

White Papers

SOA

Service Oriented
Architecture

July 2008

What is SOA

SOA is an approach where functionality of IT systems in an organization is exposed as interoperable services grouped around business processes.

Once the services have been exposed they can be reused and combined into higher level applications..

What business problems does SOA solve

Reducing high costs of implementing new systems or implementing changes in existing systems.

Reducing time necessary for introducing new products on the market or adapting to changes in business environment.

Reuse of existing IT systems for new or modified business processes.
This allows cost and time reduction for introducing new products on the market or for adapting to changes in business environment.

Existing IT systems are tested and mature which ensures good quality of the services they provide.

Possibility of integrating external service providers – including outsources services as a part of higher-level business processes.

What technical advantages does SOA promote

- Flexible architecture which allows creation of systems from building blocks.
- Improved communication between business analysts and development teams.
- Interoperability between different technologies.



Basic SOA concepts

Services are the fundamental concept in SOA. They represent high-level, coarse-grained services as opposed to low-level, fine-grained software components (eg. Java classes). The services are exposed externally, which

means that external systems or application can invoke them to achieve encapsulated functionality.

The services are well defined in terms of their interfaces.

The term service contract is used to describe the clear specification of the service interface. The service contract enables a clear way of establishing common understanding between business analysts and developers teams.

There is a low level of interdependencies between services called loose coupling, which enables flexible possibilities of structuring them. It is possible to replace some service implementation with another provider or to add a new atomic service without a need to add a big set of dependent and complex software.

SOA technologies

XML

XML is a platform and programming language independent format for representing data. Because of these characteristics it is a common choice for integration solutions. XML format defines types and structure of the data elements.

Web Services

Web Services are technology build on XML and HTTP standards which allow remote procedure calls (RPC) or message-style communication independent of the underlying programming language.

Web Services support SOA by:

- providing an open-standard and machine-readable model for creating explicit, implementation-independent descriptions of service interfaces,
- providing communication mechanisms that are location-transparent and interoperable.

Enterprise Service Bus

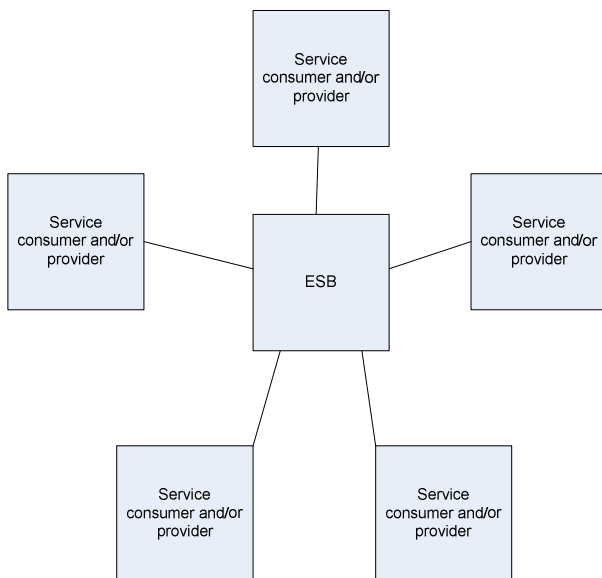
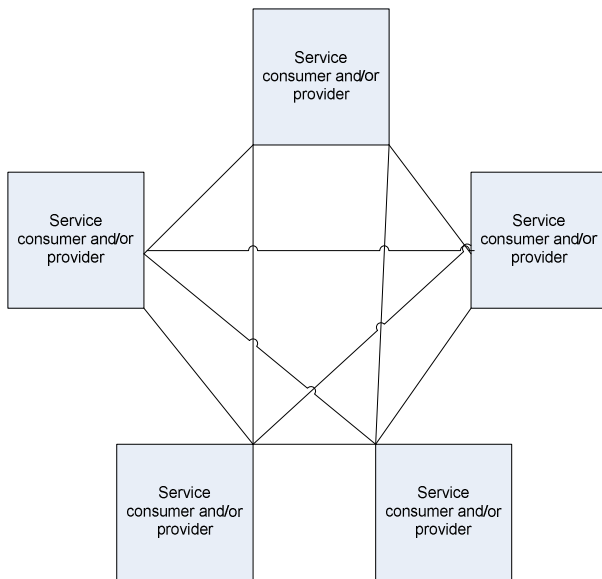
The Enterprise Service Bus (ESB) is a middleware infrastructure component that supports the implementation of SOA within an enterprise.

ESB supports SOA by:

- Decoupling the consumer's view of a service from the actual implementation of the service,
- Decoupling technical aspects of service interactions,
- Integrating and managing services in the enterprise.

ESB provides an infrastructure that removes any direct connection between service consumers and providers. Consumers connect to the bus and not the provider that actually implements the service. Such approach allows limiting the number of connections between these components and as a result the scale of interdependencies within the integrated system.

The following diagram illustrates the approach difference:



This kind of connection is called hub-and-spoke as an opposite to point-to-point connections. In a hub, the distribution rules are separated from applications. The applications connect to the hub and not directly to any other application.

Process Servers

On top of ESB there is possibility of creating a process choreography layer. Such layer provides Business Process Management (BPM) or workflow functionality using the underlying ESB infrastructure for business service execution. BPEL

or alternative business process modeling approach is used to model the business process.

SOA at Insono

Insono has an extensive experience in implementing Enterprise Application Integration solutions.

The following technologies were used in these solutions:

- XML,
- Web Services – Axis, JBoss WebServices, Java EE WebServices on Sun Application Server,
- Custom build integration brokers (hub and spoke approach),
- Custom build workflow support .

Recently we participate in a big and demanding SOA implementation project for a big telco company.

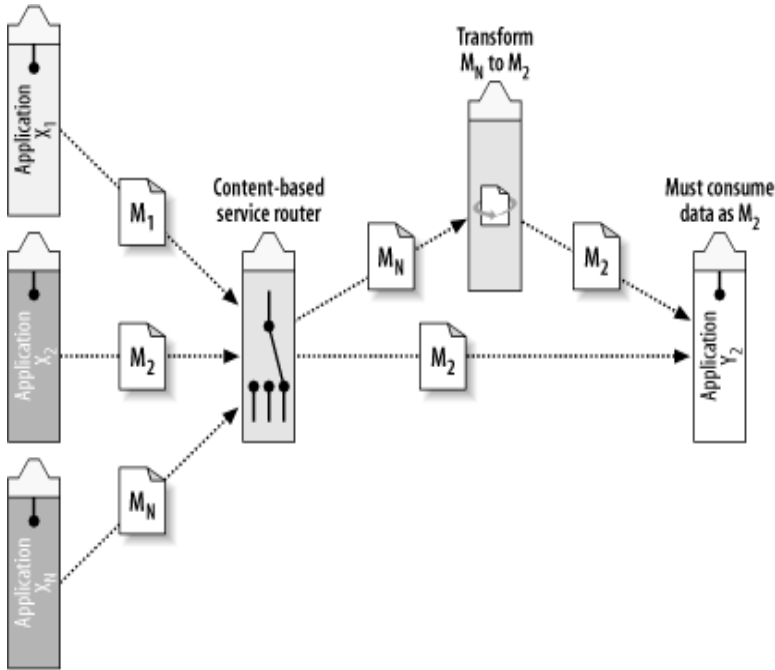
The SOA solution is based on custom build Enterprise Service Bus developed at the customer internally. The Bus is build on IBM Websphere MQ infrastructure. Insono is responsible for delivery of both service providers and service consumers, using the following technologies and solutions:

- Common data format based on complex and flexible XML format,
- Service interfaces (service contracts) defined with XML format,
- Websphere MQ infrastructure,
- Spring JMS for accessing Websphere MQ,
- Axis WebServices for endpoint adapters.

The central part of the bus is a routing component that handles message flow from service consumer to service provider making the system resistant to changes on the network or physical level. For instance, changes in network addresses or machines.



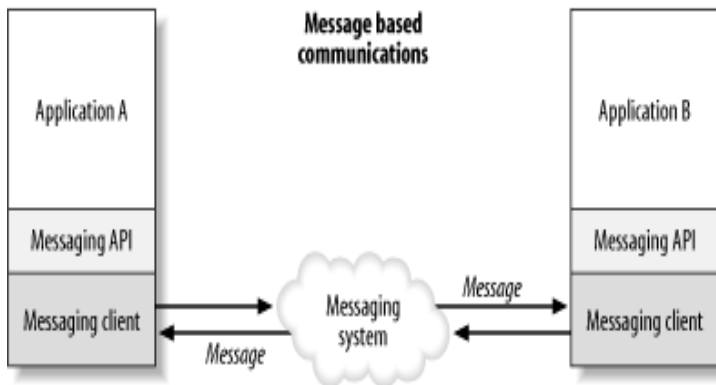
Content-based service routing techniques are used to direct the message flow.



Content-based routing with transformation

The integral part of the Bus solution is a set of common Java libraries for:

- Support of the common data format (normalized message format),
- The messaging layer, to guarantee homogenous use and reduce efforts (compared to individual implementations) .



Message oriented middleware

Messaging applications use a common Java messaging API to communicate with each other through a messaging system.