Data Services for SOA, WOA and Cloud Computing

-**Eric Samson**
CTO Data Services, Progress Software
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SOA Is Here: Do The Data Architects Care?

The IT industry is continuing its strong adoption of SOA…The major theme is the growing recognition of SOA as an important enabler of business transformation.

—Randy Heffner, VP, Forrester Research

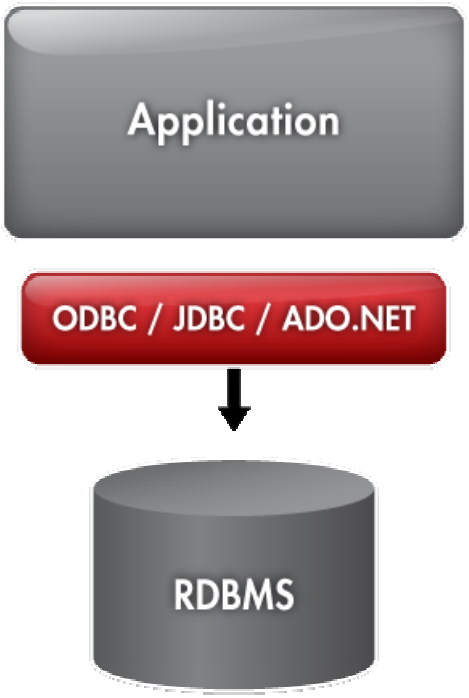
- **Every organization is embracing SOA**
  - Using ESBs for message delivery
  - Communicating with outside vendors through web services for supply chain management
  - Providing customer service portals to customers
  - Exposing mainframe assets as web services
  - Building and deploying an increasing number of services
  - Etc.

- **Ultimately though, do the Data Architects care?**

Today, SOA Data Access Is Layered On Top Of Traditional Data APIs

- **Traditional Data APIs:**
  - ODBC
  - JDBC
  - ADO.NET
  - OLE DB
  - OCI, ct-lib, embedded SQL, etc

- **These all roughly do the same thing**
  - APIs to connect to databases, issue queries, return data
  - Fast and scalable access to relational data
  - Reuse legacy business knowledge



Characteristics of Traditional Data Access APIs vs. SOA Characteristics

Traditional Data Access

- **Tightly coupled**
- **Complex State Machine**
- **Connection based**
- **Well defined API**
- **Mostly synchronous**
- **Relational model driven**
  - SELECT then Fetch model

SOA

- **Loosely coupled**
- **Stateless**
- **Disconnected**
- **Interface contracts**
- **Synchronous / Asynchronous**
- **XML data interchange – any data model applies**

Deal Breakers

- **SOA accesses information from aggregated views of multiple sources. Likewise, SOA is agile – services reuse is encouraged across the enterprise.**
  - The traditional data access strategy is to write code that will be deployed in an application specific manner against a single data source.

- **The web is disconnected.**
  - Deployed applications in the enterprise today are connected.

Deal Breakers

- **SOA <u>can</u> be layered on existing data frameworks, in the same way that HDTV can be used with analog cables, but…**

Let's Re-examine SOA 2008

+ Allows reuse of existing software assets

+ Provides architecture for disparate IT systems

+ Meets goals of abstracted business processes, programming paradigms, architectures, etc

+ Cloud Computing increases the number of off-premises data sources accessed through services

+ WOA emerging as an implementation style of SOA concepts

SaaS / IaaS / Cloud

- **"Three years ago, we never would have thought about storing our key information – our customer data – outside our firewall. Now we use *salesforce.com* and our customer data is stored somewhere out in the internet cloud."**

- **Business objects, like 'customer', are aggregate views of data inside and outside of the firewall.**

- **Adapting Enterprise applications to use data in the cloud will become more and more important.**

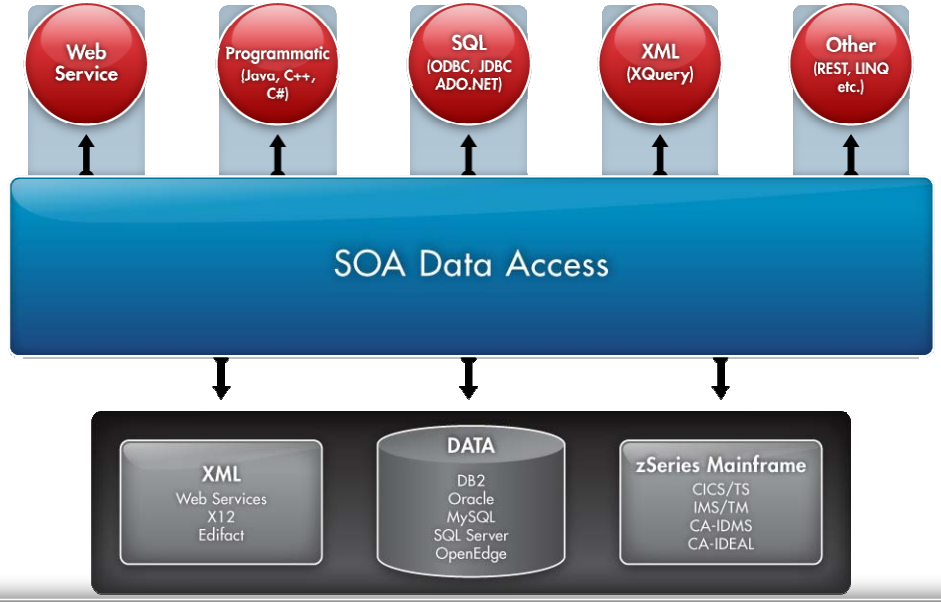
- **Database-as-a-Service, new cloud databases (BigTable, AmazonDB…).**

WOA: simple SOA on the Internet

- **SOA is a way of thinking, different implementations are possible.**
  - Multiple factors favor emergence of an implementation style based on Internet protocols: simplicity, Web 2.0, Rich UI…
- **WOA could be more data-centric than process-centric**
  - Each individual "resource" is encapsulated through simple CRUD-oriented, standardized HTTP verbs (PUT, GET…)
- **WOA could lead to a huge number of fine-grained services**
  - Need to quickly respond to user demands: data mashups.
  - Complexity is moving from service design to service composition.
  - Requires adaptive, dynamic technologies and semantic metadata to manage this new kind of complexity.

SOA Data Access

- **Provide access to numerous data sources (relational, XML, EJB, Web Services, Mainframe, etc.).**
- **Provide ways to access data from various client types (AJAX, HTML, Java, C#, Web Services, C++, etc.).**
- **Provide consistent access to all data sources using a variety of standardized query languages (SQL, XQuery, JPQL, LINQ, etc.).**
- **Provide standard transport mechanisms for data objects in a disconnected fashion for a loosely coupled solution (SOAP, REST, etc.).**



Data Services

- **A Data Service is a (Web) service that provides a business-friendly view of data that is built from multiple data sources throughout and outside the enterprise and can be naturally integrated with other (Web) resources.**

- **Data Services must be reusable and provide flexible access to corporate data.**
  - That is, provide simple usage patterns but enterprise level QoS support (distributed transaction support, scalable, high performing, enterprise security, caching).

- **Consumers of Data Services are other Data Services, business processes/services, mashups, transactional applications and portals to end users.**

Change … Customer Pains

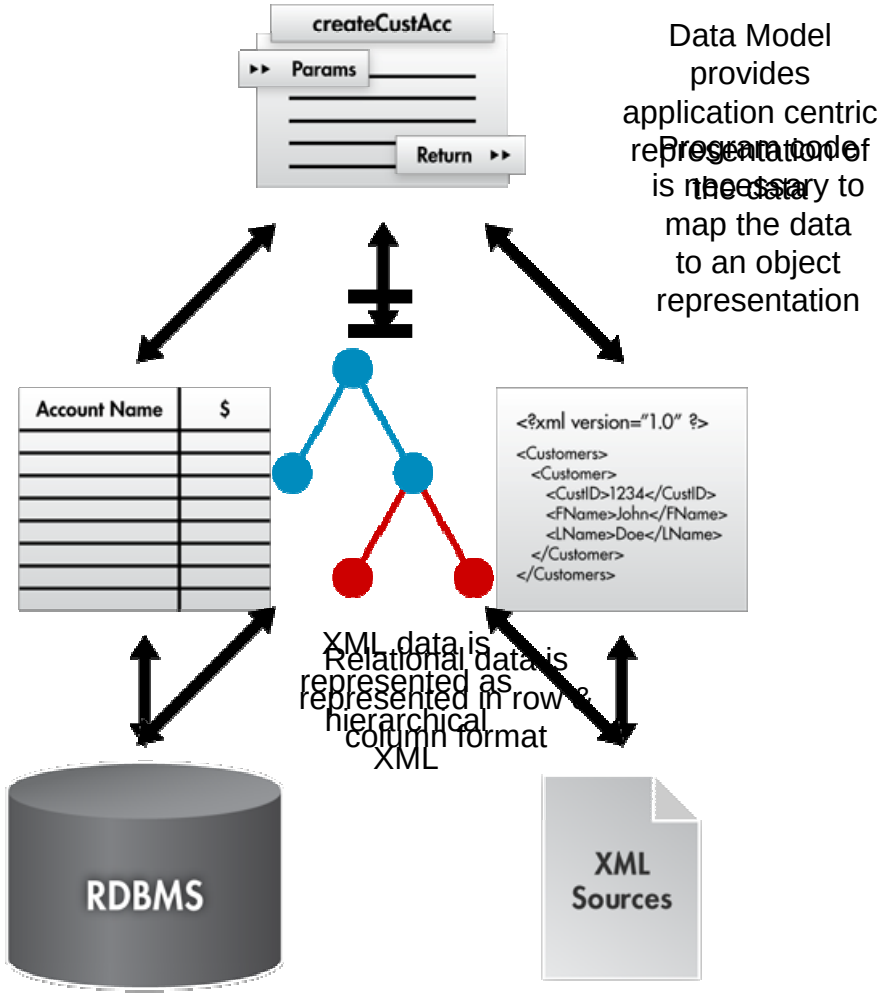
- **“Any change, even a change for the better, is always accompanied by drawbacks and discomforts “, Arnold Bennett**
- **“We’re mostly read only – but our business can’t exist without adding new customers – and that’s a write operation. If my architecture can only read then I need a new architecture”**
- **“Our teams need to focus on business problems and not how to best access data sources. We need consistent data services that support SQL, XQuery, JPQL, and work in Java, .NET, or Perl environments”**
- **“We’re not going to rewrite all our existing applications using SOA. They key is making our new applications work with our existing applications”**

Data Services Concepts

- **Business Object Model (BOM)/Common Data Model**
- **Service Data Objects (SDO)**
- **Data Access Service (DAS)**
- **Data Services Platform (DSP)**

Data Model

- **Because agile Data Services aggregate data across diverse data sources and other Data Services, the data model has become more important than ever**
  - Today, most enterprise applications and third party products operate in data silos that preclude problems with data aggregation.
  - SOA implies distributed access to all data sources
    - Including access to external data sources like SaaS, Cloud…



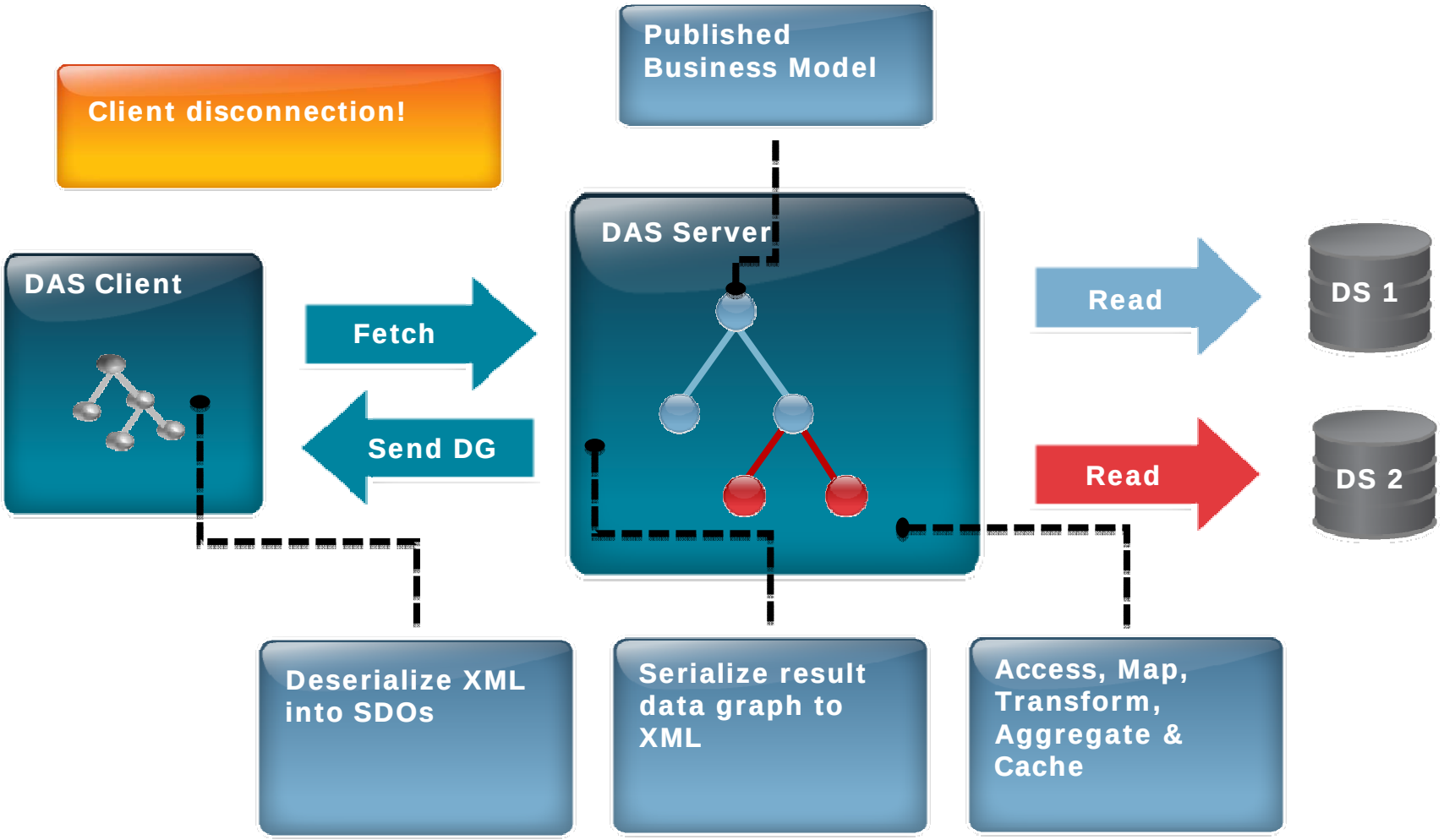
SDO

- **SDO is a unified and consistent data access methodology for heterogeneous data sources**
  - Simplified programming model for application programmers
  - Enable Tools and Frameworks to work consistently across heterogeneous data sources in a web environment

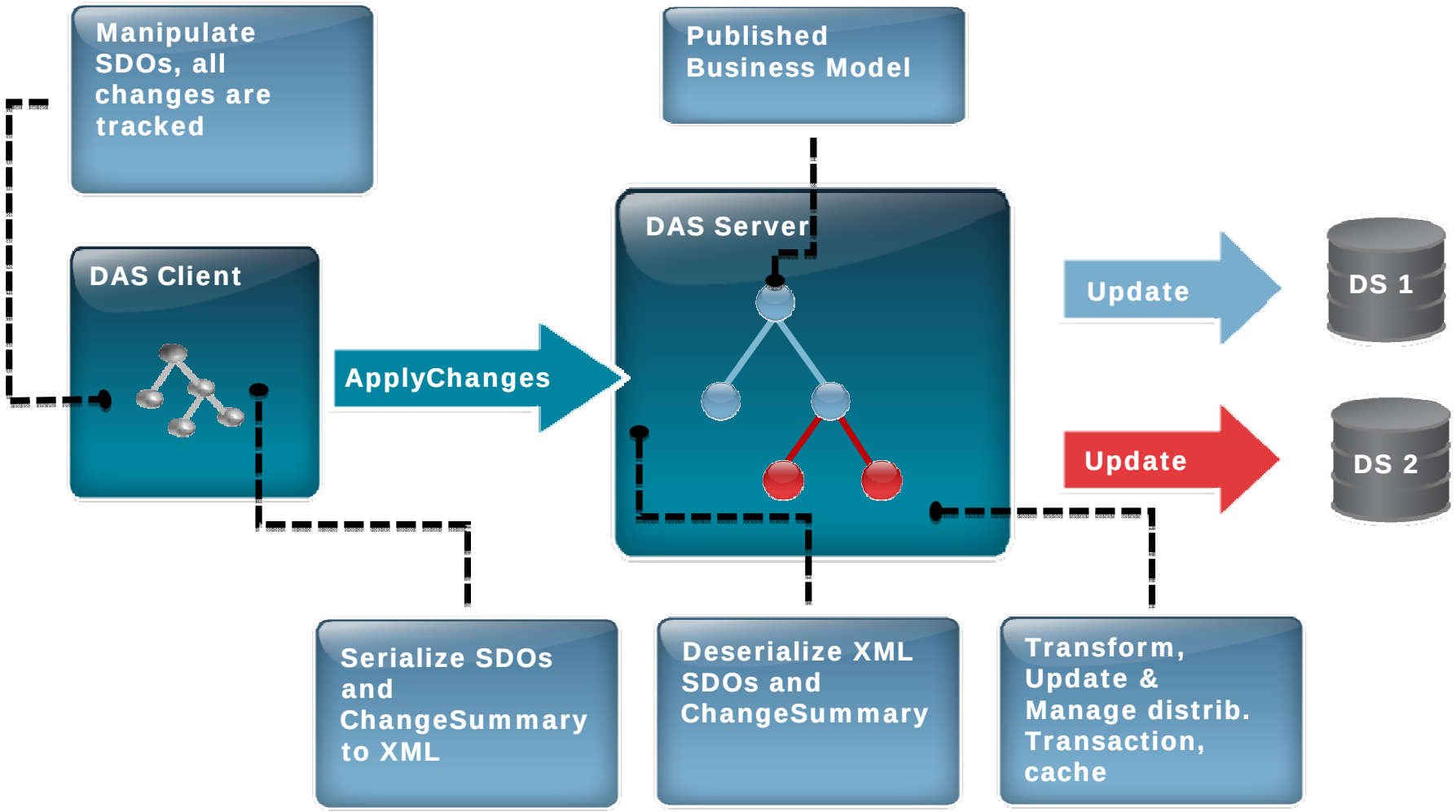
- **To become the standard for Data Access in a Service Oriented Environment (SOA)**
  - SDO will be the standard for SOA just as ODBC is the standard for C++

- **OASIS standard supported by Oracle, BEA, DataDirect, IBM, SAP, etc.**

How SDO/DAS works…



How SDO/DAS works…

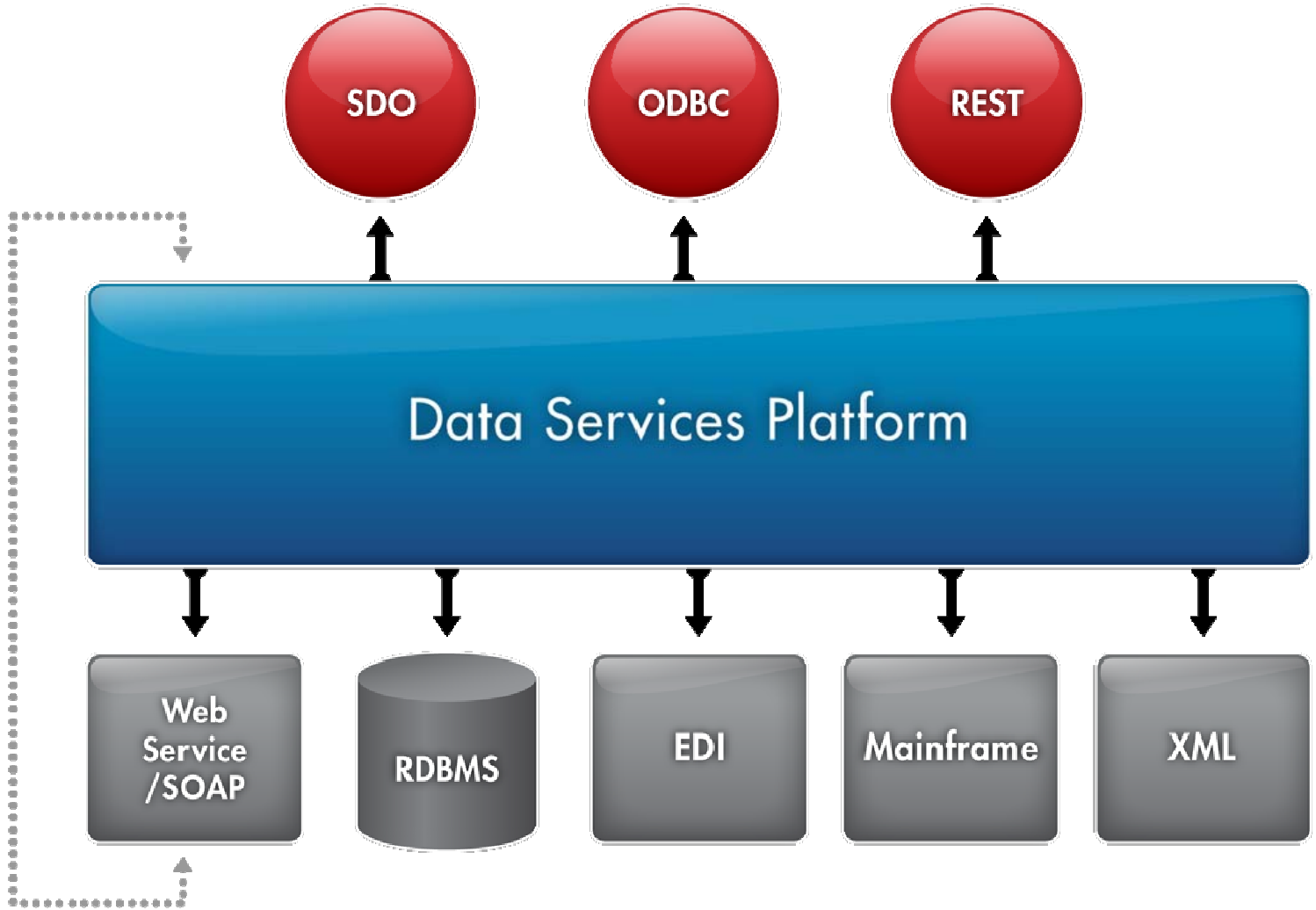


Data Services Platform (DSP)

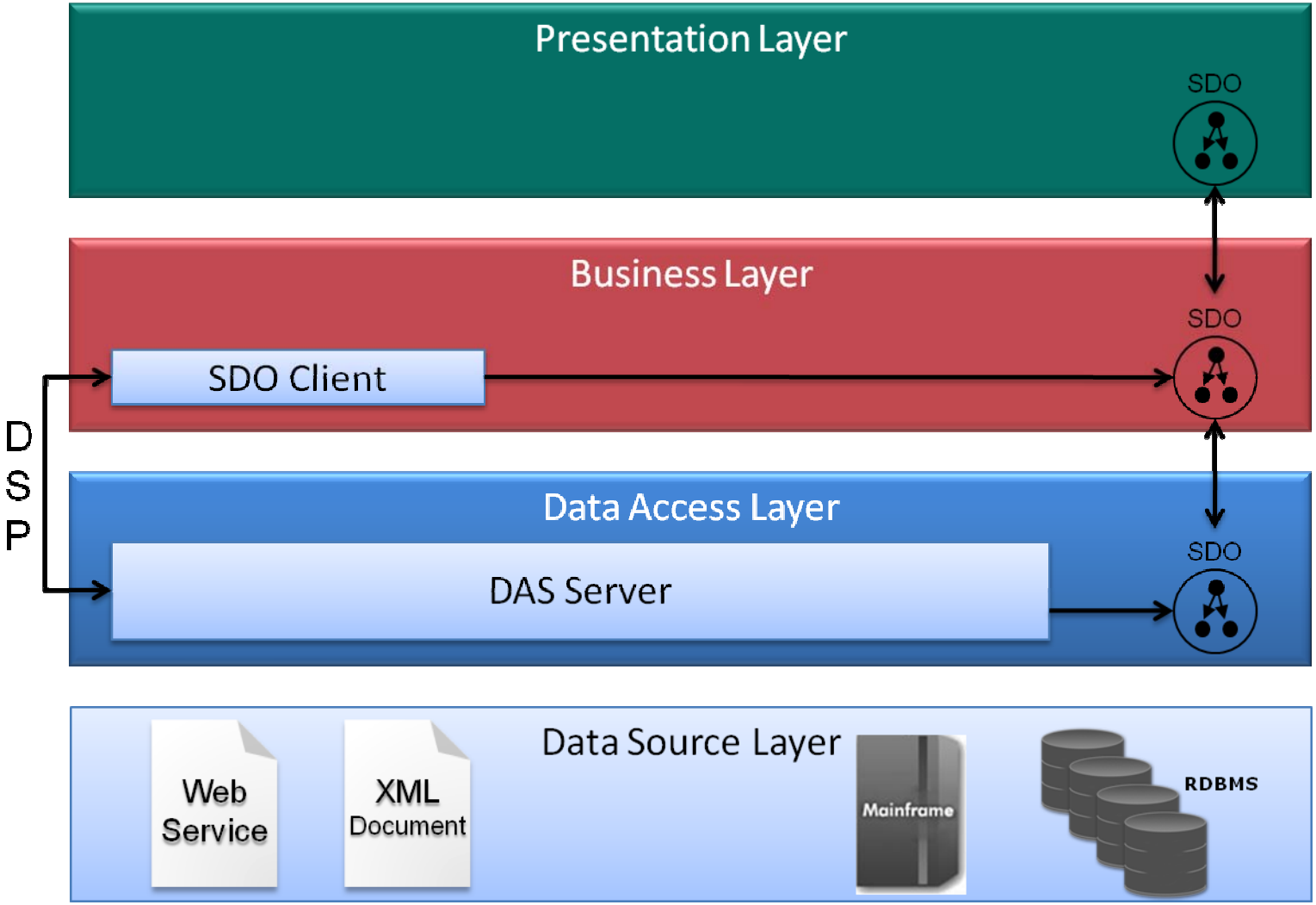
- **A Data Services Platform (DSP) provides a separate layer to encapsulate and simplify all data access**

- **Benefits of accessing data through DSP (versus directly):**
  - Separate Data Access and Business Logic – best of breed SOA
  - Business Object Model versus Physical Database Model
  - Unified / Standardized client APIs independent of data sources
  - Disconnected data access model support
  - Any data can be exposed as a Web Service
  - Quality of Service: Caching, Security, Query Optimization, distributed transaction management, etc.

Data Services Platform



Architectural View of Data Services



Summary

- **Data Services are not the "same old, same old" data access we've been used to.**
- **Changes around Data Services allow business applications to do things they haven't been able to do before.**
- **Careful planning should be done when jumping into SOA.**
  - Platforms are needed to isolate from technology changes at both sides (data source and data consumer) and support and wide range of standards
  - Dynamic data services are key: support for any new arbitrary business requirements or any new data source with no redesign.

Questions?