IBM

# Optimize your SOA solutions with DB2 Viper and XML

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**13 Juin 2006**

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# Outline

- **Business Drivers & Challenges**

- **Service Oriented Architecture**

- **Web Services**

- **DB2 and Web Services**

- **DB2 Native XML Support**

- **Recap**

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# Business Drivers

## *Flexibility & Reuse*

- **Economics: globalization demands flexibility**

- **Business processes: changing quickly and sometimes outsourced**

- Growth**: at the top of the CEO agenda**

- Reusable assets**: can cut costs**

- Information**: greater availability**

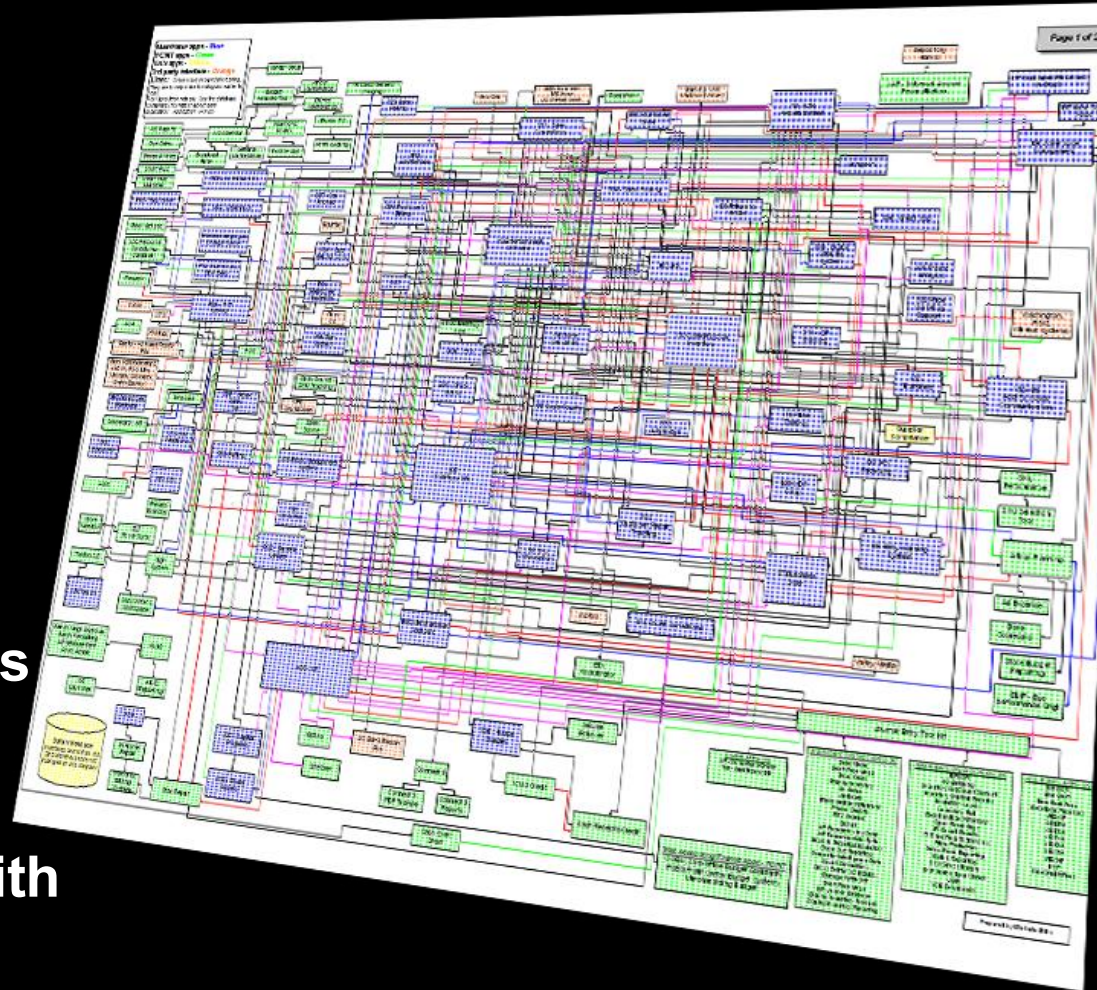- Crucial for flexibility and becoming an On Demand Business
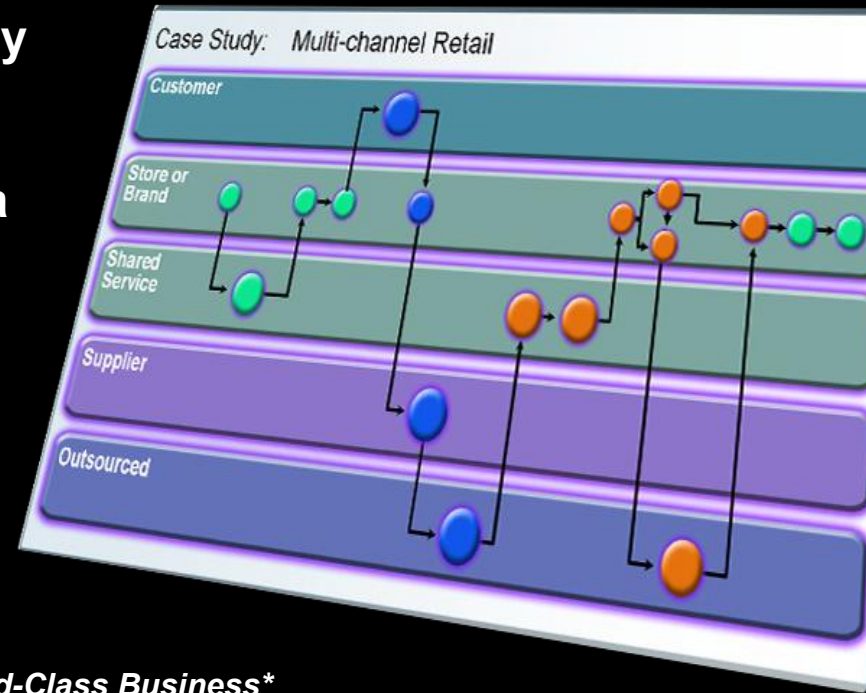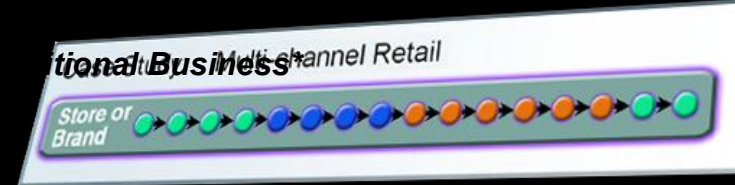


*Today's World-Class Business**

*Sources: CBDi

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# Business Barriers



- **Lack of business process standards**

- **Architectural policy limited**

- **Point application buys to support redundant LOB needs**
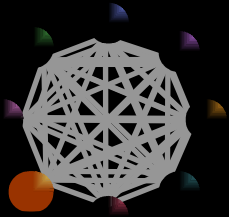
- **Infrastructure built with no roadmap**

# = *Lack of information availability*
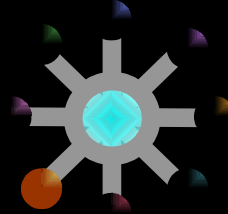
# Building flexibility on current IT investments
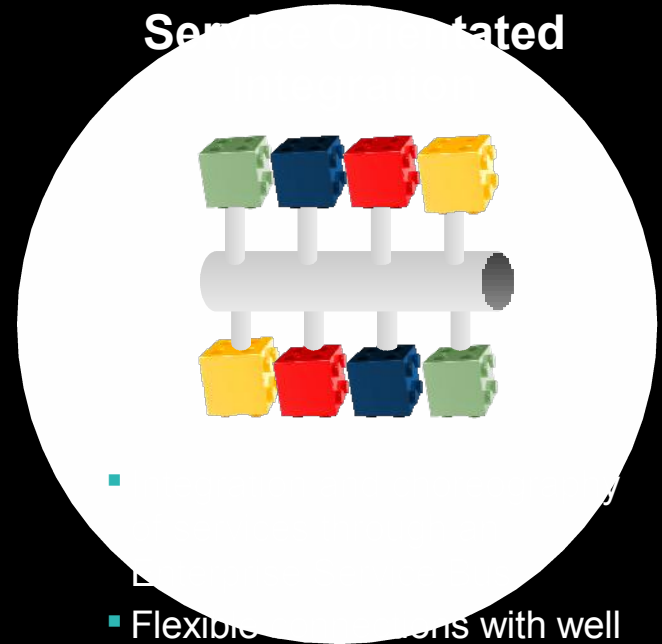## *The next stage of integration*

**Serv... ...tated**

### Messaging Backbone

### Enterprise Application Integration (EAI)

- EAI connects applications via a centralized hub
- Easier to manage larger number of connections

- Point-to-Point connection between applications
- Simple, basic connectivity

- ...
- ...
- Flexible ...ons with well defined, standards-based interfaces

**Flexibility**

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# But what is …..?

### … a service?

A **repeatable business task** – e.g., check customer credit; open new account

### … service orientation?

A way of integrating your **business as linked services** and the outcomes that they bring

### … service oriented architecture (SOA)?

An IT **architectural style** that supports service orientation

### … a composite application?

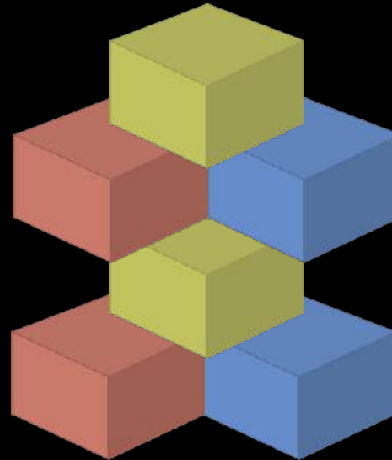A set of **related & integrated** services that support a business process built on an SOA

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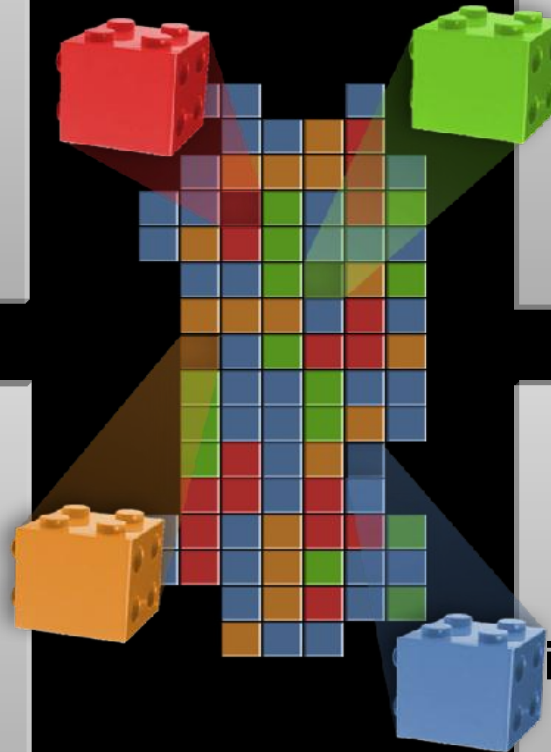
# Two sides of SOA

**Business Perspective**

Business Process
- Orchestrated sequence of Activities
- Separated elements
  - ✓ Activity sequence
  - ✓ Activity hand-off
  - ✓ Activity content

**IT Perspective**

Composite Application
- Orchestrated flows of Services
- Separated logic
  - ✓ Process flow
  - ✓ Connectivity
  - ✓ Business

## Why Service Oriented Architecture? …

- Enables re-use of existing assets
- Enhances system flexibility through separation of concerns
- Supports simplified integration of new assets with existing assets
- Enabler for process modeling and automation.
- Heterogeneous systems can be integrated

### *Focus on Flexibility and Reuse*

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# Service Oriented Architecture (contd.)

A <u>set of services</u> that a business wants to expose to customers and clients

**Business**

an <u>architectural style</u> which requires a service provider, requestor and a service description.

a <u>set of architectural principles and patterns</u> which address characteristics such as *modularity, encapsulation, loose coupling, separation of concerns, reuse, composable and single implementation*.
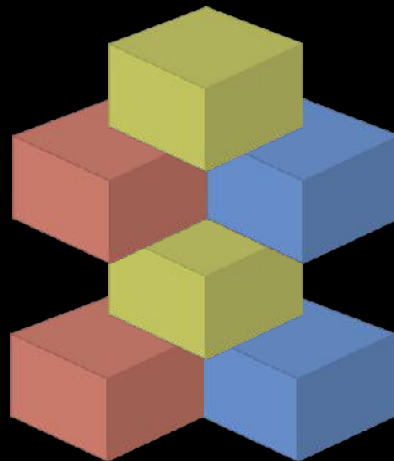
**Architecture**

A <u>programming model</u> complete with standards, tools, methods and technologies such as web services.

**Implementation**

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# SOA component technologies

Web Services
(SOAP,
UDDI,
WSDL)

Servers
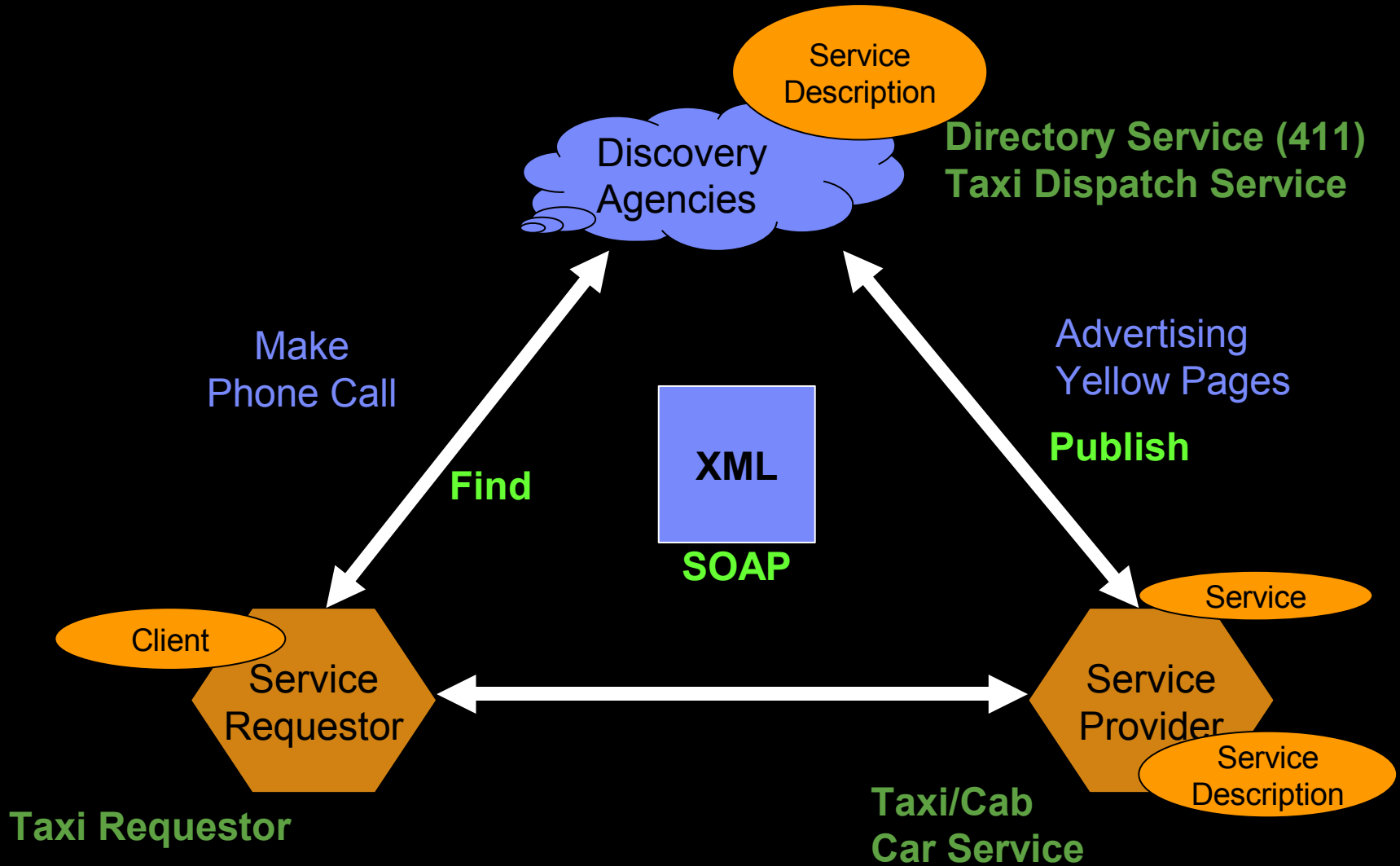(Data, Application,
Web, +++)

XML

Enterprise
Service Bus

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SOA Building Block
# Web Services

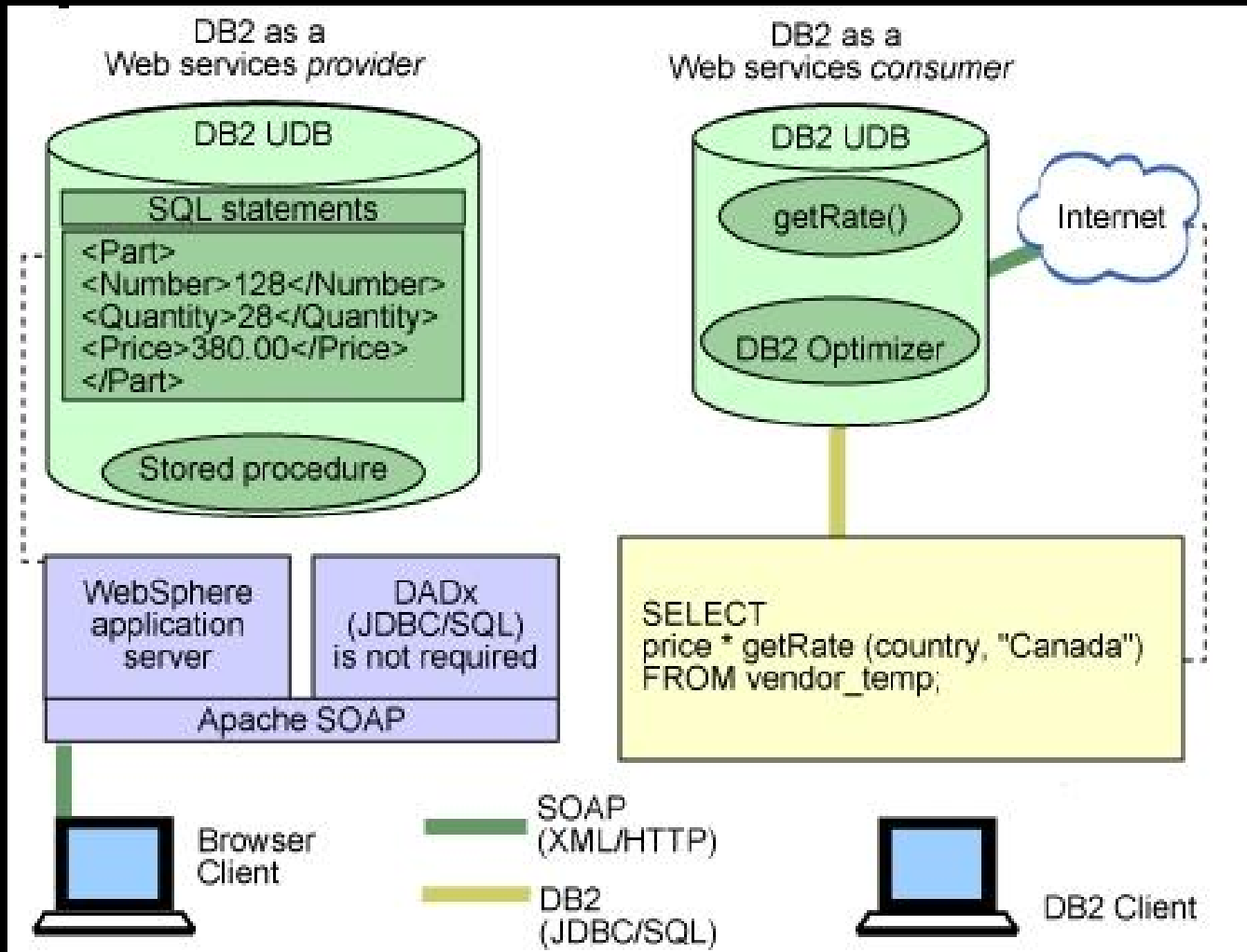*SOA on your terms and our expertise*
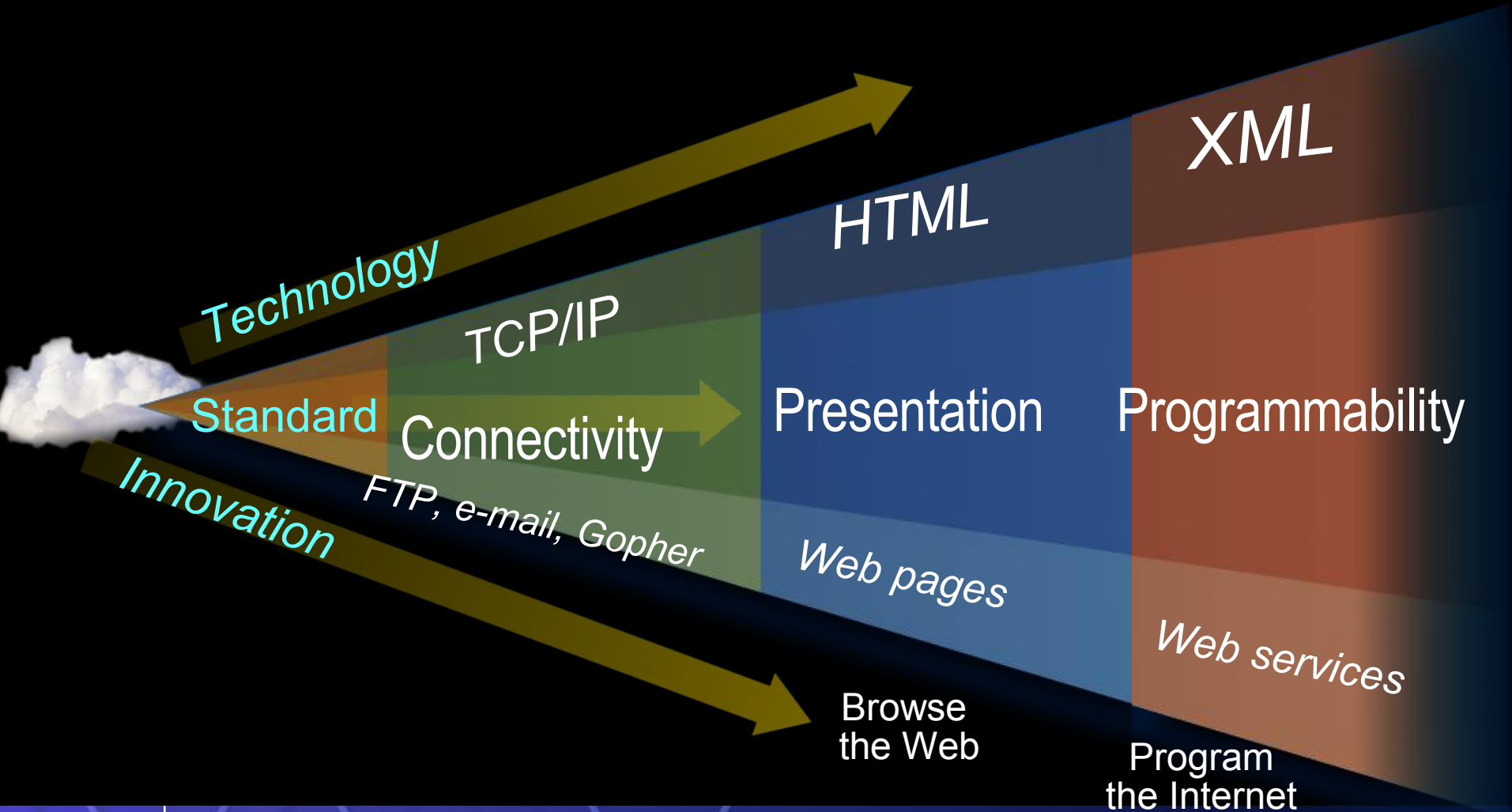
# What Web Services do for you

- **Promote interoperability**
  - Interact between services on any platform, written in any language.

- **Reduce complexity through encapsulation**
  - Service requesters and providers are concerned only with the interfaces necessary to interact with each other, not their underlying implementation.

- **Just In Time Integration**
  - Allow for loose-coupling, which means that interactions between service applications may not break each time there is a change in how one or more services are designed or implemented.

- **Adaptability**
  - Adapt existing applications to changing business conditions and customer needs.

- **Give new life to legacy applications**
  - Provide existing or legacy software applications with service interfaces without changing the original applications, allowing them to fully operate in the service environment.

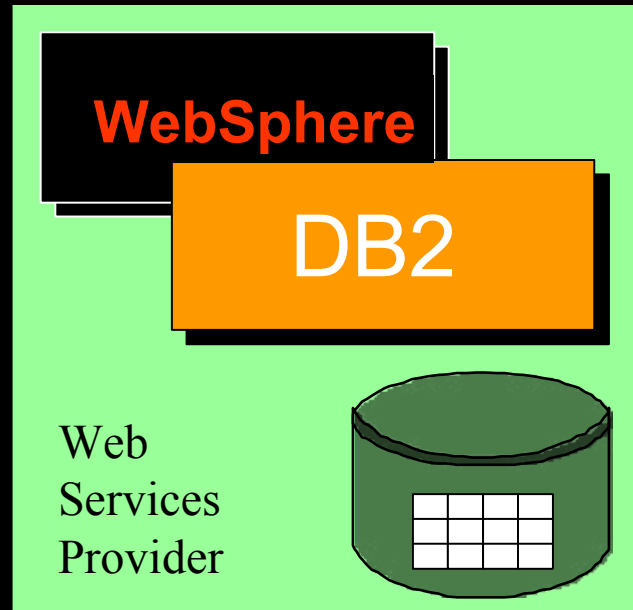*SOA on your terms and our expertise*

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# Web Services

# DB2 and Web Services

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# DB2 as a Web Services provider

- **Rapid Integration Of Existing Information Assets**

- **Easy Development - Tools masks complexity**

**Web Service** → **SOAP** → **WebSphere** / **DB2**

```
<?xml version="1.0" encoding="UTF-8"?>

<DADX
xmlns=http://schemas.ibm.com/db2/dxx/dadx>
<operation name="showemployees">

<query> <SQL_query>

SELECT * FROM EMPLOYEE<

/SQL_query> </query> </operation> </DADx>
```
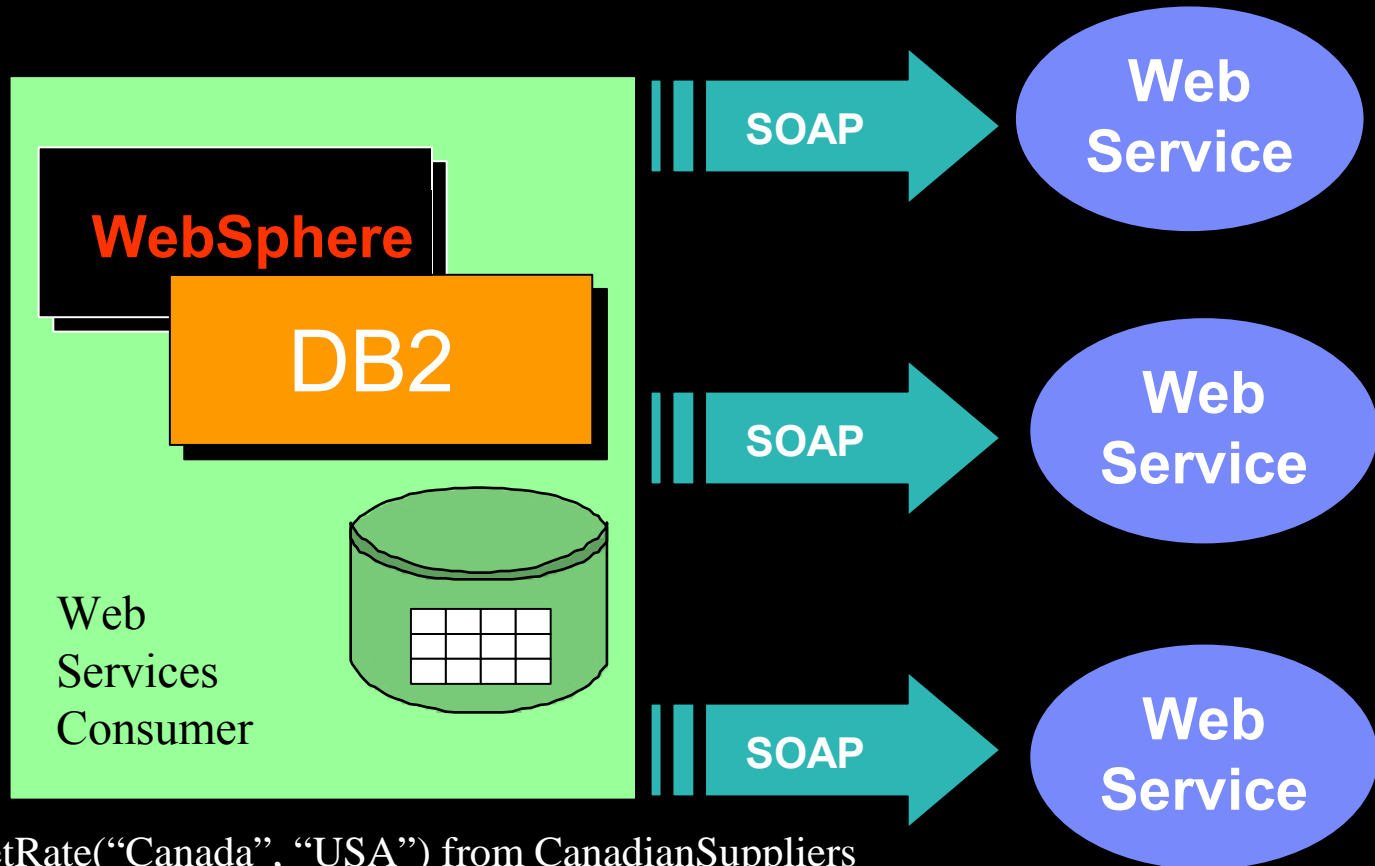
Web Services Provider

**DB2 Managed Assets**
Tables, Stored Procedures
XML Documents; Federated Sources

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# DB2 as a Web Services consumer

- **Real-time Information Integrated into SQL processing**
- **Tools Simply Creation of UDFs for SOAP Callouts.**



select price * getRate("Canada", "USA") from CanadianSuppliers

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# SOA and XML: A Happy Marriage

- **Web Services and SOA owe a debt of gratitude to XML**
  - XML has become standard protocol & payload for the service tier
  - XML lays the groundwork for intrinsic interoperability

- The **XML technology** platform is fundamental to SOA!

- **XML allows enterprises to implement highly standardized service descriptions and message structures**

"SOA leverages XML data representation."

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# XML

- Simplicity

- Separates data from presentation

- Self describing

- Adaptive

- Interoperable

- Standards based

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# XML Schemas by Industry

**Banking**

ISO 15022, SPIFA, SPARCS, ect…　　Society for Worldwide Interbank Financial Telecom. (SWIFT)

IFX Standard　　　　　　　　　　Interactive Financial Exchange Forum, Inc.

OFX Standard　　　　　　　　　　Open Financial Exchange (OFX)

STEP2　　　　　　　　　　　　　Association of European Bankers

MISMO Standard　　　　　　　　Mortgage Industry Standards Maintenance Organization

**Financial Markets**

FIX protocol, FIXML　　　　　　FIX Protocol Ltd.

Message Standard for Post Trade & Pmts　Society for Worldwide Interbank Financial Telecom. (SWIFT)

Market Data Definition Language (MDDL)　FISD/SIAA - MDDL.ORG

Research Information ML (RIXML)　RIXML.ORG

Financial Products ML (FPML)　　Int. Swaps & Derivatives Assoc. IFPML.ORG

**Insurance**

XML for P&C, Life Insurance, etc…　ACORD

**Chemical & Petroleum**

Chem eStandards, CyberSecurity　Chemical Industry Data Exchange (CIDX)

PIDX Standard　　　　　　　　American Petroleum Institute / Petroleum Industry Data Exchange

**Healthcare**

HL7 Standard　　　　　　　　Health Level 7

DICOM Standard　　　　　　　Digital Imaging and Communication in Medicine

SNOMED Standard　　　　　　College of American Pathologists - Systemized Nomenclature of Medicine Division

LOINC Standard　　　　　　　The Regenstrief Institute

HIPAA　　　　　　　　　　　Centers for Medicare & Medicaid Services

SCRIPT, Mfg. Rebate Stds.　　National Council For Prescription Drug Programs (NCPDP)

DoD XML, others　　　　　　　Defense Industry Infrastructure-Common Operating Environment (DII-COE)

# XML Schemas by Industry (contd.)

**Life Sciences**

| | |
|---|---|
| numerous technical standards | Global Grid Forum (GGF) |
| MIAME, MAGE, etc… | Microarray Gene Expression Data Society (MGED) |
| LSID, others… | Interoperable Informatics Infrastructure Consortium (I3C) |
| HL7 Standard | Health Level 7 |
| DICOM Standard | Digital Imaging and Communication in Medicine |
| CDISC Standards for ODM, LAB, ADaM, etc.. | Clinical Data Interchange Standards Consortium |

**Retail**

| | |
|---|---|
| UCCNET including EAN-UCC | Uniform Code Council, Inc |
| many existing standards | Global Commerce Initiative (GCI) |
| ePC Network & standards | Auto-ID Center |
| ARTS XML for Retail (IXRETAIL) | Association of Retail Technical Standards (ARTS) |

**Electronics**

| | |
|---|---|
| PIPs, RNIF, Business Directory, etc… | Rosetta Net |
| Open Access Standards | OpenEDA.Org |

**Automotive**

| | |
|---|---|
| ebXML, and other B2B Standards | Automotive Industry Action Group |
| STAR XML | Standards for Technology in Automotive Retail |

| | |
|---|---|
| eTOM, NGOSS, etc… | **Telemanagement Forum (TMF)** |
| | **The PARLAY Group** |

**Energy & Utilities**

| | |
|---|---|
| IEC working group14, multiple standards | International Electrotechnical Commission |
| CIM | Distributed Management Taskforce (DMTF.ORG) |
| Multispeak | Multispeak2.ORG |

**Cross Industry**

| | |
|---|---|
| PDES/STEP ISO 13003 | PEDS Inc |
| SMPI Standards | Voluntary Interindustry Commerce Standards Association |
| Radio Frequency ID (RFID) | EPCGlobal is a subsidiary of ECCnet |

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# XML Market Projections

- **XML Storage is a high growth area**

Figure VI.2: Market Size by XML Data Store Solution Type



Worldwide XML Market Forecasts (in millions of $)
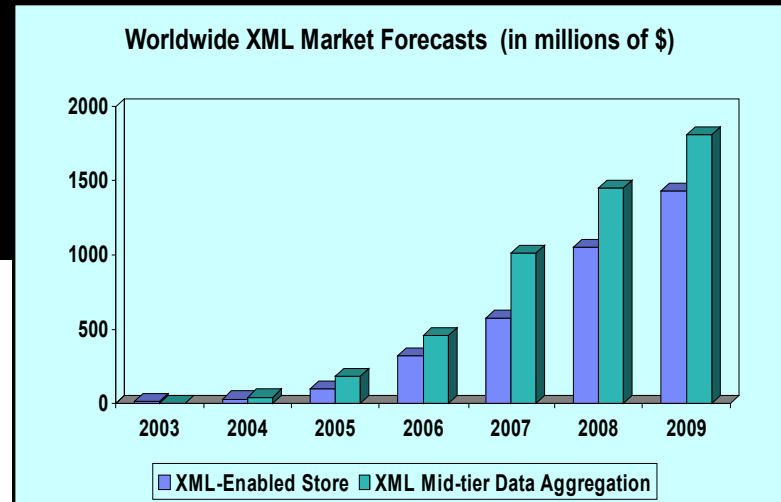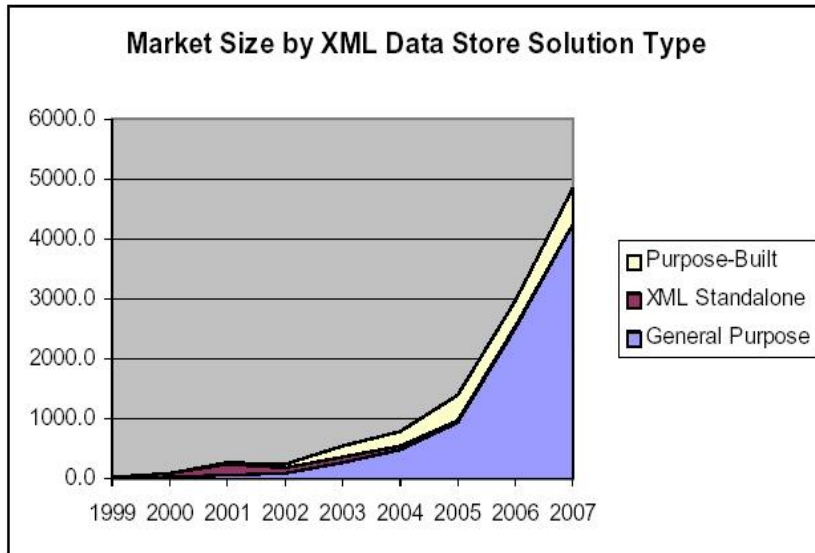


- **XML database revenue to grow at twice the rate of the total database market**

  **- IDC**

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# Why use XML with Databases?

- **Managing large volumes of XML data is a DB problem!**

  - Efficient Search & Retrieval of XML

  - Persistency, Recovery, Transactions, ACID

  - Performance, Scalability

  - …all the same reasons as for relational data!

- **Integration**

  - Integrate new XML data with existing relational data

  - Publish (relational) data as XML

  - Database support for web applications, SOA, web services (SOAP)

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# What is a Native XML data server?

- **Store XML most optimally**
  - … for querying (i.e. XPath, XQuery)
  - … for flexibility (that is what XML is all about)

- **This means**
  - Not storing as CLOB
  - Not storing as object-relational
  - Not shredding in rows and columns
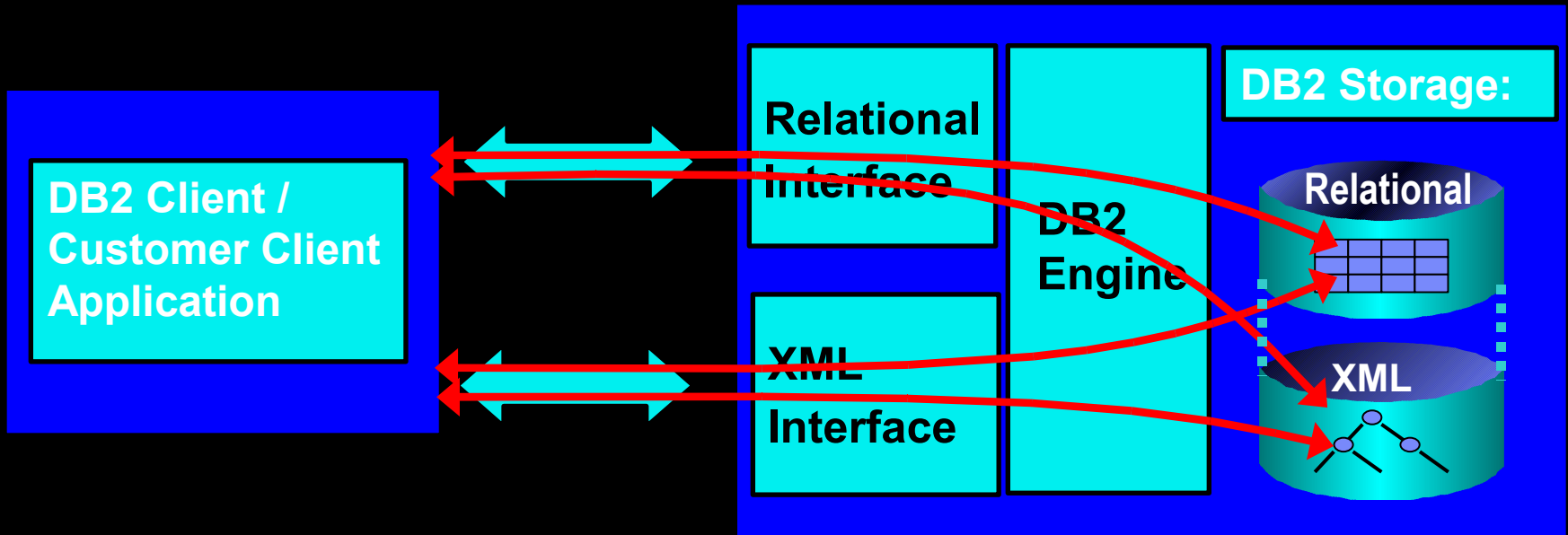  - **Storing it hierarchical**

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# Why a native XML datastore?

- **Lots of data in relational DBs**

  - That will not change…because SQL DBs are fast

- **XML as interchange**

  - Web Services everywhere

- **XML as the transaction artifact**

  - More and more data is represented as XML from the start…

- **Keep XML as XML**

  - Every transformation (e.g. shredding) is expensive

  - And potentially lossy

  - XML might be too complex to shred

  - Hierarchical XML is more the way people think

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# Integration of XML & Relational Capabilities

- Applications combine XML & relational data

- Native XML data type (server & client side)
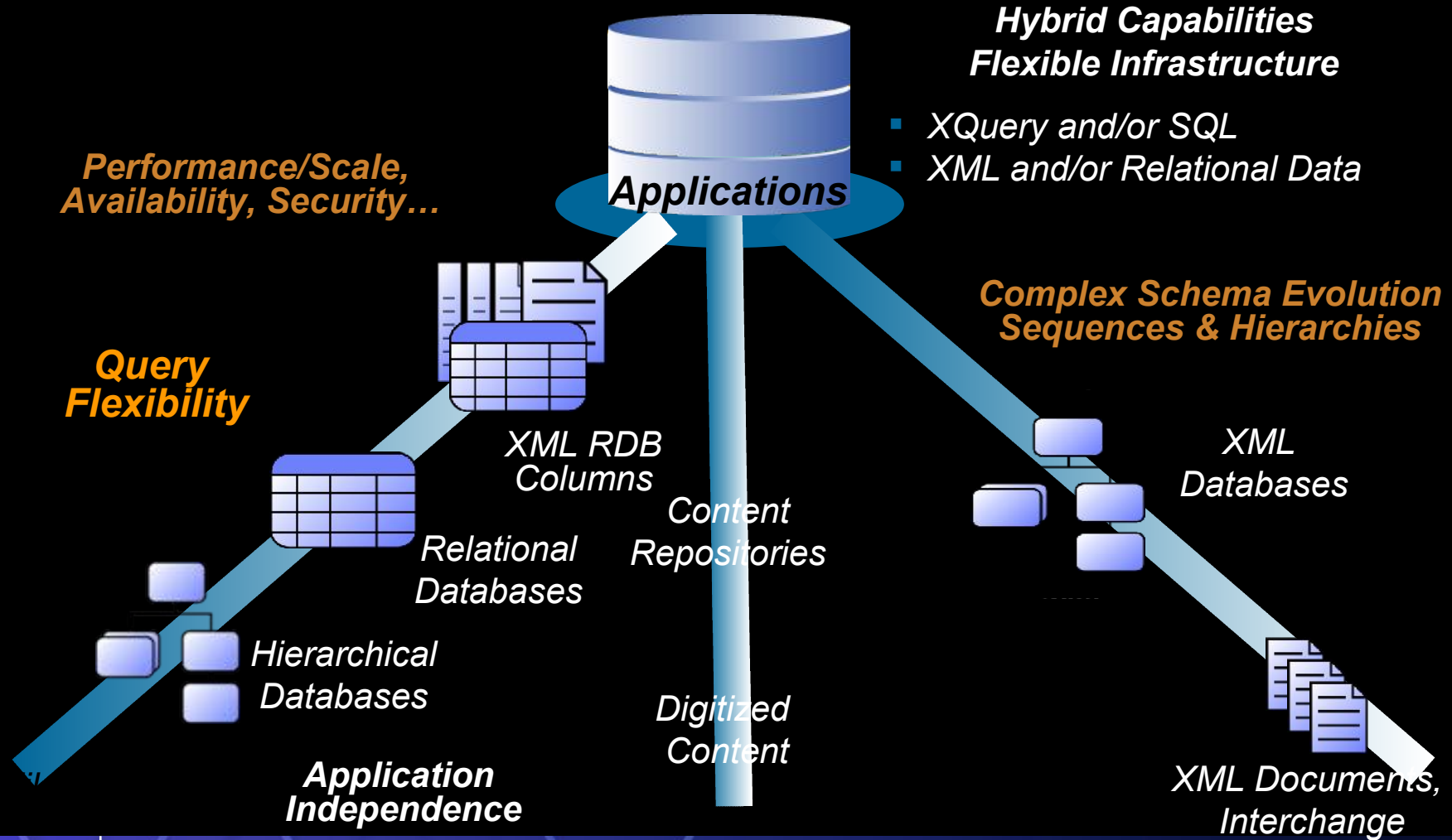
- XML Capabilities in all DB2 components



**DB2 Client / Customer Client Application**

**Relational Interface**

**DB2 Engine**

**XML Interface**

**DB2 Storage:**

**Relational**

**XML**

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# XML in the Database Tier

- SOA/Web Services make XML ubiquitous

- Message structures  becoming increasingly complex

- Traditional shredding techniques don't scale

- Publishing XML a requirement

- Many situations require saving the original message

- Supporting native XML store and query capability is a necessity!

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# The Database Industry Inflection Point
## *XML is Changing the Game*



**Hybrid Capabilities
Flexible Infrastructure**

- XQuery and/or SQL
- XML and/or Relational Data

**Performance/Scale,
Availability, Security…**

**Query
Flexibility**

**Complex Schema Evolution
Sequences & Hierarchies**

**Applications**

XML RDB
Columns

XML
Databases

Relational
Databases

Content
Repositories

Hierarchical
Databases

**Application
Independence**

Digitized
Content

XML Documents,
Interchange

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# XML Support in DB2



**SQL Person** "I see a world class RDBMS that also supports XML"
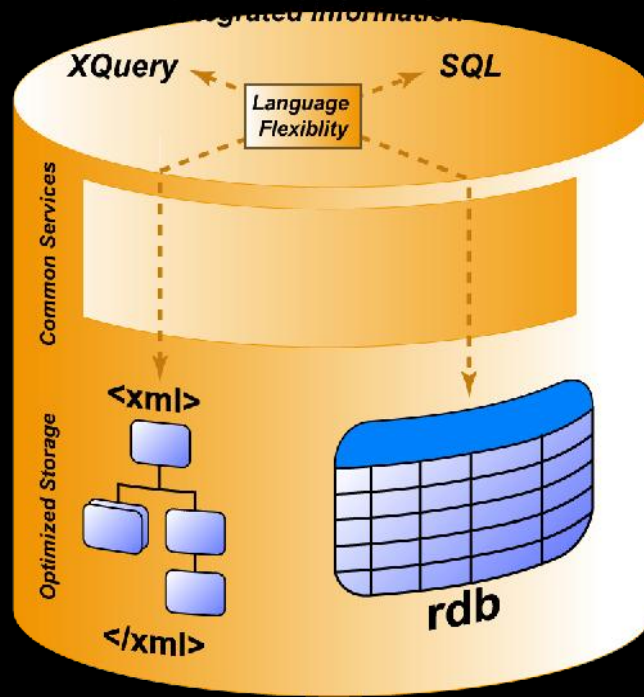
**XML Person...** "I see a world class XML repository that also supports SQL"

## XML integrated in all facets of DB2!

New XML applications benefit from:
- Ability to seamlessly leverage relational investment
- Proven Infrastructure that provides enterprise-class capabilities

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# XML Support in DB2

- **Standards compliant + driving the standards**
  - XQuery, SQL/XML, XML4C…

- **100% integrated in DB2**
  - leveraging performance, scalability, reliability, availability

- **100% integrated with SQL**
  - XML is a new SQL type
  - Access relational and XML data in same statement

- **100% integrated with application APIs:**
  - JDBC, ODBC, .NET, embedded SQL, php (future)…

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# Native XML in DB2

- **Flexibility because that is what XML is all about..**
  - Any document, Any schema, Not just the ones that are mapped to relational tables

- **XML storage: several options:**
  - Native: XML is parsed and stored hierarchical.
  - Shredded: using annotated Schema
  - BLOB

- **Sophisticated XML indexing**
  - "XANDOR join" to evaluate many predicates concurrently

- **Broad XQuery support**
  - Both embedded in SQL and as a primary language

- **Supports Digital Signatures**
  - Signatures can be validated on retrieved documents

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# Native XML in DB2

- **Flexibility**
  - Any document, Any schema, Not just the ones that are mapped to relational tables

- **Native XML storage**
  - XML is parsed and stored hierarchical.
  - Not CLOB, Not shredded

- **Sophisticated XML indexing**
  - To evaluate many predicates concurrently

- **Supports Digital Signatures**

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# DB2 Viper Pure XML Storage vs. the Competition
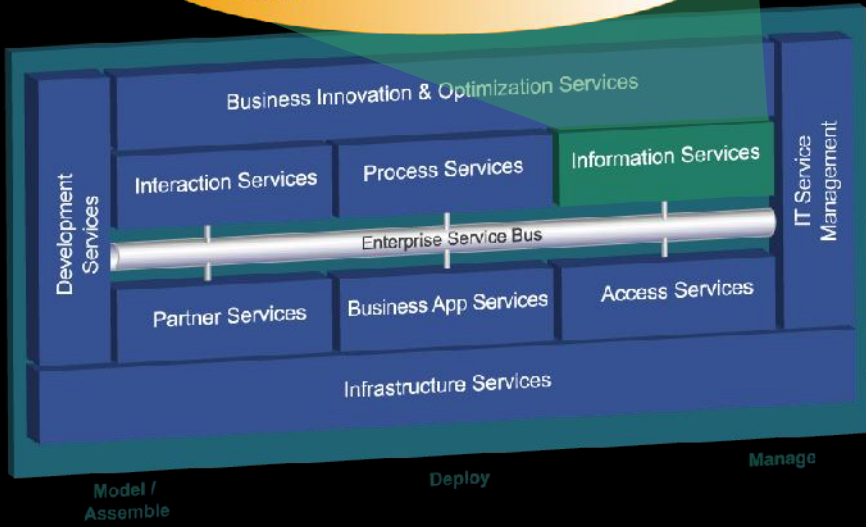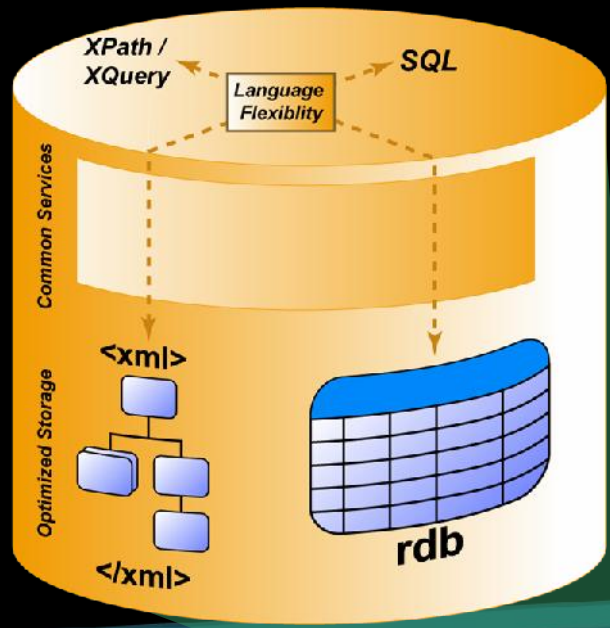


| | Shred | CLOB | XML | Pure XML Hybrid |
|---|---|---|---|---|
| **Information Fidelity** | ✗ | ✓ | ✓ | ✓ |
| **Integration** | ✓ | ✗ | ✗ | ✓ |
| **Schema Flexibility** | ✗ | = | ✓ | ✓ |
| **Performance/Scale** | = | ✗ | ✗ | ✓ |
| **Programming Models** | ✗ | ✗ | = | ✓ |
| **Manageability** | ✓ | ✗ | ✗ | ✓ |

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# Reduce Code Complexity with DB2 Viper

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# Make Changes Easily with DB2 Viper

```
<DEPARTMENT  deptid="15" deptname="Sales">
    <EMPLOYEE>
        <EMPNO>10</EMPNO>
        <FIRSTNAME>CHRISTINE</FIRSTNAME>
        <LASTNAME>SMITH</LASTNAME>
        <PHONE>408-463-4963</PHONE>
        <PHONE>415-010-1234</PHONE>
        <SALARY>52750.00</SALARY>
    </EMPLOYEE>
    <EMPLOYEE>
        <EMPNO>27</EMPNO>
        <FIRSTNAME>MICHAEL</FIRSTNAME>
        <LASTNAME>THOMPSON</LASTNAME>
        <PHONE>...</PHONE>
        <SALARY>...</SALARY>
    </EMPLOYEE>
</DEPARTMENT>
```

**Requires:**
- **Normalization of existing data !**
- **Modification of the mapping**
- **Change of applications**

*IMPROVE BUSINESS AGILITY*

**Phone**

| EMPNO | PHONE |
|---|---|
| | 406-463-1234 |
| 10 | 415-010-1234 |
| 10 | 408-463-4963 |

**Department**

| DEPTID | DEPTNAME |
|---|---|
| 15 | Sales |

**Costly!**

**Employee**

| DEPTID | EMPNO | FIRSTNAME | LASTNAME | PHONE | SALARY |
|---|---|---|---|---|---|
| 15 | 27 | MICHAEL | THOMPSON | 406-463-1234 | 41250 |
| 15 | 10 | CHRISTINE | SMITH | 408-463-4963 | 52750 |

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# Access more information faster with DB2 Viper

# What the industry experts are saying about DB2 Viper

**"First, I think this leaves Oracle and Sybase (as the two vendors with the best current handle on XML) well behind the curve, with Microsoft and the others more or less out of sight. What this release will allow you to do is to build applications that handle both XML and relational data much more easily, without losing any of the richness that this implies, and without degrading performance."**

**- Philip Howard, Bloor Research, The Register**

**"When people go back and check their assumptions, they will see an expansion of what you can do with DBMS because of XML and standards like XML Schema and XQuery," O'Kelly said. "You want to be able to take those data-centric things in XML and put them into a database without a loss of fidelity, and this is one area where IBM is going further than Oracle and Microsoft."**

**- Peter O'Kelley Burton Group, Internet News**

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# Words from DB2 Viper Beta Customers and Partners

*"Our development time using Viper's native XML store is a radical improvement over existing XML 'shred' technology. We are now able to make schema changes in minutes rather than days and will dramatically improve our customer response time."*

- Thore Thomassen, Senior Enterprise Architect for Storebrand

*"We wanted to be able to support queries that just were based on information in the e-records that had not been indexed. The way we have to do that at the moment is not terribly efficient … [Native XML support in DB2 Viper] is going to enable us to store things more compactly and access them easier ... and make it easy for us to be able to ingest and then export data in XML when we're able to migrate to that version of DB2."*

- Dave Richards, Chief Technology Officer for The Research Libraries Group Inc.

*"We are delighted to be partnering with IBM to integrate our platform with DB2 Viper. The combination of industrial strength database management for native XML by DB2 Viper and Skytide's ability to provide direct multidimensional analysis of XML data, removes two key barriers to widespread adoption of XML and the transformation of this data into actionable business information."*

- Joseph Rozenfeld, Vice President of Products for Skytide

*"The upcoming release of DB2, offers leading-edge technology for storing, managing and searching XML data in a secure, highly scalable environment. The new multi-structure hybrid architecture offered by DB2 combines the best of relational database management technology with the best of XML data management."*
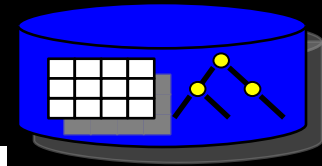
-Tim Harvey, CEO of XAware.

# Selected Partners enabling XML based solutions for DB2 Viper
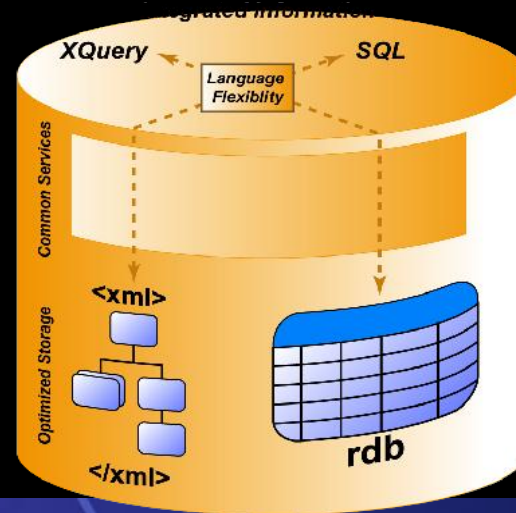
# Nextance
## *Greater Accessibility to Business Information*

## Profile

Nextance provides the ability to actively manage supplier contracts, service contracts, partner agreements, or customer contracts, resulting in lower procurement costs, increased revenue, and decreased compliance risk.

## Challenge

**90% of information related to contracts is unstructured and contains a hidden reservoir of information that is difficult to access**

## Benefits

- Ability to gain rich insight by providing query capability into existing contracts such as; service level agreements, revenue sharing models, and intellectual property ownership, just to name a few
- Complete view of the data is available when relational and XML can be easily joined

## The DB2 Viper Difference

- DB2 Viper facilitates on-the-fly schema changes and extensions without affecting data integrity or requiring existing data to conform to new schemas, thereby effectively handling the unpredictable and continually evolving nature of contracts.

- DB2 Viper also makes it easy for Nextance users to roll out new and extend existing contract types to meet changing requirements with minimal coding, dramatically reducing the need for IT programming resources and regression testing, resulting in lower TCO.

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# Justsystem
## *Accelerated Time to Market*

**JUSTSYSTEM**

### Profile

Ultra Rapid XML Application
Development Platform

### Challenge

**Simplify development and administration
when application requires both relational
and XML data**



### Benefits

- Reduced development time due to
  flexible access to the data using
  XPath, SQL/XML and XQuery
- Reduced administration with single
  data server
- Original XML document preserved
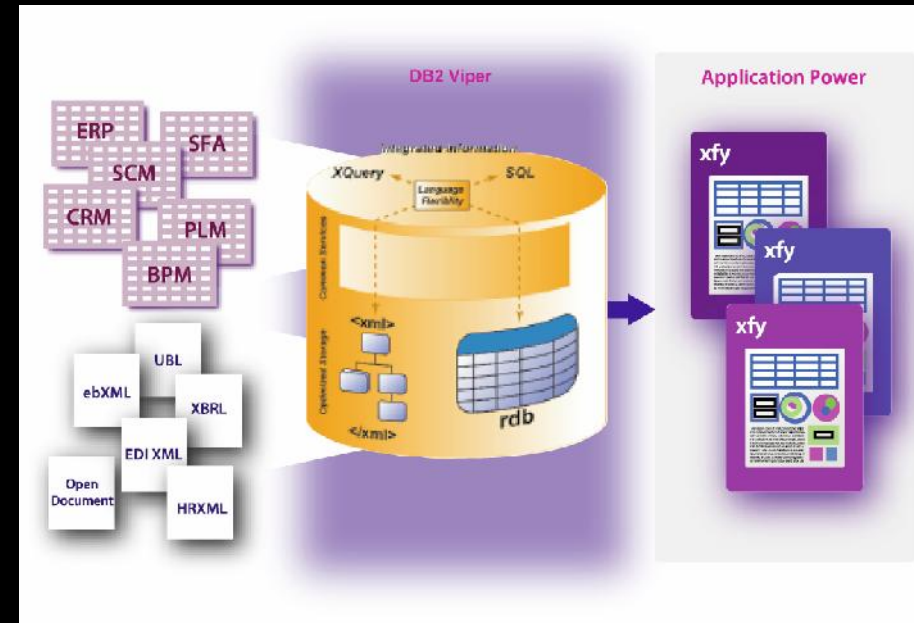
### The DB2 Viper Difference

*"IBM is the worldwide leader in creating
innovative Web services for e-business,
and DB2 Viper is the leading database
management system".*

**CEO of Justsystem Corporation
Kazunori Ukigawa**

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# Recap

- Businesses require flexibility and reuse

- Business flexibility is dependent on IT flexibility

- SOA makes IT flexibility possible

- Web Services and SOA owe a debt of gratitude to XML

- XML allows enterprises to implement highly standardized service descriptions and message structures

- SOA/Web Services make XML ubiquitous

- XML has seeped in the Database tier

- DB2 handles XML as a first class citizen

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# En savoir plus

- **Managing your XML Data**
  - ftp://ftp.software.ibm.com/software/data/pubs/papers/managingxml.pdf

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