BOEM: Business Object oriented Enterprise Modeling

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Abstract. Organizations know that information issues or problems exist, but struggle to find a clear way to get started to effectively manage this asset. Information is a business asset, and must be managed effectively. For supporting organizations towards better management of information, we propose Business Object Modeling (BOM) as a modeling approach. BOM enables companies for information management by identifying, formalizing, and visualizing business concepts, business objects, and the relationships between them in a specific business domain. The result of BOM is a precise conceptual basis which aims at getting a grip on business semantics and data landscape. Recently, we are applying the proposed approach in the banking domain to develop a business object model for Banking Industry Architecture Network (BIAN), which is widely known as a banking standard in the financial sector. BIAN Banking Object Modeling as a part of BIAN Enterprise Architecture is responsible for data management in banking focusing on business concepts, business objects, business terms, and definitions.

Keywords: Business Object Modeling, Enterprise Modeling, Information Management.

1 Introduction

For many organizations, managing information as a business asset still remains an elusive goal. This is because information is much less concrete than all other business assets – such as human resources, capital, plant, and equipment – which in fact can be only managed well through the use of timely and accurate information. Organizations know that information issues or problems exist, but struggle to find a clear way to get started to effectively manage this asset. Envizion, an information strategy and services consultancy, was founded in 2009 with the clear vision that information can and must be more effectively managed, in support of organization's business strategy.

In the Information Age, the organizations with the best data, and who know how to turn it into useful information, will be the most successful. Organizations overloaded with low-quality and inconsistent data which cannot be transformed into actionable information will be at a disadvantage. The organization's goal must be to manage operations, transform data into useful information, and meet compliance requirements, with the right amount of high-quality data.

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Information is a business asset, and must be managed effectively. For supporting organizations towards better management of information, we propose Business Object Modeling (BOM) as an approach for identifying, formalizing and visualizing business concepts, business objects and the relationships between them in a specific context like banking, retail, insurance etc. The result of BOM is a precise conceptual basis which aims at getting a grip on 1) business semantics, and 2) data landscape. Recently, we are applying the proposed approach in the banking domain to develop a business object model for Banking Industry Architecture Network (BIAN), which is widely known as a banking standard in the financial sector. The existing banking data models and standards like ISO20022, IFX, SWIFT are focused more on defining the exchanged messages between APIs. There is a lack of approach to define the core objects in banking like bank products and services, bank agreements and arrangements, banking instructions and transactions and involved party roles in a structural way that can be understood by business people. The advantage of BOM is creating a precise conceptual basis for BIAN for getting a grip on both banking semantics and banking data landscape. In the following, we explain, the way of thinking, modeling patterns and mechanisms including concept model pattern, classification mechanism and content pattern of BOM. Furthermore, we introduce the application of BOM in the banking domain to develop a pure business object model for BIAN.

2 Business Object Modeling: A Way of Thinking

BIAN BOM way of thinking is Object Orientation which is emphasized on concepts and their meaning. Concept means whatever can be thought of. Two key notions of this way of thinking are “Business Concept” and “Business Object”. ***Business Concept*** is a concept that is of importance to the business. ***Business Object*** is a business concept, concrete or abstract, that is (1) meaningful to business and (2) active in a business domain or influences the behaviour of a business system. Each business concept should be defined unambiguously by means of a business definition. Good definitions avoid misunderstandings between involved parties. Each business concept will be referred to by one or more names. The name of a business concept is often called the “business term” that is a representation of a business concept by means of a word or ‘ordered set’ of words.

3 Business Object Modeling: Concept Model Pattern

A ***Concept Model Pattern*** introduces a mechanism to define business concepts in three ways: 1) What is the meaning of a business concept? Every business concept is named by a business term and is accompanied by a business definition; 2) What is the purpose of a business concept? The purpose refers to the classification of concept or the relationship between the concepts or describes some aspect of a concept; 3) Does this term refer to individual concepts or classes or types of concepts?

According to the concept model pattern depicted in Figure 1, we can model every concept by considering four questions: 1) what is the definition of concept? 2) what are the Business Concept Types (classification)? 3) what are the descriptors (e.g., identifiers, life cycle status, other attributes)? and 4) what are the relations with other business concepts?

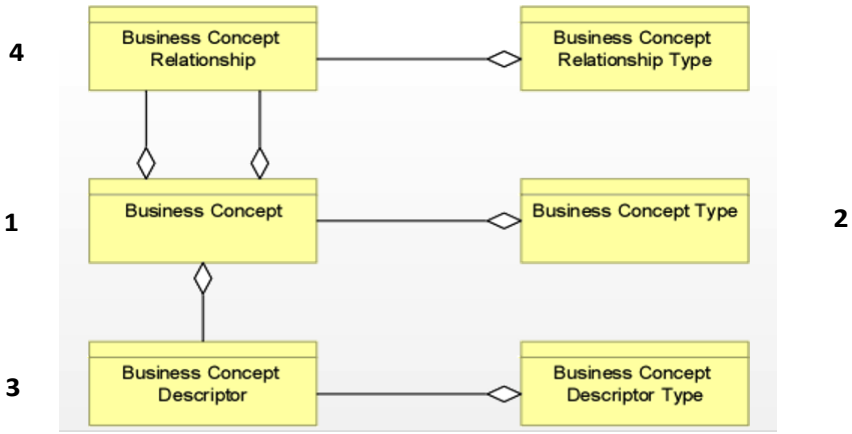

Fig.1. Concept Model Pattern of BOM

4 Business Object Modeling: Classification Mechanism

Classification is a mechanism to order or group business concepts according to specified criteria. Business Concepts can be classified according to multiple viewpoints, because different stakeholders look at Business Concepts differently. These viewpoints may depend on function or profession (for example, finance has a different view on a customer than marketing) or level in the organization (the board of directors will classify company activities differently from a shop worker). From an information architecture perspective, we have two ways of classification: 1) Taxonomical Classification; and 2) Functional Classification.

A *Taxonomical Classification* is a mechanism to classify concepts from the perspective of the nature of the concept. A concept can only be classified to one and only one class of the taxonomical classification. The characteristics that are categorizing the instances of the concepts into a taxonomical class do not change over time. For example, individuals can be classified according to their gender as a "male" or "female". Each instance can only be classified as "male" or "female" but not both. This characteristic will not change over time. The instances belonging to this class all have the same type of characteristic. Indeed, there are characteristics common between the gender, yet there are some which are only typical of a particular gender.

A *Functional Classification* is a mechanism to classify concepts from the perspective of functional interest. Most classifications are from a functional

perspective. For example, an individual can be classified according to its role role in the value chain, e.g. customer or supplier, but can also be classified according to the country of domicile as a "foreigner or a local".

5 Business Object Modeling: Content Pattern

Content Pattern is a mechanism to define business objects in a specific business context or domain. Every business is based on making and fulfilling agreements with customers, suppliers, and authorities. Each agreement is composed of a number of arrangements and conditions where one party (obligor) engages him/herself against another party (obligee) to do or not to do something (the subject of agreement). The fulfilment of one or more arrangements of an agreement can be triggered by giving an instruction to do something. The instruction will be accepted for execution only if the conditions, agreed upon in the agreement, are met. Instructions trigger transactions needed to fulfil the arrangements. When a transaction affects Financial positions, then, according to (international) accounting regulations, all those transactions must be registered as soon as possible in the Financial accounting system. An account entry (booking) must be made on the appropriate account. The content pattern includes five systems to define business objects in a specific business context (Fig.2):

1. **Agreement Management System** is a commitment system which is a basis for other systems. This system manages the promises that a business makes toward its stakeholder and ensures promises can be fulfilled. A commitment system does not in itself fulfill any promises or commitments. It makes certain that it is possible to do. An agreement is a collection of arrangements between parties. Together, they form a balance which these parties commit themselves to achieve. "Commitments" or "promises" are the source of income for a business (Knaepen and Brooms, 2013). Two core notions of a commitment system are:

- **Agreement** is a formal or informal common understanding between two or more (legal competent) parties concerning one or more subject matters expressed in a set of arrangements, terms, and conditions (Legal System). An Agreement can be classified from the perspective of various aspects of interest. One can classify the agreement from the perspective of format type (e.g., verbal agreement, written agreement). Other can classify the same agreement from the perspective of the main subject (e.g., resource agreement, party agreement, product agreement) of agreement yet other may be interested in a classification according to the type of transaction (e.g., purchase agreement, sale agreement, maintenance agreement), or a combination of these (e.g. resource maintenance agreement). These classifications are not mutually exclusive. This means that one and the same agreement can be classified into one or more classifications.
- **Arrangement** is a promise between two or more parties to do or not to do something, to give or not to give something (legal system). An arrangement is atomic. Arrangements can have a strong relationship with each other and are formulated as if it were only one arrangement. In analysis, we must investigate to

find the atomic arrangements. We can classify arrangements based on: (a) subject type: e.g., time arrangement, cost arrangement, tax arrangement; (b) action type: e.g., payment arrangement, transfer arrangement, exchange arrangement, delivery arrangement; and (c) party role type: third party arrangement, internal party arrangement.

2. **Fulfilment Management System** is a delivery system where the commitments made are actually fulfilled. Two core notions of fulfilment management system are:
- **Instruction** is a request to do something. Often instructions are seen as events. This is because mostly the focus is on the act of instructing and not on the content of the request.
- **Transaction** is an Event expressing the fact of an Agreement, contract, exchange, understanding, or transfer of cash or property that occurs between two or more parties and establishes or fulfils arrangements. A transaction is a special type of event. In a business environment, the transaction is called a business transaction. When the transaction has effected a change in asset or liability, this event must be reflected in a financial accounting system of the company.

3. **Bookkeeping System** is responsible for the recording of transactions in the formal way of double entry accounting. Two core notions of bookkeeping system are:
- **Account:** An administrative financial state where the amounts of financial transactions are registered in debit or credit, resulting in a saldo which is the financial position of a financial aspect of the business.
- **Account Entry** means the record of a financial transaction in its appropriate book of account.

4. **Product Management System** maintains products and services that a business can offer to its customers or stakeholders in the form of promises made in an agreement. A product is a good and/or package of services the seller is offering to the market. A service is actually the type of "promise" or "commitment". The real promise or commitment is in the agreement. A service is then realized by a collection of activities needed to fulfil the promise made. Two core notions of product management system are:
- **Product** represents a coherent collection of services and/or passive structure elements, accompanied by a contract/set of agreements, which is offered as a whole to (internal or external) customers (ArchiMate 3.0).
- **Service** represents an explicitly defined exposed business behaviour/ externalized functionality (ArchiMate 3.0). More precise, it means an exposed business behavior that a service provider is able to promise to the counter party. When a service is subject of an agreement this is a service arrangement.

5. **Party Management System** is responsible to define parties and also their roles which they can play in a specific business context. Two core notions of this system are:

- **Party** is an individual or organisation meaningful for the business.
- **Role** is the responsibility or involvement of a party in a specific business context.

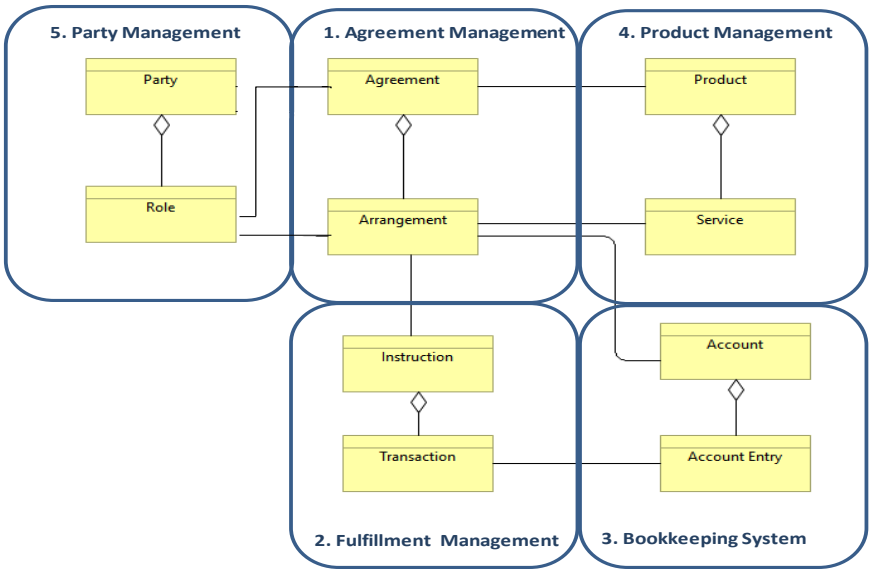

Fig.2. Content Pattern of BOM

6 Related Work: BOM in Banking

We applied BOM as an approach for information management in banking (i.e. KBC bank), retail (i.e., Colruyt) and insurance (KBC Insurance), Flemish Government (FRIS – Flanders Research Information Space). Recently, we are applying the proposed approach in the banking domain to develop a business object model for Banking Industry Architecture Network (BIAN), which is widely known as a banking standard in the financial sector. BIAN is a not-for-profit organization that was created in 2008, to define standards for service-oriented architecture in the banking industry. BIAN's goal is to set global standards and it was formed to address the integration problem. BIAN focuses on application-to-application (A2A) integration rather than business-to-business (B2B) integration (Frankel 2011).

As a result of the financial crisis, the banking industry has seen major changes in regulatory requirements and industry standards, which impose additional demands on data management, analysis, and reporting systems. Many of today's challenges for banking institutions can be addressed by a structured enterprise data management initiative (Capgemini). The existing banking data models and standards like

ISO20022, IFX, SWIFT are focused more on defining the exchanged messages between APIs. These standards as business models or data models couldn't be a pure business object model for banking.

BIAN Banking Object Modeling as a part of BIAN Enterprise Architecture is responsible for data management in banking focusing on business concepts, business objects, business terms and definitions. We have positioned BOM overlapped with both Business Architecture Layer and Information Architecture Layer in BIAN Enterprise Architecture (Fig.3). According to the position of BOM, we define two contributions of BOM: 1) The contribution of BOM in Business Architecture is defining the banking semantics regarding to business concepts; and 2) The contribution of BOM in Information Architecture which aims is getting a grip on banking data landscape.

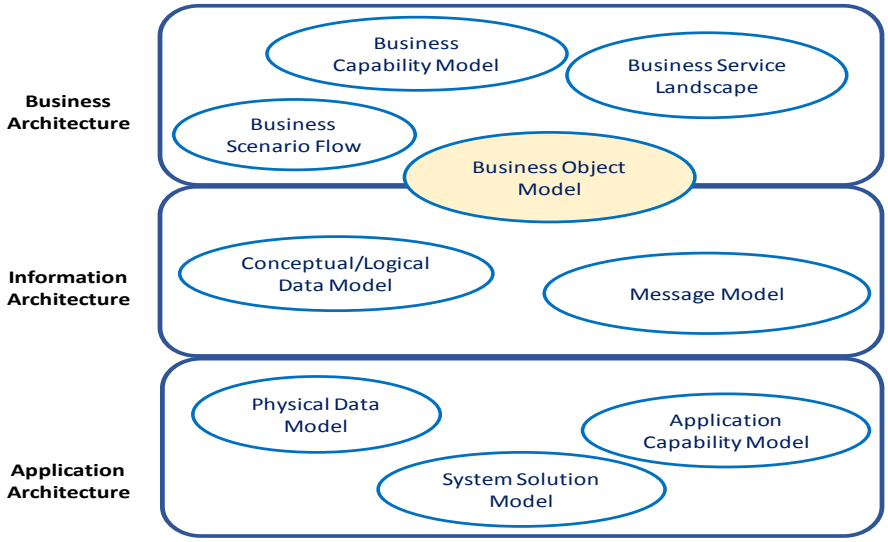

Fig. 3. Positioning BOM in BIAN Enterprise Architecture

The first area of modeling was BIAN Payment Business Domain. Payment is a key business domain in BIAN. This domain consists of six service domains including Current Account, Direct Debit, Payment Order Management, Payment Execution, Position Keeping and Party Data management. We created a business object model as a conceptual basis and foundation for these six service domains in BIAN payment business domain by applying BOM patterns (Fig.4). This business object model supports BIAN in integration with venders' messaging models (e.g., ISO20022, IFX, SWIFT). For example, the role of Current Account as a BIAN Service Domain, in payment business domain, is defined as "orchestrate a consumer checking/demand deposit account with typical range of services and fees". From a business object view, we defined two objects related to the concept of current account: 1) Current Account as product. Current account as a payment account product is a package of payment services like credit transfer service, deposit service, withdraw service, standing order

service, direct debit service and etc. and 2) Current Account as agreement. Current account is an agreement between bank and customer/client which regulates arrangements (e.g., payment service arrangements, pricing arrangements, tax arrangements), terms and conditions (e.g., interest conditions, fees, charges and penalties conditions, currency exchange conditions, cancelation of contract and closing account conditions).

7 Conclusion

In today's competitive marketplace, executive leaders are racing to convert data-driven insights into meaningful results (IBM Institute for Business Value). Data management capability is now the key differentiator to creating value for businesses. We introduce Business Object Modeling (BOM) as a modeling approach and initiative to support organizations to achieve data management capability. Data Management is ability to address data standardization, centralization, architecture, extracting, transformation, movement, storage, integration and governance. In this paper, the BOM has been introduced as a way of modeling for better management of data as a business asset. We defined two fundamental patterns for Business Object Modeling as Concept Model Pattern and Content Pattern. The combination of these two patterns at the highest abstraction level allows to model all administrative organizations.

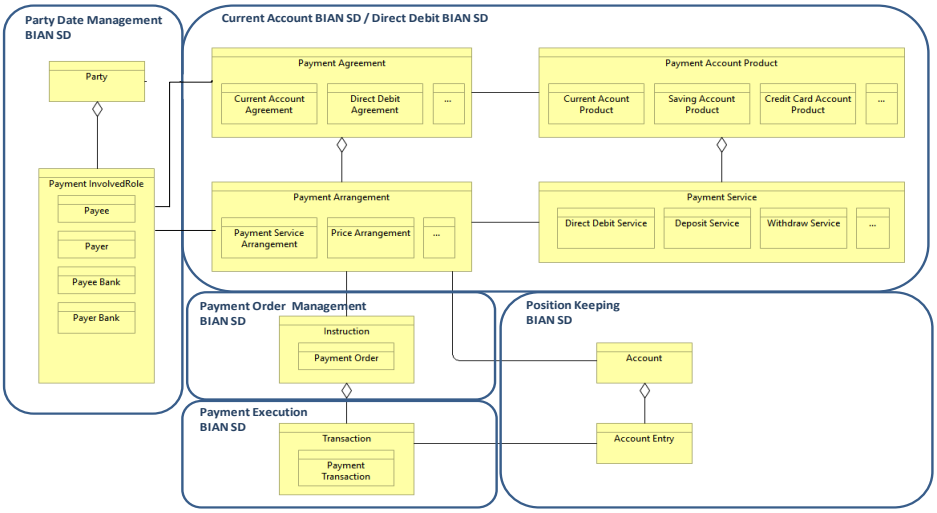

Fig. 4. Applying BOM in BIAN Payment Business Domain

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