IBM Data Warehousing and Business Intelligence for System z

Mike Biere
Summer 2008

Factors influencing Data Warehouse and Business Intelligence

- Data is most often captured on a System z platform

- The rate and volume of captured data becoming increasingly too great to get thru the typical LUW DW processes

- And even when you get it there …

  - Most BI and DW projects are targeted toward upper echelons within the enterprise leaving many potential users and contributors behind

- Real-time and operational uses of data (e.g. customer service) are becoming increasingly in vogue

- 24x7 operation and system security/regulatory compliance are high priority within the enterprise

Customer DW and BI concerns

- **Data Warehouse**

  - Platform selection – what's best for me versus what's 'hot'

  - Data placement and platforms in play

  - DBMS's installed and requirements to 'federate'

  - Data volumes growing exponentially

  - Data formats required to support increasing

    - XML
    - Unstructured data
    - Etc.

- **Business Intelligence**

  - Proliferation of tools

  - Low ROI (e.g. lower deployment than volume purchased)

  - Mixed bag of vendor support for enhancements (e.g. exploit DB2 V9, zIIPs, zAAPs, etc.)

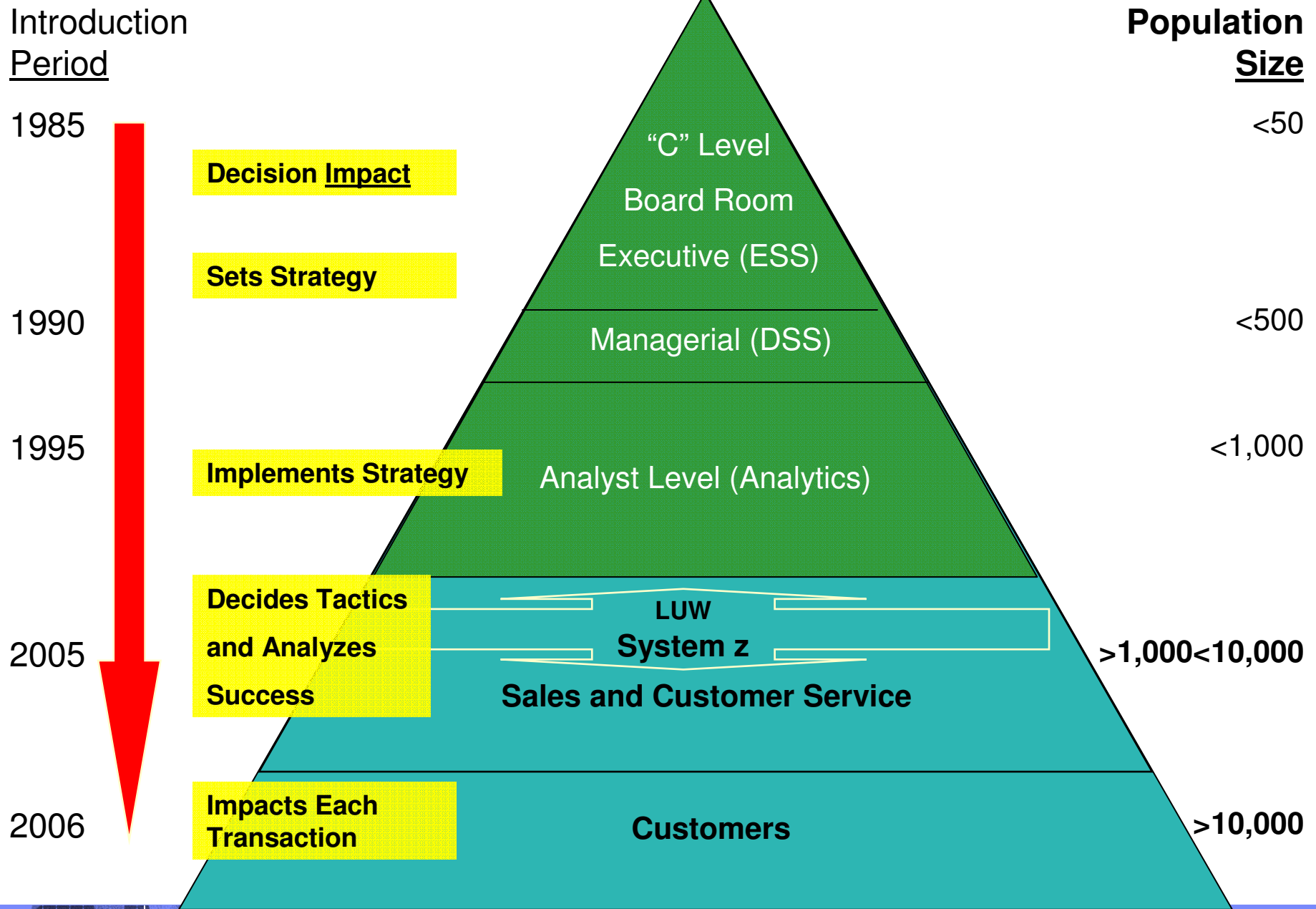 - Increased # servers to support BI success

We are seeing several new trends

- Resurging interest in System z due to its strengths

- Customer requests to enable DW and BI on System z because:
  - That's where much of the data already resides
  - The majority of the BI tools are deployed as thin client (browser-based) solutions
  - Increased interest in centralized control and standardization versus scattered and difficult to rein in solutions

- Business intelligence as a 'platform' not a loose collection of tools

- Information as a service (SOA) initiatives

- Federated approach to data due to location, format, platform disparities

- BI tools standardization

- Operational BI (aka: Operational Intelligence)

Operational BI (Operational Intelligence)

- **Major BI Growth Area is Operational Intelligence**
  - Deliver BI content
    - to customer facing people in order to optimize
      - Sales
      - Customer Service
      - Corporate efficiency
      - High customer retention
    - via OI components with operational systems & information portals
  - Central to System z BI/DW Strategy (supported by Gartner et al)
  - Establish "Embedded Analytics" for guided analysis and efficiency
- **Customer Service/ Self Service Examples**
  - Wireless Customer Service
  - Credit Card Self Service Reporting
  - Consumer Products Packaged Goods Sales

Operational Intelligence Introduction and User Population

Introduction
Period

Population
Size

1985 — <50

Decision Impact

Sets Strategy

1990 — <500

1995 — <1,000

Implements Strategy

2005 — >1,000<10,000

Decides Tactics and Analyzes Success

2006 — >10,000

Impacts Each Transaction

"C" Level
Board Room
Executive (ESS)

Managerial (DSS)

Analyst Level (Analytics)

LUW
System z
Sales and Customer Service

Customers

Information On Demand
Unlocking the Business Value of Information for Competitive Advantage

Customer & Product Profitability

Financial Risk Insight

Workforce Optimization

Dynamic Supply Chain

Multi-Channel Marketing

Business Optimization

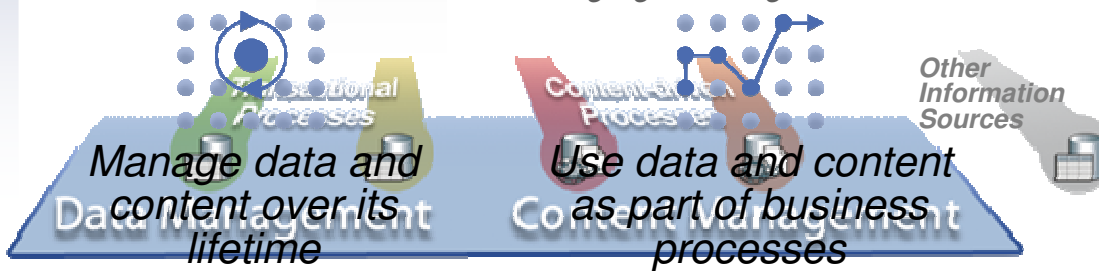***Better Business Outcomes***

Business Intelligence & Performance Management

Plan, understand and optimize business performance

Plan, understand and optimize business performance

Information Integration, Warehousing & Management

Establish and maintain an accurate, trusted view of information

Establish and maintain an accurate, trusted view of information

Flexible Architecture for Leveraging Existing Investments

Data Management

Content Management

Manage data and content over its lifetime

Use data and content as part of business processes

Other Information Sources

Manage data and content over its lifetime and as part of processes

Creates Challenges for Traditional Warehousing
Not just for traditional query and reporting purposes anymore

- Must address expanding needs for business insight

- Must serve increasing number and types of applications

- Must support varying service level demands

Increasingly mixed workload **environments and** constantly changing needs **of different business constituents require more** dynamic **and** balanced **warehousing capabilities**

Dynamic Warehousing with System z
Mission-critical analysis of operational data

Agility

Performance

Rapid and secure user-access to data analysis

- *Interactive executive dashboards and information portals*

Improved query and reporting optimizations

- *SQL Procedures may be run on zIIP*

Up to 50% reduction of storage for indexes
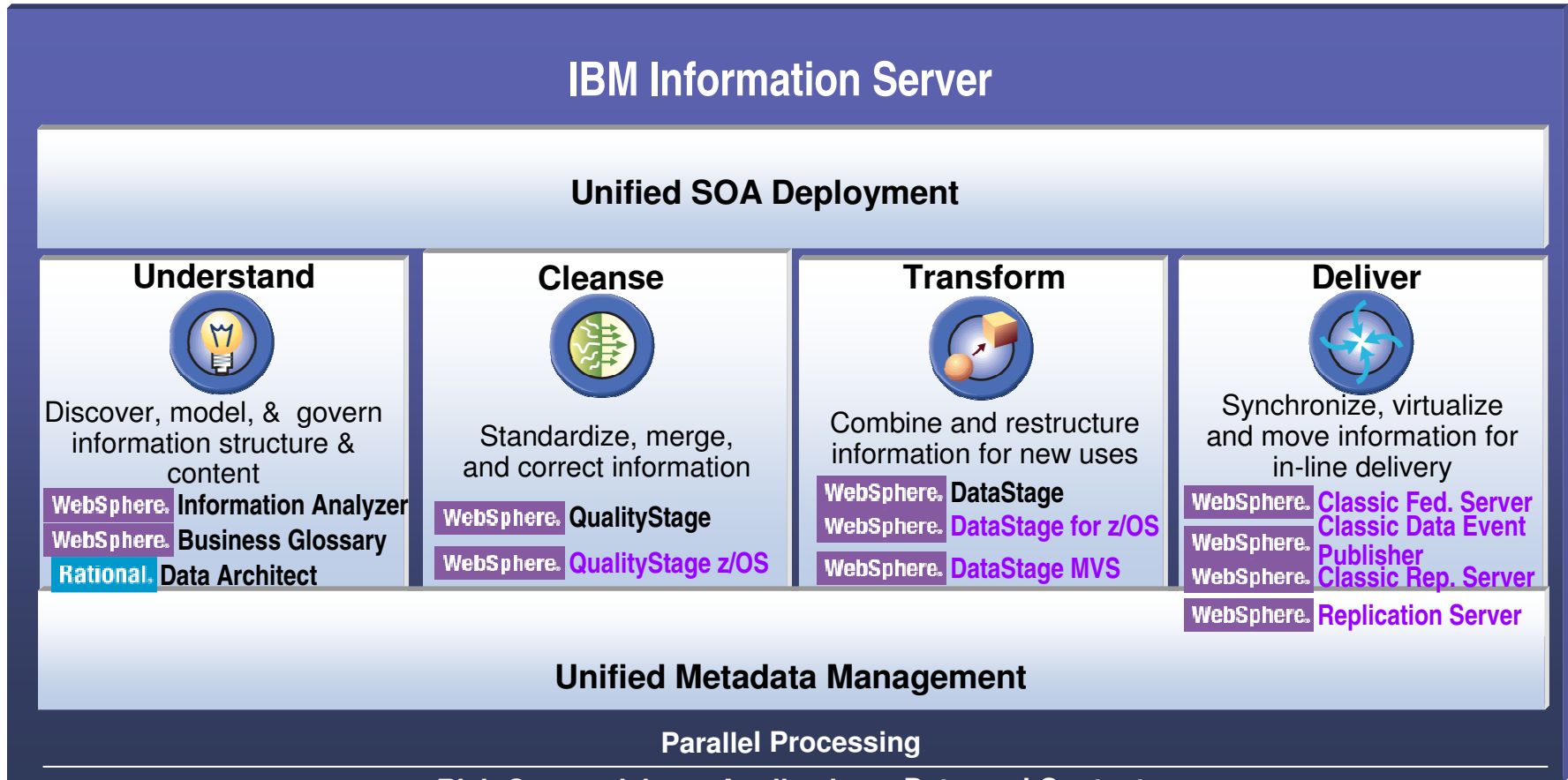
- *Improved index compression*

Up to 50% reduction of CPU utilization

- *Across most utilities*

Over 1 Billion per Hour
UPS runs DB2 for z/OS to support the
world's largest known peak database workload
- 1.1 Billion SQL statements per hour! [1]

IBM Information Server for Linux on System z … provides an infrastructure to enable DW

IBM Information Server

Unified SOA Deployment

Understand	Cleanse	Transform	Deliver
Discover, model, & govern information structure & content	Standardize, merge, and correct information	Combine and restructure information for new uses	Synchronize, virtualize and move information for in-line delivery
WebSphere Information Analyzer **WebSphere** Business Glossary **Rational** Data Architect	**WebSphere** QualityStage **WebSphere** QualityStage z/OS	**WebSphere** DataStage **WebSphere** DataStage for z/OS **WebSphere** DataStage MVS	**WebSphere** Classic Fed. Server **WebSphere** Classic Data Event Publisher **WebSphere** Classic Rep. Server **WebSphere** Replication Server

Unified Metadata Management

Parallel Processing

Announcing
IBM InfoSphere Warehouse

Optim InfoSphere Warehouse
Master Data Management

- InfoSphere Warehouse with Optim Data Retention - enable businesses to better manage the growth of information by integrating data warehousing and archiving capabilities.

- A comprehensive and flexible solution that allows customers to:
  - ✓ manage the performance and costs of their growing data warehouse
  - ✓ easily access all historical information for compliance and analytical needs
  - ✓ deliver a policy based automated solution for managing clients' data through the entire life cycle, saving storage and reducing management and data retrieval costs.

- InfoSphere Warehouse Optim Data Retention is the first offer from IBM under the new InfoSphere Warehouse name.

The schedule for rolling out the InfoSphere Warehouse name is as follows:
January 30th - Announce InfoSphere Warehouse with Optim Data Retention
April 2nd - Announce full portfolio name change (in marketing terms only). All DB2 Warehouse and IBM Balanced Warehouse editions will be renamed.
June 2nd - Introduce InfoSphere Warehouse 9.6. The product will now be caught up to the marketing name change.

Complete the architecture with BI

OLTP data

Information Server for System z

Complete ETL Solution

Data Warehouse

DB2 for z/OS

The Enterprise Data Warehouse

Cognos 8 BI for System z
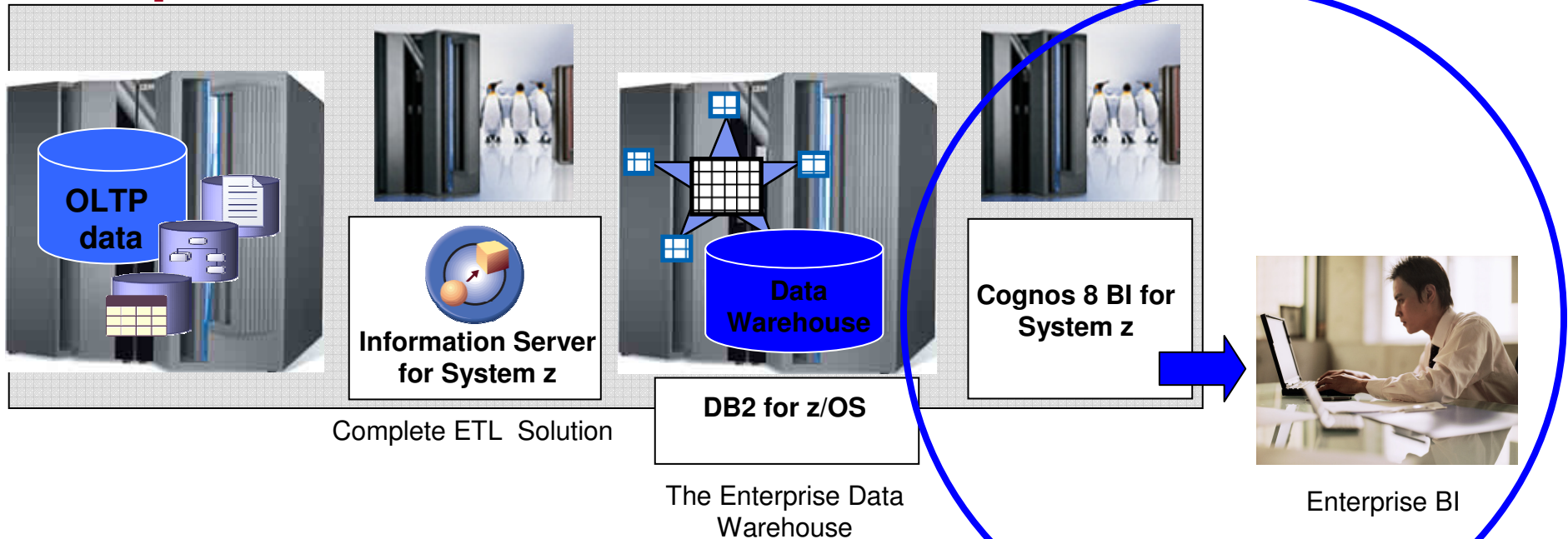
Enterprise BI

Core Offering for Enterprise Data Warehouse and BI:

- Information Server for System z
    - A complete set of ETL tools for warehouse population and management
- DB2 for z/OS , including the new Value Unit Edition
    - A new value point for new DB2 z/OS workloads
- Coming Soon! Cognos 8 BI for System z (beta announced 2/26)
    - A comprehensive System z offering for Enterprise BI

Introducing IBM Cognos 8 BI

More Users. Better Decisions. Faster.

- **Broad range of BI capabilities: all user communities receive relevant information how, when and where it is needed**

- **Open enterprise-class platform: IT delivers flexible and cost effective scale to meet growing user demands**

- **Frameworks and proven practices: Projects benefit from expertise to ensure success on the journey to performance management**

IBM COGNOS 8 BI

Introducing the Cognos 8 platform

PRESENTATION TIER

APPLICATION TIER

SERVICES

DATA TIER

**Capabilities
Delivered Anywhere**
(Web, Mobile, Search Office)

**Common Set of
Services**

**Access
to All Data**
(SQL, ERP, Cubes etc.)

Open Enterprise-Class Platform

CAPABILITIES

Query
Reporting
Analysis

Scorecarding
Dashboarding

Planning

Event Management
User Administration

CONSUMER MODES

Web
Search
Mobile
MS Office

INTEROPERABLE

Enterprise Search Integration
Application Embeddable
BPM Integration
Cognos Controller
Cognos Now!

ROUTER/FIREWALL (optional)
WEB SERVER(S):
Web Gateways. Web Services API
Industry Standard Portals (IBM, SAP, Plumtree, SharePoint, WRSP)
Cognos Application Firewall

PURPOSE-BUILT SERVICES   *WINDOWS, UNIX*, LINUX**

PRESENTATION SERVICE	EVENT SERVICE	MONITORING SERVICE	SCHEDULING & JOB SERVICE	PLANNING SERVICE

Cognos 8 BUS – SOAP, XML   *COGNOS 8 DISPATCHER(S)*

SINGLE OPEN API

AUDIT SERVICE	METADATA SERVICE	METRICS SERVICE	CONTENT MANAGER SERVICE	QUERY SERVICE	DATA MOVEMENT SERVICE
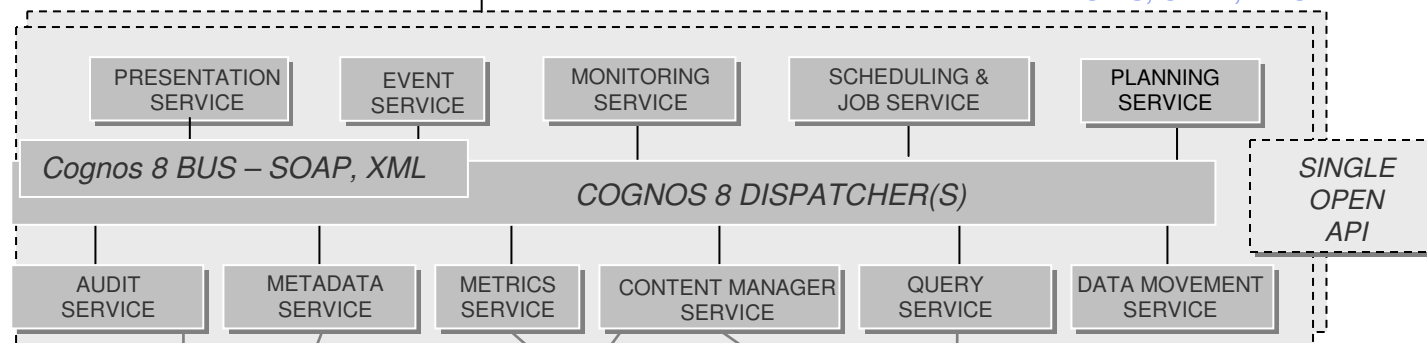
AUDIT

RDBMS,
UNIX Sys Logs,
NT Event Log

SECURITY PROVIDERS

LDAP, Active Directory,
NTLM, Netegrity, SAP BW,
Cognos Namespace,
Custom Providers

METADATA INTEGRATION

• Modeling: Erwin, Oracle Designer, Sybase
  PowerDesigner, Rational, XML/XMI, CWM…
• ETL & EII: IBM, Informatica…
• Sources: Databases, ERPs…

CONTENT, METRICS & PLAN STORE

Storage: DB2 UDB,
ORACLE, SQL Server,
Sybase, Derby

OLAP

• PowerCubes: High Performance
  Dimensional Cache. Cognos
  Planning Real-Time Plans
• Industry Standard OLAP Providers:
  Microsoft, IBM, SAP BW, Essbase

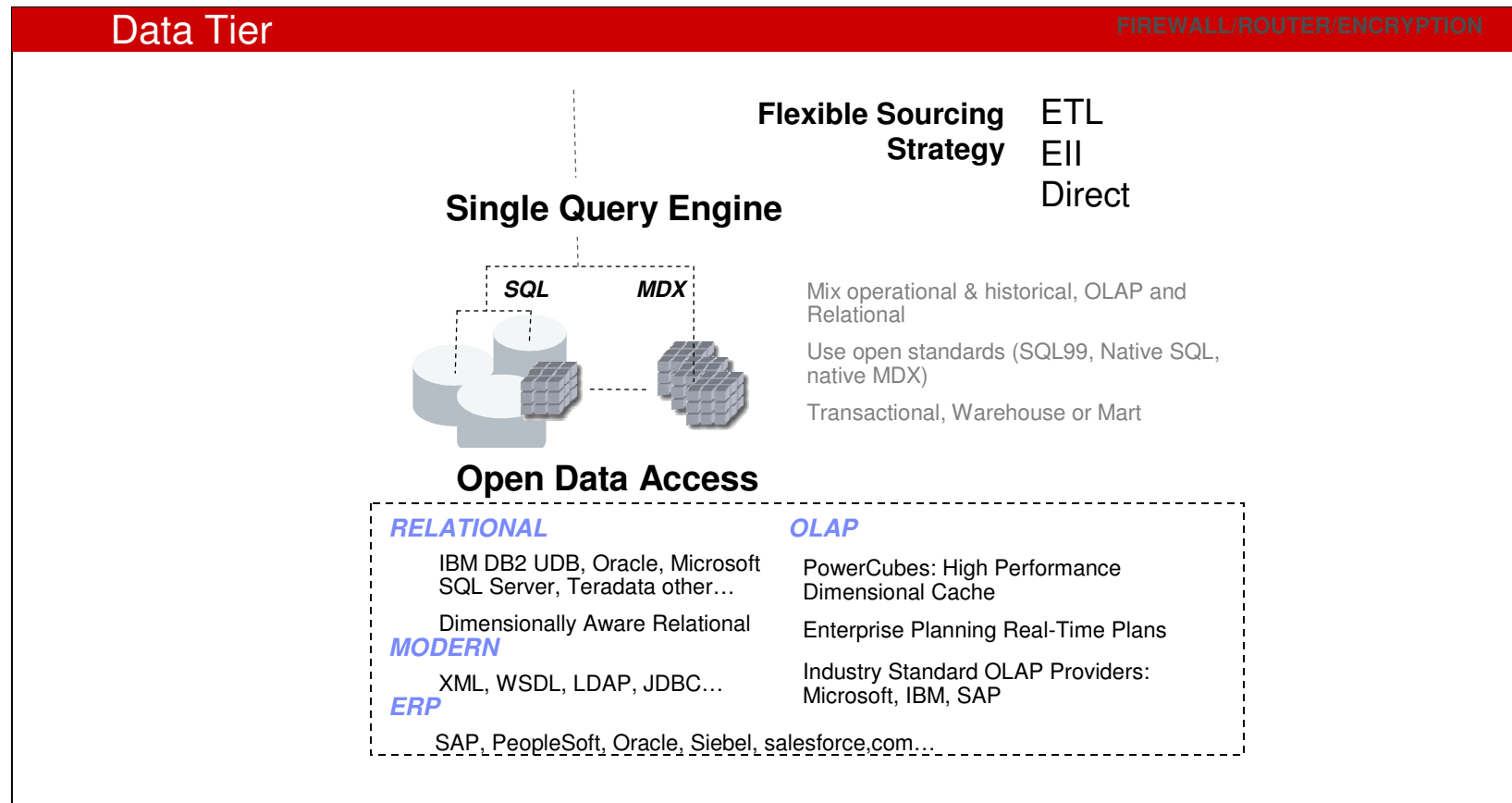**COMMON METADATA MODEL**

MDX   **SQL**

Any Latency
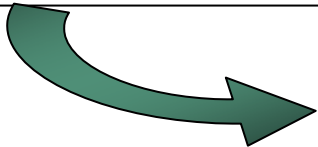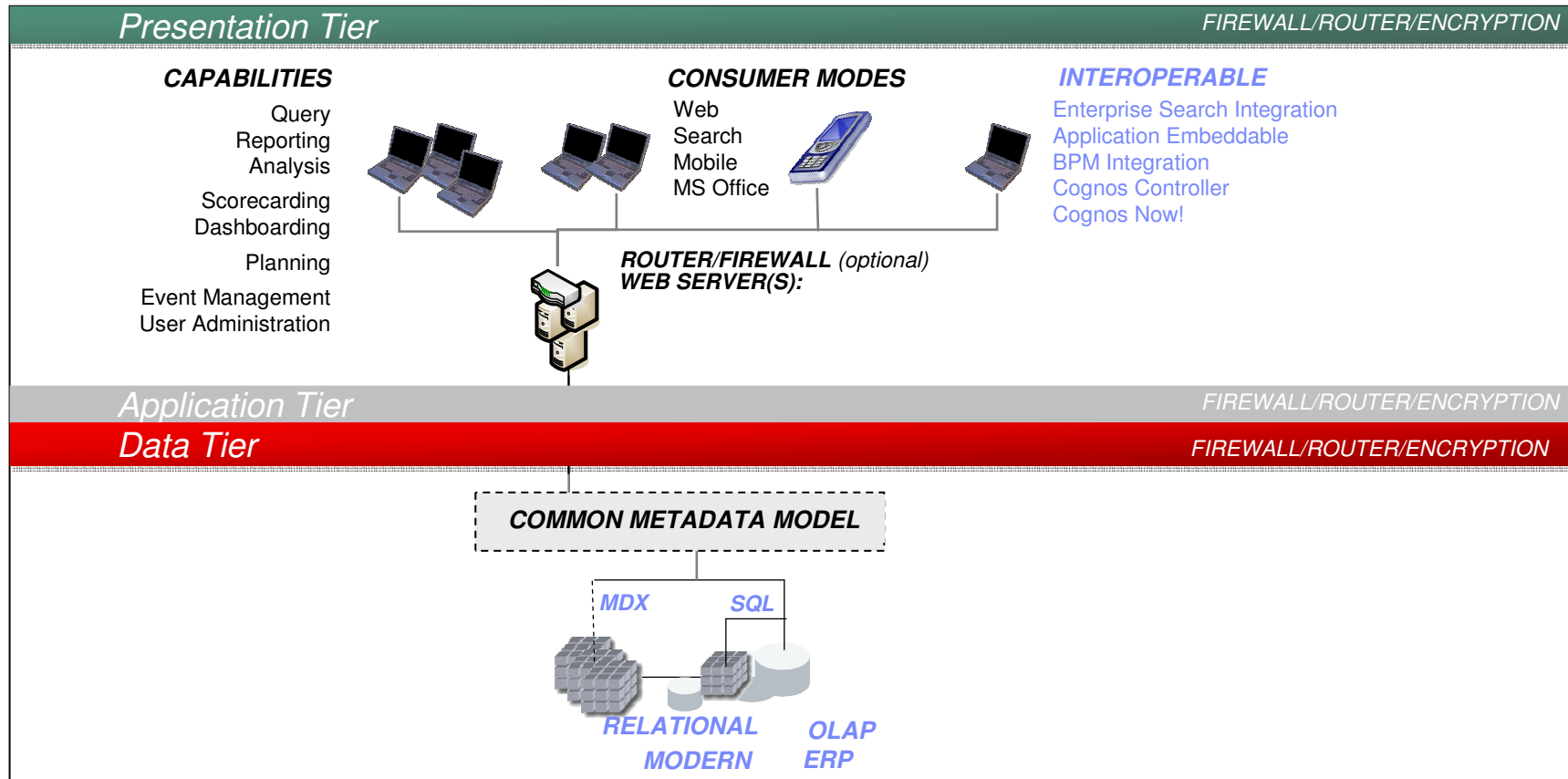Cognos ETL,
Other ETL

RELATIONAL

MODERN

ERP

• IBM DB2 UDB, Oracle, Teradata,
  Microsoft SQL Server, other…
• Dimensionally Aware Relational
• XML, WSDL, LDAP, JDBC…
• SAP, PeopleSoft, Oracle, Siebel,
  salesforce.com …

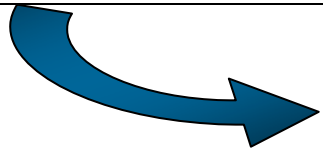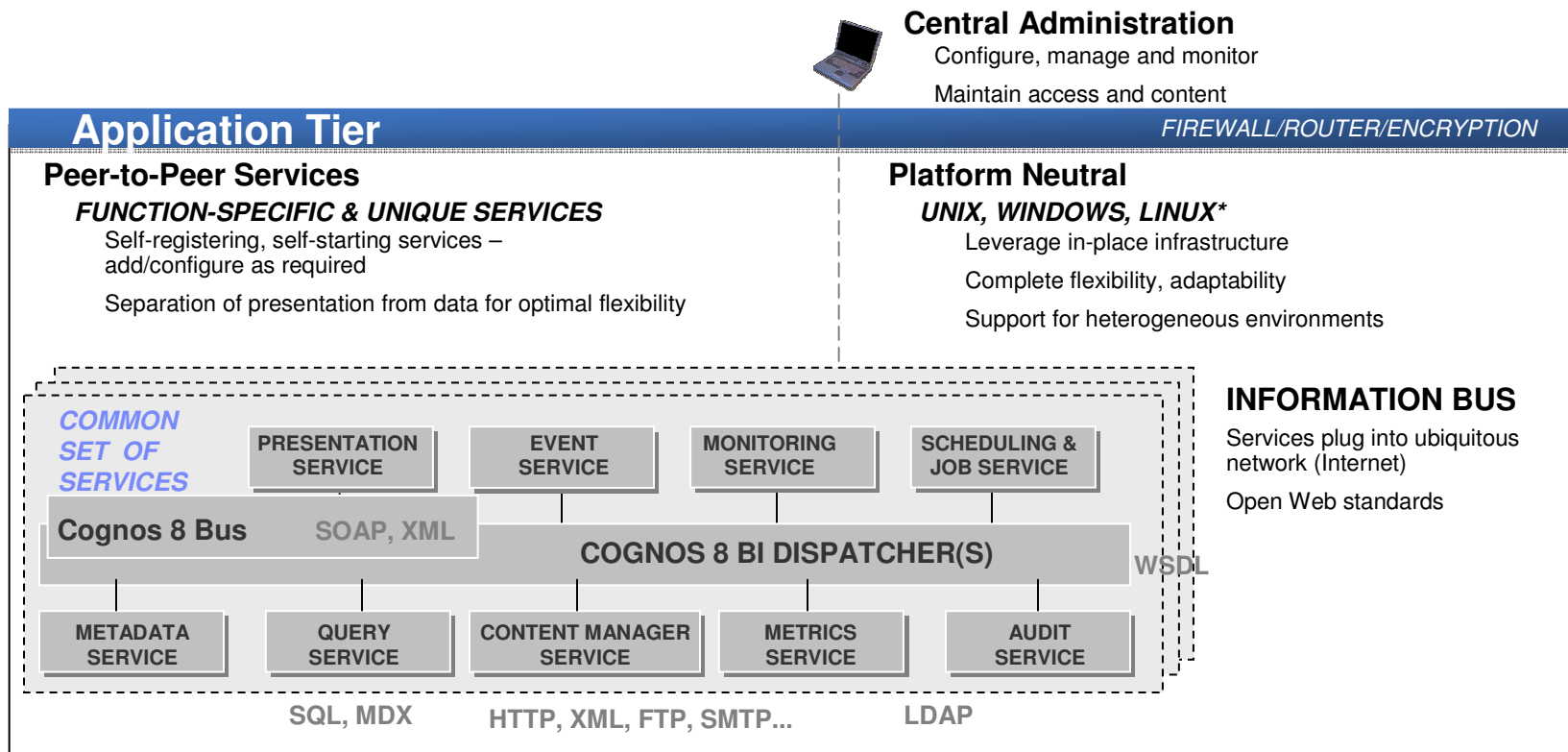**COGNOS**

Complete access to all information

Data Tier

Flexible Sourcing Strategy

ETL
EII
Direct

Single Query Engine

SQL   *MDX*

Mix operational & historical, OLAP and Relational

Use open standards (SQL99, Native SQL, native MDX)

Transactional, Warehouse or Mart

Open Data Access

RELATIONAL

IBM DB2 UDB, Oracle, Microsoft SQL Server, Teradata other…

Dimensionally Aware Relational

MODERN

XML, WSDL, LDAP, JDBC…

ERP

SAP, PeopleSoft, Oracle, Siebel, salesforce.com…

OLAP

PowerCubes: High Performance Dimensional Cache

Enterprise Planning Real-Time Plans

Industry Standard OLAP Providers: Microsoft, IBM, SAP

✓ **Access data consistently & predictably**
✓ **Gain enterprise view of all sources**

Consistent information business understands, owns, trusts

Presentation Tier	FIREWALL/ROUTER/ENCRYPTION

CAPABILITIES

Query
Reporting
Analysis

Scorecarding
Dashboarding

Planning

Event Management
User Administration

CONSUMER MODES

Web
Search
Mobile
MS Office

INTEROPERABLE

Enterprise Search Integration
Application Embeddable
BPM Integration
Cognos Controller
Cognos Now!

ROUTER/FIREWALL (optional)
WEB SERVER(S):

Application Tier	FIREWALL/ROUTER/ENCRYPTION
Data Tier	FIREWALL/ROUTER/ENCRYPTION

COMMON METADATA MODEL

MDX   *SQL*

RELATIONAL   **OLAP**

MODERN   **ERP**

✓ **Provide business confidence**
✓ **Gain business view of all sources**
✓ **Drive sustainable global rollout**

Broad system management to confidently deploy, manage and scale

Central Administration

Configure, manage and monitor

Maintain access and content

Application Tier	*FIREWALL/ROUTER/ENCRYPTION*

Peer-to-Peer Services

FUNCTION-SPECIFIC & UNIQUE SERVICES

Self-registering, self-starting services – add/configure as required

Separation of presentation from data for optimal flexibility

Platform Neutral

UNIX, WINDOWS, LINUX*

Leverage in-place infrastructure

Complete flexibility, adaptability

Support for heterogeneous environments

COMMON SET OF SERVICES

PRESENTATION SERVICE	EVENT SERVICE	MONITORING SERVICE	SCHEDULING & JOB SERVICE

Cognos 8 Bus   SOAP, XML

COGNOS 8 BI DISPATCHER(S)   WSDL

METADATA SERVICE	QUERY SERVICE	CONTENT MANAGER SERVICE	METRICS SERVICE	AUDIT SERVICE

SQL, MDX   HTTP, XML, FTP, SMTP...   LDAP

INFORMATION BUS

Services plug into ubiquitous network (Internet)

Open Web standards

✓ **Minimize risk on mission-critical deployments**
✓ **Streamline deployment & maintenance**
✓ **Confidently enable growing user communities**

Built For Today. Ready For Tomorrow.

Interoperable and Extensible

Standards
SOAP, XML, WSDL, HTTP(S), OMG CWM, XML/XMI, WSRP

Extend
Open, Web Services API to programming language of choice including Java, Microsoft .NET Framework, COM & Perl

Embed
Industry Standard Portals including IBM, SAP, Plumtree, WRSP)

Enterprise Search, BPM, Office, 3rd party Applications

Security
Any combination of LDAP, NTLM, Active Directory, Netegrity, SAP, Cognos 7, custom

Environments (Simultaneously available)

App Servers
Any J2EE application server
Apache Tomcat (incl.), IBM webSphere, SAP NetWeaver, BEA WebLogic, Oracle Application Server 10G

Operating Systems
Any combination of Windows, Unix or LINUX (RedHat)

Platforms
Intel, AIX, HP/UX, Solaris

Routers/ Firewalls
All standard gateways supported

Cognos 8 BI

Metadata Integration

Modeling tools
CA ERwin, Oracle Designer, Business Objects Designer, Sybase PowerDesigner, CA COOL, Rational Rose, XML/XMI, OMG CWM

ETL & EII
Cognos Data Manager, Informatica PowerCenter, IBM Information Server (Ascential) Metabroker, Composite, IBM II

Source catalogs
Relational databases, ERP

Open Data Access

Relational
IBM DB2 UDB, Oracle, Microsoft SQL Server, Teradata, other…

Modern
XML, WSDL, LDAP, JDBC, JDBC…

ERP
SAP, PeopleSoft, Oracle, Siebel, salesforce…

OLAP
PowerCubes: High Performance Dimensional Cache
Industry Standard OLAP Providers: Microsoft, IBM, SAP, Essbase

*This slide provides guidance on supported environments. Please refer to documentation for confirmation on conformance.

Cost Effectively Scale
to Meet Growing Demands
Open enterprise platform easy to manage and deploy

REPORT AUTHORS

Provide timely, quality, relevant content to large, diverse community

IT DIRECTOR

Proactively maintain quality of service to business even as user demands grow

DATA MODELER & DATA ANALYST

Reflect business needs in models and rapidly adapt to change

IT ARCHITECT

Fit with existing infrastructure standards and support evolution to enterprise SOA architecture

BI SYSTEM MANAGER

Proactively maintain quality of service to business even as user demands grow

Broad Range of Capabilities to Engage More Users

Reporting

- Provides full breadth of report types

- Ensures consistent information to all users

- Engages business users with simplified role-based interface

- Delivers personalized content via email, portal, MS-Office, search and mobile devices etc

- Enables collaboration across users, communities and with IT
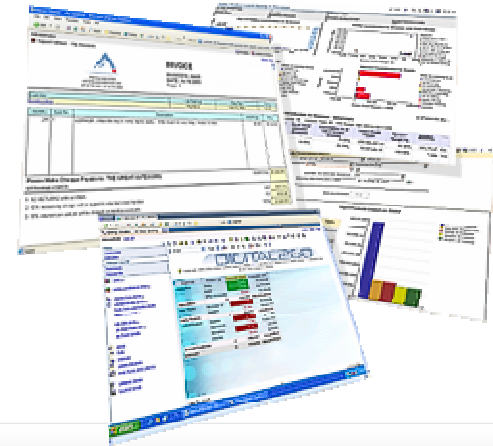
Analysis

- Provides guided exploration across multiple dimensions of information

- Performs complex analysis and scenario modeling easily and quickly

- Exposes the "why" behind trends to reveal symptoms and causes

- Moves from summary level to detail levels of information effortlessly
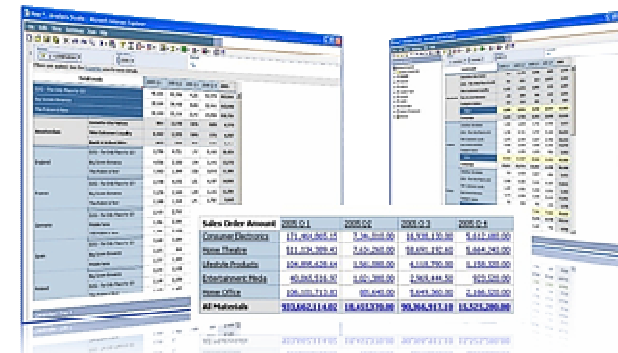
Broad Range of Capabilities to Engage More Users

Dashboards

- Provides at-a-glance, high impact views of complex information

- Helps quick focus on issues that need attention and action

- Are highly visual and intuitive

- Combines information across disparate sources

Self-Service Personal Alerts

Define how you would like to be alerted

Highlight the report, or value within a report that you wish to be alerted on

Receive alert and monitor over time
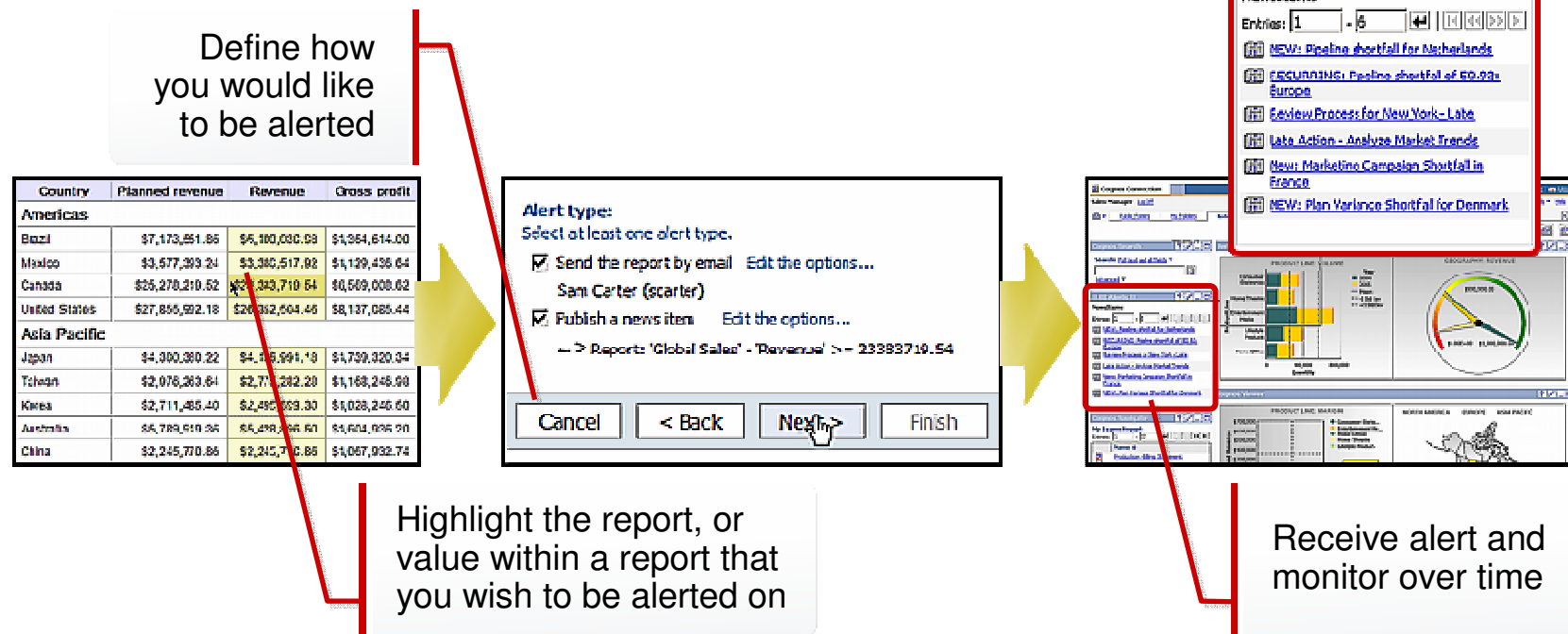
- **Users can easily create their own alerts for scheduled reports**

- **Users can control when and how they receive critical information without IT intervention**

Express Authoring Mode

Working with live data to accelerate report production

Pre-defined financial calculations

Statement style formatting

Optimized toolbox for crosstab functionality

- **Provides financial/business analysts a quick and easy mechanism to create formatted reports to support financial and business processes**

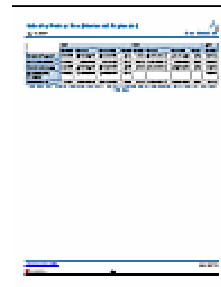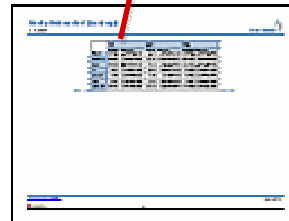- **Instant feedback and a focused user-interface satisfies self service needs**

Briefing Books

- **Provides professional authors the ability to quickly combine different styles and formats within a single report.**

Live TOC to enable quick navigation
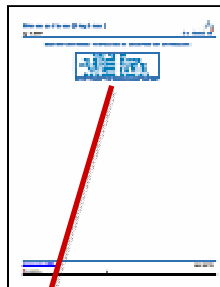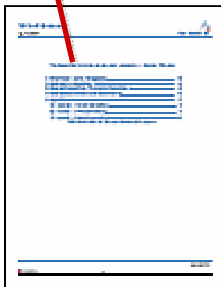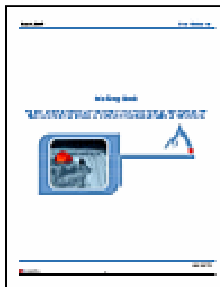
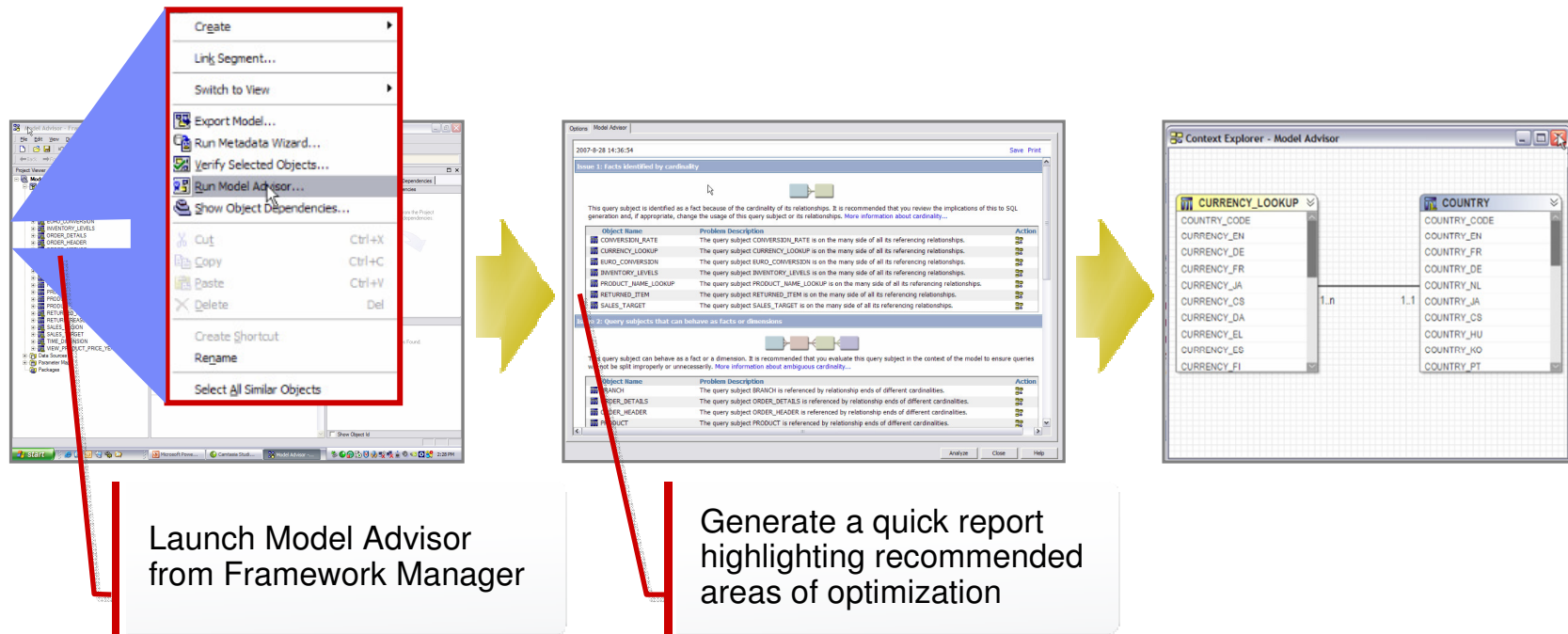Inter-mingle different page orientations within the same report
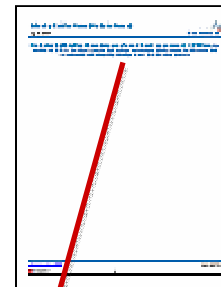
A singleton is a data frame that displays the first value for a single query item

No Data Handling allows the business user to customize the report when there is no data found

- **Business users can easily navigate multi-style, multi-page reports with critical information formatted for easy consumption.**
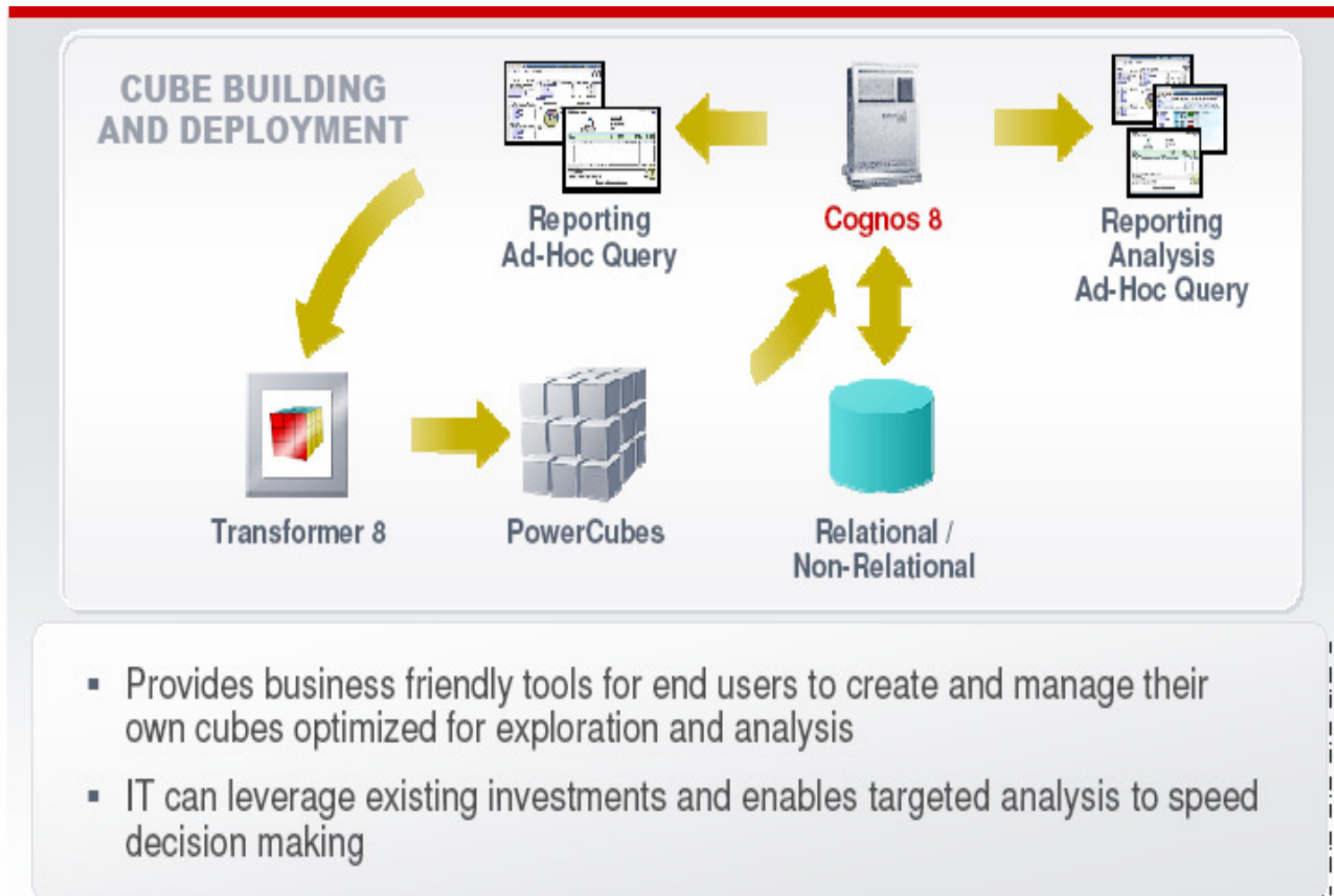
Model Advisor

- **Enables users to apply proven Cognos modeling practices to potential modeling issues**

Launch Model Advisor from Framework Manager

Generate a quick report highlighting recommended areas of optimization

- **Reduces the amount of time and effort to build high-quality models**

Transformer – cube building enhancements

- Provides business friendly tools for end users to create and manage their own cubes optimized for exploration and analysis

- IT can leverage existing investments and enables targeted analysis to speed decision making

Complete System Management To Confidently Deploy, Manage And Scale

## How can IT scale to support mission-critical deployments?

- **Enterprise Scale:** Scale with no downloads for end-users, built-in fault tolerance, predictable linear response and comprehensive security.

- **Complete View of System Activity:** Access to hundred of system metrics and ability to set thresholds

- **Streamline Environment Changes:** Test, compare and summarize report results between two environments

"**Cognos, …makes it easy for companies to deploy BI and PM** to a broader user population, while minimizing the **resulting workload for IT** departments."

- Nucleus Research, Cognos Takes on the Rest of the Enterprise, November, 2007

Snapshot of System Health

- **Provides administrators with a consolidated view of all system activity, from scheduled and interactive reports to servers and dispatchers**
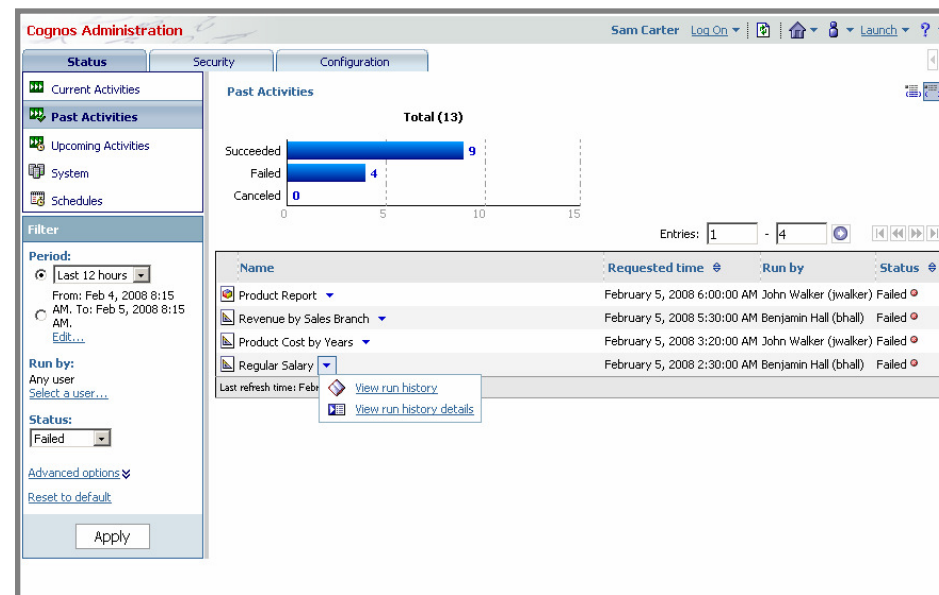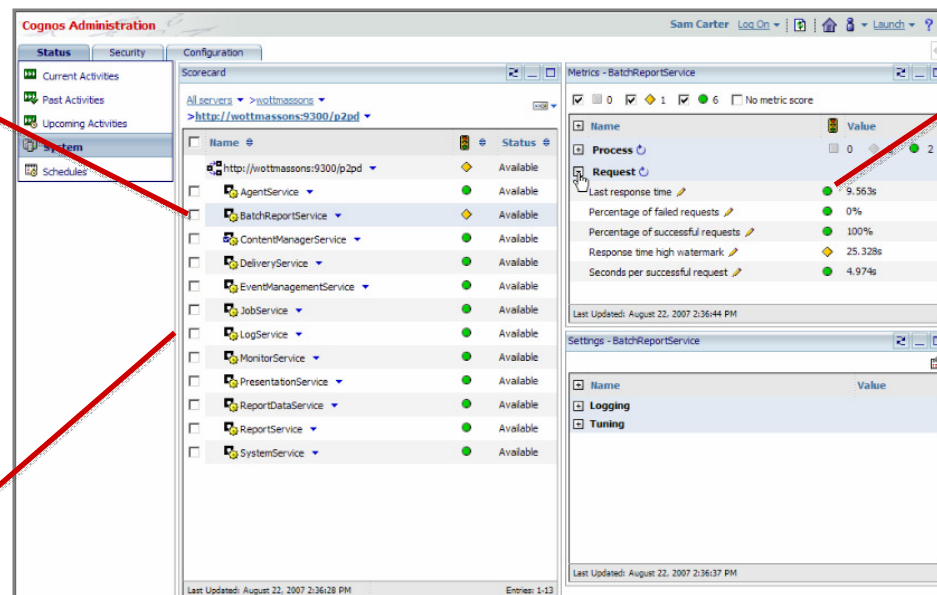

- **Reduce the time it takes to assess system activity and take appropriate actions**

Proactive Administration

- **Provides administrators with detailed metrics and set thresholds to monitor for system anomalies**

View hundreds of system metrics, consolidated in summary views

Provides centralized holistic management of Cognos solution

Prioritize critical process to ensure consistent service is delivered

- **Reduce the time it takes to identify, troubleshoot and resolve an issue**

Modern SOA To Leverage Infrastructure Today – And In The Future

How can I deploy today and respond to changing requirements?

- **Lifetime Agility:** Built on an SOA architecture to leverage technology standards today and as they evolve

- **Infrastructure Flexibility:** Scale up or out as needed with peer-to-peer services that can be located anywhere on the network.

- **Embeddable and Extensible:** Embed and Extend with full access to functionality through a single open API

"We have a platform in Cognos 8 which is truly adaptable to both our current and future needs. "

- Carl Richardson, BI Project Manager, MassHousing, Nov, 2007

Cognos 8 BI for Linux on System z

IBM Cognos 8 BI for Linux on System z

Product Capabilities

- Adhoc query, reporting and analysis (Query Studio, Report Studio & Analysis Studio)

- Dashboards and charting (Cognos Connection & Report Viewer)

- Event management (Event Studio)

- Integration with Microsoft Office (Go! Office and CAFÉ)

- Cube building (Transformer)

Initial Conformance

Operating System:
- Suse 10 Linux

Database Support:
- DB2 z/OS 8 and 9
- DB2 LUW 9.5
- Oracle 10g

Application Server:
- Apache Tomcat
- WebSphere 6.109

Content Store:
- Derby on Linux for System z
- DB2 9.5 LUW
- Oracle 10g

Directory Server:
- Netscape Directory Server 6
- Sun ONE Directory Server 5.1 SP1, 5.2
- IBM Tivoli Directory Server 5.2, 6.0
- Novell e-Directory Server 8.7.3
- LDAP version 3 compliant server

Web Server:
- IBM HTTP server 2.0

Not included in this initial release are Scorecards (Metric Studio), ,output delivery to mobile devices (Go! Mobile), and integration with enterprise search (Go! Search)
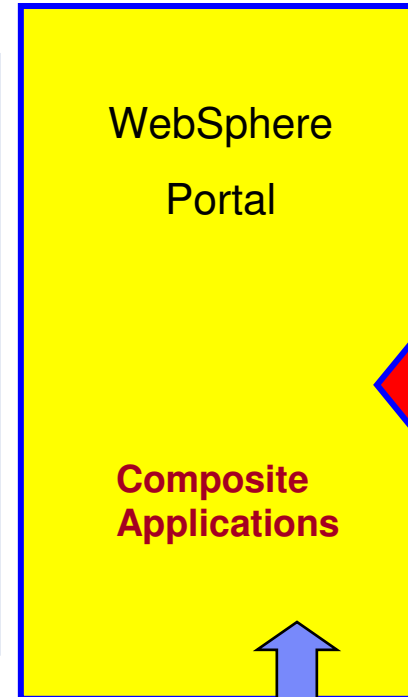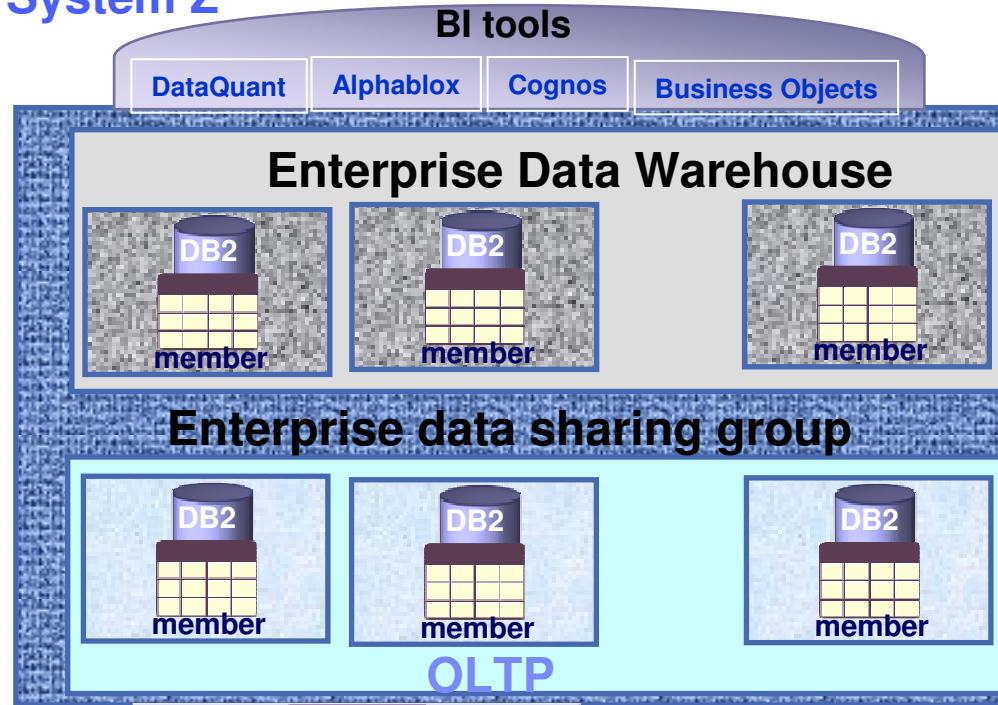
What do you need to run Cognos 8 BI?

Web Browser

Web Server

Application Server with JRE

Cognos 8 BI

Server Operating System

Content Store

BI Data Source
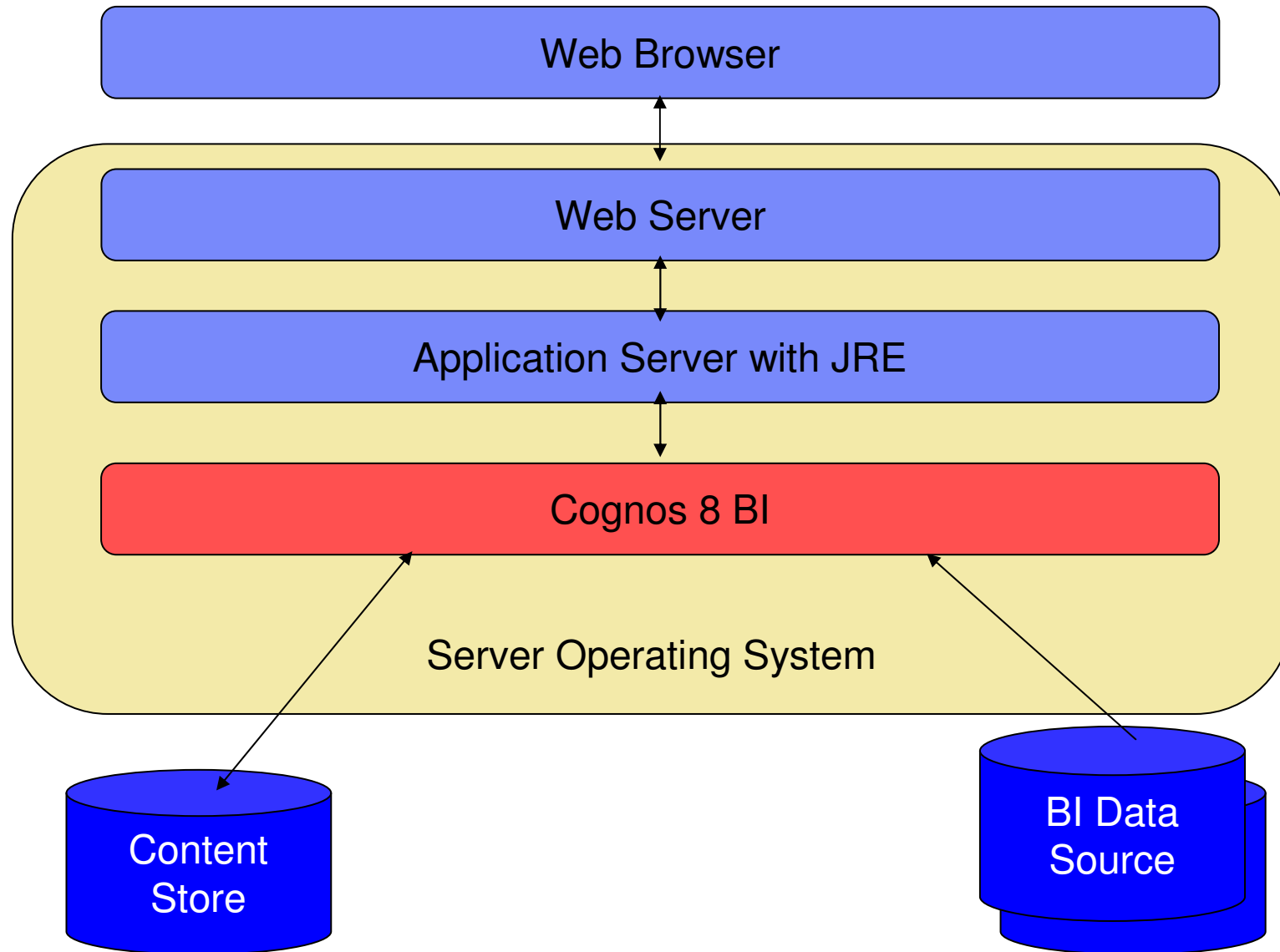
Integration of Cognos 8 BI and Lotus Notes application data

Enterprise Composite Application Architecture

System Z

BI tools

| DataQuant | Alphablox | Cognos | Business Objects |

Enterprise Data Warehouse

DB2 member

DB2 member

DB2 member

Enterprise data sharing group

DB2 member

DB2 member

DB2 member

OLTP

WebSphere Classic Federation Server

VSAM, IAM & sequential

IMS

Software AG Adabas

CA Datacom

CA IDMS

Lotus software

Notes 8 Domino

WebSphere Portal

Composite Applications

COGNOS AN IBM® COMPANY

Sun & Son
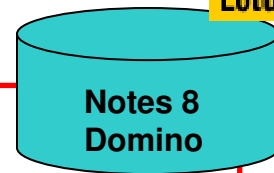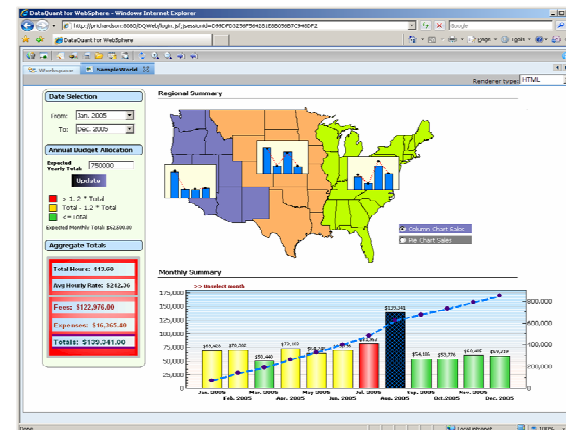**Data Modeler**

Data Sources
LUW systems

SQL Server

Sybase

ORACLE

Types of Services
- **Data access**
- **Business Intelligence**
- **Real-time BI**
- **Transaction processing**
- **Office services**
  - **Email**
  - **Messaging**
  - **Workflow**

Rich Client

Thin Client
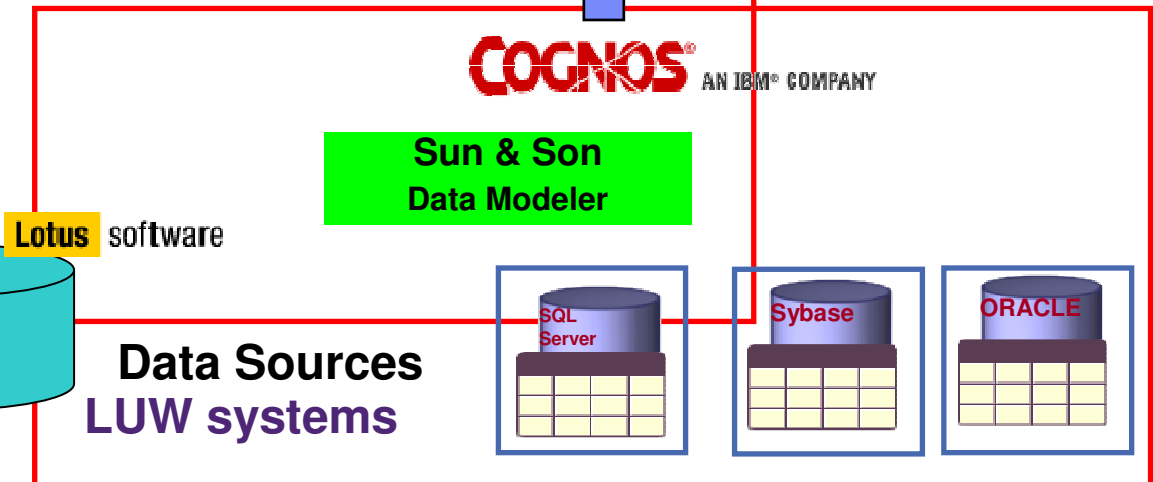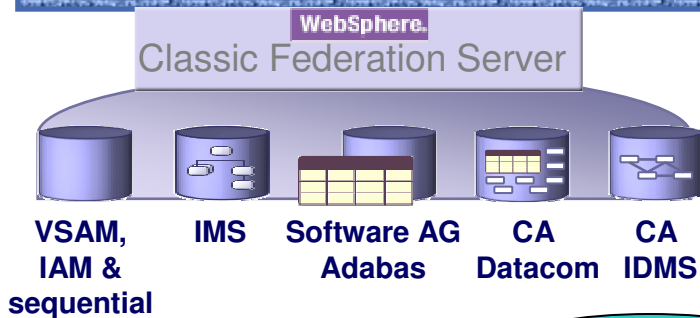
DataQuant
the next step for QMF

DataQuant Summary of capabilities

- **Enhance and extend your QMF investment (queries, forms, procs)**

  - Integrated infrastructure

  - Full spectrum of BI capabilities: from table data editing and ad-hoc querying to graphical reporting and interactive visual dashboards

- **BI content can be deployed to both workstation (rich client) and browser-based (thin client) users**

- **Zero coding, drag-drop authoring model**

  - Allows content authors to quickly develop interactive dashboards and graphical page-based reports

  - Allows lines of business to refine or design their own reports and dashboards, reducing the burden on IT

- **Powerful data analysis**

  - Support for both OLAP and relational data sources

  - Includes over 100 built-in analytical functions

Main Features of DataQuant

- **Query creation options; Graphical development via 'query diagram' designer, SQL, or Prompted**

  – Step-by-step development via 'prompted query builder'

  – Relational queries (SQL) and OLAP queries using multi-dimensional expressions (MDX) query language

- **Page-Based Reporting**

  – HTML or PDF graphical reports

  – Support for optional cover sheets, summary pages and more

  – Embed reports within portals, custom web sites or web applications

- **3 reporting technologies:** Simplified tabular report designer, Graphical report designer, BIRT-based report designer

- **Visual Dashboards**

  – Ability to present data concurrently drawn from multiple heterogeneous data sources

  – Authoring environment, based upon the award-winning Eclipse framework

  – Ability to embed dashboard content in 3rd party web pages, portals and web applications

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

- **Substantially 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**

[1]Support limited to function availability on distributed platforms – not all z/OS or REXX functions are available

DataQuant and Cognos 8 contrast

- ## Cognos 8 BI

  – our stated BI strategic product suite

  – a BI 'platform' with integrated, extensible features and Performance Management capabilities

  – has many years of known industry credibility and a large organization to back it up and assist

  – extraordinary functional capabilities

- ## DataQuant

  – a BI 'tool' that has ease of use out of the box but all extensions must be created

  – best suited to extending the QMF install base

  – can interoperate with Cognos 8 to enhance System z Cognos accounts with their QMF investment

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