Optimize your System z Data Warehouse with IBM ETL and Analytic Tools

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August 21, 2007

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- enhancements at some future date,
- a new release of DB2, or
- a Programming Temporary Fix (PTF)

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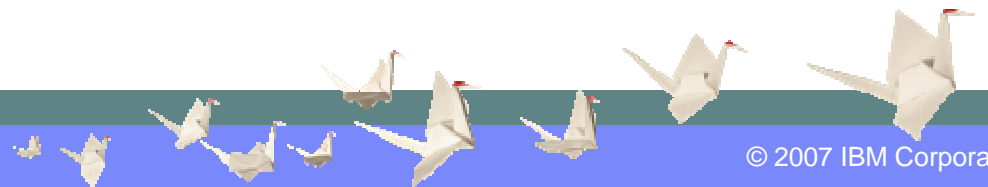
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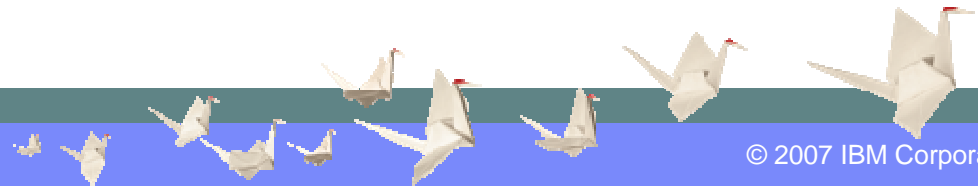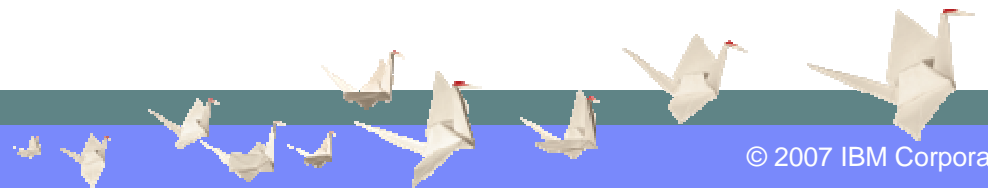
Agenda

- Review of DW on System z (8/7 Teleconference)

- IBM Information Server Supporting DW on System z

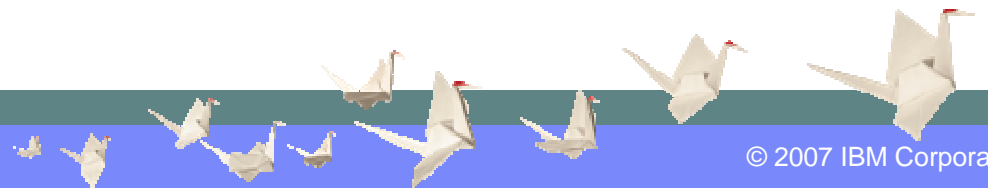- IBM Analysis & Reporting Tools Supporting DW on System z

- Q & A

Review of DW on System z

- Today's Teleconference is designed to build upon 8/7 Teleconference

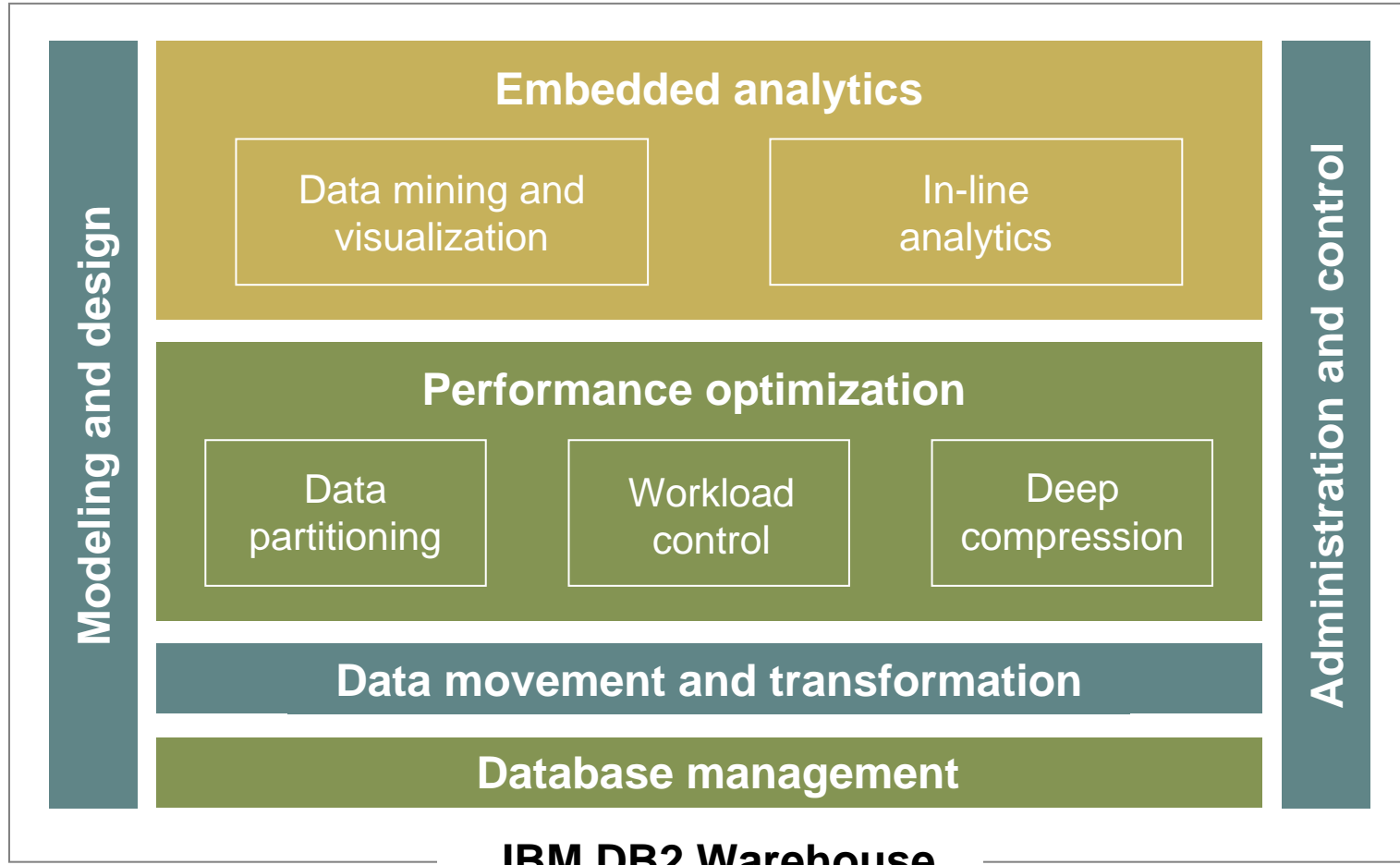- "Leveraging DB2 z/OS and System z for Dynamic Warehousing"

8/7 Teleconference Summary

- Introduced Dynamic Warehousing & Established DW on DB2 z/OS as a full participant in that IBM Initiative

- Introduced Layered Data Architecture as an approach that seeks to consolidate the logical components of a DW environment (ODS, DW & DM's) within a single database environment

- Reviewed What is Available Today to Support DW on System z

- Recommended a Solution Architecture for DW on System z

IBM DB2 Warehouse software
A complete, integrated platform

Modeling and design

Embedded analytics

Data mining and visualization

In-line analytics

Performance optimization

Data partitioning

Workload control

Deep compression

Data movement and transformation

Database management

Administration and control

IBM DB2 Warehouse
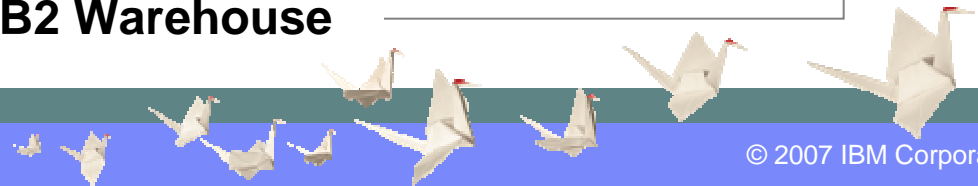
Layered "Data Architecture"

As data ages it flows through the layers

Floor 5 — Dashboard Static reports, Fixed Periods

Floor 4 — Dimensional, Data Mart, Cubes, Duration: Years

Floor 3 — Summarized Data Performance and rolled up Data Duration: Years

Floor 2 — Near 3rd Normal Form, Subject Area, code and Reference tables. Duration: Years

Floor 1 — Staging, detail, denormalized, Raw Source Duration: 60, 120, 180, etc days
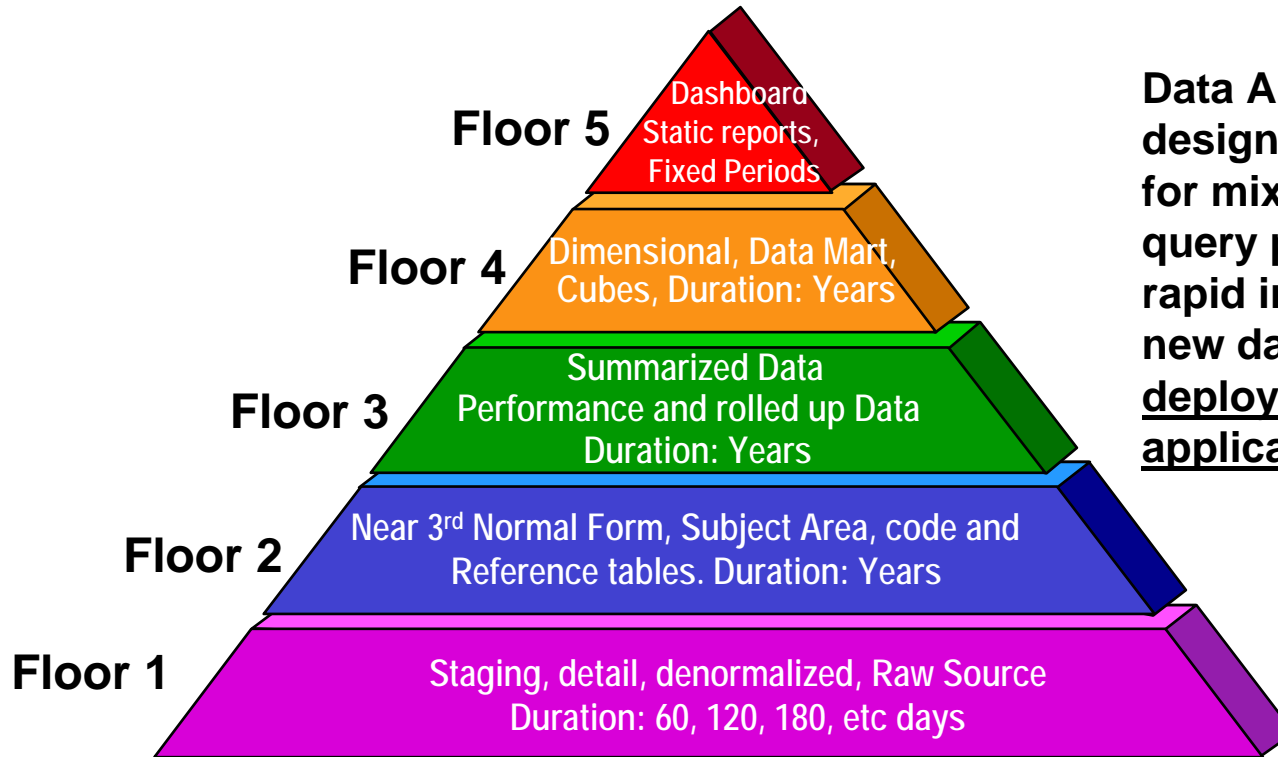
Data Architecture designed specifically for mixed workloads, query performance, rapid incorporation of new data sources, and deployment of new applications.

What DW/BI Capabilities Exist Today for System z

- **DB2 z/OS V8 & V9 EDW Base**
  - Functional and performance enhancements
  - Easier online reporting and data management capabilities
  - DB2 family compatibility – including MQTs

- **Integration (EDW ETL)**
  - WS DataStage EE, WS Classic Federation Server, WS Classic Data Event Publishers, Distributed DBMS Event Publishers, BatchPipes for OS/390, DB2 Unload/Load Utilities
  - IBM Information Server (WS Information Analyzer, WS QualityStage)

- **Analyze/Report**
  - Alphablox, QMF, DataQuant
  - Partner offerings from Cognos, Hyperion (Oracle), Business Objects, SAS, IBI
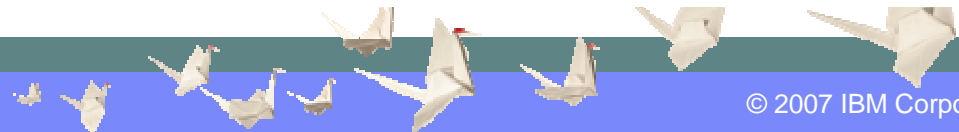
- **Performance Management**
  - IBM Tivoli Omegamon XE for DB2 Performance Expert on z/OS, DB2 Query Monitor, Optimization Service Center (V9)

- **Security and Regulatory Compliance**
  - DB2 Data Archive Expert, DB2 Test Database Generator, DB2 Audit Manager Expert, IBM Encryption for DB2 and IMS Databases
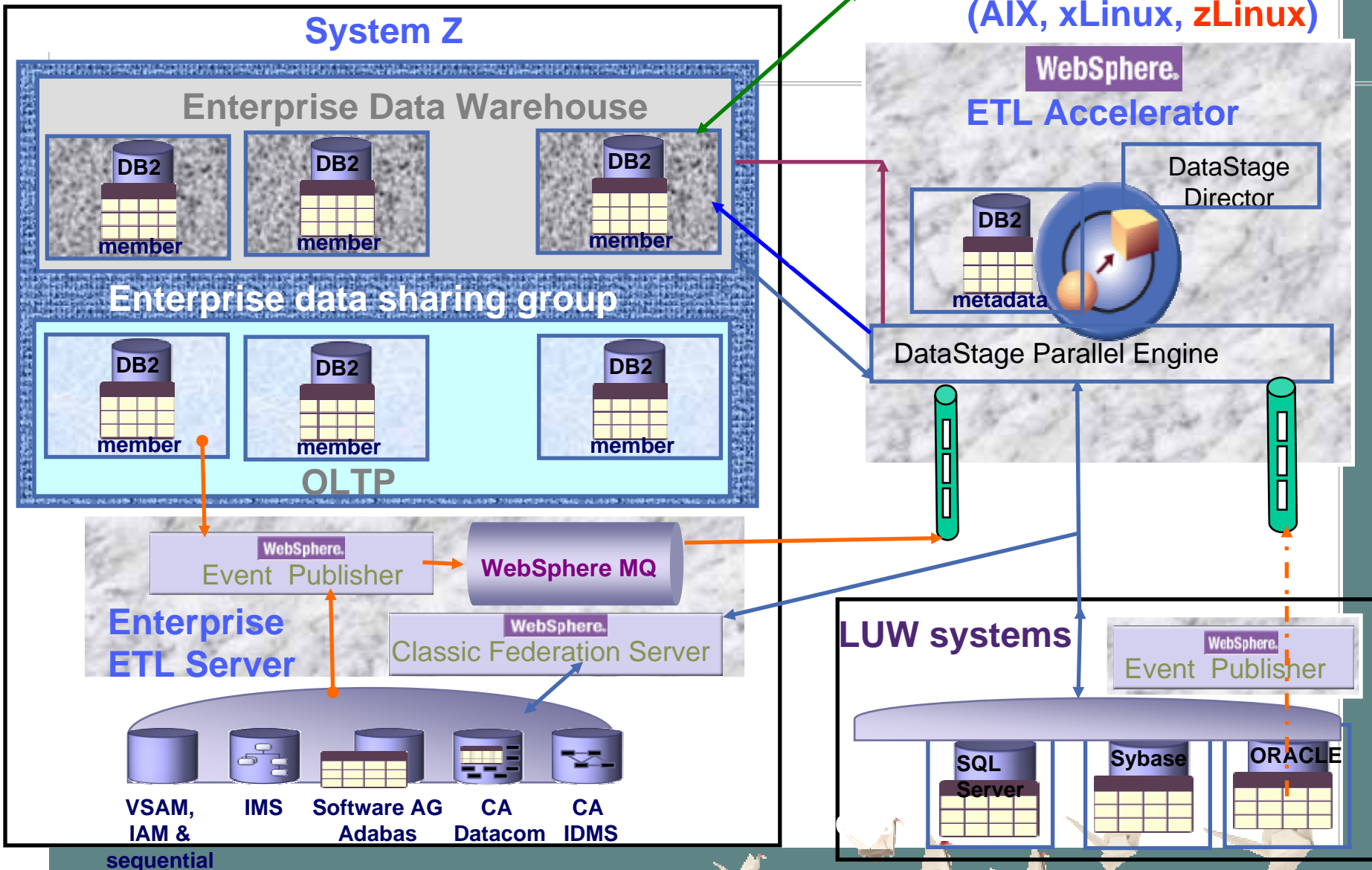
- **Application Management**
  - DB2 Table Editor, DB2 Web Query Tool, DB2 Automation Tool, DB2 Query Monitor
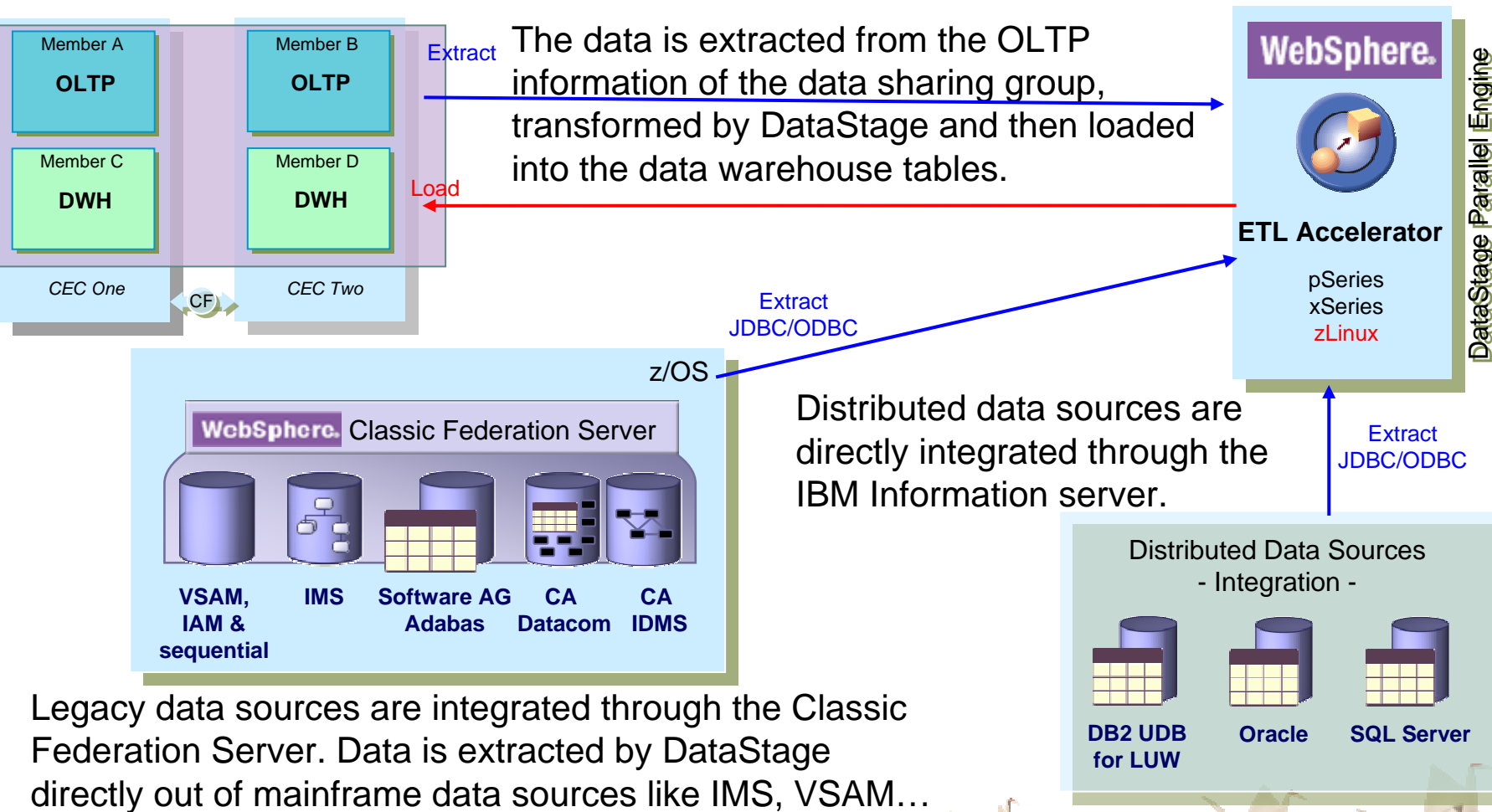
DB2 z/OS BI solution architecture

BI tools

| DataQuant | Alphablox | Cognos | Business Objects |

System Z

(AIX, xLinux, zLinux)

WebSphere.

ETL Accelerator

Enterprise Data Warehouse

DB2 member

DB2 member

DB2 member

Enterprise data sharing group

DB2 member

DB2 member

DB2 member

OLTP

DB2 metadata

DataStage Director

DataStage Parallel Engine

Enterprise ETL Server

WebSphere. Event Publisher

WebSphere MQ

WebSphere. Classic Federation Server

LUW systems

WebSphere. Event Publisher

VSAM, IAM & sequential

IMS

Software AG Adabas

CA Datacom

CA IDMS

SQL Server

Sybase

ORACLE

Initial load of the Data Warehouse

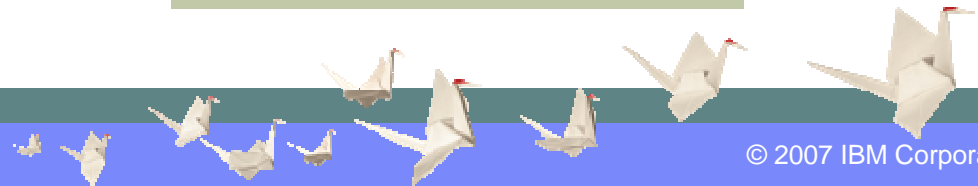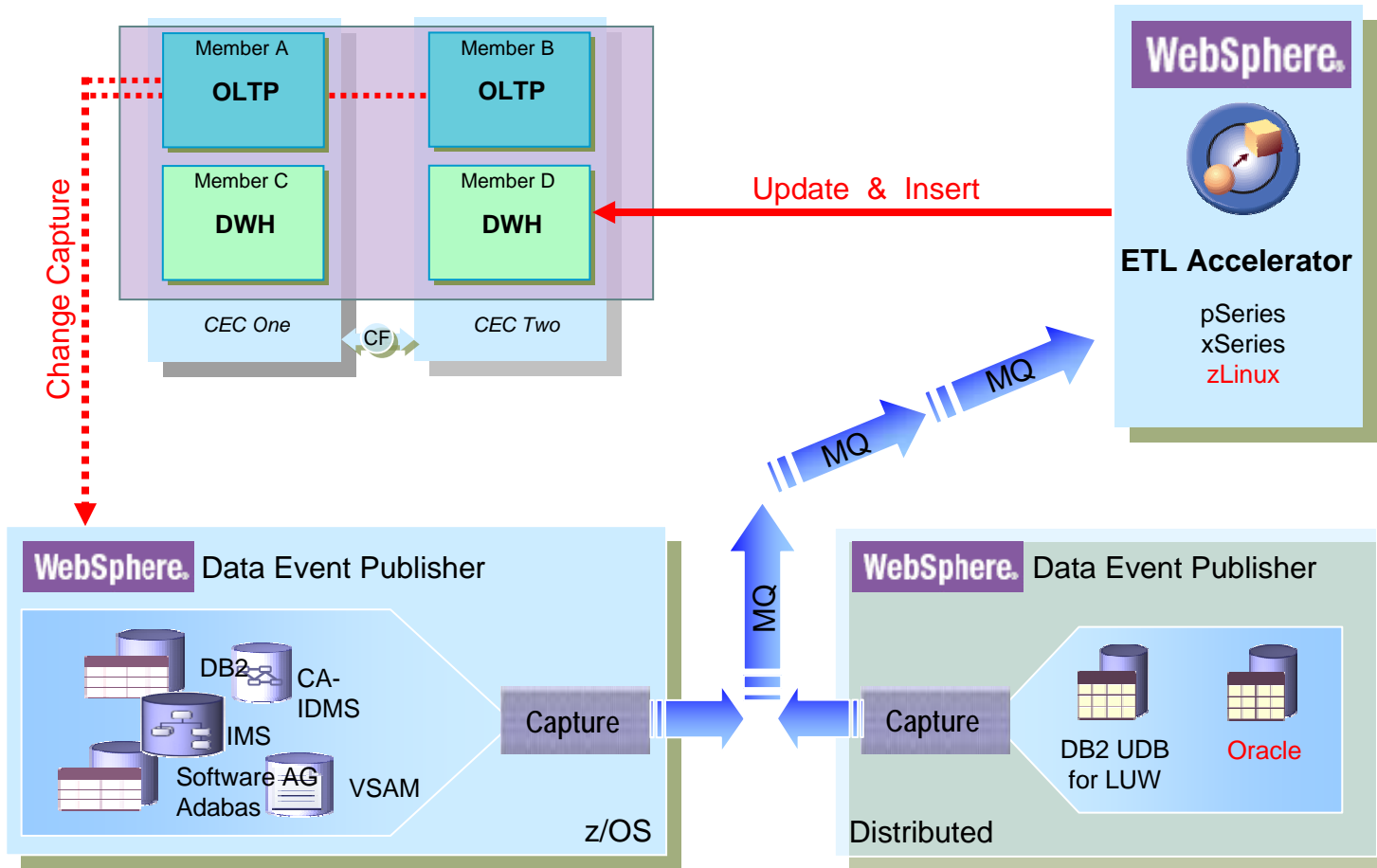| Member A **OLTP** | Member B **OLTP** |
| Member C **DWH** | Member D **DWH** |
| *CEC One* | *CEC Two* |

Extract

Load

The data is extracted from the OLTP information of the data sharing group, transformed by DataStage and then loaded into the data warehouse tables.
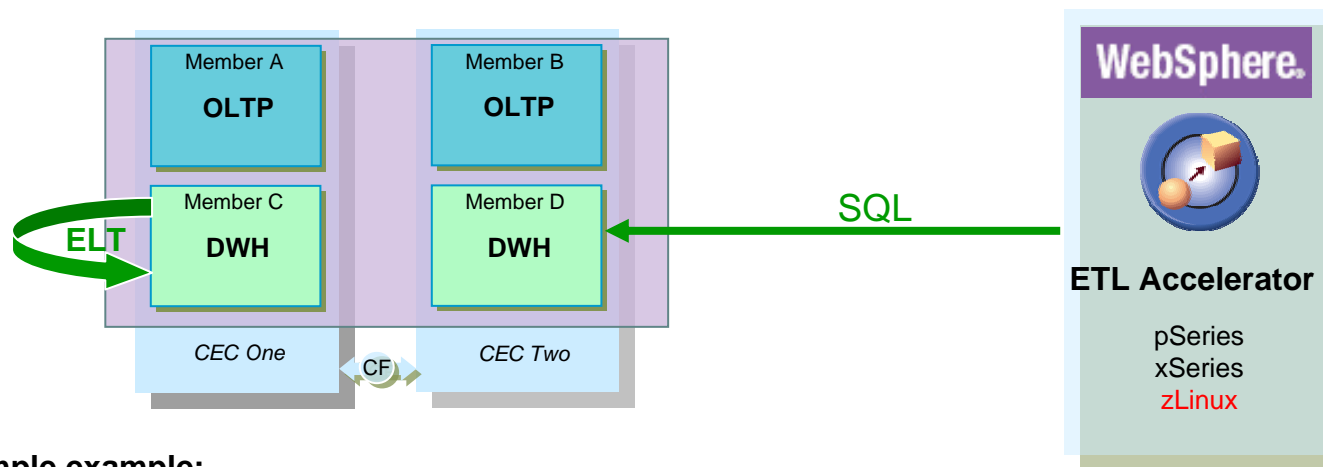
WebSphere.

ETL Accelerator

pSeries
xSeries
zLinux

DataStage Parallel Engine

CF

z/OS

Extract
JDBC/ODBC

Distributed data sources are directly integrated through the IBM Information server.

WebSphere. Classic Federation Server

VSAM, IAM & sequential   **IMS**   **Software AG Adabas**   **CA Datacom**   **CA IDMS**

Extract
JDBC/ODBC

Distributed Data Sources
- Integration -

DB2 UDB for LUW   **Oracle**   **SQL Server**

Legacy data sources are integrated through the Classic Federation Server. Data is extracted by DataStage directly out of mainframe data sources like IMS, VSAM…

9

At runtime, the Data Warehouse is updated incrementally

In Database ELT is triggered by DataStage

Member A
OLTP

Member B
OLTP

Member C
DWH

Member D
DWH

ELT

SQL

CEC One

CF

CEC Two

WebSphere.

ETL Accelerator

pSeries
xSeries
zLinux

Simple example:

```
-- Aggregate by salary by department into AGGRSALARY

INSERT INTO AGGRSALARY ( DEPTCODE, AVGBAND, AVGSALARY )
   SELECT DEPTCODE, AVG( BAND ) AS AVGBAND, AVG( SALARY ) AS AVGSALARY
   FROM STAFF GROUP BY DEPTCODE
```

Wherever possible, "In Database" transformations (ETL) are used to spare the transport of the data to the accelerator. But the used SQL is still sent from the ETL Accelerator to the database to have one place of documentation for all ETL steps.
This can also be used to shift the data up the hierarchy within the Layered Data Architecutre.

8/21 Teleconference Intent

- Expand on "building the warehouse" Components of BI Solution Architecture delivered by IBM Information Server Products

- Expand on Analysis & Reporting Component of BI Solution Architecture delivered by DataQuant & AlphaBlox Products
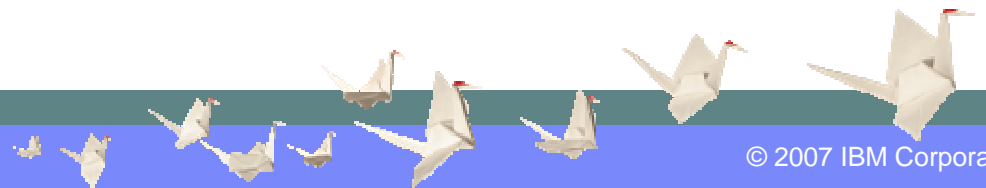
The IBM Information Server
Delivering information you can trust

IBM Information Server

Unified Deployment

| **Understand**	**Cleanse**	**Transform**	**Deliver**
Discover, model, and govern information structure and content	Standardize, merge, and correct information	Combine and restructure information for new uses	Synchronize, virtualize and move information for in-line delivery

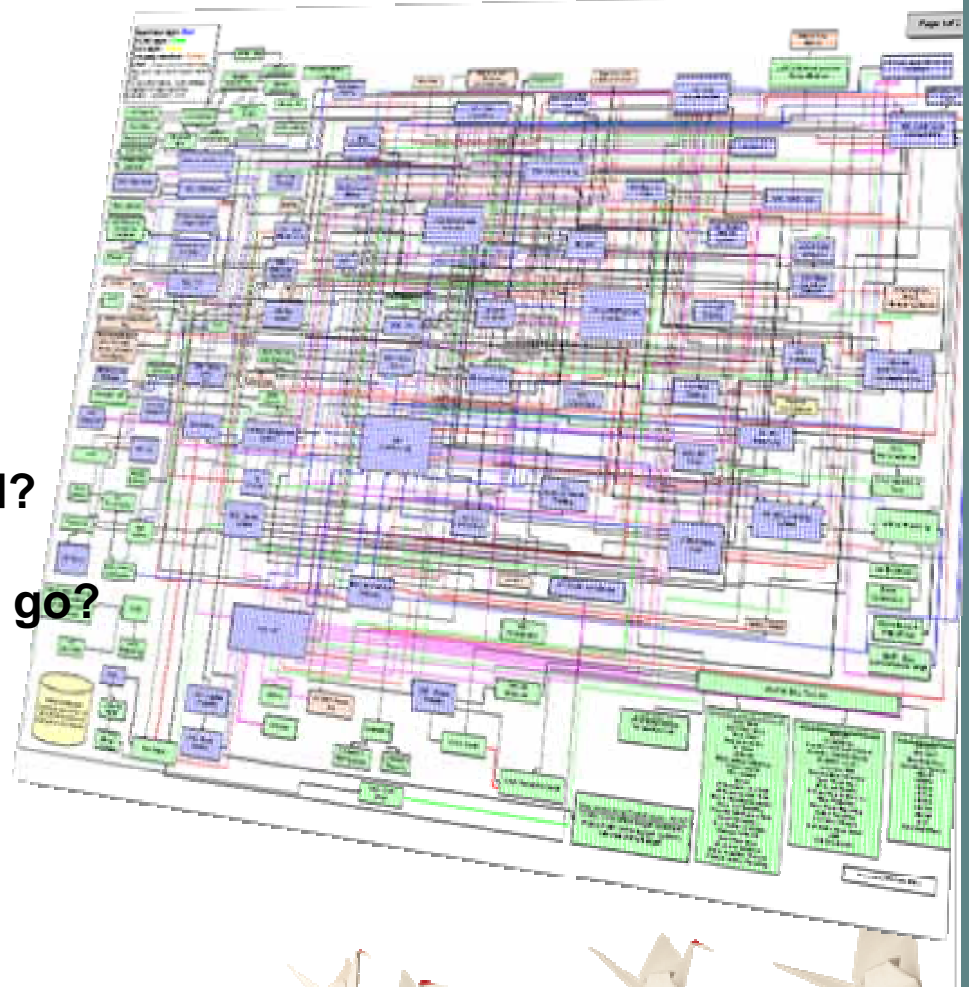**Unified Metadata Management**

Parallel Processing

Rich Connectivity to Applications, Data, and Content
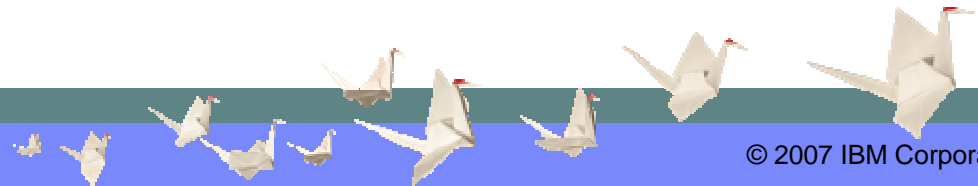
Why is it Important to Begin with Understanding?

- **Where is my information?**

- **How do I get it when I need it?**

- **What does it mean?**

- **Can I trust it?**

- **How do I get it in the form I need?**

- **How do I get it where it needs to go?**

- **How do I control it?**
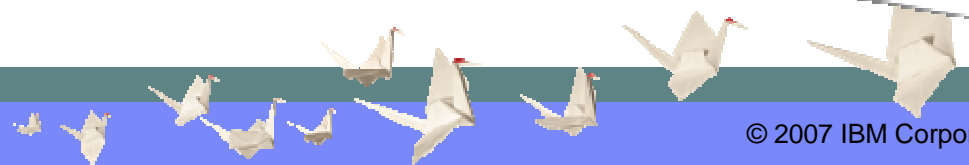
WebSphere Business Glossary

Business Meta Data

- Web-based authoring, managing & sharing of business metadata

- Aligns the efforts of IT with the goals of the business

- Provides business context to information technology assets

- Establishes responsibility and accountability

Database = DB2

Schema = NAACCT

Table = DLYTRANS

Column = ACCT_NO

data type = char(11)

Technical   Business

GL Account Number

The ten digit account number. Sometimes referred to as the account ID. This value is of the form L-FIIIIVVVV.

Subject Matter Experts

Business Users

WebSphere Business Glossary

Create and manage business vocabulary and relationships, while linking to physical sources

eporting   Help | Log O

Overview   Manage Custom Attributes ×   Manage Business Terms ×

Overview

Welcome to WebSphere Business Glossary

International Business Machines (NYSE:IBM) is the leader in enterprise data integration. Customers and partners worldwide use its information integration tools to confidently transform data into accurate, reliable and complete business information to improve operational performance and decision-making across every critical business dimension. Our comprehensive end-to-end solutions provide on demand data integration complemented by our professional services, industry expertise, and methodologies.

IBM.

USA   Europe   Data Model   Asia
Finance   Finance   Top-level category, which   Finance
Manufacturing Manufacturing   groups all the elements by   Manufacturing
Customer Relationship Customer Relationship type   Customer Relationship

See All Categories

Business View

Rational Data Architect

Subject Matter Experts

Architects

Logical Meta Data

- Data modeling for data structures and federations

- Federated data discovery

- Metadata relationship discovery and mapping

- Impact analysis, and synchronization across models

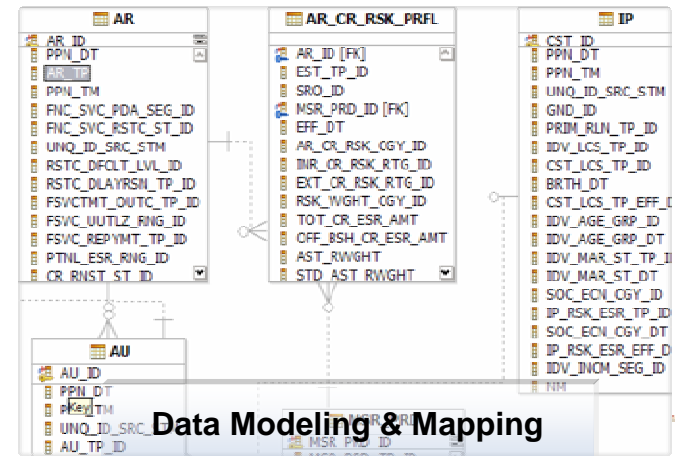- SQL & XML generation capabilities

Rational Data Architect

Create and manage business vocabulary and relationships, while linking to physical sources

Data Modeling & Mapping

WebSphere Information Analyzer

Physical Meta Data

- Data-centric analysis of application, database and file-based sources

- Secure, detailed profiling of fields, across fields and across sources

- Creation of metadata from profiling results

- Results instantly promotable across IBM Information Server

Subject Matter Experts

Data Analysts

WebSphere Information Analyzer

Analyze source data structures, and monitor adherence to integration and quality rules

Physical View
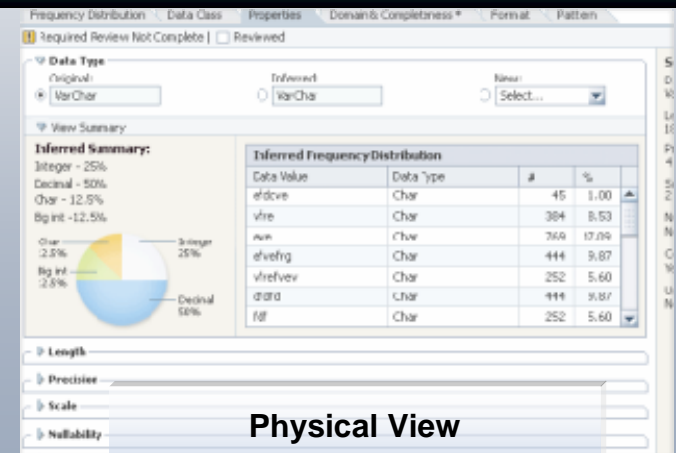
Why Care About Cleansing Information?

- **Lack of information standards**
  - ▸ Different formats & structures across different systems

- **Data surprises in fields**
  - ▸ Data misplaced in the database

- **Information is buried**
  - ▸ Free-form fields

- **Data myopia**
  - ▸ Lack of consistent identifiers inhibit a single view of:
    - customers   - products   …

- **The redundancy nightmare**
  - ▸ Duplicate records with a lack of standards

```
Kate A. Roberts     416 Columbus Ave #2, Boston, Mass 02116

Catherine Roberts Four sixteen Columbus APT2, Boston, MA 02116

Mrs. K. Roberts     416 Columbus Suite #2, Suffolk County 02116
```

Name	Tax ID	Telephone
J Smith DBA Lime Cons.	228-02-1975	6173380300
Williams & Co. C/O Bill	025-37-1888	415-392-2000
1st Natl Provident	34-2671434	3380321
HP 15 State St.	508-466-1200	Orlando

```
WING ASSY DRILL 4 HOLE USE 5J868A HEXBOLT 1/4 INCH

WING ASSEMBY, USE 5J868-A HEX BOLT .25" - DRILL FOUR HOLES

USE 4 5J868A BOLTS (HEX .25) - DRILL HOLES FOR EA ON WING ASSEM

RUDER, TAP 6 WHOLES, SECURE W/KL2301 RIVETS (10 CM)
```

```
19-84-103   RS232 Cable 6' M-F CandS

CS-89641    6 ft. Cable Male-F, RS232 #87951

C&SUCH6     Male/Female 25 PIN 6 Foot Cable
```

```
90328574   IBM              187 N.Pk. Str. Salem NH 01456
90328575   I.B.M. Inc.      187 N.Pk. St. Salem NH 01456
90238495   Int. Bus. Machines   187 No. Park St Salem NH 04156
90233479   International Bus. M. 187  Park Ave Salem NH 04156
90233489   Inter-Nation Consults 15 Main Street Andover MA 02341
90345672   I.B. Manufacturing   Park Blvd. Bostno MA  04106
```

Cleanse

WebSphere QualityStage

- Specialized data quality functions seamlessly integrated with DataStage

- Visual tools for defining complex matching and survivorship logic

- Ensures clean, standardized, de-duplicated information

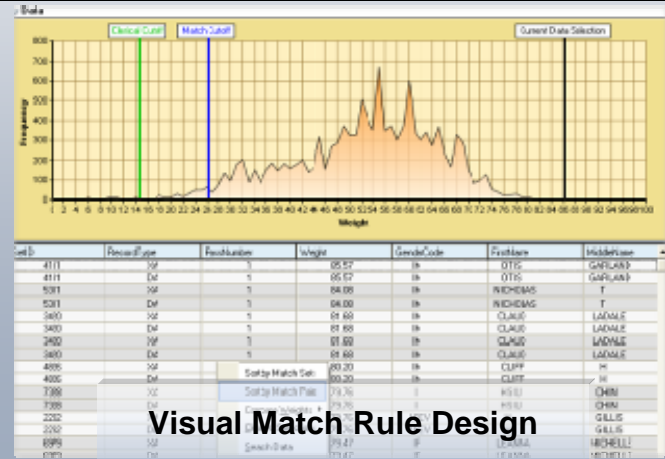- Enables a single version of the truth
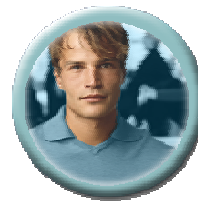
Subject Matter Experts

Data Analysts

WebSphere QualityStage™

Standardize and correct source data fields, and match records together across sources to create a single view

Visual Match Rule Design

What Is Important About Transformation & Delivery?

- Transformation is key to enabling information to be used in new business contexts – it needs to be metadata-driven

- Designed for use by information experts using the understanding imparted by the metadata

- Transformation and Delivery can be reused across multiple mechanisms
  - ▸ Large volume batch movement
  - ▸ Real-time event-driven response
  - ▸ Service-oriented architecture
  - ▸ Federated query

Data Analysts

Data Architects

DBAs

Subject Matter Experts

Logic Reuse

Request

Response

Query
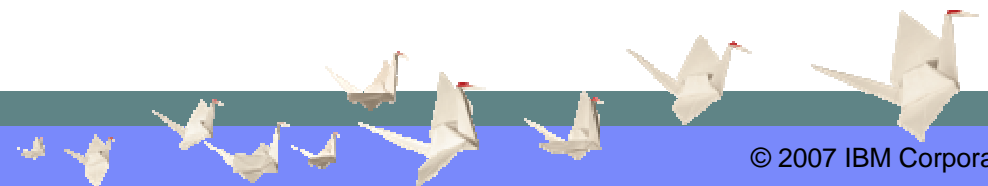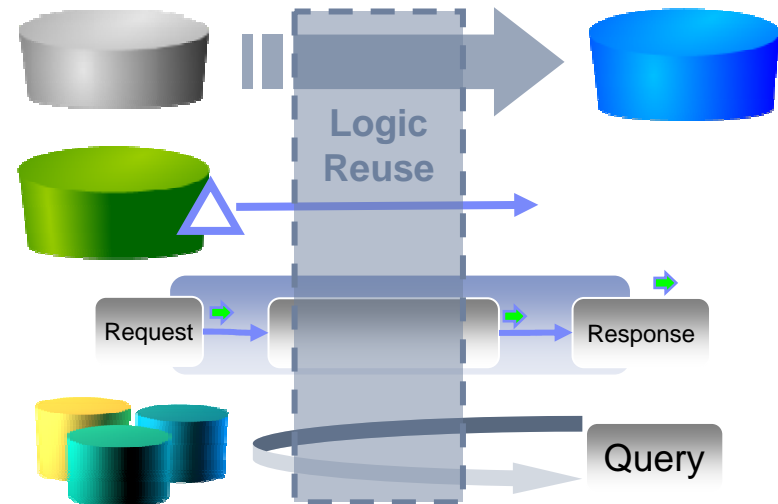
Transform **Deliver**
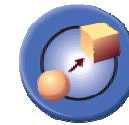
WebSphere DataStage

- Codeless visual design of data flows with hundreds of built-in transformation functions

- Optimized reuse of data integration objects

- Leverages parallel processing without requiring design changes

- Capable of supporting batch and real-time operations

Developers **Architects**

WebSphere DataStage®

Transform and aggregate any volume of information in batch or real time through visually designed logic

Hundreds of Built-in Transformation Functions

Deliver
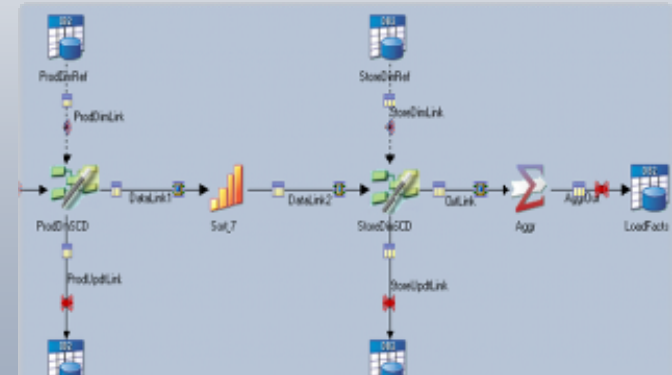
WebSphere Federation Server

SQL Access to distributed data

- Access diverse & distributed information as if it were in one system

- Industry leading query optimization with single sign-on, unified views, and function compensation

- Transactional write capabilities across heterogeneous sources

- Visual tools for federated data discovery & data modeling

WebSphere Federation Server

Access and integrate heterogeneous information across multiple sources as if they were a single source

Extend value of existing analytical applications by providing real-time access to integrated information

Visual Federation Design
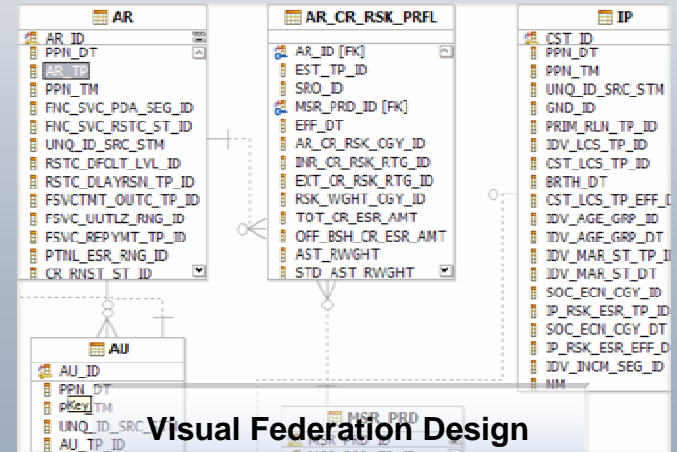
Deliver

WebSphere Classic Federation Server

Read/Write mainframe data using SQL

- Metadata-driven, so there's no mainframe programming required

- Works with existing mainframe infrastructure and "modern" applications and tools you need

- Deliver mainframe data to
  - ▸ Self-service portals
  - ▸ e-commerce solutions
  - ▸ Reporting and analytical tools
  - ▸ IBM's own data profiling, cleansing and transformation solutions

- Sources:
  - ▸ VSAM, IMS, CA-IDMS, CA-Datacom, Software AG Adabas, DB2

IBM WebSphere Classic Federation Server

Read-from and write-to mainframe data sources using SQL from Unix, Windows, Linux and JVM platforms

Empowers mainframe data integration with Information Server components, your applications as well as IBM and 3rd party tools and applications
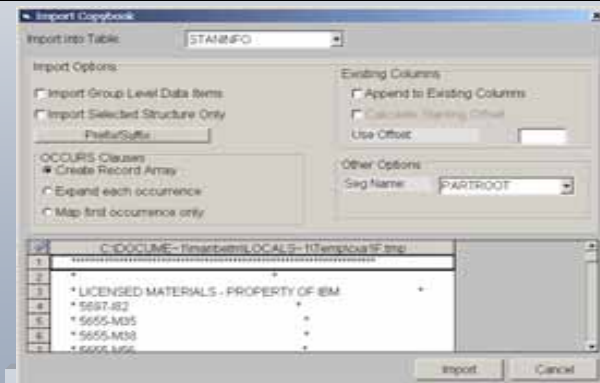
Dynamic Visual Metadata Management

Deliver

WebSphere Data Event Publishers

Push Changed Data "Events"

- Feed data to DataStage for change-only updating of the warehouse

- Loosely-coupled, no impact on applications

- Low-latency or scheduled data capture

- Multiple publication formats:
  - Consistent relational format for ease of use
  - XML for ease of consumption
  - Delimited values minimizes message size

- Recoverability, assured delivery

- Sources:
  - DB2, IMS, CA-IDMS & Software AG Adabas

IBM WebSphere Data Event Publisher

Detect and respond to data changes in source systems, and publish changes to subscribed systems, to ETL or to other modules for event-based processing

Easy Changed Data Capture
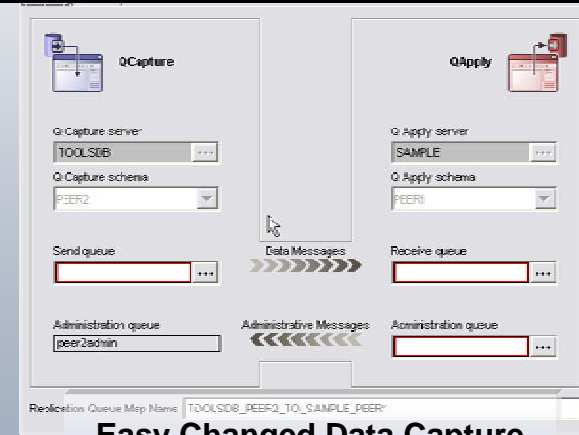
The IBM Information Server
What makes it a PLATFORM?

IBM Information Server

Unified Deployment

Understand	**Cleanse**	**Transform**	**Deliver**
Discover, model, and govern information structure and content	Standardize, merge, and correct information	Combine and restructure information for new uses	Synchronize, virtualize and move information for in-line delivery
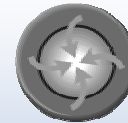
Unified Metadata Management

Parallel Processing

Rich Connectivity to Applications, Data, and Content

IBM Information Server Platform Features

- **Role-Based Tools with Integrated Metadata**
  - ▶ Simplify Integration
  - ▶ Promote reuse
  - ▶ Increase compliance to standards
  - ▶ Open to 3rd party integration

- **Visual lineage reporting increases trust**

- **Graphical impact analysis facilitates change management**

HTML View

Path View
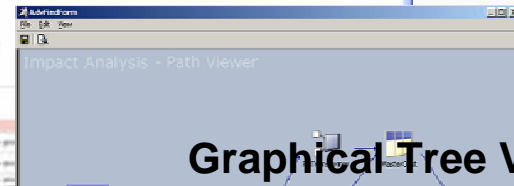
Graphical Tree View
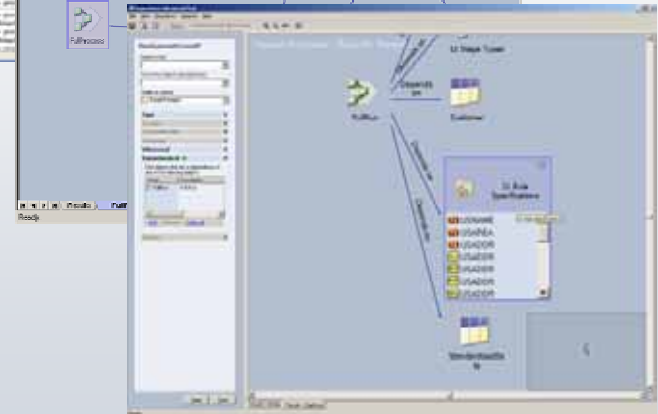
Information Server Platform: Rich Connectivity

General Access
Sequential File
Complex Flat File
File Set
Data Set
Named Pipe
FTP (standard, secure)
Compressed / Encoded Data

Real-Time
WebSphere MQ
SeeBeyond
Java Messaging Services (JMS)
Java (Client & Transformer)
XML (Read / Write)
XSLT, XSLT Transformer
Web Services (SOAP)

Enterprise Applications
JD Edwards Oneworld (direct)
Oracle Applications (Direct, Hierarchy)
PeopleSoft (Direct, Trees)
SAP BW (BAPI, IDOC)
SAP R/3 (ABAP, BAPI, IDOC)
Siebel EIM, Business

Connect
Allbase/SQL
Cache
C-ISAM
Datacom/DB
DB2 UDB
DB2/400
DRMS

MS Analysis
Nomad
NonStopSQL
Nucleus
ODBC
OLAP Services
Oracle
Progress

| Shared, easy to use connectivity infrastructure | Best-of-breed, metadata-driven connectivity to enterprise applications | High volume, parallel connectivity to databases and file systems | Event-driven, real-time, and batch connectivity |

Frictionless Connectivity

SAP · PeopleSoft · SIEBEL · JDA · ARIBA · SYBASE · Microsoft · IBM · Teradata (a division of NCR) · ORACLE

WebSphere Information Services Director

Rapid SOA Deployment:

- Packages information integration logic as services that insulate developers from underlying sources

- Allows these services to be invoked as Enterprise Java Beans or Web services

- Provides load balancing & fault tolerance for requests across multiple Information Servers

- Provides foundation infrastructure for Information Services
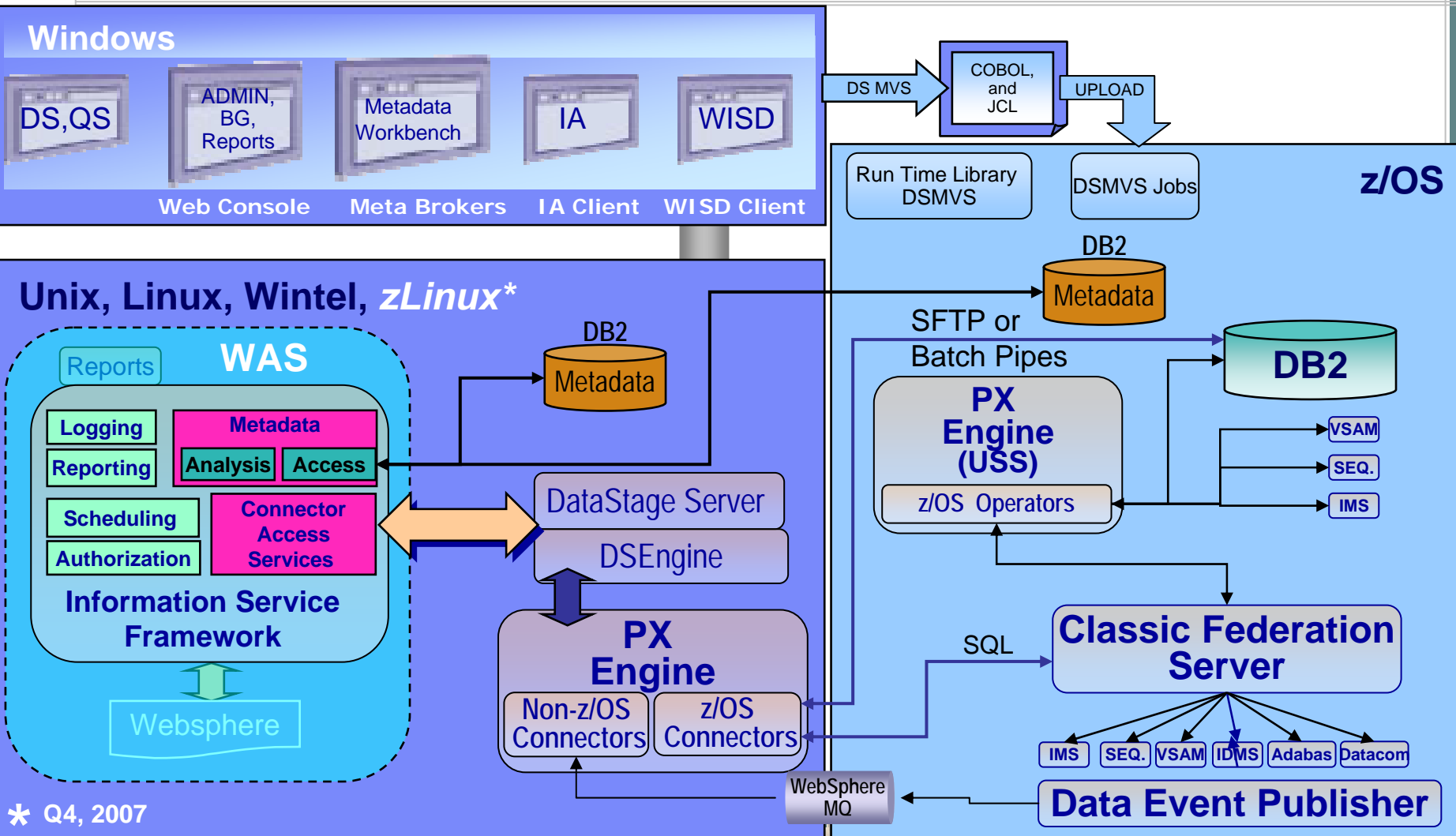
Developers   **Architects**

WebSphere Information Services Director

Flexibly deploy and manage reusable information services without hand coding

Overview Service 01

Bindings

Binding Settings

EJB

☑ Enable Binding

JNDI Name: *

Package Name: *

▷ SOAP over HTTP

▽ SOAP over JMS

☐ Enable Binding

Activation Spec JNDI Name: *   SOAP Style: *   Priority:

Select

Description: SOAP Action: *   Connecti

Rapid SOA Deployment

Destination: *   JMS Destination Mode: *   Message:

IBM Information Server Implementation Architecture
Leveraging the power of a multi-platform Environment

Windows

DS,QS	ADMIN, BG, Reports	Metadata Workbench	IA	WISD
	Web Console	Meta Brokers	IA Client	WISD Client

DS MVS → COBOL, and JCL → UPLOAD

z/OS

Run Time Library DSMVS

DSMVS Jobs

DB2 Metadata

Unix, Linux, Wintel, *zLinux*

WAS

Reports

Logging	**Metadata**
Reporting	**Analysis** | **Access**
Scheduling	**Connector Access Services**
Authorization	

Information Service Framework

Websphere

DB2 Metadata

DataStage Server

DSEngine

PX Engine

Non-z/OS Connectors	z/OS Connectors

SFTP or Batch Pipes

DB2

PX Engine (USS)

z/OS Operators

VSAM

SEQ.

IMS

SQL → **Classic Federation Server**

IMS	SEQ.	VSAM	IDMS	Adabas	Datacom

WebSphere MQ ← **Data Event Publisher**

✱ Q4, 2007

IBM Analysis & Reporting Products

- ## IBM DB2 DataQuant
  - Out of the box query, reporting, analysis and dashboards
  - Server-based licensing and deployment
  - Rich client and thin client architectures
  - Easy to use, programmer free

- ## IBM DB2 Alphablox
  - In-depth analytical tool
  - Rich development environment for imbedded analytics
 - OLAP analysis and 'cube engine'

Overview – IBM DataQuant

- **Provides**
  - a comprehensive query, reporting and data visualization package
  - support for both web and workstation-based environments.

- **Introduces**
  - a wide variety of powerful business intelligence capabilities, from executive dashboards
  - interactive visual applications to information-rich graphical reports and ad-hoc querying and data analysis.

Together with over 100 built-in analytical functions, IBM DataQuant allows organizations to derive maximum value from their data and rapidly build and distribute comprehensive data visualization solutions across the enterprise.
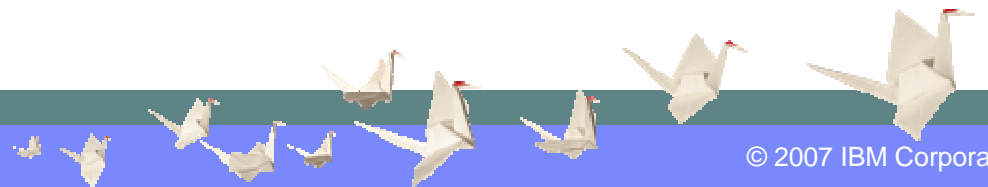
Product Components

- ## DataQuant for Workstation

  – Java-based, rich client application based upon the award-winning Eclipse platform

  – Provides a graphical environment for the development of query, report, dashboard and database visualization solutions

  – Supports multiple workstation environments, including Windows, Linux, HP-UX and Solaris

- ## DataQuant for WebSphere

  – Provides a comprehensive runtime environment, capable of displaying all DataQuant content, under a HTML, 'thin client' model

  – Runs under IBM WebSphere Application Server (WAS) on all platforms supported by WAS, including Windows, Linux, Solaris, HP-UX, iSeries, zLinux and z/OS
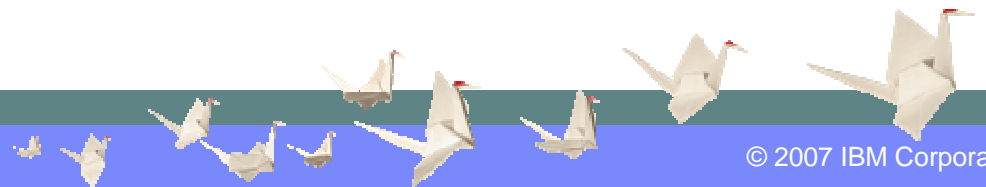
Highlights

- **Visual Dashboards**
  - Interactive dashboards and database visualization applications
  - Offers dozens of interactive charts, layouts, controls and symbols

- **Enhanced graphical reporting**
  - Rapidly produce and disseminate rich graphical BI reports

- **Security & Personalization**
  - Comprehensive LDAP or ad-hoc security model
  - Ability to define role-specific BI workspaces on a user/group basis

- **SOA Layer**
  - Allowing queries, reports & BI solutions to be shared with both internal users and external organizations outside of the enterprise

- **Enhanced Analytics**
  - Adds over 100 analytical functions to queries, reports and visual solutions

- **Backward-compatible with existing QMF infrastructure**

Visual Dashboards

- ## Provides a rapid development environment for:
  - Executive dashboards
  - Information portals
  - 'What if'-style analytical applications

- ## Key benefits
  - Highly graphical, visually intuitive solutions
  - Rapid development model permits solutions to be developed and deployed within days, rather than weeks, using a zero-coding, drag and drop authoring model
  - **Optionally leverages existing QMF queries**
  - **Deployment** via web browsers (thin client) and/or the DataQuant for Workstation application (rich client)
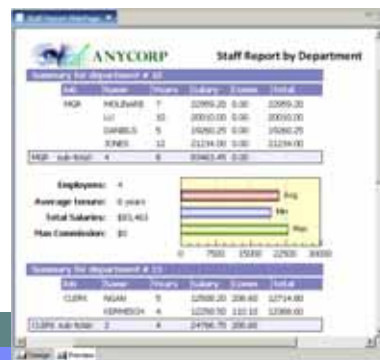
Visual Dashboards (cont.)

- **Supports over 20 'stock' visual layouts**
  - Line and bar charts
  - Geographic maps
  - Pie charts
  - Horizon charts
  - Hierarchical charts
  - Tabular layouts

- **Flexible rendering**
  - Motifs can be nested indefinitely (e.g. pie charts upon bars within maps etc.)
  - Customized graphical 'templates' – users can build their own chart types

Enterprise Business Intelligence

Budgeting and business rules from **DB2 on AIX**

Additional input from:
**Oracle
Teradata
SQL Server
Sybase …**
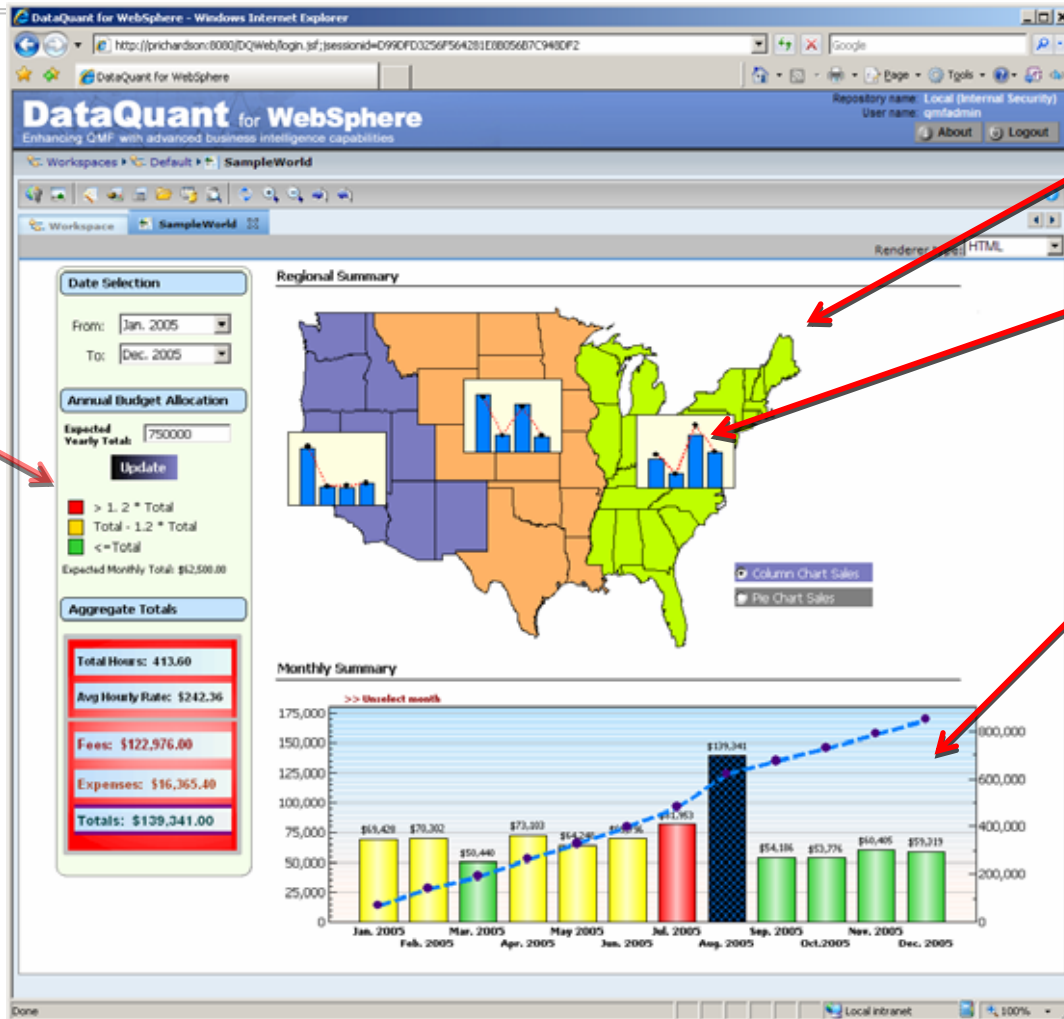
Geospatial data from **DB2 on Linux**

Annualized sales data from **Informix**

Monthly transactional summaries from **DB2 on z/OS**

Enhanced Graphical Reporting

- Transforms text-based reports into highly graphical, information-rich documents (HTML or PDF output)

- Familiar data-driven 'sectional report' model, with ability to 'nest' an unlimited number of subordinate queries

Enhanced Graphical Report

DataQuant Architecture

**Rich Client**
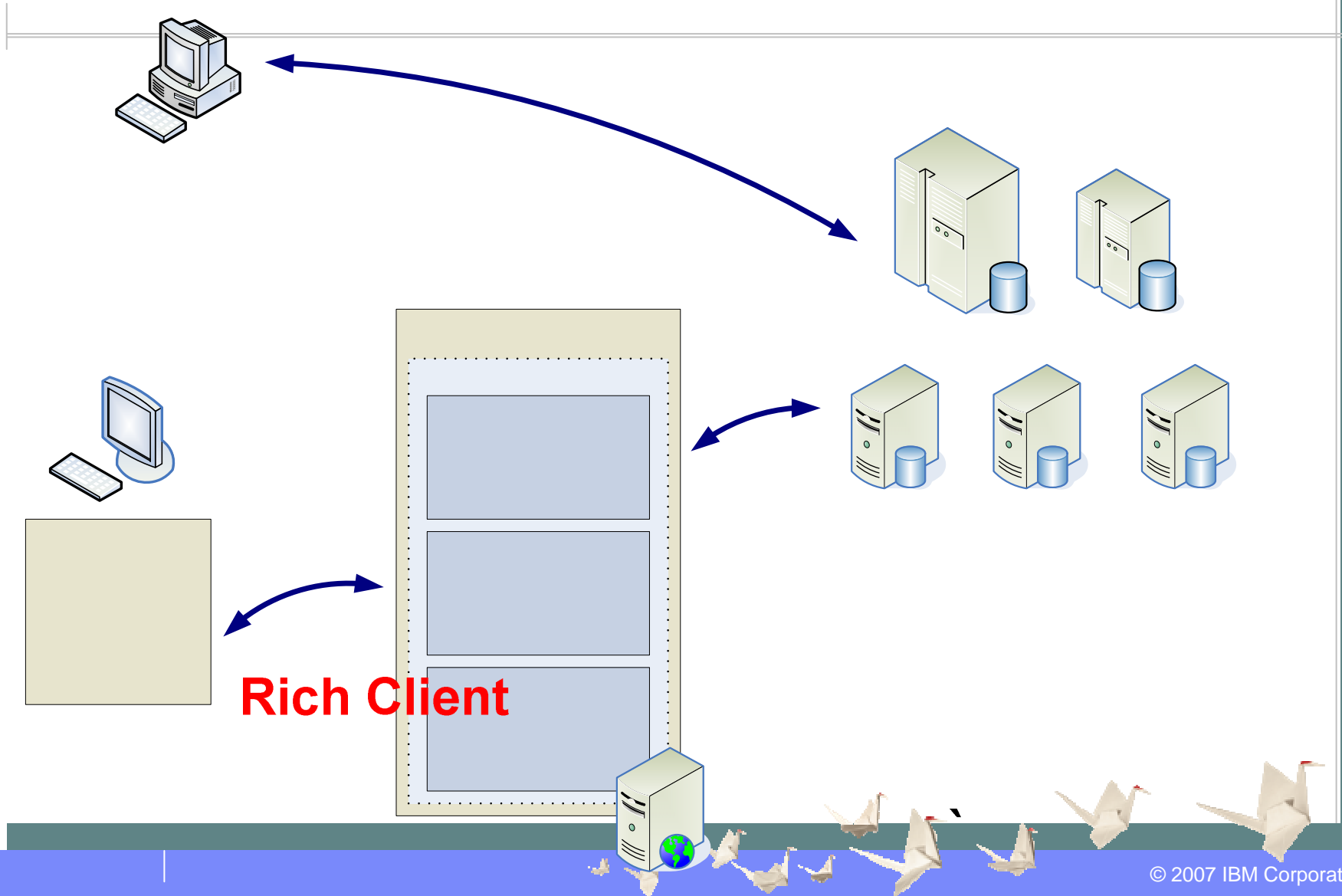
Security & Personalization

- ## Robust security and support for single sign-on
  - Introduces a comprehensive security foundation
  - Optionally interfaces with existing LDAP directories or RACF etc.
  - Built-in 'internal security' model available for customers that do not operate LDAP-based directories
  - Optionally logs onto data sources using accounts mapped from LDAP/internal security directory

- ## Personalization
  - Tailors 'look and feel', including available reports, visualizations and data on a per user/group basis
  - Ability to store user and group-specific offline views of database contents
  - Ability to create an unlimited number of workspaces, each containing differing views of available data sources, reports and visual dashboards
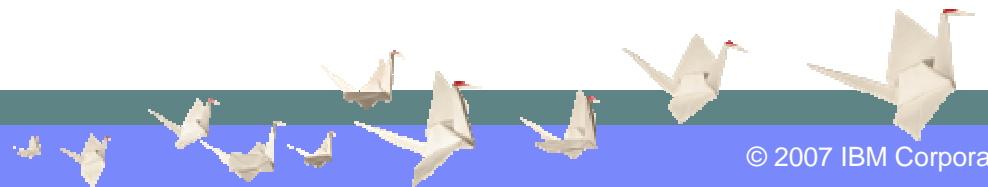
Backward Compatible with QMF Infrastructure

- Queries, forms and procedures remain object-compatible with prior QMF versions

- Retains full support for QMF Catalogs
  - Ability to create, run, edit and share QMF objects with QMF for TSO[1] and prior QMF distributed products
  - Optionally use resource limits defined in QMF catalogs

- Similar 'database explorer' provides familiar look and feel for prior QMF users

- Built-in ability to import QMF Server Definitions Files (SDF) and QMF Visionary solutions

- Built-in ability to migrate visual reports into the new graphical format
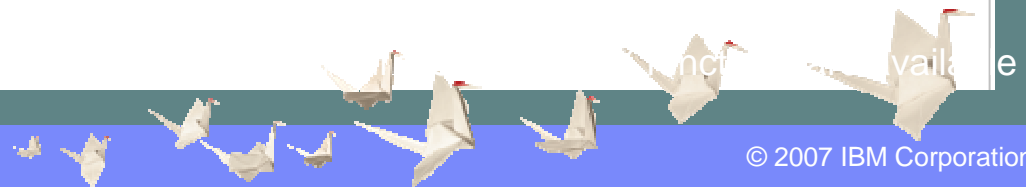
IBM DataQuant for z/OS V1.1 - 5697-N64

- OTC offering, IPLA product

- Processor pricing -- $1500/VU

- Pre-reqs QMF Enterprise Edition (either V8 or V9)

- Supports DB2, Informix, and other major relational databases
  - It offers access to DB2 on any platform (including i-series), plus other relational DBs

- DataQuant for WebSphere runs on any WebSphere supported OS
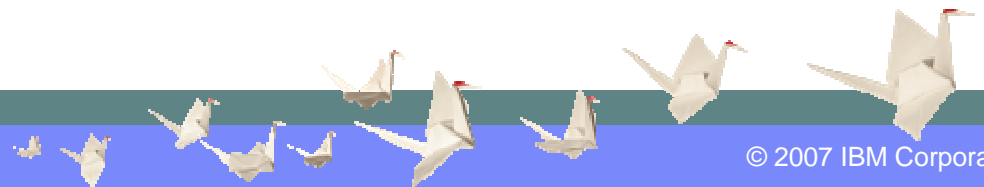 - Including zOS and zLinux

- Try & Buy available
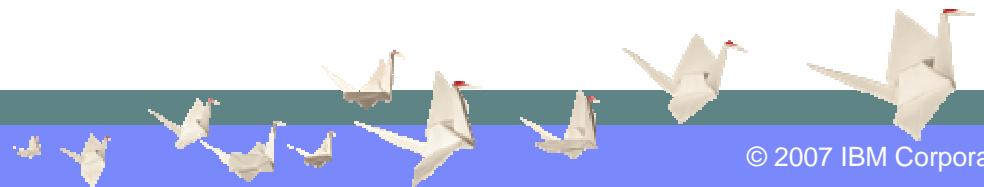
What is Alphablox?

- **Platform for Customized Analytic Applications and Inline Analytics**

- **Pre-built components (Blox) for analytic functionality**

- **Allows you to create customized analytic components that are embedded into existing business processes and web applications**
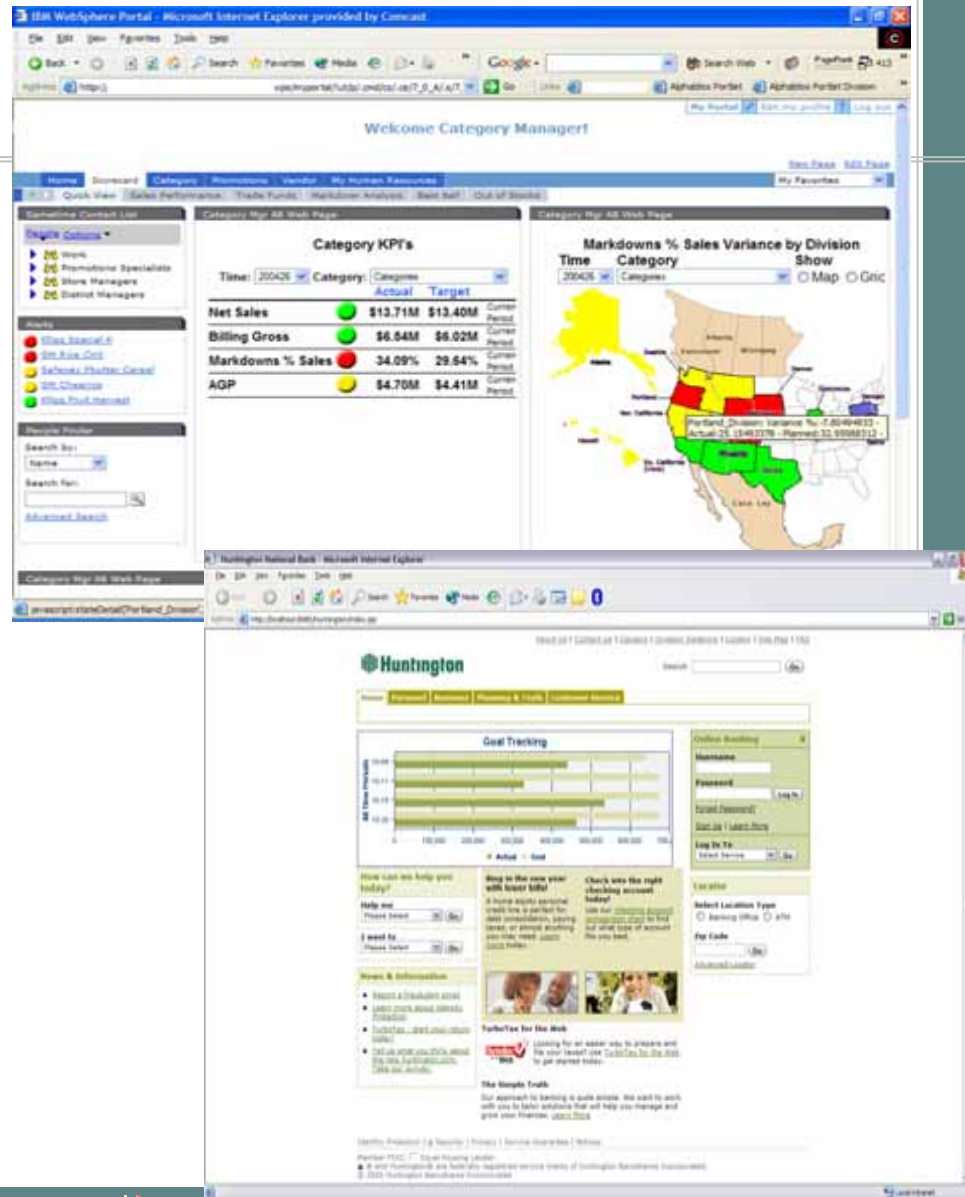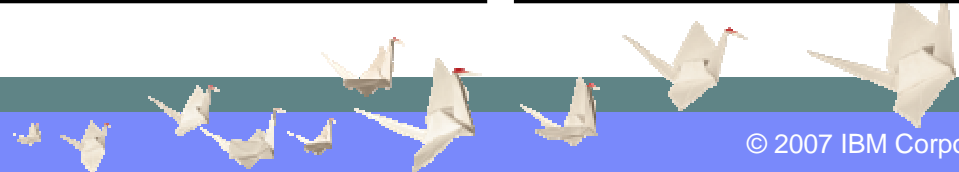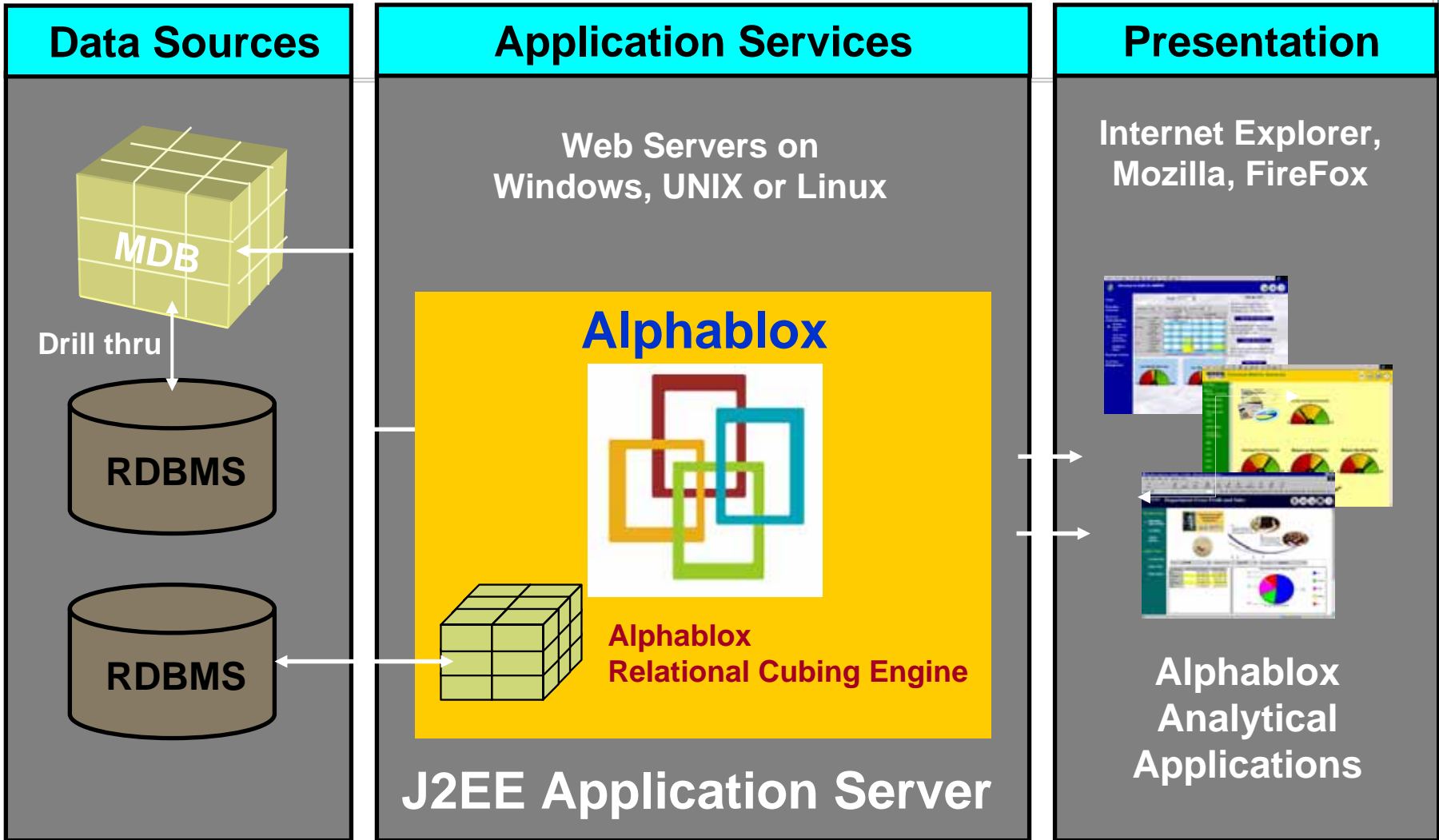
Alphablox Components

- Blox components, which are modular, reusable components
- An application framework
- A powerful programming model
- … and a variety of development tools for assembling analytic applications

- Run-time environment via standard J2EE application servers
- Can be installed on leading commercial J2EE application servers such as IBM WebSphere® software and others.
- It enhances the end-user analytics functionality, including support for:
    - full DHTML drag-and-drop
    - Histogram charts
    - 80/20 analysis
    - textual traffic lights
    - … and much more

- It can help you and partners maximize the value of information assets by delivering contextual business insight to the right people at the point of decision.

Alphablox Platform Architecture

Data Sources	Application Services	Presentation

Web Servers on Windows, UNIX or Linux

Internet Explorer, Mozilla, FireFox

MDB

Drill thru

RDBMS

RDBMS

Alphablox

Alphablox Relational Cubing Engine

J2EE Application Server

Alphablox Analytical Applications

DataQuant / AlphaBlox Positioning

- ## Where IBM DataQuant fits best
  - Where there's a need to distribute data using turn key graphical reports and information dashboards
  - Where quick prototyping and rapid development is more important than sophisticated analytical features
  - In QMF and/or z-based environments where tracking, governing and z-based deployment are valued factors
  - For customers that seek an 'out of the box' packaged BI solution for the development and distribution of query, reporting and dashboard content

- ## Where DB2 Alphablox fits best
  - Where there is a need for customized analytical solutions that are tightly integrated and embedded within the customer's existing BI infrastructure
  - Where "in-line" analytics is required—that is, where analytical application content is embedded in a business process
  - For customers that require full control of the solution's appearance and behavior, from data gathering and analysis to the user interface 'look and feel'
  - Where there is a need to include sophisticated analytical capabilities
  - As a development environment for customized Web applications instead of packaged apps

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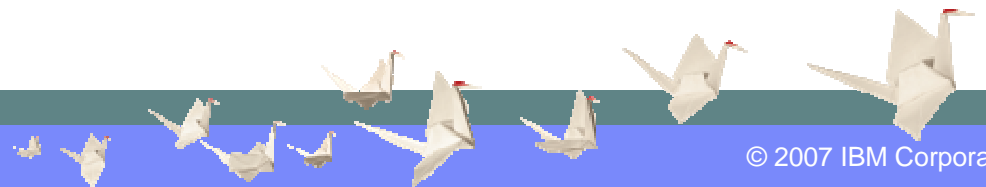
Backup Charts

Data Warehousing for DB2 on System z – more info

- **Whitepaper** : Why Data Warehousing on System z available on the web http://www.ibm.com/software/data/db2bi/systemz.html

- DW on system z – **Demo** available in the Technical Marketing Competence Center, Böblingen, Germany, TMCC@de.ibm.com

- DW on system z – **Customer Briefings** possible in the Technical Marketing Competence Center, Böblingen,Germany or at Silicon Valley Lab   TMCC@de.ibm.com

- DW on system z – '**Best Practices**' paper planned to be available 2Q2007

- …