Delivering high-value
SOA information services.

Contents

Introduction

This white paper explains how information-integration services and master data services are coupled to deliver SOA business services.

Business agility requires a new approach from IT

From competition to compliance, today's business world is faced with a constant onslaught of change. The causes of this change can be any of a number of factors, such as competition, regulation or channel instability (see Figure 1), but the organization's ability to respond is often constrained by the capabilities of its application systems. These systems are often tightly coupled to existing (or even past) business processes and frequently are not clearly aligned to support today's business objectives.
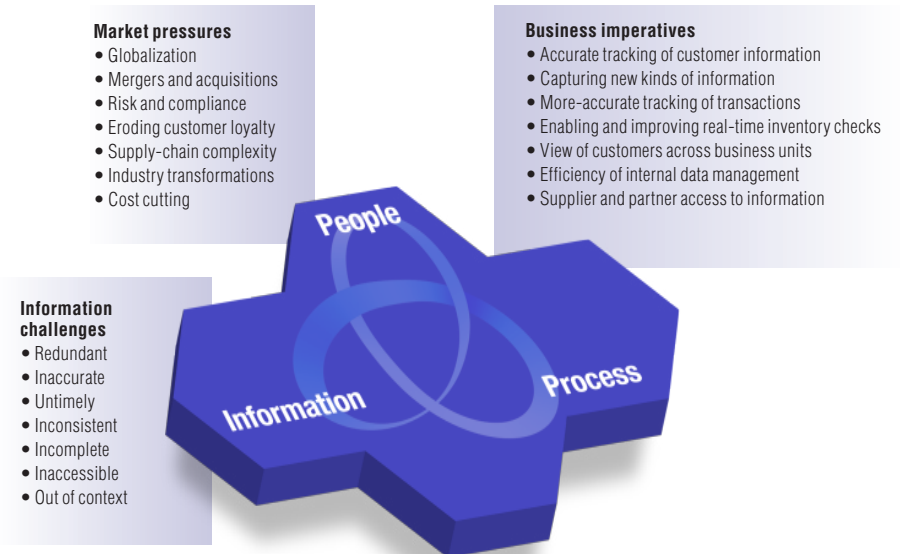
Market pressures
- Globalization
- Mergers and acquisitions
- Risk and compliance
- Eroding customer loyalty
- Supply-chain complexity
- Industry transformations
- Cost cutting

Business imperatives
- Accurate tracking of customer information
- Capturing new kinds of information
- More-accurate tracking of transactions
- Enabling and improving real-time inventory checks
- View of customers across business units
- Efficiency of internal data management
- Supplier and partner access to information

Information challenges
- Redundant
- Inaccurate
- Untimely
- Inconsistent
- Incomplete
- Inaccessible
- Out of context

Figure 1. Information—a strategic asset

Merger and acquisition activity frequently exacerbates the situation by creating silos, divisions integrated vertically but not horizontally, within the rest of the enterprise. Silos create inefficiencies related to duplication of functionality and are a significant inhibitor to business agility. Not only do they often use different technologies, but they are also likely to use different data representations and to provide functionality packaged in fundamentally different ways. In a situation where organizations need to be flexible and agile to respond to market pressures and opportunities, as well as regulatory requirements such as those imposed by the U.S. Sarbanes-Oxley Act, application silos can become a major inhibitor.

Keeping pace with these requirements demands flexible business processes and IT systems that can accommodate rapid change. Information in all forms and from all sources – including structured information residing in application databases, and unstructured information in e-mails, documents, specifications and other sources – must be complete, accurate and consistently available to those who need it, when they need it. Organizations are turning to service oriented architecture (SOA) to help address this challenge.

Supporting the business with a flexible information infrastructure
SOA breaks applications down into component services and then enables these services to be joined together as composite applications that can be rapidly constructed to meet the needs of changing business requirements. Using this approach, you can develop SOA information services to deliver the information used to empower the people and support the dynamic processes that drive your organization toward business optimization.

Your organization needs to have a holistic view of its information across multiple applications and lines of business. Two categories of information services in an SOA enable IT to satisfy this requirement:

- Master data management (MDM) *delivers master data services that provide a consolidated view of all relevant information about a specific business entity, such as customer or product. The data might be sourced from multiple systems, transcending both technology and business silos and delivered to all data consumers, processes and applications. All consumers, regardless of channel, receive a consistent, but tailored, information set.*

- Information-integration services *enable the data to be sourced from multiple platforms and systems. In delivering a federated view of this data to your MDM platform, information-integration services add value by delivering a number of services that enable the underlying data to be better understood, cleansed, transformed and enriched.*

In addition to this consolidated view of information, an SOA information-services platform enables the delivery of rich analytical information to the business. These analytical services can deliver insights from a number of sources, such as from the dynamic warehouse or from entity analytic solutions, on unstructured information. An example of this might be the analysis of a call-center log looking for trending information.

Master data services
Organizations have long understood that there are a set of core entities related to their businesses about which they want to maintain information. *Master data* is the enterprise-wide data and facts describing these key business entities. The many different types of master data include the identity, profiles and relationships among customers, employees, partners and suppliers, as well as the details, facts and hierarchies of products, items, materials, and bills of materials. Master data could also cover locations, entities, devices and equipment. It is essential that this information be managed and made available at an enterprise level, transcending line-of-business (LOB) boundaries and supporting multiple channels.

What are MDM solutions?

The source data related to master-data entities typically resides in a number of systems and databases, which hold only the subset of information that is relevant to the particular system. The MDM solution consolidates the view of this data across all of these disparate systems. It enables the enterprise to govern, create, maintain, use and analyze consistent, complete, contextual and accurate master-data information for all stakeholders, such as LOB systems, data warehouses and trading partners. It also provides a customizable framework of components that control the life-cycle management of master data, and its quality and integrity, and deploys services to control the consumption and distribution of the data (see Figure 2).
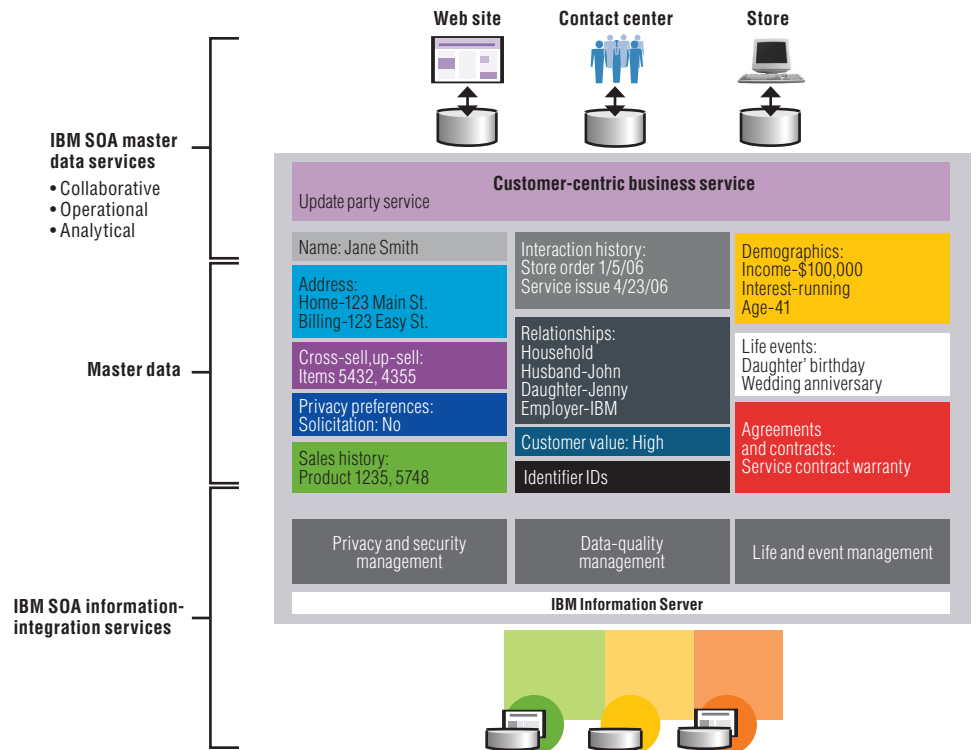

IBM SOA master data services
- Collaborative
- Operational
- Analytical

Master data

IBM SOA information-integration services

Web site | Contact center | Store

Customer-centric business service
Update party service

Name: Jane Smith

Address:
Home-123 Main St.
Billing-123 Easy St.

Cross-sell, up-sell:
Items 5432, 4355

Privacy preferences:
Solicitation: No

Sales history:
Product 1235, 5748

Interaction history:
Store order 1/5/06
Service issue 4/23/06

Relationships:
Household
Husband-John
Daughter-Jenny
Employer-IBM

Customer value: High

Identifier IDs

Demographics:
Income-$100,000
Interest-running
Age-41

Life events:
Daughter' birthday
Wedding anniversary

Agreements
and contracts:
Service contract warranty

Privacy and security management | Data-quality management | Life and event management

IBM Information Server

Figure 2. Master data services—making current, accurate and complete customer data available to all systems and channels

A robust MDM solution provides a multiform dynamic framework in that it enables the management of multiple domains (customers, products, accounts, suppliers and locations) in three usage categories:

- Collaborative MDM *manages the process of creating, defining and synchronizing master data. The focus is on the definition of master data and is built on top of SOA information-integration services.*
- Operational MDM *delivers SOA business-information services to other applications and processes, enabling them to access and manage the master data.*
- Analytical MDM *provides accurate, consistent and up-to-date master data to data warehouses and feeds business-intelligence insight data back into the MDM system.*

Advantages to using an MDM approach
A common problem for knowledge workers is that they can get different and conflicting answers from two different applications, even when the applications use the same data sources. This situation can lead to frustration, a lack of trust in the information knowledge workers see, and eventually attempts to second-guess what they are told. The next section of this white paper discusses what causes these situations.

Before SOA, integrating data involved a developer writing code that accessed, transformed and cleansed data from each source. The developer wrote the code according to the application requirements. Coding involved knowledge of each interface for the data, and written in this way, it is called *tight coupling*. Consider the case when a different developer creates data access for a different application. It also accesses, transforms and cleanses data from the same three sources. However, the rules for this integration are written differently, which means that there are different results in the second application. It doesn't have to be that way; it's just that the developer did it in a way that made sense to him, and it happened to be different from the way the first developer did it.

For IT, the circumstance causes higher maintenance costs, because if one data source changes, two sets of code must be changed. If developers forget to do both, one application might fail. And if there is a need to add or change information sources and formats, it must be changed in all places that use the sources.

With SOA, you can centralize and standardize the approach to data integration for processes. In this approach, access to master data can be packaged as a service to business processes, so that consistent, manageable information is made available to every process in a standardized way.

This approach provides:

- *A system of record for all master data that transcends organization boundaries and systems*
- *Consistent definition and packaging of data from process to process*
- *Consistent rules applied to the data*
- *Improved data quality*
- *Improved governance*
- *Centralized control and maintenance, resulting in a greater potential for reduced IT costs*
- *Services that are built, maintained and governed by domain experts, enabling them to be used with confidence*

Delivering SOA business services from an MDM platform

The IBM Master Data Management application infrastructure is designed with more than 600 business services to help reduce implementation time and costs, and accelerate time to value. Typical characteristics of SOA business services are that they:

- *Represent a business function.*
- *Are offered at a granular, but functional, level.*
- *Can be offered at a larger-grain level as an aggregate of fine-grain services (for example, UpdateCustomerAddress comprises UpdateCustomerStreetAddress, UpdateCustomerBusinessAddress and UpdateCustomerResidentialAddress).*
- *Can be invoked in various ways, such as through Web services and message queues.*
- *Can be combined with other services into a composite transaction.*
- *Permit you to customize business logic within the service.*

IBM Master Data Services comprise both large-grain services (organizational function such as AddCustomer) as well as fine-grain services (UpdateAddress), which can be exposed and configured based on the needs and requirements of the consuming application, system or business process.

SOA information-integration services link heterogeneous sources

Providing a layer of information-integration services for MDM business services, as well as other requesting applications, can bring enormous productivity benefits to the IT teams tasked with delivering solutions. You can dramatically improve information consistency and relevancy by reusing existing integration services.

With the ability to understand, cleanse, transform and deliver trusted information, and deliver all of this functionality as a service, SOA information-integration services delivered by platforms such as IBM Information Server can:

- *Map business meaning to technical data sources.*
- *Discover and cleanse information integrity and redundancy issues.*
- *Match identical records across different systems and link them together.*
- *Transform data into the right format and context.*
- *Provide read-and-write capabilities across heterogeneous information sources.*

Enabling organizations to access and use information in new ways can facilitate their drive to innovate, increase operational efficiencies and reduce risk. The IBM information-integration platform forms the base on which higher-level SOA business services can be delivered from applications such as master data management, business intelligence and systems that process unstructured content, such as memos and forms.

SOA analytical services deliver business insight
Historically, efforts at generating business insight were focused on querying and reporting about financials, sales figures and other previously captured data to understand what had happened. The next wave introduced technologies such as online analytical processing (OLAP) and data mining for historical analysis to understand why things happened and recommend future action for improved merchandising, inventory management and operations. However, companies are now looking for new ways to make available and analyze information on demand to optimize each transaction, in the call center, in the field, when helping customers or when taking orders.

The SOA infrastructure makes it possible to use real-time analytics as part of your everyday processes, taking advantage of knowledge buried in unstructured information, and providing real-time access to aggregated, cleansed information. Figure 3 shows an example of an analytical service that delivers insight from an analysis of unstructured data captured in a call center. IBM OmniFind™ Analytics Edition analyzes a call-center log and populates the results in a data warehouse. This insight is made available immediately through an SOA information service deployed by IBM Information Server to the people and applications responsible for that part of the business.
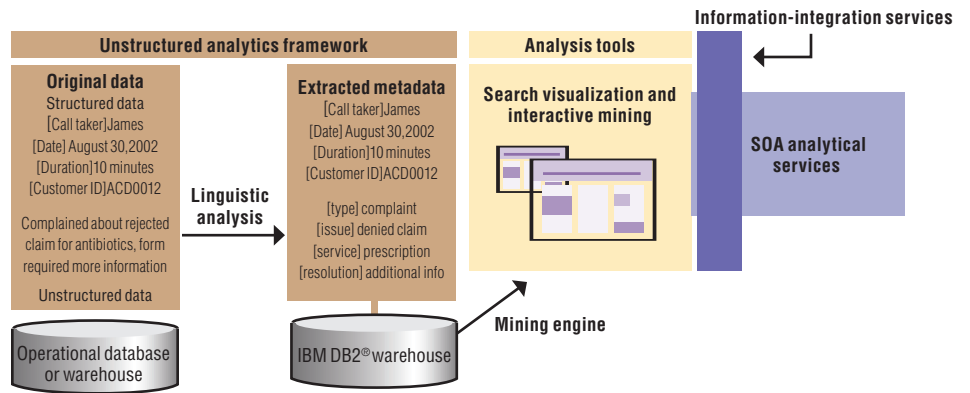
Figure 3. Example of delivering SOA analytical services

A similar approach can be used to build services to support business process management (BPM) and enable dynamic processes, portals, dashboards and scorecards to be updated in real time on changing business indicators, performance trends and alerts. SOA analytic services become the foundation for delivering the information required to optimize business operations.

Industry models create contextual relevance
SOA promises to help break down the silos of information across an organization and make it more consistent and available. To break these horizontal boundaries — or silos — it is important to define a common vocabulary (or set of semantics) for information and activities across the enterprise. This vocabulary is usually built and communicated through a set of models which can be used by developers and consumers of information services. Industry models such as IBM Information Framework can form the basis for this exercise.

IBM Industry Models
IBM Industry Models provide structured and deployable business content for a growing number of industries, including banking, insurance, telecommunications and retail. Figure 4 shows the context of how these models can be used to streamline an SOA development.
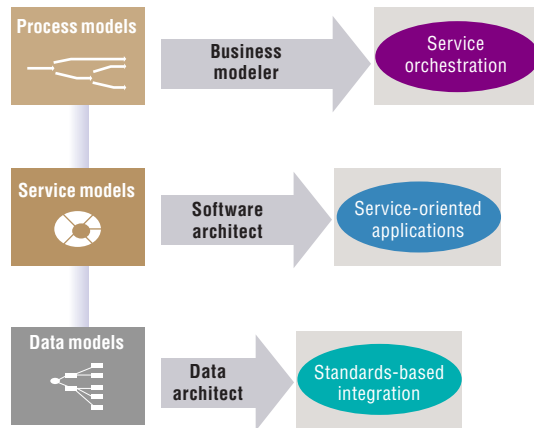
Figure 4. Industry Models — linking business intent and IT implementation

IBM Industry Models, which include process, service and integrated data models (operational and informational), can add value to many of the activities associated with planning and deploying SOA projects:

Process models
Process models describe the most-important step-by-step processes within an organization, ranging from front- to back-office functions, such as sales |and marketing management, payments, lending and human-resources (HR) administration.

Although many organizations want to reengineer and standardize their core enterprise-wide business processes, it can be difficult to know where to start. Many business processes that have essentially the same purpose are ultimately carried out in very different ways in different divisions. The different process flows are typically the result of multiple siloed systems that have come from years of mergers and acquisitions, with varying levels of automation, multiple organization structures and the continued introduction of new products and channels. Eventually, these overlapping processes can significantly increase costs and complexity, while decreasing flexibility and customer service. These problems are exacerbated by mergers and acquisitions, new products or channels, and multiple lines of business.

IBM Process Models are content-rich process models, representing industry best practices that are enterprise-wide, generic and independent of technology, product, channel or organization structure. Companies can use these templates to document or reengineer existing processes or to deploy new capabilities.

Built and managed in modeling tools such as IBM WebSphere® Business Modeler, and deployed on a process-automation platform such as IBM WebSphere Process Server, the models can help organizations with their SOA process automation projects, which aim to integrate and synchronize business systems and choreograph process activities across the organization.

Service models
Service models enable business and IT to agree upon the scope of services to be developed and deployed within an SOA. There is often a logical set of processes that operate on a common set of data structures. For example, there might be a client-services process (add a customer, update the customer's details, delete a customer) that operates primarily with client data (name, address, date of birth).

IBM provides a set of models that can assist in identifying these business and information services, along with the collaboration that takes place between these services. From these models, a set of SOA services can be defined, built and deployed. These tasks are accomplished by enabling analysts and developers to capture business requirements through use cases, thereby identifying appropriate service definitions that form the entry point into an underlying integration infrastructure.

Examples of how organizations can use them are:

- *Creating common business components for core system-renewal projects.*
- *Providing service definitions that implement the process models.*
- *Enabling the deployment of enterprise-wide information as a service.*

Data models
Data models define the data structures necessary to provide management with analytical reports that contain the business's key performance indicators, and they provide a glossary of terms and concepts that can be clearly understood and communicated by business and IT. IBM Industry Models also deliver prebuilt statutory and regulatory reporting templates to assist in implementing systems that can support the requirements of the U.S. Sarbanes-Oxley Act, Basel II and International Accounting Standards (IAS).

Enabled by this common understanding between the business and IT, project-scoping activities become simpler and the quality of the systems developed is more likely to meet the business's expectations from an information perspective in areas such as data quality and the reporting that is developed.

From an implementation perspective in an SOA, the use of data models assists in achieving semantic interoperability which helps ensure that service consumers and providers exchange data in a consistent, flexible way, regardless of the diverse information involved. For example, a service requestor from a billing application needs the customer balance, which is called BALANCE. Meanwhile, a service provider from an accounting application supplies the customer balance, which is called REMAINDER. Achieving semantic interoperability is to map BALANCE in the billing application to REMAINDER in the accounting application.

Semantic interoperability is an important architectural quality in an SOA because it enables service consumers and providers to exchange information that makes sense, and which then can be acted upon. It is the foundation of an SOA. Without semantics, data is just strings of binary code without any meaning. Without semantic interoperability, service consumers and providers could misinterpret and corrupt data, and ultimately bring undesirable effects to an SOA and the business.

Making SOA information services actionable for people and processes
SOA information services are part of a larger services ecosystem and are consumed by the enterprise though portals, dashboards, process servers and other applications. As has been discussed in this paper, and as illustrated in Figure 5, SOA information-integration services and SOA master data services create significant advantages for organizations with hetergenous data platforms who wish to get a consolidated view of their information.
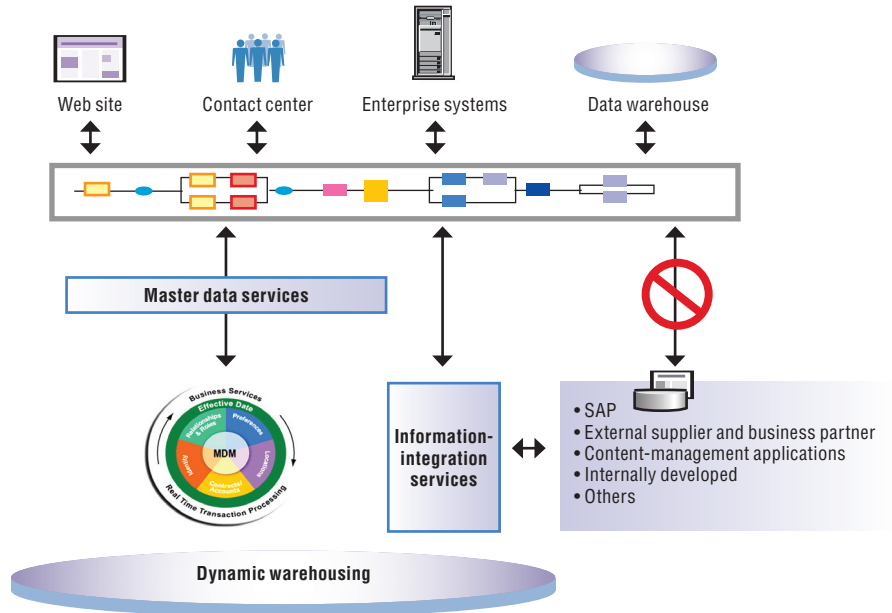

Figure 5. SOA information services are part of a larger picture.

Although projects focused on delivering information as a service can have proven, real business value on their own, it is when these projects are combined with the process and people dimensions that you can realize a multiplier effect.

Figure 6 gives two such examples. On the left side, you can see a master data management example being used to deliver a 360° view of the customer. IBM WebSphere Customer Center maintains the master customer record, using SOA to perform information-integration services as well as delivering SOA business services related to maintaining and querying the master customer record and using IBM WebSphere Portal to provide the user-interactions services. SOA services from WebSphere Customer Center can be built into an automated process that is run by WebSphere Process Server.
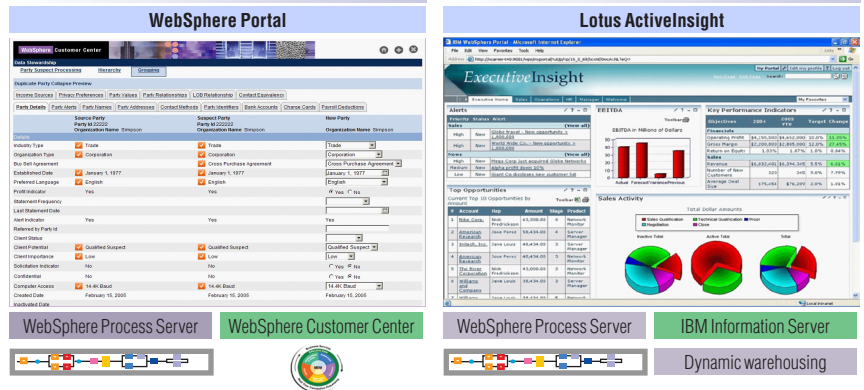
Figure 6. Combining SOA entry points for a multiplier effect

In the example on the right side of Figure 6, IBM Lotus® ActiveInsight™ offers performance dashboards, scorecards and rapid application development (RAD) tools to help organizations gain real-time insight into their operational performance. Together with the IBM dynamic-warehousing portfolio, this solution helps companies create reusable shared Web services for information, helping to ensure better information quality, accessibility and control. This capability makes SOA consumable and usable by assembling these services into flexible, personalized, portal-based composite applications. Dashboards and scorecards can be regularly updated with current data from Web services feeds, enabling users to see the real-time status of their performance metrics at a glance, delivered by SOA information services.

By following the road map of SOA adoption that IBM has developed over the course of many SOA engagements, organizations can rapidly improve their agility and position themselves well to build on this success into the future.

For more information

To learn more about IBM MDM solutions, contact your IBM representative or IBM Business Partner, or visit:

ibm.com/software/data/masterdata/

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