MEETING THE SOA DATA CHALLENGE: Connecting Data Sources to your Enterprise Service Bus

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February 14, 2008

JBoss a division of Red Hat

JBoss® WORLD
ORLANDO 2008
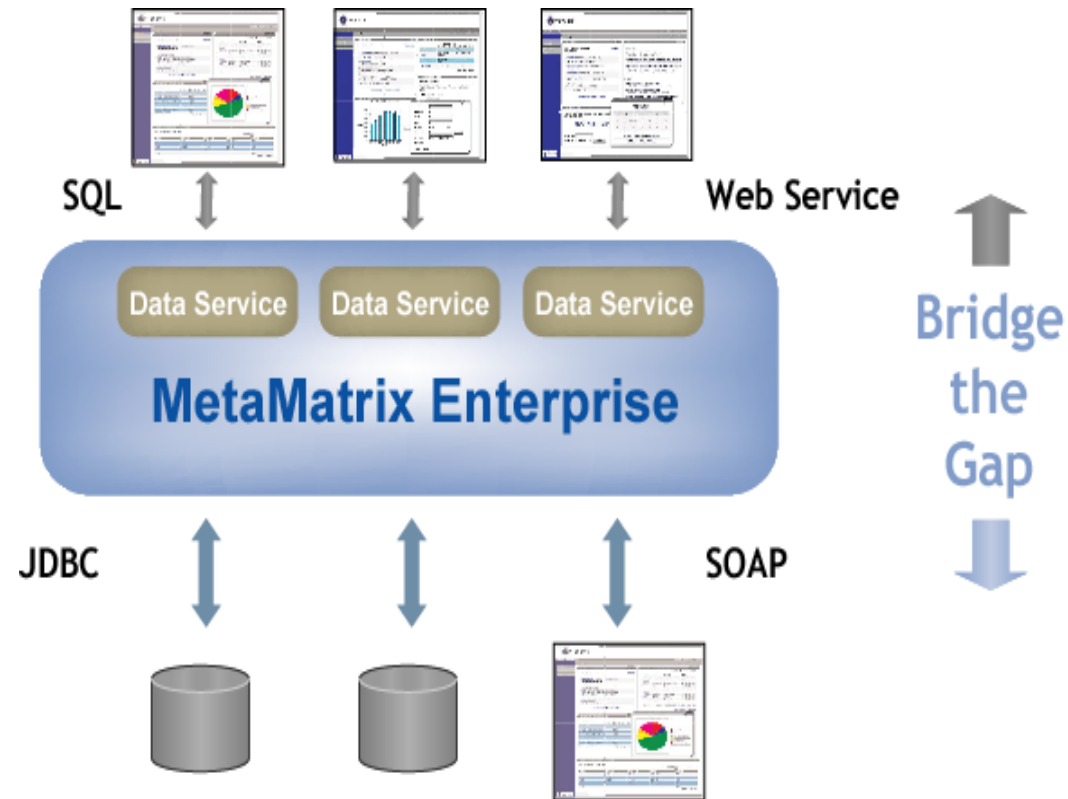PRESENTED BY RED HAT

Data Services Overview
Agenda

- **Background**
- **What Data Services do**
- **Customer use cases**
- **Where Data Services fit**

- **ESB Comparison**
- **How Data Services work**
- **ESB Interoperability**
- **Data Services – Why bother?**

MetaMatrix Background

- Founded 1998

  - Vision: Universal bridge between information-consuming applications and enterprise information resources

  - Data Services = Enterprise Information Integration (EII)

- Shipping version 5.5 – highly mature, stable, feature-rich

- Market – Global 5000 Organizations

  - Government Intelligence Agencies, Department of Defense

  - Financial Services

  - Independent Software Vendors

- May 17 2007: Acquired by Red Hat
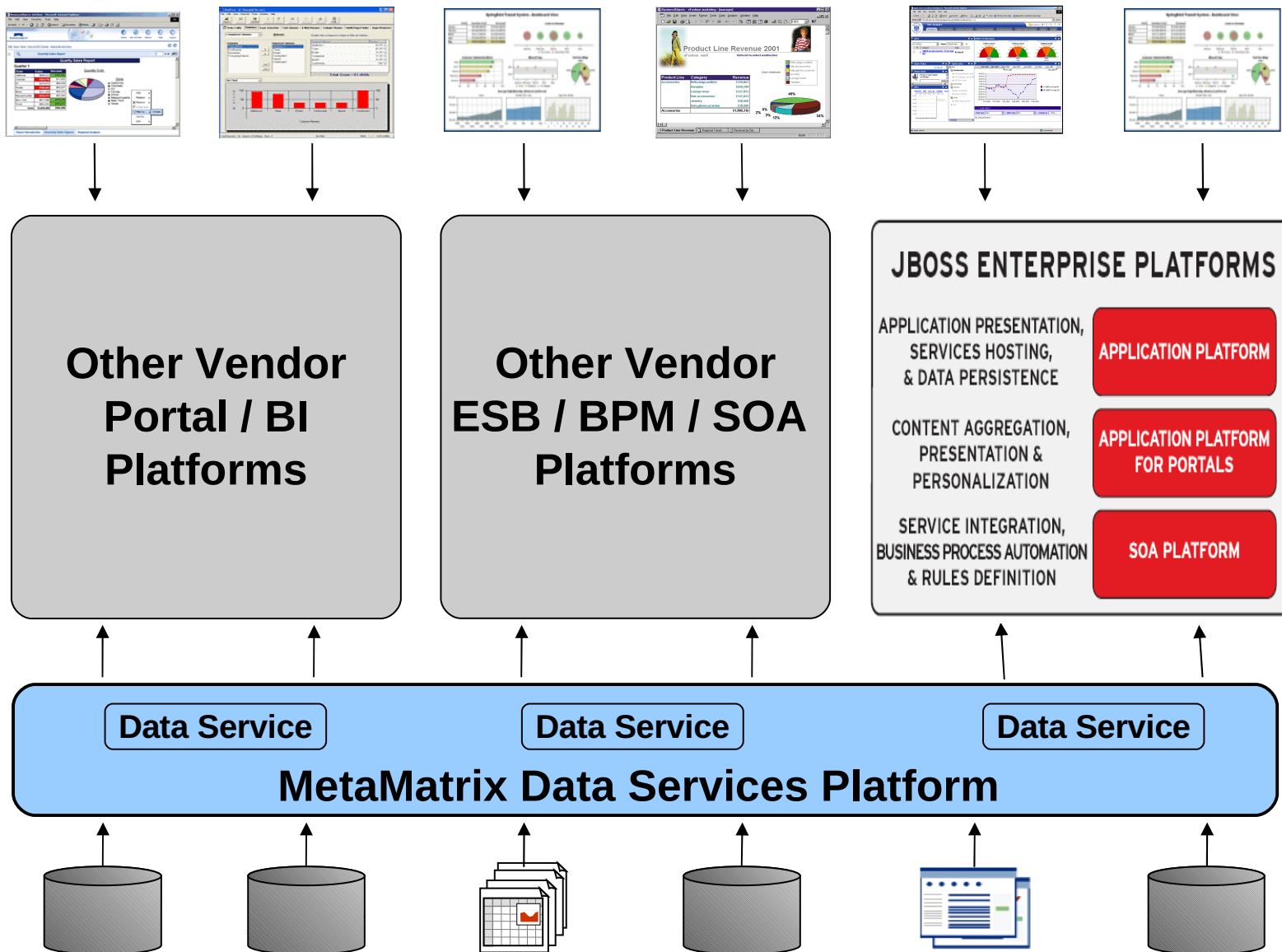
Data Services: What They Do

- Turns the data you have into the data you want

- Speeds application development by simplifying access to distributed data

- Transforms data format differences
  - Vocabulary difference
  - Schema compliance

- Consolidates (abstracts) sources of data into a "single view" without the need to move data between databases

SQL   Web Service

Data Service   Data Service   Data Service

MetaMatrix Enterprise
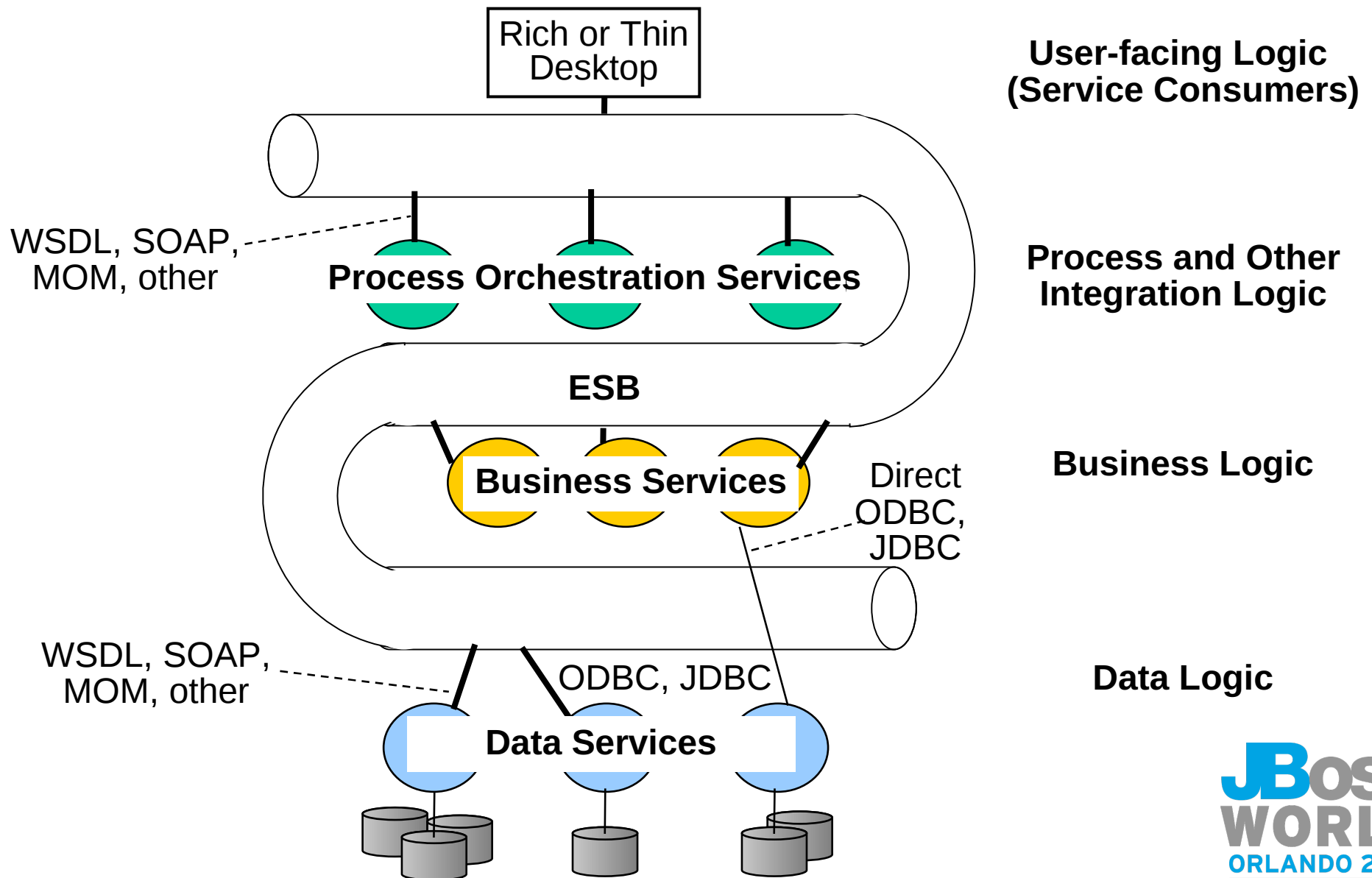
Bridge the Gap

JDBC   SOAP

Data Services Use Cases

- **Reports, Business Intelligence, Portal**

  - Consolidated reports/dashboards

- **Regulatory Compliance**

  - Provide common security and control for data

  - VISA PCI, Basel II, Sarbanes Oxley, Patriot Act

- **Master Data Management (MDM)**

  - Single View of Customer - CRM

  - Single View of Supplier – supply chain

  - Single View of Employee – HR consolidation

- **SOA**

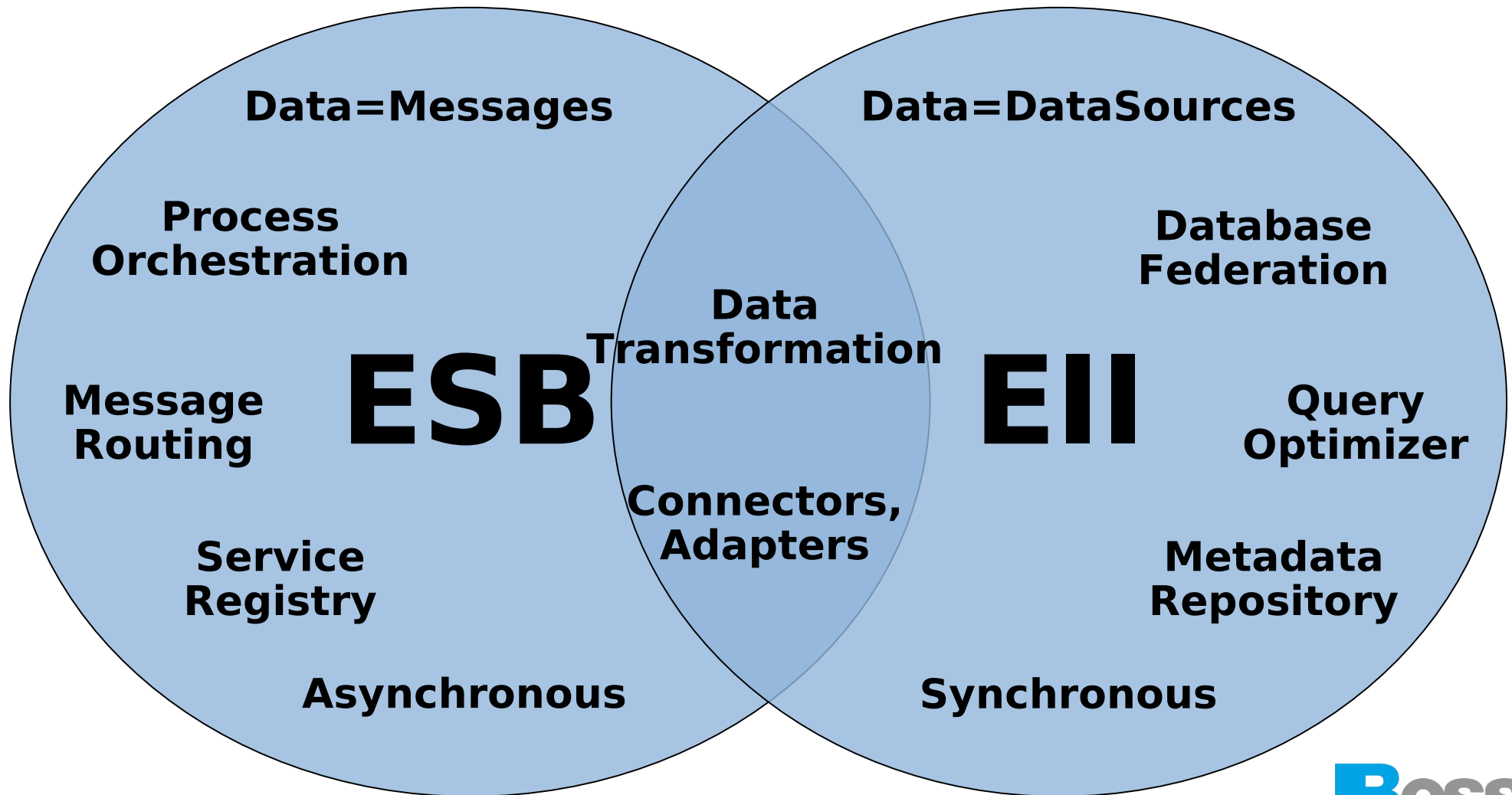 - Make data available to SOA environment
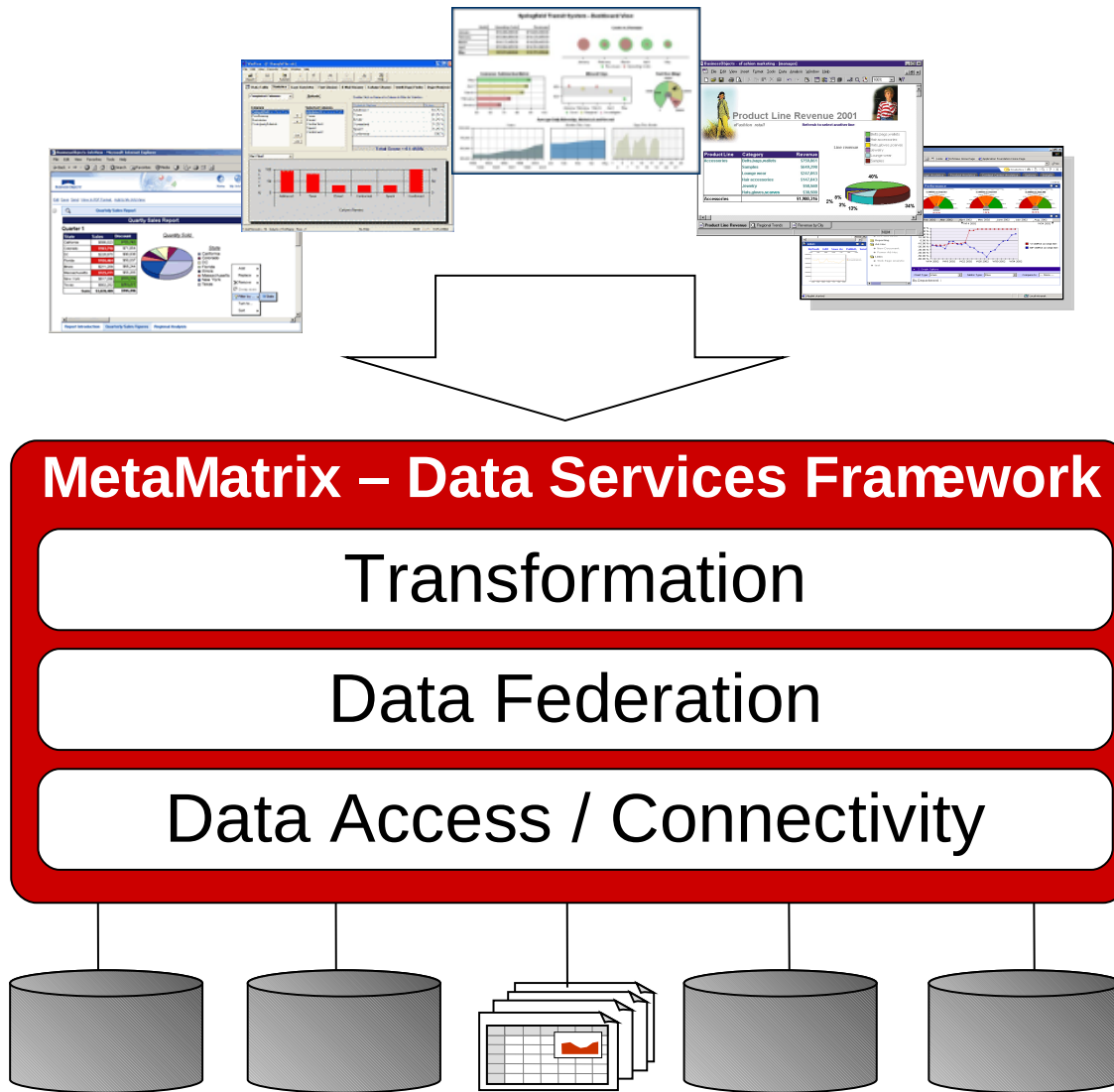
Data Services: Where They Fit

Other Vendor Portal / BI Platforms

Other Vendor ESB / BPM / SOA Platforms

JBOSS ENTERPRISE PLATFORMS

APPLICATION PRESENTATION, SERVICES HOSTING, & DATA PERSISTENCE	APPLICATION PLATFORM
CONTENT AGGREGATION, PRESENTATION & PERSONALIZATION	APPLICATION PLATFORM FOR PORTALS
SERVICE INTEGRATION, BUSINESS PROCESS AUTOMATION & RULES DEFINITION	SOA PLATFORM

Data Service   **Data Service**   **Data Service**

MetaMatrix Data Services Platform

Data Services and ESB Technologies

ESB-EII (Data Services) Comparison

Data=Messages

Data=DataSources

Process Orchestration

Database Federation

Data Transformation

ESB

EII

Message Routing

Query Optimizer

Connectors, Adapters

Service Registry

Metadata Repository

Asynchronous

Synchronous

Data Services: How They Work

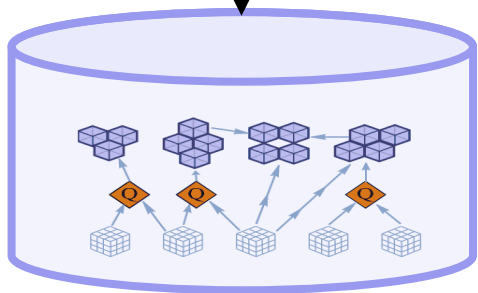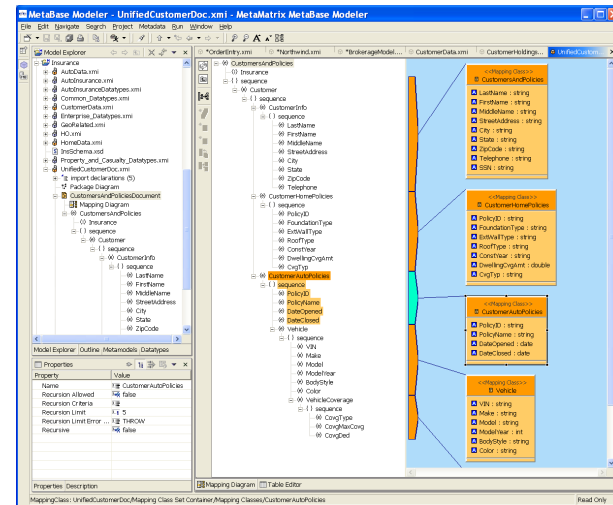**MetaMatrix – Data Services Framework**

- Transformation
- Data Federation
- Data Access / Connectivity

- Data virtualization (federation)
- Abstraction -- shield apps from DB/source
- Unified access -- SQL or Web Services
- Transformation
- Semantic mediation (vocabulary, meaning)
- Service enablement
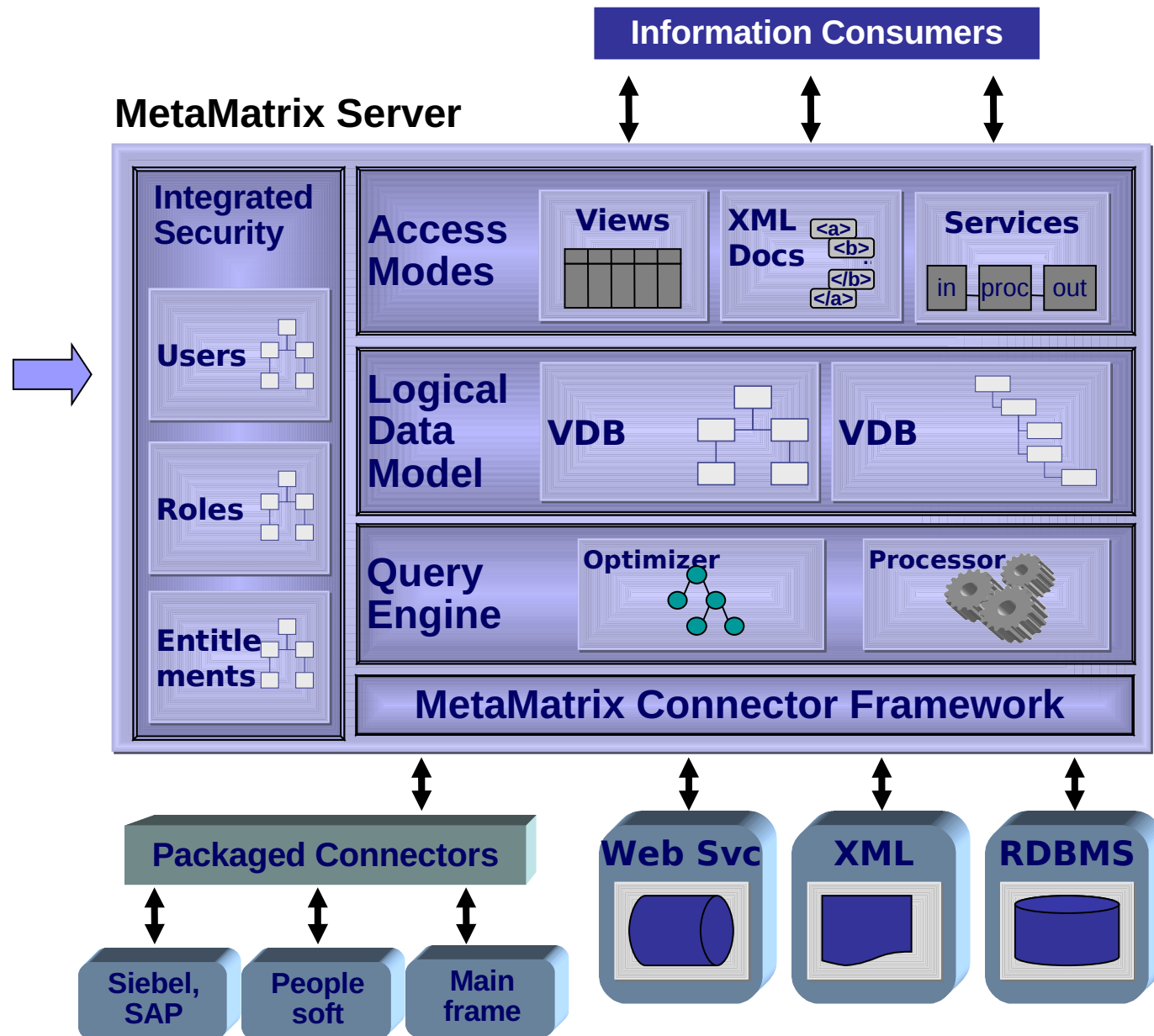- Metadata/model-driven
- Interoperable security
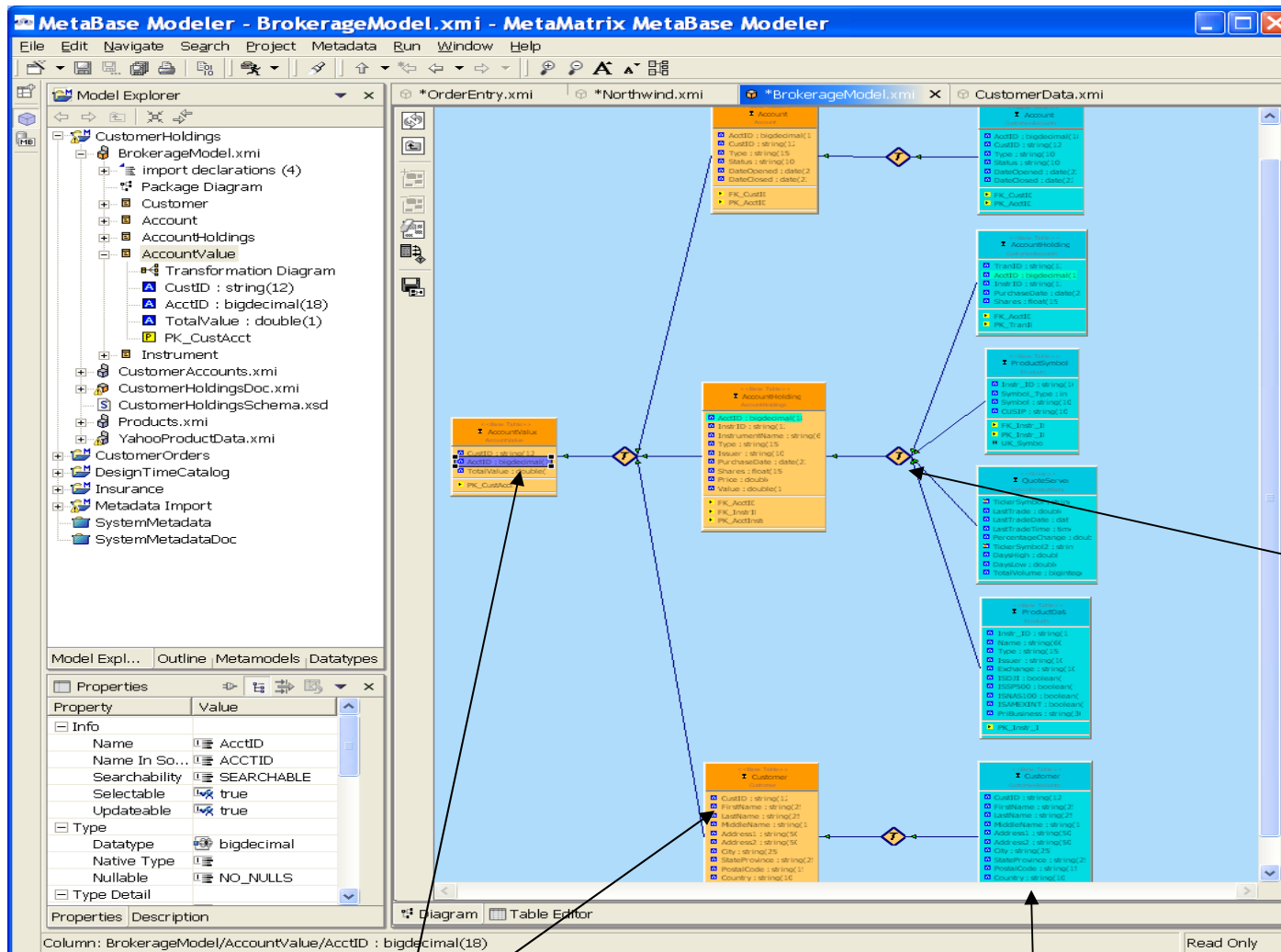
MetaMatrix: How it Works

MetaMatrix Designer

Metadata Repository

MetaMatrix Server

Information Consumers

Integrated Security

Users

Roles

Entitlements

Access Modes — Views — XML Docs — Services — in proc out

Logical Data Model — VDB — VDB

Query Engine — Optimizer — Processor

MetaMatrix Connector Framework

Packaged Connectors

Siebel, SAP — People soft — Main frame

Web Svc — **XML** — **RDBMS**

Enterprise Designer: How it Works

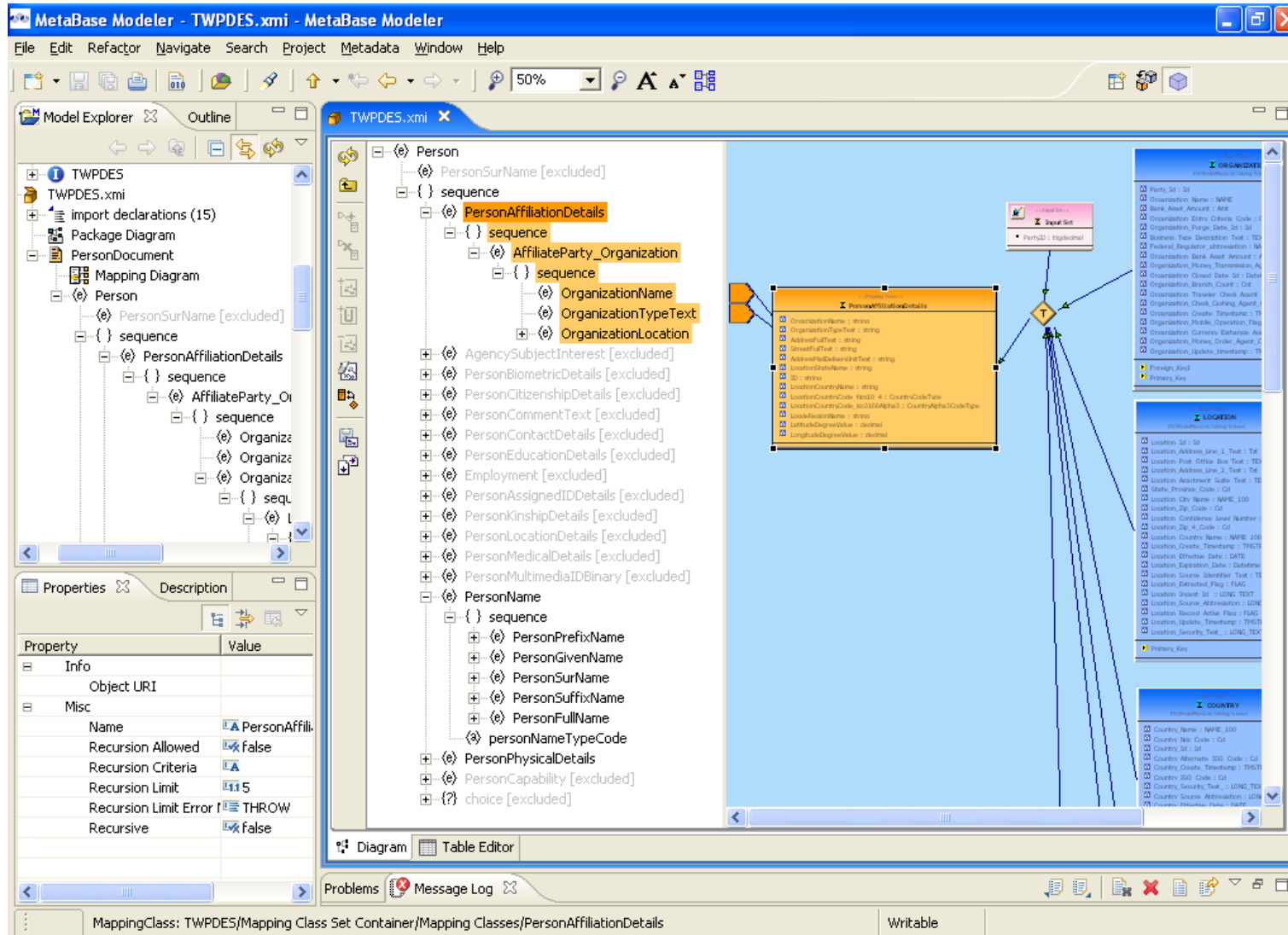**Defined by Models, not code**

Transformations:
- Select
- Join/Aggregate
- Filter
- Functions
- Text/String
- Numeric
- Decode
- User Defined

Logical Models

Physical Models representing actual data sources

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Enterprise Designer: How it Works

MetaMatrix Designer – for XML-centric Data Services

- Model XML Docs, Schemas
- Build XML Doc. models from XML Schemas
- Map XML Doc. models to other data models
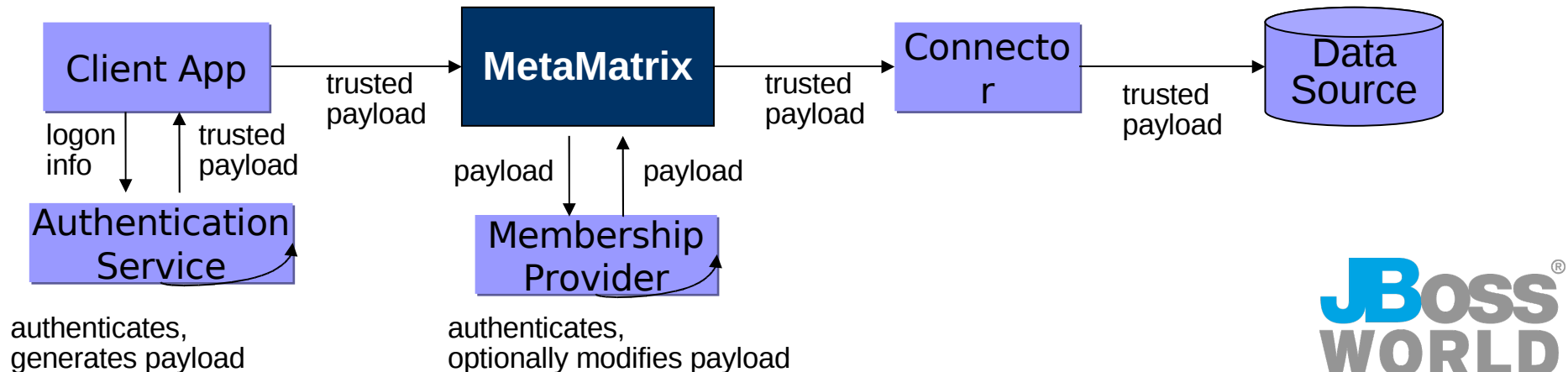- Enable data access via XML

Secure Data Access

Username/Password Logon
- Connector connects with same ID for all queries
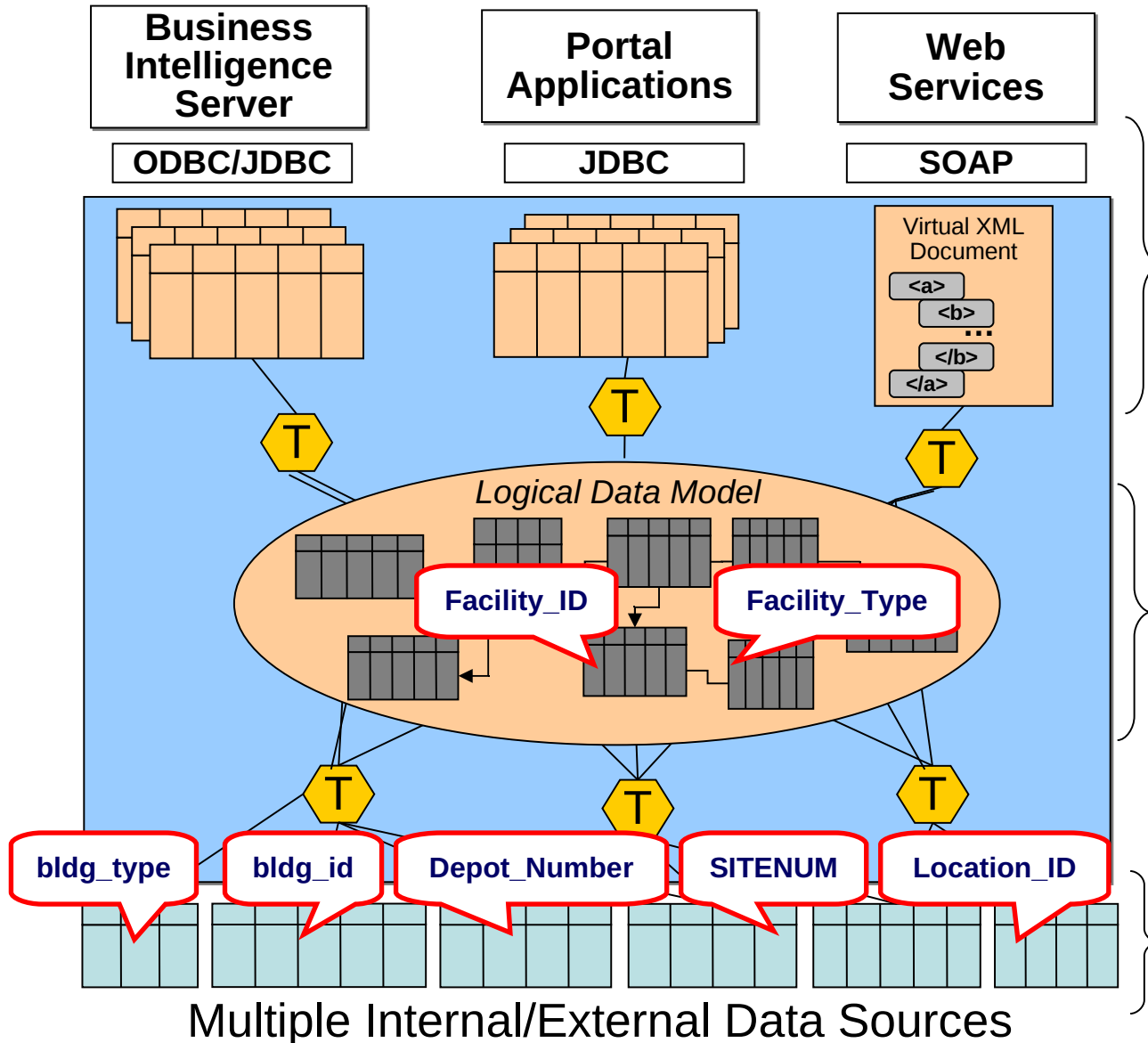- Optional: Integrated with existing authentication system

Client App → (username password) → **MetaMatrix** → Connector → (username password) → Data Source

Trusted Payload Logon:
- Connector uses different credentials per connection, per query
- Optional: Integrated with existing authentication system

Client App → (trusted payload) → **MetaMatrix** → (trusted payload) → Connector → (trusted payload) → Data Source

logon info / trusted payload

Authentication Service

authenticates, generates payload

payload / payload

Membership Provider

authenticates, optionally modifies payload

Query Performance & Optimization

- Minimal overhead for simpler requests

- Control

  - enforce mandatory criteria, time and size limitations

- Rule-based optimization

  - use criteria to avoid unnecessary fields and records

  - merge all transformation logic for a single source

- Cost-based optimization

  - join algorithms (nested loop, merge, dependent, hash)

  - cost profile of each data source

- Data caching and staging (materialized views)

- Manage dataflow – buffer management

Semantic Data Dictionary

Business Intelligence Server

Portal Applications

Web Services

ODBC/JDBC

JDBC

SOAP

Virtual XML Document

Aggregate views of enterprise data:
- Relational or XML
- ODBC, JDBC, SOAP APIs
- POJO thru Hibernate

Logical Data Model

Facility_ID

Facility_Type

Logical Data Model

bldg_type

bldg_id

Depot_Number

SITENUM

Location_ID

Source Tables - Authoritative, unaltered

Multiple Internal/External Data Sources

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JBoss Portfolio

- **Developer:** Single subscription covers ALL JBoss products.

- **Platforms:** Pre-integrated, single distributions simplify install & patch/update stream

- **Frameworks:** Modular offerings that run w/ JBoss *or* other vendors' middleware

JBoss Developer Subscriptions

JBoss Developer Professional

JBoss Developer Enterprise

JBoss Developer Studio

JBoss Enterprise Middleware

Enterprise Platforms

Enterprise Frameworks

SOA Platform *(GA early 2008)*

Portal Platform

JBoss Seam

JBoss Hibernate

JBoss jBPM

JBoss Rules

Application Platform

Other Application Servers

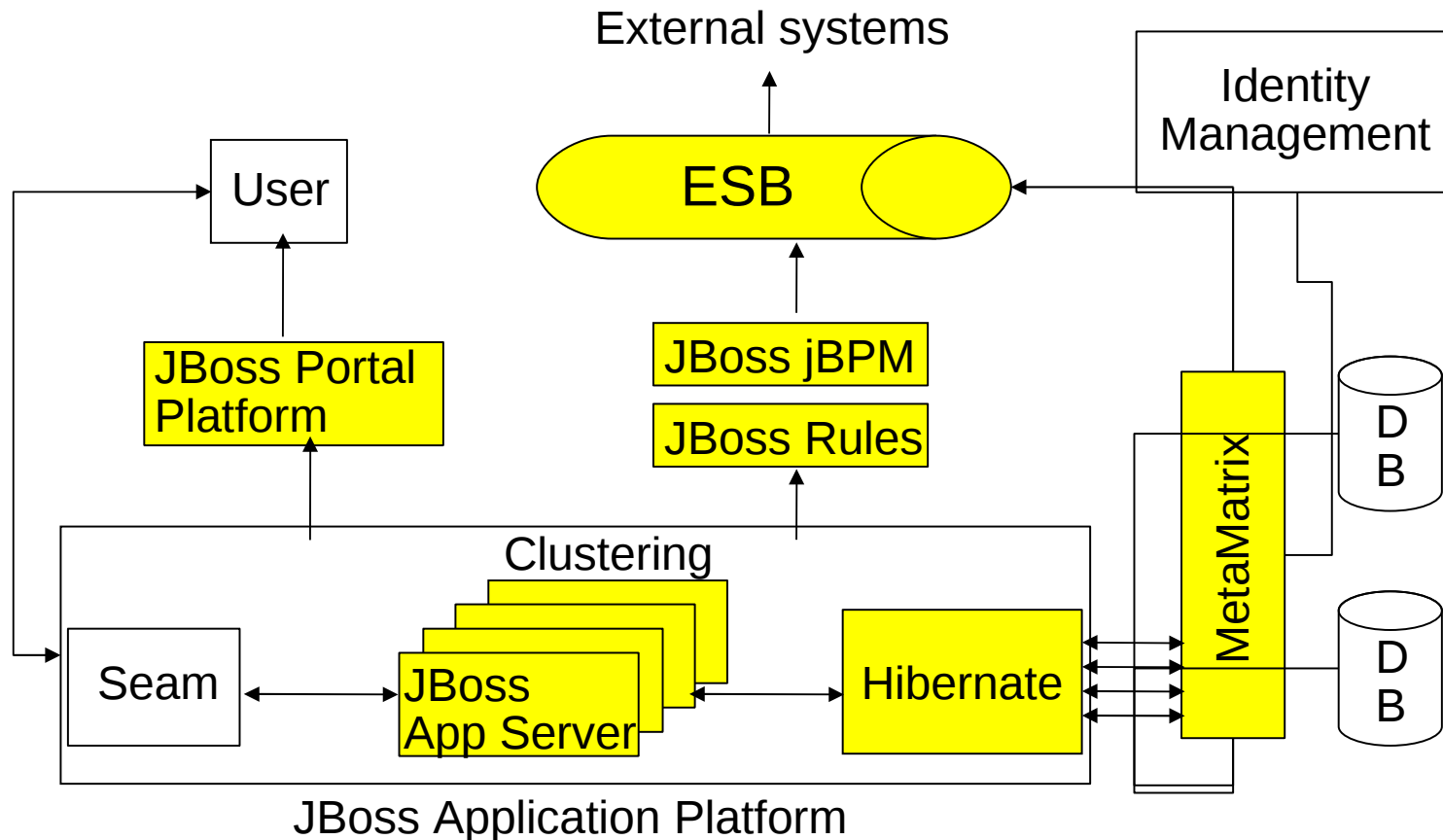**MetaMatrix Data Services**

Red Hat Enterprise Linux
Windows, Unix, Other Linux

MetaMatrix – Potential Interfaces with JBoss Components

* Makes it easier for Portal, Seam, Hibernate to talk to multiple DB's

* Interface with ESB, BPM, Rules for data integration scenarios that are process-driven, event-driven
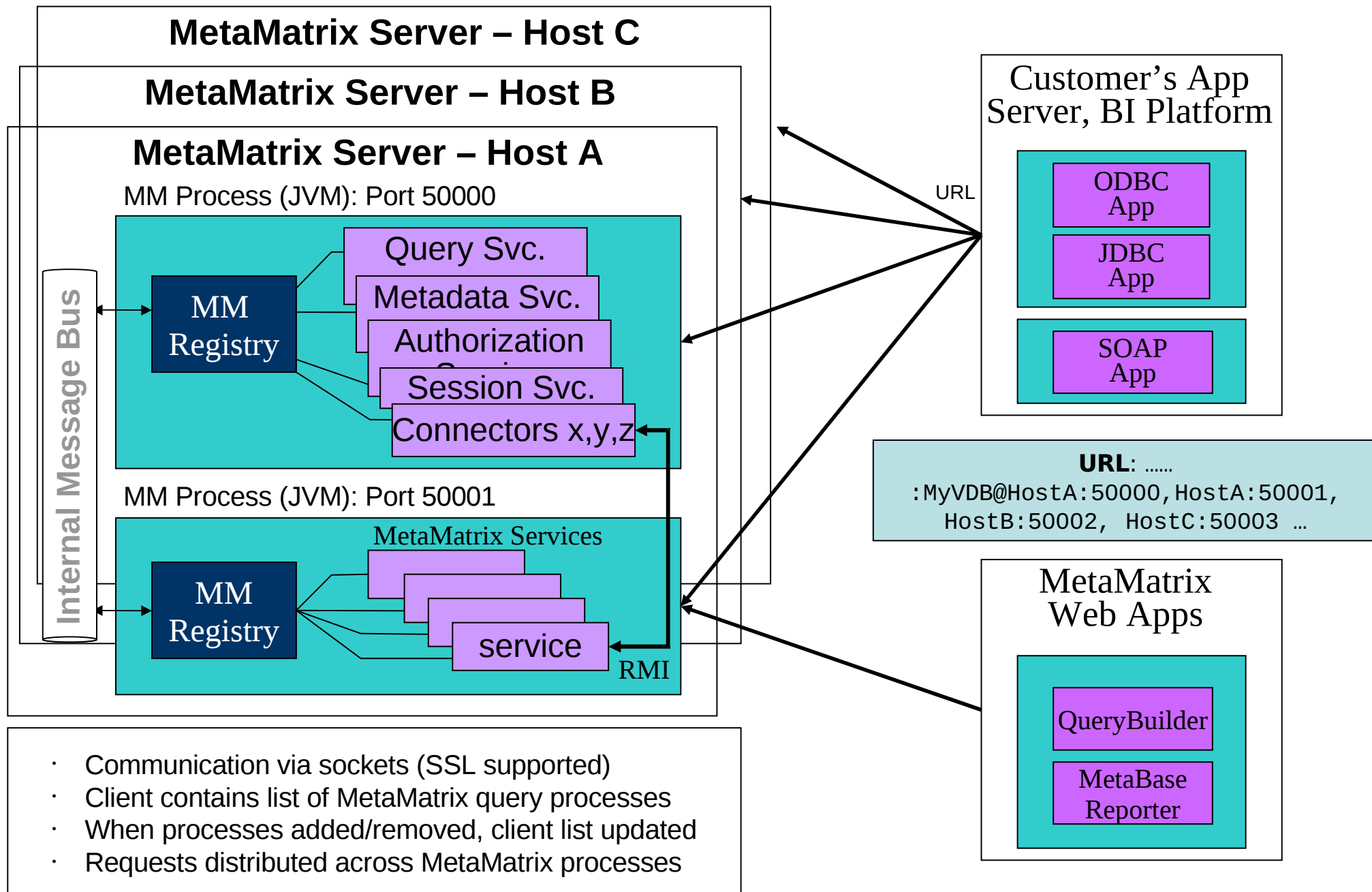
Data Services Value Proposition

- Real-time, On-demand access to distributed information

    - Avoid unnecessary data replication, data owners retain control

- Reduced application lifecycle costs

    - Initial iteration, plus "long tail" of application maintenance

- Improved agility for enterprise data assets

    - Abstraction of physical data sources enables database migrations/consolidations
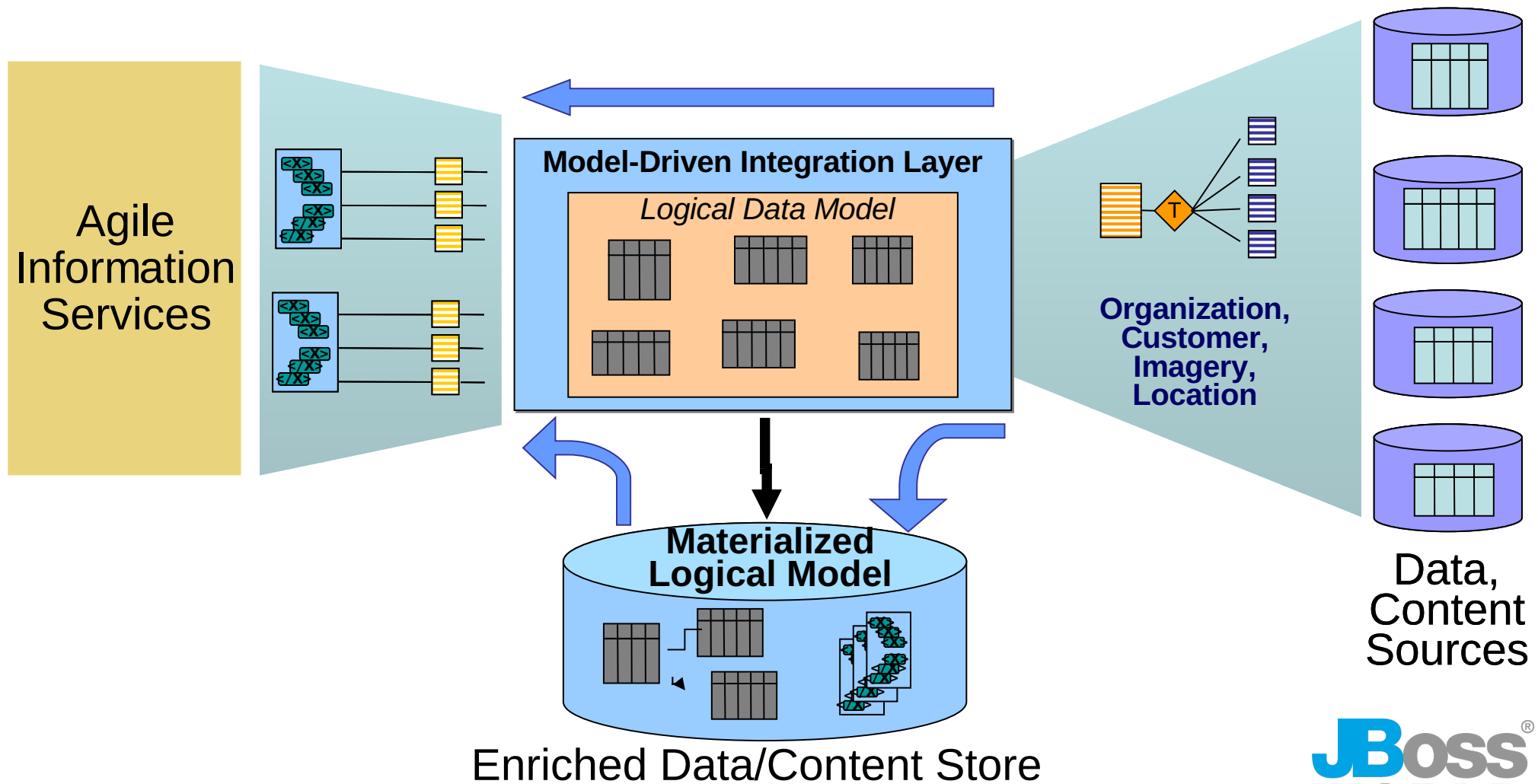
- Enabling SOA in an evolving world

MEETING THE SOA DATA CHALLENGE: Additional Slides

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Red Hat
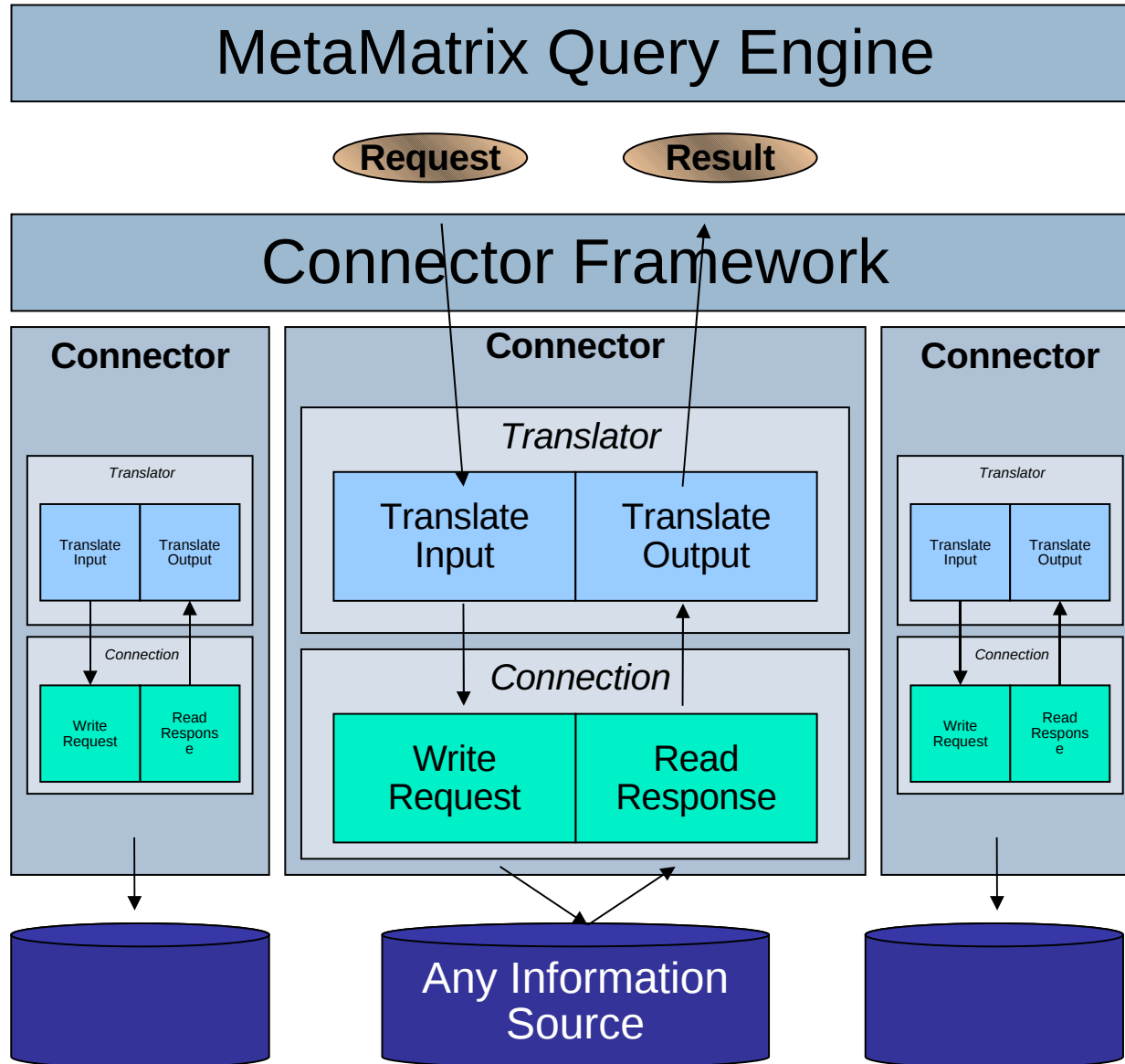VP Middleware Technology
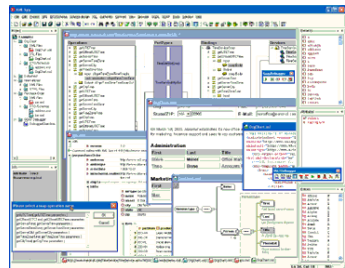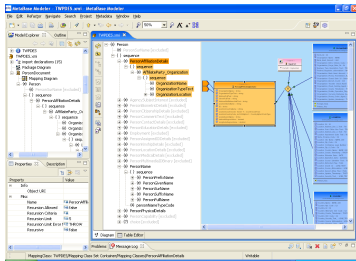February 14, 2008

MetaMatrix Scalability

MetaMatrix Server – Host C

MetaMatrix Server – Host B

MetaMatrix Server – Host A

MM Process (JVM): Port 50000

Internal Message Bus

MM Registry

Query Svc.

Metadata Svc.

Authorization

Session Svc.

Connectors x,y,z

MM Process (JVM): Port 50001

MetaMatrix Services

MM Registry

service

RMI

Customer's App Server, BI Platform

ODBC App

JDBC App

SOAP App

URL

URL: ……
:MyVDB@HostA:50000,HostA:50001,
HostB:50002, HostC:50003 …

MetaMatrix Web Apps

QueryBuilder

MetaBase Reporter

- · Communication via sockets (SSL supported)
- · Client contains list of MetaMatrix query processes
- · When processes added/removed, client list updated
- · Requests distributed across MetaMatrix processes

Data Caching/Staging

Model-Driven Integration Layer

Logical Data Model

Agile Information Services

Organization, Customer, Imagery, Location

Materialized Logical Model

Enriched Data/Content Store

Data, Content Sources

Connector Framework

Metadata Management

MetaMatrix Designer

XML Spy

ERWin

Metadata Search & Reporting	Data Lineage, Impact Analysis	Metadata-aware Applications

MetaMatrix Metadata Access Layer

MetaMatrix Repository

- Data dictionary
- Integration logic
- Data relationships
- Documentation
- Version Control

Federated Repository(s)

Document Repository(s)

Rational Rose

RDBMS

Data Sources

MetaMatrix Components

MetaMatrix Designer

Console

User Applications

JDBC ODBC SOAP JMS

Reporting Applications

MetaMatrix Repository

MetaMatrix Server

QueryBuilder

Connector Development Kit

Connectors

Enterprise Capabilities:
Metadata Management
&
Information Integration

Enterprise Information System
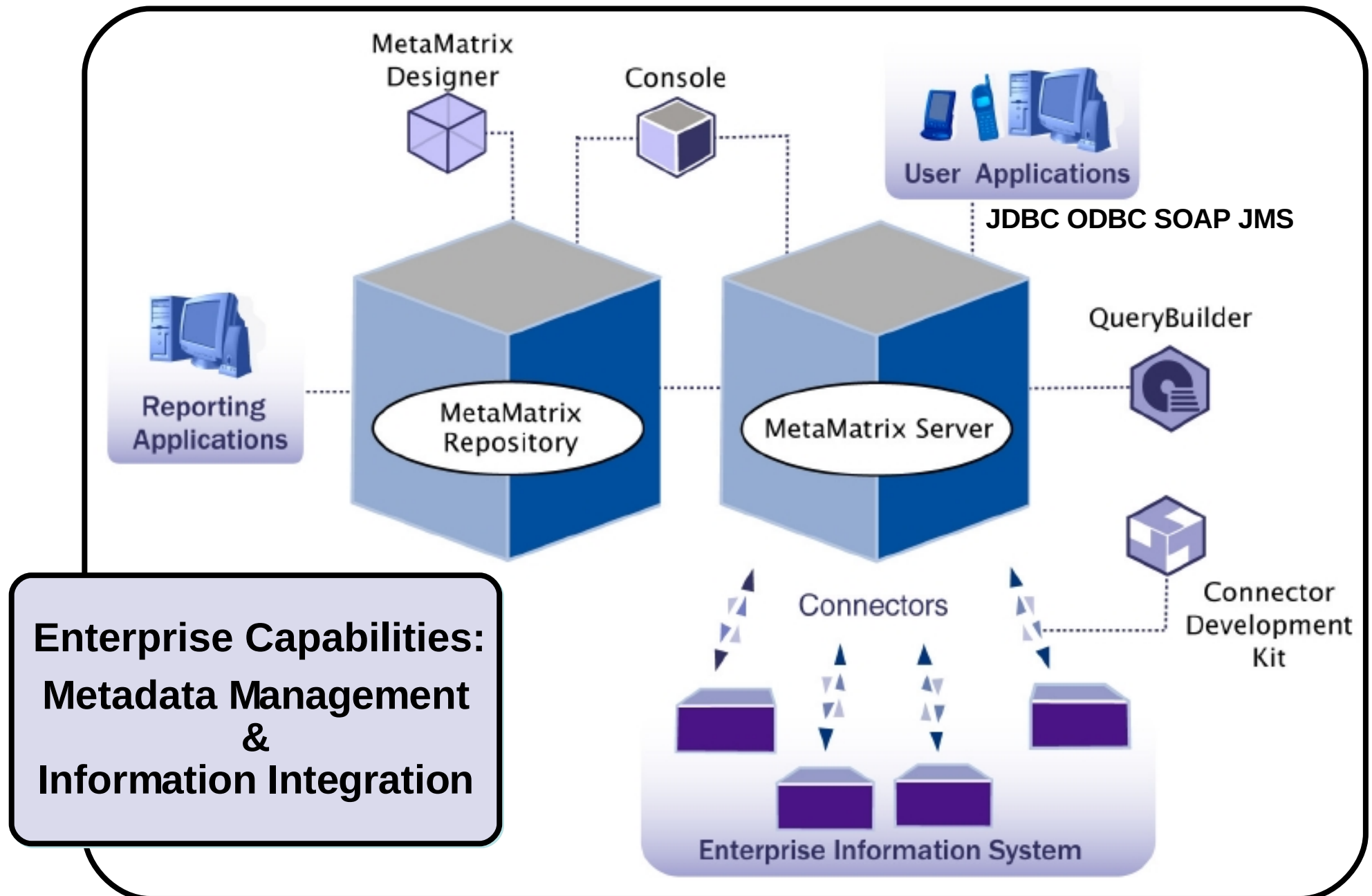
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