private cloud
  - Services and education

A Comprehensive Solution
System z integrated stack

- Guardium
- InfoSphere MDM Server
- Master Data
- Optim
- InfoSphere Information Server
- Warehouse
- Cognos BI
- QMF
- SPSS
- Mashup
- Data Synchronization

Operational Source Systems
Structured/Unstructured Data

© 2012 IBM Corporation
### Data Warehousing & Business Analytics Key Capabilities

<table>
<thead>
<tr>
<th>Capability</th>
<th>DW or BA Requirement</th>
<th>Available on System z</th>
<th>System z Product(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relational Database</td>
<td>DW &amp; BA</td>
<td>Yes</td>
<td>DB2 for z/OS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IBM DB2 Analytics Accelerator</td>
</tr>
<tr>
<td>ETL</td>
<td>DW</td>
<td>Yes</td>
<td>Information Server (DataStage for Linux on System z, etc.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>InfoSphere Warehouse for System z</td>
</tr>
<tr>
<td>Data Analysis &amp; Cleansing</td>
<td>DW</td>
<td>Yes</td>
<td>InfoSphere Information Analyzer for Linux on System z</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>InfoSphere QualityStage for Linux on System z</td>
</tr>
<tr>
<td>Near real-time data synchronization</td>
<td>DW &amp; BA</td>
<td>Yes</td>
<td>InfoSphere Data Replication for z/OS</td>
</tr>
<tr>
<td>Multi-Dimensional Data</td>
<td>DW &amp; BA</td>
<td>Yes</td>
<td>InfoSphere Warehouse for System z</td>
</tr>
<tr>
<td>Reporting &amp; Dashboarding</td>
<td>BA</td>
<td>Yes</td>
<td>QMF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IBM Cognos BI (z/OS &amp; Linux on System z)</td>
</tr>
<tr>
<td>Predictive Analytics</td>
<td>BA</td>
<td>Yes</td>
<td>IBM SPSS for Linux on System z</td>
</tr>
</tbody>
</table>

Cognos BI on System z

- **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, real-time monitoring

- **Purpose-built SOA platform**
  - Fits client environments and scales easily

Now available for z/OS & Linux on System z
Analytics on the go for more devices and disconnected interaction

- Provide business users with the information they need to make responsive and informed decisions regardless of their location.

IBM Cognos Mobile
IBM Cognos Active Report

Solution Highlights

Mobile
- iPhone, iPad, BlackBerry, Windows Mobile, and Symbian
- Full BI interactivity including Drill Up/Down/Through
- Schedule reports for immediate access to key content

Active Report
- Disconnected BI application, fun and fast
- Self-contained, interactive content
- Burst distribution to reach wide audiences

QMF 10 - WYNTK

- QMF is a feature code of DB2 for z/OS with 2 versions:
  - Classic for TSO/CICS
- QMF/EE comes as an enterprise license and will install/run on a variety of platforms: z/OS, AIX, Linux, Windows
- The price is tied to the size of the DB2 for z/OS supported. There are no per-user charges.
- QMF 10 incorporates significant enhancements: graphical queries, reports, Dashboards and KPIs, advanced analytic functions, JDBC access to any RDBMS (zAAP eligible for System z), multi-dimensional analysis, new metadata capabilities, heterogeneous database access, federated data access, mobile device support, and more
- Enhanced and easier installation, maintenance, administration.
- New features delivered with fixpacks for rapid deployment.
- Enhanced ease of use and compatibility with existing QMF infrastructure, objects and workflows.
Moving from Reactions to Predictions

SMART IS
Turning a Call Center in a Profit Center.

A large Dutch financial services company implemented predictive cross selling programs in its call centers. The implementation took 2 months and generated $30 Million in incremental sales. Essentially, 1M calls generated 180,000 suggestions, reps made 60,000 offers turning into 30,000 leading to 22,000 sales.

SMART IS
Preventing crime before it happens.

A large city in the US turned to predictive analytics to predict occurrences of crimes in four blocks radius in tranche of 4 hours. Insights led to optimized deployment of police resources reducing homicides by 35% year over year, and robberies by 20%.

SMART IS
Turning clients into advocates.

A large Swiss telco provider adopted a client retention approach based on satisfaction. Based on the use of the “Wisdom of Crowds” principle, gathering feedback. The company reduced churn from 14% to 2%.

SMART IS
Dramatically lowering the cost of claims.

A large US insurer has embedded predictive analytics in claims handling while maximizing and accelerating the collection of subrogation payment. The company achieved an ROI of 403% with payback in 3 months.

IBM SPSS for Linux on System z

- Full breadth of predictive analytics
  - Data collection, statistics, data mining, predictive modeling, deployment services...
- Putting prediction in hands of the business
  - Decision Management
- Driving better business outcomes
  - Attract and retain more profitable customers
  - Detect and prevent fraud
  - Improve resource allocation
IBM SPSS Modeler 15 Real-time Scoring with DB2 for z/OS

Customer Interaction

- Data In
- Real-Time Score/Decision Out
- Meet & Exceed SLA

Support for both in-transaction and in-database scoring on the same platform

DB2 for z/OS

End to end solution

Reduced Networking

Consolidates Resources

IBM Blue Insight
Harnessing IBM Business Analytics and data warehousing on System z technologies to drive multi-million dollar benefits

The need:

Blue Insight is IBM’s strategic analytics platform, designed to empower hundreds of thousands of IBM employees with access to sophisticated business intelligence and predictive analytics via a single cost-effective private cloud architecture. Making this vision a reality involved the usual technical and process issues of centralization, but also social and philosophical ones: how could the Blue Insight team convince users that a centralized private cloud solution was the right way forward for IBM’s business to achieve its 2015 roadmap?

The solution:

Blue Insight uses a suite of IBM Business Analytics and Information Management software running on the IBM® System z® platform, which delivers the highest possible levels of performance, availability, security and scalability. As a result, Blue Insight’s flexible core analytics services place no limits on adoption or sophistication of end-users’ analyses; this versatility, combined with top-level executive support, is helping to drive adoption throughout the enterprise.

The benefits:

- Generates new insights that drive real business value – for example, increasing software revenues by eight percent by enhancing small deals management.
- Delivers $25 million savings over five years through consolidation.
- Avoids approximately $250,000 in set-up costs for each new analytics project
- Scales seamlessly to meet increasing user demand. Blue Insight now has a user-base of nearly 200,000 people across 390 projects.

“The business gets excellent performance and near-total availability, and can regard analytics as an always-on, real-time service.”

— Larry Yarter, Chief Architect, Blue Insight Business Analytics Competency Center, IBM

Solution components:
- IBM® Cognos® Business Intelligence
- IBM SPSS® Statistics
- IBM SPSS Modeler
- IBM InfoSphere® Warehouse
- IBM zEnterprise™ 196
- IBM DB2 Analytics Accelerator
IBM Blue Insight Selects System z platform to deploy an internal Private Analytics Cloud

Project Scope
- 180K named users world-wide
- 390 distinct Cognos BI reporting projects
- 250 data sources - DB2, PowerCube, XML, pSeries, zLinux, z/OS
- 1.7 million reports delivered in Q3 2011
- The team – Operations team of 9 BACC support and 10 infrastructure
- Single instance of Cognos on 1 z box for production, using multiple zLinux guests

Value to the Business
- Hard cost savings - $25 Million over 5 yrs
  - People: 30% - more efficient use of resources, less duplication
  - Infrastructure: 50% - hardware, software, facilities
  - Common Process: 20% - common boarding, communication and practice
- Soft cost savings – 10’s of $M already
  - Cost avoidance
  - Each new project solution requiring analytics is saving
  - Reduced technical and business team solution churn
  - Improved resource flexibility
- Value Generation – 10’s of $M already
  - Better business decisions
  - Channel segmentation of sales opportunities
  - WW Cash management
  - Commodity purchase optimization

Our commitment to informed decision making led us to consider private cloud delivery of Cognos via System z, which is the enabling foundation that makes possible $25M savings over 5 years.

- IBM CIO Office

IBM Blue Insight Delivers 5yr 25M$ Savings

People - 30%
- Reduction in non value add operations of silo’d systems
- Installations, updates, operations monitoring
- Elimination of silo’d tool evaluations
- Reduced solution design using analytics service as a component architecture service
- Common tooling skills provides common practitioner “language” and workforce flexibility
- Improved analyst efficiency due to reuse of models and reports

Infrastructure – 50%
- Hardware reduction
  - Systems are right sized to maximize utilization
- SW license reduction
  - Share all SW environments reduces costs of underutilized licenses
- Reduced facilities expenses
  - Electric, real estate, network, heating/ cooling
- Reduce SW licensing due to tooling standardization
  - Reduce purchases and SW maintenance costs

Common Processes – 20%
- Common boarding process
  - Reduces adopter time to board and create value
- Common lifecycle processes
  - Common communications, code promotions and upgrades, etc.
- Common consulting practice
  - Solution and architecture assessments to assist in service integration
- Standardized problem reporting, root cause analysis and help desk

© 2012 IBM Corporation
But Why not More

But Why not More

Hard savings
$25M over 5 years

- Cost take out
  - Hardware
  - Software
  - Operations costs
  - Help desk
  - Maintenance
  - Monitoring
- Reduced operations personnel
- Reduced 3rd party licensing

Soft savings
10’s of $M already

- Cost avoidance
  - Each new project solution requiring analytics is saving ~ 250K in HW, SW and Ops savings
- Establishment of a WW Analytics strategy
  - Reduced technical and business team solution churn
  - Improved resource flexibility

Value Generation
10’s of $M already

- What business value has been produced using our services
  - Channel segmentation of sales opportunities
  - WW Cash management
  - Commodity purchase optimization
  - Etc.

IBM focused on immediate returns to the business first with an eye on the bigger prize.
Delivering the proven capabilities of analytics to the creative minds of our workforce.

Flexible Deployment Options

Smart Analytics System 9700
- Integrated solution of HW, SW and services based on zEnterprise 196 platform
- Enables customers to rapidly deploy cost effective game changing analytics across their business.

Smart Analytics System 9710 (NEW!)
- Integrated solution of HW, SW and services based upon the new zEnterprise 114 platform
- Delivers the quality of service of System z at an entry level cost

IBM Smart Analytics Cloud
- IBM Smart Business - services with industry leading hardware & software
- A private cloud computing solution for business intelligence (BI) & analytics
DB2 Analytics Accelerator (NEW!)
Accelerating decisions to the speed of business

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

Get more insight from your data
- 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

Performance & Savings

<table>
<thead>
<tr>
<th>Query</th>
<th>Total Rows</th>
<th>Total Reviews</th>
<th>Total Rows Returned</th>
<th>DB2 Only</th>
<th>DB2 with IDAA</th>
<th>Times Faster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Query 1</td>
<td>7,357,275</td>
<td>585,786</td>
<td>2,164</td>
<td>0.0</td>
<td>0.0</td>
<td>1,320</td>
</tr>
<tr>
<td>Query 2</td>
<td>2,813,571</td>
<td>853,320</td>
<td>2,640</td>
<td>0.0</td>
<td>0.0</td>
<td>1,644</td>
</tr>
<tr>
<td>Query 3</td>
<td>2,813,571</td>
<td>601,197</td>
<td>1,908</td>
<td>0.0</td>
<td>0.0</td>
<td>920</td>
</tr>
</tbody>
</table>

DB2 Analytics Accelerator: "we had this up and running in days with queries that ran over 1000 times faster"

DB2 Analytics Accelerator: "we expect ROI in less than 4 months"

Queries run faster
- Save CPU resources
- People time
- Business opportunities

Actual customer results, October 2011

Advance to 31 minute mark for DB2 Analytics Accelerator section of keynote
IBM DB2 Analytics Accelerator V3 Product Components

Deep DB2 Integration within zEnterprise

Applications

DBA Tools, z/OS Console, ...

Operational Interfaces
(e.g. DB2 Commands)

Application Interfaces
(standard SQL dialects)

DB2 for z/OS

Data Manager Buffer Manager IRLM Log Manager

Superior availability reliability, security, Workload management

z/OS on System z

IBM DB2 Analytics Accelerator

Netezza

Superior performance on analytic queries
DB2 Analytics Accelerator V3
Powered by Netezza 1000 Appliance

- Slice of User Data
- Swap and Mirror partitions
- High speed data streaming
- High compression rate
- EXP3000 JBOD Enclosures
  - 12 x 3.5" 1TB, 7200RPM, SAS (3Gb/s)
  - max 116MB/s (200-500MB/s compressed data)
  - e.g. 1T12: 8 enclosures → 96 HDDs
  - 32TB uncompressed user data → 128TB
- IDAA Server
  - SQL Compiler, Query Plan, Optimize
  - Administration
  - 2 frontend hosts, IBM 3650M3
  - clustered active-passive
  - 2 Nehalem-EP Quad-core 2.4GHz per host
- Processor & streaming DB logic
  - High-performance database engine streaming joins, aggregations, sorts, etc.
  - e.g. 1T12: 12 back/end SPUs
  - (more details on following charts)

The Appliance Connected to a System z

- Disk Enclosures
- SMP Hosts
- Snippet Blades™ (S-Blades, SPUs)
- Host
- FPGA
- CPU
- Memory
- Network Fabric
- Netezza Appliance
The Key to the Speed

```
select DISTRICT, PRODUCTGRP, sum(NRX)
from MTHLY_RX_TERR_DATA
where MONTH = '20091201'
and MARKET = 509123
and SPECIALTY = 'GASTRO'
```

Query Execution Process Flow

![Diagram of Query Execution Process Flow]

- **Application Interface**
- **Optimizer**
- **Heartbeat**
- **DB2 for z/OS**
- **IDAA**

Legend:
- Blue: Queries executed without IDAA
- Red: Queries executed with IDAA
- Orange: Heartbeat (IDAA availability and performance indicators)
### Options for Workload Analysis

<table>
<thead>
<tr>
<th>Stage</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questionnaire</td>
<td>Initial assessment based on size, query response time, update characteristics and customer pain points</td>
</tr>
<tr>
<td>Quick Workload Test</td>
<td>Assessment based on dynamic customer workload, runtime statistics, table sizes and SQL</td>
</tr>
<tr>
<td>Detailed Online Workload Analysis</td>
<td>Assessment based on data mart definition for customer data model and offload capabilities in a real Smart Analytics Optimizer environment. Addresses all inhibitors for offload and data mart definition questions.</td>
</tr>
</tbody>
</table>

### Quick Workload Test

- Collecting information from dynamic statement cache, supported by step by-step instruction and REXX script (small effort for customer)
- Uploading compressed file (up to some MB) to IBM FTP server
Workload Assessment Report

Summary based on queries, elapsed time and CPU time

Reasons why certain queries may not run in IDAA

How much of the current elapsed time may run on IDAA

Detailed query-level assessment of the workload

SQL statement per query

Elapsed time per query

The Ultimate Consolidation Platform

Bringing it all together

- Better Business Response
- Reduced Costs
- More Available
- More Secure
- Reduced Data Movement
- Better Governance
- Reduced Data Latency
- Reduced Complexity
- Reduced Resources

Together:
Destroying the myth that transactional and decision support workloads have to be on separate platforms
Today’s IBM System z is …

- The world’s most trusted transaction processing and data server for business critical applications

- The world’s most cost-efficient platform for data center consolidation and virtualization

- The world’s most dependable and scalable hardware and middleware platform for new business applications

- A thoroughly modern application environment for traditional and Cloud delivery models

The zEnterprise 196 is the world’s fastest and most scalable enterprise system. (50 BIPS)

Based on 5.2GHz core processor speed

Thank You