

# Employing a Semantic Infrastructure for Business Integration Solutions

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## 1. What are we trying to achieve?

Business integration, in my opinion, is not primarily about integrating business applications. It is instead much more about the alignment of the semantics and structure of business concepts, the employment of a common language for discourse on these business topics and the provision of the necessary service infrastructure and governance framework for the consolidation and delivery of business data.

Consider for a moment that, in general, there will be many ways in which business integration architectures can be designed, implemented and deployed. Accepting that *nothing persists like change* a vital criterium in the choice of a business integration solution is how well the business integration architecture accommodates change.

Effective business integration architectures will have the key property that they accommodate change in business requirements and architectural requirements well. Which is to say that they are designed to accommodate *low impedance, low latency*, business integration solutions.

Changes in the business requirements generally result in adaptations of the semantic content of information exchange. Often changes in the parties involved in the exchange of particular messages are required. Well designed business integration architectures will be resistant to such changes.

In the ideal case change in the semantic content of business messages should never have impact on architecture components, business components or parties not directly dependent on the business particular change.

Consider for example, a change in business requirements resulting in an additional attribute participating in a request/response message exchange. Such simple changes in practice often result in a need to perform actions such as:

- deploying new versions of both the requesting and responding components when naively implemented interfaces based on technologies such as SOAP, Corba, RMI, XMLRPC are used
- Adapting XML XSDs for naively designed XML based message exchange formats. Often impacting parties with no need to access the particular attribute added

In addition to the proficient accommodation of change, well designed business integration solutions increase the semantic transparency of all information exchanged within an enterprise by facilitating the exploitation of the semantics of business data to enable serendipity. For example, a semantic description of message payload can be exploited to enable intelligent routing of business information packets on an enterprise service bus.

This page elaborates on the nature and purpose of a semantic infrastructure and how it such an infrastructure facilitates intelligent business integration solutions.

## **2. Purpose of a Semantic Infrastructure**

For the purposes of this note, a semantic infrastructure is employed to achieve:

- Low latency, low impedance business integration solutions
- Serendipitous benefits: such as increased transparency of business performance metrics, Business Activity Monitoring

A semantic infrastructure is to be viewed as a cohesive consolidation the semantics of different business area intended to allow the alignment of semantics between different organisation units within an enterprise. In addition a semantic infrastructure provides the necessary facilities to enable:

- a common language for exchanging business messages
- intelligent routing of data over a service bus
- intelligent model driven data transformation

## **3. What comprises a Semantic Infrastructure?**

Key components of a Semantic Infrastructure are likely to be employed to some degree within your typical corporation. Components mentioned on this page will be:

- An Enterprise Ontology
- A Business Significance Language
- Intelligent Data Delivery Platform
- Intelligent Data Transformation Framework

An elaboration on these components is presented in the following.

## **4. The Enterprise Ontology**

It is the purpose of the Enterprise Ontology to defined metaphysical structure of the enterprise. It represents the infrastructure component in one of the [consolidated business area models](#) of an enterprise. Defining the metaphysical structure of different [business area models](#) is the main reason for the existens of the Enterprise ontology. The Enterprise ontology provides concrete answers to questions like:

- What are the key concepts around which the business is based?
- How are these concept structured relative to each other?
- What variation of these concepts exist from the perspective of different business area models?
- How is the structure business concepts affected by a choosen business perspective?
- What constraints can be applicable to concepts and structures involving them?
- Etc.

In the end an Enterprise ontology will turn out to be a set of multi-perspective Information Models describing areas characteristic of the business. These Information

Models define the semantics of topics of discourse pertinent to the enterprise. Put another way, the topical semantics of all business topics should be captured by information models forming the enterprise ontology. Concrete concepts likely to be defined in your enterprise ontology are:

- Types of parties involved in the business
- Types of products involved in the business
- Types of services in the business
- Types of contracts between parties
- Role of parties involved in the value chain of certain service
- Types of business actions needed in performing business tasks and how these actions are constrained
- etc

## 5. A significance language for your Enterprise

A key component in the realisation of *low latency* and *low impedance* business integration solutions is a well designed business significance language. Such a language is a prime vehicle to be employed in the *information services* architecture of an enterprise.

The enterprise significance language should be the language common to business discourse amongst different business area models. When possible this language should also be used for discourse between services within business area.

The syntax and semantics of a well designed Business Significance language have at least the following properties:

- highly decoupled from and resistant to change in the enterprise ontology
- able to facilitate discourse on all business topics; thus language is free of topical semantics
- unaffected by character encoding, locale issues etc.

An analogy serves well here.

Consider for a moment the English language and a topic of discourse such as Tennis. The claim that the English language can be employed for the purpose of exchanging information about the sport of tennis, tennis tournaments, players and tennis matches etc. will not soon be falsified. Yet, in spite of the fact that eloquent discourse on subjects relating to the sport of tennis is possible using the English language, it is also factual that no properties particular to the topic of tennis will be found when the English language is subjected to detailed analyses. Similarly, it is evident that a particular topic such as tennis does have characteristic semantics which will be called *topical semantics* here.

Thus we distinguish between the semantics of the topics of discourse and the semantics of the language used for discourse. The topics of discourse are described in the *Enterprise Ontology* while the *Significance Language* serves as the language of discourse.

Once it is possible to communicate effectively on different business topics, in a language common to all topics of discourse, the complexity of integrating different business applications becomes significantly less because there is much less, translation, or Extraction, Transformation and Loading, of data required for the timely delivery of business metrics.

## **6. An Intelligent Data Delivery platform for your Enterprise**

An effective business integration solution needs a data delivery platform that allows the semantics of messages to be exploited for routing purposes without compromising the integrity, confidentiality or authenticity of the message payload. The business significance language employed should facilitate the exploitation the semantics defined in the enterprise ontology towards the sustained improvement of the data delivery service.

Key features of an Intelligent Data Delivery Platform would include:

- Semantic description of message payload
- Decoupling data set identification from data location identification
- Intelligent routing based on semantic content and business purpose
- Employment of secure information envelopes based on semantic content, addressee
- Multi-channel data delivery
- Semantic facilities for real-time tracking of enterprise data traveling through Data Delivery network
- etc

## **7. A Data Transformation Framework for your Enterprise**

For different reasons, not all applications and data sources will be able to delivery data with the structure and semantics required by the Enterprise Business Significance Language. Consequently, semantic mappings and transformations will be needed to accomodate communication with these application. Thus, at the periphery of each data delivery chain, data transformation services need to map incoming and outgoing data to and from semantically equivalent data blocks.